



Water Quality Technical Report - I-270 Corridor Improvements Environmental Impact Statement

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Acronyms and Abbreviations

Acronym	Definition
BNSF	BNSF Railway
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CFR	Code of Federal Regulations
CM	Control Measure
CWA	Clean Water Act
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
e.Coli	Escherichia coli
FHWA	Federal Highway Administration
I-25	Interstate 25
I-270	Interstate 270
I-70	Interstate 70
I-76	Interstate 76
ITS	Intelligent Transportation Systems
M&E	Monitoring and Evaluation
mph	miles per hour
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
PWQ	Permanent Water Quality
RTD	Regional Transportation District
SDWA	Safe Drinking Water Act
SWMP	Stormwater Management Plan
TMDL	Total Maximum Daily Load
UPRR	United Pacific Railroad
U.S.	United States
WQCC	CDPHE Water Quality Control Commission

1.0 Introduction

CDOT is dedicated to providing an accessible experience for everyone. While we are continuously improving our standards, some complex items in this document, such as certain figures and images, are difficult to create with fully accessible parameters to all users. If you need help understanding any part of this document, we are here to assist and have resources to provide additional accessibility assistance to any requests. Please email us at CDOT_Accessibility@state.co.us to request an accommodation, and a member of our I-270 Engineering Program will schedule a time to review the content with you. To learn more about accessibility at CDOT, please visit the [Accessibility at CDOT webpage on the CDOT Website](#).

The Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) are preparing an Environmental Impact Statement (EIS) to evaluate potential improvements to the Interstate 270 (I-270) corridor. FHWA and CDOT are the lead agencies for this National Environmental Policy Act (NEPA) process, which was initiated in 2020, initially anticipating an Environmental Assessment. Moving into 2023, CDOT determined a more detailed environmental review was needed and requested that an EIS be prepared.

This technical report evaluates and documents potential impacts to and recommended mitigation measures for water quality. It supports the analysis and conclusions in the EIS.

1.1 Project Description

I-270 in Colorado is a controlled-access interstate highway with two through lanes in each direction between Interstate 25 (I-25) and Interstate 70 (I-70) in central Denver and Commerce City (Figure 1). It has a posted speed limit of 55 miles per hour (mph). The project limits include the I-270 interchanges with Interstate 76 (I-76), York Street, Vasquez Boulevard, and Quebec Street. The project will tie into the I-25 and I-70 system interchanges but improvements to these interchanges are part of projects on I-25 and I-70 and will be designed and approved separately.

The purpose of the I-270 Corridor Improvements Project is to implement transportation solutions that modernize the I-270 Corridor to accommodate existing and forecasted transportation demands. The project needs are:

- Traveler safety on the corridor,
- Travel time and reliability on the corridor,
- Transit on the corridor,
- Bicycle and pedestrian connectivity across I-270, and
- Freight operations on the corridor.

In addition to addressing project needs, CDOT, FHWA, and Cooperating and Participating Agencies have established a key project goal: to minimize environmental and community impacts resulting from the project.

Figure 1. I-270 Corridor Improvements Project Limits


2.0 Alternatives

CDOT developed a range of potential alternatives for I-270 improvements. The alternatives ranged from no improvements to minimal infrastructure improvements without added highway capacity to alternatives that added one or two travel lanes in each direction, which could be operated as transit, general-purpose, or Express Lanes.

A two-level alternatives evaluation process was used to screen the alternatives based on the project's purpose and need and goal, and two build alternatives were carried forward for detailed analysis in the EIS:

- Three General-Purpose Lanes Alternative
- Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

The No Action Alternative is also fully evaluated as a baseline for comparison.

Additional information on the alternatives development and evaluation process is included in the Alternatives Development Technical Report.

2.1 No Action Alternative

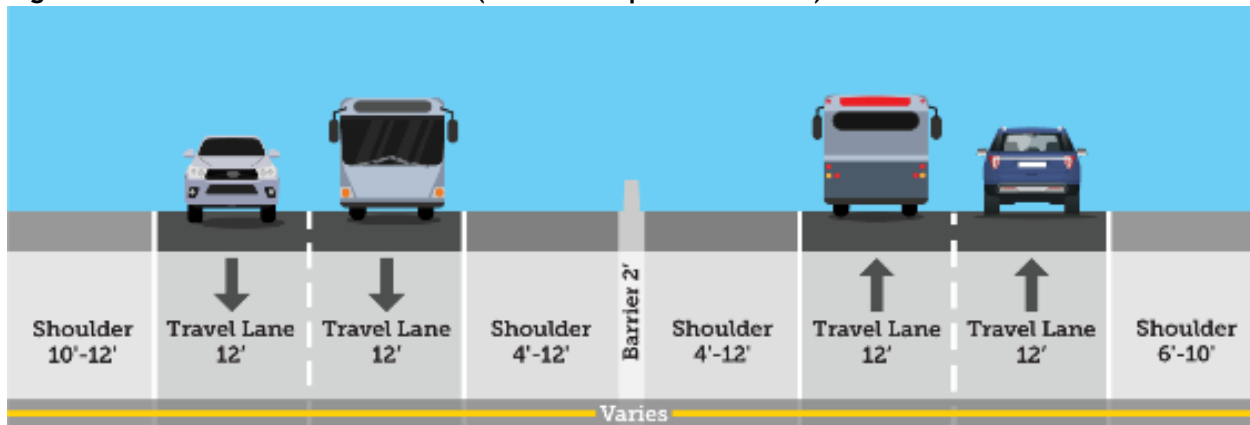
The No Action Alternative evaluates operations of I-270 if a build alternative would not occur along the corridor. It does not address the project Purpose and Need but is carried forward as a baseline for comparison. This alternative would maintain the existing highway configuration of two general-purpose travel lanes in each direction. Bridges and pavement would be maintained and repaired on a regular basis, but underlying infrastructure deficiencies would remain.

The No Action Alternative would include substantial ongoing maintenance and the rehabilitation of 19 existing structures, including seven locations that have structures that are or will be reaching the end of their useful life. The age of the structure, recent bridge inspections, and current ongoing maintenance costs, both planned and emergency maintenance, determine if a structure is or will be reaching the end of its useful life. The seven structure locations along the I-270 corridor that are or will be reaching the end of their useful life are as follows:

- Vasquez Bridge over Sand Creek (E-17-AT)
- York Street Bridge over I-270 (E-17-IC)
- I-270 over South Platte River Eastbound and Westbound Bridges (E-17-IE & E-17-ID)
- I-270 over Burlington Ditch Eastbound and Westbound Bridges (E-17-IG & E-17-IF)
- I-270 over Brighton Boulevard, Union Pacific Railroad (UPRR) and BNSF Railway (BNSF) Eastbound and Westbound Bridges (E-17-II & E-17-IH)
- I-270 over 60th Avenue & BNSF Eastbound and Westbound Bridges (E-17-IK & E-17-IJ)
- I-270 over East 56th Avenue Eastbound and Westbound (E-17-IO & E-17-IN)

The cross section would remain unchanged along I-270 under the No Action Alternative. The No Action Alternative cross sections are shown on Figure 2 and Figure 3.

Figure 2. No Action Alternative (West of Vasquez Boulevard)

Figure 3. No Action Alternative (East of Vasquez Boulevard)


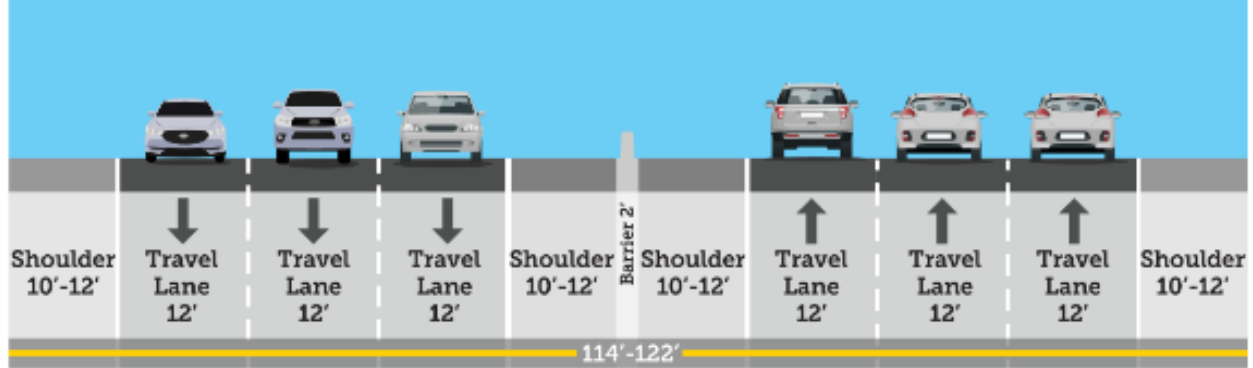
2.2 Build Alternatives

The build alternatives include improving the operational and physical conditions of the I-270 highway; reconfiguring interchanges and ramps; enhancing transit on the corridor; improving bicycle and pedestrian access across I-270; replacing deficient bridges and other infrastructure; and providing modern drainage, water quality, intelligent transportation systems (ITS), and other supporting infrastructure. Both add one new travel lane in each direction and have similar footprints, varying primarily by how the additional travel operates.

2.2.1 Three General Purpose Lanes Alternative

This alternative would reconstruct I-270 to provide three general-purpose lanes in each direction, as shown in Figure 4.

Figure 4. Three General Purpose Lanes Alternative



This alternative includes:

Mainline Improvements

- Providing three general-purpose lanes in each direction
- Widening shoulders to meet current standards
- Restriping of the westbound I-270 to northbound I-25 off-ramp to provide dual-exit lane capacity
- Adding emergency turnouts and turnaround
- Adding one continuous auxiliary lane in each direction between the I-76 and Vasquez Boulevard on-ramps and off-ramps

Interchange Improvements

- Adding an eastbound collector ramp to consolidate incoming movements from the I-76 on-ramps
- Separating the westbound I-270 York Street and I-76 off-ramps
- Improving the Vasquez Boulevard interchange design with improved westbound on-ramp acceleration lanes and the eastbound off-ramp deceleration lanes
- Improving the Quebec Street interchange ramp acceleration and deceleration lengths

Bridge Improvements

- Reconstructing bridges that are at, or will be reaching, the end of their useful life. Bridges carrying travel lanes on I-270 include widening to accommodate additional lanes
 - Replacing the existing York Street bridge over I-270 to meet current bridge standards, accommodate an additional travel lane in each direction on York Street, include a 10-foot multi-use path and a 5-foot sidewalk, and enhance lighting
 - Replacing the existing I-270 bridges over the South Platte River Trail to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements on the South Platte River Trail, and enhance lighting
 - Replacing the existing I-270 bridges over the Burlington Ditch to meet current bridge standards, accommodate future bicycle and pedestrian improvements, and enhance lighting

- Replacing the existing I-270 bridges over Brighton Boulevard to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements on Brighton Boulevard and future bicycle and pedestrian improvements by others, and enhance lighting
- Replacing the existing I-270 bridges over East 60th Avenue and the BNSF crossing to meet current bridge standards, accommodate future bicycle and pedestrian improvements, and enhance lighting
- Replacing the existing I-270 bridges over East 56th Avenue to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements, and enhance lighting
- Replacing the existing Vasquez Boulevard bridge over Sand Creek to meet current bridge standards and accommodate this project's bicycle and pedestrian improvements

Bicycle and Pedestrian Improvements

- Improving the York Street I-270 ramp terminal intersections with crosswalks, curb ramps, and pedestrian indicators at the ramp terminal traffic signals
- Adding a new 5-foot sidewalk on the west side and reconstructing a 6-foot sidewalk on the east side of Brighton Boulevard under I-270
- Reconstructing East 56th Avenue under I-270 and adding an on-street bicycle lane, a 10-foot multi-use path, and 6-foot sidewalk connecting to existing sidewalks
- Improving the intersection at East 56th Avenue and South Sandcreek Drive to include curb ramps, crosswalks, and lighting that meet current standards
- Improving the intersection at East 56th Avenue and Eudora Street to include curb ramps, crosswalks, and lighting that meet current standards
- Adding attached sidewalks on the west side of South Sandcreek Drive. The new sidewalks would be 8 feet wide from Quebec Street to East 47th Avenue Drive and 6 feet wide from East 47th Avenue Drive to East 49th Avenue, with a pedestrian crosswalk across East 47th Avenue Drive connecting the two segments
- Improving wayfinding at key locations, guiding bicyclists and pedestrians to the nearest Regional Transportation District (RTD) bus stops, major road connections, or distances to the next trailhead to avoid out-of-direction travel

Trail Improvements

- Reconfiguring the South Platte River Trail crossing under I-270 to improve bicycle and pedestrian visibility around tight curves and increase vertical clearance from the I-270 overpass
- Improving bicycle and pedestrian visibility on the Sand Creek Trail by straightening out tight curves, adding a center stripe, and enhancing lighting at the Vasquez Boulevard bridge over the Sand Creek Trail
- Adding a multi-use path with bicycle and pedestrian underpasses crossing under two free-flow interchange ramps on the east side of Vasquez Boulevard through the interchange with enhanced lighting
- Adding a multi-use path on the east and west sides of the Vasquez Boulevard bridge over Sand Creek, connecting users from the East 56th Avenue and Vasquez Boulevard intersection to a new connection to the Sand Creek Trail

- Adding a multi-use trail spur, connecting the proposed north-south Vasquez Boulevard multi-use trail to the East 56th Avenue and South Sandcreek Drive intersection
- Adding a multi-use path in the southeast corner of East 56th Avenue and South Sandcreek Drive
- Adding a 10-foot-wide bicycle and pedestrian overpass over I-270 and South Sandcreek Drive approximately halfway between East 56th Avenue and Quebec Street

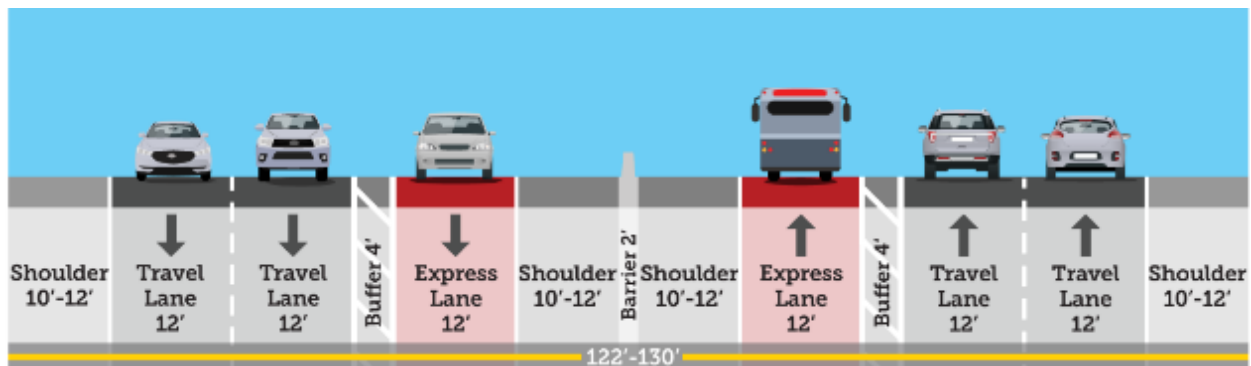
Transit Improvements

- Adding four new bus stops with connecting sidewalks and curb ramps on Quebec Street and South Sandcreek Drive near the I-270/Quebec Street interchange to improve access to RTD routes 88 and 37

2.2.2 Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

This alternative would reconstruct I-270 with two general-purpose lanes and one Express Lane in each direction, as shown in Figure 5. Transit vehicles and high-occupancy vehicles (three or more people) could travel in the Express Lane, free of charge. Other travelers, including freight trucks, who choose to pay a fee could also use the new Express Lane.

Figure 5. Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative



This alternative includes:

Mainline Improvements

- Providing two general-purpose lanes and one Express Lane in each direction that accommodates transit
- Remainder of mainline improvements identified in the Three General-Purpose Lanes Alternative

Interchange Improvements

This alternative includes the same interchange improvements identified in the Three General-Purpose Lanes Alternative.

Bridge Improvements

This alternative includes the same bridge improvements identified in the Three General-Purpose Lanes Alternative.

Bicycle, Pedestrian, Trail, and Transit Improvements

This alternative includes the same bicycle, pedestrian, trail, and transit enhancements identified in the Three General-Purpose Lanes Alternative.

3.0 Regulatory Context

Water quality regulations are numerous and occur at the federal, state, and local levels. The following regulatory requirements apply to water-related resources.

3.1 Federal Regulations

The following federal regulatory requirements apply to water-related resources:

- Section 303(d) of the Clean Water Act (CWA) - Under section 303(d) of the CWA, states, territories and authorized tribes, collectively referred to in the act as "states," are required to develop lists of impaired waters. These are waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by states. The law requires that states establish priority rankings for waters on the lists and develop total maximum daily loads (TMDL) for these waters.
- Sections 401 and 402 of the CWA - Establish the basic structure for regulating discharges of pollutants into navigable waters. They provide the statutory basis for the National Pollutant Discharge Elimination System permit program and the basic structure for regulating discharge of pollutants into waters of the United States (U.S.). Sections 401 and 402 are discussed more in the Wetlands and Aquatic Resources Technical Report.
- Section 404 of the CWA - Regulates waters of the U.S., such as traditional navigable waters and associated wetlands. Impacts to these resources require permitting through the U.S. Army Corps of Engineers. Waters of the U.S. and wetlands are discussed in the Wetlands and Aquatic Resources Technical Report and are not discussed further in the section.
- Safe Drinking Water Act (SDWA) (40 Code of Federal Regulations [CFR] Parts 141-143) - 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 program mandated by the SDWA.
- Erosion and Sediment Control on Highway Construction Projects (25 CFR 650 Subpart B) - Requires all highways that are funded in whole or in part by FHWA to 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.
- Municipal Separate Storm Sewer System (MS4) - Program regulated by U.S. Environmental Protection Agency (EPA). An MS4 is a conveyance or system of conveyances that is owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.; designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches); not

a combined sewer; and not part of a sewage treatment plant, or publicly owned treatment works. Polluted stormwater runoff is commonly transported through MS4s and then often discharged, untreated into local water bodies.

3.2 State Regulations

The EPA has delegated authority for enforcement of Sections 303(d), 401, and 402 of the CWA, SDWA, and MS4s to the Colorado Department of Public Health and Environment (CDPHE). Under this authority, the Colorado Water Quality Control Act was passed, and the Water Quality Control Commission (WQCC) was created to provide regulations and to be implemented by CDPHE that keep Colorado in compliance with the CWA.

The following state regulatory requirements apply to water-related resources:

- Colorado Water Quality Control Act (Colorado Revised Statutes [CRS] Title 25, Article 8) - Protects and maximizes the beneficial uses of state waters and regulates water quality.
- Regulation 93 - Colorado's Section 303(d) List of Impaired Waters - Establishes Colorado's Monitoring and Evaluation (M&E) list of water-quality-limited segments requiring TMDLs. This list was prepared to fulfill Section 303(d) of the CWA, which requires that states submit a list of those waters to the EPA, for which technology-based effluent limitations and other required controls are not stringent enough to implement water quality standards.

Once listed, the state is required to prioritize these waterbodies or segments (rivers, streams, lakes, and reservoirs) based on the severity of pollution and other factors. The state will then determine the causes of the water quality problem and allocate responsibility for controlling the pollution. This analysis is called the TMDL process, and the results include the following:

- The determined amount of a specific pollutant that a segment can receive without exceeding the TMDL.
- The apportionment to different contributing sources of the pollutant loading (the allocation). The TMDL must include a margin of safety, waste load allocation (for point sources), and a load allocation (for nonpoint sources and natural background). The TMDL must include upstream loads in the assessment and apportionment process.

The TMDL must include a margin of safety, waste load allocation (for point sources), and a load allocation (for nonpoint sources and natural background). The TMDL must include upstream loads in the assessment and apportionment process.

- Regulation 61 - Colorado Discharge Permit System (CDPS) Regulation 5 Code of Colorado Regulations (CCR) 1002-61 - Establishes regulations for stormwater discharges in Colorado. There are many discharge programs under the CDPS Regulation 61 that are not related to this assessment and are not listed. The most common programs are the following:
 - MS4 - Based on population, operators are required to implement a practice-based reduction of the discharge of pollutants from their MS4s. This is achieved through compliance with the following minimum control measures (CM): public education and outreach, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention and good housekeeping.

- Stormwater Construction Program - Operators are required to regulate and reduce the discharge of pollutants associated with construction activities from their permitted site.
- Construction Dewatering Discharge - Operators are required to regulate and reduce the discharge of pollutants associated with construction dewatering activities from the source water drawn from the specific permitted site. Source water can include groundwater, surface water, or stormwater commingled with groundwater or surface water.
- Discharges from Subterranean Dewatering Activities - Operators are required to regulate and reduce the discharge of pollutants associated with source water from subterranean dewatering (for example, foundation dewatering) activities. Subterranean dewatering discharges are typically long term, although short-term discharges are also eligible for coverage under the general permit. Source water can include groundwater, surface water, or stormwater commingled with groundwater or surface water. Different types of permitting will apply to contaminated versus non-contaminated waters.
- CDOT MS4 - Based on requirements promulgated under Section 402 of the CWA, CDPHE's WQCC has implemented Regulation 61 and identified CDOT as a Phase I, Non-Standard regulated MS4. By definition, a separate storm sewer system comprises a storm drainage system but also includes 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. The project is within CDOT's MS4 permitted Area. CDOT's MS4 Program includes a wet weather monitoring program and lists 15 roadway pollutants of concern.

3.3 Local Regulations

The following local regulatory requirements apply to water-related resources outside CDOT right-of-way:

- City and County of Denver: The City and County of Denver is a Phase I MS4. The project is within the City and County of Denver's MS4 boundary area.
- Adams County MS4: Adams County is a Phase II regulated MS4. The project is within the Adams County MS4 boundary area.
- Commerce City MS4: Commerce City is a Phase II regulated MS4. The project is within the Commerce City MS4 boundary area.

4.0 Methods

The study area for water resources includes the ultimate receiving water of the South Platte watershed (Figure 6). Transportation projects have the potential to impact water features and the quality of the water moving within and downstream of them. Water resources can be used for a variety of purposes, including recreation, drinking water, wildlife and fish habitat, and agriculture. Evaluating the project's potential impacts to water quality requires consideration of surface water, groundwater, and geomorphological conditions (that is, geology, soils, topography) that dictate where and how water flows. Impacts to water

resources can occur during and after the construction and operation phases of a project. Some of the water resources in the study area are impaired for CDOT pollutants of concern.

4.1 Data Gathering

The following information was gathered to evaluate the project's impacts to water resources and water quality:

- Number and location of any existing Permanent Water Quality (PWQ) features (such as extended detention ponds and water quality vaults) and the areas that these PWQ CMs treat
- General watershed information, including receiving waters, tributaries, ponds, diversions, and channelization
- Special water body designations, such as wild and scenic, outstanding, gold stream, aquatic class, water supply source (source water protection plans), and wellhead protection area
- Soil erosivity data gathered from the Natural Resources Conservation Service
- MS4 boundaries and requirements for capture and treatment volumes (If overlapping MS4 requirements were present, the most stringent was applied.)
- General watershed information, including receiving waters, tributaries, ponds, diversions, and channelization plans and watershed reports
- The 303(d) list for impaired water bodies
- Municipal water quality regulations

Figure 6. Water Resources Study Area



4.2 Analysis Approach

The analysis of impacts considers how the proposed alternatives do the following:

- Impact existing water features and water quality in the study area during and following construction. Using a graphic information system, alternative impact limits will be superimposed onto mapping to show water resource and existing water quality features.
- Capture and treat new roadway runoff (compliance with MS4 requirements). Capture volume and treatment requirements to comply with MS4 requirements will be determined

and conceptual engineering conducted to determine needed water quality infrastructure and stormwater routing and conveyance.

- Determine the MS4, CDPS, design, and permitting issues per CDOT's water quality program.

5.0 Existing Conditions

The study area is within the South Platte Basin, and the South Platte River is the primary drainage near the study area. Smaller creeks and drainages on or adjacent to the study area include Sand Creek, and Clear Creek. The project also crosses the Burlington Ditch. Sand Creek parallels much of the study area. The South Platte River, Burlington Ditch, and Clear Creek cross near the north end of the study area.

No waterways within the study area are designated as Wild and Scenic Rivers by the National Wild and Scenic Rivers Act of 1968 (Act) or any subsequent amendments to the Act.

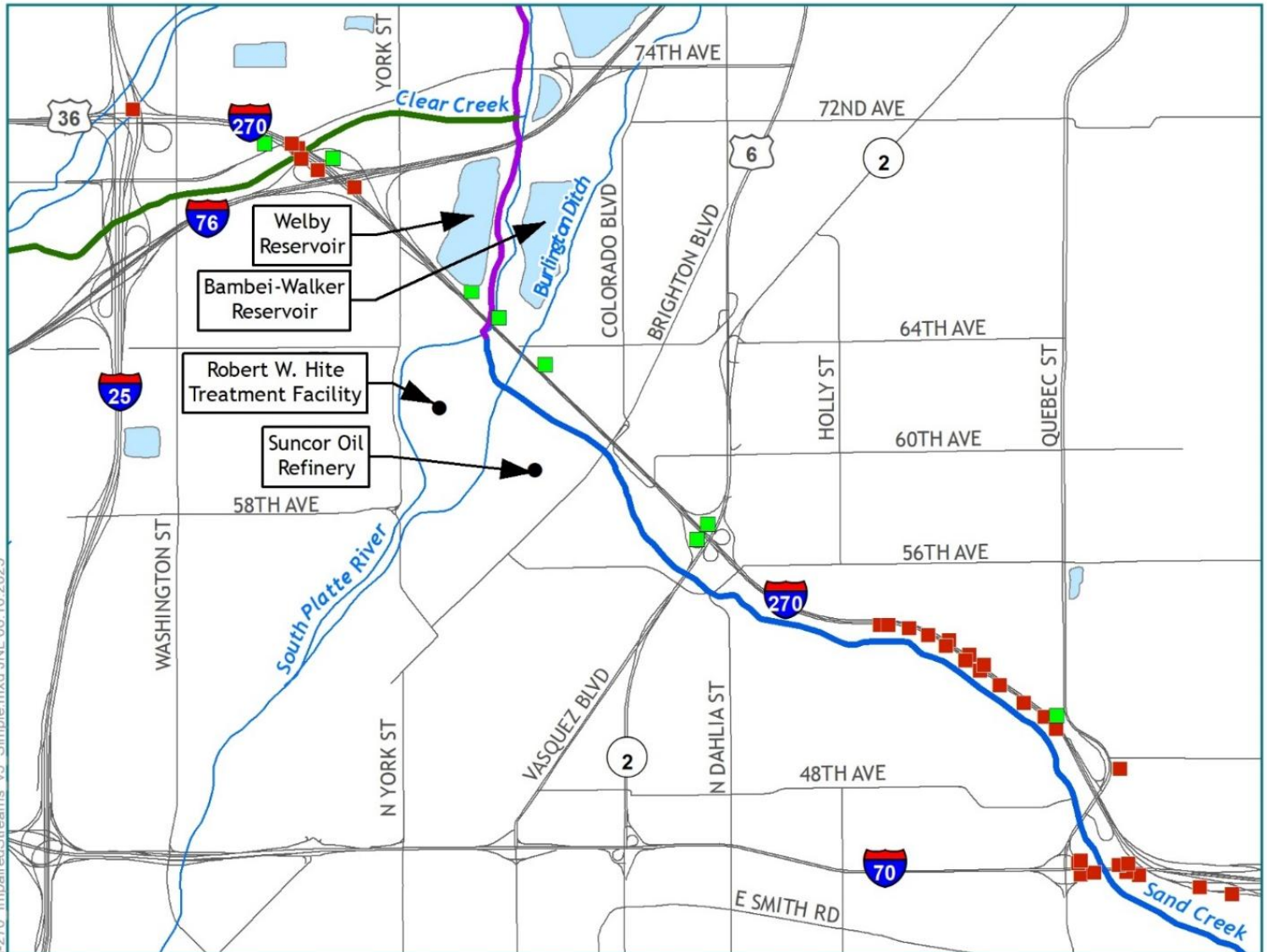
Surface waters within the study area are 303(d) impaired (Figure 7 and Figure 8). These classifications and impaired waters are listed in Table 1. The South Platte River and Clear Creek have TMDLs completed within the study area.

Table 1. 303(d) Status of Waters within the Study Area

Water Body ID	Waterway Description	Stream Impairments	Roadway Pollutants of Concern	Listing
COSPUS16i	Mainstem Sand Creek from the confluence with Westerly Creek to the confluence with the South Platte River	Escherichia coli (E. coli), selenium (dissolved)	None	303(d)
COSPUS15_C	Mainstem of the South Platte River from Sand Creek to 180 meters below 120th Avenue	Temperature TMDL: Cadmium-D, E. coli	None Cadmium	M&E List 303(d)
COSPCL15_C	Mainstem of Clear Creek from Wadsworth Boulevard to the confluence with the South Platte River	Ammonia, temperature, E. coli, arsenic (total), manganese (dissolved), organic sediment	Manganese	303(d)

CDOT's Online Transportation Information System database identifies the existing PWQ CMs in the study area (CDOT, n.d.). The existing drainage system consists of small infiltration facilities concentrated between the I-270/Vasquez Boulevard and I-270/Quebec Street interchanges and at the I-270/I-76 interchange. In general, the infiltration facilities are not well connected and discharge individually to Sand Creek. Existing, extended detention basins (that is, water quality ponds) are not to current water quality standards and are present only at the limits of the study area at the I-270/I-25 and I-270/I-70 interchanges (Figure 7).

Figure 7. Impaired Streams and Existing PWQ CMs



I-270 Corridor Improvements

Permanent Water Quality (PWQ) Control Measures (CMs)

- Existing
- Proposed

Note: PWQ and CMs include infiltration facilities, extended detention basins, and treatment swales.

Impaired Streams

- Clear Creek
- Sand Creek
- South Platte River
- Lakes/Ponds

0 2,250 4,500 Feet



COLORADO
Department of Transportation

Land use in the study area is primarily highway and industrial surrounded by a mixture of residential and commercial development. Regulatory 100-year floodplains and floodways are present in the study area along Sand Creek, the South Platte River, and Clear Creek. Potential impacts to floodplains and floodways are discussed further in the I-270 Corridor Improvements Project Floodplains Technical Memorandum. The depth to groundwater is highly variable. Samples taken during the hazardous materials investigation identified hydrocarbon and metal contamination in the groundwater. Adjacent heavy industrial land uses and landfills have contributed to regionally impacted groundwater. Groundwater conditions in the study area are evaluated further in the I-270 Corridor Improvements Project Modified Environmental Site Assessment.

Current drainage conditions include direct conveyance from the roadway into adjacent surface waters. Sheet flow on the roadside leaves the roadway across shoulders into ditches, where water is conveyed to pipes, then under the roadway, where it is discharged into adjacent water bodies.

With respect to the interstate, roadway runoff and potential pollutants enter adjacent streams in the following ways:

- Vehicular traffic on the I-270 corridor. This activity generates surface water pollutants in the study area, which can include metals, such as iron, zinc, and copper from fuels, brake pads, and vehicle wear. In addition, oil or grease (petroleum hydrocarbons) deposited by vehicles on roadways and parking areas also contribute to contaminants in receiving waters of the study area. Surface water impairments within the study area include roadway pollutants of concern, which include cadmium and manganese.
- The application of deicers to paved surfaces during the winter months, which may increase chloride levels and suspended solids in snowmelt, which in turn may enter the receiving waters.
- Sedimentation from soil erosion is a natural process that can have substantial impacts on the surface water quality. Soils eroded into streams or other water bodies contribute suspended solids and add to the sediment load in the stream or other water bodies. The increased contact between water and soil that occurs when the soil erodes can increase the concentration of dissolved constituents (salts, metals, and other chemicals) in the water from the soil.

Pollutants can enter and impair water bodies from natural and man-made causes. The ultimate source of the pollutants identified in the streams of the study area is not isolated to one cause. See the I-270 Corridor Improvements Modified Environmental Site Assessment for more information on pollutants.

No drinking water supply wells or wellhead protection areas are located in the project footprint.

A number of groundwater monitoring wells are located near the I-270 corridor to monitor groundwater impacts from the surrounding industrial developments (Figure 8, Figure 9, and Figure 10). Monitoring wells have been installed by organizations, such as Conoco Inc., Suncor Energy USA, Inc., Sprint Express Trucking Inc., and Travel Centers of America.

Figure 8. Surface Water Features and Groundwater Wells (West Section of I-270 Corridor)

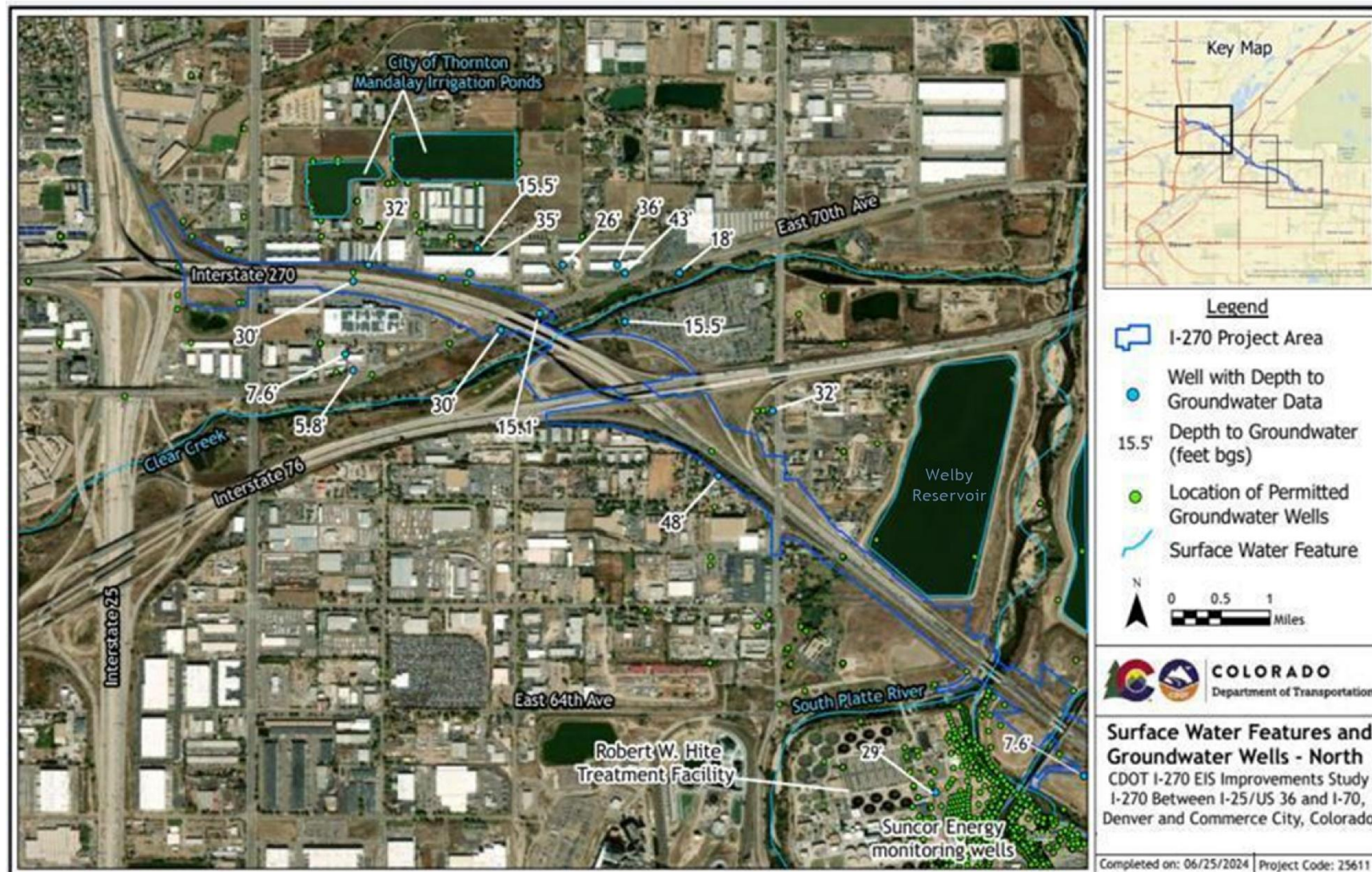


Figure 9. Surface Water Features and Groundwater Wells (Central Section of I-270 Corridor)

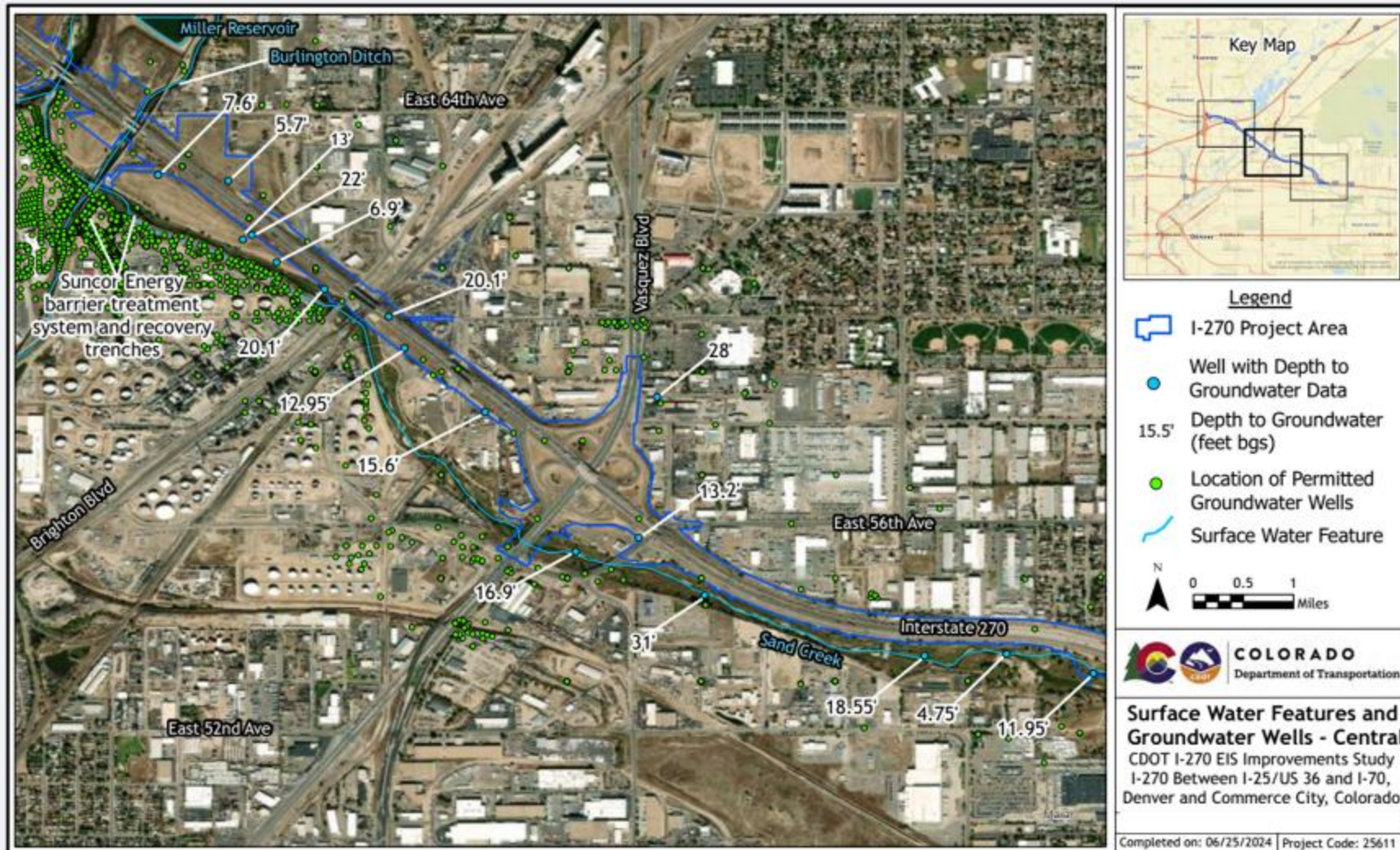


Figure 10. Surface Water Features and Groundwater Wells (East Section of I-270 Corridor)



Originally constructed in the 1960s, the Robert W. Hite Treatment Facility is adjacent to the Suncor Oil Refinery and the South Platte River crossing of I-270. The Metro Wastewater Recovery (formerly the Metro Wastewater Reclamation District) owns and maintains the facility. As the largest wastewater facility in the Rocky Mountain region, this facility provides wastewater treatment for approximately 2 million residents across the Denver metropolitan area and surrounding communities. The facility's discharge point to the South Platte River is immediately upstream of its confluence with Sand Creek.

6.0 Impacts Assessment

6.1 No Action Alternative

The No Action Alternative would maintain the existing drainage patterns and permanent water quality conditions that include treatment of portions of the study area as well as direct runoff or discharge to receiving waters, with no capture and treatment of roadway runoff before it enters adjacent streams. Maintaining the existing drainage system would likely continue to have negative impacts on water quality in the corridor by allowing untreated roadway runoff to enter adjacent streams.

6.2 Three General-Purpose Lanes Alternative

6.2.1 Permanent Impacts

The Three General-Purpose Lanes Alternative would improve water quality conditions in the I-270 corridor through modernization of the corridor's drainage infrastructure. PWQ will be required in accordance with CDOT's PWQ program requirements (CDOT MS4 Permit Modification #42017 [CDOT, 2020]). The addition of PWQ CMs and improvements to existing PWQ CMs would improve water quality in the study area. The existing, undersized, and disconnected PWQ CMs would be replaced with a system of new inlets, forebays, trickle channels, orifice plates, pipes, ditches, and outfall structures. In addition, outfalls to adjacent surface waters would be consolidated in some areas to reduce the number of PWQ CMs and reduce future maintenance needs.

This alternative includes new interstate lanes, auxiliary lanes, increased shoulder widths, reconfigured interchange ramps, new bridges, new sidewalks, realigned trail segments, and a new pedestrian overpass, resulting in a total of approximately 128 acres of impervious surface, which means there will be increased runoff from storm events. PWQ CM locations (Figure 11, Figure 12, and Figure 13) have been developed to address treatment of additional impervious surfaces and to meet CDOT's MS4 permit capture and treatment volume requirements.

Although this alternative would increase the amount of impervious surface in the study area, the modernized drainage design, additional PWQ CMs, and modernization of existing PWQ CMs to meet CDOT's current MS4 permit requirements are anticipated to improve water quality conditions in the long term when compared to the No Action Alternative.

Figure 11. PWQ Locations for Build Alternatives (West Section)



Figure 12. PWQ Locations for Build Alternatives (Central Section)



Figure 13. PWQ Locations for Build Alternatives (East Section)



A reduction in congestion and collisions would also be expected to positively impact stormwater quality by reducing tire and brake wear, as well as vehicular fluids and debris entrained in stormwater runoff.

Section 303(d) impairments are not anticipated to be exacerbated by the project, because increased roadway runoff would be captured and treated before entering adjacent streams, providing a level of filtration not offered by the existing I-270 drainage system.

No temporary or permanent impacts to ongoing wastewater treatment operations at the Robert W. Hite Treatment Facility would result from this alternative.

Potential impacts and mitigations to existing monitoring wells in the study area are addressed in the I-270 Corridor Improvements Modified Environmental Site Assessment.

Any new or improved drainage features or PWQ CMs have the potential for permanent erosion issues. This will be addressed through the final design of these features.

6.2.2 Temporary Impacts

Temporary impacts are primarily associated with construction—namely, sediment sourced from clearing and grubbing, stream channel work, and roadway construction. Import of soils and earthmoving activities may further increase the risk of erosion and transportation of sediment.

Some existing dynamics of the study area would increase the risk of soil erosion and transport until final stabilization for construction is reached. These dynamics include the following:

- Steep slope grades
- Impacted wetlands, vegetation buffers, and riparian areas
- Proximity to stream channels

Groundwater may be encountered during drilling activities necessary for pier installation and excavation activities, which would necessitate dewatering during construction and the potential for increased erosion and transportation of pollutants.

6.3 Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

6.3.1 Permanent Impacts

The Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative would have the same permanent impacts as the Three General-Purpose Lanes Alternative, with the exception of the amount of impervious surface area. Due to the Express Lane buffer in each direction by adding an additional 8 feet to the roadway width, this alternative results in approximately 133 acres of impervious surface. PWQ CMs and drainage systems would be sized to accommodate the additional impervious area volume of water and to ensure they meet CDOT's PWQ program requirements (CDOT MS4 Permit Modification #42017 [CDOT, 2020]).

6.3.2 Temporary Impacts

The Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative would have the same temporary impacts as the Three General-Purpose Lanes Alternative.

7.0 Mitigation Measures

Table 2 shows a summary of impacts and mitigations for the build alternatives.

Table 2. Summary of Impacts and Mitigation - Build Alternatives

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Erosion impacts from soil disturbances that occurred during construction	Construction Areas	Erosion and increased sedimentation to adjacent water resources	Permanent stabilization plan shall be created using techniques of revegetation, plantings, Permanent Water Quality (PWQ) control measures (CMs), and hardscape to permanently stabilize the construction area.	CDOT Engineering, Landscape Architect, and Environmental, and Contractor	Final Design, Construction, and Post-Construction
Spills of regulated materials during construction	Construction Areas	Water resources and water quality contamination and degradation	A spill prevention, control, and countermeasure plan shall be developed and implemented for the construction site that shall establish standard operating procedures and employee training to minimize the accidental release of pollutants.	CDOT Engineering and Environmental, and Contractor	Pre-Construction and Construction

Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation	During final design, a Stormwater Management Plan (SWMP) complying with all applicable federal, state, and local agency stormwater regulations will be prepared. The SWMP shall: Detail how and where temporary CMs will be used before, during, and after active construction, until final stabilization is achieved. Include temporary rundown protections on slopes steeper than 3:1. Include Municipal Separate Storm Sewer System (MS4) Construction Sites program compliance inspection and monitoring requirements until final stabilization has been achieved. The Contractor shall implement the SWMP, SWMP requirements, all the different stormwater permit requirements, and inspection requirements.	CDOT Engineering, Environmental, and Landscape Architect, and Contractor	Final Design, Construction, and Post-Construction
Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from CWA Section 401 Water Quality Certification from CDPHE.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction

Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from Adams County's Stormwater Quality Permit.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction
Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from CDOT's MS4 permit.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction
Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from CDPHE's Construction Dewatering permit(s).	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction

Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from CDPHE's Construction Stormwater permit.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction
Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from the City and County of Denver's (Denver's) Construction Activities Stormwater Discharge Permit.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction
Erosion and stormwater pollutant runoff during construction	Construction Areas	Water resources and water quality contamination and degradation Erosion and increased sedimentation to adjacent water resources	Obtain and implement any requirements from Commerce City's Construction stormwater permit.	CDOT Engineering and Environmental, and Contractor	Pre-Construction, Construction, and Post-Construction

Increased stormwater runoff from new impervious surfaces	Construction Areas	Water resources and water quality contamination and degradation	During final design, Designers will prepare PWQ CMs to treat impervious areas. This will include the following: The storm drain system shall be sized to capture, collect, and direct runoff to the PWQ CMs. PWQ CMs will be provided to treat roadway runoff prior to release to the drainage ways. PWQ CMs in an MS4 shall be designed to meet the applicable MS4 requirements. For CDOT, use the latest version of the CDOT's Drainage Design Manual for PWQ CMs and PWQ Program required CM documentation shall be completed during both design and construction. Prior to final design, determine, negotiate, and memorialize which agency will maintain the PWQ CMs per CDOT Policies, Procedures, and C.R.S. 43-2-135 requirements. An Intergovernmental Agreement (IGA) is required prior to finalizing design, if a Local Agency will perform the maintenance of the PWQ CMs. The total area treated by existing PWQ CM that is removed by construction shall be replaced by	CDOT Engineering and Environmental, and Contractor	Final Design and Construction
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			the project and will treat equal to or greater than the original area. Existing PWQ CM that are altered by construction shall have updated design and documentation (drainage report, operations and maintenance, etc.) to reflect current CDOT MS4 and CDOT Drainage Design Manual Standards. The Contractor shall construct PWQ CMs per CDOT plans and specifications and plans.		
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Permanent erosion issues	Construction Areas	Water resources and water quality contamination and degradation	During final design, Designers will prepare a drainage plan, which addresses the following: Review and implement corrective measures to areas which are erosive and have concentrated flow. All culvert outlets and rundowns shall have permanent energy dissipation protection. Rundowns shall be to the bottom of the slopes and designed to prevent erosion of the slopes. Existing slope erosion shall be permanently corrected to a stabilized condition. Contractor shall implement stormwater management, final stabilization, and drainage in accordance with CDOT's plans and specifications.	CDOT Engineering and Environmental, and Contractor	Final Design and Construction
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8.0 Required Permits and Coordination

The following permits and coordination will be required for water quality. These permits are also referenced in mitigation summary tables:

- Stormwater permits required for the Proposed Action include a CDPHE Stormwater Discharge Associated with Construction Activities (COR40000) General Permit. CDOT's MS4 Construction Sites Program includes contract provisions and other regulatory mechanisms to require erosion and sediment controls at construction sites.
- During final design, a stormwater management plant will be developed, finalized, implemented and maintained by the construction contractor qualified staff, throughout construction in accordance with CDOT's stormwater management plan procedures.
- Additional local agency stormwater permits will be required with the City and County of Denver, Adams County, and Commerce City for any work outside of CDOT's right-of-way and in their respective MS4 permit areas.
- A construction dewatering permit would be required, if groundwater were to be discharged from an excavation to any waters of the state.
- A floodplain development permit would be required for any work within floodplains.

Table 3. Required Permits and Coordination by Agency and Project Phase

Agency	Permit/Coordination	Phase
Adams County	Stormwater Quality permit	Construction
Adams County	Adams County's Stormwater Quality (SWQ) Permit	Final Design
CDOT - Water Quality	Municipal Separate Storm Sewer System permit (COS000005)	Final Design
CDPHE, Water Quality Control Division	Colorado Discharge Permit System Permit, Construction Dewatering permit(s)	Construction
CDPHE, Water Quality Control Division	Colorado Discharge Permit System Permit, Stormwater Construction Permit (COR-400000)	Final design
CDPHE, Water Quality Control Division	Section 401 Water Quality Certification	NEPA
City and County of Denver	Construction Activities Stormwater Discharge Permit	Final Design
Commerce City	Construction Stormwater permit	Final Design

9.0 References

Clean Water Act, 33 U.S.C. § 1313(d) (1972).

Clean Water Act, 33 U.S.C. § 1341 (1972).

Clean Water Act, 33 U.S.C. § 1342 (1972).

Clean Water Act, 33 U.S.C. § 1344 (1972).

Colorado Department of Public Health & Environment (CDPHE). 2020. Water Quality Control Commission regulations. “Regulation #93: Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List.” June 14, 2020.

[https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8787&fileName=5%20CCR%2010 02-93](https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8787&fileName=5%20CCR%2010%2002-93).

Colorado Department of Transportation (CDOT). n.d. Online Transportation Information System. <https://dtdapps.coloradodot.info/otis/>.

Colorado Department of Transportation (CDOT). 2020. Colorado Discharge Permit System (CDPS) Modification 4, Permit Number COS000005. May 29, 2020.

<https://cdphe.colorado.gov/wq-municipal-ms4-individual-permits>.

Colo. Rev. Stat. § 25-8-101 et seq. (1981).

Colorado Water Quality Control Act, Colo. Rev. Stat. § 25-8-101 et seq. (1981).

Erosion and Sediment Control on Highway Construction Projects, 23 C.F.R. § 650.201 et seq. (1994).

Municipal Separate Storm Sewer System Program, 40 C.F.R. § 122.26 (n.d.).

National Wild and Scenic Rivers Act, 16 U.S.C. §§ 1271-1287 (1968).

Regulation 61, 5 Colo. Code Regs. § 1002-61 (2024).

Regulation 93, 5 Colo. Code Regs. § 1002-93 (2024).

Safe Drinking Water Act, 42 U.S.C. § 300f (1974).