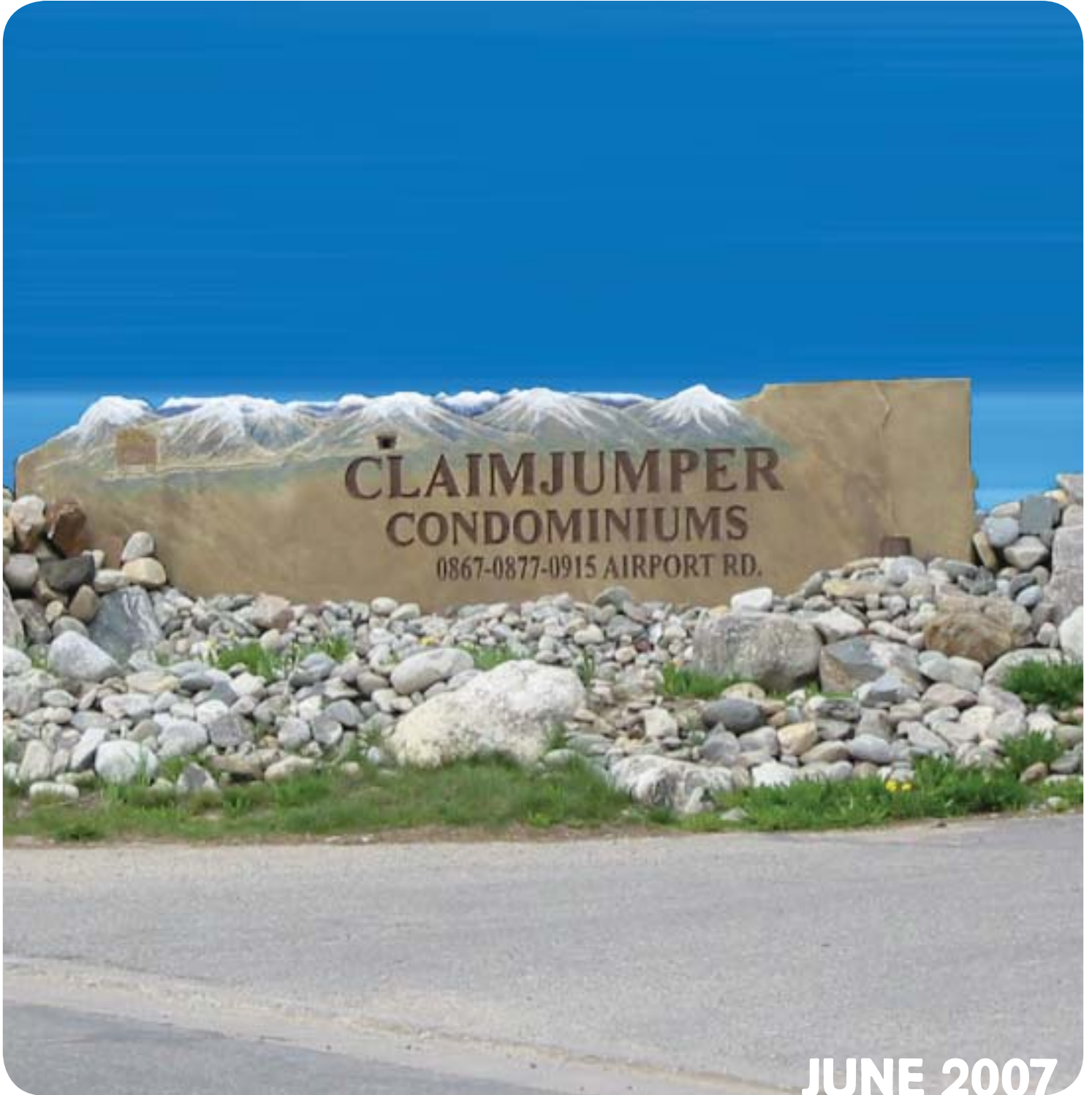


# CLAIMJUMPER MINE

## Haul Route Analysis



JUNE 2007

PREPARED FOR



PREPARED BY

**URS**

URS CORPORATION  
DENVER, COLORADO

# Claimjumper Mine Haul Route Analysis

Prepared for



United States Environmental Protection Agency

Prepared by

**URS**

URS Corporation  
Denver, Colorado

**June 2007**

## Contents

Introduction.....	1
Route Descriptions.....	1
Evaluation Criteria.....	3
Route Analysis.....	7
Conclusions/Recommendations.....	16

## Figures

Figure 1. Route Descriptions .....	2
Figure 2. Residential Frontage, Sensitive Areas, and Water Resources .....	5
Figure 3. Existing Traffic Control.....	6

## Tables

Table 1. Route Alternatives Summary.....	15
Table 2. Route Alternatives Scoring.....	16

## INTRODUCTION

The US Environmental Protection Agency (EPA) and US Department of Agriculture-Forest Service are planning a joint mine waste cleanup for the Shock Hill/Claimjumper Mine Site in Breckenridge, Colorado. The mine waste will be moved from the approximately 35-acre Shock Hill/Claimjumper area on Airport Road to the Forest Service's two-acre Wellington-Oro parcel on French Gulch Road, which currently holds mine waste. The removal of the waste from the Mine Site will decrease threat to human health and the environment from high concentrations of lead and arsenic in the mining waste. The waste will be moved to a location that already contains the same hazardous metals.

Approximately 10,000 cubic yards of mine waste will be relocated to the Wellington-Oro parcel. The waste will be transported in tandem axle (ten-wheel) bobtail dump trucks. Each truck has a carrying capacity of approximately 10 cubic yards. The hauling will take place over a period of two to three weeks comprising 600 to 800 truck loads of waste.

The purpose of this report is to analyze several proposed waste haul routes between the Mine Site and the Wellington-Oro parcel. The analysis will use several criteria to compare the different routes to determine which route best serves the community.

## ROUTE DESCRIPTIONS

Four alternative haul routes were identified between the Mine Site and the Wellington-Oro parcel. Common to all routes is the crossing of the Blue River as well as travel through Town of Breckenridge residential areas. Each route is shown in **Figure 1** and is described below.

### Route Alternative #1: Huron Road/Reiling Road Roundtrip

From the Mine Site, trucks will travel north on Airport Road to Valley Brook Road. Trucks then turn east and follow Valley Brook Road to SH 9 (North Main Street). A right turn will then take the trucks along SH 9 to Huron Road where they turn left. Trucks then follow Huron Road to Reiling Road. Trucks then turn left onto Wellington Road/French Gulch Road, where the Wellington-Oro parcel is located. The return trip is the reverse of the same route.

Residential areas are located along Huron Road, Reiling Road and Wellington Road/French Gulch Road. The route traverses the edge of Kingdom Park along Valley Brook Road and also crosses the Blue River in this area.



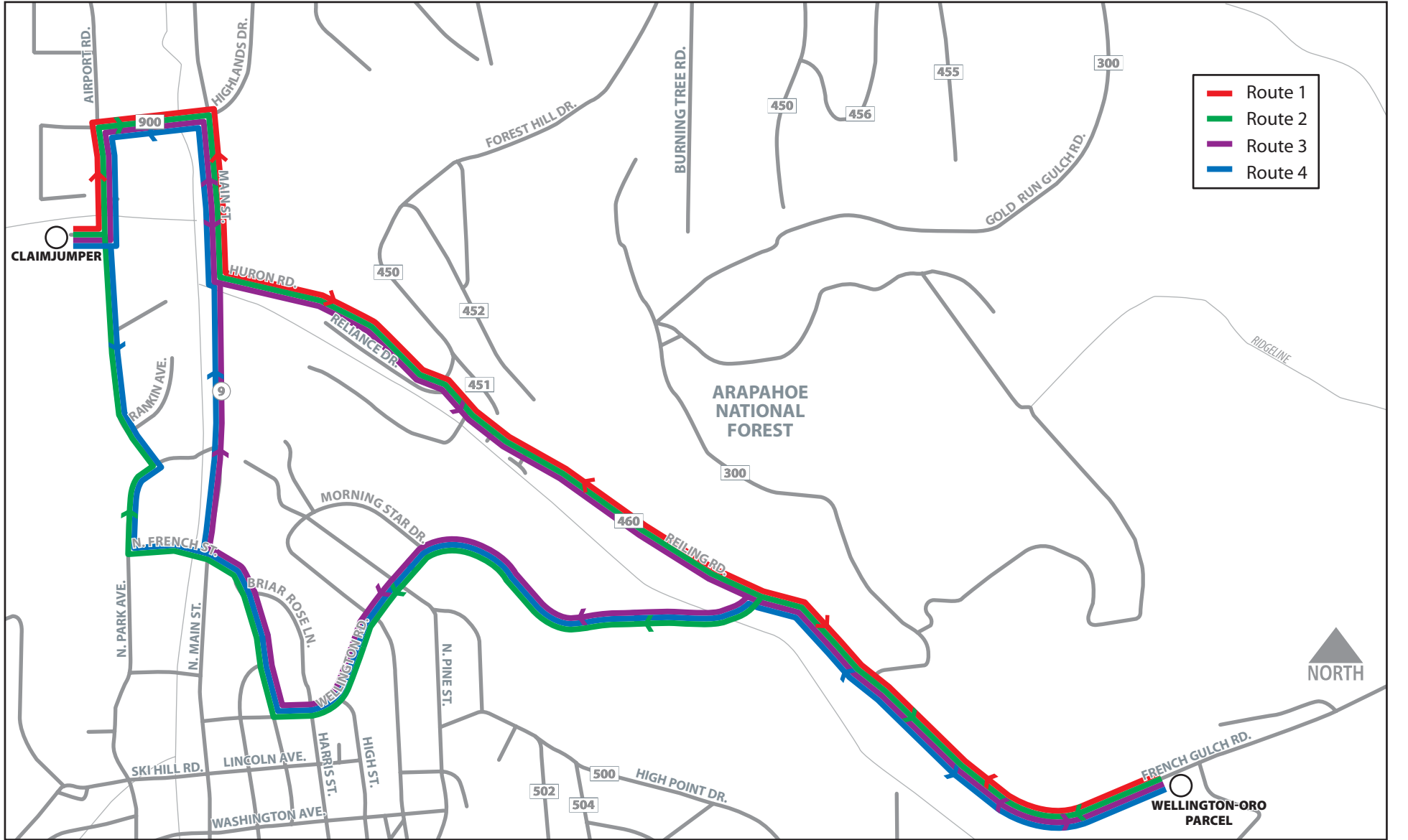
### Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)



From the Mine Site, trucks will travel to the Wellington-Oro parcel using the same streets as Route #1. Upon returning to the Mine Site, trucks will continue along Wellington Road past the intersection with Reiling Road. Trucks then turn right onto North French Street. After crossing North Main Street, trucks turn right onto North Park Avenue (SH 9). Trucks then turn left onto Airport Road, which provides access to the Mine Site.

Residential areas are located along Huron Road, Reiling Road, Airport Road, French Street, and Wellington Road/French Gulch Road. The route traverses the edge of Kingdom Park along Valley Brook Road and also crosses the Blue River in this area, as well as on North French Street. The route also crosses French Creek on Wellington Road near the intersection with Reiling Road.

**FIGURE 1: ROUTE DESCRIPTIONS**



**CLAIMJUMPER MINE Haul Route Analysis**

**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

From the Mine Site, trucks will travel to the Wellington-Oro parcel using the same streets as Route #1. Upon returning to the Mine Site, trucks will continue along Wellington Road past the intersection with Reiling Road. Trucks then turn right onto North French Street, followed by another right turn onto North Main Street. Trucks follow North Main Street to Valley Brook Road, where they turn left. Trucks then turn left again onto Airport Road, which provides access to the Mine Site.



Residential areas are located along Huron Road, Reiling Road, French Street and Wellington Road/French Gulch Road. The route traverses the edge of Kingdom Park along Valley Brook Road and also crosses the Blue River in this area. The route also crosses French Creek on Wellington Road near the intersection with Reiling Road, and on SH 9 (North Main Street) south of Huron Road.

**Route Alternative #4: Wellington Road Roundtrip**



From the Mine Site, trucks will travel south on Airport Road to North Park Avenue. Trucks turn right and follow North Park Avenue to North French Street where the route turns left. Trucks then follow North French Street across North Main Street to the intersection with Wellington Road. Trucks turn left and follow Wellington Road to the Wellington-Oro parcel. The return trip to the Mine Site is the same as Route #3, using North Main Street, Valley Brook Road and Airport Road.

Residential areas are located along Airport Road, French Street and Wellington Road/French Gulch Road. The route traverses the edge of Kingdom Park along Valley Brook Road and also crosses the Blue River in this area, as well as on North French Street. The route also crosses French Creek on Wellington Road near the intersection with Reiling Road, and on SH 9 (North Main Street) south of Huron Road.

**EVALUATION CRITERIA**

To select the route that best meets the needs of the community, several criteria were developed to evaluate each route. The evaluation criteria combine engineering and truck operating factors, social factors and other concerns presented by the Town of Breckenridge. These criteria and how they will be scored in the evaluation are described below.

**Roundtrip Distance:** Roundtrip distance is the total distance a truck would travel along the route. Routes with the shortest roundtrip distance will be scored highest.

**Residential Frontage:** For this analysis, residential frontage is defined as the amount of residential property directly adjacent to the haul route. Housing that “fronts” the haul route (with driveways and front doors) is considered to be more impacted than housing that backs the haul route. Other separation

devices such as berms and sound walls are also taken into account. Routes with the least direct residential frontage roundtrip will be scored higher.

**Sensitive Areas:** Certain land uses along the haul route that may be particularly sensitive to noise, traffic and dust. These uses may include day care centers, play grounds, ball fields, schools, cemeteries and other similar facilities. Routes with fewer sensitive land uses will be scored higher.

**Water Resources:** Since contaminated waste will be transported, routes with less potential contact with water resources will be preferred. The reduction of water crossings will reduce the risk of an accident that contaminates surface water. Routes that travel parallel to bodies of water also increase the risk of contamination. Routes with the least potential contact with water resources roundtrip will be scored higher.

The areas of residential frontage, sensitive areas and water resources are shown in **Figure 2**.

**Potential for Load Agitation:** Routes that provide the smoothest surface are preferable since any bumps and dips in the road may agitate the load; creating dust and increasing the potential for spillage. This would include residential traffic calming devices such as speed humps. Routes with the least potential for load agitation will be scored higher.

**Roadway Surface Condition:** Routes with a higher quality of pavement condition will be considered more desirable than routes with pavement that is already deteriorating. Higher quality pavement will be better able to stand up to fully loaded trucks. The routes with the best pavement condition will be scored higher.

**Number of Stops Required:** Traffic control will require trucks to stop at certain intersections along the haul route. After stopping, trucks must accelerate back to operating speeds which will introduce increased noise and exhaust into these areas. Routes with fewer stopping locations roundtrip will be scored higher.

**Pedestrian/Cyclist Safety:** Haul routes that provide designated pedestrian/bicycle facilities are preferred to keep pedestrians and cyclists safely separated from the roadway. Routes with the greatest proportion of sidewalk/bicycle trail “coverage” will be scored higher.

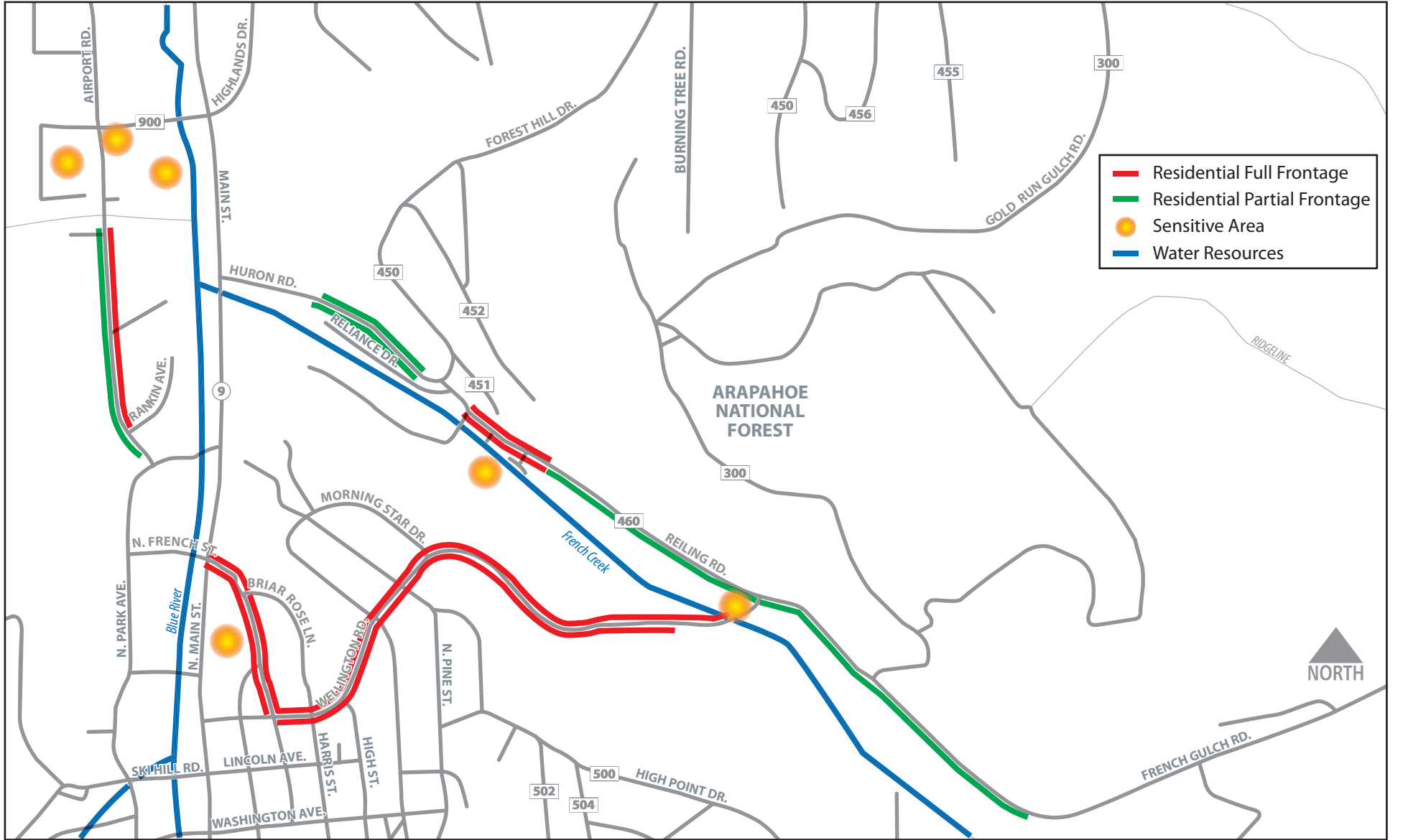
**Weight Restrictions:** Certain roadways in the hauling area have limitations on vehicle weights. Some of these roadways may lie along hauling routes. Routes with no weight restrictions will be scored higher.

**Low Clearance Hazards:** Low hanging obstacles may be considered a potential hazard (or would require modification) to trucks operating along a haul route. The most notable potential hazards would be overpasses and low-hanging power lines. Routes with no low clearance hazards will be scored higher.

**Manual Traffic Control/Flagging Requirements:** Locations along a route may require additional traffic control or flagging personnel to aid in the management of traffic. These locations may include areas with poor sight distance, steep grades or insufficient gaps to enter traffic during peak travel periods. Routes with fewer traffic control/flagging requirements will be scored higher.

Locations of existing traffic control, as well as proposed manual traffic control and flagging locations are shown in **Figure 3**.

**FIGURE 2: RESIDENTIAL FRONTAGE, SENSITIVE AREAS AND WATER RESOURCES**

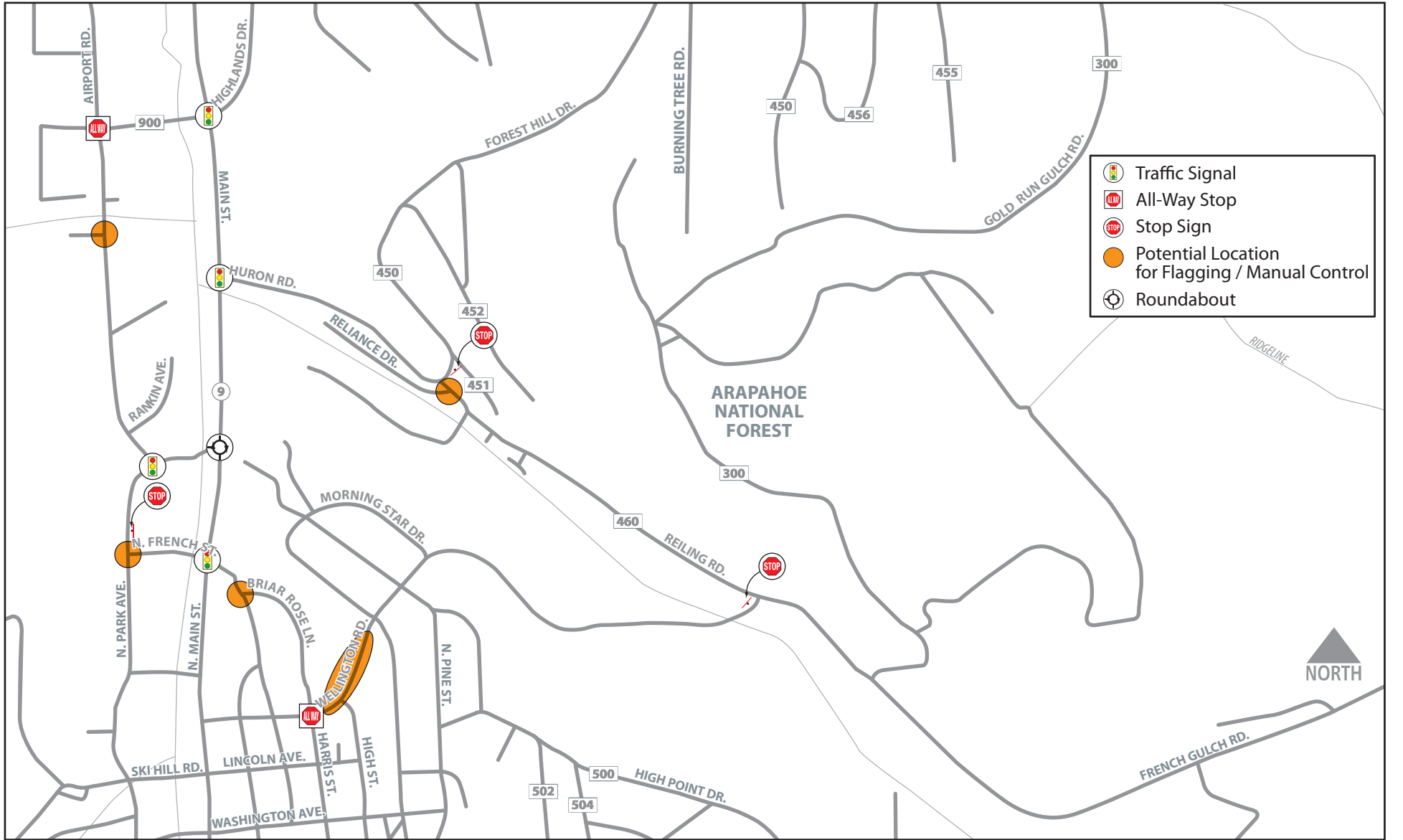


**CLAIMJUMPER MINE Haul Route Analysis**

0 mi 0.2 0.4 0.6 0.8



**FIGURE 3: TRAFFIC CONTROL AND FLAGGING**



**CLAIMJUMPER MINE** Haul Route Analysis

## ROUTE ANALYSIS

All route segments were observed and photographed on Friday June 1, 2007. The information gathered during this reconnaissance was used to analyze each proposed route. The route characteristics associated with each evaluation criteria are described below and summarized in Table 1.

### Roundtrip Distance

Route	Roundtrip Distance Miles
Route Alternative #1: Huron Road/Reiling Road Roundtrip	4.5
Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)	4.8
Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)	5.2
Route Alternative #4: Wellington Road Roundtrip	5.6

### Residential Frontage

#### Route Alternative #1: Huron Road/Reiling Road Roundtrip

Residential frontage accounts for approximately 3.4 of the 9 miles of route frontage. Most of the residential areas along this route do not directly front the route. The one exception is the residential area along Reiling Road, where houses and driveways directly access the street. In addition, an earthen berm separates parts of Reiling Road from adjacent neighborhoods.

#### Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)

Residential frontage accounts for approximately 5.7 of the 9.6 miles of route frontage. The residential areas along Reiling Road, Wellington Road, North French Street, and part of Airport Road directly front the route. The remaining residential areas do not directly front the route. In addition, an earthen berm separates parts of Reiling Road from adjacent neighborhoods.

#### Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)

Residential frontage accounts for approximately 4.9 of the 10.5 miles of route frontage. The residential areas along Reiling Road, Wellington Road and North French Street directly front the route. The remaining residential areas do not directly front the route. In addition, an earthen berm separates parts of Reiling Road from adjacent neighborhoods.



#### **Route Alternative #4: Wellington Road Roundtrip**

Residential frontage accounts for approximately 7.2 of the 11.1 miles of route frontage. The residential areas along Wellington Road, North French Street and part of Airport Road directly front the route. The remaining residential areas do not directly front the route.

### **Sensitive Areas**

#### **Route Alternative #1: Huron Road/Reiling Road Roundtrip**

The sensitive areas along this route are affected twice (trucks to/from disposal site) during the completion of one roundtrip. Sensitive areas along the route include the Valley Brook Cemetery, Kingdom Park, Carriage House Day Care, French Creek Neighborhood Playground, and Little Red Schoolhouse Day Care.

#### **Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

The sensitive areas along this route are affected once during the completion of one roundtrip. Sensitive areas along the route include the Valley Brook Cemetery, Kingdom Park, Carriage House Day Care, French Creek Neighborhood Playground, Little Red Schoolhouse Day Care (twice), and the Downtown Breckenridge area.

#### **Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

The sensitive areas along this route are affected once or twice during the completion of one roundtrip depending on their location along the route. Sensitive areas along the route include the Valley Brook Cemetery (twice), Kingdom Park (twice), Carriage House Day Care (twice), French Creek Neighborhood Playground, Little Red Schoolhouse Day Care (twice) and the Downtown Breckenridge area.

#### **Route Alternative #4: Wellington Road Roundtrip**

The sensitive areas along this route are affected once or twice during the completion of one roundtrip depending on their location along the route. Sensitive areas along the route include the Valley Brook Cemetery, Kingdom Park, Carriage House Day Care, Little Red Schoolhouse Day Care (twice), and the Downtown Breckenridge area (twice).

### **Water Resources**

#### **Route Alternative #1: Huron Road/Reiling Road Roundtrip**

The route crosses the Blue River twice on Valley Brook Road. The route also runs parallel to the Blue River along SH 9 (North Main Street).



**Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks) – The route crosses the Blue River twice, once on Valley Brook Road and once on North French Street. It also crosses French Creek on Wellington Road. French Creek also runs parallel to the portion of the route on Wellington Road between Reiling Road and Morning Star Drive.

**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

The route crosses the Blue River twice on Valley Brook Road. It also crosses French Creek twice, once on Wellington Road and once on SH 9 (North Main Street). The route runs parallel to the Blue River along SH 9 (North Main Street) and also to French Creek along Wellington Road between Reiling Road and Morning Star Drive.

**Route Alternative #4: Wellington Road Roundtrip**

The route crosses the Blue River twice, once on Valley Brook Road and once on North French Street. It also crosses French Creek three times, twice on Wellington Road and once on SH 9 (North Main Street). The route runs parallel to the Blue River along SH 9 (North Main Street) and also to French Creek along Wellington Road between Reiling Road and Morning Star Drive.

## Load Agitation

**Route Alternative #1: Huron Road/Reiling Road Roundtrip**

The route traverses three speed humps in the French Creek neighborhood on Reiling Road. These speed humps are crossed twice during the completion of one roundtrip.

**Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

The route traverses three speed humps in the French Creek neighborhood on Reiling Road and two speed humps on North French Street. The route also passes through the North Main Street/North French Street intersection which contains rather deep drainage channels on either side of North Main Street.



**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

The route traverses three speed humps in the French Creek neighborhood on Reiling Road and two speed humps on North French Street. The route also passes through the North Main Street/North French Street intersection.

**Route Alternative #4: Wellington Road Roundtrip**

The route traverses two speed humps on North French Street twice during the completion of one round trip. The route also passes through the North Main Street/North French Street intersection twice.

**Roadway Surface Condition**

**Route Alternative #1: Huron Road/Reiling Road Roundtrip**

An area of erosion exists on the north side of Huron Road near the intersection with SH 9 (North Main Street). Pavement damage also exists along Valley Brook Road, especially at the Blue River crossing. There are also a couple of ruts along the pavement at the intersection of Reiling Road and Wellington Road.



**Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

An area of erosion exists on the north side of Huron Road near the intersection with SH 9 (North Main Street). Pavement damage also exists along Valley Brook Road, especially at the Blue River crossing. There are also a couple of ruts along the pavement at the intersection of Reiling Road and Wellington Road. In addition, pavement along Wellington Road is beginning to crack and deteriorate.

**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**



An area of erosion exists on the north side of Huron Road near the intersection with SH 9 (North Main Street). Pavement damage also exists along Valley Brook Road, especially at the Blue River crossing. There are also a couple of ruts along the pavement at the intersection of Reiling Road and Wellington Road. In addition, pavement along Wellington Road is beginning to crack and deteriorate.

**Route Alternative #4: Wellington Road Roundtrip**

Pavement damage also exists along Valley Brook Road, especially at the Blue River crossing. In addition, pavement along Wellington Road is beginning to crack and deteriorate.

## Stops Required

Route	Stops Required
Route Alternative #1: Huron Road/Reiling Road Roundtrip	8 required stops
Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)	11 required stops
Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)	13 required stops
Route Alternative #4: Wellington Road Roundtrip	15 required stops

## Adjacent Pedestrian/Cyclist Facilities

### Route Alternative #1: Huron Road/Reiling Road Roundtrip

Huron Road/Reiling Road Roundtrip – Approximately 38 percent of the route has dedicated pedestrian/bicycle facilities along its length. Huron Road, Valley Brook Road, and Wellington Road (east of Reiling Road) do not provide facilities for pedestrians or bicycles. The route crosses the Blue River multi-use trail on Valley Brook Road. During the course of the day, few pedestrians and bicyclists were observed along the majority of the route.



### Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)

Approximately 56 percent of the route has dedicated pedestrian/bicycle facilities along its length. Huron Road, Valley Brook Road, Wellington Road (east of Reiling Road) and North French Street (between North Park Avenue and North Main Street) do not provide facilities for pedestrians or bicycles. The route crosses the Blue Rive multi-use trail on Valley Brook Road and North French Street. Pedestrians, children and bicyclists were observed frequently along Wellington Road, North French Street, and Airport Road throughout the day.

### Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)

Approximately 62 percent of the route has dedicated pedestrian/bicycle facilities along its length. Huron Road, Valley Brook Road, and Wellington Road (east of Reiling Road) do not provide facilities for pedestrians or bicycles. The route crosses the Blue Rive multi-use trail on Valley Brook Road. Pedestrians, children and bicyclists were observed frequently along Wellington Road and North French Street throughout the day.

### Route Alternative #4: Wellington Road Roundtrip

Approximately 76 percent of the route has dedicated pedestrian/bicycle facilities along it length. Valley Brook Road, Wellington Road (east of Reiling Road) and North French Street (between North Park Avenue and North Main Street) do not provide facilities for pedestrians or bicycles. The route crosses the Blue Rive multi-use trail on North French Street. Pedestrians, children and bicyclists were observed frequently along Wellington Road and North French Street throughout the day.



### Weight Restrictions

**Route Alternative #1: Huron Road/Reiling Road Roundtrip**

None

**Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

Posted 10,000 pound limit on North French Street

**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

Posted 10,000 pound limit on North French Street

**Route Alternative #4: Wellington Road Roundtrip**

Posted 10,000 pound limit on North French Street

Weight restrictions are an issue for Routes 2, 3 and 4. The Town of Breckenridge has posted a 10,000 pound weight limit on the portion of French Street that would be used on all three route alternatives. The weight restriction is in place for two reasons:

- The area is a residential neighborhood and the weight restriction keeps heavy trucks from bypassing Park Avenue (the designated truck route).
- The asphalt design did not incorporate a lot of heavy vehicles. The Town would like to make the asphalt last as long as possible.

Since there are no physical barriers requiring the weight restriction, it may be possible to work with the Town of Breckenridge to acquire a waiver to allow some of the empty trucks to operate along French Street. Posted weight limits are 10,000 pounds. The empty weight of the dump trucks proposed to haul the excavated material is 22,000 pounds. The estimated gross maximum weight of trucks is approximately 58,000 pounds.

### Low Clearance

**Route Alternative #1: Huron Road/Reiling Road Roundtrip**

None

**Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

Low-hanging power lines on Wellington Road

**Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

Low-hanging power lines on Wellington Road

#### **Route Alternative #4: Wellington Road Roundtrip**

Low-hanging power lines on Wellington Road



### **Manual Traffic Control/Flagging**

#### **Route Alternative #1: Huron Road/Reiling Road Roundtrip**

Manual traffic control or flagging may be necessary at two locations along the route. These locations include:

- The point on Airport Road where the trucks will be accessing the street
- The intersection of Reiling Road and Reliance Drive due to the decreased sight distance from Reliance Drive.

#### **Route Alternative #2: Huron Road/Reiling Road & Wellington Road Loop, Route A (Clockwise flow of haul trucks)**

Manual traffic control or flagging may be necessary at five locations along the route. These locations include:

- The point on Airport Road where the trucks will be accessing the street
- The intersection of Reiling Road and Reliance Drive due to the decreased sight distance from Reliance Drive
- The steep grade on Wellington Road between High Street and North Gold Flake Terrace
- The intersection of North Ridge Street Alley and North French Street due to the decreased sight distance from North Ridge Street Alley
- The intersection of North Park Avenue and North French Street since trucks may have difficulty turning left onto North French Street during peak travel periods

#### **Route Alternative #3: Huron Road/Reiling Road & Wellington Road, Route B (Counter-clockwise flow of haul trucks)**

Manual traffic control or flagging may be necessary at four locations along the route. These locations include:

- The point on Airport Road where the trucks will be accessing the street
- The intersection of Reiling Road and Reliance Drive due to the decreased sight distance from Reliance Drive
- The steep grade on Wellington Road between High Street and North Gold Flake Terrace



- The intersection of North Ridge Street Alley and North French Street due to the decreased sight distance from North Ridge Street Alley

**Route Alternative #4: Wellington Road Roundtrip**

Manual traffic control or flagging may be necessary at four locations along the route. These locations include:

- The point on Airport Road where the trucks will be accessing the street
- The steep grade on Wellington Road between High Street and North Gold Flake Terrace
- The intersection of North Ridge Street Alley and North French Street due to the decreased sight distance from North Ridge Street Alley
- The intersection of North Park Avenue and North French Street since trucks may have difficulty turning left onto North French Street during peak travel periods

**Table 1. Route Alternatives Summary**

Criterion	Route Alternative			
	#1 Huron/Reiling Roundtrip	#2 Huron/Wellington Loop A (Clockwise)	#3 Huron/Wellington Loop B (Counter-clockwise)	#4 Wellington Roundtrip
<b>Roundtrip Distance</b>	4.5 miles	4.8 miles	5.2 miles	5.6 miles
<b>Residential Frontage</b>	3.4 of 9 miles (38%)	5.7 of 9.6 miles (59%)	4.9 of 10.5 miles (46%)	7.2 of 11.1 miles (65%)
<b>Sensitive Areas</b>	Cemetery, Kingdom Park, two daycares, playground (all twice)	Cemetery, Kingdom Park, two daycares, playground, downtown area	Cemetery (twice), Kingdom Park (twice), two daycares (twice), playground, downtown area	Cemetery, Kingdom Park, two daycares, downtown area (all twice)
<b>Water Resources</b>	2 crossings, runs parallel along Blue River	3 crossings, runs parallel along French Creek	4 crossings, runs parallel along French Creek and Blue River	5 crossings, runs parallel along French Creek and Blue River
<b>Load Agitation</b>	6 speed humps	5 speed humps, North Main/French Street Intersection	5 speed humps, North Main/French Street Intersection	4 speed humps, North Main/French Street Intersection (twice)
<b>Roadway Surface Condition</b>	Some erosion on Huron, pavement damage on Valley Brook, damage at Reiling/Wellington Intersection	Some erosion on Huron, pavement damage on Wellington	Some erosion on Huron, pavement damage on Wellington and Valley Brook	Pavement damage on Wellington and Valley Brook
<b>Stops Required</b>	8 stops	11 stops	13 stops	15 stops
<b>Adjacent Pedestrian/ Cyclist Facilities</b>	38% coverage	56% coverage	62% coverage	76% coverage
<b>Weight Restrictions</b>	None	Posted 10,000 lb limit	Posted 10,000 lb limit	Posted 10,000 lb limit
<b>Low Clearance</b>	None	Low-hanging power lines on Wellington	Low-hanging power lines on Wellington	Low-hanging power lines on Wellington
<b>Flagging/Manual Traffic Control</b>	2 locations	5 locations	4 locations	4 locations

## CONCLUSIONS/RECOMMENDATIONS

For analysis purposes, the criteria were divided into two categories; truck operating and environmental criteria. This was done to make the distinction between those criteria that affect the operations of trucks along each route and the criteria that are affected by trucks using that route. Truck operating criteria were those criteria that deal with the actual maneuvering of the haul vehicles on the route. These criteria often impact the complexity and cost of the haul operation. The remaining criteria were grouped as environmental criteria. These criteria reflect the environment surrounding the haul route, and typically do not directly affect the parameters of the hauling operation, but rather are affected by the trucks using the haul route. The two categories of criteria and the route scoring are shown in Table 2.

Table 2. Route Alternatives Scoring

Route Alternative	Truck Operating Criteria							Environmental Criteria						Total	Rank
	Distance	Load Agitation	Stops Required	Weight Restrictions	Low Clearance	Manual Control/Flagging	Subtotal	Residential Frontage	Sensitive Areas	Water Resources	Roadway Surface	Pedestrian/Cyclists	Subtotal		
#1 Huron/Reiling Roundtrip	1	4	1	1	1	1	9	1	4	1	3	4	13	22	1
#2 Huron/Wellington Loop A (Clockwise)	2	2.5	2	2.5	3	4	16	3	1	2	2	3	11	27	3
#3 Huron/Wellington Loop B (Counter-clockwise)	3	2.5	3	2.5	3	2.5	16.5	2	2	3	1	2	10	26.5	2
#4 Wellington Roundtrip	4	1	4	4	3	2.5	18.5	4	3	4	4	1	16	34.5	4

Best Alternative = 1

Worst Alternative = 4

Based on the engineering analysis scoring of all the criteria, **Route Alternative #1: Huron Road/Reiling Road Roundtrip** is the preferred route for hauling waste between the Mine Site and the Wellington-Oro Parcel. The analysis also shows that **Route Alternative #4: Wellington Road Roundtrip** is the least desirable of the four route alternatives.

In addition to scoring highest overall, **Route #1, Huron Road/Reiling Road Roundtrip** also scored highest in the truck operating criteria. Route #1 offers considerable advantages to the truck operator, with fewer stops, better roadway geometrics and fewer local access distractions than the other route alternatives.

Prior to the start of hauling operations, the following requirements should be considered:

- Prepare photographic and written documentation of existing roadway conditions prior to initiating hauling operations
- Implement measures to reduce dust and material tracking onto paved roads from the Mine Site and the Wellington-Oro Parcel
- As needed, water and cover materials during transport to reduce the risk of dust, spillage and contamination
- Consider a temporary suspension of hauling during special events