

3.23 CONSTRUCTION

This section identifies the impacts that are expected during the construction phase of the No-Action Alternative or any of the build packages and mitigation measures to address impacts. Construction activities and associated impacts would be similar for the build packages, although in different locations. Therefore, impacts are discussed generally and not by package, except where there are notable differences.

What's in Section 3.23?

3.23 Construction

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While other sections of this document address permanent impacts that the packages could have on the environment, this section deals with the potential temporary impacts of construction. Specific construction methods would be addressed during the development of the final construction plans. In general, highway, rail, and supporting facilities construction includes mobilization, utility relocation and adjustments, demolition and site preparation, and lane or track construction (earth work and paving). Construction sequencing strategies are required for a project of this size and would take into account minimization of related impacts.

Concerns expressed through the public involvement process regarding construction impacts focused on noise, visual, and traffic impacts. These concerns are summarized in **Chapter 9 Public and Agency Involvement**.

3.23.1 Construction Schedule

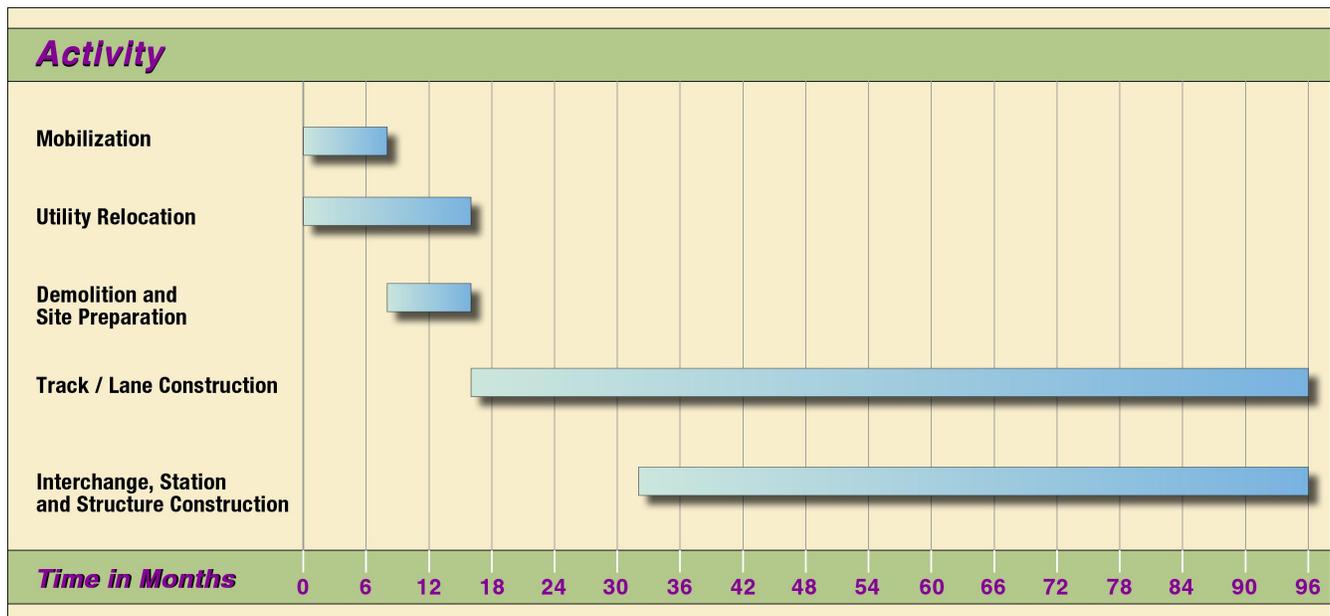
This section identifies and describes various construction impacts associated with the alternatives as well as construction scheduling and phasing. Package A would include highway widening and also double-tracked commuter rail construction mostly along the existing BNSF right-of-way using the existing BNSF railroad track plus one new track from Fort Collins to downtown Longmont, construction of a new double-tracked extension from Longmont to the proposed FasTracks North Metro end-of-line station in Thornton, and construction of associated commuter rail stations and a maintenance facility. Also, highway interchange improvements, commuter bus stations and parking and carpool lots would be constructed as part of Package A. Package B would include construction of bus rapid transit (BRT) stations along I-25, a transit maintenance facility, highway widening including the addition of tolled express lanes (TEL), interchange improvements and parking and carpool lots.

The Preferred Alternative would include four components: single track commuter rail with occasional passing tracks and maintenance roads from Fort Collins to the proposed FasTracks North Metro end-of-line; highway improvements including tolled express lanes in each direction and a general purpose lane in each direction from SH 14 to SH 66; express bus service from Fort Collins and Greeley to Denver and DIA; and commuter bus service along US 85. The approximate construction schedule for the project under ideal conditions and the possibility of project phasing are described in this section.

1 **Approximate Best-Case Construction Schedule**

2 The build packages would be built in phases since funding for the entire project is not
3 available. The schedule would take into account various construction activities grouped into
4 the categories of: mobilization, utility relocation, demolition and site preparation, lane
5 construction, and interchange and structure construction. The time required to complete
6 activities for each of these categories as well as the relative timing of the activities during the
7 course of the project has been estimated (see **Figure 3.23-1**). See **Chapter 8 Phased Project**
8 **Implementation** for more information on construction phases.

9 **Figure 3.23-1 Approximate Best-Case Construction Schedule for All Build**
10 **Alternatives**



11 **3.23.2 Environmental Consequences**

12 **3.23.2.1 NO-ACTION ALTERNATIVE**

13 The No-Action Alternative would involve very little additional construction over what is currently
14 programmed, approved, and funded to support the growing population of the regional study
15 area. Therefore, the No-Action Alternative would result in no construction or utility impacts
16 aside from those associated with the programmed projects (see **Chapter 2 Alternatives**).

17 **3.23.2.2 BUILD PACKAGES**

18 Construction of the build packages would create various temporary impacts within the project
19 area. Some of these impacts would be common to all build packages while some are specific
20 to particular components of a package, such as the incorporation of a double-track commuter
21 rail line in Package A.

22

1 **Transportation**

2 Construction detours and delays can create short-term impacts on local traffic circulation and
3 congestion and inter- and intra-state travelers using the I-25 and US 85 corridors for
4 commuting. These impacts may include delays or the need for alternative travel routes to
5 reach residences and community facilities. Emergency service response may be negatively
6 impacted as a result of construction, as well. In the more populated areas, such as the Denver
7 Metro Area, these impacts could cause greater congestion. Delays to the traveling public and
8 inconvenience to corridor residents would occur. A primary goal of CDOT during construction
9 of the project would be to minimize inconvenience to the public through construction traffic
10 planning during final design, and by monitoring and adjusting these plans throughout the
11 construction phase.

12 Construction activities associated with the additional double-track or passing track along the
13 BNSF/North Longmont Metro Connection corridors would impact roadway traffic at rail
14 crossings and possibly train traffic along the existing railway. These impacts, though
15 unavoidable, could be minimized through a variety of techniques.

16 Overall construction impacts to roadway crossings are expected to be minor with employment
17 of mitigation measures listed in **Section 3.23.3**.

18 Pedestrian and bicycle mobility is important within each of the package corridors. Construction
19 activities could temporarily affect local residents who use these facilities and those who use
20 these corridors for commuting and recreation.

21 **Land Use**

22 Construction of the build packages would temporarily affect access to the different land uses
23 within the project area throughout the duration of the project. These impacts would mostly be
24 limited to areas that are in close proximity to large-scale construction activities, generally not
25 greater than 300 feet outside of the work areas.

26 **Economic Conditions**

27 By implementing any of the build packages, the economic benefit of additional employment
28 within the project area due to construction would be evident. This additional employment
29 includes construction-related jobs that are directly and indirectly related to the project. Jobs
30 created that are directly related would include jobs that pertain to the actual construction
31 activities of the project. Jobs that are indirectly related would include positions that would help
32 support the construction efforts by supplying goods and services to construction workers.
33 Construction of Package A, Package B and the Preferred Alternative would generate
34 10,800, 10,200, and 11,400 jobs, respectively, throughout the length of construction.

35 Restricted access to businesses located adjacent to the rights-of-way during construction
36 could negatively impact the performance of some of the businesses. The severity of this
37 impact would vary depending on the type and health of the business and the length of time of
38 construction. These businesses may see a partial offset by increased retail sales due to the
39 presence of construction workers.

40

1 **Right-of-Way**

2 Some additional land would be required in areas adjacent to the existing rights-of-way for
3 construction staging purposes. These staging areas would be used to store equipment and
4 materials and would also be used to provide parking for construction workers. These
5 necessary areas would be purchased or leased, usually as temporary construction easements,
6 before the start of construction.

7 **Air Quality**

8 Without mitigation, excavation, grading, and fill activities associated with construction could
9 increase local fugitive dust emissions. Fugitive dust is airborne particulate matter, generally of
10 a relatively large size (greater than 100 microns in diameter). Because of their large size,
11 these soil particles typically settle within 30 feet of their source. Smaller particles could travel
12 as much as hundreds of feet, depending on winds.

13 Construction activity would increase emissions from additional traffic and detouring. Also,
14 construction would require the disturbance of soil, which would produce fugitive dust or
15 particulate pollution. Construction-related activities that may cause soil material to become
16 airborne include the following:

- 17 ▶ Digging and dumping of soil and discarded construction materials (asphalt, concrete, etc.)
- 18 ▶ Material hauling
- 19 ▶ Wind erosion over exposed construction sites
- 20 ▶ Re-entrainment of construction dirt deposited on local streets by vehicular traffic on the
21 streets

22 The amount of airborne dust generated and the airborne concentration of particulate matter
23 that human receptors would be exposed to would depend on a variety of factors and would
24 vary from day-to-day, depending on site and climate conditions. Factors influencing fugitive
25 dust emissions include:

- 26 ▶ Soil type
- 27 ▶ Area of exposed soil
- 28 ▶ Location of construction activities relative to potential receptors
- 29 ▶ Volume of dirt/material to be moved
- 30 ▶ Wind speed and direction
- 31 ▶ Soil moisture
- 32 ▶ Time of day
- 33 ▶ Season of the year

34

1 The length of time that any particular receptor would be exposed to construction-related dust
2 would be relatively short, lasting only during construction activities. Construction would likely
3 proceed in a linear fashion with site excavation, bed preparation, and track installation
4 beginning at one or more locations and working along the alignment.

5 Construction vehicles and equipment would generate the same exhaust emissions as motor
6 vehicles on area roadways. The emissions contribution of these vehicles would be short-term
7 and minor when compared to usual emission levels from day-to-day traffic in the project area.
8 Additionally, construction equipment would generally be diesel-powered, emitting relatively low
9 levels of carbon monoxide, but higher levels of particulate emissions.

10 Exhaust emissions could temporarily impact sensitive receptors located adjacent to the areas
11 of construction.

12 **Noise and Vibration**

13 Construction noise would present the potential for short-term impacts to receptors located
14 along the existing rights-of-way and along the designated construction access routes. The
15 primary source of construction noise is expected to be diesel-powered equipment, such as
16 trucks, earth-moving machinery, and demolition equipment.

17 Demolition and pile driving could be the loudest construction operations. Demolition of
18 structures, such as existing bridges, is generally conducted at night because of safety issues
19 requiring full or partial closure of the highway and local streets. Piles could be required at most
20 major bridge installations and could have both noise and vibration impacts. Alternative
21 construction methods, such as the use of caissons or pre-drilling for piling, could replace pile
22 driving in noise-sensitive locations. The majority of noise receptors are located greater than
23 50 feet from areas where pile driving or other high-noise activities are expected. Increased
24 noise impacts are expected to occur only in areas near residential developments that are in
25 the vicinity of interchanges requiring demolition and replacement or major renovation. These
26 impacts would occur primarily in the Windsor area and the north Fort Collins area along I-25.

27 Vibration caused by construction activities would present the potential for short-term impacts in
28 areas where pile driving and compaction equipment are being used. The potential for building
29 damage from pile-driving vibration is estimated to exist only within about 50 feet of the activity.
30 Vibration from compaction equipment is less severe because it does not propagate through
31 the lower soil layers like pile driving does. Construction activities in close proximity to buildings
32 (i.e., within 50 feet) must be sensitive to vibration damage potential. Extra care would be
33 necessary when in close proximity to buildings. Details would be developed during subsequent
34 design efforts.

35 **Table 3.23-1** shows typical noise emission levels of construction equipment that could be used
36 for any build package at 50 feet. The impact levels from construction noise would depend on
37 the sensitivity of the noise receptor, the magnitude of noise during each construction phase,
38 the duration of the noise, the time of day the noise occurs, and the distance from the
39 construction activities.

40 A detailed description of noise level measurements (dBA) can be found in **Section 3.6 Noise**
41 **and Vibration**.

1 **Table 3.23-1 Typical Construction Equipment Noise Emission Levels at 50 Feet**

Equipment Type	Typical Noise Levels at 50 feet (dBA) from Source	Equipment Type	Typical Noise Levels at 50 feet (dBA) from Source
Air Compressor	81	Pile-driver (Impact)	101
Backhoe	80	Pile-driver (Sonic)	96
Ballast Equalizer	82	Pneumatic Tool	85
Ballast Tamper	83	Pump	76
Compactor	82	Rail Saw	90
Concrete Mixer	85	Rock Drill	98
Concrete Pump	82	Roller	74
Concrete Vibrator	76	Saw	76
Crane, Derrick	88	Scarifier	83
Crane, Mobile	83	Scraper	89
Dozer	85	Shovel	82
Generator	81	Spike Driver	77
Grader	85	Tie Cutter	84
Impact Wrench	85	Tie Handler	80
Jack Hammer	88	Tie Inserter	85
Loader	85	Truck	88
Paver	89	–	–

2 The potential for construction noise impacts would vary by location and land use. It is likely
 3 that noise impacts would occur in residential areas within 50 feet of the railroad alignment as a
 4 result of construction of the commuter rail system. These impacts would be intermittent and
 5 temporary. Potential noise impacts to commercial or industrial areas could occur within 50 feet
 6 of the rail alignment from construction activities in areas where pile-driving activity would take
 7 place.

8 Construction vibration impacts would result from the use of construction equipment such as a
 9 pile driver, a bulldozer, or a jack hammer. The vibration would be generally intermittent and
 10 temporary, and therefore, would not result in an appreciable impact to receivers along the
 11 alignment with the exception of properties in close proximity to construction activities.

12 **Table 3.23-3** identifies vibration source levels for construction equipment at 25 feet.

13 Detailed information on vibration measurements (vdB) can be found in **Section 3.6 Noise and**
 14 **Vibration.**

15

1 **Table 3.23-2 Vibration Source Levels For Construction (From Measured Data)**

Equipment	PPV at 25 Feet (in/sec)	Approximate VdB at 25 Feet
Pile driver (impact)	1.518	112
Pile driver (sonic)	0.734	105
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008	66
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

PPV.... Peak Particle Velocity

VdB.... vibration decibels

Source: FTA, 2006c.

2 **Ecosystems**

3 Wildlife habitats adjacent to the railway or roadway improvements would be impacted during
4 construction. Some wildlife would be driven away during construction activities due to the
5 increased noise and activity. These impacts would be primarily limited to the undeveloped
6 areas of the project area.

7 **Farmlands**

8 Farmlands adjacent to the alignments would be impacted if construction activities are required
9 to extend beyond the right-of-way or if access must be modified. Also, dust generated from
10 construction activities could settle on agricultural lands, possibly temporarily altering soil
11 composition. The impacted farmland areas are scattered throughout the project area where
12 land is undeveloped or primarily rural.

13 **Cultural Resources**

14 Construction could damage or remove archaeological or paleontological resources that have
15 become buried beneath the soil surface, as discussed in **Section 3.15 Historic Preservation**
16 and **Section 3.16 Paleontological Resources**. The amount of damage would vary, depending
17 upon soil strata, type, and condition, materials, and type of structure. Construction could have
18 both short- and long-term impacts on cultural landscapes by introducing intrusive elements into
19 the landscape, or by removing character-defining elements of that landscape, such as large
20 trees, irrigation features, or open spaces.

21 **Parks and Recreational Resources**

22 Parks located adjacent to construction activity could experience temporary impacts during
23 construction. Detailed information on each of the parks and recreation areas can be found in
24 **Section 3.18 Parks and Recreation**. Impacts to these areas could include construction noise,
25 dust, visual degradation, and increased traffic congestion inhibiting access to the park and
26 recreation areas.

1 **Visual Setting**

2 Short-term construction-related visual impacts would likely occur as a result of the proposed
3 build packages. These impacts would include the presence of construction equipment and
4 material storage, temporary barriers, guardrail, detour pavement and signs, temporary shoring
5 and retaining walls, lighting for night construction, and removal of existing vegetative cover in
6 the construction zone. Residential areas near construction activities could experience visual
7 impacts resulting from construction activities.

8 It is assumed that the construction of any build package would be conducted in phases so the
9 entire corridor would not be undergoing construction at one time. The greatest visual impacts
10 during construction would be associated with construction lay-down yards (staging areas),
11 construction traffic/equipment along I-25 and the rail line, clearing/demolition of the bridge
12 structures, safety barriers, and signage and flag-persons. The impacts would be visible both to
13 residents along the I-25 corridor and the rail line as well as travelers on the roadway network
14 within the project area.

15 **Floodplains and Water Resources**

16 During construction, stormwater runoff could present the potential for violations of water quality
17 standards if discharge occurs without the application of best management practices. Without
18 mitigation measures, stormwater runoff could cause erosion and sedimentation and transport
19 spilled fuels or other hazardous materials off the construction site. The build packages cross
20 several drainage basins. Groundwater could be encountered during relocation of deep utilities,
21 excavation, and construction of tunnels and below-grade roadways. Dewatering and treatment
22 could be required where groundwater is present.

23 The build packages would cause an increased risk to surface water quality due to proximity of
24 construction to tributaries of the South Platte River. These tributaries include the Cache la
25 Poudre River, Big Thompson River, Little Thompson River, and St. Vrain Creek. Final design
26 would include runoff prevention measures to minimize the amount of sediment reaching
27 surface water bodies as a result of rail or road construction.

28 **Wetlands and Waters of the U.S.—Section 404**

29 Temporary impacts to wetlands could occur within the drainages of St. Vrain Creek, Little
30 Thompson River, Big Thompson River, and Cache la Poudre River. These impacts would
31 primarily be from construction equipment adjacent to wetland areas. Wetlands would be
32 restored to the extent possible if damage from the equipment occurs (see **Section 3.8**
33 *Wetlands*).

34 **Hazardous Materials**

35 Hazardous materials could be encountered during construction in several ways. The
36 movement of earth, particularly excavation, could uncover sites with hazardous chemicals or
37 petroleum products. Former or current gas stations can frequently contain petroleum
38 contamination that could be encountered during construction.

39

1 During construction, it is expected that there would be excavation and drilling for caissons to
2 support underpasses, overpasses, and bridge development. Any of these activities could
3 cause an impact to soils or groundwater containing hazardous waste and, possibly, a potential
4 impact to human health and safety.

5 Prior to construction and right-of-way acquisition, soil sampling would be performed to
6 determine the nature and extent of contamination at sites with recognized environmental
7 conditions. The results of this sampling would be incorporated into a health and safety plan
8 that would be implemented during construction to minimize the potential exposure of workers
9 to contaminants and hazards. StormWater Management Plans would be developed to
10 minimize runoff and impacts to uncontaminated soils. Contaminated materials would be
11 disposed according to Colorado Department of Public Health and Environment (CDPHE)
12 requirements.

13 **Utilities**

14 Construction associated with the build packages would require excavation, grading, boring and
15 other activities that would have short-term effects on utilities. This would include crossing
16 existing lines, relocation, modification, and usage of temporary easements. The process of
17 relocating these utilities could cause temporary planned or accidental disruptions in service to
18 local residents in the project area.

19 CDOT would coordinate with the entities responsible for utility relocations and replacements
20 required by the build packages. Mitigation would include meeting and consulting with the
21 municipalities and utility representatives during the final design and construction phases to
22 coordinate planning and construction activities. CDOT's goal is to minimize and, to the extent
23 possible, avoid interruptions in service to corridor residents and businesses.

24 **Energy**

25 The build packages would require substantial one-time energy expenditures related to the
26 manufacture of construction materials, transporting of materials to the site, and construction of
27 new facilities. Construction energy consumption is based on the number of lane-miles and
28 track-miles proposed for each construction type; at-grade and on elevated structure. The build
29 packages require energy to construct additional lanes, double- or single-track commuter rail,
30 stations, and maintenance facilities. The energy consumption estimated for construction of
31 Package A, Package B, and the Preferred Alternative is approximately 6.8 trillion, 9.0 trillion,
32 and 10.3 trillion British thermal units (BTUs), respectively (see **Table 3.23-4**).

33

1 **Table 3.23-3 Energy Consumption for Construction**

Alternative	Type of Construction	Lane Miles/ Track Miles	BTUs per Lane Mile (in millions)	BTUs Consumed (in millions)
Package A	Surface Road/Railway	445.9	13,885	6,191,322
	Elevated Road/Railway	12.0	130,739	1,568,868
	Total Construction	457.9	N/A	7,760,190
Package B	Surface Roadway	525.6	13,885	7,297,956
	Elevated Roadway	11.9	130,739	1,555,794
	Total Construction	537.5	N/A	8,853,750
Preferred Alternative	Surface Roadway/Railway	606.0	13,885	8,414,310
	Elevated Roadway/Railway	13.5	130,739	1,764,977
	Total Construction	619.5	N/A	10,179,287

Source: FTA, 2006c.

2 **3.23.3 Mitigation Measures**

3 CDOT's *Standard Specifications for Road and Bridge Construction* (2005c) and CDOT's
 4 *Construction Manual* (2002a) outline basic mitigation measures that contractors are required to
 5 take on any construction project. Appropriate application of these mitigation strategies would
 6 be defined during the final engineering phase of this project. See **Table 3.23-4** for a summary
 7 of construction-related mitigation strategies.

8

1 **Table 3.23-4 Summary of Construction-Related Mitigation Strategies**

Impact	Most Likely Impacted	Recommended Mitigation Strategies
Noise	Local residents Local businesses	<ul style="list-style-type: none"> ▶ Use enhanced signing. ▶ Implement construction best management practices. ▶ Use noise blankets on equipment and quiet-use generators. ▶ Combine noisy operations to occur in the same time period. ▶ Use alternative construction methods, such as sonic or vibratory pile-driving in sensitive areas, when possible. ▶ In residential areas, construction activities will be minimized during the evening, nighttime, weekends, and holidays when receptors are usually in these areas. ▶ Nighttime construction will be desirable (e.g., commercial areas where businesses may be disrupted during daytime hours) or necessary to avoid major traffic disruption. ▶ The major noise source on construction sites is typically diesel motors; therefore, all engines will use commercially available effective mufflers and enclosures, as possible. ▶ Modern equipment will be used with improved noise muffling and all equipment items will be evaluated to ensure that they have the manufacturers' recommended noise abatement measure, such as mufflers, engine covers, and engine vibration isolators intact and operational. Generally, newer equipment creates less operational noise than older equipment. All construction equipment will be inspected at periodic intervals to ensure proper maintenance and presence of noise-control devices (e.g., mufflers and shrouding). ▶ The use of impact pile driving will be avoided near noise-sensitive areas, where possible. Alternative foundation preparation technologies will be used, such as vibratory pile driving or cast in drilled hole. ▶ Temporary barriers will be used and relocated, as required, to protect sensitive receptors from excessive construction noise. Noise barriers should be made of heavy plywood or moveable insulated sound blankets. ▶ Plans will be made to conduct truck loading, unloading, and hauling operations so that noise will be kept to a minimum. This will be achieved by carefully selecting routes to avoid going through residential neighborhoods to the greatest possible extent. ▶ Good public relations will be maintained with the community to minimize objections to unavoidable construction noise. Frequent updates of all construction activities will be provided to the public. This program should keep residents informed so they may plan around periods of particularly high noise levels and should provide a conduit for residents to express any concerns or complaints about noise.

2

1 **Table 3.23-4 Summary of Construction-Related Mitigation Strategies (cont'd)**

Impact	Most Likely Impacted	Recommended Mitigation Strategies
Access	Local residents Local businesses Travelers	<ul style="list-style-type: none"> ▶ Use enhanced signing. ▶ Use alternate access enhancements. ▶ Use advertising/public relations. ▶ Do not close multiple interchanges concurrently.
Highway <ul style="list-style-type: none"> ▶ Traffic detours ▶ Lane closures ▶ Congestion ▶ Construction vehicles on local streets ▶ Safety of lane shifts 	Local residents Local businesses Travelers	<ul style="list-style-type: none"> ▶ Limit detours. ▶ Place detours on major arterial streets and ensure no local street detours are implemented. ▶ Schedule construction during periods of least traffic. ▶ Use geometric enhancements including wider lanes and better visibility. ▶ Limit construction vehicles to major arterials. ▶ Enforce speed restrictions; provide adequate space for enforcement; make prime contractor accountable. ▶ Use courtesy patrol. ▶ Use enhanced signing. ▶ Phase construction to limit traffic in neighborhoods. ▶ Comply with American Association of State Highway and Transportation Officials (AASHTO) guidance and Manual on Uniform Traffic Control Devices. ▶ Coordinate work activities to ensure they do not coincide with sporting, school, or special events. ▶ Implement advanced traffic diversion. ▶ Use intelligent management systems and variable message signs to advise/redirect traffic. ▶ Work with Regional Transportation District (RTD) to offer enhanced operations during peak construction. ▶ Develop traffic management plans. ▶ Maintain access to local businesses/residents. ▶ Coordinate with emergency service providers to minimize delay and ensure access to properties.
Pedestrian/ Bicycle mobility	Local residents Commuters Bicyclists	<ul style="list-style-type: none"> ▶ Provide well-defined detours for pedestrians/ bicyclists. ▶ Enhance safety through the use of adequate signing, fencing, and lighting. ▶ Implement a public relations program. ▶ Comply with American Disability Act requirements. ▶ Construct new bike/pedestrian overpass as a detour before old is demolished.

2

1 **Table 3.23-4 Summary of Construction-Related Mitigation Strategies (cont'd)**

Impact	Most Likely Impacted	Recommended Mitigation Strategies
<p>Environmental Impacts</p> <ul style="list-style-type: none"> ▶ Dust/air quality ▶ Hazardous waste ▶ Water quality ▶ Resource use/recycling material 	<p>Construction workers</p> <p>Downstream water users</p> <p>Local residents</p> <p>Local businesses</p>	<ul style="list-style-type: none"> ▶ Use wetting/chemical inhibitors for dust control. ▶ Provide early investigation of subsurface conditions. ▶ Prepare a well-defined materials handling plan. ▶ Employ educated contractor with trained personnel. ▶ Require prompt and safe disposal of waste products. ▶ Implement water quality best management practices. ▶ Prepare well-defined stormwater management plan. ▶ Conduct monitoring. ▶ Institute resource reuse and allocation. ▶ Ensure regulatory compliance. ▶ Cover trucks hauling soil and other materials. ▶ Stabilize and cover stockpile areas. ▶ Minimize offsite tracking of mud, debris, hazardous material, and noxious weeds by washing construction equipment in contained areas. ▶ Avoid impacts to wetlands or other areas of important habitat value in addition to those impacted by the project itself. ▶ Control and prevent concrete washout and construction wastewater. As projects are designed, ensure that proper specifications are adhered to and reviewed to ensure adequacy in the prevention of water pollution by concrete washout. ▶ Store equipment and materials in designated areas only. ▶ Promptly remove any unused detour pavement or signs. ▶ Follow CDOT Standard Specifications for Road and Bridge Construction (2005), including sections regarding water quality control, erosion control, and environmental health and safety. ▶ As soon as practicable after construction activities have been completed in a disturbed area, begin permanent stabilization to limit further erosion of soil. ▶ Remove soil and other materials from paved streets. ▶ Incorporate recommendations as appropriate from the Regional Air Quality Council (RAQC) report, Reducing Diesel Emissions in the Denver Area (RAQC, 2002). ▶ Operate equipment mainly during off-peak hours. ▶ Limit equipment idling time. ▶ Use recycled materials for project activities to the extent allowed by good practice and CDOT construction specifications. ▶ Use construction equipment that use ultra-low sulfur fuels to the extent practicable.

1 **Table 3.23-4 Summary of Construction-Related Mitigation Strategies (cont'd)**

Impact	Most Likely Impacted	Recommended Mitigation Strategies
Floodplains and Water Resources		<ul style="list-style-type: none"> ▶ To mitigate potential water quality problems from construction, best management practices will be implemented as part of the stormwater management plan to abate and control suspended soil loading from erosion. Best management practices used will be consistent with the MS4 permitting requirements, requirements of Northern Front Range flood control districts, as well as practices mentioned in CDOT's Erosion Control and Stormwater Quality Guide (CDOT, 2002b). This will include such measures as silt fences and detention ponds. Rip-rap slope protection will be utilized where necessary to prevent erosion. Any impacts to surface water quality as a result of construction will be temporary. Mitigation measures for contaminated groundwater potentially encountered during construction are discussed in Section 3.7 Water Resources. Section 107.25 of CDOT's Standard Specifications for Road and Bridge Construction (2005) deals with contractor's requirements for water quality control.

Source: CDOT, Construction Manual, 2002; CDOT, Standard Specifications for Road and Bridge Construction, 2005.

2 **3.23.4 Summary**

3 Package A would have the greatest construction impacts (noise, air quality, and transportation)
 4 to residential areas because the construction of the double-track commuter rail would extend
 5 through residential areas. In contrast, construction of Package B primarily would involve the
 6 widening and addition of lanes along a corridor that consists primarily of commercial, industrial,
 7 and agricultural development. The Preferred Alternative would include single track commuter
 8 rail with occasional passing tracks and maintenance roads from Fort Collins to the proposed
 9 FasTracks North Metro end-of-line, in addition to improvements on I-25, express bus and
 10 commuter bus service.

11 Construction of the build packages would cause varying temporary impacts to traffic patterns
 12 and congestion, noise and vibration, air quality, and visual presence. These impacts would be
 13 short-term and isolated in extent depending upon the types and location of construction.
 14 Through the planning and implementation of mitigation measures during final design of the
 15 Preferred Alternative, these impacts would be minimized.