Chapter 9: Resource Considerations

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9. Resource Considerations

Chapter 9 provides Colorado Department of Transportation's (CDOT) preferences on how resources should be presented in the required chapters of National Environmental Policy Act of 1969 (NEPA) documents. **Chapters 4, 5,** and **6** discuss specific format and level of detail. The CDOT project team should decide which resources discussed in this chapter should be included in the NEPA document. The level of detail for each resource should be commensurate with the importance of the resource and the potential it has to affect the decision-making process for alternative decisions.

Each resource section in this chapter is subdivided into the following elements:

- **Evaluation Process** – Identifies who is responsible for evaluating a particular resource, what to evaluate, and where it should be considered (i.e., defines the study area for the project being proposed, and when they should evaluate it). Reasons for evaluating the resource under NEPA (e.g., the "why"), how to collect and evaluate baseline information under NEPA and any other issues to consider are discussed.
- **NEPA Document Sections** – Identifies what should be included in the Affected Environment and Environmental Consequences chapter of a NEPA document for the resource, including mitigation measures. Additionally, within each resource section, cross-references are made as appropriate to other parts of this Manual where additional detail on these aspects of NEPA can be found.

Other information that should be discussed for resources includes study area boundaries and mitigation and monitoring commitments. More information is provided below.

Study Area Boundaries

The study area for stationary physical resources such as geology and soils may be the same as the project footprint because impacts to the resource will occur only where it is disturbed.

The study area for stationary biological resources such as vegetation may be slightly larger than the project footprint because emissions or effluents from project activities may indirectly impact vegetation.

The study area for mobile resources may be larger and shaped differently from the project footprint. For example, the water resources study area may extend to the edge of the watershed(s) that contain the project footprint; wildlife study areas may vary by species and extend to the boundary of species' home ranges, which can be as large as several states; or there may be multiple geographic extents for air quality analyses such as for hotspot, inventory, or regional haze.

A "project area" or "project footprint" typically includes the area that will be directly impacted by the project. A "study area" includes the limits for resource analysis. A "project vicinity" may include a larger area surrounding the "study area." Be sure to define terminology in NEPA documents.

Mitigation and Monitoring Commitments

Mitigation measures and monitoring commitments for impacted resources should be identified in CDOT's *Mitigation Tracking Spreadsheet* (**Table 9-1**), which is a tool to track mitigation and monitoring commitments identified during the NEPA process. The tracking spreadsheet is to confirm that the environmental commitments identified and documented during NEPA are fulfilled during project construction. The *Mitigation Tracking Spreadsheet* is required for Environmental Impact Statements (EISs), Environmental Assessments (EAs), and documented/non-programmatic Categorical Exclusions (CatExs). It is recommended for programmatic CatExs, but it is not required.

Mitigation and monitoring commitments are specific and include information about responsibility, monitoring, performance standards, and schedules for implementation. When developing mitigation and monitoring commitments, be sure to include design, construction, and maintenance staff to ensure that commitments are implementable. Mitigation commitments and criteria, should be developed using Colorado's SMART model:

- **Specific (S)** – To the environment that would be adversely affected and what is going to be accomplished.
- **Measurable (M)** – Criteria for providing mitigation for impacts to community and built resources, in coordination with communities and regulatory agencies.
- **Attainable (A)** – Mitigation strategies that are technically practical and within standard engineering principles.
- **Realistic (R)** – Applicability to the community and regulatory agencies, as well as financially feasible.
- **Time-oriented (T)** – Provide realistic milestones for implementation tied to the transportation delivery process through design, construction, and maintenance.

SMART criteria represent a tool for developing effective NEPA mitigation commitments that are financially feasible and implementable. The first six columns of the *Mitigation Tracking Spreadsheet* (**Table 9-1**) should be filled out and included as the *Summary of Impacts and Mitigation Table* in (**Table 9-2**).

Refer to CDOT's *Mitigation Tracking Spreadsheet* online.
For additional information, refer to Colorado's SMART model.

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all resources with identified impacts. It will be added into the full *Mitigation Tracking Spreadsheet* (**Table 9-1**), which will follow the project through the design, construction, and maintenance phases.

Timing of Mitigation

During the NEPA process, avoidance, minimization, and mitigation measures are developed to address project impacts. These considerations may need special attention when a project is to be constructed in more than one phase. When establishing a project phasing approach, impact avoidance and minimization may need to be re-examined to ensure that these can still be achieved with the anticipated phasing. If any new impacts will be introduced by the phasing or interim conditions, such impacts may require additional mitigation measures.

Mitigation measures should generally be implemented in the same construction phase as the impacts will occur, or earlier. In some cases, it may be appropriate to include specific mitigation in an earlier phase or to bundle mitigation for impacts in multiple phases into one phase.

Mitigation should generally not be delayed to later phases. However, there may be some situations where this is appropriate when the impacts in the interim will not be severe and cost and/or disruption of implementing the mitigation would be substantially greater in the earlier phase. Any delay in mitigation to a later phase will be carefully considered by CDOT and FHWA, and should be described in the NEPA document, as appropriate.

CDOT and FHWA will ensure that the mitigation commitments outlined in the NEPA document are implemented as part of the project design, construction, and post-construction monitoring. Identified commitments must be incorporated, as appropriate, into the construction plans and specifications for the project. CDOT and FHWA will ensure that the commitments are implemented by reviewing the project construction plans and specifications, as well as conducting periodic inspections during construction. Inspections during construction could involve both a review of project construction documentation and an observation of construction activities. The CDOT *Mitigation Tracking Spreadsheet* will be used to track and document mitigation for each phase.

For projects with mitigation implemented over time, CDOT and FHWA may monitor mitigation effectiveness and success by using a combination of field reviews, pre-construction and post-construction inspections, and post-construction monitoring, as appropriate. For projects with extensive mitigation, CDOT may elect to prepare annual reports reporting effectiveness of the mitigation measures, by agreement with some resource agencies. If mitigation is determined unsuccessful or mitigation commitments are not met, CDOT will rectify as needed.

Reasons for Evaluation Under NEPA

NEPA and its implementing regulations (40 CFR 1500) mandate that transportation decisions involving a Federal nexus or Federal funds adhere to the NEPA regulations. NEPA requires that Federal agencies use a systematic, interdisciplinary approach to decision-making when Federal actions may affect the quality of the human environment. In addition, CDOT strives to meet the intent and requirements of NEPA for state transportation activities, regardless of whether or not these activities are federally funded.

Table 9-1. CDOT Mitigation Tracking Spreadsheet with Example Text

Mitigation Commitment #	Mitigation Category	Impact from NEPA Document	Commitment from Mitigation Table in Source Document Use Exact Wording from Table in Source Document	Responsible Branch	Timing/Phase of Construction Mitigation to be Constructed	Location of Mitigation(s) in Plan Sheets/Specs Include All Page Numbers that Apply	Date Mitigation Completed	Name of Person Completing Mitigation	Agency Coordination Required? Yes or No	Name of Each Agency	Comments
1	Migratory Birds/Migratory Bird Treaty Act (MBTA)	Loss of migratory bird habitat and nests	Pre-construction survey required if construction occurs during migratory bird nesting and breeding season to identify migratory bird activity and/or nests	CDOT Region X Environmental	Design and Construction	Sheet #17	8/1/2014	Jon Smith	Yes	N/A	

Table 9-2. Summary of Impacts and Mitigation Table for NEPA Documents with Example Text

#	Mitigation Category	Impact	Mitigation Commitment from Source Document	Responsible Branch	Timing/Phase that Mitigation will be Implemented
1	Migratory Birds/Migratory Bird Treaty Act (MBTA)	Loss of migratory bird habitat and nests	Pre-construction survey required if construction occurs during migratory bird nesting and breeding season to identify migratory bird activity and/or nests	For example, Design Engineer, Construction Engineer, Environmental (Region/EPB), Utilities Staff, ROW Staff, ROW Staff, Maintenance	For example, Design, Construction, ROW, Post-Construction, Maintenance

9.1 Geospatial Data

Geographic information systems (GIS) manage, analyze, and share spatial and temporal data for projects and organizations. GIS tools, whether desktop-, web-, or field-based, have become an essential component of environmental analyses. GIS datasets are widely available from various Federal, state, regional, and local sources and can be used for many analyses throughout the NEPA process. GIS software is commonly used as a tool to convert datasets to-and-from MicroStation, CDOT's design software platform, and to convert information between coordinate systems. The ability of GIS to assign database information to spatial locations is essential for performing overlay analyses. For example, a GIS user can determine the area of impact to property parcels from a proposed right-of-way (ROW) footprint through overlay processes in GIS. GIS software can display data based on database attribute information, allowing fast update of maps. Basic uses of GIS in the NEPA process (for transportation) include:

- **Data Management** – The most common use of GIS is as a system of records. It stores layers of environmental and design information, along with associated metadata; that is, documentation of layer contents, how the layers were created, and how they were used for a project.
- **Data Analysis** – The most powerful use of GIS is as a system of insights. Geoprocessing tools are used to create, modify, analyze, and visualize spatial and temporal data. It allows for a better understanding of sites and promotes better decision-making.
- **Data Sharing** – The most important use of GIS is as a system of engagement. GIS is commonly used to share spatial data and insights among CDOT, consultants, other agencies, and the public. Common methods of sharing include open data catalogs, interactive web applications and story maps, electronic files (shapefiles and KMZ files), and graphics. Geodatabases and shapefiles are shared electronically for CDOT partners to perform similar NEPA functions facilitating authorization, approval processes, and general communications about transportation projects.
- **Environmental Screening** – Spatial datasets are overlayed with proposed footprints of a project to better understand potential effects and constraints the project will have on environmental resources. Aerial imagery, Google Earth and Maps, and Google StreetView are commonly used for desktop surveys before project initiation or field surveys.
- **Field Surveys** – GIS applications are used on mobile devices or handheld GPS units to complete field data collection efforts such as mapping wetlands or surveying cultural resources. The applications are mainly map-based or form-based, such as ArcGIS Field Maps or ArcGIS Survey123, respectively. The mobile device location can be used or it can be paired via Bluetooth with a high-accuracy global navigation satellite systems (GNSS) receiver for increased location accuracy.
- **Map Production** – GIS is used to create web-based interactive maps, static pdf maps and hardcopy maps for public displays and published documents.
- **Evaluation of Environmental Impacts** – GIS is used to calculate quantities for environmental impacts (for example, area of wetland impacts, volumes of material removed, numbers of historic properties, etc.).
- **Simulating Environmental Impacts** – GIS is used to provide realistic, three dimensional "before and after" simulations and modeling of environmental impacts of a given project

that support decision-making. Simulations can be enhanced using other programs such as Photoshop or Lumen.

- **Measurements** – GIS is used to provide basic tools for measuring areas, distances, and volumes in addition to more complex measures, such as change detection through time.
- **Community Engagement** – Web or hard copy maps enhance public meetings, small group meetings, open houses, conferences, workshops, and websites by conveying complex information on graphic displays. GIS can also be set up as a stand-alone interactive display for meeting participants to review and comment on proposed plans.

During early project development, the following types of data used in GIS also aid in environmental clearances:

- Baseline information, including parcels, addresses, buildings, jurisdictions, land ownership, land use and zoning, topography, aerial imagery, utilities, and easements
- Resource information, including vegetation, ecological communities, wetlands, streams, roofprints, cultural resources and surveys, geologic hazards, soils, parks, trails, and viewsheds.
- Project design scenarios and alternatives

Field survey results are often used with baseline data for environmental analysis, disclosure, and electronic data deliverables. Resources such as wetlands and cultural resources require spatial data deliverables for project clearances. Field survey results are also used for regulatory coordination, including:

- Section 404 pre-construction notifications (PCNs)
- Endangered species assessments
- Biological assessments
- Section 4(f) coordination with Officials with Jurisdiction (OWJ)
- Section 6(f) agreements
- Section 106 State Historic Preservation Officer (SHPO) consultation-site reports
- Section 4(f) with FHWA, and Federal Emergency Management Agency (FEMA) flood impacts

CDOT uses ESRI's ArcGIS software as their primary GIS platform. CDOT has developed online GIS applications that provide useful spatial datasets and information for projects, including:

- **CDOT Open Data Catalog** – This is CDOT's open data website. Data can be viewed on the web or downloaded. Data categories include planning, environmental, boundaries, and more. It can be accessed at: https://data-cdot.opendata.arcgis.com/
- **OTIS (Online Transportation Information System)** – Provides users with spatial and non-spatial highway attribute information including geometrics, traffic counts, and pavement information through a collection of multiple tools and applications. The MapView interactive tool displays environmental and other layers. Highway statistics, traffic reports, geographic data, and maps are also available for download. Straight Line Diagrams for highway segments can be generated. Video logs of all CDOT highways can be viewed in the Windshield application. OTIS can be accessed at: http://dtdapps.coloradodot.info/otis

- **C-Plan** – CDOT's organizational site within the ArcGIS Online web GIS platform and a companion to OTIS. It contains a growing collection of web maps and applications covering various CDOT business areas such as Environmental, Maintenance, and Planning. Contact the GIS Support Unit to request an account to access internal content and to contribute project data. C-Plan can be accessed at: http://cdot.maps.arcgis.com/
- **Project Locator application (ProLo)** – Allows users to find detailed information about Statewide Long Range Transportation Planning (SWLRTP) corridors and Statewide Transportation Improvement Program (STIP) projects throughout Colorado. The tool can be accessed at: http://dtdapps.coloradodot.info/projectlocator/

CDOT's GIS Support Unit is located at Headquarters and access to information frequently used for transportation planning and project development, including current and projected traffic volumes, state highway attributes, summary roadway statistics, and geographic data, can be obtained here:
http://dtdapps.coloradodot.info/otis

CDOT staff use ArcGIS Pro and ArcMap Desktop applications for more advanced analysis and cartography. The GIS Section in the Division of Transportation Development (DTD) maintains geodatabases and imagery available for Region and Headquarters users. Within DTD's GIS Section, the GIS Support Unit can assist with data connections. For ArcGIS installation, contact the OIT Help Desk.

The following provide additional functional guidance to the primary CDOT GIS tools:

- **OTIS** – Intended for a broad range of users to access GIS maps and functions through a web browser, it does not require a software installation. Many OTIS applications are based on CDOT's linear referencing system (LRS), which allows highway and traffic attributes to be queried and tables exported. The general-purpose mapping application, MapView, allows limited queries and basic map making.
- **C-Plan** – Intended for a broad range of users to access GIS maps and functions through a web browser, it does not require a software installation. C-Plan specializes in maps and apps for targeted uses. It allows users to make their own web maps or add to existing maps with their own data, CDOT corporate data, or other organizations that have published data through ArcGIS Online.
- **ArcGIS Desktop** – Intended for users who want the most powerful spatial analysis and cartographic functions. Data can be best designed, edited, and maintained in this system. Consequently, the learning curve is steeper. Custom data connections can be made to a user's own data, CDOT corporate data, and other organizations' data. It requires a software installation by the OIT Help Desk. CDOT corporate data connections can be made through the GIS Support Unit.

CDOT maintains its spatial data assets in Universal Transverse Mercator (UTM) projection, Zone 13. Commonly, corridor projects will use survey coordinate systems, created by modifying existing coordinate systems available in GIS. Where possible, survey control diagrams should be requested to allow GIS professionals to convert environmental and design layers between survey coordinates and standard GIS projections. This will help ensure the spatial accuracy of datasets and allow design and environmental professionals to integrate the data into their respective analyses. This information should be documented and referenced in metadata for layers in survey coordinates.

Project managers should manage their data in logical folder and geodatabase structures on their computers and within their units. Communication with the DTD GIS Section and other CDOT Regions is essential for data coordination and data sharing. In some instances, it will be most advantageous for staff across the agency to have GIS data stored in DTD's corporate enterprise geodatabases to provide the best data sharing opportunity. To the extent possible, CDOT's standards for geospatial data and metadata comply with the U.S. Federal Geographic Data Committee standards for quality, content, and transfer. CDOT's Corridor GIS Data Delivery Guidelines are to be referenced and used on all CDOT projects.

GIS servers host resources, such as feature layers, web maps, and aerial imagery, allowing layers to be accessed in a web browser without being downloaded locally. These services can be useful in providing the most up-to-date information available from the data creator.

In general, a reliable way to find services is to use a search engine with the agency name and "open data" in the search. Website and GIS server links change occasionally. However, helpful GIS servers include:

- **FEMA National Flood Hazard Layer Web Map Service** – Provides access to the National Flood Hazard Layer, which includes floodplain limits, letter of map revision (LOMR) locations, and floodplain cross sections. The web map service can be accessed by adding an ArcGIS server connection to: https://www.fema.gov/flood-maps/national-flood-hazard-layer
- **U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory Web Map Service** – Supplies access to linear and polygon wetland data for the U.S. and its territories, as well as riparian mapping, where available. The web map service can be accessed by establishing a connection to the ArcGIS web map server at: http://www.fws.gov/wetlands/Data/Web-Map-Services.html
- **Denver Regional Council of Governments (DRCOG) Web Map Service** – Provides a multitude of transportation and environmental resource data, including current year municipal boundaries. The web map service can be accessed by establishing a connection to: http://drcog.org/services-and-resources/data-maps-and-modeling
- **Colorado Parks and Wildlife (CPW) ArcGIS Online Services** – Displays data of species habitat (species activity mapping [SAM]), movement areas, critical range, riparian mapping, potential fen and wetland areas, biodiversity data, Colorado Trail Explorer (COTREX) trails and trailheads, and various other environmental data layers. Services can be accessed by establishing a connection at: http://www.arcgis.com/home/search.html?q=colorado%20parks%20and%20wildlife&t=groups&focus=groups
- **Natural Resources Conservation Service (NRCS) Web Map Service** – Allows access to NRCS soil mapping for the U.S., where available. The service can be accessed by establishing a connection to: http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
- **Curated List of Federal, State, and County ArcGIS Servers** – An open-source list of ArcGIS servers that is regularly maintained. It is an online PDF with background information and links to more than 3,000 ArcGIS servers. It can be accessed at: https://mappingsupport.com/p/surf_gis/list-federal-state-county-city-GIS-servers.pdf

- **Colorado Department of Public Health and Environment – Water Quality Control Division Services** – Provides data for Section 303(d), Total Maximum Daily Load (TMDL), and other water quality standards. Services can be accessed by establishing a connection at: https://www.colorado.gov/pacific/cdphe/clean-water-gis-maps

CDOT's enterprise license agreement with ESRI includes online training and occasional classroom training on GIS skills. The User Group SharePoint site has a Training page; also contact the GIS Support Unit for more information.

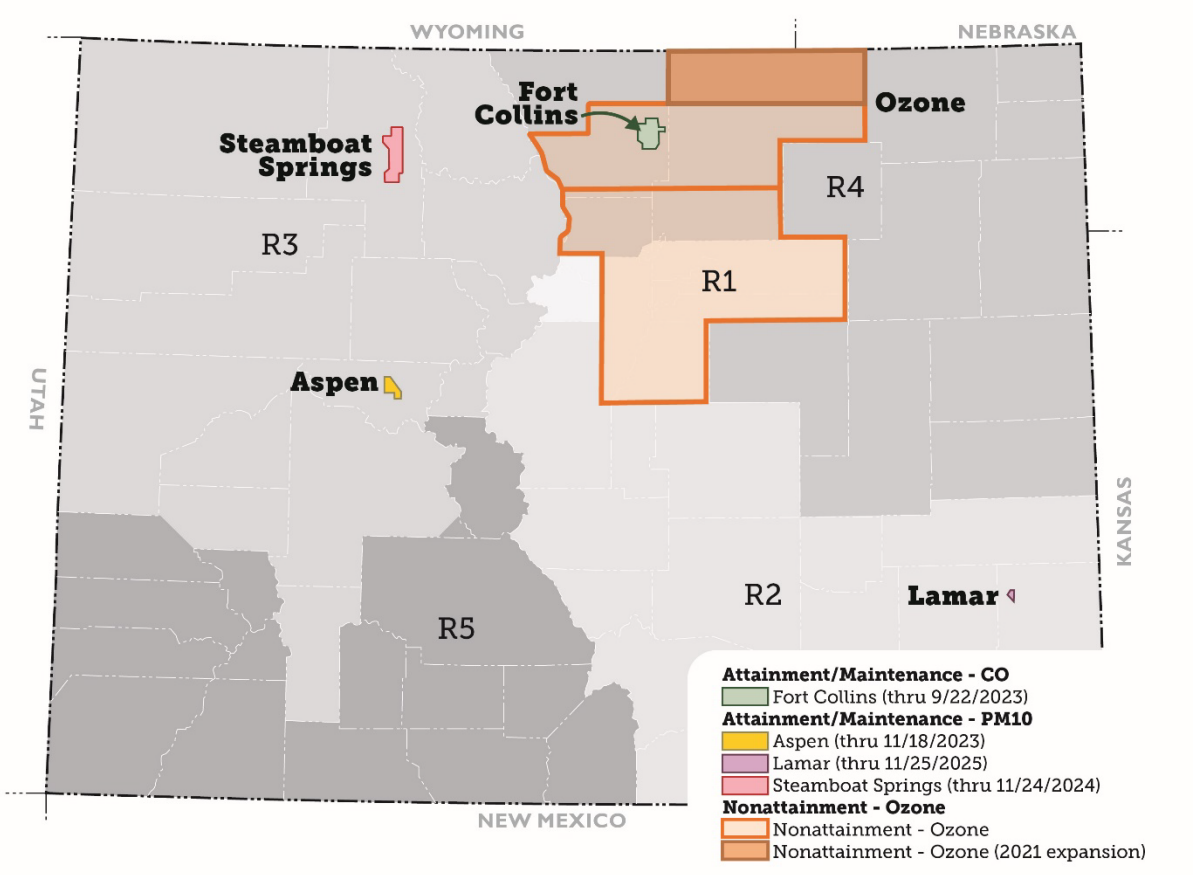
9.2 Air Quality

Air quality evaluations address emissions of air pollutants that can be harmful from transportation systems. Emissions may be from tailpipes and other vehicle-related sources.

Air quality is primarily regulated under the 1970 Clean Air Act (Title 42 United States Code Chapter 85) and amendments from 1977 and 1990 (collectively the CAA). The purpose of the CAA is to protect and enhance air quality to promote public health, welfare, and productive capacity of the nation.

The CAA addresses several criteria air pollutants through National Ambient Air Quality Standards (NAAQS). The NAAQS pollutants are carbon monoxide, particulate matter, ozone, lead, nitrogen dioxide, and sulfur dioxide. The U.S. Environmental Protection Agency (EPA) designates areas that do not meet one of the NAAQS as nonattainment areas for that pollutant. EPA may redesignate nonattainment areas where air quality has improved to meet the NAAQS as maintenance areas. Currently, Colorado has a nonattainment area for ozone and several maintenance areas for carbon monoxide and/or particulate matter less than 10 microns in diameter (PM_{10}) (**Figure 9-1**).

Figure 9-1. Colorado NAAQS Nonattainment and Maintenance Areas



Transportation projects in nonattainment and maintenance areas are evaluated for air quality under the CAA through what is known as the Conformity Rule. The Conformity Rule requires demonstration that pollutant concentrations near the project will meet the NAAQS.

Other CAA air pollutants include hazardous air pollutants (HAPs), a subset of HAPs known as mobile source air toxics (MSATs), and greenhouse gases (GHGs). NAAQS are not established for these pollutants.

Colorado established requirements for air quality and GHG analysis with the adoption of Colorado Revised Statute (CRS) § 43-1-128. The requirements are in addition to existing CAA and NEPA requirements for air quality and do not substitute for them.

Senate Bill 21-260 (SB21-260), signed by Governor Polis June 17, 2021, is primarily a transportation funding bill. However, air quality modeling, monitoring, and mitigation requirements were included in Section 30, which have been codified in CRS 43-1-128, Parts 4-5. CDOT consulted with the Colorado Attorney General's (AG) Office to clarify the requirements in Parts 4 5 to determine which projects these requirements apply to. CDOT received guidance from the AG that CRS 43-1-128 Part 4 shall be implemented as follows:

- Part 4a and 4c apply to all RS/TC projects in the 10-Year Plan which received a Record of Decision (ROD), Finding of No Significant Impact (FONSI), or Categorical Exclusion (CatEx) as provided by NEPA on or after July 1, 2022. This also applies to RODs and FONSIs that require a revision after July 1, 2022, but not to projects that just needed a reevaluation because reevaluations only determine if the NEPA decision document conclusion is still valid.
- Part 4b requires monitoring “during construction” and applies to all RS/TC projects under active construction, regardless of the NEPA documents decision date.

The term RS/TC project was interpreted for use with SB21-260 in the Regionally Significant and Transportation Capacity Interpretation and Examples for CDOT Projects memo dated August 31, 2022. Each 10-Year Plan project will need to be evaluated to determine if it meets the definition of an RS/TC project.

Projects may also need to evaluate air quality as a resource under NEPA, which applies to projects throughout Colorado. NEPA requires disclosure and reasonable mitigation.

CDOT has prepared detailed guidance on evaluation and documentation of air quality in the *Air Quality Project-Level Analysis Guidance* (AQ-PLAG) document (CDOT, 2019a). The instructions in the AQ-PLAG have primacy over **Section 9.2**, which is intended to summarize in simpler terms the treatment of air quality for CDOT’s NEPA projects. **Subsection 9.2.1** discusses the process for evaluating air quality. **Subsection 9.2.2** discusses air quality information that should be included in each NEPA document.

When the 2019 AQ-PLAG was issued, Colorado had one ozone nonattainment area, five carbon monoxide maintenance areas, and seven PM_{10} maintenance areas.[1] The ozone nonattainment area[2] encompassed parts of Larimer and Weld counties, as well as the following counties: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson. The carbon monoxide and PM_{10} maintenance area boundaries were smaller than the ozone nonattainment area and did not match county borders. The areas[3] are shown on **Figure 9-1**. Upon reaching the 20-year mark, transportation conformity is no longer expected to apply[4] in the area for that pollutant, but NEPA still applies.[5]

Access CDOT's *Air Quality Project-Level Analysis Guidance* and the instructions for more information.

9.2.1 Air Quality Evaluation Process

Air quality evaluations for CDOT and CDOT-administered projects must be performed by qualified practitioners, as defined in the AQ-PLAG.

Reasons for Evaluation of Air Quality Under NEPA

CDOT conducts air quality evaluations for its projects for multiple reasons, including:

- To fulfill requirements of the CAA and the Conformity Rule
- To fulfill NEPA requirements
- To comply with CRS 43-1-128 and the preceding Colorado SB21-260
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

Applicable regulations and guidance for air quality resource evaluations are presented in the AQ-PLAG.

[1] EPA maintains a complete, current listing of nonattainment and maintenance areas designations on its website. This listing is referred to as the Green Book, which is available at https://www.epa.gov/green-book
[2] EPA's designation for the 2008 8-hour ozone NAAQS found in 40 CFR 81.306 identifies the ozone nonattainment area as "Denver-Boulder-Greeley-Fort Collins-Loveland." However, the EPA's designation for the 2015 8-hour ozone NAAQS found in 40 CFR 81.306 identifies the ozone nonattainment area as "Denver Metro/North Front Range." Because both the 2008 and 2015 8-hour ozone NAAQS nonattainment areas include the identical geographic boundary, and both NAAQS apply, it is acceptable to use either name. However, the more commonly used name is "Denver Metro/North Front Range."
[3] Full legal descriptions of the boundaries are available at 40 CFR 81.306.
[4] EPA determines when transportation conformity no longer applies to a specific maintenance area.
[5] It is anticipated that this guidance will be updated when maintenance periods start to end. It should not be assumed that requirements will end at the same time that the maintenance period ends.

Conditional Exemption for Small Project in Advance of Regionally Significant Transportation Capacity (RS/TC) Projects in the 10 Year Plan

Colorado SB21-260, Section 30 requires that CDOT "minimize the adverse environmental and health impacts of planned transportation capacity projects and address inequitable distribution of burdens of such projects." (Colorado General Assembly, 2021). In some instances, small, early-action projects take place in advance of a larger Regionally Significant Transportation Capacity Project (RS/TC) in the 10-Year Plan which are not, in of themselves, projects that would cause the impacts attributed to the larger project that makes it regionally significant. Examples include utility relocations, vegetation removal, structure or asset demolition, preservation or replacement, and other maintenance work. These projects by themselves do not qualify as a RS/TC Project, nor are they anticipated to have the air quality impact. When small project actions like these do not "cause adverse environmental impacts...which fall most heavily on communities adjacent to projects," (Colorado General Assembly, 2021) as described in Section 30, Part 1, CDOT interprets this to mean that these small early action projects would not be required to expend state funds to comply with Part 4 until the larger elements with impacts of the RS/TC project are planned for construction.

CDOT Region Planning and Environmental Managers (RPEMs), with the assistance of the Environmental Programs Branch (EPB), will analyze these small early action phases on a case-by-case basis to document the scope of work, proximity of sensitive receptors and probability of impacts, as well as timing of these early action phases with the larger regionally significant phase of the project to make sure there is a true separation of construction activities in time and space. When it can be demonstrated that a small phase will not have an air quality impact relative to Part 4 on the surrounding communities, CDOT believes it is appropriate for this early action activity to be exempt from Part 4 which will benefit CDOT and the public by expediting project schedules and reducing project costs where no air quality impact is expected. Each early action project under review must be approved by a CDOT Air Quality Specialist and documented via a memo in the project file as a record of compliance with this legislation. The larger RS/TC project shall still be expected to meet the full requirements of Section 4.

Air Quality Analysis

All CDOT projects are evaluated at the project level. However, the analysis and documentation required varies in content and in level of detail based on project size, geographic location, and anticipated impacts. Guidance on specifics is presented in the AQ-PLAG, although the 2019 AQ-PLAG preceded CRS 43-1-128 requirements. Therefore, CDOT encourages early coordination with the EPB Air Quality and Greenhouse Gas Specialists to determine air quality and GHG requirements for projects that may meet the definitions of a RS/TC project. Project level analysis guidance for CRS 43-1-128 is located in the most recent draft of the "Interim Guidance for Project Level Compliance of CRS 43-1-128 (National Environmental Policy Act [NEPA] and Construction)" memo.

Typically, three aspects of a project are key in determining the nature and scope of an air quality analysis:

- Is any part of the project in a nonattainment or maintenance area?
- Is the project a CatEx, an EA, or an EIS?
- Is the project a RS/TC project (as interpreted by CDOT in the memo dated August 31, 2022)? https://www.codot.gov/programs/environmental/greenhousegas/regionally-significant-and-transportation-capacity-definition-final-08312204172023.pdf

The specifics of the air quality analysis are determined through project scoping. Generally, the analysis may include any, all, or none of these elements:

- Project scoping and coordination
- Regional conformity analysis
- Carbon monoxide project-level conformity analysis
- Particulate matter project-level conformity analysis
- Ozone project-level conformity documentation
- NEPA criteria pollutant project-level analysis
- MSAT analysis
- GHG analysis
- Construction emissions analysis
- Cumulative and indirect effects evaluations
- Pre-construction monitoring

The scope of analysis may range from a simple clearance letter to a complex, multi-pollutant examination of a challenging EIS project. The AQ-PLAG has scoping information and the requirements for air quality technical reports.

Is a project within a nonattainment or maintenance area exempt from conformity determination?

Projects Requiring Determination:

- Projects funded and/or approved by FHWA or Federal Transit Administration (FTA) and located in a nonattainment or maintenance area
- Regionally Significant projects (as determined by the Metropolitan Planning Organization [MPO])

Exempt Projects:

- State and locally funded projects (unless consultation determines project is not exempt)
- Located in an attainment area
- Categorically exempt under 40 CFR 93.126 (unless there are potentially adverse emissions impacts as determined by consultation)

9.2.2 NEPA Document Sections

Chapter 14 of the AQ-PLAG describes the content and presentation of air quality requirements for CDOT NEPA documents. When an air quality technical report has been prepared for a project, relevant information is summarized in the NEPA document.

A project is considered "cleared" when any necessary analyses have been completed, accepted by the EPB and/or Regional Air Quality Specialist, and documented. If a final air quality technical report is required, it must be reviewed and accepted by the EPB and/or Regional Air Quality Specialist. All comments submitted during these reviews must be resolved before the report can be finalized.

A CatEx is documented via CDOT's Form 128, which contains only high-level information related to air quality and does not require much narrative to be developed. The air quality technical report is attached to Form 128, when applicable. A CatEx requires a clearance letter from the EPB and/or Regional Air Quality Specialist.

For EAs, EISs and RS/TC Projects, narrative summarizing the air quality technical report must be developed. As described in the AQ-PLAG, the air quality narrative should include the following elements, as applicable to the project.

CDOT proposed definitions for "Regionally Significant" and "Transportation Capacity" in a 2022 memo that can be accessed here: https://www.codot.gov/programs/environmental/greenhousegas/regionally-significant-and-transportation-capacity-definition-final-08312204172023.pdf

Affected Environment

Describe the air quality status of the project area, including the general project setting, regional NAAQS status, and identification of any nonattainment or maintenance areas. Describe applicable regulatory requirements, identify analyses performed, describe applicable Regional Transportation Plans and Transportation Improvement Programs, and describe interagency consultations.

Environmental Consequences

Compare air quality effects of each alternative and each of the following, as applicable to the project:

- Carbon monoxide conformity determination
- PM_{10} conformity determination
- Ozone conformity determination
- NEPA criteria pollutant analysis
- MSAT analysis
- GHG analysis
- Construction emissions analysis
- Cumulative and indirect effects evaluation

Reference the conformity concurrence letter, when applicable.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for air quality.

In addition, RS/TC projects in CDOT's 10-Year Plan must create a project-specific plan that addresses CRS Part 4(b) and 4(c) requirements. This includes a particulate matter construction plan that covers monitoring, reports to the public, and public alerts; an action plan to mitigate air quality impacts on communities, which should also include or refer to the Fugitive Dust Control Plan, if required by APCD. The Air Quality Construction Plan must be based on CDOT's plan template and must be approved by the CDOT Project Manager and CDOT Air Quality Specialist.

Colorado Revised Statute § 43-1-128

Colorado established additional requirements for air quality and GHG analysis with the adoption of Colorado Revised Statute (CRS) § 43-1-128. The requirements are in addition to existing CAA and NEPA requirements for air quality and do not substitute for them.

As of June 15, 2023, CDOT has neither updated the AQ-PLAG to offer guidance on CRS § 43-1-128 requirements nor established a guidance document for project level GHG analysis. Interim guidance will be posted on CDOT's website when it is available.

9.3 Greenhouse Gas

GHGs are a class of pollutants that contribute to global warming and climate change. Transportation-sector GHGs include primarily carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N2O), and hydrofluorocarbons. Each of these pollutants has a different global warming potential, e.g., one ton of CH_4 is equivalent to 25 tons of CO_2 because it has a global warming potential 25 times greater than CO_2 (based on the 100-year global warming potential). Further, CO_2 accounts for 96 percent of transportation GHG emissions in the United States. Thus, all transportation-sector GHGs are often measured together as carbon dioxide equivalent (CO_2e), standardizing the warming effects of each gas relative to the most prevalent anthropogenic GHG, CO_2.

GHG emissions resulting from transportation projects have three sources: operational, construction, and maintenance emissions. In 2018 on-road transport typically accounted for nearly 80 percent of transportation operational emissions in the U.S., including both passenger and freight travel (NCHRP, no date). Off-road transport accounts for the other 20 percent, including aviation, rail, and shipping. Thus, operational emissions from CDOT projects are those emissions that typically result from added or avoided vehicle travel on the transportation network, while construction emissions from projects result from the operation of construction equipment, worker travel, materials transport and carbon embodied materials. Maintenance emissions are those that result from fuels used to maintain transportation facilities, such as snow removal, vegetation management, and other routine maintenance practices.

9.3.1 GHG Emissions Evaluation Process

Qualified practitioners must perform GHG evaluations for CDOT and CDOT-administered projects, as defined in the Greenhouse Gas Project-Level Analysis Guidance (GHG-PLAG) although the 2019 AQ-PLAG does not include the requirements for CRS 43-1-128. Therefore, CDOT encourages early coordination with the EPB Air Quality and Greenhouse Gas Specialists to determine air quality and GHG requirements for projects that may meet the definitions of a RS/TC project. Project level analysis guidance is also located in the most recent draft of the "Interim Guidance for Project Level

Compliance of CRS 43-1-128 (National Environmental Policy Act [NEPA] and Construction)" memo and should be referenced until the 2019 AQ-PLAG is updated.

Reasons for Evaluation of GHGs Under NEPA

On January 9, 2023, the Council on Environmental Quality (CEQ) issued guidance around the evaluation of GHG impacts for transportation projects. In recognition of the increasing urgency of the climate crisis, CEQ issued this update to its 2016 NEPA Guidance on Consideration of Greenhouse Gas Emissions and Climate Change as effective immediately. The newly updated guidance recommends Federal agencies to quantify a proposed action's reasonably foreseeable direct and indirect GHG emissions and monetize the social cost of those GHG emissions. The guidance also states that NEPA reviews should consider the ways that a changing climate may impact the proposed action.

Additionally, Colorado has established requirements around the analysis of GHG emissions from transportation projects. Colorado House Bill 19-1261 (Climate Action to Reduce Pollution) established statewide GHG pollution reduction targets to reduce 2025 emissions 26 percent, 2030 emissions 50 percent, and 2050 emissions 90 percent compared to 2005 emission levels.[6] To orchestrate a comprehensive, economy-wide plan to reach these reductions, the Governor directed state agencies to develop the *Colorado Greenhouse Gas Pollution Reduction Roadmap* (Roadmap). The Roadmap determined transportation to be the single largest source of GHG pollution in Colorado. It also identified several strategies to reduce GHGs from the transportation sector, including the addition of GHG pollution standards in regional and statewide transportation plans to reduce operational GHG emissions associated with light duty vehicles. In June 2021, the adoption of CRS § 43-1-128 (also referred to as SB21-260) turned the recommendations from the Roadmap into a requirement. Notably, these requirements apply only to RS/TC projects in CDOT's 10 Year Plan. CDOT's interpretation of a "Regionally Significant Transportation Capacity Project," as well as examples of projects exempt from these requirements, is provided on the following website: https://www.codot.gov/programs/environmental/greenhousegas

In December 2021, the Transportation Commission voted to approve the GHG Pollution Reduction Planning Standard, meeting the requirements of CRS 43-1-128 Section 3. Under this standard, CDOT and the state's five Metropolitan Planning Organizations (MPOs) are required to achieve individually set GHG reduction levels at four time periods: 2025, 2030, 2040, and 2050. To determine compliance with these reduction levels, agencies must model their existing transportation networks and all future RS/TC projects in their transportation planning documents using travel demand models and EPA's Motor Vehicle Emission Simulator (MOVES). Overall, the standard encourages CDOT and the MPOs to develop long range transportation plans that support travel choices that reduce GHG emissions.

Further, CRS 43-1-128 Section 4(a) says that planned RS/TC Projects must "(u)se Environmental Protection Agency Approved Models to determine air pollutant emissions for the planned project…." A RS/TC project in the approved 10 Year Plan is already included in a comprehensive GHG analysis as part of the requirements for the GHG Pollution Reduction Planning Standard. However, this analysis does not preclude additional GHG impacts analysis and mitigations at the project level as

[6] The reduction levels in GHG Pollution Reduction Standard includes these same years, with an additional level in 2040.

part of the NEPA process. CDOT is preparing detailed guidance on evaluation and documentation of GHG emissions and mitigation in a GHG-PLAG.

CDOT conducts GHG emissions analysis for its projects for multiple reasons, including:

- To fulfill the requirements under CEQ-2022-0005
- To fulfill the additional requirements of CRS 43-1-128 Section 4(a)
- To comply with CDOTs Air Quality Policy Directive 1901.0 and the associated Air Quality Action Plan
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

GHG Analysis

The following aspects of a project are key in determining the nature and scope of a GHG analysis:

- A CatEx – Generally, requires no analysis
- A RS/TC project in CDOT's 10 Year Plan, an EA, or an EIS

Generally, the analysis will look at CO_2, CH_4, and N_2O emissions in the study area and include these elements:

- Operational emissions from on-road vehicles
- Construction emissions, including machinery and materials
- Maintenance emissions
- Application of the social cost of GHG to the metric tons of CO_2e

As per the CEQ guidance, consideration of both direct and indirect emissions is required from proposed actions and their reasonable alternatives for EAs and EISs.

Table 9-3. Indirect and Direct Emissions

Indirect Emissions	Direct Emissions
▪ Embodied carbon of upstream materials ▪ Upstream transportation emissions associated with fuel used to transport materials	▪ Operational or on-road ▪ Emissions from running construction equipment ▪ Maintenance

For all RS/TC, EA, and EIS projects, quantification of emissions in the baseline, proposed action, no action scenario, and any alternatives should include operational, construction, and maintenance CO_2, CH_4, and N_2O emissions in the study area.

9.3.2 NEPA Document Section

The GHG-PLAG describes the content and presentation of GHG requirements for CDOT NEPA documents. All projects that undergo a GHG emissions analysis should include the following elements, as applicable to the project.

Affected Environment

At a minimum, the Affected Environment chapter should:

- Include the standard language as found in the GHG-PLAG, which describes the global character of GHGs and their impact on climate change, along with the climate effects that are affecting Colorado.
- Describe the existing regulatory context as it relates to Federal, state, and local GHG and climate policies in the project area, particularly those related to transportation emissions.
- Describe the project location briefly and in general terms from the perspective of factors that affect transportation GHG emissions, including development density, traffic operations, multimodal options, and existing or planned zero emission vehicle (ZEV) infrastructure. Use relevant information from the air quality, noise, land use, transportation resources, and economic resources section but do not duplicate all of the information. The GHG-PLAG provides examples to give a general template for this discussion.
- For RS/TC, EA, and EIS projects, establish a baseline for considering the environmental effects of the proposed action by quantifying the current operational and maintenance (if applicable) GHG emissions in the project area without the proposed action. These emissions should be broken out by metric tons of CO_2, CH_4, and N_2O and then aggregated as CO_2e.

Environmental Consequences

Compare the GHG effects of each alternative to the baseline, proposed action, and no action alternative for all RS/TC, EA, and EIS projects. Each NEPA document will generate five GHG effects tables:

- **Tables 1-3**: Operational, construction, and maintenance emissions should be reported in separate tables for the applicable horizon year. These tables should report individual CO_2, CH_4, and N_2O emissions, and then aggregated as CO_2e. These tables should quantify both gross CO_2e emissions and net CO_2e emission increases or decreases, as compared to the no action scenario.
- **Table 4** should display total emissions in the applicable horizon year (operational, construction, and maintenance combined) to understand how total project GHG emissions compare, reporting on both gross emissions and net emission increases and decreases as compared to the No Action Alternative. Table 4 should also report the expected vehicle miles traveled (VMT) for the horizon year.
- **Table 5** should report the cumulative emissions over the project's lifetime, reporting gross CO_2, CH_4, and N_2O emissions and net changes, and aggregated as CO2e. Table 5 should also report the SC GHG to the aggregate CO2e.[7] Project sponsors should use a discount rate of 2.5 percent, as per the requirements of SB21-260, and reference the latest Federal technical guidance on the social cost of carbon, which can be found on CDOT's GHG Program website.

[7] The SC-GHG estimates provide an aggregated monetary measure in U.S. dollars of the future stream of damages associated with an incremental metric ton of emissions and associated physical damages (e.g., temperature increase, sea-level rise, infrastructure damage, human health effects) in a particular year.

CDOT's **GHG Program and guidelines** can be accessed here:
https://www.codot.gov/programs/environmental/greenhousegas

Calculating Operational, Construction, and Maintenance Emissions

Operational, or on-road vehicle emissions, should be calculated for the project horizon year using EPA MOVES modeling runs. Further detail and instruction for this process can be found in the GHG-PLAG. To report cumulative operational emissions over the project's lifetime, work with CDOT staff to use the most recent VMT/ZEV curves from the most applicable traffic demand model.

Construction and maintenance emissions should be calculated using the latest version of FHWA's Infrastructure Carbon Estimator (ICE) or an equivalent, as well as the emissions generated by the proposed action and any alternatives.[8] Total project construction and maintenance emissions should be reported in separate summary tables. The construction table should report the annualized construction emissions for each alternative over the project's lifetime. The maintenance emissions should provide gross emission and net increases, or reductions as compared to the no action maintenance scenario.

Applicable technical guidance for conducting GHG evaluations for construction, maintenance, and operational emissions will be presented in the GHG-PLAG. The MOVES model analysis for individual projects is evolving and the GHG-PLAG will be updated accordingly.

In addition, the 2023 CEQ guidance states that, where relevant, agencies should identify the alternative with the lowest net GHG emissions or the greatest net climate benefits.

Table 9-4. Table 1, Operational Emission Reporting Example

Greenhouse Gas	Baseline (Year)	No Action Alternative	Proposed Action Gross Emissions (Year)	Proposed Action Net Change vs No Action (Year)	Alternative 1 Gross Emissions (Year)	Alternative 1 Net Change vs No Action (Year)
CO_2 (MT)						
CH_4 (MT)						
NOx (MT)						
Total CO_2e (MT)						

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT EIS and EA documents and any RS/TC Projects in the 10-year Plan.

[8] https://www.dot.state.mn.us/sustainability/ghg-analysis.html

When considering mitigating a project's effects on VMT, GHGs, and other air pollutants, project sponsors should document any planned or existing activities that increase travel choices that are less GHG intensive (such as less carbon-intensive fuels), lowering VMT (such as multimodal actions), or carbon sequestering activities as project-related elements that could lower GHG emissions. For examples of GHG mitigations, please refer to Appendix A in Policy Directive 1610, which includes a list of GHG mitigation measures that have been reviewed, vetted, and scored by CDOT subject matter experts and formally approved by the Transportation Commission. However, this list is not exhaustive, and other GHG mitigation measures can be proposed at any time.

CDOT's **GHG Mitigation Measures** can be accessed here:
pd-1610-0-greenhouse-gas-mitigation-measures-june2022.pdf (codot.gov)

It is likely that these project elements that reduce GHGs are interconnected with other programs, and those interactions can be described. For all CDOT EIS and EA documents and any RS/TC Projects in the 10-Year Plan, the NEPA document shall:

- **Comply with Procedural Directive (PD 1602.1):** Elevating Bicycle and Pedestrian Opportunities in Colorado asks project sponsors to evaluate all projects for bicycle and pedestrian opportunities. The development of new or improved bike/ped facilities can lower GHG emissions resulting from a project.
- **Comply with Procedural Directive 1601.1:** Requests for Interchange Access and Modifications to Existing Interchanges on the State Highway System requires a Transportation Demand Management (TDM) scorecard and a project-specific TDM plan.
- **Review relevant multimodal, transit, vehicle electrification, land use, Intelligent Transportation System (ITS) plans, and similar TDM plans**. Consider incorporating project components that will reduce VMT or GHGs emissions, regardless of a project's impacts.
- **Coordinate with the appropriate CDOT or MPO agency** to determine if there are programmatic funds allocated in the GHG Compliance Plan that can be used to implement GHG reductions on a project or mitigations can be found in the State Bike Plan or the State Transit Vision Documents.
- **Review documents** such as Complete Streets, Safe Routes to School, TDM, Congestion, Mitigation and Air Quality (CMAQ) or similar planning documents which would further reduce GHG emissions should be also accounted for in the GHG NEPA analysis.

Public involvement should also be used to gather comments from communities to identify community preferences for GHG reduction measures. This will help direct the allocation of project funds to measures which will be best suited for the surrounding communities and, therefore, provide the most cost-effective mitigations.

All projects shall also consider the use of construction mitigations, where practicable. This includes but is not limited to the following:

- Anti-idling requirements and enforcement
- Clean (retrofitted) equipment requirements, including solar powered equipment
- Maintaining equipment
- Efficient trips (TDM program) and onsite storage of materials

- Native planting to enhance carbon sequestration
- Project specifications and pay items that require inspections and enforcement of air quality standards

Non-RS/TC Projects in the 10-Year Plan or projects with CatEx level NEPA documentation shall be required to consider the incorporation of operational and construction mitigations, where practicable. There is an expectation, based on the goals of the Environmental Stewardship Guide (CDOT, 2017a), PD 1901 and the associated Air Quality Action Plan, that projects should incorporate measures to further address GHG reductions by considering additional GHG mitigations as project elements.

Other Issues to Consider

Environmental Justice Considerations

The burdens, risks, and hazards driven by climate change disproportionately impact communities of color and low-income populations. The NEPA process calls for identifying potential environmental justice-related issues and meaningfully engaging with communities that proposed actions and reasonable alternatives (as well as the No Action alternative) may affect. Guidance for this process is found in **Section 9.16** of this NEPA Manual. While following the guidance and requirements within that section, project sponsors should engage such communities early in the scoping and project planning process to understand any unique climate-related risks and concerns as part of the NEPA review.

Considering the Effects of Climate Change on a Proposed Action

The interim 2023 CEQ guidance recommends agencies consider climate change effects on the environment and on proposed actions in assessing vulnerabilities and resilience to the effects of climate change.

- **Affected Environment** – In considering the effects of climate change on a proposed action, the agency should describe the environment for the proposed action based on the best available climate change reports. The temporal bounds for the description of the affected environment are determined by the projected initiation of implementation and the expected life of the proposed action and its effects. Agencies should use the language in the GHG-PLAG that describes the anticipated changes to Colorado's climate and environment, including an increase in extreme heat, precipitation, and wildfire events.
- **Effects** – The analysis of climate change effects should focus on those aspects of the human environment that are impacted by the agency's potential action and climate change, or how climate change can make a resource, ecosystem, human community, or structure more vulnerable to many types of effects and lessen its resilience to other environmental effects. Practitioners should reference and consult the practices and programs conducted as part of CDOT's Resilience Program, as discussed in Chapter 3 of the CDOT NEPA Manual. For example, heatwaves and more extreme temperatures will affect the integrity and maintenance of Colorado's roadways and bridges, and extreme participation events will affect culvert capacity and functionality. Resilience measures may include alternative designs or materials, increased culvert sizing, avoiding riparian corridors where feasible, and more.

9.4 Geologic Resources, Soils, and Geohazards

Geologic features include outcrops, unique rock formations, and potential mining and energy resources. Mineral ores, petroleum, natural gas, sand, and gravel are resources related to geologic features. Impacts to geologic and soil resources from transportation projects must be assessed, as well as impacts from these resources on the project. To the extent possible, CDOT projects are designed to avoid areas containing unique geologic features and to blend into the landscape. This is to ensure the sustainability and stability of the project, as well as the preservation of these features for their value to society. Geologic features that may impact the project include formations that are unstable or erode easily, extreme topography, areas of former or active underground mining, and faults or areas of seismic activity. Soil resources include soil types and mining resources such as sand and gravel. Soil features that may affect the project include soil erodibility and permeability. Typical geohazards in Colorado include landslides, rockfalls, mudslides (debris flows), swelling soils, mine subsidence, collapsible soils, avalanches, earthquakes, flooding, and erosion.

The following subsections provide guidance on the treatment of geologic resources, soils, and geohazards for CDOT's NEPA projects. The first section discusses the process for evaluating geology and soil. The second section discusses geology and soil information that should be in each NEPA document.

CDOT's **Soils & Geotechnical Program and Geohazards Program** are located at 4670 Holly Street. Additional information can be obtained at:

https://www.codot.gov/business/designsupport/materials-and-geotechnical/programs/geotech

and https://www.codot.gov/business/designsupport/materials-and-geotechnical/programs/geohaz

The **Colorado Geologic Survey** is the geologic resource for all of Colorado:

http://coloradogeologicalsurvey.org/

Additional information is also available from the **USGS Geologic Hazards Science Center**:

https://www.usgs.gov/centers/geohazards

9.4.1 Geologic Resources, Soils, and Geohazards Evaluation Process

The CDOT Project or Geotechnical Engineer initiates the evaluation of the geology, soils, and geohazards in a proposed project area. Geologic resources, soils, and geohazards should be evaluated at all locations where the project will disturb them, including cut-and-fill locations and construction staging areas. These resources should be evaluated early in design and again at approximately the 30 percent design phase.

Reasons for Evaluation of Geologic Resources/Soils/ Geohazards Under NEPA

CDOT evaluates geologic resources, soils, and geohazards to:

- Ensure that geologic resources, soils, and geohazards are identified and that their natural and economic values, as well as their visual resources, are protected
- Identify potential negative impacts that the geologic resources, soils, and geohazards could have on the project if not identified and included in the design
- Comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

No state or Federal laws apply specifically to geologic resources, soils, and geohazards, although some local agencies may have restrictions regarding building on certain types of soils, such as expanding soils.

Collection and Evaluation of Baseline Information

The baseline information for geologic resources is provided in the Foundation Investigation Report, and the baseline information for soils is provided in the preliminary soil survey and Pavement Design Report. The Foundation Investigative Report and Pavement Design Report are prepared at approximately the 30 percent design phase and may not be available at the NEPA phase of a project. If the Foundation Investigation Report, preliminary soil survey, and Pavement Design Report are not available during the NEPA process, a Geologic Resources, Soils, and Geohazards technical memorandum may be prepared or the information may be presented in the NEPA document. Other information sources that describe geologic and soil resources include:

- NRCS soil survey reports
- U.S. Geologic Survey (USGS) or Colorado Geologic Survey reports of geologic investigations
- Geotechnical reports prepared for the project
- Assessments of mineral and energy resources

Baseline information that is necessary for conducting the impact assessment is shown in the following textbox. This information should be used to evaluate both the potential impacts of the project on the geologic resources, soils, and geohazards and the potential impacts of the geologic resources, soils, and geohazards on project features.

Baseline Geologic/Soil Information to Include in NEPA Documents

- Extreme topography
- Unique geologic features
- Engineering properties of soil and geologic formations (e.g., expanding or erodible soils, slope stability, rockfall activity)
- Faults and seismic activity
- Resources that result from the geology/soils in the project area, for example, minerals (coal), energy (petroleum or natural gas), sand and gravel, and so on.
- Snow avalanche potential
- Potential visual/aesthetic values of geologic features can be acknowledged in the Geologic/Soil Resources Affected Environment discussion, but the related impacts should be addressed in the Visual Resources discussion.

Whenever possible, project features will be moved or altered to avoid adverse impacts to geologic resources, soils, and geohazards or to avoid adverse impacts from these resources on project features. If project features cannot be moved, CDOT will attempt to modify the project features or modify the project design to account for geologic resources, soils, and geohazards that may impact the project. The Foundation Investigation Report or Pavement Design Report may discuss required mitigation measures.

Other Issues to Consider

Construction of a transportation project does not require any permits related to the geologic resources, soils, and geohazards nor are any consultations with other state or Federal agencies necessary. CDOT's Geotechnical & Soils Program and Geohazards Program should be contacted during scoping to discuss resources, known conditions, and mitigation strategies.

9.4.2 NEPA Document Sections

The content of the sections on geologic resources, soils, and geohazards in the Affected Environment and Environmental Consequences chapter is discussed below.

Affected Environment

The Affected Environment chapter of the NEPA document describes the existing conditions and uses of the geologic resources, soils, and geohazards within the project area. A discussion of the following should be included as necessary:

- A general description of the physical setting of the project area, such as topography and geomorphology
- A graphic identifying geohazards locations and/or using a geologic column to help emphasize any recent seismic activity, major outcrops, and surface or important strata
- A general statement regarding the soil types and thicknesses, hydrologic soil types, and permeability, with a focus on geologic or soil units relevant to the project
- A description of how and where these geologic resources, soils, and geohazards interface with project features, using one or more maps to illustrate the project features and the attributes of interest
- A discussion and description of any unique features present (such as Garden of the Gods in Colorado Springs), cross-referenced to **Section 9.24** (**Visual Resources**)

The level of detail in this discussion should be consistent with the extent of anticipated impacts to or from the geologic resources, soils, and geohazards. If project alternatives will not affect any geologic resources, soils, and geohazards, the document should clearly state this; no additional discussion of geologic resources, soils, and geohazards is required.

Environmental Consequences

In this chapter, describe how the proposed road construction or other project features may impact or be affected by the geologic resources, soils, and geohazards described in the NEPA document. Examples of potential impacts to geologic resources, soils, and geohazards include:

- Places where unique outcrops may have to be re-graded and will no longer provide the same view of geologic strata
- Areas containing sand and gravel deposits that will not have mining capability once the road is constructed

Geohazards could also impact the project. This information can be illustrated easily on maps that show an impact where features such as expansive soils, unstable geologic formations, old mine tunnels/features, and/or seismically active areas overlap with proposed project features. Examples of such impacts include:

- Unstable slopes that may adversely affect proposed project features, such as road design and alignment (such as landslides, rockfalls, mudslides [e.g., debris flows], and avalanches)
- Old mine tunnels and features that could collapse because of the project

Include tables showing the engineering properties of soils in the project area and their appropriateness for the various types of construction planned for the project. This information typically is included in a technical memorandum attached to the NEPA document.

After evaluating where the project may affect geologic resources, soils, and geohazards or where the geologic resources, soils, and geohazards may impact project features for each alternative, discuss the types of mitigation measures available to alleviate these potential impacts. Examples of mitigation measures include moving a project feature to avoid expansive soils or redesigning the roadbed in an area to account for the expansive soils. Visual quality mitigation methods might include using various methods of blasting rock so that drill marks are not left visible or creating planting pockets for landscaping to provide a visual (and possibly even a safety-enhancing) screen in front of exposed rock surfaces. Review the Field Inspection Review (FIR) or Pavement Design Report for mitigation measures identified during project design, if available. The NEPA document should include the information shown previously in the sidebar, as appropriate.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for geologic resources.

9.5 Water Quality

Water Quality and Floodplains technical reports can be combined into a single report or technical memorandum, as appropriate, and in consultation with the CDOT RPEM.

Evaluation of water quality includes consideration of surface water, groundwater, climate, topography, geology, land use and beneficial uses as defined by the Water Quality Control Commission (WQCC). Because these components are complex and interrelated, their assessment is best accomplished by evaluation on a watershed scale. Although floodplains and wetlands are also considered water resources, CDOT has chosen to discuss these important resources in separate sections in this NEPA Manual. Floodplains are discussed in **Section 9.6**, and wetland resources are discussed in **Section 9.7**.

Transportation projects can impact water resources used for drinking, recreation, agriculture, and wildlife habitat. These impacts can occur during both the construction and maintenance/operation phases.

This section discusses how and why CDOT evaluates water quality as part of NEPA projects and outlines information that should be included in the Affected Environment, Environmental Consequences, and Mitigation sections of NEPA documents.

9.5.1 Water Quality Evaluation Process

The CDOT RPEM, in consultation with the Project Engineer, initiates the evaluation of water resources. Depending on the project, the RPEM may conduct the water resource evaluation in-house or contract with a consultant to prepare the evaluation. CDOT evaluates water quality impacts for the proposed alternative, including the No Action Alternative.

CDOT's Permanent Water Quality (PWQ) Program suggests including information about non-MS4 NEPA reviews to protect water quality. The earlier a Region or a project team is aware of the requirements for water quality, the more time efficient and cost effective the eventual project will be.

The water resources evaluation should begin shortly after project scoping to identify sensitive surface water, groundwater, and/or drinking water supplies. It is important to include CDOT maintenance personnel in the evaluation early on to accurately disclose effects from maintenance practices; identify existing conditions that require correction; and assist in determining the type, need, and maintenance access for permanent water quality control measures, which could include ROW purchase.

The **CDPHE WQCC website** contains a complete list of Colorado's water quality regulations at: http://www.cdphe.state.co.us/op/wqcc/index.html.

The website contains links to common sources of information used in CDOT NEPA documents, such as surface water classifications and standards, groundwater classifications and standards, point source discharge regulations, watershed protection regulations, drinking water regulations, and implementation of the CWA Section 303(d) requirements.

Reasons for Evaluation of Water Quality Under NEPA

CDOT conducts water resource assessments to:

- Comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- Comply with Federal acts and executive orders, state laws, and FHWA technical guidance

The regulations and certifications applicable to water resource evaluations are summarized below.

Federal Laws and Regulations

Clean Water Act (303d, 401, 402) – The CWA established the basic structure for regulating discharges of pollutants into navigable waters. It provides the statutory basis for the National Pollutant Discharge Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants into waters of the U.S.

- **Section 303(d)** (state designation of waterbodies that are impaired, meaning they do not meet water quality standards for their designated uses, and that require total maximum daily loads (TMDLs) to bring the waterbody up to the required water quality standard).
- **Section 401** (certification by states, territories, and authorized Native American tribes that federally permitted activities comply with state water quality standards).
- **Section 402** (NPDES, administered by Colorado under the Colorado Discharge Permit System, or CDPS). Section 402 requires NPDES permits for several types of stormwater discharges, including small and large construction land disturbances and municipal separate storm sewer systems (MS4s).

The CWA requires states, territories, and authorized Native American tribes to issue water quality standards, criteria, and guidelines, and to certify that certain permitted activities comply with established standards. The state is, therefore, responsible for establishing water quality standards and permitting requirements in Colorado, consistent with Federal law, except for reservation lands of federally recognized Native American tribes and some Federal lands, such as military facilities.

Safe Drinking Water Act (40 CFR Parts 141-143) – The Safe Drinking Water Act (SDWA) protects public health by regulating the nation's public drinking water supply and protecting drinking water and its sources. CDOT is a stakeholder in the Colorado Source Water Assessment and Protection (SWAP) program mandated by the SDWA.

Erosion and Sediment Control on Highway Construction Projects (25 CFR 650 Subpart B) – All highways funded in whole or in part by FHWA must be designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface and groundwater resources.

State Laws and Regulations

Colorado Water Quality Control Act (Colorado Revised Statutes [CRS] Title 25, Article 8) – The Colorado Water Quality Control Act protects and maximizes the beneficial uses of state waters and regulates water quality (CDPHE, 2020).

The EPA has delegated authority for enforcement of the CWA and SDWA to the Colorado Department of Public Health and Environment (CDPHE). Under this authority, the Colorado Water Quality Control Act was passed and the WQCC was created to provide regulations to be implemented by CDPHE to keep Colorado in compliance with the CWA. The Colorado Water Quality Control Act also established a permit system requiring the issuance and enforcement of permits for discharges of pollutants into state waters, including both surface water and groundwater. Several state regulations have been promulgated by the WQCC in implementation of the Colorado Water Quality Control Act.

Regulation No. 31 through Regulation No. 39 (5 Code of Colorado Regulations [CCR] 1002-31 to 1002-39) – These regulations provide basic water quality standards and an antidegradation rule, a system of classification, and the established classifications and water quality standards for surface waters in Colorado.

Regulation No. 41 through Regulation No. 42 (5 CCR 1002-41 to 1002-42) – These regulations provide basic standards, a system for classification, and the established site-specific water quality classifications and standards for groundwater in Colorado.

Regulation No. 93: Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List (5 CCR 1002-93) – Regulation 93 establishes Colorado's list of impaired waters, including water-quality-limited segments requiring TMDLs, impaired waterbodies with approved TMDLs and 4b plans (i.e., other pollution control requirement), as well as the state's monitoring and evaluation list (M&E List). Waterbody segments with a CWA Section 303(d) impairment (i.e., does not meet designated use) require TMDLs, and TMDLs are required for only those parameters identified as impairments. Regulation 93 also assigns priority for TMDL development.

Regulation No. 61: Colorado Discharge Permit System Regulations (5 CCR 1002-61) – This regulation prescribes the requirements and procedures for implementation of the CDPS as required by the Colorado Water Quality Control Act, and it also implements the delegated NPDES program required by Section 402 of the CWA. Regulation 61 defines permit requirements for discharges of pollutants into state waters, including certain types of stormwater discharges, as well as other discharges such as manufacturing, commercial, silvicultural, aquaculture, etc. In addition to industrial/construction discharges, MS4s serving localities of a certain size also require stormwater discharges to be authorized through a permit. An MS4 includes not only a storm drainage system but also ditches, gutters, or other similar means of collecting and conveying stormwater runoff that do not connect with a wastewater collection system or wastewater treatment facility. CDHPE has identified CDOT as an owner/operator of an MS4.

Derived from Regulation 61 are several CDPHE permits that may be required on CDOT projects or for CDOT programs. These include, but are not limited to, the following:

- **CDPS General Permit Stormwater Discharges Associated with Construction Activity Authorization to Discharge under the Colorado Discharge Permit System (CDPS) (Permit No. COR400000). CDOT refers to this permit as the CDPS-Stormwater Construction Permit (CDPS-SCP)**. Construction projects that will disturb one acre or greater, or are part of a larger common plan of development that will disturb one acre or greater, require coverage under the CDPS-SCP. The permit requires control measures to prevent pollution or degradation of state waters; temporary and permanent stabilization measures; development, maintenance, and implementation of a stormwater management plan (SWMP);

performance of site inspections and implementing corrective actions, as necessary; recordkeeping; and reporting.

- **Authorization to Discharge under the Colorado Discharge Permit System, Permit Number COS000005**, which authorizes CDOT to discharge from its MS4 located within the "permit area," as defined in the permit. Refer to the subsection labeled "MS4 Permit Area" on the next page for more information.
- **CDPS General Permit COG080000 for Discharges from Short-Term Construction Dewatering Activities**, which authorizes short-term (less than two years) discharges of source water (i.e., groundwater, surface water, and/or stormwater commingled with groundwater or surface water) that comes in contact with construction activities. This permit is appropriate when source water is not expected to be contaminated.
- **CDPS General Permit COG317000 for Discharges from Short-Term Remediation Activities**, which authorizes short-term (less than two years) discharges of source water from remediation activities. This permit is appropriate when the source water is expected to be contaminated.
- **CDPS General Permit COG318000 for Discharges from Long-Term Remediation Activities**, which authorizes long-term (two years or more) discharges of source water from remediation. This permit is appropriate when the source water is expected to be contaminated. CDOT will need to consider long-term cost and maintenance implications when this permit is required.
- **CDPS General Permit COG603000 for Discharges from Subterranean Dewatering Activities**, which authorizes discharges of source water from below-ground dewatering (e.g., foundation dewatering).
- **CDPS General Permit COG608000 for Discharges to Surface Water from Well Development and Pumping Test Activities**, which authorizes discharges of source water from well development and pumping test activities for non-dewatering wells to surface waters of the state.

CDPS permits may be accessed and viewed in their entirety on the CDPHE website at:
https://cdphe.colorado.gov/water-quality-permits
The website also provides links to helpful permitting resources and references.

Most CDOT projects are regulated by CDPHE's CDPS program; however, in some situations the EPA or an authorized Native American tribe may be the permitting authority for an NPDES depending on project location.

Regulation No. 71 through Regulation No. 74 (5 CCR 1002-71 to 1002-74) – These are watershed-specific control regulations for Dillon Reservoir, Cherry Creek Reservoir, Chatfield Reservoir, and Bear Creek Watershed, respectively.

Regulation No. 82 (5 CCR 1002-82) 401 Certification Regulation – Regulation 82 authorizes CDPHE to certify, conditionally certify, or deny certification of licenses and permits in accordance with Section 401 of the CWA, and it sets forth conditions and procedures for the certification process.

Local Regulations

Local regulations are specific to the jurisdiction under which they belong and can be variable from city to county. The local agency's MS4 requirements should be checked before evaluating permitting requirements. While in another MS4 jurisdiction, CDOT must coordinate with local agencies so that agreement on jurisdiction and project requirements can be reached.

Municipal Separate Storm Sewer System (MS4)

Regulatory Background

In 1987, Section 402(p) was added to the CWA in response to the need to address pollution from stormwater discharges from municipal systems. The EPA subsequently promulgated NPDES MS4 regulations in two phases beginning in 1990. The Phase I regulations established requirements for 11 categories of industrial activity, including construction sites that disturbed 5 acres or more, and for discharges from large MS4s (systems serving populations of 250,000 or more) and medium MS4s (systems serving a population of 100,000 or more, but less than 250,000). In 1999, the EPA promulgated Phase II MS4 regulations to address pollution discharges from small MS4s in urbanized areas. Phase II also reduced the minimum size of construction projects requiring a permit from 5 acres of disturbed area to 1 acre or more of disturbed area.

The Water Quality Control Division (WQCD) of CDPHE issues Phase I MS4 permits as individual permits that are written to each individual MS4 permittee. CDPHE issued its first MS4 permit to CDOT, as the MS4 permittee, in 2000, effective January 2001. This original MS4 permit included only Phase I MS4 areas. Phase II MS4 areas were added to CDOT's second permit in 2007. CDOT's current MS4 permit (Permit No. COS000005) covers both the Phase I permit areas of Denver, Aurora, Colorado Springs, and Lakewood, as well as the small MS4s designated by CDPHE through the Phase II program. The current CDOT MS4 permit expired in 2020 but has been administratively extended and remains active until its renewal. A brief description of the MS4 permit follows.

MS4 Permit Area

CDOT's MS4 permit covers all areas of the Colorado state highway system and associated ROWs, as well as any properties that are CDOT-owned and operated, within another MS4 permittee's permit area. "Another permittee's permit area" is all the MS4 Phase I and Phase II permittees in Colorado. Part I.A.3 of CDOT's MS4 permit lists the geographic areas included in the permit coverage area.

To identify a project's specific water quality requirements, it is necessary to identify if a project is within CDOT's MS4 permit area. CDOT's C-Plan and OTIS ArcGIS websites identify the extents of CDOT's MS4 permit area, and either can be used to determine if a project or portion of a project is in the MS4 permit area. CDOT reviews and updates the map annually to include any Phase I or Phase II MS4 permit area changes.

Projects that are within CDOT's MS4 permit area and in another jurisdiction's ROW require additional coordination with the local agency to determine which jurisdictional MS4 permit requirements apply and how to comply with them. CDOT's MS4 permit also includes additional requirements for portions that drain into the Cherry Creek Reservoir drainage basin to comply with the watershed-specific control regulations prescribed in Regulation 72.

CDOT MS4 Program Area Overview

CDOT's MS4 permit requires CDOT to use control measures to prevent or reduce the discharge of pollutants to state waters. The permit does this by requiring CDOT to comply with the following seven MS4 programs:

Construction Sites Program. CDOT implements this program to reduce or prevent the discharge of pollutants to the MS4 from covered construction activities, which are construction activities that result in a land disturbance of 1 acre or greater, or that are part of a larger common plan of development disturbing 1 acre or greater. The program includes procedures and requirements for selection, design, installation, implementation, and maintenance of control measures through each phase of construction until final stabilization. CDOT's program also requires development, maintenance, and implementation of a SWMP for covered construction activities, as well as inspection, recordkeeping, and reporting requirements. Requirements of the Construction Sites Program are incorporated into project construction contracts through water quality standard specifications and related standard and project special provisions.

The MS4 Construction Sites Program does not negate the need for coverage under a CDPS-SCP for projects that meet the disturbance threshold. While CDOT's MS4 permit applies only to CDOT MS4 areas, CDOT implements and enforces its MS4 Construction Sites Program statewide on all projects holding a CDPS-SCP, regardless of a project's location inside or outside of CDOT's MS4 permit area. This is done to maintain consistency and efficiency; however, reporting and oversight requirements will differ if outside CDOT's MS4 permit area. CDOT also requires a SWMP for every construction project, regardless of the size of the disturbance area.

CDOT's MS4 Construction Sites Program Manual, available on the CDOT Water Quality Program website, provides additional guidance including CDOT standard operating procedures, SWMP requirements, documentation/reporting requirements, and applicable training and required certifications.

The CDOT **Water Quality Report outline** can be obtained here:
https://www.codot.gov/programs/environmental/water-quality/stormwater-programs/pwq-permanent-water-quality/assets/2017-3-1-final-water-quality-report-outline.pdf

Permanent Water Quality Management. CDOT's MS4 PWQ Program controls and reduces post-construction discharges of pollutants to its MS4. CDOT developed and implements standard operating procedures to guide the evaluation process to determine if PWQ control measures are needed and, if so, the design and approval process, construction inspection and acceptance requirements, long-term operation and maintenance procedures, tracking, and record-keeping. As part of the program, CDOT also contributes and manages a PWQ Mitigation Pool Fund to ensure compliance by dedicating funds to construct PWQ control measures that treat the CDOT MS4 area.

The MS4 PWQ Program is described in more detail below for a better understanding of how PWQ should be considered for projects.

Illicit Discharges Program. This program focuses on reducing illicit discharges, illicit connections, and illicit dumping, collectively referred to as "illicit discharges," within the CDOT MS4 permit

area. The program uses training/education, identification, reporting, investigation, tracking, and removal to curtail illicit discharges.

Industrial Facilities Program. CDOT requires all facilities that discharge stormwater into CDOT's storm drain system to obtain a specific authorization. The program prioritizes education to promote the proper management of potential pollutants in stormwater discharges from industrial facilities.

Pollution Prevention and Good Housekeeping Program. CDOT implements this program to prevent or reduce water quality impacts from pollutants being discharged to the MS4 from CDOT's facilities and maintenance operations. The program achieves this goal through development of procedures and implementation of control measures for several types of CDOT maintenance facilities and operations with stormwater discharges not authorized under a separate CDPS discharge permit. The program also provides training to CDOT maintenance personnel on proper implementation and inspection procedures.

Public Education and Outreach. CDOT implements a public education program to promote behavior change by the public to reduce pollutants in discharges from the MS4. The program includes a variety of outreach activities for employees and the public such as brochures, fact sheets, posters, newsletters, workshops, conferences, and website development and maintenance.

Wet Weather Monitoring. CDOT implements this program to understand the impact on water quality from CDOT roads, ROWs, maintenance facilities, and permanent water quality control measure practices associated with stormwater discharges.

Program description documents describing each of CDOT's seven MS4 programs are provided on CDOT's water quality website: https://www.codot.gov/programs/environmental/water-quality/stormwater-programs

These documents are updated as necessary to reflect current conditions, practices, and design standards.

MS4 Permanent Water Quality Program

The CDOT PWQ Program provides direction, criteria, and procedures to ensure that permanent water quality control measures are incorporated, as appropriate, into CDOT projects. CDOT's MS4 PWQ Program is a unique program as it includes a PWQ mitigation pool to implement control measures in the MS4 permit area. In 2014, CDOT worked with the CDPHE WQCD to develop the current PWQ Program's Mitigation Pool Fund. The WQCD approved this innovative program, the first of its kind in the nation, in April 2014 under the 2007 MS4 Permit.

The Mitigation Pool Fund established a regional approach to installing PWQ control measures on projects. This new program takes the most successful elements of the PWQ Program and provides dedicated statewide funding to install larger-scale control measures that meet the requirements of protecting state waters. Using design standards proven to limit pollution in receiving waters, the Mitigation Pool Fund promotes more efficient use of taxpayer dollars, supports collaboration with local agencies, and ultimately treats CDOT's entire MS4 area.

Projects must assess and identify the potential need for PWQ control measures early in project development so that they can be incorporated into preliminary design and the environmental compliance process. Many considerations influence control measure design and selection such as physical site and hydrologic characteristics, space constraints, safety, maintenance, and regulatory

considerations. Projects may require additional ROW to accommodate onsite PWQ control measures that should be included in the environmental process. In instances where the project involves another or multiple MS4 jurisdictions, it is important to initiate early conversations to establish agreement on jurisdiction to understand what requirements will apply to the project. It should also be established early if existing PWQ control measures are present that may be affected by the project. Locations of PWQ control measures are depicted on CDOT's OTIS and C-Plan ArcGIS mapping applications.

The CDOT *Permanent Water Quality Program Manual* on the CDOT water quality program website provides guidance on evaluating if PWQ control measures are required, eligibility criteria for Mitigation Pool Funding, and relevant standard CDOT forms and procedures for required approvals. Most transportation projects are not required to treat stormwater runoff from the project's limits by constructing PWQ control measures because of new program requirements. Instead, CDOT distributes funds for design, ROW acquisition, environmental clearances, and construction of PWQ control measures that treat CDOT's MS4 area through a competitive application process. A subset of transportation projects, however, must treat runoff from the project's limits because they have a greater chance of affecting water quality. Additionally, not all projects are eligible for funding from the PWQ Mitigation Pool.

All projects that require PWQ control measures must treat a specific impervious area dictated by the site characteristic that triggered the need for PWQ treatment. There are three possible triggers: the EA/EIS trigger, the 303(d) trigger, and the Cherry Creek trigger. More than one trigger may apply, and the requirements of all triggers must be met.

The CDOT *Drainage Design Manual* (CDOT, 2019b) provides specific design criteria for PWQ control measures, including a description of those allowed for use, those disallowed without specific approval, and a summary of required documentation for proper PWQ program compliance.

The CDOT MS4 Permit *Permanent Water Quality Program*, current Phase I/II CDPS permit, SWMP preparation guidance, *Erosion Control and Storm Water Quality Guide*, *Drainage Design Manual*, and a map illustrating the locations of the Phase II areas in Colorado are available on the CDOT Water Quality website at https://www.codot.gov/programs/environmental/water-quality/documents

9.5.2 NEPA Document Sections

Water quality modeling and documentation in the Affected Environment and Environmental Consequences chapter of EAs and EISs is discussed below.

Affected Environment

The subsection discusses documentation needs for the Affected Environment chapter of EAs and EISs. The level of detail will vary with the importance of the watershed that the project affects and the potential impact. At a minimum, the Affected Environment chapter should contain a discussion of the following.

Introduction and Table of Common Highway Runoff Pollutants – The introduction should briefly describe why water quality is analyzed in NEPA documents. Areas to focus on include WQCC regulations and CDPS. A table of common highway pollutants should be included similar to that of **Table 9-5**.

Table 9-5. Potential Contaminants from Transportation Projects that May Impact Water Resources

Construction Phase Source	Construction Phase Pollutants
Adhesives	Phenols, formaldehydes, asbestos, benzene, naphthalene
Cleaners	Metals, acidity, alkalinity, chromium
Plumbing	Lead, copper, zinc, tin
Painting	Volatile Organic Compounds (VOCs), metals, phenolics, mineral spirits
Wood	Biological Oxygen Demand (BOD), formaldehyde, copper, creosote
Masonry/concrete	Acidity, sediment, metals, asbestos
Demolition	Asbestos, aluminum, zinc, dusts, lead
Yard operations and maintenance	Oils, grease, coolants, benzene and derivatives, vinyl chloride, metals, BOD, sediment, disinfectants, sodium arsenate, dinitro compounds, rodenticides, insecticides
Landscaping and earthmoving	Pesticides, herbicides, fertilizers, BOD, alkalinity, metals, sulfur, aluminum sulfate
Materials storage	Spills, leaks, dust, sediment
Operation Phase Source	**Operation Phase Pollutants**
Leaks, spills, accidents	Oil, gasoline, diesel, grease, VOCs, chemicals, other potentially hazardous materials
Vehicle traffic	Oils, grease, gasoline, diesel, benzene and derivatives, aromatic hydrocarbons, coolants, rust (iron), heavy metals (lead, zinc, iron, chromium, cadmium, nickel, copper), rubber, asbestos
Winter sanding	Sediment
Deicing	Calcium, sodium, magnesium, chloride
Landscape maintenance	Herbicides, pesticides, fertilizers, BOD, alkalinity, metals, sulfur, aluminum sulfate
Adhesives	Phenols, formaldehydes, asbestos, benzene, naphthalene
Cleaners	Metals, acidity, alkalinity, chromium
Painting	VOCs, metals, phenolics, mineral spirits

General Watershed Information – This includes the name of receiving waters and the larger tributaries. Lakes, reservoirs, and special basins under WQCC Regulations 71–75 in the project area should also be identified. Additionally, a search for basin specific studies and master plans should be completed. Flow regimes should be discussed for all surface waters. If available, a reference to the sub-basin map should be made if that work is completed as part of the hydraulic or floodplain

report. The presence of a Wild and Scenic River also needs to be mentioned. Percent impervious surface, percent agricultural land, topographic relief and any other land accounting for 20 percent or more of the total watershed area should be noted. Topographic relief and all areas of impervious surface and agricultural land uses should be noted regardless of size. All land uses that affect water quality at the project location should be noted.

Scoping Summary – Federal, state, and local agencies provide useful information about drinking water sources, wastewater treatment facility locations, water quality monitoring data, MS4 permit requirements, and fish and wildlife habitat during the scoping phase. It is important to check with the local agency's MS4 requirements and ask questions similar to the following:

- Should the contractor obtain a CDPS permit for stormwater discharges or dewatering?
- Are there standard erosion and sediment controls?
- Are there specifics with detention basins?
- Does the local agency require the contractor to obtain a stormwater permit from them?

This information should be summarized in this section.

Soils – Soil types should be mentioned if there is a history of erosion or deposition problems in the project area. To encourage infiltration of stormwater, certain highly permeable soil types should be flagged for infiltration water quality control measures.

Historic and Current Development – Mining, industrial sites, agriculture, water diversions, and stream channelization are important topics to cover in this part. If most of this information is contained in the Land Use section of the NEPA document, a simple reference can be made.

WQCC Regulations – The author should list all the WQCC regulations that apply to the watershed in the study area. This includes surface water classifications and standards, groundwater classifications and standards, point source discharge regulations and potential permits (CDPS), watershed protection regulations, drinking water regulations, and implementation of the CWA Section 303(d) requirements (impaired waters list and monitoring list – Regulation 93).

MS4 Permanent Water Quality Program Requirements – The author should address whether the project is located in CDOT's MS4 permit area and, if so, provide a brief discussion about the construction and post-construction requirements of CDOT's PWQ Program. If the project is in another MS4 jurisdiction, applicable requirements and any reached agreements on jurisdiction should also be described.

Drinking Water Sources, Wellhead Protection Areas – General locations of these resources should be identified if they occur in the study area or could be affected by the project action. The best source of information on these resources is from local governments or water supply agencies. They are also covered in WQCC Regulations #41 and #42.

Fish and Threatened and Endangered (T&E) Species Habitat – The presence of Gold Medal Trout Streams and Wild Trout Waters should be discussed. Also, the presence of T&E habitat within any stream or riparian corridor needs to be disclosed.

Groundwater – Depth below ground, private wells used for drinking water, and protected groundwater areas listed in WQCC Regulation #42 should be discussed for this topic. The CDOT

project team should decide on the radius to use for those wells that should be considered. Typically wells within the project study area should be considered.

Graphics – The Affected Environment chapter should include a map of all surface water and important groundwater features in the project vicinity. This map should be of sufficient scale to include important segments of surface waters upstream and downstream of the project. Labels for use classification, impairment, monitoring and evaluation (WQCC Regulation #93), Gold Medal Trout Streams, Wild Trout Waters, and T&E habitat should be included with each segment. The map should also illustrate the boundaries of Phase I/II and expanded MS4 permit areas. Features such as drinking water supplies, wastewater treatment facilities, and wellhead protection areas can be added with the consent of the agency with jurisdiction.

Design criteria relating to PWQ control measures are also addressed in the following documents:

- CDOT Drainage Design Manual (CDOT, 2019b) https://www.codot.gov/programs/environmental/water-quality/drainage-design-manual-2019
- Urban Storm Drainage Criteria Manual, Volume 1 & 2 & 3. Criteria Manual | Mile High Flood District (mhfd.org)

Environmental Consequences

This section discusses documentation needs for the Environmental Consequences section of EAs and EISs. The level of detail will vary with the importance of the watershed that the project affects. At a minimum, the Environmental Consequences section should compare the effects of the alternative carried forward for detailed analysis in the following 11 categories.

Impervious Surface – Calculate impervious surface for the alternative, including the No Action alternative. Compare percentages and acres in a graph or a table. Analyze other dominant land uses, along with impervious surface. If possible, include a measure of the connectedness of the impervious surface areas and their configuration and proximity within the watershed landscape. Long narrow areas oriented perpendicular to surface flow will have a different effect than an area of the same configuration oriented parallel to surface flow. Discuss the potential for downstream and upstream increases in backwater elevations from increased impervious surface areas (volume) and increased velocities of discharge (rate), including increased potential for and effects of flash floods.

Stream Modifications – Discuss stream channelization, relocation, and bank stabilization for the alternative is discussed. Disclose any major differences in stream segment impacts (in linear feet). Discuss changes in flow regimes (temporary or permanent) as a result of the project. Discuss the potential for increased erosion of streambeds and drainage areas causing increased sediment loads; both effects from higher discharge velocities in drainage channels and streams are caused, in turn, by larger impervious surface areas to be drained.

Stream Crossings – Analyze the number of stream crossings for the alternative. Give special attention to new crossings.

Fish and T&E – Disclose effects to Gold Medal Trout Streams, Wild Trout Waters, and T&E species. Refer to the Fish and T&E sections of the NEPA document.

Drinking Water Supplies and Wastewater Treatment Facilities – Address pollutant loading from roadway runoff that has the potential to affect downstream drinking water supplies and wastewater treatment facilities for the alternative. Address the potential for impairment of any designated uses of receiving streams, especially "aquatic life class 1" uses, which will most always be adversely affected by very low levels of heavy metals and polyaromatic hydrocarbons (PAHs) in highway runoff.

Use Classifications, Impairment/Monitoring Status – Discuss possible changes in stream segment Use Classifications, TMDL, and monitoring status due to highway runoff.

Water Quality Modeling – In certain instances, use water quality modeling to evaluate relative differences in pollutant loading among alternatives. The need to use a model is determined on a project-by-project basis. The decision to model is made by the RPEM in consultation with EPA, FHWA, and EPB. Written concurrence from EPA and FHWA on whether or not to model is suggested. A flow chart is shown on **Figure 9-2**.

Monitoring Needs – It is rare to conduct water quality monitoring for CDOT projects during the NEPA phase. In instances where the RPEM determines that it is necessary, this information should be included in the Environmental Consequences section. Document conclusions from the monitoring data regarding expected effects from the alternative on the receiving water. Monitoring data may also be necessary when determining the need to use a water quality model.

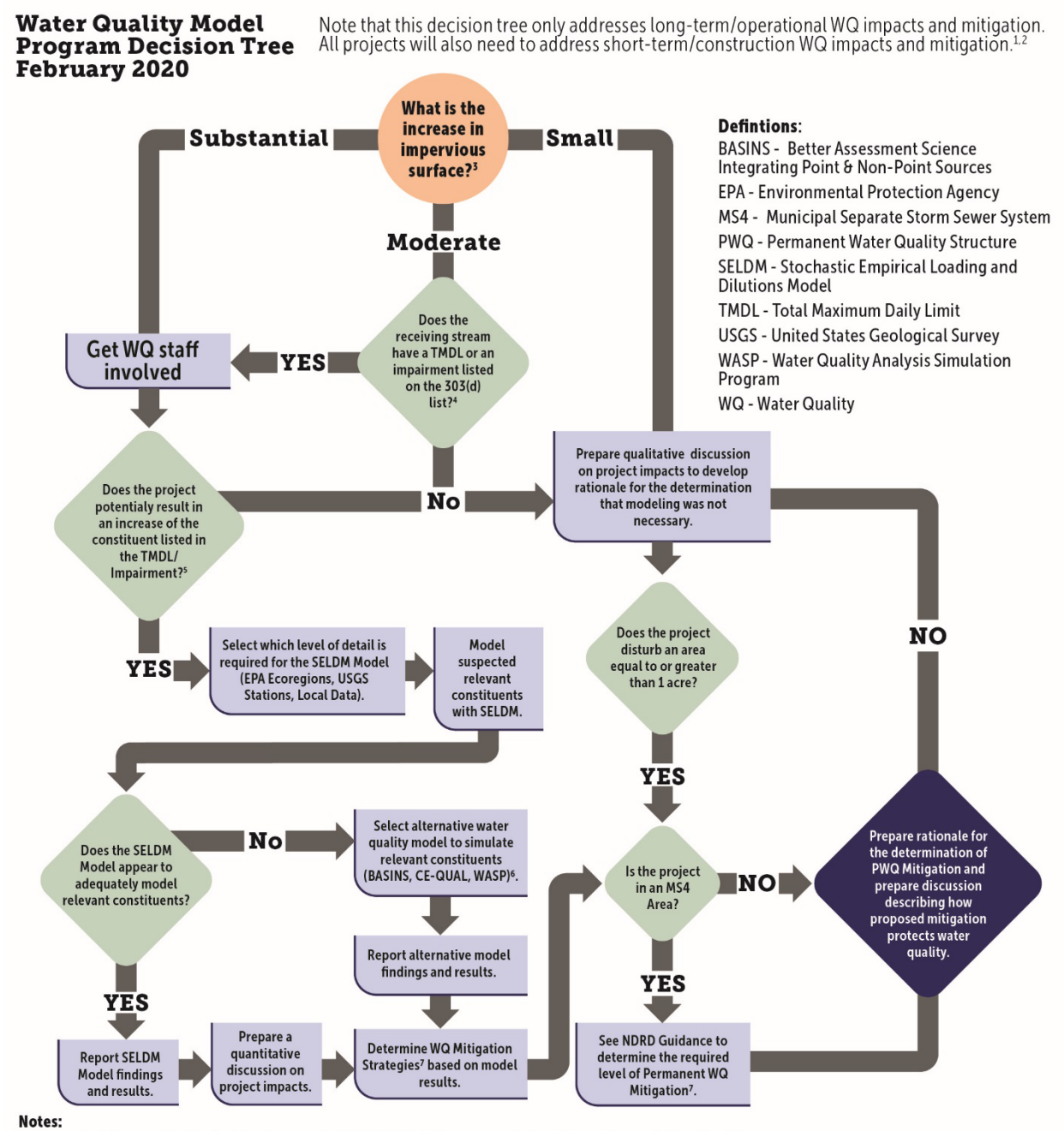
Construction – Discuss the area of disturbance for the alternative when there are noticeable differences among alternatives.

Maintenance – Discuss the effects of maintenance practices for the study area and any major differences among the alternatives.

Conclusion of Effects – Restate the conclusion of the biggest water quality concerns associated with the alternative.

Once effects are assessed in the Environmental Consequences section, evaluate mitigation measures. Water quality control measures eliminate or reduce the identified impacts during construction, as well as during operations and maintenance. When water quality control measures are installed and maintained correctly, they are effective at mitigating water quality effects resulting from highway runoff. Water quality control measures expected to be part of a proposed action or alternative, as a mandate or requirement, can be set forth as part of the proposed description of the proposed action or alternative.

Figure 9-2. Water Quality Model Program Decision Tree



Notes:

1 - If a project does not fit this decision tree, contact CDOT WQ staff (Regional and EPB), and coordinate with FHWA and resource agencies to determine whether the project can obtain a waiver from this process.

2 - If a project is a bridge project, FHWA strongly recommends that all drainage from bridges be conveyed to the ends of the bridge and is mitigated before being discarded.

3 - An "increase in impervious surface" is split into three categories:*

a) Small** - less that a 1 acre increase in impervious area.

b) Moderate - an increase of impervious area between 1 and 10 acres.

c) Substantial - greater than 10 acres of increase in impervious area.

4 - Sensitive waters as defined by either:
http://www.cdphe.state.co.us/reguations/wqccregs/100293wqlimitedsegtmdlsnew.pdf
or
http://www.cdphe.state.co.us/wq/assessmet/TMDL/TMDLs.html

5 - If sufficient WQ commitments are included within the NEPA document, so that the project will not exacerbate WQ impairment, then the answer to this decision point is "No," and subsequent decisions follow the "No" path.

6 - Refer to the Technical Report.

7- WQ Mitigation includes BMPs, PWQ, or any other approved type of mitigation.

*Based on preliminary data and best professional judgment, the numbers defined above for the three categories will be changed as more data is gathered and analyzed.
** Activities that are listed as excluded from NDRD permanent water quality BMP requirements per CDOT's MS4 permit, as of 12/31/2011 shall automatically be placed in the Small category.

Permanent Water Quality Control Measures

If PWQ control measures are required to be incorporated into the project, CDOT's standard process outlined in the Permanent Water Quality Program Manual should be followed in close coordination with CDOT's regional hydraulic engineer, CDOT Maintenance, the RPEM, CDOT's Landscape Architect, the Region Water Pollution Control Manager, and the Environmental Project Manager. The mitigation section of the EA and EIS should describe general locations and possible types of PWQ control measures; however, it is important that PWQ control measures be included within conceptual plans and within a larger footprint. Detailed design for water quality control measures is not necessary for a FONSI or ROD. For CatExs, exact locations and design details are usually provided in Final Office Review (FOR) plans and before RPEM signature of CDOT's Form 128.

Design criteria relating to PWQ control measures are also addressed in the following documents:

CDOT **Drainage Design Manual** (CDOT, 2019b), Chapter 16

https://www.codot.gov/programs/environmental/water-quality/drainage-design-manual-documents-sept-2019/20210630-drainage-design-manual-chapter-16-1.pdf

Construction Water Quality Control Measures

Construction water quality control measures and a SWMP to address erosion and sedimentation on construction sites are needed for every project in CDOT ROW (including access permits). There is no requirement to list all the construction water quality control measures for a project in an EA, an EIS, or a CatEx. These water quality control measures, along with project specifications, are included as part of the FOR plan set in final design. If the project disturbs one acre or more or is part of a larger common plan of development, the project will also require a CDPS stormwater construction permit (SCP) from the WQCD. The mitigation section of EAs and EISs should simply state that temporary water quality control measures will be included in the final design phase of the project.

A SWMP review is required if there is ground disturbance. Early acquisition projects, parcel disposals, and/or projects in which there is a change in ownership (e.g., devolutions and relinquishments), will not require a SWMP review.

Maintenance

The EA or EIS should also evaluate and discuss mitigation for maintenance activities. Interviews with CDOT maintenance personnel who are responsible for the project area are useful in determining sweeping, trash collecting, plow training, technology advances in deicing applications, product storage practices, and if they have the proper equipment to maintain PWQ if needed.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for water quality.

9.6 Floodplains

Water Quality and Floodplains technical reports can be combined into a single report or technical memorandum, as appropriate, and in consultation with the CDOT RPEM.

A floodplain is the lowland adjacent to water bodies such as a river, creek, stream, or lake. Floodplains are designated by the size and frequency of floods large enough to cover them. Flood frequency is often described by the probability of being equaled or exceeded during any given year (percentage probability of flooding). For example, the 100-year flood has a 1 percent chance of occurring in any given year. Following are a few important definitions related to floodplains (Modified from *Metropolitan Sewer District, Louisville, KY*, Federal Emergency Management Agency [FEMA]) General Provision Definitions [44 CFR 59.1]), and Section 2.4 of the CDOT *Drainage Design Manual*.

100-year Flood – A flood that has a 1-percent chance of being equaled or exceeded in any given year (also known as the 1-percent annual chance flood or base flood).

100-year Floodplain – The area of land susceptible to being inundated by a 100-year flood.

500-year Flood – A flood that has a 0.2-percent chance of being equaled or exceeded in any given year (also known as the 0.2-percent annual chance flood).

500-year Floodplain – The area of land susceptible to being inundated by a 500-year flood.

Regulatory or Base Flood Elevation (BFE) – The flood having a 1 percent chance of being equaled or exceeded in any given year. The 100-year flood has become the accepted national standard for regulatory purposes. For regulatory purposes, the floodplain is divided into two areas based on water velocity: the floodway and the flood fringe.

Conditional Letter of Map Revision (CLOMR) – FEMA's review comments on whether a proposed project complies with National Flood Insurance Program (NFIP) criteria.

Development – Any human-made changes to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

Floodway or Regulatory Floodway – The area of the floodplain that should be reserved (kept free of obstructions) to allow floodwaters to move downstream.

Flood Fringe – The portion of the floodplain outside the floodway that usually contains slow-moving or standing water. Because development in the fringe will not normally interfere as much with the flow of water, floodplain regulations typically allow development in this area but require that structures are protected.

If the Local Agency allows a PWQ feature, then their guidance takes primacy.

Encroachment – An activity within the floodplain or floodway including fill placement, new construction, and substantial improvements.

Flood Insurance Rate Map (FIRM) – Maps prepared by FEMA that show areas subject to flooding.

Flood Insurance Study (FIS) – A hydraulic study prepared by FEMA that accompanies a FIRM.

Floodway – The stream channel plus that portion of the overbanks that must be kept free from encroachment to convey the 100-year flood without increasing BFEs by more than 0.5 ft, as defined by the Colorado Water Conservation Board (CWCB) in Rules and Regulations for Regulatory Floodplains in Colorado, the most recent version at the time of the update of this Manual was from 2010.

Floodplain Development Permit – A permit required by the local community to build within the floodplain. The permit name may differ by community (e.g., Floodplain Use Permit).

Letter of Map Change (LOMC) – The combined term for the two letters issued by FEMA for projects located within a floodplain: CLOMR and LOMR.

Letter of Map Revision (LOMR) – FEMA's review of the as-built conditions of a constructed project and the associated changes to the floodplain. A LOMR results in an official change to the FIRM and FIS report.

No-Rise Certification – The terminology for when a proposed project causes a 0.00-ft increase in BFE between the existing conditions and the proposed conditions. Note that the existing conditions at a site may differ from the effective FEMA information due to changes in topography, new structures, local information, natural channel evolution, or other land-use and fluvial geomorphologic processes.

Special Flood Hazard Area (SFHA) - The type of 100-year floodplain as designated by FEMA. The most common types found in Colorado include:

- **Zone A** - An approximate floodplain that has not been determined using detailed hydraulic models. These do not include BFEs but are rather the shaded floodplain area themselves.
- **Zone AE** – A detailed floodplain that has been determined using a hydraulic model. These floodplains include BFEs and often a floodway.
- **Zone AH** – An area subject to ponding of flood waters with average depths between 1.0 and 3.0 feet.
- **Zone AO** – An area of shallow flooding (usually sheet flow on sloping terrain) with average depths between 1.0 and 3.0 feet.
- **Zone A1-30** - Equivalent to the Zone AE SFHA defined previously. Zones A1 through A30 are found on older FEMA floodplain maps and still exist for some parts of Colorado.
- **Zone A99** - Areas protected by a Federal flood-protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within these zones.

Floodplains possess significant natural values and serve many important functions. These include water resources (such as natural moderation of floods, maintenance of water quality, and groundwater recharge), living resource services (such as fish, wildlife, and plant resources), cultural resource services (open space, natural beauty, scientific study, and outdoor recreation), and cultivated resource services (such as agriculture, aquaculture, and forestry).

CDOT is required to follow the guidelines established by the CWCB through the Rules and Regulations for Regulatory Floodplains in Colorado.

CDOT has prepared detailed guidance on evaluation and documentation of floodplains in the *Drainage Design Manual* (CDOT, 2019b). The instructions in the *Drainage Design Manual* have primacy over **Section 9.6**, which is intended to summarize in simpler terms the treatment of floodplains for CDOT's NEPA projects.

The following subsections provide guidance on the treatment of floodplains for CDOT's projects. **Subsection 9.6.1** discusses the process for evaluating floodplains. **Subsection 9.6.2** discusses floodplain information that should be in each NEPA document.

9.6.1 Floodplain Evaluation Process

CDOT evaluates the potential footprint of the alternative for all transportation projects to ensure that they would not encroach on or alter floodplains and cause future flooding or other adverse impacts to CDOT assets and to adjacent private and public properties.

The floodplain evaluation should be completed when alternatives for the proposed action are first being designed and developed. Baseline information about floodplains should be obtained and addressed before initiating the NEPA process.

Significant Impacts

If a preferred alternative includes a significant impact of floodplain encroachment, refer to Executive Order 11988 Floodplain Management (1977).

Reasons for Evaluation of Floodplains Under NEPA

CDOT conducts floodplain assessments to:

- Ensure that floodplains are identified and that their services and functions are protected to the maximum extent possible
- Comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- Comply with Federal acts and executive orders
- Comply with local standards enforced at a community level by NFIP requirements for all development initiated in regulatory floodplains

The regulations, advisories, and orders are directed toward the treatment of floodplains under NEPA. The intent of these regulations is to avoid or minimize highway encroachments within 100-year (base) floodplains, where practicable, and to avoid supporting land use development that is incompatible with floodplain services. Under the requirements of Executive Order 11988 *Floodplain Management* (Executive Order 11988, 1977), all Federal-aid projects must make diligent efforts to:

- Avoid support of incompatible floodplain development
- Minimize the impact of highway actions that adversely affect the base floodplain
- Restore and preserve the natural and beneficial floodplain services
- Be consistent with the standards/criteria of the NFIP of FEMA

Complementary to Executive Order 11988, Executive Order 13690 *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* (Executive Order 13690, 2015), was issued in January 2015 to improve the resilience of communities and Federal assets against the impacts of flooding." The Executive Order requires agencies to prepare for and protect federally funded buildings and projects from flood risks through the development of the Federal Flood Risk Management Standard (FFRMS).

The FFRMS gives flexibility and requires agencies to select one of the three approaches for establishing the flood elevation ("how high") and corresponding flood hazard area ("how wide") used for project siting, design, and construction (Executive Order 13690, 2015).

In addition to Federal and state laws and regulations, local jurisdictions may have ordinances and regulations outlining higher or more stringent standards than the CWCB that must be followed. The CDOT Project Engineer must coordinate with counties, cities, regional districts, and other regulatory jurisdictions in the study area to ensure any proposed encroachment or alteration or other activities defined as development within of a floodplain meet their requirements.

Collection and Evaluation of Baseline Information

Early collection of baseline floodplain information ensures that alternatives that may encroach on or alter floodplains are identified early. The alternatives can then be designed to avoid such areas or minimize impacts to them. The CDOT Hydraulic Engineer will prepare a hydraulic study (FHWA, 23 CFR 650A), which will include the following information commensurate with the significance of the flood risk or environmental impact:

- Practicality of alternatives to any longitudinal encroachments
- Risks associated with implementation of the action
- Impacts of incompatible floodplain development
- Measures to minimize floodplain impacts
- Measures to restore and preserve the natural and beneficial floodplain services impacted

Bridge piers are considered a floodway encroachment.

The magnitude of the study will vary depending on the level of significance of the base floodplain encroachments:

- **Significant Encroachment** – May result in a high probability of loss of human life, will likely cause future damage that could be substantial in cost or extent (including interruption of service or loss of vital transportation facilities), or will cause a notable adverse impact on natural and beneficial floodplain services.
- **Minimal Encroachment** – There is floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain services are not significant and can be resolved with minimal efforts.
- **No Encroachment** – There are floodplains near the proposed alternatives, but there is no floodplain encroachment.
- **No Involvement** – There are no floodplains near the proposed alternatives.

If a proposed project will involve a regulatory floodway, the CDOT Hydraulic Engineer or designee must work with local agencies, CWCB, Regional Flood Districts and FEMA to ensure that the project is developed consistent with local floodway plans and floodplain management programs. The CatEx, EA, or EIS must document this coordination effort. An additional requirement for projects is coordination with the appropriate U.S. Army Corps of Engineers (USACE) district regulatory office. For example, when a project might encroach on a regulatory floodplain, the CDOT RPEM or resource specialist must contact the local floodplain authority early in the planning process to enable USACE's floodplain management concerns to be addressed and incorporated into the initial project design (prior to platting).

For information about the USACE's role in floodplain management, refer to the USACE Water Resources Management website at:
http://www.iwr.usace.army.mil/

A transportation project may affect floodplains by encroaching on, altering the floodplain width, or raising the BFE. CDOT's policy on floodplains is to prevent unnecessary use and development of floodplains or use that may result in hazards. CDOT's policy on floodways is to cause no rise in BFE without an approved CLOMR from the governing Regional, State or Federal agency identified by local floodplain administrators.

CDOT's specific procedures for evaluating impacts to floodplains are discussed in Section 3.06 of the CDOT *Project Development Manual* (CDOT, 2013b).

Design solutions should minimize impacts to the floodplain and be developed cooperatively with USACE, FEMA, and the affected communities. Once the alignment of the project alternatives is available, the CDOT Project Engineer must determine if one or more of the project alternatives could impact a regulatory (100-year) floodplain or increase flood risks in a NFIP community. Circumstances that would require coordination with the affected NFIP community and FEMA include the following (FHWA, 1982):

- A proposed crossing encroaches on a regulatory floodway and requires an amendment to the FIRM or certification of no rise in the BFE
- A proposed crossing encroaches on a floodplain where a detailed study has been performed but no floodway is designated and the maximum 0.5-foot increase in the BFE would be exceeded
- A local community is expected to enter into the regular (non-emergency) flood insurance program within a reasonable period and detailed floodplain studies are underway
- A local community is participating in the emergency flood insurance program and BFE near insurable buildings is increased or decreased by more than 0.3 feet

If insurable buildings are not affected, it is sufficient to notify FEMA of changes to BFEs because of highway construction through the local floodplain development permit process, or LOMC as required by the floodplain administrator. Once the impact analysis is complete, evaluate the potential mitigation measures available to eliminate or reduce the impacts and document them for floodplain development permit or LOMC approvals. Note that no rise certifications and LOMCs require certification from a professional engineer licensed to practice in Colorado, and if a no rise certification is not possible, a project clearance may require 18 to 24 months to prepare and approve a pre-construction CLOMR.

Other Issues to Consider

Along the Colorado Front Range, USACE has also determined that an unacceptable cumulative degradation of floodplain functions and services is occurring and it is working to reduce this problem. Therefore, it is unlikely that USACE will approve a Section 404 permit that fills part of an existing 100 year floodplain to increase developable land along the Colorado Front Range.

9.6.2 NEPA Document Sections

The content of the sections on floodplains in the Affected Environment and Environmental Consequences chapter is discussed below.

Affected Environment

The floodplain description and map should have sufficient detail to allow determination of whether the project alternatives may or will encroach on or impact these floodplains. If a preliminary evaluation of potential impact shows that no project impact on floodplains could possibly occur, no further information on floodplains is required in the Affected Environment chapter.

If the project may or will encroach on or alter a floodplain, more detailed information must be provided in the NEPA document's Affected Environment chapter, as follows:

- Discuss the uses of the floodplain, such as flood conveyance and groundwater recharge; cross reference uses by other resources to their respective sections.
- Provide a map showing the floodplain within the project area, including all locations where the project may cross these floodplains. All 100-year (base) floodplains should be identified and labeled by FEMA Zone, if present.
- Illustrate the base (100-year) floodplain by using FEMA maps and studies, including Flood Insurance Rate Maps (FIRM), Flood Insurance Studies (FIS), and local flood maps or master plans, if available. Other sources include the U.S. Geological Survey, USACE, NRCS, Bureau of Land Management (BLM), and the U.S. Forest Service (USFS) if previously mentioned maps are not available. Most regulatory floodplain information is published nationally at the FEMA Map Service Center (https://msc.fema.gov/portal/home) and statewide at the CWCB Colorado Hazard Mapping and Risk MAP Portal: https://coloradohazardmapping.com/
- Summarize information from the Project Hydraulic Engineer on hydraulic studies conducted for the alternatives and hydrologic factors that affect the floodplains in the area crossed by the proposed project.

If no impacts were identified in relationship to the CDOT project, state this in the NEPA document and conduct no further analysis.

Affected Environment Chapter of NEPA Document

- Summary of natural services, uses, and functions of floodplains
- Map showing floodplains within the project area and alignment of project alternatives, specifically identifying boundaries of 100-year floodplains
- Summary of information from hydraulic or hydrologic studies conducted by CDOT or others

Environmental Consequences

Summarize the results of CDOT's project location hydraulic study briefly in the NEPA document. Discuss alternatives that have the same floodplain impacts together and contrast those that differ so that similarities and differences in alternative floodplain impacts are clear. The Environmental Consequences section of the NEPA document for floodplains should identify the number and location of encroachments, as well as any incompatible floodplain developments and their potential impacts. Assess both direct (construction and operational) and indirect impacts.

If any proposed alternative supports incompatible floodplain development or results in a floodplain encroachment that significantly affects the human environment (EIS only), has impacts for which the significance is not clearly established (EA), or requires a commitment to a minimum structure size or type, the EA or EIS should include an evaluation and a discussion of practicable alternatives to the significant encroachment or proposed structure. If an alternative encroaches on a floodway, the NEPA document must address the following questions:

- Can the encroachment be located so that it is consistent with the floodway/floodplain?
- Can the floodway/floodplain be revised to accommodate the proposed project?
- Can the floodway/floodplain be avoided?

For each alternative encroaching on a designated or proposed regulatory floodway, the draft NEPA document should provide a preliminary indication of whether or not the encroachment would be consistent with or require a revision to the regulatory floodway by LOMC. If any alternative results in a floodplain encroachment or supports incompatible floodplain development having significant impacts or requires a commitment to a particular structure size or type, include an evaluation and a discussion of practicable alternatives to the structure or encroachment in the NEPA document.

If the preferred alternative includes a floodplain encroachment having significant impacts, the final NEPA document must include a finding that this alternative is the only practicable alternative and refer to Executive Order 11988 Floodplain Management (1977), and National Flood Insurance Act (23 CFR 650, Subpart A), or 44 CFR Parts 59, 60, 65 and 72. This finding should be included in a separate subsection entitled "Only Practicable Alternative Finding."

The discussion in this section must include the following information:

- Reasons why the proposed action must be located in the floodplain
- Alternatives considered and why they were not practicable
- Statement indicating that the action conforms to applicable state or local floodplain protection standards

Environmental Consequences Section of NEPA Document

- Summarize results of the Hydraulic Study
- If there is no impact, state this and conduct no further analysis
- Identify number, location, and impacts of encroachments and incompatible floodplain developments
- Provide more detailed information on location and impacts for encroachments or incompatible development having significant impacts
- Include exhibits showing alternatives, base floodplains, and where applicable, regulatory floodways

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for floodplains.

Impact Mitigation Section of NEPA Document

- If an alternative encroaches on a regulatory floodway/floodplain, indicate if it would require revision to the regulatory floodway (impacts to floodplains may require a CLOMR)
- For alternatives with significant impacts, discuss practicable alternatives
- Discuss common mitigation measures for impacts
- Include a section in the final EIS discussing the "only practicable alternative" if the preferred alternative includes an encroachment having significant impacts

9.7 Wetlands

Based on the definition used by USACE in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the term "wetlands" is defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands are important because, among other roles, they support aquatic organisms, act as water reservoirs, and trap the particulates and chemicals that might be present in surface sheet flows before they can directly enter streams and rivers. They also serve as a source of water for terrestrial organisms, enhance ecosystem diversity, and provide an ecotone between aquatic and terrestrial environments.

The following two subsections provide guidance on the treatment of wetlands for CDOT's NEPA projects. The first subsection discusses the process for evaluating wetlands. The second subsection discusses wetland information that should be in each NEPA document.

Wetlands are:

- Important to aquatic and terrestrial organisms
- Key components of hydrologic systems as reservoirs and for filtration
- Habitats that perform many beneficial functions
- Subject to regulation

9.7.1 Wetland Evaluation Process

The EPB or regional wetland specialist is responsible for wetland evaluation. The EPB wetland specialist assists with USACE consultation and FHWA coordination. They are also responsible for developing CDOT processes and policy relative to wetlands, evaluating wetlands within certain CatEx projects, reviewing NEPA documents, and supporting the regional wetland specialists, as needed. The regional wetland specialists are responsible for wetland evaluation on most project development activities, in coordination with the EPB wetland specialist. Regional and EPB resource specialists may be supported by consultants in wetland delineation and evaluation.

Wetland identification and delineation should occur early during project development to ensure alternative designs avoid and minimize impacts and to ensure timely involvement of the USACE. To the extent practicable, wetland delineation should take place during the growing season so that species can be more accurately identified to determine wetland boundaries. After the resource specialist delineates wetlands near a project area, the USACE must approve the boundaries of each wetland, which often includes performing a site visit with the resource specialist. In addition to approving wetland boundaries, the USACE may need to perform an approved jurisdictional determination.

Reasons for Evaluation of Wetlands Under NEPA

Wetland Legislation

- Clean Water Act
- Department of Transportation Order 5660.1A
- Colorado Senate Bill 40
- Executive Order 11990, Protection of Wetlands
- 23 CFR 771
- 23 CFR 777
- Technical Advisory T6640.8A

CDOT evaluates wetlands for several reasons:

- Wetlands provide important functions (benefits) for people and wildlife, including for state and federally listed threatened and endangered species.
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner.
- Federal agencies and their agents have a responsibility under Executive Order 11990 and U.S. DOT Order 5660.1A to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.
- To comply with legislation regulating and protecting wetlands that pertain to wetlands and water quality under the CWA.
- To satisfy the CDOT NEPA/Section 404 Merger process.

The regulations and certifications applicable to wetland evaluations are summarized below.

- **Clean Water Act 1972** – Establishes the basic structure for regulating discharges of pollutants into waters of the United States and regulating quality standards for surface waters. Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including certain wetlands. Last amended 1987.
- **Executive Order 11990**, Protection of Wetlands 1977 – To "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, the Order requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. Last amended 1977.
- **Department of Transportation Order 5660.1A 1978** – Provides policy and procedures for the evaluation and mitigation of adverse environmental impacts to wetlands and natural habitat resulting from Federal-aid projects. Last amended 2000.
- **FHWA 23 CFR 777 Mitigation of Impacts to Wetlands and Natural Habitat 2000** – Provides policy and procedures for the evaluation and mitigation of adverse environmental impacts to wetlands and natural habitat resulting from Federal-aid projects. Last amended 2000.
- **Technical Advisory T6640.8A 1985** – Indicates the importance of the evaluation of impacts to wetlands. Last amended 1987.

Certain wetlands are regulated under the CWA that requires the jurisdictional status of wetlands be determined and a Section 404 permit be obtained if jurisdictional wetlands will be impacted by a discharge. Section 401 certification may also be required if a project requires a CWA individual permit. USACE is responsible for determining whether a wetland is jurisdictional or non-jurisdictional and for issuing the appropriate Section 404 permit.

As part of their CWA responsibilities and before authorizing use of a permit, USACE must ensure compliance with the CWA. CWA guidance requires that the NEPA preferred alternative be the Least Environmentally Damaging Practicable Alternative (LEDPA). The purpose of Executive Order 11990, *Protection of Wetlands*, is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial services of wetlands." During project development, Executive Order 11990 requires that Federal agencies and their agents consider alternatives to constructing in wetland habitats and minimize impacts if an activity affecting a wetland cannot be avoided. Project alternatives that avoid wetland impacts are to be selected for further consideration to the exclusion of project alternatives that do not avoid wetland impacts based on EO 11990. FHWA has similar requirements as specified in 23 CFR 777.

Because of the need to fulfill requirements of both NEPA and CWA when wetland impacts are expected, the NEPA/404 merger process was developed. This merger process serves to facilitate early and ongoing integration and coordination of CWA and NEPA requirements. If impacts to wetlands cannot be avoided and an individual permit is required, USACE should be involved under the NEPA/404 merger process in all EISs and certain EAs.

USACE Coordination

- Early and frequent communication and coordination to ensure mutual informational needs are met
- Delineation of wetlands at a seasonally appropriate time
- SACE determination of jurisdiction
- Incorporation of sufficient data to ensure the LEDPA is among alternatives considered in detail

Collection and Evaluation of Baseline Information

The study area considered for wetland resources should include where ground disturbance is expected to occur with an additional buffer for indirect and/or unexpected impacts. In certain cases where a project might have downstream impacts to aquatic resources, wetlands and waters should be delineated outside the project study area. The wetland study area should be presented on a figure in the NEPA document.

All wetlands within the study area should be identified, characterized (e.g., according to wetland type, acreage, and functions), and mapped. In addition, wetland jurisdictional status should be determined in consultation with the USACE. Sources of wetland information and preliminary mapping include:

- Colorado Natural Heritage Program's (CNHP) Colorado Wetland Inventory (planning level)
- CDOT's OTIS
- Topographic maps
- Aerial photographs of the project area
- USGS National Hydrography Dataset
- Conversations with local agency personnel and adjacent landowners familiar with the wetland project area

Functional Assessment of Colorado Wetlands (FACWet) website at https://www.codot.gov/programs/environmental/wetlands/assessment-monitoring

Colorado Wetland Inventory website at http://csurams.maps.arcgis.com/apps/webappviewer/index.html?id=a8e43760cb934a5084e89e46922580cc

Colorado Natural Heritage Program website at http://www.cnhp.colostate.edu/

CDOT's OTIS website at https://dtdapps.coloradodot.info/otis

The survey of wetlands should be conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). Supplements to the *Corps of Engineers Wetlands Delineation Manual* must be used for the appropriate region concurrently with the 1987 manual. Based on these protocols, the extent and location of each wetland within the project area must be mapped and described. The presence or absence of wetland-affiliated T&E species or critical habitat will be a component of consultation with U.S. Department of Interior (USDOI) Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) as further described in **Section 9.10**.

- The wetland delineations should be performed when the ground is clear of snow and wetland vegetation is well-developed. Once the field work is complete, a report and map of the wetlands must be submitted to USACE for their approval. In addition, a USACE representative may review the delineation report in the field to determine the jurisdictional status for each wetland.

The appropriate USACE District Office must make the final determination of whether the proposed activity requires a permit authorization. Because this may be a lengthy process and because unavoidable project impacts on wetlands must be mitigated, it is important to complete the wetlands delineation as early in the project process as possible. Avoidance of impacts to all wetlands is always an important factor in identifying and selecting project alternatives, as well as in identifying potential impacts from alternatives that are carried through the NEPA process.

Once USACE has approved the delineation report, the wetland impacts of the project may be assessed. Direct impacts are typically quantified based on acreage and functions disturbed. These data are best determined by overlaying project alternatives with the wetland locations.

In addition, the potential for indirect impacts to wetlands from surface runoff, eroded soil, shading, or chemicals must be identified and discussed. This includes the types, extent, and timing of earth disturbances that could result in surface runoff and erosion and any chemicals that will be present in the project area during construction and operation. This can be determined by overlaying the project alternatives, wetland locations, and topography and drainage patterns.

In conducting the analysis of wetland impacts, the FHWA Technical Advisory 6640.8A guidance should be incorporated (FHWA, 1987b):

- In evaluating the wetland impact of the proposed project, address the functionality of the impacted wetlands and the impact severity. Merely listing the number of acres taken by the various alternatives of a project alternative does not provide sufficient information upon which to determine the degree of impact on the wetland ecosystem.
- In evaluating the wetland resources and potential impacts, consider the primary functions of the wetlands (e.g., flood control, wildlife habitat, groundwater recharge, etc.), the relative

importance of these functions to the total wetland resource of the area, and uniqueness that may contribute to the wetlands' importance.

- In determining the wetland impact, show the project's effects on the stability and quality of the wetland(s) by considering the short- and long-term effects on the wetlands and the importance of any loss, such as flood control capacity, shoreline anchorage potential, water pollution abatement capacity, and fish and wildlife habitat.
- Use the Functional Assessment of Colorado Wetlands (FACWet) method (CDOT, 2013a) to conduct the functional analysis.

Wetland Impacts/Mitigation

- Apply impact and mitigation measures to all wetlands, regardless of CWA jurisdiction
- Avoid whenever possible
- Minimize disturbance to extent practicable
- Identify importance of, and impact severity for impacted wetlands
- Control measures necessary to minimize indirect impacts
- USACE approval of mitigation often required with mitigation banking preferred

Wetland functions should be determined by applying the FACWet method, a CDOT- and USACE-approved wetland functional assessment method. CDOT requires a FACWet analysis for all projects with proposed permanent wetland impacts of 0.1 acre or more.

Knowing the functions of the wetlands proposed for impacts and the degree of the impact, CDOT and FHWA will be in a better position to determine the mitigation efforts necessary to offset wetland losses. The options for addressing potential impacts to wetlands, in decreasing order of desirability, are avoidance, minimization, and compensation for losses. CDOT's policy is to mitigate unavoidable impacts to all wetlands, not just those considered jurisdictional under Section 404.

Examples of Avoidance and Minimization: upland buffers, retaining walls, guardrails, shifting roadway, maintaining hydrology

Guidance on these approaches includes the following:

- Avoidance, the preferred option, is typically built into the design of an alternative by siting project activities where they will not impact wetlands. Avoidance strategies should be stated as part of the alternative description to prevent any future project modifications from altering this facet of the design.
- Avoidance of indirect impacts can often be achieved by using control measures during construction and operation. Control measures include actions such as properly installing silt fencing around the perimeter of a construction site, installing perimeter berms and liners in areas used for storage of chemicals, and designing roadway shoulders and drainage systems to direct roadway runoff to areas where it can infiltrate the soil rather than running directly into waterways.
- Minimization of impacts typically occurs when only partial avoidance can be accomplished. It may be that siting and design constraints necessitate impacting part of a wetland or that water quality control measures are not totally effective. Whatever the reason, impacts to wetlands should always be as small as practicable, given other project constraints.

- Compensatory mitigation measures that should be considered, in order of preference, include wetland mitigation banking / in-lieu fee, wetland restoration, enhancement, creation, and preservation, as specified in 33 CFR Parts 325 and 332 (2008). The Compensatory Mitigation for Losses of Aquatic Resources, (EPA, 2008) (Final Rule) contains guidelines for choosing a mitigation strategy and specific requirements under Section 404 of the CWA for developing a compensatory mitigation plan. All project wetland mitigation decisions should be made after ensuring the Final Rule guidance is followed.
- Options for compensatory mitigation include the purchase of credits from wetland mitigation banks or in-lieu fee programs or permittee-responsible mitigation on- or offsite. The use of such measures was mandated in 16 USC Chapter 29 – Water Bank Program for Wetlands Preservation and facilitated when the ISTEA Sections 1006 and 1007 made such purchases available for Federal-aid funding. The use of wetland banks by transportation projects is implemented through FHWA guidance (FHWA, 2003). The use of mitigation banks is limited to project impacts that occur in a bank's geographic service area. A preference for mitigation banking exists when impacted wetland functions are low or ROW conditions prohibit onsite mitigation.
- Prescribed monitoring requirements to ensure that wetland mitigation commitments are installed and continue to function properly. A monitoring plan with documentation of compensatory responsibilities and performance standards should be completed.

The **MOA between FHWA and CDOT** regarding programmatic approval of certain wetland findings and the Programmatic Wetland Finding Template can be obtained at:
https://www.codot.gov/programs/environmental/wetlands/guidance.html

Refer to **CDOT's Wetlands guidance webpage** for the most recent guidance updates:
https://www.codot.gov/programs/environmental/wetlands/guidance.html

Other Issues to Consider

Impacts to wetlands may be addressed by CDOT, FHWA, and USACE through the NEPA/Section 404 merger process (mandatory for EISs requiring an individual permit; discretionary for EAs) and are also subject to comment by EPA and USFWS as participating agencies. USACE will only issue an individual permit if the preferred alternative is also the LEDPA.

Information on wetland impacts and their mitigation must be included in the Wetland Finding and must be approved by CDOT or FHWA, as appropriate. A Wetland Finding is required to document a project that will incur more than 500 square feet of permanent impacts, or 1,000 square feet of temporary and permanent impacts combined. The impacts and mitigation documented in a Wetland Finding are for all wetland habitats regardless of CWA jurisdiction. If sufficient detail is available to prepare a Wetland Finding concurrently with the NEPA document, the Wetland Finding should be included as an appendix or technical report. Approval of the NEPA document also serves as approval of the Wetland Finding.

9.7.2 NEPA Document Sections

The content needed for the wetlands and waters of the U.S. section in the Affected Environment and Environmental Consequences chapter is discussed below.

Affected Environment

The wetlands and waters of the U.S. section of the Affected Environment should include:

- A brief introduction summarizing the importance of wetlands and the regulatory climate without reproducing lengthy excerpts from regulations and laws
- A methods section that gives the details on how and when the wetlands were delineated and mapped (GPS and GIS techniques)
- The study area and results of the functional assessment; a brief summary of the vegetation, soils, hydrology, and functions of each wetland or group of wetlands identified within the entire study area
- A discussion of other aquatic features and maps showing all features discussed

A few paragraphs should be sufficient to describe the study area wetlands. The wetland section should also address how the project wetlands generally relate to transportation corridors in the project vicinity. Address questions such as:

- Do the transportation corridors typically run through lowland areas, near floodplains, and/or cross a disproportionately high percentage of wetlands?
- What is the hydrogeological history of the project wetlands, and will it affect the transportation corridor in the future?

Affected Environment Section of NEPA Document

- Describe the general project setting regarding wetlands
- Focus on acreage and functions of any wetlands that may be directly or indirectly impacted
- Provide sufficient detail for project impacts to wetlands to be fully evaluated

Environmental Consequences

The Environmental Consequences section for wetlands should clearly address the:

- Acreage of potential permanent and temporary direct and indirect impacts to wetlands.
- Impact on functions. Support the text discussion with a map showing the location and extent of anticipated project impacts on wetlands for each alternative. Summarize the text discussion focusing on the wetland functional assessment and impact severity. This information should be presented as a tabulation of data that can be readily assimilated and compared. Wetland impacts must be described and alternatives compared without considering compensatory mitigation to comply with the CWA (b)(1) Guidelines in support of LEDPA identification.
- Methods section that explains how the impacts were calculated.
- Discussion of what specific direct (filling, dredging, etc.) and indirect impacts (erosion, sedimentation, shading, hydrologic modification, noxious weed invasion, etc.) are expected.

For each type of wetland impact (e.g., indirect/direct and temporary/permanent), present the proposed mitigation measures. Describe how the proposed mitigation measures were selected and how they would address the identified impacts.

In accordance with FHWA Technical Advisory 6640.8A (FHWA, 1987b), if the preferred alternative affects wetlands, the Final EIS needs to contain the finding required by Executive Order 11990 that there are no practicable alternatives to construction in wetlands. Where the finding is included, approval of the Final EIS will document compliance with the Executive Order 11990 requirements (23 CFR 771.125(a)(1)). The finding should be included in a separate subsection entitled "Only Practicable Alternative Finding" and should be supported by the following information:

- A reference to Executive Order 11990
- An explanation why there are no practicable alternatives to the proposed action
- An explanation why the proposed action includes all practicable measures to minimize harm to wetlands
- A concluding statement that "Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

A separate wetland finding should be included as an appendix to the NEPA document or as a technical report. Refer to the 2019 Programmatic Wetland Finding Memorandum of Agreement, the programmatic wetland finding template, and the non-programmatic wetland finding checklist (CDOT, 2022) to enable compliance with the above requirement.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for all wetlands. In compliance with Federal agency and their agents' responsibilities per Executive Order 11990 and U.S. DOT Order 5660.1A, CDOT assesses impacts to all wetland habitats regardless of CWA jurisdiction. Additionally, avoidance, minimization, and compensation measures should be considered and undertaken, to the maximum extent practicable, for all wetlands within a project study area.

9.8 Vegetation and Noxious Weeds

Vegetation is a term that encompasses the diverse plants that grow in soil and water. Oftentimes these plants are grouped based on their genetic similarity or genus (e.g., ponderosa pine, limber pine, and lodgepole pine). They can also be grouped by their structural similarity (peachleaf willow and narrowleaf cottonwood, or squaw bush and golden currant), or in plant communities (riparian forest, upland grassland, or alpine forest). A plant community is any assemblage of plants growing together in the same ecological setting. Plant communities serve as animal habitats. Collectively, the plants and animals create a biotic community. GIS maps often show land cover types, which are generally comparable to plant communities at a coarse scale of definition.

Vegetation is important because it holds soil in place and prevents erosion; removes and stores carbon dioxide from the atmosphere and releases oxygen; provides a diversity of materials used by people and other animals as food, for structures, and other products; and contributes visual resources including views, and recreational activities. Plant communities support diverse species and provide particular niches for specialized plants and animals.

Some plant species that readily move beyond their native habitat and invade new habitats are considered undesirable. Invasive species, or alien species, are defined in Executive Order 13112 Invasive Species (1999) as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem." Transportation activities act as a vector that provides a means for potentially invasive species to move beyond existing habitats through highway corridors. Such species may severely disrupt ecosystem balance because they can quickly become abundant in a community and displace native species.

The following subsections provide guidance on the treatment of vegetation for CDOT's NEPA projects. The first subsection discusses the process for evaluating vegetation. The second discusses vegetation information that should be in each NEPA document. The third specifically focuses on noxious weeds.

9.8.1 Vegetation Evaluation Process

The CDOT RPEM, resource specialist, or environmental project manager is responsible for early identification of vegetation communities, their critical uses, and important species. In fulfilling this responsibility, they may be supported by consultants who collect, evaluate, and summarize data on vegetation.

Vegetation communities should be identified throughout the project area that encompasses all alternatives. The study area should be at least large enough to contain all direct physical disturbances related to the project (the project footprint, haul roads, construction staging areas, etc.), as well as surrounding areas that could be indirectly impacted by the project through erosion, chemical/fuel and other pollutants, deicing operations, and roadside emissions. If possible, the surrounding area beyond the ROW fence should also be surveyed for the presence of noxious and invasive weeds that could readily move into the disturbed soils within the study area. If the presence of noxious weeds is noted, care must be taken to protect the project area and the surrounding habitats, particularly sensitive habitats or open water areas that are highly susceptible to the spread of invasive plants. The presence of vegetation communities and whether they might include special status species must also be determined.

Vegetation communities within the study area, their functions, and their component species must be identified as early as possible during project planning. This should be done before alternative corridors are selected, if possible, and must be done before alternative alignments are finalized. Field review is required to determine whether particular plant species are present within the study area, and such data may need to be collected when the species is flowering and, therefore, most obvious to an observer. Planning of vegetation surveys is critical, especially for identifying special status species and areas with noxious weeds. Timing for field studies should be determined early in the NEPA process so that they can be conducted at the proper season, in spring, summer, or fall, without undue delay to the project.

Reasons for Evaluation of Vegetation Under NEPA

CDOT evaluates vegetation for several reasons:

- Vegetation has implications for stormwater management and water and air quality
- To comply with CDOT's *Environmental Stewardship Guide* (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To enable compliance with several legal mandates that pertain to particular vegetation species and their uses

Early identification of the vegetation communities present within the study area provides determination of the likelihood that sensitive plant or animal species might be present. It enables determination of the need for supplemental field studies so that these can be initiated at the proper time. It enables timely identification of biological red flags that might warrant development of additional or altered project alternatives.

Protection of vegetation that is not listed as T&E is determined by the importance of that vegetation to the surrounding ecosystem. Riparian vegetation and wetlands are protected under regulations specific to those communities. Plants that serve specialized functions for the animals that inhabit them (e.g., raptor nest trees, or milkweed for the Monarch butterfly) may be protected under regulations that are specific to the animal species involved.

Transportation project managers must pay special attention to vegetation because the project may include the reclamation of long stretches of roadside habitat disturbed by construction operations that can contribute to the spread of noxious and invasive weeds. The use of native wildflowers (using at least 0.25 percent of 1 percent of the landscaping budget) during reclamation is required on Federal-aid projects as noted in FHWA's *Landscape and Roadside Development* (FHWA, 1978) and *Landscaping and Scenic Enhancement* (23 USC Part 319).

Additionally, vegetation on public lands through which a transportation project passes (e.g., BLM, USFS, National Park Service [NPS], or USFWS land, or land owned or managed by a state or regional agency) may also be protected by the mandates of the managing agency. Contact the agency managing the land within the study area for the transportation project.

In addition to the legal protection of vegetation, vegetation that provides important shade or contributes to a visual resource such as vistas should be protected to the extent that this does not interfere with implementation of the project or result in inappropriate project costs. Further, since

nearly all vegetation provides habitat for fish and wildlife, disturbance of vegetation should be kept to a minimum whenever this is reasonably possible.

Recent updates to Executive Order 13112 were amended in 2016. This order amends Executive Order 13112 and directs actions to continue coordinated Federal prevention and control efforts related to invasive species. This order maintains the National Invasive Species Council (Council) and the Invasive Species Advisory Committee; expands the membership of the Council; clarifies the operations of the Council; incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into Federal efforts to address invasive species; and strengthens coordinated, cost-efficient Federal action.

The **Colorado Department of Agriculture Noxious Weed Management Program** is available at https://www.colorado.gov/pacific/agconservation/noxiousweeds

Collection and Evaluation of Baseline Information

Collection of Baseline Information

To collect baseline information on vegetation, start first with the information from the Colorado Gap Analysis Project (GAP) from which 100,000 block datasets depicting vegetation can be downloaded. These data can be characterized as follows:

- GAP data is GIS spatial data
- Data is provided in GIS formats and GIS software is required to view the data
- Data is in Universal Transverse Mercator Zone 13, North American Datum 1927 projection, and provided by 30 by 60-minute blocks
- Metadata is viewable on-screen and downloadable separate from the data
- All files are zip files, which can be uncompressed using WinZip

GAP data represent the most comprehensive statewide spatial information on vegetation. However, note that while 80 percent accuracy was the goal of GAP mapping, the 52 land cover types in Colorado were initially mapped at an accuracy of 31 percent. Nonetheless, because of their comprehensive and consistent coverage, GAP data are an excellent starting place to determine the vegetation present in the vegetation study area.

CPW's Natural Diversity Information Source is also a good reference for data. It contains downloadable GIS data on riparian and wetland mapping and the Colorado Vegetation Classification Project, as well as the GAP webpage. Additional information is provided on riparian areas and wetlands because these could not be accurately mapped with the imagery used for the overall GAP analysis.

Additional sources of spatial information on vegetation include the following:

- GIS Data Depot
- U.S. Department of Agriculture (USDA) Data Gateway
- NatureServe
- Other sites listed in aggregate at the USFWS Geographic Information System and Spatial Data portal

Ultimately, a single source of spatial data will need to be chosen to depict the vegetation in the vegetation study area. However, other data sources may provide additional, specific information that is more precise for a specific area or location.

More precise information on sensitive vegetation species can be found with the CNHP. The CNHP tracks rare species, including T&E species. It provides data on the county and USGS quadrangle in which the tracked species occur. More precise data can be obtained by request for a fee or ask EPB's Wildlife Program Manager who may have already purchased the data that would be available for projects to use for free. The presence of a tracked species in the county or quadrangle where a project is planned necessitates obtaining detailed information along proposed alignments and may be cause for realignment of one or more alternatives. Information on noxious weed species can be obtained from the Colorado Department of Agriculture. The Colorado Department of Agriculture webpage provides contact information for county weed supervisors and information on how to inventory noxious weeds if field data must be collected.

Vegetation communities are also of importance to fish and wildlife species. For example, if a vegetation community serves as an elk calving ground or heron rookery or provides a raptor nest site, it may need to be protected to maintain adequate breeding sites, as well as forage or feeding areas. Riparian areas are another example of an important and sensitive vegetation community. Not only is the vegetation important, but many fish species rely on healthy, intact riparian vegetation for their continued survival, not to mention the importance of the riparian forest on water quality. Therefore, good communication between CDOT's plant and fish and wildlife specialists is essential.

Sources of vegetation spatial information include:

- Colorado Gap Analysis Project at http://gapanalysis.usgs.gov/data/
- CPW's Natural Diversity Information Source at http://cpw.state.co.us/learn/Pages/Maps.aspx/
- USDA Data Gateway at https://gdg.sc.egov.usda.gov/
- NatureServe at http://www.natureserve.org/
- USFWS Geographic Information Systems and Spatial Data at https://gis-fws.opendata.arcgis.com/
- Colorado Natural Heritage Program at http://www.cnhp.colostate.edu/

Evaluation of Baseline Information

To evaluate baseline information, first finalize the vegetation study area and then identify the types of impacts the project could have on vegetation and the types of measures that could be used to mitigate these impacts if they cannot be avoided. More specifically:

- Include within the vegetation study area all potential areas of direct disturbance (e.g., where the ground will be disturbed for grading activities, tree/shrub branches broken or removed) and areas of indirect disturbance (e.g., where erosion might disturb the plant cover or deposition of eroded soil might cover lowland vegetation; where deicer impacts might retard plant growth, species may be altered due to hydrology, or the disturbed soil may be vulnerable to noxious and invasive weeds).
- Prepare a matrix of vegetation land cover types within the vegetation study area and types of project impacts on vegetation by alternative.
- Prepare a matrix of the impacts that could occur because of any of the project alternatives and the measures that could be used to mitigate each.

This information will inform the project-specific analysis of impacts and how they might be mitigated. Impacts of the proposed project alternatives on vegetation should be evaluated in three primary ways.

- Map the most precise spatial data that cover the vegetation study area with the expected areas of disturbance for each project alternative. As needed, develop different GIS layers for areas of project disturbance that are expected to occur in the phases of construction (e.g., for temporary disturbance during construction and for permanent disturbance during operation) and as a result of different types of disturbance (e.g., direct and indirect). Using the GIS software, tabulate the acreage of each land cover type that intersects with the areas of disturbance shown on each GIS layer. Use the calculated acreages to quantitatively compare the impacts of the project alternatives.
- In addition to this quantitative comparison of acreage impacts by vegetation land cover type, the relative importance of each vegetation land cover type should be determined, compared, and discussed. Include in the discussion the national, regional, and local importance of each vegetation type that would be impacted, as well as the importance at these three levels of the fish and wildlife habitat it provides.
- The level of detail provided should not be excessive relative to the magnitude of the anticipated impact. In all cases, the goal should be to provide the level of detail necessary to clarify the differences among the alternatives and the magnitude of those differences.

Section 9.27 discusses the development of a list of past, present, and reasonably foreseeable future projects that should be addressed for all resources in the consideration of cumulative impacts. Locate these projects on a vegetation land cover map to identify what vegetation land cover types they will impact. Discuss cumulative impacts to vegetation in more general terms, noting which vegetation land cover types will be most impacted, their relative importance, and the degree to which impacts from the transportation project considered in the current NEPA document will contribute to the cumulative impacts.

Other Issues to Consider

Other agencies may have information or guidance that will affect a particular CDOT project. Coordinate with the various agencies having resource oversight to obtain any site-specific data they may have and talk to resource specialists who know the study area to determine whether they know of vegetation that should not be disturbed or have guidance that could constrain the project. The resource agencies that would have information or guidance on vegetation impacts include CPW, USFWS, and NRCS, as well as USFS, BLM, NPS, and Colorado counties and state parks, when they manage lands that are traversed by a transportation project.

In addition to information on vegetation species and communities, very specific information on T&E plant species that may occur in the study area will need to be analyzed regarding project impacts.

9.8.2 NEPA Document Sections

The content of the vegetation sections in the Affected Environment and Environmental Consequences chapters is discussed below. The level of detail will vary with species composition, the presence of T&E species, and the value of the vegetation habitat and the potential project impact.

Affected Environment

The description of vegetation in the Affected Environment chapter of the NEPA document should:

- Include an introduction to vegetation and the importance of protecting it in and around the project area
- Present an overview of the vegetation land cover types that are present in the project region
- Define the vegetation study area for the project
- Describe how the vegetation land cover types within the study area fit within the regional context (agriculture, forestry products, open space)
- Include a map of the vegetation land cover types within the vegetation study area and provide a cross-reference to the T&E species and wetland section of the NEPA document

If no vegetation will be impacted (e.g., the project is entirely within a highly developed urban area without any surrounding vegetation), no further detail is required in the Affected Environment chapter on vegetation. Remember, even in an urban area there may be some landscaping using sod or other irrigated landscape that could be susceptible to noxious weeds.

If impacts to vegetation may, or will occur, also include the following:

- A description of each vegetation land cover type, including the locations where it occurs, its general appearance, the species that comprise it, and its importance as a plant community (fish and wildlife habitat, visual resource, economic value, recreation, etc.)
- A note showing the proximity of any special use areas such as national or state forest areas, recreation areas, or parklands
- A description of areas of contiguous habitat
- A description of land uses, if any, within or near the proposed project alternatives (developed, agriculture, forest products)
- Scoping summaries from Federal, state, and local agencies. These agencies have expert knowledge of the project areas and will provide important insights to special vegetation issues
- Identification of any noxious weeds that are within or surrounding the vegetation study area
- A statement of the likelihood of sensitive species presence and cross-reference to the T&E species discussion
- A discussion of the importance of the vegetation land cover type as habitat for fish and wildlife species cross-referenced to further discussion of this topic in the fish and wildlife section of the NEPA document

Affected Environment Chapter of NEPA Document

- Provide a map of the vegetation communities or land cover types in the vegetation study area
- Describe each vegetation community, land cover type, or surrounding area, when dealing with noxious weeds, that is expected to be impacted by the project
- Cross reference the T&E species section so that such plant species will not be overlooked by the reader

Environmental Consequences

In the impact analysis section of the NEPA document, show the map of vegetation land cover types overlain with the project areas of direct disturbance. Include the tabulation of acreages of disturbance of each land cover type by alternative. Compare and contrast the project alternatives as to their relative vegetation impacts based on their acreage of disturbance, and the relative importance of each vegetation land cover type. Note which impacts to vegetation will be temporary, in that they occur only during construction, and which will be more permanent and last throughout the project's operation. Differentiate between direct and indirect impacts and discuss each. Prepare the vegetation input for a tabular summary of impacts by alternative and the consideration of cumulative impacts.

Include how the actions in each alternative could affect each land cover type. Impacts could be something that enhances the vegetation habitat, such as mitigation, or the impacts could result in degradation of the vegetation cover, such as tree removal. Discuss measures to mitigate impacts to vegetation only after the impacts have been clearly documented and quantified. The preferred approach toward impacts is to first avoid them or, if that is not possible, then to minimize them, and then to mitigate them. In the NEPA document:

- Discuss steps that were taken and/or will be taken in the final design of alternatives to avoid impacts to vegetation
- Discuss steps taken to minimize impacts
- Discuss the types of actions taken to avoid specific patches of vegetation or to minimize the overall acreage of vegetation disturbance, such as:
  - Rerouting alternative alignments
  - Narrowing the ROW
  - Elevating a portion of the ROW
  - Minimizing the size of construction staging areas or confining them to previously disturbed sites
- For impacts that cannot be avoided, discuss mitigation measures such as:
  - Seeding with a native grass/forb mix
  - Planting trees and shrubs per SB40 commitments (1:1 trees, sod fragmentation shrubs)
  - Transplanting (moving particularly important plant populations to areas where they would not be disturbed)
  - Employing water quality control measures during construction by using erosion and sediment control water quality control measures, implementing phased seeding, and containing potential pollutants

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for vegetation.

9.8.3 Noxious Weeds

As defined by the Colorado Noxious Weed Act, the term "noxious weed" means any non-native plant or parts of a non-native plant that have been designated by rule as being noxious or have been declared a noxious weed by the state of Colorado or a local advisory board, and meets one or more of the following criteria:

- Aggressively invades or is detrimental to economic crops or native plant communities
- Is poisonous to livestock
- Is a carrier of detrimental insects, diseases, or parasites
- The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems

Reasons for Evaluation of Noxious Weeds Under NEPA

Why are noxious weeds important?

- Noxious weeds constitute a threat to the economic and environmental value of land, as hundreds of acres of crop, rangeland, roadside, and natural resources, such as habitat for wildlife and native plant communities, are being displaced by noxious weeds each year
- The spread of noxious weeds can be partially attributed to the movement of seed and plant parts on motor vehicles, and because noxious weeds are becoming an increasing maintenance problem on highway ROW in Colorado, and because the ground disturbance caused by construction projects are often colonized by noxious weed species preventing the establishment of native vegetation
- FHWA and CDOT policy and environmental ethic

The Colorado Noxious Weed Act (CRS 35-5.5) requires the control of designated noxious weeds. The Colorado Noxious Weed List categorizes noxious weeds as one of three categories. This list is updated annually and maintained by the Colorado Department of Agriculture in the following document: *Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act* (Colorado Department of Agriculture Plant Industry Division 8 CCR 1206-2). The list is also accessible on the website of the Department of Agriculture's Noxious Weed Management Program.

The noxious weed list categories and their management guidelines are:

- **List A** – All populations of List A species in Colorado are designated for eradication.
- **List B** – All populations of List B species in Colorado should be managed to stop their continued spread. For some of these species, a state noxious weed management plan has been created; in these cases, the management plan must be followed.
- **List** C – Populations of List C species are already widespread. The goal of management of List C species will not be to stop their continued spread but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

The following additional regulations are also related to noxious weed management:

- The Weed Free Forage Crop Certification Act (CRS 35-27.5)
- Rules and Regulations Pertaining to the Weed Free Forage Crop Certification Act
- State of Colorado Executive Order D 06 99 – Development and Implementation of Noxious Weed Management Programs
- State of Colorado Executive Order D 002 03 – Directing State Agencies to Coordinate Efforts for the Eradication of Tamarisk on State Lands
- Federal Executive Order 13112 – Invasive Species

Resource Mitigation and Preventative Control Measures

Measures to eradicate and prevent the establishment and spread of invasive and noxious weeds should be included in all projects, as appropriate. The impact of noxious weeds on other resources in the area (wetlands, T&E species, etc.) should be mitigated according to strategies specific to those resources.

The NEPA analysis should reference potential noxious weed preventative control measures that will be incorporated into the scope, design, and construction processes. As defined in the Environmental Consequences section, the method of control can have an adverse effect on the sensitive environments containing the noxious weeds. The document should address potential impacts of the chemical, biological, and/or mechanical control methods to the surrounding ecosystem. These methods are outlined below:

- **Minimize Soil Disturbance** – By far the most likely place for noxious and invasive weeds to take hold will be areas that have recently been cleared of vegetation and compacted by construction activities.
- **Use of Fertilizer** – Fertilizers should not be used on most projects because of their propensity to increase the growth of noxious weeds. This should be determined in consultation with a landscape architect.
- **Native Plants** – Native grasses and forbs seed will be used on all CDOT ROW for revegetation purposes. Pollinating forb species shall be included in seed mixes. Transplanting and purchasing native shrubs and xeric and salt tolerant trees from nurseries is encouraged whenever feasible.
- **Weed Free Forage Act** – Materials used for a project such as seed, mulch, and fill materials must be inspected and regulated per the Weed Free Forage Act, Title 35, Article 27.5, CRS.
- **Topsoil Management** – Salvaging topsoil from projects is encouraged to increase lant diversity and to retain the existing biotic life. When salvaging topsoil from on-site construction locations, the potential for the spreading of noxious weeds shall be considered. Topsoil should never be salvaged if contaminated by noxious weeds or seeds. Importing topsoil onto the project site should not be allowed unless it is certified weed free.
- **Equipment Management** – Equipment should remain on designated roadways and stay out of weed-infested areas until they are treated. All equipment shall be cleaned of all soil and vegetative plant parts before arriving on the project site.

- **Stakeholder Coordination** – Weed management efforts should be coordinated with local jurisdictional agencies and adjacent landowners to the extent possible.
- Cross-reference other resource topics, such as water resources, vegetation, wildlife, T&E, and floodplains, as necessary.

Integrated Noxious Weed Management Plan

The NEPA document should commit to the creation of an Integrated Noxious Weed Management Plan (INWMP) to be completed during design. Generally, the NEPA document is too early in the process (given the likelihood of weed occurrences to change significantly in a few years) to write a comprehensive weed plan unless project construction is imminent. The INWMP must address the control methods (chemical, biological, preventative, etc.) that will be put in place to limit the spread of invasive and List C species, to stop the continued spread of List B species, and to eliminate the occurrences of any List A species.

This section must discuss the practical efforts CDOT can routinely undertake to mitigate or control impacts from noxious weeds. Describe typical mitigation or control measures corresponding to specific typical impacts. Cross-reference any appendices or websites with more detailed mitigation information, if necessary. Discuss what mitigation plans or reports are necessary and under what conditions.

It is important to include CDOT maintenance personnel in the INWMP early on. CDOT maintenance will be conducting the weed management and they need input as well as to be informed. Involving CDOT maintenance personnel early can ensure that if invasive and noxious weeds are present, they can be controlled or monitored before and after construction.

Other Issues to Consider

Noxious weeds are present on most projects. The following are some additional ideas to keep in mind concerning the control of noxious weeds with pesticides:

- Pesticides and herbicides present an additional environmental hazard that must be analyzed.
- Any individual who applies pesticides or herbicides must be licensed by the state as a Commercial Applicator, Qualified Supervisor, or Certified Operator and must take continuing education courses to maintain their qualification.
- Some pesticides/herbicides may not be used near water or other sensitive areas.
- Always follow the pesticide label for instructions on proper application.

Noxious weed surveys cannot be performed in the winter because accurate identification of species and patch size will be impossible when plants are not in the correct growth stage. Coordination with local agencies should help target which noxious weed species are priorities for control. Many noxious and invasive weed species are already so widespread that effective control is difficult. Moreover, large patches of common noxious and invasive weeds are not as important to control as small infestations of rare noxious weeds. Cross-reference other permit sections or appendices if necessary.

9.8.4 NEPA Document Sections

The content of the noxious weeds section in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

The Affected Environment chapter must include areas adjacent and near the project area, not just the project footprint. The existing vegetative conditions in and adjacent to the project area should be described. The following information should also be provided:

- Plant communities in the project area
- Plant and animal species that occur in the area (including those special status species that have specific regulatory protections and cross-referencing T&E topics)
- Distribution of plant species or plant communities (maps may be useful)
- Sensitive areas that occur in the region
- Agriculture uses in the area

Describe where affected environment information can be obtained and what field work may need to be conducted (and when). Describe what tools are appropriate at what time, for example, when aerial photography can be used and when field surveys may need to be conducted. Also describe any specific reports that may need to be developed and cross-reference or provide links to more detailed information (if it exists). Cross-reference other resource topics, such as water resources, vegetation, wildlife, T&E, and floodplains, as necessary. Tie regulatory requirements to noxious weed information where appropriate.

Affected Environment

The level of detail provided in the Affected Environment discussion should be relevant and related to the level of detail needed in the environmental consequences discussion. If there are no impacts, the Affected Environment discussion should be limited.

Environmental Consequences

The project should address the identification and approximate distribution of all noxious weed species in the study area and analysis of the impact of those noxious weeds on relevant resources in and adjacent to the study area.

Identification and Mapping of Existing Noxious Weeds – The first step in the process is to identify, inventory, and map the location of noxious weeds. If possible, it may be practical to combine the weed mapping with an existing vegetation or wetland survey. The weed survey should include:

- All species designated as List A, B, or C noxious weeds and any other species determined through consultation with county, parks, forest service, BLM, CDOT, and state weeds lists, inventories, and/or weed managers
- Geographical location and extent of infestation (size and density of patch) for each identified patch of noxious weeds
- The results of weed identification presented as both a map and a table, which includes species of weeds, extent, density, regulatory status, and any specific issues related to each weed

Potential Impacts from Invasive Species – Analysis of impacts should include area disturbed by construction and area adjacent to the project. Other questions to consider include:

- What are the impacts if the weeds spread within the project or adjacent to the project?
- Will ground disturbance result in an increase in weeds?
- Will the impacts affect wetland, riparian, or other sensitive habitats?
- Are impacts associated with weed control methods, e.g., herbicides?

The potential for spreading invasive species or noxious weeds from the project into agricultural areas or sensitive ecological areas should also be addressed.

Public Land Impacts – Most of the local, state, and Federal agencies have a policy addressing noxious weeds. If Federal land is adjacent to the project, then the list of prioritized noxious weeds for that agency should be obtained. The impacts of the additional weeds should be addressed in the document.

T&E Species – The document must address the impacts to identified T&E species. Will the presence of noxious weeds displace the listed plant or compete with desirable habitat vegetation? The presence of T&E species in a given area will limit the method of control for noxious weeds. Furthermore, more stringent management practices may be required in a T&E area, such as delineation via signing for controlled application and use of herbicides.

Wetlands and Open Water – The document must address the potential for contamination of herbicides adjacent to wetlands and open water. This requires special attention to recommended aquatic-use only herbicides due to potential leaching of chemicals into the groundwater table and sensitivity to fish and wildlife habitat.

Agricultural – Due to the toxicity of certain noxious weeds to livestock (including horses), bees, or adjacent croplands, address the potential impacts of the weed and use of herbicides on adjacent agricultural lands.

This section in the NEPA document should also describe the predicted environmental impacts of project alternatives on resources in the project area from the continued or further spread of noxious weeds. Impacts to be considered include direct (construction and operational) and indirect impacts. Cumulative impacts should also be considered and included in the Cumulative Impacts section of the NEPA document, if necessary. Provide examples of the types of impacts caused by the spread of noxious weeds. The level of detail included in the NEPA document should be commensurate with the extent and nature of the impacts.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for noxious weeds.

9.9 Fish and Wildlife

The term "fish and wildlife" is typically used to identify aquatic ("fish") and terrestrial ("wildlife") animal species that are of interest. Typically, in a NEPA document, species of interest are confined to selected species of vertebrates (i.e., fish, amphibians, birds, and mammals) and T&E species. The vertebrate species discussed are typically those that are of particular interest to the recreating public (e.g., fishermen, hunters, and bird watchers), are particularly abundant (e.g., mice, squirrels, blue jays, and robins), are at the top of food chains (e.g., coyotes, foxes, cougars, hawks, eagles, and owls), and/or have populations that are in some jeopardy (e.g., prairie dogs and sage grouse). An exhaustive discussion of all fish and wildlife species and/or other species would not be especially practical, of much interest, or of much value.

Fish and wildlife are vital components of ecosystems and contribute to their diversity, provide a source of enjoyment for recreationists, and provide a source of food for people and other animals. It is important that populations of fish and wildlife species and the habitats that support them remain healthy.

The following subsections provide guidance on the treatment of fish and wildlife for CDOT's NEPA projects. The first subsection discusses the process for evaluating fish and wildlife. The second discusses fish and wildlife information that should be in each NEPA document.

CDOT has a Black-tailed Prairie Dog Policy, which can be found at:
https://www.codot.gov/programs/environmental/wildlife/guidelines

9.9.1 Fish and Wildlife Evaluation Process

The CDOT RPEM, resource specialist, environmental project manager, EPB, regional biological specialists, or wildlife biologists are responsible for early identification of fish and wildlife species and their habitats. They are also responsible for determining whether sensitive species may be present in the project area. In fulfilling this responsibility, they may be supported by consultants who collect, evaluate, and summarize data on fish and wildlife.

Fish and wildlife populations should be identified throughout an area that encompasses all project alternatives.

Knowledge regarding how fish and wildlife populations use the habitat in the project vicinity and how humans use these populations will help define the fish and wildlife study area. Thus, the study area identified for animals is typically larger than that identified for plants because animals are mobile.

Whether the species present might include T&E species must also be determined. These species are discussed further in **Section 9.10**.

Fish and wildlife species, their populations, and their habitat within the study area must be identified as early as possible during project planning. This should be done before alternative corridors are selected if possible and must be done before alternative alignments are determined. This enables project designers to try to avoid any critical fish and wildlife impacts before they have progressed too far in developing the alternatives.

The need for field studies should also be determined early in the NEPA process so that they can be conducted at the proper season without undue delay. If field data are required to determine whether particular animal species are present within the study area, such data may need to be collected when the species are most obvious to an observer (e.g., early in the breeding season to hear the singing of songbirds; before deciduous trees have leafed out to detect raptor nests).

Reasons for Evaluation of Fish and Wildlife Under NEPA

CDOT evaluates fish and wildlife resources for several reasons:

- Fish and wildlife are vital components of ecosystems and contribute to their diversity, provide a source of enjoyment for recreationists, and provide a source of food for people and other animals
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To enable compliance with many legal mandates pertaining to fish and wildlife

The regulations and certifications applicable to fish and wildlife resource evaluations are summarized below.

Fish and Wildlife Conservation Act 1980 – Authorizes financial and technical assistance to the States for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. Last amended in 1997.

Wild Bird Conservation Act 1992 – Establishes a new Federal system to limit or prohibit U.S. imports of exotic bird species. Requires the Secretary to periodically review the Convention on International Trade in Endangered Species (CITES) and suspend trade in any CITES listed bird species (CITES, n.d.).

Wetlands Loan Act 1961 – Authorizes an advance of funds against future revenues from the sale of "duck stamps" as a means of accelerating the acquisition of migratory waterfowl habitat. Last amended 1988.

Emergency Wetlands Resources Act 1986 – Authorizes the purchase of wetlands from Land and Water Conservation Fund (LWCF) monies, removing a previous prohibition on such acquisitions. It requires the Secretary to establish a National Wetlands Priority Conservation Plan and requires the States to include wetlands in their Comprehensive Outdoor Recreation Plans. Last amended 1996.

Migratory Bird Conservation Act 1929 – Establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds. Last amended 1978.

North American Wetlands Conservation Act 1968 – Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands among Canada, U.S., and Mexico. Last amended 1998.

Senate Bill 40 Wildlife Certification (CRS Title 33, Article 5) 1969 – Requires any State agency to obtain wildlife certification from CPW when the agency plans construction in "any stream or its bank or tributaries." Latest CDOT guidance 2022.

Migratory Bird Treaty Act 1918 - The statute makes it unlawful without a waiver to pursue, hunt, take, capture, kill, or sell birds listed therein as migratory birds. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs, and active nests. Over 800 species are currently on the list.

Bald and Golden Eagle Protection Act (BGEPA) 1940 - The BGEPA prohibits any form of possession or taking of both Bald and Golden Eagles through criminal and civil sanctions, as well as an enhanced penalty provision for subsequent offenses. Further, the BGEPA provides for the forfeiture of anything used to acquire eagles in violation of the statute.

Conserving Colorado's Big Game Winter Range and Migration Corridors (Executive Order D 2019 011) – This Colorado Executive Order requires CDOT to enable safe wildlife passage, reduce wildlife-vehicle collisions, and incorporate consideration of big game migration into all levels of its planning process, to the greatest extent possible.

Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors (DOI SO 3362, 2020) – This requires BLM, USFWS, and NPS to identify and protect major migratory corridors for big game. It also instructs agencies to avoid development in the most crucial winter range or migration corridors during sensitive seasons, or that would fragment winter range and primary corridors.

In addition, state laws govern how fish, game birds, game mammals, non-game wildlife, and other species can be handled and otherwise impacted. For the most part, these laws govern the handling and intentional take of such species rather than unintentional take or habitat disruption. In addition, CPW has recommendations on buffer zones and seasonal restrictions for Colorado raptors that are viewed as guidance rather than official policy.

Collection and Evaluation of Baseline Information

Collection of Baseline Information

Baseline information on fish and wildlife is needed to generally describe the species that are common and thereby characterize the project vicinity. Baseline information is also necessary to describe in detail the species to which impacts from the project would be of concern.

Because of the mobility of fish and wildlife, the habits and behaviors of potentially impacted species need to be described, as well as their populations and habitats. To provide sufficient information to enable a thorough assessment of project impacts, information must be known for each species present, such as:

- Migration behavior
- Known migration routes and timing
- Breeding locations, behaviors, timing, and cycle length
- Rearing periods for young
- Particular habitat uses for particular life cycles
- Factors that limit the species population
- Areas of contiguous habitat
- Aspects of the species habitat that are critical for its survival

The first step in the acquisition of information on fish and wildlife is to determine what species are likely to be present in the project vicinity. Such information can be obtained from several sources, such as:

- **GAP Data** – Include information on many vertebrate animal species typically associated with the land cover types identified in the state
- **Latilong reports**, published originally by CPW in the 1980s and available in some libraries, indicate the presence/absence of mammals (Bissell and Dillon, 1982), birds (Kingery, 1987), and reptiles/amphibians (Hammerson and Langlois, 1981) in 1 degree latitude and longitude blocks across the state
- **Publications** such as Birds of Colorado (Bailey and Niedrach, 1965), the Colorado Breeding Bird Atlas (1998), Mammals of Colorado (Fitzgerald, Meaney, and Armstrong, 1994), and Amphibians and Reptiles in Colorado (Hammerson, 1982), as well as other publications on animal distribution
- Distributional data from the **Colorado Wildlife Species Database**
- Distributional information from **local CPW personnel**, who should always be consulted
- **CPW's Natural Diversity Information Source**, which provides data on many animal species in the state
- Online data on reptiles and amphibians on **Colorado Herpetological Society's website**
- **Colorado Natural Heritage Program website**, which tracks and ranks Colorado's rare and imperiled species and habitats, not all of which are T&E
- **FHWA Critter Crossing website**
- **FHWA Invasive Species website**
- **USFWS Invasive Species website**
- **NatureServe website**

Several of the above data sources contain information on the populations, behavior, and habitat use of species, as well as information on their distribution and abundance. Additional information can be found online by species-specific searches on sites such as NatureServe Explorer, or additional scientific sites such as The Birds of North America online. Highly scientific data should be needed only for species that are biologically sensitive or of high public interest and that could be severely impacted by the project.

Sources of Fish and Wildlife Data

- Colorado Gap Analysis Project at http://gapanalysis.usgs.gov/data/
- CPW's Natural Diversity Information Source at http://cpw.state.co.us/learn/Pages/Maps.aspx/
- Colorado Herpetological Society at http://www.coloherps.org/
- Colorado Natural Heritage Program at http://www.cnhp.colostate.edu/
- FHWA Critter Crossing at http://www.fhwa.dot.gov/environment/critter_crossings/index.cfm
- USFWS Invasive Species at http://www.fws.gov/invasives/
- NatureServe at http://www.natureserve.org/

Evaluation of Baseline Information

Once data have been collected on the fish and wildlife species documented or likely to be present in the study area, map their likely distribution relative to project components. For many species, this is best done by evaluating them in assemblages that use a common habitat or land cover type. Greater specificity in the assessment of impacts can be gained by assessing how particular species use their habitat and how the project will impact the habitat. Identifying the types of impacts that should be considered can best be understood through a series of examples.

CDOT follows the American Ornithological Society's guidance that every word in the common name of a bird is capitalized (i.e., Yellow-headed Blackbird).

For example, all the species that are likely to use ponderosa pine forests may be assumed to be impacted if project facilities disturb ponderosa pine habitat. Therefore:

- Small mammal species that forage and breed in ponderosa pine habitat are likely to be substantially impacted by road construction because a road will disturb the ground used for all of the mammals' activities. Small bird species that forage and nest in the ponderosa pine trees will be impacted by the loss of individual trees along the road ROW and may also be subject to roadkill, particularly if they feed by darting into the air to catch flying insects, but less so if they feed by gleaning insect larvae from tree bark.
- Large bird species that require large unbroken expanses of forest for successful breeding may be impacted by fragmentation of their habitat, even if the percentage of their home range that is disturbed is very small.
- Species such as big game that move along traditional corridors may suffer considerable impacts if roads cut across this corridor. This can result in considerable roadkill, particularly if the crossroad is in an area with poor visibility for both the game animal and the driver of the car, and if a safe means for the game animal to cross the road is not provided and its use encouraged.
- Species constrained by roadside fences may avoid roadkill impacts but be prevented from reaching traditional use areas. If these use areas are crucial for the species' survival, such as critical winter use areas, animal mortality could be high.
- Populations of amphibians that traditionally breed in a particular pond and disperse uphill from that pond after metamorphosis may be severely impacted if a road is placed on the uphill side of the pond.
- Aquatic species that move upstream or downstream for particular portions of their life cycle may be constrained from doing so if natural stream beds are replaced by culverts that are not conducive to their passage.
- Spawning beds used by aquatic species may be covered with silt or excessively scoured if surface flows are substantially altered by a transportation project.

The above examples are intended to encourage thoughtful evaluation of baseline data collected on fish and wildlife species. During this evaluation, consider what species are present, when they are present, what they are doing while present, and how important this activity is to the survival of healthy populations of the species. Also consider what would be happening on the ground throughout each day during the construction and operation of the project, as well as the permanent

impacts the project would have on the surrounding landscape. Mentally combine these two types of activities in time and space to envision project impacts.

Use of multiple GIS layers can enable calculation of acreages of impact from different project activities on various species groups. However, to be complete, impact evaluation must also thoroughly consider the type and importance of the impact to individual species or species groups. To determine the importance of impacts, consult regional information that may provide context for the project-specific impacts.

Use species-specific guidance to evaluate impacts when it is available. For example, CPW guidance on *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors* (Rossi, 2020) provides species-specific distance recommendations for avoiding surface occupancy near Bald Eagle, Golden Eagle, Osprey, Ferruginous Hawk, Red-tailed Hawk, Swainson's Hawk, Peregrine Falcon, Prairie Falcon, Goshawk, and Burrowing Owl nest sites, and near Bald Eagle winter night roosts and hunting perches.

Once impacts to fish and wildlife species have been thoroughly identified, they should be avoided to the maximum extent possible. This can be accomplished primarily by changing the location of project components or by constructing the project during times of the year when particular impacts can be avoided (e.g., construction during fall and winter could avoid impacts to an active raptor nest that might be disrupted by excessive human construction activity but could tolerate the passing vehicles during project operation). Mitigation measures that enable passage of fish and wildlife to cross the road more successfully will help to avoid roadkill. Many such measures are presented on the FHWA Critter Crossing website. These measures should be implemented to minimize project impacts whenever feasible.

Mitigation measures used to minimize impacts to other resources (e.g., air quality (**Section 9.2**), geologic resources and soil (**Section 9.3**), water quality (**Section 9.5**), floodplains (**Section 9.6**), wetlands (**Section 9.7**), and vegetation and noxious weeds (**Section 9.8**) often benefit fish and wildlife because they mitigate impacts to ecosystem components.

In addition to evaluating the impacts on fish and wildlife from the proposed project, the cumulative impact of that project and other projects must also be assessed. Locate projects that may affect similar fish and wildlife habitats (i.e., land cover types with which species groups are associated) and major traditional use areas (e.g., calving grounds, migration corridors, brood rearing areas, leks, traditional roost or nesting sites). Discuss cumulative impacts to fish and wildlife in general terms, noting which fish and wildlife species, habitats, and activities would be most impacted, their relative importance, and the degree to which impacts from the transportation project considered in the current NEPA document would contribute to the cumulative impacts.

Other Issues to Consider

Wildlife Crossings

When roads cross routes traveled by fish and wildlife species, individuals of some species are sometimes killed, or they may be prevented from crossing and perhaps from completing some aspect of their life cycle. Roads that cross wildlife corridors can also pose a safety hazard for drivers that may result in damage to a vehicle and injury or death to its occupant(s). Section 1119(n) of SAFETEA-LU mandates a study of methods to reduce collisions between wildlife

and motor vehicles, as well as preparation of a report and training on the study results. The FHWA Critter Crossings website addresses this issue. As traffic on roadways increases in volume and density, wildlife/vehicle collisions become an increasingly important adverse impact to drivers, as well as wildlife species.

Consideration shall be given to the connectivity of wildlife habitat in the project area, especially connectivity of habitat for large ungulates that constitute an important safety hazard for the traveling public when roads bisect otherwise connected portions of their range or lie between spring and fall ranges. Some tools for connectivity planning include:

- Land ownership maps
- Vegetation maps
- Topographic maps
- Aerial photos
- Wildlife habitat or range maps
- Roadkill data
- West, East, and Plains Highway Prioritization Studies

Wildlife crossing structures or other mitigating techniques, such as the following and others, can serve to reconnect wildlife habitat divided by a road and reduce the incident of animal vehicle collisions:

- Warning signs
- Box culverts
- Large arched culverts
- Open-span bridges
- Wildlife overpasses
- Wildlife fencing
- Deer/elk guards
- ROW escape ramps

Senate Bill 40 Wildlife Certification (CRS Title 33, Article 5)

Colorado SB40 requires any State agency to obtain wildlife certification from the CPW when the agency plans construction in ". . . any stream or its bank or tributaries…."

In addition to CDPS requirements, CDOT must also evaluate the project for potential impacts to "any stream or its banks or tributaries…" as specified in Colorado SB40. If a project meets any of the criteria in SB40, CDOT must obtain a SB40 Wildlife Certification from the Colorado Division of Natural Resources (CDNR) or CPW before construction begins. Under a MOA between CDOT and CDNR, CDOT projects that do not meet any of the criteria outlined in Section III A of the MOA remain under the jurisdiction of SB40 but are granted a Programmatic SB40 Certification. This Programmatic Certification gives CDOT the authority to proceed with a project 15 days after the CDOT RPEM sends a letter of notification to CPW.

For projects that require a SB40 Wildlife Certification, the CDOT RPEM must submit an application between FIR and FOR, and CPW will complete its review of the application within 30 days and issue the SB40 Certification or request additional information. The application is provided in the MOA.

Other Factors

Other factors to be considered when evaluating baseline data include any regulatory or mitigation actions that may have an effect on a project. These could include things such as officially recognized block clearances for certain species, applicable mitigation banks, such as CDOT's Plum Creek Preble's Meadow Jumping Mouse Habitat Bank, specialized initiatives like the Shortgrass Prairie Initiative or CDOT/FHWA policies that may be more restrictive than a regulation. Applicable *Memoranda of Understandings* with other entities should be sought out and strictly adhered to.

Shortgrass Prairie Initiative
https://www.codot.gov/programs/environmental/wildlife/guidelines/shortgrass-prairie-ba-and-conservation-strategy

9.9.2 NEPA Document Sections

The content of the sections on fish and wildlife in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

The Affected Environment chapter of the NEPA document should:

- Briefly characterize the important fish and wildlife species in the project vicinity and note whether there are any expected impacts from the project
- Justify how a species will or will not be impacted

Impacts could include, but are not limited to:

- Disturbance of habitat due to fragmentation, connectivity, or human encroachment
- Decrease or removal of prey base or foraging opportunities, including changes in the vegetation community
- Decrease or removal of sheltering opportunities either as part of a lifecycle (e.g., a den) or avoidance of predators
- Disruption of historic migration routes
- Increase in water contaminants that may affect species onsite or downstream
- Increase in barriers, including widened highways, guardrails, cement barriers, increased speed or number of vehicles, or increased lighting and noise
- Disruption or alteration of spawning beds
- Disruption or alteration of water regimes, temperature, or chemical makeup
- Disruption or disturbance to known lambing, fawning, or rutting areas

- Removal or depletion of water from the Upper Colorado, San Juan, or Platte River basins, which will affect species hundreds of miles downstream (Standard Platte River Depletion Language is in **Appendix F**)
- Increased competition from species that may not otherwise be a factor

If no impacts are anticipated, the section on fish and wildlife should end there. If impacts to particular species or species groups are expected, the fish and wildlife section must be expanded to include:

- A description of how the species being considered were selected and the basis for how species groups was developed, since every fish and wildlife species cannot be discussed
- Detailed information on distribution, populations, habitat features, and habitat use of these species or species groups
- The timing of particular types of habitat use and behaviors
- A discussion of the importance of maintaining a healthy and sustainable population
- A map of species habitats linked to a tabulation of important species

Environmental Consequences

In the Environmental Consequences section of the NEPA document, discuss project impacts to the species or species groups. Each impact must be described, as it is exhibited in each alternative, as it affects each species or species group. For example, discuss roadkill impacts and describe the effects of the impact and how it may differ among species or species groups as it pertains to each alternative. Then discuss alternatives that have the same roadkill impacts together and contrast those that differ so that similarities and differences in alternatives as to their roadkill impacts on fish and wildlife is clear. Include information on the importance of the impacts to the species or species groups. Impacts on fish and wildlife may be helpful to species, such as mitigation, or harmful, such as removal of high-value habitat.

Senate Bill 40 (SB 40) Certification

Mitigation for SB 40 impacts generally requires creation, restoration, and/or enhancement of impacted riparian (streamside) areas and a SWMP to address construction-related erosion/sedimentation effects. The CatEx must contain a SWMP, mitigation plan, and signed certification from CPW before the RPEM can sign Form 128. However, EAs and EISs usually provide a conceptual mitigation plan and commit to completing the SB 40 application during final design. Wetland and T&E mitigation usually applies to SB 40, and it is helpful to cross-reference the wetland and/or T&E sections of the NEPA document when this is the case.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for fish and wildlife.

Impact/Mitigation Section of NEPA Document

- Discuss impacts by type for species or species groups
- Compare and contrast alternatives within impact type
- Summarize impacts by alternatives for inclusion in final summary of impacts by alternative
- Also consider cumulative impacts by type for species or species groups

9.10 Threatened/Endangered (T&E) Species

T&E species are species that have been listed pursuant to the Endangered Species Act (ESA). The ESA prohibits the unauthorized take of listed species and prohibits Federal agencies from funding or authorizing projects that jeopardize the continued existence of listed species or adversely modify designated critical habitat.

- An endangered species is an animal or a plant species in danger of extinction throughout all or a significant portion of its range.
- A threatened species is an animal or a plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
- A proposed species is an animal or a plant species proposed in the Federal Register for listing under Section 4 of the ESA.
- A candidate species is an animal or a plant species defined by the USFWS as "plants and animals for which the Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development or a proposed listing regulation is precluded by other higher priority listing activities. Conservation of these species is important because they are by definition species that may warrant future protection under the ESA."
- Critical habitat, based on the physical or biological features deemed by the USFWS as essential to the conservation of the species, may be included with the listing of a wildlife or fish species, such as the Colorado River Basin for razorback sucker, Colorado pikeminnow, humpback chub, and bonytail chub.

Additional terms are used to describe species that have low populations but may or may not be formally listed. T&E species and other species with low populations can serve as indicator species that are particularly sensitive to adverse impacts to the environment and, thereby, are indicators of environmental problems. Their gene pool also contributes to biological diversity, uniqueness, and potential. These additional species include:

- **Species of Concern** – An informal term referring to a species that might need conservation actions ranging from periodic monitoring of populations and threats to the species and its habitat to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.
- **Species at Risk** – Any species with status under the ESA and a state's ESA. Other species at risk are those on a state's Fish and Wildlife Department's sensitive species list and a state's Department of Agriculture lists.
- **Imperiled Species** – Any species that is listed as threatened or endangered by the ESA, considered a candidate for listing, or its population is in steep decline.

The two subsections below provide guidance on the treatment of T&E species for CDOT's NEPA projects. The first subsection discusses the process for evaluating T&E species. The second subsection discusses information on T&E species that should be in each NEPA document.

9.10.1 T&E Species Evaluation Process

Because T&E species are plants or animals that have low populations, they have requirements placed on their evaluation that are in addition to the requirements for their evaluation as plants or animals, have limited habitat availability, or have other barriers. As for plants and animals in general, the CDOT RPEM, resource specialist, or environmental project manager are responsible for early identification of T&E species and their habitats and may be supported by consultants. It should be noted that some projects will have far-reaching effects that may impact listed species well outside the construction zone. For example, water depletions can adversely affect species such as greenback trout or humpback chub hundreds of miles from the highway project's location.

Similarly, the study area for T&E species should be defined based on direct and indirect impacts that any individuals of these species might incur from a project. Even more so for these species, the study area should be large enough to enable consideration of all possible direct or indirect project impacts.

T&E species are more rigidly protected than other plant and animal species; the potential impact of a project must be known early. Impacts to T&E species and their designated critical habitat must be minimized to ensure compliance with the ESA. Early knowledge that T&E species and any critical habitat may be affected enables project designers to avoid and minimize impacts to any species before they have progressed too far in developing the alternatives. It also enables any field studies needed to determine the presence/absence of T&E species to be conducted at the correct time.

Reasons for Evaluation of T&E Species Under NEPA

CDOT evaluates T&E species for several reasons:

- Unauthorized take of listed species is subject to both civil and criminal penalties.
- T&E species and their designated critical habitat are ecologically important.
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner.

The following regulations and certifications apply to T&E resource evaluations:

- T&E plant and animal species are subject to all the regulations identified in **Section 9.8** for vegetation and in **Section 9.9** for fish and wildlife. They are also subject to protection under the ESA and subsequent amendments (Endangered Species Act, 16 USC § 35).
- Section 7 of the ESA requires that "each Federal agency . . . in consultation with and with the assistance of the Secretary [of the Interior] insure that any action authorized, funded or carried out is not likely to jeopardize the continued existence of endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . which is determined to be critical . . . unless such agency has been granted an exemption for such action."
- Section 9 lists those actions that are prohibited under the ESA. Unauthorized take of a species listed in accordance with the ESA is prohibited. However, there are processes whereby take is allowed when it is incidental to an otherwise legal activity.

- Whereby an action without a Federal nexus but with a potential to result in the take of a listed species could be allowed under an incidental take permit obtained through Section 10 of the ESA.

Regulations governing interagency cooperation for T&E species can be found in the Joint Counterpart ESA Section 7 Consultation Regulations (Joint Counterpart Endangered Species Act, 50 CFR 402). FHWA Technical Advisory T6640.8A guidance (FHWA, 1987b) includes T&E species among the potentially significant impacts most commonly encountered by highway projects. The state of Colorado also protects T&E species under Non-game and Endangered Species Conservation, CRS Title 33, Article 2 (Non-game and Endangered Species Conservation, CRS 33 § 2).

Collection and Evaluation of Baseline Information Under NEPA

For T&E species, two parallel processes require collection and evaluation of baseline information—compliance with NEPA and with ESA. For CDOT and FHWA, compliance with ESA means initiating consultation with the USFWS when it has been determined that a proposed project may affect one or more federally listed species. If the project is likely to adversely affect one or more federally listed species, formal consultation will be required. FHWA or another Federal agency must then prepare a Biological Assessment (BA). A BA is a document prepared for the Section 7 process to determine whether or not a proposed major construction activity under the authority of a Federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat. The BA must be submitted to USFWS to obtain their Biological Opinion (BO) as to whether the project jeopardizes a listed species or its habitat. A BO is a document stating the opinion of USFWS as to whether or not a Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Further information on the USFWS consultation process can be found in the *Endangered Species Consultation Handbook Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act* (USFWS and National Marine Fisheries Services, 1998).

Collection of Baseline Information

The first step in addressing T&E species is to determine whether such species are impacted by the project. Use online data to obtain information on the following, at a minimum:

- Federally listed T&E species in Colorado (USFWS)
- State listed T&E species (CPW)
- County-specific species lists from the Natural Diversity Information Source (CPW)

Additional information and GIS data on listed species can be found on the following websites:

- USFWS website
- CPW (additional data may be obtained through area biologists)
- Colorado Natural Heritage Program (additional data may be requested via a prescribed process or by contacting CDOT's Wildlife Program Manager)

The latter two organizations also have databases that contain records of specific sightings of the species that they track. Some of these data are available in GIS format and can be plotted together with project features.

In addition, it is possible that some of the T&E species being impacted have critical habitat that has been formally designated by USFWS and is legally protected. Be sure to learn whether the T&E species in the project area of impact have designated critical habitat and obtain a description and map of any such habitat.

Section 9.8 and **Section 9.9** of this Manual may contain additional sources that include information on T&E vegetation and fish and wildlife species, respectively.

T&E Online Resources

- USFWS Colorado Listed Species at https://www.fws.gov/endangered
- CPW Species of Concern at http://cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx
- CPW's Natural Diversity Information Source at http://cpw.state.co.us/learn/Pages/Maps.aspx
- CPW's website at https://cpw.state.co.us/
- CNHP's website at http://www.cnhp.colostate.edu/

Evaluation of Baseline Information

The process used to evaluate baseline information for T&E plant and animal species does not differ from the process used for other plant and animal species populations. However, the rigor with which these processes are applied to T&E species should be greater because of their status. Therefore, it is also important to include:

- Documented records of species occurrence within the influence of the project
- A determination of whether or not there is potential occupied habitat and, if so, to assume the species may be present
- Evaluation of potential project impacts on T&E species, their habitat, and any designated critical habitat

Other Issues to Consider

The information used for compliance with NEPA and ESA must be consistent but may not be identical. For example, in the NEPA document, CDOT and FHWA may decide to highlight all sensitive species in a separate chapter that is titled "Sensitive Species" rather than "T&E Species," while documentation prepared to comply with ESA should address only federally listed species. Less detail may be provided for individual species in the NEPA document as long as the BA is referenced, which means that information on federally listed species in the ESA document can be summarized for the NEPA document.

A BA cannot be completed until one alternative has been selected. The USFWS has 90 days to consult with the applicant once the BA has been submitted. The BA should be submitted to the USFWS 180 days after receipt of a species list from the USFWS. The USFWS has 45 days to issue a BO. These time constraints on BA preparation mean that the formal initiation of the BA should be timed carefully. However, preparation of the species accounts in the BA can begin early in the project because informal lists of the species likely to require addressing in the BA can be obtained from the online sources listed previously. Such detailed species-specific information may benefit the development of project alternatives. Also, because the BA prepared on T&E species must ultimately be approved by USFWS, it is important to coordinate closely with this agency when collecting and evaluating information for the NEPA document.

9.10.2 NEPA Document Sections

The content of the sections on T&E species in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

Determine whether the Affected Environment section on T&E species should include only these species or also discuss other species of concern. Title the section appropriately (that is, sensitive species, species of concern etc.). If other species of concern are not discussed with T&E species, they should be highlighted in the sections on vegetation and fish and wildlife.

Information on T&E species in the Affected Environment chapter should be more detailed and species-specific than what is provided in the sections on other vegetation (**Section 9.8**) and wildlife (**Section 9.9**). Discuss each T&E species separately. Provide specific information on the habitat or critical habitat each of these species occupies, what habitat features it uses, and why this is important to the species' population. The better this information, the more precisely potential impacts to the species can be identified.

Environmental Consequences

One of five findings must be made for listed species or critical habitat:

- No effect
- May affect but not likely to adversely affect
- May affect, likely to adversely affect
- Jeopardize the continued existence of the species or destruction or adverse modification of designated critical habitat
- Beneficial to the species

No consultation is required for "no effect" findings. For a finding of "may affect but not likely to adversely affect," CDOT will informally consult with the USFWS. If USFWS concurs with the finding in writing, the Section 7 process is complete. An "adverse effect," "jeopardy," or "beneficial" finding requires the preparation of a BA and for FHWA or other Federal agency to enter into formal consultation. At the end of formal consultation, the USFWS will issue a BO.

Discuss the impacts to each T&E species separately. Because these species and their designated critical habitat are so stringently protected, determination of precise potential impacts to them will best meet NEPA and ESA requirements and will also benefit the project. After describing each type of impact to a species, note the importance of this impact to the species' population.

As for other resources, discuss alternatives that have the same impacts on a T&E species together and contrast those that differ so that similarities and differences in alternative impacts on a T&E species are clear. Prepare the T&E species input for a tabular summary of impacts by alternative.

For T&E species and designated critical habitat, avoidance of impacts is preferable. If the BA and NEPA document conclude that the project "may adversely affect" the species, USFWS may issue an incidental take statement in the BO. In addition, "reasonable and prudent measures" and "terms and conditions" must be adhered to during project implementation to minimize the incidental take.

If the BA and NEPA document conclude that the project "may adversely affect" the species and the USFWS BO contains a finding of jeopardy and/or adverse modification, the *Endangered Species Consultation Handbook Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act* (USFWS and National Marine Fisheries Services, 1998) outlines the necessary procedure to follow.

The lead Federal agency may:

- Adopt one of the reasonable and prudent alternatives for eliminating the jeopardy or adverse modification of critical habitat in the opinion
- Decide not to grant the permit, fund the project, or undertake the action
- Request an exemption from the Endangered Species Committee (Appendix G in the *Endangered Species Consultation Handbook Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act* [USFWS and National Marine Fisheries Services, 1998])
- Reinitiate the consultation by proposing modification of the action or offering reasonable and prudent alternatives not yet considered
- Choose to take other action if it believes, after a review of the BO and the best available scientific information, that such action satisfies Section 7(a)(2)

The lead Federal agency must notify the USFWS of its final decision on any proposed action that receives a jeopardy or adverse modification BO (50 CFR § 402.15(b)).

In either of the above situations, the process of ESA compliance becomes complex and the project may be severely delayed. The best course is to avoid potential impacts to T&E species whenever possible.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for threatened/endangered species.

9.11 Historic Properties

Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Historic resources frequently encountered during CDOT projects include buildings, roadways, railroads, irrigation ditches and canals, sewers, bridges, and culverts, though historic resources may include other man-made structures.

Refer to the **Colorado Cultural Resource Survey Manual**, **Volumes I and II** on how to conduct a cultural survey.

https://www.historycolorado.org/sites/default/files/media/document/2017/1527.pdf

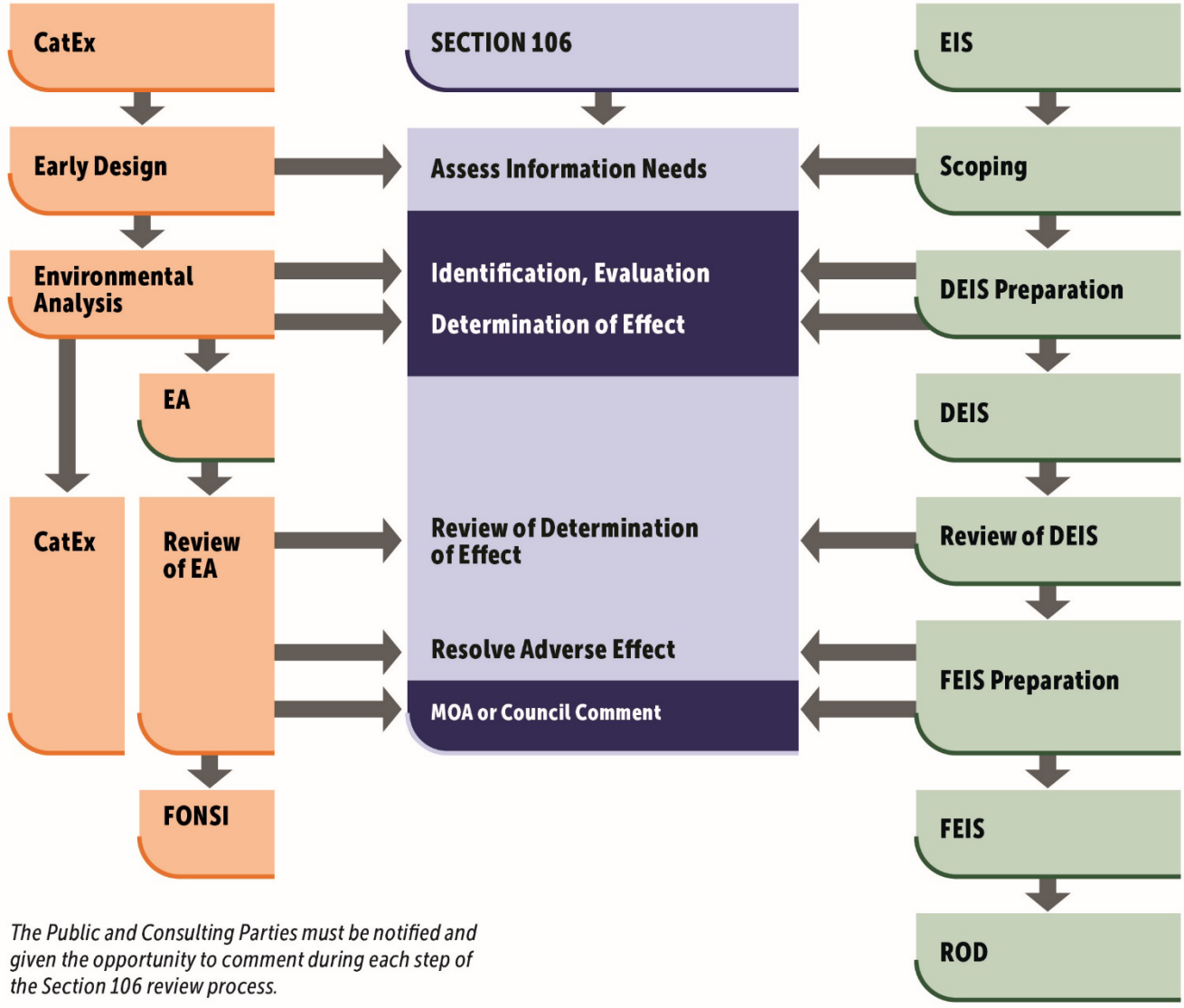
9.11.1 Historic Properties Evaluation Process

Section 106 of the National Historic Preservation Act (NHPA) describes the process that Federal agencies must follow when planning undertakings that have the potential to affect historic properties. This section outlines procedures for identifying and evaluating historic properties as required by Federal and state law. Qualified cultural resource professionals, as defined in the Secretary of the Interior's Professional Qualification Standards, are charged with identifying and evaluating historic properties that have significance and that could be affected by transportation projects facilitated by CDOT.

Cultural resource specialists in consultation with the RPEM and Project Engineers should initiate the evaluation of historic properties. CDOT identifies potential historic properties, recommends determinations of eligibility and effect, and consults with the State Historic Preservation Officer (SHPO), Indian Tribes, Native Hawaiian organizations, and other consulting parties on behalf of FHWA. FHWA has authorized CDOT to make these evaluations; however, FHWA is legally responsible for the findings and determinations made during the Section 106 process (**Figure 9-3**) and also determines whether the work done by CDOT fulfills the intent of the legislation. FHWA is also responsible for ensuring that Section 106 is undertaken early in the planning process to fulfill public coordination and SHPO review requirements. Otherwise, the agency may be unable to document that it has fulfilled its responsibilities under Section 106, causing issues for CDOT later in the process. Issues that can arise from improper Section 106 documentation include legal challenges that can delay or stop a project.

Identification and evaluation of historic properties must be conducted during the initial planning phases of the project. This includes when alternatives for the proposed action are first being designed and developed. By taking alternatives into account at the planning stage, there is an opportunity to avoid or minimize effects to historic properties and less chance of delays in the NEPA process due to undiscovered historic properties.

Figure 9-3. Coordination Between NEPA and Section 106



Reasons for Evaluation of Historic Properties Under NEPA

CDOT is required by state and Federal law to identify and evaluate the significance of historic properties before commencing work related to transportation construction and maintenance activities that could potentially impact historic and/or archaeological resources. FHWA has authorized CDOT to make these evaluations. Several state and Federal regulations direct the evaluation and protection of historic properties.

36 CFR 800, Protection of Historic Properties (the regulations implementing Section 106) – Any undertaking that may result in alterations to features of a property's location, setting, or use may constitute an impact depending on a property's significant characteristics, transfer, or lease. As defined in 36 CFR 800.16(y), an undertaking is "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval." Adverse effects can occur when historic properties listed on or eligible for listing on the NRHP are subjected to any of the following:

- Physical destruction or alteration of all or part of the property
- Isolation of the property or alteration of the property's setting when that character contributes to the property's qualification for the NRHP
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting
- Neglect of a property, resulting in its deterioration or destruction
- Transfer, lease, or sale of the property

Local jurisdictions may also have their own ordinances and regulations that must be followed. CDOT Cultural Resources staff must coordinate with the counties, cities, and other jurisdictions where the undertaking will or may affect historic properties.

Time Frames for the Section 106 Process

The following are average time frames for completion of the Section 106 process, from notification to completion, if all necessary information is provided in a timely manner and there are no issues:

- Adverse Effect – 6 months or more
- No Adverse Effect – 4 months
- No Historic Properties Affected – 2 months

Note: These time frames do not include Section 4(f) evaluations, which are detailed in **Section 9.20**.

Collection and Evaluation of Baseline Information Under NEPA and Section 106

Section 106 of the NHPA outlines procedures to determine the effects of a project on historic properties. The Section 106 and NEPA processes must be coordinated (**Figure 9-3**) to ensure that information about the presence and effects to historic properties is included and considered in the NEPA analysis.

Section 106 involves a four-step process that agencies must follow to assess NRHP eligibility of historic properties and potential impacts to them.

CDOT's process is described in the CDOT *Archaeology and History Analysis and Documentation Procedures* (CDOT Procedures Manual) (CDOT, 2018a), available online at:

https://www.codot.gov/programs/environmental/archaeology-and-history/cultural-resources-procedures-manual/view.

A summary of the four steps is provided below.

- **Step 1: Establish the Undertaking and Initiate Consultation with Participants in Section 106**. Step 1 involves identifying and coordinating with any interested or consulting parties, such as members of certified local governments, local historical societies, museums, historic preservation commissions, or other knowledgeable groups/individuals.
- **Step 2: Identify Historic Properties**. Step 2 involves determining whether any resources that may be affected by an undertaking have the potential to be eligible for listing on the National or State Registers of Historic Places. It is not necessary for a resource to be listed on the NRHP to be afforded protection under the law, as eligible properties are also protected. Activities include:
  - Determine Undertaking's Area of Potential Effects (APE)
  - Determinations of Eligibility for National or State Registers
- **Step 3**: **Assess Effects**. EPB or Regional Senior Historian, EPB Senior Archaeologist or cultural resource consultant applies the criteria of adverse effect to any eligible or listed historic properties within the APE. SHPO consultations are required. There are three kinds of effects findings:
  - No Historic Properties Affected
  - No Adverse Effect
  - Adverse Effect
- **Step 4: Resolve Adverse Effects**. In consultation with SHPO and consulting parties, develop strategies that avoid, minimize, or mitigate adverse impacts to historic properties but also meet the basic objectives of all interested stakeholders. The execution and implementation of the stipulations in an MOA provide evidence of FHWA's and CDOT's compliance with Section 106.

NRHP Eligibility Criteria

- Association with significant events
- Association with significant people
- Association with technological, engineering, or architectural significance
- Ability to yield information about prehistoric or historic site

Coordination of Section 106 and NEPA

According to 36 CFR 800.8, the NEPA process and documentation can be used for Section 106 purposes if the agency official has notified in advance the SHPO/ Tribal Historic Preservation Officer (THPO) and the Advisory Council on Historic Preservation (ACHP) that it intends to do so. The documentation must meet the standards set forth in 36 CFR 800.8 (c) (1) through 36 CFR 800.8(c)(5). Coordinating the Section 106 process within the context of NEPA processes provides an opportunity to streamline the approach to historic properties compliance, especially for projects that will or may have complex historic or archaeological resource issues. FHWA and CDOT will determine the utility of this approach early in project planning and will coordinate closely with the SHPO and ACHP. Although this process is available for use, FHWA and CDOT have found that it has had limited value in streamlining for the projects for which it has been employed.

Consultants conducting field work should review the CDOT Procedures Manual available at: https://www.codot.gov/programs/environmental/archaeology-and-history/

Native American Consultation

As stipulated in the NHPA and the revised ACHP regulations, Federal agencies must afford the Native American community a reasonable opportunity to comment on and participate in Federal undertakings in the context of the Section 106 process. Federally recognized Tribes are, by law, considered sovereign nations and as such FHWA is obligated to initiate government-to-government cultural resource consultations on transportation projects when Federal funding or a Federal action is involved.

Consultation under the Colorado Register of Historic Places Act (CRS 24-80.1 and 8 CCR 1504-5)

The Register of Historic Places Act (CRS 24-80.1) states that the planning and activities of state agencies must consider the preservation of historically significant cultural resources of the state. It also outlines how state agencies should evaluate actions that have the potential to affect properties eligible for or listed in the State Register of Historic Places (SRHP). The Rules and Procedures implementing the Act (8 CCR 1504-5) include guidance regarding the evaluation of properties for State Register eligibility, how to assess effects, and consultation with the State Historical Society.

CDOT conducts consultation under the Register of Historic Places Act when projects are state funded (i.e., lack Federal funding or another nexus) and when there is the potential to affect CDOT-owned properties that may be eligible for or listed in the SRHP. CDOT also conducts the state register process for permits (e.g., special use, access, utilities) when appropriate. This process is not typically addressed in the context of NEPA. However, there may be properties that are identified as listed or eligible on the State Register that may be evaluated under Section 106 and sometimes there are projects that are state funded but require a Federal permit and Section 106 is carried out by the lead Federal agency and CDOT facilitates a State Register consultation.

Step 1: Initial Consultation and Participants

The Register of Historic Places Act requires state agencies to notify the State Historical Society of proposed actions that have the potential to affect properties that are listed in the SRHP. CDOT includes this notification, along with eligibility and effect determinations, in a letter to the SHPO. As with Section 106 consultation, CDOT has identified the SHPO as the point of contact for the SRHP consultation process.

The state act does not specifically require consultation with local interested parties or Certified Local Governments. However, following the protocol outlined in the CDOT Environmental Stewardship Guide (2017a) and as appropriate, cultural resources staff may include interested parties in the consultation process to ensure that they are aware of the project and have an opportunity to provide information about resources that may be affected by the proposed action.

Although state law does not reference the development of an APE, the Act does require state agencies to identify properties within "the area of proposed action" (24-80.1-104). For state-funded projects, CDOT does not request SHPO agreement regarding the "area of proposed action" but does provide a map or graphic depicting this area to clarify the project and resource locations.

Step 2: Identification of Properties

Step 2 involves determining if resources affected by a state-funded action have the potential to be eligible or listed in the SRHP. The EPB or Regional Senior Historian, or EPB Senior Archaeologist, will evaluate the property to determine if it meets one or more of the Criteria for Nomination as outlined in the NRHP Act:

a) The association of such property with events that have made a significant contribution to history;
b) The connection of such property with persons significant in history;
c) The apparent distinctive characteristics of a type, period, method of construction, or artisan;
d) The geographic importance of the property;
e) The possibility of important discoveries related to prehistory or history.

Criteria for Nomination a, b, c, and e are similar to the NRHP Criteria for Evaluation (NRHP Criteria). Criterion for Nomination d (geographic importance of the property) is not addressed by the NRHP criteria. State Criteria also do not include NRHP Criterion Considerations A through G, which cover exceptional situations, including cemeteries, birthplaces, churches, reconstructed structures, memorial or commemorative structures, and structures less than 50 years old. CDOT determines if a property meets the Criteria for Nomination and consults with the SHPO to determine if the properties are significant.

Step 3: Evaluation of Effects

The Register of Historic Places Act includes guidance on how to assess effects and consult with the State Historical Society about those effects. The Act defines an "effect" as "any change in the quality of the historical, archaeological, or architectural character that qualifies the property for entry in the state register." Unlike Section 106, the degree of effect (adverse effect, no adverse effect, no historic properties affected) is not defined in the state laws, but CDOT uses these categories to describe effects when consulting for state-funded actions.

The Act outlines the process by which state agencies consult regarding eligibility and effects. State agencies are required to notify the State Historical Society of the proposed action, identify properties within the area of the proposed action, request a determination of effect on properties, and afford the State Historical Society 30 days to review the proposed action. If there is disagreement over a finding, the state agency has 30 days to negotiate an agreement with the Historical Society. If no agreement is reached during this time, the governor makes the final determination.

CDOT has modified the consultation process so that CDOT, not the State Historical Society or SHPO, determines the significance of the property and whether there is an adverse effect. CDOT submits these determinations and requests concurrence from SHPO. If there is agreement regarding the eligibility of the resource and there is a finding of no adverse effect, the consultation process is complete.

Step 4: Resolution of Adverse Effects

The state act does not require mitigation for adverse effects. However, when an adverse effect to a property is identified for a state action, CDOT may determine that mitigation is appropriate. If so, CDOT includes mitigation recommendations in a letter to SHPO and provides SHPO an opportunity to review the final mitigation. Because there is no Federal involvement for state funded actions, it is not necessary to notify the ACHP of adverse effects and there are no requirements to execute a formal MOA. Once mitigation has been completed and reviewed by SHPO, the consultation process under the State Register of Historic Places Act is complete.

9.11.2 NEPA Document Sections

The content of the sections on historic properties in the Affected Environment and Environmental Consequences chapters is discussed below. For projects having complex historic properties issues, these sections shall contain subsections on “Historic Resources,” “Archaeological Resources,” and “Native American Consultation.”

Affected Environment

Brief but thorough data specific to the historic properties within the APE must be presented. The Affected Environment chapter must contain all relevant information related to the status and disposition of historic properties in the study area and omit data that has no bearing on the transportation decision ultimately made as a result of the FONSI or ROD. Depending on the document and the resources present in an APE, historic and archaeological resources can be discussed either jointly or independently.

Other guidelines to be considered include using data tables whenever feasible, especially if many properties are present. Lengthy narrative site descriptions should generally be avoided. An adequate document will also be specific when discussing effects and proposed mitigation of adverse effects for NRHP eligible or listed sites. Discussion shall focus on properties that require protection under the law (i.e., are eligible) and exclude information regarding non-NRHP eligible resources. Referring to the appropriate technical document or survey report is acceptable.

Environmental Consequences

This chapter of the NEPA document summarizes the efforts taken during the Section 106 evaluation process and any findings. In some cases, this will involve discussing alternatives that have the same historic property impacts together and contrasting those that differ so that similarities and differences in impacts are clear. Effects on historic properties as a result of alternatives must be quantified as specifically as possible. All interagency correspondence documenting the evaluation should be attached as an appendix to the NEPA document.

As shown on **Figure 9-4** (in **Section 9.20**), one of the steps of the Section 106 evaluation process is the resolution of adverse effects. Summarize strategies identified to avoid, minimize, or mitigate adverse effects to historic properties in this section.

Basic information to include in a NEPA document includes:

- Brief overview of the "whys and whats" of Section 106
- Brief summary of SHPO and consulting party consultation regarding methodology(s) and development of the APE, file searches, and field inventory(ies)
- The number and types of historic properties, and under which NRHP criteria they are eligible

NRHP-eligible archaeological sites are sensitive resources that are exempt from the provisions of the Freedom of Information Act (FOIA), and as such should never be reflected on maps or otherwise have specific locational data included in a NEPA document. Historic built environment resources, however, can and should be illustrated on mapping, including the APE boundary.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for historic properties. Under Section 106, only properties that result in an adverse effect require mitigation.

9.12 Paleontological Resources

Paleontological resources constitute a fragile and nonrenewable scientific record of the history of life and related natural processes on earth. These resources include vertebrate, invertebrate, and plant fossils. In Colorado, plant and animal remains found in deposits post-dating the end of the Pleistocene Epoch (approximately 11,700 radiocarbon years ago), at which time modern fauna and flora were established and human occupation is well-documented, are not considered paleontological in nature. For the purposes of this Manual, paleontological resources include fossils, associated radiometrically- and/or paleomagnetically-datable rocks, sediments, or organic matter, and the physical characteristics of the fossil's associated sedimentary matrix.

The following subsections provide guidance on the treatment of paleontological resources for CDOT's NEPA projects. The first subsection provides guidance for evaluating paleontological resources. The second subsection outlines paleontological information that will be in each NEPA document.

Paleontology Regulations and Guidance

Historical, Prehistorical, and Archaeological Resources Act (Colorado Revised Statute 24-80-401 ff, aka State Antiquities Act)

- The Act protects all fossils on state owned lands and lands controlled by any subdivision of state government.

Federal Land Policy and Management Act (FLPMA) of 1976 (USC Title 43, Section 1732)

- This section authorizes the Secretary of the Interior to issue regulations providing for the use, occupancy, and development of public lands through leases, permits, and easements.

Paleontological Resources Preservation Act (PRPA) of 2009 (16 USC 470aa-aaa11)

- This Act requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on Federal lands using scientific principles and expertise.

9.12.1 Paleontological Evaluation Process

The RPEM (or their designee), in association with the CDOT Staff Paleontologist, will initiate the evaluation of paleontological resources.

Generally paralleling the archaeological program, paleontological clearances are required to proceed to construction, commence maintenance activities, or initiate materials excavation. This applies to all projects that propose any effect of the existing road prism, all CDOT-provided materials sources, and those materials sources adjacent to interstates where direct contractor access to the roadway is an issue. Previous disturbance, including cutting and even paving of an area to be impacted, does not automatically relieve the responsibility to consider potential affects to paleontological resources, particularly on projects where excavation to previously undisturbed bedrock is anticipated. Typically (although not exclusively), the scientific importance of paleontological resources is not as intimately tied to their precise original location (as in the case of archaeological resources), so that even surface finds of fossils in previously disturbed areas can be of scientific importance; however, location information is extremely useful if available.

The paleontological evaluation will be conducted when alternatives for the proposed action are first being designed.

Reasons for Evaluation of Paleontological Resources Under NEPA

The law does not explicitly state the requirements to locate and assess the scientific importance of fossils on state- and Federal-owned lands. However, state law is implicit in its requirement to avoid any damage to, or destruction or removal of, the resource without a permit.

The CDOT Staff Paleontologist, or any paleontological consultant working for CDOT, must be named on a current State of Colorado permit to search for and collect fossils on state-owned lands. Permits are obtained from the OAHP in Denver. FHWA considers protection of fossils on FHWA-funded projects a NEPA issue, but the extent of work required to protect the resource is based on the degree of protection afforded by each state's laws.

For highway projects that cross BLM-administered lands, BLM uses the Federal Land Policy and Management Act (FLPMA) of 1976 and the Paleontological Resources Preservation Act (PRPA) of 2009 to regulate the collection of fossils. The CDOT Staff Paleontologist, or any paleontological consultant working for CDOT, must be named on a current State of Colorado BLM fossil collecting permit to collect fossils on BLM-administered lands in Colorado. Permits can be obtained from the Colorado State Office of the BLM in Lakewood.

For highway projects that cross USFS-administered lands, fossil collection is regulated under the PRPA of 2009. The CDOT Staff Paleontologist, or any paleontological consultant working for CDOT, must hold a current USFS Special-Use Permit to collect scientifically significant fossils on USFS-administered lands in Colorado.

Paleontological Reports Authored by Consultants

Consultant reports are typically expected to provide a more detailed account of the factors described under Step 1 than is typical of in-house reports because the CDOT Staff Paleontologist keeps more detailed data on file where it is readily accessible for CDOT's use.

Consultant reports will include two copies of any newly recorded fossil localities and previously recorded fossil localities for which a field survey has provided additional locality data for insertion in the CDOT Staff Paleontologist's files. Consultant reports should be submitted in electronic format.

Collection and Evaluation of Baseline Information Under NEPA

The paleontological clearance process consists of four steps: (1) initiation of paleontological clearance, (2) initial research, (3) on-the-ground reconnaissance, and (4) report of results.

Step 1: Initiation of a Paleontological Clearance

To initiate a paleontological clearance, the RPEM sends a request and accompanying data to the CDOT Staff Paleontologist. A request for paleontological clearance will provide the following information, at a minimum:

- Project name and number
- For a linear highway project, its beginning and ending mileposts
- For a linear highway project, the width of the corridor requiring clearance, measured each direction from centerline (if the corridor to be cleared is the existing ROW only, stating that fact is sufficient)

- For a materials source, its location in relation to the nearest highway milepost
- For a materials source, its legal location, either descriptive or plotted on a 1:24,000 scale topographic map
- For a materials source, the dimensions of the area for which clearance is being requested
- For any excavation, estimated depth of anticipated disturbance
- Copies of any pertinent, signed rights-of-entry forms
- A proposed clearance due date

When available, plan, profile, and cross-section sheets are a valuable data source that aids in the paleontologist's assessment of the nature and scope of proposed effects to known and potential paleontological resources. Shapefiles or KML/KMZ files outlining the project area will help expedite the initial evaluation of the project. If not provided with a paleontological clearance request, the reviewing paleontologist may request them.

Step 2: Initial Research

Upon receipt of a paleontological clearance request, the paleontologist conducts a search for pertinent published and unpublished research data. This includes researching the availability of geologic map data relevant to the proposed linear highway project corridor or materials source. This initial research may reveal that a proposed linear highway project corridor or materials source does not require on-the-ground reconnaissance for paleontological resources. This is usually because there is no potential fossiliferous geologic unit cropping out at or near the existing ground surface within the proposed project footprint. The paleontological assessment must include use of the best (usually, the largest-scale available) geologic maps in identification of geologic units encountered or expected to be encountered during paleontological survey. When CDOT requests a consultant to conduct a paleontological study, CDOT's Staff Paleontologist is available for consultation on the availability of geologic maps.

In addition to searching published and unpublished literature, a previously recorded fossil locality search is conducted, typically with a major repository museum in Colorado in a location relevant to the project. Federal agencies may also require that their fossil locality databases be consulted when a survey is conducted on CDOT ROWs that intersect federally owned lands. When CDOT requests a consultant to conduct a paleontological study, CDOT's Staff Paleontologist is available to facilitate these searches, if necessary. The CDOT Staff Paleontologist will also be consulted to determine other fossil localities known to them but not recorded in either of the above-cited museum databases (e.g., USGS fossil localities cited in USGS Bulletins, Professional Papers, and various geologic map series).

Step 3: On-the-Ground Reconnaissance

If determined to be necessary, a site visit and visual survey on state-owned lands must search out not only vertebrate fossils but also macroinvertebrate (i.e., non-microscopic animals without backbones) and macropaleobotanical (i.e., plant remains other than pollen) fossils. Federal agencies may require consideration of possible effects to vertebrate fossils only where CDOT ROW intersects federally owned lands. Intermittent shallow subsurface sampling of bedrock exposures where plant and/or invertebrate fossils may be buried will be necessary. This should include cracking of limestone concretions common in some marine shale and sandstone lithologies and probing for leaf fossils in locations where literature search and on-the-outcrop experience indicate

that they may be present. Vertebrate fossil searches may be conducted by surface examination alone.

Step 4: Report of Results

The CDOT Staff Paleontologist provides reports to the appropriate RPEM. Report text, at a minimum, includes:

- The linear highway project location, with milepost limits and legal location of the endpoints of the linear survey to the quarter-quarter-quarter-quarter section, or the materials source location, located legally and in relation to the nearest highway milepost
- Date(s) of on-the-ground reconnaissance (when applicable)
- The bedrock units known to crop out within the proposed linear highway project or materials source limits and the source(s) of that geologic data
- The results of on-the-ground reconnaissance, including identification of any newly recorded and/or relocated previously recorded fossil localities
- An assessment of all identified fossil localities' scientific significance
- A recommendation for further paleontological investigation prior to NEPA clearance or clearance to proceed to project construction, commence proposed maintenance work, or initiate materials excavation. If appropriate, the clearance to proceed to project construction, commence proposed maintenance work, or initiate material excavation will include stipulations for mitigation of impacts to paleontological resources during project construction or completion of proposed maintenance work or materials excavation.

New fossil localities identified during field reconnaissance and previously recorded localities for which field survey has provided additional data are recorded on fossil locality data sheets. These data sheets are provided by the institution designated as the repository for specimens collected under the Office of Archaeology and Historic Preservation (OAHP) permit issued to CDOT or the paleontological consultant. Federal agencies may require separate recordation of fossil localities identified on federally administered lands.

Other Issues to Consider

Although OAHP is responsible for enforcing the State Antiquities Act and, by inference, reviewing reports of surveys addressing CDOT's efforts to satisfy the act, OAHP has delegated report review responsibilities to the CDOT Staff Paleontologist. OAHP only requires that the CDOT Staff Paleontologist provide annual lists of clearance reports and fossil localities identified and specimens collected.

9.12.2 NEPA Document Sections

The content of the sections on paleontological resources in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

Information from the paleontological assessment report is used to provide a brief summary in the NEPA document of the paleontological resources located within the APE, along with a brief description of those resources likely to be impacted. An EA or EIS typically includes only one to three paragraphs concerning paleontological resources in the Affected Environment chapter. Lengthy narrative fossil locality and geologic unit lithology descriptions should be avoided. If a special issue of concern is raised in the paleontological assessment report, additional information may be necessary and appropriate. In most instances, only a brief summary of the geological and paleontological data presented in the paleontological assessment report need be included in the Affected Environment chapter. If applicable, the basis for determination of identified fossil localities' scientific significance will be provided. Also, the basis for concluding that there will likely be no effects to scientifically important paleontological resources should be provided. Paleontological sites are sensitive resources that are exempt from the provisions of the FOIA and must never be reflected on maps or otherwise have specific locational data included in a NEPA document.

A NEPA document will discuss any special concerns that will require further study during the final design phase of planned construction projects within the project study corridor. Final design may be important in determining the nature and scope of any mitigation efforts required during construction. Specific subsurface soil, bedrock, and groundwater conditions that may be relevant to the nature and scope of mitigation efforts are determined at that time for use in preparing construction plans.

Environmental Consequences

The Environmental Consequences section of the NEPA document summarizes the efforts taken during the paleontological clearance process. Discuss alternatives that have the same paleontological impacts together and contrast those that differ so that similarities and differences in alternative paleontological impacts are clear. All interagency correspondence documenting the evaluation should be attached as an appendix to the NEPA document.

Effects to scientifically significant fossil localities are mitigated by avoidance and/or further collection and documentation of their associated resources. Paleontological mitigation may consist of controlled salvage excavation prior to linear highway project construction or materials source excavation, but more typically mitigation is completed through on-site monitoring of highway construction or materials excavation into bedrock deposits known to produce scientifically important fossils.

Mitigation through on-site monitoring includes the collection of any scientifically important fossils and associated scientific data uncovered during major construction or materials excavation. On-site monitoring typically is the mitigation strategy adopted when (1) potentially fossiliferous bedrock is not exposed at the ground surface prior to major construction or materials excavation, but will likely be uncovered during these efforts, and (2) fossil density at previously identified scientifically

significant fossil localities is such that controlled excavation prior to construction will not produce enough important fossils to represent a statistically valid sample in a timely and cost-effective manner. CDOT may request a paleontological consultant to conduct mitigation efforts, but such efforts will be under the direct supervision of, and/or in close cooperation with, the CDOT Staff Paleontologist.

The NEPA document will discuss concerns to be studied in depth during the final design phase of future construction projects. Final design may be an important phase in determining the nature and scope of any mitigation efforts required during construction. Specific subsurface soil, bedrock, and groundwater conditions that may be relevant to the nature and scope of mitigation efforts are determined at that time, for use in preparing construction plans.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for paleontological resources.

9.13 Land Use

Land Use, Social Resources, and Economic Resources can be combined into a single technical report or memorandum, as appropriate, and in consultation with the CDOT Environmental Manager.

The way in which land is developed and used for various activities (e.g., residential, commercial, industrial, parks and open space) affects quality of life and the environment. Land use topics include designations created by a state, county, or city through land use plans (general plans, comprehensive plans, etc.); zoning; future land use and growth management areas; conservation easements; urban infrastructure service boundaries; annexation plans; and past, existing, and future development trends. The planning, design, and construction of roads and highways, as well as other transportation modes, are often based on land use development patterns and trends and affect existing land uses and plans and proposals for future development. Safe and efficient travel, whether by walking or taking public transportation, a car, an airplane, or a bike, is also influenced by the types and patterns of land uses.

The following subsections provide guidance on the treatment of land use for CDOT's NEPA projects. The first subsection discusses the process for evaluating land use. The second subsection discusses land use information that should be in each NEPA document. In addition, the introduction to this section of this Manual provides guidance on the treatment of resource-specific information that is the same for all resources.

9.13.1 Land Use Evaluation Process

The CDOT project team is responsible for reviewing land use in the area of potential impact and consulting with local agencies.

The current land use and future planned and proposed land uses should be assessed and evaluated for their consistency with the approved local government comprehensive development.

The land use evaluation should be completed when alternatives for the proposed action are first being designed and developed, even if that occurs before the formal initiation of the NEPA process.

Reasons for Evaluation of Land Use Under NEPA

CDOT evaluates land use for several reasons:

- Its importance in a community and to a local agency
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

There are no land use specific regulations that FHWA and CDOT must comply with; however, the land use discussion should assess the consistency of the alternatives with the comprehensive development plans adopted for the area and (if applicable) other plans used in the development of the transportation plan required by 23 USC 134.

Collection and Evaluation of Baseline Information Under NEPA

Information on existing and planned and proposed land use is typically available from regional and local governments and MPOs, if applicable. County and city governments typically have land use plans that document existing and planned future land use within their legal geographic limits. Depending on the locale, these data may be available from the county or city planning department's website, in hard copy publications, or, preferably, from their GIS group. For largely rural areas, planning departments may have less data and generalized statewide data may need to be used. Use these sources to obtain information on the type of land use (i.e., urban, suburban, parks, agricultural, pastureland, riparian corridors, or unused grassland, shrubland, or forest). For urban and suburban land, obtain data that differentiate light industry, heavy industry, commercial, retail, and residential uses, if available. Also useful is information on residential density and Transit Oriented Development (TOD) whether the dwellings provide single family or multi-family housing. Map this information together with project facilities and provide further information on the mapped categories in tables. Coordinate the information obtained with land use information used in addressing noise impacts (**Section 9.23**). The data used in these two sections may differ in level of detail but should not be inconsistent.

Regional government entities also compile and analyze current and future land use information. In many instances, future land use assumptions at the regional level differ from those at the local level. Both figures can be used, but regional figures are often required for NEPA traffic, noise, and air quality analysis purposes. If differences are substantive, differences should be identified.

To assess the impacts of the project on land uses, envision what will happen during construction and operation of each project facility and how that activity will affect the ongoing uses of the adjacent land and future plans for changes in land use. Often, the need for a transportation project will have been identified by the county or city government, which would therefore have been involved since the very early planning of the project. Implementation of some projects may induce growth beyond what has been anticipated by the local planning departments.

Induced growth is an indirect impact that occurs when a project causes changes in the intensity and integrity, location, or pattern of land use. For transportation projects, this results from changes in accessibility that influence where development occurs. Induced growth impacts may be analyzed by modeling or by a round-table approach involving agency staff members, businesspeople, and citizens particularly well-informed regarding existing and future land use, restrictions to growth, the location of developable land, infrastructure, population and economic growth trends, and transportation systems and planned improvements, including the proposed project. However, CDOT typically should be reacting to growth and local growth plans and not inducing growth as part of the purpose or needs of the project.

If the transportation project will potentially affect adjacent land uses, work with the county and city government and the local citizens to develop acceptable mitigation measures. Measures such as elevated or depressed roadways, berms, or walls to constrain sight of and noise from the project come with a cost that must be balanced against their benefit to the nearby community.

Other Issues to Consider

Because induced growth has the potential to affect many aspects of a community in addition to its land use (e.g., the economy, existing transportation network, future growth plans, community diversity and composition), extensive public involvement (Chapter 7) may be required to characterize, evaluate, and help develop mitigation for potential impact. This has implications on the project's early planning, budget, schedule, and community buy-in.

9.13.2 NEPA Document Sections

The content of the sections on land use in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

Typically, two areas are discussed in detail under the land use section: existing and future land use and consistency with local government land use planning. The level of detail provided in the document depends on the complexity of the project area and its surroundings. The section should discuss how the project will or will not meet the Statewide Long Range Transportation Plan and the local comprehensive plan, as well as any possible differences in the objectives of Federal, regional, state, and local land use plans and controls for the area concerned.

Existing and Future Land Use

This section should describe the existing and planned future land use in the project area. It should also discuss any access requirements (acceleration/deceleration lanes, signalization, etc.) imposed by a new development and any required traffic impact fees of current development trends in the project vicinity and the community at large. In discussing development trends, this section should provide:

- The development name(s)
- The development's status (i.e., existing, under construction, or proposed)
- The development's size (i.e., area, type of use, density)

If the document is an EIS, this type of information is usually found in the Affected Environment chapter. The level of detail should be appropriate to enable evaluation of the impact potential of the proposed action.

Consistency with Land Use Planning

In addition, the land use section must describe the state and local government plans and policies regarding land use controls and community growth management in the project area. This discussion should entail a brief overview of existing land use and growth management planning for the county and/or city.

The goal of this portion of the land use section is to ensure that the reader gains a clear understanding of the prevailing land use and growth management policies practiced in the county and/or city, substantiated by the state, community growth patterns and values, economic incentives, and conservation/preservation areas.

In discussing the policies of the county and/or city and state regarding land use controls, this section should also show how the existing community has grown and expanded, consistent with these plans and policies or otherwise. The section should reference appropriate sections of the approved local government comprehensive plan, community services element, and other areas that would substantiate the information presented. Where conflict exists among these policies and/or land usages within the community, these areas should be identified.

Environmental Consequences

The land use section of the Environmental Consequences section should assess and evaluate the consistency of each alternative for the proposed action with the approved local government comprehensive development plan and, if applicable, other plans used in the development of the transportation plan required by Section 134. In discussing the consistency of the proposed action with local planning, evaluate how the development of various project alternatives will directly contribute to changes in land use in the project area.

The secondary social, economic, and environmental impacts of any substantial foreseeable induced development should also be presented for each alternative to determine its importance in a community. Where possible, the distinction between planned and unplanned growth should be identified.

Section 9.27 discusses the development of a list of past, present, and foreseeable future land use development projects that should be addressed for only impacted resources in the consideration of cumulative effects. Locate these projects on a land use map. Discuss cumulative impacts to land use in more general terms, noting which land use components will be most impacted, their relative importance, and the degree to which impacts from the transportation project considered in the current NEPA document will contribute to the cumulative impacts.

Minimizing potential impacts of transportation alternatives to existing and future land use and local government's comprehensive development plans is the most acceptable form of mitigation planning for land use. Other options, such as amending land use plans or compensating for land use changes by supporting replacement land uses in other locations, are likely to be costly in terms of time and money and also require extensive negotiation between CDOT and the community leaders and decision-makers.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for land use.

9.14 Social/Community Resources

This section has traditionally been referred to as Social Resources; however, another term in use now is Community Resources. This section of the NEPA Manual will continue to refer to the resource as Social, but keep in mind that Community is acceptable as well.

Land Use, Social Resources, and Economic Resources can be combined into a single technical report or memorandum, as appropriate, and in consultation with the CDOT Environmental Manager.

Social resources include a variety of factors that may affect quality of life for a population. Transportation projects must consider the following potential social impact concerns:

- Changes in neighborhoods or community cohesion
- Underrepresented populations
- Community resources (schools, churches, parks, shopping, emergency services, etc.)
- Community vision and values
- Community transportation resources (alternative modes, etc.)
- Community mixed-use developments, Transit Oriented Development

Because social resources tend to be more qualitative, dynamic, and intangible, public involvement and coordination with local communities may be required to gather adequate information to address this resource area. Other issues affecting the social health of a community include land use changes, economics, Environmental Justice, and relocation and acquisitions.

Public scoping input should help guide the topics and level of detail presented under Social Resources.

The following subsections provide guidance on the analysis of social resources for CDOT's NEPA projects. The first subsection discusses the process for evaluating the community composition. The second subsection discusses community information that should be in each NEPA document.

9.14.1 Social Resource Evaluation Process

The CDOT project manager and social analyst (either in-house social analysts or consultants) are responsible for early identification of the community composition and community issues. It is recommended that data collection and analysis be conducted under the supervision of persons with an educational background in sociology, regional planning, economics, or similar training.

Information on community composition and community issues should be collected and refined throughout the project. The study area should at least include communities within and immediately surrounding the proposed project. Community boundaries can often be delineated by physical barriers, land use patterns, political divisions (such as school districts), selected demographic characteristics, historical backgrounds, resident perceptions, and subdivisions and neighborhoods recognized by name and tradition. The project may also have consequences for communities beyond the immediate geographic area. In such instances, the study area for this resource needs to be expanded to include these other communities.

Community composition and community issues must be identified as early as possible during project planning. Early identification of social resource issues is important to community buy-in and project success. An integral part of the analysis is proactively involving community leaders and local political entities, as well as other segments of society important to a project. This outreach leads to decision-making that is more likely to be responsive to community concerns and goals, resulting in greater community acceptance of proposed transportation improvements, enhancing agency credibility, and ensuring equity.

Reasons for Evaluation of Social Resources Under NEPA

CDOT evaluates social resources for several reasons:

- To involve communities that will be affected by transportation projects (whether positively or negatively) and should be an important part of the process
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates that pertain to communities and federally funded projects

CDOT must comply with Federal social regulations when implementing transportation projects in Colorado.

The regulations and guidance applicable to community resources are summarized below:

- **Section 1508.14 of CEQ Regulations (2005)** – When an EIS is prepared and economic or social and natural or physical environmental effects are interrelated, then the EIS will discuss all these effects on the human environment.
- **Sections 109(h) and 128, Title 23 of the United States Code on Highways (2012)** – Assures that community cohesion, availability of public facilities and services, and economic and social effects are assessed during highway developments.
- **Title VI of the Civil Rights Act of 1964** – Prohibits discrimination based on race, color, or national origin in any program or activity that receives Federal funds or other Federal financial assistance.
- **Americans with Disabilities Act of 1990** – Addresses the needs of people with disabilities, prohibiting discrimination in public services and public accommodations.
- **FHWA Technical Advisory T6640.8a Guidance for Preparing and Processing Environmental and Section 4(f) Documents** – Guides entities taking part in the NEPA process to consider effects on social groups, including "the elderly, handicapped, nondrivers, transit-dependent, and minority and ethnic groups are of particular concern."
- **Major Transit Capital Investment Projects Final Rule, 49 CFR Part 611, 2001** – Prescribes actions that must be taken to be eligible for certain Federal grants. Among these actions are social considerations.

These policies require that consideration be given to qualitative factors and unquantifiable amenities and values, along with social and technical considerations in decision-making. However, social effects are not intended by themselves to require preparation of a NEPA document but should be addressed when a NEPA document is prepared, and social and natural or physical environmental effects are interrelated.

Collection and Evaluation of Baseline Information Under NEPA

Gathering baseline information can be expensive and time consuming. To avoid wasted effort, carefully define the intended use of the data, identify what data are needed, and determine whether they are readily available before beginning to gather information. In many cases, in-house staff have expertise, and in larger communities, various planning agencies and councils of government have information that can easily be obtained. Another source may be other projects' files or earlier attempts at the current project, which may then be updated. If information is not available from traditional sources, resourcefulness is needed to seek out alternative sources.

- Before using data, be aware of when they were collected, their sources, and their reliability. Use the most up-to-date data available, understand the basic assumptions used in each compilation, and recognize the purposes for which data were originally collected.

Baseline data on community composition are available from several sources including:

- **U.S. Census Bureau** – Provides easy access to community resource data and maps. U.S. Census Bureau's Decennial Census Summary File 1 and Summary File 3 – Quick Tables are a good starting point for data on demographic, social, and housing characteristics for the study area. The analysts can easily obtain Colorado state level data including economic development and gentrification down to Census Block-group level data to develop population trends, demographics, and social makeup. U.S. Census Bureau Maps and Cartographic Resources provide maps for determining community boundaries, physical characteristics, instances of joint land use, and locating activity centers within the study area.
- **Local Governments (e.g., city and county planning, labor, and social service departments)** – Provide more recent demographic, social, economic, and housing characteristics. Local governments can also provide land use and zoning plans, building-permit records, social programs, and business and marketing information that can be used to determine infrastructure, house and business locations, approved or built development, and community issues.
- **Metropolitan Planning Organizations** – Provide land-use and zoning plans, building-permit records, and real estate market surveys to determine infrastructure, house and business locations, approved or built development, and housing characteristics.
- **Local Publications (from state, local, and university libraries)** – Provide general insight, historical background, and business and marketing information. Assure all community groups are reached, including those of limited English proficiencies or unique cultural backgrounds.
- **Community Groups (such as local historical societies, Colorado Historic Preservation Office, and religious institutions)** – Provide historical background; location of historic structures, landmarks, and districts; special populations and their needs; and community issues.

- **Social Service Agencies** – Provide information on special populations and their needs, businesses, and community issues.
- **Public Scoping Meetings** (with community leaders, local political entities, special interest groups, businesses, and residents) – Provide information on community values and issues.
- **Windshield Surveys** – Provide information on locations, numbers of structures, and social activity patterns.

Use the collected baseline information to delineate and characterize the social resource study area and understand its interface with the proposed project. Work with engineers and transportation planners to consider new project options based on preliminary indications of likely community issues and special areas to avoid. The evaluation of baseline information incorporates the following components:

- Finalize the social study area, as it will vary from multiple counties to specific Census Tracts and Block data depending on the magnitude of potential social impacts and the existing community base.
- Include demographic characteristics such as ethnic composition of the existing population, age distribution, median income of the study area, low mobility status (elderly and/or disabled), and existing number of households and average household size.
- Identify the defined communities (e.g., communities recognized by name and/or practice) and perceived neighborhoods (e.g., a little section of open space, the corner grocery, a laundromat, a beauty salon, a neighborhood bar, etc.) within the study area.
- Discuss the growth policies of the local jurisdictions, such as adopted growth targets, growth management policies, or other policies relating to the location or rate of population growth.
- Briefly describe the types of transit facilities, highways, streets, and bicycle and pedestrian facilities associated with the proposal, if the proposed project will likely have an effect on such facilities.
- When it may be an issue, describe the type, size, and location of public services and facilities within the affected social environment (parks, schools, hospitals, day care centers, libraries, counseling facilities, alcohol and drug rehabilitation, bike paths, emergency services, etc.).

Impacts on social resources that may occur as a result of proposed transportation improvements include impacts on community cohesion, community facilities and services, mobility, and safety. The following subsections provide specific guidance for addressing the impacts of each alternative on these four social impact areas.

Community Cohesion

The community cohesion analysis should address such impacts of project alternatives on cohesiveness, as the following:

- Bisecting (dividing) neighborhoods
- Social isolation (isolating a portion of an ethnic group or a neighborhood)
- Facilitation of new development (infill)
- Urban renewal

- Decreased neighborhood size (relocation)
- Joint land use
- Changes in property values
- Changes in neighborhood or community access
- Changes in quality of life
- Changes in neighborhood identification
- Separation of residences from community facilities

Community social groups that will benefit from or be adversely affected by the proposed project alternatives should also be identified. It is important that all segments of the population be treated with equal consideration, including:

- Elderly persons
- Disabled persons
- Non-drivers and transit-dependent individuals
- Minority groups (refer to **Section 9.16**)
- Low-income individuals and households (refer to **Section 9.16**)

Public Services and Facilities

Analysis of project alternative impacts on public services and facilities should include actions such as the following:

- Identify the existence of public service providers, their responsibilities and facilities such as police, fire, ambulance, hospital, and schools, as appropriate, given site condition and potential project issues
- Show on a map the proximity of each facility to the project
- Define service areas, user groups, and affected populations
- Discuss each service/facility's principal involvement with the community
- Determine the value of the service/facility to the community
- Determine the project's impact on these services/facilities

Mobility

The analysis of mobility should describe and discuss changes in travel patterns and accessibility (such as vehicular, commuter, bicycle, or pedestrian). It is important to note the effects of such changes on community mobility and neighborhood interaction, especially for groups that may experience more severe mobility impacts due to physical limitations, including the elderly, disabled persons, and children.

If any of the proposed alternatives will close or move cross streets, address the impacts of closing or moving each street. If pedestrian/bicycle routes are closed or otherwise modified, identify and discuss potential impacts on community mobility/neighborhood interaction. Clearly document the views of the community and the city and/or county government on such changes.

Safety

The evaluation of safety should discuss the impacts of each project alternative on traffic and neighborhood safety. Neighborhood safety issues to be addressed include:

- Police services
- Emergency services
- Bicycle/pedestrian safety
- Increase in crime

Other Issues to Consider

Other agencies may have information or guidance that will affect a particular CDOT project. Coordinate with the various agencies having resource oversight to obtain any site-specific data they may have, talk to resource specialists who know the study area, and determine whether they know of social issues that could constrain the project. The resource agencies that are particularly likely to have information or guidance on the social makeup of the communities include local planning agencies (e.g., county, city, and community planning offices), social services agencies, and community groups, as well as the USFS and BLM when they manage lands traversed by a transportation project.

The project file should include correspondence and telephone/email contact information with community service groups, as well as meeting minutes where appropriate. The files should thoroughly document the process whereby the social service needs of the community have been taken into consideration during project development.

9.14.2 NEPA Document Sections

The content of the sections on social resources in the Affected Environment and Environmental Consequences chapter is discussed below.

Affected Environment

If the proposed project or activity impacts a population, the NEPA document should discuss the existing and projected population and the relevant demographic characteristics of the affected area and the associated city, county, or region. The level of detail should be commensurate with the importance of the social impacts. The description of the community composition in the Affected Environment chapter of the NEPA document should include social aspects that may be impacted as the result of the proposed project:

- Community cohesion
- Public services and facilities
- Mobility
- Safety

The baseline information on the social environment of the study area should be used to help develop a community profile. The community profile summarizes the history, present conditions, and anticipated future of an area. It provides an overview or a series of snapshots of the area and provides a basis for identifying potential impacts of a proposed transportation action. The community profile enables conclusions about community cohesion, public services and facilities, mobility, and safety of various groups within the social study area.

It may also be necessary to expand or supplement the information depending on the level of detail developed for the study area by communicating with community groups, stakeholders, and local sociologists. Attributes typically included in the community profile are summarized in the side bar. For additional information, consult FHWA's *Community Impact Assessment: A Quick Reference for Transportation* (FHWA, 2018).

Affected Environment Chapter of NEPA Document

- A visual map or maps that depict physical characteristics, such as neighborhood boundaries, land uses, public facilities, and commercial centers
- Narrative text that describes community characteristics, such as population demographics, social, social history and values of the communities, the importance of various facilities, and future plans
- Tables or graphics that summarize important data or conclusions, such as population demographics or employment trends

Environmental Consequences

Impacts on social resources that may occur as a result of proposed transportation improvements include impacts on community cohesion, underrepresented populations, community facilities and services, mobility, safety, visual resources, displacement, traffic, employment, and construction. Discuss alternatives that have the same social impacts together and contrast those that differ so that similarities and differences in alternative social impacts are clear. The impacts of each alternative on each of the four social impact areas—community cohesion, public services and facilities, mobility, and safety—should be addressed at a level of detail appropriate to their severity and the complexity of the project. For additional information, consult FHWA's *Community Impact Assessment: A Quick Reference for Transportation* (FHWA, 2018).

Where the evaluation determines that potential social impacts are adverse to community cohesion, public services and facilities, mobility, and/or safety, the document should discuss possible mitigation. Include the information shown in the sidebar in the NEPA document, as appropriate. This section should provide assurance that the social service needs of the community have been taken into consideration during project development.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for social resources.

Be sure to include all negative and beneficial impacts of the project. The following textbox lists possible mitigation planning activities. Note that this is not an exhaustive list.

Mitigation Planning Information to Include in NEPA Document

- Basis for the mitigation decisions and flow chart of the decision process
- Identification of mitigation strategies to avoid or minimize potential impacts to communities' well-being and incorporation into project designs as necessary
- Outreach efforts to minority and low-income populations
- Appropriateness, reasonability, and timing of the mitigation strategies relative to project planning and implementation
- Coordination required to obtain agreement on mitigation measures

9.15 Economic Resources

Land Use, Social Resources, and Economic Resources can be combined into a single technical report or memorandum, as appropriate, and in consultation with the CDOT Environmental Manager.

Economic resources include a variety of factors that may affect an area's economy. Transportation projects must consider the following potential economic impact concerns:

- Employment and tax base affected by project (retail sales, opportunity for development, tax revenues, relocation of employment centers, etc.)
- Businesses affected by project or construction (detours, bypasses, circulation)
- Housing
- Infrastructure and public services
- Changes in property values

Economic resources tend to be quantitative and tangible; however, public involvement and coordination with local communities may be required to gather adequate information to address this resource area. The economic health of a community is affected by changes in other resources such as land use, social resources, Environmental Justice, and relocations and acquisitions.

Public scoping input should help guide the topics and level of detail presented under Economic Resources.

The following subsections provide guidance on the treatment of economics for CDOT's NEPA projects. The first subsection discusses the process for evaluating economics. The second subsection discusses economic information that should be in each NEPA document.

9.15.1 Economic Evaluation Process

The CDOT project manager and economic analyst (either in-house economic analysts or consultants) are responsible for early identification of the local economies and their specific profiles. It is recommended that data collection and analysis be conducted under the supervision of persons with an educational background in economics, regional planning, or similar training.

Economic profiles of the communities should be identified throughout the project. The economic study area should include communities within and immediately surrounding the proposed project. Community boundaries can often be delineated by physical barriers, land-use patterns, political divisions (such as school districts), selected demographic characteristics, historical backgrounds, resident perceptions, and subdivisions and neighborhoods recognized by name and tradition. The project may also have economic consequences for communities beyond the immediate geographic area. In such instances, the study area needs to be expanded to include these other communities.

Economic profiles of the communities within the economic study area and issues must be identified as early as possible during the project planning. Early identification of economic issues is important to community buy-in and project success. An integral part of the analysis is proactively involving community leaders and local political entities, as well as business segments. This outreach leads to decision-making that is more likely to be responsive to community concerns and goals, resulting in greater community acceptance of proposed transportation improvements, enhancing agency credibility, and ensuring equity.

Reasons for Evaluation of Economics Under NEPA

CDOT evaluates economics for several reasons:

- The economy of an area is a vital component of a community
- To comply with CDOT's Environmental Stewardship Guide (CDOT, 2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates that pertain to local economics and federally funded projects

CDOT must comply with Federal economic regulations when implementing transportation projects in Colorado. The regulations and guidance applicable to economic resources are summarized below.

- **Section 1508.14 of CEQ Regulations (2005)** – When an EIS is prepared and economic or social and natural or physical environmental effects are interrelated, then the EIS will discuss all these effects on the human environment.
- **Intermodal Surface Transportation Efficiency Act of 1991** – Instructs Federal agencies to consider the overall social, economic, energy, and environmental effects of transportation decisions.
- **Sections 109(h) and 128, Title 23 of the United States Code on Highways (2012)** – Assures that community cohesion, availability of public facilities and services, and economic and social effects are assessed during highway developments.
- **FHWA Technical Advisory T6640.8a Guidance for Preparing and Processing Environmental and Section 4(f) Documents** – In any NEPA document, where there are foreseeable economic impacts, the draft EIS should discuss them for each alternative.
- **Section 5309 New Starts, 49 USC 5309(e)** – Prompts a comprehensive review of the economic development effects associated with the project.
- **Major Transit Capital Investment Projects Final Rule, 49 CFR Part 611 (2001)** – Places promotion of economic development as a priority in federally funded projects.

These policies require that consideration be given to qualitative factors and unquantifiable and/or quantifiable economic amenities and values in decision-making. However, economic effects are not intended by themselves to require the preparation of a NEPA document but should be addressed when a NEPA document is prepared. Economic and natural or physical environmental effects are interrelated. The document will then discuss these effects on the human environment.

U.S. Census Bureau's Decennial Census Summary File 1 at https://www.census.gov/data/datasets/2010/dec/summary-file-1.html

U.S. Census Bureau's Decennial Census Summary File 3 at https://www.census.gov/data/datasets/2000/dec/summary-file-3.html

U.S. Census Bureau Maps and Cartographic Resources https://www.census.gov/programs-surveys/geography/data/interactive-maps.html

Bureau of Economics Regional Publications at http://bea.gov/regional/index.htm

Bureau of Labor Unemployment Publications at http://data.bls.gov/cgi-bin/dsrv?la

Collection and Evaluation of Baseline Information Under NEPA

Collection of Baseline Information

Before beginning to collect baseline information on economic resources, carefully define the intended use of the data, identify what data are needed, and determine whether they are readily available to avoid wasting time and money. Obtain needed information from in-house staff with expertise and, in larger communities, from various planning agencies and councils of government. Also review other projects' files or earlier attempts at the current project, which may then be updated.

Before using the data, be aware of when they were collected, how current they are, their sources, and their reliability. Also, be sure to understand the basic assumptions used in each compilation and recognize the purposes for which data were originally collected.

Baseline data for economic resources are available from several sources including:

- **U.S. Census Bureau** – Provides data on population and economic and housing characteristics for the study area. In U.S. Census Bureau Decennial Census Summary File 1 and File 3 Quick Tables, Colorado State level data down to Census Block-group level data are available for use in developing economic trends and indicators. Additionally, U.S. Census Bureau Maps and Cartographic Resources provide maps for determining community boundaries, physical characteristics, and locating economic activity centers within the study area.
- **Bureau of Economics Regional Publication** – Provides Colorado level data down to micropolitan statistical area data on personal income and industry employment.
- **Bureau of Labor Unemployment Publications** – Provides Colorado level data down to micropolitan statistical area data on unemployment.
- **Local Governments (revenue, labor, and planning departments, economist's office, chambers of commerce, etc.)** – Provide economic and housing characteristics that can be used to determine employment and salary by industry, employment trends, unemployment rates, tax revenues, and property values.
- **Local Businesses** – Provide information on business issues, tax revenues, and property values.
- **Local Publications (from state, local, and university libraries)** – Provide business and marketing information.
- **Public Scoping Meetings (with community leaders, local political entities, special interest groups, businesses, and residents**) – Provide information on business needs and issues.

Evaluation of Baseline Information

Collected baseline information is used to help evaluate the project and delineate the economic study area. Work with engineers and transportation planners to consider new options based on preliminary indications of likely economic issues and special areas to avoid. The evaluation of baseline information incorporates the following components:

- Finalizes the economic study area, as it will vary from multiple counties to specific Census Tracts and Block data depending on the magnitude of potential economic impacts and the existing economic base.
- Identifies the types of economic impacts the project could have on the communities.
- Briefly characterizes the current fiscal and economic conditions in the study area, including information such as tax revenue(s) (retail sales and use tax, business tax, property tax, etc.) and major contributors, employment by sector, labor force characteristics (labor earnings by sector, and personal income), employment centers in the study area, jobs versus housing balance, and relevant comprehensive plans.
- Discusses impacts to economics in somewhat general terms, noting which economic components will be most impacted, their relative importance, and the degree to which impacts from the transportation project considered in the current NEPA document will contribute to the impacts.

Other Issues to Consider

Other agencies may have information or guidance that will affect a particular CDOT project. Coordinate with the various agencies having resource oversight to obtain any site-specific data they may have, talk to resource specialists who know the study area, and determine whether they know of economic issues that could constrain the project. The resource agencies that are particularly likely to have information or guidance on economics include city and county planning offices and chambers of commerce, as well as the USFS, BLM, and NPS when they manage lands traversed by a transportation project.

9.15.2 NEPA Document Sections

The content of the sections on economic resources in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

The description of economics in the Affected Environment chapter of the NEPA document should include those aspects of fiscal and economic conditions that the project is likely to impact. Economic aspects that may be impacted as a result of proposed transportation improvements include changes in growth rates, business activity, property values, and tax revenues. These impacted economic aspects are generally related to one of two factors: changes in the accessibility of an area and/or changes in the local environment.

Transportation improvements tend to affect businesses, residences, and taxing authorities in different ways; therefore, the impacts to various land uses and local government should be evaluated and addressed separately in the documentation. The types of impacts that should be evaluated for businesses, residential areas, and local taxing authorities are summarized below.

Businesses

- Changes in regional traffic (bypass impacts)
- Changes in business environment (noise, air quality, visual resources, amenities, traffic volumes and traffic speed)
- Access changes (delivery, employee, customer)
- Changes in customer and/or employee base (relocations)
- Compatibility with economic development plans
- Changes in parking availability

Residential Areas

- Changes in residential environment (noise, air quality, visual resources, amenities, traffic volumes and traffic speed)
- Changes in employment opportunities and retail shopping/services related to changes in businesses

Local Taxing Authorities

- Conversion of taxable property to public use
- Affected taxing authorities
- Revenue losses and the effect on taxing authorities

Environmental Consequences

The Environmental Consequences section of the NEPA document should identify and discuss the impacts from each alternative on the economic health of the community. Discuss alternatives that have the same economic impacts together and contrast those that differ so that similarities and differences in alternative economic impacts are clear. The section should:

- Identify affected businesses, residential areas, and/or local taxing authorities
- Show on a map the proximity of the project to each affected business or residential area
- Show on a map the jurisdictional boundaries of affected local taxing authorities
- Define the employee and customer base for affected businesses
- Discuss the value of the businesses and/or residential area to the community
- Determine the project's impact on these businesses and/or residential areas

Economic impacts are best described quantitatively, but, in certain cases, qualitative data may be the only information available to adequately characterize the area. When applicable, potential total economic impacts (direct and indirect) of alternatives associated with the project can be estimated using economic models, such as the commonly used IMPLAN Input/Output model, which can be purchased. Input/Output models generate estimates of how a given amount of a particular economic activity translates into jobs and income in the study area.

In the NEPA document, identify only those mitigation measures that are in response to project impacts and are appropriate as CDOT commitments. Summarize these measures just below the impacts they are intended to mitigate in the tabulation of economic impacts by alternative. Note whether residual economic impacts will remain after the suggested mitigation measures are applied. Discuss economic impacts as a result of induced growth as further discussed in **Section 9.27**.

Where the evaluation determines that potential economic impacts are substantial, the document should discuss possible mitigation. It is important to consider the effects on small businesses or businesses with unique customer and/or employee bases because these businesses are more sensitive to change. Include the information shown in the sidebar in the NEPA document, as appropriate.

Mitigation measures needed to resolve economic impacts can be costly. It is important to work with the project development team and the local community to choose practical solutions that result in a reasonable expenditure of public funds and help the project fit harmoniously into the community. For example, phase the project to minimize impedance to business access during peak periods. Another option could be to redesign a road segment as an underpass to avoid cutting off access to a business activity center.

For additional information, consult FHWA's *Community Impact Assessment: A Quick Reference for Transportation* (FHWA, 2018a).

Impacts and Mitigation

Be sure to include all negative and beneficial impacts of the project. The following text box lists possible mitigation planning activities. Note that this is not an exhaustive list. The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for economic resources.

An Input/Output model is a regional economic impact model that provides mathematical accounting of the flow of dollars and commodities through a region's economy.

Mitigation Planning Information to Include in NEPA Document

- Basis for the mitigation decisions and flow chart of the decision process
- Identification of mitigation strategies to avoid or minimize potential impacts to communities' economic well-being for incorporation into project designs as necessary
- Appropriateness, reasonability, and timing of mitigation strategies relative to project planning and implementation
- Coordination required to obtain agreement on mitigation measures
- Reasonableness and reliability of the mitigation measures

9.16 Environmental Justice and Equity

Equity in transportation seeks fairness in mobility and accessibility to meet the needs of all community members. A central goal of transportation is to facilitate social and economic opportunities by providing equitable levels of access to affordable and reliable transportation options based on the needs of the populations being served, particularly populations that are traditionally underserved.

In Colorado, like other states, historic policies such as redlining (refusing a loan or insurance to areas deemed to be a poor financial risk) and practices such as zoning led, both intentionally and unintentionally, to racial and income segregation in housing. Industrial areas, highways, and other pollution sources were more likely to be located within or near low-income neighborhoods and communities of color. Many of these housing and land use patterns persist today. As a result, low-income communities and communities of color in Colorado continue to face greater environmental health risks, according to the CDPHE Environmental Justice Action Task Force.

Transportation projects can affect populations protected by Environmental Justice (EJ) and equity regulations through residential and business displacements, air, noise, and water pollution, soil contamination, and deterioration of visual, social, and economic resources, among others. Further discussion on how to analyze these resources can be found in other sections of **Chapter 9** of this Manual.

This section discusses how and why CDOT conducts EJ and equity analyses as part of NEPA projects and outlines information that should be included in the Affected Environment, Environmental Consequences, and Mitigation sections of NEPA documents.

The **following resources** will help consultants and staff in **conducting EJ reviews**:

- FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Final DOT Environmental Justice Order
- Guidance on Environmental Justice and NEPA
- Environmental Justice Reference Guide
- Environmental Justice and NEPA Case Studies
- Environmental Justice Screening and Mapping Tool (EJSCREEN) at https://ejscreen.epa.gov/mapper/

CDOT conducts EJ and Equity analyses to:

- Comply with Federal acts and executive orders, state laws, and FHWA technical guidance
- Comply with CDOT's Environmental Stewardship Guide (CDOT, 2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

This section addresses the regulations and certifications applicable to EJ and equity evaluations, along with their respective analysis process. The first two have a prescribed analysis process with Executive Order 12898 - *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and Colorado SB21-260 - *Sustainability of the Transportation System*. Other Federal and state laws and orders that do not have a prescribed analysis process will also be

summarized, Title VI of the Civil Rights Act, Executive Order 13985, Colorado HB1260, and other Federal non-discrimination statutes.

During planning, it may be sufficient to identify populations at the Census-tract level. However, during NEPA, practitioners should go beyond the Census-tract level to identify minority and low-income persons or populations at a more detailed level using multiple sources of information.

9.16.1 Executive Order 12898, Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects, including interrelated social and economic effects, on low-income or minority populations resulting from their programs, policies, and activities. The Executive Order directs USDOT and other Federal agencies to take action toward:

- Avoiding, minimizing, or mitigating disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations;
- Ensuring the full, fair, and meaningful participation in the transportation decision-making process by all potentially affected communities; and
- Preventing the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The USDOT issued an order on EJ, DOT Order 5610.2, to support Executive Order 12898. An updated USDOT order 5610.2(a) was issued on May 2, 2012, which was later superseded by USDOT order 5610.2(b) issued on November 18, 2020. FHWA also issued an order, the most recent of which is FHWA Order 6640.23A dated June 14, 2012.

Environmental Justice Evaluation Process

Applicability

Federal EJ requirements apply to all CDOT projects with a Federal nexus, regardless of the NEPA Class of Action. However, EISs and EAs generally have a different level of analysis than CatEx projects. Although CatEx projects are less likely to have significant impacts on EJ communities, Federal requirements still apply, and effects should still be evaluated and documented.

Exempt Projects

Certain types of CatEx projects are unlikely to have adverse impacts on communities. CDOT has created a list of project undertakings that are considered exempt from additional EJ analysis because they are known to have minimal impacts that do not adversely affect communities. Refer to CDOT's Categorical Exclusion Projects Exempt from EJ Analysis. If the scope of an exempt project changes or expands, EJ must be looked at again and EJ analysis may be necessary.

A list of **CatEx projects exempt from EJ and equity analysis** can be found here:
https://www.codot.gov/business/civilrights/titlevi/ej

Define Area of Community Study

To evaluate the impacts on and to ensure participation by minority and low-income populations, CDOT must first identify the populations impacted by the project. The following information provides guidance on identifying minority and low-income populations.

This process consists of:

- Defining the area of potential impact (i.e., community study area)
- Identifying protected populations (i.e., minority and low-income) within the community study area

Populations experiencing homelessness is an example of a protected population living in the community study area which would not show up on the census but should still be documented in the EJ analysis.

The community study area typically includes all communities within and adjacent to the project that may reasonably be affected. Community boundaries can often be delineated by Census tracts, block groups, physical barriers, land-use patterns, political divisions (such as school districts), selected demographic characteristics, historical backgrounds, resident perceptions, and subdivisions and neighborhoods recognized by name and tradition. The project may also have social consequences for communities beyond the immediate geographic area. In such instances, the community study area needs to be expanded to include these other communities.

In practice, the community study area should start with census block groups within the project area or immediately adjacent. The community study area should then expand based on the potential impact of project activities, a desktop review of the community boundary categorizations mentioned previously, community input, and professional best judgment. The technical report should include a discussion on how the community study area was identified.

Census data should not be used as conclusive evidence that there are no affected minority or low-income populations. Additional sources of information should be used to supplement these data, when readily available, and to further refine the identification of the presence of minority and low-income populations. Additional sources, which may provide data or other anecdotal information, may include religious groups, schools, homeowner and community associations, civil rights organizations, minority business associations, economic and workforce development agencies, and local businesses. Other reliable local data sources include county assessors, social service agencies, local health organizations, local public agencies, and community action agencies.

Many transportation projects have far-reaching impacts. It is, therefore, probable that the area of impact may be a considerably larger area than the literal project footprint. The determination of the community study area should be presented, reviewed, and agreed upon by the project team, in coordination with the Region or EPB EJ specialist, and documented in the public involvement process. Also, information from the public involvement process (meetings, demographics, etc.) should inform the EJ evaluation.

Identify Minority Populations

An EJ evaluation must consider minority populations present in the community study area. Under FHWA Order 6640.23A, minority populations are defined as any readily identifiable group of minority persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be affected by a proposed FHWA program, policy, or activity. For purposes of these guidelines, tribal governments are also included in this definition of minority populations. FHWA Order 6640.23A protects minority populations that include Black or African American, Hispanic or Latino, Asian American, American Indian/ Alaskan Native, and Native Hawaiian or Pacific Islander.

Minority groups should be identified using information from the U.S. Census at the tract, block group, or block level, depending on the context of the project. Generally, minority groups can be identified by comparing the minority population percentage in the community study area to the minority population percentage in the surrounding area, such as the county. A population is considered a minority population if the percentage of the people identifying as minority in the community study area is meaningfully greater than the percentage in the larger county or municipality. If it is unclear from the desktop review of census data whether a minority population is present in the project area, further investigation may be necessary, including outreach and gathering data from local organizations.

If there is more than one minority group within the community study area, the minority percentage should be based on the aggregate of all minority persons. For example, if the percentage of African American persons in an identified Census block is 20 percent and the percentage of Asian persons is 20 percent, then the total of 40 percent should be used for the minority percentage. Hispanic is classified as an ethnicity rather than a race in the U.S. Census to avoid double counting because a person who self-identifies as Hispanic may be of any race. Therefore, for purposes of EJ analysis, the total population within the geographic area being analyzed minus the total White, non-Hispanic/Latino population would generate the total minority population.

Refer to **FHWA Environmental Justice Reference Guide's Data Collection Section** pages 15-21, for additional data resources.
https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/index.cfm

Identify Low-Income Populations

Under FHWA Order 6640.23A, low-income populations are defined as any readily identifiable group of low-income persons (household income is at or below the Department of Health and Human Services [HHS] poverty guidelines) who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers, or Native Americans) who will be affected by a proposed DOT program, policy, or activity.

As with identifying minority populations, EJ evaluations must include a discussion about the low-income populations present in the community study area. Similarly, the project team should gather and analyze as much information as reasonably possible about the community study area's population. The amount of analysis necessary for identifying low-income populations will depend on the complexity of the project and the number of residents and businesses possibly affected, among other factors.

Low-income populations should be identified on a case-by-case basis, depending on the context of the project. Generally, low-income populations can be identified by comparing the low-income population percentage in the study area to the low-income population percentage in the surrounding area, such as the county. A population is considered a low-income population if the percentage of low-income individuals in the study area is meaningfully greater than the percentage in the larger county or municipality. If it is unclear from the desktop review of census data whether a low-income population is present in the community study area, further investigation may be necessary, including outreach and gathering data from local organizations.

For a list of resources that can supplement the Census and HUD data, refer to **FHWA's Environmental Justice Reference Guide** at https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/fhwahep15035..pdf.

Existing Data Mapping Resources

The mapping tools described below can be helpful in identifying minority and low-income populations. Developed by FHWA and the EPA, they are recommended for assessing community demographics.

FHWA's Office of Environment, Planning, and Realty maintains a website with more than 300 interactive GIS-based maps designed to support priorities related to safety, equity, climate change, economic development, and infrastructure. FHWA recently expanded their maps related to equity analysis and now includes maps displaying racial, ethnic, and foreign-born population data; income and poverty data; other vulnerable population data (e.g., people with disabilities, Limited English Proficiency [LEP], and households with no computer or internet access); journey to work trip data (e.g., households without car ownership and trips by transit); and economically distressed area data. These maps are based on the U.S. Census Bureau's American Community Survey (ACS). FHWA's GIS-based maps can be found at: https://hepgis.fhwa.dot.gov/fhwagis/

Refer to the CDOT **Limited English Proficiency Plan** for additional information. https://www.codot.gov/business/civilrights/titlevi/title-vi-assets/cdot-lep-guidance_2018.pdf

The Screening Tool for Equity Analysis of Projects (STEAP) is a web-based equity analysis tool for project development. It assists practitioners in identifying a project's impact on EJ, Title VI, and LEP populations, and disadvantaged populations defined in Executive Order 13985. The tool provides for rapid screening of specified project locations anywhere in the U.S. and is intended to make buffer analysis simple for non-GIS specialists to expand access to EJ and equity screening capabilities. The Screening Tool can be found at: https://hepgis.fhwa.dot.gov/fhwagis/buffertool/

Environmental Justice Screen (EJSCREEN) is EPA's web-based GIS tool that allows for nationally consistent EJ screening and mapping, combining environmental and demographic data to highlight where vulnerable populations may be disproportionately impacted by pollution. The tool features 11 EJ indices (one for each environmental indicator) based on annually updated, high-resolution environmental and demographic data. EJSCREEN uses block group-level ACS Census data, all of which is available for download. EPA's web-based GIS tool can be found at: https://ejscreen.epa.gov/mapper/

Identify Community Resources and Minority Owned Businesses

Any gathering places, businesses, or services that are owned by a population protected by EJ or that are important to the EJ community should be described in the community study area. These can be identified through a desktop survey of business associations and through the public involvement process.

Proactive and Meaningful Public Participation

The NEPA document should include a discussion of major proactive efforts to ensure meaningful opportunities for public participation including activities to increase low-income and minority participation. Include in the document the views of the affected population(s) about the project and any proposed mitigation, and describe what steps are being taken to resolve any controversy that exists. Document the degree to which the affected groups of minority and/or low-income populations have been involved in the decision-making process related to the alternative selection, impact analysis, and mitigation.

In accordance with Title VI of the Civil Rights Act of 1964 and Executive Order 13166, CDOT's Policy Directive 604.0, "Policy on Non-Discrimination," provides that no person on the ground of race, color, national origin, sex, disability, or age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination in any operation of CDOT or of any department or agency to which CDOT extends Federal financial assistance.

LEP persons are individuals whose primary language is not English and who have a limited ability to read, write, speak or understand English. For LEP persons, language can be a barrier to accessing the benefits of program services, understanding and exercising important rights, complying with applicable responsibilities, or understanding other information regarding federally assisted programs or activities.

An additional consideration regarding the translation of documents is the safe harbor rule. The USDOT's LEP guidance establishes a "safe harbor" regarding the requirement to translate vital documents. A "safe harbor" means that providing written translation under the following circumstances serves as strong evidence of compliance:

- CDOT provides written translation of vital documents for each eligible LEP language group that constitutes 5 percent or 1,000, whichever is less, of the population of persons eligible to be served or likely to be affected or encountered.
- If there are fewer than 50 persons in a language group that reaches the 5 percent trigger, vital written materials do not need to be translated. Rather, CDOT staff may provide written notice in the primary language of the LEP group of the right to receive competent oral interpretation of those written materials, free of cost.

Identifying Impacts on the EJ Population

If minority or low-income populations exist in the community study area, the next step in the EJ evaluation is to consider how each alternative might positively or negatively impact the low-income or minority populations. These should be split into benefits and burdens to the EJ population. Describe any benefits or burdens to the EJ population from the construction (e.g., temporary) impacts, such as change in access to minority owned businesses, noise, dust, detours, or other temporary impacts. Describe any operational effects of the proposed project, such as access

changes, or changes in noise, air quality, visual, recreational, or any other impacts. Any impacts identified in the public participation process should be discussed as well.

Identifying Disproportionately High and Adverse Effects

As described in FHWA Order 6640.23A, adverse effects are defined as the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects. Adverse effects become disproportionately high on minority and low-income populations when the effect:

a. is predominately borne by a minority population and/or a low-income population; or

b. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

High and adverse effects may result from issues unique to a community's distinct cultural practices or use of affected resources. If adverse effects to other resources are expected to occur on a project, and EJ communities are present in the community study area, the specific impacts to those communities should be assessed. Construction and other temporary impacts should also be considered. Some adverse impacts to evaluate for EJ impacts may include, but are not limited to:

- Air quality impacts
- Water quality impacts
- Noise and visual impacts
- Relocations or displacement of residences or businesses
- Park, trail, or open space impacts
- Tree and vegetation removal
- Soil contamination or increased exposure to hazardous materials
- Construction noise
- Significant traffic detours, including transit, bike, and pedestrian disruption

When assessing disproportionately high and adverse effects, other considerations include previous public engagement efforts and comments received (particularly from EJ communities), distribution of benefits, and public controversy. If one or more tribal governments are involved, the tribal consultation process under Section 106 of the NHPA may be necessary, along with government-to-government consultation. Coordination with CDOT NEPA staff or the CDOT Senior Staff Archaeologist is required.

For more information on identifying disproportionately high and adverse effects and proceeding when there are disproportionately high and adverse effects, refer to FHWA's guidance on how to address EJ in NEPA documents (2011b) and the *Environmental Justice Reference Guide* (2015).

If adverse impacts to a low-income or minority population have been identified for any alternatives, efforts must be made to avoid, minimize, and mitigate such adverse effects. Mitigation may include:

- Minimizing impacts by limiting the degree or magnitude of the action and its implementation rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

FHWA Order 6640.23A states that impacts to minority and low-income populations can be addressed by "proposing offsetting benefits and opportunities to enhance communities, neighborhoods, and individuals affected by FHWA programs, policies, and activities." Project staff should consider the option of applying early mitigation where applicable and soliciting community input about how to best mitigate impacts.

If disproportionately high and adverse impacts on the low-income or minority populations still exist after considering mitigation efforts, FHWA will not approve the project unless:

- There is a substantial need for the project based on the overall public interest; and
- Alternatives that would have fewer adverse effects on protected populations have adverse social, economic, environmental, or human health impacts that are more severe or would involve increased costs of an extraordinary magnitude.

Environmental Justice Documentation

Documentation for Minority Populations

Document the percentage of individuals who identify as minority in Census tract or block groups compared to the county(ies) in which the project is taking place, and other sources of information used to identify if and where minority populations exist. Once minority households are identified, they should be documented as in **Table 9-6**.

Table 9-6. Minority Populations in Community Study Area (percentage)

Area	Total Population	Black/ African American	Native American	Asian/ Pacific Islander	Hispanic or Latino	Total Minority (%)
County						
Census Block Group						
Census Block Group						
Census Block Group						

Documentation for Low-Income Households

Description of low-income populations in Census tract or block groups compared to county(ies) in which the project is taking place, and other sources of information used to identify if and where minority populations exist. Once low-income households are identified, they should be documented as in **Table 9-7**.

Table 9-7. Low-Income Populations in Community Study Area

Area	Low-Income Households (%)
County	
Census Tract	
Census Tract	
Census Tract	

In the report, include maps overlaying the location of minority and low-income populations in the study area.

Other important resources to community cohesion should be discussed in this section. This can include religious and social facilities, pedestrian, transit, and bicycle facilities that EJ populations use, minority owned businesses, or any other resources that are important to the community under evaluation.

The NEPA document or associated technical memorandum/report must document the use of additional data or efforts to further identify minority, low-income, or LEP populations in the community study area. As previously discussed, it is important to be sensitive to the public. If information is collected down to the block level regarding individuals or individual households, it should not be included in the NEPA document. The information should be documented and included in the project file. As discussed in **Chapter 7** of this Manual, this is a particularly important source of information relevant to this process, as potentially small or dispersed groups may be identified through the public involvement process.

Documenting Impacts

After the analysis is complete, the environmental project manager should ensure that the following information is recorded in the NEPA documents:

- The benefits and burdens on the minority and low-income populations (including any disproportionately high adverse effects).
- A comparison of the burdens/benefits (i.e., impacts) to minority and low-income populations to the burdens/benefits (i.e., impacts) of the overall population within the project area.
- Measures implemented or being considered to avoid or mitigate the adverse effects. Project staff must clearly document how each project alternative avoids, minimizes, and mitigates for adverse impacts, if necessary.

- If disproportionately high and adverse effects still exist, explain the substantial need for the project based on the overall public interest and how the alternatives that would have fewer adverse effects on the protected population would have adverse social, economic, environmental, or human health impacts that are more severe or would involve increased costs of an extraordinary magnitude.

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for EJ and equity.

9.16.2 Colorado Senate Bill 21-260

Colorado SB21-260 – The Sustainability of the Transportation System put into place a series of environmental requirements. Section 28 created the Environmental Justice and Equity Branch within CDOT, which works directly with Disproportionately Impacted Communities (DI Communities) and to identify and address any barriers that may prevent their full participation in transportation decisions. DI Communities include low-income, minority, and housing-cost burdened populations. This definition should not be confused with disproportionately high and adverse effect as described under Environmental Justice. Section 30 Parts 4-6 of SB21-260 include separate environmental requirements, including a requirement for project air quality monitoring and additional outreach to DI Communities.

Colorado Senate Bill 21-260 Evaluation Process

Applicability

SB260 requires certain projects to work with DI Communities throughout the planning, environmental study, and project delivery phases. The requirement to assess work with and evaluate impacts to DI Communities applies only if the project is an RS/TC project. An RS/TC project is a change to a transportation facility that improves travel time reliability or increases the maximum throughput.

- On urban roads, a RS/TC project is one that is at least one-centerline mile in length. Urban roads are those within a census designated area with a population of 5,000 or more. A centerline mile is measured from the start of the project to the terminus of the project.
    - On rural roadways, a RS/TC project is one that is at least one-centerline mile in length where the vehicle volume to capacity ratio (V/C) equals or exceeds 85 percent. If the V/C is less than 85 percent in a rural area, a RS/TC project will need to be at least two-centerline miles in length. Rural roadways are those within a census designated area with a population less than 5,000 persons.

Certain projects are exempt from the RS/TC project requirements. The list of exempt projects is expanded from EPA's list of projects that are exempt from conformity analysis and includes projects such as those that enhance safety, add transit, or improve air quality.

Regionally Significant Transportation Capacity projects can be found at the following link: https://www.codot.gov/programs/environmental/greenhousegas/regionally-significant-and-transportation-capacity-definition-final-08312204172023.pdf

Define Area

The community study area should be defined in the same way that it is defined for an EJ analysis. In practice, the community study area should start with census block groups within the project area or immediately adjacent. The community study area should then expand based on the potential impact of project activities, a desktop review of the community boundary categorizations mentioned previously, community input, and professional best judgment. The documentation should discuss how the community study area was identified.

Identify Disproportionately Impacted Communities

DI Communities were defined in SB260, and revised in HB23-1233 (State of Colorado, 2023), as census block groups that meet the following criteria:

(a) the proportion of the population living in households that are below 200 percent of the Federal poverty level is greater than 40 percent;

(b) the proportion of households that spend more than 30 percent of household income on housing is greater than 50 percent;

(c) the proportion of the population that identifies as people of color is greater than 40 percent;

(d) the proportion of the population that is linguistically isolated is greater than 20 percent;

(e) a statewide agency determines, after a community presents evidence of being and requests to be classified as a disproportionately impacted community, that the population is disproportionately impacted based on evidence, presented in a relevant statewide agency decision-making process, that a census block group is disproportionately impacted because it has a history of environmental racism perpetuated through redlining or through anti-Indigenous, anti-immigrant, anti-Latino, or anti-Black laws, policies, or practices and that present-day demographic factors and data demonstrate that the community currently faces environmental health disparities;

(f) the community is identified by a statewide agency as being one where multiple factors, including socioeconomic stressors, vulnerable populations, disproportionate environmental burdens, vulnerability to environmental degradation or climate change, and lack of public participation may act cumulatively to affect health and the environment and may contribute to persistent disparities;

(g) the community is a mobile home park, regardless of whether the mobile home park is a census block group; or

(h) the community is located on the Southern Ute or Ute Mountain Ute Indian Reservation, regardless of whether the community is a census block group.

CDPHE has developed GIS and data resources to identify census block groups where DI Communities are located, including the eight criteria listed above. Refer to the **Existing Mapping Resources** section for DI Community data sources.

If a project area is within or partially within a census block group that is designated as a DI Community, further engagement and analysis may be necessary to determine the impacts to that community. If a DI Community is expected to be affected by the proposed project, the

environmental manager should contact the Environmental Justice and Equity Branch and the Region or EPB Specialist.

Existing Mapping Resources

Colorado EnviroScreen is an EJ mapping tool developed by CDPHE. It is developed so that a census block group that scores above the 80th percentile in the tool is presumed to be a DI Community.

The Colorado EnviroScreen mapping tool can be found at: https://cdphe.colorado.gov/enviroscreen

Colorado Senate Bill 21-260 Documentation

SB21-260 does not require a discussion on impacts; thus, documentation should describe how the community study area was defined and how DI Communities were identified. Documentation should also summarize how public involvement efforts were targeted toward those DI Communities and how feedback from the public was incorporated into the project design.

Documentation on state regulations should be distinct and separate from Federal requirements in the NEPA documentation. This can be included in the same technical document if the sections are clearly defined.

9.16.3 Other Laws and Orders Protecting Certain Populations

Other laws and orders identify populations with protection but do not outline a specific analysis process during NEPA. These populations should be considered during the NEPA process, especially if they have unique transportation needs, or if they will be impacted by a transportation project.

Populations with unique transportation needs or that will be impacted by a CDOT project should be considered during the NEPA process, even if they are not protected by a Federal or state law order.

Executive Order 14096

Executive Order 14096 *Revitalizing Our Nation's Commitment to Environmental Justice for All* expands the definition of "Environmental Justice" as the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment. This is a very recent Executive Order for which Federal guidance has yet to be developed. Once guidance is released, it will be posted on CDOT's website detailing compliance throughout the NEPA process.

Title VI of the Civil Rights Act of 1964

Title VI, 42 U.S. Code (U.S.C.) 2000d et seq., was enacted as part of the landmark Civil Rights Act of 1964. Federal regulations (FHWA [23 CFR part 200] and FTA [49 CFR part 21]) state that "…no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the recipient receives Federal assistance from the Department of Transportation."

Executive Order 13166

The Executive Order 13166 *Improving Access to Services for Persons with Limited English Proficiency* requires Federal agencies to examine the services they provide, identify any need for services to those with LEP, and develop and implement a system to provide those services so that LEP persons can have meaningful access to them.

Executive Order 13985

Under Executive Order 13985 *Advancing Racial Equity and Support for Underserved Communities* (2021), the term "equity" means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. It is important to note that transportation equity does not mean equal. An equitable transportation plan considers the circumstances impacting a community's mobility and connectivity needs, and this information is used to determine the measures needed to develop an equitable transportation network. To attain an equitable transportation network, all components of Title VI, EJ, and nondiscrimination must be considered.

Other Federal Nondiscrimination Statutes

Other nondiscrimination statutes that afford legal protection against discrimination include:

- Section 162 (a) of the Federal-Aid Highway Act of 1973 (23 U.S.C. 324), which addresses discrimination based on sex;
- Section 504 of the Rehabilitation Act of 1973, which addresses disability discrimination;
- The Age Discrimination Act of 1975;
- The Civil Rights Restoration Act of 1987; and
- The Americans with Disabilities Act (ADA) of 1990.

Many transportation projects have far-reaching impacts. It is, therefore, probable that the area of impact may be a considerably larger area than the literal project footprint. The determination of the community study area should be presented, reviewed, and agreed upon by the project team and documented in the public involvement process. Additionally, information from the public involvement process (meetings, demographics, etc.) should inform the EJ evaluation.

Colorado House Bill 21-1266: EJ Disproportionately Impacted Communities

This law contains efforts to redress the effects of EJ on DI Communities, which are defined differently than SB-260 as:

- A community that is in a census block group where the proportion of households that are low income, that identify as minority, or that are housing cost-burdened is greater than 40 percent; or
- Any other community as identified or approved by a state agency, if the community: has a history of environmental racism perpetuated through redlining, anti-Indigenous, anti-immigrant, anti-Hispanic, or anti-Black laws; or is one where multiple factors may act cumulatively to affect health and the environment and contribute to persistent disparities.

9.17 Transportation Resources

The Colorado Transportation Commission has policies that guide CDOT by providing transportation operating principles and the transportation vision, mission, goals, and objectives. The policies establish CDOT's position on promoting an integrated multimodal transportation system. Therefore, CDOT's NEPA projects should consider and evaluate all reasonable travel modes within the study area.

Transportation resources include the entire transportation network within the study area, including roadway, freight, transit, rail, aviation, bicycle, and pedestrian facilities. Evaluation of these transportation resources provides a framework within which the new transportation project can be considered and evaluated.

9.17.1 Transportation Resources Evaluation Process

When CDOT is evaluating a transportation project that is expected to be federally funded, FHWA requires integration of the NEPA process with the transportation decision-making process (FHWA, 2005). Since the transportation system is typically the focal point of CDOT's NEPA projects, purpose and need are heavily tied to the transportation problems. Therefore, the transportation system is considered and evaluated in two ways:

- Impacts of the project on the transportation system (e.g., the project results in elimination of a bus shelter)
- Transportation alternatives' ability to address the project's Purpose and Need.

In a transportation focused NEPA document, Transportation Resources are sometimes included in a separate Transportation Resources chapter and improvements are evaluated in the Alternatives chapter. Transportation system elements, however, may also be addressed in other chapters of the NEPA document, such as:

- **Freight** – Socioeconomics and Land Use sections
- **Bicycle/Pedestrian** – Section 4(f) and Parks/Recreation sections
- **Transit** – Environmental Justice and Equity, Socioeconomics, and Land Use sections

Reasons for Evaluation of Transportation Resources Under NEPA

CDOT evaluates transportation resources for several reasons:

- To understand and thoroughly evaluate the impacts and benefits to the transportation system that could result from a proposed action.
- To further CDOT's mission "to provide the best multimodal transportation system for Colorado that most effectively and safely moves people, goods, and information."
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner.

- **23 USC 135 Statewide and non-metropolitan transportation planning** sets requirements for the creation of regular statewide transportation plans and statewide transportation improvement programs.
- To comply with **FHWA's Vital Few Objective #1**: use integrated approaches to multimodal planning, the environmental process, and project development at a system level and/or context-sensitive solutions at the project level.

Collection and Evaluation of Baseline Information Under NEPA

Many resources are available for the collection and evaluation of the baseline transportation system. Information on the existing and future local and regional transportation system should be obtained and evaluated in close coordination with the local community(ies), regional agency (e.g., MPO), CDOT, and FHWA. If transit is present or planned in the study area, CDOT's Transit and Rail, the local transit agency, and Federal Transit Administration (FTA) should be involved. Likewise, if aviation alternatives are being considered, the Federal Aviation Administration (FAA) and CDOT's Division of Aeronautics should be involved.

The existing conditions and future baseline conditions should thoroughly describe and analyze the state of the multimodal transportation system within the study area today and in the future. The future baseline condition should represent the transportation system without the proposed action in the study area. Outside the immediate study area, the baseline should include only those transportation improvement projects that have committed funding during the planning horizon.

> Those projects involving FTA can reference the guidance provided in **Chapter 10**, *FTA NEPA Processes and Compliance*.

9.17.2 NEPA Document Sections

Affected Environment

The transportation system includes roadway, freight, transit, rail, aviation, bicycle, and pedestrian facilities and how the modes connect and interrelate to form the transportation network. Evaluation of the existing and future transportation system conditions provides a baseline for alternatives development and screening.

The purpose of this effort is to gather enough information to provide a complete picture of the existing and future transportation system within the study area. The data collection effort should rely on professional judgment and general knowledge of the study area to determine the information sources needed to provide an overview of the existing and future transportation system. The level of detail of the information gathered should correspond with the importance of the specific element to the transportation system.

> In NEPA, the existing and the long-range planning horizon No Action conditions are essential in determining the need for a project.

Roadway

Physical Characteristics

Information about the physical roadway network should be collected and documented, including:

- Cross-sections (e.g., ROW width, through lanes, auxiliary lanes, median, shoulder, etc.)
- Functional classification (expressway, major arterial, etc.) and access category (Regional Highway [R-A], Non-Rural Highway [NR-A], etc.)
- Access points, spacing, restrictions (right-in/right/out only) and traffic control (signalization, stop control)
- Speed mitigation infrastructure
- Interchange configurations, ramp lengths
- Lane restrictions (high occupancy vehicle [HOV] or tolled lanes)
- Freight designations (truck routes, hazardous material routes)
- Parallel transportation facilities that affect travel patterns in the study area
- Planned roadway network improvements from local agencies and regional fiscally constrained and vision plans

Traffic Composition and Operations

Existing traffic volumes and patterns for motorized traffic should be documented using thorough traffic data collection and from existing CDOT, regional, county, and municipal data sources, including:

- Daily traffic volumes and peak period intersection turning movement counts
- Posted and observed speeds (along with speed management context for each segment), travel times, and free flow travel times
- Travel patterns (e.g., trip length, local vs. regional trips, origins/destinations, trip purposes)
- Level of Service (LOS) – using the currently accepted *Highway Capacity Manual* (Transportation Research Board, 2010) methodology to provide a qualitative assessment of the traffic flow for intersections, highway or freeway segments, ramp merge/diverge/weave sections, etc.
- Hours of congestion
- Vehicle miles of travel (VMT) and vehicle hours of travel (VHT)
- Safety records and significant crash patterns
- Future traffic volumes based on regional travel demand forecasting tools (e.g., regional travel demand model) and future operational analysis based on the No Action network.

TDM/TSM

Transportation Demand Management (TDM), Transportation System Management (TSM), and transportation technology infrastructure or programs that exist within the study area should be inventoried and documented. Examples could include:

- Intelligent Transportation Systems (ITS) and transportation technology strategies and infrastructure, such as signal coordination, closed-circuit television (CCTV) camera,

automated traffic recorders, advanced warning flashers, variable speed limits, queue warnings, ramp metering, traveler information, dynamic message signs, dynamic lane use, communications infrastructure (i.e., fiber optic), enhanced lane markings, road/weather information systems, transit signal priority, connected and automated vehicle (CAV) infrastructure, etc.

- TSM strategies and infrastructure, such as maintenance and operations programs, access management plans, incident management plans, event traffic management programs, wildlife crossings, snow fence, etc.
- TDM measures such as educational information, transit or carpool incentives, park and ride facility improvements, bike sharing programs, flextime and telecommuting policy incentives, congestion pricing, parking management, etc.

Freight

Freight can be defined as the movement of goods to, from, and through the study area. In Colorado, freight is most commonly transported on the roadway network via trucks and by rail. Data collection for freight could include:

- Vehicle classification, truck counts and truck count forecasts
- Freight flow data including commodity flow databases
- Truck travel patterns
- Location of freight distribution centers, manufacturing locations, intermodal facilities, fueling locations and rest areas

Transit and Rail

The transit system includes any mass transportation service in the study area, including shuttle, bus, light rail, commuter rail, passenger rail, etc., and demand-responsive services, along with the facilities that support those services (transit stations, stops, park and ride facilities, etc.).

Transit Resources

CDOT's Division of Transit and Rail (DTR) has guidance available on the CDOT website at https://www.codot.gov/programs/programs/transitandrail

Information about transit routes, amenities, and infrastructure within the study area, or potentially impacted by the project, should be collected and documented, including:

- Public and private transit service providers
- Type of transit service by provider (e.g., fixed-route bus, demand responsive bus, light rail transit)
- Routing or service area
- Frequency of service (e.g., 2-times an hour peak/4-times an hour off peak) or service headways (e.g., 15-minute peak/30 minute off-peak)
- Span of service – days of week and hours of day service operates
- Ridership annually (by stop if available)
- Clientele served (e.g., commuters, seniors, disabled, EJ and state defined DI Communities)

- Connecting routes
- Origins and destinations served by impacted bus stops and along the transit route (e.g., business park, neighborhood, medical facility, grocery store)
- Number and location of passenger amenities (e.g., shelters, benches, trash receptacles, signing)
- Infrastructure improvements present (e.g., transit signals, associated "Park N Ride" parking spaces, queue jumps, bus pullouts)
- Planned (fiscally constrained and vision) transit improvements in the study area (e.g., local, regional, or statewide)

CDOT Transit Projects

CDOT could have projects that are transit focused or projects that are focused on another mode but have the potential to impact transit services. This guidance focuses on projects that have the potential to impact transit services.

Transit and rail projects will need to comply with FTA and/or Federal Railroad Administration (FRA) requirements.

Aviation

If aviation alternatives are being considered, an inventory of the existing airport facilities should be documented, including:

- Location of airports
- Category of airport: commercial service, primary, cargo service, reliever
- Type of service (e.g., commercial vs. general aviation)
- Annual enplanements and operational capacity
- Ground transportation facilities and services

Bicycle and Pedestrian

Bicycle accommodation can take several forms including on-street facilities (shared lanes, wide curb lanes, paved shoulder, bike lanes, etc.) and off street shared use paths. Pedestrians are most commonly accommodated on sidewalks or shared use paths. The existing and planned bicycle and pedestrian facilities and amenities near the project area should be documented, including:

- Existing bicycle facilities (designated bike routes, bike lanes, shared use paths, etc.)
- Existing pedestrian facilities (sidewalks, shared use paths, intersection crossing treatments, etc.)
- Bicycle and pedestrian LOS – using Highway Capacity Manual (Transportation Research Board, 2010) methodology to provide a qualitative assessment of segment and intersection LOS in the study area
- Level of Traffic Stress (LTS) - rating given to a road segment or crossing indicating the traffic stress it imposes on bicyclists.
- Bicycle and pedestrian crossing treatments (crosswalks, pedestrian push button activation, bicycle in-street actuation, etc.)
- Amenities (e.g., bike racks, bike lockers, bicycle accommodation on transit vehicles)

- Bicycle and pedestrian connections to other transportation facilities (e.g., transit stations or stops)
- Local and regional bicycle and pedestrian improvements (e.g., fiscally constrained and vision plan)

The condition and ADA compliance of these facilities also needs to be analyzed and considered. ADA ramps must also be brought into compliance within a project area, as outlined in Procedural Directive 0605-1 (CDOT, 2017b).

https://www.codot.gov/business/civilrights/ada/assets/0605-1.pdf

Environmental Consequences

The Environmental Consequences chapter of EAs and EISs should compare the effects of each alternative carried forward for detailed analysis for all affected travel modes in the study area. The following sections provide an overview of the range of tools and analytical techniques that can be used to evaluate how well each alternative meets the project's stated purpose and need and to assess the project's impacts on transportation resources in the study area.

Roadway

Travel Demand and Traffic Operations Modeling

One or more of the following four categories (e.g., Regional Travel Demand Models, Analytical/Deterministic Tools, Microsimulation, and Mesoscopic simulation) of travel demand and traffic operations models may be needed to appropriately forecast the travel demands and assess the operational conditions associated with the various transportation alternatives in the future.

As emerging transportation technologies become available such as autonomous vehicles, these priorities can be identified in the project purpose and need statement and alternatives analysis. Analysis of such technologies in NEPA will continue to evolve as technologies are implemented.

Regional Travel Demand Models

This type of transportation model is designed to forecast travel demand at a regional level. CDOT's Information Management Branch developed and maintains a statewide travel demand model, which is used to understand the demands on and needs of a transportation system within a region and statewide.

- **Common software packages** – TransCAD, VISUM, TransModeler
- **Basic inputs** – Land use forecasts and the transportation network (roadway and transit)
- **Basic outputs** – Forecasted daily traffic volumes and transit ridership for individual corridors in a region, regional travel patterns including origins/destinations
- **Typical applications** – Regional, community, and corridor level analysis
- **Level of effort required** – A relatively low level of effort is required to adapt these tools for project-level application

The travel demand model used by a project should be adopted by the relevant MPO and verified/approved by FHWA.

Analytical/Deterministic Tools

Analytical/deterministic tools implement the procedures of the *Highway Capacity Manual* to conduct operational analyses (Transportation Research Board, 2010). The *Highway Capacity Manual* procedures use deterministic mathematical equations to calculate facility LOS. These tools predict capacity, density, speed, delay, and queuing and may use local calibration factors to adjust formulas to local conditions. These tools are validated with field data. Analytical/deterministic tools are good for analyzing the performance of isolated facilities but generally do not evaluate the interaction between multiple intersections.

- **Common software packages** – Highway Capacity Software, Synchro
- **Basic inputs** – Traffic volumes (peak hour), roadway geometry, and signalization characteristics
- **Basic outputs** – Signalized and unsignalized intersection levels of service, travel delay, freeway mainline and ramp peak hour operations, etc.
- **Typical applications** – Intersection and segment operational analysis
- **Level of effort required** – A low level of effort is required to use these tools

Microscopic Simulation Models

Microscopic simulation models are designed to provide detailed simulation of individual vehicles in a network. They evaluate the interaction between each single car, bus, or person in the simulation based on the laneage and geometry and can provide detailed information about the performance. Due to the fine detail and large amount of information required to develop microscopic simulation models, these models often focus on small areas and are developed for specific corridor and intersection studies. Microscopic models rely on user-defined travel patterns and demands and do not adjust for capacity constraints. Microscopic simulation models can be particularly useful when evaluating over-saturated traffic conditions.

- **Common software packages** – CORSIM, VISSIM, and SimTraffic (which is packaged with the Synchro analytical/deterministic tool)
- **Basic inputs** – The most extensive and detailed of the four modeling tools; all the conditions in the study area (lanes, signal timing, volumes, geometry, etc.) are required to evaluate operational performance
- **Basic outputs** – Intersection operations (i.e., LOS) and network performance including interaction (e.g., queuing) between intersections
- **Typical applications** – Individual corridors or subarea system of intersections
- **Level of effort required** – Requires a high level of effort and calibration

Mesoscopic Operational Models

Mesoscopic models are relatively new to transportation planning and bridge the divide between travel demand models and microscopic models. Mesoscopic operational models include dynamic network assignment processes that adjust driver route choices based on real-time conditions and are designed to include more detailed aspects of the roadway system (e.g., the location of auxiliary turn lanes, the existence of tolled or managed lanes or facilities, etc.) without the intense resource requirements of a full microscopic simulation model. This model type is particularly useful when analyzing the route decision-making differences resulting from congested conditions or managed

lanes, assessing the impacts of ITS technologies, supporting the decision-making for work zone planning and traffic management, evaluating congestion pricing schemes, and planning special events and emergency situations.

- **Common software packages** – DynusT, Aimsun, TransModeler
- **Basic inputs** – The basic requirements for a travel demand model with the potential for increased network information, such as auxiliary lanes, signal timing and coordination, ITS technologies, tolled lanes and HOV lanes
- **Basic outputs** – Travel origin-destination forecasts in small time increments that account for and demonstrate the impacts of congestion (e.g., rerouting, queuing) over time
- **Typical applications** – Regional or corridor level analysis
- **Level of effort required** – This model type is not as readily available as travel demand models. The regional nature of a mesoscopic model requires a considerable effort for development, calibration, and validation. Depending on the existence of an established model and the project requirements and goals, this process requires a moderate to high level of effort.

Scope of Traffic Analysis

Key aspects of traffic scoping include:

- **Horizon Years**: Traffic analysis is generally required for the existing and the long-range planning horizon year.
- **Time Periods**: Analysis should be geared to recurrent peak traffic conditions.
- **Study Area**: The study area for the transportation analysis is often larger than the area defined for most environmental resources.
- **Model Calibration**: Travel demand and traffic operations models should be validated against actual conditions and calibrated to ensure that they are reasonably representing the area and local travel conditions.

Safety

CDOT requires explicit consideration of safety in a transportation planning process. The analysis should use the concepts of Level of Service of Safety (LOSS) and pattern recognition to test the frequency and severity of crashes throughout the study area. The LOSS formulation categorizes four levels of "potential for accident reduction," I through IV. LOSS I indicates a better-than-expected safety performance and thus a low potential for crash reduction. LOSS IV indicates a crash history significantly greater than expected for a given roadway type, thus possessing a high potential for crash reduction.

Safety Analysis Resources

- *Highway Safety Manual* – American Association of State Highway Transportation Officials (AASHTO, 2016a)
- CDOT's Safety Performance Functions (SPF)

Freight

Projects that may require the integration of freight considerations include, but are not limited to, intersection improvements, reconstruction and rehabilitation of roadways, bridge replacements and/or rehabilitation, repaving, building roadway on a new alignment, expanding roadway corridors, interchange improvements, additions of interchanges, roadway widening, access to intermodal facilities, accommodating rail expansion with roadway improvements, and safety improvements. There are generally two types of freight considerations for CDOT transportation projects:

- **Freight-focused** – A transportation project intended to resolve a freight issue or that has a significant freight element. The project's purpose and need would likely be heavily focused on freight movement, and freight would likely be a major consideration in the alternatives evaluation process.
- **Freight-related** – A transportation project that could impact freight operations. The role of freight in the project would likely be one of several transportation considerations.

Alternatives development and evaluation should consider freight infrastructure, operations, and policy. Truck volume forecasting should be verified for accuracy, as many regional models calibrate mainly on overall traffic volumes. For both freight-focused and freight-related projects, screening of alternatives may consider:

- The degree to which the alternative solves an existing freight problem
- The degree to which the alternative satisfies all transportation needs, not just freight (i.e., a balancing of benefits)
- Direct impacts on freight movement such as access changes, facility design that could reduce truck safety, tolls that could divert trucks onto the adjacent street network, inhibiting intersection design (e.g., roundabouts), poor signal timing, increased congestion that could reduce truck travel times and/or reliability
- Indirect impacts on freight movement such as induced changes in the pattern of land use, the location of freight facilities, and effects to the supply chain
- The impacts of freight movement on environmental resources and features (air quality, water quality, noise, visual, social/EJ and equity, etc.) and the potential for an alternative to minimize the impacts

Freight Stakeholders

Freight stakeholders can be hard to engage and reluctant to disclose operational information that they deem to be proprietary and could benefit their competitors.

Statewide and regional resources are important to identify freight users of the study area.

Key input from freight stakeholders:

- Current freight uses of the facility
- Freight forecasts
- Alternatives development and refinement
- Impacts of alternatives on freight operations

Transit and Rail

The travel demand modeling tools described previously may provide some insight into how ridership and travel times are likely to change because of a project. However, a calibrated travel demand model with transit is often not available. Therefore, this section provides guidance on qualitative and quantitative off-model analysis that can be useful:

- Degree to which the alternative impacts the transit service in relation to the service's importance regionally
- Change in ridership
- Potential to incite mode shift to transit
- Influence on transit's ability to service existing clientele and key activity centers
- Compatibility with planned transit improvements
- Impacts on origins and destinations served
- Impact to transit agency or service provider
- Impact on connecting services or ability to make connections
- Change in travel time and/or reliability
- Impact on passenger amenities
- Change in transit infrastructure
- Change in access to facilities and circulation

Transit Stakeholders

- Public transit agencies
- Private for profit transit providers
- Private not for profit agencies
- Municipalities
- Regional planning entities (e.g., MPOs)
- CDOT DTR
- FTA
- FRA
- Colorado Association of Transit Agencies (CASTA)
- Human services agencies
- Transit and rail interest groups

Aviation

Although it is rare for a CDOT NEPA project to impact aviation facilities, some large studies with aviation facilities near the study areas may exist. Facilities may include runways, airports, airport towers, etc. Aviation impacts should be coordinated with the FAA, CDOT Division of Aeronautics, and local airport managers.

Bicycle and Pedestrian

Both the USDOT policy statement on bicycle and pedestrian accommodation (signed March 11, 2010) and the Colorado Transportation Commission's Bike and Pedestrian Policy Directive 1602.0 (CDOT, 2009) and subsequent State Statute 43-1-120 support the development of fully integrated active transportation networks. CDOT's Policy Directive states that "the Department shall include the needs of bicyclists and pedestrians in the planning, design, operation and maintenance of transportation facilities as a necessary component of all programs and activities." As such, bicycle and pedestrian accommodation shall be documented before finalizing the decision. The Colorado Transportation Commission's Policy Directive 605.0 (dated November 27, 2018) builds on Policy Directive 1602.0 to "ensure that all new or existing Transportation Facilities, Building Facilities, and other CDOT services are accessible to persons with disabilities." Some CDOT NEPA projects may be specifically focused on bicycle and/or pedestrian travel.

Unless currently under construction, all CDOT and local agency projects (including those in a reevaluation process) are subject to the Transportation Commission's Bike and Pedestrian Policy Directive 1602.0 and State Statute 43 1-120.

To identify the potential impacts and benefits to bicycle and pedestrian use under each alternative, the following tools may be useful:

- Maps showing the alignment of the project alternatives overlaid with existing and planned bicycle and pedestrian facilities
- Data that includes the number of people using the bicycle and pedestrian facilities and for what purpose (commuter, recreation, etc.)
- Comparison of the bicycle and pedestrian features of the project alternatives with respect to existing and planned bicycle and pedestrian facilities outlined in community transportation plans and information provided by local interest groups
- Evaluation of whether the proposed action features will have negative or positive impacts on the existing and planned bicycle and pedestrian facilities
- Completion of bicycle and pedestrian LOS evaluation and LTS evaluation for each alternative, using the methodologies presented in the *Highway Capacity Manual*
- Comparison of the bicycle and pedestrian features of the alternatives to highlight the similarities and differences among alternatives

The Environmental Consequences chapter in EAs and EISs should, at a minimum, compare the effects in the following three categories of each alternative carried forward for detailed analysis:

- **Community Needs** – Demonstrate that the project has fully considered bicycle and pedestrian transportation, condition, and expected life and has actively coordinated with local government bicycle and pedestrian agencies and public interest groups to understand and meet, where feasible, the community's needs. The information contained in this discussion should provide a firm understanding of how the proposed facilities will meet local needs and movements of bicyclists and pedestrians.
- **Public Law** – The Environmental Consequences chapter must cite the Federal legislation in Title 23 of the U.S. Code Section 109(m), documenting CDOT's full consideration of bicycle

and pedestrian accommodation and the provision of reasonable accommodation for the bicycling and walking public, including ADA compliance.

- **Community Context** – Describe any project components that will benefit the local bicycle and pedestrian network by being constructed as part of the project or by providing adequate ROW for later construction.

Bicycle/Pedestrian Stakeholders

Groups supporting the development of bicycle and pedestrian facilities on the project typically have information about existing and future needs for bicycle and pedestrian accommodation. Stakeholders could include:

- Bicycle advocacy groups
- Biking clubs
- Walking organizations
- Senior advocacy groups
- Schools

Impacts and Mitigation

The Summary of Impacts and Mitigation Table (Table 9 2) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for transportation resources.

The mitigation section should describe project design elements that avoid or minimize impacts to the existing transportation network and detail the proposed mitigation measures and describe how they will mitigate the impact for which they were developed.

Roadway

Traffic Operations

Mitigation measures should be considered when the analysis of alternatives results in a negative impact to existing or future traffic operations and safety. These measures could include:

- Implementation of traffic control devices (e.g., traffic signals, stop signs, ramp metering)
- Intersection improvements (e.g., roundabout construction, auxiliary lanes)
- Signal timing improvements (e.g., reallocation of green time, addition of protected-only left turn phase to address safety issue)

TDM/TSM

Mitigation of impacts to the transportation system can often be performed by applying transportation technology, TDM, and TSM infrastructure and strategies, such as the following:

- ITS and transportation technology to optimize safety and operational benefits of alternatives. Existing and reasonably anticipated technologies at the time of the study should be considered with potential time horizons and the CDOT-identified Connected Roadway Classification (CRC) level for the study corridor(s). Example measures could include:
  - CAV infrastructure
  - Communications infrastructure

- Variable speed limits
- Queue warnings
- Ramp metering
- Advanced traffic signal technologies
- Road/weather information systems
- Dynamic messaging and lane use
- Wildlife detection and alert systems

- TDM strategies to change or reduce the demand for automobile use, particularly during peak periods of the day, by encouraging a change in travel behavior. Example measures could include:
  - Requiring parking fees
  - Subsidizing transit costs for employees or residents
  - Enhancing facilities and amenities for alternative travel modes (transit, bicycle, pedestrian) to encourage mode shift from single occupancy vehicles
  - Implementing TDM programs, often through major employers, to encourage telecommuting and flexible work schedules
- TSM strategies to maximize the efficiency of transportation system operations by improving traffic flow, reducing traveler delay, and enhancing safety. Such programs can also reduce emissions by changing vehicle speeds, reducing vehicle idling, and rerouting to avoid congested areas. Example infrastructure and programs could include:
  - Signal coordination
  - Enhanced maintenance and operations programs
  - Access management plans/access control plans
  - Incident management plans
  - Event traffic management programs
  - Freight management strategies
  - Enhanced intersection/destination signage
  - Wildlife crossing treatments
  - Snow fence

Freight

Appropriate mitigation of impacts on freight facilities and operations should be commensurate with the presence of freight activity and the project's impacts thereon. Working with freight stakeholders during the identification of mitigation options is critical to the success of freight-focused or freight related projects. Mitigation measures could address:

- Impacts to truck operations during construction (e.g., advance notice of construction schedules to prominent trucking companies, ensuring work zone safety measures account for corridor truck travel)
- Geometric design and pavement materials to adequately handle forecasted truck travel
- Alterations in the transportation network to minimize interactions between trucks/trains and autos/pedestrians/bicyclists

- Efficient truck routing that avoids residential communities
- Provision of loading and unloading areas for truck deliveries to stores, restaurants, and offices
- Provision of sound or visual barriers to reduce freight transportation noise and visual impacts on the adjacent area
- Provision of ITS for mountain pass safety (e.g., truck escape ramps, truck passing areas, consideration of truck speed reductions on mountain passes, truck chain stations with sufficient lighting for safety, truck parking and rest facilities) as truck parking is a bigger issue due to the truckers' time restrictions related to driving.

Freight Resources

FHWA's Integrating Freight into NEPA Analysis guidance (September 2010)
http://ops.fhwa.dot.gov/publications/fhwahop10033/nepa.pdf

CDOT's DTR
https://www.codot.gov/programs/programs/transitandrail

Transit and Rail

Mitigation measures should be considered when the analysis of alternatives results in a negative impact to existing or planned transit and/or rail services. Mitigation measures should be coordinated with transit stakeholders but could include:

- Relocation of transit stop(s)
- Enhancement of transit stop(s) (e.g., sidewalks, ramps, connections to adjacent land uses, lighting)
- Replacement, relocation, or enhancement of passenger amenities such as shelters and benches
- Rerouting of service to retain reliability and travel time
- Signing and way finding
- Transit priority features (e.g., queue jumps, signal priority)
- Pedestrian crossing treatments (e.g., crosswalks, grade separated crossings)
- New or expanded intercept parking lots
- Local agency modifications to zoning and/or setbacks to encourage transit-supportive land uses

Aviation

Mitigation measures should be considered if the alternatives analysis results in negative impacts to aviation facilities in the study area. These mitigation measures could include enhanced or new access to affected airports, traveler information, or enhanced transit service to access the affected airports.

Aviation Resources

CDOT's Division of Aeronautics at https://www.codot.gov/programs/aeronautics

Bicycle and Pedestrian

If the analysis of alternatives shows a negative impact on existing or planned accommodation of bicyclists or pedestrians, mitigation measures should be identified. Such mitigation measures could include:

- Expansion of or improvements to existing bicycle or pedestrian facilities to maintain a desired bicycle or pedestrian LOS
- Provision of connections to other system options such as local or regional trail system, on-street lanes or routes, etc.
- Rerouting of bicyclists/pedestrians to equivalent type facility if the proposed action would sever existing bicycle or pedestrian facilities
- Intersection or mid-block crossing treatments to enhance pedestrian safety
- Grade separations to eliminate conflicts between bicyclists/ pedestrians and autos/trains
- Provision of amenities (e.g., bike racks or bike lockers) at transit stations to enhance intermodal connections
- Signing and wayfinding

Bicycle/Pedestrian Resources
CDOT's Bicycle and Pedestrian Program at https://www.codot.gov/programs/bikeped

9.18 Residential/Business/Right-of-Way Relocation

The relocation and displacement analysis of the NEPA document should identify and discuss any residential, business, non-profit association, or farm operation relocations associated with the proposed project to:

- Ensure that community issues are identified and that project effects are addressed and incorporated into the decision-making process
- Try to avoid, minimize, or mitigate, where feasible, adverse community effects
- Ensure the incorporation of environmental protection and community impact considerations from the earliest stages of project or plan development
- Provide for the participation and consultation of communities affected by the proposed project throughout the life of the project development process

CDOT's Right-of-Way staff should be involved in all projects where ROW acquisition will be required or is a potential concern. It is the responsibility of environmental planners performing relocation and displacement analysis to coordinate closely with CDOT Right-of-Way staff to avoid duplication of effort, as well as better integrate information. Acquisitions and relocation issues also affect the land use and social and economic health of a community and should be addressed accordingly.

The following subsections provide guidance on the treatment of acquisition and relocation for CDOT's NEPA projects. The first subsection discusses the process for evaluating acquisition and relocation. The second subsection discusses acquisition and relocation information that should be in each NEPA document.

It is not appropriate to collect and present demographic details of individuals associated with displacement. In situations where the number of displacements is low, general demographic discussions may be appropriate. In situations where there are several displacements, demographic information from the Census or other sources may be sufficient to characterize the overall nature of the displaced individuals.

9.18.1 Relocation and Acquisition Evaluation Process

The CDOT Region Right-of-Way Manager and their acquisition and relocation Specialists (either in-house or consultants) are responsible for obtaining data on the number of relocations and the availability of replacement property using the Acquisition Stage Relocation Plan form.

CDOT's Region DTD staff should work with the staff acquisition and relocation agents to obtain project information that will be evaluated by the Region DTD staff on how the relocations and acquisitions, caused by the proposed project, would facilitate or inhibit access to jobs, educational facilities, religious institutions, health and welfare services, recreational facilities, social and cultural facilities, pedestrian facilities, shopping facilities, and public transit services within the project area. The study area is obligated to include communities within, and immediately surrounding, the proposed project. Community boundaries can often be delineated by physical barriers, land-use patterns, political divisions (such as school districts), selected demographic characteristics, historical backgrounds, resident perceptions, subdivisions, and neighborhoods recognized by name and tradition.

Possible ROW acquisitions must be identified and evaluated as early as possible during project planning. This should be done before alternative corridors are selected, if possible, and must be completed before proceeding with any ROW acquisitions.

Reasons for Evaluation of Relocation and Acquisition Under NEPA

CDOT DTD staff evaluates relocation and acquisition for several reasons:

- Relocation and acquisition of any residence, business, non-profit association, or farm operation is an involved undertaking that needs to be carefully considered before any individual or group is impacted
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates that pertain to ROW acquisitions (Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, and pertinent state laws)

CDOT must comply with Federal relocation regulations when implementing transportation projects in Colorado. The regulations and certifications applicable to residential business ROW and relocation are summarized below.

- **FHWA Technical Advisory T6640.8a Guidance for Preparing and Processing Environmental and Section 4(f) Documents** – In any NEPA document, the relocation information should be summarized in sufficient detail to adequately explain the relocation situation, including anticipated problems and proposed solutions for all alternatives.
- **Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 100-17)** "establishes a uniform policy for the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a Federal agency or with Federal financial assistance."
- **FHWA's Environmental Impact and Related Procedures (23 CFR 771)** – Provides direction for FHWA on implementing NEPA.

These laws and policies provide guidance toward uniform and equitable treatment of persons displaced from their homes, businesses, farms, or other properties, by Federal and federally funded programs or projects.

Collection and Evaluation of Baseline Information Under NEPA

To comply with the FHWA Technical Advisory 6640.8A (FHWA, 1987b), information on ROW requirements is to be included in the description of project alternatives. The CDOT *Right-of-Way Manual* (2016) addresses the preparation of ROW plans. These plans are a prerequisite to Federal participation in the cost of acquiring real property and are required under state law. Preliminary development of these plans is initiated as soon as the route of the proposed project has been selected and approved by the Transportation Commission.

Collection of Baseline Information

The contents of final ROW plans are prescribed in the CDOT *Right-of-Way Manual* (2016) and include information that could enable evaluation of relocation/acquisition impacts. However, NEPA analysis occurs between the processes of describing the location of land necessary to accommodate the project and preparing ROW plans for the selected route of the proposed highway. Relevant data sources are discussed in **Section 9.14** (Social Resources) and **Section 9.15** (Economic Resources) and coordinated with CDOT Right-of-Way staff.

Evaluation of Baseline Information

To enable the identification of relocation and acquisition impacts, the baseline information must be limited to the ROW Plan boundaries for each project alternative and a larger NEPA study area that includes potentially impacted neighborhood(s), metro district(s), or other political jurisdictions. Data is collected regarding property owners and potentially displaced peoples within the project ROW Plan boundaries and NEPA study area. As appropriate to project complexity, this information can then be used to develop the following types of information regarding project impacts:

- Estimation of types of households to be displaced, including:
  - Percentage of minority households (e.g., racial, national origin, and ethnic)
    - The ROW staff provide property owners and displacees with a demographic information form at the beginning of the project. A second opportunity for CDOT to collect demographic information related to race, national origin, ethnicity, sex, and age is included on a voluntary feedback form provided to the property owners at closing and to displacees after they have been relocated. Use of the forms by the property owners and displacees is voluntary for both forms. Note that this voluntary data is not necessarily representative of a project's overall demographic makeup
  - Percentage of DI Communities, as defined by the State of Colorado. This information can be found either through Google or the DTD.
  - The Region ROW Relocation Specialists interview as many of the property owners and potential displacees who can be located. If the project requires relocation, the ROW Specialist uses an interview form for each household or business. If relocation is not required on a project, the property owners are not interviewed about their relocation needs. The interview data collected from displacees include:
    - Household size – number of adults, children, and pets.
    - Household income (in dollars).
    - Percentage of elderly households to be displaced (CDOT cannot force someone to tell us their age or other demographic information about themselves).
    - Whether any of the household members require ADA compliant housing. CDOT assumes that any relocated businesses will be moving into ADA-compliant premises.
    - During the interview, the ROW Relocation Specialist asks residential displacees if the replacement residence must be ADA-compliant.
    - The ROW Specialist asks residential displacees about their specific community needs, such as preferred school districts (school grade levels needed and preferred school distance from the replacement residence) and any other conditions or unique situations that will need to be accommodated when replacement housing is

considered (examples include home businesses, activities that require a license or certain zoning classification).
    - Number of employees (if it is a business).
    - Other data collected from business displacees.
- After the displacee interviews are conducted, the Region ROW Relocation Specialist researches the local market/areas where the household or business might relocate. Residential and business displacees are provided with at least three replacement locations that CDOT thinks might be comparable locations ("comps") to replace what the displacees have (land, land use, zoning, proximity to schools, proximity to the same (or comparable) local customer market. Displacees do not have to use CDOT's "comps."
- In addition to affordability, all residential comps must meet the Uniform Act definition of "decent, safe and sanitary." The CDOT ROW Relocation Specialist must inspect replacement residential units before they are offered to displacees as potential replacement housing. If the displacee selects replacement housing on their own, CDOT must perform the "decent, safe and sanitary" inspection – and have all requirements met – before the ROW Relocation Specialist can take steps toward acquiring the replacement property.
- Actions proposed to remedy insufficient relocation housing, including a commitment to housing of last resort, if necessary.

- Number, type, and size of businesses to be displaced, including special business characteristics, number of employees, and general economic impact of business dislocation(s) on community economy, plus:
    - Sites available in the area for business relocation
    - Whether any special licenses can be transferred or otherwise obtained at the potential replacement business location (liquor, marijuana growing and sales, and franchise rules that dictate minimum distance from other franchises)
    - Sign relocations
    - Summary of potential contamination concerns
    - Identification of any publicly owned lands
        - A discussion of the results of early consultation with local government(s) and any early consultation with businesses subject to displacement, including any discussions of potential sources of funding, financing, planning for incentive packaging (e.g., tax abatement, flexible zoning, and building requirements), and advisory assistance that has been or will be furnished, along with other appropriate information. Specific financial and incentive programs or opportunities (beyond those provided by the Uniform Act) to residential and business displacees to minimize impacts of the relocation may be identified, if available through other agencies or organizations.
- A description of the actions proposed to remedy insufficient relocation housing, including, if necessary, "Last Resort Housing." If "Last Resort Housing" is anticipated, the plan should address how this housing could be provided; that is, whether newly constructed housing must be made available or if there is sufficient replacement housing that meets the displacees' needs in the preferred relocation area to handle "Last Resort Housing" situations.

- A statement that relocation and acquisition would be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), making resources for relocation available without discrimination.

Relocation and ROW acquisition impacts are mitigated by avoidance to the extent feasible, such as by changing an alignment so that there are no displacements. When this is not possible, just compensation in accordance with the Uniform Act may be provided.

Other Issues to Consider

Coordination with the Region ROW Relocation Specialist is recommended as sharing personal information must be strictly limited and is not subject to Colorado Open Records Act or FOIA requests.

9.18.2 NEPA Document Sections

The content of the sections on relocations and acquisitions in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

Relocation and acquisitions aspects that may be impacted by the project should be described in the Affected Environment chapter (as summarized in the sidebar). Additional information is provided in the CDOT *Right-of-Way Manual*.

Affected Environment Chapter of NEPA Document

- Describe the number of houses and/or buildings subject to displacement
- Incorporate CDOT's ROW estimates of the number of people in the study area who are subject to relocation
- Determine if the potential displacees represent a disproportionate population using voluntarily provided demographic information from the property owners and displacees
- Include market information on the availability of comparable replacement dwellings and business locations

Environmental Consequences

It is essential that the relocation and acquisition section in the Environmental Consequences chapter of the project's NEPA document identify and discuss any residential, business, non-profit association, or farm operation relocations associated with the proposed project to:

- Ensure that community issues are identified, and project effects are addressed and incorporated into the decision-making process via the DTD public meeting of affected parties
- Attempt to avoid, minimize, or mitigate, where feasible, adverse community effects
- Ensure the incorporation of environmental protection and community impact considerations from the earliest stages of project or plan development

- Anticipate any relocation problems early in the process and identify and develop proposed solutions
  - Because the displacees may not want to share their specific or special needs or situations with additional people beyond the ROW Relocation Specialist, this is a ROW Relocation Specialist function
- Provide for the participation and consultation of communities affected by the proposed project throughout the life of project development
- Discuss such topics as the number of relocations, categorized by residences, businesses, non-profit associations, farm operations, and acreage of ROW acquisitions involved; summarize information from the completed displacee interview forms
- Provide information on all project alternatives
- Discuss how the relocations caused by the proposed project would facilitate or inhibit access to jobs, educational facilities, religious institutions, health and welfare services, recreational facilities, social and cultural facilities, pedestrian facilities, shopping facilities, and public transit services

When a project requires the relocation or acquisition of residences or businesses, standard CDOT statements such as the following should be included in the NEPA document discussion of relocation or acquisition impacts. These statements are also included in Appendix F.

Model Relocation Statement

In certain situations, it may also be necessary to acquire improvements that are located within a proposed acquisition parcel. In those instances where the improvements are occupied, it becomes necessary to "relocate" those individuals from the subject property (e.g., residential or business) to a replacement site. The Uniform Act provides many benefits to these individuals to assist them both financially and with advisory services related to relocating their residence or business operation. Although the benefits available under the Uniform Act are far too numerous and complex to discuss in detail in this document, they are available to both owner occupants and tenants of either residential or business properties. In some situations, only personal property must be moved from the real property and this is also covered under the relocation program.

As soon as feasible, any person scheduled to be displaced shall be furnished with a general written description of the displacing agency's relocation program that provides, at a minimum, detailed information related to eligibility requirements, advisory services and assistance, payments, and the appeals process. It shall also provide notification that the displaced person(s) will not be required to move without at least 90 days' advance written notice. For residential displacees, this notice cannot be provided until a written offer to acquire the subject property has been presented, and at least one comparable replacement dwelling has been made available. Relocation benefits will be provided to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits under the Uniform Act, to which each eligible owner or tenant may be entitled, will be determined on an individual basis and explained to them in detail by an assigned Right-of-Way Specialist (CDOT, 2016).

Model Acquisition Statement

For any person(s) whose real property interests may be impacted by this project, the acquisition of those property interests will comply fully with the Uniform Act. The Uniform Act is a federally mandated program that applies to all acquisitions of real property or displacements of persons resulting from Federal or federally assisted programs or projects. It was created to provide for and ensure the fair and equitable treatment of all such persons. To further ensure that the provisions contained within this act are applied "uniformly," CDOT requires Uniform Act compliance on any project for which it has oversight responsibility regardless of the funding source. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of "just compensation." All impacted owners will be provided notification of the acquiring agency's intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests. A Right-of-Way Specialist will be assigned to each property owner to assist them with this process (CDOT, 2016).

When relocation and acquisition impacts are identified, the document will discuss possible mitigation and include the information shown in the sidebar in the NEPA document, as appropriate.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for relocations.

Mitigation Planning Information to Include in NEPA Document

- The availability of residential and commercial real estate for sale to accommodate potential relocation needs
- Consider and reference the Relocation Assistance Program, including types of benefits available
- An evaluation of city zoning considerations with respect to potential relocation and franchise territories for potentially relocated/acquisitioned commercial entities

9.19 Utilities and Railroad Facilities

A utility is a private or publicly owned line, facility, or system for producing, transmitting, or distributing irrigation water, communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, stormwater not connected with highway drainage, or any other similar type of commodity that directly or indirectly serves the public (23 CFR Part 645.105(m) Utility Relocations, Adjustments, and Reimbursement, Definitions).

The following subsections provide guidance on the treatment of utilities and railroads for CDOT's NEPA projects. The first subsection discusses the process for evaluating utilities and railroads. The second subsection discusses utilities and railroads information that should be addressed in each NEPA document.

9.19.1 Utilities and Railroads Evaluation Process

The CDOT project manager will coordinate with the Regional Utility Engineering Program Manager (RUEPM) whenever there is involvement with utilities and/or a rail system on a project.

The study area will include a Subsurface Utility Engineering investigation per CRS 9-1.5-103 for existing utilities. Each Railroad within the project footprint shall complete a minimum of a diagnostic meeting and Preliminary Engineering reviews. If present, project construction will be coordinated with the existing and proposed infrastructure. It may also be necessary to relocate utilities or railroad facilities for several reasons, such as:

- A utility may conflict with proposed construction. Identify all utility conflicts within a Utility Conflict Matrix (refer to Design Bulletin 2022-1)
- Road construction may provide a convenient opportunity to place new utility or upgrade existing ones (e.g., betterment)
- Existing unsafe or hazardous conditions may easily and economically be mitigated during construction
- Certain visual impacts may be replaced with a more acceptable solution (i.e., undergrounding an overhead line)
- Railroad crossing requires relocation due to impacts of the proposed roadway design, including at-grade crossings, grade separated structures (e.g., over and under passes).

Early coordination with utility and rail line owners ensures development of reasonable alternatives relative to existing utilities and railroads. The associated improvements and timely consideration of the costs associated with the potential relocation of these resources can also be fully integrated into the NEPA document. Early coordination identifies potential conflicts with existing or future utilities, rail line owners, and rail line users within the study area. Associated improvements that can be impacted include proposed/revised roadway section, drainage/irrigation facilities (storm sewer facilities, retention/detention ponds, etc.), landscaping, and any other proposed improvement with potential for subsurface disturbance.

Utility and Railroad Clearance Documentation

Utilities

- CDOT's *Project Development Manual* (CDOT, 2013b) Section 7.03 Utility Involvement for clearance process

Railroad

- Early coordination with the railroad company and with the Statewide Railroad Coordinator is critical as **it may take a year or more to obtain clearance**

Reasons for Evaluation of Utilities and Railroads Under NEPA

CDOT evaluates utilities and railroads for several reasons:

- Utilities and railroads are under the ownership of a private or public entity, which requires coordination and possibly relocation
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates
- Project footprint may increase due to outside drainage facilities tie in locations, e.g., City and County of Denver modifies a drainage facility one quarter mile outside the CDOT project but will need access to this facility in two years for the roadway project
- Additional structures may need to be constructed or evaluated to hold utilities, e.g., SH 82 in Glenwood Springs evaluated a new pedestrian bridge to reduce utility relocations

Legal mandates include:

- **Transportation Act, CRS 43-1-225** – The revision granted the Transportation Commission additional powers to make regulations about utility facilities, defined appropriate situations to relocate utility facilities, and clarified cost of relocating utility facilities. Last revised in 2021.
- **Eminent Domain Act, CRS 38-5-101** – Gives any utility company currently doing business in Colorado the ability to construct, maintain, and operate utilities along any public highway. Last revised in 2013.
- **State Highway Utility Accommodation Code: CFR Title 23 Section 645, 646 and 635-309b** – Prescribes the policies, procedures, and reimbursement provisions for the adjustment and relocation of utility facilities on Federal-aid and direct Federal projects. Last amended in 2021.

In addition to these regulations, other state laws and constitutional provisions concern utilities and railroads. These mandates give utilities the right to construct their lines within highway ROW, provided they meet CDOT's established criteria.

Collection and Evaluation of Baseline Information Under NEPA

CDOT has established procedures in the Project Development Manual (CDOT, 2013b), Section 7.03, for coordinating with utility companies when a project may have an impact on utilities.

A coordinated effort among the RUEPM, the Project Manager or Resident Engineer, and the Utility Owners furnishes all relevant information about the location, dimension, and characteristics of major utilities found within a proposed project corridor (i.e., all viable alternatives under consideration). The RUEPM is responsible for maintaining contact with local utility agencies and coordinating with those utility agencies during design. It is the responsibility of the project manager to evaluate and consider potential utility conflicts and recommended relocations made by the RUEPM and staff when addressing roadway impacts on utilities.

CDOT also has established procedures in the Project Development Manual, Section 7.04 (CDOT, 2013b) for coordinating with railroad companies when a project may have an impact on a railroad facility.

Section 9.27 discusses the development of a list of past, present, and foreseeable future projects that should be addressed for all resources in consideration of cumulative impacts. A utilities and railroad map should be consulted to identify which utility and railroad facilities will be impacted by projects. For input to this section, evaluate cumulative impacts to utilities and railroads in relatively general terms, noting which utility and railroad facilities will be most impacted, their relative importance, and the degree to which impacts from the transportation project considered in the current NEPA document will contribute to cumulative impacts.

9.19.2 NEPA Document Sections

The content of the sections on utilities and railroads in the Affected Environment and Environmental Consequences chapters is discussed below.

General Information to Include in NEPA Document

Utilities

- Owner
- Location
- Dimension
- Characteristics
- Type of facility/utility
- Material (if known)
- Easements/agreements/ permits (property interests)

Railroad

- Owner
- Location
- Type of crossing (at grade, etc.)
- Used or abandoned

Affected Environment

The introduction of the Affected Environment chapter of the NEPA document shall identify existing and proposed utilities and rail systems within the project area and discuss their relationship to the proposed project.

The Affected Environment chapter of the NEPA document will include the information developed to understand the utility and railroad information compiled as part of the inventory process. Present this information in the NEPA document with sufficient detail to be clear and understandable. Include general information listed in the sidebar, as well as any unique information necessary to evaluate potential impacts.

Environmental Consequences

Summarize impacts by alternative, such that similarities and differences among alternatives relative to utility and railroad impacts can be discerned.

Overall, it is in the best interest of CDOT to avoid impacts to utility and railroad facilities. This is due to the cost of relocations (as applicable) and the time and effort needed to coordinate with the entities. As noted previously, early involvement of the RUEPM and Resident Engineer in the alternatives development process is key to identifying locations of utilities and railways, possible effects to these locations, and possible avoidance alternatives. It also contributes to the development of effective agreement documents if avoidance is not possible.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for utilities and railroads.

9.20 Section 4(f) Evaluation

Section 4(f) has been part of Federal law since 1966 when it was enacted as Section 4(f) of the USDOT Act. It is codified in 23 USC Section 138 and 49 USC Section 303. Section 4(f) requires consideration of:

- Parks and recreational areas of national, state, or local significance that are both publicly owned and open to the public
- Publicly owned wildlife and waterfowl refuges of national, state, or local significance that are open to the public to the extent that public access does not interfere with the primary purpose of the refuge
- Historic sites of national, state, or local significance in public or private ownership regardless of whether they are open to the public

The law says that FHWA (and other DOT agencies) cannot approve the use of land from publicly owned parks, recreation areas, wildlife refuges, or historic sites unless there is no feasible and prudent alternative to the use and the action includes all possible planning to minimize harm to the property. The substantive provisions of Section 4(f) apply only to agencies within the branches of the USDOT and are implemented by FHWA and FTA through 23 CFR 774.

Section 4(f) resources that may be affected by transportation uses can be divided into two principal categories:

- Significant publicly owned parks, recreation areas, and wildlife or waterfowl refuges
- Historic resources

Publicly owned land that has been formally designated and determined to be significant for park, recreation area, or wildlife and waterfowl refuge purposes is also considered a Section 4(f) resource, even if it may not be functioning as such during project development. If a governmental body has a proprietary interest in the land (such as fee ownership or an easement), it is considered publicly owned.

9.20.1 Legislative Background

In 2005, Section 6009(a) of the SAFETEA-LU made the first substantive revision to Section 4(f) since it was enacted in 1966. This amendment simplified the process and approval of projects that have only *de minimis* impacts on lands subject to protection under Section 4(f). *De minimis* impacts are of such a minor extent as to not require a full Section 4(f) evaluation. Under the new provisions, once the USDOT determines that a transportation use of Section 4(f) property results in a *de minimis* impact, analysis of feasible and prudent avoidance alternatives is not required.

In 2008, FHWA reorganized the regulations implementing Section 4(f), clarifying specific elements of the Section 4(f) approval process and simplifying the regulatory requirements. Section 4(f) regulations moved from 23 CFR 771.135 to 23 CFR 774. FHWA developed a *Policy Paper* to supplement the regulations and to aid FHWA in consistently administering Section 4(f).

In July 2012, FHWA released a new policy paper on Section 4(f). The *Policy Paper* is available at https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf

The following subsections provide guidance on the evaluation of Section 4(f) resources for CDOT's NEPA projects. **Subsection 9.20.2** discusses the process for evaluating Section 4(f) resources, and **Subsection 9.20.3** discusses information about Section 4(f) properties that should be included in each NEPA document.

9.20.2 Section 4(f) Evaluation Process

A Section 4(f) evaluation is required when a project with USDOT nexus "uses" a Section 4(f) resource. A "use" is defined as one of the following:

- **Permanent incorporation/permanent easement** – Land from a Section 4(f) property is permanently incorporated into the transportation system through fee simple acquisition or permanent easement
- **Temporary occupancy** – Land occupied for construction purposes is adverse in terms of the statute's preservationist purposes
- **Constructive use** – Proximity impacts of the transportation project (e.g., noise, visual) are so severe that the activities, features, or attributes that qualify the Section 4(f) property for protection are substantially impaired

The Section 4(f) evaluation should be initiated when alternatives for the proposed action are first being designed and developed. If the Section 4(f) evaluation is part of the NEPA document, it should be completed in conjunction with the NEPA process to the extent possible.

Reasons for Evaluation of Section 4(f) Properties Under NEPA

CDOT conducts Section 4(f) evaluations for its projects for a variety of reasons, including the following:

- Section 4(f) evaluation is required by law for USDOT agencies (i.e., Federal-aid or Federal approval projects)
- To comply with mandated Section 4(f) documentation, coordination, and approval requirements
- To make special effort to preserve public park and recreation lands, wildlife and waterfowl refuges, and historic sites, consistent with USDOT policy

Determining What Type of Section 4(f) Evaluation to Complete

Collection of Baseline Information

The first step in the Section 4(f) evaluation process is to identify existing and planned Section 4(f) properties, which include the following:

- Historic sites on or eligible for the NRHP.
- Archaeological sites on or eligible for the NRHP and that warrant preservation in place as determined by FHWA and the SHPO.
- Officially designated publicly owned parks, recreation areas (including recreational trails), and wildlife or waterfowl refuges. Factors such as public access restrictions may affect whether properties qualify for Section 4(f) protection. A property that requires fees for

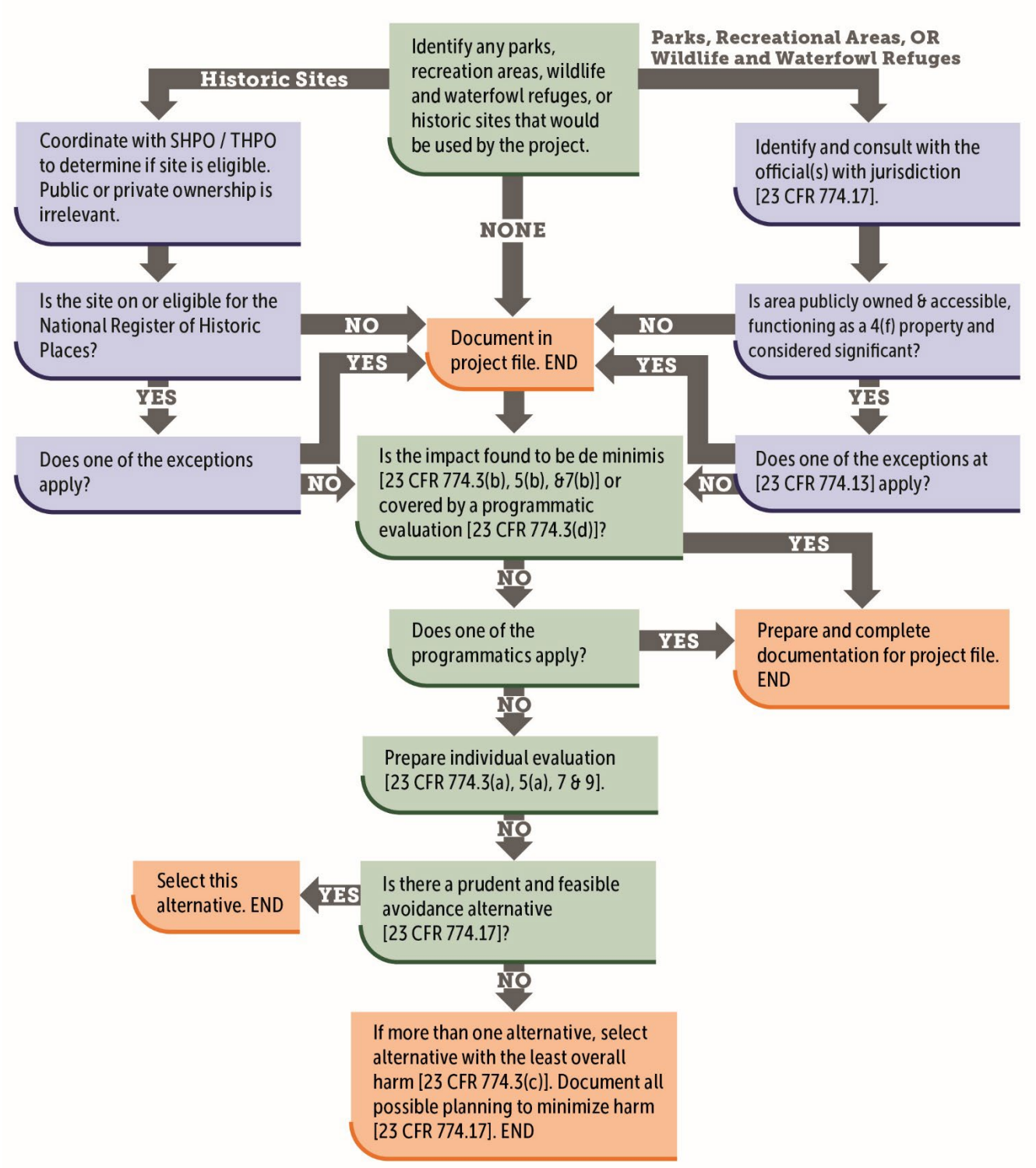
public access does not disqualify the property as a Section 4(f) resource. A refuge would not have to provide unrestricted access to the public to be considered a Section 4(f) property.

- Portions of multi-use properties, including public schools, U.S. Forest Service property, some Wild and Scenic Rivers, and open space properties, where the agency having jurisdiction over the land determines that the area of the property affected by the project has a primary recreational purpose or function and are considered significant for purposes of use as a park, recreation area, or refuge.
- Planned publicly owned parks, recreation areas (including recreational trails), wildlife or waterfowl refuges where agencies having ownership have taken significant steps toward implementation.

Once a Section 4(f) property is identified within the project area, it must be determined if there will be a "use" of land from that property within the meaning of Section 4(f). As a result, all Section 4(f) applicability determinations are made on a case-by-case basis. **Figure 9-4** presents an evaluation diagram for Section 4(f) projects.

The **Colorado Trail Explorer** is an inventory of recreation trails in Colorado: https://trails.colorado.gov/

Figure 9-4. Section 4(f) Evaluation Process



Evaluation of Baseline Information

Compliance with Section 4(f) can be established through: 1) application of an exception to Section 4(f) identified in 23 CFR 774.13; 2) a *de minimis* impact determination; 3) a Nationwide Section 4(f) Programmatic Evaluation approved at the FHWA Division Office level; or 4) a full individual Section 4(f) evaluation that requires FHWA legal and external agency review prior to approval. An analysis for each property must be made and the appropriate process for the use of that property followed. However, where a project has multiple approval options, consideration of which process minimizes overall paperwork and process should be evaluated.

If a proposed alternative involves more than one Section 4(f) resource, review each resource individually to determine if the exception, *de minimis*, or programmatic evaluation is applicable. If there remain uses for which an exception to Section 4(f), the *de minimis* impact determination, or a programmatic evaluation is not appropriate, complete a full Section 4(f) evaluation for the project as a whole and include measures to minimize harm for all Section 4(f) protected properties.

The advantage of using exceptions, *de minimis*, and programmatic evaluations is that there is no requirement to circulate the draft Section 4(f) evaluation to the USDOI, the USDA, or U.S. Housing and Urban Development (HUD). There is also the advantage of not needing a legal sufficiency review on a programmatic evaluation, which is necessary for full Section 4(f) evaluations. This reduces the amount of time necessary to complete the Section 4(f) evaluation. Include the complete Section 4(f) documentation in the NEPA document, usually as an appendix, and retain it in the project file as a matter of public record.

Several agencies and organizations have a role in preparing and approving programmatic Section 4(f) evaluations:

- The SHPO, as the OWJ for historic and archaeological properties
- Agencies having ownership and management of non-historic Section 4(f) properties
- EPB and Regional environmental staff
- FHWA Area Engineers
- FHWA environmental staff

The EPB Manager, RPEM, and FHWA Division Administrator approve the final programmatic Section 4(f) evaluations.

Additional information on FHWA's five nationwide programmatic evaluations for Section 4(f) properties is available at https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/evaluations_program.aspx

Exceptions to Section 4(f)

23 CFR 774.13 establishes a series of exceptions to the requirement for Section 4(f) evaluation and approval. Each exception has specific requirements that must be met (described in 23 CFR 774.13 (a) through (g)), and applicability needs to be demonstrated in the appropriate documentation. To streamline and make the Section 4(f) process more consistent, CDOT and the FHWA Colorado Division developed a Memorandum of Understanding (MOU) that outlines procedures for the preparation and approval of Section 4(f) *de minimis* findings and exceptions. Because most of the exceptions apply to a specific property, and not to the project as a whole, each Section 4(f) property in the project area must be evaluated separately. Exceptions include, but are not limited to, the following:

- The use of historic transportation facilities in certain circumstances
- Archeological sites that are NRHP listed or eligible, given certain circumstances
- Designations of parks/recreation areas/refuges made late in project development
- Temporary occupancies so minimal that they are not considered a use
- Projects for the Federal lands transportation facilities
- Certain trails, paths, bikeways, and sidewalks, under certain circumstances
- Transportation enhancement projects and mitigation activities

CDOT and FHWA have a Memorandum of Understanding for Section 4(f) *de minimis* and Section 4(f) Exceptions processes available here: https://www.codot.gov/programs/environmental/section-4-f/section-4-f-exceptions-and-de-minimus-mou/view

23 CFR 774.13 describes circumstances and criteria that must be met for each exception to apply. Several exceptions require coordination with the OWJ and documented agreement or a lack of objection to the findings. For example, an exception commonly applied is the temporary occupancy exception (23 CFR 774.13[d]), which is the exception for temporary occupancies of land that are so minimal as to not constitute a use within the meaning of Section 4(f). For this regulatory exception to apply, the following conditions must be satisfied:

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, either on a temporary or permanent basis;
4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
5. There must be documented agreement of the OWJ over the Section 4(f) resource regarding the above conditions.

In situations where the first four criteria are met for a Section 4(f) property, compile and provide the OWJ with documentation describing how and why the conditions are fully satisfied, accompanied with a request for concurrence to the findings. Upon receipt of documented

agreement from the OWJ, all conditions would then be satisfied, and the Section 4(f) exception can be applied.

Determining *de minimis* Impacts to Section 4(f) Resources

Certain uses of Section 4(f) properties are minor (*de minimis*) in nature. The requirements for *de minimis* are included in 23 CFR 774.5(b), 774.7(b), and 774.17. If, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, FHWA determines that CDOT transportation projects result in *de minimis* impacts to a Section 4(f) property, an analysis of avoidance alternatives is not necessary, and the Section 4(f) process is complete.

Because *de minimis* applies to individual uses, each property must be evaluated separately to determine if *de minimis* is appropriate for the specific use identified. An alternative with all *de minimis* impacts does not require further evaluation.

Section 4(f) Resources: Historic Properties

According to 23 CFR 774.5(b)(1)(i) and (ii), a Section 4(f) *de minimis* finding can be made only when: 1) the Section 106 process results in a finding of "no adverse effect" or "no historic properties affected" in accordance with 36 CFR part 800; 2) there is written concurrence from the SHPO and/or THPO (and ACHP if they are part of the consultation process) on the Section 106 effect determination; 3) the SHPO and/or THPO, and ACHP if participating, are notified of FHWA's intent to make a *de minimis* finding based on the Section 106 determination; and 4) the views of the Section 106 consulting parties have been considered. Although the regulation requires notification to SHPO, CDOT typically will request that they acknowledge the *de minimis* notification.

Section 4(f) Resources: Publicly Owned Parks, Recreation Areas, and Wildlife or Waterfowl Refuges

According to 23 CFR 774.5(2)(i) and (ii), impacts that are *de minimis* for publicly owned parks, recreation areas, and wildlife or waterfowl refuges are defined as those that do not adversely affect the activities, features, and attributes of the Section 4(f) resource. The public must be afforded the opportunity to review and comment on the effects of the project on the identified Section 4(f) resource(s). After the public comment period, the OWJ over the property must provide written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f). When identifying *de minimis* impacts on publicly owned parks, recreation areas, and wildlife or waterfowl refuges, it is important to distinguish the activities, features, and attributes of a Section 4(f) resource that are important to protect from those that can be impacted without adverse effects.

De minimis Impact Finding

Only the FHWA Division Administrator can make the final *de minimis* impact finding. The *de minimis* impact finding is based on the degree or level of impact, including any avoidance, minimization, and mitigation or enhancement measures that are included in the project to address the Section 4(f) use. *De minimis* impact findings must include conditions requiring the implementation of any measures relied on to reduce the impact to a *de minimis* level.

A *de minimis* finding cannot be made for a constructive use of a Section 4(f) property. A constructive use, by definition, involves impacts such that the protected activities, features, and attributes would be substantially impaired.

A *de minimis* finding can sometimes be made for temporary uses of a Section 4(f) property, when the project does not meet FHWA's temporary occupancy exception criteria.

Public Involvement

Historic Section 4(f) properties do not require a separate public review process, but non-historic properties do require public involvement. Additional information can be found in FHWA's *Section 4(f) Policy Paper* (FHWA, 2012) and 23 CFR 774.

For parks, recreation areas, or wildlife or waterfowl refuges, in most cases a separate public review process, including the public notice or comment requirement, is not necessary because the information supporting the *de minimis* impact finding will be included in the NEPA document. The public involvement criteria related to the specific NEPA document will be sufficient to satisfy the same criteria for the *de minimis* impact finding if the information about the impacts and use of the properties is included in the public review and comment activities. There are instances (e.g., certain CatExs and Reevaluations) that do not routinely require public review and comment; however, for those where a *de minimis* finding will be made, a separate public notice and opportunity to review and comment will be necessary.

Programmatic Evaluations

FHWA developed five nationwide programmatic evaluations for Section 4(f) properties. Each programmatic evaluation has specific applicability criteria. A detailed description of their specific criteria can be found by following the links for a particular Section 4(f) evaluation.

- Final Nationwide Section 4(f) Evaluation and Approval for Federally Aided Highway Projects With Minor Involvements With Public Parks, Recreation Lands, and Wildlife and Waterfowl Refuges.
  https://www.environment.fhwa.dot.gov/legislation/section4f/4f_minor_parks.aspx
- Final Nationwide Section 4(f) Evaluation and Approval for Federally Aided Highway Projects With Minor Involvements With Historic Sites:
  https://www.environment.fhwa.dot.gov/legislation/section4f/4f_minor_hist.aspx
- Programmatic Section 4(f) Evaluation and Approval for FHWA Projects That Necessitate the Use of Historic Bridges:
  https://www.environment.fhwa.dot.gov/legislation/section4f/4f_bridges.aspx
- Section 4(f) Statement and Determination for Independent Bikeway or Walkway Construction Projects: https://www.environment.fhwa.dot.gov/legislation/section4f/4fbikeways.aspx
- Section 4(f) Evaluation and Approval for Transportation Projects That Have a Net Benefit to a Section 4(f) Property:
  https://www.environment.fhwa.dot.gov/legislation/section4f/4f_netbenefits.aspx

The programmatic evaluations require coordination and documentation similar to that of the regular Section 4(f) procedures, including proof that there is no prudent and feasible alternative to the use of Section 4(f) lands and that all measures to minimize harm have been taken. In addition, programmatic evaluations must demonstrate that the project meets the criteria of the appropriate nationwide programmatic evaluation. Programmatic evaluations do not require legal review and are reviewed and approved by FHWA Colorado Division staff. Therefore, programmatic evaluations are usually approved faster than individual evaluations.

Individual Section 4(f) Evaluation

Individual Section 4(f) evaluations must include sufficient analysis and supporting documentation to demonstrate that there is no feasible and prudent avoidance alternative to using the Section 4(f) property and shall summarize the results of all possible planning to minimize harm (23 CFR 774.7(a)). Individual Section 4(f) evaluations are processed in two distinct stages: draft and final. Draft evaluations must be circulated to the USDOI and shared with the OWJ. The final Section 4(f) evaluation must document the analysis and identification of the alternative that has the overall least harm. If the analysis concludes that there is no feasible and prudent avoidance alternative, then FHWA may approve, from among the remaining alternatives that use Section 4(f) property, only the alternative that causes the least overall harm considering the statute's preservation purpose. Detailed guidance on least harm is provided in the FHWA *Section 4(f) Policy Paper* (FHWA, 2012b).

Although public review is not required by Section 4(f), the public may review and comment on a draft evaluation during the NEPA process. When a project is processed as a CatEx, the Section 4(f) evaluation must be circulated independently to the USDOI. In all cases, final Section 4(f) evaluations are subject to FHWA legal sufficiency review prior to approval.

Section 4(f) chapters should include "All Possible Planning to Minimize Harm," not Measures to Avoid and Minimize Harm.

9.20.3 Section 4(f) Documentation in NEPA Documents

Most information related to Section 4(f) exceptions, *de minimis*, programmatic, or individual evaluations will be included in a separate Section 4(f) chapter. The Section 4(f) alternatives analysis is generally incorporated into an EIS or an EA. The body of the NEPA document describes the process and includes the findings of the Section 4(f) evaluation, while the programmatic evaluations and *de minimis* findings may be included in an appendix. The following subsections discuss the information that should be included in each chapter.

Affected Environment and Environmental Consequences

Separate identification and review of Section 4(f) resources is not necessary in the Affected Environment or Environmental Consequences chapter of the NEPA document. Affected Environment and Environmental Consequences information for the following resources will be used as part of the Section 4(f) evaluation and may include a Section 4(f) evaluation related to the property/resource for each of the following:

- Historic properties (**Section 9.11**)
- Social resources (**Section 9.14**) for parks and other public recreational properties
- Bicycle and pedestrian facilities **(Section 9.17**)
- Fish and wildlife (**Section 9.9**) for wildlife or waterfowl refuges
- Other sections as appropriate (**Section 9.13**)

Section 4(f) Compliance and Approvals

The type of Section 4(f) evaluation determines the requirements for what should be included as part of the evaluation as discussed below.

Exceptions

Application of an exception to the requirement for Section 4(f) evaluation and approval is established through demonstration of meeting the respective exception criteria in 23 CFR 774.13. This includes completion of required coordination and documented agreement with the OWJ over the Section 4(f) resource, when applicable. This documentation can be included in the appendix or attached to the NEPA document.

23 CFR 774.7(2) provides guidance on how to handle Section 4(f) evaluations in tiered NEPA documents

De minimis Findings

The *de minimis* impact determination must include sufficient supporting documentation to demonstrate that the impacts, after avoidance, minimization, mitigation, or enhancement measures are considered, are *de minimis* as defined in 23 CFR 774.17. The *de minimis* information can be presented in a chapter in the NEPA document or in an appendix.

Programmatic Evaluations

Information related to an approval to use Section 4(f) property by applying a programmatic Section 4(f) evaluation should be included in the project NEPA document (EA or EIS) or in the project file for a CatEx. The evaluation should include sufficient supporting documentation to demonstrate that the coordination required by the applicable programmatic evaluation was completed and that all specific conditions of the applicable programmatic evaluation were met.

Some of the information identified in the following sections would typically be included in a NEPA document, even in the absence of the Section 4(f) process. However, it is summarized here to fully document Section 4(f) compliance and approval protocols.

Individual Section 4(f) Evaluation

Individual Section 4(f) evaluations must include sufficient analysis and supporting documentation to demonstrate that there is no feasible and prudent avoidance alternative and shall summarize the results of all possible planning to minimize harm. For projects requiring a least overall harm analysis, that analysis must be included within the individual Section 4(f) evaluation. Additionally, the least overall harm analysis must address the seven factors set forth in 23 CFR 774.3(c)(1) and further explained in the *Section 4(f) Policy Paper* (FHWA, 2012b).

Draft Section 4(f) Evaluation

The following format and content are suggested for a draft Section 4(f) Evaluation as outlined in the 1987 *FHWA Technical Advisory T 6640.8A*:

- Description of the proposed project, including an explanation for the project purpose and need.
- Description of each Section 4(f) resource that would be used by any alternative under consideration.
- Discussion of the impacts on the Section 4(f) resource for each alternative. Impacts that can be quantified should be quantified.
- Identification and evaluation of location and design alternatives that would avoid the Section 4(f) property. Detailed descriptions of alternatives in an EIS or an EA do not need to be repeated if they are presented in other chapters.
- Discussion of all possible measures available to minimize the impacts of the proposed action on the Section 4(f) property(ies), including detailed discussion of mitigation measures in the EIS or EA. Include a preliminary least harm analysis of the Section 4(f) analysis.
- Discussion of the results of preliminary coordination with the OWJ over the Section 4(f) property and with regional (or local) offices of USDOI.

At the draft Section 4(f) evaluation stage, it should be noted that although it will contain a discussion about prudent and feasible avoidance alternatives and a preliminary least harm analysis, conclusions about these subjects are made only after the evaluation has been circulated and coordinated with the appropriate agencies and any identified issues have been adequately evaluated.

Final Section 4(f) Evaluation Format and Content

When the preferred alternative uses Section 4(f) land, the final Section 4(f) evaluation must:

- Contain all information required for a draft Section 4(f) evaluation.
- Discuss the basis for concluding that there are no feasible and prudent alternatives to the use of the Section 4(f) land. The supporting information must demonstrate consistency with the requirements for a prudent and feasible evaluation as required in 23 CFR 774.17.
- Discuss remaining prudent and feasible alternatives and include a determination of which alternative has the overall least harm as defined in 23 CFR 774.3(c)(1).
- Discuss the basis for concluding that the proposed action includes all possible planning to minimize harm to the Section 4(f) property.
- Summarize the appropriate formal coordination with the headquarters offices of USDOI (and/or appropriate agency under that department) and, as appropriate, the involved offices of USDA and HUD.
- Provide copies of all formal coordination comments, a summary of other relevant Section 4(f) comments received, and an analysis and response to any comments received. When new alternatives or modifications to existing alternatives are identified and will not be given further consideration, include information supporting the basis for dismissing these alternatives (using the prudent and feasible criteria).

- Where Section 6(f) land is involved, document the NPS's position on the land conversion should be documented.
- Provide a concluding statement as follows: "Based on the above considerations, there is no feasible and prudent alternative to the use of land from the (identify the Section 4(f) property) and the proposed action includes all possible planning to minimize harm to the (Section 4(f) property) resulting from such use." If the analysis of avoidance alternatives concludes that there is no feasible and prudent avoidance alternative, then FHWA may approve only the alternative that causes the least overall harm to the Section 4(f) property (23 CFR 774).

Documenting the Section 4(f) Process

The following information should be presented in the NEPA document in the Section 4(f) section of the resource evaluation or as a separate chapter or used as supporting documentation for a CatEx, as appropriate:

- Comments received after the circulation of the draft Section 4(f) evaluation
- Responses to comments
- Documentation that all possible planning has been done to minimize harm to Section 4(f) resources
- Summary of coordination with the SHPO, other OWJs and, as appropriate, the USDA and HUD including any activities since the draft NEPA document was published
- Documentation that the preferred alternative is the one with the overall least harm

Full Section 4(f) approval can take up to a year or more to process. It is important to start the process early.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for Section 4(f).

9.20.4 Section 4(f) Evaluation Processing, Review, and Approval

Full Section 4(f) evaluations included in NEPA documents are typically incorporated and reviewed internally within the preliminary versions of that NEPA document. Once the Section 4(f) evaluation has undergone FHWA review and has been revised to include any comments, the FHWA Area Engineer will submit the NEPA document and associated Section 4(f) evaluation to FHWA legal counsel (if required) for a review period of 30 days. The FHWA legal review is conducted prior to external agency and public review.

Approval for the NEPA document and associated draft full Section 4(f) evaluation to be circulated for external review is indicated by FHWA approval of the accompanying NEPA document. External review is required by USDOI. USDA and HUD may also require review.

Once the external agency review is complete, a FHWA legal sufficiency review is required prior to approval of the final full Section 4(f) evaluation. For full Section 4(f) evaluations processed as part

of an EIS, approval of the evaluation will typically occur upon approval of the Final EIS. The ROD must also include a summary of the basis for the Section 4(f) approval. In EAs, the draft Section 4(f) evaluation is included in the FHWA-approved EA. The FHWA-approved FONSI includes the final Section 4(f) evaluation. The final full Section 4(f) evaluation must be provided to USDOI and to USDA and HUD if required.

For full Section 4(f) evaluations circulated separately from NEPA documents, such as for a project classified as a CatEx or if another agency is the lead agency for the NEPA process, EPB or Regional staff, FHWA Area Engineers, and FHWA environmental staff review the preliminary draft evaluations. Upon completion of the FHWA Division review, the draft Section 4(f) evaluation is submitted to FHWA legal counsel for a 30-day review. The signed draft Section 4(f) evaluation is then forwarded to the USDOI and any entities with jurisdiction over a Section 4(f) resource. The USDA and/or HUD may also need to review the evaluation (45-day review period). Following receipt of the agency comments, the concluding statement is incorporated, and the Section 4(f) evaluation is submitted to FHWA for internal and official legal sufficiency review. The EPB Manager and the FHWA Division Administrator sign the final document and submit it to the USDOI.

Constructive Use Approval

In the case of constructive use of a Section 4(f) resource, the FHWA headquarters office must review and approve the pre-draft Section 4(f) evaluation. This coordination ideally occurs early in the project development process. During the legal review, the FHWA Area Engineer will also send a copy to FHWA headquarters. If the determination of constructive use is approved, the draft Section 4(f) document is processed normally.

Final Section 4(f) Approval

The FHWA must make a formal determination that there is no prudent and feasible alternative to the use of Section 4(f) resources and all possible planning has been done to avoid the use of a Section 4(f) property or to minimize harm to any Section 4(f) property affected by the project. This approval can be contained in a FONSI, a ROD, or a separate document.

The FHWA is ultimately responsible for making all decisions related to Section 4(f) compliance. These include whether Section 4(f) applies to a property, whether a use will occur, whether a *de minimis* impact determination may be made, assessment of each alternative's impacts to Section 4(f) properties, and whether the law allows the selection of a particular OWJ. CDOT staff also play a critical role in assessing alternatives and their impacts to Section 4(f) properties and should be included throughout the entire Section 4(f) process.

9.21 Section 6(f) Evaluation

Section 6(f) properties are those purchased or improved with grants from the Land and Water Conservation Fund (LWCF) Act. Importantly, Section 6(f) applies to all transportation projects involving possible conversions of the property whether or not Federal funding is being used for the project. The Section 6(f) evaluation and process should be conducted separately from the Section 4(f) evaluation and process.

The Land and Water Conservation Fund State Assistance Program administrative procedures and requirements are provided in the Federal Financial Assistance Manual (2021) at:
https://www.nps.gov/subjects/lwcf/upload/LWCF-FA-Manual-Vol-71-3-11-2021-final.pdf

9.21.1 Section 6(f) Evaluation Process

The Section 6(f) evaluation should be started when alternatives for the proposed action are first being designed and developed or during the scoping phase of a proposed action.

Reasons for Evaluation of Section 6(f) Under NEPA

CDOT evaluates Section 6(f) for several reasons:

- To preserve the intended use of public funds for land and water conservation and the protection of outdoor recreational activity
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates that pertain to the LWCF Act of 1965, Section 6(f)(3)

State and local governments often obtain grants through the LWCF to develop or make improvements to parks and outdoor recreation areas. Section 6(f) of the LWCF prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the NPS.

Collection and Evaluation of Baseline Information Under NEPA

Once a study area, or the approximate area of impact, is established, and if there are any parks or outdoor recreational facilities in or adjacent to the area, a Section 6(f) file search should be conducted. CDOT's OTIS database has a GIS layer with LWCF grant-funded properties that can be used to help identify Section 6(f) properties in or near the study area. This information is provided by CPW, the state agency that serves as a liaison to the NPS in helping to administer the LWCF program. CPW provides CDOT with annual updates of new grants to be added and their locations. If a LWCF grant was issued for a property that could be affected by the proposed action, then CDOT needs to request an official Section 6(f) boundary map from CPW. This boundary map shows the area of the property to which the grant applies and is protected by Section 6(f) (also referred to as "LWCF-assisted area"). This could be the entire property or just a portion of it.

If it is determined that the proposed action could potentially impact a Section 6(f) property and that impact cannot be avoided, the OWJ of the Section 6(f) property and the CPW Section 6(f) State Liaison Officer (SLO) must be consulted. Impacts to the protected property and its intended outdoor recreation uses are to be minimized to the extent possible. CDOT must now determine the approximate size of the Section 6(f) property that will be converted. A conversion of use happens when any portion of a Section 6(f) property, no matter how small, will be used for a purpose other than the intended outdoor recreation use. The most likely Section 6(f) conversion trigger on a transportation project is a permanent easement or acquisition that converts land from public outdoor recreation use to transportation use. Temporary easements of less than six months may not trigger a conversion if certain criteria are met; however, CPW and NPS coordination and approval are still required.

The complexity of the Section 6(f) approval process varies based on if impacts trigger a conversion and, if so, if that conversion is characterized as a full/partial conversion or a small conversion. The approval process for each scenario is summarized below and additional information is provided in the *LWCF Federal Financial Assistance Manual* (NPS Manual) (NPS, 2021).

Temporary Non-Conforming Uses

Temporary non-conforming uses (activities other than outdoor recreation) on a portion of Section 6(f) property for less than six months may not trigger a conversion if CPW and NPS determine that required criteria are met. The following criteria apply:

- The size of the LWCF-assisted area affected by any temporary non recreation use shall not result in a significant impact on public outdoor recreation use. This means that the site of the temporary activity should be sufficiently small to restrict its impact on other areas of a LWCF-assisted area.
- A temporary use shall not result in permanent damage to the LWCF-assisted area, and appropriate measures will be taken to ensure the outdoor recreation area is restored for public recreation use and there are no residual impacts on the site once the temporary use is concluded.
- No practical alternatives to the proposed temporary use exist.
- The proposal has been adequately reviewed at the state level and has been recommended by the SLO.

The NPS has established that non-conforming uses beyond six months are not temporary and do not qualify for this exception. Continued use beyond six months will trigger a Section 6(f) conversion and require replacement property.

To obtain approval for a proposed temporary non-conforming use exception, CDOT should obtain demonstrated support and agreement with stated findings regarding impacts and mitigation measures from the OWJ of the Section 6(f) property. CDOT will then compose a letter to the Section 6(f) SLO at CPW, requesting review and approval of the proposed temporary non-conforming use exception. The request will include the following documentation required for CPW's completion of the NPS Compliance and Stewardship (C&S) Form:

- A detailed description of the proposed temporary non-conforming use and all associated activities, why it is needed, and alternative locations that were considered and why they were not pursued

- Length of time needed for the temporary non-conforming use and why
- A description of the size of the LWCF area that will be affected and expected impacts to public outdoor recreation areas, facilities, and opportunities, as well as an explanation of efforts to keep the size of the area impacted to a minimum
- A site plan map showing the location of the proposed use in relation to the LWCF boundary and drawings and/or renderings of the proposed use
- A description of any anticipated temporary and permanent impacts to the site's environment or on recreation use and how they will be mitigated during and after the non-conforming use ceases

CDOT will submit the request letter with supporting documentation and attached letter of concurrence from the OWJ to the CPW SLO for review. The CPW may comment on the documentation to resolve any issues. Upon acceptance by the CPW, the SLO will then forward the request and supporting documentation to the NPS for their review and approval.

Forms to be completed as part of the Land and Water Conservation Fund approval process are available on the NPS website at https://www.nps.gov/subjects/lwcf/lwcf-forms.htm

Section 6(f) Conversions

A Section 6(f) conversion is a Federal action subject to NPS NEPA processes and compliance with other Federal laws such as NHPA. A conversion may be characterized as one of the following:

- a full conversion, where the entire Section 6(f) property is being replaced
- a partial conversion, where a portion of a property is being replaced and it does not qualify as a small conversion
- a small conversion, where no more than 10 percent of the Section 6(f) property is being replaced and other project criteria are met

While the approval process for all conversions is similar, less documentation is required for approval if a project qualifies as a small conversion due to the NPS determination that these types of actions are categorically excluded from the need for an EA or an EIS. Early consultation with CPW and NPS should occur to establish if a conversion can qualify as a small conversion.

If it is determined in consultation with CPW that a Section 6(f) conversion is triggered, CDOT, in cooperation with the OWJ, must identify replacement land that is of reasonably equivalent size, usefulness and location, and of at least equal fair market value. CDOT's ROW staff should be involved in the selection of replacement property. Replacement will be required for all conversions, including full, partial, and small conversions.

The process is as follows:

- Upon identification of such land(s), CDOT must compose a letter of concurrence to the local OWJ, demonstrating that the Section 6(f) replacement land is acceptable to the local government entity. The letter must also include any special conditions, mutually agreed to by both parties, as deemed necessary, to bring about equivalent size, location, and usefulness, and of at least equal fair market value in the replacement land as required

under Section 6(f). The same professional assessor should assess the value of both the land to be converted and the replacement land.

- Coordination with the CPW and NPS should occur during this process.
- Once the local OWJ signs the concurrence letter, CDOT will compose a letter to the Section 6(f) SLO at CPW. The letter will contain a project description; a description of the Section 6(f) property(ies); avoidance considerations; impacts to the Section 6(f) property(ies), including the location and size of the conversion; planned mitigation, including the size, location, usefulness, and value of replacement land; and the attached letter of concurrence from the OWJ. The CPW may comment on the letter to resolve any issues. Upon acceptance of the letter by the CPW, the SLO will forward the letter to NPS for their review and conditional clearance. If NPS grants conditional clearance, this concludes the process for NEPA clearance.
- The local OWJ letter and the correspondence with CPW and NPS should be included in the appendix of the NEPA document.

The conversion of the Section 6(f) land to transportation ROW or permanent easement, and the acquisition of the replacement land, typically occur during the normal ROW acquisition phase of a project. The conversion proposal will establish a replacement proposal timeline that will need to be followed. The ROW staff should, therefore, be involved in the development of the replacement proposal timeline so that all parties can agree on the timing of acquisition and the development of replacement lands.

After construction is complete, but before the project is closed out, NPS will need to be contacted showing the exact amount of land converted and the exact size, location, and value of the replacement land. They will then grant their final clearance for the Section 6(f) conversion process.

Full and Partial Conversion Documentation

After CPS and NPS confirm all prerequisites set forth in 36 CFR 59.3(b) are met, as described in Chapter 8 of the NPS Manual (NPS, 2021), and agreement is obtained on the conversion details, a formal conversion proposal package is prepared. This package is prepared in coordination with the OWJ (LWCF project sponsor) and provided to the CPW SLO for review and submittal to the NPS. The formal conversion proposal submitted to NPS must include:

- SLO recommendation letter (from CPW to NPS)
- Standard Form 424, Application for Federal Assistance
- NPS C&S Form, including the environmental resources survey and a NEPA document with Section 6(f) analysis for the entire conversion proposal (the lost LWCF-assisted area, the remaining LWCF-assisted area for partial conversions, and the new replacement property)
- Project amendment form identifying changes to the original boundary caused by the conversion and the new established boundary including the replacement lands
- Signed and dated LWCF boundary area map for any remaining LWCF assisted area resulting from a partial conversion and for the new replacement lands
- NPS Description and Notification Form, which includes pertinent data about the LWCF property

Small Conversion Documentation

Small conversions are partial conversions in which no more than 10 percent of the total protected property is proposed for conversion. To qualify, the replacement property must be contiguous with the current site, or another existing park or recreation area, and otherwise meet the LWCF eligibility criteria described fully in Chapter 3 of the NPS Manual. In addition, the conversion must qualify as a NPS NEPA categorical exclusion. Documentation must show that the small conversion is not controversial and has no potential for significant environmental impacts, considering the site being removed from protection, the viability of the remaining Section 6(f) property, and the proposed replacement property.

After CPW and NPS confirm all requirements for a small conversion are met and agreement is obtained on the conversion details, a small conversion proposal package is prepared. This package is prepared in coordination with the OWJ (LWCF project sponsor) and provided to the CPW SLO for review and submittal to the NPS. The formal small conversion proposal submitted to NPS must include:

- SLO transmittal letter describing the small conversion proposal (from CPW to NPS)
- Standard Form 424, Application for Federal Assistance
- NPS C&S Form with the environmental resources survey completed indicating that a categorical exclusion is justified
- Project amendment form
- Revised LWCF boundary area map indicating the deletion of the small, converted area and the addition of the replacement property
- NPS Description and Notification Form, including Pertinent Data about the LWCF Property

9.21.2 NEPA Document Sections

The content of the sections on the Section 6(f) evaluation in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

The Affected Environment chapter of the NEPA document should include the definition of Section 6(f) of the LWCF Act of 1965, general requirements for determining a Section 6(f) resource, and a brief discussion of each Section 6(f) resource(s) in the project area, including value, size, location, and use.

Environmental Consequences

The Environmental Consequences section should identify Section 6(f) properties that would be impacted by any of the project alternatives, as well as any lands proposed to replace them. The section should include a map showing the Section 6(f) properties and a description of the properties, focusing particularly on any losses or gains in specific attributes associated with the purposes for which the properties were acquired.

This section should also include information such as any local OWJ or CPW/NPS coordination/communication and any approvals obtained from the agency(ies). A mitigation plan

should be included indicating where replacement land will occur and during what project phase it should occur (preliminary design, final design, ROW process, or construction).

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for Section 6(f).

9.22 Farmlands

Farmlands are a valuable economic and cultural resource that is protected by the Farmland Protection Policy Act, 7 CFR Part 658.

The two subsections below provide guidance on the treatment of farmlands for CDOT's NEPA projects. The first subsection discusses the process for evaluating farmlands. The second subsection discusses farmlands information that should be in each NEPA document.

Farmland Regulations and Guidance
- 7 CFR Part 658 – Farmland Protection Act
- 23 CFR Part 771 – Environmental Impact and Related Procedures

9.22.1 Farmland Evaluation Process

The project team is responsible for reviewing the applicability of the Farmland Protection Policy Act and obtaining the Farmland Protection clearance from the USDA – NRCS, if necessary.

The "Impacted Farmlands of Colorado" county maps may have copies of the maps, but the most current data are available online or from the county NRCS office. If the maps indicate that the impacted area is farmland, but visual inspection of the area indicates it is clearly not being used as farmland, the Farmland Protection Policy Act does not apply.

The farmlands evaluation should be completed when alternatives for the proposed action are first being designed and developed before the formal initiation of NEPA.

Figure 9-5 identifies the steps involved in completing a Farmland Protection Policy Act analysis.

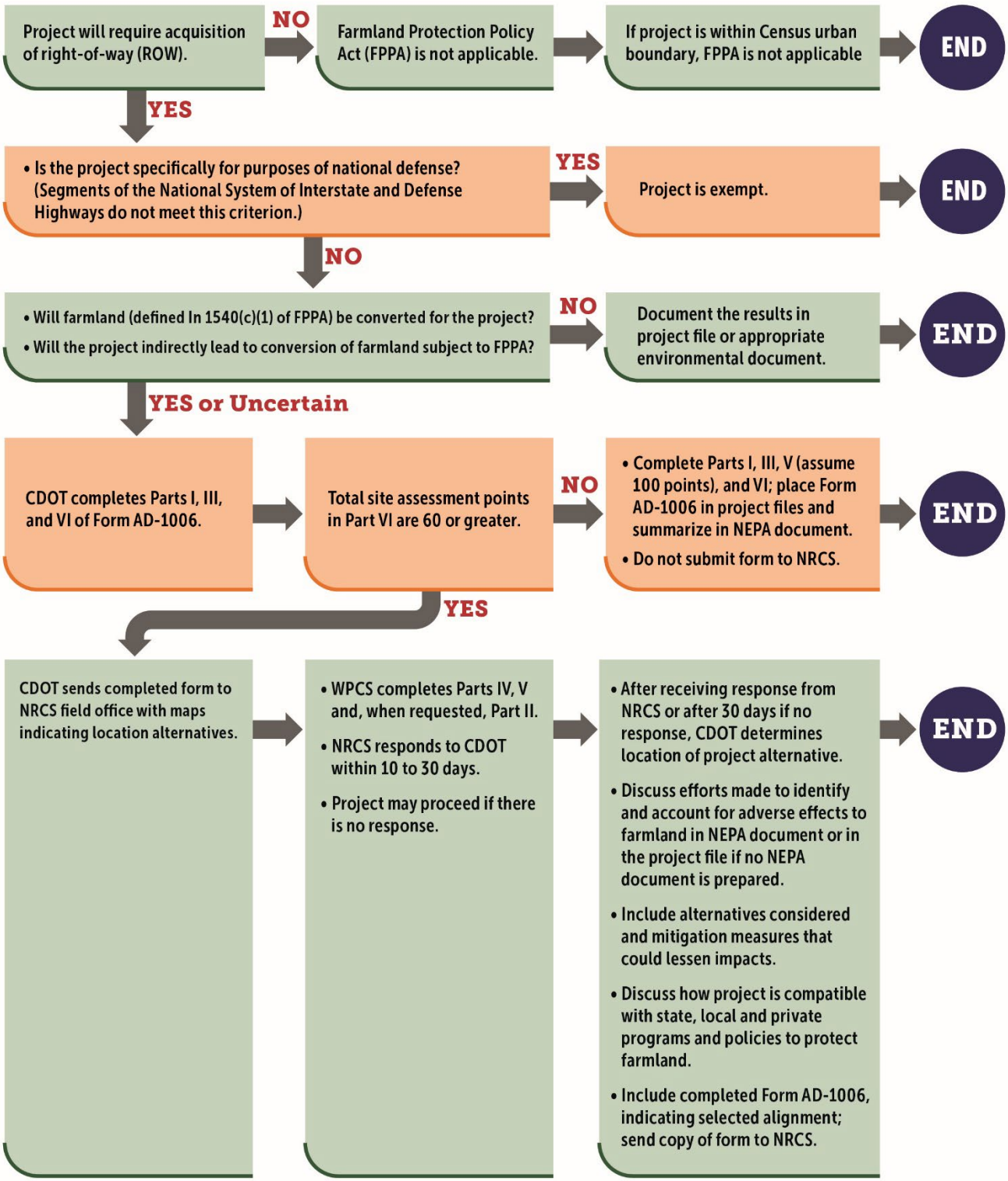
Reasons for Evaluation of Farmlands Under NEPA

CDOT evaluates farmlands for several reasons:

- To enable identification and protection of important farmlands
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates required under the Farmland Protection Policy Act

The Federal Farmland Protection Policy Act, 7 CFR Part 658, requires Federal agencies to consider the adverse effects their programs may have on the preservation of farmland, to review alternatives that could lessen adverse effects, and to ensure that their programs are compatible with private, local, and state programs and policies to protect farmland. The Federal Farmland Protection Policy was last amended in 1981.

Figure 9-5. Completing the Farmland Protection Policy Act Analysis



Collection and Evaluation of Baseline Information Under NEPA

The Farmland Protection Policy Act defines farmlands as follows:

- **Prime farmland** is land that has the best combination of physical and chemical characteristics to produce food, feed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. Prime farmland includes land that possesses the above characteristics but is currently being used to produce livestock and timber.
- **Unique farmland** is land other than prime farmland that is used to produce specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of specific crops.
- Other than prime or unique farmland that is of statewide importance to produce food, feed, and other crops, as determined by the appropriate state government agency or local government agency.

Clearance and coordination with the NRCS and other appropriate state and local agricultural agencies is required for all projects that require acquisition of ROW. Once the alternative ROW requirements are conceptually defined and the study area is identified as farmland, the RPEM should complete the farmland conversion impact rating, NRCS Form AD 1006, and submit it to NRCS for review.

Figure 9-5 illustrates the process for completing the Farmland Protection Policy Act analysis. Note: Use Form NRCS-CPA-106 for corridor projects.

Farmlands Clearance Documentation

- Identify whether conversion of farmland may occur.
- If so, follow the process outlined on Form AD-1006.
- For corridor projects, use Form NRCS-CPA-106.
- Incorporate alternatives to avoid farmland, potential impacts to farmland, and appropriate mitigation in the NEPA document.

Other Issues to Consider

As part of the process for Form AD 1006, a farmland conversion impact rating score for the proposed project is established based on the severity of impacts on the farmland. If the site assessment criteria score (Part VI completed after return of form from NRCS) is 59 points or less for each alternative, then Form AD 1006 need not be sent back to the NRCS. If the score is 60 points or greater and/or an area qualifies as prime farmland, Form AD 1006 must be submitted to the NRCS.

9.22.2 NEPA Document Sections

An EA or an EIS typically should include only one to three paragraphs concerning farmland resources in the Affected Environment and Environmental Consequences chapters.

Affected Environment

The farmlands section of the Affected Environment chapter should describe:

- The general abundance of farmland in the project vicinity
- The land's primary use and economic and cultural importance

Environmental Consequences

Include a copy of the completed Farmland Conversion Impact Rating in the document, as well as correspondence to and from the NRCS. Discuss alternatives that have the same farmlands impacts and contrast those that differ so that similarities and differences in alternative farmlands impacts are clear. The NEPA document should discuss the extent to which alternatives avoid farmland impacts. Include measures to minimize and mitigate impacts to farmlands if avoidance is not possible. Mitigation measures to consider include:

- Replacement of any lost or damaged irrigation pipes or ditches
- Assurance that all remaining farmland can be irrigated
- Payment for any crops damaged during construction or restriction on a farmer's access to fields

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for farmlands.

9.23 Noise

Noise is generally defined as unwanted or excessive sound. It can interfere with sleep, work, or recreation, and in extremes may cause physical or psychological damage. The primary source of highway noise is automobile, truck, motorcycle, and bus traffic.

Physical and operational changes associated with a highway project can lead to changes in the traffic noise levels. Transportation projects may cause noise levels to either decrease or increase, although some highway improvement actions are more likely to increase noise. If a highway project is on a new alignment, resulting traffic noise levels may be considerably higher than existing noise levels.

Highway traffic noise is primarily regulated under 23 CFR 772. Federal-action and Federal-aid projects are subject to 23 CFR 772. CDOT's implementation of 23 CFR 772 is presented in the most current CDOT Noise Analysis and Abatement Guidelines (NAAG). At the time this Manual was updated, the 2020 version was the most current version (CDOT, 2020b). The NAAG also applies to some CDOT and CDOT-administered projects, even if there is no Federal participation, as described in the NAAG. The NAAG contains detailed guidance on evaluation and documentation for traffic noise, including the noise thresholds called Noise Abatement Criteria (NAC).

Projects may also need to evaluate noise as a resource under NEPA. One difference between NEPA and 23 CFR 772 is that NEPA requires a comparison of a proposed alternative with a baseline (the No Build Alternative or No Action Alternative, in the future design year) to evaluate potential changes in the traffic noise environment. NEPA requires disclosure and reasonable mitigation. For more information, refer to FHWA's Noise Policy Frequently Asked Questions #A.5 and #A.6 (FHWA, 2017).

The NAAG provides detailed technical guidance for noise analyses and has primacy over **Section 9.23**, which is intended to summarize in simpler terms the treatment of noise in CDOT's NEPA projects. **Subsection 9.23.1** discusses the process for evaluating noise. **Subsection 9.23.2** discusses noise information that should be included in each NEPA document.

> The term "abatement" is commonly used for traffic noise, but in this Manual "abatement" and "mitigation" are used interchangeably.

9.23.1 Noise Evaluation Process

Noise evaluations for CDOT and CDOT-administered projects must be performed by qualified practitioners, as defined in the NAAG.

Reasons for Evaluation of Noise Under NEPA

CDOT evaluates traffic noise:

- To comply with 23 CFR 772 and related legal mandates, including CDOT's NAAG
- To fulfill NEPA requirements
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

The NAAG describes the regulations and guidance applicable to noise.

Noise Analysis

The following steps, explained in more detail in the NAAG (CDOT, 2020b), summarize the process to determine if a proposed project will have noise impacts and if an impacted area will qualify for noise abatement to be built by CDOT under 23 CFR 772:

1. Evaluate the project to determine if it is Type I. Only Type I projects are analyzed for potential noise impacts and abatement. Type I project examples include adding through-traffic lanes or constructing interchanges. If a project is not Type I, it is Type III.
2. Conduct a noise analysis for all Type I projects to determine if receptors (e.g., homes, schools, parks, or churches) will be impacted due to the proposed project. If there are no receptors and no undeveloped, unpermitted lands within 500 feet of the proposed edge of freeways and expressways or 300 feet of the proposed edge of other roadways, noise modeling is not conducted, noise abatement is not considered, and a noise technical report is not required. An “impact" is defined as design year noise levels meeting or exceeding NACs or increasing from existing conditions by at least 10 decibels.
3. If results show that any receptors will be impacted, analyze potential noise abatement (frequently a noise barrier) for feasibility and reasonableness. For noise abatement to be included in a project, it must be both feasible and reasonable:
    a. Feasibility has to do with constructability. There are two feasibility criteria: noise reduction and design/construction factors. The evaluation criteria describe physical considerations and concerns with the construction of an acoustically effective noise barrier at a particular site and project.
    b. Reasonableness of noise abatement evaluates three criteria: environmental (via the Noise Reduction Design Goal [NRDG]), economic (via the cost-benefit evaluation), and social (via the Benefited Receptor Preference Survey). This process ensures a prudent use of public funds. Failure to achieve any of these criteria results in not building noise abatement.
4. Prepare a technical report documenting the methods and results of the noise analysis.

> If there are no receptors within 500 feet of the proposed edge of freeways and expressways or 300 feet of the proposed edge of other roadways but there are undeveloped, unpermitted lands, an abbreviated noise analysis and technical memo are required to provide noise contour information to local government agencies.

Type I projects with a noise analysis require a noise technical report. The NAAG describes the required content of the reports. CDOT has prepared a noise technical report template that should be used for projects scoped after October 9, 2020. At the time this Manual was updated, the 2020 version was the most current version. It is available at: https://www.codot.gov/programs/environmental/noise/assets/cdot-noise-report-template-ver-2-sept-2020.docx.

The CDOT Project Manager, in coordination with the RPEM and the EPB or Regional Noise Specialist, is responsible for ensuring that appropriate noise analyses are performed. Typically, if a project is determined to be Type I for noise, a consultant is hired to perform the noise analysis, including the noise modeling, and to prepare the noise technical report.

A project is considered "cleared" when any necessary analyses have been completed, accepted by the EPB and/or Regional Noise Specialist, and documented. If a noise technical report is required, the EPB and/or Regional Noise Specialist must review and accept it. All comments submitted during these reviews must be resolved before the report can be finalized. A CatEx requires a clearance letter from the EPB and/or Regional Noise Specialist.

9.23.2 NEPA Document Sections

All Type I projects that include a noise analysis require a stand-alone noise technical report. Noise analysis details belong in the technical report, not the NEPA document. For CatEx projects, the technical report is attached to Form 128 for the project and a summary is not needed in the main document. For EA or EIS projects, the technical report is included as an appendix, and the impact and abatement findings are summarized in the main document.

For projects that do not include a noise analysis, the main NEPA document should state whether the project was Type I or Type III and explain why a noise analysis was not conducted. In addition, briefly discuss construction noise and mitigation measures. For projects that include a noise analysis, the main EA and EIS should include the following sections.

Affected Environment

Describe regulatory requirements, identify analyses performed, and summarize the conclusions. Identify which date of 23 CFR 772 and CDOT NAAG were in effect and used to analyze noise. Include a summary discussion of these elements:

- Land use categories and receptors present in the Noise Study Zone
- Existing noise levels from modeling

Environmental Consequences

The section should contain a summary discussion of these elements:

- Future noise levels from modeling – Describe results for each future alternative being considered
- Noise impacts for build alternatives in the design year, both for location and type of impact (i.e., NAC exceedance or substantial increase)
- Construction noise and mitigation measures

Discussion of the evaluation of noise abatement may be needed. In cases where no noise impacts have been identified for the project, include the following text under the heading "Statement of Likelihood."

> Based on this most current analysis, highway traffic noise abatement measures were not evaluated because no receptors were impacted. Therefore, noise abatement measures are not proposed for this project. If, during final design, it is determined that any receptors are impacted, abatement measures will be evaluated and may be provided. A final decision of abatement measure(s) installation will be made during or upon completion of the project's final design.

In cases where noise impacts have been identified and noise abatement has been evaluated, include a summary discussion of the Statement of Likelihood for each identified area of noise impacts. Describe the types of abatement actions considered and summarize the findings from the feasibility and reasonableness assessments for each. Complete this evaluation to the extent that design information is available at the time the NEPA decision document is completed. Include the feasibility and reasonableness criteria listed on Form 1209. Summarize the dimensions of the potential abatement structures. Note that the preferences of the benefiting receptors must be determined for a potential abatement measure to be reasonable, which generally occurs after NEPA clearance. Clearly indicate if potential mitigation actions were or were not found to be feasible and reasonable (to the extent possible for the project) and if they are recommended for inclusion in the project. Note that the final noise abatement decision will be made during the completion of the project's final design. Consult the EPB or Regional Noise Specialist about when the survey should be conducted on a project-by-project basis.

If a Type I project has undeveloped, unpermitted land within 500 feet of the proposed edge of traveled lanes of freeways or expressways, or within 300 feet for all other types of roads, limited noise modeling may be required to develop noise information for local public officials. In these cases, provide a summary of the distances to 66 decibel and 71 decibel traffic noise levels.

An important and challenging criterion for reasonableness is the preference of benefitting receptors. More than half of these receptors must support the abatement action for the action to be reasonable. A survey of preferences is needed during final design for the final determination on whether a possible abatement action will be implemented. The survey may happen after the NEPA decision. In the meantime, possible abatement actions that are otherwise feasible and reasonable are treated as "recommended" abatement actions.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for noise. Noise studies for Tier 1 NEPA documents are general in nature and cannot be used to make detailed impact determinations or mitigation commitments.

Noise abatement must be constructed at the same time as the project aspects that triggered the Type I analysis (e.g., addition of lanes). If the project sponsor cannot afford the abatement, the project cannot be built.

9.24 Visual Resources

Visual resources are often thought of as vistas or overlooks. However, they can also be natural features, like water features, rock walls, mountain peaks, and vegetation. They can even include cultural features such as architecture, landscape design, urban skylines, road alignment, bridge structures, retaining walls, noise barriers, grading, signage, lighting, fencing, pedestrian/bicycle trails, stormwater facilities, or other components in the built environment. All CDOT projects, regardless of size and geographic location, should be scoped for visual resources. The long-term goal of evaluating visual resources is to consider transportation design in a broader, sustainable, and contextual perspective. Visual Impact Assessment (VIA) reinforces CDOT's Context Sensitive Solutions (CSS) principles (CDOT, 2005) and the CDOT *Landscape Architecture Manual* (CDOT, 2020a).

Visual resources are important because of the strong emotion they inspire in human viewers. They often provide a sense of community to the inhabitants of an area and may attract tourism and drive its economy. Visual resources might provide ecosystem services like stormwater retention, air quality, or carbon sequestration that contribute to public health and quality of life. CDOT values the visual resources of Colorado and emphasizes the role of VIAs and visual resource mitigation in the NEPA decision process, project design, and project implementation. Toward that end, CDOT seeks to create guidance for VIAs that meets the expectations and standards of CDOT staff, communities and counties, and Federal land management agencies. In collaboration with FHWA, CDOT created the 2020 CDOT VIA Guidelines (CDOT, 2020c) to establish a statewide standard that is meaningful to NEPA decision-making and that provides CDOT a better product, both a more useful VIA and a more context sensitive transportation improvement relative to Colorado's diverse regions, landscapes, and communities. This is a living document that has been continually improved and refined since 2019.

The CDOT VIA Guidelines (CDOT, 2020c) provide detailed guidance on evaluation and documentation of visual resources. The instructions in the VIA Guidelines have primacy over **Section 9.24**, which is intended to summarize in simpler terms the treatment of visual resources for CDOT's NEPA projects. **Subsection 9.24.1** discusses the process for evaluating visual resources. **Subsection 9.24.2** discusses visual resource information that should be included in each NEPA document.

9.24.1 Visual Resource Evaluation Process

Qualified practitioners, as defined in the VIA Guidelines (CDOT, 2020c), must conduct the visual resource evaluations for CDOT and CDOT-administered projects.

Reasons for Evaluation of Visual Resources Under NEPA

CDOT evaluates visual resources for several reasons:

- To fulfill requirements of NEPA
- To fulfill requirements of the Highway Beautification Act of 1965
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

The VIA Guidelines present applicable regulations and guidance for visual resource evaluations.

Visual Impact Assessment

VIAs are necessary to capture key visual issues, identify adverse impacts, and develop effective mitigation for projects along transportation corridors, within adjacent communities, and near Federal lands in Colorado. Meaningful VIA documentation supports the NEPA decision-making process, addresses regulatory requirements, supports goals of communities and/or Federal land managers, and promotes context sensitivity. VIAs can be broken down into four main phases:

- **Establishment Phase** - CDOT's process includes early interdisciplinary scoping to define a VIA study area. Scoping of visual resources helps to identify stakeholders and any relevant plans, policies, and regulations early on. The scoping questionnaire determines if a VIA is necessary and establishes the appropriate level of visual resource documentation.
- **Inventory Phase** – The Inventory Phase documents landscape character (e.g., natural and cultural), from the perspective of both the traveling public and site neighbors. The product is an inventory of viewer preferences, stakeholder values, and scenic designations.
- **Analysis Phase** - CDOT evaluates adverse, beneficial, and cumulative impacts of the proposed project.
- **Mitigation** – The Mitigation Phase addresses potential visual impacts through development of specific, measurable, attainable, realistic, and tangible (SMART) mitigation strategies and collaboration with an interdisciplinary team and involved stakeholders.

In terms of schedule, VIA scoping is most effective at the earliest phase of a project, even before a scope of work has been finalized (during project planning). The Inventory Phase is similar to establishing the affected environment in a NEPA document. The Analysis Phase assesses and documents visual impacts. Identifying mitigation sets the stage for how VIAs can influence project development and be more sensitive to the surrounding visual environment during and after construction. The VIA Guidelines further address each key VIA component.

9.24.2 NEPA Document Sections

The content of the sections on visual resources in a NEPA document is discussed below. The VIA Guidelines may be applied to VIAs involving the following NEPA classes of action:

- EIS
- CatEx
- EA
- Reevaluations
- Planning and Environmental Linkages (PEL) studies

For projects that include a VIA, the main NEPA document should include the following sections.

Affected Environment

Use Table 3 (also in the VIA Templates as Appendix A) in the VIA Guidelines to assist in documenting field observation and photos of the landscape character and composition, as well as landscape context and sense of place of the landscape compositions. Table 4 (also in the VIA Templates as Appendix A) can help to document viewer inventory in coordination with visual quality inventory.

Environmental Consequences

Table 5 (also in the VIA Templates as Appendix A) in the VIA Guidelines provides a template matrix format for displaying the visual compatibility analysis of the Proposed Action with landscape character. Use Table 6 in the VIA Guidelines to evaluate viewer impact indicators, such as visual sensitivity, proximity, visual quality, and viewer position. Create and include visualizations of impacts; evaluate Section 4(f), Section 6(f), and Section 106 impacts; evaluate cumulative visual impacts; and identify opportunities to reduce visual contrast. Compare each alternative regarding the results from any visual resource analysis relevant to the project.

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for visual resources.

9.25 Energy

Energy resources typically include liquid or gaseous fuels, petroleum products, or electricity. The term "energy" is used in many other contexts and might be universally defined as "the potential for causing change." It is a conserved quantity, which means the total energy of the universe remains constant but may be converted from one form into another. The efforts to conserve such energy sources are in part efforts to conserve currently available energy resources that can do useful work such as propel vehicles. Such efforts are also intended to minimize the consumption of energy resources, which contributes to air and water pollution.

Wise use of energy resources is important because those that are readily available are dwindling and subject to political constraints.

The following subsections provide guidance on the treatment of energy for CDOT's NEPA projects. Note that this resource is considered only during large-scale projects that require an EIS. The first subsection discusses the process for evaluating energy use and conservation. The second subsection discusses information about energy that should be in each NEPA EIS document.

9.25.1 Energy Evaluation Process

The aspects of the current transportation system that contribute to inefficient use of energy should be discussed as should the ways in which project components will contribute toward more efficient use of energy. The discussion should focus on the project system as a unit (rather than on specific locations), including construction and operation time frames, and project aspects and components that contribute to energy economy.

Energy use should be considered throughout the design, development, construction, and use of a transportation project. Efficiencies can be incorporated in each phase.

Reasons for Evaluation of Energy Under NEPA

CDOT evaluates energy for several reasons:

- To recognize available and readily usable energy as a resource that is important to the nation's economy and sustainability
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner
- To comply with several legal mandates that pertain to energy production, use, and conservation

The following regulations and certifications apply to energy evaluations:

- **National Energy Policy Act, 2005** – Provides incentives for traditional energy production and for newer, more efficient energy technologies and conservation. Last amended 2005.
- **Executive Order 13211, 2001** – Requires preparation of a Statement of Energy Effects from Federal agencies responsible for "significant energy actions." The proposed and final rulemaking notices published by the agency must include the Statement or a summary. Last amended 2001.
- **SAFETEA-LU Section 1121, 2009** – Identifies fuel-efficient vehicles among the exceptions that may be allowed in high-occupancy vehicle (HOV) lanes. Last amended 2012.

These regulations and guidance are variously relevant to transportation. Because of these, as well as broad-based national policy, energy conservation is an important factor in designing and analyzing highway projects and in conducting day-to-day life at CDOT. Beyond the legal requirements for energy conservation are environmental benefits under the NEPA umbrella.

Collection and Evaluation of Baseline Information Under NEPA

Collection of Baseline Information

Because the topic of energy is complex, focus the collection of baseline information specifically on the types of energy that will be affected by the project. The level of detail obtained for the baseline should not be greater than that which can be predicted for project construction and operation energy uses.

For existing roadways, obtain information on the traffic mix, speed, and volume at key times of the day. Use this information to characterize the annual energy consumption of current vehicular traffic. Data could also be collected on other annual expenditures of energy, such as in maintenance of the existing roadway, lighting, and signage. The specific information collected should be guided by the changes in energy use that the project will bring about. The larger the scale and complexity of the proposed project, the greater the level of detail should be in collecting baseline data on energy consumption. Except for large-scale projects, a detailed energy analysis, including computations of British thermal unit requirements, and so on, is not needed.

Evaluation of Baseline Information

Evaluate all aspects of the proposed project to identify how it will be different from the existing situation in ways that affect energy consumption or conservation. Consider questions such as the following for each alternative:

- Will the new roadway be longer and require vehicles to travel further, as well as require more lighting and more maintenance?
- Will the design, speed limit posting, and LOS of the new roadway cause vehicles to travel at speeds of maximum efficiency or at speeds higher or lower than that?
- How much energy will be expended during project construction and what energy conservation measures will be used during construction?
- Will HOV lanes be installed to encourage efficient use of the roadway and, if so, what energy savings are likely to result?

- Will incentives be provided to encourage and promote the use of fuel-efficient vehicles on the new roadway?
- Will the new roadway and the materials used for it require less maintenance?

To evaluate the energy impacts of the project, develop tables that compare existing and proposed future energy use for the entire road network affected by each project alternative.

Other Issues to Consider

Beyond regulations and guidance directed specifically at energy policy, energy conservation is woven throughout CDOT activities. CDOT's *Lighting Design Guide* (CDOT, 2019c), which provides current recommended practice for roadway lighting and criteria for typical Colorado applications, focuses on energy efficiency repeatedly as a primary benefit of various lighting fixtures. Energy dissipation is also a factor in roadside barrier material selection and drainage system design. In this and other documents, energy efficiency is an environmental concern, a safety concern, and an economic consideration.

9.25.2 NEPA Document Sections

The content of the sections on energy in the Affected Environment and Environmental Consequences chapters is discussed below.

Affected Environment

In the energy section of the Affected Environment chapter of the NEPA document, present the data collected on current energy use. Include information only on the types of energy use that the proposed project will alter, at a level of detail that can be matched with reasonable projections for the project alternatives.

Affected Environment Chapter of NEPA Document

- Constrain the types of energy use that the proposed project would alter
- Quantify the existing energy use to the same level of detail that can be projected for the project

Environmental Consequences

Discuss in general terms the construction and operational energy requirements and conservation potential of various alternatives under consideration. The discussion should be reasonable, supportable, and, when appropriate, do the following:

- Recognize that the energy requirements of various construction alternatives are similar and generally greater than the energy requirements of the No Action alternative.
- Point out that the post-construction, operational energy requirements of the facility should be less with one or more of the build alternatives. In such a situation, one could conclude that the savings in operational energy requirements would more than offset construction energy requirements and thus, in the long term, result in a net savings in energy usage.
- For large-scale projects with potentially substantial energy impacts, discuss the major direct and/or indirect energy impacts and conservation potential of each alternative.
- For direct energy impacts, refer to the energy consumed by vehicles using the facility.

- For indirect impacts, include construction energy and items such as the effects of any changes in automobile usage.
- Indicate the alternative's relationship and consistency with a state and/or regional energy plan if one exists.

The NEPA document should identify any energy conservation measures that would be implemented for each alternative. Once the preferred alternative is identified, the energy conservation measures to be implemented for that alternative should be highlighted. Measures to conserve energy could include:

- Using HOV incentives
- Implementing measures to improve traffic flow
- Reducing the energy used in lighting
- Reducing the roadway maintenance extent or frequency
- Limiting the idling of construction equipment
- Encouraging employee carpooling or vanpools for construction workers
- Encouraging the use of the closest material sources
- Locating construction staging areas close to work sites
- Using cleaner and more fuel-efficient construction vehicles
- Using alternative fuels and asphalt binders
- Implementing traffic management schemes that minimize motorist delays and vehicle idling
- Carrying out maintenance activities during periods of reduced traffic volumes
- Promoting carpooling/vanpooling
- Encouraging transit

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for energy.

9.26 Hazardous Materials

The term "hazardous materials" is an all-inclusive term for materials that are regulated as a solid waste, hazardous waste, and other materials contaminated with hazardous substances, radioactive materials, petroleum products, toxic substances, and pollutants. Because of their quantity, concentration, or physical or chemical characteristics, hazardous materials may pose a significant present or potential hazard to human health and safety or to the environment if released into the environment.

Hazardous materials assessments for site-specific projects are used to identify the potential for encountering contamination during construction, to determine whether materials management or worker health and safety may be impacted, and to assess liability as part of acquisition. Accurately identifying potential concerns early is important for effective planning and efficient completion of a project. The primary objective of completing a hazardous materials assessment is to identify sites within the project area with concerns related to hazardous materials for use in the CDOT decision-making process.

The CDOT Hazardous Materials Guidance Manual (CDOT, 2018b) provides guidance on conducting hazardous materials assessments. The purpose and intent of this guidance is to help CDOT staff and environmental professionals (EPs) identify potential existing hazardous materials concerns as an integral step of the advanced planning and environmental documentation stages of project development and, when applicable, to facilitate project alternative selection. The CDOT Hazardous Materials Guidance Manual provides detailed technical guidance for hazardous material evaluations and has primacy over

Section 9.26 is intended to summarize in simpler terms the treatment of hazardous materials in CDOT's NEPA projects. **Subsection 9.26.1** discusses the process for evaluating hazardous materials. **Subsection 9.26.2** discusses hazardous material information that should be included in each NEPA document.

9.26.1 Hazardous Material Evaluation Process

Qualified practitioners, as defined in Section 7.0 of the CDOT *Hazardous Materials Guidance Manual*, must conduct the hazardous materials assessments for CDOT and CDOT-administered projects. CDOT Property Management should be engaged early in the project, particularly regarding any structure and/or property acquisitions and/or impacts.

Section 7.0 of the *Hazardous Materials Guidance Manual* can be accessed at:
https://drive.google.com/file/d/1gAOge9Y2aHKGbxbL_XTGc7hDQEKRQ6TL/view

Reasons for an Evaluation of Hazardous Materials Under NEPA

CDOT conducts hazardous material evaluations for its projects for multiple reasons, including:

- To fulfill requirements of the Resource Conservation Recovery Act (RCRA) of 1976 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
- To fulfill requirements of NEPA
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner

The CDOT *Hazardous Materials Guidance Manual* (CDOT, 2018b) presents applicable regulations and guidance that apply to hazardous material assessments.

Hazardous Material Assessment

CDOT staff and consultants conducting or coordinating hazardous materials assessments and investigations should be familiar with the Federal, state, and local environmental laws and regulations that apply to hazardous materials. Additionally, it is important to keep track of and be aware of changes to laws and regulations. Regulatory changes with the potential to impact hazardous materials assessments are addressed in the CDOT *Hazardous Materials Guidance Manual*. CDOT and its consultants must work together to ensure that the appropriate regulatory agencies are involved, as required. It is also important to keep track of and be aware of changes to laws and regulations.

Based on the project scope of work and the available information on the potential for contamination, the level of effort for documentation of the hazardous materials assessment could use one or more of the following:

- Initial Site Assessment (ISA), CDOT Form 881
- Modified Environmental Site Assessment (MESA)
- Phase I Environmental Site Assessment (ESA)

In general, all three methods contain similar fundamental requirements and processes, which include:

- Standard environmental database (records) review
- Historical records review
- Visual reconnaissance
- Detailed regulatory file review
- Interagency coordination
- Identification of environmental concerns and conditions

Based on the information and recommendations provided in the initial hazardous materials assessment, further analysis of the property may be required, typically using a Phase I ESA or a Phase II ESA (which may also be known as a remedial investigation). The hazardous materials assessment for most CDOT projects would use the ISA method of documentation. the CDOT *Hazardous Materials Guidance Manual* (2018b) describes each type of assessment, fundamental steps, fundamental requirements, and additional information.

Working on CDOT hazardous material clearances? Interested in:

- Learning more about relevant laws and regulations
- Identifying hazardous materials concerns during NEPA assessments
- Understanding the various assessment methods and processes typically used by CDOT
- Recognizing CDOT-specific issues and concerns?

Take a look at the CDOT Hazardous Materials Guidance located HERE!

9.26.2 NEPA Document Sections

The content of the sections on hazardous materials in a NEPA document is discussed below. Generally, the information in the NEPA document should be sufficient to compare the scope of potentially hazardous waste involvement among the project alternatives and support the determination of a preferred alternative.

In the case of a CatEx, where a full NEPA document is not required, CDOT expects that the appropriate hazardous material information will confirm the presence/absence of hazardous materials to be evaluated before the final approval of the CatEx.

The level of effort required to conduct the hazardous materials assessment is based on several factors, including the level of environmental NEPA documentation (CatEx, EA, or EIS). Most CDOT projects are completed as a CatEx under the *Programmatic Agreement for Processing Categorical Exclusion Actions between FHWA and CDOT*, with the most recent agreement dated June 2022. For projects that include a hazardous materials assessment, NEPA documents should include the following sections.

Affected Environment

Describe regulatory requirements, identify analyses performed and the conclusions, describe applicable Regional Transportation Plans and Transportation Improvement Programs, and describe interagency consultations. Describe existing conditions and identify sites in the project area that may be potential hazardous material sites and areas of potential environmental concern.

Environmental Consequences

Compare the hazardous material potential of each alternative relevant to the project using the results from the following:

- ISA
- MESA
- Phase I ESA
- Phase II ESA
- Remedial Investigation

Impacts and Mitigation

The *Summary of Impacts and Mitigation Table* (**Table 9-2**) is required for all CDOT NEPA documents and must include all identified impacts and mitigation actions for hazardous materials.

9.27 Cumulative Impacts

Cumulative impacts are defined in Section 1508.7 CEQ, 40 CFR § 1500 – 1508:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (e.g., 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.

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify:

- Whether the environment has been previously degraded and to what extent
- Whether ongoing activities are causing impacts
- What the trends are for activities and impacts in the area
- Whether the environment will be degraded in the foreseeable future and to what extent

The cumulative impact analysis must consider all aspects of the environment affected by the proposed action, as well as the impacts of that action in relation to other past, present, and reasonably foreseeable actions in the vicinity and/or region. Reasonably foreseeable actions are those future activities that have been committed to or that are known proposals, which could take place within the defined planning horizon.

Cumulative Impacts Regulations and Guidance

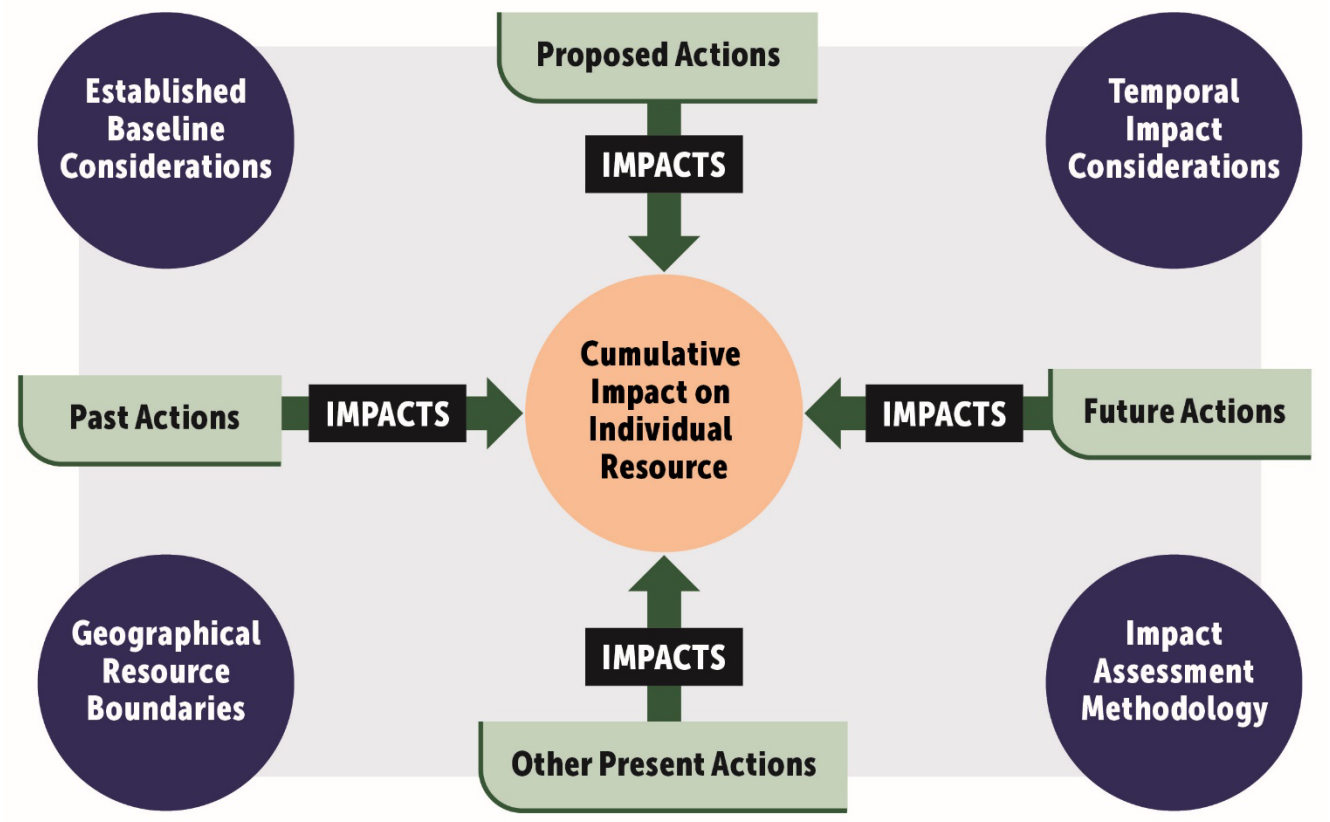
- CEQ's NEPA website at http://energy.gov/nepa/council-environmental-quality-ceq
- FHWA Technical Advisory T 6640.8a at http://www.environment.fhwa.dot.gov/projdev/impTA6640.asp
- FHWA Secondary and Cumulative Impact Assessment in the Highway Project Development Process at http://www.environment.fhwa.dot.gov/guidebook/content/Secondary_Cumulative_Impact_Assessmt.asp
- Guidance on the Consideration of Past Actions In Cumulative Effects Analysis at http://energy.gov/nepa/downloads/guidance-consideration-past-actions-cumulative-effects-analysis
- AASHTO Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts Under NEPA at https://environment.transportation.org/wp-content/uploads/2021/05/ph12-2.pdf

In selecting the cumulative impacts to analyze and discuss, consider scoping direction, and:

- Whether a resource(s) is important and especially vulnerable to incremental impacts
- If the proposed action is one of several actions within the same resource study area with common impacts
- Whether other proposed activities in the area will have similar impacts
- If these impacts have been historically significant for the resource
- If other environmental or planning analysis in the area has identified a cumulative impact concern

Individual resource studies and consultation with Federal, state, and local agencies should provide the basis for identifying cumulative impact issues. Previous environmental documents prepared for local and regional plans can provide guidance regarding adopted mitigation that may be applicable to reducing the cumulative impact of a specific proposed highway or off-highway project. **Figure 9-6** depicts the process for determining cumulative impacts.

Figure 9-6. Process for Determining Cumulative Impacts



Potential cumulative impacts are described for each resource within a defined cumulative impact analysis area. Generally, these areas are larger for resources that are mobile (such as wildlife) compared to resources that are stationary (such as historic and archaeological resources). In the cumulative impacts discussion, discuss only substantial impacts to those resources that may be affected.

A cumulative analysis requires the following components:

- **Spatial and Temporal Boundaries** – In establishing appropriate spatial and temporal boundaries for a cumulative impact analysis, EPA points out that there are no set or required formulas for determining appropriate scope. Decisions must be made case-by-case depending on the magnitude of project impacts and the environmental setting. For a given project, decisions are also made resource-by-resource. Generally, the boundaries for cumulative analysis are broader than the scope of analysis used in assessing direct or indirect impacts. Geographic boundaries should be defined for each resource of concern, and the periods of time considered should include the period in which the proposed action's impacts will persist. The geographic boundaries and periods of time being considered are likely to vary among resources. The NEPA document should identify the rationale used to establish the spatial and temporal boundaries of the cumulative analysis. Some thought must be given to whether the CDOT project is the cause or the effect of cumulative impacts. A larger development may be the reason for growth in the study area, and the CDOT project could just be a response to that growth.
- **Past, Present, and Reasonably Foreseeable Future Actions** – In identifying past, present, and reasonably foreseeable future actions to consider, address only those actions that incrementally contribute to the cumulative impacts on resources. Consider the current level of degradation, ongoing activities in the area causing impacts, and trends for activities and impacts in the area. To be considered "reasonably foreseeable," an action need not be a specific proposal; however, the courts have excluded actions that can be considered purely "speculative." Near-term projects identified in local, state, and Federal agency planning documents are usually considered reasonably foreseeable. In general, the description of past, present, and reasonably foreseeable projects for a cumulative impact analysis should be inclusive but does not need to identify every project in the defined spatial and temporal boundaries of the analysis.

The CEQ and EPA have highlighted the importance of cumulative impact analysis and recognized the complexity of delineating the cause-and-effect relationships among the multiple actions and the resources, ecosystems, and human communities of concern. Both CEQ and EPA have issued detailed guidance to assist in formulating cumulative analysis. The latter document was prepared to assist EPA staff in evaluating and commenting on EISs; however, it contains substantial information of use to NEPA practitioners.

EPA's Consideration of Cumulative Impacts in EPA Review of NEPA Documents (1999)
https://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf

Cumulative impacts result when the impacts of an action are added to or interact with impacts of other actions that result in a compounded impact from all actions in the same geographic area over time. The cumulative impact analysis focuses on the combination of these impacts and any resulting environmental degradation on its sustainability.

While ecological and land use cumulative impacts are particularly important, other resource areas are considered, including social resources, economic resources, recreation, quality of life or community values, global climate change, and cultural resources. The level of analysis and scope of the cumulative analysis should be commensurate with the potential impacts, resources affected, scale, and other relevant factors associated with the project. These assessments involve determinations that are often complex and, to some degree, subjective.

> Variation in the areas for which resource data are available may also influence the size of the cumulative impacts study area. For example, socioeconomic data may be available for Census blocks, economic data may be available for counties, and wildlife data may be available for game management units—none of which have the same boundaries.

The following subsections provide guidance on the treatment of cumulative impacts for CDOT's NEPA studies. The first subsection discusses the process for evaluating cumulative impacts. The second subsection discusses information on cumulative impacts that should be in each NEPA document.

9.27.1 Cumulative Impact Process

The CDOT project manager, together with the specialists responsible for each environmental resource expected to be impacted by the project, is responsible for evaluating cumulative impacts. Typically, the resource specialists who perform resource-specific impact analyses will collaborate, together and with their CDOT counterparts in EPB or the CDOT Regions, in providing information for the cumulative impact analysis.

The collective impacts of the proposed project and all other past, present, and future projects in the cumulative impacts study area, regardless of their ownership, sponsorship, or funding source, should be evaluated for each resource. The study area for cumulative impacts is the physical area that bounds the environmental, sociological, economic, or cultural resources of interest for cumulative analysis. The practical bounds of this statement are discussed below.

Detailed consideration of cumulative impacts should occur after project specific impacts have been identified for each resource. However, even at the start of project development, it should be possible to identify resources in the project vicinity that have been historically impacted by talking with local planning and agency personnel and asking the public at scoping meetings. Whenever possible, further impacts on the identified resources should be avoided and/or minimized through project design.

Reasons for Evaluation of Cumulative Impacts Under NEPA

CDOT evaluates cumulative impacts for several reasons:

- To consider total project impacts in combination with the impacts from other past, present, and reasonably foreseeable future actions to provide a measure of overall impacts to environmental resources
- To provide the decision-maker information on the health of an environmental resource due to past, present, and reasonably foreseeable future actions
- It is a required analysis in NEPA documents.
- To comply with CDOT's Environmental Stewardship Guide (2017a), which ensures that the statewide transportation system is constructed and maintained in an environmentally responsible, sustainable, and compliant manner.
- To comply with several legal mandates that pertain to cumulative impacts as discussed below.

The original wording of NEPA in 1969 does not contain the word "cumulative" but does direct agencies to "recognize the worldwide and long-range character of environmental problems." CEQ's Regulations for Implementing NEPA (CEQ, 40 CFR § 1500 – 1508) introduce the consideration of cumulative impacts. The concept of cumulative impacts has continued to be developed and refined through subsequent guidance from CEQ and Federal agencies.

Evaluation of Cumulative Impacts Under NEPA

Collection of Baseline Information

The main components in the cumulative impact analysis process include:

- Determining temporal and spatial boundaries for the analysis
- Generating a list of planned projects or foreseeable activities for consideration
- Gathering data to supplement the generated list
- Achieving agreements on which resources to count, the baseline data, and its sources

The approach for each component is further described below:

- Develop temporal (e.g., time frame) and spatial (e.g., cumulative impacts study area) boundaries for the cumulative analysis based on all resources of concern and all the actions that may contribute. Generally, the temporal and spatial boundaries are based on the period of time that the impacts would persist and the natural boundaries of resources of concern (as opposed to jurisdictional boundaries), for example:
    - The most common temporal scope is from the naturally occurring baseline (as depicted in the affected environment) through the life of the project.
    - The size and shape of the cumulative impacts study area boundaries vary by resource and are larger for resources that are mobile or migrate (e.g., elk populations) compared with stationary resources. Occasionally, spatial boundaries may be contained within the project area or just a portion of the project area.

- Generate a list of past, present, and reasonably foreseeable future actions through informal contacts and formal meetings with cooperators, local agencies, and other stakeholders.
- Gather data to supplement the list of projects and activities accumulated through telephone calls, website searches, and document reviews. Enough information should be gathered to generally describe the project and impacts that occurred or may potentially occur from the project or activity.

The planning process can be used to develop any of the following:

- Population and employment projections
- Assumptions about auto ownership and household incomes
- A list of projects to include in the No Action scenario
- Explanations of travel and development trends
- Zoning and land use assumptions
- Assumptions about service by other modes
- Air quality and emissions forecasts
- Criteria for determining acceptable levels of transportation service

The AASHTO *Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts Under NEPA* (2016b) states that assessments of indirect effects and cumulative impacts can be conducted as part of the transportation planning process and then, under certain conditions, adopted in the NEPA process for an individual project. It has been recognized that the transportation planning process can produce information that will later be used in NEPA-level studies of indirect effects and cumulative impacts. This information can expedite project-level reviews by minimizing the amount of additional data that needs to be collected.

To successfully assess cumulative impacts, the analysis must consider other projects with a broad range of activities and patterns of environmental degradation occurring near the project. The following factors are considered in identifying actions that may relate to the project:

- Proximity (either spatially or temporally)
- Probability of an action affecting the same environmental system
- The likelihood a project leads to a range of impacts or other associated activity
- Whether the impacts are similar to the project proposed
- The likelihood a project will occur, and if the project is imminent

Time, money, and reliable data constraints make detailed consideration of the past unrealistic, although some recognition of the undeveloped natural state of an area should be provided so that the abundance of predevelopment ecosystems will not be forgotten. In 2005, CEQ issued *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ, 2005), which states in part:

> CEQ interprets NEPA and CEQ's NEPA regulations on cumulative effects as requiring analysis and a concise description of the identifiable present effects of past actions to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have a continuing, additive and significant relationship to those effects. In determining what information is necessary for a cumulative effects analysis, agencies should use scoping to focus on the extent to which information is "relevant to reasonably foreseeable significant adverse impacts," is "essential to a reasoned choice among alternatives," and can be obtained without exorbitant cost.

Evaluation of Baseline Information

To evaluate the cumulative impact information collected:

- Characterize each resource within the project cumulative impacts study area by obtaining data on past trends in the state of the resource and its current state. Document this information in the Affected Environment chapter of the NEPA document.
- Locate the projects identified on a map to enable easy comparison for each resource. If possible, combine several resources, such as vegetation and fish and wildlife, on a single map.
- Evaluate only the effects of resources that are expected to receive impacts under one or more of the project alternatives.
- Assess the magnitude and importance of cumulative impacts by comparing the environment in its naturally occurring state with the expected impacts of the project alternatives and other actions in the same geographic area. Base magnitude on the extent of difference between the naturally occurring environment and the anticipated condition. Base importance on whether the long-term sustainability of a resource or social system would be affected.
- Describe any cumulative impacts in somewhat general terms. Note any cumulative benefits, as well as detriments, in the analysis.
- Note the relative importance of this impact to the overall resource as it currently exists and in relation to historic trends.
- Describe the degree to which impacts from the proposed transportation project will contribute to the cumulative impacts for this resource.

Other Issues to Consider

When considering the appropriateness of evaluating a project as a CatEx, it should be remembered that a CatEx should be used only for projects that do "not individually or cumulatively have a significant effect on the human environment (Sec. 1508.4) and . . . [that] are therefore exempt from requirements to prepare an environmental impact statement." (CEQ, 40 CFR § 1500 – 1508).

9.27.2 NEPA Document Sections

The description of cumulative impacts in the NEPA document should provide a summary of cumulative impacts.

This section would include the temporal and spatial boundaries used, the baseline condition used (typically documented in the Affected Environment section), and any additional factors considered, such as:

- Federal, non-Federal, and private actions
- Potential for synergistic impacts or synergistic interaction among or between impacts
- Potential for impacts to cross political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives
- Past, present, and reasonably foreseeable future actions considered in the analysis and how the list of actions was developed (note any public meetings, agency meetings, etc.).
- Cumulative impacts identified through the analysis by resource

Conclude the discussion with project-specific text that states: "When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative (or build alternatives) is (or are not) expected to negatively (or beneficially) impact the resource."

If some of the impacts occur only during construction and would be temporary while others would be more permanent and last throughout the project's operation, mention this. Also note which cumulative impacts are direct and which are indirect. Tables provide a useful way to present cumulative impacts if a project is complex.

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