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4.16 UTILITIES

INTRODUCTION

Utilities include water, sewer, reclaimed water, electrical distribution and transmission, natural gas, communications, and fiber optic, located either above ground or underground. Public and private utilities are typically located along a roadway corridor within separate utility easements or within the roadway right-of-way. Within the study area, many utilities run through open areas away from roadway corridors. Since utilities generally parallel or are located within the right-of-way, they are often impacted by roadway improvements.

When impacts do occur, adjustments or relocations are required. Utilities relocated outside the proposed right-of-way of the build alternatives will require a separate easement, and the additional impact area will need to be quantified. It is important that there be early coordination efforts with the affected utility companies, as well as continued coordination throughout the preliminary and final design process. Adjustments and relocations of facilities may require substantial lead time by the utility company for verification, analysis, design, material acquisition, and construction.

Public concerns expressed through the public involvement process regarding utilities include short term loss of utility service and/or potential travel delays resulting from utility relocation construction. These concerns are addressed in **Section 4.16.3**.

4.16.1 AFFECTED ENVIRONMENT

The Utility Notification Center of Colorado was contacted to identify the private utility companies and municipalities with utilities in the study area. The owners were contacted and maps or verbal descriptions of the facilities were obtained. Follow-up field reconnaissance and review of USGS topographic maps confirmed the findings and provided additional information. The information was compiled into a map, contact list, and utility table.

Certain utilities were classified as “major utilities” based on their critical nature and/or potential high cost and complexity of relocation. These included electric transmission lines, irrigation ditches, water lines and sanitary/storm sewers with diameters greater than 24 inches, fiber optic lines, raw water lines (municipal water supplies), and high-pressure gas lines. Only these major utilities and their impacts are addressed. Utilities not meeting the criteria for major utilities are not taken into consideration.

A broad description of major utilities located in the study area is provided in the following paragraphs. Additional information including utility descriptions by location, utility maps, and contact information is available (see **Northwest Corridor Supporting Technical Document-Existing Corridor Conditions-Roadway/Structures, Utilities, Railroads, Floodplains/Drainage, Traffic**).

4.16.1.1 ELECTRIC TRANSMISSION FACILITIES

Xcel Energy provides electricity to the northwest Denver metropolitan area through a network of power plants, substations, and transmission lines. There are six Xcel substations in the study area. The height of 115 kV and 230 kV transmission lines are a minimum of 25 and 30 feet, respectively. Xcel’s substations are on fee-owned property, while its transmission lines are almost always located in private easements.

A network of four 115 kV electric transmission lines and two 230 kV electric transmission lines distribute power throughout the study area. In general, there are three northwest/southeast trending 115 kV lines; they connect Eldorado Springs to Denver West, Boulder to Lakewood, and Louisville to Broomfield. An east/west trending 115 kV line is north of US 6 between Golden and Denver West. Two 230 kV electric transmission lines transverse the study area; a north/south trending line connects Boulder to Golden and an east/west trending line passes north of the Table Mountains in Golden to Wheat Ridge.



4.16.1.2 FIBER OPTICS

Numerous private telecommunications companies (Comcast, CDOT, Level 3, ICG Telecom, MCI, Qwest, Qwest Long Distance, and Colorado School of Mines) have buried fiber runs throughout the study area, primarily along the Union Pacific Railroad, I-70, Interlocken Loop, and in cross-streets. Buried fiber is usually contained in plastic conduit or ducts at a depth of about four feet. Except for the fiber in the Union Pacific Railroad right-of-way, which is covered by a license agreement, fiber is usually in a public easement by virtue of a franchise agreement.

4.16.1.3 HIGH-PRESSURE GAS LINES

Xcel Energy has several high-pressure gas lines in the study area, ranging from 6 to 24 inches in diameter. The gas lines are at a minimum depth of four feet and are in public right-of-way or in a private exclusive easement. Two notable high-pressure gas lines are in the study area. One, a 12-inch line from the Interlocken area trends west and turns south in alignment with the east edge of Rocky Flats and Quaker Street. The line follows this alignment to SH 58 in Golden. The other, a 20-inch line parallels Interlocken Loop and SH 128 then continues south between Indiana Street and Simms Street to W. 96th Avenue. The line parallels 96th Avenue west toward the 12-inch line described above. The line parallels the 20-inch line until 50th Avenue where it jogs over to McIntyre Street. The line parallels McIntyre Street until it crosses SH 58 and continues south going around the east side of South Table Mountain and crosses I-70 at Indiana Street.

At Leyden, Xcel Energy operated a gas storage facility in the former coal mines approximately 1,000 feet below ground. There were 13 gas wells that fed a 24-inch high-pressure gas line that parallels Leyden Road. In preparation to close the facility, Xcel stopped adding gas to the caverns in September 2001. In November of 2003, the City of Arvada began filling the caverns with water in an effort to close the gas facility and prepare the site for use as an underground water reservoir. In April 2005, the City of Arvada stopped injecting water into the caverns as they were considered full. Xcel's operations at this time consist of carrying out a closure plan approved by the Colorado Oil and Gas Conservation Commission. In addition to venting small amounts of gas and monitoring the soil for storage gas, Xcel is in the process of plugging wells and surface reclamation. These projects are expected to be completed by December 2005. While many of the 36 wells on site have been or will be plugged, others will remain open as observation wells or for use by the City of Arvada. Xcel will continue to monitor the site through fall/winter of 2007. Currently, the City of Arvada is using low-pressure segments of the former gas pipeline system and may use other pipelines that are located on land that they own. The 24-inch high-pressure pipeline is not slated for use at this time, but the City of Arvada does not discount using the pipeline in the future.

4.16.1.4 IRRIGATION DITCHES

Numerous irrigation ditches traverse the study area. Ditches are usually 6 to 12 inches below grade under roadways and are generally located in a private easement or fee ground. The ditches generally flow west to east crossing roadways in pipes or concrete box culverts. Most of the ditches carry irrigation water from spring through fall. Some of the ditches also carry municipal water.

While there are numerous ditches and canals in the study area, several ditches are notable because of their size and high number of roadway crossings. Church Ditch, owned by the Church Ditch Water Authority, parallels SH 58 from Golden and heads north along the east side of North Table Mountain toward the intersection of Indiana Street and W. 80th Avenue. The ditch parallels the south side of W. 80th Avenue and continues east out of the study area boundaries. Farmers Highline Canal, owned by the Farmers Highline Canal & Reservoir Co., crosses SH 58 near Easley Road and heads north meandering across both McIntyre Street and Indiana Street at least three times before flowing east of the study area boundary south of W. 80th Avenue. The Ralston-Clear Creek Canal owned by the Denver Water Department (DWD) crosses SH 58 in a northwest/southeast alignment to SH 93 near W. 68th Avenue. South Boulder Diversion Canal also owned by DWD crosses SH 93 twice south of Rocky Flats.



4.16.1.5 SANITARY SEWER LINES

Several entities were contacted regarding their sanitary sewer pipeline systems. They are: Applewood Sanitation, Fruitdale Sanitation, Metro Wastewater, North Table Mountain Water and Sanitation, North West Lakewood Sanitation, Pleasantview Sanitation, Superior Metro District, Westpoint Metro, and the Cities of Arvada, Broomfield, Golden, Westminster, and Wheat Ridge. Sanitary sewers are typically at a depth of 8 to 10 feet and are located in public right-of-way. The pipe sizes are generally less than 24 inches in diameter, with the exception of the following. A Metro Wastewater interceptor parallels the south side of SH 58 between approximately I-70 and the North Table Mountain Water and Sanitation metering facility, 0.75 mile west of I-70. Another Metro Wastewater interceptor parallels I-70 between SH 58 and the Applewood-Youngfield and Pleasant View-Youngfield metering facilities at W. 38th Avenue. Two Pleasant View Sanitation 24-inch lines cross I-70 in 42-inch steel casings. One line crosses south of Metro's metering facility near W. 38th Avenue; the other crosses north of W. 20th Avenue.

4.16.1.6 STORM SEWER LINES

The Cities of Arvada, Broomfield, Golden, Westminster, and Wheat Ridge were contacted regarding their storm sewer pipeline systems. Only Golden reported having a storm sewer larger than 24 inches in diameter (a 36-inch storm sewer that crosses SH 93 just west of Heritage Road). A 54-inch storm sewer parallels the east side of I-70 near W. 38th Avenue. Storm sewers are typically located in public right-of-way and range in depth from 2 to 10 feet below grade.

4.16.1.7 RAW WATER LINES

Many municipalities have water lines in the study area including Consolidated Mutual Water, Denver Water District, North Table Mountain Water and Sanitation, Pleasant View Water and Sanitation, Ralston Valley Water and Sanitation, Superior Metro District, Valley Water District, and the Cities of Arvada, Broomfield, Golden, Westminster, and Wheat Ridge. Water lines typically range in depth from 5 to 8 feet and are usually located in public right-of-way. Most pipelines are smaller than 24 inches in diameter. The Denver Water District owns two notable water lines: a 42- and a 54-inch raw water line that parallel each other in a northwest/southeast trending easement that crosses SH 93 north of W. 68th Avenue and I-70 north of W. 32nd Avenue. The City of Arvada owns two raw water lines (27 inches and 30 inches) that cross SH 93 north of 68th Avenue.

4.16.2 ENVIRONMENTAL CONSEQUENCES

Utilities are assumed to be impacted if:

- They would be unable to function normally.
- They would be unable to be accessed.
- There would be insufficient clearance between it and the proposed improvements.
- There would be danger of rupture or disruption of service.

Potential major utility conflicts were identified by comparing the footprint of each of the build alternatives with the locations of major utilities as plotted on the utility map. Minor utilities, such as electric distribution lines, low-pressure gas lines, service lines, and small diameter pipes (24 inches or less), were not considered because impacts would be similar for all alternatives and their detailed evaluation is not typically part of an environmental impacts assessment.



The likelihood of a conflict was evaluated by assessing the profile and cross section of the proposed roadway improvements, the estimated depth of the utility, its type of protection, and the potential for the presence of manholes and valves in relation to the proposed improvements in that location. This evaluation resulted in one of three determinations:

- Relocation – Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.
- Adjustment – Utility would be affected by the alternative but no relocation would be required. Actions considered for adjustments include:
 - Lengthening pipe or culvert.
 - Raising, lowering, or moving manholes or valves.
 - Moving inlets and associated piping.
 - Extending or adding protective casing.
 - Moving fire hydrants.
- No Action – Utility would not be affected by the alternative.

Both relocations and adjustments were evaluated because it is possible that disruption in service or endangerment to human health and the environment from rupture could result during either action.

The major utility impacts for each of the build alternatives are described below and are summarized in tables which are grouped by geographical area (see **Tables 4.16-1, 4.16-2, 4.16-3, 4.16-4, 4-16.5, 4.16-6, and 4.16-7**). It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect effects or long-term impacts.

Table 4.16-1 Overall Utility Impact–Interlocken Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Comcast	Fiber	No Action	Not Affected	No Action	Not Affected	—	—	—	—	Fiber optic line crosses Interlocken Loop 1/8 mile south of Eldorado Boulevard.
Comcast	Fiber	No Action	Not Affected	No Action	Not Affected	—	—	—	—	Fiber optic line parallels Eldorado Boulevard between Interlocken Loop and Interlocken Boulevard.
Comcast	Fiber	No Action	Not Affected	No Action	Not Affected	—	—	—	—	Fiber optic line parallels Interlocken Loop between 1/8 mile south of Eldorado Boulevard and US 36.
Comcast	Fiber	No Action	Not Affected	No Action	Not Affected	—	—	—	—	Fiber optic line parallels west side of Interlocken Loop between Eldorado Boulevard and 1/8 mile south of Eldorado Boulevard.
ICG Telecom	Fiber	No Action	Not Affected	No Action	Not Affected	—	—	—	—	Fiber optic line parallels Interlocken Loop along east side of street from Eldorado Boulevard to US 36; 2 feeders on east side of right-of-way at Environmental Way and on east side of Coalton Drive.
Level 3 Communications	Fiber	Relocate	100 LF; relocate around proposed retention pond	Relocate	100 LF; relocate around proposed retention pond	No Action	Not Affected	No Action	Not Affected	Fiber (12 duct HDPE) parallel to Interlocken Loop between US 36 and Eldorado Boulevard. Line crosses from east side to west side at Coalton Drive.



Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Level 3 Communications	Fiber	Relocate	200 LF; relocate around proposed retention ponds	Relocate	200 LF; relocate around proposed retention ponds	No Action	Not Affected	No Action	Not Affected	Fiber (8 duct HDPE) crosses Interlocken Loop at Eldorado Boulevard.
Qwest	Fiber	Relocate	500 LF; retained fill	Relocate	500 LF; retained fill	Relocate / Adjust	2,000 LF; up to 10-foot fill	Relocate / Adjust	2,000 LF; up to 10-foot fill	Multiple facilities cross Interlocken Loop three times between SH 128 and Eldorado Boulevard then parallel Interlocken Loop to Interlocken Boulevard.
Qwest	Fiber	No Action	Not Affected	No Action	Not Affected	Adjust	1 lower; 1-foot cut	Adjust	1 lower; 1-foot cut	Multiple facilities parallel Eldorado Boulevard crossing Interlocken Loop.
Qwest	Fiber	No Action	Not Affected	No Action	Not Affected	Adjust	1 lower; 1-foot cut	Adjust	1 lower; 1-foot cut	Multiple facilities parallel Interlocken Boulevard crossing Interlocken Loop.
Qwest	Fiber	No Action	Not Affected	No Action	Not Affected	Relocate / Adjust	4,500 LF; up to 2-foot cut / fill	Relocate / Adjust	4,500 LF; up to 2-foot cut / fill	Multiple facilities parallel Interlocken Loop between Interlocken Boulevard and Dillon Road.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Qwest	Fiber	No Action	Not Affected	No Action	Not Affected	No Action	Not Affected	No Action	Not Affected	Two cabinets and a vault located near Interlocken Loop and Flatiron Circle.
City and County of Broomfield	Water	No Action	Not Affected	No Action	Not Affected	—	—	—	—	30-inch water line crosses Interlocken Loop at Eldorado Boulevard.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in **tan** and **yellow**.

Linear Feet is abbreviated as LF.

—: Utility is not within referenced alternative footprint.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-2 Overall Utility Impact – State Highway 128 Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Church Ditch Company	Ditch	Relocate	1 encase; 15-foot fill	Relocate	1 encase; 15-foot fill	Relocate	1,600 LF; realign	Relocate	1 encase; 15-foot fill	Upper Church Ditch crosses SH 128 1/8 mile west of Indiana Street.
Xcel Energy	Electric Transmission	Relocate	1 tower in traveled way; up to 10 feet cut/fill	Relocate	1 tower in traveled way; up to 10 feet cut/fill	No Action	Not Affected	Relocate	1 tower in traveled way; up to 10-foot cut/fill	115 kV transmission line crosses SH 128 100 feet east of Indiana Street.
Xcel Energy	Electric Transmission	—	—	—	—	No Action	Not Affected	—	—	115 kV transmission line crosses SH 128 1/8 mile west of McCaslin Boulevard.
Xcel Energy	Electric Transmission	—	—	—	—	Relocate	1,800 LF, 2 towers at edge of cut/fill	—	—	115 kV transmission line parallels SH 128 between Indiana Street and McCaslin Boulevard.
Comcast	Fiber	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Relocate / Adjust	9,800 LF; raise/lower	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Fiber optic line parallels SH 128 between McCaslin Boulevard and Interlocken Loop.



Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Level 3 Communications	Fiber	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Relocate / Adjust	4,200 LF; raise/lower	Relocate	400 LF; 30-foot retained cut, 15-foot cut	Fiber optic line (12 duct HDPE) parallel to SH 128 between Eldorado Boulevard and Interlocken Loop.
Qwest	Fiber	—	—	—	—	Relocate / Adjust	900 LF; up to 20-foot fill	—	—	Fiber optic line parallels Indiana Street crossing SH 128 then parallels SH 128 and turns to parallel McCaslin Boulevard.
Qwest	Fiber	Relocate / Adjust	4,600 LF; cut / fill	Relocate / Adjust	4,600 LF; cut / fill	Relocate / Adjust	9,300 LF; up to 10-foot fill	Relocate / Adjust	4,600 LF; cut / fill	Fiber optic line crosses SH 128 at Indiana Street and parallels SH 128 between Indiana Street and Network Parkway.
Qwest	Fiber	—	—	—	—	Relocate / Adjust	3,800 LF; up to 10-foot fill	—	—	Multiple facilities parallel SH 128 from Indiana Street to Eldorado Boulevard where the line crosses SH 128 to continue north parallel to Eldorado Boulevard.
Xcel Energy	Gas	Relocate	900 LF; 30-foot retained cut, 15-foot cut	Relocate	900 LF; 30-foot retained cut, 15-foot cut	Relocate / Adjust	1,900 LF; raise/lower	Relocate	900 LF; 30-foot retained cut, 15-foot cut	10-inch high pressure gas line parallels the south side of SH 128 between Simms Street and Interlocken Loop.
Xcel Energy	Gas	—	—	—	—	No Action	N/A	—	—	12-inch high pressure gas line crosses SH 128 1 mile west of McCaslin Boulevard.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Xcel Energy	Gas	Relocate	2,800 LF; raise/lower	Relocate	2,800 LF; raise/lower	Relocate / Adjust	2,800 LF; raise/lower	Relocate	2,800 LF; raise/lower	20-inch high pressure gas line enters south side of SH 128 approximately 200 feet west of Eldorado Boulevard and parallels the north side of SH 128 for 1/2 mile to 200 feet east of Eldorado Boulevard; line parallels Interlocken Loop on west side of road for approximately 1/2 mile beginning 100 feet south of Eldorado Boulevard.
Town of Superior	Water	—	—	—	—	Relocate	1 near edge of cut/fill limit	—	—	0.5 MG water tank in easement north of SH 128 and east of McCaslin Boulevard.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

— : Utility is not within referenced alternative footprint.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-3 Overall Utility Impact – Indiana Street & McIntyre Street Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Church Ditch Company	Ditch	—	—	—	—	—	—	Relocate	1 extend / reinforce	Church Ditch crosses Indiana Street south of Leyden Road.
City and County of Broomfield	Ditch	—	—	—	—	Relocate	1 extend / reinforce; 10- to 20-foot fill	—	—	McKay Ditch crosses Indiana Street 1/2 mile south of SH 128.
City of Arvada	Ditch	—	—	—	—	—	—	Relocate	1 extend / reinforce; 20-foot fill at Centerline	Tucker Ditch crosses Indiana Street 1/8 mile north of 80 th Avenue.
Clark Lateral Ditch Co.	Ditch	—	—	—	—	—	—	Relocate	1 extend / reinforce	Clark Ditch crosses Indiana Street 1/4 mile of W. 64 th Avenue.
To Be Determined	Ditch	—	—	—	—	—	—	Relocate	1 extend / reinforce	Clark North Ditch crosses Indiana Street south of W. 72 nd venue.
Xcel Energy	Electric Transmission	Relocate	1 tower in 15-foot cut	Relocate	1 tower in 15-foot cut	Relocate	1 relocate tower; raise line height	Relocate	1 tower in 15-foot cut	230 kV transmission line crosses Indiana Street just south of entrance to Rocky Flats.
Comcast	Fiber	—	—	—	—	—	—	Relocate	1,400 LF; 5-foot cut / fill	Comcast fiber optic parallels Indiana Street between 1/4 mile north of W. 64 th Avenue and W. 72 nd Avenue where the line continues east on W. 72 nd Avenue.
MCI Worldcom	Fiber	—	—	—	—	—	—	Relocate	1 lower; 20-foot cut	Fiber optic line crosses Indiana Street along BNSF railroad tracks.
Qwest	Fiber	—	—	—	—	—	—	No Action	N/A	Multiple facilities parallel W. 6 th Avenue crossing Kendrick Drive and Indiana Street.
Qwest	Fiber	—	—	—	—	—	—	Adjust	1 raise; up to 5-foot fill	Multiple facilities cross Indiana Street at W. 72 nd Avenue.



Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Qwest	Fiber	—	—	—	—	—	—	Relocate / Adjust	4,300 LF; avg. 1 to 5-foot cut / fill up to 10-foot	Fiber optic line parallels Indiana Street between W. 72 nd Avenue and W. 86 th Parkway. Line then parallels W. 86 th Parkway.
Qwest Long Lines	Fiber	—	—	—	—	—	—	—	—	Fiber optic line crosses Indiana Street along BNSF railroad tracks.
Xcel Energy	Gas	—	—	—	—	—	—	—	—	18-inch high pressure gas line crosses Indiana Street at 82 nd Avenue.
Xcel Energy	Gas	—	—	—	—	Adjust	1 reinforce; up to 10-foot fill	—	—	20-inch high pressure gas line crosses Indiana Street at W. 96 th Street.
Xcel Energy	Gas	Relocate	1 raise / reinforce pipe; 20-foot fill	Relocate	1 raise / reinforce pipe; 20-foot fill	Relocate / Adjust	600 LF; 30- to 40-foot fill	Relocate	1 raise / reinforce pipe; 20-foot fill	6-inch high pressure gas line crosses Indiana Street at entrance to Rocky Flats.
City of Arvada	Water	—	—	—	—	—	—	Adjust	1 extend / reinforce	30-inch ductile iron (DI) water line parallels W. 64 th Avenue between Quaker Street to Eldridge Street, crossing Indiana Street.
City of Arvada	Water	—	—	—	—	—	—	Relocate	1 extend / reinforce; 20-foot fill at Centerline	36-inch steel water transmission line crosses Indiana Street south of 82 nd Avenue; line roughly parallels south side of UPRR.
City of Arvada	Water	—	—	—	—	—	—	Adjust	1 extend / reinforce	54-inch steel water line crosses Indiana Street 1/4 mile south of W. 72 nd Avenue.
City of Westminster	Water	—	—	No Action	N/A	Relocate	1,300 LF; 5-10-foot fill	Adjust	1 extend / reinforce	Kinnear Ditch Replacement Pipeline crosses Indiana Street 3/4 mile north of W. 86 th Parkway.



Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Farmers Reservoir and Irrigation Co.	Ditch	—	—	—	—	—	—	2 Relocate / 1 Adjust	3 extend/reinforce	Croke Canal crosses McIntyre Street 1/8 mile north of W. 44 th Avenue; Croke Canal crosses Indiana Street north of W. 64 th Avenue, 1/4 mile north of W. 72 nd Avenue, and parallels Indiana Street 1/8 mile south of W. 72 nd Avenue to 1/4 mile north of W. 72 nd Avenue.
Farmers Reservoir and Irrigation Co.	Ditch	—	—	—	—	—	—	4 Relocate / 2 Adjust	6 extend/reinforce	Farmers Highline Canal crosses McIntyre Street 3 times; south of 52 nd Drive, 1/2 mile north of W. 54 th Avenue, north of W. 56 th Place. The canal follows the new alignment of McIntyre Street and then crosses W. 64 th Avenue east of McIntyre Street. The canal crosses Indiana Street 3 times; 1/8 mile south of W. 76 th Drive, 1/8 mile north of W. 77 th Drive, and 3/8 mile north W. 77 th Drive.
Consolidated Mutual Water District	Water	—	—	—	—	Adjust	1 extend / reinforce; 5-foot fill	Relocate / Adjust	8,600 LF; raise / lower	Consolidated Mutual Water raw water line parallels McIntyre Street from Agricultural Ditch on W. 32 nd Avenue to W. 64 th Avenue. The line continues north for approximately 2 miles before turning east and continuing north parallel to Indiana Street; line leaves Indiana Street and turns west to Welton Reservoir. Pipe sizes vary from 20-inch PVC south of Fairmount Reservoir and 24-inch steel north of Fairmount Reservoir.
Coors	Ditch	—	—	—	—	—	—	Relocate	1 extend / reinforce	Wannamaker Ditch crosses McIntyre Street 1/8 mile north of W. 44 th Avenue.
Xcel Energy	Electric Transmission	—	—	—	—	—	—	Relocate	1 lower	12-inch high pressure gas line crossing McIntyre Street at W. 44 th Avenue.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Qwest	Fiber	—	—	—	—	—	—	Relocate / Adjust	500 LF; 1 to 25-foot cut / fill	Multiple facilities parallel McIntyre Street between SH 58 and W. 52 nd Avenue.
Qwest	Fiber	—	—	—	—	—	—	No Action	Not Affected	Approximately 400 feet of fiber optic line parallels McIntyre Street south of W. 58 th Avenue.
Xcel Energy	Gas	—	—	—	—	—	—	Relocate	3,200 LF; lower	20-inch high pressure gas line parallels McIntyre Street from 100 feet south of Table Mountain Parkway and continues south around South Table Mountain.
North Table Mtn. Water & San.	Sanitary	—	—	—	—	—	—	Relocate	1 lower; 2.5-foot fill	24-inch PVC sewer line parallels W. 44 th Avenue on north side of road between Salvia Street and McIntyre Street; crossing Indiana Street.
Denver Water Department	Water	—	—	—	—	—	—	Adjust	1 add / extend casing	Aqueduct (42-inch and 54-inch concrete pipelines) crosses McIntyre Street 1/8 mile north of W. 50 th Avenue.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

—: Utility is not within referenced alternative footprint.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-4 Overall Utility Impact – State Highway 72 Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Denver Water Department	Ditch	—	—	—	—	Relocate	4 extend / reinforce (roadway, 2 ramps, retention pond)	—	—	South Boulder Diversion Canal crosses SH 72 1/4 mile east of SH 93.
Xcel Energy	Electric Transmission	—	—	—	—	No Action	Not Affected	—	—	115 kV transmission line crosses SH 72 3/4 mile east of SH 93.
MCI Worldcom	Fiber	Relocate	1 lower; 25-foot cut	Relocate	1 lower; 25-foot cut	Relocate / Adjust	25, 500 LF; raise/lower	Relocate	1 lower; 25-foot cut	Fiber parallels SH 72 from outside the project west boundary until it joins the UPRR ROW approximately 1 mile west of Indiana Street. The fiber run continues with UPRR outside of the east project boundary.
Qwest Long Lines	Fiber	Relocate	1 lower; 25-foot cut	Relocate	1 lower; 25-foot cut	Relocate / Adjust	25,500 LF; raise/lower	Relocate	1 lower; 25-foot cut	Fiber parallels SH 72 from outside the west project boundary until it joins the UPRR ROW approximately 1 mile west of Indiana Street. The fiber run continues with the UPRR outside of the east project boundary.
Qwest	Fiber	Relocate / Adjust	600 LF; up to 25' foot cut	Relocate / Adjust	600 LF; up to 25' foot cut	Relocate / Adjust	5,300 LF; up to 5-foot cut / fill	Relocate / Adjust	600 LF; up to 25' foot cut	Fiber optic line parallels SH 72 east of Bronco Lane to Indiana Street.
Xcel Energy	Gas	Relocate	1 lower/raise; cut / fill	Relocate	1 lower/raise; cut / fill	No Action	Not Affected	Relocate	1 lower/raise; cut / fill	12-inch high pressure gas line crosses SH 72 1 mile west of Indiana Street.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Xcel Energy	Gas	Relocate	1 raise; 7-foot fill	Relocate	1 raise; 7-foot fill	—	Not Affected	Relocate	1 raise; 7-foot fill	20-inch high pressure gas line crosses SH 72 1 mile west of Indiana Street.
City of Westminster	Water	Relocate	400 LF; lower	Relocate	400 LF; lower	Relocate / Adjust	10,300 LF; raise/lower	Relocate	400 LF; lower	Kinnear Ditch Replacement Pipeline parallels south side of SH 72 for 1/2 mile starting 1/8 mile east of SH 93.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

— : Utility is not within referenced alternative footprint.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-5 Overall Utility Impact – Leyden Road Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Xcel Energy	Electric Transmission	Relocate	1 tower in 65-foot cut	Relocate	1 tower in 65-foot cut	—	—	Relocate	1 tower in 65-foot cut	115 kV transmission line crosses Leyden Road east of the landfill.
Xcel Energy	Electric Transmission	No Action	Not Affected	No Action	N/A	No Action	Not Affected	No Action	Not Affected	Electric transmission line crosses Leyden Road 1 mile west of Quaker Street.
Xcel Energy	Gas	No Action	Not Affected	No Action	N/A	—	—	No Action	Not Affected	24-inch high pressure gas line enters Leyden Road ROW from north from 4 gas wells 1-1/2 miles west of Quaker Street.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

— : Utility is not within referenced alternative footprint.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-6 Overall Utility Impact – State Highway 93 Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Not Affected City of Arvada	Ditch	No Action	N/A	No Action	Not Affected	Relocate	1 extend / reinforce; 40-foot retained fill	No Action	Not Affected	Haines & Piquette Ditch crosses SH 93 3/4 mile north of W. 68 th Avenue.
TBD	Ditch	Relocate	1 extend / reinforce pipe; 5-foot cut	No Action	Not Affected	Relocate	1 realign-extend / reinforce	No Action	Not Affected	Ralston Clear Creek Canal crosses SH 93 1/8 mile north of W. 68 th Avenue.
City of Arvada	Ditch	Relocate	1 extend / reinforce pipe; 35-foot retained fill	Relocate	1 extend / reinforce; 35-foot fill	Relocate	1 extend / reinforce; 20-foot fill	Relocate	1 extend / reinforce; 35-foot fill	Long Lake Ditch crosses SH 93 1/8 mile south of W. 68 th Avenue.
Denver Water Department	Ditch	Relocate	1 extend / reinforce pipe; 20-foot fill	No Action	Not Affected	Relocate	1 extend / reinforce; 30/20-foot cut/fill W/E	No Action	Not Affected	South Boulder Diversion Canal crosses SH 93 3/8 mile south of SH 72.
Qwest	Fiber	Relocate	800 LF; 0 to 25-foot cut	Relocate	700 LF; 20-foot cut	Relocate	800 LF; 0 to 25-foot cut	Relocate	800 LF; 0 to 25-foot cut	Multiple facilities cross SH 93 at Iowa Street.
Qwest	Fiber	No Action	N/A	No Action	Not Affected	Relocate	200 LF; 0 to 10 foot fill	Relocate	200 LF; 0 to 10 foot fill	Multiple facilities parallel Golden Gate Canyon Road west of SH 93.
Qwest	Fiber	Relocate / Adjust	4,200 LF; up to 25-foot fill	No Action	Not Affected	Relocate	4,000 LF; 20-foot cut / fill	Relocate	4,000 LF; 20-foot cut / fill	Multiple facilities parallel SH 93 between Iowa Street and 58 th Avenue.
Qwest	Fiber	Relocate / Adjust	7,000 LF; retained cut / fill	No Action	Not Affected	Relocate / Adjust	7,500 LF; max 25-foot cut / 55-foot fill	Relocate	2,000 LF; 0 to 10-foot cut	Fiber optic line parallels SH 93 between 58 th Avenue and Leyden Road.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Qwest	Fiber	Relocate / Adjust	1,700 LF; retained fill	No Action	Not Affected	Relocate / Adjust	2,000 LF; 5-foot cut / fill	Relocate	1,500 LF; 0 to 15-foot cut	Fiber optic line parallels SH 93 between W. 58 th Avenue and W. 68 th Avenue.
Qwest	Fiber	—	—	—	—	Relocate / Adjust	3,000 LF; up to 10 foot fill	—	—	Multiple facilities parallel SH 93 between Leyden road and SH 72.
City of Arvada	Water	Relocate	1 extend / reinforce pipe; 15-foot fill	Adjust	1 extend / reinforce	Relocate	1 extend / reinforce; 30/20-foot cut/fill W/E	Adjust	1 extend / reinforce	27-inch steel raw water line crosses SH 93 1/4 mile north of W. 68 th Avenue.
City of Arvada	Water	Relocate	1 extend / reinforce pipe; 15-foot fill	Relocate	1 raise; retained fill	Relocate	1 extend / reinforce; 30/20-foot cut/fill W/E	Relocate	1 raise; retained fill	30-inch concrete raw water line crosses SH 93 1/4 mile north of W. 68 th venue.
Denver Water Department	Water	Relocate	1 extend / reinforce pipe; 20-foot fill	No Action	Not Affected	Adjust	1 extend / reinforce; <5-foot fill	No Action	Not Affected	Aqueduct (42-inch and 54-inch concrete pipelines) crosses SH 93 1/4 mile north of W. 68 th Avenue.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005.

Table 4.16-7 Overall Utility Impact – US 6 Area

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Consolidated Mutual Water (majority owner)	Ditch	Relocate	1 extend / reinforce	Relocate	1 extend / reinforce	Relocate	1 extend / reinforce	Relocate	1 extend / reinforce	Welch Ditch crosses US 6 between SH 58 and 19 th Street.
Church Ditch Company	Ditch	No Action	N/A	No Action	Not Affected	No Action	N/A	No Action	Not Affected	Church Ditch crosses US 6 south of SH 58.
Xcel Energy	Electric Transmission	No Action	N/A	No Action	Not Affected	No Action	N/A	No Action	Not Affected	230 kV transmission line crosses US 6 1/4 mile northwest of Heritage Road.
Colorado School of Mines	Fiber	Relocate	1 raise; 25-foot fill	Relocate	1 raise; 5-foot fill	Relocate	1 raise; 25-foot fill	Relocate	1 raise; 25-foot fill	Fiber optic line crosses US 6 north of 19 th Street.
Qwest	Fiber	Relocate / Adjust	3,400 LF; fill / up to 25-foot cut	Relocate	3,500 LF; up to 30-foot cut	Relocate / Adjust	3,400 LF; fill / up to 25-foot cut	Relocate / Adjust	3,400 LF; fill / up to 25-foot cut	Multiple facilities parallel US 6 east and west of Heritage Road.
Qwest	Fiber	Relocate	500 LF; 25-foot cut	Relocate	1 realign; 25-foot cut	Relocate	500 LF; 25-foot cut	Relocate	500 LF; 25-foot cut	Multiple facilities cross US 6 at Heritage Road.
Qwest	Fiber	Relocate	1 raise; 10-foot fill	Relocate	1 realign; 0 to 25-foot cut	Relocate	1 raise; 10-foot fill	Relocate	1 raise; 10-foot fill	Multiple facilities cross US 6 near Heritage Road.

Operator/Owner	Type	Freeway Alternative		Tollway Alternative		Regional Arterial Alternative		Combined Alternative (Recommended)		Description
		Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	Relocate/Adjust	Detail	
Qwest	Fiber	Relocate	400 LF; 15 to 25-foot cut	Relocate	1 realign; 10 to 15-foot cut	Relocate	400 LF; 15 to 25-foot cut	Relocate	400 LF; 15 to 25-foot cut	Fiber optic line parallels US 6 east of 19 th Street.
Qwest	Fiber	Relocate	1,100 LF; 25-foot cut	Relocate	1 realign; 10-foot cut	Relocate	1,100 LF; 25-foot cut	Relocate	1,100 LF; 25-foot cut	Multiple facilities parallel 19 th Street crossing US 6.
City of Golden	Storm	Adjust	1 extend / reinforce	Adjust	1 extend / reinforce	Adjust	1 extend / reinforce	Adjust	1 extend / reinforce	36-inch storm sewer crosses US 6 west of Heritage Road.

Notes: Relocate: Utility would need to be moved horizontally and/or vertically to maintain adequate clearance and avoid conflict.

Adjust: Utility would be affected by proposed improvement but no relocation is required.

Impacts common to Build Alternatives due to common sections of alignment are highlighted in green.

Linear Feet is abbreviated as LF.

No Action: Utility is within referenced alternative footprint but is not impacted.

Relocations and Adjustments given in Linear Feet are not tallied as Relocations or Adjustments in the Summary of Utility Impacts Table to avoid duplication.

Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. The exact location of these facilities is unknown and these estimates are subject to change once more detailed information becomes available.

Source: Compiled by Goodbee & Associates, Inc., 2005



4.16.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no roadway corridor improvements would be made; therefore, no utility impacts are anticipated. However, to accommodate increased development and population in the study area, new utilities will likely continue to be built and existing utilities will be replaced and improved.

4.16.2.2 IMPACTS COMMON TO ALL BUILD ALTERNATIVES

DIRECT IMPACTS

There are very few direct utility impacts common to all of the build alternatives. While many of the same utilities are crossed with the various build alternatives, the impacts differ. Most of the common impacts occur along US 6, three of which would require no action. Those requiring action would be a City of Golden storm line adjustment, a Colorado School of Mines fiber relocation, and relocation of a portion of the Welch Ditch owned by Consolidated Mutual Water.

INDIRECT EFFECTS

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect effects or long-term impacts.

4.16.2.3 FREEWAY ALTERNATIVE

DIRECT IMPACTS

Utility companies or municipalities with facilities impacted by the Freeway Alternative include:

- City of Golden—36-inch storm line adjustment.
- City of Arvada—27- and 30-inch raw water lines and Long Lake Ditch relocations.
- City of Westminster—Kinnear Ditch pipeline relocation.
- Colorado School of Mines—fiber relocation.
- Comcast—fiber relocation.
- Qwest—multiple fiber relocations and adjustments.
- Denver Water Department—42- and 54-inch aqueduct and S. Boulder Diversion Canal relocations.
- Level 3—fiber relocations.
- MCI Worldcom—fiber relocation.
- Qwest Long Lines—fiber relocations.
- Xcel Energy—two 115 kV tower relocations; one 230 kV tower relocation; and high-pressure gas relocations on pipelines varying from 6 inches to 20 inches in diameter.

Additionally, three ditch companies have facilities impacted by the Freeway Alternative:

- Church Ditch Company—at SH 128 west of Indiana Street.
- Consolidated Mutual Water—Welch Ditch at US 6 between SH 58 and 19th Street.
- Ralston Creek Canal—SH 93 north of W. 68th Avenue.

Major utility impacts for the Freeway Alternative include the relocation of 3 electric transmission towers, 1 utility adjustment, 16 utility relocations, and relocation of sections of fiber, gas, electric, water, and ditches.

INDIRECT EFFECTS

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect effects or long-term impacts.



4.16.2.4 TOLLWAY ALTERNATIVE

DIRECT IMPACTS

Utility companies or municipalities with facilities impacted by the Tollway Alternative include:

- City of Golden–36-inch storm line adjustment.
- City of Arvada–27- and 30-inch raw water lines and Long Lake Ditch adjustment and relocation.
- City of Westminster–Kinnear Ditch pipeline relocation.
- Colorado School of Mines–fiber relocation.
- Comcast–fiber relocation.
- Level 3–fiber relocations.
- MCI Worldcom–fiber relocations.
- Qwest Long Lines–fiber relocation.
- Xcel Energy–two 115 kV tower relocations; one 230 kV tower relocation; and five high pressure gas relocations on pipelines varying from 6 inches to 20 inches in diameter.

Additionally two ditch companies have facilities impacted by the Tollway Alternative:

- Church Ditch Company–at SH 128 west of Indiana.
- Consolidated Mutual Water–Welch Ditch at US 6 between SH 58 and 19th Street.

Major utility impacts for the Tollway Alternative include the relocation of three electric transmission towers, two utility adjustments, 13 utility relocations, and relocation of sections of fiber, gas, electric, water, and ditches.

INDIRECT EFFECTS

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect or long-term impacts.

4.16.2.5 REGIONAL ARTERIAL ALTERNATIVE

DIRECT IMPACTS

Utility companies or municipalities with facilities impacted by the Regional Arterial Alternative include:

- City of Golden–36-inch storm line adjustment.
- City of Arvada–27 inch raw water line relocations; Haines & Piquette Ditch and Long Lake Ditch relocations.
- City of Westminster–Kinnear Ditch pipeline relocation.
- City and County of Broomfield–McKay Ditch relocation.
- Colorado School of Mines–fiber relocation.
- Comcast–fiber relocation.
- Denver Water Department–42- and 54-inch aqueduct adjustment and S. Boulder Diversion Canal relocation (two locations).
- Level 3–fiber relocation.
- MCI Worldcom–fiber relocation.
- Qwest–multiple fiber relocations.



- Qwest Long Lines—fiber relocations.
- Town of Superior—water tank relocation.
- Xcel Energy—two 115 kV tower and line relocations; one 230 kV tower relocation; and high-pressure gas relocations and adjustment on pipelines varying from 6 inches to 20 inches in diameter.

Additionally three ditch companies have facilities impacted by the Regional Arterial Alternative:

- Church Ditch Company—at SH 128 west of Indiana.
- Consolidated Mutual Water—Welch Ditch relocation at US 6 between SH 58 and 19th Street and 20-inch/24-inch raw water line adjustment.
- Ralston Creek Canal—SH 93 north of W. 68th Avenue.

Major utility impacts for the Regional Arterial Alternative include the relocation of three electric transmission towers, six utility adjustments, 15 utility relocations, and relocation of sections of fiber, gas, electric, water, and ditches.

INDIRECT EFFECTS

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect effects or long-term impacts.

4.16.2.6 COMBINED ALTERNATIVE (RECOMMENDED ALTERNATIVE)

DIRECT IMPACTS

Utility companies or municipalities with facilities impacted by the Combined Alternative (Recommended Alternative) include:

- City of Golden—36-inch storm line adjustment.
- City of Arvada—27-inch, 30-inch, and 54-inch water line adjustments; 30-inch and 36-inch water line relocations; and Long Lake Ditch and Tucker Ditch relocations.
- City of Westminster—Kinnear Ditch pipeline relocations.
- Colorado School of Mines—fiber relocation.
- Comcast—fiber relocations.
- Denver Water Department—42- and 54-inch aqueduct adjustment.
- Level 3—fiber relocations.
- MCI Worldcom—fiber relocation.
- North Table Mountain Water and Sanitation District—24-inch sanitary relocation.
- Qwest—multiple fiber relocations.
- Qwest Long Lines—fiber relocations.
- Xcel Energy—two 115 kV tower and line relocations; one 230 kV tower relocation; and high pressure gas relocations and adjustment on pipelines varying from 6 inches to 20 inches in diameter.

Additionally four ditch companies and Coors have irrigation facilities impacted by the Combined Alternative (Recommended Alternative):

- Church Ditch Company—two relocations, at Indiana Street and at SH 128.
- Consolidated Mutual Water—Welch Ditch relocation at US 6 between SH 58 and 19th Street and 20-inch/24-inch raw water line adjustment.



- Farmers Reservoir and Irrigation Company—two relocations and one adjustment of Croke Canal; four relocations and two adjustments of Farmers Highline Canal.
- Coors—relocation of Wannamaker Ditch.
- Clark Lateral Ditch Company—one relocation.
- Clark North Ditch—one relocation.

Major utility impacts for the Combined Alternative (Recommended Alternative) include the relocation of three electric transmission towers, 13 utility adjustments, 27 utility relocations, and relocation of sections of fiber, gas, electric, water, and ditches.

INDIRECT EFFECTS

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would have no indirect effects or long-term impacts.

4.16.3 SUGGESTED MITIGATION

The No Action Alternative would have no utility impacts; therefore, mitigation measures do not apply.

Mitigation measures would be the same for all build alternatives. It is anticipated that many utility impacts could be mitigated through close coordination with utility owners. Relocations may be avoided by placing encasement for protection over a buried utility or through design modifications to avoid major utility impacts, such as the use of retaining walls, roadway profile variations, and/or horizontal alignment shifts. For those situations where relocations cannot be avoided, construction could be scheduled during low-use periods or in a manner that would minimize service disruption and/or travel delays to the public as much as possible.

4.16.4 SUMMARY

Each alternative has numerous utility impacts (see **Table 4.16-8**). Not all impacts and relocations are equal in terms of cost implications. It is possible that an alternative with a greater number of less expensive or less complicated relocations could be determined to be preferable to one with fewer relocations but more costly or complicated relocation issues. The number of transmission towers requiring relocation is called out specifically, because impacts to the large transmission towers can be extremely costly and time-consuming.

It is expected that all utility impacts would be short term, addressed prior to or during construction by relocation or adjustment, and would therefore have no residual or indirect effects or long-term impacts. Through mitigation, many utility impacts can be minimized or even avoided. As shown below, the Tollway Alternative ranks as being the best choice with the least overall impacts to utilities, while the Regional Arterial Alternative ranks the worst with the greatest overall impacts to utilities.



Table 4.16-8 Summary of Utility Impacts

Utility Impact	Alternative			
	Freeway	Tollway	Regional Arterial	Combined (Recommended)
Electric Transmission Towers Relocation/Adjustment ¹	3	3	3	3
Total Adjustments²	1	2	6	13
Total Relocations³	16	13	15	27
Estimated Linear Feet of Relocation/Adjustment				
Fiber Optic Line	25,900	11,000	113,700	32,600
High-Pressure Gas Line	3,700	3,700	5,300	6,900
Ditch	0	0	1,600	0
Electric Transmission Line	0	0	1,800	0
Water Pipeline	400	400	11,600	9,000
Total Estimated Linear Feet of Relocation/Adjustment⁴	30,000	15,100	134,000	48,500
Ranking (1= Best, 4=Worst)	2	1	4	3

Notes: ¹Electric transmission towers are not tallied as relocations or adjustments in **Table 4.16-8** to avoid duplication.

²Adjustments—Utility would be affected by the alternative but no relocation would be required.

³Relocations—Utility would need to be moved horizontally and/or vertically to maintain adequate clearance.

⁴Relocations and adjustments given in linear feet in **Table 4.16-1** to **Table 4.16-7** are not tallied as relocations or adjustments in **Table 4.16-8** to avoid duplication. Relocations and Adjustments given in Linear Feet are best estimates rounded to the nearest 100 feet for comparison purposes. We do not know the exact location of these facilities and these estimates are subject to change once more detailed information becomes available.

Source: *Compiled by Goodbee & Associates, Inc, 2006.*



REFERENCES

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Maps and data provided from various utility companies or municipalities as part of utility inventory.

Colorado Oil and Gas Conservation Commission. Available at:

www.oil-gas.state.co.us/Library/LeydenReports.html

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Colorado School of Mines Communications. Fiber and electricity Maps received from Gary Bowersock February 2, 2004.

Kerr McGee. Clear per Personal Communication with Chris Rhoton February 5, 2004.

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Church Ditch Company. Personal Communication with Kody Brooks March 29, 2004.

United Power. Received map by FAX from Ed Roush March 4, 2004.

Xcel. Received gas and electric maps February 7, 2004 and July 25, 2005.

Xcel. Received Overhead Electric Transmission maps from Kim Houston April 8, 2004.

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US Cable. Personal Communication Steven Lehane February 24, 2004 and Tony Smith July 29, 2005.

Leyden Xcel Gas Storage Facility. Personal Communication Liz Neimtschick, maps received February 19, 2004 and continued communication July 2005.

Qwest. Various field visits February to September 2004. Maps received Jody Farnsworth October 14, 2005.

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Colorado Department of Transportation Region 6. Received maps from Ken Gazbarri February 26, 2004.

Clark Ditch. Personal Communication with John Cowan March 1, 2004.

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McLeod USA. Personal Communication February 2004 and July 2005.

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National Renewable Energy Laboratory. Personal Communication with Maureen Jordan and David Sprowls February 18, 2004 and February 19, 2004 respectively.

City of Broomfield. Received maps March 23, 2004 from Dan Hartman.



City of Golden. Received maps from Kevin Stanbridge March 26, 2004.

City of Arvada. Received water, sanitary, and storm maps from Karen Crawford February 2004.

City and County of Broomfield. Received water and sanitary maps from Tyler Hando April 23, 2004 and April 2, 2004.

North Table Mountain Water and Sanitation. Received Maps via FAX February 2, 2004 and Personal Communication July 25, 2005.

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Superior Metro District. Received map showing location of water tank from Jeanne Boyle March 2004.

Northwest Lakewood Sanitation District. Maps received from Bert Eads of Ramey Environmental Compliance, Inc. July 26, 2004.

Metro Wastewater Reclamation District. Maps received from Sue Allegrezza July 26, 2005.

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Fruitdale Sanitation District. Personal Communication July 27, 2005.

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