

DRAFT

**South Wadsworth Boulevard/Waterton Road
Intersection Feasibility Study Appendices**

Jefferson County, Colorado



In Cooperation with:

Douglas County, Colorado &

Lockheed Martin Corporation

Prepared by:

JACOBS

July 2010

**Appendix A.
Alternatives Technical Report**

3. Improve safety for users of all modes.

Congestion and roadway deficiencies combine to create safety issues. The heavy exit hours from LM result in steady traffic streams with few ‘gaps’. Queued SB drivers on Wadsworth can become impatient and often try to make it through these small gaps.

Several educational and recreational facilities exist within the study area, including the trailhead for the Colorado Trail. Visitors park on the east side of Waterton, then use an at-grade pedestrian crossing to access the facilities on the west side. This has led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.

4. Improve access control

There is a lack of access control in the vicinity of the Intersection. Access control needs to be improved to allow safe and intuitive access to the variety of activity points in the area. These include access to LM, the Audubon Center, the state park, the Colorado Trail, the South Platte River, the Kassler Center, and other amenities.

Project Goals

The Goals identified for this project are to:

- ▶ Provide practical and financially realistic transportation improvements.
- ▶ Incorporate Context Sensitive Solutions (CSS)¹ into the planning and design.
- ▶ Avoid and minimize adverse impacts to the natural and human environments.
- ▶ Minimize disruption to adjacent land uses, including large utilities.
- ▶ Meet LM’s transportation requirements².
- ▶ Be consistent with adopted local plans, including land use, park, transportation, and facility plans.

Coordination and Involvement

Agency coordination and public involvement activities were specifically designed to be open, inclusive, and ongoing throughout the feasibility study process. The outreach process was designed to encourage agency and public awareness, input, review, and comment. Activities included small group meetings, public open houses, project mailings, and a project Web site. Descriptions of these methods of involvement are provided below.

- **Stakeholder Meetings** – Identified stakeholders for the project include agencies involved in the project and those who are owners or leaseholders of adjacent properties. Specifically, the stakeholder group was composed of representatives from the following agencies:

¹ CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, historic, and environmental resources, while maintaining safety and mobility.

² The design must accommodate vehicles 140’ long, 170’ inside turning radius and 30’ width, and a clearance of 18’ to 20’ (preferred).

- Jefferson County
- Douglas County
- Lockheed Martin
- Colorado Department Of Transportation
- US Army Corps of Engineers
- Denver Water
- Audubon Society of Greater Denver
- Colorado State Parks

This team met formally throughout the project process in order to assist with development of the Purpose and Need and identification of the Preferred Alternative. A total of seven meetings occurred between December 2008 and July 2009. Attendance rosters for the Stakeholder Meetings are included in **Appendix A**.

- **Public Meetings** – Two public open houses were held during key points in the project to gather public input on the project. The public meetings were advertised through newspaper ads in six local papers, emails and postcards sent to distribution lists of local government officials and citizen groups known by the stakeholders, flyers and posters placed at area parks and the library, links and information placed on websites of local government and citizen groups, and variable message sign placed on Waterton.

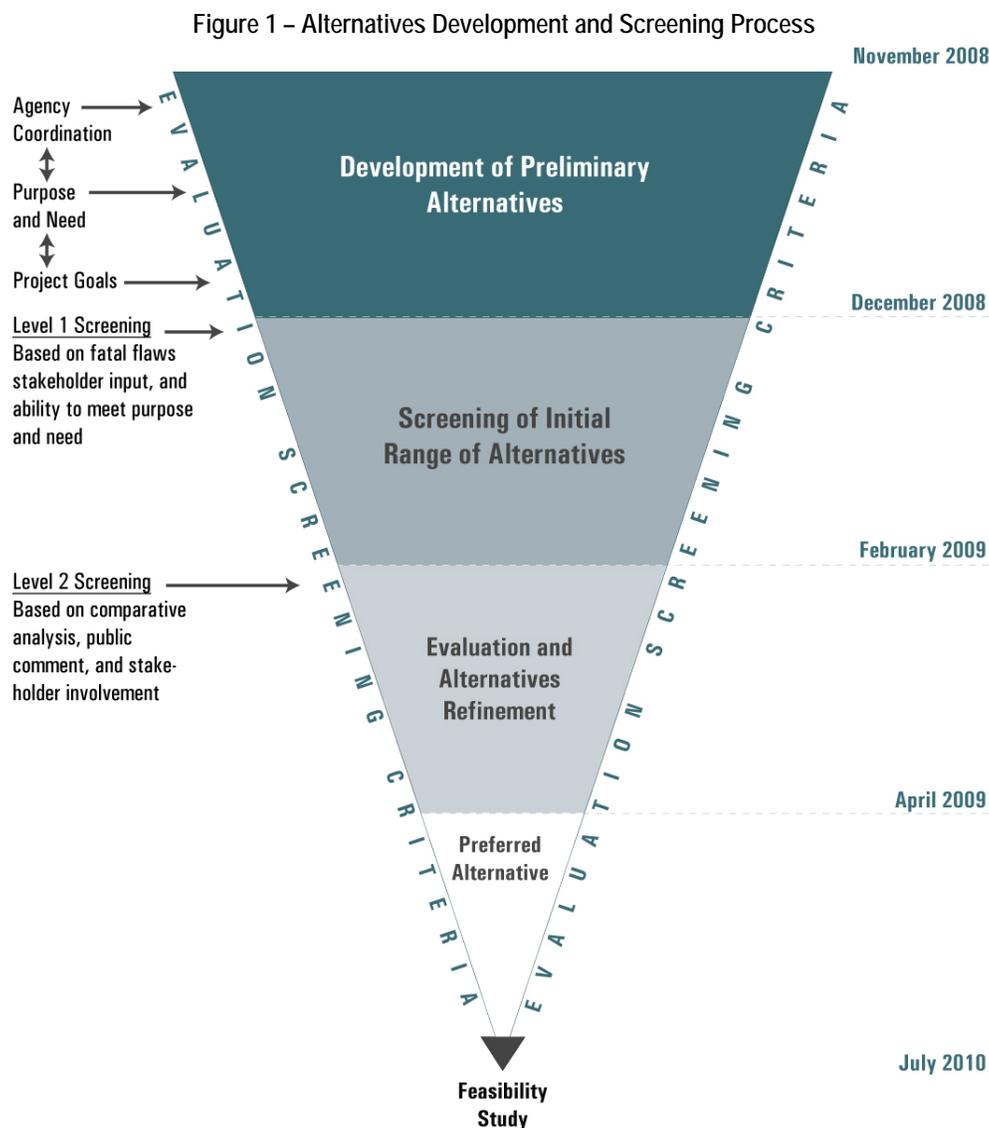
The first meeting, a public scoping open house, was held at Roxborough Elementary on February 25, 2009. This meeting solicited public input on the Purpose and Need and Goals identified for the project, provided an opportunity to comment on the alternatives carried into Level 2, and provided an opportunity for interaction and collaboration between the public and project team. The meeting also was used to identify issues of concern. Approximately 258 people attended the meeting. The second meeting will be held at Roxborough Elementary following the completion of preliminary design to present the Preferred Alternative and to collect additional information on potential public concerns that may result from implementation of the project.

- **Small Group Meetings** – Throughout the development of the Feasibility Study, meetings were held with small groups of interested parties to provide them an opportunity for dialogue with the project team and to provide opinions and comments during the alternative selection process. A total of three of these meetings were held. The first was with the Army Corps of Engineers on December 10, 2008, the second with CDOT on June 3, 2009, and the third with FHWA on July 13, 2009.
- **Web site** – A project Web site (www.wadsworthwatertonstudy.com) was developed to provide real-time access to project information and progress. Links to the project Web site were provided on the Colorado Department of Transportation (CDOT) and Jefferson County Web sites. The public could also provide comments on the project via the Web site.

Alternatives Development and Screening Process

Members of the Stakeholder Team and the public were integral to the alternatives development and screening process. The alternatives presented in this memo were developed based on options considered in the past by Jefferson County and CDOT, project team development, as well as input gathered throughout the agency coordination and public involvement process. In order to provide a benchmark with which to judge the build-alternatives, the No-Action Alternative was carried through the entire process. An overview of the process is described below, and detailed descriptions of each

step are provided in subsequent sections of this report. The alternatives development and evaluation process involved four steps (see **Figure 1**).



1. Development of Evaluation Criteria

Project evaluation criteria and Measures of Effectiveness (MOEs) were developed to ensure that alternatives carried forward met the project’s Purpose and Need as well as project Goals. MOEs helped define the evaluation criteria and were used to screen the alternatives.

2. Development of Preliminary Alternatives

A range of preliminary alternatives were developed. Some of these alternatives were the result of options considered in the past by Jefferson County and CDOT. Others were developed by the Jacobs design and engineering team.

3. Initial Alternatives Screening (Level 1)

The initial alternatives were comparatively evaluated to eliminate the obviously infeasible or unsuitable alternatives as well as those that would not meet the Purpose and Need and Goals of the project. At this stage of screening, the comparisons were made using qualitative information. The Stakeholder Team provided input to the screening process.

4. Detailed Evaluation and Alternatives Refinement (Level 2)

The remaining alternatives were evaluated through a detailed comparative screening that resulted in the selection of a Preferred Alternative. A general assessment was conducted on these alternatives for environmental impacts, transportation impacts, current and future levels of service (and other operational performance measures), and socioeconomic impacts. Also community design, design issues and opportunities, and planning level engineering feasibility were considered in this stage. At this screening stage, quantitative comparative information was prepared for some of these MOEs to allow for detailed comparison.

Evaluation Criteria

In order to objectively compare potential alternatives, seven evaluation criteria were used to reflect the Purpose and Need and the project Goals. For each criterion, MOE were developed to gauge how the alternatives met the evaluation criteria. The MOEs were applied to the alternatives using information available at each level of screening. More detailed and more quantitative information was available at each successive stage of screening.

The four evaluation criteria along with MOEs that relate to the project Purpose and Need include:

- ▶ **Traffic Congestion** – Ability of the alternative to address travel demand Needs, provide acceptable traffic operations, and reduce travel times.
- ▶ **Road Deficiencies** – Ability of the alternative to improve sight distance, reduce roadway grades, and meet desirable geometric design standards.
- ▶ **Safety** – Ability of the alternative to improve traffic safety conditions at the Intersection and reduce potential conflicts between motorists, pedestrians, and bicyclists.
- ▶ **Access Control** – Will the alternative improve access control along Wadsworth and Waterton roadways, provide efficient access to Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points, and will it meet LMs geometric transportation requirements?

Alternatives must also address federal and state requirements and, where possible, exceed the project Needs and requirements. Three additional evaluation criteria along with MOEs include:

- ▶ **Environmental** – Ability of the alternative to minimize environmental impacts.
- ▶ **Multimodal** – Ability of the alternative to improve pedestrian and bicycle facilities and to reduce potential conflicts for all users.
- ▶ **Implementation** – Ability of the alternative to minimize construction impacts, including costs and right-of-way impacts; to meet LM's transportation access requirements, provide CSS, provide for the future expansion of Waterton, and to comply with local and regional planning objectives.

Development of Preliminary Alternatives

A range of preliminary alternatives for the Project were developed based on general transportation requirements and initial information related to the Purpose and Need and Goals for the project. Ten initial build alternatives (shown in Table 3) were identified as well as the No-Action Alternative. The No-Action Alternative was carried through the entire alternative screening process in order to be used as a benchmark for comparison with the action alternatives although it was understood that this alternative would not meet the project Purpose and Need. The ten build alternatives were based on options considered in the past by Jefferson County and CDOT, or developed by the project team. These alternatives were initially screened for identification of “fatal flaws” found to make an alternative unrealistic for implementation. Fatally flawed alternatives are alternatives with 1) exorbitant costs; 2) legal, logistical, or engineering infeasibility; or 3) unacceptable environmental or community impacts.

Initial Alternatives Screening (Level 1)

The initial alternatives were presented to the Stakeholder Team at two workshop meetings held on December 17, 2008 and January 22, 2009. The purpose of these meetings was to reduce the number of alternatives that would be advanced to the Level 2 analysis. This initial screening was intended to eliminate infeasible or unsuitable alternatives. The Purpose and Need elements and project Goals were used to distinguish the alternatives and thus formed a two-stage Level 1 screening process. Also during the Level 1 screening some minor revisions were suggested for some alternatives including access, grade, and lane options that are shown on the initial designs that can be examined for each alternative. Concepts from one alternative may also be added or subtracted from another similar alternative. These were incorporated if stakeholder agreement was obtained on the proposed change. A definition of how each criterion is applied to the alternatives is provided in **Appendix B**.

Purpose and Need Screening

The first aspect of Level 1 screening is based on Purpose and Need. A comparative matrix was prepared that rated each of the alternatives using qualitative information (see **Table 1**). The matrix provided an objective comparison of the alternatives for each of the criterion, and provided a basis for stakeholder discussion. The following defining qualitative characteristics were used for the comparative ratings for Purpose and Need:

- *Traffic Congestion*: Unimpeded movements provide greater capacity than signalized movements.
- *Road Deficiencies*: Primary road deficiencies include limited sight distance and approach grades.
- *Safety*: The safety element is broken up into:
 - Intersection safety: Unimpeded movements are safer, and weaving movements are not as safe.
 - Pedestrian/Bicycle safety: off-grade crossings are safest. Slower speeds on Waterton Road (primarily concerning the parking lot crossing area) are safer.
- *Access Control*: Improved access to the facilities on Waterton Road could be met by all initial alternatives as it is separated from the intersection area, therefore this was not a deciding factor among alternatives. Alternatives that elevate Waterton Road require modifying the access to the Audubon parking area.

Table 1: Purpose and Need Screening Criteria Matrix

Alt. #	Alternative Name	Traffic Congestion	Road Deficiencies	Intersection Safety	Bike / Pedestrian Safety	Score
	No-Action Alternative	●	●	●	○	6
1	Signal	●	●	●	○	9
2	LM T & Signal	●	○	●	○	10
3	LM T, S-curve & Signal	●	○	○	○	11
4	Roundabout	●	○	○	○	11
5	Waterton / Golf & Turf Signal	●	○	○	●	11
6	Grade Separated SB Wadsworth	○	○	○	●	14
7	Grade Separated Loop	○	○	○	●	15
8	Grade Separated NB Wadsworth, Waterton through	○	○	○	●	14
9	Grade Separated NB Wadsworth, LM through	○	○	○	○	14
10	Ridge Road & Signal	●	○	○	●	10

KEY: Meets Criterion: ○ Very Well (5); ○ Well (4); ○ Average (3); ● Somewhat (2); ● Not at All (1)

Goal Screening

Along with the Purpose and Need screening, the environmental and implementation Goals helped in comparing alternatives. Once again a comparative matrix was prepared to rate each of the alternatives (see **Table 2**). None of the alternatives addressed pedestrian concerns well, since pedestrian crossing facilities were not included at this stage of design. However, alternatives that contain a bridge which introduces a grade separation on Waterton could best accommodate a future pedestrian underpass. Concern that the fill involved with alternatives that would change the grade south of the Intersection would affect access to the Denver Water conduits was noted, but not accounted for at this stage of alternatives evaluation

Alternatives

The ten Preliminary Alternatives identified and developed for the project are illustrated and described in **Table 3**, along with a brief summary of the pros and cons of each. A discussion of the possible modifications and problems identified with each during the Level 1 screening is also included.

In continuing discussion of Level 1 Screening, the stakeholders agreed that Alternatives 6, 7, 8, and 9 rated highest for meeting the Purpose and Need of the project. Although the three at-grade intersection alternatives scored poorly in this category it was decided that at least one should be carried on for further evaluation. Alternative 3 was determined to be most likely, as it scored highest of the at-grade intersection alternatives without being identified as having a fatal flaw. However, it was determined that some refinement may be required to ensure the “S” curve does not introduce sight distance issues. Alternative 1 was also likely for its low cost and impacts.

In conclusion, the alternatives were eliminated or advanced in Level 1 for the following reasons:

- **No Action** was advanced in order to provide a baseline alternative with which to comparatively analyze the action alternatives.
- **Alternative 1** was carried forward due to its relative low cost and its ability to meet Purpose and Need without peripheral impacts. It was also noted that it can be easily refined to address additional issues such as concerns with the vertical grades.
- Elements of **Alternatives 2 and 3** were combined into a single alternative and advanced as Alternative 2. This combination scored the highest in Level 1 Screening of the at-grade intersection alternatives.
- **Alternative 4** was eliminated as it was a less effective alternative at meeting Purpose and Need and due to questions regarding the ability of the roundabout to accommodate large LM vehicles.
- **Alternative 5** was also eliminated due to its poor ability to address the Purpose and Need as well as potential for impacts to Denver Water Conduit No. 10.
- **Alternative 6** scored highly in all aspects of Level 1 Screening with no fatal flaws identified and therefore was advanced.
- **Alternative 7** was eliminated due to the fact that the large cut and possible access limitations of this alternative make it less favorable.
- **Alternatives 8 and 9** were advanced as they scored relatively high in all categories and would provide additional benefits of accommodating future capacity Needs.
- **Alternative 10** was eliminated due to unacceptable impacts to LM property.

Table 2: Goal Screening Matrix

Alt. #	Alternative Name	Access	Flood-pool	4(f) / Recreation	Water Resources	Adjacent Land Use	LM vehicle requirements	Cost	Accommodate / Not preclude capacity Needs	Score
	No-Action Alternative	●	○	○	○	○	○	○	○	36
1	Signal	○	○	○	●	○	○	○	○	39
2	LM T & Signal	○	○	●	●	●	○	●	○	35
3	LM T, S-curve & Signal	○	●	○	●	●	○	○	○	32
4	Roundabout	○	●	○	●	○	●	○	●	28
5	Waterton / Golf & Turf Signal	○	●	●	○	●	○	●	●	21
6	Grade Separated SB Wadsworth	○	○	●	●	●	○	○	○	32
7	Grade Separated Loop	○	○	●	●	○	○	●	○	27
8	Grade Separated NB Wadsworth, Waterton through	○	●	●	●	○	○	●	○	26
9	Grade Separated NB Wadsworth, LM through	○	●	○	○	○	○	●	○	26
10	Ridge Road & Signal	○	○	○	●	●	○	●	○	26

KEY: Meets Criterion: ○ Very Well (5); ○ Well (4); ● Average (3); ● Somewhat (2); ● Not at All (1)

Table 3: Preliminary Alternatives

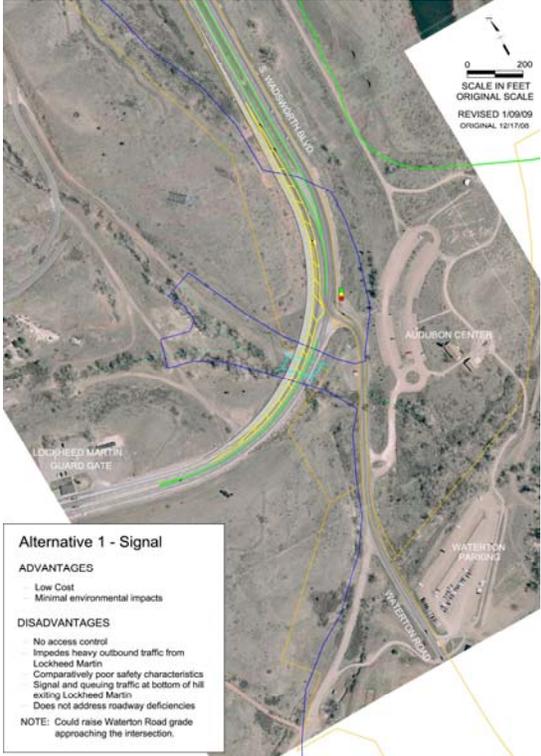
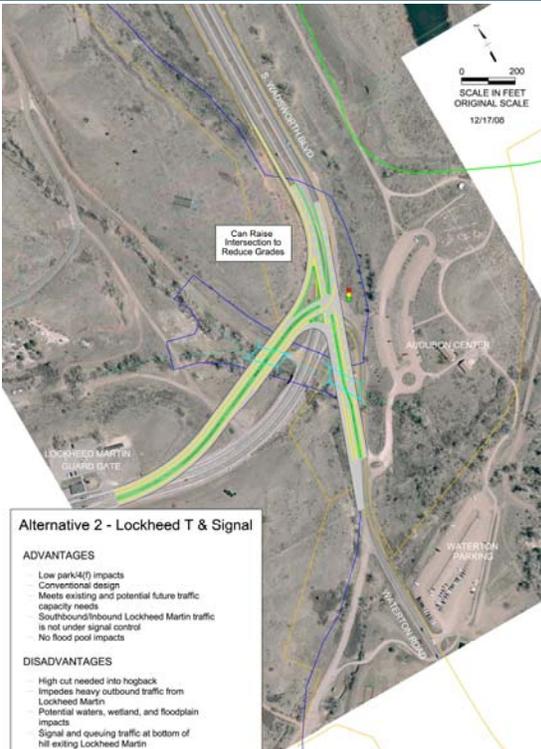
Alternative 1 – Signal	
<p>Description:</p> <ul style="list-style-type: none"> Involves the addition of a signal at the Intersection. <p>Modifications:</p> <ul style="list-style-type: none"> Could include a free flow SB to westbound movement. Could be refined to address concerns with vertical grades. <p>Screening Notes:</p> <ul style="list-style-type: none"> Was rated "Somewhat" for Traffic Congestion and Roadway Deficiencies. Scored "High" on Implementation. "Low" on Purpose and Need. <p>Results:</p> <ul style="list-style-type: none"> Carried forward due to its relative low cost and its ability to meet Purpose and Need without peripheral impacts. It was also noted that it can be easily refined to address additional issues such as concerns with the vertical grades. 	 <div data-bbox="824 821 1044 1045" style="border: 1px solid black; padding: 5px;"> <p>Alternative 1 - Signal</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Low Cost Minimal environmental impacts <p>DISADVANTAGES</p> <ul style="list-style-type: none"> No access control Impedes heavy outbound traffic from Lockheed Martin Comparatively poor safety characteristics Signal and queuing traffic at bottom of hill exiting Lockheed Martin Does not address roadway deficiencies <p>NOTE: Could raise Waterton Road grade approaching the intersection.</p> </div>
<p>Alternative 2 – LM "T" & Signal</p> <p>Description:</p> <ul style="list-style-type: none"> Involves straightening the convergence of Wadsworth and Waterton and realigning the LM entrance to meet at a signalized "T" intersection. <p>Modifications:</p> <ul style="list-style-type: none"> Could be adjusted to provide a curved transition from Wadsworth onto Waterton similar to Alternative 3. <p>Screening Notes:</p> <ul style="list-style-type: none"> Combination of 2 and 3 scored the highest in Level 1 Screening of the at-grade intersection alternatives. <p>Results:</p> <ul style="list-style-type: none"> Elements of Alternatives 2 and 3 were combined into a single alternative and advanced as Alternative 2. 	 <div data-bbox="824 1604 1076 1843" style="border: 1px solid black; padding: 5px;"> <p>Alternative 2 - Lockheed T & Signal</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Low park(4) impacts Conventional design Meets existing and potential future traffic capacity needs Southbound/Inbound Lockheed Martin traffic is not under signal control No flood pool impacts <p>DISADVANTAGES</p> <ul style="list-style-type: none"> High cut needed into hogback Impedes heavy outbound traffic from Lockheed Martin Potential waters, wetland, and floodplain impacts Signal and queuing traffic at bottom of hill exiting Lockheed Martin </div>

Table 3: Preliminary Alternatives

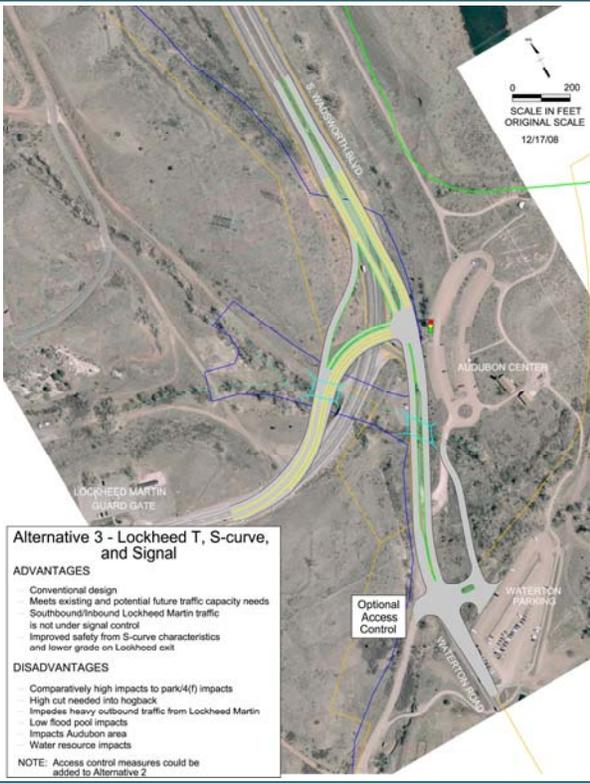
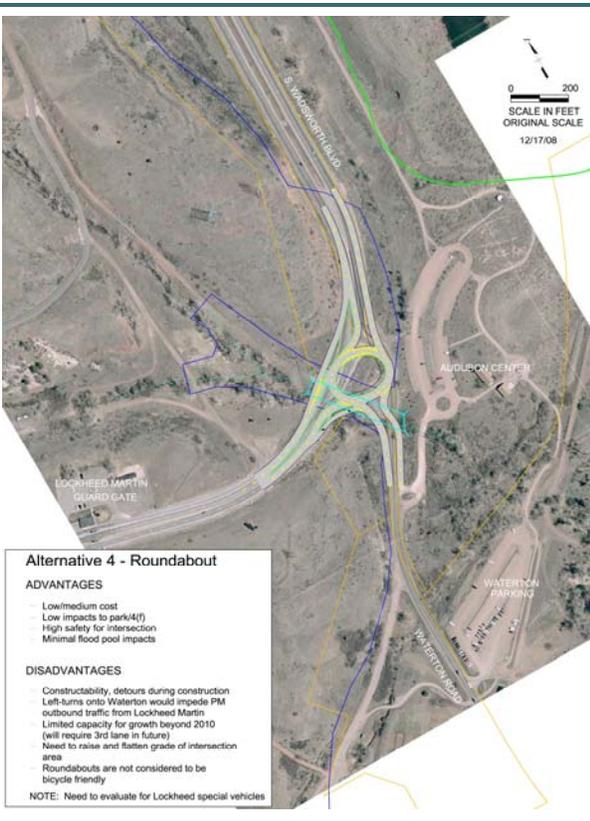
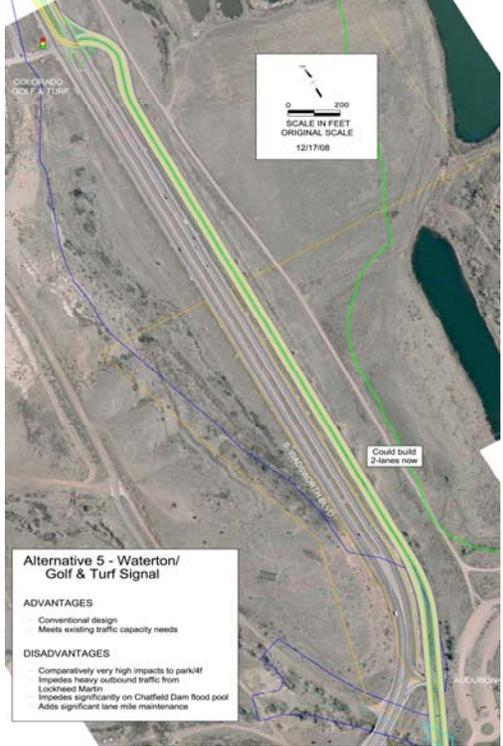
Alternative 3 – LM “T”, “S” Curve and Signal	
<p>Description:</p> <ul style="list-style-type: none"> Similar to Alternative 2 but with an “S” curve on the LM entrance. This alternative would provide improved safety from the “S” curve characteristics and lower grade on the LM exit. <p>Modifications:</p> <ul style="list-style-type: none"> Access control measures included in this alternative could be added to Alternative 2. <p>Screening Notes:</p> <ul style="list-style-type: none"> Combination of 2 and 3 scored the highest in Level 1 Screening of the at-grade intersection alternatives <p>Results:</p> <ul style="list-style-type: none"> Elements of Alternatives 2 and 3 were combined into a single alternative and advanced as Alternative 2. 	 <p>Alternative 3 - Lockheed T, S-curve, and Signal</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Conventional design Meets existing and potential future traffic capacity needs Southbound/Inbound Lockheed Martin traffic is not under signal control Improved safety from S-curve characteristics and lower grade on Lockheed exit <p>DISADVANTAGES</p> <ul style="list-style-type: none"> Comparatively high impacts to park(4)(f) impacts High cut needed into hogback Impedes heavy outbound traffic from Lockheed Martin Low flood pool impacts Impacts Audubon area Water resource impacts <p>NOTE: Access control measures could be added to Alternative 2</p>
<p>Alternative 4 – Roundabout</p> <p>Description:</p> <ul style="list-style-type: none"> Would replace the standard designs for the Intersection with a roundabout <p>Screening Notes:</p> <ul style="list-style-type: none"> This alternative may break down due to heavy PM SB flows from Wadsworth to Waterton impeding outbound traffic from LM entering the roundabout. Not clear if the roundabout will accommodate the LM vehicular requirements (18’ minimum clearance for LM vehicular requirements should be assumed. Clearance Needs to consider additional vertical clearance for 140’ long vehicles in a sag curve) Should be rated “Somewhat” for safety. Should be given an “F” rating if it is unable to handle LM trucks. <p>Results:</p> <ul style="list-style-type: none"> Eliminated as it was a less effective alternative at meeting Purpose and Need and questions regarding the ability of the roundabout to accommodate large LM vehicles. 	 <p>Alternative 4 - Roundabout</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Low/medium cost Low impacts to park(4)(f) High safety for intersection Minimal flood pool impacts <p>DISADVANTAGES</p> <ul style="list-style-type: none"> Constructability, delours during construction Left-turns onto Waterton would impede PM outbound traffic from Lockheed Martin Limited capacity for growth beyond 2010 (will require 3rd lane in future) Need to raise and flatten grade of intersection area Roundabouts are not considered to be bicycle friendly <p>NOTE: Need to evaluate for Lockheed special vehicles</p>

Table 3: Preliminary Alternatives

Alternative 5 – Waterton/Golf & Turf	
<p>Description:</p> <ul style="list-style-type: none"> ▪ Would add a new signalized intersection at the Colorado Golf & Turf entrance which would separate LM traffic at that point from other Wadsworth/Waterton traffic. <p>Screening Notes:</p> <ul style="list-style-type: none"> ▪ Alternative 5 likely will impact Denver Water Conduit No.10. <p>Results:</p> <ul style="list-style-type: none"> ▪ Eliminated due to its poor ability to address the Purpose and Need as well as potential for impacts to Denver Water Conduit No. 10. 	 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Alternative 5 - Waterton/Golf & Turf Signal</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> - Conventional design - Meets existing traffic capacity needs <p>DISADVANTAGES</p> <ul style="list-style-type: none"> - Comparatively very high impacts to park/4f - Impedes heavy outbound traffic from Lockheed Martin - Impedes significantly on Chatfield Dam flood pool - Adds significant line mile maintenance </div>

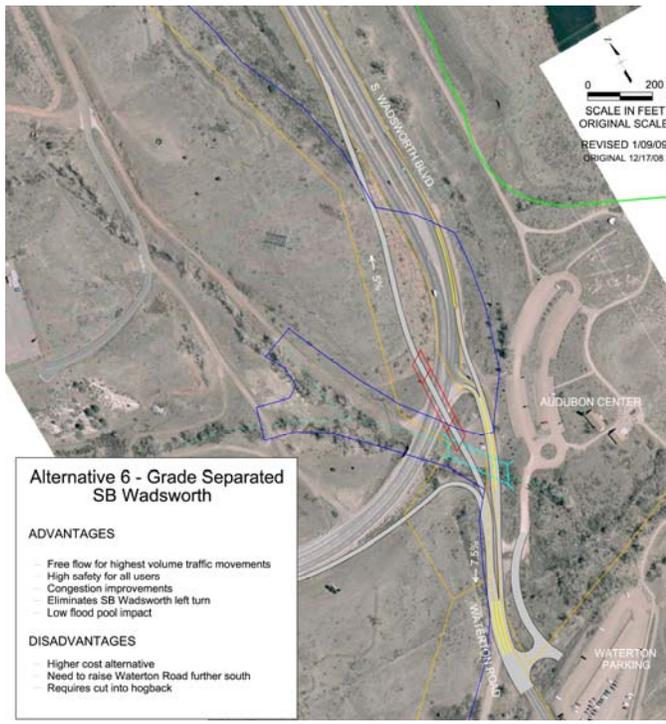
Alternative 6 – Grade Separated SB Wadsworth	
<p>Description:</p> <ul style="list-style-type: none"> ▪ Wadsworth to Waterton connections would be made via a grade separated roadway. <p>Modifications:</p> <ul style="list-style-type: none"> ▪ Could add a NB left turn movement at existing intersection and make the overpass one-way SB. ▪ Existing intersection could be used for EB right turn movement (may induce weaving problem). ▪ Combining parking lot access reduces grade and allows installation of a pedestrian underpass. ▪ Parking lots could include Right-in/right-outs. <p>Screening Notes:</p> <ul style="list-style-type: none"> ▪ Denver Water approves combined parking lot. ▪ Rated "Well" for safety, "Well/High" for land use, "Well" for roadway deficiencies. ▪ Minor use of LM land is acceptable. ▪ Roxborough sewer line may be impacted. ▪ Did not score well for bicycle safety but makes a case for a grade separated crossing. <p>Results:</p> <ul style="list-style-type: none"> ▪ Advanced for scoring highly in all aspects of Level 1 Screening and no fatal flaws identified. 	 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Alternative 6 - Grade Separated SB Wadsworth</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> - Free flow for highest volume traffic movements - High safety for all users - Congestion improvements - Eliminates SB Wadsworth left turn - Low flood pool impact <p>DISADVANTAGES</p> <ul style="list-style-type: none"> - Higher cost alternative - Need to raise Waterton Road further south - Requires cut into hogback </div>

Table 3: Preliminary Alternatives

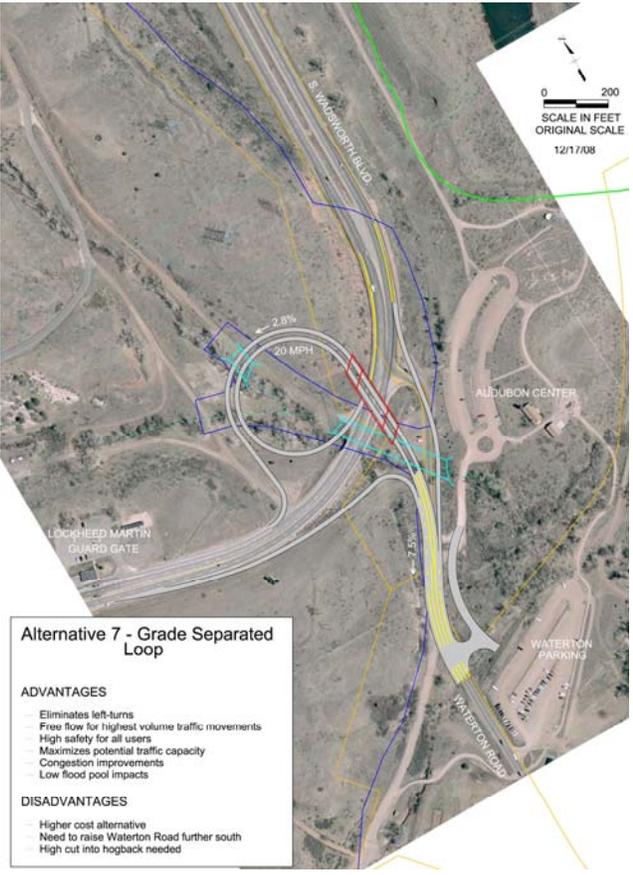
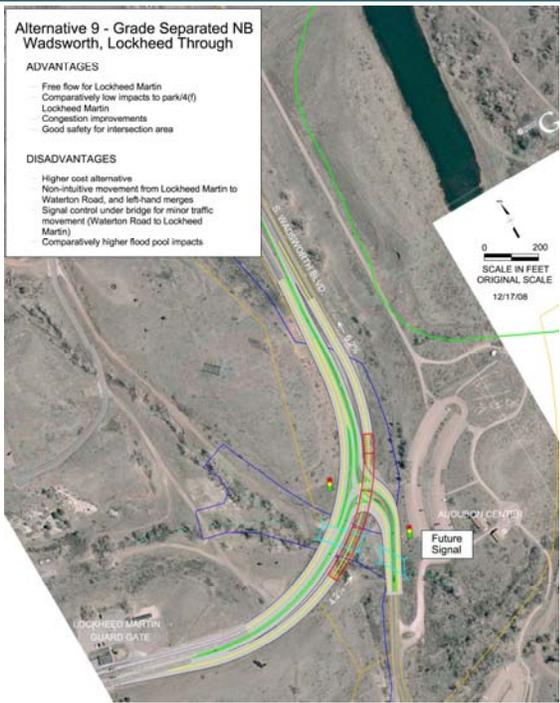
Alternative 7 – Grade Separated Loop	
<p>Description:</p> <ul style="list-style-type: none"> Would utilize a grade separated loop for connections from SB Wadsworth to Waterton and NB Waterton traffic to the LM entrance. <p>Modifications:</p> <ul style="list-style-type: none"> Could include 2 NB Wadsworth to Waterton lanes. Existing intersection could be used for EB right turn movement but it may induce weaving problems. Could combine access to parking lots similar to Alternative 6 to avoid steep grades. <p>Screening Notes:</p> <ul style="list-style-type: none"> Rated "Well" for safety, "Well/High" for adjacent land use, and "Well" for roadway deficiencies because of the higher grades. Minor use of LM land is acceptable. The Roxborough sewer line may be impacted. May pose a problem for access to Strontia Springs southern gate and Conduit Road 20. Did not score well with bicycle safety but makes a case for a grade separated crossing. <p>Results:</p> <ul style="list-style-type: none"> Eliminated due to the large cut and possible access limitations that make it less favorable. 	<p>Alternative 9 - Grade Separated NB Wadsworth, Lockheed Through</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Free flow for Lockheed Martin Comparatively low impacts to park(4/f) Lockheed Martin Congestion improvements Good safety for intersection area <p>DISADVANTAGES</p> <ul style="list-style-type: none"> Higher cost alternative Non-intuitive movement from Lockheed Martin to Waterton Road, and left-hand merges Signal control under bridge for minor traffic movement (Waterton Road to Lockheed Martin) Comparatively higher flood pool impacts <p>Alternative 8 – Grade Separated NB Wadsworth/Waterton Through</p> <p>Description:</p> <ul style="list-style-type: none"> The grade separation under this alternative would be for exiting LM heading NB on Wadsworth and provides priority turn movements to Waterton through traffic. <p>Modifications:</p> <ul style="list-style-type: none"> Could include one continuous NB lane onto Wadsworth. <p>Screening Notes:</p> <ul style="list-style-type: none"> Should be rated "Very Well" for LM requirements. Scored poorly for bicycle safety but makes a case for a grade separated crossing. <p>Results:</p> <ul style="list-style-type: none"> Advanced as it scored relatively high in all categories and would provide additional benefits of accommodating future capacity Needs.

Table 3: Preliminary Alternatives

Alternative 9 – Grade Separated NB Wadsworth/LM Through	 <p>Alternative 9 - Grade Separated NB Wadsworth, Lockheed Through</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Free flow for Lockheed Martin Comparatively low impacts to park/4(f) Lockheed Martin Congestion improvements Good safety for intersection area <p>DISADVANTAGES</p> <ul style="list-style-type: none"> Higher cost alternative Non-intuitive movement from Lockheed Martin to Waterton Road, and left-hand merges Signal control under bridge for minor traffic movement (Waterton Road to Lockheed Martin) Comparatively higher flood pool impacts <p>SCALE IN FEET ORIGINAL SCALE 12/17/08</p>
<p>Description:</p> <ul style="list-style-type: none"> Generally similar to Alternative 8 this alternative has a different configuration that allows LM traffic priority on turn movements at the Intersection. <p>Screening Notes:</p> <ul style="list-style-type: none"> Should be rated "Very Well" for LM requirements. Did not score well with bicycle safety but would make a case for a grade separated crossing. <p>Results:</p> <ul style="list-style-type: none"> Advanced as it scored relatively high in all categories and would provide additional benefits of accommodating future capacity Needs. 	 <p>Alternative 10 - Ridge Road and Signal</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Devolved access into Lockheed Martin No/low park/4(f) impacts Congestion improvements High safety for all users No flood pool impacts <p>DISADVANTAGES</p> <ul style="list-style-type: none"> Higher cost alternative Adds significant lane mile maintenance Impacts guard gate High out-of-direction travel <p>SCALE IN FEET ORIGINAL SCALE 12/17/08</p>

Detailed Evaluation and Alternatives Refinement (Level 2)

The Level 1 screening advanced Alternatives 1, 3, 6, 8, to the Level 2 screening. Refinements were made to Alternative 3 in order to address concerns about the sight distance issues with the “S” curve. Following those refinements it was determined that the resulting alternative was closer in design to Alternative 2 and that it would be presented as Alternative 2 during Level 2 screening.

At this point in the process the remaining alternatives had been developed to a conceptual design level including horizontal and vertical alignments. Each of the five alternatives was analyzed with more detail in regards to engineering and environmental impacts.

The Level 2 evaluation involved a level of design that allowed for a better assessment of project costs. Although more design details would be needed for final costs, these updated estimates helped the Stakeholders make cost comparisons between alternatives.

Updated traffic analyses allowed the screening to look at the life span of each alternative and where the constricting points were located. This also included updated 2030 Peak Hour Forecasts which included information from the Sterling Ranch Traffic Impact Study and other planned but not approved developments in the area.

Pedestrian improvements that had been generally discussed during the Level 1 screening were now being engineered to a point that they could be evaluated as additional features with the remaining alternatives. These were analyzed in a matrix in order to qualitatively assess the overall advantages of each. **Table 4** displays this Pedestrian Features Screening Matrix.

Table 4: Pedestrian Features Screening Matrix

	Safety	Cost (\$1,000)	Life Span Effectiveness	Maintenance	Total
No Improvements	●	○	●	○	12
Raised Median	●	○ \$30	●	○	13
Roundabout	●	● \$150	●	○	11
Underpass	○	● \$150	○	●	15
Parking Lot	●	○ \$35	○	●	12

Increased level of design and updated right-of-way information also allowed for a more complete analysis of impacts to surrounding properties including potential Section 4(f) impacts. Section 4(f) refers to a section of a U.S. Department of Transportation (DOT) law that provides protection for public parks, historic properties, and wildlife and waterfowl refuges. Several resources in the study area would qualify for Section 4(f) protection and therefore this could greatly influence alternative selection. As such, these issues were considered early in the process to help identify potential issues.

In order to help determine impacts, a screening matrix was created based on Section 4(f) 'least harm' requirements. **Table 5** displays the results Section 4(f) Screening Matrix.

Finally, completion of the utility mapping in the area allowed for an analysis of impacts that may be incurred to various utilities in the area.

An Alternative Screening Matrix was compiled for Level 2 with the updated information to compare the remaining alternatives (see **Table 4**). **Appendix C** contains full definitions of the Level 2 Screening Criteria.



Table 5: Section 4(f) Screening Matrix

Alt.	4(f) Impacts (Acres)	4(f) Features Impacted (severity)	Ability to Mitigate Adverse Impacts to 4(f) Property	Relative Severity of Harm to Protected Activities After Mitigation	Views of Officials with Jurisdiction	Degree to which Purpose and Need is Met	Magnitude of Any Adverse Impacts to Other Resources	Cost	Score
No-Action Alternative	0	Pedestrian , Bicyclist, and vehicle access and safety	○	○	●?	●	○	○	23
1. Signal	0.16	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (minor)	○	○	○?	●	○	○	25
2. Lockheed T & Signal	0.53	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (moderate)	○	○	○?	○	○	○	20
6. Grade Separated Southbound Wadsworth	1.28	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (moderate), aesthetics (moderate), Audubon access	○	○	○?	○	○	○	20
8. Grade Separated NB Wadsworth, Waterton through	3.01	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (moderate), Audubon access, aesthetics (moderate)	●	●	○?	○	●	●	15
9. Grade Separated NB Wadsworth, Lockheed through	3.13	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (major), Audubon parking and access, aesthetics (moderate)	●	●	○?	○	●	●	15

Table 5: Section 4(f) Screening Matrix

Alt.	4(f) Impacts (Acres)	4(f) Features Impacted (severity)	Ability to Mitigate Adverse Impacts to 4(f) Property	Relative Severity of Harm to Protected Activities After Mitigation	Views of Officials with Jurisdiction	Degree to which Purpose and Need is Met	Magnitude of Any Adverse Impacts to Other Resources	Cost	Score
Other Features	Roundabout	Passive Recreation Land (adjacent to existing transportation corridor), vegetation (minor), Waterton parking and access	●	●	○?	○	○	●	21
	New Parking	Passive Recreation Land (not adjacent to existing transportation corridor), visual (moderate), vegetation (minor)	●	●	○?	○	○	●	20
	Ped Crossing	Passive Recreation Land (adjacent to existing transportation), vegetation (minor)	○	○	○?	○	○	○	28



Public Open House

Level 2 screening process involved a public open house held on February 25, 2009 at Roxborough Elementary. Approximately 258 people attended; the majority identified themselves as area residents and/or recreational trail users. The project background, Purpose and Need, and Goals, as well as the alternatives screening process were presented to the public for informational purposes. The five remaining alternatives were then presented for review and comment, including the advantages and disadvantages associated with each. Environmental constraints were also briefly explained.

One-hundred and twenty-six survey responses were received. Following is a summary of the major points identified from the survey responses regarding the project:

- Regarding the transportation Needs for the area, “Improving Safety for All Modes” was rated highest with 76% saying it was “Extremely Important” followed by “Traffic Congestion” with 50%.
- 45% of survey respondents identified “Bike and Pedestrian Safety” as “Other Transportation Needs in the Study Area” and 19% identified “Roadway Configuration”.
- 47% of “Bike and Pedestrian Safety” comments concerned safety for cyclists along Waterton, either through the addition of bike lanes or bike paths.
- 45% of bike-related comments concerned the safe crossing of Waterton, especially in light of speed and growing development.
- Speed is a major concern of respondents that contributes to the bike/pedestrian issues identified.
- The public was generally supportive of project Goals, although many of the answers did not directly address them.
- Respondents heavily favored Alternative 6 followed by Alternatives 1 and 8.

Alternative Refinements

The Stakeholder Meeting held March 26, 2009 included discussion of alternate features or refinements that could be included with different alternatives to help meet project Goals, Purpose and Need as well as to address public and stakeholder concerns. Desired features and improvements included the following:

- Keeping a long acceleration lane from Waterton onto NB Wadsworth.
- Improving grades of Waterton approaching Wadsworth.
- Improving the left turn from Waterton into LM by adding a left turn storage lane.
- Improving access from the Waterton Canyon parking lot onto Waterton (The existing gravel surface is hard to accelerate on and has a steep upward grade).
- Adding a 16’ wide median and 4’ shoulders on Waterton.

Table 6: Level 2 Alternative Screening Matrix

Alt.	Traffic Congestion (When Level of Service becomes "D")	Road Deficiencies	Intersection Safety	Bike/Pedestrian Safety at Parking Lots	Access	Accommodates both LM/ Wads and Wads/Wat Thru	Floodpool (Embankment Required - 1000 CY)	Section 4(f) Impacts (Least Harm Anal.)	Water Resources	Visual –Has context with Environment	Cost (In Millions)	Accommodate Long Range Plans/ Not Preclude Capacity	Adjacent Land Use During Construction	On Road Bicycle Accommodation	Total
Purpose and Need						Environmental					Implementation				
No-Action Alternative	●	●	●	●	●	○	○	○	○	○	○	●	○	○	41
	NA														
1. Signal	●	○	○	●	●	●	○	○	○	○	○	●	○	○	40
	2015-20						20				\$3.3				
2. Lockheed T & Signal	●	○	○	○	○	●	●	○	○	○	○	○	●	○	42
	2015-20						110				\$7.6				
6. Grade Separated SB Wadsworth	○	○	○	○	○	○	○	○	○	●	●	○	○	○	44
	2025-30						89				\$11.1				
8. Grade Separated NB Wads, Waterton through	○	○	●	○	○	○	●	●	●	●	●	○	○	●	40
	2025-30						133				\$15.2				
9. Grade Separated NB Wads, Lockheed through	○	○	●	○	○	○	●	●	●	●	●	●	○	●	32
	2020-25						134				\$13.9				

KEY: Meets Criterion/Impact

○ Very Well/Very High(5); ○ Well/High (4); ○ Average (3); ● Somewhat/Low (2); ● Not at All/Very Low (1)

- Denver Water vehicle access onto the Strontia Springs Dam access road needs to be maintained.
- Examining the possibility of a roundabout/median/island as a traffic calming option at the entrance to the Waterton Canyon parking lot to facilitate pedestrian crossings and vehicle turning movements.
- Traffic calming measures would need to accommodate horses. The Colorado Trail Foundation pointed out that medians may be an issue with horses and may not work as well as a refuge area as it would for pedestrians and bicyclists.
- Discussed bicyclist comments and pros/cons with the alternatives. Bicyclists are requesting a combination of separate bicycle paths to improve safety through the Intersection, and better on road safety.

In addition, a new alternative referred to as Alternative 11 was presented (**Figure 2**). This alternative would involve installation of a metering traffic signal on LM property as well as incorporate some of the additional features discussed. It was pointed out that a metering signal would not be Manual Uniform Traffic Control Device (MUTCD) compliant as it would not be located at a conflict area. It also may backup traffic into the intersection located on LM property currently controlled by a traffic light.

Alternative 11 was determined unacceptable by LM for reasons stated above. Other features that were discussed have been added to appropriate alternatives.

Alternative Pairings

It was determined that funding issues may not allow the flyover alternatives to be constructed in the near future as the cost is much higher than other alternatives. A potential solution would be to combine two alternatives, pairing a non-flyover alternative with a flyover alternative. The initial phase would construct the non-flyover, and the final phase would construct the flyover alternative. In this manner, it was recognized Alternative 1 could be paired with Alternative 6 and Alternative 2 paired with Alternative 8 and evaluated as a phased solution to construction funding issues. Combined alternatives would be evaluated to accommodate plans for the future 4-laning of Waterton by Douglas County. Combined alternatives would need to look at alignments to ensure the next phase can be built without restricting access to LM and Waterton, and to minimize any additional reconstruction.

Figure 2: New Alternative 11

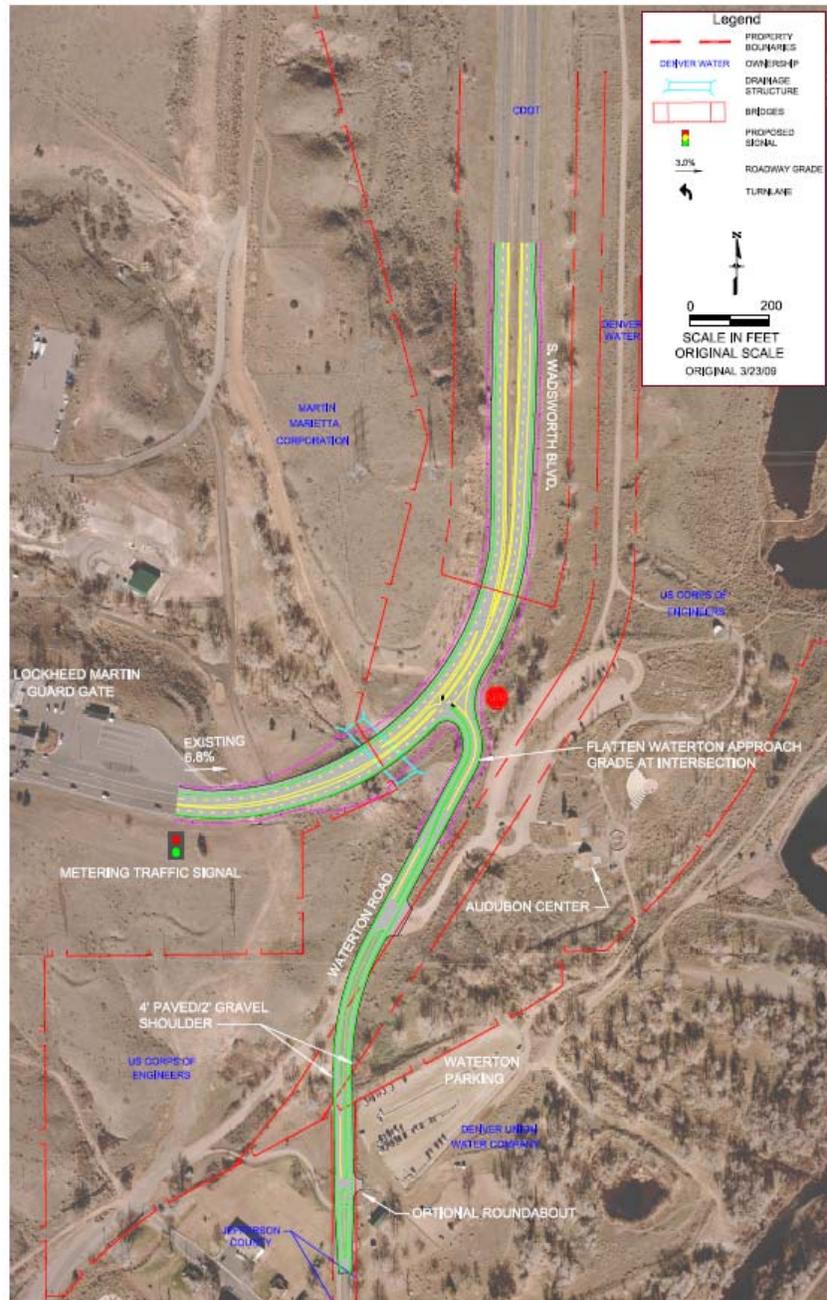
**Alternative 11 – Grade Separated
 NB Wadsworth, Lockheed
 Through Roadway**

Advantages:

- Low cost.
- Minimal environmental and park impacts.
- Less impact on LM traffic than signal at current intersection (only 20% will need to stop opposed to 40% to 50%).
- Provides 4' shoulder for bikes along Waterton.
- Raises Waterton approach grade for better sight distance.
- Provides separated left turn deceleration and acceleration lanes from NB Waterton to LM entrance.
- Roundabout feature on Waterton would:
 - Slow traffic.
 - Provide protected median refuge for pedestrians.
 - Alleviate left turn out of Waterton parking lot.
- Advantages over Alternative 1:
 - Not raising intersection grade allows greater ultimate intersection flexibility.
 - Signal only needs to be activated 2 hours daily rather than 24 hours a day.

Disadvantages

- Does not improve grades entering intersection.
- Signal impedes heavy outbound traffic from LM.
- Additional signal may impact 20% to 25% of LM employees.
- Does not effectively address future 4-lane section on Waterton.



Preliminary analysis of the paired alternatives of 1/6 and 2/8 determined that constructing the alternatives in two phases may not provide the anticipated cost savings. If Alternatives 1 or 2 are built as a first phase, the resulting grade-separated structures for Alternatives 6 or 8 in Phase 2 would be much higher, which would add to the cost of that phase as a result of longer approach grades. The intersection elevation in Alternative 1 would need to be about 6' higher to improve the grades to 4%.

Similarly, Alternative 2 would result in the intersection being about 12' higher. It was concluded that pairing and phasing construction of the alternatives may not be the best solution. Future phasing would have more fill, a greater footprint, and steeper roadway grades.

Signal Warrant Study

Jefferson County met with CDOT and agreed that under Alternative 1, if the grades are improved, the intersection meets warrants required for a signal to be installed. Under Alternative 2, different through movements are planned at the intersection, however, it was also determined to meet enough of the warrants to justify a signal. It should be noted that warrants are determined based on existing conditions, volume, & delay.

Preferred Alternative Selection

At the fifth Stakeholder Meeting held on June 4th 2009, discussion centered on selection of a Preferred Alternative. This included an analysis of when each alternative would fail with a Level of Service "D". Also, the No-Action Alternative was analyzed again for comparative purposes. Currently, the SB left turn onto Waterton operates at LOS F in the PM, and the left turn off Waterton to LM operates at LOS F in the AM (this was prior to the signal timing in LM being changed) **Figure 3** through **Figure 7** displays the alternatives screened in the Level 2 analysis including refinements and updates made after Level 1 screening.

Figure 3: Advanced Alternative #1

Alternative 1 – Signal

Screening Notes:

- Signals eliminate severe accidents, but can induce other types of minor accidents.
- Sight distance remains an issue, especially the sight distance to the signal.
- The signal reaches LOS D by 2015-2020 in the PM peak, with the left turn to Waterton being the critical move.
- Jefferson County feels that this alternative works well for now and is less expensive than the other signal alternative.
- CDOT traffic representative and Jefferson County prefer this option of the two less expensive alternatives.
- The Colorado Trail Foundation likes this alternative because they believe that growth projections for the area are over-rated and they would like to see the alternative with the least overall visual impact.

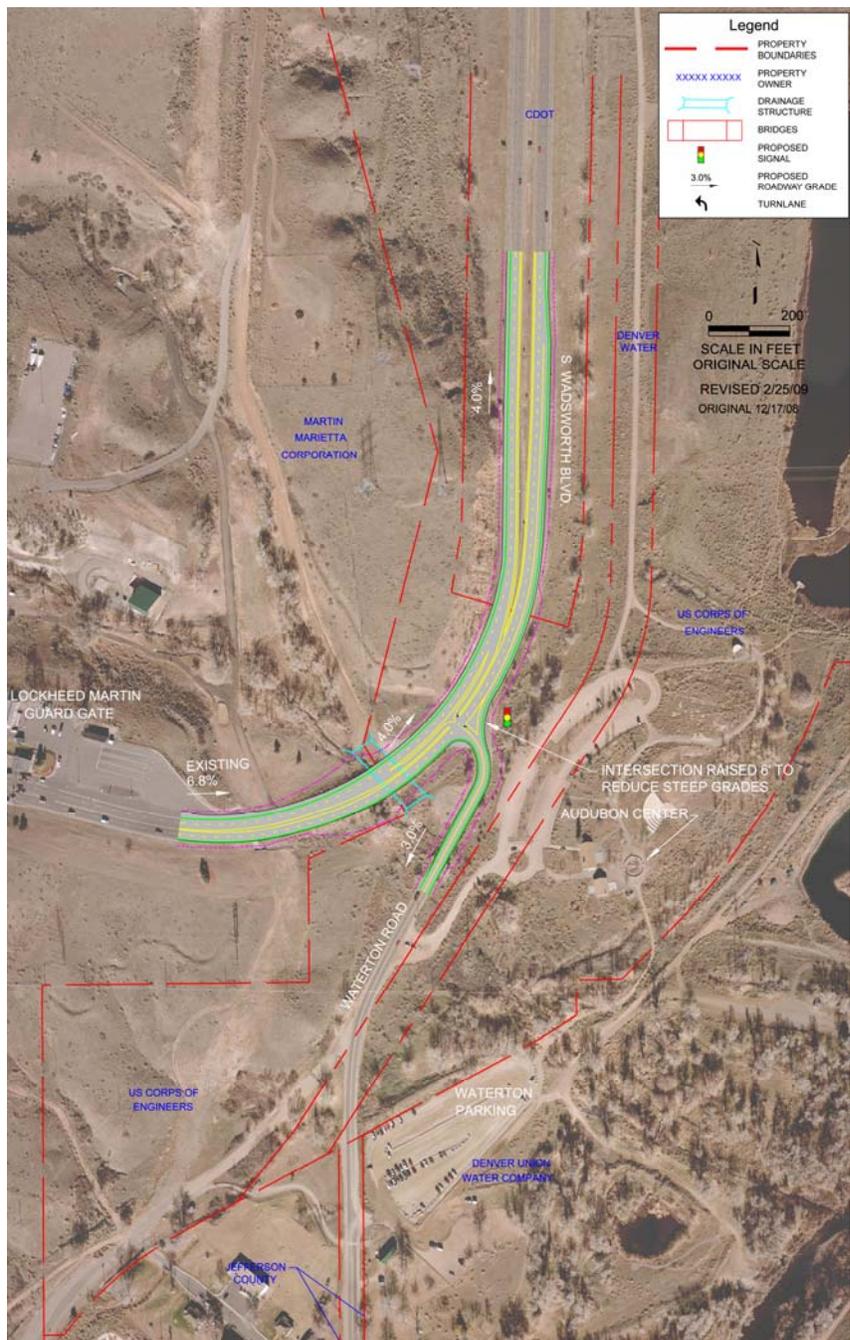


Figure 4: Advanced Alternative #2

Alternative 2 – LM "T" & Signal

Screening Notes:

- Signals eliminate severe accidents, but can induce other types of minor accidents.
- Less capacity for outgoing LM traffic.
- More suited to Wadsworth SB traffic movement to Waterton.
- Improves sight distance over Alternative 1.
- The signal reaches LOS D by 2015-2020 in the PM peak, with the southbound through lane being the critical movement.
- Jefferson County would like to eliminate Alternative 2 since it is much more expensive than the other signal alternative.
- The Audubon Society prefers the separate left turn movement for SB Waterton traffic shown in this alternative as opposed to Alternative 1.



Figure 5: Advanced Alternative #6

Alternative 6 – Grade Separated SB Wadsworth

Screening Notes:

- Minimizes cut into hogback.
- A new Denver Water access further south would be okay with an appropriate design.
- Douglas County feels that future EB to SB lane from LM could be the 2nd Waterton lane.
- Denver Water would like a deceleration lane for SB traffic and a median turn for NB traffic into their facility.
- The Intersection reaches LOS D by 2025-2030, with the left turn from Waterton towards LM being the critical movement. The SB diverge point where the flyover begins reaches LOS D in the same timeframe.
- Jefferson County prefers this alternative and would like to build it, but has not identified sufficient funding
- Denver Water prefers this alternative depending on whether impacts and mitigation for access and utilities are similar for all alternatives.
- Audubon approves of this alternative but would like to insure the connection between the parking lots is designed so all movements accommodate the turning radius of a bus.
- LM prefers this alternative as meeting Purpose and Need is more important than cost.
- CDOT traffic and Jefferson County prefer this alternative.

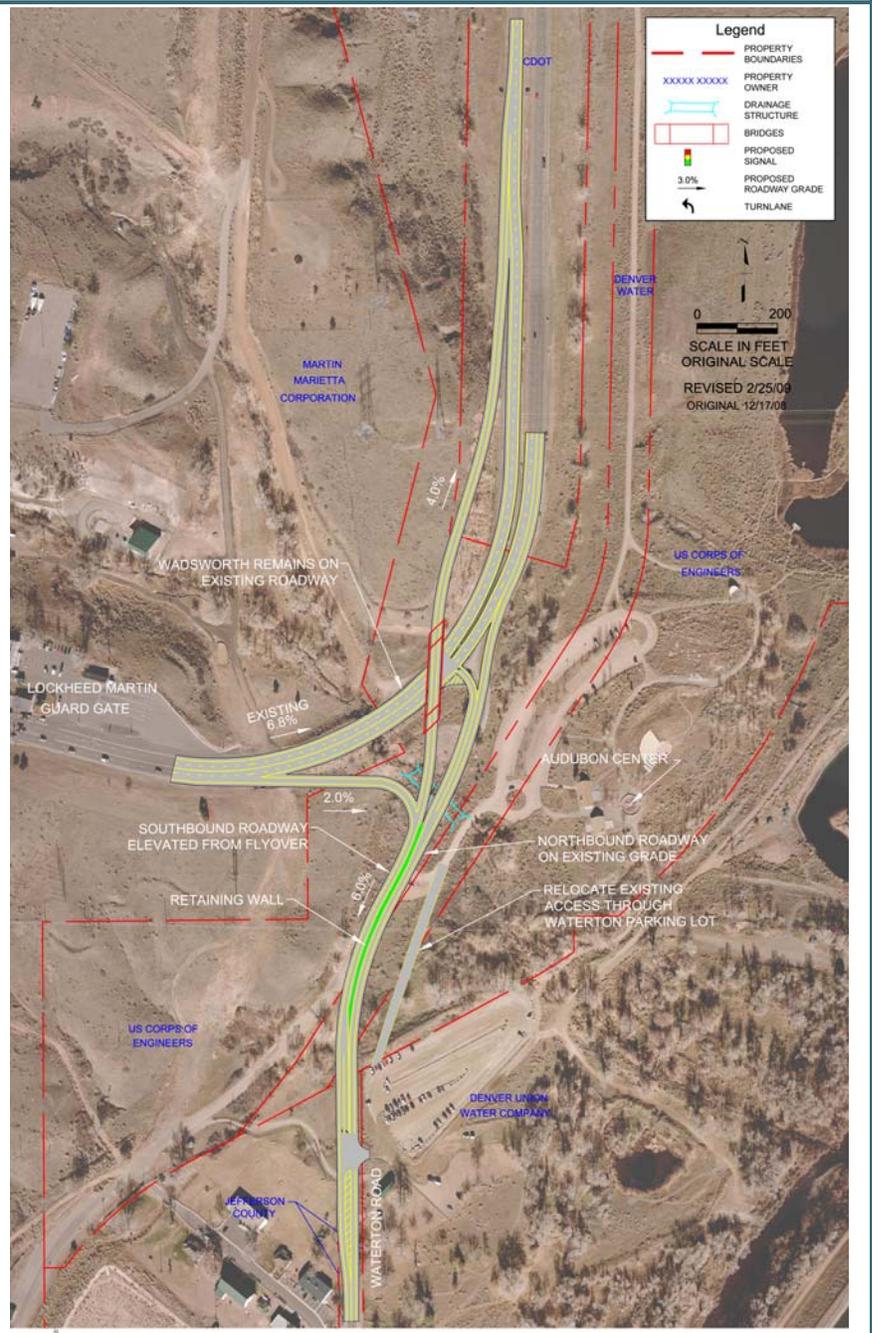


Figure 6: Advanced Alternative #8

Alternative 8 – Grade Separated NB Wadsworth/Waterton Through Roadway

Screening Notes:

- Improves both LM and Waterton traffic.
- Has high floodpool impacts.
- Introduces left-side exits, but only to serve LM traffic so it should not be a big problem.
- Bridge shadows LM exit to SB Waterton which adds potential roadway icing problems.
- Intersection reaches LOS D by 2025-2030, with the unsignalized left turn from Waterton towards LM being the critical movement. Creating a good long term solution for this turn is difficult without introducing a signal that would impact SB Wadsworth to Waterton traffic. Based on this factor, this alternative will be rated lower than Alternative 6. The SB diverge point before the Intersection is also a LOS D in the same timeframe.
- Jefferson County is concerned with the cost and the limitations on traffic volumes at the merge between LM and Wadsworth, and the SB conflicts with traffic turning from Waterton to LM in this alternative.
- Denver Water finds this alternative acceptable.
- Audubon would like to insure the connection between the parking lots is designed so that all movements can accommodate the turning radius of a bus.

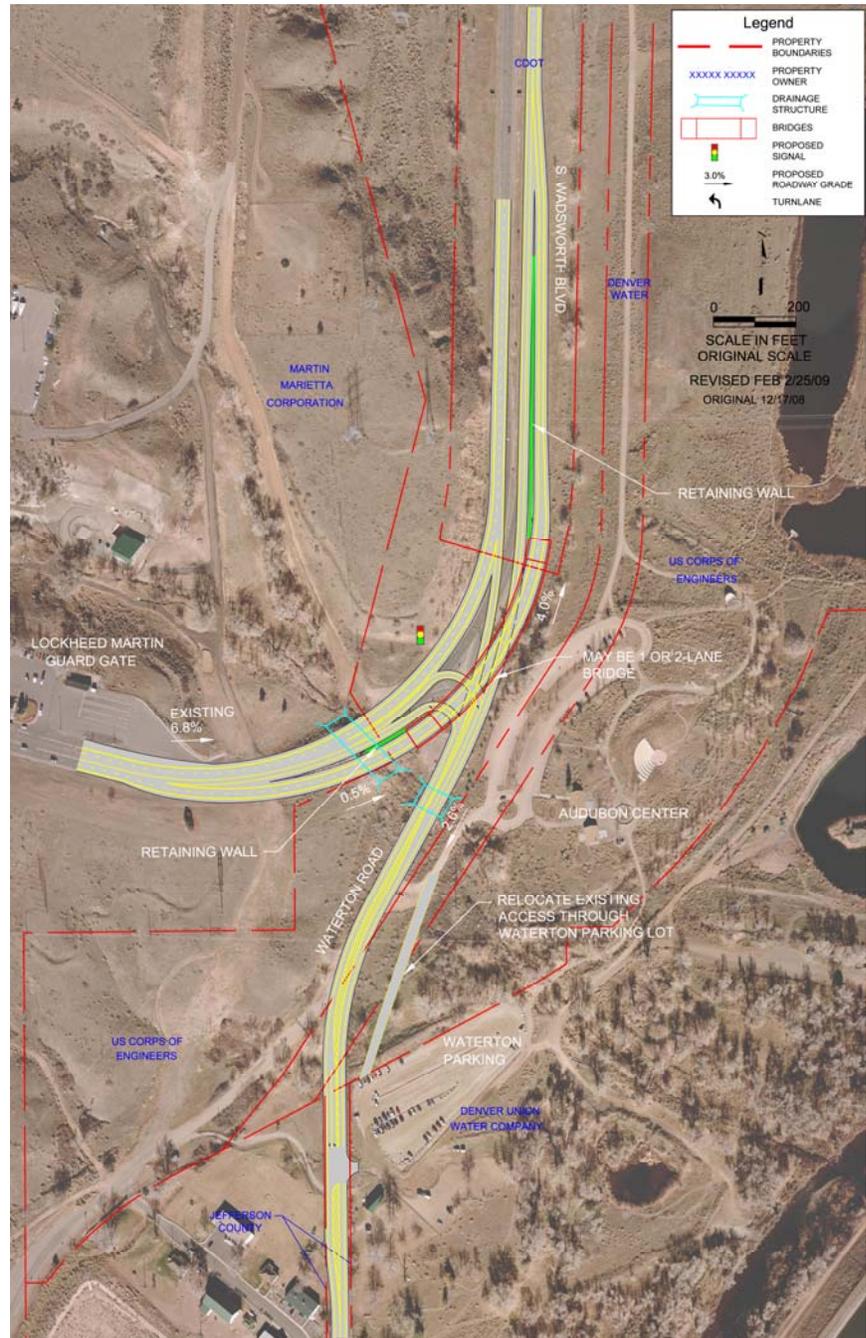
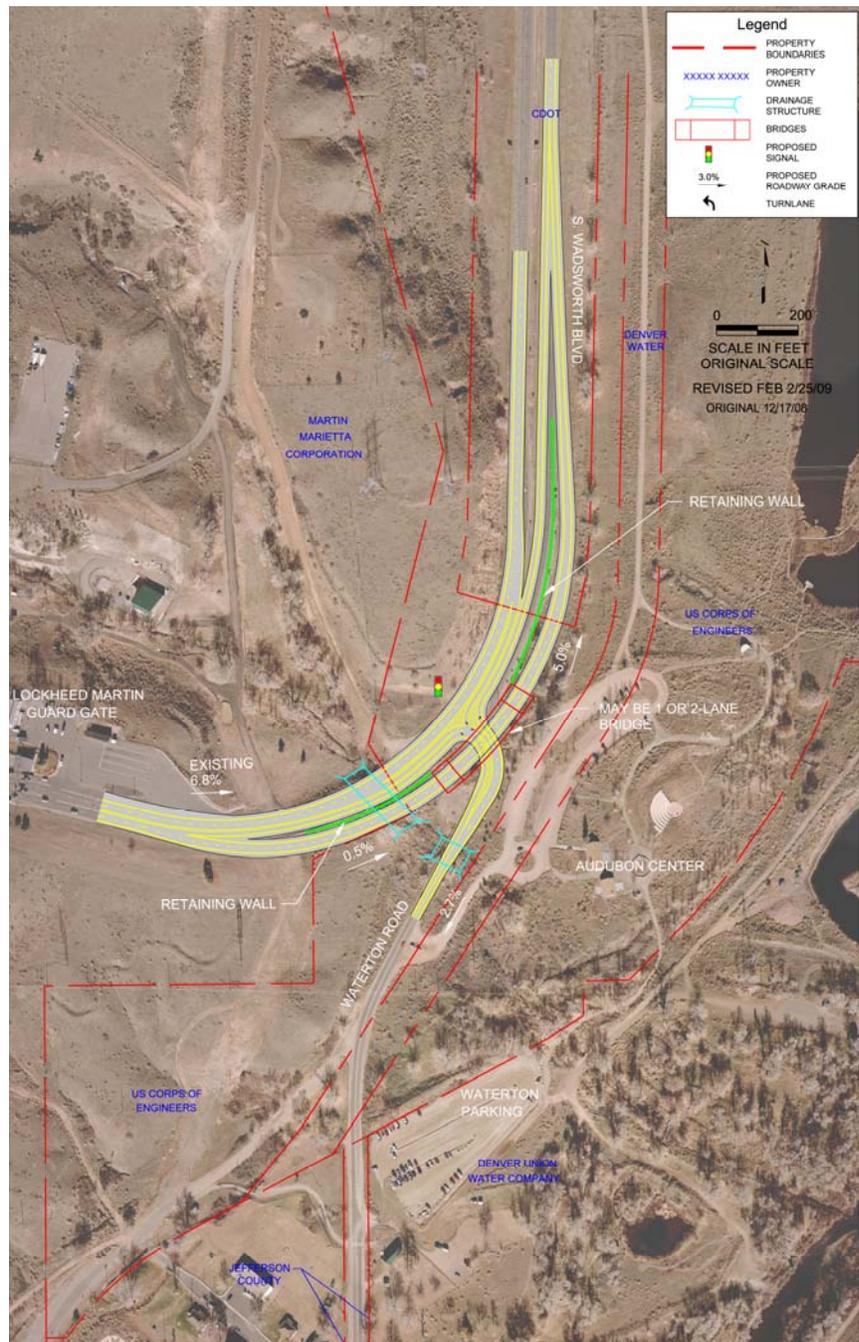


Figure 7: Advanced Alternative #9

**Alternative 9 – Grade Separated NB
Wadsworth/LM Through**

Screening Notes:

- Double lane right turns don't function well.
- This alternative introduces more traffic conflicts at intersection under bridge. A signal could be necessary.
- Floodpool impacts are very bad.
- Introduces left-side exits, but they only serve regular LM commuter traffic, so it should not be a big problem.
- Bridge shadows LM exit to SB Waterton. This could add potential problems with roadway icing that do not exist today.
- The Intersection reaches LOS D by 2020-2025 with the left turn to Waterton being the critical movement. The difference between the impact with this alternative and Alternative 1 is that the flyover removes the conflict with the LM NB traffic, which extends its useful life.
- It was agreed that Alternative 9 should be removed.
- Jefferson County does not like this alternative.



Alternative Features:

Comments from stakeholders regarding alternative features include:

- The Colorado Trail Foundation felt that the Sterling Ranch Development is not likely to happen and that the No-Action Alternative works well under the current circumstances. CDOT, however, believes that safety concerns at the Intersection are drastic enough that the county is warranted in looking at the feasibility of improvements here.
- The Colorado Trail Foundation would like to see the 25 mph speed limit along Waterton Road maintained. They also would prefer an at-grade signalized crossing as opposed to the pedestrian tunnel option because it has less visual impact.
- The stakeholders agreed the roundabout was not the most effective solution for a pedestrian feature. In general, everyone was in favor of the underpass, although the cost of \$150,000 was questioned. It was mentioned that this cost was based on \$100,000 for concrete and steel for a 12' wide by 10' high by 64' wide box, plus \$50,000 for a culvert to drain the structure. Lighting, excavation and other costs had not been included. A 12' clearance is recommended for equestrian usage, and many thought it should be wider and include a paved portion and a separate unpaved portion for horses.
- Most stakeholders thought the suggested additional parking lot should be included, especially since the Audubon center is now open daily throughout the year, and impacts to the existing lots are possible, especially if the Audubon traffic travels through it. The cost for 6" of aggregate for the lot is estimated to be about \$35,000. There is no cost for excavation, since embankment material is needed for the project, and it will help attain the earthwork balance required for the Chatfield flood pool.

Conclusion

The Stakeholder Team agreed that Alternatives 1 and 6 were both viable options. Alternative 1 appears to have less overall impact, but many of the impacts from Alternative 6 can be mitigated. Regarding the influence of Section 4(f) impacts on alternative selection, the team agreed that, as long as the parties impacted (Army Corps of Engineers, Denver Water, Colorado State Parks and Audubon Society) agree on the Preferred Alternative, 4(f) should not end up driving the decision. Mitigation could be worked out in the future and could include the underpass, additional parking, and other specific design details. Also, speed control for pedestrian safety was mentioned as an issue that should be addressed. This would be one of the benefits of the pedestrian underpass as a mitigation measure.

The possibility of carrying two alternatives forward was discussed, however, it was decided that there appeared to be a Preferred Alternative in Alternative 6. Alternative 6 was selected as the Preferred Alternative for the following reasons:

- Alternative 6 met Purpose and Need as well as or better than any alternatives in the Level 2 screening with only bicycle and pedestrian safety being a concern. This issue could be addressed through the inclusion of the other features such as the pedestrian underpass.
- Alternative 6, along with Alternative 8, offer the longest life span without reaching a failing LOS, however, Alternative 6 performs better with the SB Wadsworth to Waterton movement.
- Members of the public polled at the open house also preferred Alternative 6 over other alternatives.

- Alternative 6 would require very little reconstruction to accommodate a future four lane facility on Waterton Road, should this be needed.
- Alternative 6 best addresses safety for the two turning movements that currently cause congestion in the following manner:
 - In the PM, the left turn from southbound Wadsworth must wait for openings in the northbound traffic exiting Lockheed Martin, a situation that will continue to worsen. Alternative 6 would eliminate this turning movement conflict by separating southbound Wadsworth to Waterton Road traffic in a flyover ramp that passes over the top of Wadsworth and comes back down to Waterton Road. Alternatives 8 and 9 also eliminated this conflict, but Alternative 9 still required southbound Wadsworth traffic to stop before turning onto Waterton Road.
 - In the AM, the left turn from northbound Waterton Road into Lockheed Martin was experiencing some delays. These delays were a combination of a few northbound vehicles leaving Lockheed Martin, southbound Wadsworth traffic continuing into Lockheed Martin and those making the left turn onto Waterton Road. Alternative 6 effectively addressed more of these conflicts than any other alternative.

In summary, the Preferred Alternative would effectively address all elements of the project Purpose and Need, meet project goals, and would provide the best short-term and long-term solution to achieve Jefferson and Douglas counties' long-term vision for the corridor.

Preferred Alternative Description

The Preferred Alternative would provide a grade-separation at the existing intersection. It would include some minor widening on existing South Wadsworth Boulevard from Lockheed Martin to the north. Northbound Waterton Road traffic would continue to use the existing roadway alignment and would have a long acceleration and merge lane onto northbound South Wadsworth Boulevard. A separate left turn lane and protected (barrier separated) acceleration lane would be provided for the northbound Waterton Road to southbound South Wadsworth Boulevard movement into Lockheed Martin. Southbound traffic on South Wadsworth Boulevard to Waterton Road would exit one-third mile north of the current intersection, and continue on a flyover ramp over South Wadsworth Boulevard. Traffic exiting Lockheed Martin wishing to go south on Waterton Road will merge onto the descending raised portion of the flyover which will be separated from the northbound Waterton traffic by an eighteen-foot median and continue until they merge just north of the Platte Canyon/Denver Water access road.

The Preferred Alternative would combine the separate entrances for the Waterton parking lot and the Audubon Nature Center into one intersection with a new access road constructed on Denver Water, Jefferson County, and USACE property that connects those two parking lots. A median deceleration lane would be provided for southbound Waterton Road to separate left turns from through traffic at this access. As discussed below, the Preferred Alternative also includes a pedestrian underpass north of the Waterton parking lot to improve safety for Waterton Canyon/Colorado Trail users and visitors to the Kassler Center and Denver Water property amenities. Figure 8 shows the Preferred Alternative.

Preferred Alternative Refinement

After selection of the Preferred Alternative, an independent design team was formed to look at constructability, and potential value engineering savings and enhancements. As a result of this review, the southbound Waterton Road flyover alignment was moved about 75 feet west. By separating these alignments, it eliminated the 5 to 25 foot-high wall between northbound and southbound Waterton Road, south of the intersection. A secondary benefit of this design was that by extending the flyover structure an extra 200 feet, it spanned both Wadsworth Boulevard and Brush Creek. This eliminated about 150 feet of concrete box culvert for Brush Creek, which was under a 30 foot fill. The overall savings was over \$1.5 million, and benefits included less shading of proposed roadways in winter, less visual impact, and better connectivity of Brush Creek for wildlife. This design change was approved during Stakeholder Team Meeting #6 in July of 2009.

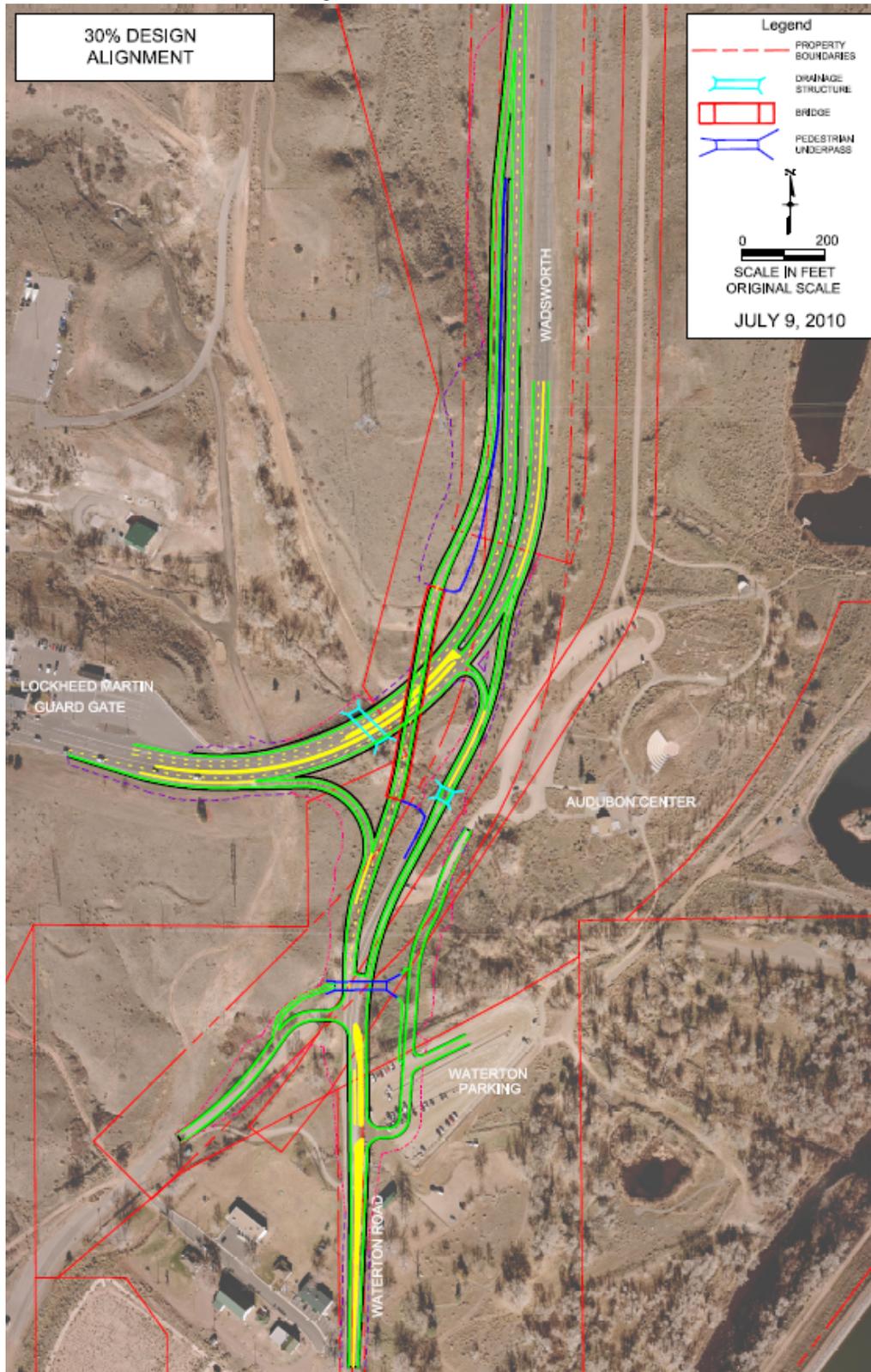
At that same meeting, Denver Water requested that alternatives for the location of their Maintenance Access Road be reviewed. Consequently, project designers developed three proposed alignments in greater detail that were then presented to Denver Water and the Project Team. The first proposal, the Filter Bed Access, moved the access to the south of their existing buildings, and used a roadway along the south side of their filtration ponds. This proposal was eventually dismissed by Jefferson County since it required upgrading about $\frac{3}{4}$ mile of gravel roadway on Denver Water property, and extended well outside of the Project Study Area for which environmental data had not been collected.

The second proposal, the Colorado Trail Access, used the existing access, but redirected the last 500 feet over the existing Colorado Trail to connect to Waterton Road at a right angle opposite the Waterton parking lot entrance. This was dismissed by Denver Water since it moved the road from county Right-of-Way onto Denver Water property and it would be placed over existing water lines and storage tanks.

The third proposal would keep the access at its existing location with improvements to the proposed grade and turning templates of the Maintenance Road that would provide better access for maintenance vehicles in all directions. This proposal was determined to be the best solution by all and the refinements were added to the Preferred Alternative.

To address public concerns regarding pedestrian and bicyclist safety at the existing at-grade crossing of Waterton Road, two possible solutions were explored. The first, a pedestrian underpass north of the Waterton Parking lot could provide visitors with a safe crossing between the parking lot and recreation amenities on the east side road to the Kassler Center and Waterton Canyon/Colorado Trail on the west side. This underpass has been included in the Preferred Alternative design. The second option would be construction of an additional parking lot on Jefferson County and US Corp of Engineers land west of Waterton Road. This option was ultimately removed from the Preferred Alternative because of the potential impacts to wetlands on the west side of the road and because it would not work to balance cut and fill limits within the Chatfield Flood Pool.

Figure 8 – Preferred Alternative



**Appendix A:
Stakeholder Meeting Attendance Rosters**

Sign In	Name	Affiliation	Phone	E-mail
✓	Brad Bauer	Jefferson County	303-271-8495	bbauer@jeffco.us
✓	Jeanie Rossillon	Jefferson County	303-271-8480	jrossill@jeffco.us
✓	Valdis Zebuaers	Jefferson County	271-8495	vzebauer@jeffco.us
	Tim Carl	Jefferson County		tcarl@jeffco.us
	Art Griffith	Douglas County	303-660-7490	agriffit@douglas.co.us
✓	Bob Geist	Lockheed Martin	303-977-6141	bob.c.geist@lmco.com
✓	Jon Chesser	CDOT	303-757-9936	Jonathon.chesser@dot.state.co.us
	Jane Hann	CDOT	303-757-9397	jane.hann@dot.state.co.us
✓	Ryan Eggelton	Chatfield State Park	303-973-9530 303-791-7275	ryan.eggelton@state.co.us
✓	Keith Kahler - Operations Manager	Chatfield State Park	303-791-7275 Fax: 303-791-1231	Keith.Kahler@state.co.us
	Fred Rios	Army Corp of Engineers	303-979-4120	Alfredo.A.Rios@usace.army.mil
✓	Carl Norbeck	Audubon Society	303-973-9530	CNorbeck@denveraudubon.org
✓	Amy Turney	Denver Water	303-628-6625	amy.turney@denverwater.org
	Neil Sperandeo	Denver Water	303-628-6189	Neil.sperandeo@denverwater.org
✓	Dean Van De Wege	Jacobs Engineering Group	720-359-3052	Dean.vandewege@jacobs.com
✓	Jim Clarke	Jacobs Engineering Group	303-820-5218	jim.clarke@jacobs.com
✓	Chris Primus	Jacobs Engineering Group	303-820-4875	Chris.primus@jacobs.com
	Beth Ordonez	Ordonez and Vogelsang	303-898-8042	beth@ovllc.com
✓	Barry Schaefer	DENVER WATER	303-7409785	BARRY, SCHAEFER @ DENVER WATER.ORG.



South Wadsworth/
Waterton Road Intersection
FEASIBILITY STUDY



✓	Rusty Christensen	Denver Water	3/278-9605	Russell.Christensen@denwater.gov



**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

December 17, 2008 Stakeholder Meeting #2

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✓	Valdis Zebuaers	Jefferson County	303-271-8495	vzebauer@jeffco.us
✓	Tim Carl	Jefferson County	303-271-8510	tcarl@jeffco.us
✓	Art Griffith	Douglas County	303-660-7490	agriffit@douglas.co.us
✓	Bob Geist	Lockheed Martin	303-977-6141	bob.c.geist@lmco.com
✓	Jon Chesser	CDOT	303-757-9936	jonathon.chesser@dot.state.co.us
	Jane Hann	CDOT	303-757-9397	jane.hann@dot.state.co.us
✓	Ryan Egelton	Chatfield State Park	303-791-7275	ryan.eggelton@state.co.us
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South Wadsworth/
Waterton Road Intersection
FEASIBILITY STUDY



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**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

January 22, 2009 Stakeholder Meeting #3

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South Wadsworth/
Waterton Road Intersection
FEASIBILITY STUDY

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**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

March 26, 2009 Stakeholder Meeting #4

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**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

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**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

June 4, 2009 Stakeholder Meeting #5

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**South Wadsworth/
Waterton Road Intersection**
FEASIBILITY STUDY

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MTG NO. 6

July 16, 2009

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**Appendix B:
Level 1 Evaluation Criteria Definitions**

Evaluation Criteria Definitions

The Level 1 Screening involves evaluating the conceptual alternatives against screening criteria developed from the project purpose and need, as well as from the project goals. The Level 1 evaluation involves a relative comparison between alternatives, using information that is readily available. The first stage of Level 1 tests the alternatives for meeting purpose and need, and the second stage of Level 1 evaluates the alternatives using the project goals. This approach would eliminate those initial alternatives that would not meet purpose and need, have unacceptably high environmental impacts, or are unfeasible from a practical or economic standpoint. For Level 1, only critical environmental impacts are considered, such as water resources and open space/parkland impacts.

Criteria used in the Level 1 Screening, and their definitions, include:

Traffic Congestion

Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection. The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

DRCOG projections indicate traffic volumes on South Wadsworth Boulevard and Waterton Road will increase by 85 and 105 percent, respectively, by Year 2035. Congestion will worsen as traffic increases.

This criterion measures the ability of the alternative to:

- Address travel demand needs
- Provide acceptable traffic operations
- Reduce travel times

Evaluating the preliminary alternatives against this criterion included considering that:

- Unimpeded movements offer more capacity than signalized movements
- Signalized movements offer more capacity than stop-controlled movements
- Roundabouts when properly designed offer similar capacity as signalized control, pending site-specific analysis



Roadway Deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area.

This criterion measures the ability of the alternative to:

- Improve sight distance;
- Reducing roadway grades approaching the intersection; and
- Accommodating current design standards.

Intersection Safety

The congestion and roadway deficiencies problems discussed above combine to create safety issues. The heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps.

This criterion measures the ability of the alternative to:

- Improve traffic safety conditions at the Wadsworth and Waterton intersection.

Evaluating the preliminary alternatives against this criterion included considering that:

- Unimpeded movements offer a safer design than signalized movements;
- Approaches at a level grade to a signal offer a safer design than approaches on a grade;
- Avoidance of weaving movements;
- Roundabouts are safer than signals for vehicles; and
- Bicyclists are accommodated more safely with unrestricted movements or traffic signals than roundabouts.

Bike/Pedestrian Safety at Parking Lots

Several educational and recreational facilities exist within the study area. These include: the Audubon Center; Kassler Center for Environmental Education; Chatfield State Park, Waterton and Colorado trailhead parking; the South Platte River; and recreational trails and picnic areas on Denver Water Board property. The amenities are located on the east and west sides of Waterton Road and generate considerable cross-traffic. For example, Colorado and Waterton trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. Also, school buses often park in the Waterton Trail parking area, then students will cross Waterton Road to access educational programs at the Kassler Center.

These movements have led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.



This criterion measures the ability of the alternative to:

- Reduce potential conflicts between motorists, pedestrians and bicyclists;
- Improve overall safety of pedestrians and bicyclists; and
- Improve pedestrian and bicycle facilities.

Evaluating the preliminary alternatives against this criterion included considering that:

- Grade separated bicycle/pedestrian crossing of Waterton Road is safer than at-grade crossings; and
- Lower speeds on Waterton Road create a safer condition. Lower speeds would result from signalized intersections, or intersections with impeded flow (left turns, round-about).

Access

There is a lack of access control in the vicinity of the intersection. Several access points exist off of Waterton Road into the Audubon Center, Waterton Trail parking, and Kassler Center. Motorists, including school buses, traveling southbound on Waterton Road make left turns into the Audubon parking area have no turn lane, limited sight distance, and steep grades on the gravel access to the parking area. Exiting vehicles have traction problems.

Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area.

This criterion measures the ability of the alternative to:

- Improve access control along Wadsworth and Waterton roadways
- Provide efficient access to and between Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points

Evaluating the preliminary alternatives against this criterion included considering:

- Whether or not the alternative would preclude the need to improve access along Wadsworth and Waterton; and
- Providing additional separated turn lanes improves access.

Flood Pool

Much of the study area is located on Corps of Engineers (COE) property and resides within the Chatfield Flood Pool. Any construction activities would need to meet the COE's land development policies pertaining to the flood pool. Perhaps the most important requirement for this study is potential loss of flood pool storage. All cut and fill needs to be balanced within each separate elevation zone.

This criterion measures the ability of the alternative to:

- Avoid, minimize, or balance cut and fill in the COE's flood pool areas.



Section 4(f)/Recreation

Much of the study area contains recreation areas, some of are or may be protected by Section 4(f) regulations. The study team will coordinate with CDOT and FHWA to determine the exact limits of Section 4(f) property. For purposes of the Level 1 Screening, Chatfield State Park and several historic resources which exist in the study area are deemed Section 4(f) resources. These historic resources include the Kassler Center, built in 1905, and the Last Chance Ditch. Similarly, the Denver Water property near the South Platte River that is used for recreational purposes is assumed to be a 4(f) resource at this point. However, property to the west of South Wadsworth Road leased by the Denver Botanic Gardens is assumed not to be a 4(f) property for Level 1 Screening.

This criterion measures the ability of the alternative to:

- Avoid and minimize parkland/Section 4(f) impacts.

Water Resources

This criterion encompasses effects to floodplains, surface water bodies, wetlands, and water quality. Much of the study area is included in the 100-year regulatory floodplains for the South Platte River and Brush Creek. Floodplain regulations can be met with proper hydraulic analysis, engineering design, and avoidance measures, but the presence of floodplains can influence the alternatives. For example, raising the profile for Waterton Road to span South Wadsworth Boulevard would require fill material, which could pose a floodplain issue. A field review indicated that near the South Wadsworth/Waterton intersection, wetlands are mostly confined near and within the creek channel.

This criterion measures the ability of the alternative to:

- Avoid and minimize wetlands/waters impacts;
- Avoid and minimize water quality impact; and
- Avoid and minimize floodplain impacts.

Adjacent Land Use

As mentioned above, the study area contains many recreational and educational amenities. It also includes the Lockheed Martin property, an access-restricted facility, and COE property used for flood control.

This criterion measures the ability of the alternative to:

- Minimize disruption to adjacent land uses, including large utilities
- Minimize construction impacts

Lockheed Martin Vehicle Requirements

The Lockheed Martin facility has special transportation needs pertaining to oversized vehicles. One such vehicle is 140-foot long and has a 170-foot inside turning radius on a 30-foot-wide road.

The minimum vertical clearance requirement for these oversized vehicles is 18 feet. Further, access into Lockheed Martin must be provided year round, 7 days a week, and 24 hours a day, including during the construction phase.

There is also a need to coordinate the design of a proposed guard house and visitor parking project.

This criterion measures the ability of the alternative to:

- Meet Lockheed Martin's geometric transportation requirements, which need to be maintained 24/7/365.

Cost

Alternatives will be evaluated based on their relative cost.

Accommodate/Not Preclude Capacity Needs

Douglas County's long term plans call for widening of Waterton Road to accommodate future travel capacity needs. While this study would only address existing safety and operational issues, the criterion measures the alternatives' relative ability to provide flexibility for future expansion of Waterton Road to four lanes with a median.

Considerations in evaluating this criterion included:

- A provision of excessive or redundant capacity, which increases cost and disturbance and therefore should be avoided; and
- The relative ability of alternatives to accommodate future traffic volumes.

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Appendix C: Level 2 Evaluation Criteria Definitions

Evaluation Criteria Definitions

The Level 2 Screening continues evaluating the remaining 5 alternatives against screening criteria developed based on the project purpose and need, project goals, and other concerns identified. The Level 2 evaluation involves a more detailed comparison between alternatives, using information that has been calculated or evaluated to provide more specific measurements. This approach will guide the team in the selection of the preferred alternative.

Criteria used in the Level 2 Screening, and their definitions, include:

Traffic Congestion

Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection. The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin (LM) in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

Sterling Ranch has recently completed their traffic impact study. Based on their growth projections, we can expect traffic through this intersection to approximately triple by Year 2030.

This criterion measures the ability of the alternative to:

- Address travel demand needs
- Provide acceptable traffic operations
- Provide a Level of Service (LOS) better than "D", which is considered the failure threshold.

For evaluating the Level 2 Alternatives, we analyzed when each alternative (as drawn) would fail with a Level of Service "D". The results were as follows:

- The No Action has a current LOS F for the southbound left turn onto Waterton in the PM, and the left turn off Waterton to LM in the AM. This was prior to the signal timing in LM being changed.
- For Alternative 1, the signal reaches LOS D by 2015-2020 in the PM peak, with the left turn to Waterton being the critical move.
- For Alternative 2, the signal reaches LOS D by 2015-2020 in the PM peak, with the southbound through lane being critical.
- For Alternative 6, the intersection reaches LOS D by 2025-2030, with the left turn from Waterton towards LM being critical. The southbound diverge point where the flyover begins reaches LOS D in the same timeframe.
- For Alternative 8, the intersection reaches LOS D by 2025-2030, with the unsignalized left turn from Waterton towards LM being critical. Creating a good long term solution for this turn is difficult for Alternative 8 without introducing a signal that would impact southbound Wadsworth to Waterton



traffic. Based on this factor, this alternative will be rated lower than Alternative 6. The southbound diverge point before the intersection is also a LOS D in the same timeframe.

- For Alternative 9, the intersection reaches LOS D by 2020-2025. with the left turn to Waterton being the critical move. The difference between the impact with this alternative and Alternative 1 is that the flyover removes the conflict with the LM northbound traffic, which extends its useful life.

Roadway Deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area. In addition, the curve superelevation approaching LM ranges from 2% to 5%, which greatly reduces the Design Speed through this curve, and does not meet standard.

This criterion measures the ability of the alternative to:

- Correct and improve existing design standards.
- Ability of the alternative to maximize the design speeds for through movements.
- Reduce grades on reconstructed roadways to less than 4%.

While all the alternatives will correct design obvious design deficiencies, this criterion will measure the extent to which they are improved:

- Improve sight distance and sharp mainline curves. For example, Alternatives 1 and 9 still would have a 15 mph curve into Wadsworth.
- Minimizing roadway grades approaching or over the intersection. For example, Alternative 6 would require steep grades for the SB flyover.

Intersection Safety

The congestion and roadway deficiencies problems discussed above combine to create safety issues. For the existing intersection, the heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps. The signals in Alternatives 1 and 2 do mitigate some of the turning queue problems, but introduce additional rear end collisions which are more frequent than reported. Injuries related to rear end collisions also are usually more severe than expected, since symptoms do not show up immediately.

This criterion measures the ability of the alternative to:

- Improve traffic safety conditions at the Wadsworth and Waterton intersection.

While all the proposed alternatives correct some of the existing safety issues, each has new unique safety considerations:

- Unimpeded movements offer a safer design than signalized or stop condition movements. Alternatives 6 and 8 meet this best.

- From LM, the left hand diverge ramp for a right turn is unconventional, but most users are from LM and will adapt (Alternatives 8 and 9). Of greater concern is that this roadway will be shaded by the new ramp, and may result in new icing problems on the existing steep grades.
- All the alternatives will have the left hand merge entering LM.
- The relative safety of the left turn from Waterton Road to Lockheed will be considered. The signalized intersections in Alternatives 1 and 2 create the safest condition for this movement, and Alternatives 6, 8 and 9 become steadily worse in that order based on the following conditions being rated poorly:
 - Unimpeded SB through movement on Wadsworth
 - Number of through or turn movements competing at the turn.
 - Traffic volumes of the competing movements.

Bike/Pedestrian Safety at Parking Lots

Several educational and recreational facilities exist within the study area. These include: the Audubon Center; Kassler Center for Environmental Education; Chatfield State Park, Waterton and Colorado trailhead parking; the South Platte River; and recreational trails and picnic areas on Denver Water Board property. The amenities are located on the east and west sides of Waterton Road and generate considerable cross-traffic. For example, Colorado and Waterton trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. Also, school buses often park in the Waterton Trail parking area, then students will cross Waterton Road to access educational programs at the Kassler Center.

These movements have led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.

This criterion measures the ability of the alternative to:

- Reduce potential conflicts between motorists, pedestrians and bicyclists;
- Improve overall safety of pedestrians and bicyclists; and
- Improve pedestrian and bicycle facilities.

Since the Level 1 Screening, a decision has been made to address bike/pedestrian safety at the existing bike/ped crossing over Waterton Road to the Colorado/Waterton Canyon trail. For Level 2 evaluation, see the separate evaluation criteria for recommended solutions. Only the No Action and Alternative 1 do not address this issue.

Access

There is a lack of access control in the vicinity of the intersection. Several access points exist off of Waterton Road into the Audubon Center, Waterton Trail parking, and Kassler Center. Motorists, including school buses, traveling southbound on Waterton Road make left turns into the Audubon parking area have no turn lane, limited sight distance, and steep grades on the gravel access to the parking area. Exiting vehicles have traction problems.



Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area.

This criterion measures the ability of the alternative to:

- Improve access control along Wadsworth and Waterton roadways.
- Provide efficient access to and between Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points.

Evaluating the Level 2 alternatives against this criterion included considering:

- Providing additional separated turn lanes to improve access.
- Maintaining the Audubon access at its current location with a southbound median turn lane (Alternative 2).
- Ability to provide a new full turn access movement to replace the existing Denver Water access.

Notes:

- Where the roundabout is shown, a southbound median left turn into the Waterton parking lot can be provided instead.
- If a roundabout is not built, the current access location to the Denver Water road will be maintained. Alternative 6 will not allow for a full access because of the grade separation in the northbound and southbound Waterton roadway.

Accommodates both LM/Wadsworth and the Wadsworth/Waterton Through Movement

The traffic needs at this intersection are unique. Currently the high volumes are to and from LM to the north. As Douglas County growth continues to occur (particularly at Sterling Ranch), the major traffic movement and needs will shift to the Wadsworth/Waterton Road legs of the intersection.

This criterion measures the ability of the alternative to accommodate both the current and future needs of the intersection effectively:

For evaluating the Level 2 alternatives, the alternatives that allow free flow for both movements will receive the highest rating. Alternatives which will require slowing or stopping of traffic on either or both of the major legs will rate lower.

Flood Pool

Much of the study area is located on Corps of Engineers (COE) property and resides within the Chatfield Flood Pool. Any construction activities would need to meet the COE's land development policies pertaining to the flood pool. Perhaps the most important requirement for this study is potential loss of flood pool storage. All cut and fill needs to be balanced within each separate elevation zone.

This criterion measures the ability of the alternative to:



- Avoid, minimize, or balance cut and fill in the COE's flood pool areas.

For evaluating the Level 2 alternatives, the volume of new fill as shown in the cost estimates was used. It should be noted though, that a portion of these fills may be above the Chatfield Flood Pool. For example, for the overpass alternatives the new grade is 28' above the existing roadway at the intersection, but only the bottom 8' would be within the flood zone. This difference in volume has not been calculated.

Section 4(f) Resources

Section 4(f) protects certain recreational properties as well as historic properties on or eligible to the National Register of Historic Places. Much of the study area contains recreation areas, some of are or may be protected by Section 4(f) regulations.

The study team has been coordinating with FHWA in an attempt to determine the exact limits of Section 4(f) recreational property. However, in lieu of pending 4(f) determinations from FHWA, some assumptions have been made on 4(f) applicability. For purposes of the Level 2 Screening, Chatfield State Park and several historic resources which exist in the study area are deemed Section 4(f) resources. The historic resources include the Kassler Center, built in 1905, and the Last Chance Ditch. The Audubon Center facility might also be deemed as historic as part of the Section 106 process currently underway. The screening also assumes all land owned by the Water Board as Section 4(f). However, property to the west of South Wadsworth Road leased by the Denver Botanic Gardens is assumed not to be a 4(f) property.

This criterion measures the ability of the alternative to result in the 'least harm' to Section 4(f) resources, considering the use of probable mitigation measures. Due to the importance of Section 4(f) with regard to the alternatives screening, a separate least harm analysis was prepared (see screening matrices). In cases in which all prudent and feasible alternatives make use of land that is deemed a Section 4(f) resource, the selected alternative must be the one that results in the 'least harm' to Section 4(f) resources. As directed by USDOT regulations, this is determined by balancing the six factors, shown in the separate matrix entitled Section 4(f) Least Harm Analysis. The Section 4(f) ratings applied in the summary matrix represent the results on the least harm analysis.

Water Resources

This criterion encompasses effects to floodplains, surface water bodies, wetlands, and water quality. Much of the study area is included in the 100-year regulatory floodplains for the South Platte River and Brush Creek. Floodplain regulations can be met with proper hydraulic analysis, engineering design, and avoidance measures, but the presence of floodplains can influence the alternatives. For example, raising the profile for Waterton Road to span South Wadsworth Boulevard would require fill material, which could pose a floodplain issue. A field review indicated that near the South Wadsworth/Waterton intersection, wetlands are mostly confined near and within the Brush Creek channel.

This criterion measures the ability of the alternative to:

- Avoid and minimize wetlands/waters impacts;
- Avoid and minimize water quality impact; and
- Avoid and minimize floodplain impacts.

Visual Impacts

Currently the study area resides in an environment where park users enjoy the rural context of the area. Wildlife, bird watching, hiking, horseback riding and fishing are just some of the amenities the area offers. This is slowly being impacted by growth in nearby Douglas County. Many attendees of the open house stressed that they wanted a solution that had minimal footprint or visual impacts.

This criterion measures the ability of the alternative to:

- Minimize the project footprint.
- Maximize the ability of the alternative to blend into the existing environment.

For Level 2 screening, the following will be considered:

- The project footprint
- Visual impacts such as
 - Visibility of retaining walls
 - Visibility of bridge structures
 - Cut into the existing hillside west of Wadsworth

Cost

Alternatives will be evaluated based on their relative cost.

Accommodate Long Range County Plans/Not Preclude Capacity Needs

Douglas County's long term plans call for widening of Waterton Road to accommodate future travel capacity needs. While this study would only address existing safety and operational issues, the criterion measures the alternatives' relative ability to provide flexibility for future expansion of Waterton Road to four lanes with a median.

Considerations in evaluating this criterion included:

- Can the alternative be readily adapted to provide a 4 lane connection from Wadsworth to Waterton Road
- The effectiveness of this movement – are there signals or right angle turns.



Adjacent Land Use During Construction

As mentioned above, the study area contains many recreational and educational amenities. It also includes the Lockheed Martin property, an access-restricted facility, and COE property used for flood control.

This criterion measures the ability of the alternative to:

- Minimize disruption to adjacent land uses, including large utilities
- Minimize traffic impact during construction (for instance number of phases)

On-Road Bicycle Accommodation

This intersection is heavily used by bicyclists, who traverse it as part of the Wadsworth / Roxborough / Chatfield Park loop ride. The left turn from Wadsworth Boulevard to Waterton Road is considered as one of the most dangerous for bicyclists to execute in the area, especially during peak hours. Also, many cyclists park here to access Deer Creek Canyon Road instead of in the Chatfield Park area, since there is no Park use fee.

This criterion measures the ability of the alternative to:

- Minimize the need for cyclists to cross lanes of traffic traveling at high speed.
- Minimize unsignalized conflicts points with other motorist.
- The criterion also considers the extent to which cyclists would be exposed to wind gusts from elevated roadways.

Notes regarding the Level 2 alternatives include the following:

Alternative 1- Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed Lockheed bound traffic to join a turning lane of queued vehicles.

Alternative 2 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of Lockheed bound high speed traffic.

Alternative 6 - Requires bicyclists southbound from Wadsworth to LM to make the crossing of Waterton bound lane of high speed traffic. Requires Waterton bound bicyclists to climb 5% plus grade to an exposed overpass where gusting winds are common.

Alternative 8 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed LM bound traffic. Requires bicyclists northbound from Waterton to Wadsworth to make the crossing of two lanes of high speed ramp traffic NB from LM.

Alternative 9 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed LM bound traffic. Requires bicyclists northbound from Waterton to Wadsworth to



make the crossing of two lanes of high speed ramp traffic NB from LM. Northbound LM cyclists will also be on an exposed overpass where gusting winds are common.

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Appendix B. Stakeholder Team Information

Topic: Meeting Minutes Stakeholder Team Meeting #1
Date: 10:00 a.m. November 18, 2008
Location: Jefferson County Offices
Attendees: See Attached

1. Welcome/Introductions

Dean Van de Wege welcomed everyone to the first Stakeholder Team meeting of the South Wadsworth/Waterton Road Intersection Feasibility Study, and introductions were made. An initial draft of a Project Directory was distributed, which includes Stakeholder Team members.

2. Scope of Work/Feasibility Study

Dean gave a brief overview of the project. It is a safety improvement project, to improve existing conditions. He briefly described some of the existing safety, mobility, and access issues near the intersection. Jim Clarke described the project in the context of NEPA. This is a feasibility study that will be conducted to meet the requirements of NEPA, in case a NEPA process becomes required. Therefore, the team will be using a "Linking Planning with NEPA" approach.

Consultant team members and their corresponding responsibilities include:

- Metcalf Archaeology surveys
- All Traffic Data Collect existing turning movement and traffic data
- Hartwig & Assoc Traffic analysis, trail design, assist with roadway design
- Hermsen Historic properties
- Ordonez & Vogelsang Public Involvement
- PKM Wildlife and fisheries, threatened and endangered species
- Yeh and Assoc Geotechnical support
- HC Peck Obtain title commitments
- Rocky Mtn. Paleo. Paleontology

Dean gave a short overview of the study activities, including developing the purpose and need, traffic analysis, screening of alternatives, assessment of environmental impacts, and public involvement.

- Traffic will be reviewed for existing conditions. Future traffic conditions will be assessed so the alternatives can be evaluated for their ability to be modified in the future to accommodate future needs, for example the potential widening of Waterton Road.
- A project website will be set-up.
- Two public meetings are planned, to provide information to the public and other stakeholders, and to receive input regarding the plans for the project. The meetings will be conducted as "open house" forums. Consultant representatives and summary information from specific areas will be available as needed at the meetings. Amy Turney suggested that it is helpful to have information about current and on-going projects at the meetings, and offered to provide staff representing Denver Water projects at the meetings.
- An initial list of public contacts and interest groups has been prepared, but specifics including contact name and phone number are needed. Dean asked for help from the Stakeholder Team in



identifying individuals they may know who should be involved in the project. A list is provided below, but information for additional interested parties is welcome.

Bike Jeffco
Chatfield Farms
Colorado Division of Wildlife (CDOW)
Colorado Golf & Turf
Colorado Historical Society
Colorado Trail Foundation
Federal Highway Administration
International Mountain Bicycling Association
Ravenna Development
Rocky Mountain Cycling Club
Roxborough Area Historical Society
Roxborough State Park
Roxborough Village
Sierra Club
Sterling Ranch Development
Thorne Ecological Institute
U.S. Forest Service - Pike National Forest

3. Schedule–Critical Path Items

Dean handed out a draft project schedule and identified the major study milestones.

Zeke Zebauers asked about the potential raising of the water level in Chatfield Reservoir. State park representatives answered that a coalition of 15 water users, under the auspices of the Colorado Water Conservation Board, need increased water storage. A DEIS is underway and is scheduled for completion by late Summer 2009. There is a stakeholder group for the EIS. It is proposed that the average pool level be raised 12 feet, to 5,644 above sea level. The frequency that the reservoir would be at the new level is unknown.

Amy asked why the pedestrian underpass was not included as part of this study. The Water Board's primary need is to improving access for recreationists on its property; the study should assess all needs in the area, and it would make sense to construct the underpass at the same time the intersection is improved. It was answered that the primary goal of this project is to improve the safety of the intersection, and the design will be sure to not preclude the pedestrian underpass. Jefferson County is not intending to fund the underpass.

It was noted some design of an underpass has already been prepared, but those in attendance were uncertain of the specific proposed location. This prior study, sponsored by Douglas County, focused on needs along Waterton Road. Amy will obtain and send the draft design plans to Brad Bauer and Dean. It was agreed to revisit this issue of the pedestrian underpass at the next Stakeholder meeting.

Team members provided input on primary pedestrian concerns, which include pedestrian access to parking for the Kassler Center, pedestrian access to the Highline Canal, and bicycle/pedestrian access to the Colorado Trail. It was mentioned that the improved intersection could possibly include a pedestrian facility along Brush Creek under the intersection, depending on the intersection design.



The representatives from State Parks pointed out the unsafe traffic conditions in the area; specifically the left turn movement of visitors and school buses from southbound Waterton Road to the Audubon parking area. There is no left turn lane, limited sight distance, and steep grades on the gravel access to the parking area. Exiting vehicles have traction problems.

4. Project Area/Logical Termini

Jim described the study boundaries and logical termini. The study area extends to the north and south some distance away from the intersection to accommodate (1) potential changes for local access needs along Waterton and (2) some potential alternatives that connect to the Wadsworth roadway at locations removed from the current intersection. It was noted that a new guardhouse at the Lockheed Martin gate will soon be constructed, but uses the same footprint as the existing one.

5. Environmental Issues Map

Jim distributed and reviewed a map showing the initial environmental constraints that have been identified. The project area has a complexity of environmental issues. It was noted that there are three layers of jurisdictional encumbrance on much of the property in the study area.

There was an inquiry about the general magnitude of traffic. Dean provided some initial data on peak hour traffic flows. There is traffic congestion and turning conflicts in the AM rush hour, and these are worse during the PM period. Lockheed Martin work hours are staggered over 2 ½ hours during the morning (6:00 to 8:30) and afternoons (3:00 to 5:30). The PM mix of traffic includes recreationists. Parking along the roads after the parking lots are full contributes to safety problems. In particular, this happens when the Kassler Center has events. It was asked if the DRCOG projections include the new development at Sterling Ranch. Also, it was noted that Lockheed Martin is moving some employees to the Waterton facility (approximately 500), and that this study should address Lockheed's immediate projections, besides long range forecasts. It was noted that the eventual widening of Waterton Road to 4-lanes by Douglas County does not yet have a defined timeframe.

6. Purpose and Need / Project Goals

Jim stated that draft elements of the purpose and need have been prepared, and distributed these along with draft project goals. The draft need elements that have been identified to date are:

- Address Traffic Congestion.
- Improve Deficient Roadway Conditions
- Improve Safety of All Users.
- Improve Access Control

It was stated that the listed order of these elements is not meant to convey any priority of importance, however it helps the descriptive flow of the purpose and need since traffic congestion and deficient roadway conditions lead to safety issues.

Jim asked for review and input on these draft purpose and need elements. Similarly, Jim distributed and reviewed draft goals for the project, and asked for input from the group.



7. Evaluation Criteria

Jim and Chris Primus provided a list of draft evaluation criteria and measures of effectiveness for screening alternatives. These reflect the draft purpose and need elements and the draft goals. Jon Chesser suggested that wording be changed to Minimize and Avoid.

Jon Chesser stated the importance of defining the purpose and need, because it is critical to project definition, the required NEPA process and alternative selection throughout all stages of the project. He noted that if capacity improvements are included as a purpose and need item, then the project would likely need to be conducted as a NEPA EA/EIS process. It was noted the project is intended to accommodate a widening of Waterton Road, but not widen the road as part of this project. A well defined purpose and need, as the basis for alternative selection, should keep this intention on track.

Jon also mentioned that just because the project is on Corp Land does not require it be an EA/EIS.

Dialogue will need to be conducted to determine whether the Corp of Engineers or FHWA is the lead agency.

It was agreed that input from the group on the purpose and need, the goals, and the evaluation criteria be provided to Jacobs by December 1st, 2008.

8. Lines of Communication

It was agreed that communications concerning this study should be directed to Dean, and Brad should be copied.

9. Overview of Upcoming Meetings

The next meeting will focus on screening the potential alternatives from about 12 down to about 5. The requested input from the Stakeholder Team on the purpose and need, goals, and evaluation criteria is important for this reason.

It was asked if this study will include obtaining permits. This study will identify the need for permits, but later study stages would actually initiate the permit process.

It was asked if the schedule includes time for getting approval from the Corps of Engineers, which can be lengthy. It was noted that minimizing impacts to the flood pool will quicken the Corps approval process. It was agreed that the Corp will be contacted to find out at which stage of the study the Corp should be furnished draft plans and designs for initial review.

It was noted the FHWA could be provide valuable guidance on 4(f) classifications and other determinations, but that the FHWA may not have much availability to participate since this is a feasibility study.



10. Plan date for next meeting.

Dean distributed a draft meeting log plan. It was agreed the next meeting will be December 17th at 9:00.

Meeting minutes will be prepared after each stakeholder meeting, and sent to the group for review before finalization. The distributed meeting minutes will include handouts from the meetings. Some graphic handouts will not be distributed due to size.

Action Items

1. **Jacobs** will research for pedestrian underpass information in the files provided by Douglas County to see what has been done to date
 - o Note: A 20' wide by 10' high box was shown on plans midway between the Water Board entrance road and the existing Waterton Canyon Trailhead crossing. Specific design information including underpass elevations or design of the outlet pipe was not found. Additional trail crossings have been planned by Douglas County at the Platte River.
2. **Amy Turney** will also look for files she may have available on the Pedestrian underpass. She noted that there was one design they preferred.
3. **Jacobs** will provide word copies of the Purpose and Need document and the Evaluation Criteria document that Stakeholder Team members can use to provide input of comments.
4. **Everyone** – Provide input on Purpose and Need, and the Evaluation Criteria documents by December 1st, 2008..
5. **Jacobs** will need to have dialogue with Corp of Engineers and FHWA to determine who will be the Lead Agency.
6. **Jacobs** will contact the Corp to find out at which stage of the study the Corp should be furnished draft plans and designs for initial review. Overall, a better understanding is required of how the level of impacts could affect the process and review timeframes.

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November 18, 2008

Purpose and Need Elements

The project purpose is to improve the safety and operational deficiencies of the South Wadsworth Boulevard and Waterton Road intersection. Transportation needs for the South Wadsworth/Waterton Roads Feasibility Study include:

1) Address existing and projected traffic congestion

The portions of South Wadsworth Boulevard and Waterton Road in the study area are important regional travel corridors. These roads serve many transportation users, including commuters who live in Douglas County and recreationists accessing Chatfield State Park, the Audubon Center, the Colorado Trail, and other nearby amenities. Southbound Wadsworth provides access to Lockheed Martin Corporation, Incorporated, the second largest employer in Jefferson County. Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection.

The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

DRCOG projections indicate traffic volumes on South Wadsworth Boulevard and Waterton Road will increase by 85 and 105 percent, respectively, by Year 2035. Congestion will worsen as traffic increases.

2) Correct roadway deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area.

3) Improve safety for users of all modes

The congestion and roadway deficiencies problems discussed above combine to create safety issues. The heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps (see traffic flow maps).

Several educational and recreational facilities exist within the study area, including the Colorado Trailhead. Trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. This has led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.



4) Improve access control

There is a lack of access control in the vicinity of the intersection. Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area. These include access to Lockheed Martin, the Audubon Center, the state park, the Colorado Trail, the South Platte River, the Kassler Center, and other amenities.

Project Goals

Project goals are those viewed as crucial to project success by the stakeholders. These goals help differentiate between the transportation improvements identified to meet the transportation needs identified above, and therefore help guide the alternatives development and screening process. While the needs must be addressed by the project, the goals provide a framework by which the proposed improvements can exceed those requirements. The goals identified for this project are to:

- Provide practical and financially realistic transportation improvements.
- Incorporate Context Sensitive Solutions (CSS) into the planning and design.
 - CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, historic, and environmental resources, while maintaining safety and mobility.
- Avoid and minimize adverse impacts to the natural and human environments
- Minimize disruption to adjacent land uses
- Meet Lockheed Martin's transportation requirements
 - These requirements will be incorporated into the alternative evaluation and construction phases, and will include ensuring 7/24/365 access for national security reasons.
 - The design must accommodate vehicles 140' long, 170' inside turning radius and 30' width, and a clearance of 18' to 20' (preferred).
- Be consistent with adopted local plans, including land use, park, transportation, and facility plans. Examples would be Douglas County projected growth and Thorne Ecological Institute expansion.

Evaluation Criteria	Measures of Effectiveness
Traffic Congestion	<p>Ability of alternative to:</p> <ul style="list-style-type: none"> • Address travel demand needs • Provide acceptable traffic operations • Reduce travel times
Road Deficiencies	<ul style="list-style-type: none"> • Improve sight distance • Reduce roadway grades • Meet desirable geometric design standards
Safety	<ul style="list-style-type: none"> • Improve traffic safety conditions at the Wadsworth and Waterton intersection • Reduce potential conflicts between pedestrians and bicyclists
Access	<ul style="list-style-type: none"> • Improve access control along Wadsworth and Waterton roadways • Provide efficient access to Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points • Meet Lockheed Martin’s geometric transportation requirements
Environmental	<ul style="list-style-type: none"> • Minimize wetlands/waters impacts • Minimize water quality impact • Minimize floodplain impacts • Minimize historic resource impacts • Minimize adjacent land use impacts • Minimize protected specie impacts • Minimize parkland/Section 4(f) impacts
Multimodal	<ul style="list-style-type: none"> • Improve pedestrian and bicycle facilities
Implementation	<ul style="list-style-type: none"> • Minimize construction impacts • Meet Lockheed Martin’s transportation access requirements (e.g. 24/7/365) • Provide a CSS • Provide flexibility for future expansion of Waterton Road • Comply with local plans • Relative cost of the alternatives

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Stakeholder Team Members

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Topic: Meeting Minutes Stakeholder Team Meeting #2
Date: 9:00 a.m. December 17, 2008
Location: Jefferson County Offices
Attendees: See Attached

1. Welcome/Introductions

Dean Van De Wege welcomed everyone and introduced Beth Vogelsang as the team leader for public involvement. Self introductions were made. Dean quickly reviewed the action item list.

1. Jacobs researched available design plans for the pedestrian crossing and did not find anything. Follow up with Denver Water or Jefferson County have not provided additional design information either.
2. Purpose and Need, Goals, and Measures of Effectiveness were distributed after the last meeting, and comments were incorporated.
3. A coordination meeting was held with the Corp Of Engineers (COE), CDOT, and FHWA

2. Updated Purpose and Need, Goals, and Measures of Effectiveness

Jim stated that a few minor comments had been received and all were incorporated. New versions of these documents were distributed.

Art said that Douglas County had a goal that the intersection improvement would not preclude a direct connection of Waterton Road and Wadsworth. It was agreed that this would not be an element of purpose and need since the measures of effectiveness include a need to provide flexibility for future expansion of Waterton Road. The alternative screening process will therefore address this concern.

3. Update on COE/FHWA/CDOT meeting

Dean gave a brief update of the coordination meeting:

- It was decided the feasibility study would be prepared assuming FHWA/CDOT will serve as the future lead agency role under NEPA, in case federal funds are used. Jon Chesser is the main contact person at CDOT for this project.



- If federal funds are not used, CDOT still would prepare a Categorical Exclusion--Form 128 for the intersection improvements using information from the feasibility study. The COE would use this information for its NEPA purposes. ...
- It was agreed an abbreviated Linking Planning and NEPA process would be used for this project.
- Impacts to Brush Creek and any jurisdictional wetlands would require a Section 404 permit.

It was noted that FHWA has a keen interest in this project. Craig Larson of FHWA has been invited to the Stakeholder Team and will attend stakeholder meetings as his schedule allows.

It was clarified that the COE rules regarding cut and fill apply on all COE property, regardless of leasing or easements. The COE process typically requires 90 days for reviewing cut and fill impacts, and the plans for review need to be at about 60% design level.

The team discussed whether 4(f) regulations might apply to Denver Water Board property. It was suggested that the regulations might not apply since the primary use is not recreation, but this needs to be confirmed. FHWA is the agency that makes the 4(f) determination, and coordinates with CDOT regarding this issue. Jim indicated that he would prepare an information memo for CDOT/FHWA review regarding 4(f) applicability of properties in the study area.

4. Bicycle & Pedestrian Trail – Update

Dean updated the situation on prior design efforts. It has been determined that no actual designs were prepared. In the past, concepts were only sketches, and nothing formal has been prepared.

However, Art gave some background on the prior ideas for a bicycle and pedestrian underpass, and some of the issues regarding its design. It was clarified that the proposed location of the underpass had been slightly north of the current at-grade crossing of Waterton Road. Some of the issues include:

- The underpass would most likely require raising Waterton Road
- Cut and fill balance requirements of the COE
- Possibility of providing an underpass at the Platte when the Platte bridge is rebuilt. Can this be considered an alternative? It was decided there was a need to have the crossing location near the Audubon and Kassler Centers.
- Part of problem is they could not drain the underpass because outlet pipe had conflict with Denver Water conduits.



South Wadsworth/ Waterton Road Intersection

FEASIBILITY STUDY

- Art noted that Douglas County has long-term plans to build a pedestrian bridge over the river to connect Highline Canal and Colorado trails.
- There is current equestrian use of the trail. Equestrian usage requires 12' clearance.

Jacobs should look at the possibility of using the abandoned Last Chance Ditch for the pedestrian crossing. Denver Water will check on the location of the ditch.

The Waterton Parking area will not be moving across the road, contrary to some earlier discussions about this possibility.

Some team members expressed concern that this project is focusing on the intersection improvement while not addressing the need for improving the crossing of Waterton Road for pedestrian and wildlife activity. A concept for the whole area needs to be planned now, so that we are certain that the intersection design does not preclude the other future needs. It was noted that this might matter more for some alternatives than others, and conceptual plans for the area would help. Overall, there is a plan of about 4,000 to 5,000 children a year that will visit adjacent facilities.

It was observed that a free-flowing Waterton Road will increase speeds, to the detriment of the safety of pedestrians and bicyclists crossing at-grade.

Data on wildlife crossing Waterton Road may be available from Jerry McKee and Matt Martinez of the Division of Wildlife.

It was asked of Douglas County, when the Waterton Road will be widened, and Art answered not in the immediate future, but perhaps 2015 or after, unless other money becomes available. Art described ongoing project planning that involves:

- 4-laning Waterton Road south of the South Platte River;
- Building a median at Data Drive;
- Building a pedestrian bridge across the Platte;
- A soon to be advertised project includes installing a box culvert under Highline Canal that would accommodate future 4-laning.



Jefferson County also has no plans to widen Waterton Road at this time. It was asked if CDOT could help coordinate the counties. Jon stated that CDOT's role is as the lead agency in advance of NEPA but not for funds, design, or anything else.

It was asked if there are known pipe or future conduit conflicts? The recent Roxborough project has good data on the utilities in this area, and they put in a utility line. Conduit 161 should be identified.

5. Alternatives Workshop

Dean described each alternative with some detail. The discussion included a variety of observations:

- Alternative 1 could include a free flow southbound to westbound movement.
- Alternative 4 will break down due to heavy PM southbound flows from Wadsworth to Waterton impeding outbound traffic from Lockheed entering the roundabout.
- It is not clear if the roundabout will accommodate the Lockheed Martin vehicular requirements.
- Bob indicated we should assume 18' minimum clearance for Lockheed Martin vehicular requirements. This clearance needs to consider additional clearance for the 140 long vehicle in a sag curve.
- Alternative 5 will impact Conduit 10
- Alternative 6 could be modified:
 - Add a northbound Left turn movement at the existing intersection location; and make the overpass one-way southbound.
 - The existing intersection could be used for the eastbound right turn movement, but it was noted that this might induce a weaving problem.
- Does Alternative 7 assume 4 lanes on Waterton? Where does Waterton reduce to 2 lanes?
- Alternative 7 could include 2 lanes onto northbound Wadsworth from Waterton.
- Alternative 6 & 7 have a steep grade on Waterton to access parking lots at location shown. By combining access to south end of Waterton Parking lot, the grade can be reduced, and may provide the ability to install a pedestrian underpass north of the parking lot where the grade would be 10' higher than exists now. Denver Water would approve this combined use of their parking lot.
- A right-in, right-out could be included at either parking lot, to add a second access to these facilities
- In alternative 8, we could make it so one northbound lane onto Wadsworth is continuous.



- The Audubon Center may have increased traffic loads, due to a potential new visitor center for the park at this location.

It was noted that several access, grade and lane options are shown, and concepts from one alternative may be added or subtracted from another similar alternative.

Jim and Chris distributed an initial draft screening matrix. Chris described the first stage of screening based on purpose and need. He noted that the purpose and need element of improved access to the Waterton Parking could be met by all alternatives as it is separated from the intersection area. However, the alternatives that elevate Waterton Road require modifying the access to the Audubon Parking area. It was questioned if improving access is specific to the parking areas, or also includes access to Lockheed Martin. The team agreed this needs to be specified in the screening. For those alternatives that passed the purpose and need screening, Jim described the second stage of screening that addresses environmental and implementation measures of effectiveness. The comments included:

- The safety criterion should also consider weaving.
- The safety criterion should consider safety of bicyclists and pedestrians separate from vehicular safety. These may be split up into two criteria.
- Alternative 1 should be rated Somewhat for Traffic Congestion and Road Deficiencies.
- Alternative 4 should be rated Somewhat for safety
- Alternatives 6 and 7 should be rated Well for safety
- Alternatives 6 and 7 should be rated Well/High for Adjacent Land Use
- Alternatives 6 and 7 should be rated Well for Roadway Deficiencies because of the higher grades.
- Alternative 8 & 9 should be rated Very Well for Lockheed Martin requirements
- Alternative 10 impacts the gate house at Lockheed Martin, and adds lane-miles of roadway for Lockheed Martin.
- Minor use of Lockheed Martin land is acceptable, such as for Alternatives 6 or 7.
- The Roxborough sewer line may be impacted by Alternatives 6 and 7.
- Note the 140' span of Lockheed Martin trucks needs to be taken into account when calculating the vertical clearance.
- Art suggested to make it clear, a "F" rating could be given to those that have a fatal flaw. Alternative 10 on Lockheed property should be rated an "F", and possible Alternative 4, the roundabout, if it can't handle the 140' long trucks.

- It was noted the Alternative 1 scored high on environmental and implementation, but low on purpose and Need. Since Alternative 1 is a relatively minimal action, it has low environmental impacts, but also only minimally addresses the purpose and need. Although not mentioned at the meeting, this applies to all of the simple intersection alternatives.

6. Public Involvement

Beth said that a basic public involvement plan will be developed for this project.

- She is developing a contact database. She asked for contact information to neighborhood groups, as well as the appropriate agencies. It was suggested the Chatfield Reallocation Study has a pretty well developed contact list.
- A webpage will be developed, with a link from the Jefferson and Douglas counties' websites.
- A survey form will be developed as the main mechanism for obtaining public input. It will be available on the webpage, as well as distributed at the open houses.

After some discussion, the team agreed to hold the first open house in late February. Douglas County offers the most appropriate facility for the meeting; Art will contact the school to reserve a date. Attendance could be 30 to 40 people from Roxborough area alone. Since it is a feasibility study, the requirements of formal public notification are not necessary. Public announcements of this open house should include signs at the Waterton Parking lot, as well as on message boards at the parks and other facilities in the area. Besides a news release, a paid ad in local papers might be appropriate, but resources for this would need to be determined. A mail out notice should be sent to key addresses, such as homeowner associations. Both counties have indicated they can use variable message boards along County roadways.

7. Next meeting

After some discussion, the team agreed to hold a stakeholder meeting to finalize the first level of screening. It was scheduled for January 22, 9:00, at the Jefferson County offices.

Action Items

1. Jacobs to prepare an information memo for CDOT/FHWA review regarding 4(f) applicability of properties in the study area.
2. Denver Water will check on the location of the Last Chance ditch.
3. Jacobs to revise the Alternatives 1 and 6 with minor changes, as well as the screening tables to incorporate comments, and send out to the group by the end of the year
4. Art will check with the schools regarding potential dates for the public open house.



Purpose and Need Elements

The project purpose is to improve the safety and operational deficiencies of the South Wadsworth Boulevard and Waterton Road intersection. Transportation needs for the South Wadsworth/Waterton Roads Feasibility Study include:

1) Address existing and projected traffic congestion

The portions of South Wadsworth Boulevard and Waterton Road in the study area are important regional travel corridors. These roads serve many transportation users, including commuters who live in Douglas County and recreationists accessing Chatfield State Park, the Audubon Center, the Colorado Trail, and other nearby amenities. Southbound Wadsworth provides access to Lockheed Martin Corporation, Incorporated, the second largest employer in Jefferson County. Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection.

The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

DRCOG projections indicate traffic volumes on South Wadsworth Boulevard and Waterton Road will increase by 85 and 105 percent, respectively, by Year 2035. Congestion will worsen as traffic increases.

2) Correct roadway deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area.

3) Improve safety for users of all modes

The congestion and roadway deficiencies problems discussed above combine to create safety issues. The heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps (see traffic flow maps).

Several educational and recreational facilities exist within the study area, including the Colorado Trailhead. Trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. This has led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.



4) Improve access control

There is a lack of access control in the vicinity of the intersection. Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area. These include access to Lockheed Martin, the Audubon Center, the state park, the Colorado Trail, the South Platte River, the Kassler Center, and other amenities.

Project Goals

Project goals are those viewed as crucial to project success by the stakeholders. These goals help differentiate between the transportation improvements identified to meet the transportation needs identified above, and therefore help guide the alternatives development and screening process. While the needs must be addressed by the project, the goals provide a framework by which the proposed improvements can exceed those requirements. The goals identified for this project are to:

- Provide practical and financially realistic transportation improvements.
- Incorporate Context Sensitive Solutions (CSS) into the planning and design.
 - CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, historic, and environmental resources, while maintaining safety and mobility.
- Avoid and minimize adverse impacts to the natural and human environments
- Minimize disruption to adjacent land uses, including large utilities
- Meet Lockheed Martin's transportation requirements
 - These requirements will be incorporated into the alternative evaluation and construction phases, and will include ensuring 7/24/365 access for national security reasons.
 - The design must accommodate vehicles 140' long, 170' inside turning radius and 30' width, and a clearance of 18' to 20' (preferred).
- Be consistent with adopted local plans, including land use, park, transportation, and facility plans. Examples would be Douglas County projected growth and Thorne Ecological Institute expansion.

Evaluation Criteria	Measures of Effectiveness
Traffic Congestion	<p>Ability of alternative to:</p> <ul style="list-style-type: none"> • Address travel demand needs • Provide acceptable traffic operations • Reduce travel times
Road Deficiencies	<ul style="list-style-type: none"> • Improve sight distance • Reduce roadway grades • Meet desirable geometric design standards
Safety	<ul style="list-style-type: none"> • Improve traffic safety conditions at the Wadsworth and Waterton intersection • Reduce potential conflicts between motorists, pedestrians and bicyclists
Access	<ul style="list-style-type: none"> • Improve access control along Wadsworth and Waterton roadways • Provide efficient access to and between Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points • Meet Lockheed Martin’s geometric transportation requirements
Environmental	<ul style="list-style-type: none"> • Avoid and minimize wetlands/waters impacts • Avoid and minimize water quality impact • Avoid and minimize floodplain impacts • Avoid and minimize historic resource impacts • Avoid and minimize adjacent land use impacts • Avoid and minimize protected specie impacts • Avoid and minimize parkland/Section 4(f) impacts
Multimodal	<ul style="list-style-type: none"> • Improve pedestrian and bicycle facilities
Implementation	<ul style="list-style-type: none"> • Minimize construction impacts • Meet Lockheed Martin’s transportation access requirements (e.g. 24/7/365) • Provide a CSS • Provide flexibility for future expansion of Waterton Road • Comply with local plans • Relative cost of the alternatives

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Topic: Meeting Minutes Stakeholder Team Meeting #3
Date: 9:00 a.m. January 22, 2009
Location: Jefferson County Offices
Attendees: See Attached

1. Welcome/Introductions

Dean Van De Wege welcomed everyone and self introductions were made.

2. Continued Alternatives Workshop

Dean described how Alternatives 1 and 6 were revised based on comments from the last stakeholder meeting.

Alternative 1 was revised by moving the SB through movement to Lockheed 20+ feet into the hill to avoid the need to be controlled by the signal. This allows the NB left turn off Waterton Road to have its own acceleration lane into Lockheed.

Alternative 6 was previously a two-lane, out of direction travel loop. It required quite a bit of cut into the hillside. It is now a single lane ramp southbound on Wadsworth, and the loop required for the left turn is now at the proposed signal.

Chris Primus reviewed the Level 1 screening. During the Level 1 screening, there is a two-stage review process. The first stage is to go through the screening considering purpose and need elements, and then to review in light of project goals. He said that the suggested changes from the Stakeholder group at the December meeting had been incorporated. One of the suggested changes had been to provide a definition of how each criterion had been applied to the alternatives. This criteria rating definition document was part of the agenda packet, and had been emailed prior to today's meeting. He briefly reviewed the ratings system for the purpose and need Evaluation Criteria:

- Unimpeded movements provide greater capacity than signalized movement
- Primary road deficiencies are limited sight distance and approach grades
- The safety element had been broken up safety into intersection safety and bicycle safety.
 - Intersection safety: Unimpeded movements are safer. Weaving movements were not as safe.



- Pedestrian/bicycle safety: A pedestrian crossing above or below grade would be safest. If Waterton Road has slower speeds (turns, signals), then that is safer than higher speeds. If the intersection influences speed on Waterton, then that would be safer. This concerned the parking lot crossing area primarily.
- Access: Looked primarily on Waterton. Any build alternative could improve access on Waterton.

He then reviewed the scoring for each alternative based on the Purpose and Need Criteria. The No Action alternative did not meet Purpose and Need. Alternatives 4, 5 and 10 were quickly eliminated as having fatal flaw characteristics with a least one stakeholder. CDOT would not accept a future three lane roundabout (alt 4), alternative 5 impact to the flood pool was unacceptable, and alternative 10 which realigned the road through Lockheed was unacceptable to them.

Of the remaining alternatives, alternatives 6, 7, 8, & 9 rated the highest for meeting purpose and need of the project. The three at-grade intersection alternatives scored more poorly in this category, but it makes sense to carry forward at least one intersection alternative. The screening graphics indicated that Alternative 3 should perhaps be carried forward, as it provides an at-grade signalized option, but CDOT commented that the S-curve may introduce some sight distance issues. Initially it was recommended an option be carried forward that combines the best elements from alternatives 2 and 3.

Next, Chris reviewed the ratings results for the project goals screening evaluation. The alternatives that move forward from this point will be presented to the public. The alternatives that are screened out at this stage will not be analyzed in any further detail. In the second level of screening, the at-grade intersections rated higher. Following was much discussion on which alternatives it would be best to carry forward.

Denver Water commented that although alternatives 6, 7, 8 & 9 don't score as well with bicycle safety, they do make a good case for a separate crossing because of the higher speeds. Dean pointed out that the grade-separated bridge alternatives would offer the ability to accommodate a pedestrian underpass due to the grade separation from existing ground introduced on Waterton Road.

State Parks noted that none of these alternatives addressed the pedestrian concerns very well. Jacobs explained that none of these alternatives contain pedestrian crossing or facilities to specifically address pedestrian safety. None of these alternatives preclude a future underpass.



Denver Water had pulled some engineering drawings for Last Chance Ditch.

Alternative 7 may pose a problem for access to the southern gate into Strontia Springs, as well as to Conduit Road 20 closer to Lockheed roadway. It is absolutely imperative that Denver Water can get heavy equipment in and out of Strontia Springs from both directions.

If you change the grade going south of the intersection, a larger fill would be required. Denver Water explained that there are some pretty big conduits that run in there and if something goes wrong, it would require significant work that would impact the road. They suggested access to existing utilities should be weighed pretty heavily in the evaluation. We should look at adjacent land uses to see how they are impacting access and utilities.

The Jacobs team explained that this is a Level 1 screening analysis. But, access and utility issues may result in a higher rating for the signalized alternatives in Level 2 screening that determines the preferred alternative.

Denver Water requested that we strongly consider the pedestrian underpass in the evaluation of alternatives. Douglas County explained that the timing of that facility is important. We should consider how we should ultimately handle this crossing, but that implementation will come with further development of Chatfield basin in Douglas County. Art suggested that perhaps an interim solution for the bicycle and pedestrian crossing could be constructed in the form of a median refuge for pedestrians. This would be a low cost solution that could be implemented before the funds for a pedestrian underpass are available.

Denver Water recognized that we are making these improvements piecemeal but that we should have a full picture of what should ultimately be included.

State Parks added that any plan that does not incorporate a solution for bike and pedestrian traffic is not an appropriate solution. A vision of the future concepts for the bicycle and pedestrian crossing needs to be established.



South Wadsworth/ Waterton Road Intersection FEASIBILITY STUDY

Jefferson County noted that the primary goal of this project was initially to improve the intersection, movement and access and address the conflict from southbound left turn to Waterton with evening traffic leaving Lockheed Martin. But any solution that would improve pedestrian movement would be appealing. Douglas County noted that this intersection conflict is just an early action item, but cash flow is an issue for implementation of a full planning horizon. The design should not lock into an underpass solution, but should look at any solutions that address the pedestrian safety.

Alternative 3, 7 and 8 would all see increased speeds at Waterton Parking lot and Waterton Canyon Road and be a concern to Denver Water and Recreation. From State Parks and Denver Water's perspective, pedestrian movement is just marginally safe now.

It was noted the pedestrian crossing issue will be a hot topic at the public meeting. Diagrams of interim solutions should be available at the public meeting. These should be shown specifically for each alternative.

Jacobs team would like to consider these concerns and determine if some tweaks to alternatives or consolidation of alternatives could be made to address these concerns in Level 2. Jacobs will incorporate access needs into Denver Water properties, utility needs and location and conceptual plans for bike and pedestrian safety across Waterton Road. Jacobs will focus on these items in Level 2. CDOT requested that if an alternative negatively impacts pedestrian safety, that both short term and long term solutions/concepts should be developed now.

Jefferson County likes Alternative 1 over 2 and 3. It's a mistake to eliminate Alternative 1 at this time. Alternative 1 addresses the conflicting movement without a lot of peripheral impacts. It could be refined to also improve grade. CDOT's primary concern was grade. The through movement remains Wadsworth – Lockheed. Alternatives 2 and 3 emphasize the movement from Wadsworth-Waterton, better accommodating future development in Douglas County.

Douglas County commented that if Alternative 1 remains, it must address the grade. There is a significant cost difference between Alternatives 1 and 3.

Jacobs team offered a solution of doing a Level 2A screening on Alternatives 1, 3, 6, 7, 8 and 9. Then the 2B Level would be fewer alternatives for more engineering analysis.



Douglas County would be willing to throw out 7, keep 1 and 3 and assume that 8 and 9 will be resolved into one alternative. Jacobs could introduce Denver Water access needs as a criteria and Alternative 7 may not fare as well. Jacobs will also add observations from the group to the general evaluation.

After some discussion, it was agreed to drop Alternative 7 today. The large cut and possible access limitations of this alternative make it less favorable. Alternatives 1, 3, 6, 8 and 9 will move forward from Level 1 screening and be shown at the Open House.

3. Public Involvement

Beth distributed a packet of draft material for the February 25 public meeting. It was agreed the hours of the Open House would be from 5:00 to 7:30.

OV Consulting reviewed the Contact Database with the group and noted the addition of Bike Jeffco and Colorado Trails. Homeowner associations most likely will provide their own internal circulation. OV asked for additional input on names that should be added to the contact list.

The group reviewed the Open House flyer and suggested the addition of hard copy flyers at Waterton Canyon parking lot, State Parks, Audubon Society and libraries. Some minor editing suggestions were made for the flyer and map. A web-ready version will be posted to the website. An electronic version of the flyer will be made available to the project team for agency and firm internal distribution purposes.

OV will contact State Parks and Audubon to follow up on placement of signs in the parking lots on sandwich boards, and other bulletin board locations. The State Park has portable signs that can handle 22"x34" laminated posters.

OV reviewed materials needed at the Open House and Jefferson County suggested a single sheet handout with basic project info including, project schedule, explanation of alternatives review, how to stay in touch and how did they find out about the meeting? Douglas County suggested a board for Purpose and Need with comment sheets available at that board. Larry Corcoran will handle VMS sign and placement for Douglas County and Brad Bauer will manage VMS for Jefferson County.

Sticky notes for comments need to be available at the public meeting.

Meeting notifications will include email and hard copy post cards. Brad Bauer would like both sent to him. Brad Bauer and Art Griffith will provide additional Commissioner names, etc. for notification.

OV will submit a newspaper advertisement to Art Griffith by February 4th and he will manage advertisement in Douglas County publications. OV will contact Columbine Courier for details of advertisement publication for Jefferson County. Douglas County will pay for the advertisements in Douglas County papers. Jefferson County will reimburse the consultant team for newspaper ads.

February 6th is the target date for distribution of flyers and posting of signs announcing the public meeting. Jefferson County stated that they need to review drafts of all items before they are finalized.

The alternatives that were considered in Level 1 and screened out need to be available at the Open House, in case someone is interested.

OV reviewed the web page information and will revise the comment form to reflect specific categories for comments and details of Alternatives.

After the public meeting comments are summarized Brad wants the originals.

4. Discuss Alternatives Advanced

This discussion occurred during Agenda Topic #2.

5. Update on Flood Pool

Jacobs quickly reviewed the Flood Zone map and information, to get an understanding of the exceedance levels in the project area.

It was questioned if there was a partnering opportunity to dig a hole at the Kessler filter beds, to offset fill that the project may require. Denver Water said those beds are already accounted for, and this project would have to identify another location(s) for mitigation of fill.

6. Status Update



Dean gave a very brief status update on utilities, traffic, environmental, survey, and geotechnical activities.

7. Action Item review

Dean quickly reviewed the action items from last meeting.

Jacobs is progressing on an information memo for CDOT/FHWA review regarding 4(f) applicability of properties in the study area. Additional ROW information is still needed.

Denver Water pulled data on the location of the Last Chance ditch.

8. Next meeting

Next meeting will be March 26th, 9:00 – 11:30 at Jefferson County Building.

Action Items

- OV will submit a newspaper advertisement to Art Griffith by February 4.
- February 6th is the target date for distribution of flyers and posting of signs announcing the public meeting.
- Alternatives at open house should show solutions to pedestrian crossings.
- A questionnaire should be prepared and reviewed/approved prior to the open house.

Follow up Discussions

After the meeting, Jon Chesser, Jefferson County and Jacobs discussed comments on Stakeholder Meeting #2 Minutes. These were forwarded by Jon on January 8. Jon Comments were as follows:

After reviewing the meeting minutes from Stakeholder Meeting #2, I have one thing to add. A commitment was made by Jefferson County during the discussion of federal lead agency, and the prospects of Jefferson County receiving federal funds for the project that I believe needs to be reflected in the minutes. I made the comment that we will need to know whether federal funds will be a part of this project before starting NEPA (after the feasibility study is complete) so that we have a clear understanding of how to proceed with environmental clearances, particularly 4f. I am trying to avoid a situation where the project receives federal funding half-way through NEPA and we then have to go back and change course mid-stream with respect to 4f and/or other resources. In response to that comment, Brad Bauer stated that if Jefferson County does not have federal funds acquired by the time the project needs to start the NEPA process, a final



decision will be made for project to move forward without federal funds. I understand this to mean that we have Jefferson County's commitment that no federal funds will be acquired after NEPA starts. This is an important point and I would like it added to the Meeting Minutes.

This issue was discussed in further detail following Stakeholder Meeting #3. The following is a summary of the discussion:

- Jefferson County has applied for Discretionary Funding, but does not know if or when it will be approved.
- A final decision concerning funding assumptions will be made when we begin the NEPA process.
- It will most likely be between May and July when a final decision will need to be made.
- Although there may be some additional costs in assuming federal funding, those may well offset a possible project delay and additional costs to revisit NEPA later if funds suddenly become available.
- There is a good chance that we may just proceed assuming federal funds may become available. It is hoped that by the time a decision needs to be made, we will be more informed concerning potential 4(f) issues which will help make the decision.

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Stakeholder Meeting #2.doc



Evaluation Criteria Definitions

The Level 1 Screening involves evaluating the conceptual alternatives against screening criteria developed from the project purpose and need, as well as from the project goals. The Level 1 evaluation involves a relative comparison between alternatives, using information that is readily available. The first stage of Level 1 tests the alternatives for meeting purpose and need, and the second stage of Level 1 evaluates the alternatives using the project goals. This approach would eliminate those initial alternatives that would not meet purpose and need, have unacceptably high environmental impacts, or are unfeasible from a practical or economic standpoint. For Level 1, only critical environmental impacts are considered, such as water resources and open space/parkland impacts.

Criteria used in the Level 1 Screening, and their definitions, include:

Traffic Congestion

Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection. The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

DRCOG projections indicate traffic volumes on South Wadsworth Boulevard and Waterton Road will increase by 85 and 105 percent, respectively, by Year 2035. Congestion will worsen as traffic increases.

This criterion measures the ability of the alternative to:

- Address travel demand needs
- Provide acceptable traffic operations
- Reduce travel times

Evaluating the preliminary alternatives against this criterion included considering that:

- Unimpeded movements offer more capacity than signalized movements
- Signalized movements offer more capacity than stop-controlled movements
- Roundabouts when properly designed offer similar capacity as signalized control, pending site-specific analysis

Roadway Deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area.

This criterion measures the ability of the alternative to:

- Improve sight distance;
- Reducing roadway grades approaching the intersection; and
- Accommodating current design standards.

Intersection Safety

The congestion and roadway deficiencies problems discussed above combine to create safety issues. The heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps.

This criterion measures the ability of the alternative to:

- Improve traffic safety conditions at the Wadsworth and Waterton intersection.

Evaluating the preliminary alternatives against this criterion included considering that:

- Unimpeded movements offer a safer design than signalized movements;
- Approaches at a level grade to a signal offer a safer design than approaches on a grade;
- Avoidance of weaving movements;
- Roundabouts are safer than signals for vehicles; and
- Bicyclists are accommodated more safely with unrestricted movements or traffic signals than roundabouts.

Bike/Pedestrian Safety at Parking Lots

Several educational and recreational facilities exist within the study area. These include: the Audubon Center; Kassler Center for Environmental Education; Chatfield State Park, Waterton and Colorado trailhead parking; the South Platte River; and recreational trails and picnic areas on Denver Water Board property. The amenities are located on the east and west sides of Waterton Road and generate considerable cross-traffic. For example, Colorado and Waterton trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. Also, school buses often park in the Waterton Trail parking area, then students will cross Waterton Road to access educational programs at the Kassler Center.

These movements have led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.



This criterion measures the ability of the alternative to:

- Reduce potential conflicts between motorists, pedestrians and bicyclists;
- Improve overall safety of pedestrians and bicyclists; and
- Improve pedestrian and bicycle facilities.

Evaluating the preliminary alternatives against this criterion included considering that:

- Grade separated bicycle/pedestrian crossing of Waterton Road is safer than at-grade crossings; and
- Lower speeds on Waterton Road create a safer condition. Lower speeds would result from signalized intersections, or intersections with impeded flow (left turns, round-about).

Access

There is a lack of access control in the vicinity of the intersection. Several access points exist off of Waterton Road into the Audubon Center, Waterton Trail parking, and Kassler Center. Motorists, including school buses, traveling southbound on Waterton Road make left turns into the Audubon parking area have no turn lane, limited sight distance, and steep grades on the gravel access to the parking area. Exiting vehicles have traction problems.

Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area.

This criterion measures the ability of the alternative to:

- Improve access control along Wadsworth and Waterton roadways
- Provide efficient access to and between Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points

Evaluating the preliminary alternatives against this criterion included considering:

- Whether or not the alternative would preclude the need to improve access along Wadsworth and Waterton; and
- Providing additional separated turn lanes improves access.

Flood Pool

Much of the study area is located on Corps of Engineers (COE) property and resides within the Chatfield Flood Pool. Any construction activities would need to meet the COE's land development policies pertaining to the flood pool. Perhaps the most important requirement for this study is potential loss of flood pool storage. All cut and fill needs to be balanced within each separate elevation zone.

This criterion measures the ability of the alternative to:

- Avoid, minimize, or balance cut and fill in the COE's flood pool areas.



Section 4(f)/Recreation

Much of the study area contains recreation areas, some of are or may be protected by Section 4(f) regulations. The study team will coordinate with CDOT and FHWA to determine the exact limits of Section 4(f) property. For purposes of the Level 1 Screening, Chatfield State Park and several historic resources which exist in the study area are deemed Section 4(f) resources. These historic resources include the Kassler Center, built in 1905, and the Last Chance Ditch. Similarly, the Denver Water property near the South Platte River that is used for recreational purposes is assumed to be a 4(f) resource at this point. However, property to the west of South Wadsworth Road leased by the Denver Botanic Gardens is assumed not to be a 4(f) property for Level 1 Screening.

This criterion measures the ability of the alternative to:

- Avoid and minimize parkland/Section 4(f) impacts.

Water Resources

This criterion encompasses effects to floodplains, surface water bodies, wetlands, and water quality. Much of the study area is included in the 100-year regulatory floodplains for the South Platte River and Brush Creek. Floodplain regulations can be met with proper hydraulic analysis, engineering design, and avoidance measures, but the presence of floodplains can influence the alternatives. For example, raising the profile for Waterton Road to span South Wadsworth Boulevard would require fill material, which could pose a floodplain issue. A field review indicated that near the South Wadsworth/Waterton intersection, wetlands are mostly confined near and within the creek channel.

This criterion measures the ability of the alternative to:

- Avoid and minimize wetlands/waters impacts;
- Avoid and minimize water quality impact; and
- Avoid and minimize floodplain impacts.

Adjacent Land Use

As mentioned above, the study area contains many recreational and educational amenities. It also includes the Lockheed Martin property, an access-restricted facility, and COE property used for flood control.

This criterion measures the ability of the alternative to:

- Minimize disruption to adjacent land uses, including large utilities
- Minimize construction impacts

Lockheed Martin Vehicle Requirements

The Lockheed Martin facility has special transportation needs pertaining to oversized vehicles. One such vehicle is 140-foot long and has a 170-foot inside turning radius on a 30-foot-wide road.

The minimum vertical clearance requirement for these oversized vehicles is 18 feet. Further, access into Lockheed Martin must be provided year round, 7 days a week, and 24 hours a day, including during the construction phase.

There is also a need to coordinate the design of a proposed guard house and visitor parking project.

This criterion measures the ability of the alternative to:

- Meet Lockheed Martin's geometric transportation requirements, which need to be maintained 24/7/365.

Cost

Alternatives will be evaluated based on their relative cost.

Accommodate/Not Preclude Capacity Needs

Douglas County's long term plans call for widening of Waterton Road to accommodate future travel capacity needs. While this study would only address existing safety and operational issues, the criterion measures the alternatives' relative ability to provide flexibility for future expansion of Waterton Road to four lanes with a median.

Considerations in evaluating this criterion included:

- A provision of excessive or redundant capacity, which increases cost and disturbance and therefore should be avoided; and
- The relative ability of alternatives to accommodate future traffic volumes.

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South Wadsworth/ Waterton Road Intersection

FEASIBILITY STUDY

DRAFT Conceptual Alternatives Screening (12/17/08) **REVISED** (1/13/09)

Alt. #	Alternative Name	Purpose and Need					score
		Traffic Congestion	Road Deficiencies	Intersection Safety	Bike / Ped Safety	Access	
	No-Action Alternative	●	●	●	●	●	7
1	Signal	●	●	●	●	○	14
2	Lockheed T & Signal	●	●	●	●	○	15
3	Lockheed T, S-curve & Signal	●	●	●	●	○	16
4	Roundabout	●	●	●	●	○	16
5	Waterton / Golf & Turf Signal	●	○	●	●	○	16
6	Grade Separated Southbound Wadsworth	○	○	○	●	○	19
7	Grade Separated Loop	○	○	○	●	○	20
8	Grade Separated NB Wadsworth, Waterton through	●	○	○	●	○	19
9	Grade Separated NB Wadsworth, Lockheed through	●	○	●	●	○	19
10	Ridge Road & Signal	●	○	●	●	○	15

KEY

Meets Criterion:

- Very Well (5)
- Well (4)
- Average (3)
- Somewhat (2)
- Not at All (1)

South Wadsworth/ Waterton Road Intersection

FEASIBILITY STUDY

DRAFT Conceptual Alternatives Screening (12/17/08) REVISED (1/13/09)

Alt. #	Alternative Name	Environmental				Implementation				score
		Floodpool	4(f) / Recreation	Water Resources	Adjacent Land Use	LM vehicle requirements	Cost	Accommodate / Not preclude capacity needs		
	No-Action Alternative	○	○	○	○	○	○	○	35	
1	Signal	○	○	◐	○	○	○	○	34	
2	Lockheed T & Signal	○	◐	◑	◐	○	◐	○	30	
3	Lockheed T, S-curve & Signal	◑	◐	◑	◑	○	◐	○	27	
4	Roundabout	◐	◐	◑	◐	◑	◐	◑	23	
5	Waterton / Golf & Turf Signal	◑	◑	○	◑	○	◑	◑	16	
6	Grade Separated Southbound Wadsworth	○	◑	◑	◑	○	◑	○	27	
7	Grade Separated Loop	○	◑	◑	◑	○	◑	◑	22	
8	Grade Separated NB Wadsworth, Waterton through	◑	◑	◑	◑	○	◑	○	21	
9	Grade Separated NB Wadsworth, Lockheed through	◑	◑	◑	◑	○	◑	◑	21	
10	Ridge Road & Signal	◐	◐	◑	◑	○	◑	○	21	

KEY

Meets Criterion/Impact

○ Very Well/Very High(5)

◐ Well/High (4)

◑ Average (3)

◒ Somewhat/Low (2)

◓ Not at All/Very Low (1)

◑ Less effective at meeting

◑ Purpose and Need

◑ Suggest Retaining at least this Intersection Alternative

Topic: Meeting Minutes Stakeholder Team Meeting #4
Date: 9:00 a.m. March 26, 2009
Location: Jefferson County Offices
Attendees: See Attached

Pre-Meeting Discussion

Dean Van De Wege announced that Jon Chesser (CDOT Region 6) would be joining the meeting by conference call and Douglas County representatives would be fifteen minutes late.

Dean asked Fred Rios (Army Corp of Engineers) about the Chatfield flood pool and where the fill required to construct most of the alternatives could be mitigated. Fred explained that Zones 1-4 (between the flood pool elevation of 5432 and the top of the spillway at 5500) could possibly be used for mitigation for impacts to Zone 5. Fill and mitigation will need to stay within the CDOT ROW where possible and no areas within Chatfield State Park can be used without a considerable public involvement process.

Dean discussed the feasibility (based on a couple of comments from the Public Meeting) of moving the Waterton parking west of Waterton Road onto Jefferson County property. The comment was discussed further under Agenda item No. 7.

1. Welcome/Introductions

Dean Van De Wege welcomed everyone and self introductions were made. Guests from the Colorado Trails Foundation were recognized.

2. Updates since last meeting

Dean described the Stimulus (ARRA) Package Submittal of Alternative 1 by Jefferson County. The Stimulus criteria was based on mobility versus safety priorities and the Alternative was not able to qualify for funding at this time.

Alternatives 8 and 9 with a one lane flyover for potential cost savings were discussed. Steve Markovetz and Art Griffith noted that the one lane flyover had a number of operational and safety issues that could pose problems. In summary, forcing a merge to one lane in the short distance between the guard gate



and the beginning of the ramp (and in the area where grades are the worst), could result in just moving the safety problem, not mitigating it.

3. Utility Update

Jim Mills provided a utility plan with the latest updates on aboveground and underground utilities in the project vicinity. Two meetings have been held with Xcel Energy and one on-site meeting with Denver Water. Denver Water, Xcel Energy, Roxborough Water and Sanitation District, and Lockheed Martin have supplied utility maps and drawings. Qwest has not returned phone calls.

Jim noted that major utilities including the 115kV and 230kV Xcel electric transmission lines and the Denver Water Conduits 10, 20, and 133 do not appear to be impacted by the remaining Alternatives. Several of the Alternatives that widen and/or raise the Lockheed Martin Road will have minor impacts including extending the casing pipes of the Lockheed Martin/Roxborough force main sanitary sewer lines. Minor utility impacts including overhead 13.2 Xcel electric transmission and service lines and Qwest phone lines are anticipated for all Alternatives. Potential utility impacts will be noted as design on the Alternatives is advanced.

Jim noted that impacts to fiber optic lines and gas lines will need to be reviewed further. Meetings will be scheduled with Lockheed Martin and Qwest to review communication lines. Additional meetings with Xcel to review gas line locations will be needed.

Denver Water noted that the original 3 MG underground reservoir at Kassler Treatment Plant (west of Waterton Road) is still in service. Denver Water will provide drawings showing details on the reservoir and tie-in to Conduits No. 10 and 133. Also, Neil Sperando will have Denver Water's staff review the utility information to ensure everything is represented.

4. Updated ROW Mapping

Dean reviewed the latest existing property ownership information and provided a handout. Fred Rios asked if Jefferson County has fee simple ownership of their ROW, or whether it is an easement. Jim Clarke offered to check into this issue.

5. Environmental Update



Jim Clarke discussed on-going work on identification of potential Section 4f properties. Jacobs submitted a memorandum to FHWA describing study area properties and requested 4(f) applicability determinations. He will coordinate with Craig and Stephanie at FHWA to schedule a meeting to discuss the issues.

6. Traffic Forecast/Accidents Updates

Steve Markovetz provided a handout with the forecast traffic volumes and turning movements noted for the intersection. Steve noted that there are very few accidents recorded by CDOT over a six year period on Highway 121. 40% of the accidents were wildlife related although they were at fairly random crossing locations. 2005 or 2006 is the latest accident data from CDOT. More recent accident data from CDOT would be preferred but is difficult to track down. Steve suspects that there could be a higher incident of accidents at the intersection except that the daily drivers are aware of the safety issues and take extra precautions to avoid accidents.

7. Open House Comments Review

Dean provided a handout and the team quickly reviewed the slides in the Executive Summary of the February 25, 2009 Public Meeting.

Art Griffith and the group discussed bicycle lane issues and other desired design elements for roads in the area, including widened shoulders on Waterton Road and Titan Road. Art mentioned that there is a long term plan to Chatfield Park trails and the Highline Canal trail. Also, a current project will improve shoulders from the highline to Rampart Range Road.

For the Question No. 6 slide the group discussed adding another column to identify additional Alternative comment preferences derived from other parts of the questionnaire and the meeting.

Discussed visual effects from Alternatives 6 and 8 and also the increased speeds on Waterton Road that could result from these direct connections. In particular, the Alternative 6 flyover could result in increased speed for SB Waterton Road drivers descending from the overpass.



Carl Norbeck with the Denver Audubon Society brought up the growth in visitation to the Audubon facilities. Currently 1200 kids/800 adults visit annually. Up to 400 people visit on Saturdays and total Numbers are anticipated to increase to 5,000 annually by 2010. Annual projections are up to 25,000 visitors by 2014. Denver Audubon has 3,000 members and is undergoing a major marketing push for new members and visitors to their facilities. They are now providing opportunities for groups to go out with skilled naturalists. Currently they are open every Saturday (last week they had 400 visitors), and are open one Sunday a month. Chatfield State Park has a number of joint activities coordinated with Denver Audubon now. Signs and vehicle (and bus) access to the parking lot needs to remain well marked if the parking lot entrance is shifted to a shared location with the Waterton Canyon Parking lot.

The team discussed the Last Chance Ditch and if it is on or eligible to the National Register of Historic Places. The ditch was discussed in relation to a potential bike/ped underpass in that location. Jim will check on the eligibility of the ditch.

Moving of the Parking lot to the west/south side of Waterton Road was again discussed. There are two possible locations for this parking lot, either North of the Denver Water Access Road, or south of the Kassler Center. If moved north of the Access Road, this would be Corp Land, and someone would need to take over management of the land. The other option was on Denver Water Board Land. Denver Water discussed that the inactive Kassler Plant filter beds are planned for future use by the dredging project at Strontia Springs Reservoir. Strontia Dredge Project is expected to continue for 2-3 years but could also be an on-going activity periodically or the sand filter beds may be activated by Denver Water for future use. This area is not anticipated to be available for a future parking lot but Neil Sperando with Denver Water will confirm.

8. Open Alternatives Discussion

Dean reviewed a handout on features/improvements. Desired features and improvements include:

- Keep a long acceleration lane from Waterton Road onto Wadsworth Blvd. (northbound)
- Improve grades of Waterton Road approaching Wadsworth.
- Improve the left turn from Waterton Road into Lockheed Martin by adding a left turn storage lane.
- Improve access from the Waterton Canyon parking lot onto Waterton Road (currently gravel surface is hard to accelerate on and has a steep upward grade)



- Add a 16' wide median and 4' shoulders on Waterton Road
- Denver Water vehicle access onto the Strontia Springs Dam access road needs to be maintained.
- Possible roundabout/median/island traffic calming options at the entrance to the Waterton Canyon parking lot to facilitate pedestrian crossings and vehicle turning movements
- Traffic calming needs to accommodate horses as well. The Colorado Trail Foundation guests pointed out that medians may be an issue with horses and may not work as a refuge area as it would for pedestrians and bicyclists.
- Discussed the option for a Metering Traffic Signal on Lockheed Martin property. Steve Markovetz pointed out that it would not be MUTCD compliant if it was not located at a conflict area. It also may backup traffic into the Lockheed Martin private traffic light controlled intersection.

Discussed bicyclist comments and pros/cons with the Alternatives. Bicyclists are requesting a combination of separate bicycle paths to improve safety through the intersection, and better on road safety.

9. Alternatives to Carry Forward

There was a consensus to drop Alternative 9 based on Stakeholder input and input from the Public Meeting. Alternative 9 is similar to Alternative 8 which will be carried forward.

Alternatives 1, 2, 6, and 8 will be carried forward. Funding issues may not allow the flyover Alternatives to be constructed in the near future. It was pointed out that an acceptable option can be a recommendation to combine two Alternatives as the Preferred Alternative. Alternative 1 could be paired with 6 and Alternative 2 paired with 8 and evaluated as a phased solution to construction funding issues. Combined alternatives should be evaluated to accommodate the future 4 lane Waterton Road by Douglas County. Combined alternatives would need to look at alignments to ensure the next phase can be built without restricting access to Lockheed Martin and Waterton Road, and to minimize any additional reconstruction. This will be looked at further to determine the feasibility.

10. Schedule Next Meeting

Next meeting will be Thursday May 14th, 2009 from 9:00 AM to 12:00 PM at Jefferson County Building.



Action Items

- Denver Water will provide drawings showing details on the reservoir and tie-in to Conduits No. 10 and 133. (Drawings have been provided)
- Neil Sperando will have Denver Water's staff review the utility information.
- Jim Clarke offered to check into whether Jefferson County has fee simple ownership, or easement of their ROW. (They have fee ownership)
- Question 6 of the Open House comments only totaled Alternative Preferences specifically identified within that section. It was suggested that comments elsewhere throughout this document also be tallied and identified on this slide.
- Jim will check on the historic eligibility of the Last Chance Ditch.
- Denver Water will review the Strontia Springs Dredge Project and the potential availability of the Kassler Filter Bed area for a future parking lot. (Information was provided – Details need to be discussed with Denver Water)
- Jacobs will review the alignments and issues with phasing and combining Alternatives 1 & 6 and Alternatives 2 & 8.
- Jacobs (Jim Clarke) will follow up with FHWA on 4f designated areas within the project area.

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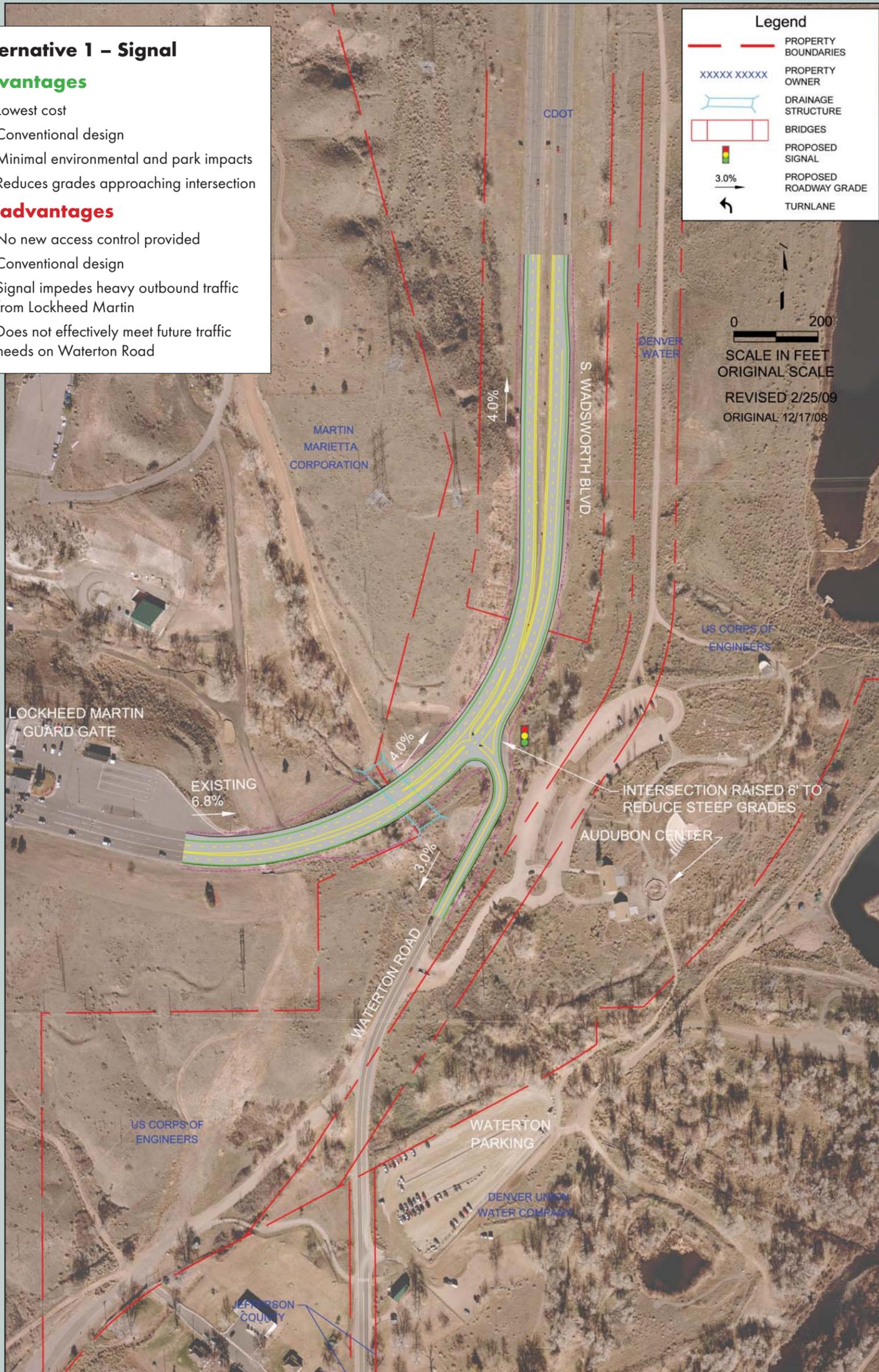
Alternative 1 – Signal

Advantages

- Lowest cost
- Conventional design
- Minimal environmental and park impacts
- Reduces grades approaching intersection

Disadvantages

- No new access control provided
- Conventional design
- Signal impedes heavy outbound traffic from Lockheed Martin
- Does not effectively meet future traffic needs on Waterton Road



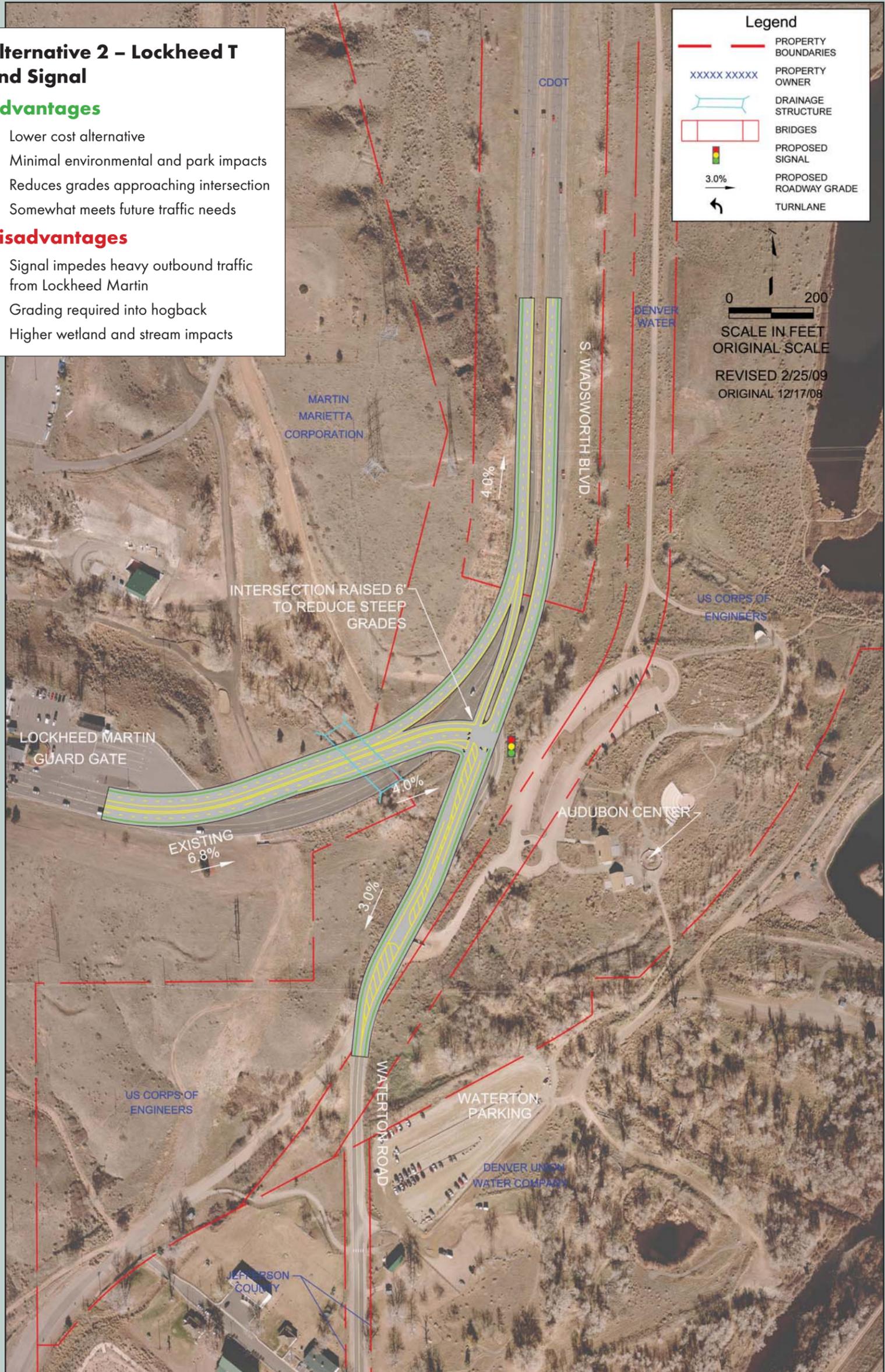
Alternative 2 – Lockheed T and Signal

Advantages

- Lower cost alternative
- Minimal environmental and park impacts
- Reduces grades approaching intersection
- Somewhat meets future traffic needs

Disadvantages

- Signal impedes heavy outbound traffic from Lockheed Martin
- Grading required into hogback
- Higher wetland and stream impacts



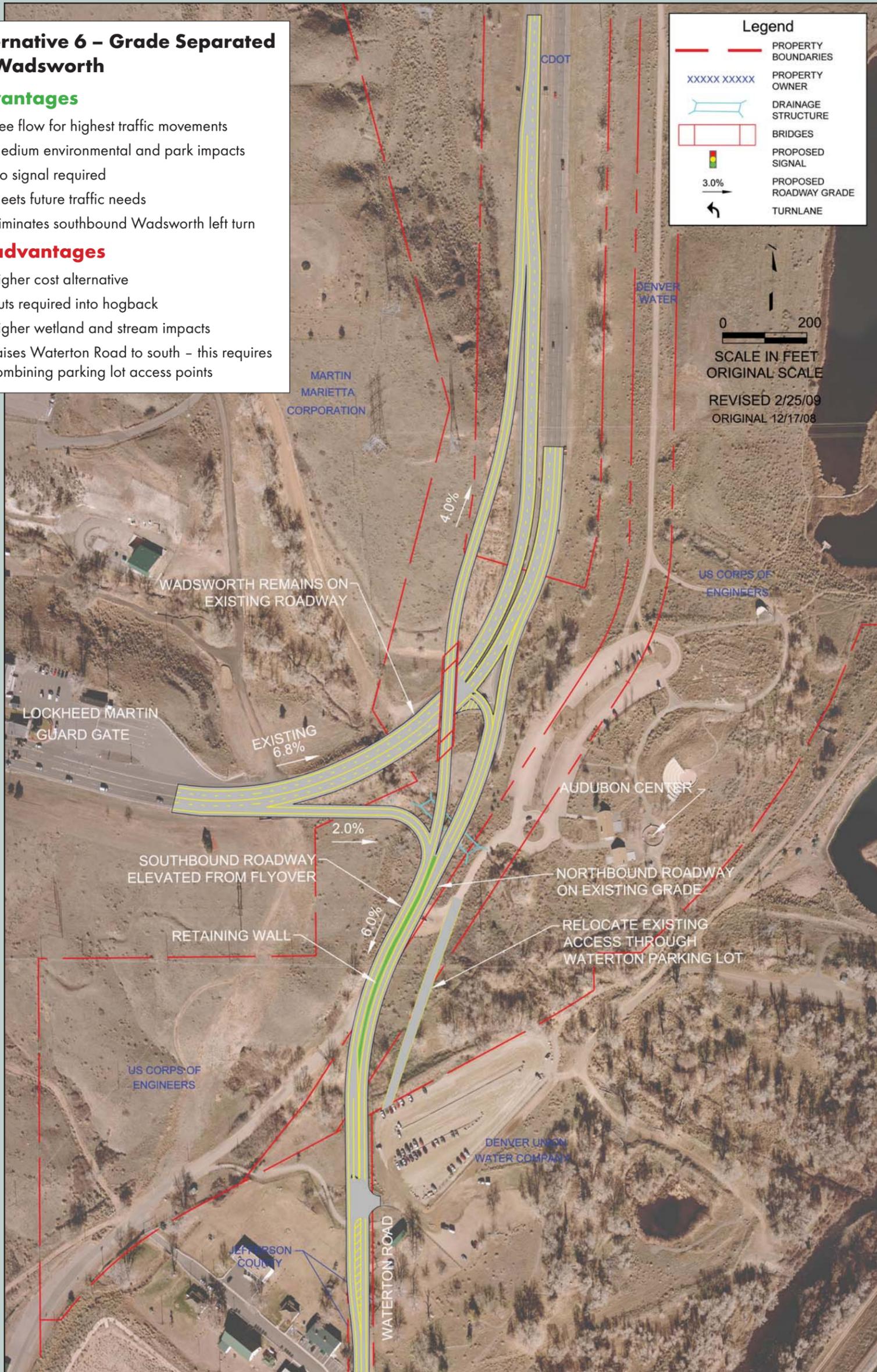
Alternative 6 – Grade Separated SB Wadsworth

Advantages

- Free flow for highest traffic movements
- Medium environmental and park impacts
- No signal required
- Meets future traffic needs
- Eliminates southbound Wadsworth left turn

Disadvantages

- Higher cost alternative
- Cuts required into hogback
- Higher wetland and stream impacts
- Raises Waterton Road to south – this requires combining parking lot access points



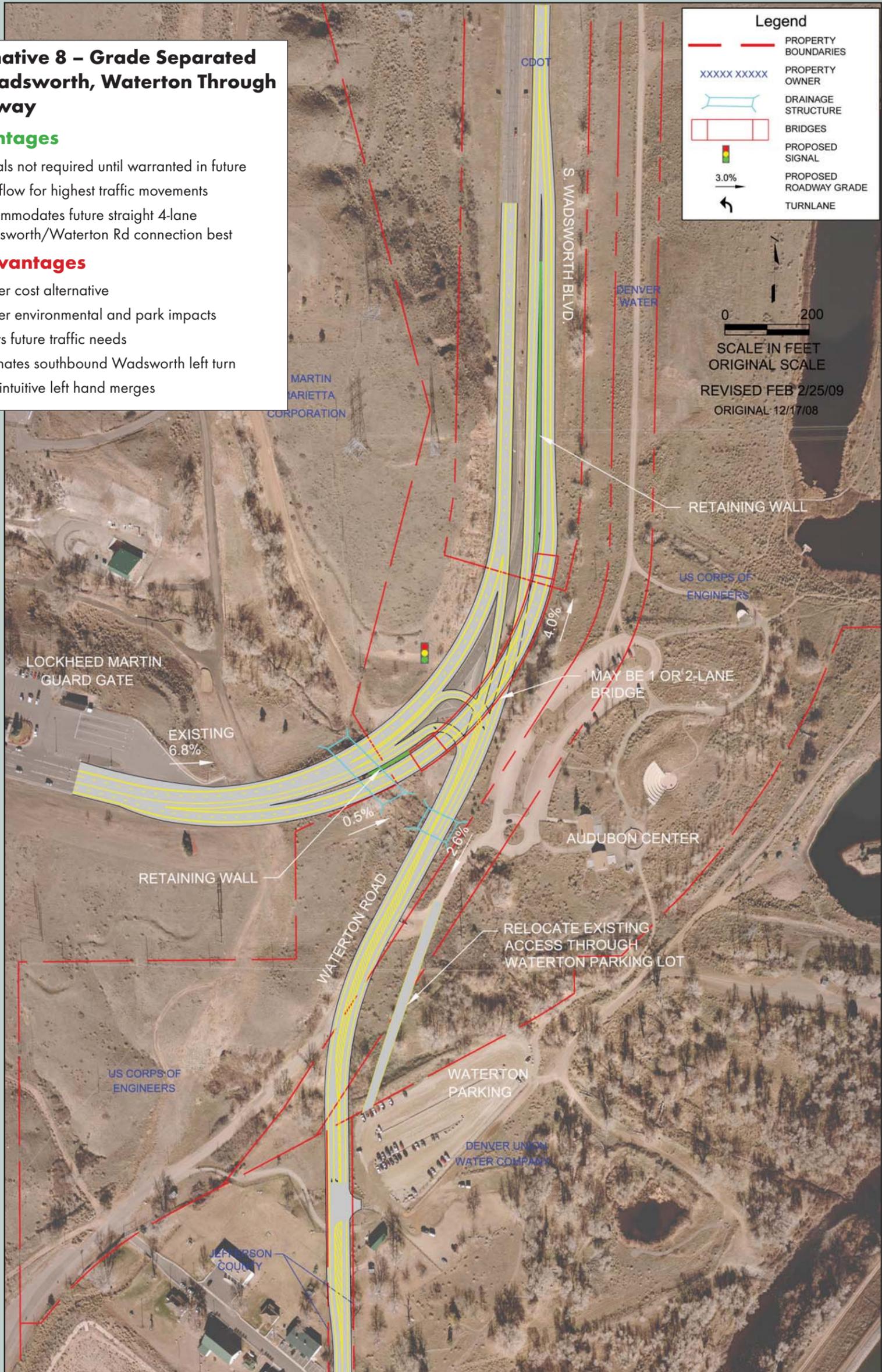
Alternative 8 – Grade Separated NB Wadsworth, Waterton Through Roadway

Advantages

- Signals not required until warranted in future
- Free flow for highest traffic movements
- Accommodates future straight 4-lane Wadsworth/Waterton Rd connection best

Disadvantages

- Higher cost alternative
- Higher environmental and park impacts
- Meets future traffic needs
- Eliminates southbound Wadsworth left turn
- Non-intuitive left hand merges



ALTERNATIVE 9 GRADE SEPARATED NB WADSWORTH, LOCKHEED THROUGH ROADWAY

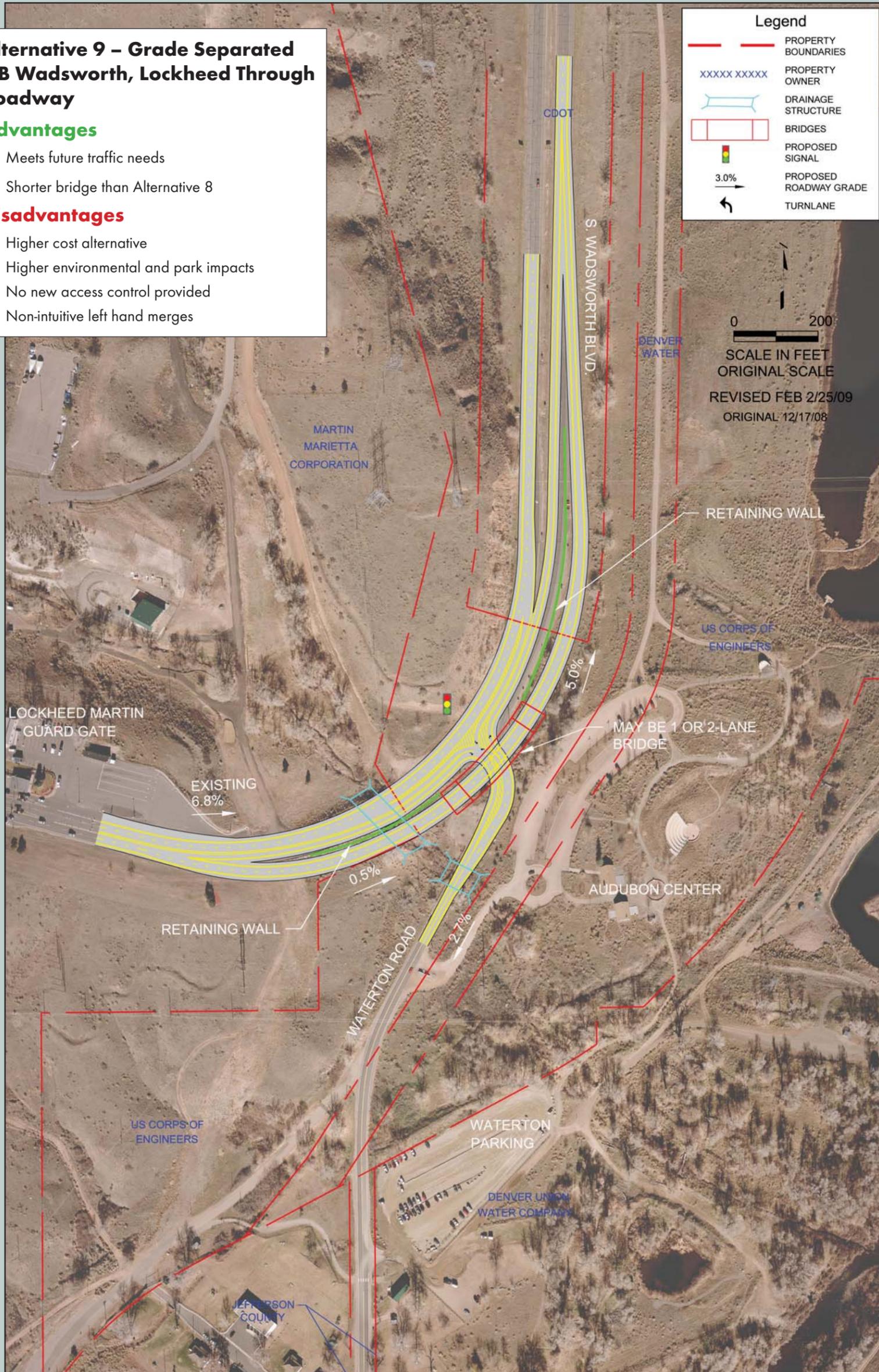
Alternative 9 – Grade Separated NB Wadsworth, Lockheed Through Roadway

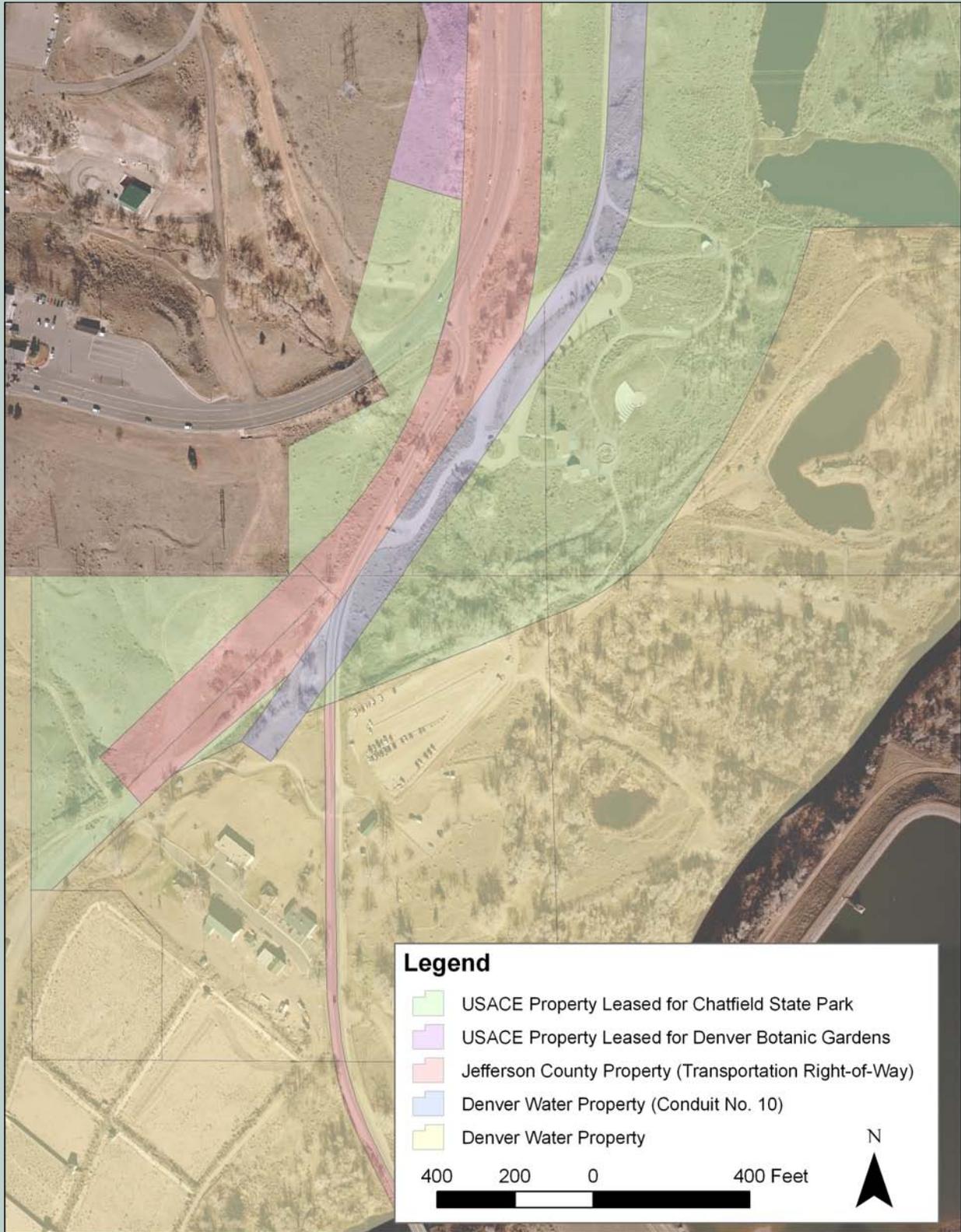
Advantages

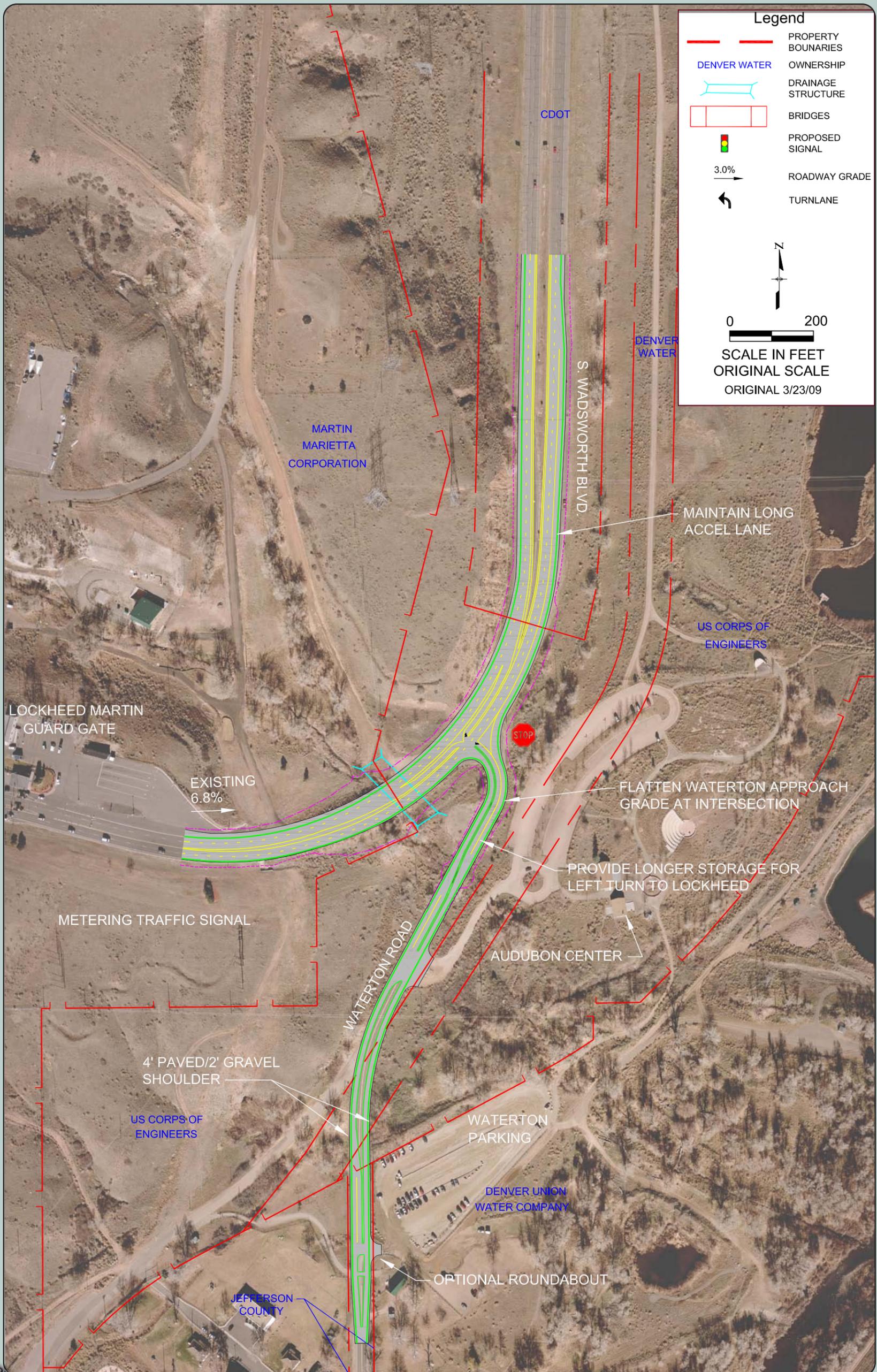
- Meets future traffic needs
- Shorter bridge than Alternative 8

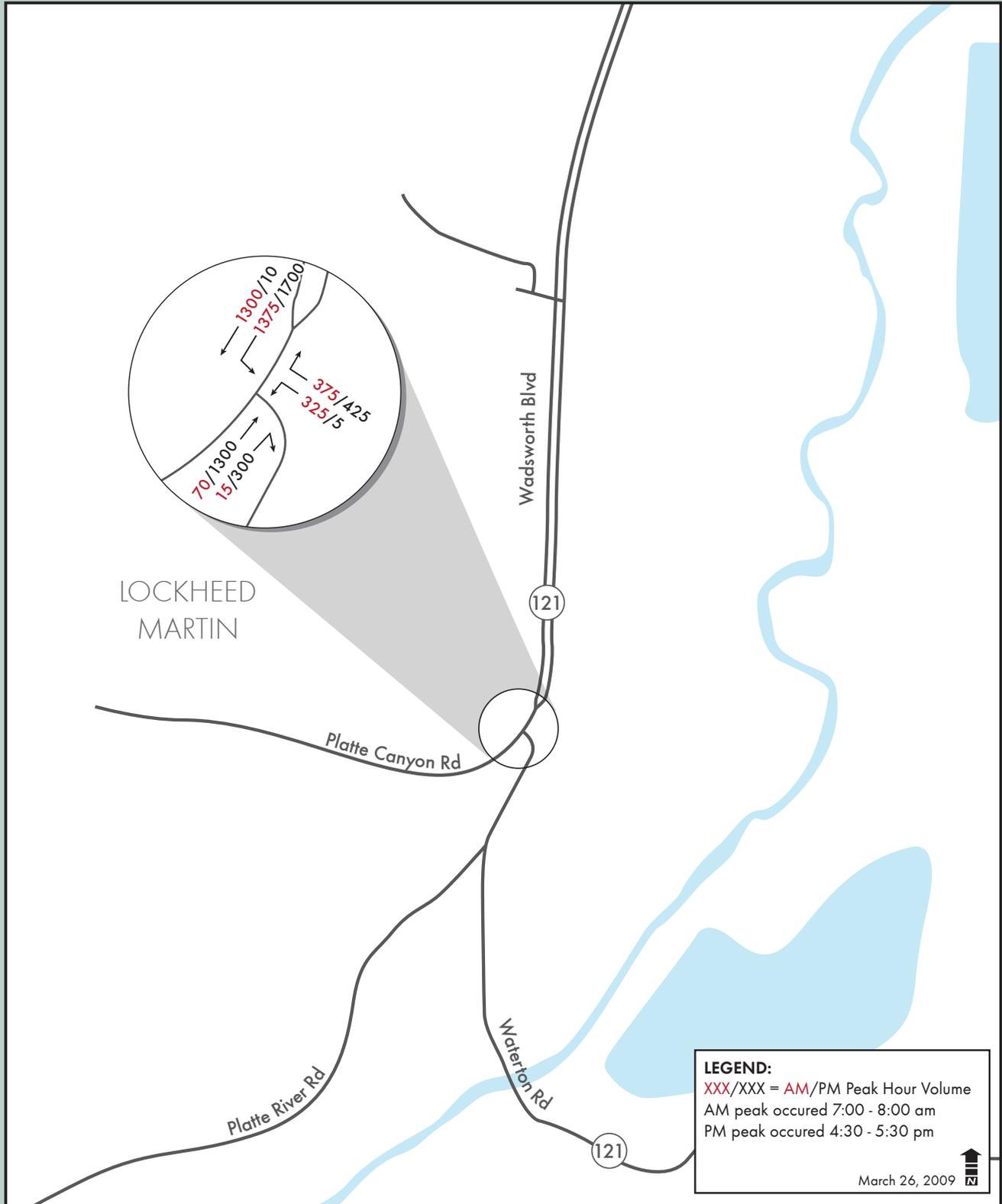
Disadvantages

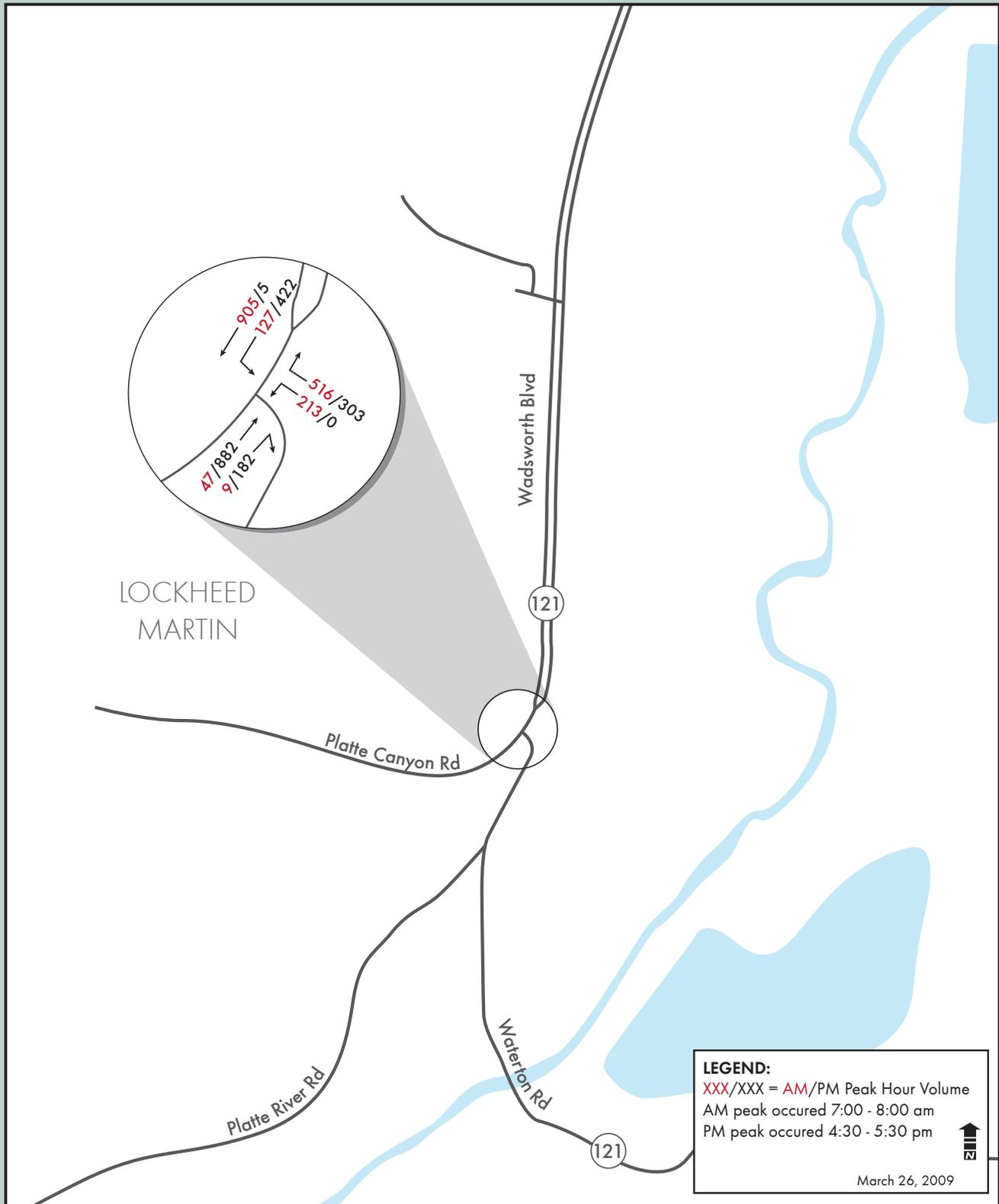
- Higher cost alternative
- Higher environmental and park impacts
- No new access control provided
- Non-intuitive left hand merges











Topic: Stakeholder Team Meeting #5

Date: 9:30 a.m. June 04, 2009

Location: Jefferson County Offices

Attendees: See Attached

1. Welcome/Introductions

Dean Van De Wege welcomed everyone, gave a brief summary of our goals for the day, and self introductions were made.

2. Additions to Minutes of Last Meeting

From Bob Geist

The concept of a metering traffic signal on Lockheed Martin (LM) property below the Guard Shack was considered at the last meeting. After some examination, it did not appear to be the best solution. Furthermore, LM management felt the concept was unacceptable, and asked that its consideration be removed from further study.

From Brad Bauer

In Agenda Item No.2 regarding the discussion of a one-lane flyover bridge for Alternatives 8 and 9, two members of the team stated that a one-lane bridge for those alternatives "had a number of operational and safety issues that could pose problems". The minutes noted that the objection was based on the view that "forcing a merge to one lane in the short distance between the guard gate and the beginning of the ramp (and in the area where the grades are the worst), could result in just moving the safety problem, not mitigating it."

Jefferson County's perspective is that Alternatives 8 and 9 might pose a different (possibly much less severe) safety problem than the current condition, as opposed to "moving the safety problem". The current unsignalized intersection poses a significant risk of "T-bone" accidents occurring when the PM left-turners cross Wadsworth while the Lockheed



employees leave work at the end of the day. The "hazards" of having a merge from two lanes out of Lockheed Martin's guard gate to a one-lane bridge would pose a potential side-swipe hazard which generally is not as likely to result in injuries or fatalities, as "T-bone" accidents do.

Jefferson County suggests that the decision regarding whether the bridges for Alternatives 8 and 9 should be one or two lanes wide, should remain open to further engineering study and as a minimum until an engineering evaluation of the correct weaving distance can be made.

3. Updates since last meeting

Lockheed Signal—Operations and Changed Timing

Until recently, the Lockheed signal-timing consisted of a 3-second all red phase from 8:30 AM until 5:30 PM. From 5:30 PM to 8:30 AM, there was a 10 second all red phase. These all red phases occurred twice during each cycle. On May 15, the 10 second all red phase was readjusted to between 3:30 and 6:30 PM, to coincide with the evening peak volumes both out of LM and on southbound Waterton. This should increase the number of gaps available for SB left turns to Waterton Road.

June 2 Traffic Observations

On June 2, Dean observed the traffic at the intersection between 4:30 and 6:00 PM, to get a feel if the all red signal timing change may have helped traffic. Overall delays seemed to be less than when Steve Markovetz observed them last winter, but it was a rainy day, and overall traffic counts were not taken to make sure we were comparing delays with the same peak volumes. Delays were typically about 10 to 60 seconds, with them extending to 1 to 2 minutes during about a 10-15 minute period shortly after 5:00.

Before the signal timing change, the intersection was experiencing a Level of Service (LOS) F in the AM and PM peaks. This will need to be revisited again now. Even though



the signal timing change may help the PM conflict, it does not impact the previous AM delays.

Traffic Signal Warrants

Alternative 1: Jeffco and Jacobs met with CDOT and agreed that if the grades are improved, the signal meets warrants

Alternative 2: Alternative 2 has different through movements, but was also determined to meet enough of the warrants to justify a signal.

It was noted that warrants are determined based on existing conditions, volume, & delay.

Jeffco Speed Study

- SB Wadsworth has a 45 mph posted speed approaching the intersection with a 35 mph warning sign before the last curve. Observed speeds are 58 mph.
- Waterton has a 25 mph post speed.
- NB Wadsworth: Is posted at 55 mph after the intersection, and 35 mph above the intersection. Observed speeds are 49mph.
- Observed speeds in both cases were the 85 percentile speeds.

Some side observations about the current roadway were made at this time.

- For alternatives 6, 8 and 9, it was suggested that the superelevation of the existing roadway be improved, and the roadway rebuilt. Existing super ranges from 2% to 5%. For a 3% super, the posted speed would be 20 mph per the AASHTO Green Book, and for a 5% super, the posted speed would be 30 mph based on the 6% maximum super curve for a 745' radius (note: this radius was not available at the meeting).



- It was discussed that using 6 percent super could be hazardous in this location when icy conditions exist. Adding to this concern is that this is an area where vehicles stop, which compounds the hazard. Douglas and Jefferson Counties agreed that using 4% maximum superelevation curves is appropriate for this project location.

Pairings of Alternatives

Jacobs reviewed how the paired Alternatives of 1/6 and 2/8 may not work together as well as originally anticipated. Essentially, there are not any cost savings by constructing the alternatives in two phases. If Alternatives 1 or 2 are built as a first phase, the resulting grade separated structures for Alternatives 6 or 8 in Phase 2 would be much higher, which would add to the cost of that phase as a result of longer approach grades.

The intersection elevation in Alternative 1 will need to be about 6' higher to improve the grades to 4%. Similarly, Alternative 2 would result in the intersection being about 12' higher.

In discussions with Jefferson County, it was concluded that pairing and phasing construction of the alternatives may not be the best solution. Future phasing would have more fill, a greater footprint, and steeper roadway grades.

Jeffco pointed out that they submitted the Preliminary Alternative #6 for federal high priority funding and are hoping to hear next month if they will receive any money. This may be the only way they could fund this higher cost alternative.

4. Alternative Updates and Alternative Costs

Dean described the updated maps of the alternatives, including new or updated features:

- Addition of horizontal and vertical design speeds.
- Updated grades.
- Updated ROW to correct some discrepancies.
- Potential parking lot, underpass and roundabout.



- Roundabout: The planned roundabout would basically serve as a traffic calming device for this project; but it is not a desired solution for the following reasons:
 - They are generally not perceived as pedestrian friendly.
 - Limited lifespan given traffic growth projections and possible future 4 lane roadway.
 - It is potentially costly.
 - It becomes the bottleneck of traffic movement or Level of Service (LOS) for all the alternatives.
- Pedestrian Underpass:
 - It was mentioned by others that they thought the estimated cost of \$150,000 is low; probably more like \$400,000 to \$500,000. Costs only included concrete and steel for a 12' wide by 10' high CBC, and \$50,000 for drainage.
 - It was mentioned that for equestrian usage, a 12-foot height should be used. There were also discussions that a much wider structure may be needed.
 - An at-grade crossing would provide equestrian users the option of using the underpass or the at grade crossing.
 - Conversely, controlling a horse in a median with traffic on both sides is not recommended.

Additional Douglas County comments:

- Maximum posted speed recommended on South Waterton in the future is 40 mph; may even want to consider 35 mph.
- It was noted the roadway design needs to meet the desired speed, as posted speeds are not effective.

Jeffco Comment:

- If the CBC for Brush Creek under Waterton is connected to the CBC under LM, who would maintain the structure? LM maintains theirs now.



Dean described some key comparisons of the Alternatives; these key considerations were summarized in the attached memo:

Alternative 1:

- Alternatives 1 and 2: Signals eliminate severe accidents, etc. but can induce other types of minor accidents (the type that tend to be unreported).
- Sight distance remains an issue, especially the sight distance to the signal.

Alternative 2:

- Less capacity for outgoing LM traffic
- More suited to Wadsworth SB traffic movement to Waterton.
- Improves sight distance over Alternative 1.

Alternative 6:

- Minimized cut into hogback.
- One lane bridge; future for two lanes would need modifications. Costs assume one-lane, but bridge substructure could be designed for two lanes.
- A new Denver Water access further south would be okay with an appropriate design.
- Comment from Art - In the future, the EB to SB lane from LM could be the 2nd lane on Waterton.
- Denver Water comment – They would like a deceleration lane for SB traffic and a median turn for NB traffic into their facility. The SB deceleration lane could cause a weaving problem. In summary, eventually there would be turn lanes provided upon meeting warrants.

Alternative 8:

- This alternative is good for both LM and Waterton traffic.
- Floodpool impacts are very bad.



- Introduces left-side exits, but these only serve regular LM commuter traffic, so should not be a great problem.
- Bridge shadows LM exit to SB Waterton. This could add potential problems with roadway icing that do not exist today.

Alternative 9:

- Double lane right turns don't function well.
- This alternative introduces more traffic conflicts at intersection under bridge. A signal could be necessary.
- Floodpool impacts are very bad.
- Introduces left-side exits, but there only serve regular LM commuter traffic, so should not be a great problem.
- Bridge shadows LM exit to SB Waterton. This could add potential problems with roadway icing that do not exist today.

5. Present Alternatives Level of Service / Life Span / Updated Traffic Forecasts

Level of Service (LOS) of Alternatives

Steve Markovetz briefly discussed the life span of each alternative, and where the constricting points were located. A summary was provided in the Agenda package.

Updated Traffic Forecasts

Steve Markovetz gave an update on the traffic forecasts. A graphic was supplied which provided the updated 2030 Peak Hour Forecast. Since the Feasibility Study started, Sterling Ranch has completed their Traffic Impact Study which includes a proposed 11,000 homes. Additionally, Shea Homes has proposed 1,000. Both of these developments are in Douglas County, but are not yet approved.



- It was mentioned that this graphic should have a heading/title on it "2030 Peak Hour Forecasts". A note should be added that this is based on the build out of Sterling Ranch and Shea Homes, which is 12,000 dwelling units.
- It was also suggested that a new graphic be provided which has volumes without these developments, since they have not yet been approved. This will impact the split of the projected traffic leaving and entering from LM.

6. Present and Discuss Level 2 Screening Criteria

Chris Primus described the general screening process. In Level 1 we screened ten alternatives down to five. Today, during Level 2 Screening, we want to screen the five alternatives down to one final alternative. In Level 2 we use the same categories of criteria as we did in Level 1, but in Level 2 we have more detailed information for many of the criteria.

Chris presented a screening matrix for the Level 2 comparisons. The criteria of the matrix are grouped by category: Purpose and Need, Environmental, and ability to Implement. A score for each category is calculated, as well as an overall score. The different criteria are not weighted, but the matrix provides a common point of reference for comparing the five alternatives using the project purpose and need and goals.

Art Griffith (Douglas County) mentioned that he did not think we should score the No Action. He agreed that it must be considered, but a high score (based on no impacts) should not result in it being selected as the Preferred Alternative, since it did not meet the Purpose and Need of the project. From a NEPA viewpoint, the project must meet the Purpose and Need.

Chris quickly summarized the results for each category of screening.

Jim Clarke described in detail the 4(f) comparisons amongst the alternatives, using a supporting screening matrix for 4(f).



Dean described the pedestrian comparisons. In general, it is assumed the pedestrian improvements can be included with any alternative.

7. Select Preferred Alternative and Pedestrian Features

Chris Primus led the discussion, which began with some general discussions. Later, since time was short, it was decided we would just go around the table and let everyone give a brief summary of the alternative(s) they preferred, and why.

For starters, everyone agreed to remove Alternative 9.

Mike Bond (Colorado Trail Foundation) did not feel the Sterling Ranch development would take place since it has not yet been approved, and there was local opposition. He felt the No Action works well under the present circumstances.

Jon Chesser (CDOT) says that he takes a much different stance. Safety concerns at this intersection are warranted, and that is why the County has undertaken this Feasibility Study.

Steve Hersey (CDOT) did mention that a signal is not warranted at this location based on accidents, since there are only 4 accidents a year, and 5 are needed for a warrant. We do not have accident data for the last 2 years though, to see if the trend is changing.

Round the table comments, beginning with Brad Bauer of Jefferson County:

Brad (Jefferson County) mentioned that the County had met previously during the week, and they prefer Alternative 6, and would like to build it, but identifying sufficient funding is the problem the County faces. He also mentioned that they eliminated Alternative 2, since it was much more expensive than the other signal alternative, Alternative 1. The county did not like Alternative 9 at all. They felt that Alternative 1 works well for now. With Alternative 8, they were concerned with costs, the limitations on traffic volumes at the merge between Lockheed and Wadsworth, and the southbound conflicts with traffic turning from Waterton to Lockheed.



Amy Turney (Denver Water) likes Alternative 6; Alternative 8 is also OK. She did express concerns that at this time, not all the fine tuned details are known on the alternatives, and that her vote on 6 depends on whether impacts/mitigation to their access and utilities was similar for all alternatives, or were at least acceptable to them. She would like to see a layout without the roundabout. In addition, she would like to see an executive summary of the impacts.

Barry Schoger (Denver Water) also like Alternative 6, but was wondering why utilities were not in the Screening Matrix on this round. Dean indicated that per discussions with our utilities representative, the impacts for most alternatives were very similar since we were mainly filling. Note: This may be a concern at the proposed new parking lot though. At this location you can see a ground scar going up from the north end of the parking lot on the east side, which is the location of recently placed force mains¹.

¹Barry did call up later, and after thinking about it more he does prefer Alternative 1, but understands why Alternative 6 makes sense also. With Alternative 6 he has the following concerns:

- Footnote: Barry did call up later, and after thinking about it more he does prefer Alternative 1, but understands why Alternative 6 makes sense also. With Alternative 6 he has the following concerns: The security gate would need to be moved and there would be a cost associated with its move.
- If the Denver Water entrance is moved, and the underpass is built, there will be an additional conflict with their vehicles and path users.
- The addition of the new parking lot may result in more users on the Waterton Road Trail which is already packed, and would make it more difficult to Access Strontia Dam in a timely manner.
- Art Griffith (Douglas County) felt that Alternative 1 should be carried over because it is the most affordable. He does not think that Alternative 2 would meet everyone's goals, in particular Lockheed Martin. His preferred alternative is 6.



Carl Norbeck (Audubon) mentioned that their facility is open year around now, and they are experiencing much more use of their facilities, so impacts to parking would be a concern. He did like the separate left turn movement shown in Alternative 2 for southbound Waterton traffic. These improvements have not been included in Alternative 1. He did like Alternative 6 and the additional optional parking lot. For the alternatives that show a connection between their parking lot and the Waterton parking lot, he would like to make sure we design the connection and internal movement to accommodate the turning radius of a bus.

Ryan Eggelton (State Parks) generally had concerns that we address drainage problems correctly.

Mike Bond likes Alternative 1, and would like to see the 25 mph speed limit along Waterton Road maintained. He would like an at-grade signal crossing. He did not like the pedestrian tunnel option. He would like a solution that has the least visual impact. He thinks the growth projections in the area are over-stated.

Steve Hersey (CDOT Traffic) indicated he would echo what the county had indicated they would like. He would accept Alternative 1, and if money were not an issue he prefers Alternative 6 over Alternative 8.

Bob Geist (Lockheed Martin) felt meeting the Purpose and Need was more important than the cost. He prefers Alternative 6.

Unknown: Likes the north/south movement provided in Alternatives 2 or 6, even though we do not know when development will happen. He thinks Alternative 6 is the best to serve future growth.

Brad Bauer once again summarized the County's preference as being Alternatives 1 and 6, and their preferred alternative is 6 if they have the funding.



Jon Chesser agreed that Alternatives 1 and 6 were good. He felt Alternative 1 had less overall impact, but Alternative 6 was workable. He did mention that 4(f) impacts has a big part in the overall decision of the alternatives, but as long as the parties impacted (Corp, Denver Water, State Parks and Audubon) are in agreement of the Preferred Alternative, which it seemed they are, 4(f) should not end up driving the Preferred Alternative. Both Counties were happy to hear this. The fine details of mitigation could be worked out later, but could include the underpass, additional parking, and the decision of whether the adjacent parties want to build a wall (to minimize impacts) or flatter slopes.

Mike mentioned that we should do more to control speeds at Lockheed Martin, but others indicated it is a public roadway, so not much can be done except law enforcement. Art did agree that lower speeds would be good since it may be a while before we build anything.

At this point it was discussed if we should carry two alternatives forward to complete additional design and environmental work. This is not part of the scope of work with the County though, and Dean mentioned that Jacobs and the County would need to discuss this.

Jon basically indicated that it really looked like the conclusion we came up with today, and the conclusion that should be part of the Feasibility Study, was that Alternative 6 was the Preferred Alternative. Note: Jacobs agrees that the Feasibility Study should show Alternative 6 as the Preferred Alternative. Discussions will come later on how to proceed with the County.

Preferred Pedestrian Features:

Pedestrian Features had been discussed earlier throughout the agenda, and it was common consensus that the Roundabout was not the most effective solution. In general, everyone was in favor of the underpass, although the cost of \$150,000 was questioned. Dean mentioned that this cost was based on \$100,000 for concrete and steel for a 12' wide by 10' high by 64' wide box, plus \$50,000 for a culvert to drain the structure. Lighting, excavation



and other costs had not been included. It was mentioned that 12' clearance is recommended for equestrian usage, and many thought it should be wider. A portion could be paved, and a separate portion unpaved for horses².

Most thought the suggested additional parking lot would also be good, especially since the Audubon center is now open daily throughout the year, and there may be possible impacts to the existing lots, especially if the Audubon traffic travels through it. The cost for 6" of aggregate for the lot is estimated to be about \$35,000. There is no cost for excavation, since embankment material is needed for the project, and it does help in attaining the earthwork balance required for the Chatfield Flood Pool².

8. Plan Future Meeting Dates

If and when we should hold the next open house was discussed. The purpose of the Open House would be to present the Preferred Alternative. It was common consensus that an Open House should not be held with two very opposing alternatives. Comments from the first Open House were split fairly evenly between, do as little as possible (Alternative 1), or build an alternative that would meet the future corridor needs (Alternatives 6 or 8).

We then discussed if we should set up the next meeting, but a final decision on whether to have an open house, or where we were going from here needed to be discussed with the County first. Jeanie Rossillion felt the County would need to sit down and talk prior to making a final decision.

² Note: A total of \$300,000 (\$150,000 for the roundabout, and \$150,000 for the underpass) is included in the current estimate for pedestrian features, which may alleviate some of the above concerns on low costs. The 30% contingencies identified will effectively raise this total to \$400,000 included in the current estimate.



Action Items

- Determine the design speed of the existing curve with a 4% maximum super rates.
 - After the meeting, Jacobs looked at page 167 of the 2004 AASHTO Green Book, and for a maximum super of 4% and a 745' radius, the design speed of this curve would be 45 mph, and the posted speed would be 40 mph. For Alternatives 6, 8 and 9 it may be possible to save dollars by not reconstructing this curve.
- Amy would like to see an executive summary of the impacts to utilities.
- The main Alternative Screening needs to be updated and sent out again. Alternative 2 under Bike/Pedestrian should be rated Well/High (4 points).
- The new traffic graphic should have a heading/title on it "2030 Peak Hour Forecasts". A note should be added that this is based on the build out of Sterling Ranch and Shea Homes, which is 12,000 dwelling units.
- It was also suggested that a new graphic be provided which has volumes without these developments, since they have not yet been approved. This will impact the split of the projected traffic leaving and entering from LM.
- Jacobs and the County need to meet to decide how the Jacobs team should proceed at this point.

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Minutes\Stakeholder Meeting #5\060409 Meeting Minutes Stakeholder Meeting #5.doc



Level 2 Section 4(f) Least Harm Analysis June 4, 2009



South Wadsworth/ Waterton Road Intersection FEASIBILITY STUDY											
Alt. #	Alternative Name	4(f) Acreage Impact	4(f) Features Impacted	Ability to Mitigate Adverse Impacts to 4(f) Property	Relative Severity of Remaining Harm to Protected Activities After Mitigation	Views of Officials with Jurisdiction	Degree to which Purpose and Need is Met	Magnitude of Any Adverse Impacts to Other Environmental Resources	Cost	score	
Section 4(f)											
	No-Action Alternative	0	Pedestrian , Bicyclist, and vehicle access and safety	○	○	●?	●	○	○	23	○
1	Signal	0.16	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (minor)	○	○	○?	●	○	○	25	○
2	Lockheed T & Signal	0.53	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (moderate)	○	○	○?	●	●	●	20	●
6	Grade Separated Southbound Wadsworth	1.28	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (moderate), aesthetics (moderate), Audobon access	●	○	○?	○	●	●	20	●
8	Grade Separated NB Wadsworth, Waterton through	3.01	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (moderate), Audubon access, aesthetics (moderate)	●	●	○?	○	●	●	15	●
9	Grade Separated NB Wadsworth, Lockheed through	3.13	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (major), Audubon parking and access, aesthetics (moderate)	●	●	○?	○	●	●	15	●
Other Features	Roundabout	1.01-1.11	Passive Recreation Land (adjacent to existing transporation corridor), vegetation (minor), Waterton parking and access	●	●	○?	○	○	●	21	○
	New Parking	1.14	Passive Recreation Land (not adjacent to existing transporation corridor), visual (moderate), vegetation (minor)	●	●	○?	○	○	●	20	●
	Ped Crossing	0.09	Passive Recreation Land (adjacent to existing transporation), vegetation (minor)	○	○	○?	○	○	○	28	○

Level 2 Alternatives Screening Revised June 11, 2009

South Wadsworth/
Waterton Road Intersection
FEASIBILITY STUDY

Alt. #	Alternative Name	Traffic Congestion (When Level of Service become "D")	Road Deficiencies	Intersection Safety	Bike/Pedestrian Safety	Access	Accommodates both LHM Wads and Wads/Water Thru	Floodpool (Embankment Required - 1000 CY)	Water Resources	Visual - Has context with Environment	Accommodate Long Range Plans/ Not preclude capacity	On Road Bicycle Accommodation	Purpose and Need Total	Environmental Total	Implementation Total	Overall Total
		Purpose and Need						Environmental			Implementation					
	No-Action Alternative	●	●	●	●	●	○	○	○	○	●	○	8	19	14	41
		NA														
1	Signal	●	○	○	●	●	○	○	○	○	●	○	12	16	12	40
	2015-2020						20			\$3.3						
2	Lockheed T & Signal	●	○	○	○	○	●	○	○	○	○	○	20	11	11	42
	2015-2020						110			\$7.6						
6	Grade Separated Southbound Wadsworth	○	○	○	○	○	○	○	○	○	○	○	22	10	12	44
	2025-2030						89			\$11.1						
8	Grade Separated NB Wads, Waterton through	○	○	●	○	○	●	●	●	●	○	○	23	7	10	40
	2025-2030						133			\$15.2						
9	Grade Separated NB Wads, Lockheed through	○	○	●	○	○	●	●	●	●	○	○	18	7	7	32
	2020-2025						134			\$13.9						

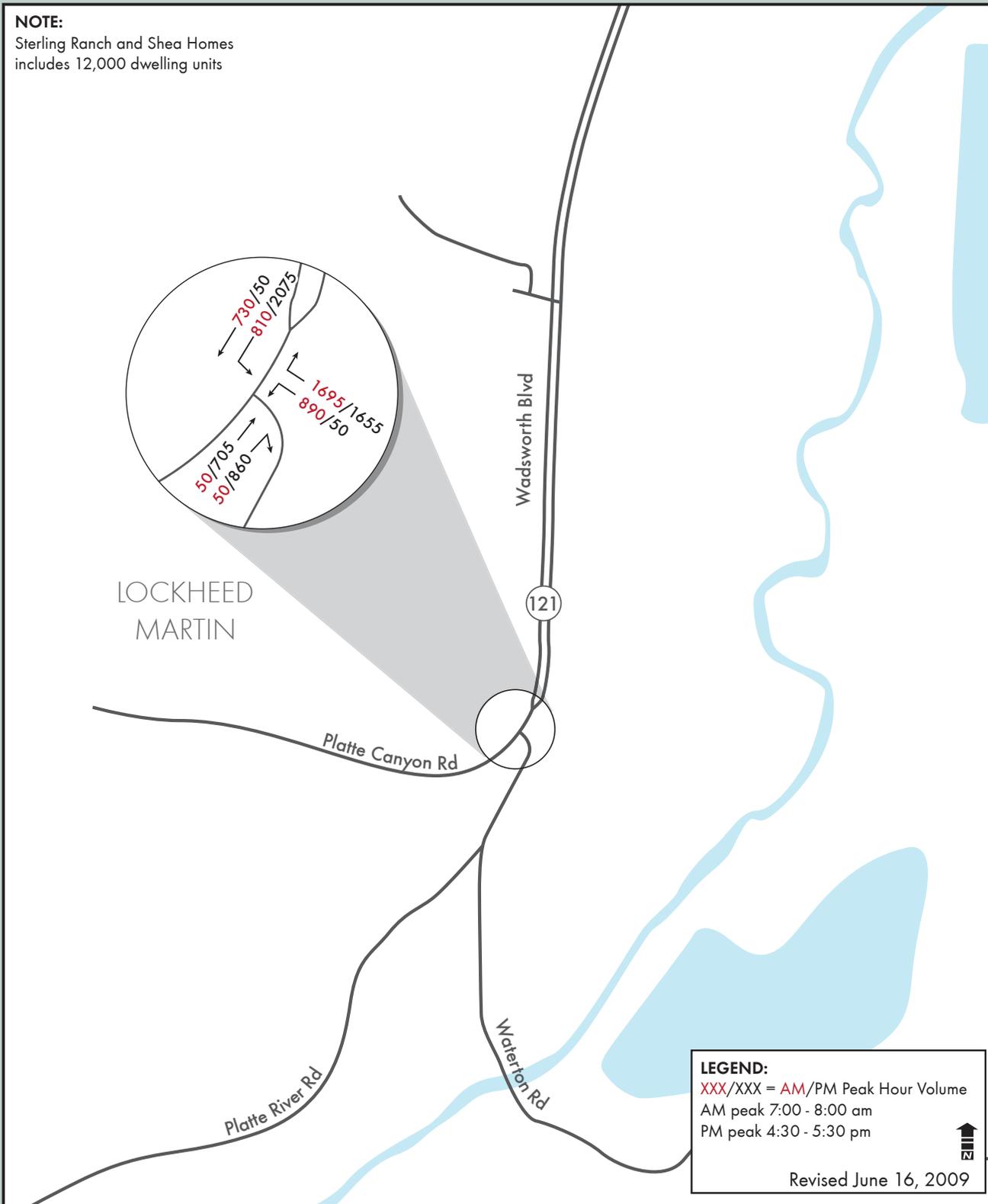
KEY

Meets Criterion/Impact

- Very Well/Very High(5)
- Well/High (4)
- Average (3)
- Somewhat/Low (2)
- Not at All/Very Low (1)

NOTE:

Sterling Ranch and Shea Homes includes 12,000 dwelling units



Level 2 Pedestrian Alternatives Screening June 4, 2009

South Wadsworth/ Waterton Road Intersection FEASIBILITY STUDY					
Alternative Name	Safety	Cost (\$1,000)	Life Span Effectiveness	Maintenance	Total
No Improvements	●	○	●	○	12
Raised Median	●	⊙	●	⊙	13
		\$30			
Roundabout	●	●	●	⊙	11
		\$150			
Underpass	○	●	○	●	15
		\$150			
Parking Lot	●	⊙	⊙	●	12
		\$35			

Note: Costs for roundabout are only for paving and are comparatively low

Note: The Parking Lot only provides safer access to Colorado Trail users

KEY
Meets Criterion/Impact

- Very Well/Very High(5)
- ⊙ Well/High (4)
- Average (3)
- Somewhat/Low (2)
- Not at All/Very Low (1)

Evaluation Criteria Definitions

The Level 2 Screening continues evaluating the remaining 5 alternatives against screening criteria developed based on the project purpose and need, project goals, and other concerns identified. The Level 2 evaluation involves a more detailed comparison between alternatives, using information that has been calculated or evaluated to provide more specific measurements. This approach will guide the team in the selection of the preferred alternative.

Criteria used in the Level 2 Screening, and their definitions, include:

Traffic Congestion

Local mobility is hampered and travel times reduced by congestion, roadway design, and safety issues at the intersection. The South Wadsworth/Waterton Road intersection is approaching capacity and congestion occurs during peak travel times. Much of the weekday traffic occurs over a few hours in the morning and afternoon, when Lockheed Martin's employees are arriving to or leaving work. Traffic leaves Lockheed Martin (LM) in the evenings roughly when southbound traffic on Wadsworth Boulevard peaks, complicating left turns onto Waterton Road.

Sterling Ranch has recently completed their traffic impact study. Based on their growth projections, we can expect traffic through this intersection to approximately triple by Year 2030.

This criterion measures the ability of the alternative to:

- Address travel demand needs
- Provide acceptable traffic operations
- Provide a Level of Service (LOS) better than "D", which is considered the failure threshold.

For evaluating the Level 2 Alternatives, we analyzed when each alternative (as drawn) would fail with a Level of Service "D". The results were as follows:

- The No Action has a current LOS F for the southbound left turn onto Waterton in the PM, and the left turn off Waterton to LM in the AM. This was prior to the signal timing in LM being changed.
- For Alternative 1, the signal reaches LOS D by 2015-2020 in the PM peak, with the left turn to Waterton being the critical move.
- For Alternative 2, the signal reaches LOS D by 2015-2020 in the PM peak, with the southbound through lane being critical.
- For Alternative 6, the intersection reaches LOS D by 2025-2030, with the left turn from Waterton towards LM being critical. The southbound diverge point where the flyover begins reaches LOS D in the same timeframe.
- For Alternative 8, the intersection reaches LOS D by 2025-2030, with the unsignalized left turn from Waterton towards LM being critical. Creating a good long term solution for this turn is difficult for Alternative 8 without introducing a signal that would impact southbound Wadsworth to Waterton



traffic. Based on this factor, this alternative will be rated lower than Alternative 6. The southbound diverge point before the intersection is also a LOS D in the same timeframe.

- For Alternative 9, the intersection reaches LOS D by 2020-2025. with the left turn to Waterton being the critical move. The difference between the impact with this alternative and Alternative 1 is that the flyover removes the conflict with the LM northbound traffic, which extends its useful life.

Roadway Deficiencies

Sight distances are limited from all directions, reducing decision times for motorists. Also, roadway grades approaching 8% exist on South Wadsworth Boulevard near the Lockheed Martin guard gate. Severe weather exacerbates problems caused by these steep grades in the intersection area. In addition, the curve superelevation approaching LM ranges from 2% to 5%, which greatly reduces the Design Speed through this curve, and does not meet standard.

This criterion measures the ability of the alternative to:

- Correct and improve existing design standards.
- Ability of the alternative to maximize the design speeds for through movements.
- Reduce grades on reconstructed roadways to less than 4%.

While all the alternatives will correct design obvious design deficiencies, this criterion will measure the extent to which they are improved:

- Improve sight distance and sharp mainline curves. For example, Alternatives 1 and 9 still would have a 15 mph curve into Wadsworth.
- Minimizing roadway grades approaching or over the intersection. For example, Alternative 6 would require steep grades for the SB flyover.

Intersection Safety

The congestion and roadway deficiencies problems discussed above combine to create safety issues. For the existing intersection, the heavy exit hours from Lockheed Martin result in steady traffic streams with few 'gaps'. Queued southbound drivers on South Wadsworth Boulevard can become impatient and try to make it through these small gaps. The signals in Alternatives 1 and 2 do mitigate some of the turning queue problems, but introduce additional rear end collisions which are more frequent than reported. Injuries related to rear end collisions also are usually more severe than expected, since symptoms do not show up immediately.

This criterion measures the ability of the alternative to:

- Improve traffic safety conditions at the Wadsworth and Waterton intersection.

While all the proposed alternatives correct some of the existing safety issues, each has new unique safety considerations:

- Unimpeded movements offer a safer design than signalized or stop condition movements. Alternatives 6 and 8 meet this best.

- From LM, the left hand diverge ramp for a right turn is unconventional, but most users are from LM and will adapt (Alternatives 8 and 9). Of greater concern is that this roadway will be shaded by the new ramp, and may result in new icing problems on the existing steep grades.
- All the alternatives will have the left hand merge entering LM.
- The relative safety of the left turn from Waterton Road to Lockheed will be considered. The signalized intersections in Alternatives 1 and 2 create the safest condition for this movement, and Alternatives 6, 8 and 9 become steadily worse in that order based on the following conditions being rated poorly:
 - Unimpeded SB through movement on Wadsworth
 - Number of through or turn movements competing at the turn.
 - Traffic volumes of the competing movements.

Bike/Pedestrian Safety at Parking Lots

Several educational and recreational facilities exist within the study area. These include: the Audubon Center; Kassler Center for Environmental Education; Chatfield State Park, Waterton and Colorado trailhead parking; the South Platte River; and recreational trails and picnic areas on Denver Water Board property. The amenities are located on the east and west sides of Waterton Road and generate considerable cross-traffic. For example, Colorado and Waterton trail users park on the east side of Waterton Road, then use an at-grade pedestrian crossing to access the Colorado Trail on the west side. Also, school buses often park in the Waterton Trail parking area, then students will cross Waterton Road to access educational programs at the Kassler Center.

These movements have led to conflicts between motorists, bicyclist, and pedestrians, especially during heavy travel times. These safety issues would worsen with projected traffic increases.

This criterion measures the ability of the alternative to:

- Reduce potential conflicts between motorists, pedestrians and bicyclists;
- Improve overall safety of pedestrians and bicyclists; and
- Improve pedestrian and bicycle facilities.

Since the Level 1 Screening, a decision has been made to address bike/pedestrian safety at the existing bike/ped crossing over Waterton Road to the Colorado/Waterton Canyon trail. For Level 2 evaluation, see the separate evaluation criteria for recommended solutions. Only the No Action and Alternative 1 do not address this issue.

Access

There is a lack of access control in the vicinity of the intersection. Several access points exist off of Waterton Road into the Audubon Center, Waterton Trail parking, and Kassler Center. Motorists, including school buses, traveling southbound on Waterton Road make left turns into the Audubon parking area have no turn lane, limited sight distance, and steep grades on the gravel access to the parking area. Exiting vehicles have traction problems.



Access control needs to be improved, to allow safe and intuitive access to the variety of activity points in the area.

This criterion measures the ability of the alternative to:

- Improve access control along Wadsworth and Waterton roadways.
- Provide efficient access to and between Chatfield State Park, Audubon Center, the Kassler Center, Colorado Trailhead parking, and other activity points.

Evaluating the Level 2 alternatives against this criterion included considering:

- Providing additional separated turn lanes to improve access.
- Maintaining the Audubon access at its current location with a southbound median turn lane (Alternative 2).
- Ability to provide a new full turn access movement to replace the existing Denver Water access.

Notes:

- Where the roundabout is shown, a southbound median left turn into the Waterton parking lot can be provided instead.
- If a roundabout is not built, the current access location to the Denver Water road will be maintained. Alternative 6 will not allow for a full access because of the grade separation in the northbound and southbound Waterton roadway.

Accommodates both LM/Wadsworth and the Wadsworth/Waterton Through Movement

The traffic needs at this intersection are unique. Currently the high volumes are to and from LM to the north. As Douglas County growth continues to occur (particularly at Sterling Ranch), the major traffic movement and needs will shift to the Wadsworth/Waterton Road legs of the intersection.

This criterion measures the ability of the alternative to accommodate both the current and future needs of the intersection effectively:

For evaluating the Level 2 alternatives, the alternatives that allow free flow for both movements will receive the highest rating. Alternatives which will require slowing or stopping of traffic on either or both of the major legs will rate lower.

Flood Pool

Much of the study area is located on Corps of Engineers (COE) property and resides within the Chatfield Flood Pool. Any construction activities would need to meet the COE's land development policies pertaining to the flood pool. Perhaps the most important requirement for this study is potential loss of flood pool storage. All cut and fill needs to be balanced within each separate elevation zone.

This criterion measures the ability of the alternative to:



- Avoid, minimize, or balance cut and fill in the COE's flood pool areas.

For evaluating the Level 2 alternatives, the volume of new fill as shown in the cost estimates was used. It should be noted though, that a portion of these fills may be above the Chatfield Flood Pool. For example, for the overpass alternatives the new grade is 28' above the existing roadway at the intersection, but only the bottom 8' would be within the flood zone. This difference in volume has not been calculated.

Section 4(f) Resources

Section 4(f) protects certain recreational properties as well as historic properties on or eligible to the National Register of Historic Places. Much of the study area contains recreation areas, some of are or may be protected by Section 4(f) regulations.

The study team has been coordinating with FHWA in an attempt to determine the exact limits of Section 4(f) recreational property. However, in lieu of pending 4(f) determinations from FHWA, some assumptions have been made on 4(f) applicability. For purposes of the Level 2 Screening, Chatfield State Park and several historic resources which exist in the study area are deemed Section 4(f) resources. The historic resources include the Kassler Center, built in 1905, and the Last Chance Ditch. The Audubon Center facility might also be deemed as historic as part of the Section 106 process currently underway. The screening also assumes all land owned by the Water Board as Section 4(f). However, property to the west of South Wadsworth Road leased by the Denver Botanic Gardens is assumed not to be a 4(f) property.

This criterion measures the ability of the alternative to result in the 'least harm' to Section 4(f) resources, considering the use of probable mitigation measures. Due to the importance of Section 4(f) with regard to the alternatives screening, a separate least harm analysis was prepared (see screening matrices). In cases in which all prudent and feasible alternatives make use of land that is deemed a Section 4(f) resource, the selected alternative must be the one that results in the 'least harm' to Section 4(f) resources. As directed by USDOT regulations, this is determined by balancing the six factors, shown in the separate matrix entitled Section 4(f) Least Harm Analysis. The Section 4(f) ratings applied in the summary matrix represent the results on the least harm analysis.

Water Resources

This criterion encompasses effects to floodplains, surface water bodies, wetlands, and water quality. Much of the study area is included in the 100-year regulatory floodplains for the South Platte River and Brush Creek. Floodplain regulations can be met with proper hydraulic analysis, engineering design, and avoidance measures, but the presence of floodplains can influence the alternatives. For example, raising the profile for Waterton Road to span South Wadsworth Boulevard would require fill material, which could pose a floodplain issue. A field review indicated that near the South Wadsworth/Waterton intersection, wetlands are mostly confined near and within the Brush Creek channel.

This criterion measures the ability of the alternative to:

- Avoid and minimize wetlands/waters impacts;
- Avoid and minimize water quality impact; and
- Avoid and minimize floodplain impacts.

Visual Impacts

Currently the study area resides in an environment where park users enjoy the rural context of the area. Wildlife, bird watching, hiking, horseback riding and fishing are just some of the amenities the area offers. This is slowly being impacted by growth in nearby Douglas County. Many attendees of the open house stressed that they wanted a solution that had minimal footprint or visual impacts.

This criterion measures the ability of the alternative to:

- Minimize the project footprint.
- Maximize the ability of the alternative to blend into the existing environment.

For Level 2 screening, the following will be considered:

- The project footprint
- Visual impacts such as
 - Visibility of retaining walls
 - Visibility of bridge structures
 - Cut into the existing hillside west of Wadsworth

Cost

Alternatives will be evaluated based on their relative cost.

Accommodate Long Range County Plans/Not Preclude Capacity Needs

Douglas County's long term plans call for widening of Waterton Road to accommodate future travel capacity needs. While this study would only address existing safety and operational issues, the criterion measures the alternatives' relative ability to provide flexibility for future expansion of Waterton Road to four lanes with a median.

Considerations in evaluating this criterion included:

- Can the alternative be readily adapted to provide a 4 lane connection from Wadsworth to Waterton Road
- The effectiveness of this movement – are there signals or right angle turns.



Adjacent Land Use During Construction

As mentioned above, the study area contains many recreational and educational amenities. It also includes the Lockheed Martin property, an access-restricted facility, and COE property used for flood control.

This criterion measures the ability of the alternative to:

- Minimize disruption to adjacent land uses, including large utilities
- Minimize traffic impact during construction (for instance number of phases)

On-Road Bicycle Accommodation

This intersection is heavily used by bicyclists, who traverse it as part of the Wadsworth / Roxborough / Chatfield Park loop ride. The left turn from Wadsworth Boulevard to Waterton Road is considered as one of the most dangerous for bicyclists to execute in the area, especially during peak hours. Also, many cyclists park here to access Deer Creek Canyon Road instead of in the Chatfield Park area, since there is no Park use fee.

This criterion measures the ability of the alternative to:

- Minimize the need for cyclists to cross lanes of traffic traveling at high speed.
- Minimize unsignalized conflicts points with other motorist.
- The criterion also considers the extent to which cyclists would be exposed to wind gusts from elevated roadways.

Notes regarding the Level 2 alternatives include the following:

Alternative 1- Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed Lockheed bound traffic to join a turning lane of queued vehicles.

Alternative 2 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of Lockheed bound high speed traffic.

Alternative 6 - Requires bicyclists southbound from Wadsworth to LM to make the crossing of Waterton bound lane of high speed traffic. Requires Waterton bound bicyclists to climb 5% plus grade to an exposed overpass where gusting winds are common.

Alternative 8 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed LM bound traffic. Requires bicyclists northbound from Waterton to Wadsworth to make the crossing of two lanes of high speed ramp traffic NB from LM.

Alternative 9 - Requires bicyclists southbound from Wadsworth to Waterton to make the crossing of two lanes of high speed LM bound traffic. Requires bicyclists northbound from Waterton to Wadsworth to



make the crossing of two lanes of high speed ramp traffic NB from LM. Northbound LM cyclists will also be on an exposed overpass where gusting winds are common.

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Revised Minutes – July 28, 2009

Topic: Stakeholder Team Meeting #6
Date: July 16, 2009
Time: 9:00 to 12:00
Location: Kassler Center at Waterton
Attendees: See Attached

1. Welcome/Introductions

Dean Van De Wege welcomed everyone, gave a brief summary of our goals for the day, and self introductions were made.

2. Review Remaining Action Items from Last Meeting

Request for Utility Executive Summary from Denver Water

Included in the Agenda was a 4-page Preliminary Technical Memorandum of potential utility conflicts. Jim Mills gave a summary of affected utilities within the project limits and a rough order of magnitude on the costs associated with potential relocates or adjustments.

- The proposed parking lot on the west side of Waterton Road as it is shown will have a significant impact to the existing sewer force mains. To avoid these costs, Jacobs will look at parking to either side of these sewer lines.
- Jacobs will need utility service locations for the Audubon building.

Jefferson County was to have Internal Meeting to Determine Project Direction with Alt 6

- Brad Bauer presented Alternative 6 to the Board of County Commissioners on July 14. As a result of this meeting, County staff was directed to proceed with preliminary and final design on Alternative 6. The current contract is through preliminary design only.



- Funding for this project has been applied for, but it will not be known for 18 months whether or not it gets funded. The primary reason for the delay is that the old highway bill, which is SAFETEA-LU, is being extended for 18 months instead of being replaced with a new bill.

3. Summary of Meeting with FHWA on July 13

Dean gave an update on the meeting FHWA.

- The project will most likely fall under a programmatic or de minimis clearance, since 4f impacts are small compared the areas large resources.
- FHWA will make the final determination on whether the project can be non-programmatic, with SHPO and CDOT HQ providing input
- Environmental clearance of the upper half of Form 128 will be necessary to obtain ROW.
- Preliminary indications are this project can be a Documented CatEx.

4. Roadway Design Element

Typical Section

The Typical Section being used by Douglas County was used as a guide for discussions. The following standards were selected:

- 11' lanes will be used to help slow traffic.
- We are to design to accommodate an ultimate 4-lane section.
- An 18' median (lip to lip) will be used. Use 1' catch pan on median curb and gutter. For clarification, the pans are included in the 18'.
- 4' paved shoulders
- Estimated ROW needs are about 110'.
- A normal crown section will be used on Waterton Road (no supers).



Interim roadway section:

- 11' lanes (1 each direction)
- 18' median (lip to lip)
- 5.5' paved shoulder – This will result in a pavement joint in the middle of the lane for the future 4-lane section.
- Turn lanes will also be 11'.

Other Roadway Design Element Comments:

- The ultimate roadway section will be designed to hold the existing edge of pavement on the west side of Waterton Road to eliminate any impacts to the historic Kassler site (all widening will be to the east). The interim Waterton Road alignment will be built to the ultimate centerline. A redirect shift in the pavement section will bring the proposed road back to the existing alignment before the curve to Platte River bridge to the south. The Jefferson County would like Jacobs to submit an alignment and profile of this layout before proceeding with preliminary design. Art mentioned that building the roadway this way may also help in phasing traffic through the site during construction.
- After much debate it was decided that a 30mph (design)/25mph (posted) speed would be used for Waterton Road. The overpass will be 35mph (design)/ 30mph (posted). Although tighter radius curves will be used, adequate sight distance will still be maintained for drivers approaching the parking and pedestrian areas.
- It was suggested that incorporating rumble strips into the tangent section prior to the parking entrance may help slow traffic for pedestrians or equestrians crossing the road.
- It was suggested that an at-grade crossing should still be provided for equestrian use.



- Douglas County would prefer 12 inches of ABC under the asphalt pavement because of swelling soils. Jefferson County would prefer to go with the geotechnical recommendation. The chance of swelling soils should be discussed with them.
- It was discussed if we should use 2:1 or 3:1 slopes between proposed walls and roadway. Jacobs will determine based on savings in wall height and ROW constraints. In general, a 2.5:1 slope was mentioned as a possible compromise since it has been used on other similar projects.
- For the future 4-lane section on Waterton, Jacobs wanted to know how to address that we would have a 4-lane section where NB Lockheed Martin (2-lanes) meets the NB Waterton Road (2-lanes). This connection detail really does depend on development that happens in the future, and one solution may be that the left lane actually becomes the access to LM and ends there.
- Lockheed Martin agreed that they could shift their trucks to the inbound lanes of Wadsworth when transporting large loads out of the plant. This would allow the bridge clearance to be reduced to 18' at the south end of the bridge while still providing 20' or more clearance at the north end over the inbound lanes. The ultimate design would need to accommodate this crossover to the North on Wadsworth.
- We discussed the acquisition of ROW for the ultimate section. Per Chris Horn of FHWA, this can't be done under this project.
- We also discussed the approach for the Documented CatEx clearance for the project. In general, the focus will be on project mitigation rather than minimizing impacts.

Access Issues:

The Denver Water Board prefers the option of the north access road to their property. The south entrance has numerous sharp curves, and if used these curves should be reduced or eliminated. The driveway needs to accommodate a 70' long crane (turning radius 75'). In reality, the location where the underpass can be built to avoid utilities may drive the location of the access road. Audubon also prefers the northern access between the parking lots.



A secondary concern is the impact to Last Chance Ditch with either the access road or underpass. A better understanding of how we can impact this ditch is needed.

Value Engineering Alternative:

Jacobs Engineering had a group of engineers look at the proposed Alternative 6 from a Value Engineering perspective. Suggestions were made that could possibly reduce the overall cost of the alternative.

Dean presented this new alignment at the Stakeholder Meeting. The proposed changes include the following:

- Straighten the roadway alignment for the flyover
- Move the alignment into the hillside to the north of the intersection, and separate it from the NB roadway south of the intersection. This was done to reduce the possible high cost and maintenance of walls.
- Adjusting the location and length of the bridge over Wadsworth could eliminate the need for a new box culvert for Brush Creek under Waterton Road, or its connection to the existing bridge structure on Lockheed property. Jacobs will investigate the condition of the existing 3-72" culvert pipes to determine if they can be extended.
- Have the flyover bridge span Brush Creek, eliminating the need to connect it to the Lockheed Martin bridge.

Jefferson County would like to see a blend of this alignment with the original Alternative 6 layout. They would like the design to include 25mph curves in the roadway to help slow traffic. They would also like to shift the overpass to west to help reduce wall lengths and heights.

In order for Jefferson County to make the final decision on the original Alternative 6, or the Value Engineering Alternative 6, they would like to see the following:

- They would like to see the pros and cons of each alignment.



- At the top of the Value Engineering Review sheet, a quick comparison of additional costs and savings were presented. Jefferson County would like an updated cost estimate for both alignments. These estimates should have the same level of detailed analysis.
- They also want to know if blasting may be needed if we excavate into the hogback.

Other discussion items:

- The grades should not be steeper than those shown on the original Alternative 6.
- For the Brush Creek drainage, they would like to know the condition of the existing culverts under Waterton Road to determine if it would be best to extend them or replace with a new CBC structure. There are 3-72" culverts now, and the proposed box is 24' wide.

Trail Design & Location:

It was decided that the pedestrian trail will be 10 feet wide with additional 2' shoulders when it is adjacent to retaining walls.

The pedestrian underpass will be 10 feet high by 20' wide. A 20' long portion of the trail will taper from the 10' trail to the 20' underpass at each end of the underpass to allow for clear sight lines for bike riders and pedestrians. The trail is not intended to accommodate equestrian users, since most said they would not use it anyway. Jacobs will look at skewing the crossing under Waterton Road and shifting it to the north to avoid utilities and the Last Chance ditch.

It was agreed that more research needs to be completed to find out exactly what can be done with the Last Chance Ditch if there is a conflict. David Singer is the CDOT contact.

The trail out of the underpass back up to existing ground will be designed per the current ADA requirements and will also include stairs. The east end of the trail will connect to the current parking lot as well as the proposed drive to the Audubon parking area.

The issue of draining the underpass via gravity outfall or pumps still needs to be determined.



A location for an at-grade crossing will be determined as the design progresses based on the driveway and pedestrian underpass locations.

Additional Parking Location:

The Denver Water Board would prefer not to have the proposed parking lot constructed as shown in the alternative. The concern they had were potential additional conflicts of pedestrian and maintenance vehicles if this lot was built.

Jacobs will refine the design to avoid the sanitary sewer force mains for future discussion.

The existing parking lot will be impacted with the Waterton Road widening occurring to the east. Jacobs will look at how the lot can accommodate the parking spaces lost to the roadway widening as well as any additional spaces.

This new parking lot has been considered as an environmental mitigation feature for the project, which offsets the impacts.

The restroom facility near the existing parking lot can be relocated if necessary.

Bridge Width:

The bridge over Wadsworth Blvd. can be designed and built as a 2 lane structure and still meet CatEx. It will be striped as 1 lane for the interim condition.

Douglas County would like to see terracing if the fill slopes are 30 feet or higher.

Field Visit:

About half way through the meeting, a field visit was conducted on Waterton Road between the Kassler Center and the current Denver Water maintenance entrance. The following were some discussion items which have not been mentioned earlier:



- The alignment of the existing road towards the Platte was observed, and discussions included how we could tie into the existing road.
- The location of the future road Centerline was visually shown, giving a better idea of impacts to the existing parking and structures by the Waterton Parking lot.
- Possible alignments of the underpass were observed in the field.
- A smaller group inspected some standing pipes, and discovered another underground storage tank that is probably connected to conduit No. 133. This tank will impact either of the current underpass alignments.
- The Last Chance Ditch channel was identified and discussed.

Action Items

- Last Chance Ditch – Roadway widening, and access and underpass alternatives have varying impacts to Last Chance Ditch. Jacobs will contact SHPO and work with Dave Singer of CDOT to determine what, if anything, needs to be done to mitigate any impacts to the Last Chance Ditch.
 - Follow up - It should be noted that Last Chance Ditch has been relocated since 1972 through the project area. Our historian indicates that little tweaks in the alignment do not impact its historic status, and the ditch has an officially eligible determination. We are currently revising the underpass and access locations, and these changes impact its original alignment more than its current alignment. Jacobs will continue to pursue impacts and required mitigation with SHPO.
- Jacobs will provide an updated Value Engineering Solution to compare with the original Alternative 6 drawing. Updated costs and pros and cons will be provided Jefferson County for review.
- Check with Yeh and Associates to see if swelling soils are present, which may require additional subgrade.



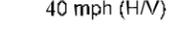
- Follow up with Yeh – This site consists of alluvial materials, which do not swell. They will check the hogback bore to see if it has swelling soils.
- Check with Yeh and Associates to see if any cuts in the hogback are expected to require blasting.
- Jacobs will investigate the condition of the existing 3-72" culvert pipes to determine if they can be extended.
 - From pictures, these pipes are concrete and appear to be in very good condition. A design flow year will be provided to see if this could be a cost reducing idea.

J:_Transportation\072695 Waterton Canyon\manage\Meeting Agendas & Minutes\Stakeholder Meeting #6\071609 Meeting Minutes Stakeholder Meeting #6.doc



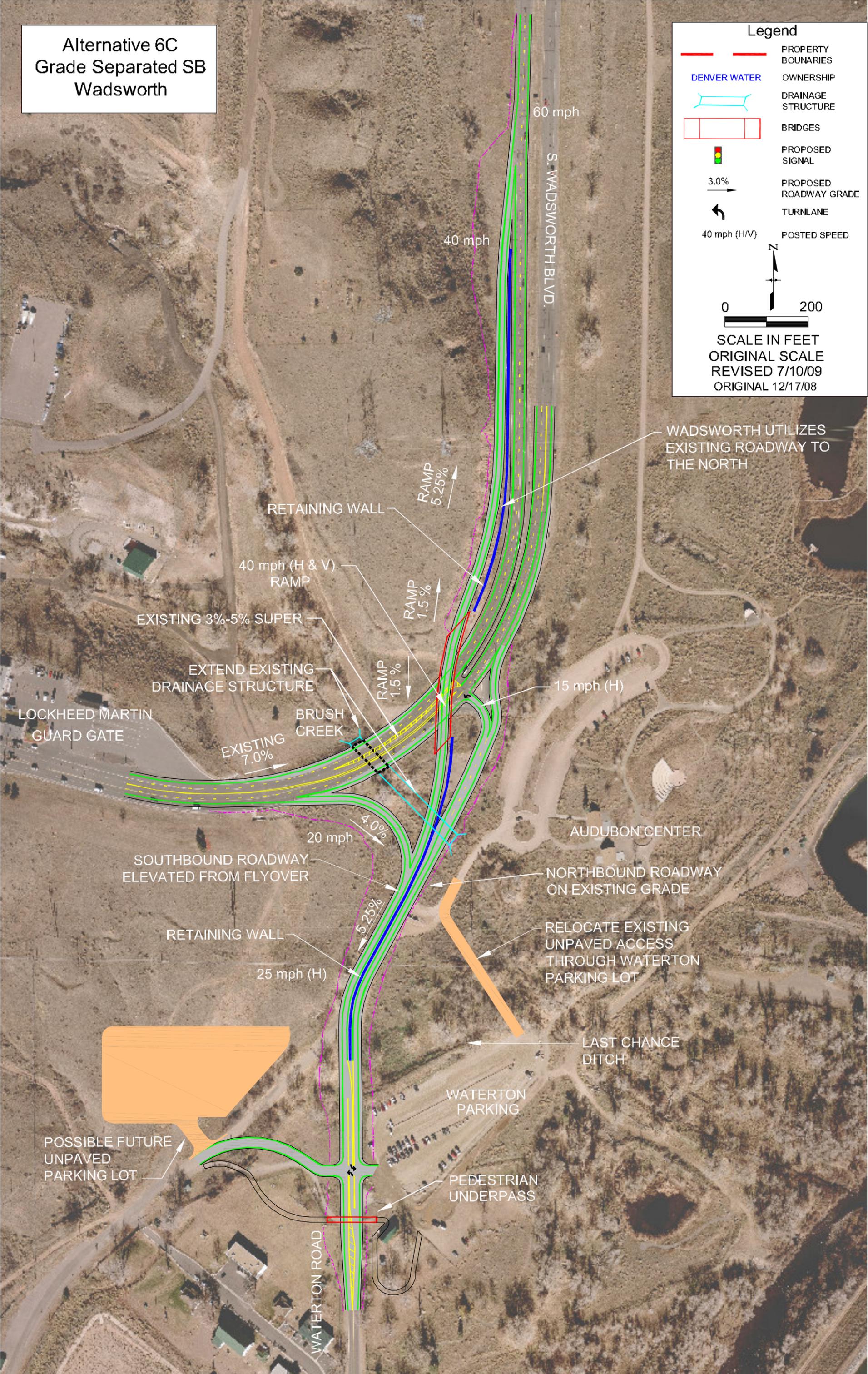
**Alternative 6C
Grade Separated SB
Wadsworth**

Legend

-  PROPERTY BOUNDARIES
-  DENVER WATER OWNERSHIP
-  DRAINAGE STRUCTURE
-  BRIDGES
-  PROPOSED SIGNAL
-  PROPOSED ROADWAY GRADE
-  TURNLANE
-  POSTED SPEED



 SCALE IN FEET
 ORIGINAL SCALE
 REVISED 7/10/09
 ORIGINAL 12/17/08



WADSWORTH UTILIZES EXISTING ROADWAY TO THE NORTH

RETAINING WALL

RAMP 5.25%

40 mph (H & V) RAMP

RAMP 1.5%

EXISTING 3%-5% SUPER

EXTEND EXISTING DRAINAGE STRUCTURE

RAMP 1.5%

15 mph (H)

LOCKHEED MARTIN GUARD GATE

BRUSH CREEK

EXISTING 7.0%

AUDUBON CENTER

20 mph

SOUTHBOUND ROADWAY ELEVATED FROM FLYOVER

NORTHBOUND ROADWAY ON EXISTING GRADE

RETAINING WALL

RAMP 5.25%

RELOCATE EXISTING UNPAVED ACCESS THROUGH WATERTON PARKING LOT

25 mph (H)

LAST CHANCE DITCH



POSSIBLE FUTURE UNPAVED PARKING LOT

WATERTON PARKING

PEDESTRIAN UNDERPASS

WATERTON ROAD

60 mph

40 mph

S. WADSWORTH BLVD.

3.1 Design Criteria

The design criteria used for developing the Waterton Canyon trail alternative follows AASHTO's *Guide for the Development of Bicycle Facilities (1999)* and *ADA Standards for Accessible Design (28 CFR Part 36, revised July 1, 1994)* issued by the Department of Justice. This trail is classified as a shared use two-way facility, which means that the users are non-motorized and may include but are not limited to, bicyclists, in-line skaters, roller skaters, wheelchair users, walkers, and runners. The trail is designed for two-way traffic.

Tables 3.1 and Table 3.2 summarizes the criteria applicable to this design.

	MULTI-USE TRAIL	EQUESTRIAN TRAIL**
CRITERIA		
MATERIAL	CONCRETE	CRUSHER FINES
TRAIL WIDTH Minimum: Recommended:	8 FT 10 FT to 12 FT	8 FT 12 FT
GRADED AREA		
WIDTH Minimum: Recommended:	2 FT* 3 FT*	2 FT 3 FT
MAXIMUM SLOPE	6:1	
* If Trail is adjacent to canals, ditches or slopes down steeper than 3:1, a minimum 5 foot separation should be used.		
VERTICAL CLEARANCE		
<i>For Trail:</i> Minimum: Recommended:	8 FT 12 FT (>8 FT to permit passage of maintenance vehicles)	10 FT 12 FT
<i>For Waterton Canyon Road</i>	17-1/2 FT	
DESIGN SPEED		
<i>MINIMUM FOR SHARED USE FACILITY</i>	20 MPH	N/A
<i>DOWNGRADE EXCEEDS 4%</i>	30 MPH IS ADVISABLE	N/A
SOURCE: * AASHTO'S: <i>Guide for the Development of Bicycle Facilities, 1999</i> ** FHWA: <i>Equestrian Guidebook for Trails, Trailheads and Campgrounds</i>		

TABLE 3.2 – HORIZONTAL & VERTICAL ALIGNMENT CRITERIA – MULTI-USE TRAIL

DESIGN SPEED	12 MPH	MINIMUM 20 MPH	25 MPH	30 MPH*	*When a downgrade exceeds 4 percent, a 30 mph design speed is more advisable
Horizontal Curves Based on 15degree Lean Angle 2% Superelevation & 20degree Lean Angle	36 ft 30 ft	100 ft 90 ft	156 ft 155 ft	225 ft 260 ft	
Superelevation Rate Maximum		3%			Use a minimum 25 foot transition distance
Friction Factors – Paved Surface	0.31			0.21	
Grades	5-6% Up 800 ft 7% Up to 400 ft 8% Up to 300 ft 9% Up to 200 ft 10% Up to 100 ft 11%+/- Up to 50 ft				

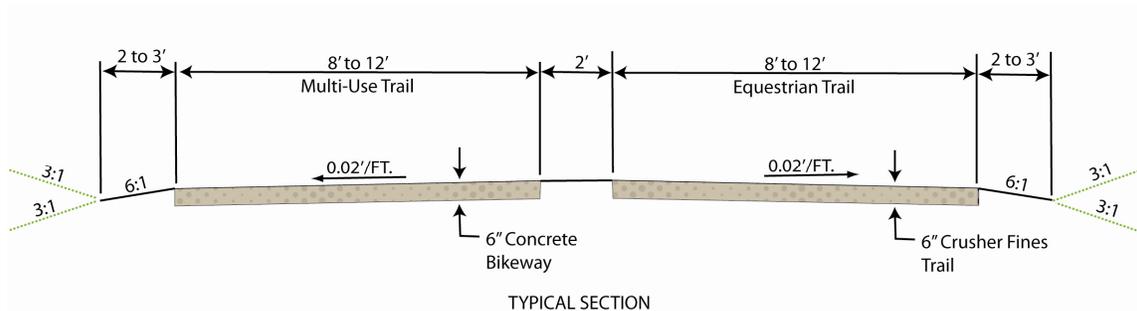
The following structural design criteria were used:

Pedestrian Bridge

- Design Method’s LFD (Load Factor Design)
- AASHTO Guide Specifications for Pedestrian Bridges
- Recommended design live loading: Five-ton vehicle or 85 pounds per square foot Pedestrian Loading.
- Structure width: 10 foot clear
- Bridge Deck: Concrete Preferred (CDOT Class D)
- 54” High Pedestrian Railing

Underpass

- Design Method: LRFD (Load and Resistance Factor Method)
- Live Load: HL93 Vehicle Loading
- Vertical Clearance – 10’ for Pedestrians, 12’ for Equestrian
- Horizontal Clearance – 10’ Minimum with 3 Shoulders



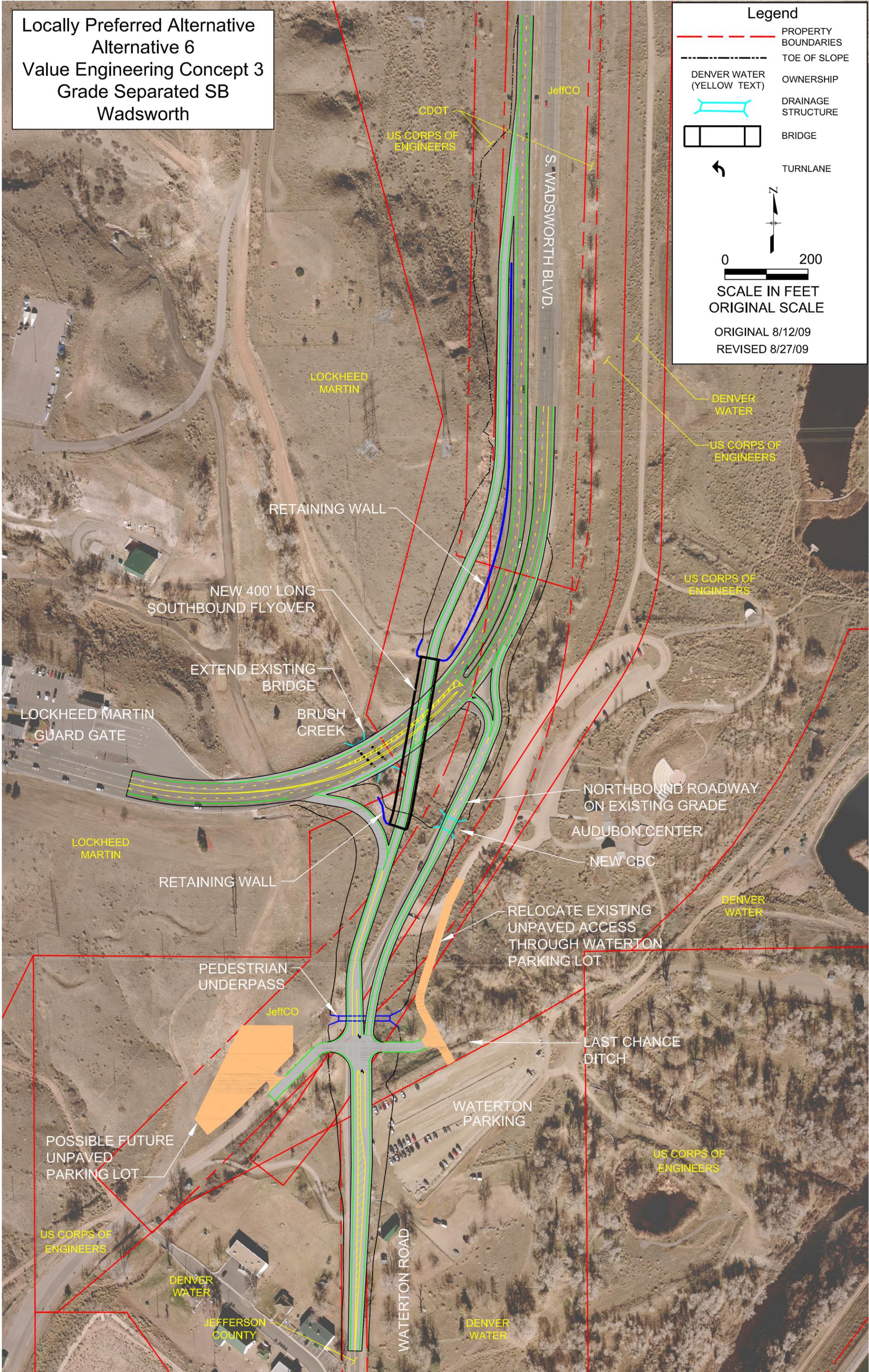
**Locally Preferred Alternative
Alternative 6
Value Engineering Concept 3
Grade Separated SB
Wadsworth**

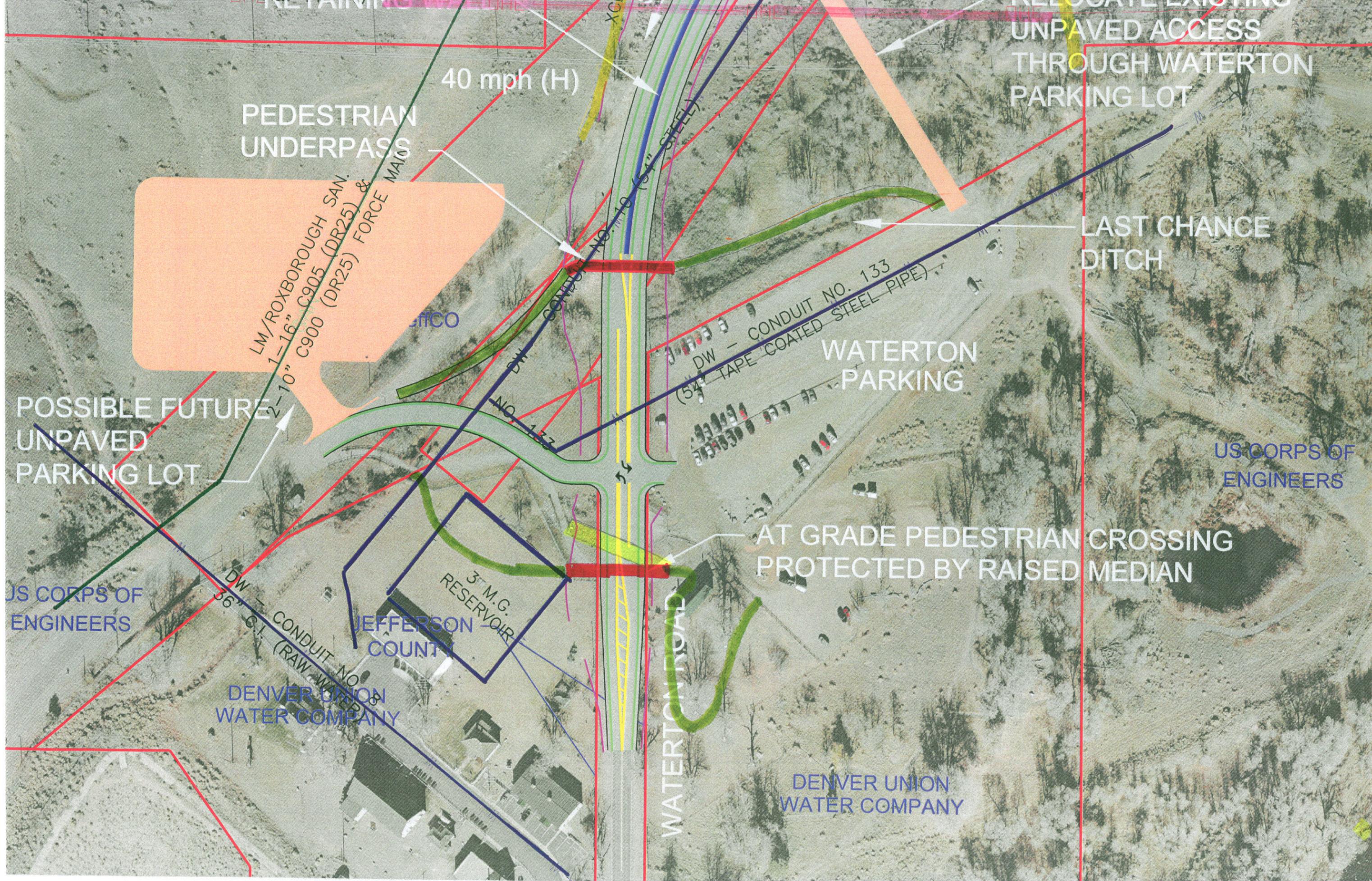
Legend

-  PROPERTY BOUNDARIES
-  TOE OF SLOPE
-  DENVER WATER (YELLOW TEXT) OWNERSHIP
-  DRAINAGE STRUCTURE
-  BRIDGE
-  TURNLANE


 0 200

**SCALE IN FEET
ORIGINAL SCALE**
 ORIGINAL 8/12/09
 REVISED 8/27/09





PEDESTRIAN UNDERPASS

40 mph (H)

RELOCATE EXISTING UNPAVED ACCESS THROUGH WATERTON PARKING LOT

LM/ROXBOROUGH SAN. 1-16" C905 (DR25) & 2-10" C900 (DR25) FORCE MAINS

LAST CHANCE DITCH

POSSIBLE FUTURE UNPAVED PARKING LOT

CONDUIT NO. 133 (54" TAPE COATED STEEL PIPE)

WATERTON PARKING

US CORPS OF ENGINEERS

US CORPS OF ENGINEERS

AT GRADE PEDESTRIAN CROSSING PROTECTED BY RAISED MEDIAN

3 M.G. RESERVOIR
JEFFERSON COUNTY
DENVER UNION WATER COMPANY

WATERTON ROAD

DENVER UNION WATER COMPANY

Appendix C. Small Group Meetings

Topic: Meeting Minutes: Government Agency Coordination Meeting

Date: December 10, 2008, 3 p.m.

Location: USACE Office at Chatfield Dam

Attendees: Brad Bauer and Zeke Zebauers (Jeffco), Fred Rios (USACE), Craig Larson (FHWA), Jon Chesser (CDOT), Jim Clarke, Dean Van De Wege (Jacobs)

1. Welcome/Introductions

- a. Dean welcomed everyone to this small group meeting for the South Wadsworth/Waterton Road Intersection Feasibility Study, and introductions were made. An agenda was distributed. Dean provided a overview of the feasibility study for the benefit of Fred Rios and Craig Larson.

2. Lead Agency Discussions

- a. Brad and Zeke indicated that Jefferson County had not identified a funding source for future improvements and, therefore, it's unknown whether federal funds will be used.
- b. The group agreed that the study should be conducted assuming that FHWA/CDOT would serve as lead agencies in any future NEPA process. Jon indicated that, if federal funds are not used in the future, CDOT would clear the intersection improvements with a Categorical Exclusion. The U.S. Army Corps of Engineers (USACE) would use information on CDOT's Form 128 for its NEPA clearance.
- c. Regarding FHWA's ongoing role in the study, Craig indicated that FHWA would like to stay involved as much as their schedule would allow. To that end, Craig will be added to the Stakeholder Team.
- d. Jim would confirm that no Land and Water Conservation funds were used in the area, such that Section 6(f) protection would not apply.
- e. There was some discussion that maybe two preferred alternatives be established, one considering 4(f) and federal funding, and one that does not consider 4(f).

3. Planning/Environmental Linkage (PEL) Questionnaire

- a. Jim provided an overview of the questionnaire and its purpose.
- b. Jim distributed a draft questionnaire completed for the study, explaining that the questionnaire was completed as if the study recently had been completed.
- c. Jon and Craig agreed that an 'abbreviated PEL process' would be appropriate for this study.
- d. Jim asked the group to review the feasibility study process described in the questionnaire to ensure the process is sound from a PEL standpoint. Craig indicated he was comfortable with the process as it was described in the meeting.

4. ROW Ownership

- a. The question was raised of who would take ownership of the intersection and its maintenance after this project. CDOT mentioned that they were actually interested in abandonment of SH 121. Agreements between CDOT, Jefferson County and Lockheed will need to be addressed during final design.
- b. Any impacts outside existing easements will need to be addressed with the USACE.
- c. Denver Water owns the southern portion in fee. There was some discussion on whether this land would require 4(f) consideration if its primary use is for Denver Water.
- d. The Denver Water service road east of S Wadsworth is not paved.



- e. The group discussed property ownership. CDOT has a lease for S. Wadsworth Blvd. which ends at the intersection with Wadsworth Road. Fred also indicated that the land west of Wadsworth was leased by Denver Botanic Gardens at Chatfield. Beyond the east fence State Parks leases the land. He did not think that Waterton was leased since it falls within the Denver Water fee agreement area.
- f. Fred indicated that the lease agreements may not have legal descriptions, but the easements are defined.
- g. State Parks has a lease agreement with the USACE. Audubon Society has a third party lease with State Parks. The area by the parking lots is leased by State Parks.
- h. Dean asked what entities should we approach to get right-of-entry/access permits. Fred indicated we should start with him, State Parks and Denver Water. For permissions to enter from CDOT, we should check with Brad Sheehan or Greg Jamaison. For Waterton Road, we should get approval from Brad.
- i. Utilities need to be located before any drilling activities occur. Fred should be contacted for any work on USACE land.
- j. Fred indicated there are archaeological sites just west of S. Wadsworth Blvd. in the study area and agreed to provide Jacobs with this information.
- k. After the meeting, Fred provided Jacobs with property tract information he had available.
- l. We are to work with Fred for utility easements. They are normally a centerline legal description with a 10 foot width.

5. Chatfield Flood Pool

- a. Fred described how the flood pool requirements work and indicated that any construction activities would need to meet the land development policies he had previously provided Dean.
- b. Perhaps the most important requirement for our study is potential loss of flood pool storage. All cut and fill needs to be balanced within each separate elevation zone.
- c. Clearance for flood pool requirements will take at least 90 days. The USACE Omaha District will review. Normally this review would be at about 60% plans.
- d. Rena Brand with USACE Regulatory is the contact for GIS information.

Action Items:

1. Jacobs will add Craig to the Stakeholder Team.
2. Jim will send Craig minutes from the first Stakeholder Team meeting.
3. Jim would confirm that no Land and Water Conservation funds were used in the area, such that Section 6(f) protection would not apply.
4. Consideration will given to whether Denver Water Board land requires 4(f) evaluation.
5. Fred will provide Jacobs information on archaeological sites
6. Jacobs and its subs are to work with Fred for identifying utility easements, and before any drilling is started.



Topic: Meeting Minutes: Meeting with CDOT to Determine if Signal is Warranted
Date: **May 1, 2009**
Location: CDOT Region VI
Attendees: Brad Bauer, Zeke Zebauers and Scot Lewis (Jeffco)
Steve Hersey and Jon Chesser (CDOT)
Steve Markovetz (Hartwig & Assoc)
Dean Van De Wege (Jacobs)

Note: These minutes are broken into two parts. It includes the actual meeting minutes, and information from other correspondence that provides insight concerning the remaining alternatives.

Meeting Minutes

Meeting Purpose:

The purpose of this meeting was to determine if a signal at this intersection can be warranted. Two of the five remaining alternatives recommend a signalized intersection, and the County had concerns whether they could build either of these signalized alternatives if one became the preferred alternative. Jefferson County is also looking at possible phased solutions, in which phase 1 would build a signal, and phase 2 would build the interchange.

To exacerbate the county's concern, in 2003 PBSJ did a traffic operations analysis which met three MUTCD traffic signal warrants at this location, and in 2004 CDOT did their own study and found that only one warrant was met (i.e. the Peak Hour Warrant). Since that time, the MUTCD signal warrant analysis method has changed. Scot Lewis of Jefferson County has just completed a MUTCD Signal Warrant Study on April 24, 2009, which met warrants 1, 2, & 3 when the 70% values were used for the existing intersection with the existing traffic approach traffic volumes (with the right turns being excluded).

- Note: After the meeting it was realized that an additional/different analysis needs to be done for Alternative 2, since that alternative changes the geometry of the intersection to have the Lockheed Martin being the "side street".

Meeting Conclusion:

It was determined that a signal at this location can be warranted, but the details of geometrics, operations, grade, and so forth must be provided. This means that Alternatives 1 and 2 (and phased alternatives) can still be considered during the analysis of alternatives. [Note: assuming that the new analysis for Alternative No. 2 still meets a warrant.]



Discussions:

- Steve Hersey was briefed on all the alternatives, and the proposed features that came out of the Public Open House.
- Grades
 - A conclusion was made that a signal at the existing intersection and existing grade would not be acceptable. If a signal is installed, grades should be improved.
 - Currently, by raising the elevation of the intersection 6', approach grades of 4% can be accommodated for Alternative 1. There was general agreement that a 4% would be highly desirable at this location, but steeper grades could be considered, especially if they are more compatible with both the short and long term solutions for the intersection.
 - It was explained to Steve H. that we have two issues that impact how much we can raise the intersection. The first is the overall fill in the Chatfield Flood Pool, and the 2nd is if we build an intersection first, and then build an interchange in the future, we would need to provide higher overpasses for the ultimate bridge structures. This would impact Flood Pool and touchdown points.
 - Existing and proposed grades for Alternative 1 are shown below. We will provide the same proposed grades on Alternative 2.
 - Existing Grade behind a proposed stop bar at the Intersection
 - 100' at 5.60%
 - 250' at 6.25%
 - 200' at 7.00%
 - Proposed Grade with 6' raise in intersection
 - 150' at 4.00%
 - 400' varies 4.00% to 7.00% in vertical curve
 - Meets 7% grade shown above
- Steve would like to know at what Level of Service (LOS) the signal would perform at when constructed, and would it provide a LOS D for future traffic.
- Steve noted that in his experience the Phase I of a project often times lasts longer than originally planned. If the project is phased, it would make sense for the first Phase to accommodate the anticipated shift in higher traffic volumes to and from Douglas County rather than the trips to Lockheed Martin. It was noted that Alternative No. 2 did this much better than Alternative No. 1.
- Steve was not against constructing the project in phases.
- Steve said his experience indicates that signalized intersections results in more rear-end collisions than non-signalized intersections. The injuries from rear-end collisions are under reported, and are much more serious than usually acknowledged by traffic engineers and the public, since the injuries often do not become apparent until days/weeks later.
- The roundabout by the Waterton Parking lot was discussed.
 - This roundabout is basically a traffic calming device.



- It also provides a protected pedestrian refuge.
 - Steve expressed the following concerns:
 - Roundabouts are not necessarily perceived by the public as pedestrian friendly. He did agree though, that this acts as more of a two legged rather than multi-legged roundabout which may not be as bad. Pedestrians are generally only dealing with traffic from 2 legs of the intersection.
 - It was noted though, that although roundabouts are not perceived as pedestrian friendly, there seems to be no real data to confirm this statement. Also, what is really less safe, crossing the entire roadway, or crossing in two steps with a roundabout?
 - He also expressed a concern that since the majority of the traffic will pass straight through the roundabout, the occasional vehicle that needs to make a left or u-turn would be at greater risk than normal Example: The vehicle that actually performs the left or u-turn movement in the roundabout may be forced to yield to the Waterton through traffic, since the through traffic is not expecting this movement.
 - In conclusion, he was going to leave the final decision for use of a roundabout to the county as long as they could demonstrate the ability to provide proper advance warning to Waterton Road traffic
- Overall, Steve H. did feel more comfortable with interim alternatives that addressed the future levels of traffic that would be on the Wadsworth/Waterton through movement.

Action Items:

- A MUTCD traffic signal warrant study needs to be done for the existing approach volumes with the revised geometry for Alternative No. 2.

Other Correspondence on Alternatives

January 22 CDOT comments on remaining alternatives:

Alternative 1

Traffic - We looked at constructing a signal a few years back but decided against it because of the grades. This Alt does nothing for those grades. We thought a free right was necessary for the NB movement and I still think it is important if this Alt advances. This Alt does channelize the in-bound Lockheed Martin traffic, separating it from the lefts and permitting a free movement into Lockheed Martin in the morning. This is an improvement over a simple signal. Sight distance to signal heads would be poor for the NB traffic.



Alternative 2

Traffic - This Alt probably has less capacity for the out going Lockheed Martin traffic than Alt-1. The same volume has to make a left turn instead of a through movement. The left merge for the NB to WB left turning traffic is awkward and may lead to side swipe same direction type accidents. Turning radius may be a problem for that movement as well. This Alt is, however, more efficient for the SB Waterton Road traffic.

Alternative 6

Traffic - This Alt would require some raised median on SH 121 at Waterton Rd to discourage WB SH 121 traffic that missed the exit from turning left to Waterton Road. It would also need a left turn lane accel lane from NB Waterton to SB SH 121. I don't know the volumes, however, I would guess at some times of the day the NB to WB left would be difficult and possibly dangerous without signalization. May require at least one overhead sign.

Engineering - The large cut into the hogback is a show-stopper....too much impact and \$\$\$\$\$. Also, there is a line of high tension electrical towers entering Lockheed Martin near the intersection, and a couple towers sit on top of the hogback near where the cuts would need to be ... they'd have to be relocated resulting in an even higher cost with Alt-6.

Alternative 8

Traffic - This is a good design that does a pretty good job of isolating the heavy movements. An actuated left turn would allow the N/S movements to be green most of the time, therefore, providing a high capacity for the heavy SB and NB Waterton road traffic. It does however, have the awkward left merge of the other signalized options. If the decision makers could agree to eliminate the NB left then this is the best alternative. Would probably require several overhead signs (more \$).

Engineering - This Alt has high impacts to the flood pool, with a long structure and high cost.

Alternative 9

Traffic - Much less efficient than Alt-8. Any trade-off for less 4(f) impact would not be worth it in the long run. This Alt is much less efficient and safe than Alt-8. The signalized intersection is very cumbersome, with too many unnecessary curves and very poor approach sight distance to the signal. Would require overhead signs (more \$).

Engineering - This Alt has high impacts to the flood pool, with a long structure and high cost.



May 12 Comments from Steve Hersey (Summarized)

I have taken another look at Alt 9 and would say my earlier comments are still valid and accurate. As far as the “ultimate would have double lefts SB and double rights NB”.

I am not a big proponent of signalized double rights for the following reasons.

1. A single free right turn with good entrance geometrics often has similar capacity to a signalized double right with a better safety record (e.g. fewer side swipe same accidents)
2. For safety reasons we usually are forced to restrict the right on red movement in a double right configuration...further restricting capacity.

One other feature of both Alt 8 and Alt 9 that makes me a bit uncomfortable is the EB to SB movement from outgoing Martin traffic to SB Waterton Rd. First of all, the driver must make a left exit to make a right turn which may be confusing and catch some drivers off guard. It will probably require overhead signing as I mentioned in earlier comments. Furthermore, that ramp has a down grade to essentially a U turn and during winter time it will be shaded by both the structure and retaining wall. It is hard to predict if and when these conditions will occur and how well we could mitigate before they become a problem but its something to consider.

I think the best option for all the ultimate grade separation alternatives would be a EB to SB ramp design similar to Alt 6. However, all bets are off if the grades are too severe.

Response to these Comments:

- The NB double right could be straightened to provide a free flow / non stop condition. This would result in lengthening the bridge, which ultimately would make it look more similar to Alternative 8. Alternative 9 was established to minimize the flyover bridge length and cost. This was one reason why we asked your opinion on this alternative. This alternative was initially dropped after Level 1 Screening, but was added back in since the bridge cost was lower.
- Concerning the left side exits and merges. We had discussed this in the past, but felt that since 99% of the traffic will be from a captive user (Lockheed Martin), the driver confusion would be minimal.
- A good point is made concerning the shading of the EB to SB roadway from Lockheed.



Topic: Coordination Meeting with FHWA

Date: 9:00 a.m. July 13, 2009

Location: FHWA Offices

Attendees: Stephanie Gibson (FHWA)

David Singer, Jon Chesser (CDOT)

Brad Bauer (Jefferson County)

Jim Clarke, Dean Van De Wege (Jacobs)

1. Introductions and Project Overview

Jim and Dean gave a quick overview of the project to date. This included the steps to getting to the preferred alternative, why a signal was not the preferred alternative, how the Lockheed Martin (LM) signal change impacted current Level of Service at the intersection, and a brief summary of the elements of Alternative 6.

Stephanie did mention that Dahir Egat, a retired CDOT employee will start with FHWA on August 10th, and will be the primary contact in the future.

2. Funding

Both Jim and Brad gave an overview of the funding for the project.

Jim indicated that basically we are approaching this project assuming federal funds will be used for construction. It was mentioned that Alternative 6 did not have designated funding through the County, and that the County is seeking high priority grant funding through DRCOG at this time. Brad mentioned that they will probably not know whether they will get this funding for at least 18 months. If this funding does not become available, the county will need to look at other funding source opportunities in the future.



3. Linking Planning and NEPA, and the Alternative Selection Process

Jim and Jon mentioned that the Linking Planning and NEPA Questionnaire (which was provided Stephanie), had been filled out, and was being used to steer the project. In general, we have been approaching the project as if it were a NEPA Study. Agency Coordination has been ongoing, and the feasibility study process includes analysis of wetlands, water of the US, and 4(f), in addition to other resources. The project established Goals and Purpose and Need statements during the early process of the Feasibility Study.

Stephanie was informed on how the process started with 10 alternatives, was reduced to 5 which was presented in a public open house, and was then reduced to one Preferred Alternative.

At this point, Brad mentioned how we planned to build a two-lane bridge instead of a one-lane bridge for the flyover, to seek overall costs and delays for the project. Stephanie felt this was a reasonable approach.

Noise at the Amphitheater was also mentioned as a concern by Stephanie. It was noted though, that the AM and PM traffic peaks likely would not coincide with events occurring at the amphitheatre. Its location is 400' from the existing road.

4. Environmental Impacts

Section 4(f)

Jim discussed the potential 4(f) applicability of the different properties in area.

- State Parks has a 25 year lease that was signed in 2003. Stephanie agreed with CDOT's opinion that all property that makes up the state park would be determined Section 4(f). This includes the Audubon Society facility. She also believed that the Denver Water property for Conduit 10 would be deemed 4(f) as that use did not alter the surface use of the land. The deed states the property is open to the public and used in a similar manner as the lands surrounding it, which are part of Chatfield State Park.



- As a result of the Jefferson County right-of-way being acquired primarily for transportation use, Stephanie agreed that it would be deemed not Section 4(f) property. The Corps of Engineers owned-property to the east of S. Wadsworth Blvd, which is leased by the Denver Botanic Gardens, would not be considered 4(f). This property has been designated for vegetative management in the Chatfield Dam Master Plan and is not used for recreation use in the study area .
- Denver Water property extends on both sides east and west of Waterton Road. Due to the public ownership and recreational uses, areas where there are focused recreational uses (e.g. parking lot and picnic areas) likely would qualify for 4(f).
 - Need to check if the park has a management plan.
 - Note that picnic tables are present.
 - Find out if it is identified as a park in the lease. If it is, what are the revocation provisions (e.g. are recreational uses only short-term).

Documentation of 4(f)

- We likely will not exceed the minimum threshold of acres impacted for a Section 4(f) Minor Use Programmatic Evaluation.
- Stephanie recommended getting the ROW for the future roadway impacts now, and was going to check if we could do this under a CatEx. For example, we could identify a future roadway centerline and related Right of Way width.
 - Acquiring Right of Way becomes part of the 4(f) impact. We would have more impact if we buy for future now, but shows that we have used a better planning process and more applicable mitigation plan.
- Stephanie indicated a documented CatEx would be acceptable since we are not adding capacity, just roadway structure.



- Impact is for new transportation use.
- Need to identify footprint and proposed mitigation.

Historic 6(f)

- Farmhouse on the Audubon property – This property was not recommended for eligibility since it lost its integrity when the building structure was modified. SHPO will make a final determination on this building.
- Kassler Center – This property is currently eligible for historic listing. Stephanie recommended looking at shifting the alignment to minimize impacts to the Kassler historic property.
- Last Chance Ditch – The ditch is not listed but eligible.
- Stephanie looks at the new parking lot as an enhancement of the recreational usage.

5. Next Steps

- Jon was wondering when we should proceed with the CatEx.
 - We can't sign the top portion of the Form 128 until we have funding.
 - At this time it was noted that the bottom part includes more construction specific items and permits such as 404, stormwater management.....
 - If we identify environmental impacts now, how long can the CatEx process sit before we need to revisit the process?
 - Stephanie – We will need to look to see if anything has changed at the time funding becomes available. She mentioned that 3 years is the rule of thumb before everything needs to be re-evaluated.



- Jim – We plan to provide a documented CatEx Report that we could call a Planning & Environmental Linkage (PEL) document. By calling it a PEL document, we are providing allowance to review what changes may take place later.
- Stephanie summarized as follows:
 - Have a PEL document.
 - Have the Feasibility Study.
 - Do 4(f) coordination, but not get the clearance yet. FHWA can review preliminary drafts but not formally approve the documents.
- Right of Way (ROW)
 - We can't buy ROW until we get the top part of the Form 128 signed.
 - Stephanie was going to check with Chris Horn (FHWA) on whether we could buy ROW for the ultimate section along Waterton now.
 - An option is that ROW could be bought with County funds.
 - We must make sure that the ROW acquisition process follows the Uniform Relocation Act procedures.
- *Di minimis* vs Programmatic
 - Jim will work with David and provide documentation for Stephanie's review.
 - Using de minimis findings or programmatic 4(f) clearances would be difficult if we impact major structures. Are the bathroom facilities considered one of these? (Note, in a meeting later in the week, the Water Boards was not worried about relocating the bathroom facilities).
- We will need to do initial eligibility and effects determinations on the historic properties.



- We will need to have some public involvement if we make *de minimis* findings for the 4(f) impacts.
 - This could possibly be through the website and mailings, but should be coordinated with CDOT and FHWA first.
- The key is to have a well documented and reasoned process.

Action Items

- Stephanie – Was going to check with Chris Horn about early acquisition of property for the ultimate roadway section.
 - *Per follow up by Stephanie on 7-13-09 - The regulation relating to this is 23 CFR 710.501. One of the actions that is prohibited [23 CFR 710.501(b)(2)] is the taking of any properties that are protected by Section 4(f). The reasoning is that by acquiring the property from the 4(f) property, you would actually be removing its protections (since it would then be already in transportation use) and that would unduly influence the decision-making process. Obviously in this case, given that 4(f) properties surround the existing road it is unlikely that it would change what the proposal is, but it is still against our regulations and could jeopardize the potential to get future Federal funding for the project.*
- Jim - Check if the Denver Water has a management plan for recreational area.



Topic: Meeting Minutes: Meeting with Denver Water to Discuss Access Alternatives
Meeting Date: September 16, 2009
Location: Denver Water – Kassler Center
Attendees: Brad Bauer (Jefferson County)
Art Griffith (Douglas County)
Amy Turney, Neil Sperandeo, Kevin Keefe & Russell Christensen (Denver Water)
Jim Krogman & Dean Van De Wege (Jacobs)

Meeting Minutes

Meeting Purpose and Goals:

Dean Van De Wege began the meeting by discussing the meeting Purpose and Goals. The purpose of the meeting was to review the three different access alternatives that had been presented in various e-mails and discussions. The goal, is to leave the meeting with an access solution, or at least an action plan to find a final solution.

Alternatives Presented:

Dean provided handouts and a brief description of the alternatives.

- Northern Access at current Denver Water access location. (Northern Access)
 - A slightly revised version of this access was shown. The Denver Water access remains in the same location as Value Engineering Concept 3, but the Waterton parking lot access would be to the south just north of its current location.
- New Access along existing Colorado Trail (Colorado Trail Access)
 - This provided a new Denver Water Access that goes east from Waterton Road at the current Colorado Trail location, between the fenced portion of the Kassler Center and the vault vent pipes for conduit #133 (?).
- Proposed new southern access along existing Filter Beds (Filter Bed Access)
 - This access follows an existing 1-lane road along the abandoned filter beds for about ½ mile until it meets the current access road.

Field Review of Filter Bed Access:

The primary focus of this meeting was to walk the alignment of the proposed new access south of the Kassler Center and abandoned filter beds. Numerous discussions between different individuals took place, so I will just try to provide an overall summary.



- The final determination was that if built, this would be a 26' wide road with 6" of aggregate base material.
- In some narrow areas, it may be necessary to fill into the existing filter beds. Much of the alignment did have the necessary width for a road.
- Earlier in the day, Robert Rutherford of Jacobs, and Neil Sperandeo met, so Robert could take a quick look at impacts to environmental resources. Riparian habitat exists along much of this section, and possible wetlands along the portion west of the filter beds. A suggestion was made to angle the road north just west of the filter beds to reduce the road length and avoid the wetlands. Large trees, and possibly some other wetlands may be in this area. Also, there was a picnic area that would need to be avoided.
- A historic flume was identified that should be avoided.

Access to Waterton and Audubon Parking:

There seemed to be an agreement that the new access was reasonable. Should probably take a closer look at the radius of the first curve.

Conclusion and Follow Up:

No defined conclusion resulted from this meeting. Denver Water prefers the Filter Bed Access, then the Northern Access, and lastly the Colorado Trail Access. One concern with the Colorado Trail Access is that the multiple users of the road would cross their land.

The following tasks were suggested for Jacobs to assist in making a better decision:

- Exhibits with turning movement impacts should be revised to show access from right lane, not the through lane.
- Denver Water would like drawings/exhibits of each of the 3 proposed driveway locations that include lane lines and turn arrows. They would also like to know the grades of each approach.
 - *Note: This is time extensive, so a simplified effort may be an option.*
- Complete a quick cost estimate for the Filter Bed Access.
- Provide an updated Pros and Cons list for each location.



**Appendix D.
Public Involvement Information**

...to attend an Open House for the S. Wadsworth Boulevard / Waterton Road Intersection Feasibility Study

The purpose of this event is to listen to your comments regarding alternatives for improvements to the S. Wadsworth / Waterton Road intersection. Project team members will be available to answer your questions at this Open House.

Questions or
Special Needs:
303-589-5651

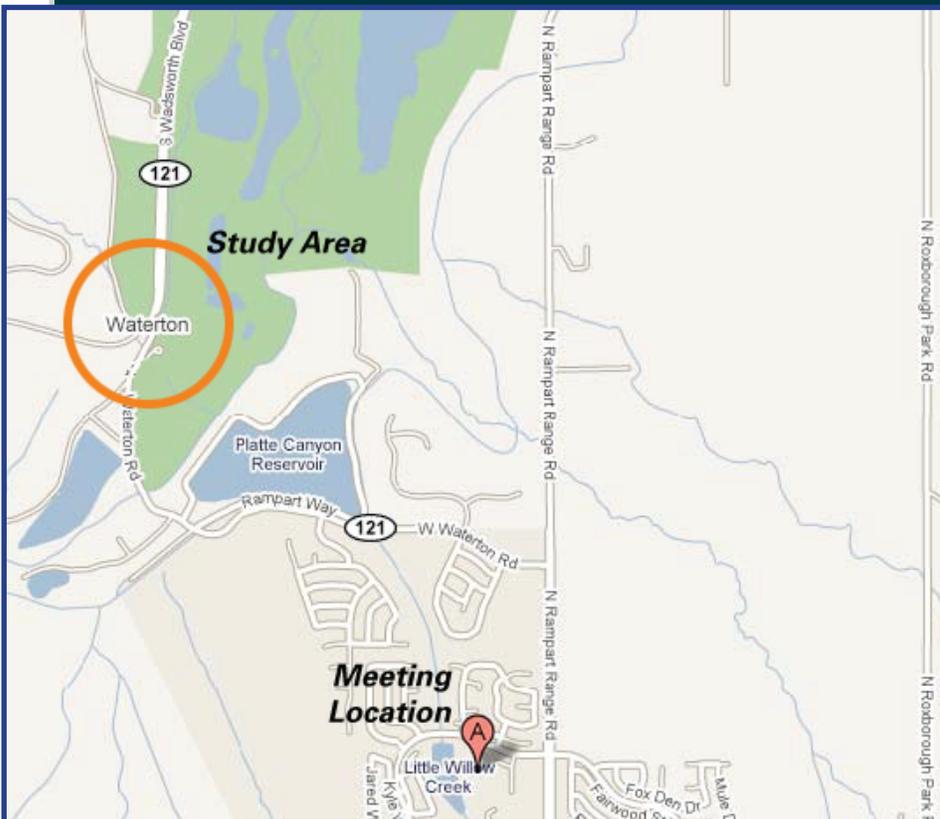
Project info:
www.wadsworthwatertonstudy.com

Time: Anytime between 5:00 pm - 7:30 pm
No formal presentation will be made

Date: February 25, 2009

Place: Roxborough Elementary School
8000 Village Circle West
Littleton, CO 80125

Refreshments Provided



South Wadsworth/ Waterton Road Intersection FEASIBILITY STUDY

Welcome

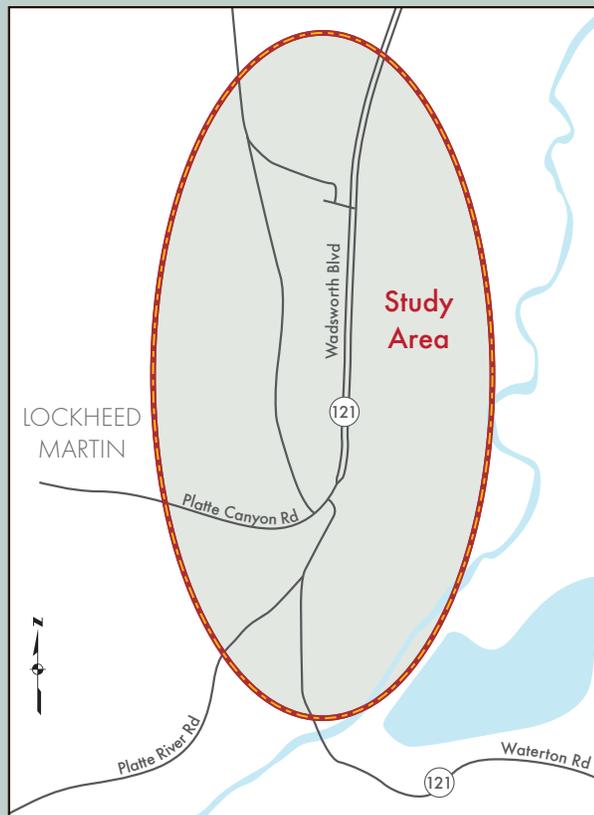
to the
Public Open House



FEBRUARY 25, 2009



- Jefferson County, working with Douglas County and Lockheed Martin Company, initiated this feasibility study in Fall 2008.
- This study will examine design alternatives, engineering, traffic and environmental analysis of improvements to the intersection of Waterton Road and S. Wadsworth Blvd.
- The study includes looking at numerous design alternatives and providing engineering, traffic, and environmental analysis of each.
- A Stakeholder Team has been formed to help guide the study and develop recommendations. This team includes:
 - Denver Water
 - Colorado State Parks
 - Audubon Society of Greater Denver
 - Colorado Department of Transportation (CDOT)
 - US Army Corps of Engineers
 - Federal Highway Administration



The feasibility study process begins with identification of the Purpose and Need, which helps guide the evaluation of project alternatives.

Project Purpose and Need

The project purpose is to improve the safety and operational deficiencies of the South Wadsworth Boulevard and Waterton Road intersection. Transportation needs for the South Wadsworth/Waterton Roads Feasibility Study include:

1. Address existing and projected traffic congestion
2. Correct roadway deficiencies
3. Improve safety for users of all automobile, bicycle, and pedestrian users
4. Improve access control



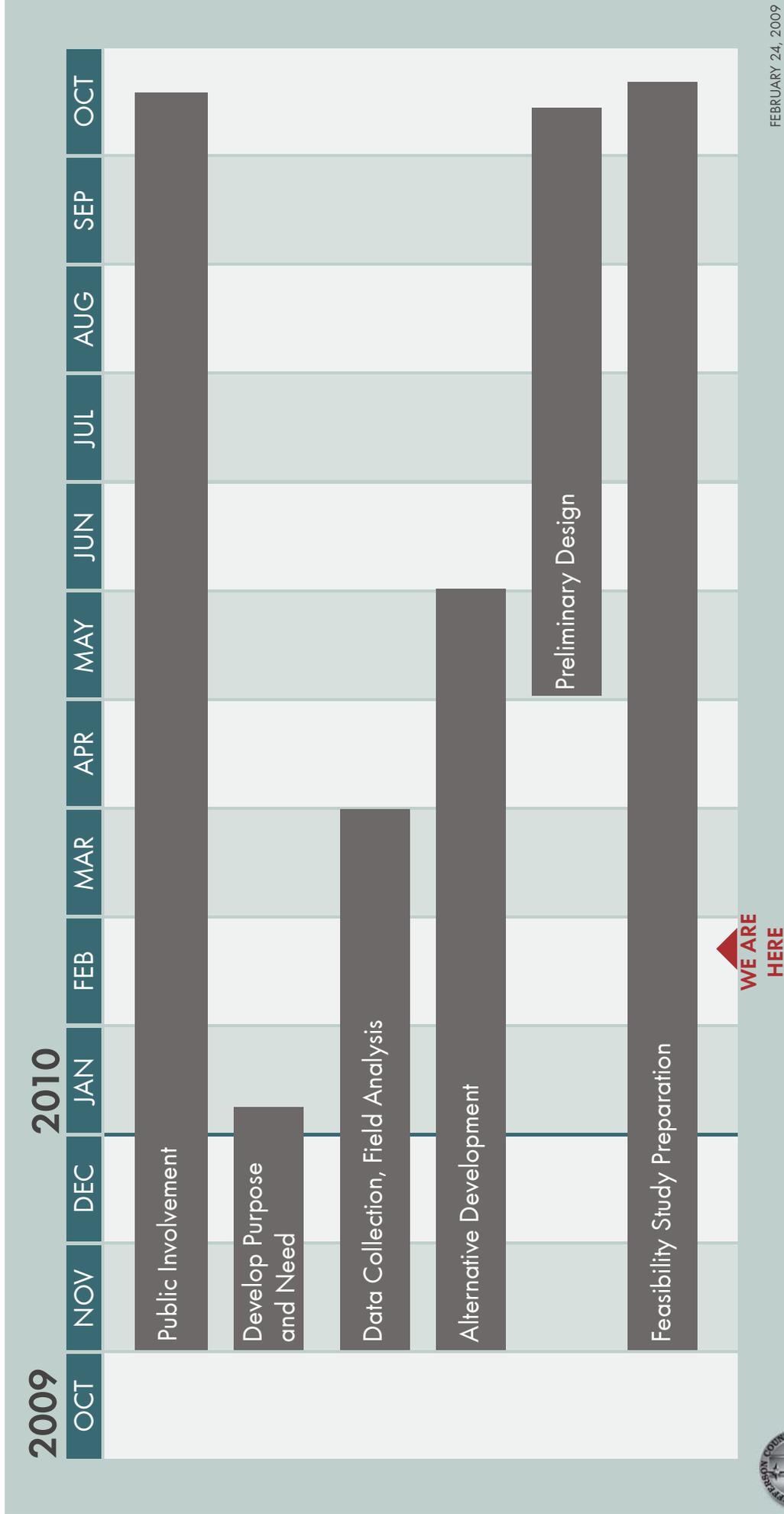
Project goals are those viewed as crucial to project success by the stakeholders, and supplement the Purpose and Need.

The goals identified for this project are to:

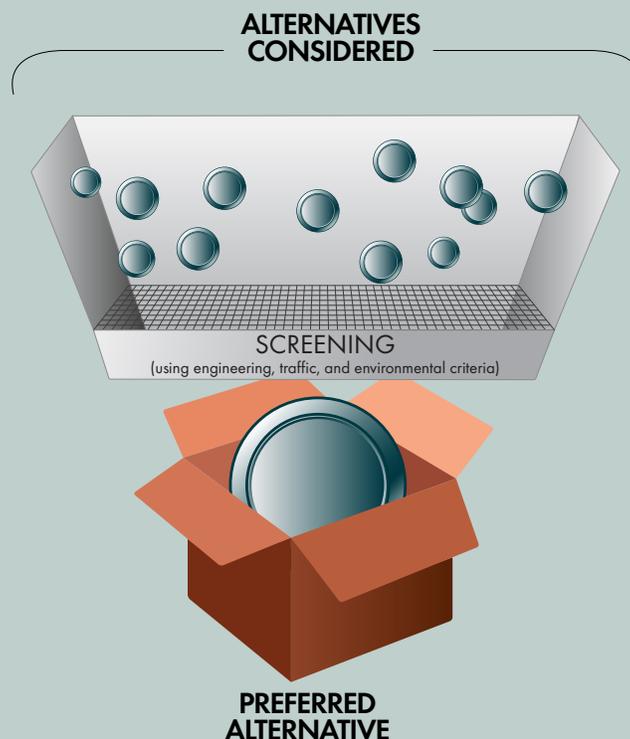
- Provide practical and financially realistic transportation improvements.
- Incorporate Context Sensitive Solutions (CSS) into the planning and design.
- Avoid and minimize adverse impacts to the natural and human environments.
- Minimize disruption to adjacent land uses, including large utilities.
- Meet Lockheed Martin's oversized vehicle requirements.
- Be consistent with adopted local plans, including land use, park, transportation, and facility plans.



PROJECT SCHEDULE



- The Alternatives were developed by Jefferson County, Douglas County and Lockheed Martin with input from the Stakeholder Team.
- Alternatives are being evaluated against screening criteria developed from the project Purpose and Need and Goals. Criteria include these key categories: Traffic Congestion, Road Deficiencies, Intersection Safety, Bike/Ped Safety, Access, Floodpool, Section 4(f)/ Recreation, Water Resources, Adjacent Land Use, Vehicle Requirements, Capacity Needs.
- The Stakeholder Team will use your comments to help eliminate or enhance the remaining alternatives.
- Also, the Team will use engineering, traffic, and environmental criteria to compare alternatives.



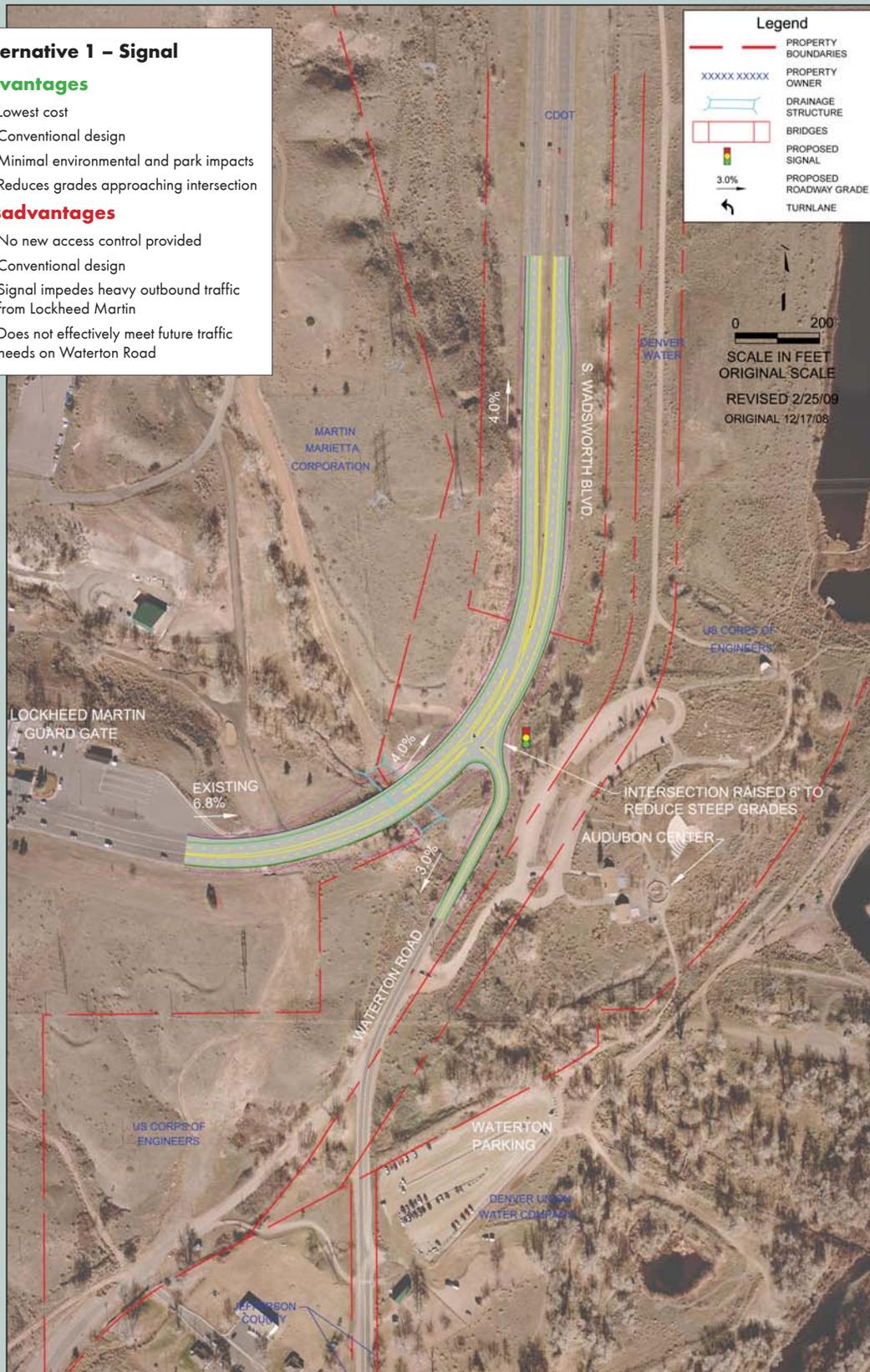
Alternative 1 – Signal

Advantages

- Lowest cost
- Conventional design
- Minimal environmental and park impacts
- Reduces grades approaching intersection

Disadvantages

- No new access control provided
- Conventional design
- Signal impedes heavy outbound traffic from Lockheed Martin
- Does not effectively meet future traffic needs on Waterton Road



Alternative 2 – Lockheed T and Signal

Advantages

- Lower cost alternative
- Minimal environmental and park impacts
- Reduces grades approaching intersection
- Somewhat meets future traffic needs

Disadvantages

- Signal impedes heavy outbound traffic from Lockheed Martin
- Grading required into hogback
- Higher wetland and stream impacts



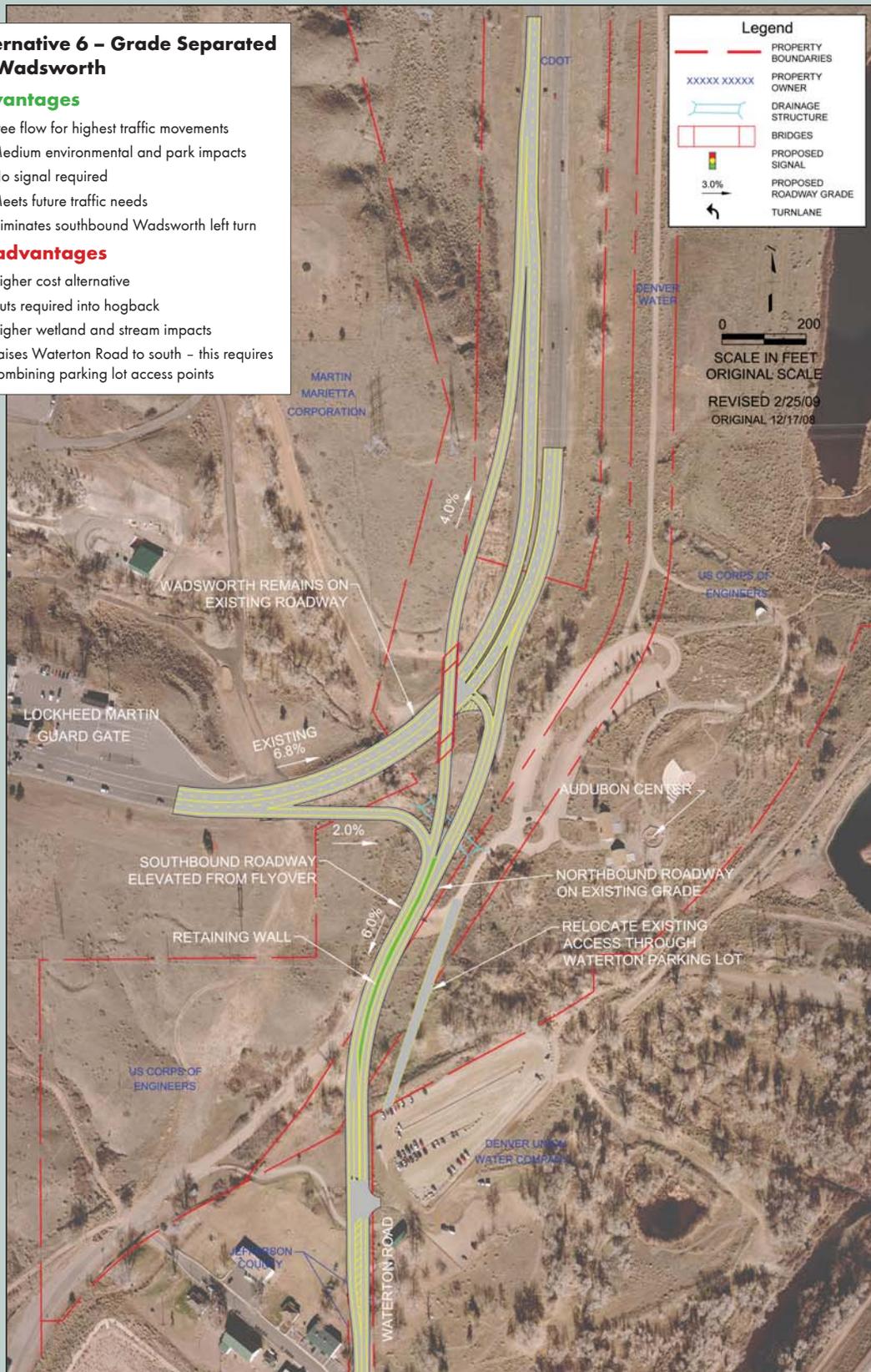
Alternative 6 – Grade Separated SB Wadsworth

Advantages

- Free flow for highest traffic movements
- Medium environmental and park impacts
- No signal required
- Meets future traffic needs
- Eliminates southbound Wadsworth left turn

Disadvantages

- Higher cost alternative
- Cuts required into hogback
- Higher wetland and stream impacts
- Raises Waterton Road to south – this requires combining parking lot access points



FEBRUARY 25, 2009

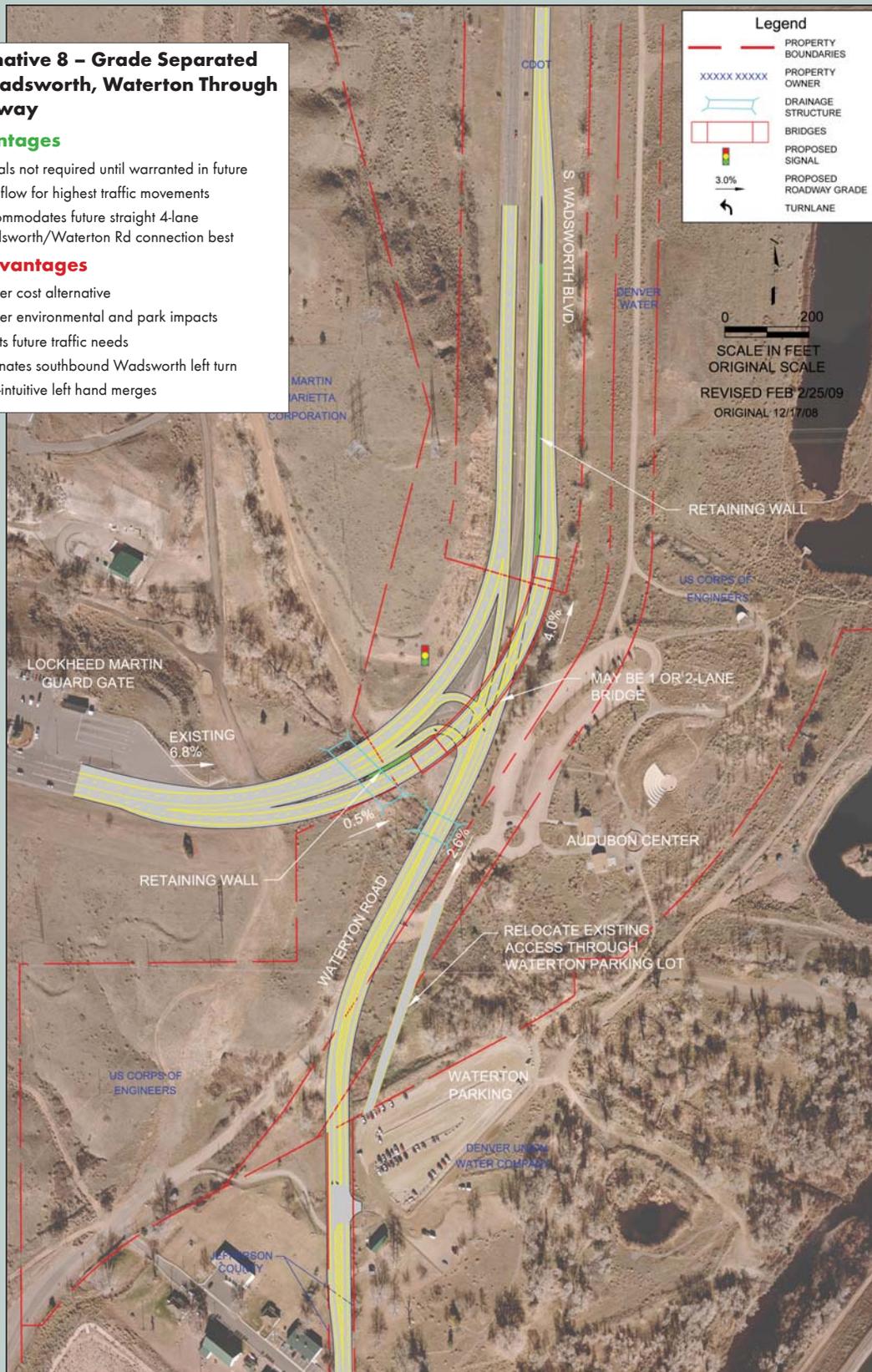
Alternative 8 – Grade Separated NB Wadsworth, Waterton Through Roadway

Advantages

- Signals not required until warranted in future
- Free flow for highest traffic movements
- Accommodates future straight 4-lane Wadsworth/Waterton Rd connection best

Disadvantages

- Higher cost alternative
- Higher environmental and park impacts
- Meets future traffic needs
- Eliminates southbound Wadsworth left turn
- Non-intuitive left hand merges



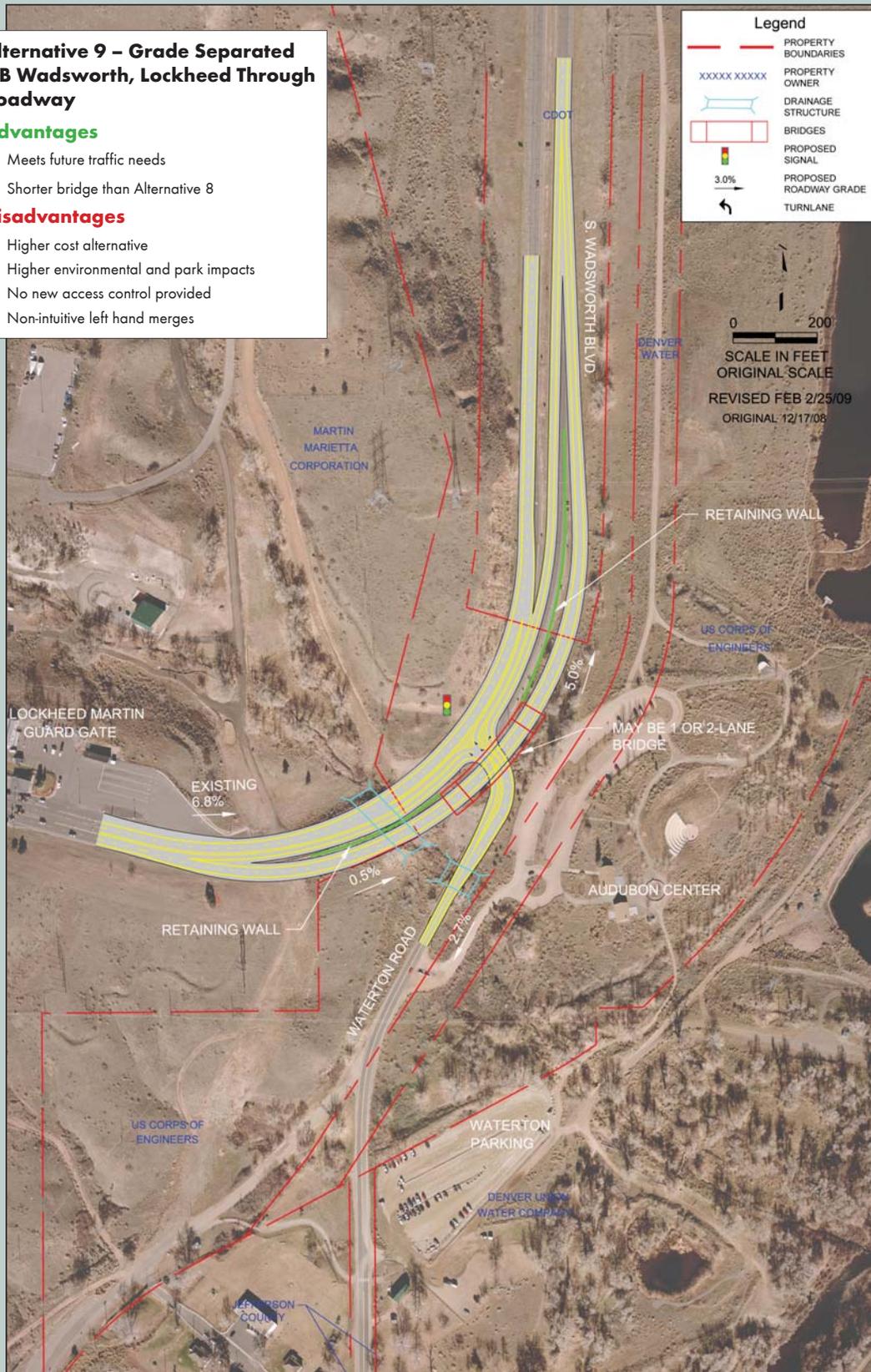
Alternative 9 – Grade Separated NB Wadsworth, Lockheed Through Roadway

Advantages

- Meets future traffic needs
- Shorter bridge than Alternative 8

Disadvantages

- Higher cost alternative
- Higher environmental and park impacts
- No new access control provided
- Non-intuitive left hand merges





- Water Resources and Water Quality.
- Wetlands and Vegetation.
- Floodplains.
- Wildlife and Fisheries.
- Threatened or Endangered Species and Sensitive/Rare Species.
- Historic Properties.
- Hazardous Materials.
- Recreation Resources.
- Cumulative Effects.
- Section 4(f) Resources*

**These resources include publicly-owned parks recreation areas, wildlife and waterfowl refuges, as well as eligible historic properties. Chatfield State Park and portions of Denver Water property may qualify for Section 4(f) protection.*



- Provide your comments! You may:
 - Complete a comment sheet and leave it in the Comments Box;
 - Write your comment on a 'sticky' note and place by the appropriate meeting board;
 - Provide comments via the project website at: www.Wadsworthwatertonstudy.com
- The Stakeholder Team will:
 - Review comments and input
 - Refine alternatives
 - Identify Preferred Alternative
 - Return for your input at next Public Open House early Summer 2009



South Wadsworth/ Waterton Road Intersection

FEASIBILITY STUDY

Thank You

for coming to the
Public Open House



FEBRUARY 25, 2009



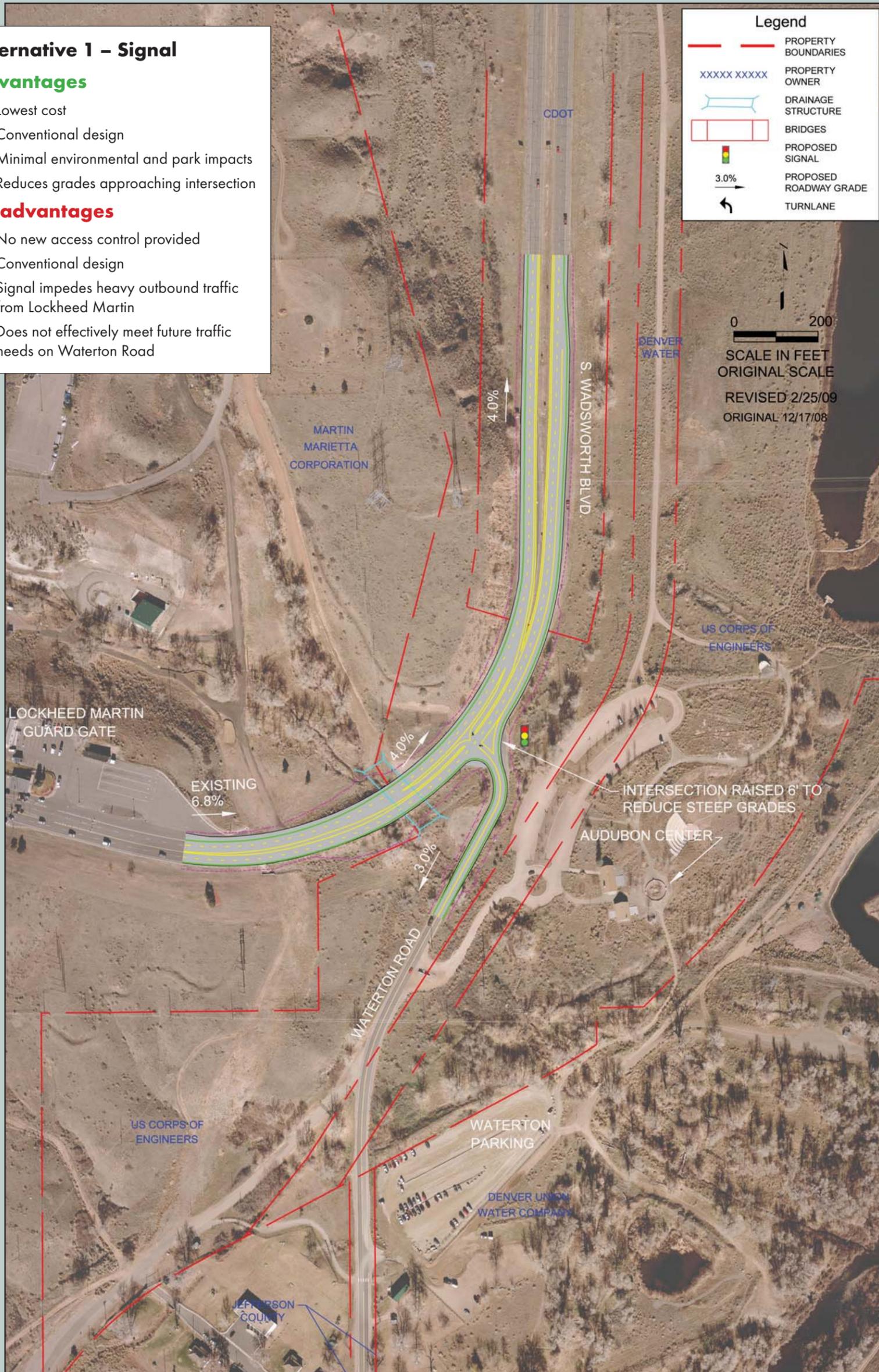
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Disadvantages

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- Signal impedes heavy outbound traffic from Lockheed Martin
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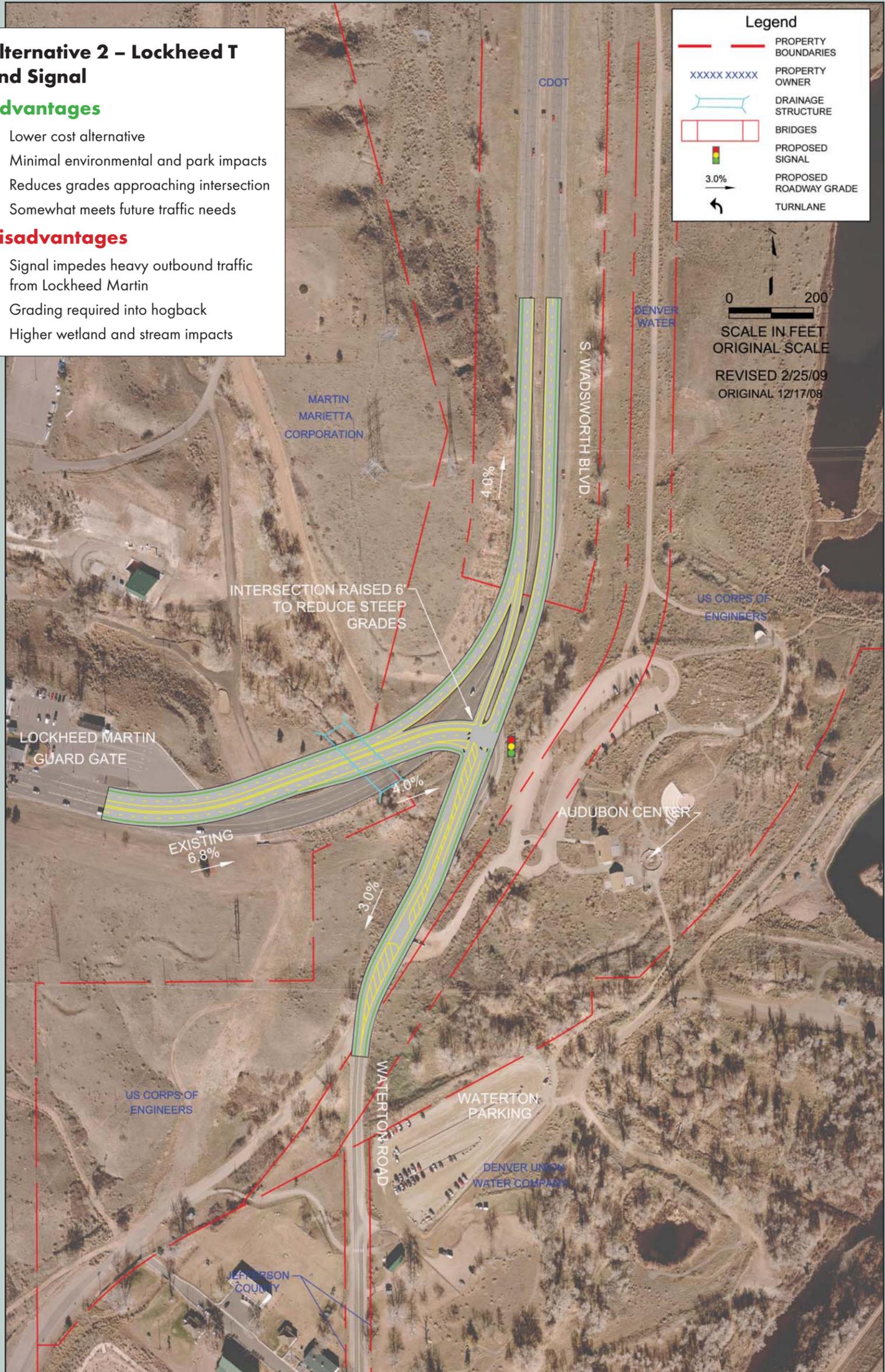
Alternative 2 – Lockheed T and Signal

Advantages

- Lower cost alternative
- Minimal environmental and park impacts
- Reduces grades approaching intersection
- Somewhat meets future traffic needs

Disadvantages

- Signal impedes heavy outbound traffic from Lockheed Martin
- Grading required into hogback
- Higher wetland and stream impacts



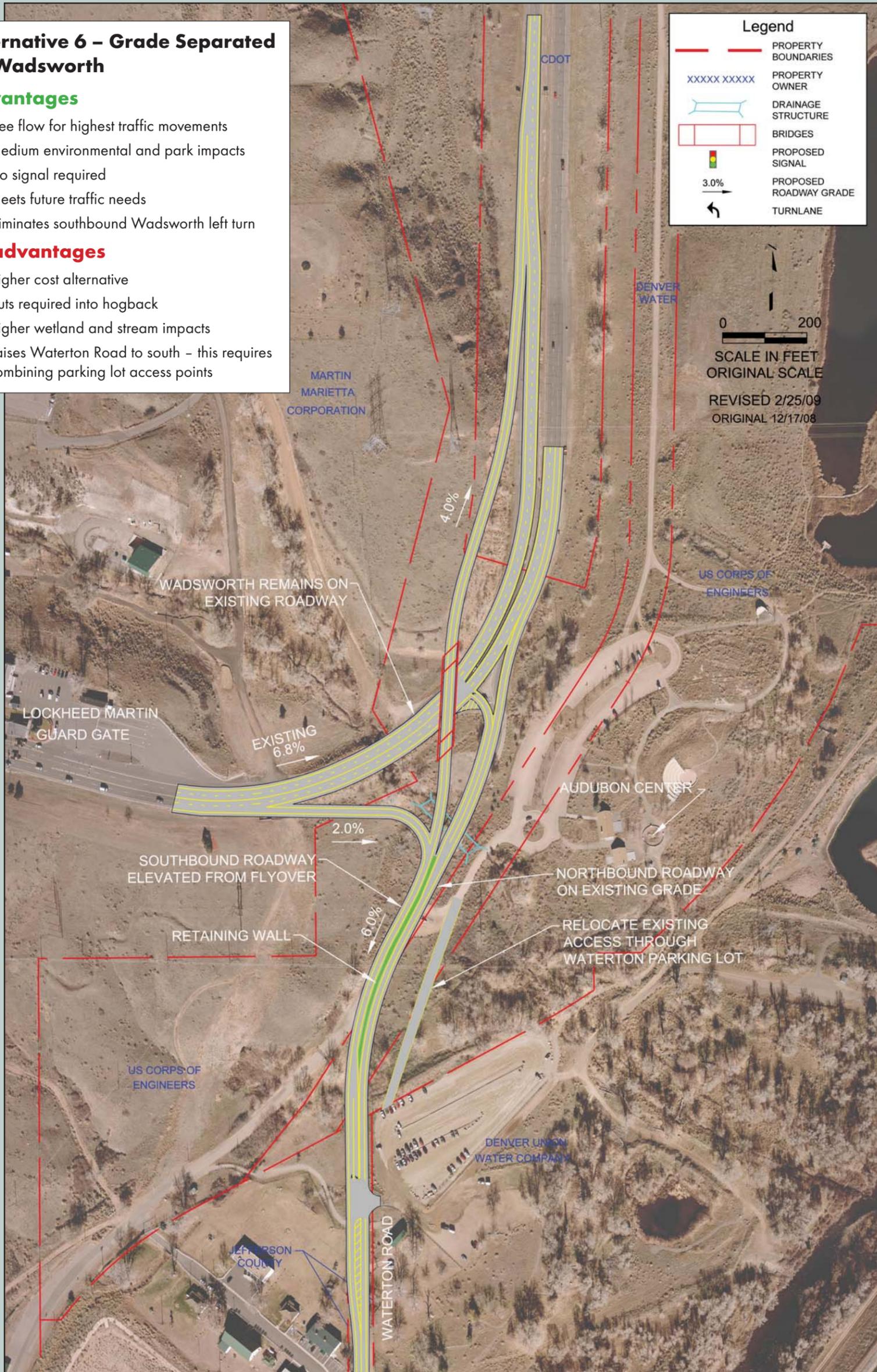
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Disadvantages

- Higher cost alternative
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- Higher wetland and stream impacts
- Raises Waterton Road to south – this requires combining parking lot access points



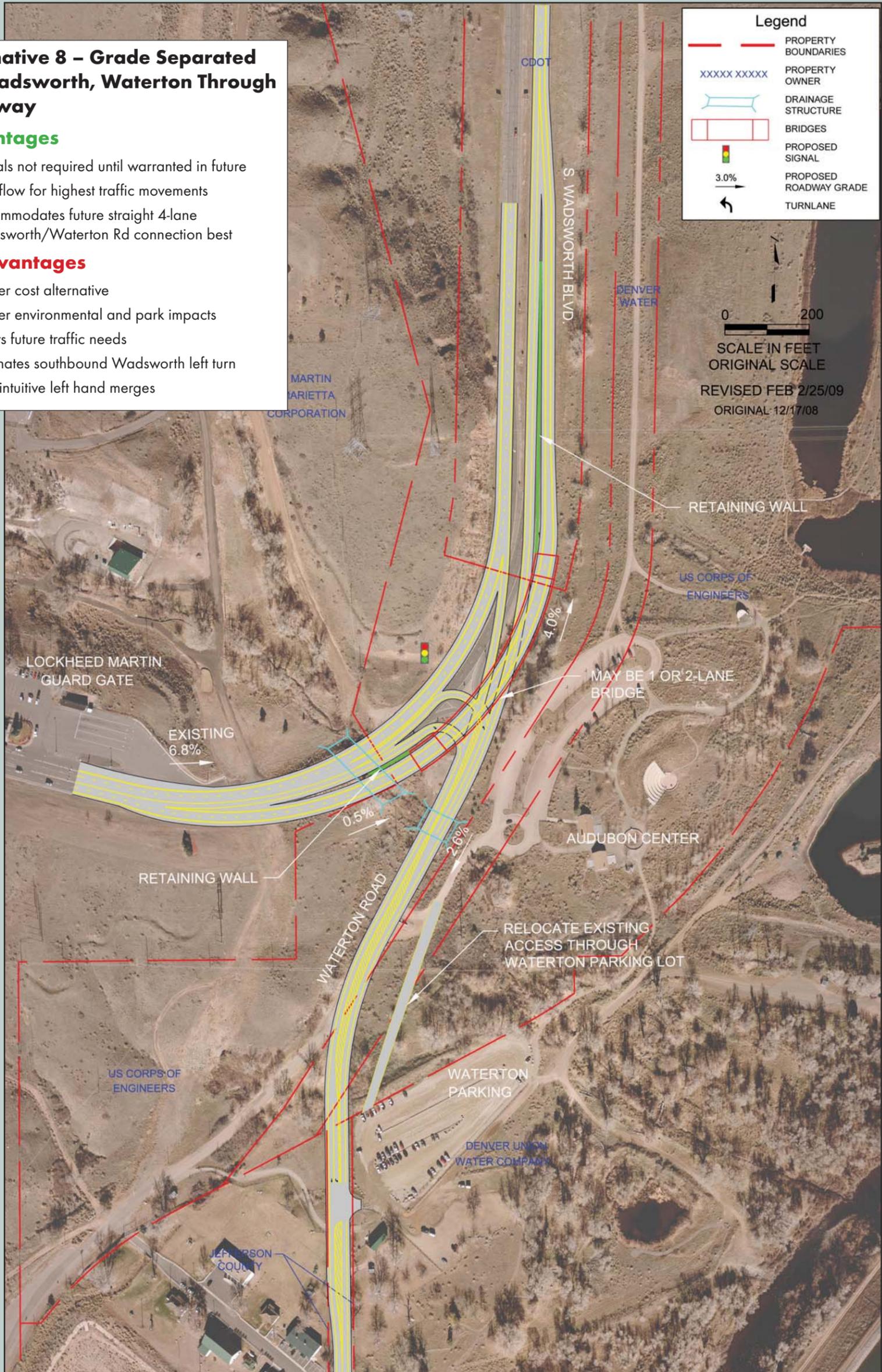
Alternative 8 – Grade Separated NB Wadsworth, Waterton Through Roadway

Advantages

- Signals not required until warranted in future
- Free flow for highest traffic movements
- Accommodates future straight 4-lane Wadsworth/Waterton Rd connection best

Disadvantages

- Higher cost alternative
- Higher environmental and park impacts
- Meets future traffic needs
- Eliminates southbound Wadsworth left turn
- Non-intuitive left hand merges



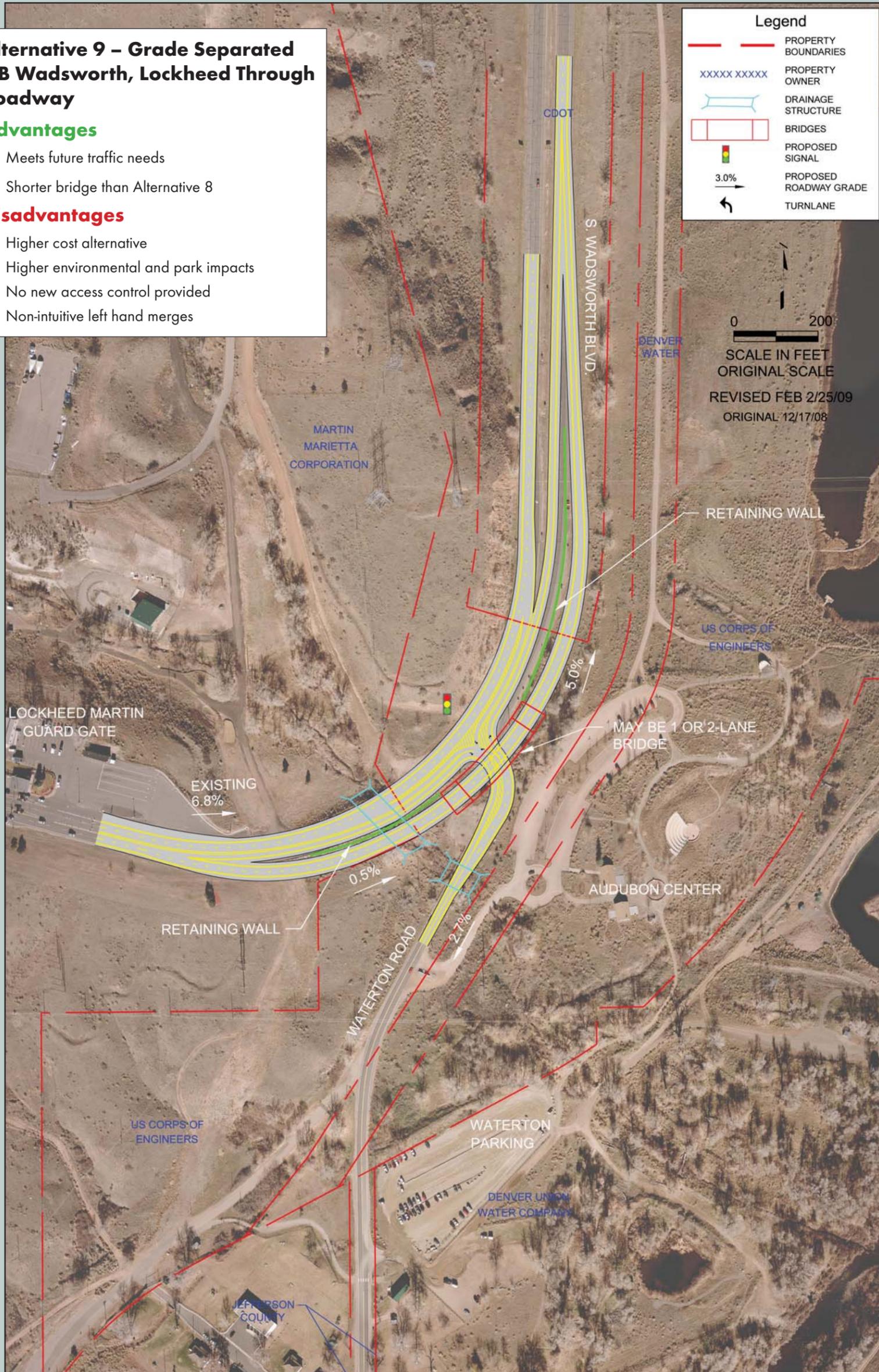
Alternative 9 – Grade Separated NB Wadsworth, Lockheed Through Roadway

Advantages

- Meets future traffic needs
- Shorter bridge than Alternative 8

Disadvantages

- Higher cost alternative
- Higher environmental and park impacts
- No new access control provided
- Non-intuitive left hand merges



Board	Comments
Alternative Evaluation Process	<ol style="list-style-type: none"> 1. Given all the issues, at least an <u>EA</u> should be prepared. 2. Please consider wildlife corridors and equestrian use and access.
Project goals	<ol style="list-style-type: none"> 1. Need to include the foreseeable upgrades to Waterton Road. 2. Need to <u>mitigate</u> unavoidable impacts. 3. Improve wildlife movement separate facilities to accommodate both. 4. Improve visitor access road across. 5. Preserve wildlife corridors. Chatfield Basin conservation network plans. 6. I've hit a deer here.
Purpose and Need	<ol style="list-style-type: none"> 1. Deer Habitat here. Have seen them cross the road 100 feet to the south. 2. Equestrian. 3. Resident and wildlife.
Alternative 1 Signal	<ol style="list-style-type: none"> 1. I wonder about Lockheeds anticipated growth rate and its impact, (i.e. the facilities and employee growth); that would be helpful to know. 2. What is the percent of LM staff that live in Noxborough? If high, would a longer wait at a traffic light really impact their commute? 3. Easiest, cheapest, least environmental impact.
Alternative 6 Grade Separated SB Wadsworth	<ol style="list-style-type: none"> 1. Please allow for bicyclists. There are two Recreation areas adjacent.
Alternative 8 Grade Separated NB Wadsworth, Waterton through Roadway	<ol style="list-style-type: none"> 1. Please allow for bicyclists. There are two Recreation areas adjacent. 2. Wondering about Lockhead's expected growth rate, (i.e. facilities and employee growth); that would be helpful to know. 3. Flashing yellow Signals for the Waterton ped crossing. Signals in directions should be relocated to the far side of the crosswalk.

**Appendix E.
Historic Resources Coordination**



OFFICE of ARCHAEOLOGY and HISTORIC PRESERVATION

August 18, 2009

Jim Paulmeno
Region 6 Planning and Environmental Manager
Colorado Department of Transportation, Region 6
2000 South Holly Street
Denver, CO 80222

Re: Determination of Eligibility, South Wadsworth/Waterton Road Intersection, Jefferson County, CO.
(CHS #55433)

Dear Mr. Paulmeno,

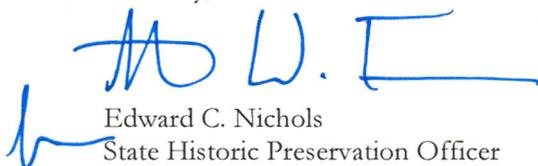
Thank you for your correspondence dated August 4, 2009 and received by our office on August 6, 2009 regarding the consultation of the above-mentioned project under Section 106 of the National Historic Preservation Act (Section 106).

After review of the provided additional information, we are unable to fully comment on the proposed Area of Potential Effects (APE). The APE is described on page 2 of the survey report, but the discussion does not include a narrative on how the APE incorporates the direct and indirect effects of the area that could be affected by the project. Please provide more information on direct and indirect effects of the geographic area that could be affected by the project. In regards to the submitted survey property, we concur that resource 5JF.1846 is not eligible for the National Register of Historic Places.

We look forward to further consultation in regards to the APE. We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings.

Please note that our compliance letter does not end the 30-day review period provided to other consulting parties. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Manager, at (303) 866-4678.

Sincerely,


Edward C. Nichols
State Historic Preservation Officer

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION

Region 6
2000 South Holly Street
Denver, CO 80222
(303) 757-9511
(303) 757-9907 FAX



September 23, 2009

Edward C. Nichols
State Historic Preservation Officer
Office of Archaeology and Historic Preservation
1300 Broadway
Denver, CO 80203

SUBJECT: Additional Information, Area of Potential Effects, South Wadsworth / Waterton Road Intersection, Jefferson County, Colorado (CHS #55433)

Dear Mr. Nichols,

This letter is in response to your correspondence dated August 18, 2009, in which you requested additional information regarding the Area of Potential Effects including the direct and indirect effects of the geographic area that could be affected by the project. In regards to effects determinations we are still currently working on design revisions and therefore are not yet ready to assess effects to historic resources. Further correspondence regarding this project and effects to the historic resources will be forthcoming.

We do have a small correction in regards to the Area of Potential Effect (APE). The APE is the same area described in our letter of August 4, 2009 requesting a determination of eligibility, except that it is just **north** (not west) of the South Platte River. The APE includes the parcels fronting both sides of South Wadsworth Boulevard and Waterton Road. In the area of Chatfield State Park, the APE follows the east side of an old access road that parallels South Wadsworth within the park. This project will improve the existing intersection, resulting in direct impacts to land along these roadways located on the fronting parcels. No buildings will be directly affected by this project. Indirect effects will include temporary construction impacts and those impacts should not extend past those properties that front along South Wadsworth Blvd. and Waterton Road. For these reasons, the APE is defined as the parcels adjacent to South Wadsworth and Waterton Road.

This area is characterized by parks and open space land uses with the Audubon Discovery Center at Chatfield State Park and the Waterton Canyon recreation area and parking lot. For an illustration of the APE, please refer to Figure 1 and Figure 2 in the *Historic Resources Survey Report, South Wadsworth / Waterton Road Intersection, Jefferson County, Colorado, July 2, 2009*.

If you have further comments on the APE or require additional information, please contact CDOT Staff Historian Dianna Litvak at (303) 757-9461.

Sincerely,

A handwritten signature in blue ink that reads "Jim Paulmeno". The signature is fluid and cursive, with the first name being particularly prominent.

Jim Paulmeno
Region 6 Planning and Environmental Manager

cc: Dennis Dempsey, Jefferson County
Jim Clarke, Jacobs
Jon Chesser, Region 6
Lisa Schoch, CDOT EPB



OFFICE of ARCHAEOLOGY and HISTORIC PRESERVATION

September 30, 2009

Jim Paulmeno
Region 6 Planning and Environmental Manager
Colorado Department of Transportation, Region 6
2000 South Holly Street
Denver, CO 80222

Re: Area of Potential Effects (APE), Determination of Eligibility, South Wadsworth/Waterton Road
Intersection, Jefferson County, CO.
(CHS #55433)

Dear Mr. Paulmeno,

Thank you for your additional information correspondence dated September 23, 2009 and received by our office on September 25, 2009 regarding the consultation of the above-mentioned project under Section 106 of the National Historic Preservation Act (Section 106). After review of the provided additional information, we do not object to the proposed Area of Potential Effects (APE) for the project.

If unidentified archaeological resources are discovered during construction, work must be interrupted until the resources have been evaluated in terms of the National Register criteria, 36 CFR 60.4, in consultation with this office.

We look forward to further consultation in regards to the APE. We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings.

Please note that our compliance letter does not end the 30-day review period provided to other consulting parties. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Manager, at (303) 866-4678.

Sincerely,

Edward C. Nichols
State Historic Preservation Officer

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION

Region 6, Planning and Environmental
2000 South Holly Street
Denver, CO 80222
(303) 757-9385
(303) 757-9036 FAX



June 21, 2010

Dennis Dempsey
Jefferson County Historic Preservation Commission
100 Jefferson County Parkway, Ste. 3550
Golden, CO 80419-3550

SUBJECT: Determinations of Eligibility and Effects and Notification of Section 4(f) *De minimis* Determination, South Wadsworth / Waterton Road Intersection, Jefferson County, Colorado (CHS #55433)

Dear Mr. Dempsey:

Your request to keep the Jefferson County Historical Commission informed on the Section 106 consultation for the above-referenced project was received by Dianna Litvak on Friday, August 21, 2009. This letter and associated materials constitutes CDOT's request for comments on Determinations of Eligibility and Effect to historic properties within the project Area of Potential Effect (APE). In addition, we have provided copies of correspondence between CDOT and SHPO regarding this project for your review. This letter, site, form, and attachments reflect new information for the Last Chance Ditch/Platte Canyon Ditch (5JF.258), including a new segment, 5JF.258.9, and request for comments on CDOT's determinations of effect to the Last Chance Ditch and the Kassler Water Treatment Plant Historic District (5JF.373). The cultural survey work was conducted by Gail Keeley of Hermsen Consultants.

Please refer to the attached correspondence requesting SHPO comments on our findings for more details on this project. Should you have any questions or comments, please contact Ms. Litvak at (303) 757-9461 or dianna.litvak@dot.state.co.us.

Sincerely,

Jane Hann
Action Region 6 Planning and Environmental Manager

Attachments: Attachment A, Historic Resources Setting
MDF and Linear Component Form, 5JF258.9
Revised Figure 2
Correspondence between SHPO and CDOT for South Wadsworth/Waterton Road Intersection project

cc: Gail Keeley, Hermsen Consultants
Kevin McDermott, Jacobs
Jon Chesser, Region 6
Lisa Schoch, EPB
Amy Pallante, Colorado SHPO

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION

Region 6, Planning and Environmental
2000 South Holly Street
Denver, CO 80222
(303) 757-9385
(303) 757-9036 FAX



June 21, 2010

Edward C. Nichols
State Historic Preservation Officer
Office of Archaeology and Historic Preservation
1300 Broadway
Denver, CO 80203

RE: Determinations of Eligibility and Effects and Notification of Section 4(f) *De minimis*
Determination, South Wadsworth / Waterton Road Intersection, Jefferson County, Colorado
(CHS #55433)

Dear Mr. Nichols,

This letter and associated materials constitute a request for concurrence on Determinations of Eligibility and Effect for the project referenced above. Previous correspondence between CDOT and SHPO for this project occurred in August and September 2009 during which time the agencies consulted on the Area of Potential Effect (APE), and SHPO concurred with CDOT's determinations of eligibility for historic properties within the APE. This letter, site, form, and attachments reflect new information for the Last Chance Ditch/Platte Canyon Ditch (5JF.258), including a new segment, 5JF.258.9, and request for comments on CDOT's determinations of effect to the Last Chance Ditch and the Kassler Water Treatment Plant Historic District (5JF.373). The cultural survey work was conducted by Gail Keeley of Hermsen Consultants.

Project Description

Jefferson County will administer and manage a project to improve the South Wadsworth Boulevard and Waterton Road intersection. The project is receiving federal transportation funding and CDOT and FHWA are involved in the preparation and review of environmental clearances. The purpose of the project is to improve the safety and traffic flow at the intersection.

The Preferred Alternative involves minor widening on Wadsworth Boulevard to accommodate a new protected acceleration lane for the left turn movement from northbound Waterton Road to southbound Wadsworth. Northbound Waterton to northbound Wadsworth will continue to use the existing roadway alignment and will have a long acceleration and merge lane onto northbound Wadsworth. Southbound Wadsworth to Waterton traffic will now exit Wadsworth north of the current intersection and utilize a new flyover ramp over Wadsworth and descend down to Waterton near the existing Waterton parking lot. Access for the existing Waterton parking lot, the Audubon Center and the Denver Water maintenance road will be combined into one intersection rather than three separate entrances with a median deceleration lane for left turns at this intersection. A pedestrian underpass will be constructed beneath Waterton Road to connect the parking on the east side with the Kassler Center and the Colorado/Waterton Canyon Trail.

Revised Eligibility Determinations

Previous Recording of Ditch Segment, Last Chance Ditch – Platte Canyon Ditch, 5JF. 258.3: This segment of the Last Chance / Platte Canyon Ditch was previously recorded on January 6, 2003 by Gordon C. Tucker, Jr. This ditch was one of the earliest features developed in the area and supported the region's early farms and is eligible under Criterion A for its association with early irrigation and early water systems. At one time, this ditch provided the water necessary to operate the sedimentation filter beds at the Kassler Water Treatment Plant which purified water for use by Denver citizens. The ditch has not been used for more than 35 years. This segment was determined to support the eligibility of the linear resource of which it is a part on April 10, 2003. The segment is a 3750 foot portion of the ditch from the Kassler Treatment Plant southwest to a headgate in the South Platte River.

Last Chance Ditch – Platte Canyon Ditch, 5JF. 258.9: This segment of ditch extends from the Kassler Treatment Plant to the north end of the APE for this project. Due to differences between the two segments observed in the field, Gail Keely of Hermsen Consultants prepared a management data form and linear component form for this additional segment of this ditch within the APE for this project.

The alignment of the segment of the ditch extending north and east from the treatment plant was incorrectly shown on Figure 2 of the survey report reviewed by your office on August 18, 2009. Several construction projects east of Waterton Road have impacted the original alignment of the ditch, including the construction of a water conduit, trail, and toilet facilities at Chatfield State Park, the embedding of a fiber optic cable, and the construction of a parking lot for recreational users of Waterton Canyon. As part of the parking lot construction, a drainage ditch was built immediately north of the parking lot. In our previous submittal, we thought that ditch was the Last Chance Ditch – Platte Canyon Ditch and it was shown as such on Figure 2 in the Historic Resources Survey Report. We have since obtained better information and have determined the original alignment is further north, based upon a September 1972 plan prepared by the Denver Water Department, the USGS map for the area, and our field observations. The corrected alignment is shown on the attached Figure 2 and Attachment A. Please replace the existing map in the Historic Resources Report with the attached updated Figure 2 for your records.

Construction and installation of the water conduit as shown on Attachment A obliterated the original ditch within the conduit ROW (approximately 100 feet wide and 3000 feet long). We have determined that because the original channel was obliterated for the conduit project, 5JF258.9 does not support the eligibility of the linear resource of which it is a part. The earthmoving and grading for that project as well as for the trail and toilet construction in Chatfield State Park, the construction of Wadsworth Blvd. and the burying of a fiber-optic cable have all destroyed evidence of the ditch in about half of this entire segment. Because of the discontinuous nature of the remaining portions, 5JF258.9 has lost integrity and does not support the eligibility of the entire ditch.

Effects Determinations

Last Chance Ditch – Platte Canyon Ditch, 5JF. 258: The proposed widening of Waterton Road will impact approximately 300 feet of land that at one time included the historic alignment of Last Chance / Platte Canyon Ditch in segment 5JF.258.9 but no longer has any evidence of the former ditch. The impacts result from the new acceleration and merge lane onto northbound Wadsworth and the new flyover ramp over Wadsworth to Waterton and the existing Waterton parking lot. There will also be temporary impacts from increased levels of noise and dust during construction to segment 5JF.258.3, but there will not be temporary construction easements or changes in access that would affect this segment of the ditch.

The work as described is depicted in Attachment A. The portion of the ditch alignment that will be affected by this project has been previously obliterated. CDOT has determined that the action constitutes *no adverse effect* to the entire ditch because the portions of the ditch that convey significance will remain intact and in their current condition.

Kassler Water Treatment Plant Historic District, 5JF.373: This property, owned by Denver Water, has a total of 22 contributing structures within the site of this important water treatment facility. The Kassler Treatment Plant was determined officially eligible for inclusion on the NRHP on August 4, 1998. It was also designated as an American Water Landmark by the American Water Works Association.

There would be no direct effects to this property. The road improvements to Waterton Road would stay within the existing road right-of-way adjacent to the Kassler property. There will be a temporary access change to the Kassler Water Treatment Plant during construction. There currently are three access points to the property, the northern most one on the Strontia Springs access road, then one directly off Waterton Road just south of the pedestrian crossing, and a southern access down by the ponds. The northern access will be closed for approximately a month during construction to reconfigure the grade going from the access road to Waterton. Denver Water will need to use one of the other entrances during that time. There are no expected construction easements required for any of the lands that make up the Kassler Water Treatment Plant Historic District although there will be construction easements on other portions of Denver Water property. Temporary indirect effects during construction of the roadway improvements would include increased levels of noise and dust. CDOT has determined that this would result in *no adverse effect* to this property because noise and dust impacts will not change or modify the current appearance and features of the property.

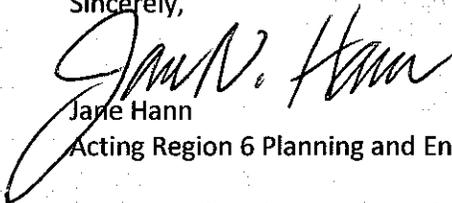
NOTIFICATION OF SECTION 4(f) DE MINIMIS DETERMINATION: The finding of No Adverse Effect outlined above for the Last Chance Ditch – Platte Canyon Ditch (5JF.258) and Kassler Water Treatment Plant Historic District (5JF.373) under Section 106 reflects a conclusion that for the Section 4(f) historic site affected by the project, those effects will not “alter, directly or indirectly, any of the characteristics of [the] historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” as described in 36 CFR § 800.5(a)(1). Based on this finding, FHWA may make a *de minimis* finding for the Section 4(f) requirements for this historic resource.

FHWA requests any comments by Colorado SHPO in the above-described finding of *de minimis* impact on historic properties for the proposed project. Your written concurrence on the No Adverse Effect as outlined above will be evidence that consultation requirements of Section 6009 of SAFETEA-LU, as they will be codified at 23 U.S.C. § 138(b)(2)(B) and (C), and 49 U.S.C. § 303(d)(2)(B) and (C) are satisfied. Additional comments will be considered for the *de minimis* finding.

The Jefferson County Historical Commission has requested to be a consulting party under Section 106 for this project. We will inform them of these determinations and request comments on these findings. Their comments will be forwarded to your office for review.

We request your concurrence with these determinations of eligibility and effects and an acknowledgement of the 4(f) *de minimis* determination. Your response is necessary for the Federal Highway Administration's compliance with Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's regulations. If you require additional information, please contact CDOT Staff Historian Dianna Litvak at 303-757-9461.

Sincerely,



Jane Hann
Acting Region 6 Planning and Environmental Manager

cc: Gail Keeley, Hermsen Consultants
Kevin McDermott, Jacobs
Jon Chesser, Region 6
Lisa Schoch, EPB
Dennis Dempsey, Jefferson County Historical Commission

Attachments: Attachment A, Historic Resources Setting
MDF and Linear Component Form, 5JF258.9
Revised Figure 2



HISTORY *Colorado*

June 30, 2010

RECEIVED
7/7/2010

Jane Hann
Acting Region 6 Planning and Environmental Manager
Colorado Department of Transportation
Region 6
2000 South Holly Street
Denver, CO 80222

Re: Determination of Eligibility and Effects and Notification of Section 4(f) De minimis Determination, South Wadsworth/Waterton Road Intersection, Jefferson County, CO. (CHS #55433)

Dear Ms. Hann:

Thank you for your correspondence dated June 21, 2010 and received by our office on June 24, 2010 regarding the review of the above-mentioned project under Section 106 of the National Historic Preservation Act (Section 106).

After review of the provided information, we concur that segment 5JF.258.9 does not retain integrity and, therefore, does not support the overall eligibility of the entire linear resource. We concur that segment 5JF.258.3 retains integrity and supports the overall eligibility of the entire linear resource. We also concur that resource 5JF.373 is eligible for the National Register of Historic Places.

After review of the scope of work and assessment of adverse effect under Section 106, we concur with the recommended finding of *no adverse effect* [36 CFR 800.5(b)] for resources 5JF.258 and 5JF.373. We acknowledge that FHWA may make a *de minimis* finding for the Section 4(f) requirements for historic resources.

If unidentified archaeological resources are discovered during construction, work must be interrupted until the resources have been evaluated in terms of the National Register criteria, 36 CFR 60.4, in consultation with this office.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings. Please note that our compliance letter does not end the 30-day review period provided to other consulting parties. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Manager, at (303) 866-4678.

Sincerely,

Edward C. Nichols
State Historic Preservation Officer

THE COLORADO HISTORICAL SOCIETY