Water Quality and Floodplains Technical Report Addendum

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Federal Highway Administration
Colorado Department of Transportation

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LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
BMP	Best Management Practice
CBC	Concrete Box Culvert
cfs	Cubic feet per second
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
lbs	Pounds
PEIS	Programmatic Environmental Impact Statement
RCP	Reinforced Concrete Pipe
ROW	Right of Way
SH	State Highway
TSS	Total Suspended Solids
WQCV	Water Quality Capture Volume

1.0 INTRODUCTION

This document supplements the *Water Quality and Floodplains Technical Report, October 2008* originally submitted as part of the Draft Environmental Impact Statement (EIS). This addendum provides documentation of the water quality and floodplains impacts associated with the Preferred Alternative. Previously, the Draft EIS assessed the water quality impacts for Package A, Package B, and the No-Action Alternatives.

The Preferred Alternative is a multi-modal solution with highway, rail and bus improvements. The Preferred Alternative includes I-25 interchange reconstructions, addition of general purpose lanes, tolled express lanes and express bus service on I-25, commuter rail along the Burlington Northern Santa Fe (BNSF) Railway tracks between Fort Collins and the Regional Transportation District (RTD) FasTracks North Metro end-of-line station in Thornton, and commuter bus along US 85 between Greeley and downtown Denver.

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2.0 WATER QUALITY REGULATIONS

The previous *Water Quality and Floodplains Technical Report (FHU, 2008)* addressed various water quality regulations that would apply to Packages A and B. The same regulations apply to the Preferred Alternative. This section provides details on the regulations that have been updated since the previous technical report was issued.

2.1 Stream Impairments

The Colorado Department of Public Health and Environment (CDPHE) is required by the Clean Water Act to develop a list of water quality limited segments requiring total maximum daily loads (TMDLs). The list is updated biennially. The majority of the impairments in the project area are associated with Escherichia coli (*E. coli*) and selenium. *E. coli* impairments in Colorado streams are generally derived from animal waste (CDPHE, 2006c). Although selenium is a naturally occurring element that is found in rocks, soils, and water, it can be harmful to certain aquatic fish and wildlife species when concentrations are only slightly elevated above normal levels (Lemly, 2002). In general, accelerated selenium mobilization can be associated with subsurface irrigation drainage systems that are incorporated in agricultural fields to prevent excess salt-build-up in soils. An updated map of impaired streams in the project area is presented in **Figure 2-1**.

Since the Draft EIS and supporting technical report was issued in 2008, CDPHE released the revised Regulation 93 (CDPHE, 2010) and the following changes in surface water impairments have been identified within the project area:

<u>Cache la Poudre:</u>

- Segment 12 – E. coli (added)
- Segment 13a – E. coli (added)

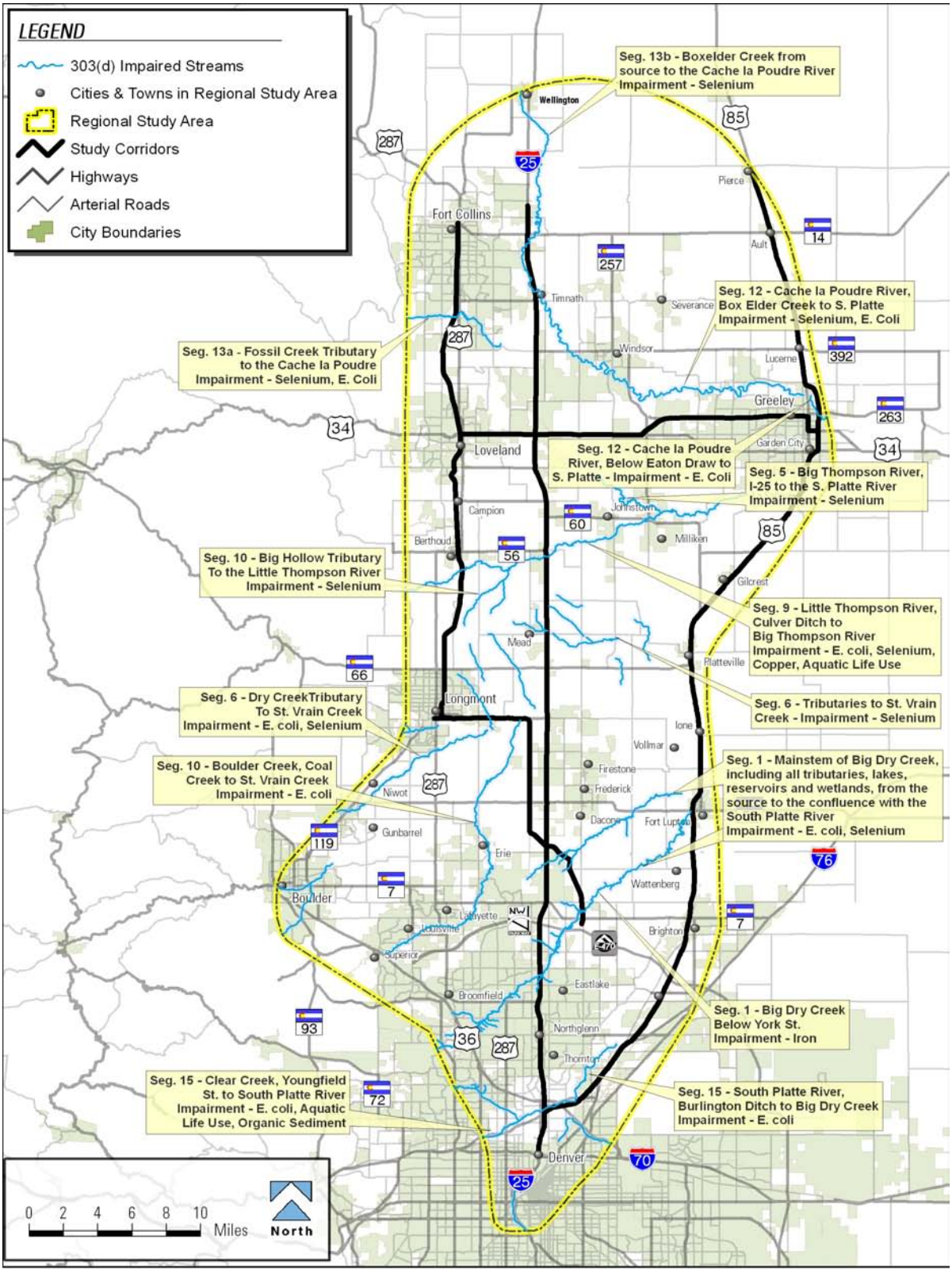
<u>Big Thompson</u>

- Segment 5 – Ammonia (removed)
- Segment 9 – Copper, Aquatic Life Use (added)

Because E. coli is a bacteria that comes from human and other animal sources, it can be detected in stormwater runoff, but is not generally associated with highway activities. Copper can be generated as a result of metal plating, bearing wear, engine parts, brake lining wear, fungicides and insecticides, and is generally associated with highway activities. Since Segment 9 in the Big Thompson Watershed is downstream of I-25, copper generated in stormwater from the Preferred Alternative could affect this segment. Details of potential copper impacts are discussed in **Section 3.0** and mitigation measures are presented in **Section 5.0**. Aquatic life use impairments indicate that native fish species have declined in the stream system as compared to historical conditions, but the decline is not associated with highway activities.

Other existing water quality regulations remain as presented in the Draft EIS.

Figure 2-1 Impaired Streams in the Project Area



3.0 WATER QUALITY IMPACTS

This section presents water quality impacts associated with the Preferred Alternative for both surface water and groundwater. Mitigation measures for the impacts discussed in this section are discussed in **Section 5.0**.

3.1 Surface Water

For the Preferred Alternative, surface water quality impacts were determined using the same methodology to determine impacts for Package A and Package B in the Draft EIS. This was completed by evaluating the total impervious surface area, estimating the total areas of roadway that will be treated by BMPs, applying the Driscoll model, and by comparing projected traffic volumes.

3.1.1 Impervious Surfaces

Direct effects on surface water quality that are common to the Preferred Alternative, as well as other alternatives, would result from the addition of paved impervious surfaces, primarily from highway widening for additional general purpose lanes and associated interchanges, bridges, carpool lots.

The total impervious surface area of the preferred alternative was evaluated as a way to estimate water quality impacts in the absence of BMPs. In addition, the impervious surface area treated by BMPs was also used to estimate overall water quality impacts from each alternative. Generally, if roadway runoff is passed through a BMP, the post-BMP runoff will have better quality than untreated runoff. This was quantified by comparing the impervious surface area associated with an alternative to the percent of that area being treated, or passed through, a BMP. Therefore, an alternative with a higher percentage of treatment will have a lesser impact to the water quality in the project area when compared to levels of existing BMP treatment (see **Table 3-1**). Areas of proposed water quality treatment were estimated based on current and future MS4 areas, the presence of sensitive waters, and the available area for BMPs within the right-of-way.

Table 3-1 Summary of Total and Treated Impervious Areas

Alternative	Total Impervious Area (acres)	Area Treated (acres)	% of Area Treated
Existing	1,212	29	2.4%
No-Action	1,257	141	11.2%
Package A	1,946	1,765	90.7%
Package B	2,001	2,509	125%
Preferred Alternative	1,982	2,009	101%

The Preferred Alternative would result in more impervious surface area (1,982 acres) than the existing impervious area (1,212 acres), the No-Action Alternative (1,257 acres), and Package A (1,946 acres). Package B has approximately 20 more impervious acres than the Preferred Alternative. The Preferred Alternative, however, is providing an increased amount of treatment as compared to existing conditions and the No-Action alternative. Current CDOT and other local municipal stormwater standards require 100 percent water quality capture volume (WQCV), or percent of area treated. The Preferred Alternative meets this standard.

To fully understand the impacts from impervious surface area for the Preferred Alternative, it is important to consider the greater area surrounding the project. There are approximately 159,223 acres of total impervious surface area within the regional study area from commercial and residential developments and other infrastructure. This gives context to the total impervious surface of Preferred Alternative in relation to its surroundings that the impervious surface area associated with Preferred Alternative is a small fraction (1.2 percent) of the overall impervious areas in the regional study area.

3.1.2 Driscoll Model

The Driscoll Model was designed by FHWA to analyze impacts to surface waterbodies from highway runoff. The constituents chosen for the analysis were chloride, copper, phosphorus, total suspended solids (TSS), and zinc. These constituents are associated with highway runoff, and are a result of winter maintenance practices, brake, and tire wear. The stormwater runoff concentration data for the constituents analyzed using the Driscoll model were obtained from the *I-70 Mountain Corridor Tier 1 Draft Programmatic Environmental Impact Statement (I-70 PEIS)* (CDOT, 2004b). The runoff concentration data used in this analysis are presented in *Water Quality and Floodplains Technical Report***.**

The results of the Driscoll Model (**Table 3-2**) are presented as a screening tool to differentiate impacts among alternatives and not whether or not water quality standards are expected to be exceeded. In general, the contaminant loadings associated with Preferred Alternative are less than Package B, but greater than existing conditions, No-Action, and Package A. However, The Preferred Alternative has the highest estimated contaminant load for the southern and more urban watersheds than both Package A and Package B. The Cache la Poudre and Big Thompson watersheds have the highest increased load from existing conditions, approximately 62 and 82 percent increase, respectively. These watersheds show the greatest increase in loading because of the ratio of the amount of impervious surfaces to right-of-way associated with the Preferred Alternative. The results of the Preferred Alternative are also shown graphically for copper in **Figure 3-1**.

3.1.3 Traffic

In general, the projected traffic volumes are relatively similar between the project alternatives and range from nearly two to three times the existing traffic volumes (see **Table 3-3**). Therefore, the Preferred Alternative would cause an increase in the amount of pollutants being washed from the roadway due to increased traffic volumes when compared to existing conditions. All of the proposed traffic volumes for the Preferred Alternative components are greater than 30,000 AADT. The greatest predicted travel demand is generated in the southern portion of the project area between E-470 to US 36 followed by SH 60 to E-470, SH 14 to SH 60, and SH 1 to SH 14. However, the SH 1 to SH 14

component would be expected to have the most significant increase in pollutants because existing traffic in this segment is at times currently less than 30,000 AADT, which is generally characteristic of nonurban areas. Project activities in this segment would cause traffic to increase to levels characteristic of urban areas (i.e., greater than 30,000 AADT), which have higher pollutant concentrations of certain constituents when compared with nonurban areas with AADT less than 30,000 (see **Section 5.1.1.3)**.

Table 3-2 Driscoll Model Results by Watershed

Contaminant	Alternative	Watershed						
		Cache la Poudre	Big Thompson	St. Vrain	Dry Creek	South Platte	Clear Creek	Total Loading
Chloride (lbs/event)	Existing	266	181	265	125	78.4	14.5	930
	No-Action	266	184	287	140	78.4	14.5	970
	Package A	400	272	323	229	81.1	14.5	1,320
	Package B	445	366	343	180	90.3	14.8	1,440
	Preferred Alternative	430	329	320	175	96.5	17.6	1,370
Copper (lbs/event)	Existing	0.20	0.13	0.20	0.09	0.06	0.011	0.69
	No-Action	0.20	0.14	0.21	0.10	0.06	0.010	0.72
	Package A	0.30	0.20	0.24	0.17	0.06	0.011	0.98
	Package B	0.33	0.27	0.25	0.13	0.07	0.011	1.06
	Preferred Alternative	0.32	0.24	0.24	0.13	0.07	0.013	1.01
Phosphorus (lbs/event)	Existing	12.4	8.4	12.4	5.8	3.7	0.7	43.4
	No-Action	12.4	8.6	13.4	6.5	3.7	0.7	45.3
	Package A	18.7	12.7	15.1	10.7	3.8	0.7	61.7
	Package B	20.8	17.1	16.0	8.4	4.2	0.7	67.2
	Preferred Alternative	19.9	15.2	14.8	8.1	4.5	0.8	63.4
TSS (lbs/event)	Existing	8,820	6,010	8,800	4,150	2,600	481	30,900
	No-Action	8,814	6,090	9,530	4,660	2,600	481	32,200
	Package A	13,300	9,040	10,700	7,610	2,690	481	43,800
	Package B	14,800	12,100	11,400	5,960	3,000	492	47,800
	Preferred Alternative	14,300	10,900	10,600	5,800	3,200	583	45,400
Zinc (lbs/event)	Existing	1.77	1.21	1.77	0.83	0.52	0.10	6.20
	No-Action	1.77	1.22	1.92	0.94	0.52	0.10	6.48
	Package A	2.66	1.82	2.15	1.53	0.54	0.10	8.78
	Package B	2.97	2.44	2.28	1.20	0.60	0.10	9.59
	Preferred Alternative	2.86	2.19	2.13	1.17	0.64	0.12	9.11

Figure 3-1 Driscoll Results for Copper

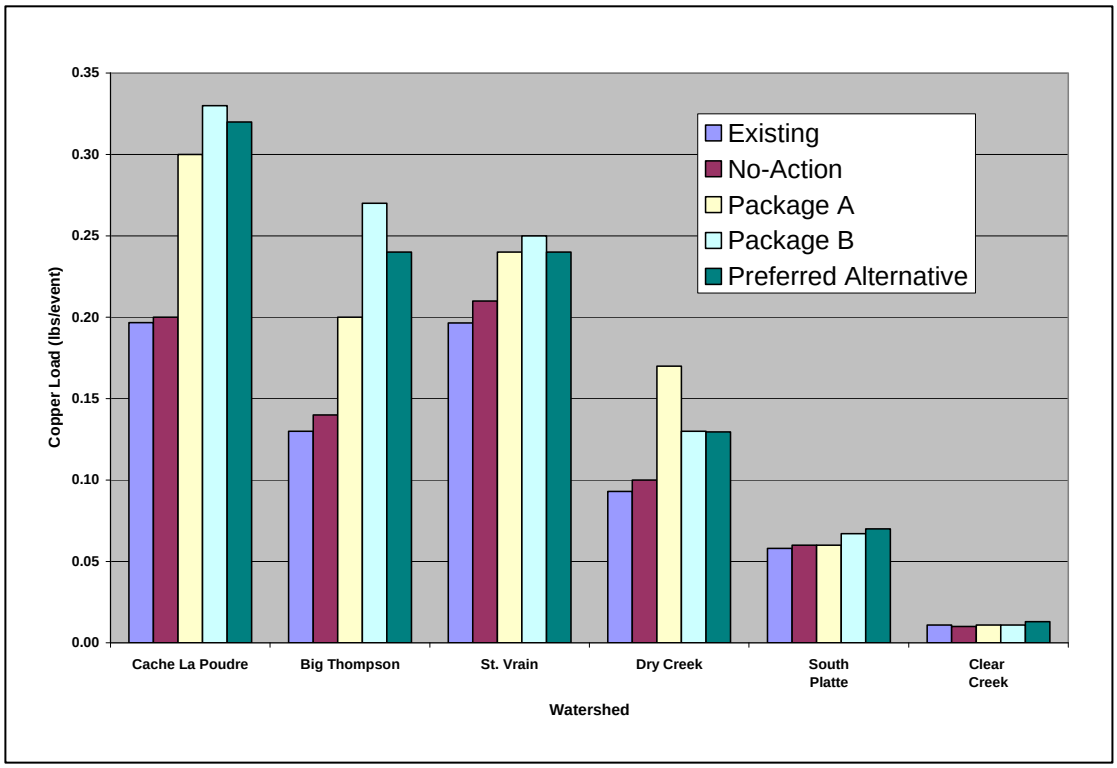


Table 3-3 Projected 2035 Traffic Volumes (AADT) from the North I-25 Project Alternatives

Package	SH 1 to SH 14	SH 14 to SH 60	SH 60 to E-470	E-470 to US 36
Existing	19,100–40,800	40,800–65,100	65,000–96,700	87,200–180,700
No-Action	31,600-72,300	72,300–127,400	116,800–188,000	167,500–246,400
Package A	37,600-93,000	93,000–160,600	128,000–202,900	171,400–248,200
Package B	37,600-92,000	92,000–149,100	115,000–200,300	183,700–253,500
Preferred Alternative	37,600-97,600	97,600–168,000	130,300–197,000	183,700–253,500

3.2 Groundwater

Groundwater is not typically impacted by roadways except during construction. The construction of the Preferred Alternative could require the relocation of up to 112 wells that are within the proposed right-of-way (see **Table 3-4**).

Table 3-4 Summary of Groundwater Wells within the Project Area

	Package A	Package B	Preferred Alternative
Potentially Impacted Groundwater Wells	105	111	112

The total amount of groundwater wells in Package A and Package B are presented for comparison purposes. All of the well data presented includes wells located within the right-of-way for all transit stations and associated parking lots and CDOT maintenance facilities and associated parking lots.

The status and exact of groundwater well use will have to be determined prior to construction activities to identify the necessary course of action. Active wells would need to be relocated, and all active and non-active wells would need to be plugged, sealed, and abandoned.

3.3 CONSTRUCTION AND DRAINAGE

The implementation of the Preferred Alternative would result in construction-related impacts at all stream/ditch/canal crossings, if left unmitigated. Other water bodies that may not cross I-25, but are within the construction footprint (including staging areas) would also be affected. The majority of construction related impacts results from the demolition and/or construction of structures and highway lanes. Construction-related impacts and the proposed mitigation to minimize these impacts are discussed in the *Water Quality and Floodplains Technical Report*, (FHU, 2008).

Major drainage impacts that result from cross drainage are addressed in **Section 4.0** *Floodplains*. The roadway improvements associated with the Preferred Alternative would require existing drainage system modifications or a new drainage conveyance system. By installing new drainage structures (e.g., storm drainage pipes, inlets, open channels and other facilities conveying local storm drainage), no additional impacts to the drainage system are anticipated. These structures could actually improve the drainage system when compared to the No-Action Alternative.

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4.0 FLOODPLAINS

Floodplain impacts were assessed for the Preferred Alternative the same way they were assessed for Package A and Package B. The regulatory framework and the hydrologic and hydraulic methodology were discussed in the Draft EIS and are still valid. The Existing Conditions and Impacts specific to Packages A and B are also valid except where updates have been noted in the following sections.

4.1 Existing Floodplains and Drainage Systems

The following section addresses updates to the Big Thompson Watershed, Big Dry Creek Watershed, and the Cache la Poudre River Watershed that occurred after the Draft EIS was published.

4.1.1 Big Thompson Watershed

The Big Thompson River has experienced major flooding eight times since 1864. The worst flooding occurred in 1976 when a cloudburst caused extensive flooding and took 139 lives.

At I-25, the Big Thompson River has a 3,100-foot wide floodplain and the Little Thompson River has a 700-foot wide floodplain. The Little Thompson frontage bridge on the east side of I-25 is a steel-truss bridge, which was built in 1938. Along the BNSF railway corridor, there is a crossing of the Big Thompson River where a 3,600-foot wide floodplain exists and one at Little Thompson River where an 800-foot wide floodplain exists.

Flooding occurs at eight tributary crossings in this watershed. An unnamed tributary at Big Thompson River crosses US 34 on the east side of I-25.

4.1.2 Big Dry Creek Watershed

Previously, in the Draft EIS, Preble Creek was discussed as having an undersized 60-inch reinforced concrete pipe (RCP) culvert under I-25. The capacity of this pipe is approximately 200 cubic feet per second (cfs) and the 100-year flow at this location is 2,317 cfs. In early 2010, construction began at this crossing to add a 12-foot wide by 6-foot high concrete box culvert (CBC). This new CBC in conjunction with the existing 60-inch RCP will be able to convey the 100-year flows without overtopping I-25. This new structure has been added to **Table 4-1**.

The crossing structure for Little Dry Creek at I-25 was misidentified during the Draft EIS phase. The existing structure is a 72-inch RCP instead of a 58-inch RCP and a 36-inch RCP as originally called out in the Water Quality and Floodplains Technical Report. The correct structure has been listed in **Table 4-1.**

These are the only known updates to the existing floodplains and drainage system along I-25 and the commuter rail alignment since the Draft EIS.

Table 4-1 Big Dry Creek Tributary Drainages

Mile Point	Name	Area (sq. mile)	Q100 (cfs)	Existing Structure*	FEMA Zone	Comments
231.700	Minor Local Drainage	-	-	20" RCP	NA	
231.470	Little Dry Creek	2.27	3,384 (CUHP)	72" RCP	NA	Not Adequate (CDOT 2004)
230.636	Tributary to Little Dry Creek	0.23	503 (CUHP)	56" RCP	NA	Not Adequate (CDOT 2004)
229.480	Preble Creek	3.3	2,317 (WWE 2007)	60" RCP 3-cell 12'X6' CBC	NA	Adequate (FHU 2008)
228.546	S. Fork Preble Creek	0.6	1,139 (WWE 2006)	16'x6' CBC	A	Not Adequate (WWE 2006)
227.733	Sack Creek S.	0.3	658 (WWE 2006)	54" RCP	A	Not Adequate (WWE 2006)
227.335	Mustang Run	1.1	1,284 (WWE 2006)	18" CMP	A	Not Adequate (WWE 2006)
226.729	Shay Ditch	1.0	1,183 (WWE 2006)	48" RCP	A	Not Adequate (WWE 2006)
225.646	McKay Lake Drainageway	2.1	1,600 (Kiowa 2001)	None	A	Not Adequate
224.675	Big Dry Creek	61	8,839 (FEMA 1995)	2-span CIC	AE	Adequate
224.470	Tanglewood Creek	0.7	906 (CUHP)	50" RCP	AE	Not Adequate (CDOT 2004)

Notes*
RCP....Reinforced Concrete Pipe
CIC.....Concrete on Rolled I-beam continuous
CBC....Concrete Box Culvert
CMP ...Corrugated Metal Pipe
Q100...100 year-flow
Shaded row is updated information from the Draft EIS

4.1.3 Cache la Poudre Watershed

The 100-year discharge at I-25 is 17,400 cfs according to the Larimer County FIS. This 17,400 cfs splits at the I-25 Bridge. About 13,300 cfs passes under the existing I-25 bridge and the remaining 4,100 cfs passes to the south toward Harmony Road. While portions of the Cache la Poudre River drainage have been recently remapped, the mapping is based on several separate hydraulic models in the split flow area that are not interconnected to establish water surface profiles with a balanced hydraulic model output. Consequently, CDOT and the local agencies acknowledge that reliance on the existing hydraulic models and floodplain mapping in order for each jurisdiction to properly size new hydraulic structures for this complicated split flow drainage area is not in the best interest of all the jurisdictions involved. The City of Fort Collins is requiring this split flow to be kept intact. This is necessary because the entire 100-year flow cannot pass into the main channel

without exceeding the allowable rise. The City of Fort Collins has future plans to raise Harmony Road and install an adequately sized culvert or bridge. South of Harmony Road these overflows spill back over I-25 and return to the Cache la Poudre River. The City of Fort Collins realizes that a future I-25 structure will be required here.

The City of Fort Collins looked at passing the entire 17,400 cfs under I-25 at the existing bridge location. They encountered physical limitations such as a large bridge span and sedimentation problems within the channel. The regulatory limitation of having no rise in the water surface elevations downstream of I-25 is an additional requirement. This rise would be in Larimer County and the Town of Timnath, so their mitigation rules would also apply. Raising the water surface elevations east of I-25 adds additional constraints, and further limits the feasibility of this option (Hayes, 2006; Smith, 2006).

4.2 Floodplains and Drainage Consequences

This section describes the consequences of the Preferred Alternative to the floodplains and drainage system. An update to both Package A and Package B has been included to address the changes made at Preble Creek since the Draft EIS.

The impacts to floodplains due to the Preferred Alternative are discussed starting from north to south along the I-25 corridor and then north to south along the commuter rail alignment. There are no floodplain impacts from bus routes, bus stations, bus maintenance facilities, or associated parking facilities along SH 85.

4.2.1 Update to Package A and Package B

Both Package A and Package B called for a major drainage structure at Preble Creek and I-25. This was reported in Highway Component from SH 60 to E-470. Both Packages called for the replacement of five major drainage structures and impacts to four floodplains in this section of I-25. There would now only be replacement of four major drainage structures because of impacts to four floodplains. Preble Creek does not currently have a 100-year floodplain mapped as part of the Flood Insurance Rate Program with the Federal Emergency Management Agency (FEMA). The only impact to this drainageway due to Package A or Package B would be from widening the existing structure.

4.2.2 Preferred Alternative

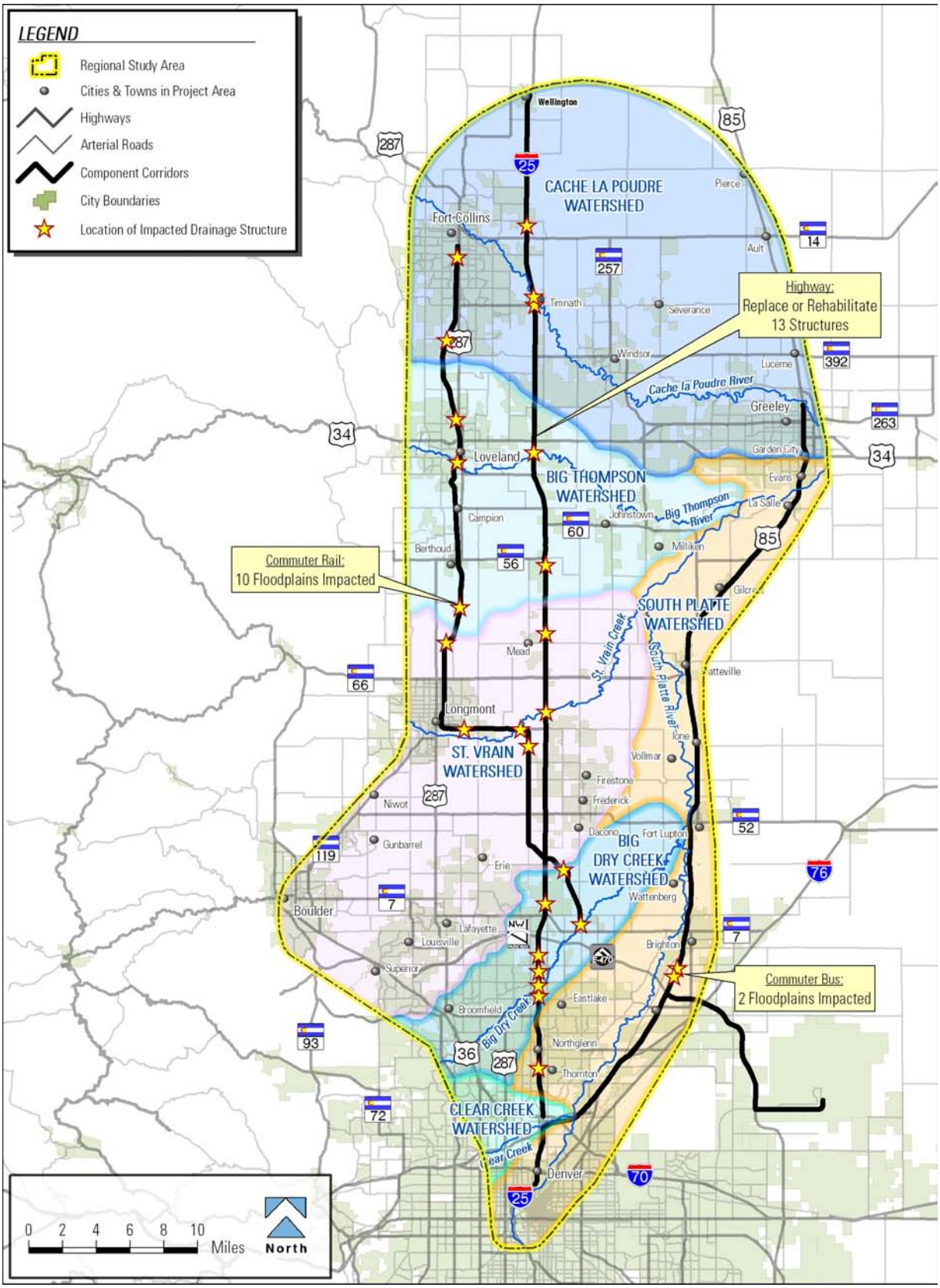
Impacts to floodplains and the drainage system associated with the Preferred Alternative are from construction of general purpose lanes and tolled express lanes on I-*25* and the implementation express bus services on I-25. Commuter Rail is proposed from Fort Collins to tie into the FasTracks rail line and commuter bus service is proposed along Highway 85 also impacts floodplains and the drainage systems. **Table 4-2** provides a comparison of the floodplain impacts due to the Preferred Alternative, Package A, and Package B. **Figure 4-1** displays the generalized floodplain impacts.

Table 4-2 Estimated Area of Impacts to Floodplains

Package A		Package B		Preferred Alternative	
Component Description	**Impacted Area (Acres)**	**Component Description**	**Impacted Area (Acres)**	**Component Description**	**Impacted Area (Acres)**
Package A Highway Components		**Package B Highway Components**		**Preferred Alternative Highway Components**	
Safety Improvements: SH 1 to SH 14	1.3	Safety Improvements: SH 1 to SH 14	1.3	Safety Improvements: SH 1 to SH 14	1.3
GPL Improvements: SH 14 to SH 60	4.9	Tolled Express Lanes: SH 14 to SH 60	6.0	GPL Improvements: SH 14 to SH 60	4.3
GPL Improvements: SH 60 to E-470	4.6	Tolled Express Lanes: SH 60 to E-470	5.0	GPL Improvements: SH 60 to E-470	4.2
Structure Upgrades: E-470 to US 36	0	Tolled Express Lanes: E-470 to US 36	1.2	Structure Upgrades: E-470 to US 36	1.2
Total Package A Highway Impacts:	*10.8*	*Total Package B Highway Impacts:*	*13.5*	*Total Preferred Alternative Highway Impacts:*	*11*
Package A Transit Components		**Package B Transit Components**		**Preferred Alternative Transit Components**	
Commuter Rail: Fort Collins to Longmont	1.7	BRT: Fort Collins/ Greeley to Denver	0	Commuter Rail: Fort Collins to Longmont	1.7
Commuter Rail: Longmont to North Metro	0.2	BRT: Fort Collins/ Greeley to DIA	0	Commuter Rail: Longmont to North Metro	0.2
Commuter Bus: Greeley to Denver	0.1			Commuter Bus: Greeley to Denver	0.1
Commuter Bus: Greeley to DIA	0			Commuter Bus: Greeley to DIA	0
Total Package A Transit Impacts:	*2.0*	*Total Package B Transit Impacts:*	*0*	*Total Preferred Alternative Transit Impacts:*	*2.0*
Total Package A Impacts:	**12.8**	**Total Package B Impacts:**	**13.5**	**Total Preferred Alternative Impacts:**	**13**

BRT .....Bus Rapid Transit
GPL .....General Purpose Lane

Figure 4-1 Preferred Alternative Floodplain Impacts



Preferred Alternative I-25/Highway Impacts

Most of the drainage crossings at I-25 are too small to pass the required flows under I-25 and will need to be replaced. In areas where the structures are sufficient to pass the required flows, the increased width at I-25 will necessitate their being lengthened. Any replacement or lengthening of a drainage structure, whether it is a bridge or culvert, will impact the floodplain. Specific consequences would be as follows:

Boxelder Creek crosses under I-25 near MP 269, flowing from east to west. The current structure would be replaced in-kind. This improvement would have the following floodplain impacts:

- There should be minimal, or no changes to the floodplain limits. There may be local changes due to the new structure, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation around the drainage structure would be disturbed during construction.

The Cache la Poudre River crosses under I-25 near MP 266, flowing from west to east. The current bridge would be replaced in-kind, but the new alignment of I-25 would shift the bridge. The bridge also would be widened to match the new typical section. These improvements would have the following impacts on the floodplain:

- There should be minimal or no changes to the floodplain limits. There may be local changes due to the new structure and new structure location, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation around the drainage structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and destroyed by the new structure location.

The Cache la Poudre River 100-year flows split just west of I-25. About two-thirds of the flow spills over I-25 and passes east under the existing bridge. The remaining flows pass to the south crossing Harmony Road before flooding I-25 at the I-25 and Kechter Road crossroads. There are no structures at this location currently. CDOT and the local agencies acknowledge that a comprehensive reevaluation at the time of final design would be necessary to determine the appropriate alignment and sizing of structures throughout this complicated split flow reach. Due to the level of design and information available at this time, the proposed options are based on current regulations and the master plan for the City of Fort Collins which plans to keep the split flow intact. Four concrete box culverts (CBCs) would be added to this area, one in each quadrant of the crossroads. These improvements would have the following impacts to the floodplain:

- The floodplain limits would change with the new structures. I-25 would probably not be overtopped anymore and the flows would become more channelized. There could be an increase in downstream flooding due to the more concentrated flows.
- Natural vegetation surrounding the roadway would be disturbed during construction.
- Surrounding wetlands could be disturbed during construction.

The Big Thompson River crosses under I-25 near MP 257, flowing from west to east. The current bridge would be replaced with a new wider bridge due to widening of I-25. The proposed bridge will not be much longer than the existing bridge, but the profile of I-25 was raised to provide the capacity needed to pass the 100-year flows. This improvement would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain limits. There may be local changes due to the widening of the bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and destroyed due to the widening of the structure.

The Little Thompson River crosses under I-25 near MP 250, flowing from west to east. The current bridge would be replaced with a new wider bridge and shifted to accommodate widening of I-25 and a new alignment. These improvements would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain. There may be local changes due to the widening and shifting of the bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and permanently disturbed due to the widening and shifting of the structure.

North Creek crosses under I-25 near MP 245, flowing from west to east. The existing CBC would be replaced in-kind, but it would probably be extended due to the new alignment of the ramps and frontage road. This improvement would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to extending the CBC, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and destroyed due to extending the CBC.

Little Dry Creek crosses under I-25 near MP 231, flowing from west to east. The existing 72-inch reinforced concrete pipe (RCP) would be replaced with a larger structure. This improvement would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to replacing the CBC, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction.

St. Vrain Creek crosses under I-25 near MP 242. The existing bridge would be replaced with a wider bridge to match the widening of I-25 in this area. This would have the following impacts to the floodplain:

- There should be minimal or no changes to the floodplain limits. There may be local changes due to the widening of the bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and permanently disturbed due to the widening of the structure.

The South Fork of Preble Creek crosses under I-25 near MP 229, flowing from west to east. The existing CBC would be replaced with a larger CBC. This would have the following floodplain impacts:

- A larger structure might eliminate some of the spreading of the floodplain upstream of I-25. Flooding could be increased downstream of I-25, however, due to the increased capacity of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.

Mustang Run crosses under I-25 near MP 227, flowing from west to east. The existing structure is an 18-inch corrugated metal pipe that would be replaced with a CBC. This would have the following floodplain impacts:

- A larger structure would probably reduce upstream ponding behind I-25. Immediately downstream of the structure ponding could increase behind a levee at Bull Canal. It is unlikely that flooding would increase downstream of the Bull Canal levee.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands could be disturbed during construction.

Shay Ditch crosses under I-25 near MP 227, flowing from west to east. The existing pipe would be replaced with a CBC. This would have the following floodplain impacts:

- Ponding upstream of I-25 would probably be reduced, but there could be an increased chance of flooding downstream of I-25.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands could be disturbed during construction.

Big Dry Creek crosses under I-25 near MP 225, flowing from west to east. The existing bridge would be replaced in-kind and extended to match the widening of I-25. This would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to extending the bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.

- Surrounding wetlands would be disturbed during construction and permanently disturbed due to the extension of the bridge.

Niver Creek crosses under I-25 near MP 219, flowing from west to east. The existing CBC would be replaced and could be extended. This would have the following floodplain impacts:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to possibly extending the structure, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation surrounding the structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and possibly permanently disturbed due to extending the CBC.

Preferred Alternative Commuter Rail Impacts

The commuter rail alignment will impact floodplains where new crossings occur and where existing rail lines require widening. Specific consequences would be as follows:

Spring Creek crosses under the BNSF railroad, the proposed alignment for the commuter rail, approximately 0.15 mile south of Prospect Road. The existing CBC is inadequate but adding two 60-inch reinforced concrete pipe (RCP) would help pass the full 100-year flows. These improvements would have the following impacts to the floodplain:

- The railroad is currently overtopped by the 100-year flows. Adding the pipes could alleviate this problem. However, there could be an increase in downstream flooding because the flows would be more concentrated through the pipes as opposed to spilling over the railroad.
- Natural vegetation around the drainage structures would be disturbed during construction.

Fossil Creek crosses under the BNSF railroad five times between Fossil Creek Drive and south of Trilby Road. The floodplain has been mapped by the City of Fort Collins in this area. At these crossings, three of the structures would be replaced with larger structures, and two new structures would be added. These improvements would have the following impacts to the floodplain:

- At three of the five crossings, Fossil Creek overtops the railroad. The new structures could alleviate this problem. They could also reduce ponding on the upstream sides of the railroad. Increasing the capacity of the crossing structures could cause more flooding downstream however. Because Fossil Creek snakes back and forth around the railroad, more detailed study would be needed to determine the full changes to the floodplain. Channel improvements and downstream studies may be needed in the future.
- Natural vegetation around the drainage structures would be disturbed during construction.
- Current mapping only shows wetlands at two locations. At both of these locations, the wetlands would be disturbed during construction.

Dry Creek crosses under the BNSF railroad near the Loveland Plaza Mobile Home Park. The existing CBC is inadequate. This could be solved by adding several 96-inch RCP or replacing the CBC with a larger structure. These improvements would have the following impacts to the floodplain:

- A larger structure or the added pipes could decrease ponding upstream of the railroad, but could increase the chance of flooding downstream of the railroad.
- Natural vegetation around the drainage structures would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction.

The Big Thompson River crosses under the BNSF railroad approximately one-third of a mile south of West 1st Street. The existing bridge is not overtopped and would be extended in kind. This would have the following impacts to the floodplain:

- There should be minimal or no changes to the floodplain limits. There may be local changes due to extending the existing bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation around the drainage structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and could possibly be destroyed due to the bridge extension.

The Little Thompson River crosses under the BNSF railroad approximately 1/3 of a mile south of County Road 6c. The existing bridge is not overtopped and would be extended in kind. This would have the following impacts to the floodplain:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to extending the existing bridge, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation around the drainage structure would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and could possibly be destroyed due to the bridge extension.

Spring Gulch crosses under the BNSF railroad just south of 17th Avenue. The new commuter rail would cross Spring Gulch again along SH 119. The existing pipe at the railroad is inadequate. A bridge is needed to pass the 100-year flows. At the new crossing, a bridge is proposed as well. These improvements would have the following impacts to the floodplain:

- A larger structure at the railroad crossing and an adequately sized structure at the new commuter rail crossing should maintain or improve the floodplains at these locations. There could be a chance of increase flooding between these two bridges in Longmont, but this area is only mapped to a zone “X” level of detail currently.
- Natural vegetation around the drainage structures would be disturbed during construction.

The St. Vrain Creek would cross under the proposed commuter rail approximately 1.5 miles west of I-25 along SH 119. The proposed bridge would be very wide because of the wide, shallow floodplain in this area. This improvement would have the following impacts to the floodplain:

The proposed bridge is designed to prevent overtopping of the proposed commuter rail, but the proximity to the SH 119 bridge, which is inadequate, could cause the flows to back up. The floodplain is so wide in this area that the proposed bridge would probably not make it worse.

- Natural vegetation around the drainage structures would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and destroyed due to the new bridge.

Idaho Creek would cross under the proposed commuter rail approximately 0.66 mile west of I-25 along SH 119. A wide bridge is proposed for this crossing as well, because the St. Vrain floodplain encompasses Idaho Creek. This improvement would have the following impacts to the floodplain:

- Adding a bridge at the commuter rail crossing at the St. Vrain Creek floodplain and at Idaho Creek could change the floodplain upstream of SH 119. The current wide shallow floodplain may split into two flows that join together again downstream of SH 119. More detailed study would be needed in the future to determine the full extent of the changes to the floodplain. There would probably not be an increase in the flooding downstream of the proposed commuter rail due to the new bridges.
- Natural vegetation around the drainage structures would be disturbed during construction.

Little Dry Creek would cross under the proposed commuter rail approximately 0.15 mile south of Weld County Road 8 and 0.8 mile east of I-25. A new bridge is proposed at this crossing. This would have the following impacts to the floodplain:

- There should be minimal or no changes to the floodplain limits. There could be local changes due to the new structure, but this should not affect flooding upstream or downstream of the structure.
- Natural vegetation around the drainage structures would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and permanently disturbed due to the new bridge.

Big Dry Creek crosses under the Union Pacific (UP) Railway approximately 0.5 mile north of SH 7 and 2.33 miles east of I-25. The current bridge is not overtopped and it is recommended that this structure be extended in-kind. This would have the following impacts to the floodplain:

- There should be minimal or no changes to the floodplain limits. There may be local changes due to extending the existing structure, but this should not affect flooding upstream or downstream of the structure.

- Natural vegetation around the drainage structures would be disturbed during construction.
- Surrounding wetlands would be disturbed during construction and permanently disturbed due to the new bridge.

Second Creek has floodplains with designation zone “A” at the intersection of US 85 and East 136th Avenue. This is a location of a proposed queue jump for the commuter bus. Tapers and a shoulder would be added to northbound US 85 turn and to eastbound 136th. This would have the following impacts to the floodplain:

- The additional pavement could increase flows and cause some local changes to the floodplain limits.
- Vegetation will be disturbed and destroyed during construction.

First Creek has floodplains with designation zone “A” at the intersection of US 85 and East 104th Avenue. This is a location of a proposed queue jump for the commuter bus. Tapers and a shoulder would be added to southbound US 85 and to westbound 104th. This would have the following impacts to the floodplain:

- The additional pavement could increase flows and cause some local changes to the floodplain limits.
- Vegetation will be disturbed and destroyed during construction.

5.0 MITIGATION MEASURES

This section summarizes the mitigation measures that have been incorporated into the Preferred Alternative.

5.1 Surface Water Quality

A combination of mitigation measures should be implemented in the Preferred Alternative's project area to reduce the impacts to water resources and include permanent structural, non-structural and temporary construction BMPs.

Permanent Structural BMPs

Mitigation for Permanent Structural BMPs remains unchanged to the mitigation described in the *Water Quality and Floodplains Technical Report* (FHU, 2008). **Table 5-1** describes the sizing criteria used to preliminarily size structural BMPs for the Preferred Alternative, Package A, and Package B. **Figure 5-1** presents the areas of water quality BMPs incorporated into the Preferred Alternative in each watershed.

The performance criteria for the water quality ponds within the project area are consistent with CDOT's current MS4 design criteria identified in the New Development and Redevelopment Program (CDOT, 2004a). The removal efficiencies for these types of BMPs (e.g., extended detention basin) are 50 percent to 70 percent TSS, 10 percent to 20 percent (total phosphorus), and 30 percent to 60 percent (total zinc) (CDOT, 2004a). CDOT will coordinate with other MS4 entities to ensure compliance with each individual MS4 permit, specifically with Construction and Development/New Development programs. This coordination will include design specifics, as well as maintenance responsibilities and potential cost sharing opportunities. Additionally, structural BMPs should be reevaluated for appropriateness during final design to incorporate new treatment technologies, design criteria, and/or current MS4 permit requirements.

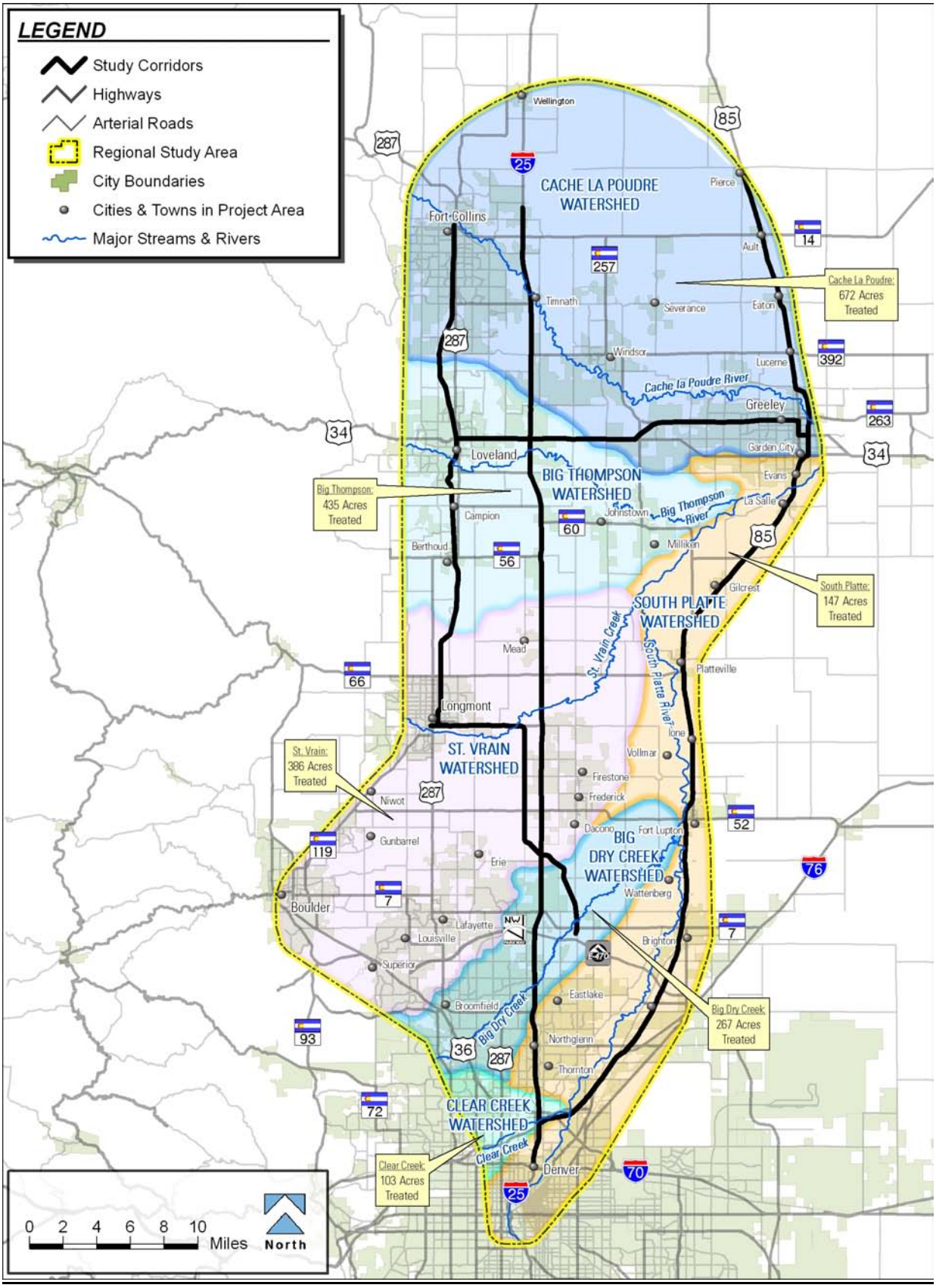
As described in **Section 2.0**, copper generated by vehicles using the Preferred Alternative may be an issue in the Big Thompson watershed. CDOT's New Development and Redevelopment Program does not specify removal efficiencies of copper for structural BMPs. However, structural ponds have been shown to lower dissolved copper concentrations (Strecker, 2004).

The locations of the water quality ponds have been identified throughout the project area for the Preferred Alternative. The placement is based on existing and future MS4 areas, locations of sensitive surface waters or irrigation canals and physical design constraints. Other water quality BMPs, such as underground water quality features, for areas within the project where ponds In areas where ponds are not feasible. Further details of the rating system can be found in the *Water Quality and Floodplains Technical Report, (FHU, 2008)*.

Table 5-1 Structural BMP sizing Criteria

Water Quality Capture Volume (WQCV)	**Locations**: MS4 areas and parking lots for commuter rail stations, bus rapid transit (BRT) and carpool lots
	Roadway basins were delineated from high point to high point as identified from the roadway profile.
	The WQCV was determined by assuming ½ an inch depth of water over the paved area of the interstate or parking lots. This depth of water corresponds to approximately a 2-year storm event.
	Typical sections were used to determine paved area of I-25.
Pond Sizing for I-25	To determine the area required for the water quality ponds, the WQCV was divided by an assumed average pond depth of two feet to 4.5 feet depending on the volume needed.
	Pond lengths were assumed in 50-foot increments generally starting at the minimum of 100 ft and not exceeding 500 feet.
	Pond widths were kept at 50 feet unless smaller dimensions were needed due to limited ROW.
	A minimum length to width ratio of 2:1 was maintained as is recommended by the UDFCD.
	A buffer of 20 feet was added to the length and width dimensions to account for access and maintenance roads.
Pond Sizing for Parking Lots	To determine the area required for the water quality ponds the WQCV was divided by an assumed average pond depth of two feet. This was based on a water quality pond having varying depths from zero to four feet.
	Pond dimensions were assumed in 10-foot increments.
	A minimum length to width ratio of 2:1 was maintained as is recommended by the UDFCD.
	A buffer of 20 feet was added to the length and width dimensions to account for access and maintenance roads
Pond Placement	Water quality ponds were placed in all MS4 areas as well as areas that drained to sensitive waters like the St. Vrain River and Little Thompson River.
	Water quality ponds were placed in the infield areas of interchanges, upstream of outfalls to main drainages, and low spots where practical.
	Water quality ponds were also placed outside of known floodplains except where it was impractical to do so.

Figure 5-1 Preferred Alternative – Areas of Future Water Quality Treatments



Non-Structural BMPs
Mitigation for non-structural BMPs remains unchanged to the mitigation described in the *Water Quality and Floodplains Technical Report, October 2008.*

Temporary Construction BMPs
Mitigation for Temporary Construction BMPs remains unchanged to the mitigation described in the *Water Quality and Floodplains Technical Report, October 2008.*

5.2 Groundwater Quality

As with any roadway construction, the status of groundwater well use will have to be determined prior to construction activities to identify if active wells are present. Active wells in the final right-of-way would need to be relocated and all wells would need to be plugged, sealed, and abandoned. Mitigation for groundwater remains unchanged to the mitigation described in the *Water Quality and Floodplains Technical Report, October 2008.*

An additional regulatory guidance on when obtaining a dewatering permit is not necessary was released by CDPHE between the Draft EIS and the Final EIS. If the groundwater the discharge is in accordance with the CDPHE Water Quality Policy-27, Low-Risk Discharges—September 2009, then a dewatering permit is not required.

5.3 Floodplains

Preferred Alternative I-25 Mitigation Measures

Boxelder Creek floodplains east of I-25 would be impacted. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows released downstream of I-25 would not be more than the present 100-year flows. Downstream capacity should be designed for the present 100-year flow conditions, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- If wetlands are disturbed, the mitigation approach described in **Section 3.8** *Wetlands* in the EIS would be followed.

Boxelder Creek floodplains at I-25 would be impacted. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

The Cache la Poudre River floodplains at I-25 would be impacted. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction
- Disturbed land would be seeded and re-vegetated after construction.

- Wetland mitigation would be conducted in accordance with the mitigation approach described in **Section 3.8** *Wetlands* in the EIS.
- CDOT and the local agencies acknowledge that a comprehensive basin hydraulic model reanalysis and appropriate map revisions would be necessary to determine the appropriate sizing of various hydraulic structures throughout this complicated split flow reach of the Cache la Poudre River at the I-25 crossing. Consequently, an appropriate mitigation measure would be consideration for a comprehensive hydraulic model analysis to support the associated map revisions and appropriate sizing of hydraulic structures across I-25 with implementation of the preferred alternative.

The Cache la Poudre River split flow floodplains at I-25 would be impacted. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows downstream of I-25 would not be more than the present condition 100-year split flows. Downstream capacity should be designed for the present flow conditions, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- If wetlands are disturbed, the mitigation approach described in **Section 3.8** *Wetlands* in the EIS would be followed.
- CDOT and the local agencies acknowledge that a comprehensive basin hydraulic model reanalysis and appropriate map revisions would be necessary to determine the appropriate sizing of various hydraulic structures throughout this complicated split flow reach of the Cache la Poudre River at the I-25 crossing. An appropriate mitigation measure is a comprehensive hydraulic model analysis to support the associated map revisions and appropriate sizing of hydraulic structures across I-25 with implementation of the Preferred Alternative.

The Big Thompson River floodplains would be impacted at I-25.The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would be conducted in accordance with the mitigation approach described in **Section 3.8** *Wetlands* in the EIS.

The Little Thompson River floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

North Creek floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

The St. Vrain Creek floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

The South Fork of Preble Creek floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows released downstream of I-25 would not be more than the present 100-year flows. Downstream capacity should be designed for the present 100-year flow conditions, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

Mustang Run floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- If wetlands are disturbed, wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

Shay Ditch floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows released downstream of I-25 would not be more than the present 100-year flows. Downstream capacity should be designed for the present 100-year flow conditions, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- If wetlands are disturbed, wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

Big Dry Creek floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

Erosion control measures would be used during construction.

- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS*.*

Niver Creek floodplains would be impacted at I-25. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS

Preferred Alternative Commuter Rail Impacts

Spring Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows released downstream of the railroad would not be more than the present 100-year flows. Downstream capacity should be designed for the present 100-year flow conditions, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

Fossil Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows in this area would remain at the present 100-year flows. Downstream capacity should be designed for the present 100-year flows, in accordance with local, state, and federal regulations.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS*.*

Dry Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows in this area would remain at the present 100-year flows. Downstream capacity should be designed for the present 100-year flows, in accordance with local, state, and federal regulations
- Erosion control measures would be used during construction.

- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

The Big Thompson River floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

The Little Thompson River floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

Spring Gulch floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- The flows in this area would remain at the present 100-year flows. Downstream capacity should be designed for the present 100-year flows, in accordance with local, state, and federal regulations. Detailed study in the future would be needed between the two bridges to determine actual impacts.
- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

The St. Vrain Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in the **Section 3.8** *Wetlands* in the EIS.

Idaho Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

Little Dry Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

Big Dry Creek floodplains would be impacted at the commuter rail corridor. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.
- Wetland mitigation would follow the approach described in **Section 3.8** *Wetlands* in the EIS.

Second Creek floodplains would be impacted at a commuter bus queue jump. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

First Creek floodplains would be impacted at a commuter bus queue jump. The following measures would be taken to mitigate floodplain impacts to the extent practicable:

- Erosion control measures would be used during construction.
- Disturbed land would be seeded and re-vegetated after construction.

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6.0 REFERENCES

All references in this addendum refer to the citations as they appear in the *Water Quality and Floodplains Technical Report, October 2008*. This section only presents references that were not previously included in the Technical Report.

Colorado Department of Public Health and Environment (CDPHE). 2010. Regulation 93 – Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List. Effective April 30.

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