

US 6 Bridges Design Build Project

Archaeology and Paleontology

Technical Report

US6 Bridges Design Build Project
BR 0061-083
Sub Account Number 18838 (CN)

Prepared for:
Colorado Department of Transportation
Federal Highway Administration

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Tables

Table 1: Summary of Previously and Currently Identified Archaeology and Paleontology Resource Impacts and Mitigation 10

List of Abbreviated Terms

<u>CDOT</u>	<u>Colorado Department of Transportation</u>
<u>CFR</u>	<u>Code of Federal Regulations</u>
<u>EB</u>	<u>eastbound</u>
<u>EIS</u>	<u>Environmental Impact Statement</u>
<u>FEIS</u>	<u>Final Environmental Impact Statement</u>
<u>FHWA</u>	<u>Federal Highway Administration</u>
<u>I-25</u>	<u>Interstate 25</u>
<u>RMP</u>	<u>Rocky Mountain Paleontology</u>
<u>ROD</u>	<u>Record of Decision</u>
<u>ROD2</u>	<u>Record of Decision 2</u>
<u>RTP</u>	<u>Regional Transportation Plan</u>
<u>SB</u>	<u>southbound</u>
<u>SHPO</u>	<u>State Historic Preservation Officer</u>
<u>US 6</u>	<u>6th Avenue</u>
<u>WB</u>	<u>westbound</u>

Project Background

The Project includes modifications to the roadway, interchanges, and bridges along 6th Avenue (US 6) between Sheridan Boulevard and the BNSF Railway in Denver, Colorado. The Colorado Department of Transportation (CDOT) is preparing a Reevaluation and Record of Decision (ROD2) to document the impacts of and mitigation for the Project.

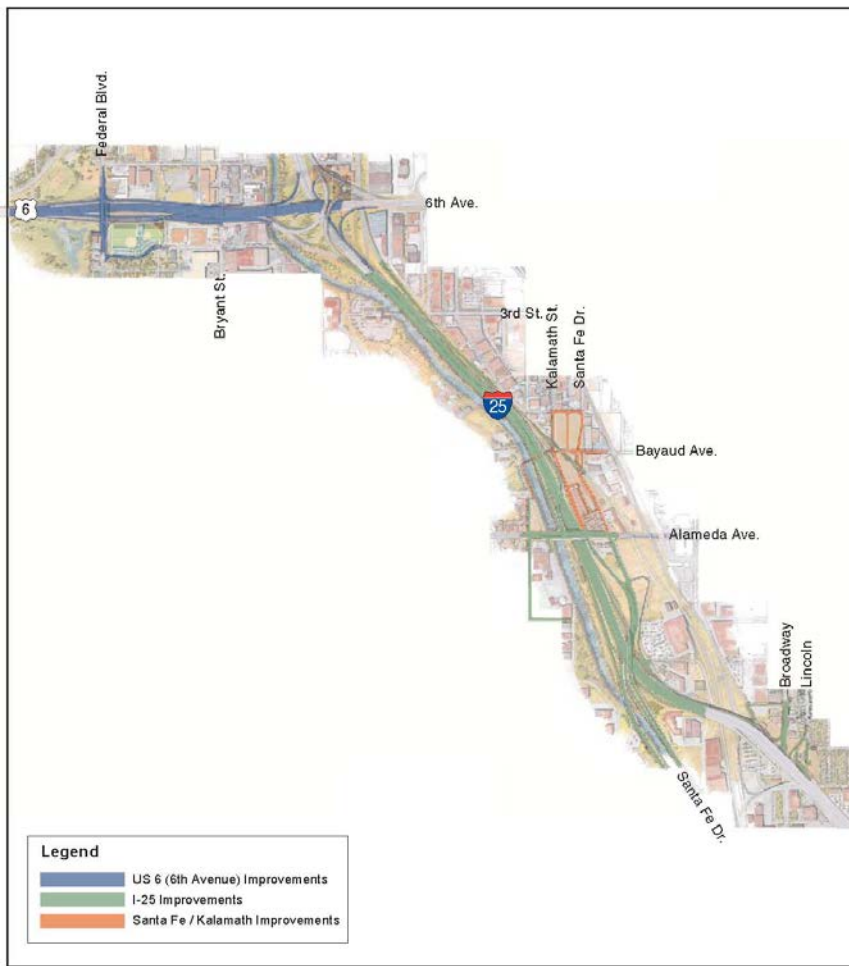
The Valley Highway Project

The Federal Highway Administration (FHWA) and CDOT prepared a Final Environmental Impact Statement (FEIS) in 2006 and a ROD in 2007 for the Interstate 25 (I-25) Valley Highway Project, located in Denver, Colorado. The Valley Highway Project includes the reconstruction of I-25 and reconfiguration of interchanges from Logan Street to United States Highway (US) 6, US 6 from I-25 to Federal Boulevard, and the crossing of Santa Fe Drive and Kalamath Street at the Consolidated Main Line railroad. The Preferred Alternative, as described in the FEIS, includes the following elements:

- I-25 Mainline: Widening of I-25 to provide a consistent section with four through lanes plus auxiliary lanes in each direction throughout the project area
- I-25/Broadway: Tight diamond interchange
- I-25/Santa Fe Drive: Single point urban interchange with a flyover ramp for northbound Santa Fe Drive to northbound I-25
- I-25/Alameda/Santa Fe/Kalamath: Offset partial urban interchange at I-25 and Alameda Avenue; Santa Fe Drive and Kalamath Street grade separated under the railroad close to their current alignments
- US 6: Ramp improvements at the I-25/US 6 interchange; closure of the Bryant Street interchange; diamond interchange at US 6/Federal Boulevard with slip ramps to Bryant Street and a braided ramp from Federal Boulevard to eastbound US 6; reconstruction of US 6 with collector-distributor roads/auxiliary lanes throughout the project area

The Preferred Alternative of the Valley Highway Project is shown in Figure 1.

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Figure 1: I-25 Valley Highway Project Preferred Alternative

US 6 Bridges Design Build Project

The Project includes the reconstruction of US 6, reconfiguration of interchanges from Federal Boulevard to I-25, and replacement of the US 6 bridges from Federal Boulevard to the bridge over the BNSF Railway. More specifically, the Project includes the following elements:

- The replacement of five bridges along US 6: Federal Boulevard, Bryant Street, South Platte River, I-25, and BNSF Railway. Three of these bridges are in poor condition and the other two are functionally obsolete. The project would also add a tunnel immediately east of I-25 under US 6 to separate traffic on northbound I-25 from traffic exiting the interstate to travel east and west on US 6.
- Ramp improvements at the I-25/US 6 interchange, closure of the westbound (WB) US 6 to Bryant Street ramp, a diamond interchange at US 6/Federal Boulevard with slip ramps to Bryant Street, and a braided ramp from Federal Boulevard to eastbound (EB) US 6.
- Reconstruction of US 6 with collector-distributor roads/auxiliary lanes from Federal Boulevard to the BNSF Railway bridge structure
- Conversion of 5th Avenue to two-way traffic from Federal Boulevard to Decatur Street
- Widening of Federal Boulevard, from five to six lanes, from 5th to 7th Avenues to accommodate current and future improvements
- Pavement resurfacing of US 6 from Knox Boulevard to Sheridan Boulevard
- In-kind replacement of impacted facilities for Barnum East Park
- A bicycle/pedestrian bridge structure over US 6, connecting Barnum North Park and Barnum Park (also known as Barnum Park South, and herein referred to as Barnum Park South)
- Upgrading portions of the South Platte River Trail to current standards

Figure 2 shows the Project.

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Figure 2: Project

Relationship of the Valley Highway Project and the US 6 Bridges Design Build Project

At the time of the FEIS, funding had not been identified for the entire Preferred Alternative. Although budget placeholders were included in the 2030 Regional Transportation Plan (RTP), these budgets fell short of the estimated cost of the Preferred Alternative. Therefore, FHWA and CDOT planned for a phased implementation of the Preferred Alternative. These six phases are outlined in Chapter 7 of the FEIS. The ROD2 for the Project will reevaluate part of Phase 1 (the part including the US 6/Federal Boulevard interchange) as presented in the 2007 ROD, and provide a decision for Phase 5 of the Valley Highway Project. The ROD2 for the Project will also address six new, minor project elements, which were not part of the FEIS. Due to the minor environmental significance and nature of these additional components, they are included in the ROD2 and will not affect the independent utility, logical termini, or Preferred Alternative of the Valley Highway Project.

Phasing of the FEIS Preferred Alternative

The Project includes elements of two of the six construction phases—Phase 1 and Phase 5—from the Valley Highway Project. A decision on construction Phase 1 of the Valley Highway Project, which included the US 6/Federal Boulevard bridge and ramps, excluding the braided ramp, was made in the 2007 ROD. Figure 3 shows the phases of the Valley Highway Project's Preferred Alternative and Figure 4 shows the Project Elements and how they relate to the FEIS phasing.

Additional Project Elements in the Project

At this time, the Project includes six additional elements that were not included in the FEIS or 2007 ROD:

- Reconstruction of the southbound (SB) I-25 to EB US 6 ramp;
- A bicycle/pedestrian bridge structure over US 6, connecting Barnum North and Barnum South parks;
- Replacement of the US 6 bridge over Bryant Street;
- Replacement of the US 6 bridge over I-25;
- Replacement of the US 6 bridge over the BNSF Railway; and
- Pavement resurfacing of US 6 between Sheridan Boulevard and Knox Court

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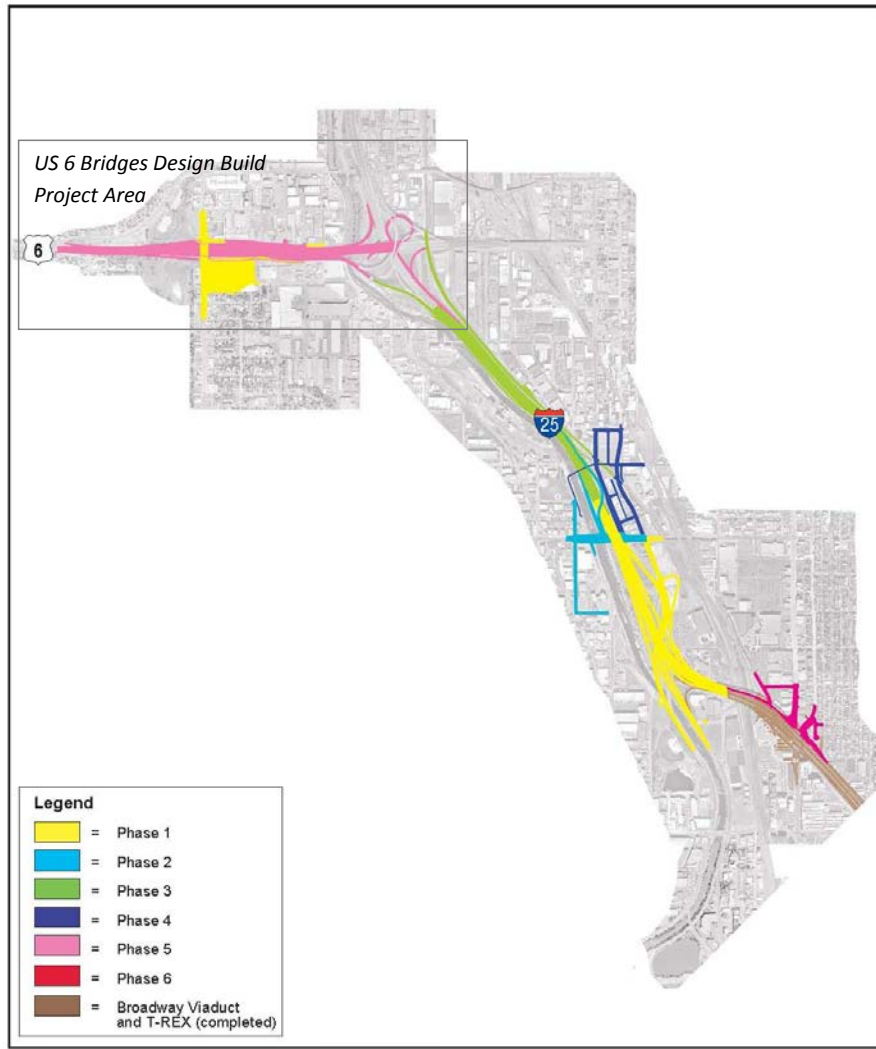


Figure 3: FEIS Phased Implementation of the Preferred Alternative

(source: I-25 Valley Highway FEIS)

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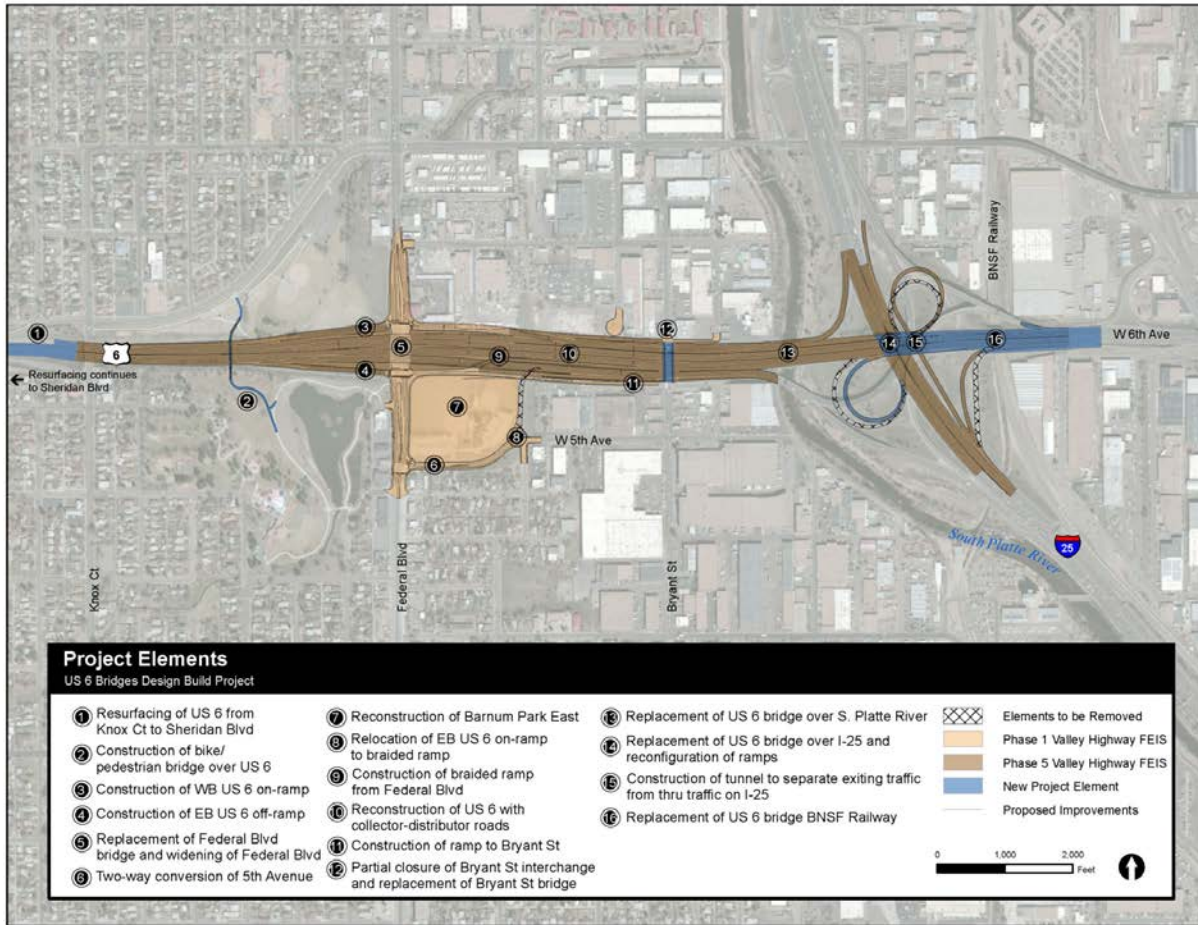


Figure 4: Project Elements

List of Abbreviated Terms

AADT	Annual Average Daily Traffic
ADA	Americans with Disabilities Act
AM	morning
APCD	CDPHE Air Pollution Control Division
BMP	best management practice
CAA	Clean Air Act
CCD	City and County of Denver
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHS	Colorado Historical Society
CML	Consolidated Main-Line railroad
CO	carbon monoxide
DPM	Diesel Particulate Matter
DRCOG	Denver Regional Council of Governments
EB	eastbound
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
HEI	Health Effects Institute
I-25	Interstate 25
IGA	intergovernmental agreement
IRIS	Integrate Risk Information System
ITS	intelligent transportation system
LOS	level of service
MS4	municipal separate storm sewer system
MSAT	Mobile Source Air Toxic
MVRTP	Metro Vision Region Transportation Plan
NAAQS	National Ambient Air Quality Standard
NAC	Noise Abatement Criteria
NB	northbound
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
OAQPS	Office of Air Quality Planning and Standards
PM	afternoon/evening
PM _{2.5}	Particulate matter smaller than 2.5 microns in diameter
PM ₁₀	particulate matter less than 10 microns in size
PUC	Public Utilities Commission
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision

RTD	Regional Transportation District
RTP	Regional Transportation Plan
SB	southbound
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
TIP	Transportation Improvement Program
T-REX	Transportation Expansion Project
US 6	6 th Avenue
USACE	US Army Corps of Engineers
USC	US Code
USDOI	US Department of Interior
USFWS	US Department of Interior Fish and Wildlife Service
WB	westbound

Project Background

The Proposed Project includes modifications to the roadway, interchanges, and bridges along 6th Avenue (US 6) between Sheridan Boulevard and the BNSF Railway in Denver, Colorado. The Colorado Department of Transportation (CDOT) is preparing a Reevaluation and Record of Decision (ROD) to document the impacts of and mitigation for the Proposed Project.

The Valley Highway Project

The Federal Highway Administration (FHWA) and CDOT prepared a Final Environmental Impact Statement (FEIS) in 2006 and a ROD in 2007 for the Interstate 25 (I-25) Valley Highway Project, located in Denver, Colorado. The Valley Highway Project includes the reconstruction of I-25 and reconfiguration of interchanges from Logan Street to United States Highway (US) 6, US 6 from I-25 to Federal Boulevard, and the crossing of Santa Fe Drive and Kalamath Street at the Consolidated Main Line railroad. The Preferred Alternative, as described in the FEIS, includes the following elements:

- I-25 Mainline: Widening of I-25 to provide a consistent section with four through lanes plus auxiliary lanes in each direction throughout the project area
- I-25/Broadway: Tight diamond interchange
- I-25/Santa Fe Drive: Single point urban interchange with a flyover ramp for northbound Santa Fe Drive to northbound I-25
- I-25/Alameda/Santa Fe/Kalamath: Offset partial urban interchange at I-25 and Alameda Avenue; Santa Fe Drive and Kalamath Street grade separated under the railroad close to their current alignments
- US 6: Ramp improvements at the I-25/US 6 interchange; closure of the Bryant Street interchange; diamond interchange at US 6/Federal Boulevard with slip ramps to Bryant Street and a braided ramp from Federal Boulevard to eastbound US 6; reconstruction of US 6 with collector-distributor roads/auxiliary lanes throughout the project area

The Preferred Alternative of the Valley Highway Project is shown in Figure 1.

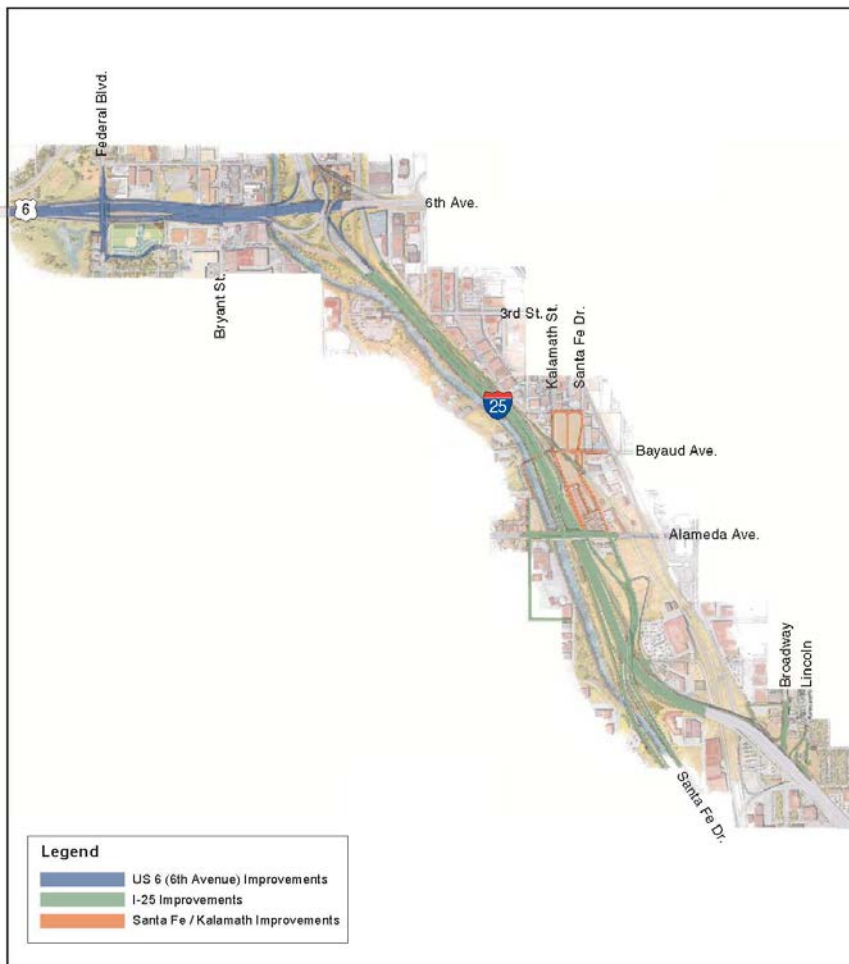


Figure 1: I-25 Valley Highway Project Preferred Alternative

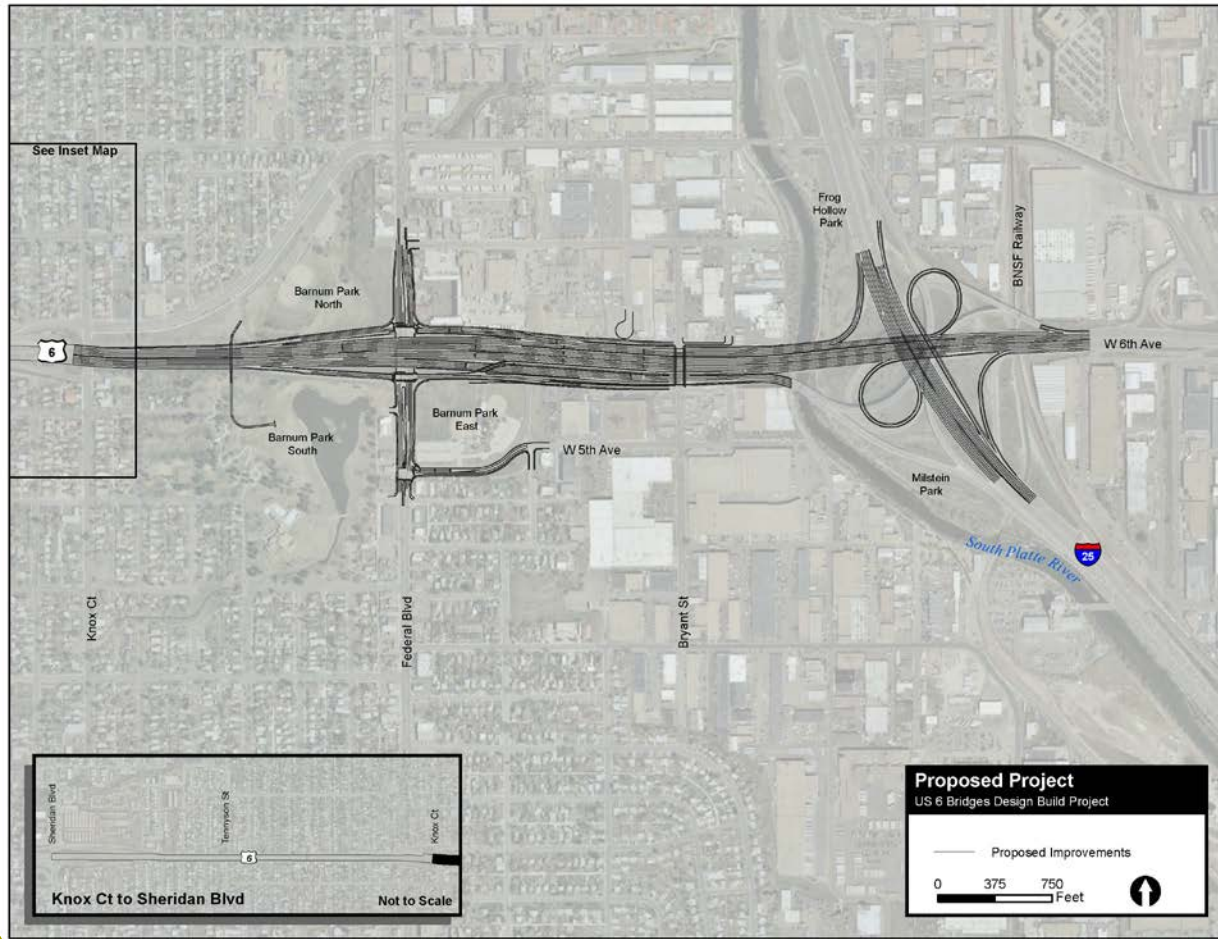
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US 6 Bridges Design-Build Project

The Proposed Project includes the reconstruction of US 6, reconfiguration of interchanges from Federal Boulevard to I-25, and replacement of the US 6 bridges from Federal Boulevard to the bridge over the BNSF Railway. More specifically, the Proposed Project includes the following elements:

- The replacement of five bridges along US 6: Federal Boulevard, Bryant Street, South Platte River, I-25, and BNSF Railway. Three of these bridges are in poor condition and the other two are functionally obsolete. The project would also add a tunnel immediately east of I-25 under US 6 to separate traffic on northbound I-25 from traffic exiting the interstate to travel east and west on US 6.
- Ramp improvements at the I-25/US 6 interchange, closure of the westbound (WB) US 6 to Bryant Street ramp, a diamond interchange at US 6/Federal Boulevard with slip ramps to Bryant Street, and a braided ramp from Federal Boulevard to eastbound (EB) US 6.
- Reconstruction of US 6 with collector-distributor roads/auxiliary lanes from Federal Boulevard to the BNSF Railway bridge structure
- Conversion of 5th Avenue to two-way traffic from Federal Boulevard to Decatur Street
- Widening of Federal Boulevard, from five to six lanes, from 5th to 7th Avenues to accommodate current and future improvements
- Pavement resurfacing of US 6 from Knox Boulevard to Sheridan Boulevard
- In-kind replacement of impacted facilities for Barnum East Park
- A bicycle/pedestrian bridge structure over US 6, connecting Barnum North Park and Barnum Park (also known as Barnum Park South, and herein referred to as Barnum Park South)
- Upgrading portions of the South Platte River Trail to current standards

Figure 2 shows the Proposed Project.



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Figure 2: Proposed Project

Relationship of the Valley Highway Project and the US 6 Bridges Design-Build Project

At the time of the FEIS, funding had not been identified for the entire Preferred Alternative. Although budget placeholders were included in the 2030 Regional Transportation Plan (RTP), these budgets fell short of the estimated cost of the Preferred Alternative. Therefore, FHWA and CDOT planned for a phased implementation of the Preferred Alternative. These six phases are outlined in Chapter 7 of the FEIS. The Reevaluation and ROD for the Proposed Project will reevaluate part of Phase 1 (the part including the US 6/Federal Boulevard interchange) as presented in the 2007 ROD, and provide a decision for Phase 5 of the Valley Highway Project. The Reevaluation and ROD for the Proposed Project will also address six new project elements, which were not part of the FEIS. Due to the minor environmental significance and nature of these additional components, they are included in the Reevaluation and ROD and will not affect the independent utility, logical termini, or Preferred Alternative of the Valley Highway Project.

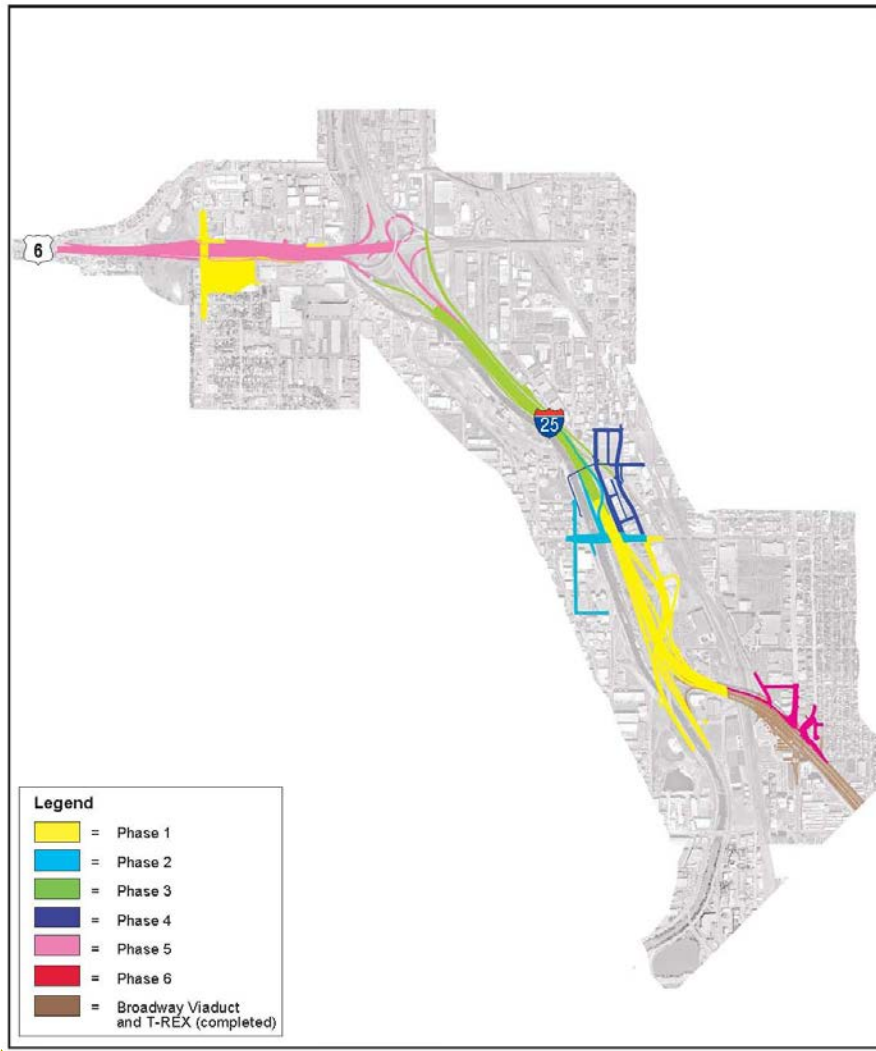
Phasing of the FEIS Preferred Alternative

The Proposed Project includes elements of two of the six construction phases—Phase 1 and Phase 5—from the Valley Highway Project. A decision on construction Phase 1 of the Valley Highway Project, which included the US 6/Federal Boulevard bridge and ramps, excluding the braided ramp, was made in the 2007 ROD. Figure 3 shows the phases of the Valley Highway Project's Preferred Alternative and Figure 4 shows the Proposed Project Elements and how they relate to the FEIS phasing.

Additional Project Elements in the Proposed Project

At this time, the Proposed Project includes six additional elements that were not included in the FEIS or 2007 ROD:

- Reconstruction of the southbound (SB) I-25 to EB US 6 ramp;
- A bicycle/pedestrian bridge structure over US 6, connecting Barnum North and Barnum South parks;
- Replacement of the US 6 bridge over Bryant Street;
- Replacement of the US 6 bridge over I-25;
- Replacement of the US 6 bridge over the BNSF Railway; and
- Pavement resurfacing of US 6 between Sheridan Boulevard and Knox Court



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Figure 3: Valley Highway EIS Phased Implementation of the Preferred Alternative

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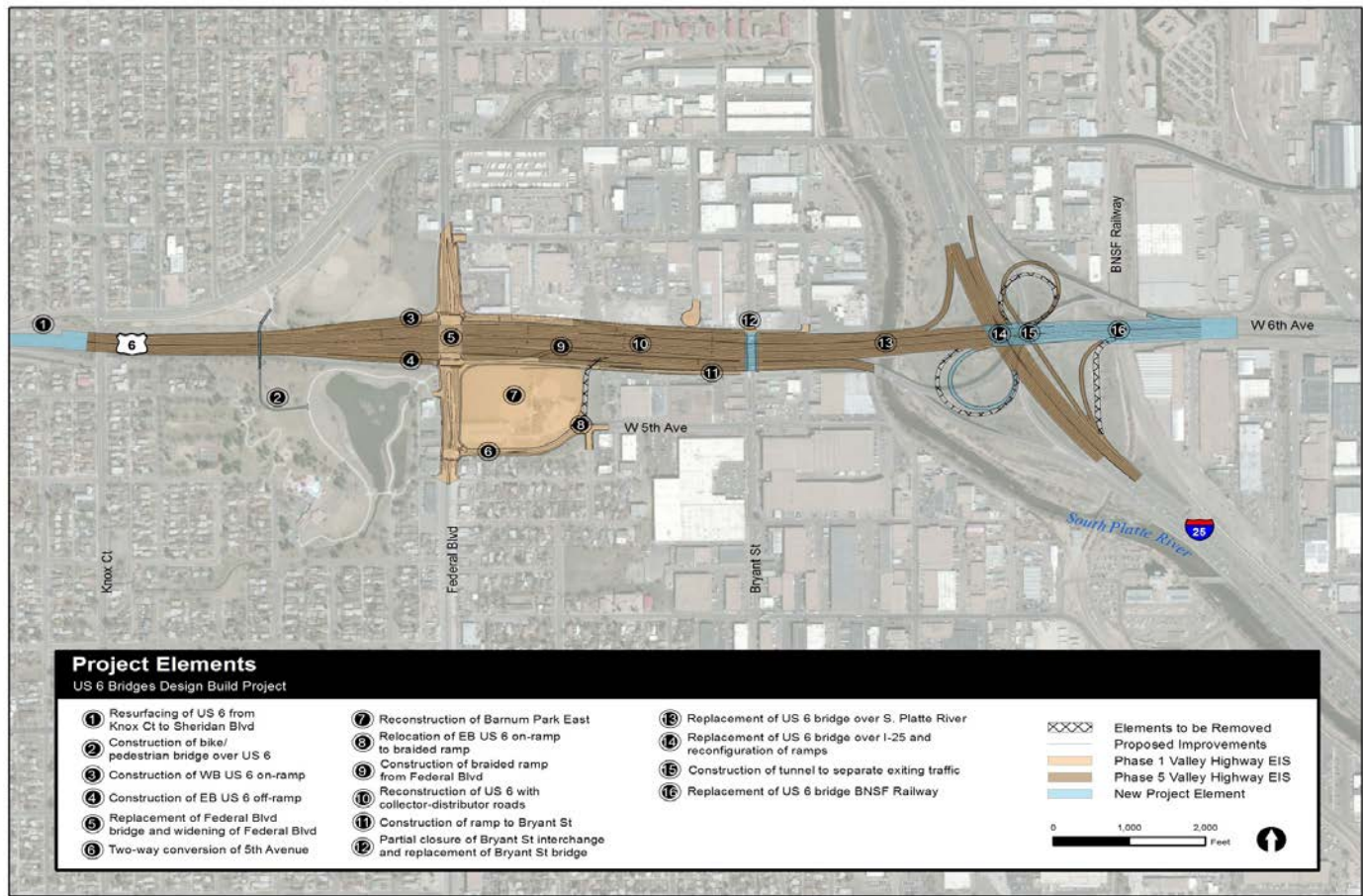


Figure 4: Proposed Project Elements

Archaeology and Paleontology Introduction

The US 6, BNSF Bridge/I-25 to Knox Court, project will implement improvements along US 6 that were identified in the I-25 Valley Highway Final Environmental Impact Statement (FEIS; FHWA and CDOT 2006) Preferred Alternative. Part of the improvements (the US 6 portion of Phase 1 of the Preferred Alternative) were approved for implementation in a 2007 Record of Decision (2007 ROD; CDOT and FHWA). The remainder (Phase 5 of the Preferred Alternative) will be included in an additional ROD currently being prepared by CDOT and FHWA.

This project includes bridge replacement, highway reconstruction, interchange improvements and associated elements such as utility relocations and water quality improvements. The project area (referred to herein as the US 6 project area) is shown in Figure 3. Project construction activities will be conducted within the area shown on this figure.

Impacts to archaeological and paleontological resources from the US 6 BNSF Bridge/I-25 to Knox Court project were previously analyzed as part of the I-25 Valley Highway FEIS. Mitigation measures, where appropriate, were identified in the FEIS and 2007 ROD. A summary of the impacts and mitigation measures identified in the FEIS/2007 ROD is provided below.

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Paleontology

Existing Conditions

A paleontological resource investigation of the I-25 Valley Highway project area, which includes the US 6 project area, was completed in 2003 by Rocky Mountain Paleontology (RMP) (RMP 2003). The US 6 project area is located in Pleistocene to Holocene age Broadway Alluvium, Piney Creek Alluvium, and Post-Piney Creek Alluvium. The paleontological sensitivity of all of these alluvial formations is low with a class 2 probable fossil yield classification (RMP 2003; FHWA and CDOT 2006). Within the US 6 project area, the alluvial formations extend to a depth of approximately 3-30 feet depth below ground surface (bgs) and are underlain by the fossiliferous Denver Formation.

No fossils were found during the field survey; however, previously documented scientifically significant fossils have been reported in the vicinity of the project area from late Pleistocene age alluvial deposits and rocks of the Denver Formation (RMP 2003; FHWA and CDOT 2006).

Mitigation

Construction monitoring of areas where Denver Formation rocks may be disturbed will be conducted, as appropriate. As project design plans are finalized, the CDOT paleontologist will review them to evaluate the extent of impacts to the Denver Formation, and the scope of monitoring work, if any, which is required.

Although the paleontologic sensitivity of the surficial deposits within the project area is low because they typically contain few fossils, construction personnel will be made aware of the potential to encounter fossils while excavating. If any sub-surface bones, leaf impressions, or other potential fossils

are found during construction, the CDOT paleontologist will be notified immediately to assess their significance and make further recommendations.

Archaeology

Existing Conditions

Due to intensive urban development over the past 140 years in the project area, no archaeological sites are known to exist in the project area (FHWA and CDOT 2006). According to the FEIS (FHWA and CDOT 2006), no impacts to archaeological resources are expected.

Mitigation

Mitigation measures and monitoring commitments that were identified in the FEIS and [2007](#) ROD (FHWA and CDOT 2006, 2007) included the following: If historic or archaeological materials are encountered or unearthed during construction, work will be halted immediately in the vicinity of the find, and the CDOT Senior Archaeologist will be notified promptly. The location of the find will be secured and work will be suspended in that area until it can be evaluated and/or removed by a qualified professional archaeologist. If warranted, additional archaeological testing or data recovery may be necessary before work can be resumed in the vicinity of the find.

If bones of potential human origin are encountered during construction, ground disturbing work will be halted in the vicinity of the discovery, and the CDOT archaeologist will be promptly notified. The CDOT archaeologist will assess the find, and the county coroner would be summoned if necessary to determine the relative age and ethnicity of the individual(s) represented. Work will not resume in the vicinity of the find until clearance is granted by CDOT.

Table 1: Summary of Previously and Currently Identified Archaeology and Paleontology Resource Impacts and Mitigation

Resource	FEIS and 2007 ROD		US 6 Bridges Design Build Project: What Has Changed	US 6 Bridges Design Build Project	
	Impacts of Proposed Action	Mitigation		Impacts of Proposed Action	Mitigation
Archaeology	No impacts are expected.	If historic or archaeological materials are encountered or unearthed during construction, work will be halted immediately in the vicinity of the find, and the CDOT archaeologist or cultural resource staff, and the SHPO, will be notified promptly.	No additional impacts to archaeological resources are anticipated.	Same as FEIS/2007 ROD.	<p>If historic or archaeological materials are encountered or unearthed during construction, work will be halted immediately in the vicinity of the find, and the CDOT archaeologist or cultural resource staff, and the SHPO, will be notified promptly. This process is outlined in Section 107.23 of CDOT's Standard Specifications for Road and Bridge Construction for procedures regarding unexpected discoveries during construction.</p> <p>Follow process outlined in 36 CFR 800.12 regarding Section 106 compliance during emergency situations.</p>

Resource	FEIS and 2007 ROD		US 6 Bridges Design Build Project: What Has Changed	US 6 Bridges Design Build Project	
	Impacts of Proposed Action	Mitigation		Impacts of Proposed Action	Mitigation
Paleontology	Denver Formation fossils may be encountered during construction.	CDOT paleontologist to examine final design plans to determine the extent of impact to the Denver Formation, and the scope, if any, of monitoring required.	No additional impacts to paleontology resources are anticipated.	Same as FEIS/2007 ROD.	Provide the CDOT paleontologist final design plans for examination to determine the extent of impact to the Denver Formation, and the scope, if any, of monitoring required prior to construction. If subsurface bones or other potential fossils are discovered, the contractor shall halt work and contact CDOT Staff Paleontologist to assess significance and make recommendations.

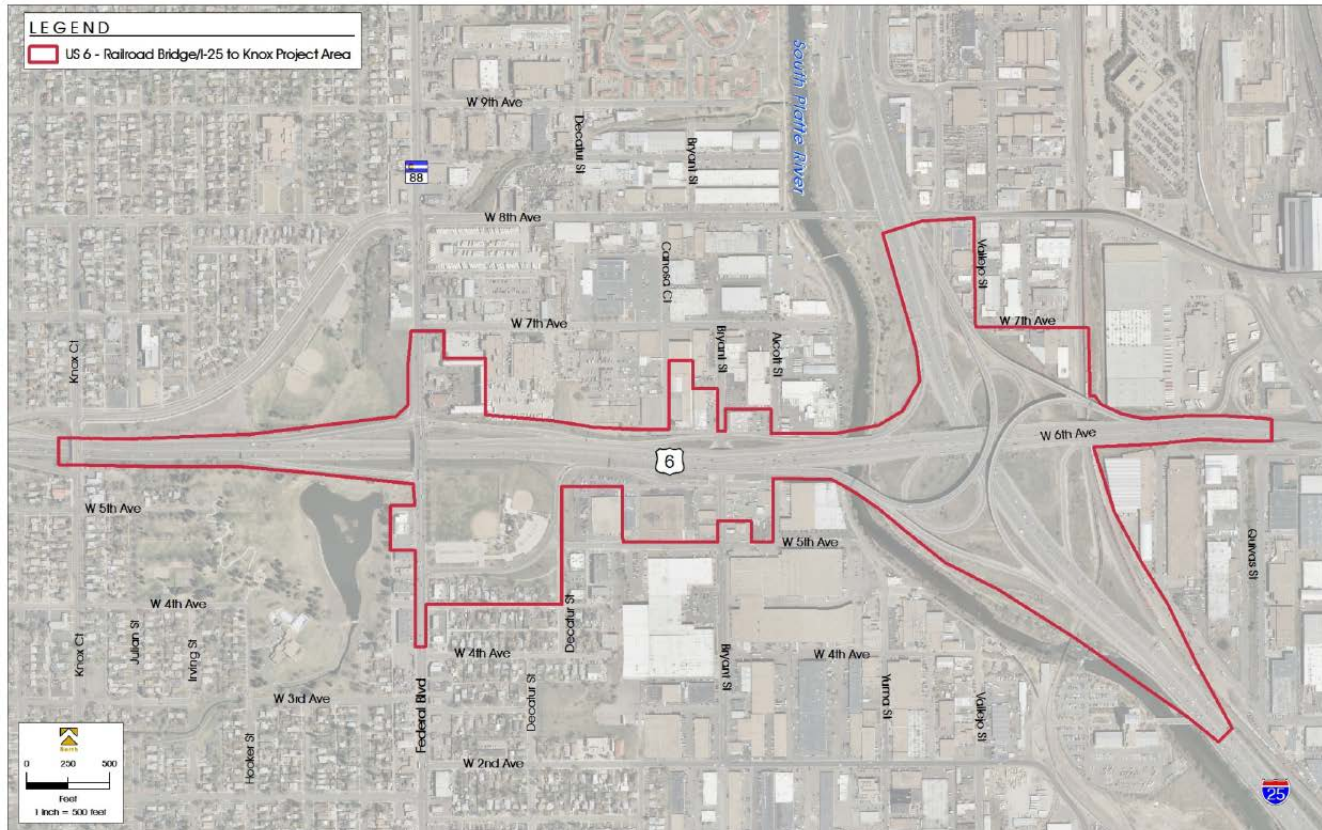


Figure 3. Archaeology and Paleontology Project Area

References

FHWA and CDOT. 2006. Final Environmental Impact Statement for the Valley Highway: Logan Street to 6th Avenue Project. November.

FHWA and CDOT. 2007. Record of Decision for the Valley Highway: Logan Street to 6th Avenue Project. July.

Rocky Mountain Paleontology (RMP). 2003. Paleontology Survey Report for the Valley Highway (Logan to 8th Avenue) EIS, City and County of Denver, Colorado. Paul C. Murphey. August 10.