



Level 2B Alternatives Evaluation

C-470 Segment – Kipling to I-70/US 6

WestConnect Coalition PEL

CATEGORY	EVALUATION CRITERIA	NO ACTION	ALTERNATIVE 1: SIX/EIGHT GENERAL PURPOSE LANES WITH AUXILIARY LANES		ALTERNATIVE 2: GENERAL PURPOSE LANES WITH TWO/FOUR MANAGED LANES AND AUXILIARY LANES	
Safety	Ability to address identified unsafe physical or operational conditions	No change	<p>Mainline: Increased capacity of the mainline with the additional lanes and auxiliary lanes would reduce crashes. Dual lane exits at multiple locations would reduce congestion and ramp crashes.</p> <p>Quincy: Roundabouts reduce severe crashes such as broadside and approach turn.</p> <p>US 285: Flyover ramps remove the tight curves of loop ramps, reducing off road crashes.</p>		<p>Mainline: Increased capacity of the mainline with the auxiliary lanes would reduce crashes. Dual lane exits at multiple locations would reduce congestion and ramp crashes.</p> <p>Quincy: Roundabouts reduce severe crashes such as broadside and approach turn.</p> <p>US 285: Flyover ramps remove the tight curves of loop ramps, reducing off road crashes.</p>	
	Expected crash frequency (crashes/year)	C-470: 213 total; 41 severe Kipling: 27 total, 9 severe Ken Caryl: 73 total, 22 severe Bowles: 44 total, 15 severe Quincy: 34 total, 16 severe Morrison: 17 total, 2 severe Alameda: 21 total, 5 severe	C-470: 149 total; 29 severe Kipling: 27 total, 9 severe Ken Caryl: 73 total, 22 severe Bowles: 40 total, 11 severe Quincy: 19-25 total, 9-12 severe Morrison: 17 total, 2 severe Alameda: 21 total, 5 severe		C-470: 149 total; 29 severe Although capacity of managed lanes may reduce crashes, congestion in general purpose lanes may increase crashes. Overall crash frequency expected to be similar to Alternative 1 Kipling: 27 total, 9 severe Ken Caryl: 73 total, 22 severe Bowles: 40 total, 11 severe Quincy: 19- 25 total, 9-12 severe Morrison: 17 total, 2 severe Alameda: 21 total, 5 severe	
	Pedestrian and bicycle comfort and safety (level of traffic stress – LTS)	Along C-470: LTS 1 Kipling: Free right turn lanes at ramps Bowles: Free right turn lanes at ramps Quincy: No crossings or pedestrian facilities	Along C-470: LTS 1 Grade separation at Kipling and Bowles would substantially improve comfort and safety Kipling: Double right turn lanes increase crossing distance Bowles: Double right turn lanes increase crossing distance Quincy: Crossing of multi-lane free-flow movements		Along C-470: LTS 1 Grade separation at Kipling and Bowles would substantially improve comfort and safety Kipling: Double right turn lanes increase crossing distance Bowles: Double right turn lanes increase crossing distance Quincy: Crossing of multi-lane free-flow movements	
Traffic Operations	2040 peak hour intersection delay (AM/PM)	Kipling EB Ramps: LOS F / LOS C Kipling WB Ramps: LOS D / LOS B Ken Caryl EB Ramps: LOS F / LOS C Ken Caryl WB Ramps: LOS C / LOS C Bowles EB Ramps: LOS C / LOS D Bowles WB Ramps: LOS F / LOS A Quincy EB Ramps: LOS F / LOS A Quincy WB Ramps: LOS F / LOS A Morrison Ramps: LOS C / LOS D Alameda EB Ramps: LOS C / LOS B Alameda WB Ramps: LOS A / LOS A	Kipling EB Ramps: LOS B / LOS C Kipling WB Ramps: LOS C / LOS C Ken Caryl EB Ramps: LOS C / LOS D Ken Caryl WB Ramps: LOS C / LOS C Bowles EB Ramps: LOS C / LOS D Bowles WB Ramps: LOS B / LOS B Quincy EB Ramps: LOS A / LOS A Quincy WB Ramps: LOS C / LOS A Morrison Ramps: LOS C / LOS E Alameda EB Ramps: LOS C / LOS C Alameda WB Ramps: LOS A / LOS A		Kipling EB Ramps: LOS C / LOS D Kipling WB Ramps: LOS C / LOS D Ken Caryl EB Ramps: LOS C / LOS C Ken Caryl WB Ramps: LOS C / LOS D Bowles EB Ramps: LOS D / LOS C Bowles WB Ramps: LOS B / LOS A Quincy EB Ramps: LOS A / LOS A Quincy WB Ramps: LOS C / LOS A Morrison Ramps: LOS C / LOS D Alameda EB Ramps: LOS C / LOS D Alameda WB Ramps: LOS B / LOS C	
	2040 vehicular peak hour travel time index (AM/PM)	EB: 2.6 / 6.6 WB: 10.3 / 3.9	EB: 1.3 / 1.3 WB: 1.9 / 1.4		EB: General Purpose = 1.3 / 1.4; Managed Lanes = 1.2 / 1.2 WB: General Purpose = 1.6 / 1.0; Managed Lanes = 1.0 / 1.0	
Multimodal Operations and Connectivity	Enhanced regional biking and walking transportation options	No new infrastructure and/or wayfinding provided for pedestrians and bicyclists	Improved sidewalks and crossings at almost all interchanges Wayfinding improvements between Bowles and Quincy		Improved sidewalks and crossings at almost all interchanges Wayfinding improvements between Bowles and Quincy	
	Enhanced regional transit options	No additional transit service provided	Increased 116X frequency and formalized park and ride facility at Quincy Avenue		Increased 116X frequency and formalized park and ride facility at Quincy Avenue	
	Local multimodal connections	No new or improved connections	Improved parking facilities at Quincy and Morrison		Improved parking facilities at Quincy and Morrison	
Community	Design and operational context related to local community surroundings	C-470 alignment and design elements blend well with unique natural surroundings along Dakota Hogback but with recurring peak period congestion	Widened corridor generally consistent with corridor natural and built surroundings		Substantial widening and infrastructure and sign structures for managed lane operations somewhat inconsistent with corridor natural surroundings	
	Access management	Interchange spacing and configurations appropriate for freeway access, except low-speed access to Bear Creek Lake Park north of US 285	Interchange spacing and configurations appropriate for freeway access with relocation of low-speed access to Bear Creek Lake Park north of US 285		Interchange spacing and configurations appropriate for freeway access with relocation of low-speed access to Bear Creek Lake Park north of US 285	
	Impacts on existing properties	None	<p>Alternative 1A (with I-70 C/D Road) Residential: < 1 acre (2 parcels) Business/Other: < 1 acre (2 parcels) Public: < 1 acre (5 parcels)</p>	<p>Alternative 1B (with I-70 Braided Ramp) Residential: < 1 acre (2 parcels) Business/Other: < 1 acre (2 parcels) Public: < 1 acre (5 parcels)</p>	<p>Alternative 2A (with I-70 C/D Road) Residential: < 1 acre (2 parcels) Business/Other: < 1 acre (3 parcels) Public: 1 acre (5 parcels)</p>	<p>Alternative 2B (with I-70 Braided Ramp) Residential: < 1 acre (2 parcels) Business/Other: < 1 acre (3 parcels) Public: 1 acre (5 parcels)</p>
	Support of local and regional planning efforts	Inconsistent with Jefferson County plans identifying interchange capacity projects along C-470	Consistent with Jefferson County plans identifying interchange capacity projects along C-470		Consistent with Jefferson County plans identifying interchange capacity projects along C-470	
Environmental Resources	Impacts on environmental resources within the built and natural environment	Impacts to air quality and noise are likely with increase in traffic volumes and congestion	<p>Alternative 1A 9 100-year floodplains with approximately 618,000 square foot area of impact 32 cultural surveys and known sites 5 parks and open spaces impacted 5 wetlands impacted 7 stream and/or water bodies 1 Section 6(f) property 7 potential hazardous material site/regions 3 potential noise analysis areas in neighborhoods between Kipling and Ken Caryl; just south of Bowles; and between Bowles and US 285</p>	<p>Alternative 1B 8 100-year floodplains with approximately 621,000 square foot area of impact 32 cultural surveys and known sites 5 parks and open spaces impacted 5 wetlands impacted 7 stream and/or water bodies 1 Section 6(f) property 7 potential hazardous material site/regions 3 potential noise analysis areas in neighborhoods between Kipling and Ken Caryl; just south of Bowles; and between Bowles and US 285</p>	<p>Alternative 2A 9 100-year floodplains with approximately 534,000 square foot area of impact 30 cultural surveys and known sites 7 parks and open spaces impacted 5 wetlands impacted 7 stream and/or water bodies 1 Section 6(f) property 7 potential hazardous material site/regions 3 potential noise analysis areas in neighborhoods between Kipling and Ken Caryl; just south of Bowles; and between Bowles and US 285</p>	<p>Alternative 2B 8 100-year floodplains with approximately 534,000 square foot area of impact 30 cultural surveys and known sites 7 parks and open spaces impacted 5 wetlands impacted 7 stream and/or water bodies 1 Section 6(f) property 7 potential hazardous material site/regions 3 potential noise analysis areas in neighborhoods between Kipling and Ken Caryl; just south of Bowles; and between Bowles and US 285</p>
Implementability	Construction and maintenance costs	Construction: None Operations & Maintenance: > \$1.7M/yr (deferred costs)	Construction: \$325M - \$400M Operations & Maintenance: \$2.3M/yr	Construction: \$320M - \$390M Operations & Maintenance: \$2.3M/yr	Construction: \$370M - \$450M Operations & Maintenance: \$2.6M/yr	Construction: \$355M - \$435M Operations & Maintenance: \$2.6M/yr
	Ability to proceed independently with phased projects	N/A	Easy Mainline improvements could be constructed in useful phases to address current congestion Interchange improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements		Moderate Managed lane implementation required as one project Interchange improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements	
	Effective connections with identified corridor projects	No changes to connect with adjacent corridor projects	Provides additional capacity for the segment, but inconsistent with managed lanes currently under construction from Wadsworth to I-25		Managed lanes provide regional connection to managed lanes currently under construction from Wadsworth to I-25	
	Ability to incorporate technology that can be used to optimize safety and operations	Low	Moderate Opportunities for corridor operations enhancements with improvements		High Opportunities for corridor operations enhancements with improvements and potential repurposing for autonomous vehicle lanes	
Summary of Results		CARRIED FORWARD	CARRIED FORWARD		CARRIED FORWARD	
Notes		Further analysis required as the No Action Alternative in NEPA process for comparison to action alternatives.	This alternative is carried forward to future NEPA processes because the alternative provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources. This alternative would be easier to independently proceed than Alternative 2, but is relatively inconsistent with the managed lanes currently under construction east of study corridor.		This alternative is carried forward to future NEPA processes because the alternative provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources. This alternative provides better travel time reliability than Alternative 1 with higher speeds maintained in managed lanes, but with some congestion in the general purpose lanes.	

GREEN = Comparatively beneficial and/or minor impacts.

BLACK = Comparatively neutral benefits and/or moderate impacts.

RED = Comparatively minor benefits and/or major impacts.



Level 2B Alternatives Evaluation

Golden Segment – US 6 and Johnson Road and CO 93 56th Ave to 64th Pkwy

WestConnect Coalition PEL

CATEGORY	EVALUATION CRITERIA	NO ACTION		ALTERNATIVE 1: FOUR GENERAL PURPOSE LANES AND INTERSECTION IMPROVEMENTS		ALTERNATIVE 2: FOUR GENERAL PURPOSE LANES WITH FREE FLOW SOUTHBOUND CO 93	
Safety	Ability to address identified unsafe physical or operational conditions	No change		<p>Mainline: Increased capacity with additional lanes would reduce crashes. Wider median also helps to reduce crashes</p> <p>58th: Channelized northbound right reduce crashes related to this movement</p> <p>64th (Alt 1A: at-grade): Channelized right turns reduce crashes related to right turns</p> <p>64th (Alt 1B: grade-separated): Crashes related to northbound through vehicles significantly reduced</p> <p>68th (Alt 1B: grade-separated): Closing this movement eliminates crashes related to intersection</p>		<p>Mainline: Increased capacity with additional lanes would reduce crashes. Wider median also helps to reduce crashes</p> <p>58th (Alt 2A: channelized-T): Channelized T significantly reduces crashes related to southbound through movement</p> <p>58th (Alt 2B: roundabout): Roundabouts reduce severe crashes by reducing broadside and approach turn type crashes</p> <p>64th: Channelized T significantly reduces crashes related to southbound through movement</p>	
	Expected crash frequency and severity (crashes/year)	US 6/CO 93: 7 total; 2 severe Johnson: 84 total, 20 severe 58 th : 16 total, 6 severe 64 th : 11 total, 1 severe		US 6/CO 93: 6 total; 1 severe Johnson (at-grade): 84 total, 20 severe 58 th (at-grade): 15 total, 6 severe 64 th (Alt 1A: at-grade): 10 total, 1 severe 64 th (Alt 1B: grade-separated): 8 total, 1 severe		US 6/CO 93: 6 total; 1 severe Johnson (at-grade): 84 total, 20 severe 58 th (Alt 2A: channelized-T): 13 crashes, 4 severe 58 th (Alt 2B: roundabout): 5-15 total, 2-5 severe 64 th : 7 total, 1 severe	
	Pedestrian and bicycle comfort and safety (level of traffic stress – LTS)	Along CO 93: LTS 3		<p>Along CO 93: LTS 1</p> <p>Johnson (at-grade): Increased crossing width</p> <p>58th (at-grade): Added free rights and increased width</p> <p>64th (Alt 1A: at-grade): Added free rights and increased width</p> <p>64th (Alt 1B: grade-separated): Added free rights, but grade separation of NB CO 93</p>		<p>Along CO 93: LTS 1</p> <p>Johnson (at-grade): Increased crossing width</p> <p>58th (Alt 2A: channelized-T): Increased width</p> <p>58th (Alt 2B: roundabout): Crossing of multi-lane free-flow movements</p> <p>64th (channelized-T): Increased width</p>	
Traffic Operations	2040 peak hour intersection delay (AM/PM) *LOS F for CO 93 through movement	With Jefferson Pkwy Johnson: LOS C / LOS F 58 th : LOS D / LOS C 64 th : LOS F* / LOS F*	Without Jefferson Pkwy Johnson: LOS C / LOS F 58 th : LOS C / LOS B 64 th : LOS E / LOS F*	With Jefferson Pkwy Johnson (at-grade): LOS D / LOS C 58 th (at-grade): LOS B / LOS B 64 th (Alt 1A: at-grade): LOS D / LOS E 64 th (Alt 1B: grade-separated): LOS B / LOS B	Without Jefferson Pkwy Johnson (at-grade): LOS D / LOS C 58 th (at-grade): LOS B / LOS B 64 th (Alt 1A: at-grade): LOS C / LOS B 64 th (Alt 1B: grade-separated): LOS B / LOS B	With Jefferson Pkwy Johnson (at-grade): LOS D / LOS C 58 th (Alt 2A: channelized-T): LOS D* / LOS C* 58 th (Alt 2B: roundabout): LOS F* / LOS F* 64 th (channelized-T): LOS E / LOS F*	Without Jefferson Pkwy Johnson (at-grade): LOS D / LOS C 58 th (Alt 2A: channelized-T): LOS C / LOS B 58 th (Alt 2B: roundabout): LOS D / LOS D 64 th (channelized-T): LOS D / LOS E
	2040 vehicular peak hour travel time (AM/PM)	With Jefferson Pkwy NB: 2.4 / 1.4 SB: 1.1 / 1.0	Without Jefferson Pkwy NB: 1.9 / 1.3 SB: 1.3 / 1.1	With Jefferson Pkwy Alt 1A: NB: 5.3 / 3.9 SB: 1.2 / 1.4 Alt 1B: 1.4 / 1.2 SB: 1.2 / 1.3	Without Jefferson Pkwy Alt 1A: NB: 1.7 / 1.5 SB: 1.2 / 1.2 Alt 1B: NB: 1.2 / 1.2 SB: 1.2 / 1.2	With Jefferson Pkwy Alt 2A: NB: 2.8 / 2.0 SB: 1.1 / 1.1 Alt 2B: NB: 2.8 / 3.2 SB: 1.4 / 1.5	Without Jefferson Pkwy Alt 2A: NB: 1.5 / 1.4 SB: 1.2 / 1.2 Alt 2B: NB: 1.5 / 1.5 SB: 1.3 / 1.3
Multimodal Operations and Connectivity	Enhanced regional biking and walking transportation options	No new infrastructure and/or wayfinding provided for pedestrians and bicyclists		Improved sidewalks and crossings at all intersections		Improved sidewalks and crossings at all intersections	
	Enhanced regional transit options	No additional transit service provided		<p>Alt 1A: Queue jumps northbound at 58th and 64th</p> <p>Alt 1B: Queue jump lane at 58th and NB grade separated at 64th, but bus stops moved away from intersection</p>		<p>Alt 2A: Queue jumps northbound at 58th and 64th</p> <p>Alt 2B: Roundabout facilitates NB movement at 58th and queue jump lane at 64th</p>	
	Local multimodal connections	No new or improved connections		Improved multimodal connections to bus stops at 64 th intersection		Improved multimodal connections to bus stops at 64 th intersection	
Community	Design and operational context related to local community surroundings	Recurring AM and PM congestion and delay inconsistent with local community		Reduced congestion and arterial corridor generally consistent with local community		Reduced congestion and arterial corridor generally consistent with local community	
	Access management	Intersection spacing appropriate for highway, but driveway access limits highway mobility		Intersection spacing and configurations improve highway mobility		Intersection spacing and configurations improve highway mobility	
	Impacts on existing properties	None		<p>Alternative 1A</p> <p>Residential: 1 acre (3 parcels)</p> <p>Business/Other: < 1 acre (4 parcels)</p> <p>Public: < 1 acre (4 parcels)</p>	<p>Alternative 1B</p> <p>Residential: 1 acre (3 parcels)</p> <p>Business/Other: < 1 acre (4 parcels)</p> <p>Public: < 1 acre (4 parcels)</p>	<p>Alternative 2A</p> <p>Residential: 1 acre (3 parcels)</p> <p>Business/Other: < 1 acre (4 parcels)</p> <p>Public: < 1 acre (4 parcels)</p>	<p>Alternative 2B</p> <p>Residential: 1 acre (4 parcels)</p> <p>Business/Other: < 1 acre (3 parcels)</p> <p>Public: < 1 acre (2 parcels)</p>
	Support of local and regional planning efforts	Inconsistent with Jefferson County plans for improvements along CO 93		Consistent with Jefferson County plans for four lanes from Golden to County line		Consistent with Jefferson County plans for four lanes from Golden to County line	
Environmental Resources	Impacts on environmental resources within the built and natural environment	Impacts to air quality and noise are likely with increase in traffic volumes and congestion		<p>Alternative 1A</p> <p>3 100-year floodplains with approximately 126,000 square foot area of impact</p> <p>48 cultural surveys and known sites</p> <p>12 parks and open spaces impacted</p> <p>6 wetlands impacted</p> <p>3 potential/critical PMJM habitats</p> <p>7 stream and/or water bodies</p> <p>2 potential noise analysis areas in neighborhoods between Johnson and the Jefferson County Sheriff's Office and between 56th and 62nd</p>	<p>Alternative 1B</p> <p>3 100-year floodplains with approximately 90,000 square foot area of impact</p> <p>48 cultural surveys and known sites</p> <p>12 parks and open spaces impacted</p> <p>6 wetlands impacted</p> <p>3 potential/critical PMJM habitats</p> <p>7 stream and/or water bodies</p> <p>2 potential noise analysis areas in neighborhoods between Johnson and the Jefferson County Sheriff's Office and between 56th and 62nd</p>	<p>Alternative 2A</p> <p>3 100-year floodplains with approximately 115,000 square foot area of impact</p> <p>46 cultural surveys and known sites</p> <p>12 parks and open spaces impacted</p> <p>6 wetlands impacted</p> <p>3 potential/critical PMJM habitats</p> <p>7 stream and/or water bodies</p> <p>2 potential noise analysis areas in neighborhoods between Johnson and the Jefferson County Sheriff's Office and between 56th and 62nd</p>	<p>Alternative 2B</p> <p>3 100-year floodplains with approximately 159,000 square foot area of impact</p> <p>46 cultural surveys and known sites</p> <p>12 parks and open spaces impacted</p> <p>6 wetlands impacted</p> <p>3 potential/critical PMJM habitats</p> <p>7 stream and/or water bodies</p> <p>2 potential noise analysis areas in neighborhoods between Johnson and the Jefferson County Sheriff's Office and between 56th and 62nd</p>
Implementability	Construction and maintenance costs	Construction: None Operations & Maintenance: > \$110K/yr (deferred costs)		Construction: \$33M - \$40M Operations & Maintenance: \$195K/yr	Construction: \$37M - \$46M Operations & Maintenance: \$195K/yr	Construction: \$34M - \$41M Operations & Maintenance: \$195K/yr	Construction: \$33M - \$41M Operations & Maintenance: \$195K/yr
	Ability to proceed independently with phased projects	N/A		<p>Easy</p> <p>CO 93 improvements could be constructed in useful phases to address congestion</p> <p>Intersection improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements</p>		<p>Easy</p> <p>CO 93 improvements could be constructed in useful phases to address congestion</p> <p>Intersection improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements</p>	
	Effective connections with identified corridor projects	No changes to connect with adjacent corridor projects		Provides additional capacity for the segment consistent with the improvements in the Golden Plan		Free flow southbound flow at intersections more consistent with the Golden Plan	
	Ability to incorporate technology that can be used to optimize safety and operations	Low		Moderate Opportunities for corridor operations enhancements with improvements		Moderate Opportunities for corridor operations enhancements with improvements	
Summary of Results	CARRIED FORWARD		CARRIED FORWARD		CARRIED FORWARD		
Notes	Further analysis required as the No Action Alternative in NEPA process for comparison to action alternatives.		<p>These elements of the alternative are Not Recommended:</p> <ul style="list-style-type: none"> - 64th at-grade intersection due to unacceptable level of service and increased delays along the corridor <p>The grade separation at 64th Parkway is carried forward to future NEPA processes because the improvement provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources.</p> <p>The at-grade intersection improvement at 58th Avenue may be considered a short-term improvement to the long-term channelized T intersection improvement included in Alternative 2.</p>		<p>These elements of the alternative are Not Recommended:</p> <ul style="list-style-type: none"> - 64th channelized-T intersection due to unacceptable level of service and increased delays along the corridor, although this configuration may be considered as a short-term improvement to the long-term grade-separated intersection - 58th roundabout due to unacceptable level of service and increased delays along the corridor <p>The channelized T intersection at 58th Avenue is carried forward to future NEPA processes because the improvement provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources.</p> <p>The at-grade intersection improvement at 58th Avenue included in Alternative 1 may be considered a short-term improvement to the long-term channelized T intersection.</p>		

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BLACK = Comparatively neutral benefits and/or moderate impacts.
RED = Comparatively minor benefits and/or major impacts.



Level 2B Alternatives Evaluation

CO 93 Segment – 64th Parkway to Marshall Road

WestConnect Coalition PEL

Category	Evaluation Criteria	No Action	ALTERNATIVE 1: FOUR GENERAL PURPOSE LANES WITH AT-GRADE INTERSECTION IMPROVEMENTS	ALTERNATIVE 2: COMBINATION OF FOUR LANES SOUTH OF CO 72 AND TWO LANES WITH PASSING LANES AND FREE FLOW SOUTHBOUND CO 93	ALTERNATIVE 3: COMBINATION OF FOUR LANES AND TWO LANES WITH PASSING LANES, ROUNDABOUTS AND AT-GRADE INTERSECTION IMPROVEMENTS	
Safety	Ability to address identified unsafe physical or operational conditions	No change	Mainline: Increased capacity with additional lanes would reduce crashes. Median with wider outside shoulders also helps to reduce crashes. Westgate: Channelized T significantly reduces crashes related to southbound through movement.	Mainline: Increased capacity with additional lanes reduces crashes. Median with wider outside shoulders also helps to reduce crashes. 82nd: Signalized channelized T significantly reduces crashes related to southbound through movement. CO 72: Interchange significantly reduces crashes related to northbound/southbound through movements. Westgate: Channelized T significantly reduces crashes related to southbound through movement. CO 128: Channelized T significantly reduces crashes related to southbound through movement.	Mainline: Increased capacity with additional lanes reduces crashes. Median with wider outside shoulders also helps to reduce crashes. 82nd: Roundabout reduces severe crashes by reducing broadside and approach turn type crashes. Westgate: Channelized T significantly reduces crashes related to southbound through movement. CO 128: Roundabout reduces severe crashes by reducing broadside and approach turn type crashes.	
	Expected crash frequency and severity (crashes/year)	CO 93: 56 total; 17 severe 82 nd : 4 total, 3 severe CO 72: 21 total, 4 severe Westgate: 5 total, 3 severe CO 128: 12 total, 4 severe CO 170: 18 total, 10 severe	CO 93: 37 total; 11 severe 82 nd (at-grade): 3-5 total, 2-3 severe CO 72 (at-grade): 21 total, 4 severe Westgate (channelized-T): 2 total, 2 severe CO 128 (at-grade): 12 total, 4 severe CO 170 (at-grade): 18 total, 10 severe	CO 93: 41 total; 12 severe 82 nd (channelized-T): 1-2 total, 1-2 severe CO 72 (interchange): 12 total, 2 severe Westgate (channelized-T): 2 total, 2 severe CO 128 (channelized-T): 8 total, 3 severe CO 170 (at-grade): 18 total, 10 severe	CO 93: 41 total; 12 severe 82 nd (roundabout): 1-3 total, 1-2 severe CO 72 (at-grade): 21 total, 4 severe Westgate (channelized-T): 2 total, 2 severe CO 128 (roundabout): 4-11 total, 1-4 severe CO 170 (at-grade): 18 total, 10 severe	
	Pedestrian and bicycle comfort and safety (level of traffic stress – LTS)	Along CO 93: LTS 3 82 nd : stop-controlled crossing of 82 nd CO 72: signalized but no pedestrian facilities Westgate: signalized but no pedestrian facilities CO 128: signalized but no pedestrian facilities CO 170: signalized but no pedestrian facilities	Along CO 93: LTS 1 Grade separation of CO 93 at CO 72 and CO 128 82 nd (at-grade): signalized crossing of 82 nd CO 72 (at-grade): increased crossing width Westgate (at-grade): increased crossing width CO 128 (at-grade): no change to CO 128 crossing CO 170 (at-grade): Added free right and increased width	Along CO 93: LTS 1 Grade separation of CO 93 at CO 72 and CO 128 82 nd (channelized-T): signalized crossing of 82 nd CO 72 (interchange): reduced crossing width on CO 72 Westgate (channelized-T): increased crossing width CO 128 (channelized-T): no change to CO 128 crossing CO 170 (at-grade): Added free right and increased width	Along CO 93: LTS 1 Grade separation of CO 93 at CO 72 and CO 128 82 nd (roundabout): Crossing of free-flow movements CO 72 (at-grade): increased crossing width Westgate (channelized-T): increased crossing width CO 128 (roundabout): Crossing of multi-lane free-flow movements CO 170 (at-grade): Added free right and increased width	
Traffic Operations	2040 peak hour intersection delay (AM/PM) *LOS F for CO 93 through movement	With Jefferson Pkwy 82 nd : LOS F / LOS F CO 72: LOS D / LOS E Westgate: LOS C / LOS D CO 128: LOS C / LOS D CO 170: LOS F* / LOS F*	With Jefferson Pkwy 82 nd (at-grade): LOS B / LOS A CO 72 (at-grade): LOS C / LOS D Westgate (channelized-T): LOS B / LOS B CO 128 (at-grade): LOS A / LOS B CO 170 (at-grade): LOS C / LOS D	Without Jefferson Pkwy 82 nd (at-grade): LOS C / LOS B CO 72 (at-grade): LOS D / LOS D Westgate (channelized-T): LOS C / LOS B CO 128 (at-grade): LOS C / LOS C CO 170 (at-grade): LOS D / LOS F*	With Jefferson Pkwy 82 nd (channelized-T): LOS B / LOS B CO 72 (interchange): LOS A / LOS B Westgate (channelized-T): LOS B / LOS B CO 128 (channelized-T): LOS B / LOS C CO 170 (at-grade): LOS C / LOS C	Without Jefferson Pkwy 82 nd (channelized-T): LOS C / LOS B CO 72 (interchange): LOS A / LOS B Westgate (channelized-T): LOS B / LOS B CO 128 (channelized-T): LOS B / LOS B CO 170 (at-grade): LOS B / LOS D
	2040 vehicular peak hour travel time index (AM/PM)	With Jefferson Pkwy NB: 1.6 / 1.5 SB: 7.2 / 20.5	With Jefferson Pkwy NB: 1.2 / 1.3 SB: 1.2 / 1.4	Without Jefferson Pkwy NB: 1.3 / 1.2 SB: 1.2 / 1.4	With Jefferson Pkwy NB: 1.3 / 1.2 SB: 1.1 / 1.3	Without Jefferson Pkwy NB: 1.2 / 1.2 SB: 1.1 / 2.6
Multimodal Operations and Connectivity	Enhanced regional biking and walking transportation options	No new infrastructure and/or wayfinding provided for pedestrians and bicyclists	Separated trail along CO 93. Improved crossings for pedestrians/bicyclists at CO 72 and CO 170	Separated trail along CO 93. Improved crossings for pedestrians/bicyclists at CO 170	Separated trail along CO 93. Improved crossings for pedestrians/bicyclists at CO 72 and CO 170	
	Enhanced regional transit options	No additional transit service provided	Increased GS service between Boulder and Golden	Increased GS service between Boulder and Golden	Increased GS service between Boulder and Golden	
	Local multimodal connections	None	Improved and expanded park and ride facility on southeast corner at CO 72	Improved and expanded park and ride facility on southwest corner at CO 72	Improved and expanded park and ride facility on southeast corner at CO 72	
Community	Design and operational context related to local community surroundings	Recurring AM and PM congestion and limited shoulders inconsistent with local community and surroundings	Reduced congestion consistent with local community, but increased roadway width inconsistent with natural surroundings	Reduced congestion generally consistent with local community and minimal roadway width consistent with natural surroundings	Reduced congestion generally consistent with local community and minimal roadway width consistent with natural surroundings	
	Access management	Intersection spacing appropriate for highway, but driveway access limits highway mobility	Intersection spacing and configurations improve highway mobility	Intersection spacing and configurations improve highway mobility Improved access for CO 93 at CO 72	Intersection spacing and configurations improve highway mobility	
	Impacts on existing properties	None	Residential: 2 acres (3 parcels) Business/Other: 12 acres (24 parcels) Public: 34 acre (28 parcels)	Residential: 2 acres (3 parcels) Business/Other: 12 acres (23 parcels) Public: 37 acre (24 parcels)	Residential: 2 acres (3 parcels) Business/Other: 11 acres (21 parcels) Public: 34 acre (25 parcels)	
	Support of local and regional planning efforts	Inconsistent with Jefferson County and Boulder County plans for improvements along CO 93	Consistent with Jefferson County plans for four lanes from Golden to County line, but inconsistent with Boulder County vision	Consistent with Jefferson County plans for four lanes from Golden to County line and consistent with Boulder County vision	Consistent with Jefferson County plans for four lanes from Golden to County line and consistent with Boulder County vision	
Environmental Resources	Impacts on environmental resources within the built and natural environment	Impacts to air quality and noise are likely with increase in traffic volumes and congestion	49 cultural surveys and known sites 20 parks and open spaces 12 existing trails 5 wetlands impacted 5 potential/critical PMJM habitat 7 stream and/or water bodies 3 potential hazardous material site/regions 1 potential noise analysis area in neighborhoods between 80th and Coal Creek Canyon Road	49 cultural surveys and known sites 19 parks and open spaces 12 existing trails 6 wetlands impacted 5 potential/critical PMJM habitat 8 stream and/or water bodies 3 potential hazardous material site/regions 1 potential noise analysis area in neighborhoods between 80th and Coal Creek Canyon Road	49 cultural surveys and known sites 19 parks and open spaces 12 existing trails 5 wetlands impacted 5 potential/critical PMJM habitat 8 stream and/or water bodies 3 potential hazardous material site/regions 1 potential noise analysis area in neighborhoods between 80th and Coal Creek Canyon Road	
Implementability	Construction and maintenance costs	Construction: None Operations & Maintenance: > \$450K/yr (deferred cost)	Construction: \$195M - \$240M Operations & Maintenance: \$990K/yr	Construction: \$185M - \$225M Operations & Maintenance: \$915K/yr	Construction: \$175M - \$215M Operations & Maintenance: \$915K/yr	
	Ability to proceed independently with phased projects	N/A	Easy CO 93 improvements could be constructed in useful phases to address congestion Intersection improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements	Easy CO 93 improvements could be constructed in useful phases to address congestion Intersection improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements	Easy CO 93 improvements could be constructed in useful phases to address congestion Intersection improvements could be implemented as independent projects with mobility and safety benefits independent of mainline improvements	
	Effective connections with identified corridor projects	No changes to connect with adjacent corridor projects	Provides additional capacity for the segment consistent with the improvements in the Golden Plan	Free flow southbound flow at intersections more consistent with the Golden Plan	Less consistent with improvements in the Golden Plan than other alternatives	
	Ability to incorporate technology that can be used to optimize safety and operations	Low	Moderate Opportunities for corridor operations enhancements with improvements	Moderate Opportunities for corridor operations enhancements with improvements	Moderate Opportunities for corridor operations enhancements with improvements	
Summary of Results		CARRIED FORWARD	CARRIED FORWARD	CARRIED FORWARD	NOT RECOMMENDED	
Notes	Further analysis required as the No Action Alternative in NEPA process for comparison to action alternatives.	This alternative is carried forward to future NEPA processes because the alternative provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources.	This alternative is carried forward to future NEPA processes because the alternative provides reasonable safety and mobility benefits related to recurring congestion and operational conditions and enhances multimodal mobility options, while minimizing impacts to the community and environmental resources. This alternative provides similar CO 93 travel speeds, and greater safety benefits, and is more consistent with the Boulder County vision compared to Alternative 1.	These elements of the alternative are Not Recommended: - CO 128 roundabout due to unacceptable level of service and increased delays along the corridor - 82 nd roundabout as only roundabout along corridor due to concerns with CO 93 speeds and dark conditions The remaining alternative highway and intersection elements are contained within Alternatives 1 and 2 and, therefore, are carried forward with those alternatives.		

GREEN = Comparatively beneficial and/or minor impacts.
BLACK = Comparatively neutral benefits and/or moderate impacts.
RED = Comparatively minor benefits and/or major impacts.