Applied Research and Innovation Branch

FULL CLOSURE STRATEGIC ANALYSIS

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16. Abstract
The full closure strategic analysis was conducted to create a decision process whereby full roadway closures for construction and maintenance activities can be evaluated and approved or denied by CDOT Traffic personnel. The study reviewed current full closure practices in Colorado and throughout the country, gathered stakeholder input, and employed an iterative development process to reach a systematic decision tool that can be applied to judging the merits of full closure scenarios. A number of case studies were created to more fully understand the methodology and adjust the tool to best match real-world scenarios. Project deliverables include a technical report and a series of electronic forms that can be used by CDOT to work through the process.

Implementation
Currently, CDOT Staff considers full closure opportunities on a case-by-case basis, applying engineering judgment and various factors to weigh the decision. This analysis provides a uniform decision process that CDOT Staff can use to efficiently and effectively evaluate and approve full closures. Use of the decision tool is anticipated to broaden the consideration and use of full closures for highway work and ensure that they are successfully implemented.

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GLOSSARY OF TERMS

Full closure: A closure of all travel lanes in one or both directions on a state highway. A full closure can be implemented for a variety of reasons, including both construction and maintenance activities.

Detour route: The roadway route that is officially designated as the path around a fully closed highway segment. Regional routes chosen at the discretion of drivers are not considered the detour route.

Diversion: Decisions made by drivers to alter their travel route, time of departure, travel mode, or destination because of the full closure. Achievement of greater diversion can significantly reduce traffic impacts of a full closure.

Applicant: The entity requesting CDOT Traffic consideration of a particular full closure scenario. May include individuals or entities within CDOT.

1.0 INTRODUCTION

1.1 Study Purpose

The full closure strategic analysis project was developed to address a growing interest in implementing temporary full roadway closures of state highways to facilitate roadway construction and maintenance activities. Full closures can provide a means for completing highway work in a shortened period of time, saving time and resources over a phased construction approach.

Currently, CDOT Staff considers full closure opportunities on a case-by-case basis, applying engineering judgment and various factors to weigh the decision. The purpose of the full closure strategic analysis is to provide a uniform decision process that CDOT Staff can use to efficiently and effectively evaluate and approve full closures. Use of the decision tool is anticipated to broaden the consideration and use of full closures for highway work and ensure that they are successfully implemented.

Project goals included:

- Developing a simple and consistent decision-making process that:
  - Can be easily understood and used by a wide spectrum of interested applicants, including contractors, local agencies, CDOT maintenance personnel, and consultants
  - Can be applied in a uniform fashion to ensure that all factors are considered
  - Provides an objective methodology by which full closure decisions are made in an equitable manner for a variety of construction and/or maintenance activities
  - Can be used to facilitate full closure decisions for a variety of state highway facility types
  - Determines when and where full closures are beneficial and should be considered
  - Can provide documentation of full closures for record-keeping
- Making full closures easier for CDOT to review and approve or deny full closures

1.2 Study Process

The full closure strategic analysis was developed by a study team including CDOT and Consultant Staff. The team undertook and iterative process of evaluating various ideas for the decision process and full closure criteria, meeting regularly to discuss their progress.

The analysis process included the following elements:

Literature Review – A literature review was conducted in order to understand current industry practice related to full roadway closures. The review provided a number of helpful resources and facts, and

Stakeholder Input – The project team held a meeting with a number of metropolitan area agency representatives to understand their perspectives and concerns related to temporary full closures of state highways.

Team Progress Meetings – Regular team meetings were held to discuss the best way to accomplish the identified goals.

Iterative Decision Tool Development – The project team developed several versions of a full closure decision tool, and conducted internal review to determine whether the tool was providing sufficient support.

Case Studies – As a part of strategy development, the team studied nine full closure scenarios and tracked each through the process to demonstrate how a given scenario would be crafted and evaluated.

2.0 LITERATURE REVIEW

A review of literature about full road closures was conducted to provide input for the decision support tool. Most of the available research available provided case studies of full road closure implementation. Overall, the documented case studies showed that using a full road closure had positive benefits and works well under the proper circumstances.

When reviewing this literature, it is apparent the most significant benefit of full road closures is shorter project duration. Many of the case studies showed that the projects could be completed in 50 to 25 percent of the time required to complete if the road were to remain open. Surveys of the public in some of these closure reviews indicated that the public generally prefers a shorter time duration of full road closure to extended partial closures. Other benefits include improved worker safety, increased productivity, and improved product quality. All of these benefits are the result of not working near traffic and having a larger workspace available. Some projects also showed a cost savings, which could be expected when completing a project on a shorter timeline. A few projects did show increased costs due to the expense associated with closing the road. Some of the larger projects completed improvements to the alternate routes to prepare for the detouring traffic to add capacity, which added a cost that would have not otherwise been experienced, but in some cases also provided long-term value. There is also an additional cost in creating public awareness campaigns which is a necessity for a successful full road closure.

According to the case studies reviewed, there are several factors that need to be considered when deciding if a full road closure should be used on a project. The biggest factor is the availability of adequate local detour and regional alternate routes. If no satisfactory routes exist or the routes do not have adequate capacity, then a full road closure should be considered with particular caution. It should be noted that detour routes do not need the capacity to carry all the traffic from the closed road. One survey found that approximately 60 percent of people made adjustments to their travel plans based on a full road closure rather than navigating the detour route. They chose an alternative travel route, changed the time of travel, changed the destination, or skipped the trip all together. As a result in many of these closures, the delays and queuing were less than anticipated. A good media campaign to increase public awareness is a key ingredient in achieving this.

One of the factors that needs to be considered is whether the contractor and supplier possess the capacity to meet the accelerated schedule that accompanies a full road closure. It is extremely important that the deadlines be met because the date of the roadway re-opening will be highly publicized. Other factors that need to be considered include potential impacts to businesses and the impacts of a 24 hour per day work schedule which can affect neighbors due to noise and lights.

Probably the most extreme example of the impact of public awareness is with the closure of California's I-405 in Los Angeles. There was massive media campaign to spread awareness about this weekend closure, which lead to a lot of hype and the nickname "Carmaggedon". As a result, so many people changed their driving behavior that the alternate routes actually had lower traffic volumes and lower travel times than would be experienced on a typical weekend. The L.A. public transit system also experienced the highest weekend ridership in its history. The success in making people aware of the potential delays actually reduced delays.

Many of the case studies provided information on what they considered to be ingredients of a successful full road closure. Public awareness is consistently mentioned as the most important item. As mentioned earlier, public awareness allows people to adjust their plans, which in turn lessens the impact of the road closure. Another key was a good Travel Demand Management (TDM) plan. Creating a plan to reduce congestion and delays helps to make a successful closure. Some techniques used in TDM plans included increasing transit services and reducing transit fares to encourage people to use transit services and avoid car travel. Most projects also had tow trucks on the roads or near locations where an accident could cause significant delays. Some of the larger projects completed roadway improvements including adding/extending turn lanes and retiming traffic signals to increase capacity on the detour routes prior to the closure. A traffic command center workforce was created for the Missouri I-64 closure, which involved closing two five-mile segments of roadway for one year each. The workforce was tasked with collecting and watching real-time data in an effort to locate and address any problems as quickly as possible.

Overall, the literature review shows that when planned and executed correctly, a full road closure can be beneficial for some construction projects. It provides a shorter project duration, increased worker safety, increased product quality, and does not create a negatively perceived experience for the traveling public.

3.0 STAKEHOLDER INVOLVEMENT

A meeting was held on February 15, 2013 with representatives of the following Denver metro area transportation stakeholders:

City and County of Denver	City of Thornton
Douglas County	CDOT Maintenance
CDOT Construction	CDOT Engineering
City of Lakewood	City of Aurora

The group discussed previous experiences with full closures, including:

- Full weekend closure of Interstate 270 for bridge rehabilitation
- Closure of I-25 near University Boulevard to facilitate the presidential debate held in 2012
- Closure of I-25 through Lower Downtown to facilitate installation of the 15th Street bridge
- Closure of I-70 at Pecos Street to allow for interchange reconstruction activities

The group also discussed key elements to consider in the full closure decision process and locations to include as case studies. Meeting notes are provided in **Appendix A**.

In addition to the stakeholder meeting, CDOT Staff conducted outreach to representatives of the Colorado Contractors Association (CCA) to understand additional perspectives.

4.0 METHODOLOGY

4.1 Options Considered

In the process of developing the decision tool, the project team considered the following general options in the process of developing the decision tool.

1. **Basic Checklist** – This option would provide a list of factors that should be considered for a full closure to be reviewed and approved. This checklist would be helpful to ensure that all important factors are weighed in the decision, but does not provide a framework for how those elements should influence the decision to close. Therefore, the basic checklist was not selected.
2. **Flow Chart** – The decision process could be formulated as a flow chart including decision boxes and a path for applicants to follow toward eventual approval or denial of a particular full closure scenario. Upon consideration of this option, the project team determined that the flow chart would be too complex to meet the goal of simplicity. This option was not selected.
3. **Step Process** – This methodology would provide a series of steps that would begin with the initial application, then progress to providing additional detail and, eventually to implementation. Advancement to each step would require review and approval from CDOT Traffic. This option was selected because it provides a logical and simple process and the flexibility needed to accommodate different types of closures.

4.2 Decision Process

The methodology is depicted on **Figure 1**. It consists of three steps, each of which requires information from the applicant and response from CDOT Traffic. The steps are described as follows:

Step One – Step One requires that the applicant fill out a worksheet describing the basic details of the closure scenario, including location, time, detour route, and anticipated time savings associated with a full closure instead of phased construction with the highway remaining open. The Step One Worksheet is provided in **Appendix B**. Upon receiving a completed worksheet, CDOT Traffic Staff evaluates the characteristics of the requested closure based on a list of criteria categories. **Table 1** outlines the criteria to be considered, along with a description of how the performance of the closure scenario is to be rated in each category.

Upon evaluating the closure, CDOT Traffic staff will fill out the Step One Evaluation Form included in **Appendix C**. The form provides decision makers with a basis for evaluating whether the closure will be advanced to Step 2. Favorable ratings in the form enhance the likelihood that the closure will be advanced to Step 2, while unfavorable ratings can result in a request for more information from the applicant, rejection of the proposed full closure, or significant modification to characteristics of the closure. Upon summarizing all ratings, CDOT Staff responds to the applicant by advancing the closure to Step 2, requesting additional information or alterations to the closure scenario, or denying the full closure requested by the applicant.

Step Two – Upon advancing the closure to Step Two, CDOT Traffic provides a request back to the applicant for additional information using the Step Two Added Information Form. The additional information will include information needed by CDOT to more fully understand the implementation of the closure, and the closure scenario may still be rejected or accepted at this time. Additional information may be needed to evaluate traffic and business impacts, describe traffic safety conditions, or define the detour route(s) or regional diversions. The Step Two Added Information Form to be used by CDOT Traffic to request more information from the applicant is provided in **Appendix D**. When the applicant is internal to CDOT, it is anticipated that CDOT Traffic will assist in compiling the requisite information.

Upon receipt of the additional information, CDOT Traffic Staff will consider the closure scenario and determine whether the closure should advance to Step Three. It is possible that the closure could be denied based on Step 2 findings.

Step Three – Closures advanced by CDOT to Step Three will be implemented, and a number of items need to be addressed in order to ensure successful implementation, as shown on **Figure 1**. CDOT and the applicant will work together to ensure contractor accountability, monitoring of closure impacts, and agency coordination.

Figure 1. **FULL CLOSURE DECISION PROCESS**

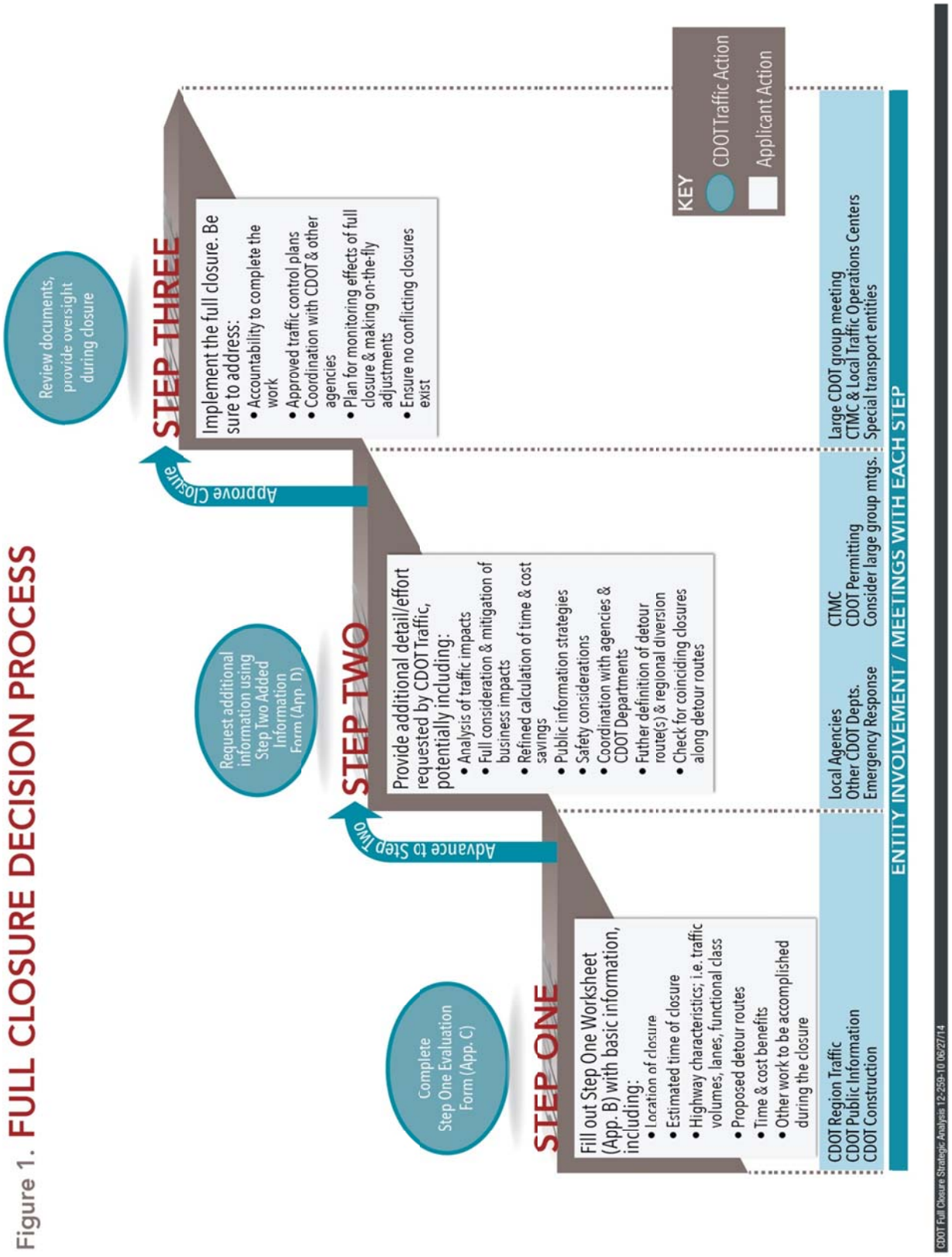

Table 1. Full Closure Rating Criteria – Step 1

Category		Favorable	Fair	Unfavorable
1	Impact to traffic (volume impacted (ADT x # of days, prorated)	<50,000	50,000-100,000	>100,000
2	Functional equivalence of detour roadways	Detour is the same or higher functional class as closed highway	Detour route is a different functional class, but will accommodate traffic in similar fashion to closed highway	Detour route is of functional class below the closed highway
3	Use of state highways as detour routes	Detour route uses all state highways	Detour route uses mixture of state highways and non-state highways	Detour route uses all non-state highways
4	Impacts to businesses and local access	there are no direct, exclusive local accesses to the closed highway segment	local accesses to the closed highway can be accommodated by equivalent alternate means	one or more exclusive local accesses would be closed by the full closure
5	Travel distance added by detour	3x travel distance or less	3-5x travel distance	5x or more travel distance
6	Local agency coordination	No agency coordination required	1 agency to coordinate with	2 or more local agencies involved
7	Advance public notice	>2 weeks notice	1-2 weeks notice	<1 week notice
8	Potential for diversion out of area	well known regional travel options present	limited regional travel options present	very few good regional travel options present
9	Construction time savings	>30% reduction in construction time	0-30% reduction in construction time	No reduction in construction time
10	Ability to do concurrent work	Other activities can be done that would have required separate, additional full closure time	Additional activities can be accomplished that would not have required separate, additional full closure time	No additional activities can be accomplished

5.0 CASE STUDIES

The project team selected nine full closure case studies located within the Denver Metro area covering a variety of highway types, activity types, and traffic and business impact levels. The scenarios are:

FREEWAY

1. C-470 (470A) from University Boulevard (21.1) to Quebec Street (24.1), drainage culvert reconstruction, one weekend each direction
2. C-470 (470A) from Lucent Boulevard (18.5) to Broadway (19.6), drainage culvert reconstruction, one weekend each direction
3. I-70 (70A) from I-25 (274.1) to York Street (275.6), joint replacement, both directions, 1 night per joint, 10 hours per night

EXPRESSWAY

4. US 285 (285D) under C-470 bridge (249.5 to 250.5), bridge demo, full weekend
5. Parker Road (83A) intersection with Quincy (68.8), reconstruction, weekend, Friday 9pm to Monday 5am

MULTILANE URBAN ARTERIAL

6. Colfax Avenue (40C), Monaco (302.15) to Quebec (302.6), 1 week each direction for subgrade rehabilitation
7. Wadsworth Boulevard (SH 121) intersection with Yale Avenue, weekend, Friday 9pm to Monday 5am

RURAL HIGHWAY

8. US 36 (SH 36D) between Price Road-CR217 (MP 111.7) and Private Driveway (MP 114.8), reconstruct multiple drainage structures/bridges, 2 weeks
9. SH 93A @ MP 10.4, bridge reconstruction, full 2 week duration

Appendix E provides completed Step 1 worksheets and CDOT evaluation forms for each of the case studies. The case studies should be used by applicants and CDOT Staff as references for future consideration of full closure opportunities. It is important to note that these case studies are provided FOR REFERENCE ONLY, and do not represent closure scenarios that would automatically be accepted by CDOT Traffic.

APPENDIX A

MEETING NOTES
2/15/14 STAKEHOLDER MEETING

MEETING NOTES

FULL CLOSURE STRATEGIC ANALYSIS
FHU Reference No. 111-111-15
Large Group Discussion Meeting
February 15, 2013

In attendance: See attached sign-in sheet

1.0 OVERVIEW OF STUDY

Steve Hersey provided the background and evolution of the project. CDOT is looking to develop a decision making process to evaluate potential full road closures to determine when and where such closures should be utilized. The goal of this strategic analysis is to take a broad look at all factors and reach a strategic approach to determining when full closures are beneficial and should be considered. All impacts need to be considered in this strategy.

2.0 LITERATURE REVIEW FINDINGS

Colleen Guillotte provided an overview of the literature review findings. See the attached handout for a summary of the findings.

3.0 GROUP DISCUSSION

Many local and other full closure examples were mentioned and discussed, as follows:

- A 10-year project in Dallas made improvements to alternate routes prior to closures and used reversible lanes.
- I-270 emergency bridge closures. I-270 was closed for two weekends, one weekend for each direction. An extensive public information campaign supported the closures. Ninety percent of the work was able to be completed in the two weekends. Was a simpler closure because I-270 only has three access points and a redundant Interstate option in I-70. State Patrol assisted. Recommended that some uniformed traffic control always be used for full closures. Used VMS signs extensively, and benefitted from good VMS density. Lesson learned – don't detour traffic into another project with a detour (conflicting projects). Good communication with the local agencies and within CDOT can help to avoid such conflicts.
- SH 93 was a full road closure for resurfacing and shoulder widening, but only on weeknights.
- I-25 closures during T-REX from Hampden to Santa Fe, signal coordination was adjusted on detour routes for these closures.

- Presidential debate closure and DNC closures were very successful. Extensive public information helped create very little traffic along I-25 through the closure area, even 1 hour before the closure was initiated.
- 15th Street bridge in Denver. Lesson learned – plan closures around events such as major sporting or festival events.
- Pecos closure to construct roundabouts. The public was brought into the process and asked if they wanted a full closure.
- I-35W bridge collapse closure in Minneapolis-St. Paul. Lesson learned – longer closures may be acceptable, as drivers get accustomed to the situation. However, Minnesota's network of freeways is more extensive than Denver, so drivers may be more able to divert with little impact.

More general information and lessons learned were also discussed:

- Thornton has found that closures sometimes have resulted in permanent diversion(s).
- Weather factors should be considered in the process.
- Thornton provided a copy of their Road Closure Procedures, see attached.
- The impact of full closures of arterials on business access must be carefully considered.
- It was found that certain project types and construction/maintenance activities benefit more from full closures. Resurfacing projects, particularly along arterials, have a better product quality and potential for no/fewer laydown joints. Bridge repairs also benefit from full closure. Accelerated bridge construction also work well, with prep/demolition/precast installation able to be completed in a weekend. The Pecos project is an example of how this can work (closure of I-70).
- Per the FHWA interstate work can only be conducted at night.
- Some full closures are not discretionary – emergency repairs, presidential visits.
- Railroad coordination can sometimes require a full closure, particularly along arterials.

Key factors to consider in the decision process were identified including:

- Type of work
- Public awareness (one-time and ongoing)
- Access density
- Detour Routes, considering regional and local traveler perspectives
- Coordination
- Type of road
- VMS availability
- Weather/Season
- Business impacts
- School locations
- Night work – residential housing impacts
- Closure duration
- benefit to the public
- Special events

Further discussion addressed information to include in the report and how the analysis could best meet CDOT objectives, as follows:

- It was suggested that several decision flow charts be created for different closure durations. There should be different considerations based on the length of closure planned.

- A generalized cost/benefit analysis could help to facilitate closure decisions
- Maintenance activities are often not considered candidates for full closures. However, some activities could be done quite efficiently during a full closure, particularly if maintenance efforts are consolidated along a particular stretch of state highway. The analysis should consider potential full closures for highway maintenance work.
- Penalties for delay in re-opening the roadway should be in the decision tree to determine if penalties (such as lane rental fees) are needed. Public opinion of full closures depends, in part, on ensuring that there are consequences for contractors when things are delayed.
- Some potential closures can probably have a clear-cut "yes" or "no" result from the decision tree, while others may say a full road closure warrants more analysis.

4.0 TYPICAL SEGMENTS

FHU requested input about potential corridors/segments to analyze for the strategy, as the scope of work includes application of closure strategy to various freeway/arterial situations. It was suggested that segments with varying characteristics be chosen to get a wide range of roadway types. For example: arterials, expressways, 2-lane, 4-lane, 6-lane, corridors with many accesses, corridors with few accesses, and diagonal routes with no clear parallel road. Roadway segments mentioned included the following:

- C-470
    - Broadway to I-25
    - Santa Fe to Kipling
    - Kipling to I-70
- I-25
- I-70
- SH 93 or 104th
- Colorado Boulevard
- Wadsworth
- Parker Road
- Santa Fe Drive
- US 36 – good example of diagonal route that traverses communities

5.0 NEXT STEPS / ACTION ITEMS

Building upon input received at the meeting, FHU will:

- Identify a preliminary list of state highway segments to represent typical conditions
- Develop initial thoughts about the decision support tool and work with CDOT Staff to refine the strategy.

SIGN-IN SHEET

CDOT FULL CLOSURE STRATEGIC ANALYSIS
INPUT MEETING
February 15, 2013 – CDOT Region 6

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SIGN-IN SHEET

CDOT FULL CLOSURE STRATEGIC ANALYSIS
INPUT MEETING
February 15, 2013 – CDOT Region 6

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APPENDIX B

STEP ONE WORKSHEET

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario

State Highway Number	
Milepoint Limits of section to be closed	
Physical length of closed section (miles)	
Direction of closed section (if divided highway)	
Number of Travel Lanes to be closed	
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	
CDOT Access Category	
Statewide Functional Classification	
Current weekday lane closure allowed hours	

Type, Schedule and Duration of Closure

Date(s) of closure	
Hours of closure	
Number of exclusive private/business accesses to the highway within closed area	
Activities planned to take place within closed area:	

Proposed Detour Route(s)

Roads to be used:	
Functional Classification of Detour roads:	
Mileage of detour route:	
Will the detour route use local roadways (i.e., non-state highways)?	
Which agencies could be involved?	
Have the agencies been contacted?	

Map of state highway segment(s) to be closed (may also be provided as attachment):

Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	☐
1-2 weeks	☐
>2 weeks	☐

2. How might the closure affect emergency response?

The comparable length detour onto a lower classification roadway could cause minor delays for emergency response.

BENEFITS OF CLOSURE

Please estimate the time and cost savings anticipated to occur with implementation of the proposed full closure:

Benefit Category	Without full closure	With full closure	Savings
Time			
Cost			

Describe any other benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

Description of benefits:

PROPOSED DETOUR MAP(S) (insert image(s) below)

ADDITIONAL INFORMATION

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

APPENDIX C

STEP ONE EVALUATION FORM

CDOT Step One Evaluation Form
Full Closure

COLORADO
Department of Transportation

CLOSURE SCENARIO:	CDOT TRAFFIC DECISION:

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic	☐	☐	☐	
2	Functional equivalence of detour roadways	☐	☐	☐	
3	Use of state highways as detour routes	☐	☐	☐	
4	Impacts to businesses and local access	☐	☐	☐	
5	Travel distance added by detour	☐	☐	☐	
6	Local agency coordination	☐	☐	☐	
7	Advance public notice	☐	☐	☐	
8	Potential for diversion out of area	☐	☐	☐	
9	Construction time savings	☐	☐	☐	
10	Ability to do additional work	☐	☐	☐	
11	Other considerations	☐	☐	☐	

APPENDIX D

STEP TWO ADDED INFORMATION FORM

Step One Evaluation Form
Full Closure

Category	No Additional Analysis	Additional Analyses/ detail	If needed, nature of analyses/detail
1. Impact to traffic	☐	☐	
2. Functional equivalence of detour roadways	☐	☐	
3. Use of state highways as detour routes	☐	☐	
4. Impacts to businesses and local access	☐	☐	
5. Travel distance added by detour	☐	☐	
6. Local agency coordination	☐	☐	
7. Advance public notice	☐	☐	
8. Potential for diversion out of area	☐	☐	
9. Construction time savings	☐	☐	
10. Ability to do additional work	☐	☐	
OTHER INFORMATION	☐	☐	

APPENDIX E

CASE STUDY MATERIALS

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario (Case Study #1)

State Highway Number	470A
Milepoint Limits of section to be closed	University (21.1) – Quebec (24.1)
Physical length of closed section (miles)	3.0
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	4
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	95,000
CDOT Access Category	F-W – Interstate System, Freeway Facilities
Statewide Functional Classification	Principal Arterial – Freeways and Expressways
Current weekday lane closure allowed hours	9/10 PM – 5:30 AM

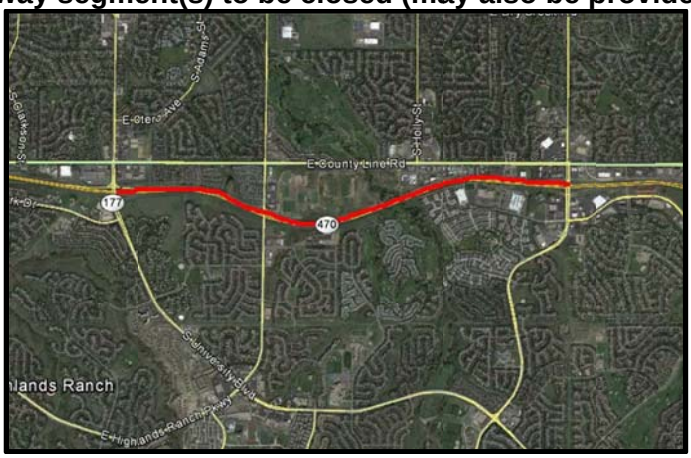
Type, Schedule and Duration of Closure

Date(s) of closure	One Weekend
Hours of closure	9 PM Friday – 5:30 AM Monday
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Reconstruction of drainage crossing beneath C470.

Proposed Detour Route(s)

	Roads to be used:	Santa Fe Dr, Highlands Ranch Pkwy, Broadway
	Functional Classification of Detour roads:	Expressway, Arterial
	Mileage of detour route:	3.5 Miles
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	Douglas County, City of Littleton
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

The comparable length detour onto a lower classification roadway could cause minor delays for emergency response.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

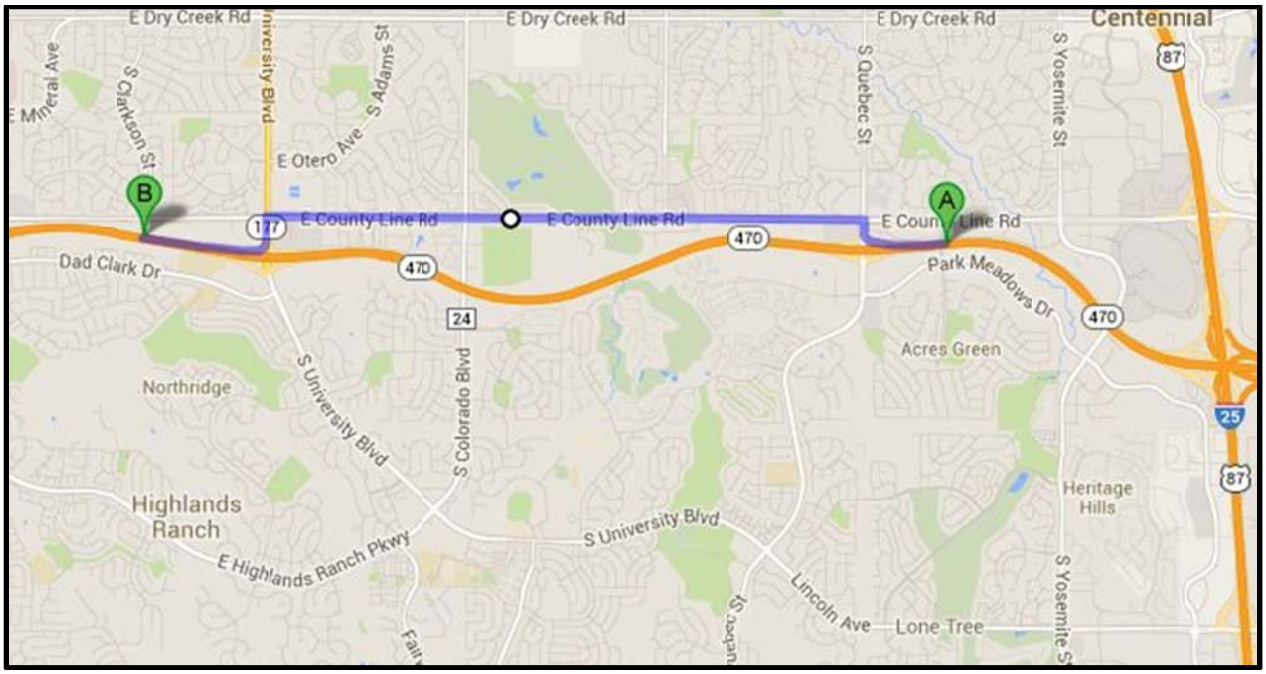
1. Reduces the construction time required compared to a scenario under which the project is built using phased construction

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project.

3. Provides for clarity of public messaging related to significant freeway reconstruction effort

4. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

Closure Scenario (Case Study #2)

State Highway Number	470A
Milepoint Limits of section to be closed	Lucent (18.5) – Broadway (19.6)
Physical length of closed section (miles)	0.9
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	4
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	81,000
CDOT Access Category	F-W – Interstate System, Freeway Facilities
Statewide Functional Classification	Principal Arterial – Freeways and Expressways
Current weekday lane closure allowed hours	9/10 PM – 5:30 AM

Type, Schedule and Duration of Closure

Date(s) of closure	One Weekend
Hours of closure	9 PM Friday – 5:30 AM Monday
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Reconstruction of Drainage crossing beneath C470

Proposed Detour Route(s)

	Roads to be used:	Lucent, Broadway, County Line Road, Plaza Drive
	Functional Classification of Detour roads:	Arterial
	Mileage of detour route:	2.5 Miles
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	Douglas County, City of Littleton
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):

Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

The traffic volume added to the detour roadways could cause some delays for emergency response.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

1. Reduces the construction time required compared to a scenario under which the project is built using phased construction

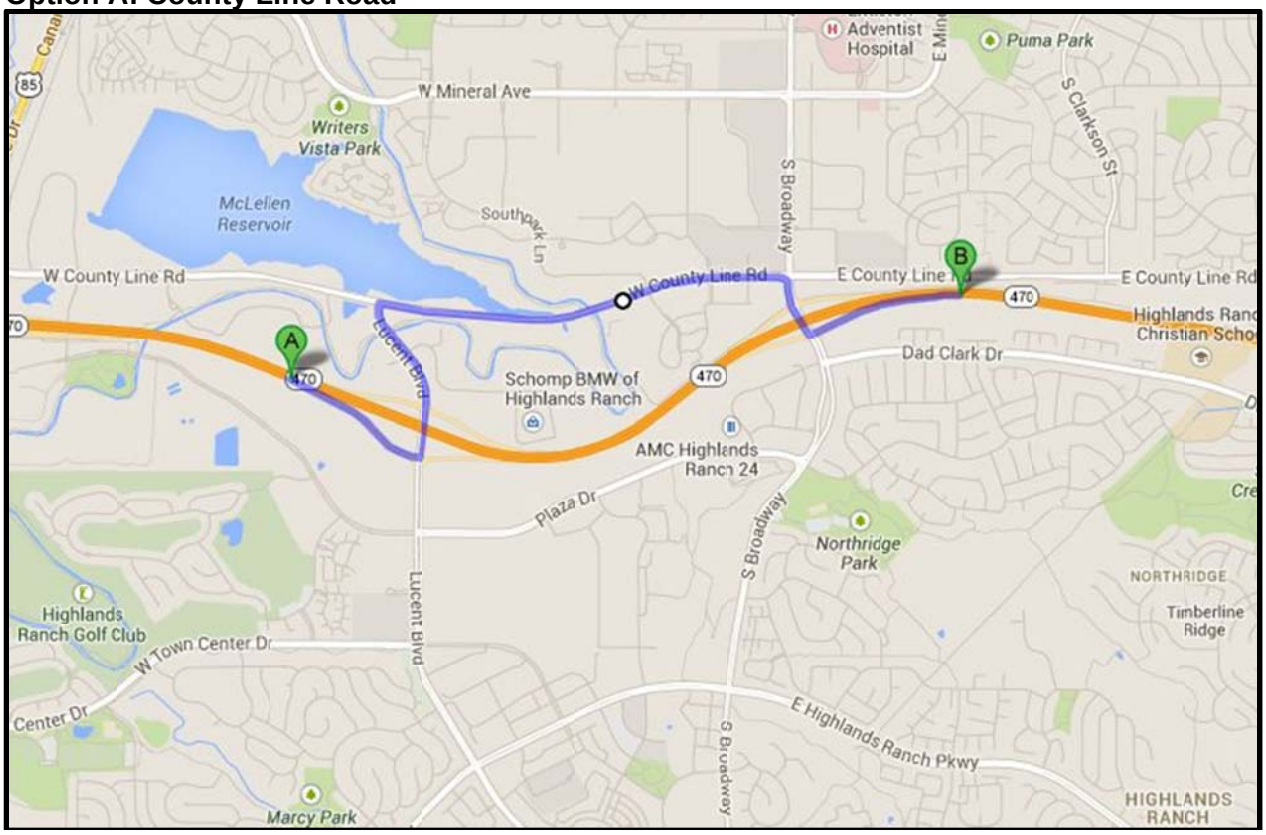
2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project

3. Provides for clarity of public messaging related to significant freeway reconstruction effort

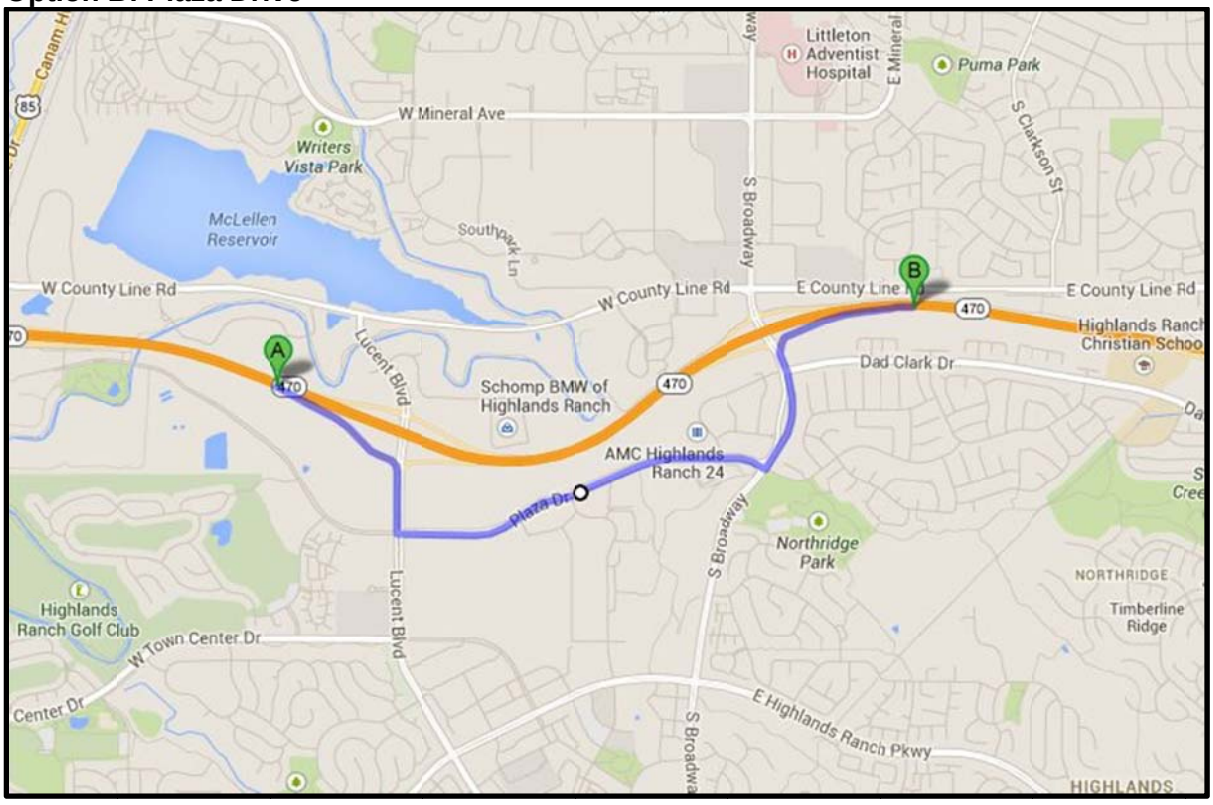
4. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)

Option A: County Line Road



Option B: Plaza Drive



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

Closure Scenario (Case Study #3)

State Highway Number	70A
Milepoint Limits of section to be closed	274.1 (I-25) – 275.6 (York Street)
Physical length of closed section (miles)	1.5
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	4-8
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	150,000
CDOT Access Category	F-W – Interstate System, Freeway Facilities
Statewide Functional Classification	Interstate
Current weekday lane closure allowed hours	8 PM – 5 AM

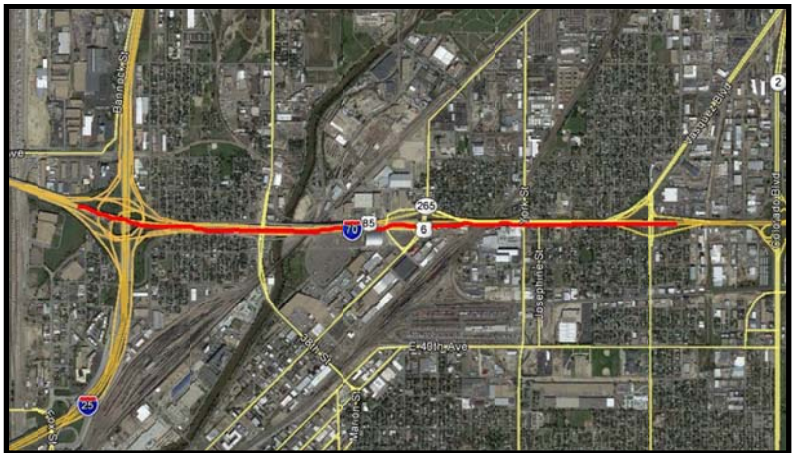
Type, Schedule and Duration of Closure

Date(s) of closure	1 Night/Joint
Hours of closure	10 Hours/night
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Joint Replacement, 6 total joints to be replaced across all travel lanes

Proposed Detour Route(s)

	Roads to be used:	I-25, I-76, I-270, US 6, Colorado Blvd.
	Functional Classification of Detour Roads:	Freeway, Arterial
	Mileage of detour route:	7.5 Miles
	Will the detour route use local roadways (i.e., non-state highways)?	No
If yes:	Which agencies could be involved?	
	Have the agencies been contacted?	

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

This closure may cause a slight delay in emergency response, but it should not be significant. The closure will only be at night when there will not be a high level of traffic and the suggested detour is on high capacity state highways.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

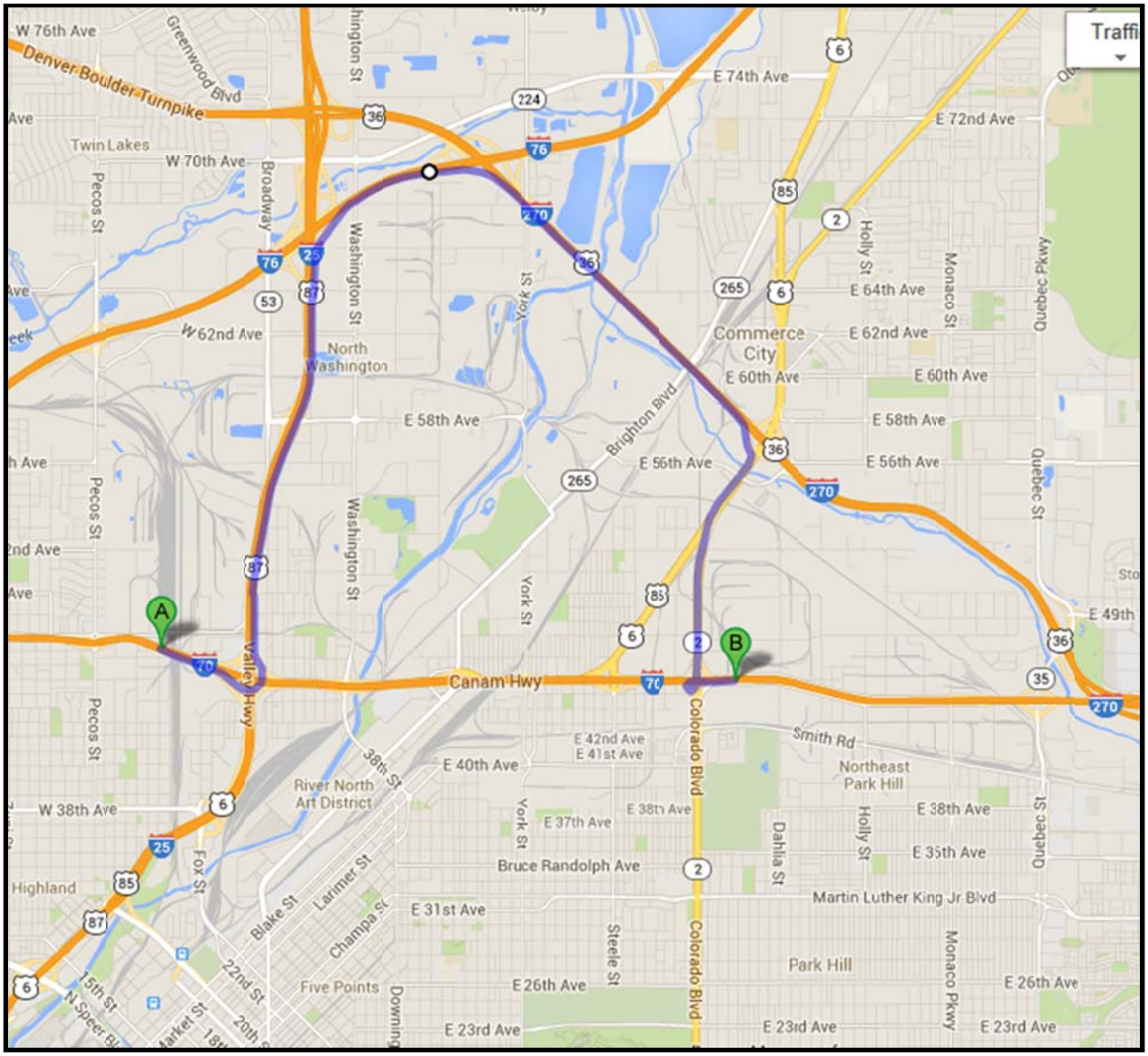
---

1. This closure allows for full joint replacement to take place in a single night, which is both easier and provides a higher quality joint than phased construction. With phased construction, replacement of a single joint would require multiple evenings of 1-2 lane closures to remove the old joint and replace with new. Also, replacing the joints in segments would require multiple joint welds, which would reduce the overall quality of the finished product.

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project.

3. Removing vehicles from the adjacent lanes during construction will improve safety for workers

PROPOSED DETOUR ROUTE MAP(S)



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario (Case Study #4)

State Highway Number	285D
Milepoint Limits of section to be closed	249.5 – 250.5 (under C470 bridge)
Physical length of closed section (miles)	1.0
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	4
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	32,000
CDOT Access Category	F-W – Interstate System, Freeway Facilities
Statewide Functional Classification	Principal Arterial – Freeways and Expressways
Current weekday lane closure allowed hours	6 PM – 5:30 AM, 8 AM – 3 PM

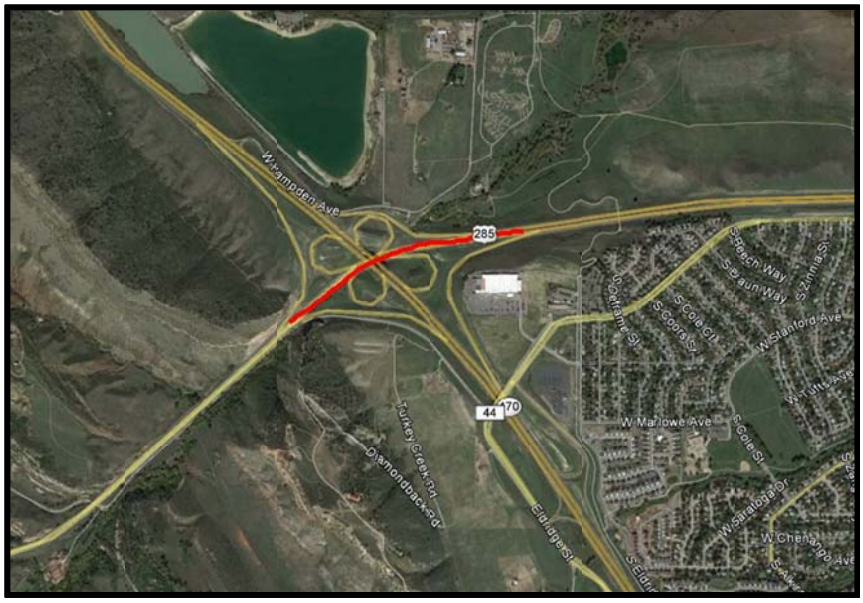
Type, Schedule and Duration of Closure

Date(s) of closure	One weekend
Hours of closure	9:00 PM Friday to 5:00 AM Monday
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Bridge Demolition – C470 bridge over US 285

Proposed Detour Route(s)

	Roads to be used:	SH 8, Eldridge, Quincy, C470
	Mileage of detour route:	EB 2.7 Miles, WB 5.2 Miles
	Functional Classification of Detour routes:	Arterial
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	Jefferson County
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

The closure will likely have a significant impact on emergency response times, given the importance of US 285 as a connection into the foothills.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

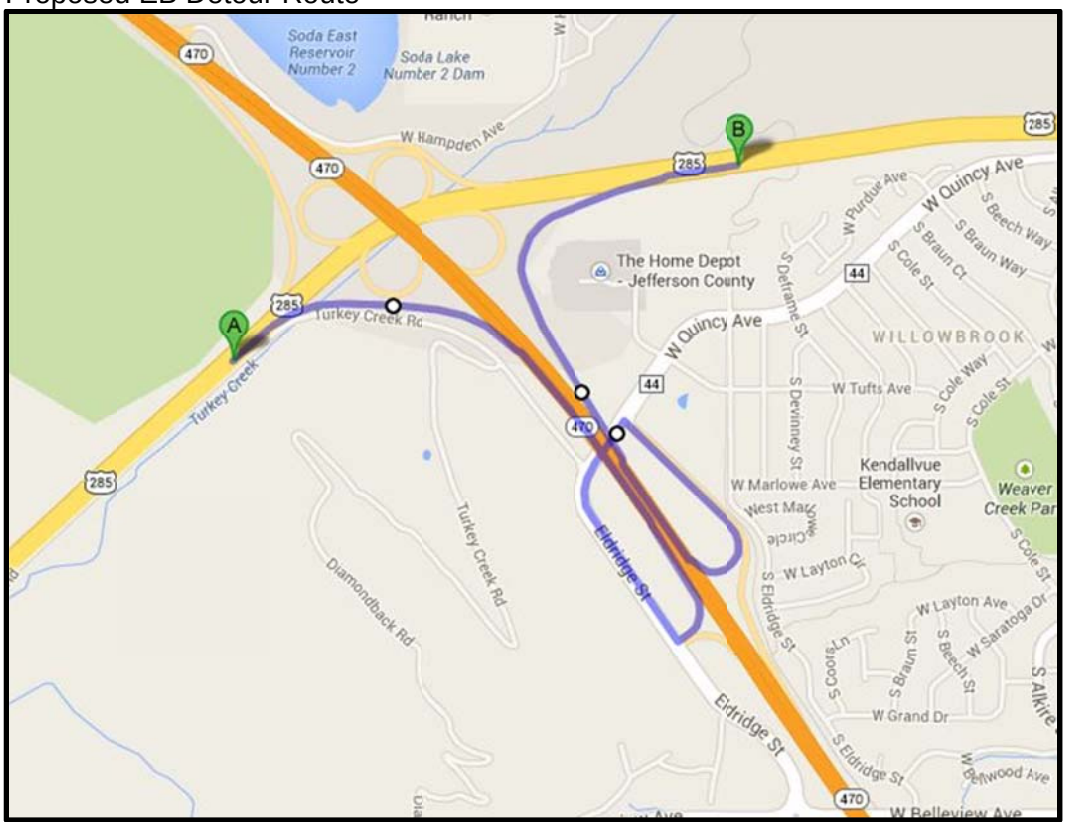
1. Provides adequate accommodation and protection for safety critical tasks

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project. Phased construction would require multiple lane closures over several nights, and a weekend full closure would reduce the overall time impact.

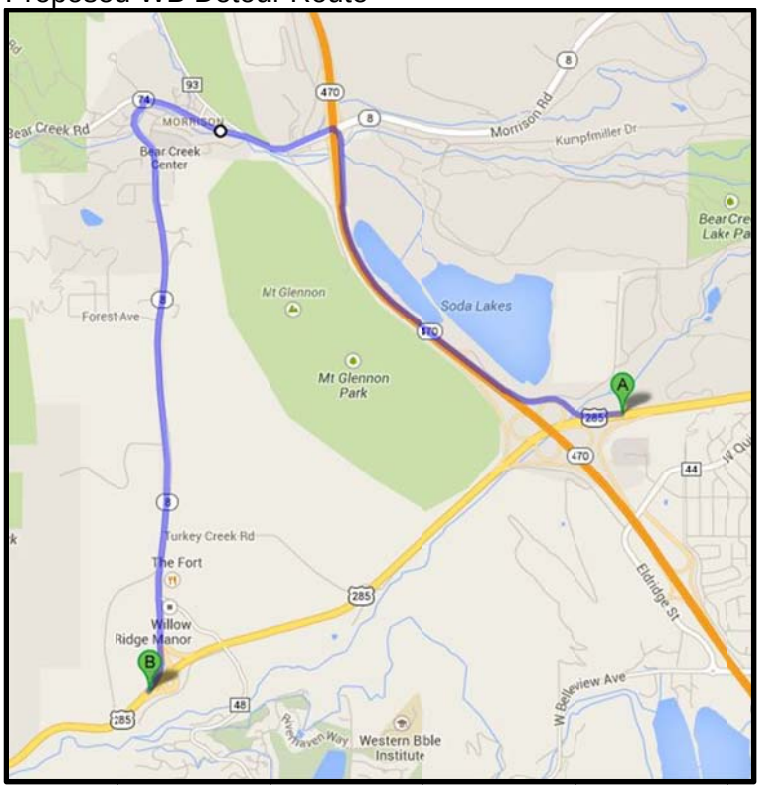
3. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)

Proposed EB Detour Route



Proposed WB Detour Route



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario (Case Study #5)

State Highway Number	83A
Milepoint Limits of section to be closed	68.8
Physical length of closed section (miles)	Quincy Intersection
Direction of closed section (if divided highway)	Full Intersection
Number of Travel Lanes to be closed	6
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	75,000
CDOT Access Category	NR-A – Non-Rural Principal Highway
Statewide Functional Classification	Principal Arterial – Freeways and Expressways
Current weekday lane closure allowed hours	6 PM – 7 AM, 9 AM – 3 PM

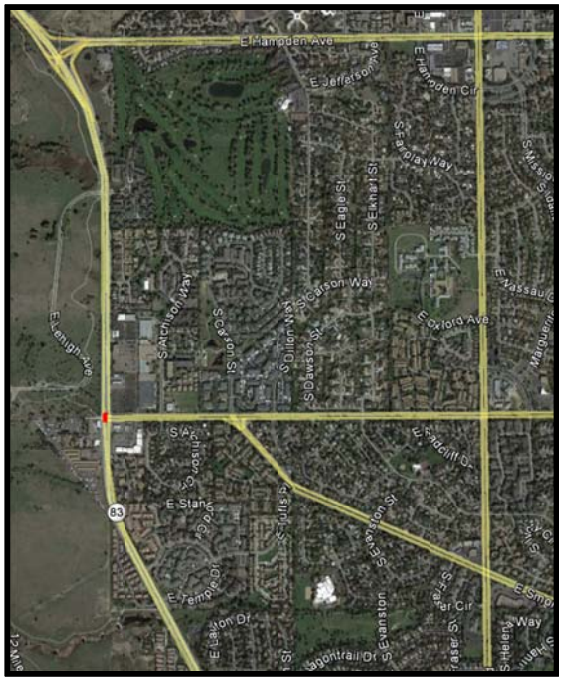
Type, Schedule and Duration of Closure

Date(s) of closure	Weekend
Hours of closure	9 PM Friday – 5 AM Monday
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Intersection Reconstruction – full concrete

Proposed Detour Route(s)

	Roads to be used:	Belleview, Chambers, Hampden
	Mileage of detour route:	3.7 Miles
	Functional Classification of Detour Roads:	Arterial
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	City of Aurora
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

This closure could potentially have a large impact on emergency response. SH 83A has a larger capacity than the detour roads, so there could be delays.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

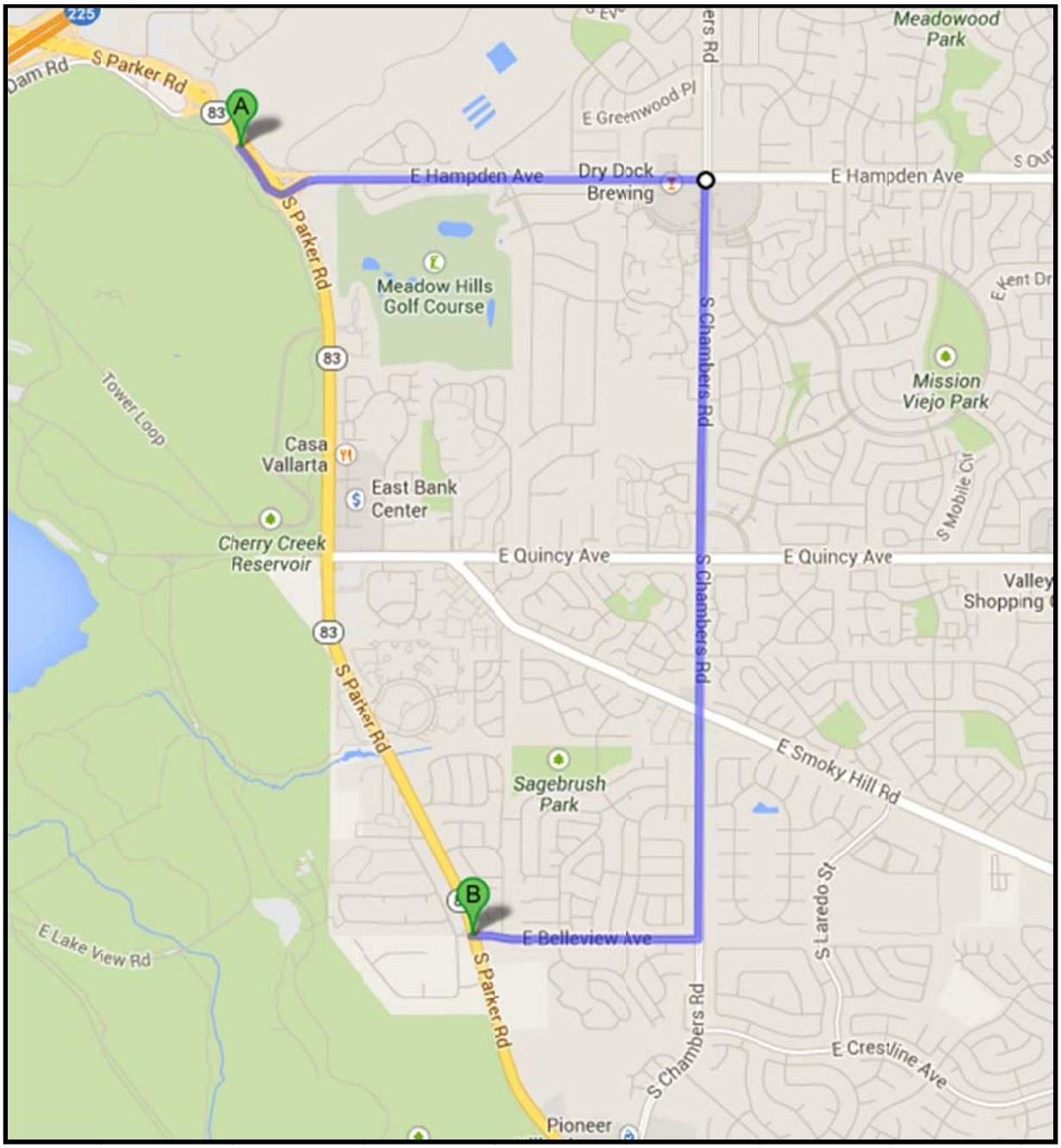
---

1. Reduces the construction time required compared to a scenario under which the intersection would be reconstructed in individual phases

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project. Traffic control adjustments for this intersection reconstruction would involve significant ongoing alterations to traffic signal configuration, pedestrian patterns, and lane geometry approaching and through the intersection. The time required to mobilize and execute these phases would greatly exceed the full closure time.

3. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario (Case Study #6)

State Highway Number	40C
Milepoint Limits of section to be closed	302.15 (Monaco) – 302.60 (Quebec)
Physical length of closed section (miles)	0.45
Direction of closed section (if divided highway)	Both Directions (1 week each direction)
Number of Travel Lanes to be closed	4
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	27,000
CDOT Access Category	NR-C – Non-Rural Arterial
Statewide Functional Classification	Principal Arterial – Other
Current weekday lane closure allowed hours	6 PM – 8 AM, 9 AM – 1 AM

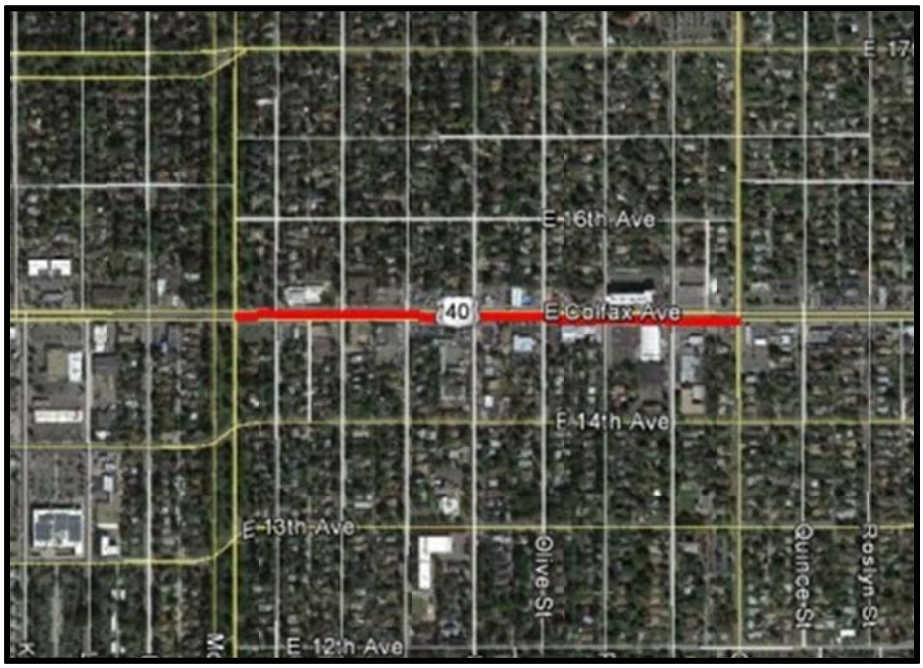
Type, Schedule and Duration of Closure

Date(s) of closure	1 week (7 days/week) each direction
Hours of closure	All day
Number of exclusive private/business accesses to the highway within closed area	3
Activities planned to take place within closed area:	Major subgrade rehabilitation

Proposed Detour Route(s)

	Roads to be used:	13th Avenue, Monaco/Quebec
	Mileage of detour route:	EB 0.7 Miles, WB 0.9 Miles
	Functional Classification of Detour roads:	Arterials (residential street type in CCD)
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	City and County of Denver
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

Because this is an urban area with a grid street network, the closure should have little impact on emergency response.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

1. Allows for a higher quality of final pavement by providing sufficient space to excavate and replace the subgrade material for the nearly ½ mile length of Colfax Avenue.

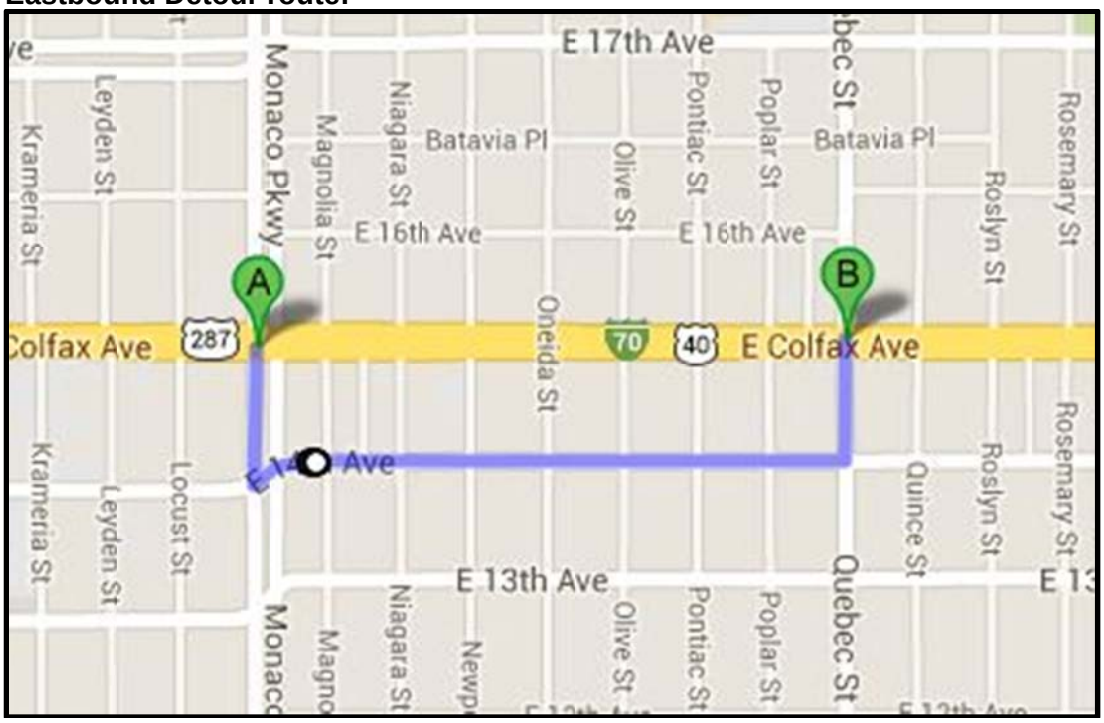
2. Reduces project cost by decreasing construction time and reducing the need to adjust traffic control throughout the project

3. Avoids the sustained impacts to business visibility and access that would result from phased construction

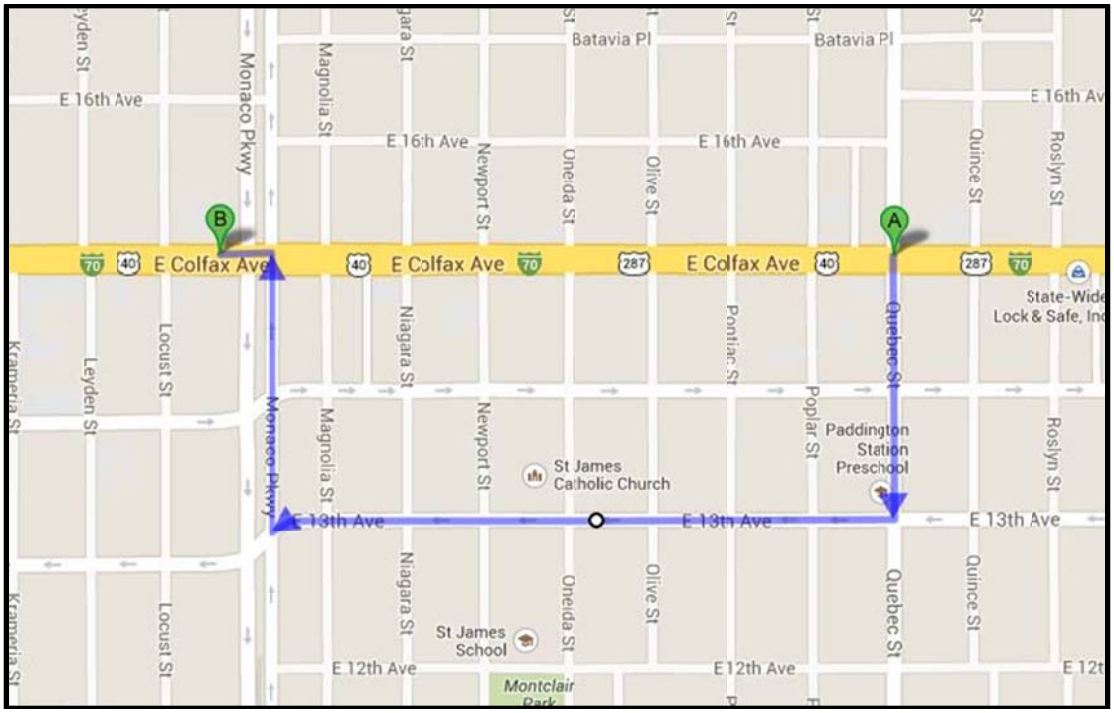
4. Removing vehicles from the adjacent lanes during construction will improve safety for workers

PROPOSED DETOUR MAP(S)

Eastbound Detour route:



Westbound Detour route:



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

Closure Scenario (Case Study #7)

State Highway Number	121A
Milepoint Limits of section to be closed	8.5 (Yale Avenue intersection)
Physical length of closed section (miles)	0.0 (Intersection)
Direction of closed section (if divided highway)	Intersection closure
Number of Travel Lanes to be closed	Multiple lanes on all four approaches
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	48,000
CDOT Access Category	NR-A – Non-Rural Arterial
Statewide Functional Classification	Principal Arterial – Other
Current weekday lane closure allowed hours	7 PM – 7/8 AM

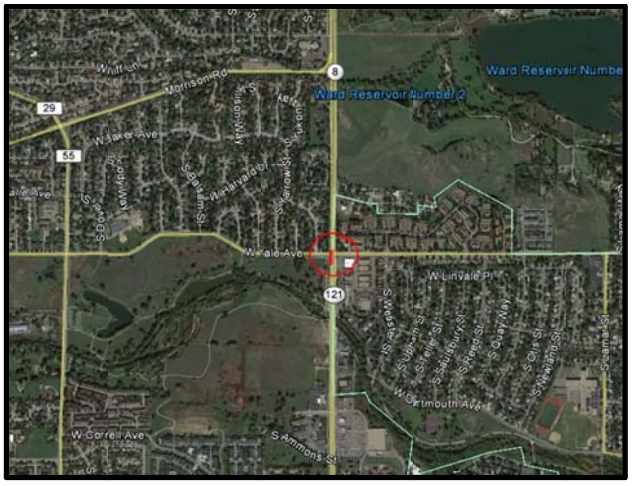
Type, Schedule and Duration of Closure

Date(s) of closure	1 weekend
Hours of closure	9 PM Friday – 5:30 AM Monday
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Completed intersection reconstruction - concrete

Proposed Detour Route(s)

	Roads to be used:	SH 8, SH 391, US 285, SH 95, Kipling St.
	Mileage of detour route:	5.8 Miles (Yale) 4.6 Miles (SH 121)
	Functional Classification of Detour roads:	Arterial, Expressway, short portion of Local (Kipling St.)
	Will the detour route use local roadways (i.e., non-state highways)?	Yes, short portion of Kipling St.
If yes:	Which agencies could be involved?	City of Lakewood, City/County of Denver
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

This closure may cause minor delays in emergency response due to re-routing

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

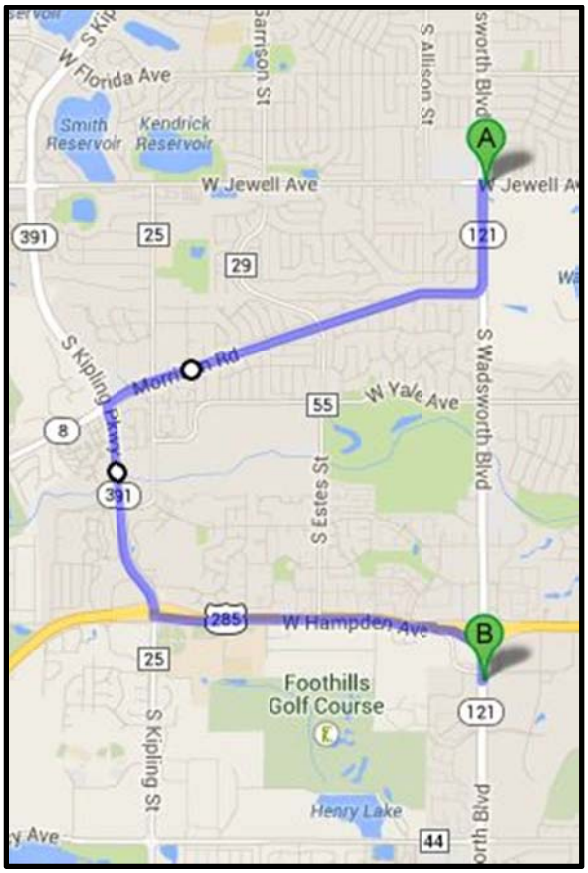
1. Phased intersection reconstruction in concrete would require multiple days or evenings of lane closures and traffic shifts, causing delays to the traveling public and extended inconvenience to local businesses. The weekend full closure would isolate impacts to a shorter period of time and result in a significant decrease in overall construction time and mobilization effort.

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project.

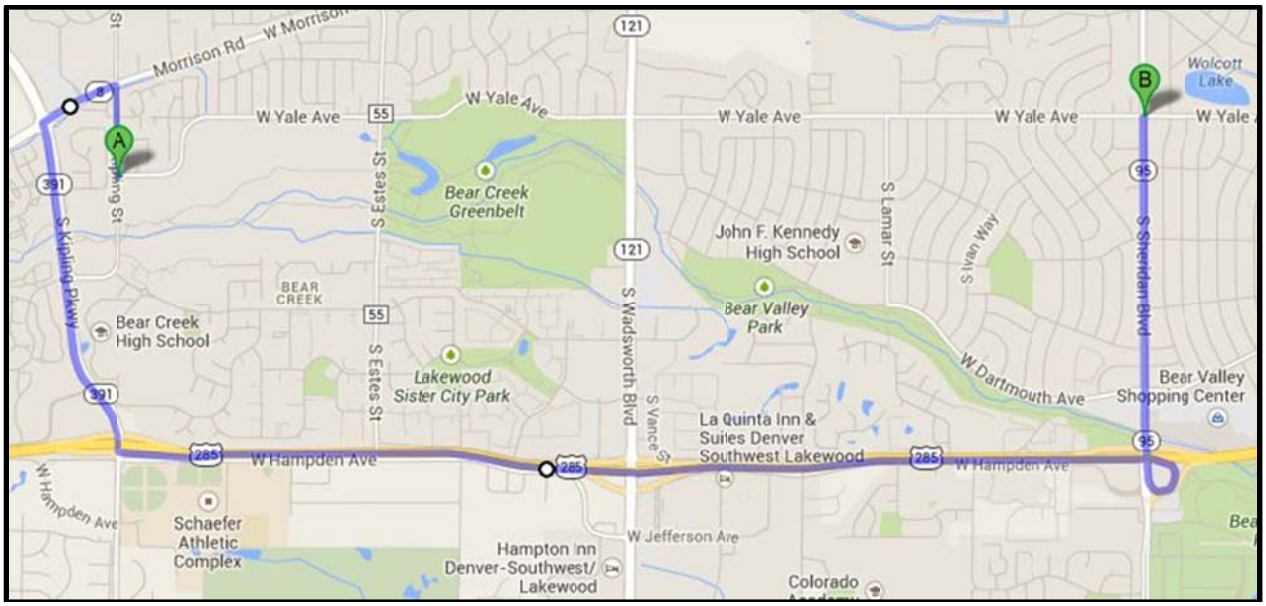
3. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)

SH 121 Detour



Yale Avenue Detour



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

Closure Scenario (Case Study #8)

State Highway Number	36D
Milepoint Limits of section to be closed	111.7 (Price Road) – 114.8 (Private Drive)
Physical length of closed section (miles)	3.1
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	2
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	820
CDOT Access Category	R-A – Regional Highway
Statewide Functional Classification	Minor Arterial
Current weekday lane closure allowed hours	6 PM – 8 AM

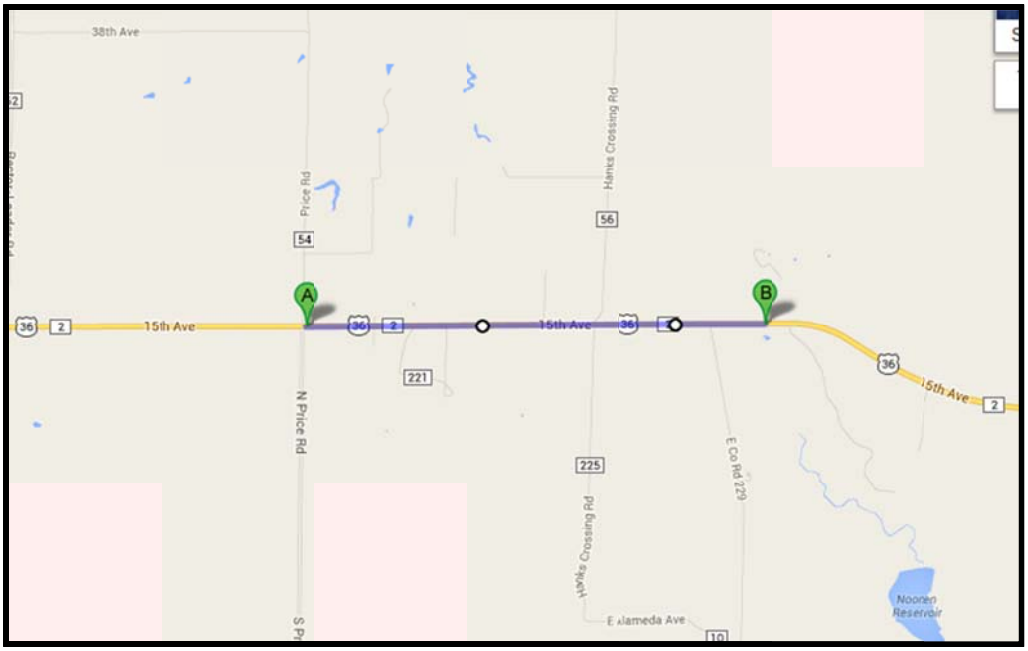
Type, Schedule and Duration of Closure

Date(s) of closure	2 Weeks
Hours of closure	All Day
Number of exclusive private/business accesses to the highway within closed area	5
Activities planned to take place within closed area:	Reconstruct multiple drainage structures/bridges

Proposed Detour Route(s)

	Roads to be used:	CR 217, CR 34, CR 241
	Mileage of detour route:	21.5 miles
	Functional Classification of Detour roads:	Rural arterial, 2-lane, CR 241 gravel
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	Adams County
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):



Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

Emergency response times will be impacted because of the rural nature of the area and the lengthy detours

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

---

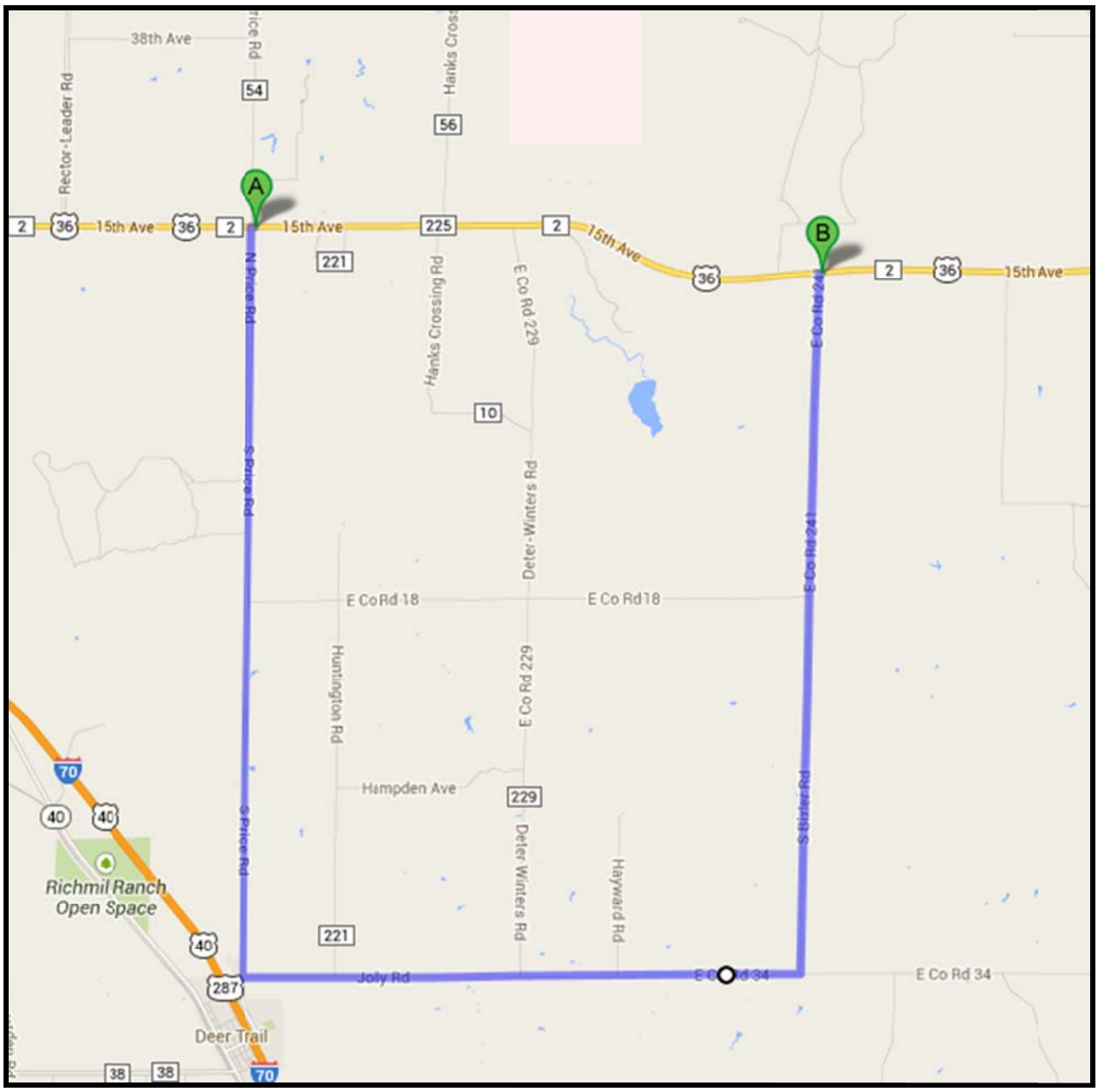
1. Reduces the construction time required compared to a scenario under which the projects are built individually using phased construction.

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project.

3. Accommodates short delivery timeframe for important drainage improvements.

4. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

Proposed detour route:



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

Step 1 Worksheet
Full Closure

COLORADO
Department of Transportation

Closure Scenario (Case Study #9)

State Highway Number	93A
Milepoint Limits of section to be closed	10.4
Physical length of closed section (miles)	0.1
Direction of closed section (if divided highway)	Both Directions
Number of Travel Lanes to be closed	2
Average Annual Daily Traffic (AADT) – highest recorded within the closure area (vehicles per day)	16,000
CDOT Access Category	E-X – Expressway, Major Bypass
Statewide Functional Classification	Principal Arterial - Other
Current weekday lane closure allowed hours	7 PM – 7 AM, 9 AM – 3 PM

Type, Schedule and Duration of Closure

Date(s) of closure	2 Weeks (14 days)
Hours of closure	All Day
Number of exclusive private/business accesses to the highway within closed area	0
Activities planned to take place within closed area:	Bridge Reconstruction, SH 93 over mining linkage

Proposed Detour Route(s)

	Roads to be used:	SH 72, Indiana St, SH 128
	Mileage of detour route:	12.5 Miles
	Functional Classification of Detour roads:	Arterial
	Will the detour route use local roadways (i.e., non-state highways)?	Yes
If yes:	Which agencies could be involved?	Jefferson County, City of Arvada
	Have the agencies been contacted?	No

Map of state highway segment(s) to be closed (may also be provided as attachment):

Additional Questions

1. How many days in advance can the public be made aware of the closure?

< 1 week	
1-2 weeks	
>2 weeks	x

2. How might the closure affect emergency response?

Emergency response would be impacted negatively because the suggested detour is lengthy.

BENEFITS OF CLOSURE

Please describe benefits of the proposed full closure. Possible benefits for consideration include:

a) Reduced construction time
b) Avoiding night work
c) Better construction efficiency
d) Enhanced worker safety
e) Enhanced traveler safety
f) Reduced cost of construction/maintenance
g) Potential to accommodate additional projects and/or maintenance activities
h) Better quality product
i) Less time spent setting up and taking down traffic control devices

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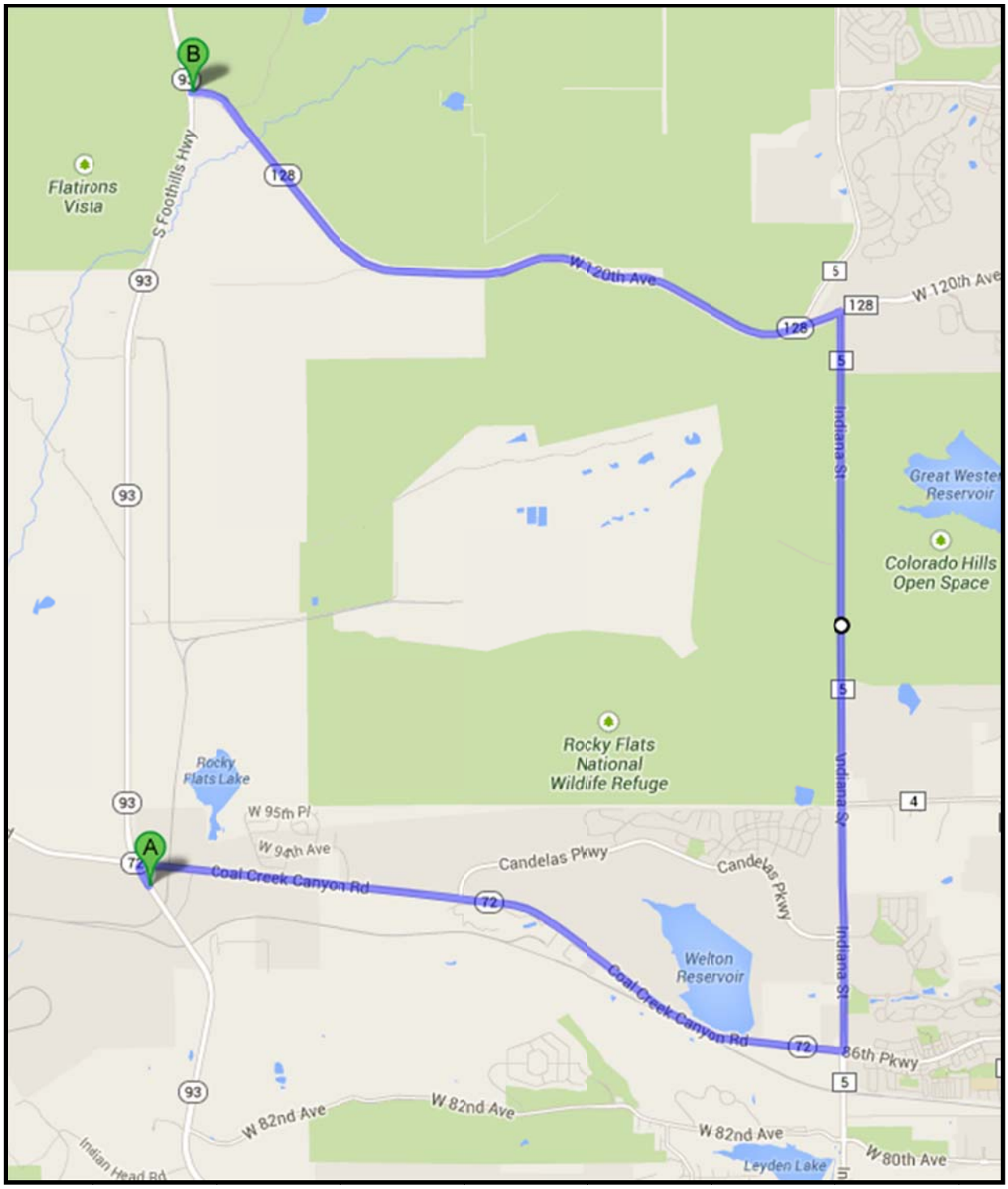
1. This full closure will allow for the full tear-down and reconstruction of the bridge. This will allow the bridge to be constructed in the same location without an alignment shift that would otherwise be needed to allow the road to remain open during construction.

2. Reduces project cost by decreasing construction time and eliminating the need to adjust traffic control throughout the project.

3. Removing vehicles from the adjacent lanes during construction will improve safety for workers.

PROPOSED DETOUR MAP(S)



ADDITIONAL INFORMATION

None

CDOT USE ONLY BELOW LINE:

Advance to Level 2? (Yes, No)

1. C470 Closure University to Quebec **DECISION:** Advance to Step 2, look at detours

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	223,700
2	Functional equivalence of detour roadways			x	Arterials/Expressways would run freeway traffic through at-grade intersections
3	Use of state highways as detour routes			x	no SH
4	Impacts to businesses and local access	x			no accesses
5	Travel distance added by detour	x			1.2x
6	Local agency coordination			x	2 agencies
7	Advance Public Notice	x			plenty of time
8	Potential for diversion out of area	x			County Line Road/ Lincoln Ave good
9	Construction Time Savings	x			30% plus reduction anticipated
10	Ability to do additional work		x		Some activities, but none requiring full closure
11	Other Considerations				

2. C470 Closure Lucent to Broadway **DECISION:** Advance to Step 2, look at detours

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	190,700
2	Functional equivalence of detour roadways			x	Arterials would run freeway traffic through at-grade intersections
3	Use of state highways as detour routes			x	no SH
4	Impacts to businesses and local access	x			no accesses
5	Travel distance added by detour	x			2.8x
6	Local agency coordination			x	2 agencies
7	Advance Public Notice	x			plenty of time
8	Potential for diversion out of area	x			supporting arterial network good
9	Construction Time Savings	x			30% plus reduction anticipated
10	Ability to do additional work		x		
11	Other Considerations				

3. I-70 Closure I-25 to York **DECISION:** Advance to Step 2, examine ways to ease detour

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	250,000
2	Functional equivalence of detour roadways	x			mostly freeway for freeway, with exception of Colorado Blvd
3	Use of state highways as detour routes	x			All SH
4	Impacts to businesses and local access		x		No direct accesses to 70A
5	Travel distance added by detour			x	5x
6	Local agency coordination	x			no local roads on detour route
7	Advance Public Notice	x			sufficient time
8	Potential for diversion out of area	x			many transportation options
9	Construction Time Savings	x			much quicker completion in high traffic area
10	Ability to do additional work		x		unknown
11	Other Considerations				

4. 285D Closure under C470 **DECISION:** Advance to step 2, ask for more info about detour - state highway option?

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic		x		53,500
2	Functional equivalence of detour roadways			x	Arterials available, but not equivalent to grade-separated facility of US 285
3	Use of state highways as detour routes			x	
4	Impacts to businesses and local access	x			minimal impacts
5	Travel distance added by detour			x	5x plus for both directions
6	Local agency coordination		x		More traffic through Morrison, need coordination
7	Advance Public Notice	x			higher visibility roadway = good audience capture
8	Potential for diversion out of area		x		Minimal other options, but can capture commuter audience
9	Construction Time Savings	x			time savings major benefit
10	Ability to do additional work			x	unknown
11	Other Considerations				

5. 83A Closure at Quincy Intersection **DECISION:** Advance to Step 2, examine local impacts and detour routes

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	175,000
2	Functional equivalence of detour roadways		x		detour routes not expressways, but major arterials
3	Use of state highways as detour routes			x	reliance on local highways
4	Impacts to businesses and local access		x		impacts indirect
5	Travel distance added by detour	x			1.8x
6	Local agency coordination		x		local roads impacted, requires coordination
7	Advance Public Notice	x			high visibility area
8	Potential for diversion out of area	x			good options
9	Construction Time Savings	x			difficult to reconstruct with phased effort
10	Ability to do additional work			x	unknown
11	Other Considerations				

6. 40C Closure Monaco to Quebec **DECISION:** Reject, unless time can be reduced

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	135,000
2	Functional equivalence of detour roadways	x			Can use similar urban arterials
3	Use of state highways as detour routes			x	
4	Impacts to businesses and local access			x	Though direct accesses are not blocked, side streets will serve as business access
5	Travel distance added by detour			x	5.5x signed detour adds significant distance
6	Local agency coordination			x	CCD coordination
7	Advance Public Notice	x			high visibility
8	Potential for diversion out of area	x			abundance of transportation options
9	Construction Time Savings		x		Quality benefits, but phased construction could be done in manner to minimize impacts
10	Ability to do additional work			x	unknown
11	Other Considerations				

7. 121A (Wadsworth) at Yale Ave. Intersection **DECISION:** Advance to Step 2, look at detour and agency coordination

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	113,000
2	Functional equivalence of detour roadways	x			equal or better
3	Use of state highways as detour routes	x			all SH
4	Impacts to businesses and local access	x			no direct, but traffic diverted to detours will miss biz frontage
5	Travel distance added by detour		x		3.3x, 1.6x
6	Local agency coordination			x	2 plus agencies
7	Advance Public Notice	x			
8	Potential for diversion out of area	x			
9	Construction Time Savings	x			
10	Ability to do additional work			x	
11	Other Considerations				

8. 36D Closure Price Road to Private Drive **DECISION:** Reject, detour too inconvenient

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic	x			11,500
2	Functional equivalence of detour roadways			x	detour onto lower functional classification roadways
3	Use of state highways as detour routes			x	
4	Impacts to businesses and local access			x	a few properties have only access from closed section
5	Travel distance added by detour			x	7x, very inconvenient
6	Local agency coordination		x		unknown, but coordination anticipated
7	Advance Public Notice			x	difficult to convey message
8	Potential for diversion out of area			x	few options
9	Construction Time Savings	x			benefits by delivering project quickly
10	Ability to do additional work	x			lengthy stretch, can do repaving, etc.
11	Other Considerations				

9. 93A Closure MP 10.4 Bridge **DECISION:** Reject due to traffic impact - reduce time window?

	Category	Favorable	Fair	Unfavorable	Notes
1	Impact to traffic			x	224,000
2	Functional equivalence of detour roadways	x			arterial detour routes
3	Use of state highways as detour routes		x		some state highway used
4	Impacts to businesses and local access	x			access impacts minimal
5	Travel distance added by detour		x		3.6x
6	Local agency coordination		x		coordination required but expected to be amenable
7	Advance Public Notice	x			Can capture commuter audience
8	Potential for diversion out of area		x		relatively less options than urbanized area
9	Construction Time Savings	x			time benefits
10	Ability to do additional work			x	Cannot to other activities
11	Other Considerations				