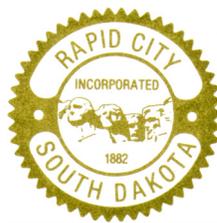


CHAPEL VALLEY ACCESS AND ROUTE ALIGNMENT STUDY

Final Report



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EXECUTIVE SUMMARY

The City of Rapid City, in cooperation with the Rapid City Area Metropolitan Planning Organization (MPO) has undertaken an access study of the Chapel Valley neighborhood in southwest Rapid City. Originally annexed in 1978, the 542-home neighborhood is located in a valley with steep forested slopes on all sides that isolate the residents from the surrounding area.

Because of its topography and vegetation, Chapel Valley residents are vulnerable to flooding and fire. The Chapel Lane Bridge over Rapid Creek currently provides the lone vehicular access to Chapel Valley. The bridge was submerged and collapsed in the flood of 1972. Rebuilt and recently improved, this single access leaves Chapel Valley's 500-plus residents vulnerable to being stranded should it close for any reason. The twofold purpose of this project is:

- (1) To develop alternative alignments for the alternate means of access for the Chapel Valley area, and,
- (2) to determine the feasibility of providing an alternate access for the Chapel Valley area.

The results of the study are best understood in two stages:

The first stage, the **Draft Report**, involved a comprehensive evaluation of all possible access alternatives that could be constructed as a year-round City street, built to meet City roadway design standards. These alternatives were evaluated and compared against each other across a range of criteria to identify the most feasible alternative for second access. The Draft *Chapel Valley Access and Route Alignment Study*, submitted to the City of Rapid City Planning Commission for review, described the study process and recommendations.

The second stage, the **Addendum**, followed a special Rapid City Planning Commission meeting held on July 27, 2010 to review the Draft Report. At this meeting, the Planning Commission unanimously approved a motion requesting the consultant to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further, they requested that an additional public meeting be held to review those options before reporting back to the Planning Commission. An Addendum was written to address the request of the Planning Commission.

This Executive Summary describes each stage of the study and provides recommendations.

Draft Report Summary

The project team cooperated with the public to develop a list of 14 possible alternate access alternatives. The alternatives, shown on **Figure S-1**, were developed to serve as year-round City streets, and, subsequently analyzed using the *City of Rapid City Street Design Criteria Manual* (City of Rapid City, June 1996 revision). An overall "footprint" was developed for each alternative, incorporating the amount of cut/fill earthwork needed to construct the alternative. Due to the significant slopes in the area, most of the alternatives required large earthwork quantities and impacted areas well beyond the pavement surface.



The list of 14 alternatives was reduced to four based on the following three critical questions: 1) Does the Alternative provide a second access, 2) Does the alternative meet City/State design criteria, and 3) Does the Alternative impact more than 20 properties(land and/or structures). The Level 1 screening results were presented to the public in November of 2009. The results of the initial screening are depicted graphically on **Figure S-2**. Each eliminated alternative is shown with its reason for screening. Property impacts in excess of 20 properties and structures served to eliminate four alternatives (A, C, D, E), one alternative does not provide a second access (M), slopes that did not meet the City’s requirement of vertical grades not exceeding 12 percent eliminated two alternatives (I, J), two alternatives were eliminated due to tight horizontal curves (below City’s minimum radius) (H, K), and one alternative was eliminated by falling short of SDDOT access spacing requirements along Jackson Boulevard.

Following initial screening, alternatives B, F, F2, G, and No Action were evaluated based on screening criteria developed in cooperation with the Project Advisory Group and the public. **Table S-1** identifies the screening criteria and the scoring of each alternative.

Table S-1 Final Screening Scores

Final Screening Criteria	Alternative Ranking and Aggregate Score				
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	NO ACTION
Impacts to Property Only	3.0	5.0	4.0	2.0	1.0
Impacts to Structures	4.0	1.5	5.0	3.0	1.5
Park and Trail impact	5.0	2.5	2.5	2.5	2.5
Impact on viewshed for ex. homes	2.0	4.0	4.0	4.0	1.0
Impact on treed acres	4.0	3.0	2.0	5.0	1.0
Drainage/Floodplain Issues	3.0	3.0	3.0	3.0	3.0
Provides two access points	2.5	2.5	2.5	2.5	5.0
Connects with regional roadway network	2.0	3.5	3.5	1.0	5.0
Cut-through traffic volumes	2.0	3.5	3.5	5.0	1.0
Fitness of Connecting Roads to serve additional traffic	2.0	4.5	4.5	3.0	1.0
Relative Construction Cost	3.0	2.0	4.0	5.0	1.0
Alternative Funding Availability	4.0	4.0	4.0	2.0	1.0
Geotechnical Feasibility	5.0	3.0	3.0	3.0	1.0
POINT TOTAL	41.5	42.0	45.5	41.0	25.0
Overall Alternative Rank	3	4	5	2	1



Not to Scale
July 2009

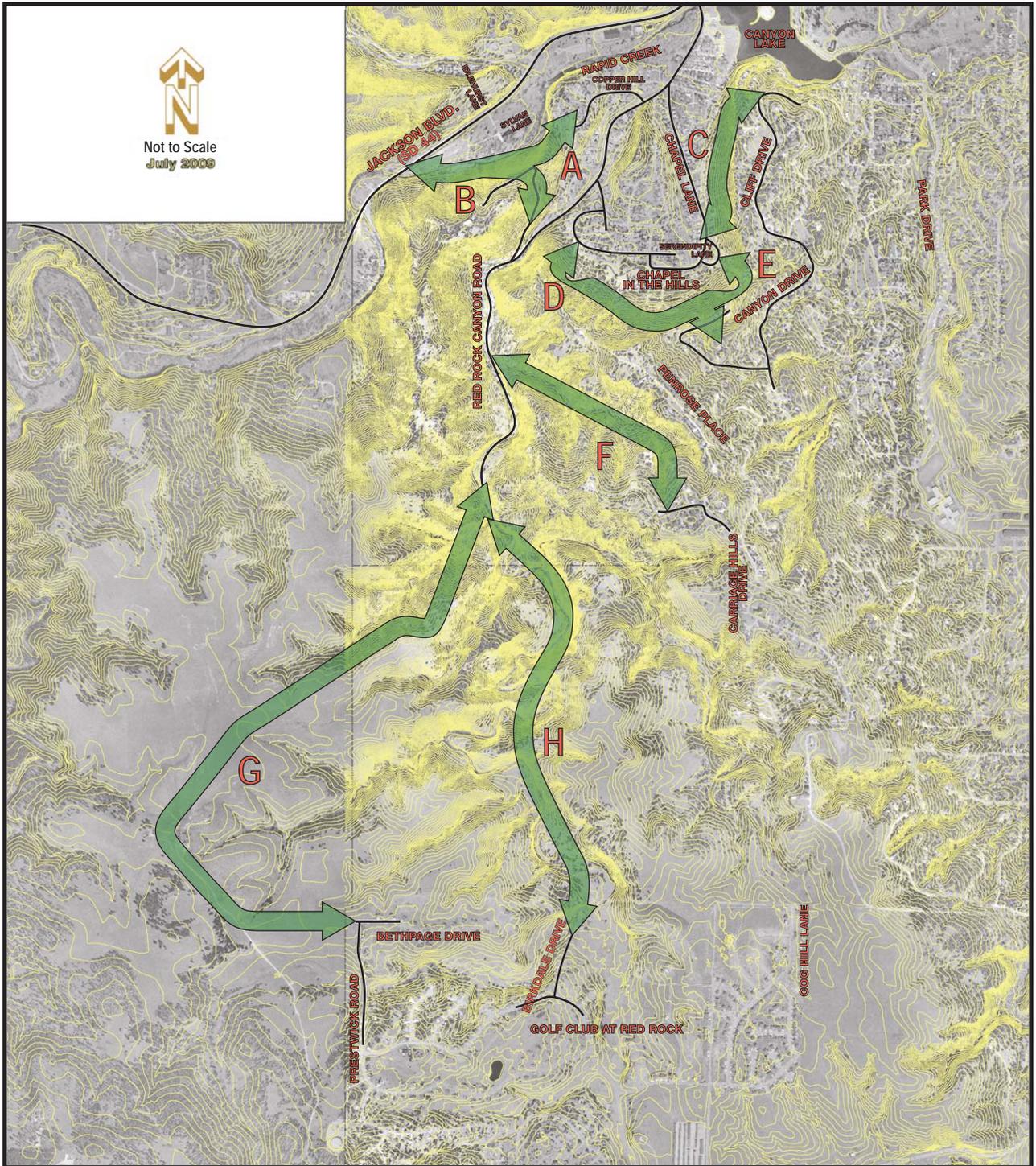


Figure S-1
Initial Alternative Concepts





The alternatives were ranked by performance within each criterion. Alternatives could be ranked from 1.0 to 5.0 in a given category. The top performer in a category was typically ranked 1.0 with the poorest typically awarded a 5.0. Each criterion was equally weighted in the final evaluation. **Table S-1** provides the screening scores within each category. As shown in **Table S-1**, the No Action alternative performs best when measured across each of the 13 criteria. This is due to there being no direct impacts on property, cost and no direct environmental impact.

Alternative G was selected as the recommended Most Feasible Alternative for providing an alternate access to Chapel Valley. This alternative's ability to serve within the City's Major Street plan, relatively low property impacts, and potential for developer funding provide advantages over other alternatives. **Figure S-3** depicts the Most Feasible Alternative preliminary conceptual layout. The alignment is shown with the cut and fill boundaries along its length. Based on this alignment, a conceptual opinion of probable costs to construct this roadway is approximately \$50 Million (excluding property and engineering costs or cost for improvements to existing facilities).

Based on public feedback and engineering analyses, there are a number of considerations that need to be addressed with implementation of the Most Feasible Alternative. These include drainage improvements to Red Rock Canyon Road, and design along the roadway to help mitigate higher traffic volumes and reduce travel speeds through residential areas.

Addendum Summary

In July of 2010, the Draft *Chapel Valley Access and Route Alignment Study* was submitted to the City of Rapid City Planning Commission for review and approval. Following the submittal, on July 27, a Special Planning Commission Meeting was held to discuss the study. At the meeting, the Planning Commission unanimously approved a motion requesting the consultant (Felsburg Holt & Ullevig) to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further they requested that an additional neighborhood meeting be held to review those options before reporting back to the Planning Commission.

Public comments on the draft report reinforced comments received at previous public meetings, including the concern that the recommended new alignment G would increase traffic volumes through the neighborhood and allow additional development, without improving emergency safety. Concern was also expressed regarding the high cost of constructing a second access.

Following public comment on the report at the meeting, the Planning Commission requested an updated report focused on safety for the existing residents rather than the development potential associated with a second access. To address this request, this addendum provides the following information:

- Emergency Management Planning – Identification of emergency management strategies, including hazard mitigation, emergency preparedness, emergency response, and recovery;

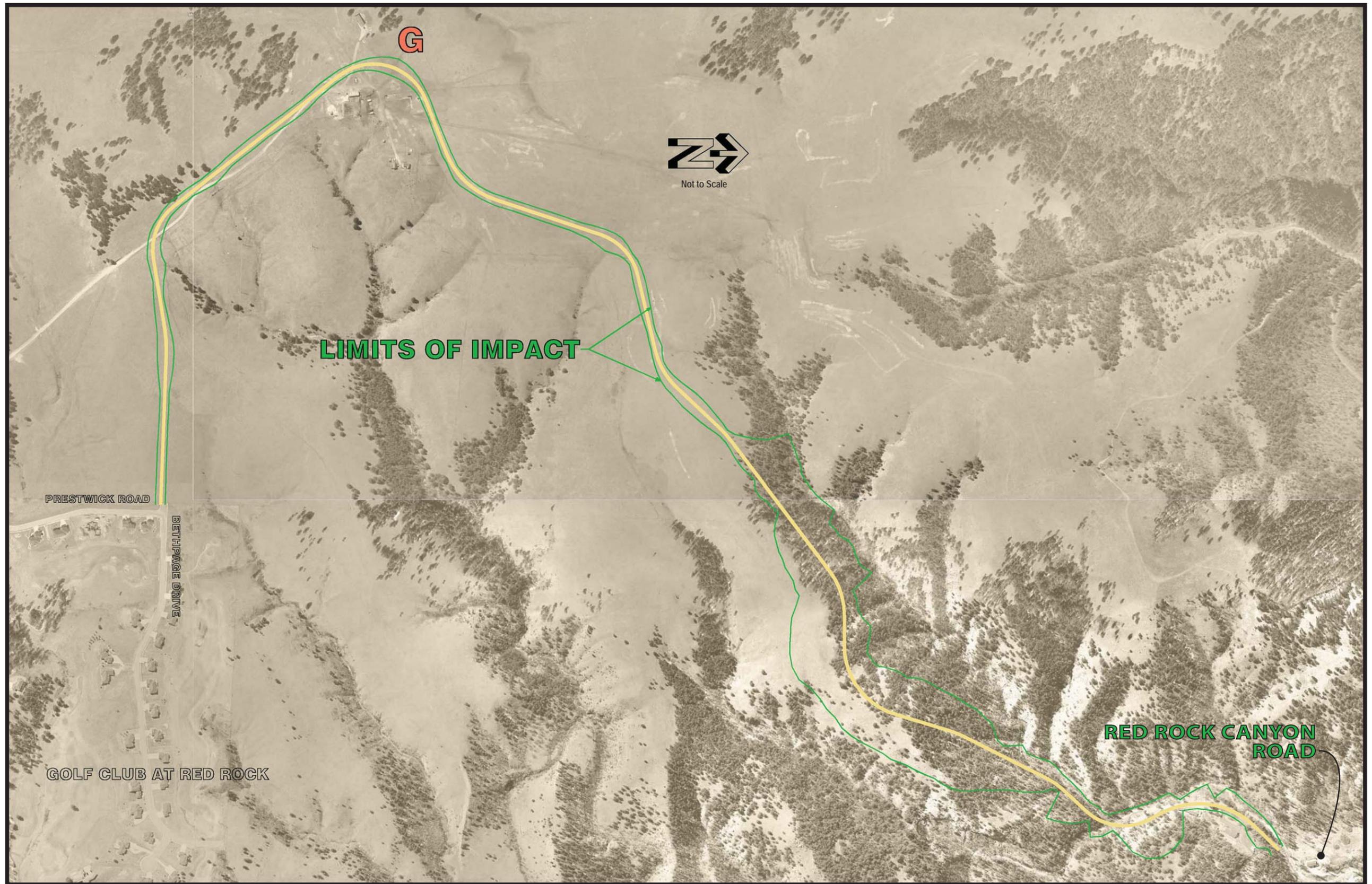


Figure S-3
Most Feasible Alternative Concept





- Emergency-only Alternatives Analysis – Updated analysis of several access routes assuming they can be built as more narrow, steep roads that would serve as emergency-only routes rather than full city streets. This analysis includes rating and screening of access alternatives alongside non-access alternatives; and
- Public Meeting Summary – Summary of a Public Open House held on October 20, 2010 to discuss the Draft Addendum.

Emergency Management Planning

A listing of potential emergency management strategies for use in Chapel Valley was developed with input and cooperation from a number of entities, including the general public, Pennington County Emergency Management, Rapid City Fire Department, Rapid City Growth Management, Rapid City Public Works, Rapid City Police Department and the Rapid City Metropolitan Planning Organization. This listing is preliminary, and may not include all possible strategies.

Emergency Management Strategies for Chapel Valley were organized into 3 phases: 1.) Hazard Mitigation, 2.) Emergency Preparedness, or 3.) Emergency Response. Table S-2 summarizes the strategies for future consideration. Implementation of these strategies will be a collaborative effort among City, County and State agencies. In order to implement these strategies, the formation of a Chapel Valley Emergency Management Task Force is recommended. This group would be comprised of Chapel Valley residents interested in pursuing emergency management strategies and Agency representatives experienced in emergency management.

Table S-2. Emergency Management Strategies

PHASE 1. HAZARD MITIGATION
<ul style="list-style-type: none"> • Hazard Identification • Fuel Reduction • Firewise Communities Program
PHASE 2. EMERGENCY PREPAREDNESS
<ul style="list-style-type: none"> • Advance Flood/Fire Warning Systems • Neighborhood Evacuation Plan <ul style="list-style-type: none"> • Household readiness • Wildfire Mitigation <ul style="list-style-type: none"> • Reverse 911 • Phone Tree • 2nd Access to Neighborhood for Emergency Only
PHASE 3. EMERGENCY RESPONSE
<ul style="list-style-type: none"> • Traffic Control Planning • Staging Areas



Emergency-Only Alternatives Analysis

Following the July 27, 2010 Planning Commission meeting, the access study was shifted to focus on the emergency-only characteristics of the access alternatives. The design criteria, previously set to match Rapid City's collector standards, were relaxed to reflect the characteristics of a route that would only be used for emergencies.

Alternatives previously eliminated due to excessive property impacts or not providing a second access were not considered as potential emergency-only routes. The emergency-only alternatives are depicted on **Figure S-4**. The eleven (11) alternatives include 8 second access alternatives and 3 non-access alternatives. The non-access alternatives are the No Action alternative, Alternative M and Alternative O. Alternative M would provide storm flow improvements to the existing Chapel Lane bridge. Alternative O would implement the emergency management strategies outlined in **Table S-2**.

Following the July 27 Planning Commission meeting, alternatives N2 and K2 were recommended by the Project Advisory Group. These options were included in the updated screening process and are depicted on **Figure S-4**.

Alternatives J (20 percent grade) and K2 (23 percent grade) were eliminated due to grades exceeding 16 percent, the maximum grade for emergency vehicles. The remaining nine alternatives were rated for performance in each of ten screening criteria. The screening criteria are:

- Impacts to property only
- Impacts to structures
- Impact on viewshed for existing homes
- Impact on treed acres
- Drainage/floodplain issues
- Provides two access points
- Cut-through traffic volumes
- Fitness of Connecting Roads to serve additional traffic
- Relative construction cost
- Geotechnical Feasibility

The alternatives were rated by performance within each criterion using a ranking method. The scoring methodology ensured that each criterion would be equally weighted in the final evaluation and no single criterion would lead to an inordinate difference between alternatives.

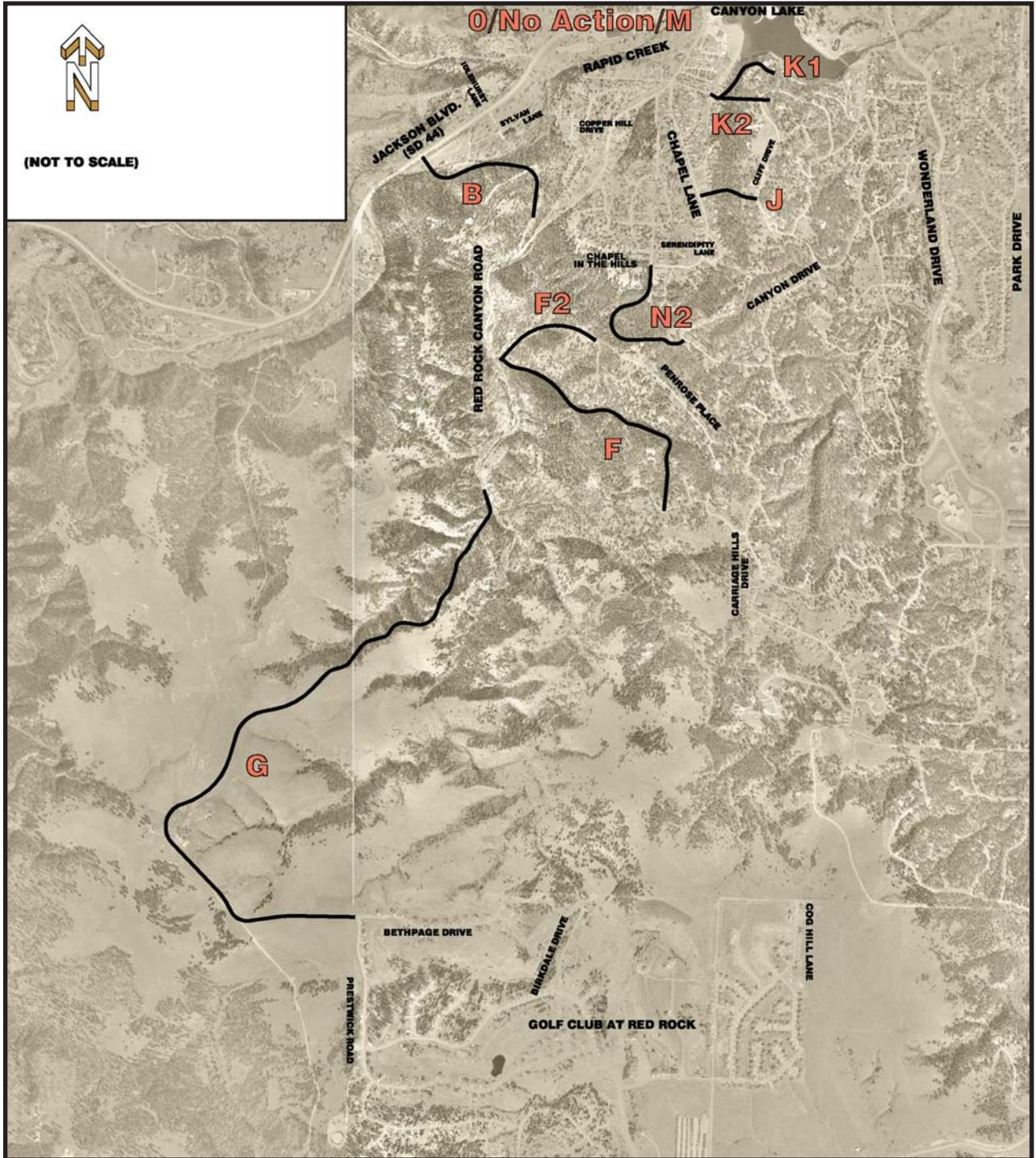


Figure S-4
Emergency Only Alternatives





Table S-3 provides the screening scores within each category and the final tally for each emergency-only alternative.

Table S-3. Screening Scores

	EMERGENCY-ONLY ALTERNATIVE								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Guest Road to Calle Baja	Alternative M - Bridge Storm Flow Improvements	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative O - Emergency Mngmt. Planning	NO ACTION
POINT TOTAL	60.5	63.0	58.5	62.0	57.5	31.5	60.0	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	3	6	2	1

As shown in **Table S-3**, the three alternatives that would not provide a second access (The No Action, Bridge Storm Flow Improvements and Emergency Management Planning (O) alternatives) rank highest of the emergency only options. Of the emergency-only access alternatives, it is important to note that all of the options would be extremely challenging to construct. All require significant earthwork and would impact valuable property and/or structures. Public discussion of second access alternatives to date has been contentious, and no clear favored alternative has emerged. Alternative K1 ranks best in screening performance. However, its footprint would significantly impact properties, structures and Canyon Lake.

Public Meeting Summary

A public meeting, the fourth Open House of the project, was held on October 20, 2010 following the online posting of the Addendum. A total of 58 people plus project team members attended the meeting. Attendees were generally pleased by the Addendum as a means of addressing emergency conditions in Chapel Valley. The public were supportive of implementing emergency management strategies and constructing a second, emergency only access to Chapel Valley. Several people were interested in participating in the Emergency Management Task Force.



Study Recommendations

Based on the Draft Report and Addendum, the following actions are recommended:

1. Implement Alternative O, Emergency Management Planning: This action would require minimal capital investment and would result in improved emergency readiness among Chapel Valley residents. Though the No Action Alternative ranks above Alternative O, the No Action would not improve emergency conditions. Implementation of Alternative O would require participation from Chapel Valley residents who would form the Emergency Management Task Force. Several Chapel Valley residents have indicated interest in participating, and it is recommended that the Task Force be formed immediately following completion of this study.
2. Review the need for storm flow capacity improvements through the existing Chapel Lane bridge over Rapid Creek. Named Alternative M, these improvements could increase flow capacity during a flood, perhaps via a new culvert beneath Chapel Lane south of the bridge.
3. If a second access for emergency use only is desired, Alternative K1 ranks best among the six emergency-only options. Alternative K1, however, holds only a 1 point advantage over the nearest alternative and several alternatives are closely clustered in the final scoring. It is evident that even a slight change to one of the screening measures could identify a different leading option. A more detailed engineering study is required to define the impacts and additional public meetings would be necessary before moving forward.
4. If a full-year City street is to be planned and constructed, Alternative G was selected as the recommended Most Feasible Alternative for providing an alternate access to Chapel Valley. This alternative's ability to serve within the City's Major Street plan, relatively low property impacts, and potential for developer funding provide advantages over other alternatives. Based on public feedback and engineering analyses, there are a number of considerations that need to be addressed with implementation of the Most Feasible Alternative. These include drainage improvements to Red Rock Canyon Road, and design along the roadway to help mitigate higher traffic volumes and reduce travel speeds through residential areas.



1.0 INTRODUCTION

This report provides the following content:

- ▶ Introduction to the project background, purpose, and process,
- ▶ a description of conditions within and surrounding the valley,
- ▶ text and graphics describing the alternatives development, screening and final selection process, and,
- ▶ a summary of the public information and participation process.

1.1 Background

Originally annexed in 1978, Chapel Valley is a 542-home residential neighborhood on the southwest edge of Rapid City, South Dakota. The development has steep slopes on all sides that isolate the neighborhood from the surrounding area. These forested slopes also serve to enhance the natural beauty of the area creating an appealing place to live. The Valley features the historic Chapel in the Hills and is bordered by Rapid Creek on the west. Because of its topography and vegetation, Chapel Valley is vulnerable to flooding and fires.

The Chapel Lane Bridge over Rapid Creek currently provides the only vehicular access to Chapel Valley. The bridge was submerged and collapsed in the flood of 1972, rebuilt and recently improved; this single access leaves Chapel Valley's 500-plus residents vulnerable to being stranded in emergencies. For this reason, the City of Rapid City and the Rapid City Area Metropolitan Planning Organization initiated an engineering effort to develop alternative alignments for an alternate means of access for the Chapel Valley area. This *Chapel Valley Access and Route Alignment Study* describes the process, analyses, and results of the search for a feasible alternate access.

1.2 Study Purpose

The twofold purpose of this project is:

- (1) To develop alternative alignments for the alternate means of access for the Chapel Valley area, and,
- (2) to determine the feasibility of providing an alternate access for the Chapel Valley area.

A need has been identified to develop an additional access to the Chapel Valley area for the following reasons:

- ▶ A man-made or natural event could block ingress or egress from the subdivision, which could create life/safety issues for residents and rescue personnel.
- ▶ Other less threatening situations could impede access and cause inconvenience for the residents



- ▶ Due to public safety concerns, further subdivision of land within this area has been prohibited, until an alternative means of access is developed
- ▶ An alternate access to Chapel Valley is needed to meet City requirements. The City of Rapid City requires that a single point of access cannot serve more than 40 homes. Chapel Lane currently provides the only access to 542 homes.

1.3 Study Area

A map of the Chapel Valley area is depicted on **Figure 1**. Jackson Boulevard extends across the north and west edges of the development. Canyon Lake is located north of Chapel Valley and the Carriage Hills subdivision to the southeast. Red Rock Estates is located south of Chapel Valley across the Selador Ranches property.

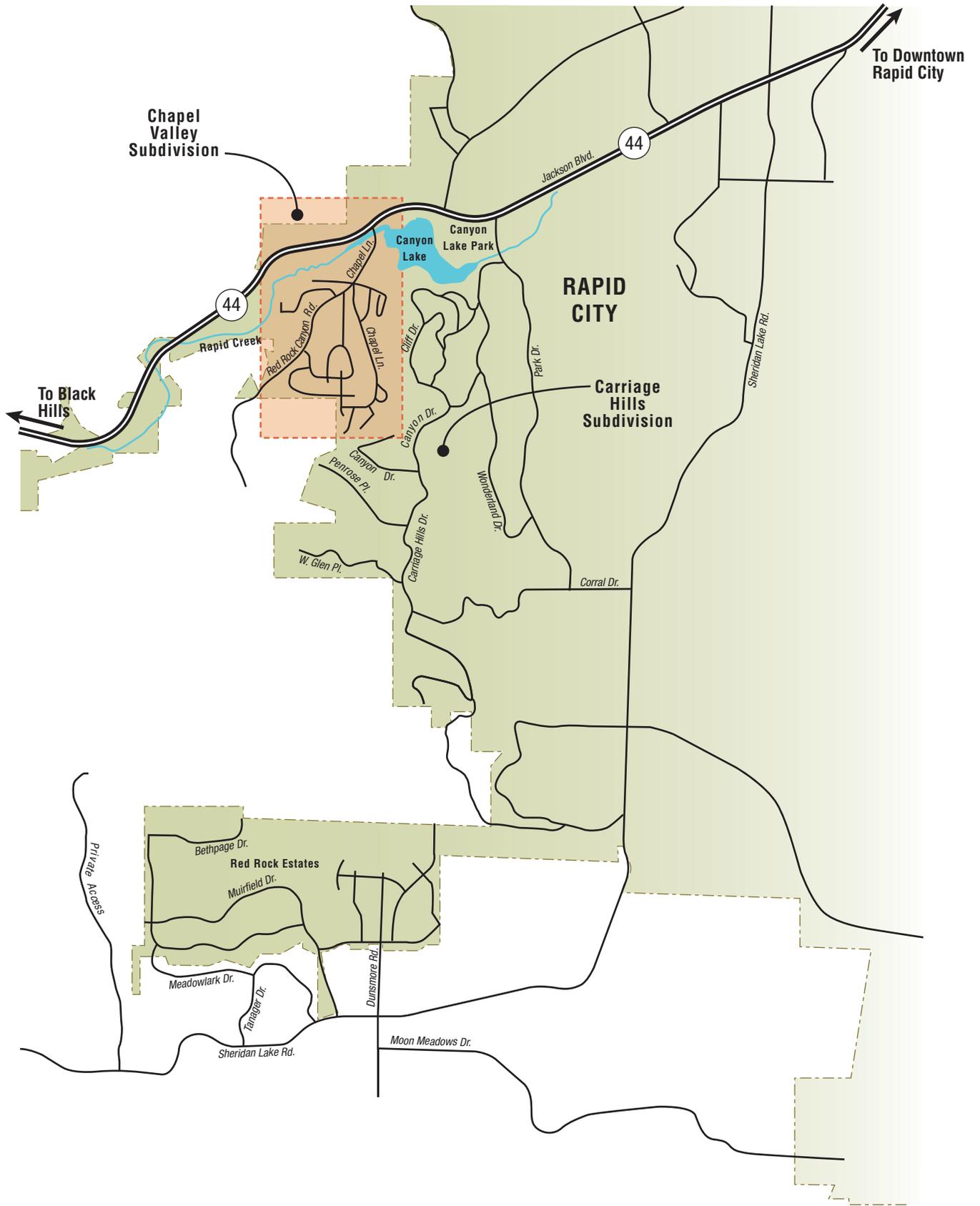


Figure 1
Vicinity Map





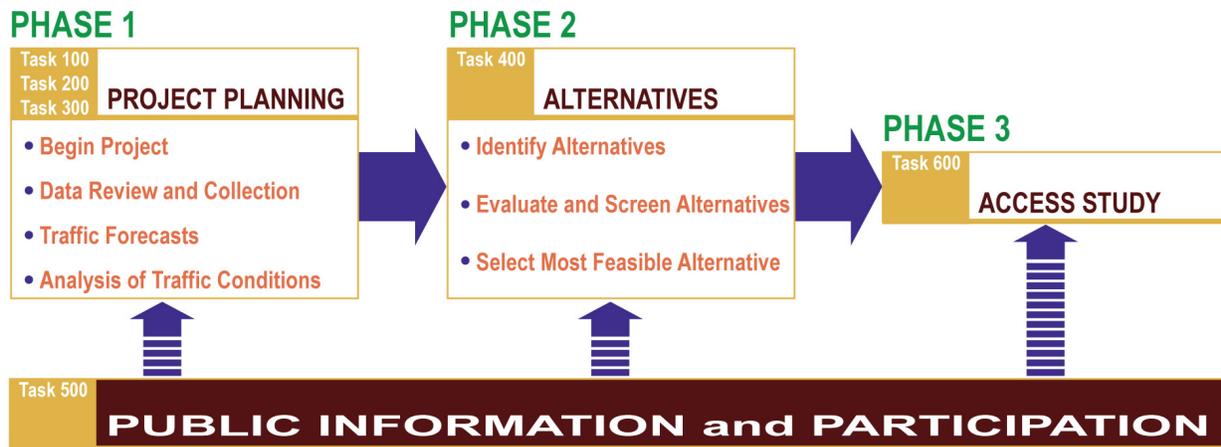
1.4 Project Process

1.4.1 Project Schedule

The project process is depicted on **Figure 2**. The study began in June 2009 with a Project Advisory Group meeting to confirm project goals and objectives and begin data collection. During the initial month of the study, existing traffic operations, safety, topographic, land use, and drainage conditions were assessed based on information provided by City Staff in Geographic Information Systems (GIS) format. These data, along with future traffic volume forecasts for the Jackson Boulevard/Chapel Lane intersection and initial options for roadway connections, were presented to the public at the Community Input meeting in July 2009. The public provided suggestions of possible alignments for an alternate access.

A list of all possible alternatives was developed, combining the public suggestions with the project team’s investigations. The list of 14 alternatives was reduced to 4 based on three critical questions, and the Level 1 screening results were presented to the public in November 2009. Following the public meeting, the alternatives were evaluated against a list of criteria and ranked according to performance and a Most Feasible Alternative has been selected. This report documents the alternatives development, screening and selection process.

Figure 2. Project Process





1.4.2 Project Advisory Group

A Project Advisory Group was formed prior to the project kickoff in June 2009. The Committee consists of Rapid City staff, Rapid City Metropolitan Planning Organization (MPO) Staff, a Federal Highway Administration representative, and SDDOT staff. The Project Advisory Group was responsible for coordinating public involvement, serving as a resource for the consultant team, convening for regular progress meetings, and reviewing consultant deliverables. This committee met five times throughout the study process.

1.4.3 Public Information and Participation

The public information and participation plan for the project included three public open house meetings and content posted on the City's website. The initial public meeting in July 2009 provided attendees with the opportunity to review suggested alignment connecting points and provide their own ideas for alternate access. The second public meeting, held in November 2009, presented the alternatives to the public along with the screening process that shortened the list to 4 options. The final meeting in April 2010 will present the recommended Most Feasible Alternative for public review and comment.



2.0 DESCRIPTION OF VALLEY CONDITIONS

2.1 Roadway Network

As discussed earlier, vehicular access to the Chapel Valley neighborhood is exclusively provided via Chapel Lane. Chapel Lane intersects with Jackson Boulevard (South Dakota Highway 44) north of Chapel Valley. Chapel Lane crosses Rapid Creek immediately south of the intersection via a bridge that was recently widened to provide three travel lanes. The intersection is unsignalized with exclusive left and right turn lanes provided along Chapel Lane approaching Jackson Boulevard.

Figure 3 depicts the Rapid City Major Street Plan in the Chapel Valley area. Principal Arterials include Jackson Boulevard and Sheridan Lake Road. Park Drive is a Minor Arterial west of the subdivision and Wonderland Drive a Collector. Chapel Lane serves as a Collector. South of Chapel Valley, Red Rock Estates is served by Muirfield Drive, a Collector.

2.2 Traffic Conditions

The City conducted weekday peak hour traffic counts at the Chapel Lane / Jackson Boulevard intersection. The results of these counts are shown on **Figure 3** along with daily traffic counts conducted in June 2009. The primary peak hour movement is to and from the east along Jackson Boulevard. Chapel Lane carries approximately 4,230 vehicles per day (vpd) south of Jackson Boulevard. Jackson Boulevard carries approximately 10,930 vpd east of Chapel Lane and drops to approximately 4,720 vpd west of Chapel Lane. According to growth factors provided by the SDDOT, Jackson Boulevard traffic is anticipated to grow at a rate of approximately 1.5 percent per year to the Year 2035. Jackson Boulevard east of Chapel Lane would reach approximately 16,300 vpd by the Year 2035 at this growth rate.

Traffic operations within the study area were evaluated based on techniques documented in the *Highway Capacity Manual*, (Transportation Research Board, 2000) using the existing traffic volumes and intersection geometry. Level of Service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. Level of Service is described by a letter designation ranging from A to F, with Level of Service A representing generally free-flow travel, while Level of Service F represents congested conditions. For signalized intersections, Level of Service is calculated for the entire intersection, while Level of Service for unsignalized intersections is calculated for movements which must yield right-of-way to other traffic movements.

As shown on **Figure 4**, movements through the Chapel Lane / Jackson Boulevard intersection currently operate at Level of Service C or better during peak hours. Movements from Chapel Lane onto Jackson Boulevard would remain at Level of Service C conditions through the Year 2035. Left turns from the Blessed Sacrament Church would operate at LOS E by the Year 2035, but relatively few vehicles would be affected by this condition during peak hours (5-10). A traffic signal is not anticipated to be warranted at the intersection by the Year 2035 based on signalization warrants outlined in the *Manual on Uniform Traffic Control Devices* (Federal Highway Administration, 2003 Edition).

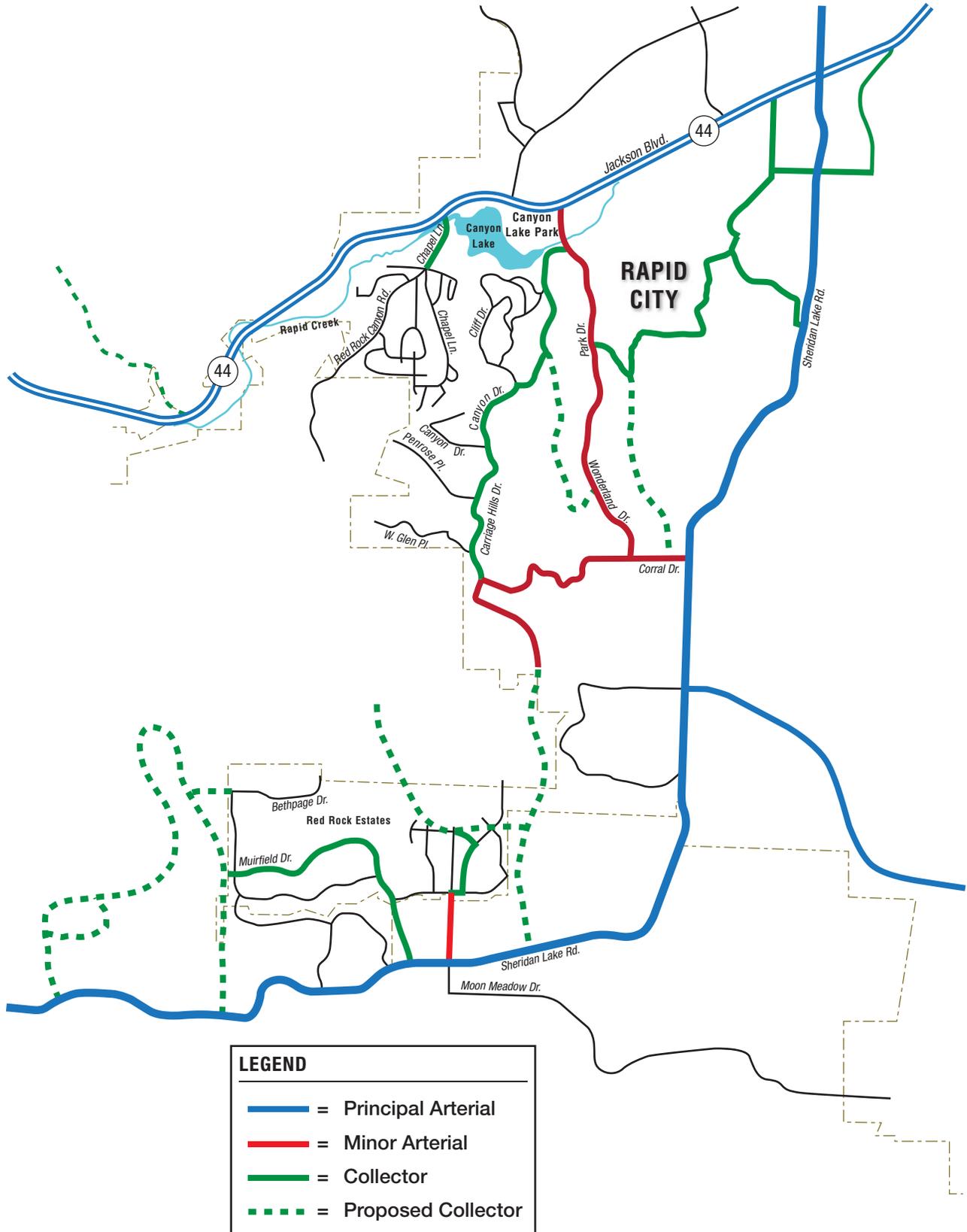
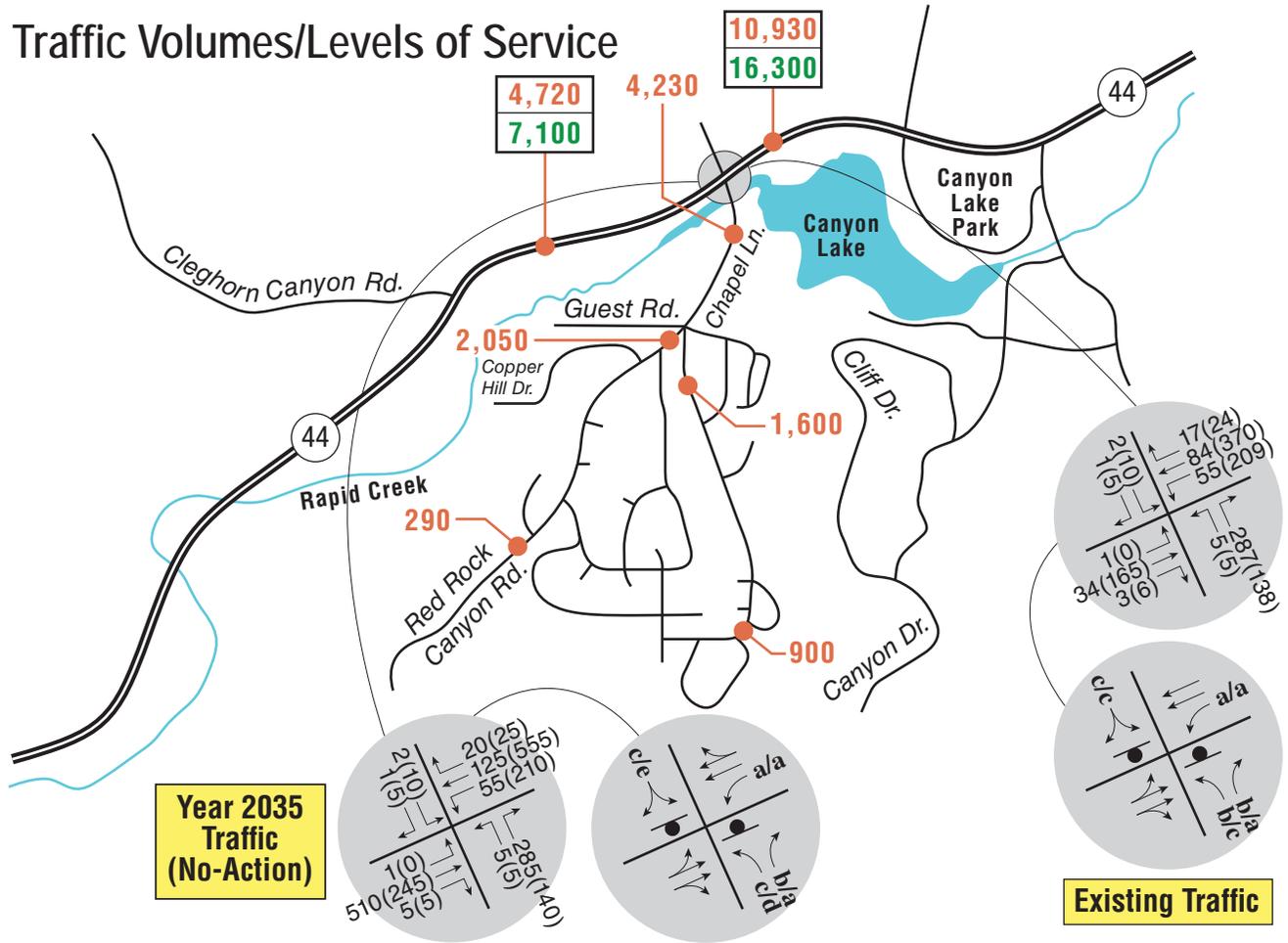


Figure 3
Area Major Street Plan



Traffic Volumes/Levels of Service



LEGEND

XXXX = Daily Traffic Volume (Vehicles Per Day) From 2006-2009

XXXX = Year 2035 Forecast Traffic Volume

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

x/x = AM/AM Peak Hour Unsignalized Levels of Service

● = Stop Sign

Chapel Lane/SH 44 Crash History 2006-2008

LEGEND

- = Sideswipe
- = Left Turn Angle
- = Broadside
- = Fixed Object Collision
- = Animal Collision
- = Rear End Collision

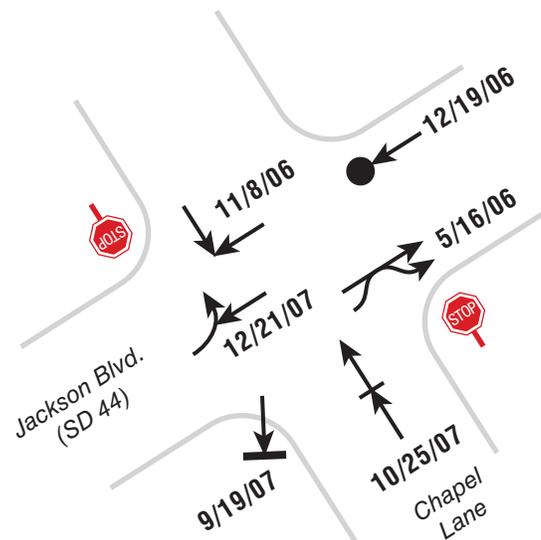


Figure 4
Traffic Conditions





2.3 Other Area Features

Figure 5 depicts a number of land and environmental features surrounding and within Chapel Valley. Several are described in the following subsections.

2.3.1 Drainage

As shown on **Figure 5**, the Rapid Creek floodplain runs adjacent to Jackson Boulevard making it difficult to access the Chapel Valley development from the north. The floodplain also extends along portions of Red Rock Canyon Road. Residents along Red Rock Canyon south of Chapel Valley recount flooding through the canyon during heavy rains.

2.3.2 Topography

As mentioned earlier, steep slopes surround the Chapel Valley development, placing homes and roadways within the floor of a bowl. **Figure 5** depicts shading of particularly steep grades in the area. Slopes of up to 55 percent separate the Chapel Valley floor from Cliff Drive, which traces the top of the ridge along the Valley's east side. Similar constraints exist south of the Chapel Valley development, where slopes up to 35 percent boundary the valley. Slopes up to 75 percent confine the valley on the west side, followed by a precipitous drop to Rapid Creek.

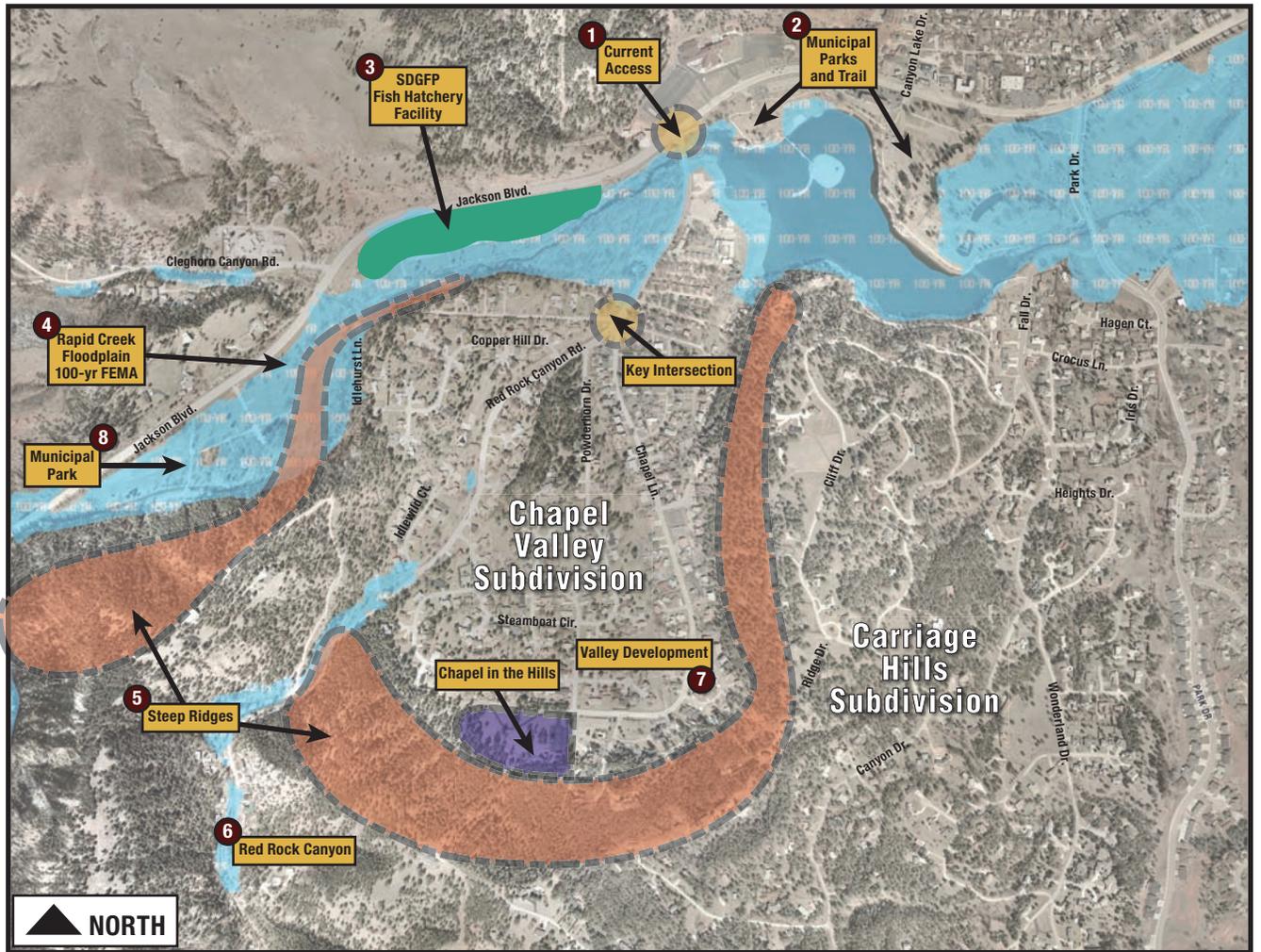
A notch in the surrounding slopes occurs at the southwest edge of the development, where Red Rock Canyon begins. Red Rock Canyon Road extends south into the canyon and approximately 25 single-family homes line the roadway.

2.3.3 Development/Land Use

East: Single-family residences are located within the Carriage Hills Subdivision east of Chapel Valley. The Canyon Lake dam is located immediately east of Chapel Lane, creating Canyon Lake and its adjoining park. The Canyon Lake Resort is located at the northeast end of Chapel Valley.

South: Chapel in the Hills lies at the south end of Chapel Valley. Across the southern ridge, Canyon Drive and Penrose Place provide access to large-lot residential properties on rocky land.

West: Rapid Creek is located across the west ridge of Chapel Valley. Along the Creek, Braeburn Park provides open space. The Cleghorn Springs Fish Hatchery is located along the creek toward the northwest end of Chapel Valley.



Photos



Figure 5
Project Context Map





3.0 ALTERNATIVES

3.1 Development of Alternatives

The development of alternatives began with identification of conceptual connections between points inside Chapel Valley and points outside of Chapel Valley. These connections are shown as broad arrow lines in **Figure 6**. These general options were presented to the public at the Public Input meeting in July of 2009. Approximately 100 attendees reviewed the connections and added their own suggestions to the alternatives.

Following this meeting, the project team developed conceptual alignment alternatives. The alternatives were developed to serve as year-round City streets and subsequently analyzed using the *City of Rapid City Street Design Criteria Manual* (City of Rapid City, June 1996 revision). **Table 1** identifies the Roadway Design Criteria used to conduct preliminary engineering of the alternatives.

Table 1. Roadway Design Criteria

Design Criteria Description	Value
Design Speed - MPH	25-35
Curve Radius (Min.) - Feet for 25 MPH	135'
Curve Radius (Min.) - Feet for 35 MPH	320'
e-Max	0.06 ft/ft (6%)
Maximum Grade (Local Road)	12% (8% Preferred)
Minimum Grade	0.5% (w/ Curb)
Stopping Sight Distance - Feet for 25 MPH	150'
Stopping Sight Distance - Feet for 30 MPH	200'
Stopping Sight Distance - Feet for 35 MPH	250'
K-value for crest curve (Min.) for 25 MPH	20
K-value for crest curve (Min.) for 30 MPH	30
K-value for crest curve (Min.) for 35 MPH	50
K-value for sag curve (Min.) for 25 MPH	30
K-value for sag curve (Min.) for 30 MPH	40
K-value for sag curve (Min.) for 35 MPH	50
Normal Cross-Slope	0.015 ft/ft (1.5%) to 0.03 ft/ft (3.0%) (5% Max.)
Paved Width (Min.) - Feet	24'
Curb and Gutter	Not Required for Rural
Right-of-Way Width (Min.) - Feet	60'
Intersecting Angle	60-90 degrees
Intersection Approach Grade	5% (Max.) for 50' (Min.)
Intersecting Radius	25-30'
Driveway Connection Grades (Max.)	16%

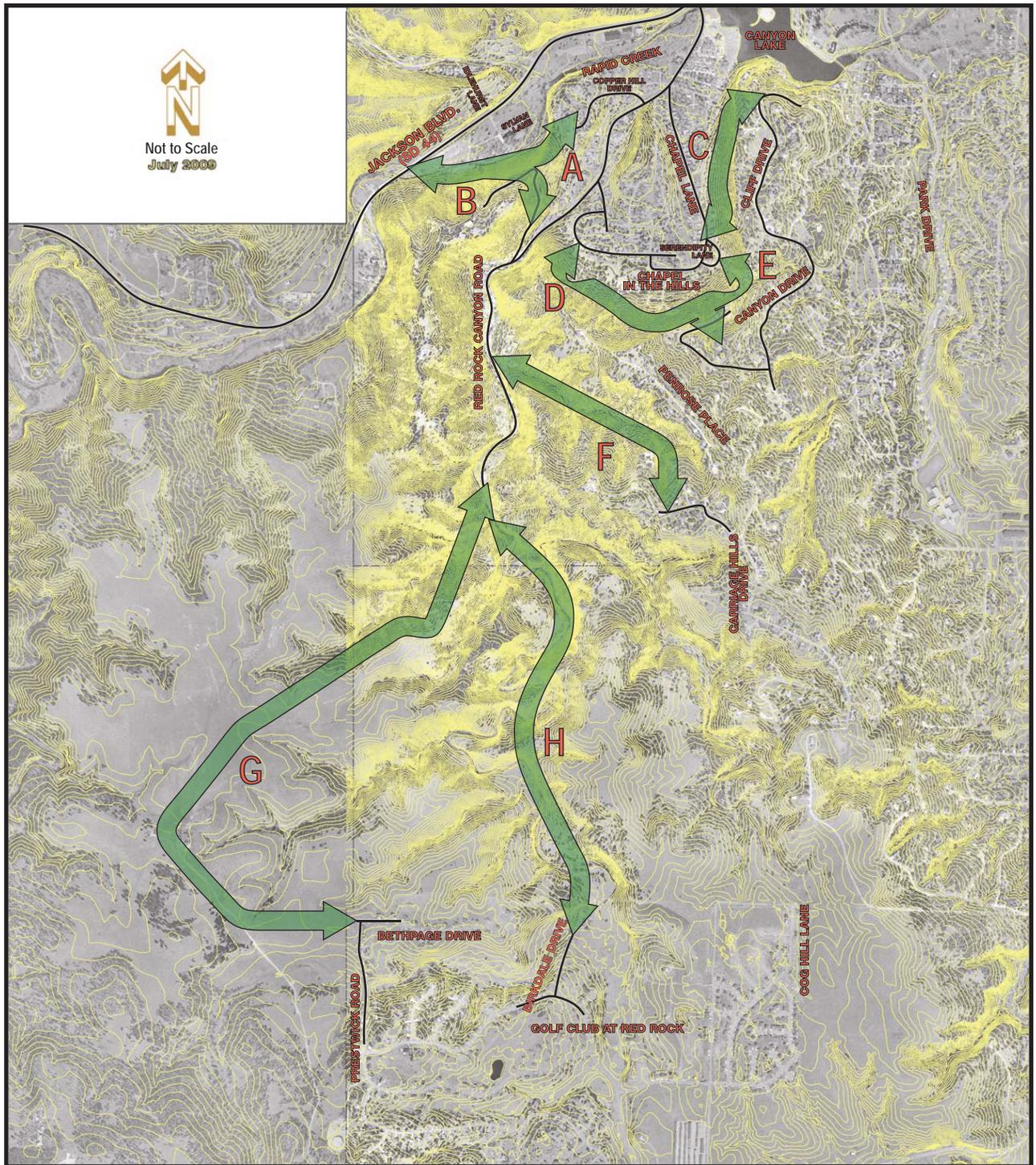


Figure 6
Initial Connecting Points





A total of 14 alternatives were developed: 13 build alternatives plus the No Action alternative. An overall “footprint” was developed for each alternative, incorporating the amount of cut/fill earthwork needed to construct the alternative. Due to the significant slopes in the area, most of the alternatives require large earthwork quantities and impacted areas well beyond the pavement surface. **Table 2** lists the alternatives, and the alternatives are depicted graphically on **Figure 7**.

Table 2. List of Initial Access Alternatives

Alternative	Description
NA	No Action
A	Jackson Boulevard to Copper Hill Drive
B	Jackson Boulevard to Red Rock Canyon Road
C	Chapel Lane to Cliff Drive
D	Steamboat Circle to Canyon Drive
E	Serendipity Lane to Canyon Drive
F	Red Rock Canyon Road to West Glen
G	Red Rock Canyon Road to Prestwick Road
H	Red Rock Canyon Road to Birkdale Drive
I	Red Rock Canyon Road to Penrose Place
J	Chapel Lane to Cliff Drive
K	Lakeshore
L	Red Rock Canyon Road to Jackson Boulevard (new bridge)
M	Widen Chapel Lane bridge over Rapid Creek



Not to Scale
April 2010

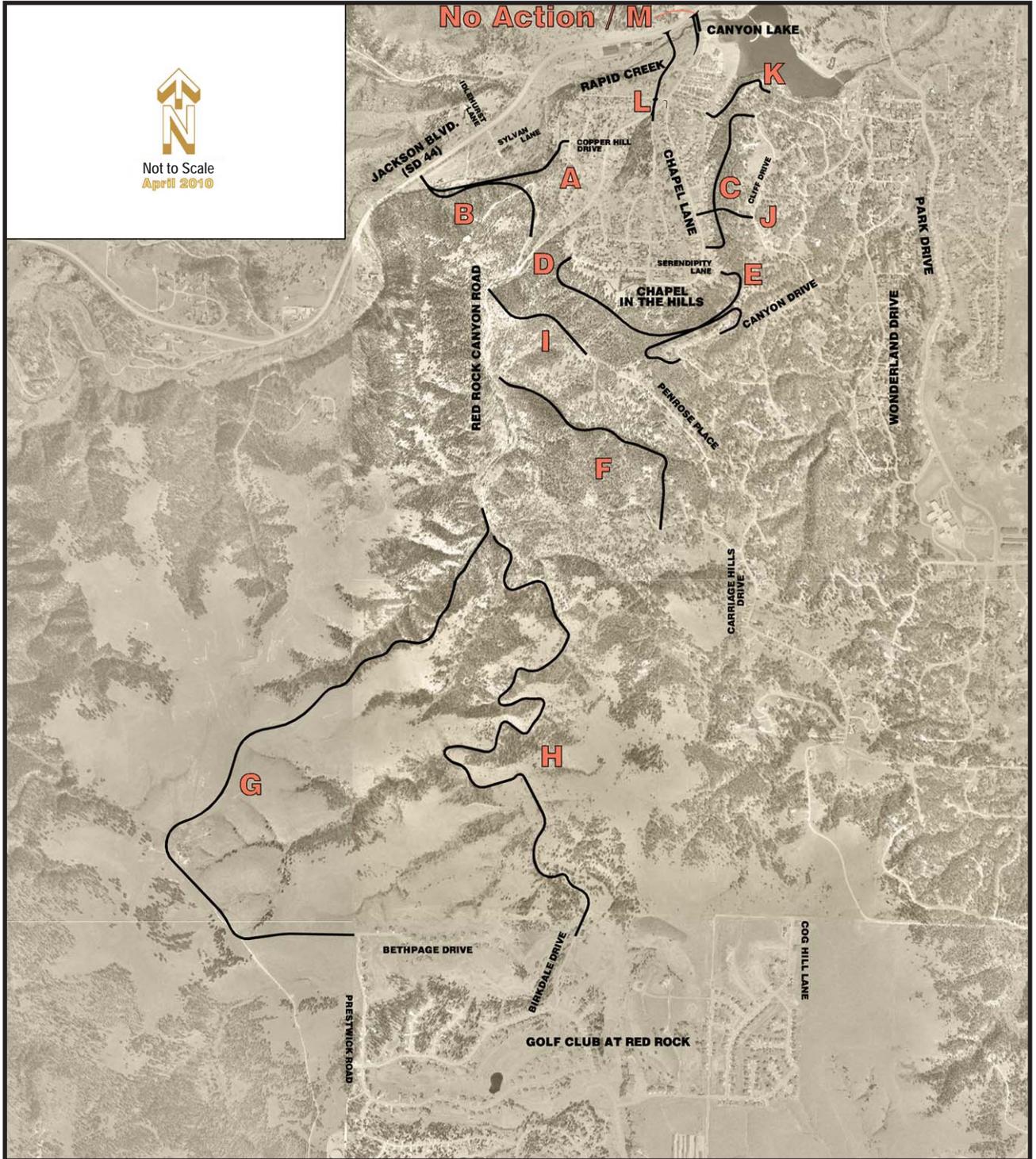


Figure 7
Initial Alternative Concepts





3.2 Alternative Screening

3.2.1 Screening Process

The alternative screening process is depicted on **Figure 8**. The first level of screening is depicted within the top portion of the triangle. During the first level screening, each of the 14 conceptual alignments were reviewed relative to the following three questions:

1. Does the Alternative actually provide a second access in addition to the Chapel Lane connection?
2. Can the Alternative be reasonably designed to meet City/State Street Design Criteria?
3. Does the Alternative impact more than 20 properties (land and/or structures)?

Upon surviving the initial screening, the remaining alternatives were evaluated based on a number of criteria and rated relative to each other. The best performing alternative within the categories listed in the bottom portion of **Figure 8** was chosen as the Most Feasible Alternative.

3.2.2 Initial Screening

The results of the initial screening are depicted graphically on **Figure 9**. Each eliminated alternative is shown with its reason for screening. Property impacts in excess of 20 properties and structures served to eliminate four alternatives (A, C, D, E), one alternative does not provide a second access (M), slopes that did not meet the City’s requirement of vertical grades not exceeding 12 percent eliminated two alternatives (I, J), two alternatives were eliminated due to tight horizontal curves (below City’s minimum radius) (H, K), and one alternative was eliminated by falling short of SDDOT access spacing requirements along Jackson Boulevard. **Table 3** outlines the reasons for keeping or eliminating each of the 14 alternatives.

Table 3. Initial Screening Results

Alternative	Decision	Reasons
A	Eliminated	Excessive Property Impacts (22)
B	Kept	Provides 2nd access, meets criteria, lower property impact
C	Eliminated	Excessive Property Impacts (70)
D	Eliminated	Excessive Property Impacts (29)
E	Eliminated	Excessive Property Impacts (87)
F	Kept	Provides 2nd access, meets criteria, lower property impact
G	Kept	Provides 2nd access, meets criteria, lower property impact
H	Eliminated	Tight Horizontal Curves (75')
I	Eliminated	Too Steep (16.91%)
J	Eliminated	Too Steep (19.60%)
K	Eliminated	Tight Horizontal Curves (45')
L	Eliminated	Too close to existing access (500')
M	Eliminated	Does not provide 2nd access
No Action	Kept	Low impacts, kept for comparison purposes

Project Progress

Number of Alternatives

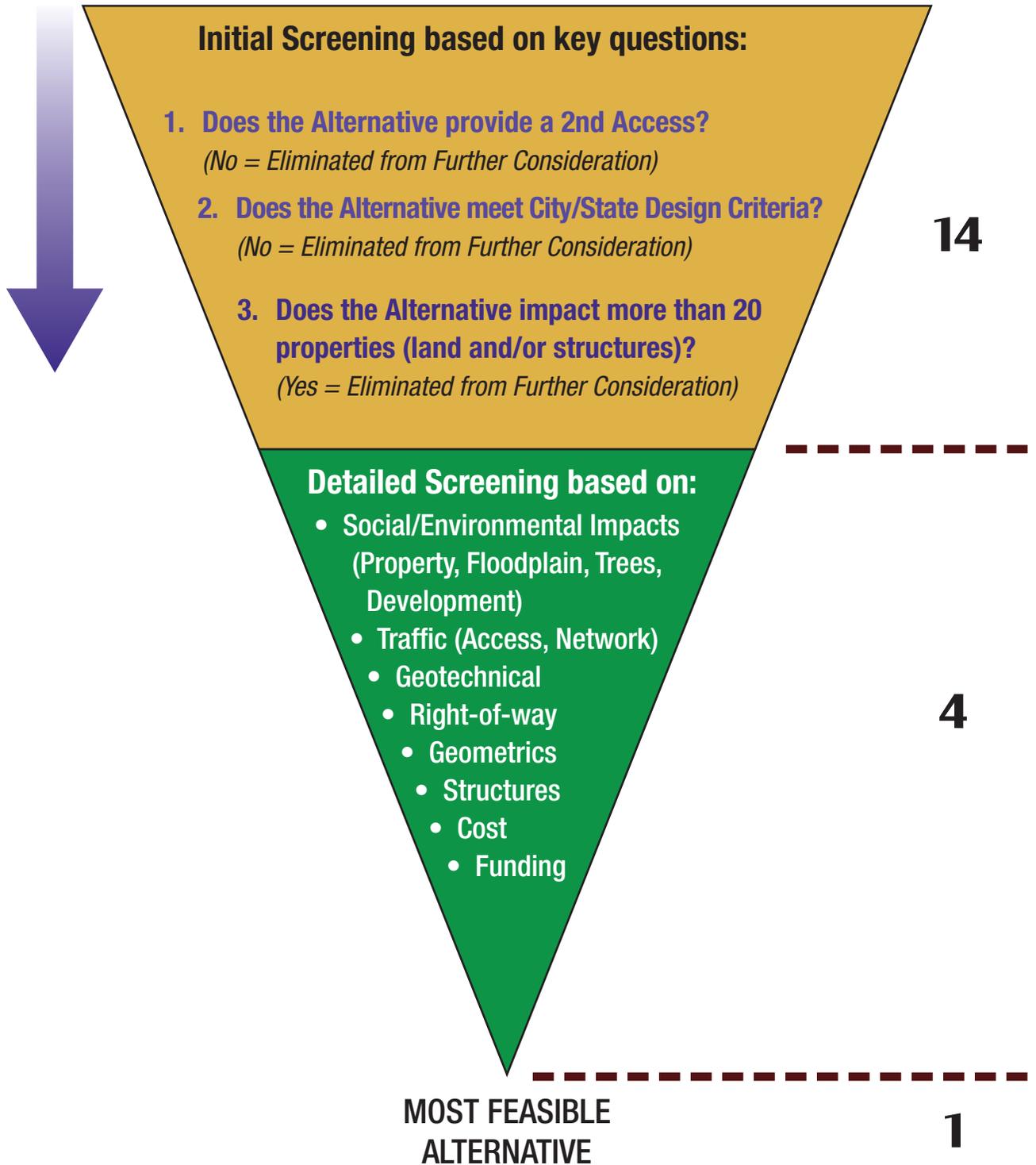


Figure 8
Alternative Screening Process





As shown in Table 3, alternatives B, F, G and the No Action alternative were kept for further consideration, moving into the final alternative screening process. These options are shown on **Figure 10**.

3.2.3 Additional Options

The Project Advisory Group and consultant team presented the initial screening results to the public on November 17, 2009. Attendees were given the opportunity to comment on the results and suggest modifications. Several people provided modifications to the surviving alternatives that had not been previously considered. These options are shown in green on **Figure 10** and described as follows:

Option B2 – This alignment would extend directly west along the Guest Road alignment to connect Red Rock Canyon Road to Jackson Boulevard via a bridge over Rapid Creek. Analysis of this options indicated that it would impact more than 20 private properties and 7 structures, eliminating it from further consideration.

Option F2 – This alignment would extend from Red Rock Canyon Road to Penrose Place to provide a second access in a fashion similar to Option I. Analyses indicated that the grade and horizontal curvature along this connection would satisfy the design criteria. In addition, property and structure impacts would fall below the threshold for elimination. Based on meeting these conditions, it was determined that Option F2 would be included as an access alternative.

Options G2 and G3 – These options would modify Alternative G to connect farther east at the Dunsmore Road alignment. Option G3 would not satisfy City grade or horizontal curve criteria. However, Option G2 could be built to meet design criteria. Because of its similarity to Alternative G, it was determined that Option G2 would serve as a potential enhancement to Alternative G rather than an access alternative.



Not to Scale
April 2010

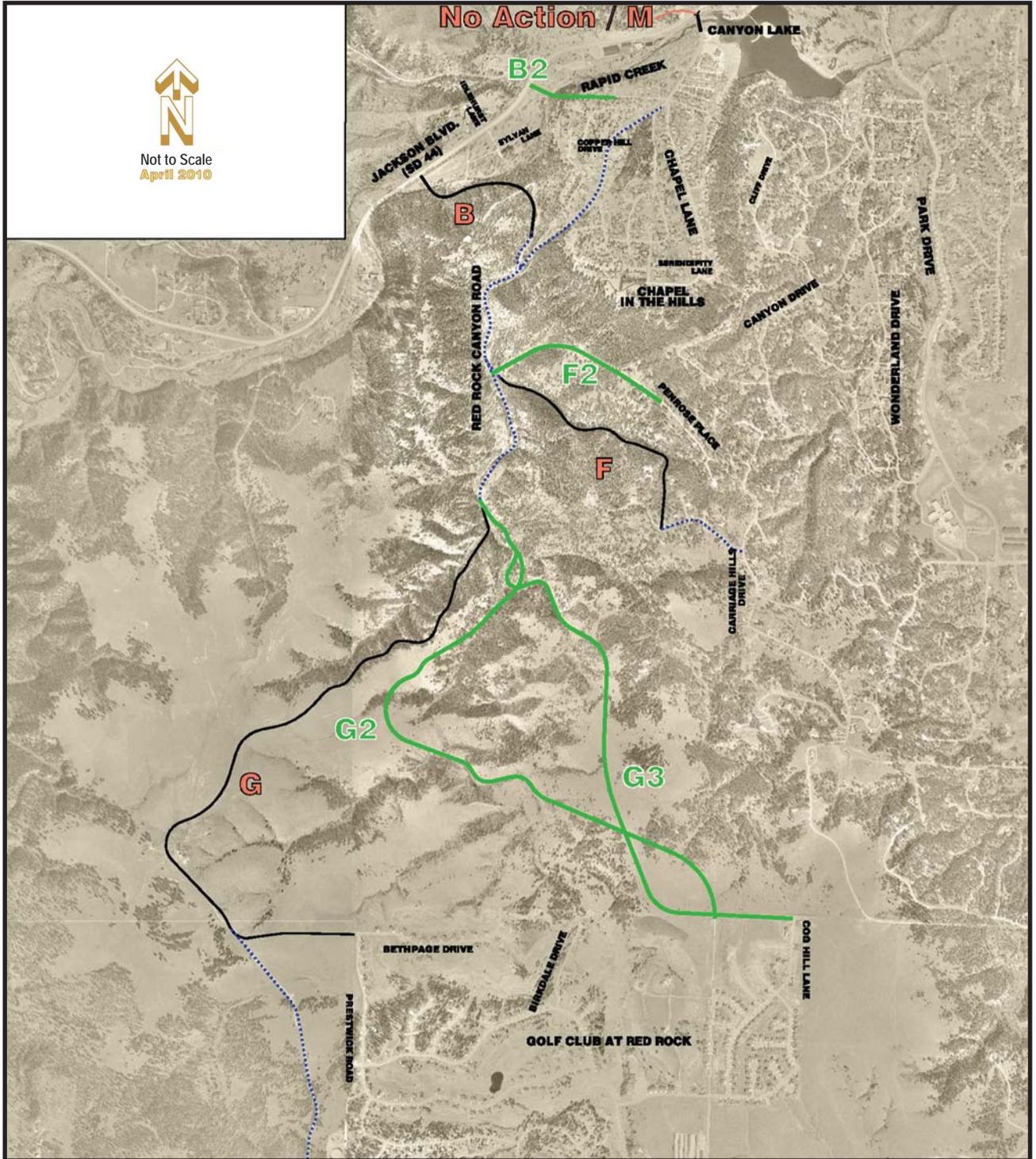


Figure 10
Final Screening Alternatives and Options





3.2.4 Final Screening

Following initial screening, alternatives B, F, F2, G, and No Action were evaluated based on screening criteria developed in cooperation with the PAG and the public. **Table 4** identifies the screening criteria and the method of measurement for each.

Table 4. Final Screening Criteria

Screening Criteria	Measured as:
Impacts to Property Only	Number of properties overlapped by the alignment footprint
Impacts to Structures	Number of both properties and their structures overlapped by the alignment footprint
Park and Trail impact	Proximity of alignment to parkland; crossings of existing trails
Impact on viewshed for existing homes	Qualitative evaluation of alignment's impact on views for existing homeowners within or near Chapel Valley
Impact on treed acres	Number of acres of trees impacted by the footprint
Drainage/Floodplain Issues	Length of alignment within the 100-year floodplain, crossing of major drainage ways
Provides two access points	Yes or no question based on actual provision of 2 nd access
Consistency with regional roadway network	Ability of alternative to connect with a collector road within the City's Major Street Plan
Cut-through traffic volumes	Likelihood of drivers to use the new access as a diversion from a neighborhood outside of Chapel Valley. Based on travel time savings
Fitness of Connecting Roads to serve additional traffic	The alternative will connect with existing streets. This category measures the ability of these existing streets to serve increased traffic volumes. Small residential roadways not meeting City standard are poor options for additional traffic.
Relative Construction Cost	Relative magnitude of the cost of construction for each alternative
Alternative Funding Availability	Upon construction, qualitative measure of the likelihood of receiving construction funding assistance from developers
Geotechnical Feasibility	Need for specific design treatments to address geotechnical challenges

The alternatives were rated by performance within each criterion using a ranking method. A total of 15 points were awarded within each criterion. Alternatives could be ranked from 1.0 to 5.0 in a given category. The top performer in a category was typically ranked 1.0 with the poorest typically awarded a 5.0. Ties were accommodated by assigning the same number of points to all tied alternatives while ensuring the overall points totaled 15. This scoring methodology ensured that each criterion would be equally weighted in the final evaluation and no single criterion would lead to an inordinate difference between alternatives.



Table 5 provides the screening scores within each category and the final tally for each alternative.

Table 5. Final Screening Scores

Final Screening Criteria	Alternative Ranking within Criteria and Aggregate Score				
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	NO ACTION
Impacts to Property Only	3.0	5.0	4.0	2.0	1.0
Impacts to Structures	4.0	1.5	5.0	3.0	1.5
Park and Trail impact	5.0	2.5	2.5	2.5	2.5
Impact on viewshed for existing homes	2.0	4.0	4.0	4.0	1.0
Impact on treed acres	4.0	3.0	2.0	5.0	1.0
Drainage/Floodplain Issues	3.0	3.0	3.0	3.0	3.0
Provides two access points	2.5	2.5	2.5	2.5	5.0
Connects with regional roadway network	2.0	3.5	3.5	1.0	5.0
Cut-through traffic volumes	2.0	3.5	3.5	5.0	1.0
Fitness of Connecting Roads to serve additional traffic	2.0	4.5	4.5	3.0	1.0
Relative Construction Cost	3.0	2.0	4.0	5.0	1.0
Alternative Funding Availability	4.0	4.0	4.0	2.0	1.0
Geotechnical Feasibility	5.0	3.0	3.0	3.0	1.0
POINT TOTAL	41.5	42.0	45.5	41.0	25.0
Overall Alternative Rank	3	4	5	2	1

As shown in **Table 5**, the No Action alternative performs best when measured across each of the 13 criteria. This is due to its low property impacts, cost and environmental impact. The recommend Most Feasible Alternative is Alternative G. Its ability to serve within the City’s Major Street plan, relatively low property impacts, and potential for developer funding offset its higher cost and environmental impacts. **Appendix A** provides a screening matrix with quantities for each criterion.



3.3 Most Feasible Alternative

Alternative G was selected as the Most Feasible Alternative for providing an alternate access to Chapel Valley. Though the No Action Alternative performs best, it does not meet the original study purpose of identifying a second access to Chapel Valley.

Figure 11 depicts the Most Feasible Alternative preliminary conceptual layout. The alignment is shown with the cut and fill boundaries along its length. Based on this layout, a conceptual opinion of probable costs to construct this roadway is approximately \$50 Million (excluding property and engineering costs or cost for improvements to existing facilities).

3.3.1 Implementation Considerations

Based on public feedback and engineering analyses, there are a number of particular considerations that need to be addressed with implementation of the Most Feasible Alternative. These are listed as follows:

Emergency Evacuation

Members of the public expressed concern that any alternative extending south from Red Rock Canyon Road would be vulnerable to fire danger due to the surrounding forests. While a fire could hinder the ability of the recommended Most Feasible Alternative to serve as a secondary access, the Chapel Lane connection would likely remain open and accessible during a fire. Considered together, these two accesses would improve emergency access to Chapel Valley and evacuation efficiency.

Implementation of the recommended Most Feasible Alternative should include an update to emergency planning for Chapel Valley that will clearly identify the procedure for making evacuees aware of the proper evacuation route to use in a given situation.

Red Rock Canyon Road

Chapel Valley homes would connect with the recommended Most Feasible Alternative via Red Rock Canyon Road. Significant portions of Red Rock Canyon Road lie within the 100-year floodplain.

Traffic Volumes

The recommended Most Feasible Alternative is likely to carry elevated traffic levels, particularly as homes are built along its length. Residents of new development south of Chapel Valley may choose to utilize the recommended Most Feasible Alternative and Red Rock Canyon as a route to Jackson Boulevard and downtown Rapid City. The design of the recommended Most Feasible Alternative should take into consideration the residential nature of Red Rock Canyon Road and the existing residential development in Chapel Valley.

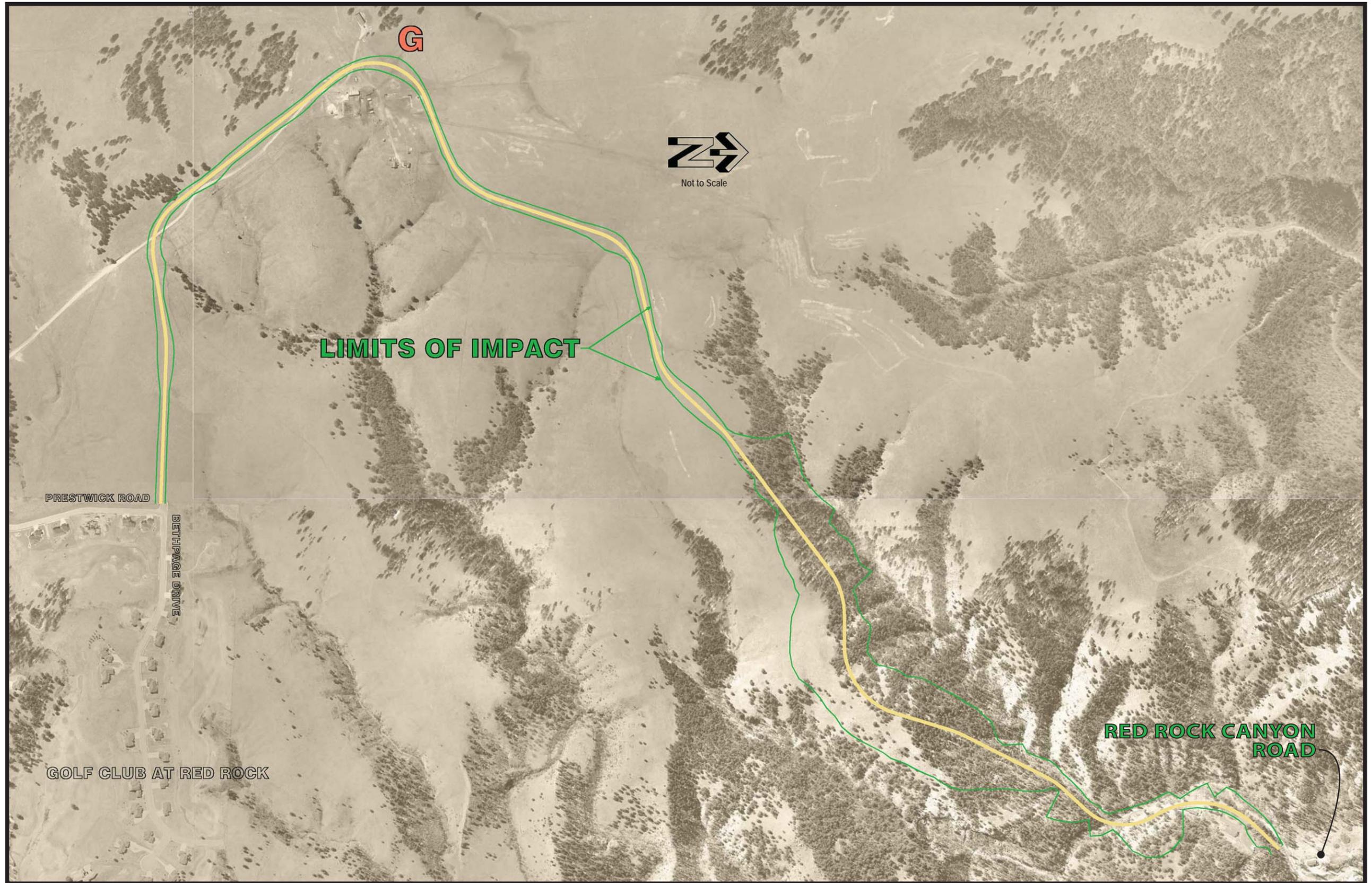


Figure 11
Most Feasible Alternative Concept





4.0 PUBLIC INFORMATION AND PARTICIPATION

The public information and participation process anchored the Chapel Valley Access and Route Alignment study. Chapel Valley and adjacent residents were engaged and active in the public process. A total of three public meetings were held during the project. The first meeting was held in July 2009 to gather input on the study process, goals and objectives, and preliminary connection alternatives. A second meeting was held in November 2009 to inform the public about the alternatives development and first level of screening. The third meeting will be held in April 2010 to present the final screening results and draft report.

Prior to each public meeting, study materials were posted on the City of Rapid City's website for advance review. Meeting announcements were sent to Chapel Valley residents and residents of the surrounding area. A comment period of approximately 3 weeks followed each meeting, during which members of the public submitted personal correspondence and placed telephone calls to the project team.

In addition to the larger public meetings, the project team held individual meetings with involved members of the public. The project consultant team walked property south of Chapel Valley with its owner and City Staff met individually with residents of Carriage Hills to discuss the project.

Presentations of the final report to the Rapid City Council and MPO Committees will complete the public information and participation efforts associated with this *Chapel Valley Access and Route Alignment Study*.

The following sections provide a description of each public meeting and public comments received. **Appendices B** and **C** provide detailed documentation of both meetings.

4.1 Community Input Open House

The Community Input Open House was held on July 8, 2009 at the West Community Center in Rapid City. A total of 98 people attended the meeting. The purpose of the meeting was to provide an overview of the project and gather public input on the critical issues and preliminary connection points. Public feedback was gathered via conversations with attendees, comment sheets, personal letters and emails, and hand sketches on alternative boards.

Attendees were also asked where they believe an alternate access could best connect to the Chapel Valley area. Most responded that no second access should be constructed. The second-most frequent response was that a route to the south would be best. Less support was expressed for routes east or west from Chapel Valley.

People also provided criteria they believe should be evaluated to determine which alignment should be built. Impacts to property was most frequently cited by the group. Cost, environmental impacts, safety, and shortest routing were noted multiple times. Aesthetics and development potential were also noted.



All written comments provided at the Community Input public meeting can be found in Appendix B.

Post-Meeting Correspondence

In addition to comment sheets and conversational comments received at the meeting, the project team received letters, petitions, emails and phone calls from interested parties. These are included in Appendix B.

Primary Message

A major message received at and following the Community Input Open House was that most attendees do not believe there is a need for a second access to the subdivision and would prefer that the study focus more on how to improve emergency evacuation and existing roadways within Chapel Valley.

4.2 Public Open House #2

Public Open House #2 was held on November 17, 2009 at the Canyon Lake Senior Center in Rapid City. A total of 73 people attended the meeting. The purpose of the meeting was to provide an overview of alternatives and the alternative screening process/results and listen to public comments on the alternatives. Public feedback was gathered via conversations with attendees, comment sheets, personal letters and emails, and hand sketches on alternative boards.

The comment sheets returned by the public are included in Appendix C.

Post Meeting Correspondence

In addition to comment sheets and conversational comments received at the meeting, the project team has received letters, petitions, emails and phone calls from interested parties. These are included in Appendix C.

Primary Message

A primary message received at and following the Open House was that most attendees agree that the four alternatives selected for final screening are the appropriate selections. The most favored alternative was the No Action Alternative.

4.3 Public Open House #3

Public Open House #3 was held on April 14, 2010 at the Canyon Lake Senior Center in Rapid City. A total of 100 people plus project team members attended the meeting. The purpose of the meeting was to present the final alternative screening process and results and gather comments from the public on the draft report. The draft report was posted on the City of Rapid City's website for public review in advance of the meeting. Most of the meeting attendees were familiar with the draft report, having reviewed the report and/or the Executive Summary online.



Public comments were received via conversations with attendees, comment sheets, and personal letters and emails. The comment sheet was posted online after the meeting to continue to receive comments from individuals until April 30. The comment sheets returned by the public are included in Appendix C.

Primary Message

Attendees expressed disagreement with the selection of Alternative G as the Most Feasible Alternative, stating that Alternative G is costly and would induce too much traffic, increase current storm drainage problems along Red Rock Canyon Road and provide poor emergency access in the event of a forest fire. While many voiced opposition, some attendees did express support for Alternative G as the Most Feasible Alternative.



5.0 CONCLUSION

In June of 2009, the Rapid City Area MPO initiated the Chapel Valley Access and Route Alignment Study to identify a year-round alternate vehicular access to the Chapel Valley neighborhood. To accomplish this objective, the project team developed 14 alternatives. These alternatives were presented to the public at an Open House meeting in June of 2009, where attendees provided feedback on the options. Following this meeting, the alternatives that would not meet design standards, would not provide a second access, or would excessively impact structures and properties were eliminated from further consideration. After this screening, the project team brought the four remaining alternatives to the public in November of 2009. Input received at this meeting contributed to the final technical screening effort, which compared alternative performance across a range of chosen criteria. Based on its rankings, Alternative G was selected as the Most Feasible Alternative for providing an alternate access to Chapel Valley. This alternative would extend south from the Chapel Valley neighborhood, extending the current Red Rock Canyon Road alignment.



6.0 ADDENDUM

In July of 2010, the Draft *Chapel Valley Access and Route Alignment Study* was submitted to the City of Rapid City Planning Commission for review and approval. Following the submittal, on July 27, a Special Planning Commission Meeting was held to discuss the study. At the meeting, the Planning Commission unanimously approved a motion requesting the consultant (Felsburg Holt & Ullevig) to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further they requested that an additional neighborhood meeting be held to review those options before reporting back to the Planning Commission.

Public comments on the draft report reinforced comments received at previous public meetings, including the concern that the recommended new alignment G would increase traffic volumes through the neighborhood and allow additional development, without improving emergency safety. Concern was also expressed regarding the high cost of constructing a second access.

Following public comment on the report at the meeting, the Planning Commission requested an updated report focused on safety for the existing residents rather than the development potential associated with a second access. To address this request, this addendum provides the following information:

- Emergency Management Planning – Identification of emergency management strategies, including hazard mitigation, emergency preparedness, emergency response, and recovery;
- Emergency-only Alternatives Analysis – Updated analysis of several access routes assuming they can be built as more narrow, steep roads that would serve as emergency-only routes rather than full city streets. This analysis includes rating and screening of access alternatives alongside non-access alternatives;
- Public Meeting Summary - Summary of a Public Open House held on October 20, 2010 to discuss the Draft Addendum; and
- Recommendations – Recommendations based on the analysis of emergency conditions.



6.1 Emergency Management Planning

A listing of potential emergency management strategies for use in Chapel Valley has been developed with input and cooperation from a number of entities, including the general public, Pennington County Emergency Management, Rapid City Fire Department, Rapid City Growth Management, Rapid City Public Works, Rapid City Police Department and the Rapid City Metropolitan Planning Organization. This listing is preliminary, and may not include all possible strategies.

The traditional practice of emergency planning may be categorized into four phases:

1. Hazard Mitigation;
2. Emergency Preparedness;
3. Emergency Response; and
4. Recovery.

Emergency Management Strategies for Chapel Valley may be organized into these categories. **Table A-1** lists the strategies and provides a description, an assessment of the feasibility of implementation, next steps, and responsible parties. In order to implement these strategies, the formation of a Chapel Valley Emergency Management Task Force is recommended. This group would be comprised of Chapel Valley residents interested in pursuing emergency management strategies and Agency representatives experienced in emergency management.

A Note on Evacuation

Evacuation of Chapel Valley residents is among the components of Emergency Management Planning, particularly the Emergency Response phase. Several factors influence the time required to complete an evacuation once the order to evacuate has been issued, including response time, notification time, preparation time, and vehicular travel time.

It is assumed that during an evacuation of the Chapel Valley neighborhood, Chapel Lane would provide two outbound traffic lanes entering Jackson Boulevard. Based on this assumption, all Chapel Valley residents would be able to exit the development in approximately ½ hour to 1 hour of time. This does not include the time required to respond to the emergency, notify residents or prepare residents to evacuate. It is important to note that these times can vary widely depending on the situation.



Table A-1. Preliminary Chapel Valley Emergency Management Strategies (Alternative O)

PHASE 1. HAZARD MITIGATION				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Hazard Identification	forest fire, flooding are particular hazards, others	More Feasible	Document hazards posing threat to neighborhood	Pennington County Emergency Management, Emergency Management Task Force
Fuel Reduction	Reduce tree fuel surrounding neighborhood	Feasible	Identify costs and responsibilities	Rapid City Fire Department-Fire Prevention Division
Firewise Communities Program	Implement guidance found at www.firewise.org	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
PHASE 2. EMERGENCY PREPAREDNESS				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Advance Flood/Fire Warning Systems	Predictions already provided by NWS, could explore more localized technology	Feasible, may require capital investment	Investigate options, including low-tech and high-tech	Pennington County Emergency Management
Neighborhood Evacuation Plan	Map evacuation routes; develop communication protocol	Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
Household readiness	Educate residents on measures to take to prepare themselves and their property	More Feasible	Provide workshop for Chapel Valley residents	Pennington County Emergency Management
Wildfire Mitigation	Actions at individual homes to prevent fire damage	Feasible	Conduct local meeting(s) to equip residents to protect their properties	Rapid City Fire Department-Fire Prevention Division



Chapel Valley Access and Route Alignment Study



Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Reverse 911	Emergency notification system	Less Feasible, costly	Review 911broadcast.com	Pennington County Emergency Management
Phone Tree	Simple organization of communication among neighbors	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
2 nd Access to Neighborhood for use during emergencies only	Only one current access to 540+ homes. Additional access required by City ordinance	Less Feasible, costly and difficult terrain	Document options in Access Study, identify most feasible	Rapid City Growth Management, MPO
PHASE 3. EMERGENCY RESPONSE				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Traffic Control Planning	Emergency Traffic Control configuration for Jackson/Chapel Lane intersection	More Feasible	Include Recommended configuration in Chapel Valley Access Plan	Rapid City Growth Management, MPO, Rapid City Fire and Police Departments, Rapid City Public Works, SDDOT
Staging Areas	Locations where equipment, personnel, evacuees can be kept during emergencies	Feasible, some possible locations	Consider locations, such as potential purchase of tennis courts at Chapel Lane Village	Rapid City Fire Department, Rapid City Public Works, Pennington County Emergency Management
PHASE 4. RECOVERY (No Strategies at this time for Chapel Valley Neighborhood)				



6.2 Emergency-Only Alternatives Analysis

6.2.1 Description of Alternatives

Following the July 27, 2010 Planning Commission meeting, the access study was shifted to focus on the emergency-only characteristics of the access alternatives. The design criteria, previously set to match Rapid City's collector standards, were relaxed to reflect the characteristics of a route that would only be used for emergencies. Specifically, the maximum grade was adjusted from 12 percent to 16 percent, the roadway width from 24 feet to 20 feet and the right-of-way width from 60 feet to 49 feet. These updated criteria were developed in cooperation with Rapid City Emergency Service Agencies.

Alternatives previously eliminated due to excessive property impacts or not providing a second access were not considered as potential emergency-only routes. The emergency-only alternatives are depicted on **Figure A-1**. The eleven (11) alternatives include 8 second access alternatives and 3 non-access alternatives. The non-access alternatives are the No Action alternative, Alternative M and Alternative O. Alternative M would provide drainage improvements to the existing Chapel Lane bridge. Further investigation into the flood characteristics of the bridge is needed, but possible improvements include construction of a culvert under Chapel Lane south of the bridge or increasing the size of the opening beneath the bridge. Alternative O would implement the emergency management strategies outlined in **Table A-1**.

Following the July 27 Planning Commission meeting, alternatives N2 and K2 were recommended by the Project Advisory Group. These options were included in the updated screening process and are depicted on **Figure A-1**.

6.2.2 Alternative Ratings and Screening

Alternatives J (20 percent grade) and K2 (23 percent grade) were eliminated due to grades exceeding 16 percent, the maximum grade for emergency vehicles. The remaining nine alternatives were rated for performance in each of ten screening criteria. The screening criteria are shown in **Table A-2**.

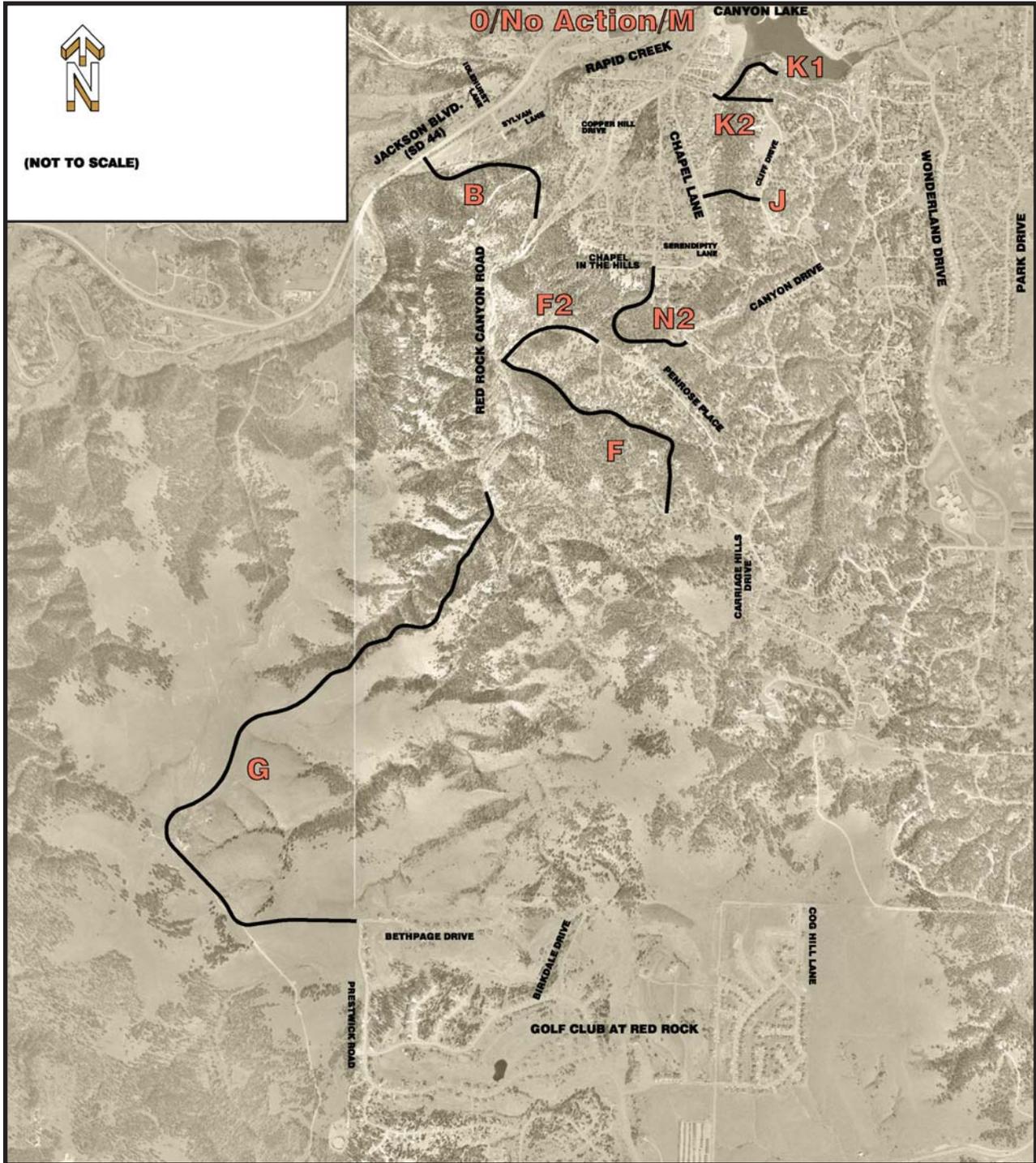


Figure A-1
Emergency Only Alternatives





Table A-2. Screening Criteria

Screening Criteria	Measured as:
Impacts to Property Only	Number of properties overlapped by the alignment footprint
Impacts to Structures	Number of structures overlapped by the alignment footprint
Impact on viewshed for existing homes	Qualitative evaluation of alignment's impact on views for existing homeowners within or near Chapel Valley
Impact on treed acres	Number of acres of trees impacted by the footprint
Drainage/Floodplain Issues	Ability of alternative to improve drainage conditions in Chapel Valley
Provides two access points	Yes or no question based on actual provision of 2 nd access
Cut-through traffic volumes	Likelihood of drivers to use the new access as a diversion from a neighborhood outside of Chapel Valley. Based on travel time savings
Fitness of Connecting Roads to serve additional traffic	The alternative will connect with existing streets. This category measures the ability of these existing streets to serve increased traffic volumes. Small residential roadways not meeting City standard are poor options for additional traffic.
Relative Construction Cost	Relative magnitude of the cost of construction for each alternative
Geotechnical Feasibility	Need for specific design treatments to address geotechnical challenges

The alternatives were rated by performance within each criterion using a ranking method. A total of 45 points were awarded within each criterion. Alternatives could be ranked from 1.0 to 9.0 in a given category. The top performer in a category was typically ranked 1.0 with the poorest typically awarded a 9.0. Ties were accommodated by assigning the same number of points to all tied alternatives while ensuring the overall points totaled 45. This scoring methodology ensured that each criterion would be equally weighted in the final evaluation and no single criterion would lead to an inordinate difference between alternatives.

Table A-3 provides the screening scores within each category and the final tally for each alternative. **Addendum Attachment A** provides quantities associated with the scores in Table A-3.



Table A-3. Screening Scores

SCREENING CRITERIA	EMERGENCY-ONLY ALTERNATIVE RANKINGS								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Guest Road to Calle Baja	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative M - Bridge Storm Flow Improvements	Alternative O - Emergency Mngmt. Planning	NO ACTION
Impacts to Property Only	6.0	9.0	4.5	4.5	8.0	7.0	2.0	2.0	2.0
Impacts to Structures	8.0	5.5	7.0	2.5	9.0	5.5	2.5	2.5	2.5
Impact on viewshed for ex. homes	4.0	7.0	7.0	7.0	7.0	7.0	2.0	2.0	2.0
Impact on treed acres	8.0	7.0	4.0	9.0	5.0	6.0	2.0	2.0	2.0
Drainage/Floodplain Issues	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Provides two access points	3.5	3.5	3.5	3.5	3.5	3.5	8.0	8.0	8.0
Cut-through traffic volumes	5.0	7.5	7.5	9.0	5.0	5.0	2.0	2.0	2.0
Fitness of Conn. Rds. for addl. traffic	4.0	6.5	9.0	6.5	5.0	8.0	2.0	2.0	2.0
Relative Construction Cost	8.0	6.0	5.0	9.0	4.0	7.0	3.0	2.0	1.0
Geotechnical Feasibility	9.0	6.0	6.0	6.0	6.0	6.0	3.0	1.5	1.5
TOTAL	60.5	63.0	58.5	62.0	57.5	60.0	31.5	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	6	3	2	1



As shown in **Table A-3**, the three alternatives that would not provide a second access (The No Action, Bridge Storm Flow Improvements and Emergency Management Planning (O) alternatives) rank highest of the emergency only options. This is because the screening criteria emphasize physical impacts. On this basis, the non-access options outscore any options for a second access. Among the three non-access options, the No Action ranks highest, followed by Emergency Management Planning (O) and Drainage Improvements to the Chapel Lane Bridge (M).

Of the emergency-only access alternatives, it is important to note that all of the options would be extremely challenging to construct. All require significant earthwork and would impact valuable property and/or structures. Public discussion of second access alternatives to date has been contentious, and no clear favored alternative has emerged. Alternative K1 ranks best in screening performance. However, its footprint would significantly impact properties, structures and Canyon Lake.

6.3 Public Meeting Summary

A public meeting, the fourth Open House of the project, was held on October 20, 2010 following the online posting of the Addendum. A total of 58 people plus project team members attended the meeting. The purpose of the meeting was to present the report addendum and gather comments from the public. The addendum was posted on the City's website for public review in advance of the meeting. Many meeting attendees were familiar with the addendum, having reviewed it online. Public comments were received via conversations with attendees, comment sheets, and personal letters and emails. The comment sheets returned by the public are included in **Addendum Attachment B**.

Two additional emergency route options were suggested by meeting attendees. These are described as follows:

- Modified Alternative E – Named Alternative E1, this option would partially follow the alignment previously shown as Alternative E, extending east from Serendipity Lane. It would then divert from the previous E alignment to connect directly to Canyon Drive. This option was examined and it was found that a roadway could be constructed at a 16 percent grade, but several very tight horizontal curves would limit the design speed to 15 Miles per Hour or less.

The tight curves of E1 would make it difficult for emergency vehicles to negotiate. Analyses of turning templates indicate that ambulances and fire trucks would need to utilize the full pavement width for maneuvers and larger fire trucks (approximately 51 feet long) could not complete the turns. Because of limited design speeds and the associated large vehicle difficulty, Alternative E1 is dismissed from further consideration.

- Adjustment to Alternative G – This alignment would generally follow the previous Alternative G, but would extend west from Red Rock Canyon Road near the north edge of the Conrad



property and re-connect with Alternative G farther south. This option may be considered in the future if Alternative G is given further consideration.

Primary Messages

Attendees were generally pleased by the Addendum as a means of addressing emergency conditions in Chapel Valley. The public were supportive of implementing emergency management strategies and constructing a second, emergency only access to Chapel Valley. Several people were interested in participating in the Emergency Management Task Force.

6.4 Recommendations

Based on the alternative screening results, the following actions are recommended:

5. Implement Alternative O, Emergency Management Planning: This action would require minimal capital investment and would result in improved emergency readiness among Chapel Valley residents. Though the No Action Alternative ranks above Alternative O, the No Action would not improve emergency conditions. Implementation of Alternative O would require participation from Chapel Valley residents who would form the Emergency Management Task Force. Several Chapel Valley residents have indicated interest in participating, and it is recommended that the Task Force be formed immediately following completion of this study.
6. Review the need for storm flow improvements to the existing Chapel Lane bridge over Rapid Creek. Named Alternative M, these improvements could increase flow capacity during a flood, perhaps via a new culvert beneath Chapel Lane south of the bridge.
7. If a second access for emergency use only is desired, Alternative K1 ranks best among the six emergency-only options. Alternative K1, however, holds only a 1 point advantage over the nearest alternative and several alternatives are closely clustered in the final scoring. It is evident that even a slight change to one of the screening measures could identify a different leading option. A more detailed engineering study is required to define the impacts and additional public meetings would be necessary before moving forward.



Addendum Attachment A

Emergency-only Alternative Screening Quantities

Emergency Only Alternative Screening Scores and Quantities (Including No Action)

FINAL SCREENING CRITERIA	Emergency Alternative Ranking within Evaluation Criteria and Aggregate								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Lakeshore	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative M - Bridge Drainage Enhancements	Alternative O - Emergency Management Plan	NO ACTION
Impacts to Property Only	6.0 3 properties	9.0 19 properties	4.5 2 properties	4.5 2 properties	8.0 9 properties	7.0 6 properties	2.0 0 properties	2.0 0 properties	2.0 0 properties
Impacts to Structures	8.0 6 structures	5.5 3 structures	7.0 5 structures	2.5 0 Structures	9.0 9 structures	5.5 3 structures	2.5 0 structures	2.5 0 structures	2.5 0 structures
Impact on viewshed for existing homes	4.0 light	7.0 severe	7.0 severe	7.0 severe	7.0 severe	7.0 severe	2.0 none	2.0 none	2.0 none
Impact on treed acres	8.0 15 acres	7.0 14 acres	4.0 5 acres	9.0 36 acres	5.0 7 acres	6.0 8 acres	2.0 0 acres	2.0 0 acres	2.0 0 acres
Drainage/Floodplain Issues	5.0 severe	5.0 severe	5.0 severe	5.0 severe	5.0 severe	5.0 severe	5.0 severe	5.0 severe	5.0 severe
Provides two access points	3.5 Yes	3.5 Yes	3.5 Yes	3.5 Yes	3.5 Yes	3.5 Yes	8.0 No	8.0 No	8.0 No
Cut-through traffic volumes	5.0 minimal	7.5 moderate	7.5 moderate	9.0 severe	5.0 minimal	5.0 minimal	2.0 least	2.0 least	2.0 least
Fitness of Connecting Roads to serve additional traffic	4.0 370'	6.5 3100'	9.0 4800'	6.5 3100'	5.0 1930'	8.0 3700'	2.0 n/a	2.0 n/a	2.0 n/a
Relative Construction Cost	8.0 \$12.7 Million	6.0 \$5.8 Million	5.0 \$3.1 Million	9.0 \$14.5 Million	4.0 \$2.2 Million	7.0 \$6 Million	3.0 \$1 Million	2.0 \$0.5 Million	1.0 zero
Geotechnical Feasibility	9.0 very difficult	6.0 moderate	6.0 moderate	6.0 moderate	6.0 moderate	6.0 moderate	3.0 not difficult	1.5 none	1.5 none
TOTAL	60.5	63.0	58.5	62.0	57.5	60.0	31.5	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	6	3	2	1

NOTES:

1. Alignments J and K2 were eliminated due to grades exceeding 16 percent.
2. Opinions of probable cost do not include property and engineering costs or cost for improvements to existing facilities.



Addendum Attachment B Summary of Public Meeting #4

October 2010

List of Contents

Meeting Overview and Comment Summary
Comment Sheets and Other Correspondence
Meeting Handout
Sign-In Sheets
Meeting Advertisement
Open House Exhibits

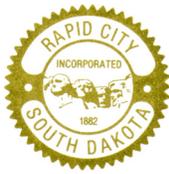


Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

**October 2010
Public Open House #4
Summary**

Meeting Overview and Comment Summary



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Public Open House #4-Overview

Date:	October 20, 2010, 4:30pm – 6:00pm
Location:	Canyon Lake Senior Center, 2900 Canyon Lake Drive
Attendance:	58 people, plus consultants, Project Advisory Group members, and City representatives
Purpose:	Gather comments on addendum completed following Planning Commission Meeting of July 27, 2010
Meeting Graphics:	plotted displays of tables and graphics from addendum, with handout of addendum text
Feedback:	Conversations with attendees, comment sheets (14), other correspondence

Comment Summary

Comment Sheets:

(Comment Sheets provided a series of blank lines for general comments. No specific questions were included on the sheet)

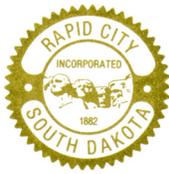
General Comments from Comment Sheets:

- Several comments expressed support for a emergency-only access route along the K1 alignment. Bill Keck suggested the route could follow the K1 alignment and narrow to a single lane path with a grass/earth surface. Keck stated this road would be gated at both ends.
- One comment expressed that an emergency only access should not be constructed because it will eventually become a full-time roadway that will increase traffic and endanger residents. Instead, the comment favored enhancements to the existing Chapel Lane bridge. Another comment stated that bridge maintenance needs to be kept as a high priority.
- Comments expressed appreciation toward the City for looking at emergency-only access, and support for emergency preparedness measures
- A modified Alignment G was suggested that would extend west from Red Rock Canyon Road slightly north of the Conrad property and extend down to meet the current G alignment.
- A commenter stated that Alternatives O, No Action, and M should not be included in the study because they do not provide a 2nd access.
- Alternative N2 is the best option as a 2nd access because it could be constructed at a lower grade and would not be as vulnerable to flooding.

- The Chapel Lane bridge should not be widened unless the project is financed by development interests.

Conversational Comments:

- Attendees were provided with an opportunity to sign up to participate on the Emergency Management Task Force. The signup list is included with the sign-in sheet in this meeting summary.
- Several attendees felt that the study had examined all possible options for a second access.
- Attendees expressed hope that any routes utilizing Red Rock Canyon will no longer be considered as viable second access options.
- Some expressed support for an emergency access along Canyon Lake that would essentially consist of a grass/gravel roadway.



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

**October 2010
Public Open House #4
Summary**

Comment Sheets and Other Correspondence



Comment Sheet

General Comments:

A inexpensive emergency evit would be nice.
Can we take KI where the drainage (dip in the road) on Guest Road and develop a narrow one lane road along the south shore of lake to the parking lot at the south side of the dam. The road being as narrow as possible, and a grass road that the property owner can leave natural or mow if they wish. Gated at both ends.

The task force is a good idea as long as it only in force 4 to 6 months. The City and emergency management need to develop an emergency ~~plan~~ ^{evacuation plan} specific for the valley residents sent to every homeowner and given to every realtor or title company so that new residents are always kept informed.

I'm fine with NO ACTION, because I will listen to emergency personnel when a disaster strike

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Bill Keck
ADDRESS: 4815 Telemark Ct 02
PHONE# (Optional): 341-2443

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

I support developing an emergency plan, phone tree traffic closing + emergency planning in case of flood or fire

Our most pressing issue is fire exit. I would like to see if K2 near the lake is a possible option. We don't want to go in the direction of a fire, which most likely will come from toward Carriage Hills where N2 is located.

Getting all homeowners to fire ready their landscaping is important.

Locations of fire hydrants in the area should be visible + may not be right now

In the event of flood, Chapel Valley could be directed to the Powderhorn Creek lot lot where displaced persons could be helped by neighbors. Most of Chapel Valley is on high ground so flood exit is less of a problem than fire.

FEMA / www.usa.gov has many excellent guides for homeowners on emergency management.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Linda Anderson
ADDRESS: 4810 Powderhorn Dr Rapid City SD
PHONE# (Optional): 605 342-8450

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

Emergency planning upgrades sound like a good idea. These are probably sufficient to deal with safety. The top recommendation - not to carry out new road construction - should be followed in our opinion. That would be the proper balance between safety upgrades and maintaining the integrity of the residential areas involved.

Thank you.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Bill + Patty Carney

ADDRESS: 3621 Ridge Dr.

PHONE# (Optional): 430-5063

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

My husband (Bill [Chip]) and I are not in favor of an emergency only route because we feel once it is built it will eventually become a "REAL" road and be a severe detriment to the homeowners of Chapel Valley.

Chapel Valley owners do not want a road that brings in extra traffic and congestion to the neighborhood. The roads described would be a "short cut" to Jackson from the other areas of the city and a danger to our residents.

Enlarging the bridge or simply make it a "one way" road during emergencies seems to be a viable option. OR simply leave it the way it is and set up an emergency siren to warn the residents of fire or flood dangers.

Building any new road or bridge when the roads within Chapel Valley and in and around R.C. are in need of repair appear irresponsible on the part of R.C.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Sharon Rasmussen
ADDRESS: 4826 Steamboat Circle - R.C. 57702
PHONE# (Optional): 341-3664

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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ULLEVIG

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Comment Sheet

General Comments:

In Agreement to R, Alt - ...
Thank You

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: *Mark York*
ADDRESS: *3861 Red Rock Canyon Rd.*
PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

We prefer K1 Alternative Route
N2 is our second choice.

We are happy you are now looking
at Safety rather than expansion.
Keep up the good work!

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Jack Smith
ADDRESS: 3312 Anapahse CT.
PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

EMERGENCY ONLY ROAD MAKES MOST LOGIC

DO NOT RUN A ROAD TO COUNTRY SIDE IT WOULD BE A MAJOR TRAFFIC HAZARD

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: GARY ROBINSON

ADDRESS: 4710 COPPER HILL DR

PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

*Thank you for taking the time
to look at Emergency access only.
An agreement with the K1 alternative*

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: *Kim York*
 ADDRESS: *3861 Bell Rock Canyon Rd.*
 PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
 Felsburg Holt & Ullevig
 6300 S. Syracuse Way, Suite 600
 Centennial, CO 80111

P: 303.721.1440
 F: 303.721.0832
 E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

Emergency preparedness finally sounds like a workable solution that can be implemented at a feasible cost. There is no perfect solution - but with this plan people can be warned of problems & solutions & have plans in place if needed.

Maybe the structure of the present bridge & upkeep on it should be maintained. If it took years before basic maintenance was performed last time - it should be a top priority to make sure the bridge is in perfect condition at all times.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Janet Hall
ADDRESS: 3613 Chapel Valley Rd
PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

Emergency preparedness is the best option.

Exit roads are narrow, in trees (fire hazard), or in flooded areas (Red Rock Canyon has both.) Most are also very steep & go through already congested areas. Upgrading the bridge is possible, but costly. (We need our streets paved if there is any available money.)

Fuel reduction is important, esp. with the spreading pine beetles.

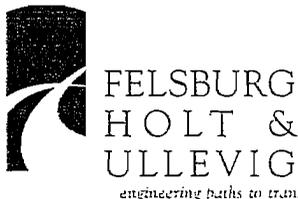
You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Peg McIntire
ADDRESS: 4520 Steamboat Cir.
PHONE# (Optional): 348-7623

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com





Comment Sheet

General Comments:

THE BEST PLAN IS "NO ACTION"
THIS STUDY HAS BE GOING ON FOR
OVER A YEAR, WITH THE SAME RESULT,
THERE IS NO PRACTICAL EXIT TO CHAPEL
VALLEY, SECOND

THE RESIDENTS KNEW THAT WHEN THEY
PURCHASED THEIR HOMES. IT IS NO DIFFERENT
NOW.

THE RESIDENTS DO NOT WANT THE
EXTRA TRAFFIC THAT A SECOND EXIT WOULD
BRING.

PLEASE STOP SPENDING MONEY ON
A STUDY THAT IS GOING NO WHERE
THE "CHOP HOUSE" IS THE ONLY
ONES WHO WANT A SECOND EXIT.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: RICHARD J. TWPPER
ADDRESS: 4917 STEAMBOAT CIR. RC, 57702
PHONE# (Optional): _____

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com





Comment Sheet

General Comments:

If current access cannot be modified to accomplish desired goals - then kill this whole notion. Any other solⁿ would seriously disrupt established neighborhoods, destroy wooded vegetation, scar hillsides, and generally degrade property values wherever it goes.

You may hand in this sheet before you leave tonight or you can mail it to the address below.

YOUR NAME: Jim Johnson
ADDRESS: 3602 Ridge Dr. 02
PHONE# (Optional): 605-348-3435

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com



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Comment Sheet

General Comments:

Regarding Option L
(long term / full use)

An acreage ~~of~~ (±20A) on the east side of Red Rock Canyon road just prior to Conrad's 40 acres may be an option to get on top and travel through R Hill & Bob Berg over to Red Rock
(see attached)

You may hand in this sheet before you leave tonight or you can mail it to the address below.

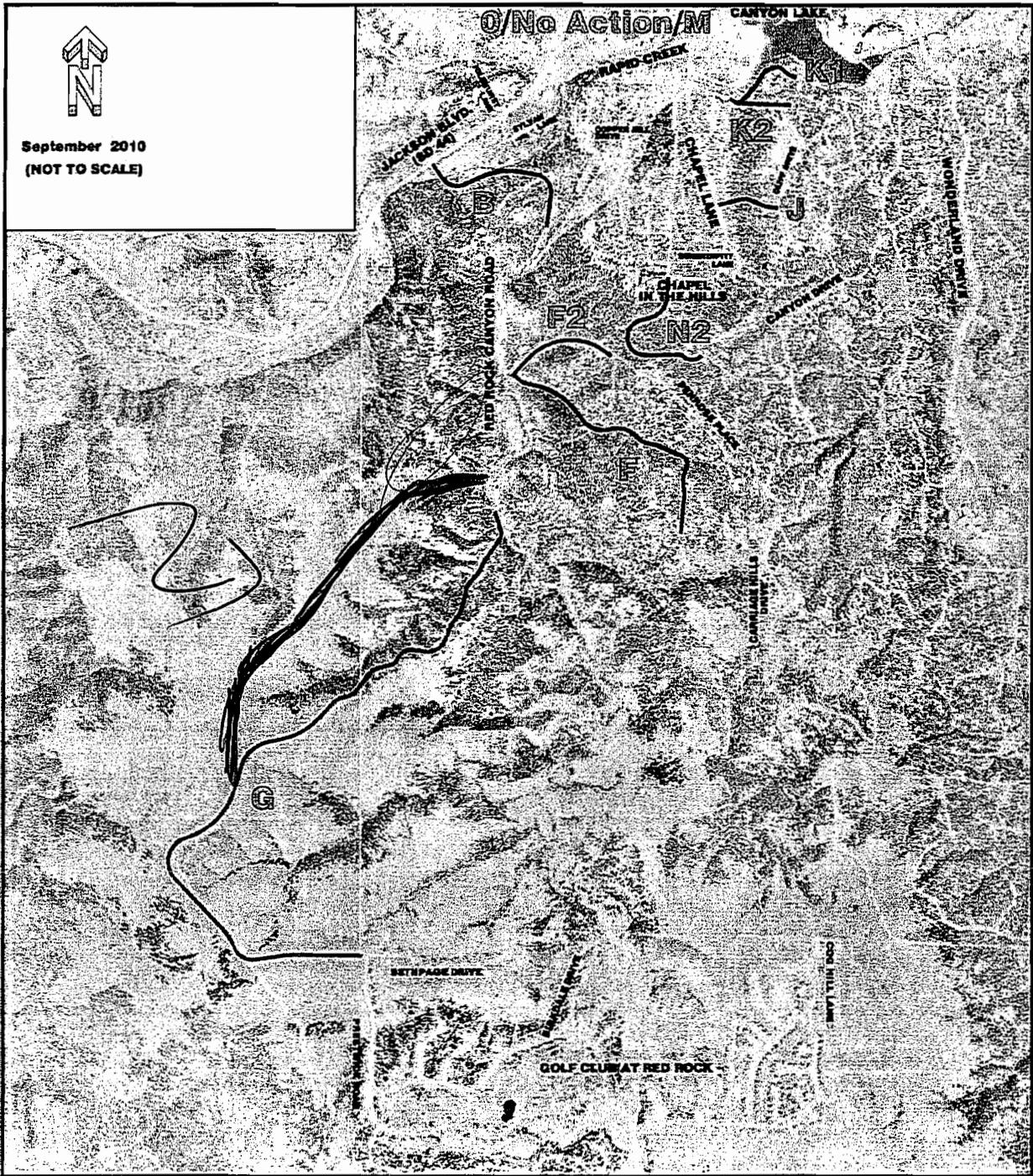
YOUR NAME: Rollie Hill
ADDRESS: 5744 West Hwy 44
PHONE# (Optional): 605-391-6000

Return Comments to:

Lyle DeVries
Felsburg Holt & Ullevig
6300 S. Syracuse Way, Suite 600
Centennial, CO 80111

P: 303.721.1440
F: 303.721.0832
E: lyle.devries@fhueng.com





DRAFT

Figure F1
Emergency Only Alternatives



Response to Chapel Valley Alignment and Route Study

We offer the following comments to the Draft Copy of the Emergency Only Alternatives Addendum to the Chapel Valley Access and Route Alignment Study. We are referencing Figure F1 - Emergency Only Alternatives Map and Table F3 - Screening Scores in our comments.

Alternative – No Action (Rank #1) should not be included in this study since it is not a solution to the problem of finding an emergency access.

Alternative O – Emergency Management Planning (Rank #2) should not be included in this study since it is not a solution to the problem of finding an emergency access. Certainly Emergency Management Planning is important to any area of Rapid City and its unique problems, but it isn't a solution to the problem of finding an emergency access.

Alternative M – Bridge Drainage Improvements (Rank #3) should not be included in this study since it is not a solution to the problem of finding an emergency access. Certainly the drainage could be improved and the bridge reinforced to withstand flood waters, but when floodwaters over top the bridge deck, access will become perilous and life-threatening at best.

Alignments K1, K2, F2, B, G, and F (Ranks #4, #5, #7, #8, and #9) are all alignments that either start or end in low-lying areas that would be susceptible to flooding during a catastrophic flooding event. This flooding would probably prevent their use as an emergency access.

Alignment N2 – Glendale Lane to Canyon Drive (Rank #6) or Alignment J – Chapel Lane to Cliff Drive (Unranked) are alignments that appear to start and end at elevations that would not be susceptible to flooding during a catastrophic flooding event. We assume that Alignment J was not even listed because of the severe grade of the roadway (near 20%). The grade for Alignment N2, as shown on Figure F1, would probably be under 10%.

In conclusion, we think the findings are clear that the City should build Alignment N2 as an emergency access. The City should encourage emergency management planning in the Chapel Valley area the same as it would in any other area of Rapid City susceptible to catastrophic flooding or forest fire. The bridge at Chapel Lane and Rapid Creek should only be widened if need be by the demands of legal commercial development in the Chophouse area. The cost should be paid for at least partially, if not entirely, by the developer.

Thank you for your work on this important issue to the residents of the Chapel Valley area.

Sincerely,



Barb and Steve Doshier

Lyle.DeVries

From: Shirley Frederick [shirleyf@theriver.com]
Sent: Wednesday, October 27, 2010 1:48 PM
To: Lyle.DeVries
Subject: Chapel Valley Access Comments

Dear Mr. DeVries,

I've studied the revised Chapel Valley Access Study for Rapid City, and here are my comments:

I totally agree that an emergency evacuation plan should be our number one priority along with hazard mitigation.

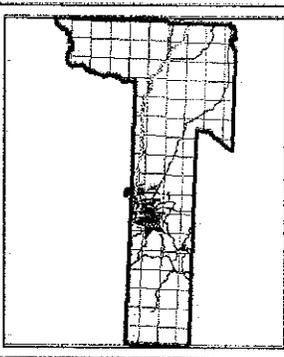
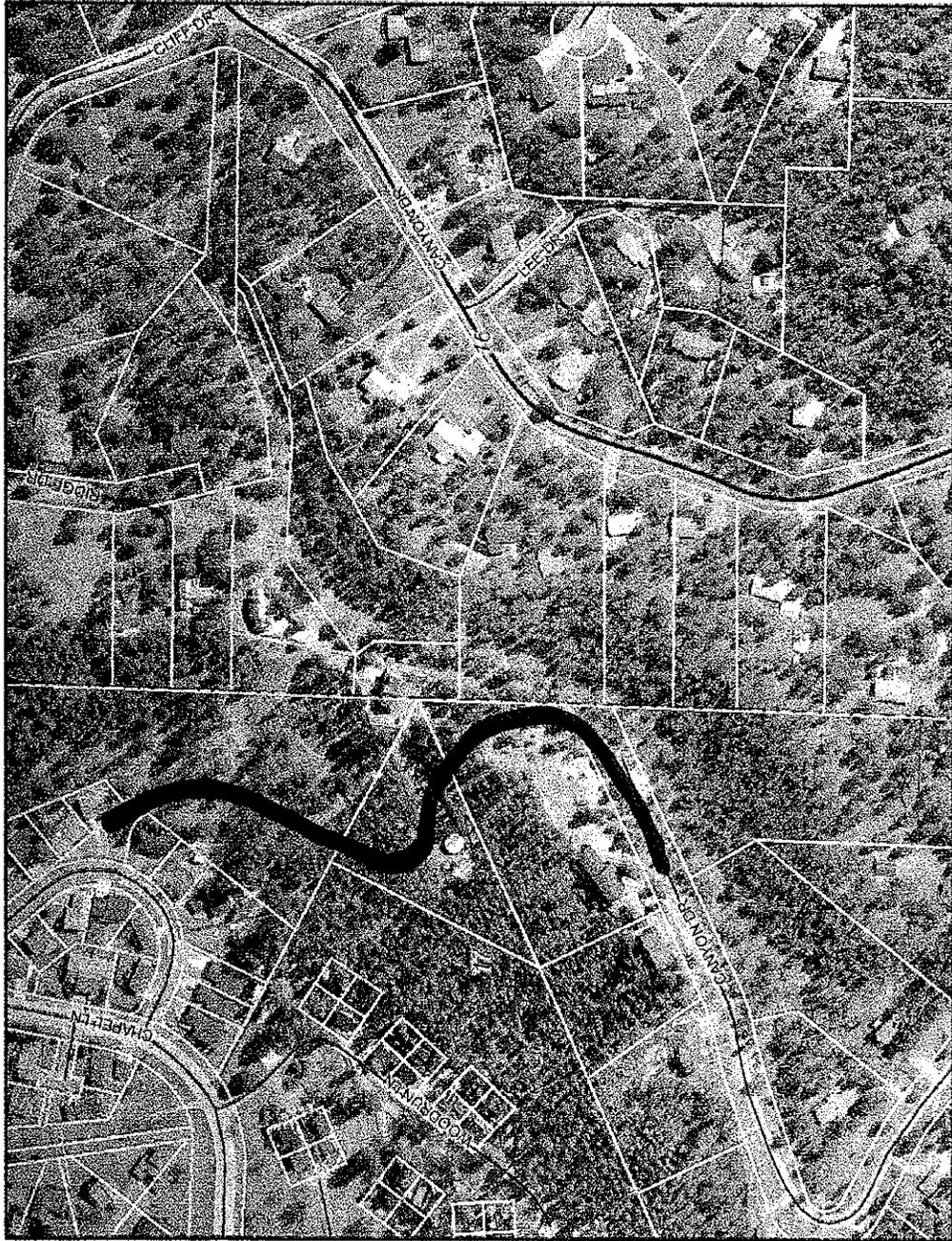
Not sure about bridge improvements. If there is too much water for the present bridge, we in Chapel Valley should stay home. It would be good for families to have a plan B--where family members who are outside the valley go if the bridge is impassable.

I agree with the proposal to create an emergency exit along the south side of Canyon Lake. That would involve minimal driving in forested areas and quick access to Park Drive and on to Jackson Blvd.

Thank you for your work on this project.

Shirley Frederick
3411 Idlewild Court
Rapid City SD 57702

Rapid City-Pennington County GIS



Legend

Roads

- Not classified
- Interstate
- US Highway
- SD Highway
- County Highway
- Main Road
- Minor Arterial
- Collector
- Ramp
- Paved Road
- Unpaved Road
- Unimproved Road
- Trail
- other
- Not yet coded

Township/Section lines

- SECTION
- TOWNSHIP
- Parcel Boundary
- Lot Lines
- COUNTY
- LOT LINE
- PARCEL LINE
- ROAD ROW
- RR ROW
- SECTION
- TOWNSHIP
- WATER LINE
- PLSS Sections
- County Line
- City Boundaries
- Rapid City
- Box Elder

Scale: 1:3,328

Map center: 44° 2' 53.6" N, 103° 17' 30.3" W



DISCLAIMER: This map is provided "as is" without warranty of accuracy, timeliness, or completeness. The burden for determining accuracy, completeness, usefulness, and fitness for use is on the user. Rapid City and Pennington County make no warranties, express or implied, as to the use of this map. There are no implied warranties of merchantability or fitness for a particular purpose. The user acknowledges and accepts the limitations of the map, including the fact that the data used to create the map is by no means a complete and current record. This document does not represent a legal survey of the land. There are no restrictions on the use of this map by any person. The City of Rapid City and Pennington County are not liable for any damages, including consequential damages, arising from the use of this map. The copyright and other proprietary rights are reserved by the City of Rapid City and Pennington County.

Mike Darby 381-0992



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

October 2010
Public Open House #4
Summary

Meeting Handout



ADDENDUM

In July of 2010, the Draft *Chapel Valley Access and Route Alignment Study* was submitted to the City of Rapid City Planning Commission for review and approval. Following the submittal, on July 27, a Special Planning Commission Meeting was held to discuss the study. At the meeting, the Planning Commission unanimously approved a motion requesting the consultant (Felsburg Holt & Ullevig) to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further they requested that an additional neighborhood meeting be held to review those options before reporting back to the Planning Commission.

Public comments on the draft report reinforced comments received at previous public meetings, including the concern that the recommended new alignment G would increase traffic volumes through the neighborhood and allow additional development, without improving emergency safety. Concern was also expressed regarding the high cost of constructing a second access.

Following public comment on the report at the meeting, the Planning Commission requested an updated report focused on safety for the existing residents rather than the development potential associated with a second access. To address this request, this addendum provides the following information:

- Emergency Management Planning – Identification of emergency management strategies, including hazard mitigation, emergency preparedness, emergency response, and recovery;
- Emergency-only Alternatives Analysis – Updated analysis of several access routes assuming they can be built as more narrow, steep roads that would serve as emergency-only routes rather than full city streets. This analysis includes rating and screening of access alternatives alongside non-access alternatives; and
- Recommendations – Recommendations based on the analysis of emergency conditions.

1.1 Emergency Management Planning

A listing of potential emergency management strategies for use in Chapel Valley has been developed with input and cooperation from a number of entities, including the general public, Pennington County Emergency Management, Rapid City Fire Department, Rapid City Growth Management, Rapid City Public Works, Rapid City Police Department and the Rapid City Metropolitan Planning Organization. This listing is preliminary, and may not include all possible strategies.

The traditional practice of emergency planning may be categorized into four phases:

1. Hazard Mitigation;
2. Emergency Preparedness;
3. Emergency Response; and
4. Recovery.

Emergency Management Strategies for Chapel Valley may be organized into these categories. **Table F1** lists the strategies and provides a description, an assessment of the feasibility of implementation, next steps, and responsible parties. In order to implement these strategies, the formation of a Chapel Valley Emergency Management Task Force is recommended. This group would be comprised of Chapel Valley residents interested in pursuing emergency management strategies and Agency representatives experienced in emergency management.



DRAFT

Chapel Valley Access and Route Alignment Study

Table F1. Preliminary Chapel Valley Emergency Management Strategies (Alternative O)

PHASE 1. HAZARD MITIGATION				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Hazard Identification	forest fire, flooding are particular hazards, others	More Feasible	Document hazards posing threat to neighborhood	Pennington County Emergency Management, Emergency Management Task Force
Fuel Reduction	Reduce tree fuel surrounding neighborhood	Feasible	Identify costs and responsibilities	Rapid City Fire Department-Fire Prevention Division
Firewise Communities Program	Implement guidance found at www.firewise.org	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
PHASE 2. EMERGENCY PREPAREDNESS				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Advance Flood/Fire Warning Systems	Predictions already provided by NWS, could explore more localized technology	Feasible, may require capital investment	Investigate options, including low-tech and high-tech	Pennington County Emergency Management
Neighborhood Evacuation Plan	Map evacuation routes; develop communication protocol	Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
Household readiness	Educate residents on measures to take to prepare themselves and their property	More Feasible	Provide workshop for Chapel Valley residents	Pennington County Emergency Management
Wildfire Mitigation	Actions at individual homes to prevent fire damage	Feasible	Conduct local meeting(s) to equip residents to protect their properties	Rapid City Fire Department-Fire Prevention Division



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Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Reverse 911	Emergency notification system	Less Feasible, costly	Review 911broadcast.com	Pennington County Emergency Management
Phone Tree	Simple organization of communication among neighbors	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
2 nd Access to Neighborhood for use during emergencies only	Only one current access to 540+ homes. Additional access required by City ordinance	Less Feasible, costly and difficult terrain	Document options in Access Study, identify most feasible	Rapid City Growth Management, MPO
PHASE 3. EMERGENCY RESPONSE				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Traffic Control Planning	Emergency Traffic Control configuration for Jackson/Chapel Lane intersection	More Feasible	Include Recommended configuration in Chapel Valley Access Plan	Rapid City Growth Management, MPO, Rapid City Fire and Police Departments
Staging Areas	Locations where equipment, personnel, evacuees can be kept during emergencies	Feasible, some possible locations	Consider locations, such as potential purchase of tennis courts at Chapel Lane Village	Rapid City Fire Department
PHASE 4. RECOVERY (No Strategies at this time for Chapel Valley Neighborhood)				



1.2 Emergency-Only Alternatives Analysis

1.2.1 Description of Alternatives

Following the July 27, 2010 Planning Commission meeting, the access study was shifted to focus on the emergency-only characteristics of the access alternatives. The design criteria, previously set to match Rapid City's collector standards, were relaxed to reflect the characteristics of a route that would only be used for emergencies. Specifically, the maximum grade was adjusted from 12 percent to 16 percent, the roadway width from 24 feet to 20 feet and the right-of-way width from 60 feet to 49 feet. These updated criteria were developed in cooperation with Rapid City Emergency Service Agencies.

Alternatives previously eliminated due to excessive property impacts or not providing a second access were not considered as potential emergency-only routes. The emergency-only alternatives are depicted on **Figure F1**. The eleven (11) alternatives include 8 second access alternatives and 3 non-access alternatives. The non-access alternatives are the No Action alternative, Alternative M and Alternative O. Alternative M would provide drainage improvements to the existing Chapel Lane bridge. Further investigation into the flood characteristics of the bridge is needed, but possible improvements include construction of a culvert under Chapel Lane south of the bridge or increasing the size of the opening beneath the bridge. Alternative O would implement the emergency management strategies outlined in **Table F1**.

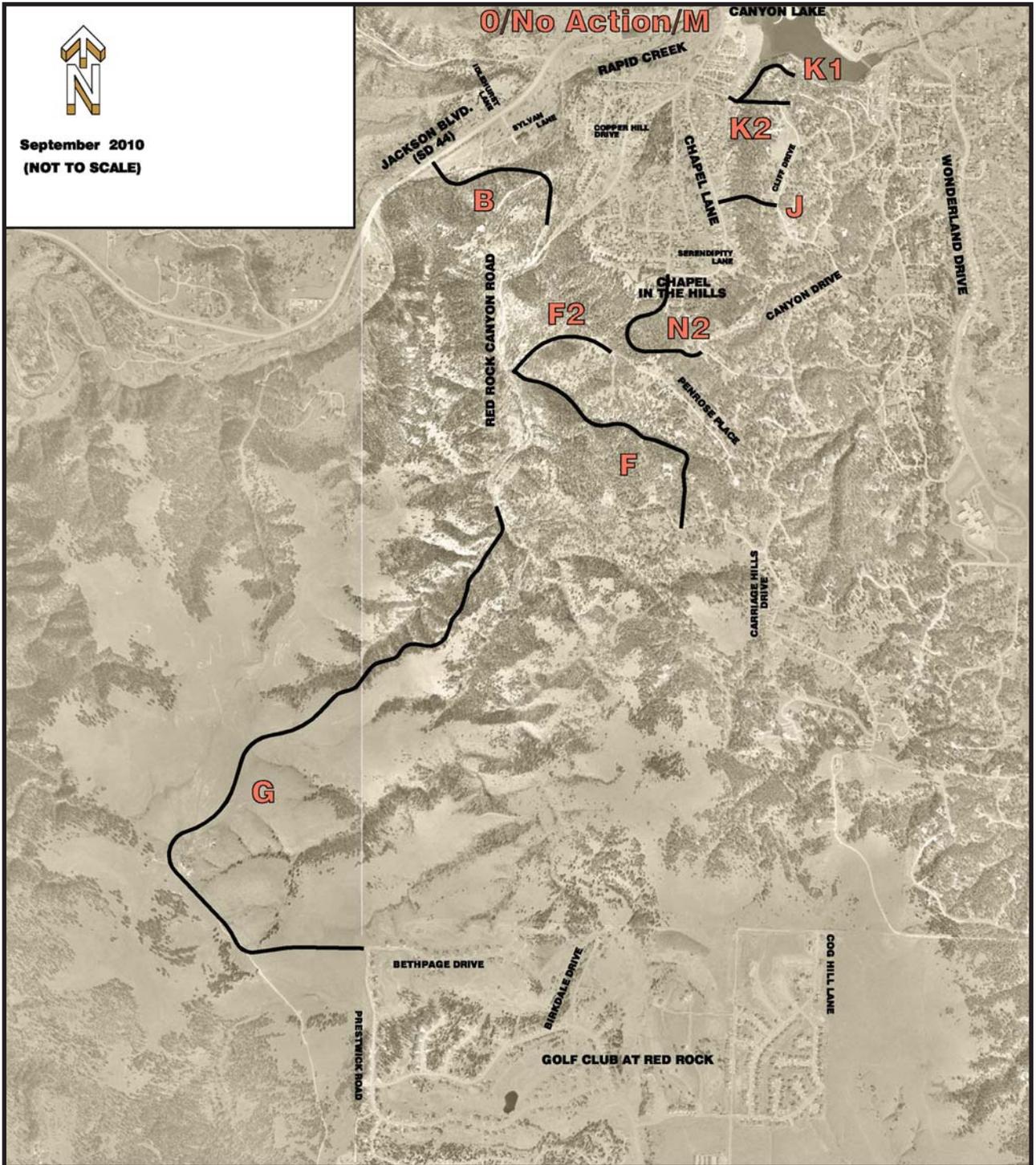
Following the July 27 Planning Commission meeting, alternatives N2 and K2 were recommended by the Project Advisory Group. These options were included in the updated screening process and are depicted on Figure F1.

1.2.2 Alternative Ratings and Screening

Alternatives J (20 percent grade) and K2 (23 percent grade) were eliminated due to grades exceeding 16 percent, the maximum grade for emergency vehicles. The remaining nine alternatives were rated for performance in each of ten screening criteria. The screening criteria are shown in **Table F2**.



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Chapel Valley Access and Route Alignment Study
City of Rapid City and Rapid City Area MPO

Figure F1
Emergency Only Alternatives





Table F2. Screening Criteria

Screening Criteria	Measured as:
Impacts to Property Only	Number of properties overlapped by the alignment footprint
Impacts to Structures	Number of structures overlapped by the alignment footprint
Impact on viewshed for existing homes	Qualitative evaluation of alignment's impact on views for existing homeowners within or near Chapel Valley
Impact on treed acres	Number of acres of trees impacted by the footprint
Drainage/Floodplain Issues	Ability of alternative to improve drainage conditions in Chapel Valley
Provides two access points	Yes or no question based on actual provision of 2 nd access
Cut-through traffic volumes	Likelihood of drivers to use the new access as a diversion from a neighborhood outside of Chapel Valley. Based on travel time savings
Fitness of Connecting Roads to serve additional traffic	The alternative will connect with existing streets. This category measures the ability of these existing streets to serve increased traffic volumes. Small residential roadways not meeting City standard are poor options for additional traffic.
Relative Construction Cost	Relative magnitude of the cost of construction for each alternative
Geotechnical Feasibility	Need for specific design treatments to address geotechnical challenges

The alternatives were rated by performance within each criterion using a ranking method. A total of 45 points were awarded within each criterion. Alternatives could be ranked from 1.0 to 9.0 in a given category. The top performer in a category was typically ranked 1.0 with the poorest typically awarded a 9.0. Ties were accommodated by assigning the same number of points to all tied alternatives while ensuring the overall points totaled 45. This scoring methodology ensured that each criterion would be equally weighted in the final evaluation and no single criterion would lead to an inordinate difference between alternatives.

Table F3 provides the screening scores within each category and the final tally for each alternative.



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Chapel Valley Access and Route Alignment Study

Table F3. Screening Scores

SCREENING CRITERIA	EMERGENCY-ONLY ALTERNATIVE RANKINGS								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Lakeshore	Alternative M - Bridge Drainage Improvements	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative O - Emergency Mngmt. Planning	NO ACTION
Impacts to Property Only	6.0	9.0	4.5	4.5	8.0	2.0	7.0	2.0	2.0
Impacts to Structures	8.0	5.5	7.0	2.5	9.0	2.5	5.5	2.5	2.5
Impact on viewshed for existing homes	4.0	7.0	7.0	7.0	7.0	2.0	7.0	2.0	2.0
Impact on treed acres	8.0	7.0	4.0	9.0	5.0	2.0	6.0	2.0	2.0
Drainage/Floodplain Issues	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Provides two access points	3.5	3.5	3.5	3.5	3.5	8.0	3.5	8.0	8.0
Cut-through traffic volumes	5.0	7.5	7.5	9.0	5.0	2.0	5.0	2.0	2.0
Fitness of Connecting Roads to serve additional traffic	4.0	6.5	9.0	6.5	5.0	2.0	8.0	2.0	2.0
Relative Construction Cost	8.0	6.0	5.0	9.0	4.0	3.0	7.0	2.0	1.0
Geotechnical Feasibility	9.0	6.0	6.0	6.0	6.0	3.0	6.0	1.5	1.5
TOTAL	60.5	63.0	58.5	62.0	57.5	31.5	60.0	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	3	6	2	1



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Chapel Valley Access and Route Alignment Study

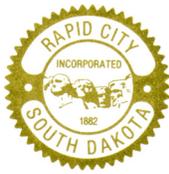
As shown in **Table F3**, the three alternatives that would not provide a second access (The No Action, Bridge Drainage Improvements and Emergency Management Planning (O) alternatives) rank highest of the emergency only options. This is because the screening criteria emphasize physical impacts. On this basis, the non-access options outscore any options for a second access. Among the three non-access options, the No Action ranks highest, followed by Emergency Management Planning (O) and Drainage Improvements to the Chapel Lane Bridge (M).

Of the emergency-only access alternatives, it is important to note that all of the options would be extremely challenging to construct. All require significant earthwork and would impact valuable property and/or structures. Public discussion of second access alternatives to date has been contentious, and no clear favored alternative has emerged. Alternative K1 ranks best in screening performance. However, its footprint would significantly impact properties, structures and Canyon Lake.

1.3 Recommendations

Based on the alternative screening results, the following actions are recommended:

1. Implement Alternative O, Emergency Management Planning: This action would require minimal capital investment and would result in improved emergency readiness among Chapel Valley residents. Though the No Action Alternative ranks above Alternative O, the No Action would not improve emergency conditions. Implementation of Alternative O would require participation from Chapel Valley residents who would form the Emergency Management Task Force.
2. Review the need for drainage improvements to the existing Chapel Lane bridge over Rapid Creek. Named Alternative M, these improvements could increase drainage capacity during a flood, perhaps via a new culvert beneath Chapel Lane south of the bridge.
3. If a second access for emergency use only is desired, Alternative K1 ranks best among the six emergency-only options. Alternative K1, however, holds only a 1 point advantage over the nearest alternative and several alternatives are closely clustered in the final scoring. It is evident that even a slight change to one of the screening measures could identify a different leading option. A more detailed engineering study is required to define the impacts and additional public meetings would be necessary before moving forward.



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

October 2010
Public Open House #4
Summary

Sign-In Sheets

**CHAPEL VALLEY ACCESS AND
ROUTE ALIGNMENT STUDY
OPEN HOUSE, October 20, 2010
4:30 TO 6:00 P.M.**

NAME	ADDRESS	CITY/STATE
Carole Coon	3107 Chapel Ln	Rapid City, SD
Halina Madyn	4801 Powderhorn Dr	" " "
DANIEL Ellenbecker	4911 Copper Hill Ct	" " "
Tom Faye	4002 Canyon Dr.	RC
Shirley Frederick	3411 Idlewild Ct	RC
James LaRay	4744 Cliff Dr	RC
Bob Eastman	4011 Fenrose Fl.	RC
Linda Jordan	4810 Powderhorn Dr 1	RC
Beg McIntire	4520 Steamboat	"
Abbie Hill	5744 W Hwy 40	RC
Nick Tupper	4917 Steamboat Cir	RC
Arny Kookie Satung	3788 Chapel Lane	RC
Mary Olsen	4510 Carriage Hill Ln	RC
Mark York	3861 Red Rock Canyon Rd	RC SD
James	4810 Copper Hill Dr	RC SD
Miko Derby	2735 Country Club Dr	RC SD
Helen Gibson	Red Rock Canyon Rd.	
Albina Crosswhite	3950 Red Rock Canyon	RC SD
Jocelyn Baker	3220 Kerckwood Dr	RC SD
Adri Gibson	3960 Red Rock Canyon	RC
Brant C. Grote	4000 Penrose Place	RC SD
Dean + Judy Nelson	3540 Red Rock Canyon Rd	RC, SD
Quyn Hansen	4475 W. Glen Pl.	RC SD
Brenda Melvin	3520 Red Rock Canyon Rd	RC SD
Dave Crabb	4084 Canyon Dr	RC SD
Terry Kenney	3311 Powderhorn Dr.	RC SD

**CHAPEL VALLEY ACCESS AND
ROUTE ALIGNMENT STUDY
OPEN HOUSE, October 20, 2010
4:30 TO 6:00 P.M.**

NAME	ADDRESS	CITY/STATE
Craig Lewis	709 Joy Ave.	Rapid City, SD
CAROL ROBINSON	4710 COPPERHILL DR	RC
DAN STATION	3820 CASPORT CT	RC
Barb Doshier	3302 Snowmass Ct.	R.C
Bill Keck	4815 Telemark Ct.	RC 02
Tim Weaver		RC SD
HARBAR GARDNER	4011 Fenwick Pl	RC SD
Christine Sandvik	4810 Ponderhorn Dr	RC, SD
Janet Hall	3613 Chapel Valley Rd	RC SD
Kim York	3861 Red Rock Camp Rd.	RC, SD
Ed HUBBING	4001 Canyon Drive	RC SD 57704
Jeanette Keck	4815 Telemark Ct	RC
Connie Ireland	4810 Copper Hill Dr	RC SD 57702
Jim Johnson	3602 Ridge Dr.	RC 02
Steve Doshier	3302 Snowmass Ct.	RC SD 57702
Steve Mousel	3226 Snowmass Ct	TRE. S.D. 57702
Kon Bunneil	3208 Kirkwood Dr.	RC SD 57702
Marcus Ellis	300 Sixth St	RC SD 57702
BOB LAUTENSCHLAGER	3507 ICEWILD CT	RC
Phili Lautenschlager	"	"
Barry Risdall	3870 Red Rock Camp Rd	RC 57702
Art Kenney	3311 Ponderhorn Dr.	RC 57702
Marilee McLaughlin	4927 Shadow Mt Ct	RC 57702

Chapel Valley Emergency Management Task Force

Name	Address	Email Address	Phone Number
John Willman	3214 Kirkwood Drive	jcwillman@aol.com	343-1135
Zbigniew (Ziggy) Hladysz	4801 Powderhorn Drive	halina@rushmore.com	718-5719
Linda Sandvik	4810 Powderhorn Dive	lindasandvik@rushmore.com	342-8450
Jeanette Keck	4815 Telemark Ct	readtome49@hotmail.com	341-2443
Peg McIntire	4520 Steamboat Cir	mcintire@rushmore.com	348-7623
Edd Hubbeling	4001 Canyon Dr	rcianh@aol.com	342-0379



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

**October 2010
Public Open House #4
Summary**

Meeting Announcement

OPEN HOUSE NOTICE

CHAPEL VALLEY ACCESS AND ROUTE ALIGNMENT STUDY

Please join us! The Rapid City Area Metropolitan Planning Organization (MPO) will hold an open house to gather input on the Addendum to the Draft Report for the Chapel Valley Access and Route Alignment Study area. There will be no formal presentation. The Addendum to the Draft Report is available at <http://www.rcgov.org/Growth-Management/>.

**Wednesday, October 20, 2010
4:30 PM to 6:00 PM
Canyon Lake Senior Center
2900 Canyon Lake Drive, Rapid City**

For additional information contact Monica Heller with the Rapid City Growth Management Department at 605-394-4120 or by e-mail at Monica.heller@rcgov.org.

OPEN HOUSE NOTICE

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DATE: Wednesday, October 20, 2010
TIME: 4:30 PM to 6:00 PM
LOCATION: Canyon Lake Senior Center
2900 Canyon Lake Dr, Rapid City

For additional information contact Monica Heller with the Rapid City Growth Management Department at 605-394-4120 or by e-mail at Monica.heller@rcgov.org.

ADA Compliance: The City of Rapid City fully subscribes to the provisions of the Americans with Disabilities Act. If you desire to attend this public meeting, and are in need of special accommodations, please notify the Rapid City Growth Management Department so that appropriate auxiliary aids and services are available.

The Rapid City Area Metropolitan Planning Organization provides services without regard to race, color, gender, religion, national origin, age or disability, according to the provisions contained in SDCL20-13, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, as amended, the Americans with Disabilities Act of 1990 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Populations and Low-Income Populations, 1994.

(Published once at the approximate cost of: \$139.20)



Chapel Valley Access and Route Alignment Study Rapid City, SD

Chapel Valley Access and Route Alignment Study

October 2010
Public Open House #4
Summary

Open House Exhibits

PHASE 1. HAZARD MITIGATION				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Hazard Identification	forest fire, flooding are particular hazards, others	More Feasible	Document hazards posing threat to neighborhood	Pennington County Emergency Management, Emergency Management Task Force
Fuel Reduction	Reduce tree fuel surrounding neighborhood	Feasible	Identify costs and responsibilities	Rapid City Fire Department- Fire Prevention Division
Firewise Communities Program	Implement guidance found at www.firewise.org	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
PHASE 2. EMERGENCY PREPAREDNESS				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Advance Flood/Fire Warning Systems	Predictions already provided by NWS, could explore more localized technology	Feasible, may require capital investment	Investigate options, including low-tech and high-tech	Pennington County Emergency Management
Neighborhood Evacuation Plan	Map evacuation routes; develop communication protocol	Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
Household readiness	Educate residents on measures to take to prepare themselves and their property	More Feasible	Provide workshop for Chapel Valley residents	Pennington County Emergency Management
Wildfire Mitigation	Actions at individual homes to prevent fire damage	Feasible	Conduct local meeting(s) to equip residents to protect their properties	Rapid City Fire Department-Fire Prevention Division
Reverse 911	Emergency notification system	Less Feasible, costly	Review 911broadcast.com	Pennington County Emergency Management
Phone Tree	Simple organization of communication among neighbors	More Feasible	Convene Emergency Management Task Force	Emergency Management Task Force
2 nd Access to Neighborhood for use during emergencies only	Only one current access to 540+ homes. Additional access required by City ordinance	Less Feasible, costly and difficult terrain	Document options in Access Study, identify most feasible	Rapid City Growth Management, MPO
PHASE 3. EMERGENCY RESPONSE				
Strategy	Description	Feasibility	Next Step(s)	Responsible Parties
Traffic Control Planning	Emergency Traffic Control configuration for Jackson/Chapel Lane intersection	More Feasible	Include Recommended configuration in Chapel Valley Access Plan	Rapid City Growth Management, MPO, Rapid City Fire and Police Departments
Staging Areas	Locations where equipment, personnel, evacuees can be kept during emergencies	Feasible, some possible locations	Consider locations, such as potential purchase of tennis courts at Chapel Lane Village	Rapid City Fire Department
PHASE 4. RECOVERY (No Strategies at this time for Chapel Valley Neighborhood)				

**Draft Addendum Table F1
Preliminary Chapel Valley Emergency Management Strategies (Alternative O)**



SCREENING CRITERIA	EMERGENCY-ONLY ALTERNATIVE RANKINGS								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Lakeshore	Alternative M - Bridge Drainage Improvements	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative O - Emergency Mngmt. Planning	NO ACTION
Impacts to Property Only	6.0	9.0	4.5	4.5	8.0	2.0	7.0	2.0	2.0
Impacts to Structures	8.0	5.5	7.0	2.5	9.0	2.5	5.5	2.5	2.5
Impact on viewshed for existing homes	4.0	7.0	7.0	7.0	7.0	2.0	7.0	2.0	2.0
Impact on treed acres	8.0	7.0	4.0	9.0	5.0	2.0	6.0	2.0	2.0
Drainage/Floodplain Issues	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Provides two access points	3.5	3.5	3.5	3.5	3.5	8.0	3.5	8.0	8.0
Cut-through traffic volumes	5.0	7.5	7.5	9.0	5.0	2.0	5.0	2.0	2.0
Fitness of Connecting Roads to serve additional traffic	4.0	6.5	9.0	6.5	5.0	2.0	8.0	2.0	2.0
Relative Construction Cost	8.0	6.0	5.0	9.0	4.0	3.0	7.0	2.0	1.0
Geotechnical Feasibility	9.0	6.0	6.0	6.0	6.0	3.0	6.0	1.5	1.5
TOTAL	60.5	63.0	58.5	62.0	57.5	31.5	60.0	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	3	6	2	1

Draft Addendum Table F3
Screening Scores



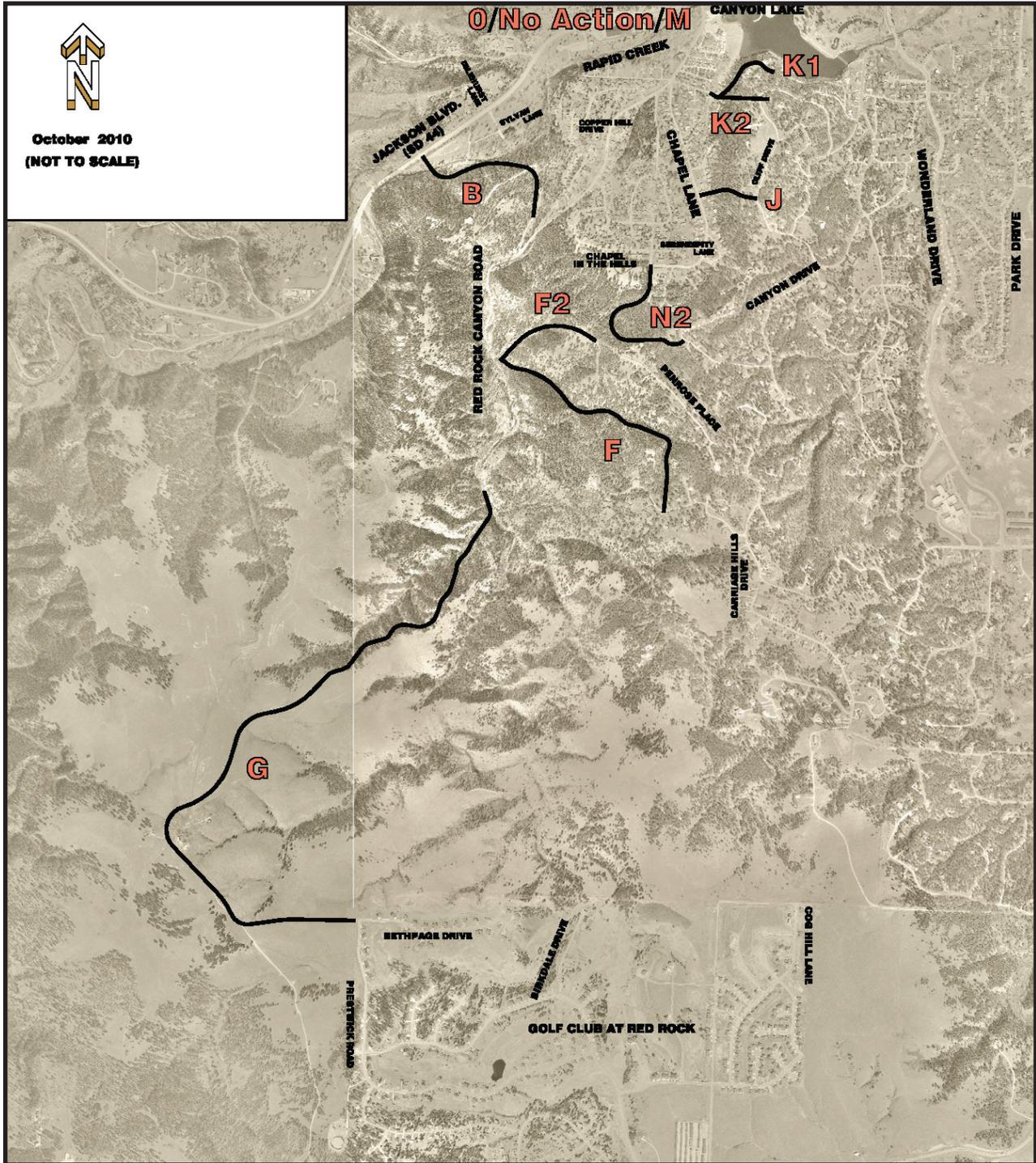


Figure F1
Emergency Only Alternatives





APPENDIX A ALTERNATIVE SCREENING QUANTITIES

FINAL SCREENING CRITERIA	Alternative Ranking within Evaluation Criteria and Aggregate				
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	N - NO ACTION
Impacts to Property Only	3.0 3 properties	5.0 15 properties	2.0 1 property	4.0 6 properties	1.0 0 properties
Impacts to Structures	4.0 6 structures	1.5 0 structures	3.0 2 structures	5.0 8 structures	1.5 0 structures
Park and Trail impact	5.0 crosses trail	2.5 none	2.5 none	2.5 none	2.5 none
Impact on viewshed for existing homes	2.0 light	4.0 severe	4.0 severe	4.0 severe	1.0 none
Impact on treed acres	4.0 15 acres	3.0 9 acres	5.0 24 acres	2.0 6 acres	1.0 0 acres
Drainage/Floodplain Issues	3.0 severe	3.0 severe	3.0 severe	3.0 severe	3.0 severe
Provides two access points	2.5 Yes	2.5 Yes	2.5 Yes	2.5 Yes	5.0 No
Connects with regional roadway network	2.0 redundant	3.5 moderate	1.0 Most	3.5 moderate	5.0 Least
Cut-through traffic volumes	2.0 minimal	3.5 moderate	5.0 most	3.5 moderate	1.0 least
Fitness of Connecting Roads to serve additional traffic	2.0 steep	4.5 narrow	3.0 flood prone	4.5 narrow	1.0 n/a
Relative Construction Cost	3.0 \$13.9 Million	2.0 \$7.9 Million	5.0 \$49.6 Million	4.0 \$23.8 Million	1.0 zero
Alternative Funding Availability	4.0 none	4.0 none	2.0 developable land	4.0 none	1.0 no cost
Geotechnical Feasibility	5.0 very difficult	3.0 moderate	3.0 moderate	3.0 moderate	1.0 none
TOTAL	41.5	42.0	41.0	45.5	25.0
Overall Alternative Rank	3	4	2	5	1

NOTES:

- Alignments C, E, H, I, J, K, L, and M were previously eliminated due to impacts to structures and inability to meet City and SDDOT standards.
- Alignments A and D eliminated in screening process due to increased property and structure impacts.
- Opinions of probable cost do not include property and engineering costs or cost for improvements to existing facilities.