

# Denver Union Station Final Environmental Impact Statement

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### Acronyms and Abbreviations

ac	Acres
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
AGC	Annual Guideline Concentrations
AIR	Automobile Inspection and Readjustment Program
APCD	Colorado Air Pollution Control Division
APE	Area of Potential Effects
AT&S	Atchison, Topeka and Santa Fe Railroad
BCI	Bicycle Compatibility Index
BID	Business Improvement District
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe Railroad
BOGs	Breakout Groups
BOMA	Building Owners and Managers Association
BRT	Bus Rapid Transit
BTU	British Thermal Units
C&S	Colorado and Southern Railroad
CAA	Clean Air Act
CAC	Citizen Advisory Committee
CAP	Corrective Action Plan
CBD	Central Business District
CCD	City and County of Denver
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDWR	Colorado Division of Water Resources
CEQ	Council on Environmental Quality
CIFGA	Colorado Intermountain Fixed Guideway Authority
C-Line	Central Platte Valley Light Rail Line
CMAQ	Congestion Mitigation Air Quality
CML	Consolidated Mainline (Railroad Corridor)
CNHP	Colorado Natural Heritage Program
CO	Carbon Monoxide



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CPTED	Crime Prevention Through Environmental Design
CPV	Central Platte Valley
CPVMD	Central Platte Valley Metropolitan District
D&RGW	Denver and Rio Grande Western Railroad
dB	Decibel
DBMP	Denver Bicycle Master Plan
DDP	Downtown Denver Partnership
DDRO	Downtown Denver Residents Organization
DIA	Denver International Airport
DMAP	Downtown Multimodal Access Plan
DMSA	Denver Metropolitan Statistical Area
DMU	Diesel Multiple Unit
DPM	Diesel particulate matter
DRCOG	Denver Regional Council of Governments
DTC	Denver Technological Center
DUS	Denver Union Station
DUT	Denver Union Terminal
DWMD	Denver Wastewater Management Division
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EOC	Executive Oversight Committee
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
ft/ft	Feet per foot
FTA	Federal Transit Administration
FWS	Fish and Wildlife Service
GN	Great Northern Railroad
GPR	Ground Penetrating Radar
GHG	Greenhouse Gas
HC	Hydrocarbon



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HCM	Highway Capacity Manual
HOV	High-Occupancy Vehicle
HSA	Historic Structure Assessment
I-225	Interstate 225
I-25	Interstate 25
I-70	Interstate 70
IGA	Intergovernmental Agreement
INC	Inter-Neighborhood Cooperation
ISC	Industrial Source Complex
kV	Kilovolt
L <sub>dn</sub>	Day/Night Sound Level
L <sub>eq</sub>	Equivalent Sound Level
LNAPL	Light Non-Aqueous Phase Liquid
LoDo	Lower Downtown
LOS	Level of Service
LPC	Landmark Preservation Commission
LRT	Light Rail Transit
LRV	Light Rail Vehicle
MBTA	Migratory Bird Treaty Act
MBTU	Million British Thermal Units
MIS	Major Investment Study
MOA	Memorandum of Agreement
mph	Miles Per Hour
MPO	Metropolitan Planning Organization
MSS	Market Street Station
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NO <sub>2</sub>	Nitrogen Dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO <sub>x</sub>	Nitrous Oxide



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NP	Northern Pacific Railroad
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O <sub>3</sub>	Ozone
OAHP	Office of Archaeology and Historic Preservation
OAQPS	EPA Office of Air Quality Planning and Standards
OCS	Overhead Contact System
O-D	Origin-Destination
OPT	Occupational Privilege Tax
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
Pb	Lead
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PHA	Preliminary Hazard Analysis
PMT	Project Management Team
PM <sub>x</sub>	Particulate Matter (e.g., PM <sub>10</sub> = fine particulate matter, less than 10 microns in diameter)
ppb	parts per billion
ppm	parts per million
ppv	peak particle velocity
PRV	Platte River Valley
PUC	Public Utilities Commission
PUD	Planned Unit Development
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
RFQ	Request for Qualifications
R-MU	Residential Mixed Use
ROD	Record of Decision
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users

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SEL	Sound Exposure Level
SGC	Short-Term Guideline Concentration
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Station
SO <sub>2</sub>	Sulfur Dioxide
SOV	Single-Occupancy Vehicle
SP	Southern Pacific Railroad
sq. ft.	Square Feet
SRHP	State Register of Historic Places
STIP	State Transportation Improvement Program
STP	Strategic Transportation Plan
SVOC	Semi-Volatile Organic Compound
SWMP	Stormwater Management Plan
TAC	Technical Advisory Committee
TCE	Trichloroethene
TDP	Transit Development Program
TIF	Tax Increment Finance
TIP	Transportation Improvement Program
T-MU	Transit Mixed-Use
TPSS	Traction Power Substation
T-REX	Transportation Expansion Project (I-25 Southeast Corridor, Denver)
TSD	Technical Support Document
TSM	Transportation System Management
TSP	Total Suspended Particles
TVA	Threat and Vulnerability Analysis
UP	Union Pacific Railroad
USAC	Union Station Advisory Committee
USACE	U.S. Army Corps of Engineers
USDOE	U.S. Department of Energy
USDOI	U.S. Department of the Interior
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service



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USGS	U.S. Geological Survey
VdB	Velocity Decibels
VOC	Volatile Organic Compound
WQCV	Water Quality Capture Volume

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### Glossary

Above-grade	Placed above the ground surface.
Alternative	Potential solution to a transportation problem. An alternative may consist of different configurations, alignments, type of access control or transportation modes and strategies.
Area of Potential Effects	Per Section 106 regulations, the Area of Potential Effects is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking.
At-grade	Placed at the ground surface.
Below-grade	Placed below the ground surface or street elevation.
Best Management Practices (BMPs)	Used during construction, methods that have been determined to be the most effective, practical means of preventing or reducing environmental impacts.
Breakout Group	Public meetings focused on key topics related to the DUS project, including environmental resources, land use and urban design, parking and traffic, and others. The intent of these meetings was to discuss the design in detail and to gather feedback from the Union Station Advisory Committee (USAC) and larger public.
Build Alternative	An alternative that includes a major capital improvement project to address the problem under investigation. As part of the decision making process, the Build Alternative is compared against the No Action Alternative from the standpoints of transportation performance, environmental consequences, cost-effectiveness, and funding considerations. The Build Alternative in this Final EIS includes light rail, passenger rail, and regional bus facilities, as well as pick-up/drop-offs for the 16 <sup>th</sup> Street Mall Shuttle and Downtown Circulator.
C-Line	RTD's Central Platte Valley light rail transit line. The C Line's northern terminus is at DUS, and the southern terminus is at Mineral Avenue in Littleton.
Census	The census of population and housing is taken by the Census Bureau in years ending in zero. The census form includes both a short form (100% survey) and a long form (sample survey of one in six households).



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Census block	A block is the smallest geographic unit for which the Census Bureau tabulates 100-percent data. In urban areas, blocks typically correspond to individual city blocks.
Census block group	A subdivision of a census tract, a block group is the smallest geographic unit for which the Census Bureau tabulates sample data. A block group consists of all the blocks within a census tract with the same beginning number.
Census tract	A small, relatively permanent statistical subdivision for the purpose of presenting data. Census tract boundaries normally follow visible features, but may follow governmental unit boundaries or other non-visible features. Census tracts average about 4,000 inhabitants.
Community cohesion	The social relationships, patterns, and interaction among persons and groups within a community that allows for the recognition and coalescence of common values and goals for the community.
Conformity	The requirement for transportation plans, programs and projects to be consistent with the local or state air quality plans.
Connectivity	Linking various transportation modes and services to minimize wait times between transfers and reduce overall travel time.
Consist	The make-up or composition (number and specific type) of a train or vehicles.
Consolidated Main Line (CML)	Freight railroad tracks that cross through downtown Denver and serve both the Union Pacific and Burlington Northern Santa Fe Railroads.
Construction impact	Temporary impact that would occur over a limited period of time while a project is being built.
Cooperating agency	A federal agency other than the lead agency that has jurisdiction by law(s) or special expertise, with respect to any environmental impact of a proposed action.
Cumulative impact	An impact that "results from incremental consequences of an action when added to other past and reasonably foreseeable future actions." The cumulative effects of an action may be undetectable when viewed in the individual context of direct and indirect impacts but can add to other area disturbances and eventually lead to a measurable environmental change.
Diesel Multiple Unit (DMU)	Each unit carries passengers and can be self-powered by a diesel motor; no engine unit is required.
Downtown Multimodal Access Plan (DMAP)	An interagency planning study concerning future access to and circulation throughout downtown Denver.

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Downtown Circulator	A new transit service to be provided in downtown Denver along 18th and 19th streets as identified in the DMAP study.
Denver Union Station (DUS) Master Plan	A plan adopted in fall 2004 to provide guidance for the redevelopment of Denver Union Station and the surrounding 19.5 acre property into the region's multimodal transportation hub. The plan established a Vision Plan for which provides guidance for: 1) the incremental implementation of public transportation improvements needed to expand and establish DUS as the region's multimodal transportation center; and 2) the anticipated incremental private redevelopment of the DUS property.
E-Line	RTD's light rail line. Has a northern terminus is at Union Station in downtown Denver, shares track with the C Line from Union Station to I-25/Broadway, then runs along the Southeast Corridor to Lincoln Avenue in Lone Tree.
Effects	Effects include ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Effects include: (1) direct effects that are caused by the action and occur at the same time and place, and (2) indirect effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8) [NEPA].
Electric Multiple Unit (EMU)	The EMU is heavier than a LRT vehicle but is powered in the same way-by an overhead electric system.



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Environmental Impact Statement (EIS)	An environmental document required by the National Environmental Policy Act (NEPA), 42 USC 4332, when an agency proposes an action that is likely to have significant impacts to the environment. The Draft EIS includes a discussion of purpose and need, alternatives considered, existing environmental conditions, environmental consequences, financial analysis, and public involvement activities. The Final EIS incorporates the Draft EIS with changes made as appropriate throughout the document to reflect the selection of an alternative, modifications to the project, updated information on the affected environment, changes in the assessment of impacts, the selection of mitigation measures, wetland and floodplain findings, the results of coordination, comments received on the Draft EIS and responses to these comments.
Environmental Justice	A federal policy that provides equitable outreach benefits to minorities and low-income populations and that any adverse environmental effects are not disproportionate to these historically underserved groups. Based on Executive Order 12898 signed in February 1994, DOT Order 5610.2 (April 1989), and FHWA Regulation DOT Order 6640.23 (December 1998).
FasTracks	A mass transit expansion plan and funding program to improve and expand the Denver region's existing transit system and facilities. In November 2004, the region's voters approved RTD's request to increase its sales tax by 0.4 percent which would provide \$6.1 billion over 12 years to expand rapid transit services (light rail, commuter rail, and bus rapid transit); park-and-Ride facilities; and enhance the existing bus network and transit hubs.
Fatal flaw analysis	Factors that render a potential alternative as impractical or unfeasible to carry forward for further evaluation.
Floodplains	Lowlands that are relatively flat and are subject to flooding in a given year.
Groundwater	Supply of fresh water found beneath the earth's surface, usually in aquifers, that supply wells and springs.
Hazardous materials	Material, often waste, that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, explosive, or chemically reactive. In general, any materials which poses harmful risks to human health and/or the environment.
High-Occupancy Vehicle (HOV) lane	A dedicated lane (typically on a freeway) reserved for vehicles carrying two or more people. The minimum number of vehicle occupants required to qualify for HOV lane use may vary depending on the congestion levels and capacity of the HOV lane and the surrounding road system.



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Hispanic/Latino	A self-designated classification of people whose origins are from Spain, the Spanish-speaking countries of North, Central or South America, the Caribbean, or those identifying themselves generally as Spanish, Spanish-American, Mexicans, etc. Origin can be viewed as ancestry, nationality, or country of birth of the person or person's parents or ancestors. Hispanic/Latino persons may be of any race, White and Non-White.
Inboard	The placement of a service mode (e.g., LRT) immediately adjacent to a facility.
Intermodal	Accommodation or interconnection of various transportation modes both for the movement of people and goods.
Lead agency	The agency that prepares, or takes primary responsibility for preparing an EIS or an Environmental Assessment (EA).
Letter of Intent	A written statement expressing the intention of the undersigned parties to enter into a formal agreement.
Light rail transit (LRT)	Transit mode characterized by an overhead electric power source, and by its ability to operate in: 1) an at-grade and / or a grade-separated environment; and 2) within a street right-of-way and / or within a dedicated right-of-way. Operates in one or multiple car consists (trains).
LoDo Historic District	Lower Downtown area of Denver designated as a City and County of Denver Historic District.
Mitigation measures	Measures taken to reduce adverse impacts on the environment caused by the proposed action. "Mitigation" includes in order of sequence: (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or taking affirmative steps to avoid or reduce impacts; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (5) compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or (6) monitoring the impact and taking appropriate corrective measures ((40 CFR 1508.20) [NEPA]) .
Mode	A particular form or method of travel distinguished by vehicle type, operation technology and right-of-way separation from other traffic.
Multimodal	Having or involving several modes of transportation.



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National Environmental Policy Act (NEPA)	The national environmental policy which established federal agency responsibility and created the basis or foundation of the federal decision making process. The fundamentals of the NEPA decision making process include: consideration of alternatives, examination of potential environmental impacts and mitigation, interagency coordination, public involvement and documentation.
National Register of Historic Places (NRHP)	The nation's official list of cultural resources over 50 years old worthy of preservation. Properties include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture.
No Action Alternative	An alternative included in the EIS analysis which is comprised of the existing and committed regional land use and transportation projects contained in the region's long range transportation plan and the transportation improvement plan.
Notice of Availability (NOA)	A written notice by the federal lead agency and published in the Federal Register that a project is available for public review and comment for a specified period. The notice also lists the time, date and location of the public hearing, if applicable.
Notice of Intent (NOI)	The written decision by the federal lead agency and published in the Federal Register that a proposal is likely to have a significant adverse environmental impact and, therefore, preparation of an EIS is required.
Off-peak periods	Those times of the day when demand for transportation is not at a maximum (refers to private automobiles and transit vehicles).
Operational impact	Environmental impact that could occur long-term following the construction of a project.
Outboard	The placement of a service mode (e.g., LRT) on the far side of a facility.
Passenger rail / Commuter rail	An electric or diesel propelled railway for urban passenger train service consisting of local medium distance travel operating between a central city and adjacent cities or towns.
Peak hour	The hour of the day in which the maximum demand for transportation service is experienced (refers to private automobiles and transit vehicles).
Peak period	A specified time period for which the volume of traffic is greater than that during any other similar period (e.g., peak hour).
Promenade	A public space utilized for pedestrian movement and activity. A promenade is planned along 17th Street extending from DUS to the light rail station.

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Purpose and Need Statement	A project purpose is a broad statement of the overall objective to be achieved by a proposed action. Need is a more detailed explanation of the specific transportation problems that exist or are expected to occur in the future.
Race	Race is a self-identification characteristic of population. The 2000 census included White and Non-White (Persons of Color). Non-White includes Black or African-American alone, American Indian or Alaska Native alone, Asian alone, Native Hawaiian or other Pacific Islander alone, some other race alone, or a mixture of two or more races. Non-White can include persons of Hispanic/Latino heritage. Some Hispanic/Latinos, however, are White.
Record of Decision (ROD)	The ROD is part of the NEPA process and explains the reasons for the project decision, summarizes any mitigation measures that will be incorporated in the project, and documents any required Section 4(f) approval.
Rehabilitation	To put back into good condition (reconstruct or repair the existing structure).
Right-of-way	Publicly owned land that can be acquired and used for transportation purposes.
Scoping	Process used to determine the range of proposed actions, alternatives, impacts and issues to be discussed in an EIS. The required scoping process provides agencies and the public the opportunity to comment on the environmental investigation and process. Scoping is used to encourage cooperation and early resolution of potential conflicts, to improve decisions, and to reduce paperwork and delay.
Secondary impact (see also indirect effects)	Impact that is “caused by an action and is later in time or farther removed in distance but is still reasonably foreseeable” (40 CFR 1508.8). Also referred to as indirect impact.
Section 106	The section of the National Historic Preservation Act which requires that federal, federally assisted and federally licensed Historic Places be submitted to the Advisory Council on Historic Preservation for review and comment prior to the approval of any such undertaking by the federal agency. As with Section 4(f), adequate documentation is required.
Section 4(f)	A provision of the U.S. Department of Transportation providing protection for publicly owned public parks, recreation areas, wildlife and waterfowl refuges, or historic sites on or eligible for the National Register of Historic Places (49 USC 303 and 23 CFR Part 774-formerly 23 CFR Part 135).



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Social resources	Social elements of the environment, including population, housing, community facilities, religious institutions, social and employment services, cultural and social institutions, government institutions, military installations, and neighborhood cohesion.
Stormwater	That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into receiving waters.
Study area	The geographic boundaries of a project's technical analysis.
Tax Increment Finance	TIF is a funding tool that is applied to future gains in taxes in order to finance the current improvements that will create those gains.
Tribe (also affected tribe)	Any Indian tribe, band, nation, or community in the state of Colorado that is federally recognized by the U.S. Secretary of the Interior that will or may be affected by the proposal.
T-REX Project	A 19-mile LRT line and highway reconstruction expansion project located along I-25 and I-225.
VdB	Quantification of vibration velocity.
Viewpoint	A network of permanently established observation sites which provide the means of studying the visual impact of alterations to the landscape (similar term—"observation points").
Viewshed	The surface area visible from an observer's viewpoint.
Visual impact	The degree of change in visual resources and viewer response to those resources caused by project construction and operations.