UTILITIES TECHNICAL REPORT

FOR THE

6TH AVENUE PARKWAY EXTENSION ENVIRONMENTAL ASSESSMENT

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LIST OF ACRONYMS

E-470 ..... E-470 Tollway
EA..... Environmental Assessment
FHU ..... Felsburg Holt and Ullevig
NEPA..... National Environmental Policy Act
PVC ..... Polyvinyl Chloride
RCP ..... Reinforced Concrete Pipe
ROW..... Right-of-Way
SH 30 ..... State Highway 30

1. INTRODUCTION

This technical report has been prepared in support of the 6th Avenue Parkway Extension Environmental Assessment (EA) extending 6th Avenue from State Highway 30 (SH 30) to the E-470 Tollway (E-470). This technical memorandum evaluates the effects of the Proposed Action Alternative and the No Action Alternative with respect to utilities.

1.1 Proposed Action

The Proposed Action would extend the 6th Avenue Parkway for approximately 2 miles along a new alignment, connecting existing 6th Avenue/SH 30 to the west with the existing 6th Avenue Parkway at E-470 to the east. This would close a gap in the existing major arterial street system, reducing out of direction travel and improving the efficiency and reliability of the transportation system. The Proposed Action would be a six-lane arterial roadway with a raised median and sidewalks.

Six initial alternatives were developed and screened through three screening levels to identify the Proposed Action. The alternatives screening is summarized in **Appendix A1** *Alternatives Technical Report* of the EA. Details of the Proposed Action are presented in **Appendix A2** *Conceptual Design Plans* of the EA.

The Proposed Action is shown on **Figure 1**. Major elements of the Proposed Action are identified by number from west to east on **Figure 1**, and include the following:

Element 1. Tie into existing 6th Avenue/SH 30: 6th Avenue/SH 30 is an existing two-lane arterial. At the western end of the Proposed Action, a signalized "thru-tee" type intersection would be constructed connecting the Proposed Action roadway to existing 6th Avenue/ SH 30. This new signalized intersection would include bypass lanes for the eastbound SH 30 through movement or a thru-tee signalized intersection with bypass lanes for both the eastbound SH 30 through movement. The tie-in would be an urban curb and gutter section with three 12-foot travel lanes in each direction to connect to future 6-lane section to the west. A 10-foot sidewalk would be located on both the north and south sides of the roadway.

Element 2. Triple Creek Trail realignment and connections: A portion of the existing Triple Creek Trail would be realigned and would pass beneath the Proposed Action roadway which would be on a bridge at this location (see Element 3 in **Figure 1**). The Triple Creek Trail would be connected to 6th Avenue via a spur trail to the sidewalk constructed along the south side of the new roadway. The Triple Creek Trail is a 10–foot wide soft surface trail that serves equestrians, bicyclists and pedestrians. The realigned portion would match the existing width and surface. A 10-foot sidewalk on both sides of the bridge (Element 3) would provide connections to the trail. The southern terminus of the trail is currently at the Coal Creek Arena, and further extension to the south is planned by the City of Aurora.

Element 3. Roadway bridge over Sand Creek: Immediately east of the new intersection with existing 6th Avenue/SH 30 (Element 1 in **Figure 1**), the roadway would be elevated onto a six-lane bridge crossing over Sand Creek and its associated floodplain/floodway, and over the Triple Creek Trail. The bridge length and profile would be set to minimize impacts to Sand Creek, while still providing a minimum 10-foot vertical clearance over the Triple Creek Trail. The bridge would have a median and sidewalks. The bridge would be approximately 680 feet in length with 5 variable length spans supported on four piers. The bridge would be

designed to be compatible with the surrounding environment and to allow wildlife connectivity along Sand Creek and the Triple Creek Trail.

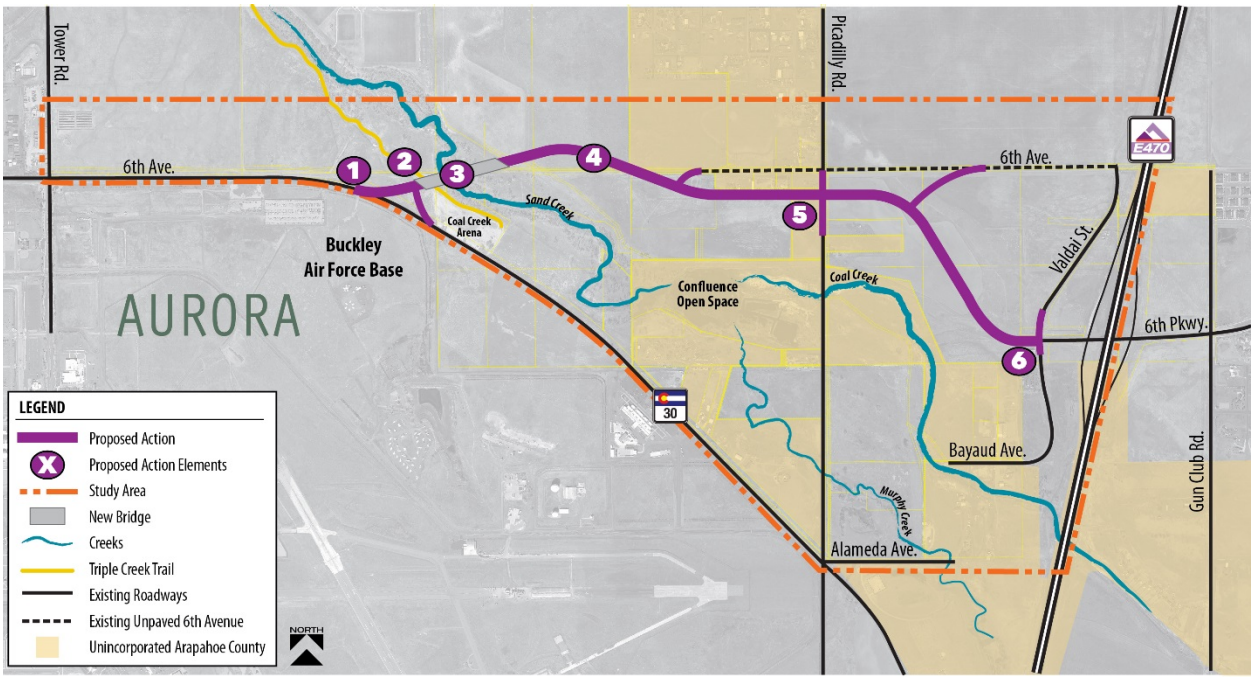
Element 4. 6th Avenue Parkway arterial roadway: The 6th Avenue Parkway extension would consist of a 144-foot wide, six-lane arterial roadway (three lanes in each direction) with a raised vegetated median. There would be curb and gutter and 10-foot wide sidewalks on the north and south sides of the roadway. The Proposed Action would provide two new access connections from the Proposed Action to two existing portions of 6th Avenue. One of these connections would provide access to the existing residences along unpaved 6th Avenue, west of Picadilly Road. The second connection would extend northeast from the Proposed Action to unpaved 6th Avenue to areas planned for development east of Picadilly Road.

Element 5. Intersection with Picadilly Road: The Proposed Action roadway would cross Picadilly Road, which is an existing north-south road. A signalized intersection would be constructed at this location. Picadilly Road is currently two lanes, but the City of Aurora anticipates that expansion to six lanes would occur in the future as a different project. Therefore, the intersection would be configured such that future expansion of Picadilly Road to six lanes can be accommodated and is not precluded.

Element 6. Tie into existing 6th Avenue Parkway at E-470: On its eastern end, the Proposed Action roadway would tie into the existing E-470 interchange, which currently truncates at this location, forming a connection with the existing 6th Parkway to the east of the interchange. The intersection tie-in at Valdai Street and 6th Avenue Parkway would be signalized. This connection would allow access from the west via the Proposed Action to the E-470 interchange and to the existing 6th Avenue Parkway extending to the east of E-470.

In addition to these transportation elements, the Proposed Action would include permanent roadway stormwater drainage with water quality features for roadway runoff and accommodate offsite stormwater flows. Details of drainage and water quality features are presented in **Appendix A6** *Floodplains and Drainage Assessment Technical Report* of the EA.

Figure 1 Proposed Action and Study Area



Note: Numbers in graphic correspond with text above.

1.2 No Action Alternative

If the Proposed Action is not selected for implementation, there would be no improvements made to 6th Avenue beyond the existing and committed transportation system. The No Action Alternative was carried forward as a baseline comparison for environmental analysis purposes.

2. UTILITY ANALYSIS

Merrick & Company, as a sub-consultant to Felsburg Holt and Ullevig (FHU), will provide utility design support for the overall project Scope of Services. Merrick & Company will provide within this report utility information gathered from utility agencies, potential conflicts, and recommendations.

This report presents a broad overview of utility agencies present in the surrounding areas.

The purpose of the analyses presented in this report is to identify the utility impacts associated with both the No Action and Proposed Action alternatives, and how to mitigate these potential impacts.

2.1 General Utility Information

Public and private utilities are typically located within the study area within separate or shared utility easements or within the public right-of-way. These include water, sewer, electrical (distribution), natural gas, communications, and fiber optic, located either above ground or underground. Since utilities generally parallel or are located within roadway corridors, impacts are a common occurrence with roadway improvements and require coordination early in the process. If impacts to utilities do occur, mitigation is required, usually consisting of adjustments or relocations. Adjustments and relocations need to be designed and verified with each utility agency during the preliminary and final design processes.

Several utilities are located within the study area. These include electrical (underground and overhead), telephone and communication (including fiber optic), gas, water, and sewer. Utility information was obtained from coordination with utility companies and City provided utility maps.

3. AFFECTED ENVIRONMENT

3.1 Related Plans and Policies

The National Environmental Policy Act (NEPA) requires projects with federal oversight to evaluate the environmental consequences of proposed actions. This includes impacts to existing infrastructure improvements, such as utilities.

3.2 Description of Existing Conditions

3.2.1 Electrical (Distribution)

Xcel Energy has underground one phase primary electrical distribution lines that follow the existing SH 30 alignment to the southeast. There are overhead three phase primary electrical lines along the east side of Picadilly Road running north-south within the study limits and along the north side of existing 6th Avenue running east-west to the west side of Picadilly Road. There are overhead lines located south of existing 6th Avenue and west of Picadilly Road that are in conflict with the proposed alignment. An underground one phase primary electrical distribution line near the east limits of the project near the intersection of Valdai Street and 6th Parkway may be in conflict.

3.2.2 Natural Gas

Xcel Energy has underground natural gas lines on the west and east limits of the project limits. These include the following:

- 2-inch gas main along the north side of existing 6th Avenue at the western limits of the project and continuing until it turns into the existing SH 30 alignment. There are potential conflicts with the proposed alignment.
- 2-inch gas main along the west side of Valdai Street, intersecting 6th Parkway servicing the E-470 Public Highway Authority offices may be in conflict as well.

Xcel does not anticipate any further lines in the study area at this time.

3.2.3 Telecommunications/Fiber Optics

Comcast

Comcast Cable has an underground fiber optic line running south along the east side of Picadilly Road to the intersection with existing 6th Avenue. The fiber optic line continues east along the existing 6th Avenue to the east towards Valdai Street. No future lines are expected in the study area at this time. It is anticipated that there will be conflicts with the proposed storm sewer alignment at the intersection with Picadilly Road.

Century Link

Century link has multiple underground telephone and fiber optic lines running along the existing 6th Avenue alignment on both the north and south sides of the road near Picadilly Road within the study area. At the intersection with Picadilly Road, fiber splits in all directions. Buried fiber optic lines continue north and south along Picadilly Road along the west side of the road within the study area. Buried fiber also continues west along the existing 6th Avenue on both the north and south sides of the road to the western project limits. The buried fiber running along the north side of existing 6th Avenue is a known shared conduit with Verizon. It is anticipated that there will be conflicts with the proposed storm sewer alignment at the intersection with Picadilly Road.

Verizon

Verizon has a minimum of four conduits running along the north side of existing 6th Avenue in a shared conduit with Century Link east of Picadilly Road. At the Picadilly Road and existing 6th Avenue intersection, three Verizon fiber optic lines continue north and south along the west side of Picadilly Road within the study limits. Additionally, Verizon has fiber lines running along the north side of existing 6th Avenue on the western limits of the study area and continuing south until it turns into SH 30. There is a potential for conflicts with the proposed storm sewer at the intersection with Picadilly Road and also with the proposed bridge piers at Sand Creek. No future lines are anticipated in the study area at this time.

Zayo Communications

Zayo has multiple trenched fiber optic lines running along the north side of SH 30 within the right-of-way from E-470 on the east side and continuing west until it turns into existing 6th Avenue at the western limits of the study area. There is a potential for conflicts with the proposed alignment in and around the western limits of the study area.

Special Telecommunication Considerations

Due to the proximity to Buckley Air Force Base, it is possible that buried fiber optic facilities may contain special highly sensitive federal government lines ("Black Lines"). This will be further investigated during the design process. If present, special care and relocation specifics need to be followed when dealing with these lines, and any relocation work will need to be coordinated through the military. Similarly, 9-1-1 emergency communication lines may be in the duct structure of one of the communication facilities, and special care and coordination efforts will need to be followed.

3.2.4 Potable Water Lines

There is a 30-inch potable water line within the study area that is owned by the City of Aurora. This 30-inch steel pipe follows the north side of existing 6th Avenue at the western limits of the study area and continues due east in a dedicated easement to existing 6th Avenue. The potable water line follows the north side of the roadway and continues to where 6th Avenue ends on the west side of E-470 and intersects with Valdai Street. At this location, the water line reduces to a 12-inch ductile-iron pipe continues south along Valdai Street to service the E-470 Public Highway Authority Building. The proposed roadway will cross the 30-inch water line twice, but the proposed improvements will be designed to avoid conflicts. There appears to be no conflicts with the proposed alignment at the 6th Parkway intersection.

3.2.5 Sanitary Sewer Line

There is a City of Aurora owned 42-inch reinforced concrete pipe (RCP) sanitary sewer interceptor located along Sand Creek and Murphy Creek within the study limits from the north until it reaches Picadilly Road. At Picadilly Road, near Murphy Creek, the sanitary sewer interceptor then follows the roadway south along the west side of the road, crossing Murphy Creek and continuing southeast. The interceptor crosses Picadilly Road south of the study limits. It is anticipated the proposed alignment would not conflict with the sanitary sewer interceptor.

3.2.6 Reuse Water Line

A 16-inch polyvinyl chloride (PVC) reuse water line parallels the 42-inch sanitary sewer interceptor pipe through the study area and is also owned by the City of Aurora. The reuse line would not conflict with the Proposed Action footprint, but would be in conflict with the proposed drainage systems near Sand Creek.

4. IMPACT EVALUATION

4.1 Methodology for Impact Evaluation

4.1.1 Description of Methodology Used

Methodology for impact evaluation involves review of proposed horizontal and vertical alignments. A field survey of existing utilities (including field locates and potholing) and general information collected from utility agencies assisted in identifying potential impacts to these utilities. **Appendix A** provides a compiled table of the impacts for insertion into the EA.

4.2 No Action Alternative

The No Action Alternative will not impact existing utilities as no changes will result if no improvements are made. Existing utilities could be impacted by future development.

4.3 Proposed Action

This project will change the existing conditions within the Study Area. From a utility standpoint, the primary potential impacts include:

1. Proposed grading changes over existing utilities: Proposed grading changes to support the new roadway will reduce or increase the cover (bury depth) over some of the existing utilities. In some cases, those utilities will need to be adjusted vertically or relocated to maintain the required cover. These utilities include: Xcel Energy, Comcast, Century Link, Verizon, and Zayo.
2. Physical conflicts of proposed roadway improvements with existing utilities: The proposed roadway improvements may conflict with existing utilities, such as poles, cabinets and boxes.
3. Proposed stormwater management facilities: The proposed roadway would require numerous drainage improvements that could conflict with existing utilities. These include: storm sewer systems, open channels, culverts for cross-drainage, and water quality facilities. In some cases, the required drainage improvements cannot be constructed without conflicting with existing utilities, so they would need to be relocated.
4. Proposed Sand Creek bridge: The proposed Sand Creek bridge drilled caissons and abutments have been located to avoid conflict with the known water line, but conflicts with an existing fiber option line occur. The drilled caissons would be spaced to avoid conflict with the 30-inch water line, but the water line would need to be protected during and after construction, including vibrations from the caisson drilling process

4.3.1 Impacts

Since the Proposed Action crosses primarily vacant land, utility impacts are expected to be minimal except at the east and west connections to the existing roadways and at the Picadilly Road crossing. In the development of the conceptual design for the Proposed Action, efforts have been made to avoid and minimize utility impacts to the extent feasible. This was done with the horizontal and vertical alignment decisions, decisions regarding the location of the Sand Creek bridge, and decisions regarding the types and locations of stormwater management facilities. To assist in avoiding and minimizing impacts to these utilities, coordination with the known utility companies in the area was conducted to obtain the latest information possible on the number, type and location of each utility within the corridor, as well as the relative costs and

difficulties associated with the relocation process. During final design, locator services and potholing will be conducted to provide more accurate information on underground utility locations to confirm whether or not conflicts exist.

The following utility impacts are anticipated as a result of the Proposed Action.

1. Proposed grading changes over existing utilities:
    a) At the eastern limits of the project alignment (Station 243+00 to Station 250+00), Xcel Energy has a 2-inch gas main and underground electric lines that may require lowering.
    b) At the western limits of the project (Station 144+00 to Station 156+00) there are potential utility conflicts with an Xcel Energy 2-inch gas line and Zayo Communications fiber optic cable.
2. Physical conflicts of proposed roadway improvements with existing utilities:
    a) There are potential conflicts with surface features (valves, manholes, cabinets, etc.) at the east and west connection points and at Picadilly Road
    b) From Station 190+00 to Station 211+00, there are impacts to Xcel Energy overhead power lines. The overhead lines may need to be relocated to avoid the proposed alignment. If so, required clearances will need to be provided between the relocated facility and existing buried facilities.
3. Proposed stormwater management facilities:
    a) The proposed storm sewer system and water quality facility near the roadway sump at Station 168+03 may require several small buried private utilities to be lowered. These include: 2-inch gas mains, communications, and cable lines.
    b) The 16-inch PVC re-use water line will need to be lowered near Stations 166+00 and 169+00 to facilitate proposed storm sewer. It is anticipated that this water line will need to be lowered approximately 3 feet for a length of 30 feet in two locations. This water line is owned by the City of Aurora and the lowering is not anticipated to impact private utility lines.
    c) At the proposed intersection with Picadilly Road (Station 211+00), there are potential conflicts between underground utilities (Century Link, Verizon, and Comcast) and the proposed storm sewer system and water quality facility.
4. Proposed Sand Creek bridge: As previously stated, the proposed Sand Creek bridge may conflict with an existing fiber optic line.

4.3.2 Mitigation

Where relocations are required due to conflicts with the Proposed Action, designs to relocate the utility will be developed with the utility company or public utility department. Utility adjustments that are required will be reviewed by each affected company or public utility department. Proper detours and advance notice will be coordinated with service providers to allow delivery of uninterrupted utility service during construction. **Appendix B** provides a compiled table of the mitigation measures for insertion into the EA.

5. REFERENCES

City of Aurora. 1997. 6th Avenue Water Line civil drawings. MK Centennial Engineering, Inc. December.

City of Aurora. 1998. Sand Creek and Murphy Creek Sanitary Sewer Interceptor. HDR Engineering, Inc.

Century Link. 2015. Horizontal alignments for utility agency lines near and around project area. February.

Comcast. 2015. Email correspondence with utility agent detailing location of underground lines. May.

Verizon. 2015. Phone and Email correspondence with basic horizontal alignments provided by utility agent. May.

Xcel Gas and Energy. 2015. Email correspondence with utility mapping information provided. May.

Zayo Communications. 2015. Email correspondence with utility agency and as-builts for utility within the project area. June.

Appendix A Resource Impact Table

Resource	Context	No Action Alternative	Proposed Action
Utilities	The study area has a number of existing utilities, including: ▪ Xcel Energy: Gas and electrical lines cross the project area at various locations including SH 30, Picadilly Road and 6th Parkway ▪ Comcast: Underground fiber optic cable along 6th Avenue and Picadilly Road ▪ Century Link: Multiple conduits running along the north side of existing 6th Avenue in a shared conduit with Century Link east of Picadilly Road, and north-south along Picadilly ▪ Verizon: Underground fiber optic cable runs east/west along 6th Avenue to Picadilly Road. Fiber runs north/south underground Picadilly Road ▪ Zayo Communications: Underground fiber optic cable running within right-of-way (ROW) of SH 30 and 6th Avenue west of project limits ▪ Potable Water Line. City of Aurora Water: 30" potable water line along existing 6th Avenue ▪ Sanitary Sewer. City of Aurora 42" RCP sanitary sewer interceptor along Sand Creek and Picadilly Road ▪ Re-Use Water Line. City of Aurora: 16" PVC reuse line along Sand Creek and Picadilly Road, parallel to the 42" sewer	Would result in no conflicts with the existing utilities	Would result in potential conflicts with existing utilities as follows: ▪ Xcel Energy: Potential conflicts with underground gas and electric lines along SH 30 and at 6th Parkway and E-470 ▪ Comcast: Possible conflicts with proposed storm sewer, which is included in the Proposed Action for roadway drainage, at the Picadilly Road and 6th Avenue intersection ▪ Century Link: Possible conflicts with proposed storm sewer, which is included in the Proposed Action for roadway drainage, at the Picadilly Road and 6th Avenue intersection and at the proposed bridge ▪ Verizon: Possible conflicts with proposed storm sewer, which is included in the Proposed Action for roadway drainage, at the Picadilly Road and 6th Avenue intersection ▪ Zayo Communications: Potential conflicts at the western limits of the project ▪ Potable Water Line: Proposed Action Alternative would not affect water main line. Protection at crossings and easement issues would be further investigated during preliminary design. ▪ Sanitary Sewer: Proposed Action Alternative would not affect sanitary sewer interceptor. Protection at crossings and easement issues would be further investigated during preliminary design.

Resource	Context	No Action Alternative	Proposed Action
			▪ Re-Use Water Line: A lowering would be required in two locations to facilitate storm sewer and drainage outfall to Sand Creek

Appendix B Resource Mitigation Table

Mitigation Category	Proposed Action Impact	Mitigation Commitments for the 6th Avenue Extension Project	Responsible Branch	Timing/Phase that Mitigation will be Implemented
Utilities	Grading changes, physical conflicts with utilities	Where relocations are required due to conflicts with the Proposed Action, designs to relocate the utility will be developed with the utility company or public utility department. Utility adjustments that are required will be reviewed by each affected company or public utility department. Proper detours and advance notice will be coordinated with service providers to allow delivery of uninterrupted utility service during construction.	City of Aurora	Prior to construction