COTTONWOOD PASS CONCEPT DESIGN (EAGLE AND GARFIELD COUNTIES)

FINAL REPORT

AUGUST 2023

COLORADO
Department of Transportation

Prepared by:

DAVID EVANS AND ASSOCIATES INC

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Submitted to:

Colorado Department of Transportation, Region 3

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ACKNOWLEDGEMENTS

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INTRODUCTION

The Colorado Department of Transportation (CDOT) is supporting Eagle and Garfield counties to identify safety improvements on county roads that traverse Cottonwood Pass. Cottonwood Pass is a critical roadway used by local stakeholders. It is imperative improvements continue to be evaluated on this roadway to improve safety and reliability.

As a first step towards making this alternate route safer, a collaborative Cottonwood Pass Concept Design Study identified 14 specific locations along the county roads that cross through both Eagle and Garfield counties (six locations in Eagle County, eight in Garfield County). This process included the public, subject matter experts, and elected officials though Garfield and Eagle county stakeholders were more engaged from those in other nearby areas like Mesa County. These improvements and locations were defined by the counties based on known safety issues.

Eagle County has been considering Cottonwood Pass improvements for many years. The ability to move local traffic, commuters, hospital workers, and emergency responders along this route is beneficial to the counties and the local community – especially when I-70 is closed. The road system on the Garfield County side is mostly paved, but they identified issues impacting local traffic when additional traffic uses Cottonwood Pass. These impacts were heightened during the closures of Interstate 70 (I-70) through Glenwood Canyon during the flooding in 2021, when local traffic was using Cottonwood Pass as a local detour. Eagle and Garfield counties spent a significant amount of money flagging and respond to incidents, and at one point the National Guard was involved. The 14 specific locations in the Concept Design Study were identified as problem areas during this time.

The Concept Design Study assessed existing conditions and defined concept level improvements as a short-term solution to the safety challenges along the road. Potential site improvements include curve softening, improved sight distance, improved intersection geometry, and increased road width in specific areas to accommodate two vehicles passing.

The Concept Design Study documents the results of the concept design effort conducted to identify and evaluate design options at the 14 sites along Cottonwood Pass. With the information provided by this project, Eagle and Garfield counties will ultimately determine if and when improvements at each site would move forward. Further design and construction of potential improvements is not funded at this time.

PROJECT SITE SELECTION

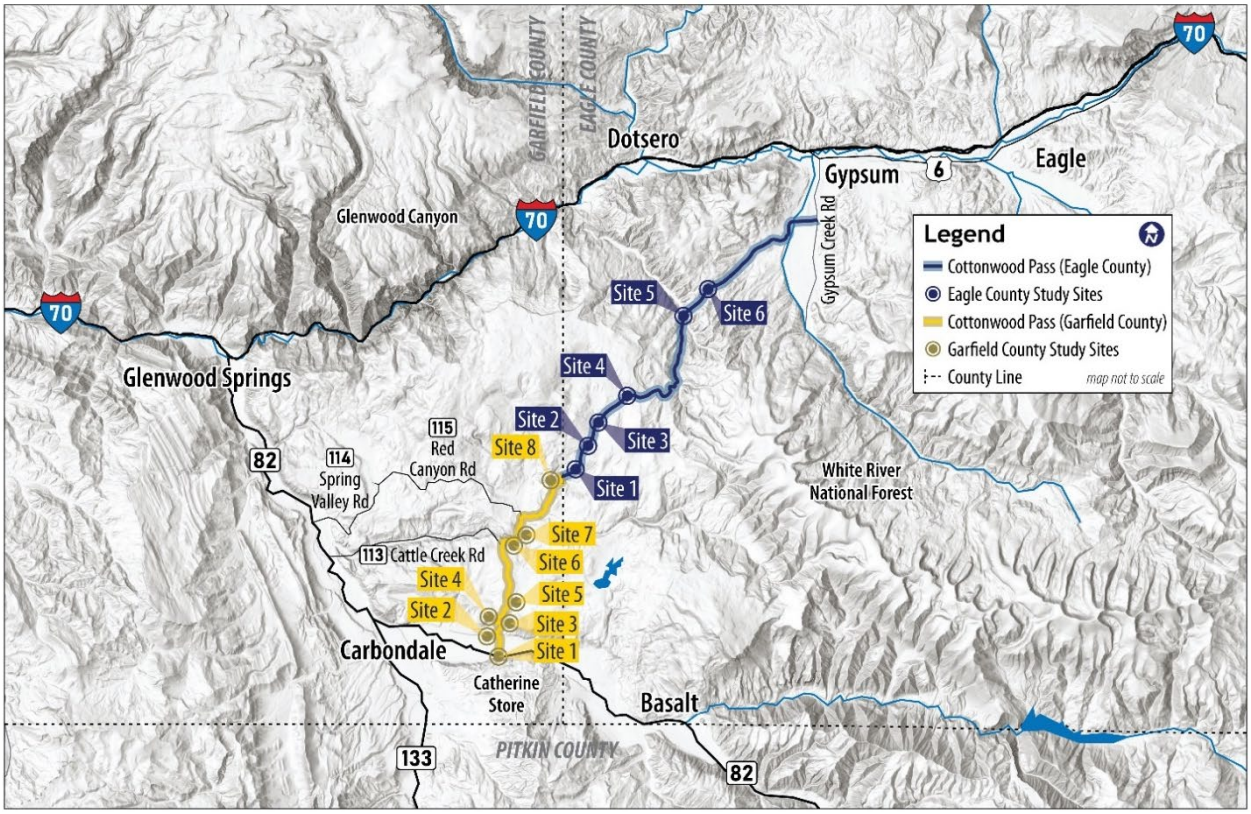
The Cottonwood Pass Concept Design project is located with Eagle and Garfield counties along the western slope of Colorado. Eagle and Garfield counties selected the 14 locations along the Cottonwood Pass route based on reported and recurring safety concerns including: limited sight distance, tight curves, narrow roadway width, and lack of guardrail. The sites are illustrated in **Figure 1**.

There are multiple roadways in Garfield County that connect Cottonwood Pass Road from Eagle County to CO 82. During the summer of 2021, Garfield County evaluated multiple options for consideration as the official Cottonwood Pass route for evaluation by this project.

- County Road (CR) 114 (Spring Valley Road/CR 115 (Red Canyon Road))
- CR 113 (Cattle Creek Road)
- Catherine Store Road

The county concluded that the Catherine Store Road route was the most feasible for consideration of improvements because the other two routes have significant challenges and constraints, including extremely narrow (one-lane) roadway widths and multiple residences directly adjacent to the roadway. Additionally, the intersection of CO 82 and Catherine Store Road is currently signalized and provides better visibility for traffic as compared to the other routes.

Figure 1. Project Site Key Map



CONTEXT SENSITIVE SOLUTIONS (CSS) PROCESS

CDOT developed CSS guidelines for all planning, design, and construction projects along the I-70 Mountain Corridor. Given the high-profile nature of this corridor, the project team applied the CSS process to the Cottonwood Pass project. The CSS process is designed to foster collaboration, partnerships, transportation innovation, and environmental sustainability. The process also considers the unique context of the corridor in design option development and evaluation.

PRINCIPLES INHERENT IN THE CSS DECISION-MAKING PROCESS INCLUDE THE FOLLOWING:

- ***Collaborative Decision-making*** – The project involved an open, comprehensive, and fair public process. Input from stakeholders and project teams was highly valued.
- ***Teams*** – The following collaborative stakeholder teams were formed for this project:
  - Project Leadership Team (PLT)/Technical Team (TT): Multidisciplinary team of technical experts who focus on the decision-making process and moving the process forward
  - Issue Task Forces (ITFs): Teams of technical experts brought together to address specific issues, which for this project included a Natural Resources ITF and a Residential/Property Owner ITF
  - Project Staff: CDOT and Consultant staff focused on the day-to-day work of the project
- ***Six-Step Process*** – This project generally applied the six-step CSS process, which included:
  - Establishing project goals
  - Establishing participant roles and responsibilities
  - Establishing criteria for evaluating alternatives
  - Developing alternatives for improvements
  - Evaluating alternatives based on established criteria
  - Documenting the process and final recommendations

See the Agency Coordination and Public Engagement section of this report for more information on the team members and meetings held throughout the project.

As part of the CSS process, the PLT-TT was formed of technical experts from multiple disciplines and agencies to focus on moving the decision-making process forward during this concept design project. This group included representatives from CDOT, Eagle County, Garfield County, Town of Gypsum, United States (U.S.) Forest Service, and Bureau of Land Management (BLM). This group guided decisions for the concept design project. Following this phase, work products including the summary report, concept designs, and public feedback received will be provided to Eagle and Garfield county staff. The county staff and their elected officials will ultimately determine if and when they would like to work toward implementation of safety improvements at any of the site locations.

CONTEXT STATEMENT AND CORE VALUES

The context statement and core values for Cottonwood Pass were developed collaboratively by the PLT-TT with review and input from the two project ITFs.

WHAT MAKES COTTONWOOD PASS UNIQUE?

Cottonwood Pass, in Eagle and Garfield Counties, provides a critical connection for local residents between the towns of Gypsum and Carbondale, including access to medical care. The rural mountain county road provides access to numerous private properties, including primary residences, equestrian facilities, and ranches. The winding and narrow road provides sweeping views of the Elk Range and provides access to recreation areas on BLM and U.S. Forest Service land. The surrounding federal land supports valuable natural resources, including habitat for numerous state and federal threatened and endangered species. The corridor is also traversed by numerous waterways and wetlands, which provide habitat and foraging areas for wildlife.

Cottonwood Pass is currently unpaved in Eagle County, with several one-lane sections located on steep embankments with sharp curves without guardrail. While the alignment is primarily paved in Garfield County, there are several sharp curves with limited visibility and narrow roadway sections. These roadway conditions create safety and operational problems for all travelers, which became especially problematic for local residents during recent long-term closures of I-70 through Glenwood Canyon. Improvements to Cottonwood Pass must provide safer conditions for drivers while maintaining the rural nature of the route and minimizing impacts to private properties and natural resources.

CORE VALUES

The core values are the goals and elements that are most important to consider when developing and evaluating improvements. The core values identified below were used to evaluate the design options at the 14 locations as part of this concept design project:

- ***Safety*** - Improve driver safety by making improvements at critical areas of geometric deficiencies
- ***Respecting Corridor Character*** - Maintain the rural feel of road, minimize impacts to private property, mitigate visual impacts from improvements
- ***Natural Resource Preservation*** - Minimize impacts to nearby wildlife habitat and waterways
- ***Collaborative Improvements*** - Engage public and stakeholders to provide meaningful input into the concept design process

EXISTING CONDITIONS

Existing conditions at the 14 project sites along Cottonwood Pass were collected to inform the development and evaluation of potential safety improvements. Data was collected and/or compiled for traffic and safety, geotechnical conditions, and environmental resources. The data collected also included right-of-way (ROW) boundaries and ownership and topographic survey within the roadway ROW at the 14 project sites. The ROW and topographic data were utilized in the development of the design options.

TRAFFIC AND SAFETY

Available traffic data collected along the Cottonwood Pass route was compiled and reviewed (no new traffic counts were collected). Crash data was also gathered from Eagle and Garfield counties, but it is limited and incomplete data for crashes along the Cottonwood Pass route, and no crashes could be attributed to the specific project locations. This is normal for rural areas and roads like this, as data includes only fully-reported crashes and does not reflect near-misses and unreported crashes, and it does not reflect the safety conditions at the project sites. Safety concerns and crash descriptions from county staff, adjacent property owners, and the general public were noted and used in the evaluation of potential roadway improvements.

Traffic counts were collected by the counties at a few key places along the corridor within the last five years (2019 and 2021). The traffic count data is summarized in **Table 1**.

Table 1. Cottonwood Pass Area Traffic Counts

ROAD	LOCATION	YEAR	DAILY TRAFFIC - WEEKDAY	DAILY TRAFFIC - WEEKEND
Catherine Store Road	0.5 mile north of CO 82	April 2019	1.390 vehicles/day	930 vehicles/day
CR 113 (Cattle Creek Road)	North of Upper Cattle Creek Road intersection	June/July 2019	345 vehicles/day	310 vehicles/day
Cottonwood Pass Road	Eagle County Line	Summer 2021 I-70 Glenwood Canyon Open	370 vehicles/day	470 vehicles/day
Cottonwood Pass Road	Eagle County Line	Summer 2021 I-70 Glenwood Canyon Closed	3,790 vehicles/day	3,650 vehicles/day

Source: Garfield County; Eagle County

Garfield County collected traffic counts on Catherine Store Road above the first curves from CO 82 (approximately 0.5 mile north of CO 82) in April 2019. Traffic volumes on CR 113 (Cattle Creek Road) are substantially lower than the volumes on Catherine Store Road. Both of the roadways had less traffic

volume on weekends than weekdays, indicating higher use as a local commuter corridor than a recreational route.

Eagle County provided traffic counts collected over two months in the summer of 2021 noting the days when I-70 through Glenwood Canyon was closed. The data for volumes when the canyon was closed are after the Cottonwood Pass route was removed from Google Maps. When the route was shown on Google Maps, the traffic volumes were reportedly much higher.

The traffic counts show an increase of eight to ten times the typical traffic volumes on Cottonwood Pass Road when I-70 through Glenwood Canyon is closed, even when it is not signed as a detour and not shown on Google Maps as a viable route.

The speed data collected on Catherine Store Road show a mean speed of 34.6 miles per hour (mph). The 85th-percentile speed, which typically defines the speed limit of a roadway, was 39.6 mph. This is substantially higher than the 25-mph speed limit. Count and speed data on Catherine Store Road were also collected at the same location in May 2017 and the results were similar with no growth in traffic volumes or increases in speeds.

While the proposed site improvements will improve safety at specific locations with improved curve geometry and increased road width to accommodate two-way traffic, the overall Cottonwood Pass corridor will remain mountainous with steep grades and low speeds. Therefore, there are no expected changes in average traffic volume along the Cottonwood Pass corridor from what is experienced today, with the canyon open and closed, due to the site improvements. Also, the improvements considered by this project would not allow access by vehicles over 45 feet in length. The current length and size restrictions on large vehicles would remain the same as they are today with no expected increase in truck traffic along the corridor.

GEOTECHNICAL

Given the unique geological context and conditions along the Cottonwood Pass route, the existing geologic and geotechnical setting were evaluated, including geologic hazards that may impact the feasibility and/or cost of potential roadway improvements. The geotechnical constraints were evaluated via research of published information and field reconnaissance along and immediately adjacent to the roadway. The full geological and geotechnical evaluation memorandum is provided in **Appendix A**.

The most prominent geologic and geotechnical features along Cottonwood Pass are collapsible soils, evaporite soils and karst, and landslide features. The collapsible soils are due to the dry, low density silty and sandy soils with high void space or air gaps between the soil particles where the soil particle binding agents are highly sensitive to water. The evaporite soils consist primarily of gypsum and anhydrite that were deposited during the cyclic evaporation of shallow seas that existed in central Colorado millions of years ago. The evaporite soils can dissolve in the presence of fresh water and causing caverns, sink holes and subsidence. The landslides described along Cottonwood Pass occur either in the surficial deposits or deeper into bedrock.

Geologic hazards are natural phenomena, or a geologic process, capable of inflicting harm to people or property (U.S. Geological Survey (USGS), 2017). Geotechnical features are modifications to the geologic

setting and have similar effect as geologic hazards. The complex and problematic subsurface conditions along Cottonwood Pass have developed zones of marginally stable conditions, and potential of developing problematic conditions. These developments are the results of natural processes and land use activities, they can pose a risk to public either directly by an encounter with the hazard or indirectly through structures including roadways and buildings. The geologic conditions, precipitation, wind, temperature, seismic, ground modifications and drainage features can directly or indirectly impact the geologic hazards. The severity and risk factors of these geologic hazards can be mitigated through identifications of the potential issues, evaluating the conditions and engineering design.

The risk factors for the geologic hazards and geotechnical features were identified for the project sites along Cottonwood Pass and considered as part of the evaluations of the design options. All geotechnical conditions found to date would be mitigable and would not preclude the proposed improvements.

Environmental Resources

Important environmental resources were summarized and mapped from existing and readily available documentation to identify opportunities and constraints that may affect the ability to implement future improvements in a timely and costly manner. No new data or field surveys were conducted. An ITF was formed of regulatory agency staff to solicit review and input on natural resources at the Cottonwood Pass project sites, including wetlands, water quality, and wildlife. This group included U.S. Forest Service, BLM, Colorado Parks & Wildlife (CPW), and U.S. Fish and Wildlife Service (USFWS) representatives. More in depth review and environmental evaluation of individual sites will be conducted if and when projects move forward with design development and construction.

The following section summarizes the existing environmental conditions within a study area which encompasses the limits of potential improvements at each site (approximately 0.5-mile length of Cottonwood Pass at each site plus a 150-foot buffer of the roadway center line except for Eagle Sites 5 and 6, which used a 400-foot buffer). The described environmental resources were selected based on the characteristics of the study area and input from stakeholders. The resources are generally consistent with National Environmental Policy Act (NEPA), its implementing regulations, and the Federal Highway Administration (FHWA) and CDOT guidelines.

Threatened and Endangered Species

Federally Listed Species

A review of the USFWS Information for Planning and Consultation (IPaC) system (USFWS, 2023a) indicates that there is a potential for nine federally threatened and endangered species, one proposed federally threatened species, and one candidate species to occur in, or potentially be affected by the project. No critical habitat exists within the study area for any federally listed species. **Table 2** lists the species, their federal status and basic habitat description, and their potential for occurrence in the study area based on habitat requirements and distribution.

Table 2. Federally Listed Species

Common Name	Scientific Name	Federal Status	Basic Habitat Description	Potential For Occurrence in the Study Area
Birds				
Mexican Spotted Owl	*Strix occidentalis lucida*	FT	Occurs at elevations below 9,100 feet in large steep canyons with exposed cliffs and dense old growth mixed coniferous forests.	No, suitable habitat does not exist
Yellow-billed Cuckoo	*Coccyzus americanus*	FT	Nest in shrubs and forage in trees within riparian areas.	Yes (Garfield Sites 6-8)
Fishes				
Bonytail Chub	*Gila elegans*	FE	Rocky runs, riffles, and rapids in swift, deep rivers. Mainstem Colorado River and major tributaries	No, suitable habitat does not exist
Colorado Pikeminnow	*Ptychocheilus Lucius*	FE	Medium to large rivers with small quiet backwaters within the Colorado River system.	No, suitable habitat does not exist
Humpback Chub	*Gila cypha*	FT	Rocky runs, riffles, and rapids in swift, deep rivers. Mainstem Colorado River and major tributaries	No, suitable habitat does not exist
Razorback Sucker	*Xyrauchen texanus*	FE	Deep, slow runs, pools, and eddies. Spawning in silt to gravel substrates in shallow water and seasonally flooded overbank areas. Mainstem Colorado River and major tributary rivers	No, suitable habitat does not exist
Insects				
Monarch Butterfly	*Danaus plexippus*	C	Widespread, but requires milkweeds for caterpillars	Yes
Silverspot Butterfly	*Speyeria nokomis*	PT	Wetlands, wet meadows, and riparian areas	Yes

Common Name	Scientific Name	Federal Status	Basic Habitat Description	Potential For Occurrence in the Study Area
Mammals				
Canada Lynx	*Lynx canadensis*	FT	Found primarily within the subalpine and upper montane forests zones typically from 8,000 to 12,000 feet in elevation. Early successional spruce/fir and lodgepole pine forests used for foraging, mature and old growth spruce/fir and lodgepole pine containing large downed woody debris used for denning. Riparian areas, mixed aspen/conifer, mature spruce/fir, and shrublands to forested lynx habitat also used for foraging	No, suitable habitat does not exist
Gray Wolf	*Canis lupus*	FE	May be present throughout Colorado but only requires evaluation for projects that include a predator management program.	No, project does not include species management
Plants				
Ute Ladies'-tresses	*Spiranthes diluvialis*	FT	Occurs in seasonally moist soils and wet meadows of drainages below 7,750 feet elevation.	Yes (Garfield Sites 6-8)

Source: USFWS 2023a, USFWS 2023b

Notes:
FE=Federally Endangered
FT=Federally Threatened
PT=Proposed Threatened
C=Candidate

State Listed Species

According to the Colorado Natural Heritage Program (CNHP) Tracking List (CNHP 2023), 18 state-listed species were identified with the potential to occur in the study area. **Table 3** lists the species, their state status and basic habitat description, and their potential for occurrence in the study area based on habitat requirements and distribution. Federal species previously discussed that are also state-listed are not repeated.

Table 3. State Listed Species

Common Name	Scientific Name	State Status	Basic Habitat Description	Potential For Occurrence in the Study Area
Amphibians				
Boreal Toad (Southern Rocky Mountain Population)	*Anaxyrus boreas pop. 1*	SE	Mountain lakes, ponds, meadows, and wetlands at 8,500 to 11,500 ft.	No, outside of species overall range
Northern Leopard Frog	*Lithobates pipiens*	SC	Wet meadows and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.	Yes
Birds				
American Peregrine Falcon	*Falco peregrinus anatum*	SC	Nest on steep precipitous cliffs; forages over forests and shrublands in proximity to cliffs. Primarily below 10,000 ft.	No, suitable habitat does not exist
Bald Eagle	*Haliaeetus leucocephalus*	SC	In Central Colorado, primarily uses low elevation riparian habitat along the Colorado, Eagle, and White River drainages and their major tributaries. Roosts and nests in trees near open water. Active nests and roost sites on the Roaring Fork River.	Yes
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	SC	Mid elevation mountain sagebrush/grassland habitat usually adjacent to forested areas. Grouse production area in north central Eagle Co.	No, outside of species overall range
Ferruginous Hawk	*Buteo regalis*	SC	Open grasslands and shrub steppe communities. Nests in tall trees or shrubs along streams or on steep slopes. Occasional fall migrant in Garfield, Eagle, Pitkin, and Rio Blanco Counties.	Yes

Common Name	Scientific Name	State Status	Basic Habitat Description	Potential For Occurrence in the Study Area
Greater Sage-Grouse	*Centrocercus urophasianus*	SC	Found only in areas with abundant sagebrush, preferably open sagebrush flats or rolling sagebrush hills at elevations between 6000-8500 ft. Known populations north of I-70 in Gypsum and in central-western Garfield Co.	No, outside of species overall range
Greater Sandhill Crane	*Antigone canadensis tabida*	SC	Found along watercourses and ponds; nests in wetlands and shallow marshes	No, outside of species overall range
Fishes				
Colorado River Cutthroat Trout	*Oncorhynchus clarkii pleuriticus*	SC	Cold, clear, gravely headwater streams and mountain lakes that provides an abundant food supply of insects.	Yes
Roundtail Chub	*Gila robusta*	SC	Warm streams and large rivers, usually in habitats with slow-flowing water adjacent to areas of faster water; occupy pools and eddies, often concentrating in swift, swirling water below rapids.	No, suitable habitat does not exist
Mammals				
Kit Fox	*Vulpes macrotis*	SE	Sparsely-covered, semi-desert shrublands of saltbrush, shadscale and greasewood	No, suitable habitat does not exist
Townsends Big-eared Bat Subsp.	*Corynorhinus townsendii pallescens*	SC	Semidesert shrublands, pinyon-juniper woodlands and open montane forests below 10,000 ft. (Siemers 2002). Requires caves or abandoned mines for roost sites during all seasons and stages of its life cycle, and its distribution is strongly correlated with the availability of these features.	Yes
Wolverine	*Gulo*	SE	High elevation areas with artic and subarctic conditions	No, suitable habitat does not exist

Common Name	Scientific Name	State Status	Basic Habitat Description	Potential For Occurrence in the Study Area
Reptiles				
Longnose Leopard Lizard	*Gambelia wislizenii*	SE	Areas with bare ground or sparse vegetation, including greesewood, sagebrush, and rabbitbrush. The presence of rodent burrows is also preferred.	No, outside of species overall range
Midget Faded Rattlesnake (Western Rattlesnake)	*Crotalus oreganus concolor*	SC	Semidesert shrubland, mountain shrubland, riparian zones, piñon-juniper woodland, and montane woodland; soils may be sandy to rocky; absent from perennially wet areas and high mountains	No, outside of species overall range

Source: CNHP 2023, CNHP 2022, CPW 2023, NatureServe 2023

Notes:
SC= Species of Concern
SE=State Endangered

BLM Sensitive Species

According to the CNHP Tracking List, 21 BLM sensitive species that were not previously identified as federal or state listed, have the potential to occur in the study area. **Table 4** lists the species, their basic habitat description, and their potential for occurrence in the study area based on habitat requirements and distribution.

Table 4. BLM Sensitive Species

Common Name	Scientific Name	Basic Habitat Description	Potential For Occurrence in the Study Area
Amphibians			
Great Basin Spadefoot	*Spea intermontana*	Breeds in pools and stock ponds filled by heavy rains or flooding in basins and rocky canyons, in areas with sagebrush, semidesert shrubland, or pinyon-juniper woodland	Yes
Birds			
Northern Goshawk	*Accipiter gentilis*	Mature forest generalist. Often found in mixed conifer/aspen stands. Nests primarily in mature aspen and pine trees.	Yes

Common Name	Scientific Name	Basic Habitat Description	Potential For Occurrence in the Study Area
Black Swift	*Cypseloides niger*	Nests behind or next to waterfalls and wet cliffs. Forages over forests and open areas.	No, suitable habitat does not exist
White-faced Ibis	*Plegadis chihi*	Marshes, swamps, ponds and rivers, mostly in freshwater habitats	No, outside of species overall range
Fish			
Flannelmouth Sucker	*Catostomus latipinnis*	Medium to large streams in the Upper Colorado River Basin.	No, suitable habitat does not exist
Mammals			
White- tailed Prairie Dog	*Cynomys leucurus*	Open shrublands, semidesert grasslands, and open valleys.	No, outside of species overall range
Spotted Bat	*Euderma maculatum*	Cliff/rock/scree in arid Douglas-fir or Ponderosa Pine canyons associated with water. Occurs in western semi-desert canyonlands in Colorado. (Armstrong et al. 1994, Adams 2003).	No, outside of species overall range
Fringed Myotis	*Myotis thysanodes*	Conifer, Gambel oak shrublands, caves, mines, building roosts, including Rio Blanco, Garfield, and Mesa Counties up to 7,500 ft.	Yes
Plants			
DeBeque Milkvetch	*Astragalus debequaeus*	Among Pinyon-juniper woodlands and desert shrubs. Clustered on toe slopes and along drainages, but many occur on steep sideslopes. Soils are clayey but littered with sandstone fragments	Yes
Ferron's Milkvetch	*Astragalus musiniensis*	Gullied bluffs, knolls, benches and open hillsides; in pinyon-juniper woodlands or desert shrub communities, mostly on shale, sandstone, or alluvium derived from them (Spackman et al. 1997).	Yes
Naturita Milkvetch	*Astragalus naturitensis*	Pinyon-juniper woodlands in areas with shallow soils over exposed bedrock (Peterson 1981)	Yes
Crandall's Rockcress	*Boechera crandallii*	This plant grows in limestone chip-rock and stony areas, often among sagebrush, ridges, and steep hill slopes (Rollins 1993)	Yes
Eastwood Evening-primrose	*Camissonia eastwoodiae*	Found on clay soils derived from Mancos shale with Gardner's saltbush (*Atriplex gardneri*) a dominant associate.	No, suitable habitat does not exist

Common Name	Scientific Name	Basic Habitat Description	Potential For Occurrence in the Study Area
Slender Rock- brake	*Cryptogramma stelleri*	Found scattered on moss and duff, in the shade of moist coniferous forests. Found in crevices in calcareous rocks in shaded localities with dripping water (Hulten 1968). Grows in horizontal crevices of moist, shaded limestone cliffs, which tend to be mossy, and are often associated with waterfalls and under shallow rock overhangs.	No, suitable habitat does not exist
Grand Buckwheat	*Eriogonum contortum*	Mancos shale badlands, with shadscale and other salt desert shrub communities (Spackman et al. 1997).	No, suitable habitat does not exist
Roan Cliffs Blazingstar	*Nuttallia rhizomata (Mentzelia rhizomata)*	Known only from steep, shaley talus slopes derived from the Parachute Creek Member of the Green River Formation (Holmgren and Holmgren 2002, Reveal 2002)	No, suitable habitat does not exist
Rollins' Cat's- eye	*Oreocarya rollinsii (Cryptantha rollinsii)*	White shale slopes of the Green River Formation in pinyon-juniper or cold desert shrubland communities.	No, suitable habitat does not exist
Harrington Beardtongue	*Penstemon harringtonii*	Open sagebrush or, less commonly, pinyon-juniper habitats, on gentle slopes. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials (Spackman et al. 1997).	Yes, known to occur near Garfield Site 6 and Eagle Site 6
Piceance Bladderpod	*Physaria parviflora (Lesquerella parviflora)*	Endemic to outcrops of the Green River Shale Formation in the Piceance Basin. It grows on ledges and slopes of canyons in open areas of pinon juniper communities. The soils are Torriorthent Rock outcrop complex (Peterson and Baker 1982).	No, suitable habitat does not exist
Montrose Bladderpod	*Physaria vicina (Lesquerella vicina)*	Grows on Mancos shale at the ecotone between pinyon-juniper woodland and salt desert scrub (Anderson et al. 1997)	No, suitable habitat does not exist
Sun- loving Meadowrue	*Thalictrum heliophilum*	Found in open sunny sites on sparsely vegetated, dry shale slopes. Soils usually consist of Green River Shale Formation. Associated vegetation is usually very sparse (Scheck 1994).	No, suitable habitat does not exist

Source: CNHP 2023, CNHP 2022, CPW 2023, NatureServe 2023

Other Wildlife Habitat

Portions of the study area overlap with the following CPW seasonal activity areas (CPW 2023) and high priority habitat areas (CPW 2021):

- Aquatic Native Species Conservation Waters: Streams and lakes managed by CPW for native fish species. In the study area, this designation applies only to Cattle Creek.
- Aquatic Sportfish Management Waters: Streams and lakes managed by CPW for native fish species This designation applies all study area streams.
- Elk Summer Range: That part of the range of a species where 90% of the individuals are located between spring green-up and the first heavy snowfall, or during a site specific period of summer as defined for each data analysis unit (DAU). Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap. This designation applies to all of Cottonwood Pass.
- Elk Severe Winter Range: That portion of the species range where 90 percent of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten. In the study area, this designation includes a portion of Cottonwood Pass within Garfield County.
- Elk Winter Concentration Area: That portion of the species winter range where densities are at least 200 percent greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten. In the study area, this designation includes the southern portion of Cottonwood Pass.
- Mule Deer Summer Range: That part of the range of a species where 90% of the individuals are located between spring green-up and the first heavy snowfall, or during a site specific period of summer. Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap. This designation applies to all of Cottonwood Pass.
- Mule Deer Severe Winter Range: Portion of the species overall range where 90 percent of the individuals are located when the annual snowpack is at its maximum and/or temperatures area at a minimum in the two worst winters out of ten. In the study area, this designation includes the northern and southern extents of Cottonwood Pass.
- Mule Deer Winter Concentration Area: Portion of the species overall range where higher quality habitat supports significantly higher densities than surrounding areas. These areas are typically occupied year round and are not necessarily associated with a specific season. Includes rough break country, riparian areas, small drainages, and large areas of irrigated cropland. In the study area, this designation includes northern and southern extents of Cottonwood Pass.

Waters of the US And Wetlands

The Clean Water Act (CWA) of 1972 protects the physical, biological, and chemical quality of waters of the U.S. (WUS). As of March 20, 2023 the U.S. Army Corps of Engineers' (USACE) defines waters of the U.S. to mean 1) traditional navigable waters, the territorial seas, and interstate waters; 2) impoundments of waters of the U.S.; 3) tributaries to traditional navigable waters, the territorial seas, and interstate waters when the tributaries meet either the relatively permanent standard or the significant nexus standard; wetlands adjacent to traditional navigable waters, the territorial seas, and

interstate waters; wetlands adjacent to and with a continuous surface connection to relatively permanent impoundments of waters of the U.S. or jurisdictional tributaries when the jurisdictional tributaries meet the relatively permanent standard; and wetlands adjacent to impoundments of waters of the U.S. or jurisdictional tributaries when the wetlands meet the significant nexus standard; and 5) intrastate lakes and ponds, streams, or wetlands not identified in paragraphs 1) through 4) that meet either the relatively permanent standard or the significant nexus standard.

The USACE defines wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas".

The USACE regulates and enforces Section 404 of the CWA. Under Section 404, a USACE permit is required for the discharge of dredged or fill material into jurisdictional waters of the U.S., including wetlands. The USACE is responsible for determining jurisdictional status. Impacts to WUS, including wetlands, must be avoided, minimized, or mitigated (in order of preference) to ensure that there is no net loss of functions and values of jurisdictional wetlands. CDOT's policy is to mitigate unavoidable impacts to all wetlands, not just those considered jurisdictional under Section 404.

According to the USFWS National Wetland Inventory (NWI), the study area contains numerous potential wetlands including both palustrine emergent (PEM) and palustrine scrub-shrub (PSS) (USFWS 2022). Generally, PEM wetlands are dominated by emergent (herbaceous) vegetation and PSS wetlands are dominated by shrubs. The study area wetlands occur in topographic swales, roadside and irrigation ditches, and/or in association with streams and ponds. During the site visit, potential wetlands were observed at Garfield Sites 4 (not in NWI) and 7, and Eagle Sites 4-5. A detailed field investigation and boundary delineation would be required to verify the presence of hydrology, hydrophytic vegetation, and hydric soils at each potential wetland.

The field investigation would also be required to verify the presence of any fens, which are a type of wetland fed by groundwater and with organic soils that typically support sedges and low stature shrubs (Rydin et al. 2017; Mitsch and Gosselink 2015). No fens were observed during the site visit. CDOT with support from Colorado State University and CNHP, mapped all potential fens within a 500 meter buffer of all state and federal highway segments in Colorado which did not include the study area.

In addition to wetlands, other surface waters occur in or adjacent to the study area including East Coulter Creek (Eagle Site 2-4), Cottonwood Creek (Eagle Site 5), Cattle Creek (Garfield Site 7), Von Springs Reservoir 1 (Eagle Site 3), Shippees Draw (Garfield Site 8), one unnamed irrigation ditch (Garfield Sites 2, 6), one unnamed tributary (Garfield Site 3), and one unnamed pond (Garfield Site 8).

WATER QUALITY

The Colorado Department of Public Health & Environment (CDPHE), Water Quality Control Commission (WQCC) has divided and defined all Colorado water bodies into various segments and classified them as defined in the *Integrated Water Quality Monitoring & Assessment Report* (CDPHE, 2022). Based on this document, the project lies in the Upper Colorado-North Platte River Basin and the stormwater from Cottonwood Pass drains to several different streams.

The WQCC regulations pertinent to surface water quality in the project study area include Regulations 31 and 33. WQCC Regulation 31: *The Basic Standards and Methodologies for Surface Water* establishes beneficial use categories together with basic standards, an antidegradation rule, and numeric tables that define the conditions generally necessary to maintain and attain such beneficial uses. Regulation 33: *Classifications and Numeric Standards for the Upper Colorado River Basin and North Platte River* establishes classifications and numeric standards for the study area river basin.

Additionally, water bodies that are impaired or identified for monitoring and evaluation are listed in WQCC Regulation 93: *Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List.* Each state is required to assess and report the water quality status of all surface water bodies and classify the intended uses of each water body in order to develop criteria to protect the designated uses of these water bodies. The current 303(d) list of water bodies that are not meeting their designated uses because of excess pollutants was published in 2022 and for each water body that is included on the list, Colorado identifies the pollutant causing the impairment and a priority is assigned for development of Total Maximum Daily Loads (TMDL) based on the severity of the pollution and the sensitivity of the uses to be made of the waters (CDPHE 2021). Colorado's Monitoring and Evaluation (M&E) List identifies water bodies where there is reason to suspect water quality challenges, but there is also uncertainty regarding one or more factors.

Table 5 summarizes beneficial use classifications, attainment status, and 303(d) and M&E listings for each stream segment in the study area.

Table 5. CDPHE Stream Segment Classifications and Water Quality Standards

Waterbody ID	Stream Name(s) in the Study Area	Description	Designated Beneficial Uses and Attainment	303(d) and M&E Listings
COUCEA10a_A	Gypsum Creek	All tributaries to the Eagle River, including all wetlands, from a point immediately below the confluence with Lake Creek to the confluence with the Colorado River, except for specific listings in Segments 10b, 11 and 12, and those waters included in Segment 1	Agriculture – fully supporting Aquatic Life – impaired Recreational – fully supporting	M&E: dissolved oxygen (2016)

Waterbody ID	Stream Name(s) in the Study Area	Description	Designated Beneficial Uses and Attainment	303(d) and M&E Listings
COUCRF03a_F	East Coulter Creek, Coulter Creek, Cattle Creek	Mainstem of the Roaring Fork River, from a point immediately below the confluence with Trentaz Gulch, to a point immediately below the confluence with the Fryingpan River. All tributaries to the Roaring Fork River, including wetlands, from a point immediately below the confluence with Hunter Creek to the confluence with the Colorado River, except for those tributaries included in Segment 1, 3b, 3d, 4-10b, West Sopris, Capital, Roaring Fork, Cattle Creek, and Three Mile Creek Portions.	Agriculture – fully supporting Aquatic Life – fully supporting Recreational – fully supporting	M&E: arsenic-total (2018)
COUCUC04_C	Cottonwood Creek	All tributaries to the Colorado River, including all wetlands, from the outlet of Lake Granby to above the confluence with the Roaring Fork River, which are on National Forest lands, except for the specific listings in Segments 2, 8, 9 and 10a.	Agriculture – fully supporting Aquatic Life – fully supporting Recreational – fully supporting	Not listed
COUCUC07a_D	Cottonwood Creek	All tributaries to the Colorado River, including wetlands from a point above the confluence with the Blue River to below confluence with Roaring Fork, which are not on NF lands except Alkali Slough and Muddy Creek	Agriculture – fully supporting Aquatic Life – fully supporting Recreational – fully supporting	Not listed

Source: CDPHE 2021

Floodplains

A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where Federal Emergency Management Agency (FEMA) has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available. Executive Order (EO) 11988, Floodplain Management (1977): Requires federal agencies to avoid to the greatest extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative (FEMA, 2015).

The study area is located within five FEMA flood insurance rate maps (FIRMs): 08037C0550D, 08037C0575D, 08037C0750D, 0802051880B, and 0802051500B (unprinted). A review the of FIRMs was conducted and Van Springs Reservoir 1 and 2 are designated Zone A special flood hazard areas subject to a 1 percent annual chance of flooding (FEMA, 2022). The remainder of the study area is Zone X which are outside of special flood hazard areas and have minimal flood hazard risk.

Cultural Resources

A cultural resources database and literature review was performed to identify known and potentially occurring historic and archaeological resources in the study area. The results of the evaluation are included in **Appendix B** and summarized in **Table 6**.

Table 6. Cultural Resources in the Study Area

Site	Cultural Resources
Garfield County Site 1	• Patterson Ditch (5EA2753): another segment of the ditch outside of the study area was surveyed in 2009 and was recommended as needs data for National Register of Historic Places (NRHP) eligibility • 1972 residential building • SH82-Segment and CR100 • Catherine Building (5GF1254) : previously surveyed but not assessed for listing in the NRHP
Garfield County Site 2	• CR100 • 1960 residential building
Garfield County Site 3	CR100
Garfield County Site 4	CR100
Garfield County Site 5	CR100
Garfield County Site 6	• Hopkins-Basalt Section 15kv Transmission Line (5GF2456.1) : previously surveyed in 2012 and determined eligible for listing in the National Register of Historic Places (NRHP) • Needham Ditch (5GF.4623.2): previously surveyed in 2012 and determined eligible for listing in the NRHP • CR100 • CR170
Garfield County Site 7	• CR100 • CR113
Garfield County Site 8	CR113
Eagle County Site 1	CR10A
Eagle County Site 2	• CR10A • 1908 Trail
Eagle County Site 3	Von Springs Reservoir and Dam
Eagle County Site 4	CR10A
Eagle County Site 5	• CR10A • Road 8350
Eagle County Site 6	CR10A

Due to the lack of previous survey in the study area, the potential for undocumented Native American resources is unknown, but their presence is likely. The likelihood for buried archaeological resources is moderate to low because most of the sites are located in areas of Pleistocene alluvium and colluvium. Pleistocene deposits typically predate the generally accepted range for human occupation in North America.

Right-of-Way (ROW) and Survey

The control network was established for the sites along the study corridor using GPS Static Methods. The control network was post processed using Trimble TBC software and met CDOT accuracy requirements. The control monuments met the standards of a CDOT Work Point, consisting of a No. 5 rebar with aluminum cap stamped with the control point number. Right of Entry was acquired from the private property owners prior to performing any survey work requiring access. Survey work was coordinated with the Forest Service and the BLM as required prior to performing the aerial mapping over the public land controlled by those agencies.

Existing plats and deeds were obtained via research of the Garfield and Eagle County records to determine ROW lines for Cottonwood Pass where the roadway crosses private property. In the areas where Cottonwood Pass falls within the Forest Service and BLM boundaries, the survey team worked with those agencies to determine the width of the prescriptive easement. The controlling section corners were surveyed with property corners and other boundary evidence sufficient to determine the recorded ROW lines.

Mapping of the project sites was conducted using a SUAS (aerial drone) with a photographic sensor to collect aerial photogrammetric mapping of the area. The road was mapped with a 300- to 500-foot-wide corridor. In the areas where the aerial photography was obscured by terrain and foliage, additional ground shots were collected using conventional survey methods to confirm the ground elevations.

Pix4D software was used to register aerial photographs and generate a point cloud. TopoDOT software was used to extract the planimetric linework and develop a surface model. A CAD file in Civil 3D format was created for the existing ROW and the SUAS acquired topographic mapping for the concept design of potential improvements at the 14 project sites.

DESIGN OPTION DEVELOPMENT AND EVALUATION

EVALUATION CRITERIA

The criteria used to evaluate the options were developed directly from the Core Values that were reviewed and confirmed by the project stakeholders and general public. The Core Values and the associated evaluation criteria represent what is most important to reflect the unique context of the Cottonwood Pass corridor. They focus on safety, respecting corridor character, natural resource preservation, and collaboration. The criteria outlined in **Table 7** were applied in the evaluation of the design options at each site.

Table 7. Evaluation Criteria

CORE VALUE	CRITERIA / PERFORMANCE MEASURE
Safety	Assessment of changes to vehicular safety concerns at site (speed, off-road vehicles, two-way traffic conflicts)
Respecting Corridor Character	• Ability to maintain rural feel of road • Potential ROW impacts to private property • Potential visual impacts
Natural Resource Preservation	Potential impacts to wildlife habitat and waterways
Collaborative Improvements	• Concerns and support from adjacent property owners • Concerns and support from corridor travelers and general public

DESIGN OPTIONS EVALUATION

The development of potential design concepts at each site focused on balancing improved driver safety without increasing traffic volumes or speeds. To address safety concerns, improvements focused on:

- Smoothing curves in ways that do not increase the radius or design speed of the curve, but improves the driver path through the curve
- Increasing the lane and/or shoulder widths to provide more room for drivers to avoid on-coming traffic or recover to get back into the curve
- Improving sight distance at intersections and curves with rock outcroppings, so drivers can see on-coming traffic or bicyclists or animals in the road

The following pages describe the design options considered at each of the project sites and the evaluation of the options based on the project evaluation criteria. The potential ROW and property impacts are based on the conceptual level of design and actual ROW impacts will be determined during future design. There would be temporary construction easements in addition to any permanent ROW acquisitions noted. Cost estimates were also developed for each design option, based on the broad, conceptual level of design. These costs do not include ROW or easements.

GARFIELD COUNTY SITE 1

Safety issues at this site include conflicts with long vehicular queues on Catherine Store Road at the signal.

Adding a dedicated right turn lane for southbound Catherine Store Road would facilitate vehicles turning westbound on CO 82 toward Glenwood Springs. The existing ditch on the west side of Catherine Store Road would be shifted. The gated field access would be maintained. The existing traffic signal layout and timing and phasing would be reviewed and potentially adjusted with the new turn lane. This project would improve safety by reducing queue lengths and conflicts at the signal.

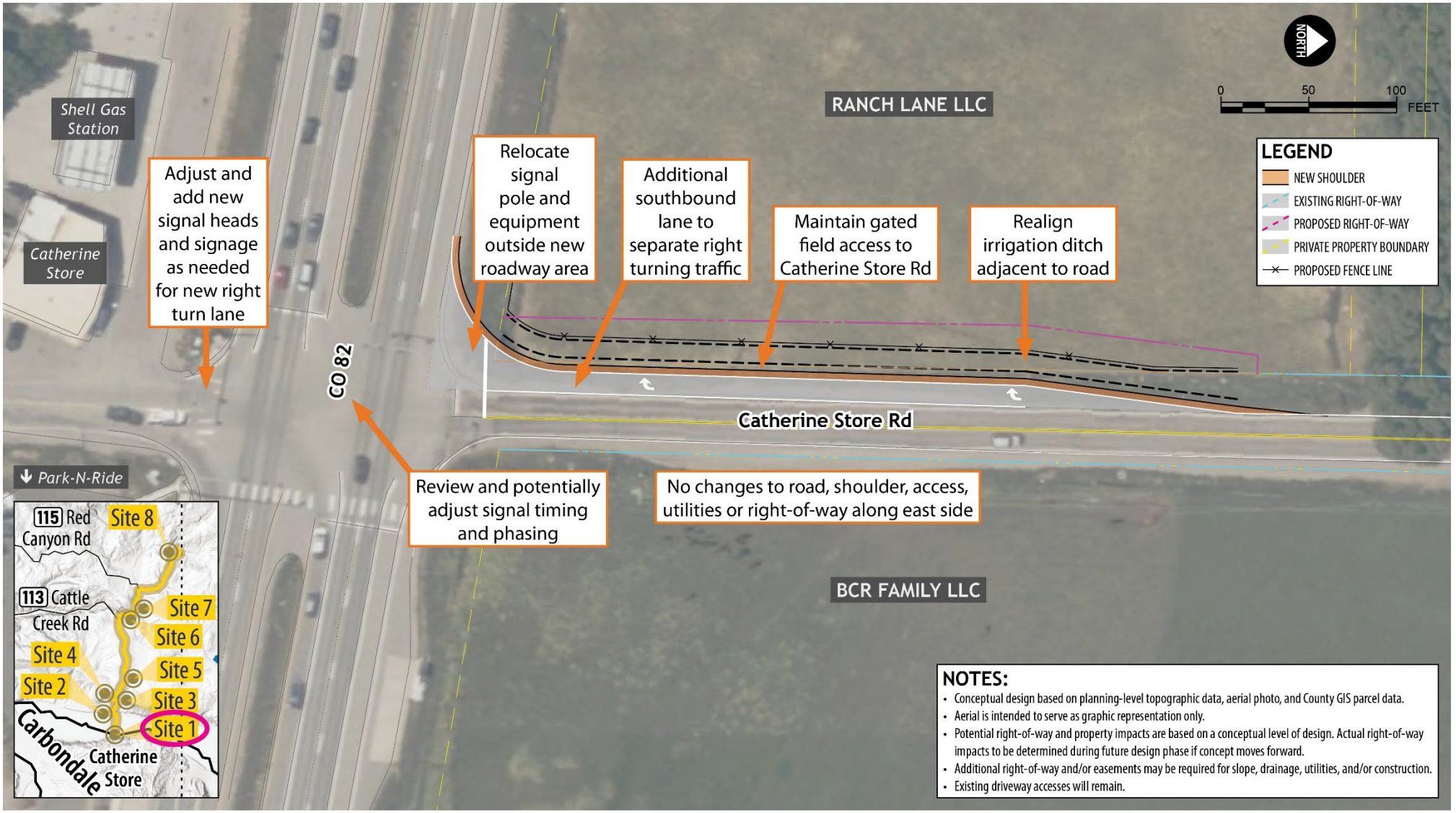
Table 8. Garfield County Site 1 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – NEW SOUTHBOUND RIGHT TURN LANE
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate improvement in safety with reduced potential for rear-end crashes on southbound approach with reduced queue lengths and separation of right-turning traffic
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in traffic control or roadside environment
Potential right-of-way (ROW) impacts to private property	Less than 0.25 acres of potential ROW impacts to one property on west side of road
Potential visual impacts	Minimal visual impacts with added width, but no change in roadside environment and no additional infrastructure elements
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	Irrigation ditch, presumed to be non-jurisdictional water, must be realigned adjacent to road No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	No comments or concerns received
Concerns and support from corridor travelers and general public	General agreement with benefit of proposed changes Additional changes should be made to accommodate parking on east side of road

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	$300,000 - $350,000

Figure 2. Garfield County Site 1 - New Southbound Right Turn Lane



Garfield County Site 2

Safety issues at this site include driver speeds and two-way traffic conflicts through the curve.

Two options were considered to improve safety through the curve. Option 1 would realign the road to better guide drivers through the curve, which would require a wall along the outside of the curve. Option 2 would minimize the road realignment, reducing the need for a wall, and would widen the shoulders to provide more room for drivers through the curve.

Table 9. Garfield County Site 2 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Realigned Curve with Retaining Walls	Design Option 2 – Modified Curve with Grading
Core Value: Safety		
Changes to vehicular safety concerns at site	Moderate improvement in safety with realigned curve to guide drivers through curve Maximum grades reduced from 10% to less than 9%	Moderate improvement in safety with modified curve and widened shoulders for more room through curve Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character		
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or property access	Rural feel maintained with no change in number of lanes or property access
Potential right-of-way (ROW) impacts to private property	Less than 0.10 acres of total potential ROW impacts to two properties	No expected permanent ROW impacts, but would have temporary construction easements
Potential visual impacts	Moderate visual impacts with added guardrail and walls	Minimal visual impacts with added guardrail
Core Value: Natural Resource Preservation		
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements		
Concerns and support from adjacent property owners	Strong concern that improving curve will increase speeds	Strong concern that improving curve will increase speeds
Concerns and support from corridor travelers and general public	Some public preference for this option Support for guardrail to reduce vehicle roll-offs	Public noted this option seems easier and just as beneficial Support for guardrail to reduce vehicle roll-offs
Conceptual Construction Cost Estimate: (not including ROW or easements)	$1.4 - $1.5 Million	$600,000 - $700,000

T&E = Threatened and Endangered Species

Figure 3. Garfield County Site 2 Option 1 - Realigned Curve with Retaining Walls

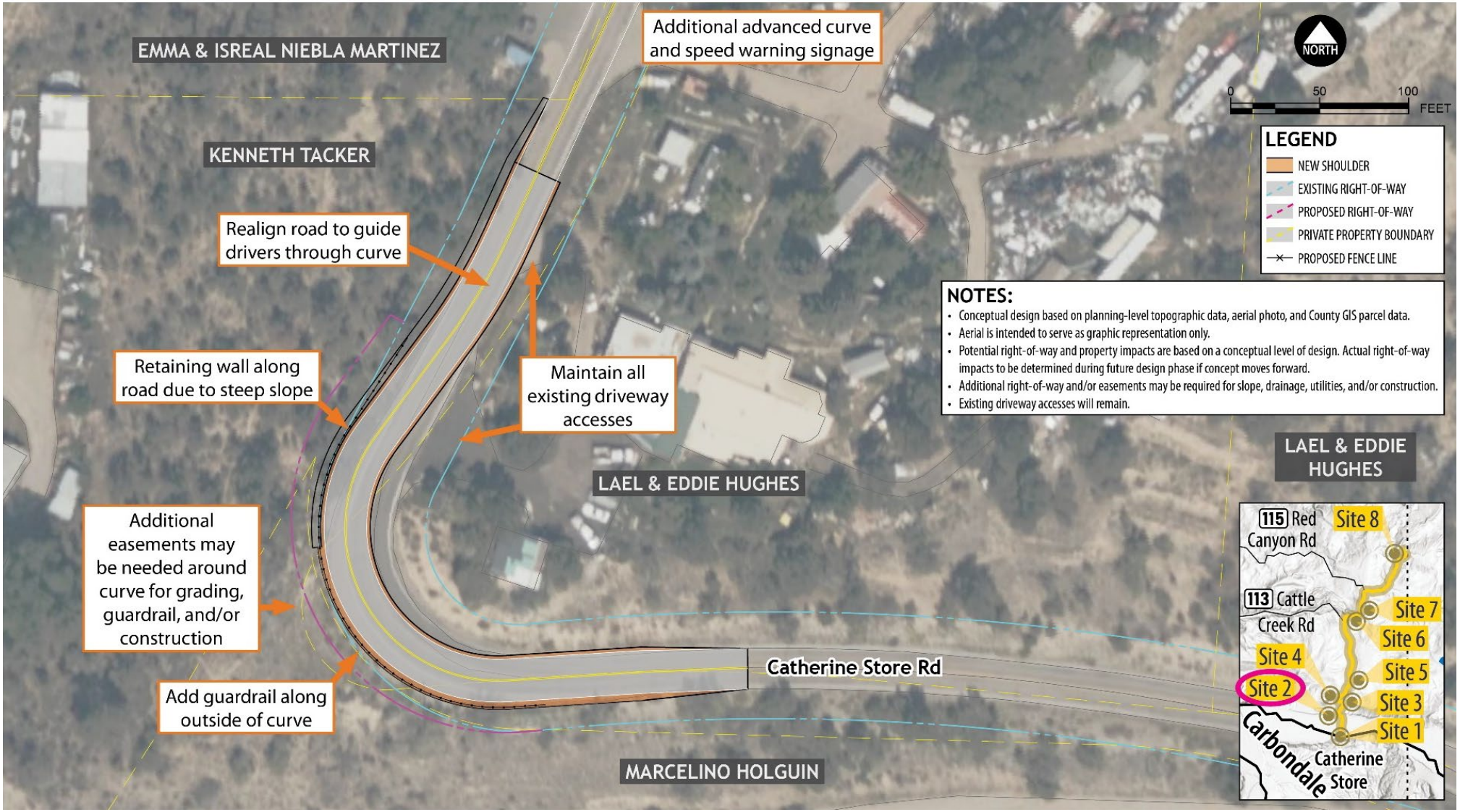
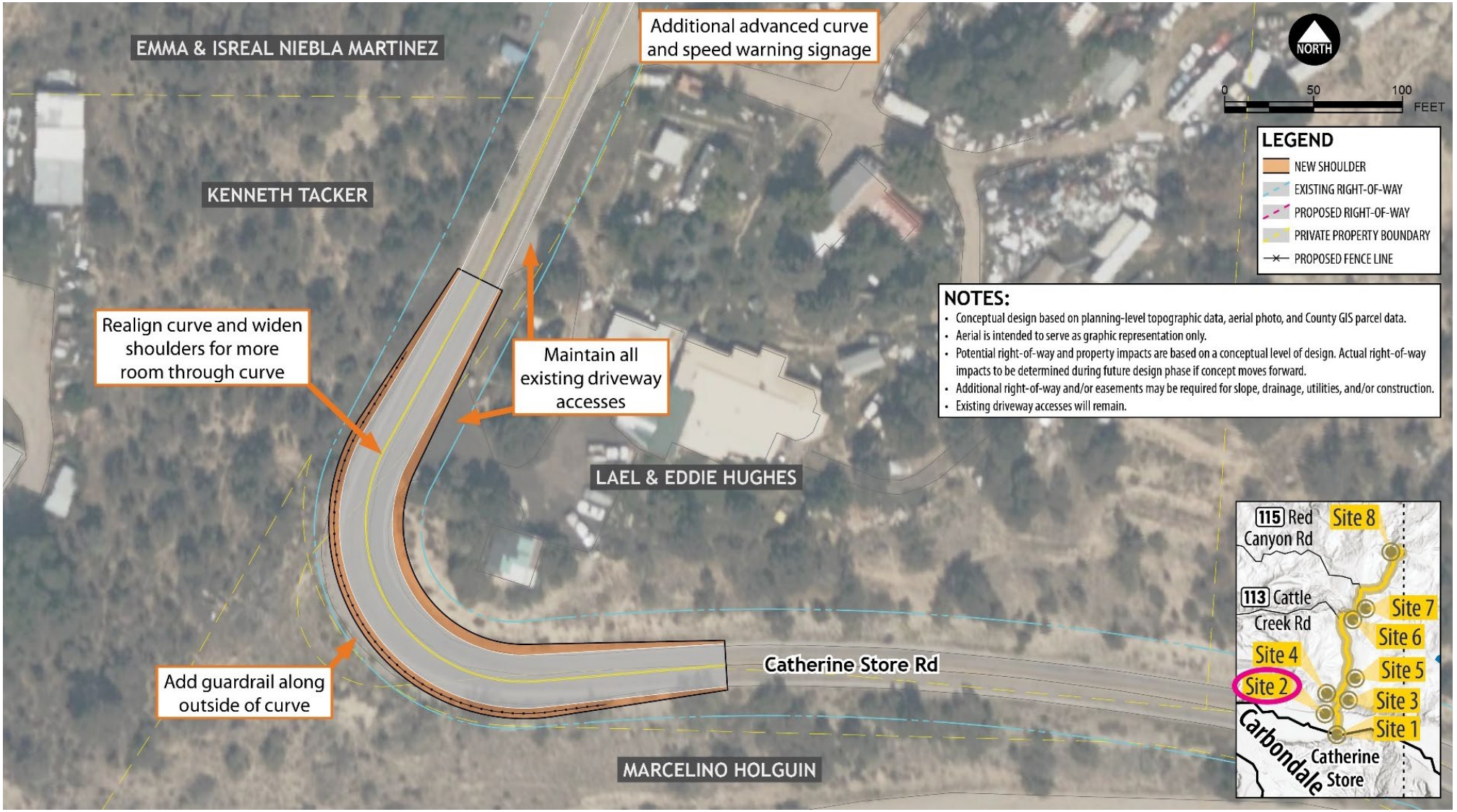


Figure 4. Garfield County Site 2 Option 2 - Modified Curve with Grading



GARFIELD COUNTY SITE 3

Safety issues at this site include driver speeds, two-way traffic conflicts through the curve, and lack of driveway delineation along the outside of the curve.

Road modifications would improve safety by realigning the curve and widening shoulders to provide more room for drivers through the curve. The existing driveways would be modified to tie into the new curve and the existing culvert would be replaced or extended along the inside of the curve.

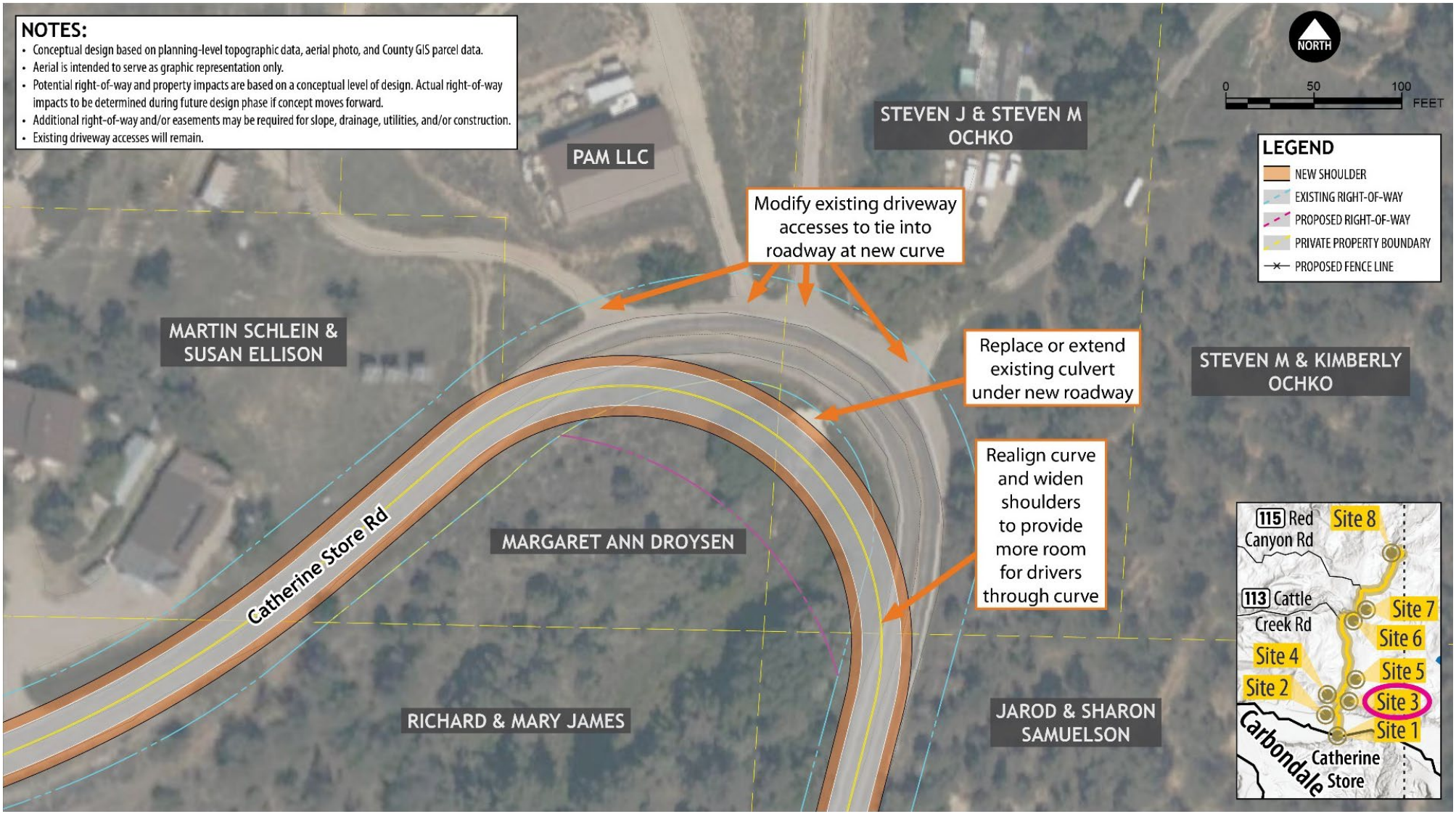
Table 10. Garfield County Site 3 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – MODIFIED CURVE WITH WIDENED SHOULDERS
Core Value: Safety	
Changes to vehicular safety concerns at site	Minor improvement in safety with modified curve and widened shoulders for more room through curve Access consolidation along outside of curve would improve safety further by improving sight distance and reducing conflicts Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or property access
Potential right-of-way (ROW) impacts to private property	Less than 0.25 acres of total potential ROW impacts to three properties along curve
Potential visual impacts	Minor visual benefits with shifting roadway away from residential properties
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	Potential jurisdictional mapped stream (unnamed) No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	Strong concern with property impacts when the change seems unnecessary
Concerns and support from corridor travelers and general public	Some support for improvements, but also concern that improving curve will increase speeds

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	$1.0 - $1.1 M

Figure 5. Garfield County Site 3 - Modified Curve with Widened Shoulders



GARFIELD COUNTY SITE 4

Safety issues at this site include driver speeds, two-way traffic conflicts through the curve, and off-road crashes after the curve in the downhill (southbound) direction.

Road modifications are being considered to improve safety by realigning the curve and widening the lanes and shoulders to provide more room for drivers through the curve. Additional advanced curve and speed warning signage would be installed for drivers approaching the curve, along with chevron signs along the outside of the curve. Guardrail may be added along the downhill edge of the existing driveway to direct errant vehicles.

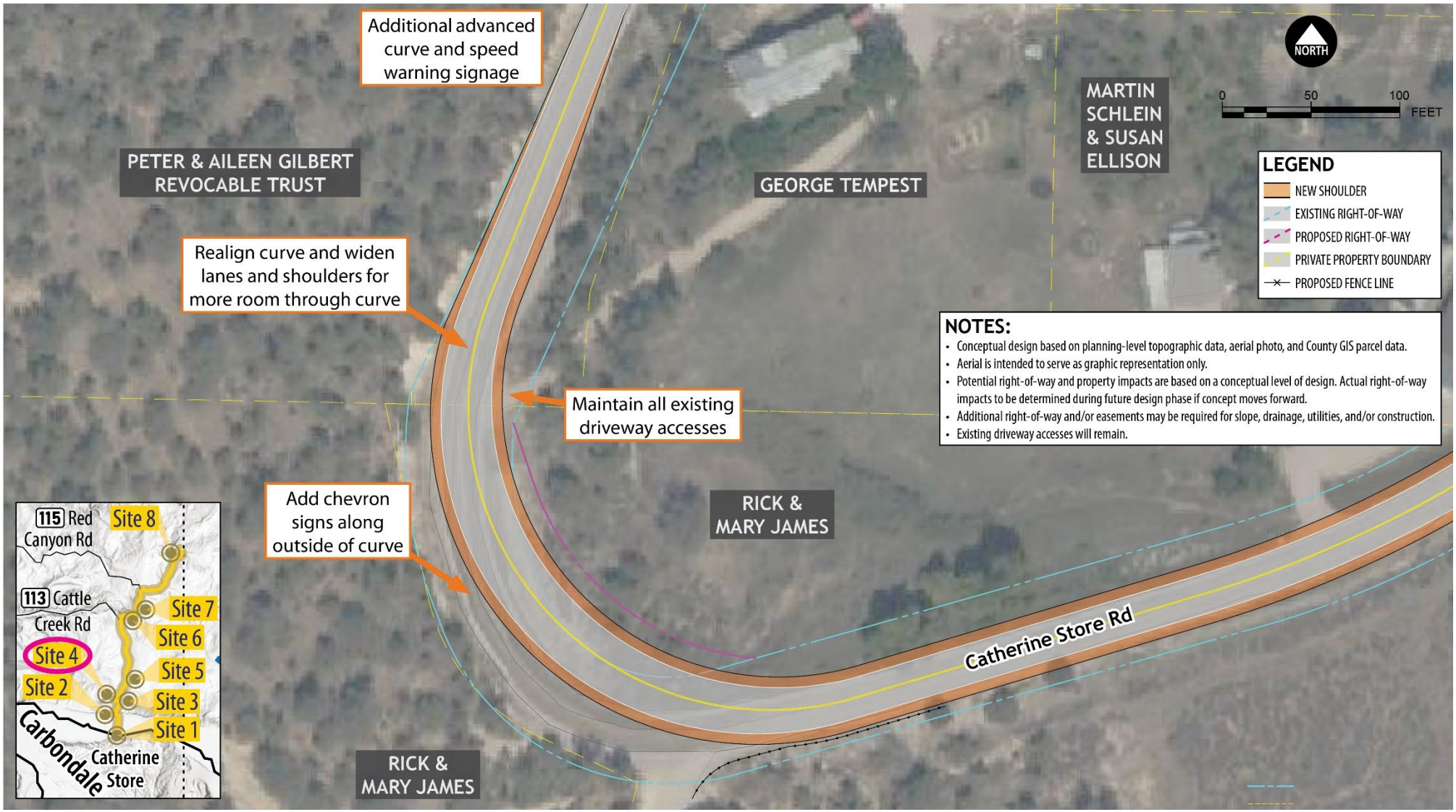
Table 11. Garfield County Site 4 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – MODIFIED CURVE WITH WIDENED SHOULDERS
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate improvement in safety with realigned curve and widened shoulders for more room through curve Maximum grades reduced from over 10% to 8.5%
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or property access
Potential right-of-way (ROW) impacts to private property	Less than 0.10 acres of potential ROW impacts to one property along curve
Potential visual impacts	Minimal visual impacts with added guardrail
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	Strong concern that improving curve will increase speeds
Concerns and support from corridor travelers and general public	General agreement with benefit of improvements, but also concern that improving curve will increase speeds

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	$1.3 - $1.4 M

Figure 6. Garfield County Site 4 – Modified Curve with Widened Shoulders



GARFIELD COUNTY SITE 5

Safety issues at this site include limited driver sight distance and the associated two-way traffic conflicts through the curve.

Road modifications would improve safety by cutting into the hillside on the west side of the road and widening the inside shoulder to increase the sight distance around the curve. It is assumed that the new roadside grading along the west side of the road would be constructed and maintained with an easement, not requiring permanent ROW acquisition. The increased sight distance will improve visibility for drivers and bicyclists through the curve.

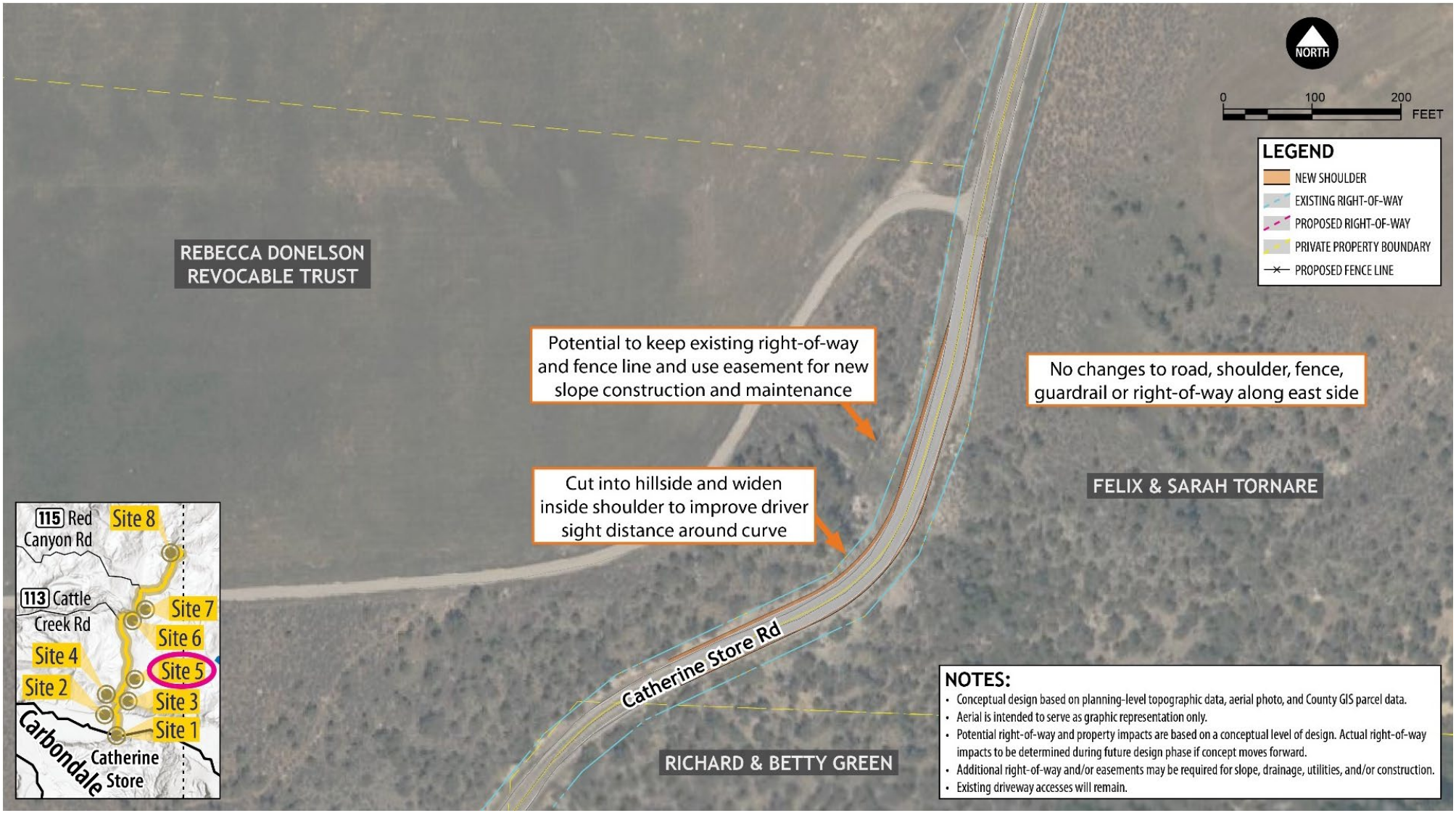
Table 12. Garfield County Site 5 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – HILLSIDE GRADING
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate improvement in safety with increased sight distance around curve Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or roadside environment
Potential right-of-way (ROW) impacts to private property	No expected permanent ROW impacts, but would have temporary construction easements
Potential visual impacts	Minimal visual impacts with new hillside slope
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	Concern for stream and spring impacts Concern that improving sight distance will increase speeds
Concerns and support from corridor travelers and general public	Some agreement with benefits of improvements, but also concern that improvements will increase speeds

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	$1.3 - $1.4 M

Figure 7. Garfield County Site 5 – Hillside Grading



GARFIELD COUNTY SITE 6

Safety issues at this site include limited sight distance and turning vehicle conflicts at the intersection.

The Panorama Drive intersection with Catherine Store Road would be realigned to intersect at a better angle for turning traffic. The new intersection alignment would improve safety by increasing sight distance and reducing conflicts for vehicles turning to/from Panorama Drive. The existing pavement at the Panorama Drive leg of the intersection would be removed and restored to natural vegetation. No private property or driveway access would be impacted with these improvements.

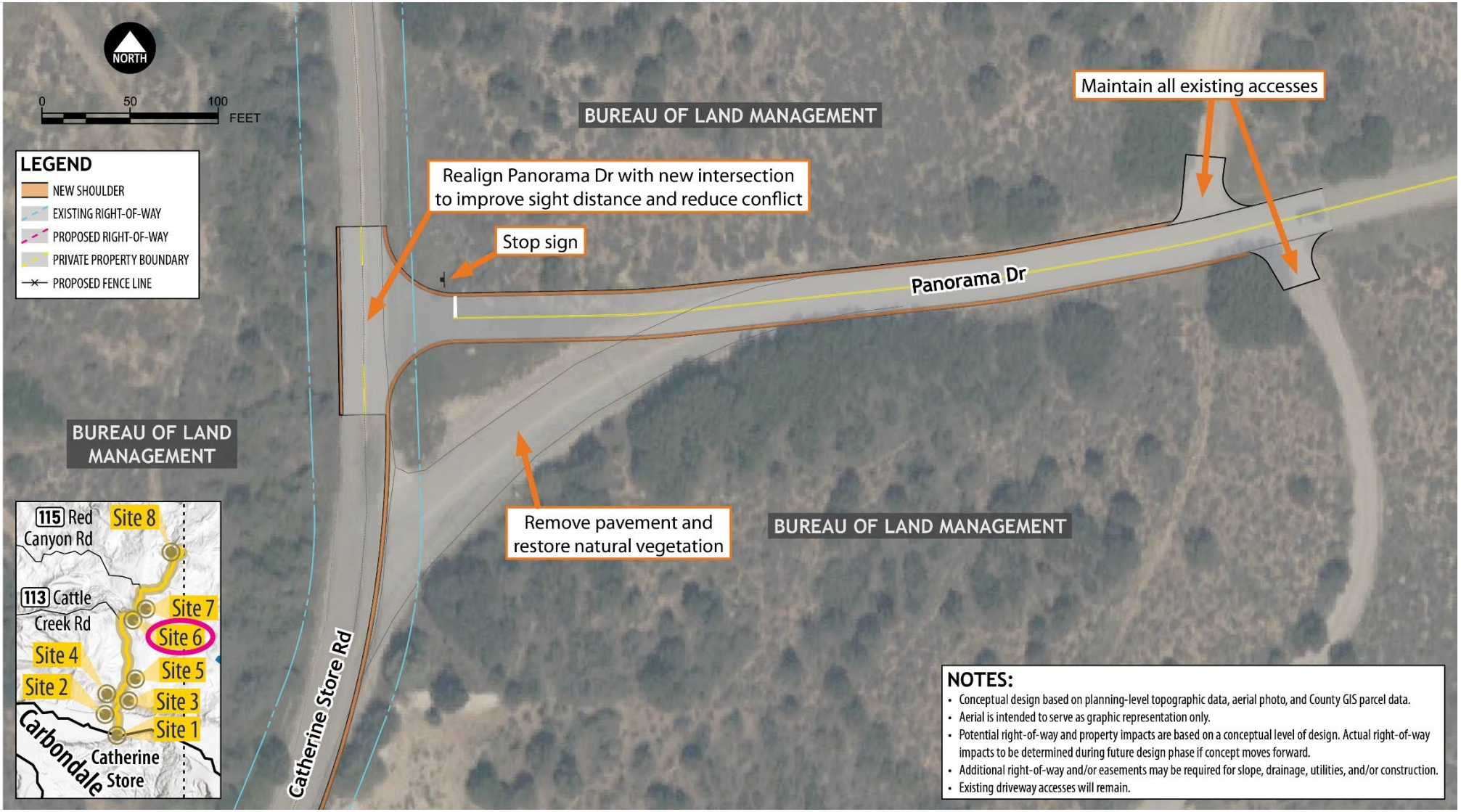
Table 13. Garfield County Site 6 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – PANORAMA DR INTERSECTION REALIGNMENT
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate to major improvement in safety with increased sight distance and reduced conflicts for turning drivers at intersection Minimum grades at intersection reduced from over 4% to less than 2%
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in traffic control, number of lanes, or roadside environment
Potential right-of-way (ROW) impacts to private property	No expected permanent private ROW impacts, but would have temporary construction easements to BLM property around intersection
Potential visual impacts	Minimal visual impacts with intersection shifts and restored vegetation
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	Potential jurisdictional mapped stream (unnamed) Potentially suitable habitat for federal T&E species
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	No comments or concerns received
Concerns and support from corridor travelers and general public	General agreement with benefits of proposed changes

T&E = Threatened and Endangered Species
BLM = Bureau of Land Management

Conceptual Construction Cost Estimate: (not including ROW or easements)	$500,000 - $600,000

Figure 8. Garfield County Site 6 - Panorama Drive Intersection Realignment



Garfield County Site 7

Safety issues at this site include driver confusion with navigation at the intersection and turning vehicle conflicts.

Two options were considered to improve safety at the Cattle Creek Road intersection with Catherine Store Road. Both options would reduce driver confusion and conflicts with a traditional three-legged, stop-controlled intersection. The north-south movement between Cattle Creek Road and Catherine Store Road would be the free-flow through movement while Cattle Creek Road to the west would continue to be controlled by a stop sign. Option 1 would realign Cattle Creek Road to intersect Catherine Store Road and a retaining wall or grading would be required. Option 2 would minimize the realignment of Cattle Creek Road, but it would potentially have more impacts to the Cattle Creek crossing.

Table 14. Garfield County Site 7 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Realigned Intersection	Design Option 2 – Realigned and Shifted Intersection
Core Value: Safety		
Changes to vehicular safety concerns at site	Moderate improvement in safety with better wayfinding and reduced conflicts for turning drivers Minimal change in grades (<0.5%)	Moderate improvement in safety with better wayfinding and reduced conflicts for turning drivers Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character		
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes, road surface, or roadside environment	Rural feel maintained with no change in number of lanes, road surface, or roadside environment
Potential right-of-way (ROW) impacts to private property	Less than 0.10 acres of potential ROW impacts to one property	Less than 0.20 acres of potential ROW impacts to one property
Potential visual impacts	Minor visual impacts with added wall	Minimal visual impacts with intersection shifted closer to creek
Core Value: Natural Resource Preservation		
Potential impacts to wildlife habitat and waterways	Impacts to Cattle Creek and associated wetlands, presumed to be jurisdictional waters Potentially suitable habitat for federal T&E species	Impacts to Cattle Creek and associated wetlands, presumed to be jurisdictional waters Potentially suitable habitat for federal T&E species
Core Value: Collaborative Improvements		
Concerns and support from adjacent property owners	No comments or concerns received	No comments or concerns received
Concerns and support from corridor travelers and general public	General agreement with benefits of modifying intersection, without preference of design option	General agreement with benefits of modifying intersection, without preference of design option
Conceptual Construction Cost Estimate: (not including ROW or easements)	$3.0 - $3.2 M	$1.7 - $1.8 M

T&E = Threatened and Endangered Species BLM = Bureau of Land Management

Figure 9. Garfield County Site 7 Option 1 - Realigned Intersection

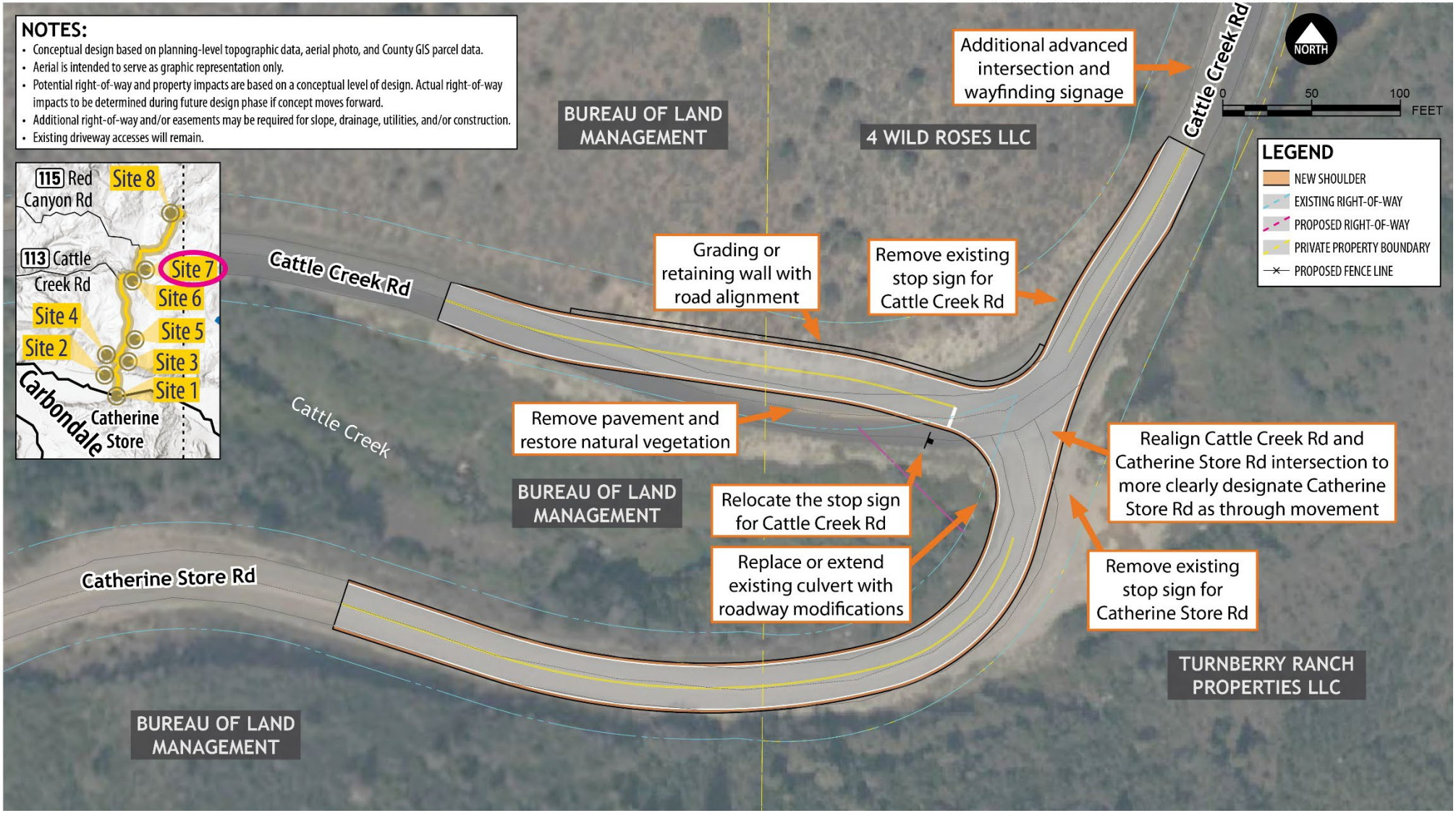
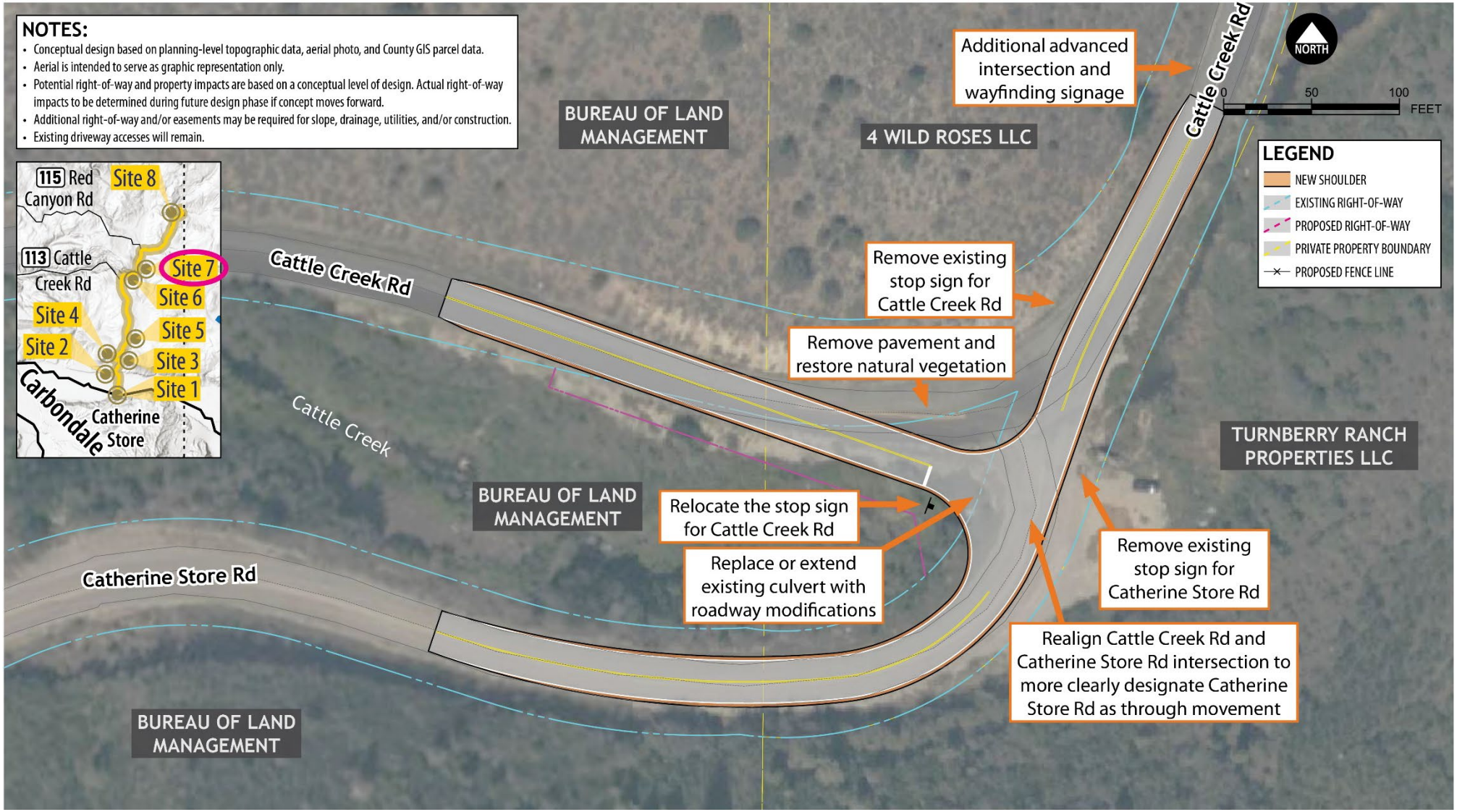


Figure 10. Garfield County Site 7 Option 2 - Realigned and Shifted Intersection



GARFIELD COUNTY SITE 8

Safety issues at this site include limited driver sight distance and the associated two-way traffic conflicts through the curve.

Road modifications would improve safety by cutting into the hillside on the west side of the road and widening the lanes and shoulders to increase the sight distance around the curve. It is assumed that the new roadside grading along the west side of the road would be constructed and maintained with an easement, not requiring permanent ROW acquisition. The increased sight distance will improve visibility for drivers and bicyclists through the curve.

Table 15. Garfield County Site 8 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – HILLSIDE GRADING
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate improvement in safety with increased sight distance around curve Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes, road surface, or roadside environment
Potential right-of-way (ROW) impacts to private property	No expected permanent ROW impacts, but would have temporary construction easements
Potential visual impacts	Minimal visual impacts with new hillside slope
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands Potentially suitable habitat for federal T&E species
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	No comments or concerns received
Concerns and support from corridor travelers and general public	General agreement with benefits of improvements, but also concern that improving curve will increase speeds

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	$600,000 - $700,000

Figure 11. Garfield County Site 8 - Hillside Grading

Eagle County Site 1

Safety issues at this site include driver speeds and two-way traffic conflicts through the closely spaced curves. Road modifications would improve safety through the multiple curves. Option 1 would realign the curves and widen lanes to provide more room for drivers through the curves. Option 2 would soften the curve alignments further to improve sight distance and guide drivers. Based on stakeholder input, a refined option (Option 3) was developed that realigns the curves to minimize property impacts. With all options, existing driveways would be modified to tie into the road and guardrail may be added to direct errant vehicles.

Table 16. Eagle County Site 1 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Soften Curves	Design Option 2 – Realign Curves	Design Option 3 – Realign and Soften Curves
Core Value: Safety			
Changes to vehicular safety concerns at site	Minor improvement in safety with minor curve softening and widened shoulders through curves Maximum grade at middle curve increased by <0.5%	Moderate improvement in safety with realigned curves and widened shoulders through curves Maximum grade at all curves reduced by <0.5%	Moderate improvement in safety with combination of realigned and softened curves with widened shoulders Maximum grade at middle curve increased by <1%
Core Value: Respecting Corridor Character			
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or road surface	Rural feel maintained with no change in number of lanes or road surface	Rural feel maintained with no change in number of lanes or road surface
Potential right-of-way (ROW) impacts to private property	Less than 0.5 acres of potential ROW impacts to two properties at curves	0.5 - 1.0 acre of potential ROW impacts to two properties at curves	Less than 0.5 acres of potential ROW impacts to three properties at curves
Potential visual impacts	Minor visual impacts with shifting roadway closer to residential properties	Moderate visual impacts with shifting roadway closer to residential properties	Minor visual impacts with shifting roadway closer to residential properties
Core Value: Natural Resource Preservation			
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat	No mapped streams or wetlands No federal or state-listed T&E species habitat	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements			
Concerns and support from adjacent property owners	Strong concern about property impacts	Strong concern about property impacts	Concern about property impacts
Concerns and support from corridor travelers and general public	Some support for option to minimize property impacts and speed increase	General agreement with benefits of improvements	Preference for option to minimize property impacts
			T&E = Threatened and Endangered Species
Conceptual Construction Cost Estimate: (not including ROW or easements)	$900,000 - $1.1 Million	$900,000 - $1.1 Million	$900,000 - $1.1 Million

Figure 12. Eagle County Site 1 Option 1 - Soften Curves

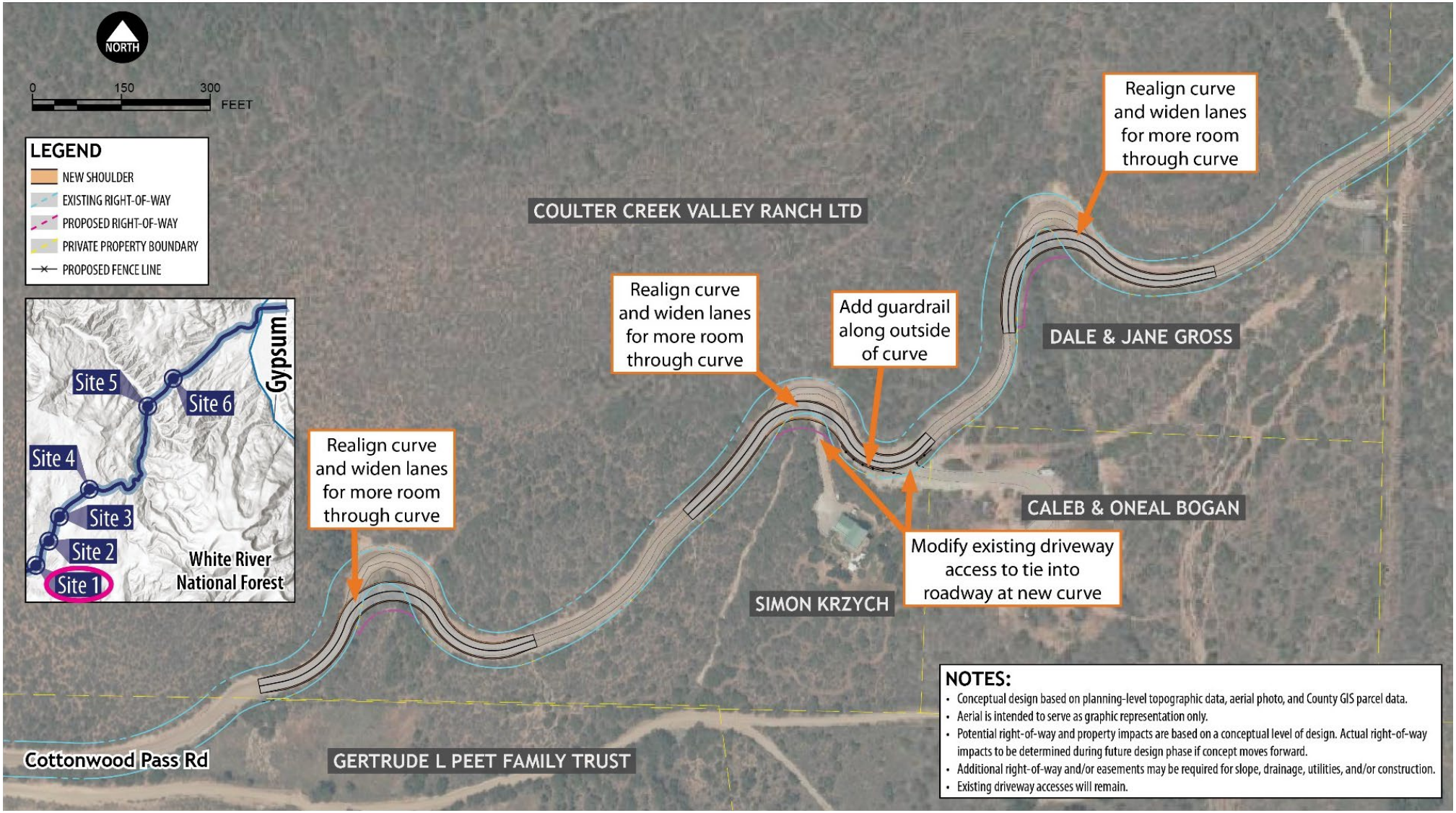


Figure 13. Eagle County Site 1 Option 2 - Realign Curves

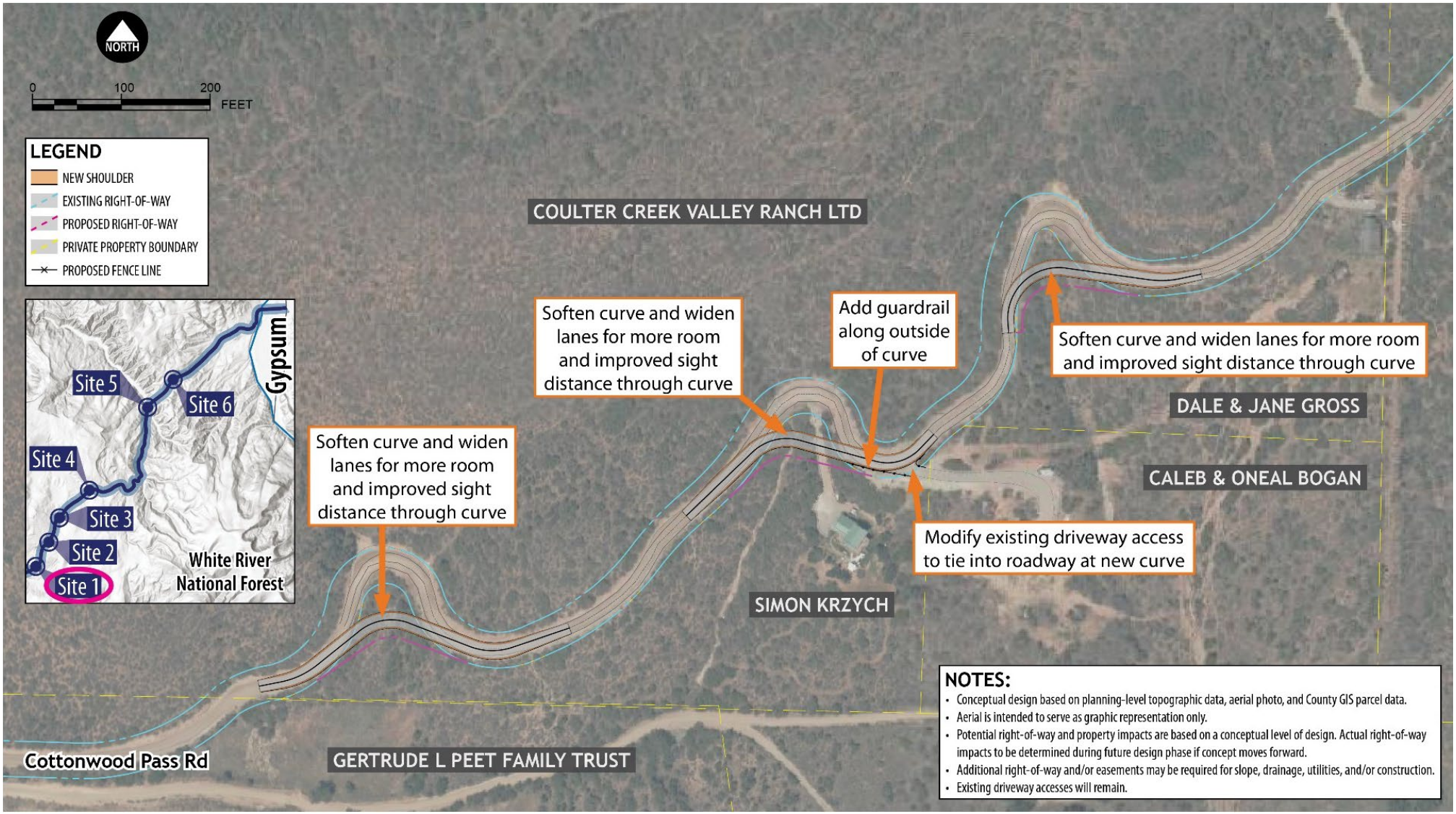
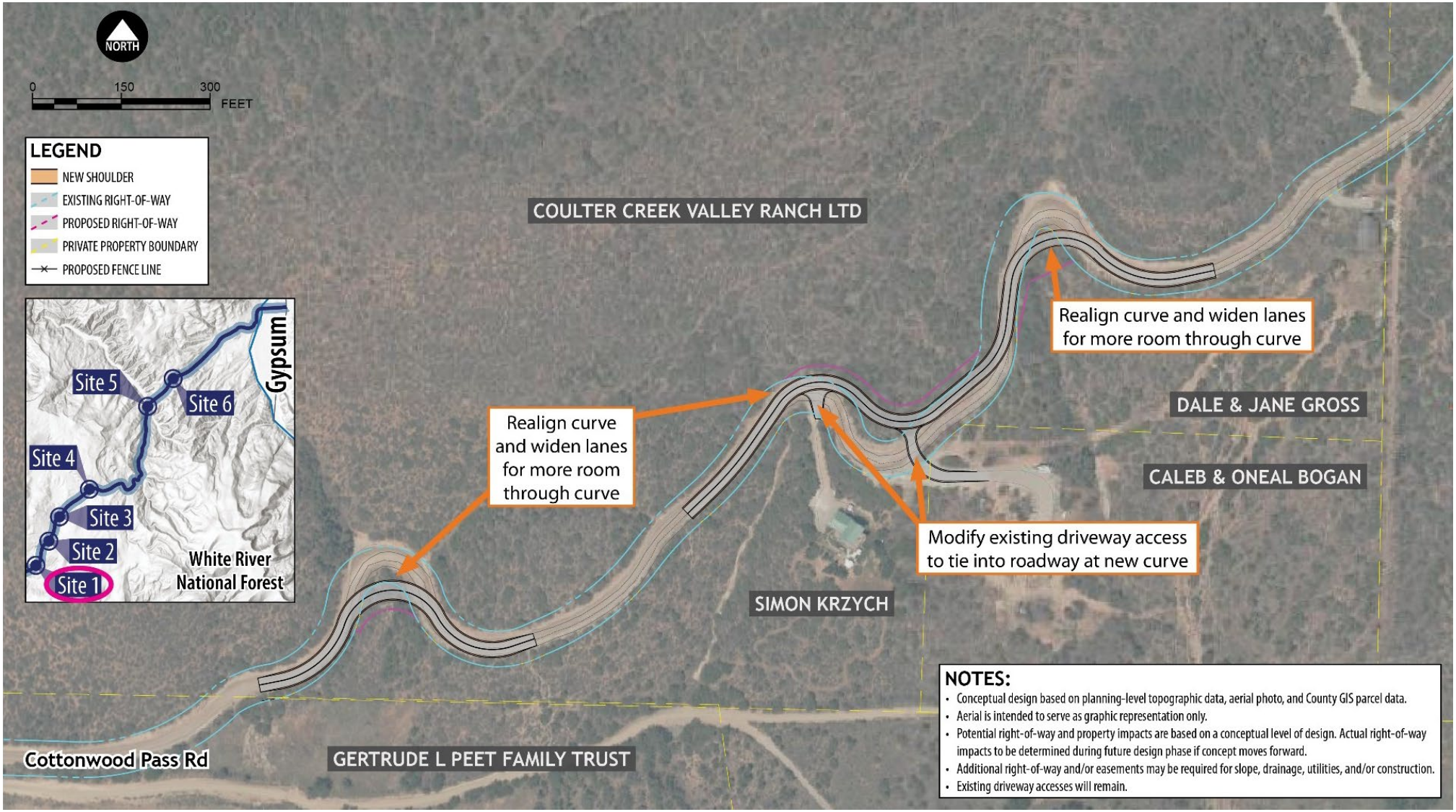


Figure 14. Eagle County Site 1 Option 3 - Realign and Soften Curves



Eagle County Site 2

Safety issues at this site include driver speeds and two-way traffic conflicts through the narrow stretch.

Road modifications would improve safety by widening the lanes and shoulders to provide room for two-way traffic and increase sight distance along the road. The widening along the east side of the road would require a retaining wall or grading with property impacts. There are no changes expected to the west side of the road. Based on stakeholder input, a refined option (Option 2) was developed that extends improvements further south to incorporate widening at a tight curve.

Table 17. Eagle County Site 2 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Widened Lanes and Shoulders	Design Option 2 – Further Widened Lanes and Shoulders
Core Value: Safety		
Changes to vehicular safety concerns at site	Moderate improvement in safety with shoulders and room for two-way traffic No change in grades	Moderate to major improvements in safety with shoulders and room for two-way traffic (longer distance) No change in grades
Core Value: Respecting Corridor Character		
Ability to maintain rural feel of road	Rural feel maintained although road surface hardened to protect wall	Rural feel maintained although road surface hardened to protect wall
Potential right-of-way (ROW) impacts to private property	No expected permanent ROW impacts, but would have temporary construction easements	No expected permanent ROW impacts, but would have temporary construction easements
Potential visual impacts	Minimal visual impacts with wall/grading	Minimal visual impacts with wall/grading
Core Value: Natural Resource Preservation		
Potential impacts to wildlife habitat and waterways	Potential impacts to Coulter Creek and associated wetlands, presumed to be jurisdictional waters No federal or state-listed T&E species habitat	Potential impacts to Coulter Creek and associated wetlands, presumed to be jurisdictional waters No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements		
Concerns and support from adjacent property owners	Strong concern for impacts to Coulter Creek and surrounding habitat	Strong concern for impacts to Coulter Creek and surrounding habitat
Concerns and support from corridor travelers and general public	General agreement with benefits of improvements	General agreement with benefits of improvements
		T&E = Threatened and Endangered Species
Conceptual Construction Cost Estimate: (not including ROW or easements)	$3.7 - $4.0 M	$4.2 - $4.4 M

Figure 15. Eagle County Site 2 Option 1 - Widened Lanes and Shoulders

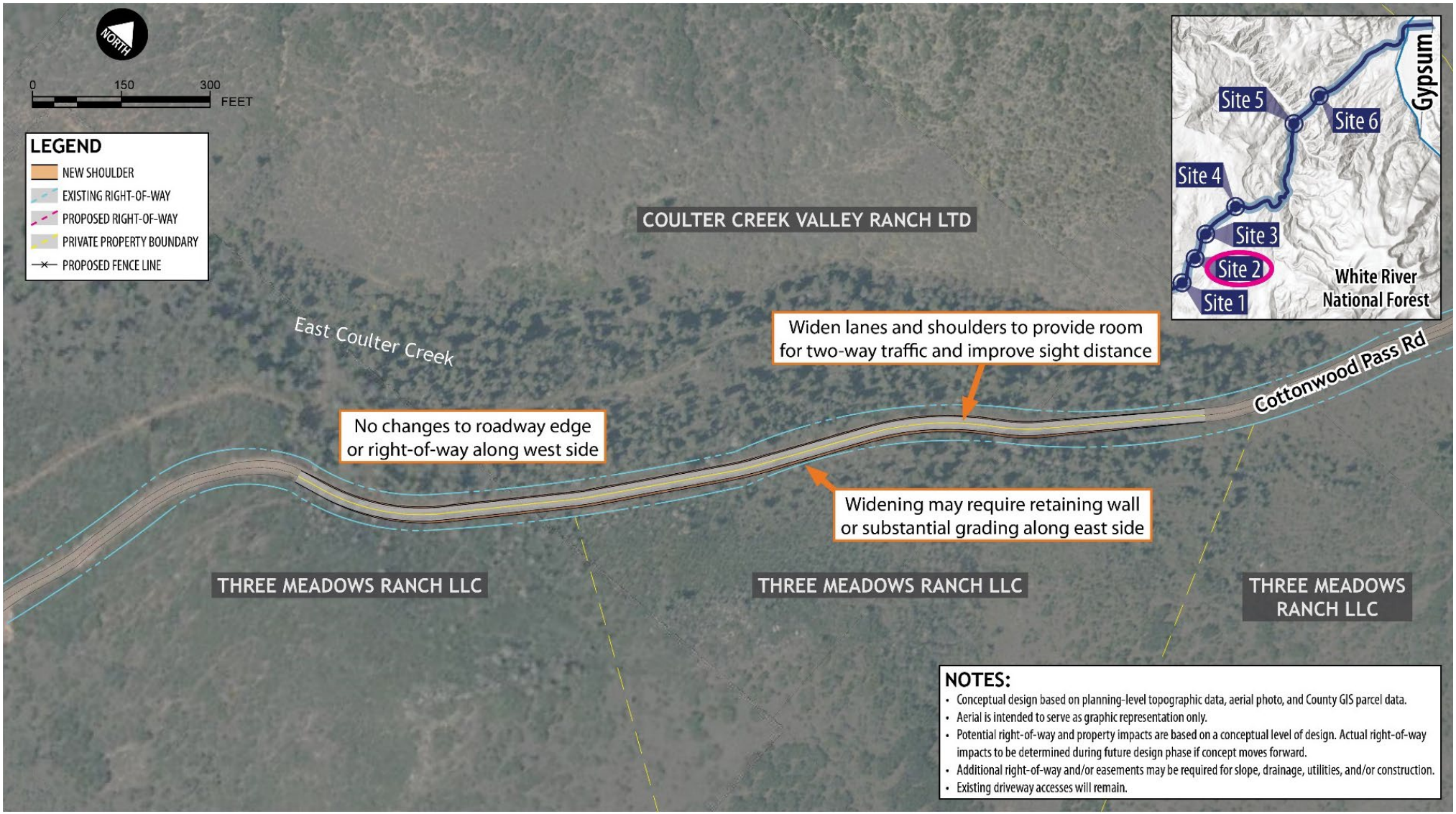
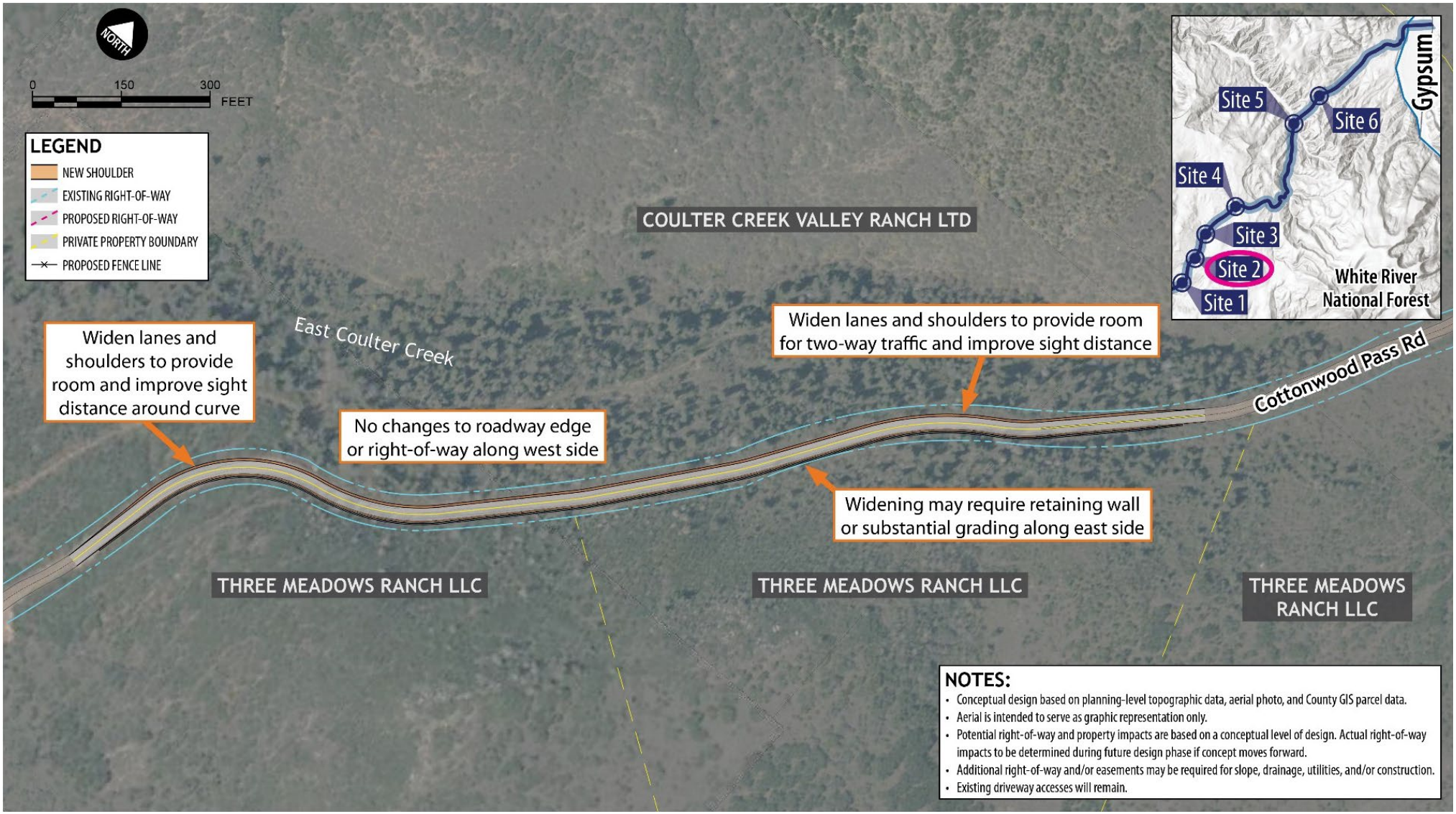


Figure 16. Eagle County Site 2 Option 2 - Further Widened Lanes and Shoulders



Eagle County Site 3

Safety issues at this site include driver speeds and two-way traffic conflicts through the curve. Road modifications would improve safety through the curves. Option 1 would soften the curves and widen lanes to increase sight distance and provide more room for drivers through the curves. Option 2 would realign the main sharp curve and widen lanes, but with reduced length of improvements along Cottonwood Pass Road and minimized property impacts. Based on stakeholder input, a refined option (Option 3) was developed to minimize property impacts at the curve and extend the improvements through Buck Point Drive.

Table 18. Eagle County Site 3 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Realign Curves	Design Option 2 – Soften Curves	Design Option 3 – Further Soften Curves
Core Value: Safety			
Changes to vehicular safety concerns at site	Moderate improvement in safety with realigned curve and widened shoulders Maximum grades reduced from 7% to 5.5%	Minor improvement in safety with minor curve softening and widened shoulders Maximum grades reduced from 7% to almost 6%	Moderate improvement in safety with softened curve and widened shoulders Maximum grades reduced from 7% to almost 6%
Core Value: Respecting Corridor Character			
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes, road surface, or roadside environment	Rural feel maintained with no change in number of lanes, road surface, or roadside environment	Rural feel maintained with no change in number of lanes, road surface, or roadside environment
Potential right-of-way (ROW) impacts to private property	About 0.30 acres of potential ROW impacts to one property at curve	Less than 0.10 acres of potential ROW impacts to one property at curve	Less than 0.10 acres of potential ROW impacts to one property at curve
Potential visual impacts	Minimal visual impacts	Minimal visual impacts	Minimal visual impacts
Core Value: Natural Resource Preservation			
Potential impacts to wildlife habitat and waterways	Potential jurisdictional mapped stream (unnamed) and wetlands No federal or state-listed T&E species habitat	Potential jurisdictional mapped stream (unnamed) and wetlands No federal or state-listed T&E species habitat	Potential jurisdictional mapped stream (unnamed) and wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements			
Concerns and support from adjacent property owners	Strong concern about property impacts	Strong concern about property impacts	Preference for option to minimize property impacts with improvements
Concerns and support from corridor travelers and general public	General agreement with benefits of improvements	General agreement with benefits of improvements	Preference for option to minimize property impacts and speed increase
Conceptual Construction Cost Estimate: (not including ROW or easements)	$1.2 – $1.4 M	$550,000 - $700,000	$1.2 – $1.4 M

T&E = Threatened and Endangered Species

Figure 17. Eagle County Site 3 Option 1 - Realign Curves

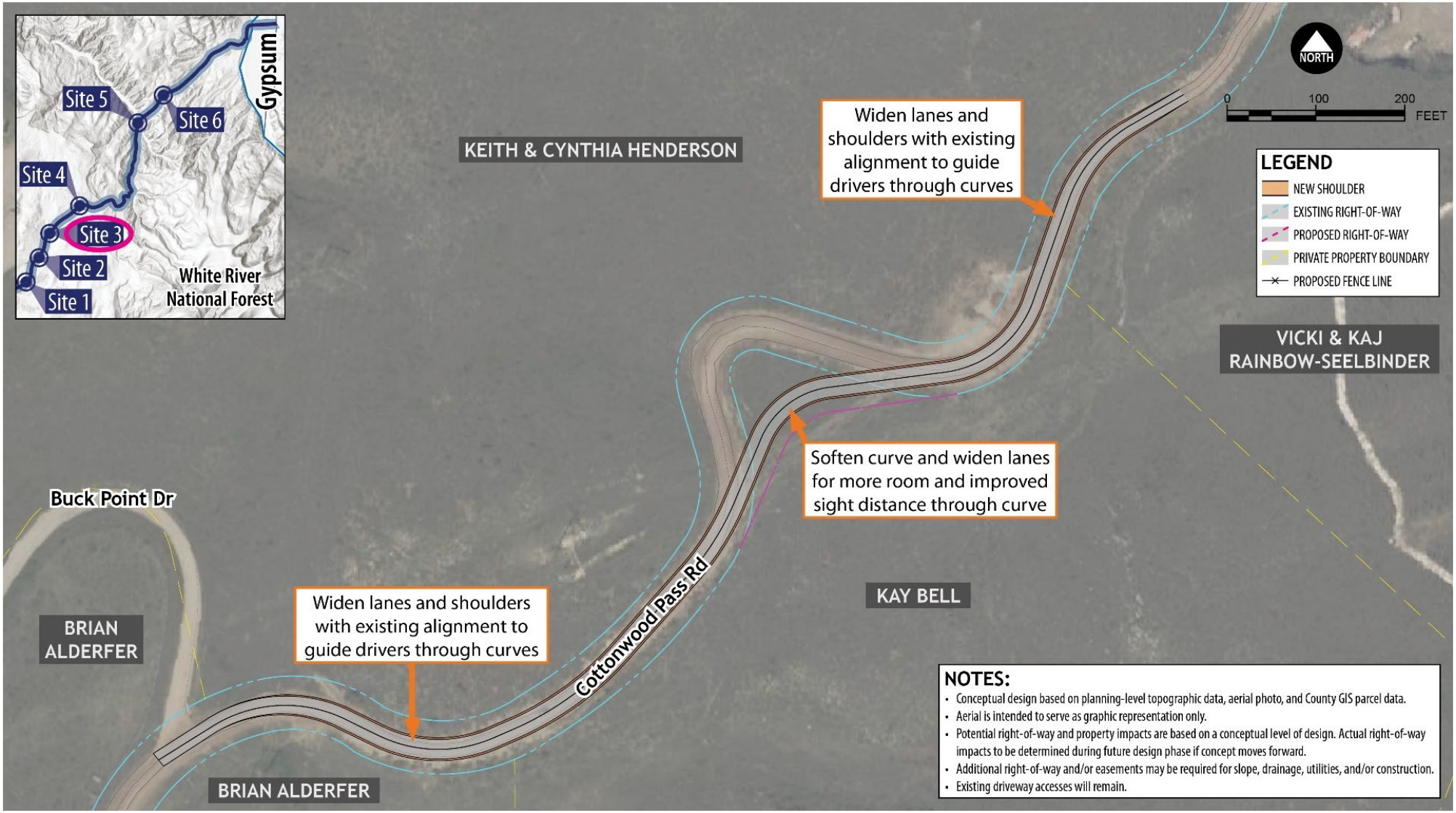


Figure 18. Eagle County Site 3 Option 2 - Soften Curves

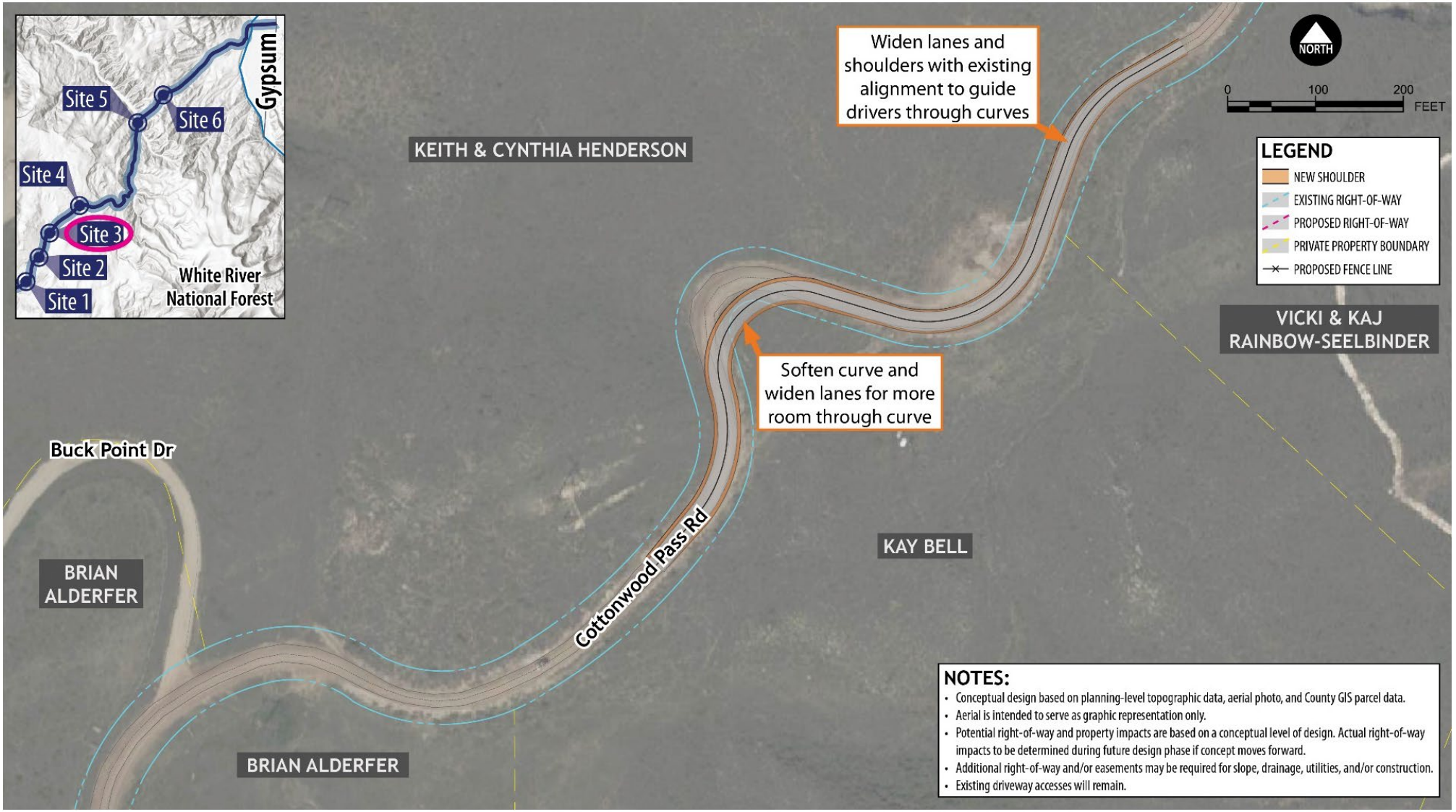
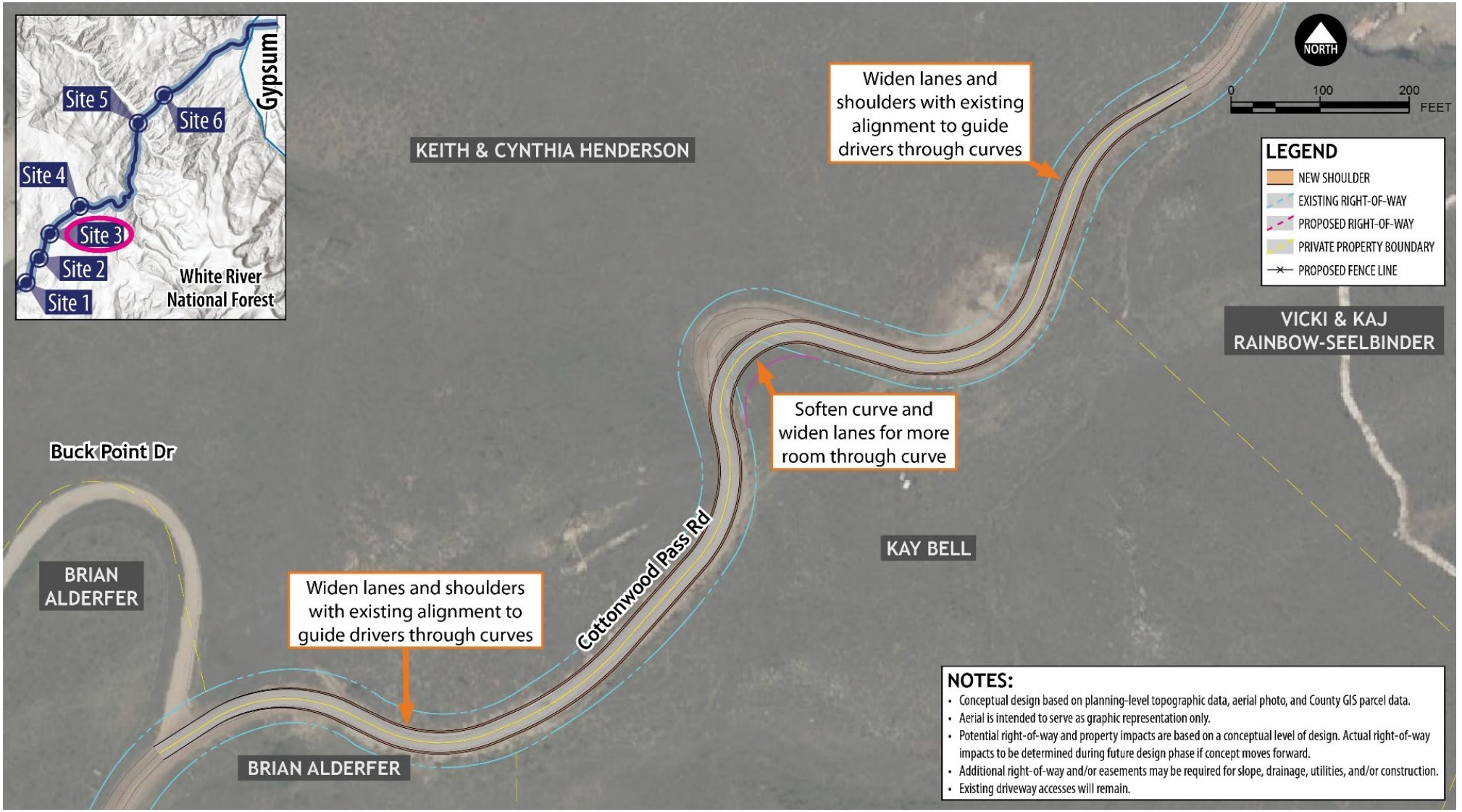


Figure 19. Eagle County Site 3 Option 3 - Further Soften Curves



EAGLE COUNTY SITE 4

Safety issues at this site include driver speeds and two-way traffic conflicts through the curve.

Road modifications are being considered to improve safety by softening the curve and widening lanes to provide more room for drivers through the curve.

Table 19. Eagle County Site 4 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – MODIFIED CURVE WITH WIDENED LANES
Core Value: Safety	
Changes to vehicular safety concerns at site	Minor improvement in safety with softened curve and widened lanes for more room through curve Minimal change in grades (<0.5%)
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes, road surface, or roadside environment
Potential right-of-way (ROW) impacts to private property	Less than 0.10 acres of potential ROW impacts to one property at curve
Potential visual impacts	Minimal visual impacts with grading
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	No comments or concerns received
Concerns and support from corridor travelers and general public	Concern that improving curve will increase speeds and input that the change seems unnecessary
	T&E = Threatened and Endangered Species
Conceptual Construction Cost Estimate: (not including ROW or easements)	$200,000 - $250,000

Figure 20. Eagle County Site 4 – Modified Curve with Widened Lanes

Eagle County Site 5

Safety issues at this site (also known as Blue Hill) include two-way traffic conflicts through the narrow stretch, combined with tight curves with limited sight distance and steep grades. Road modifications would improve safety and traffic operations by softening the curves and grades of Cottonwood Pass Road. Lanes would be widened to provide more room for two-way traffic through this section. Option 1 provides improvements in the grades and curves with a section of new road alignment, which would allow a section of existing road to remain open during the complicated construction. Option 2 improves grades and curves as much as possible with minimal new road alignment. Property access would remain open during construction with either option.

Table 20. Eagle County Site 5 - Design Option Evaluation

Core Value and Evaluation Criteria	Design Option 1 – Improved Grades and Curves with New Alignment	Design Option 2 – Improved Grades and Curves
Core Value: Safety		
Changes to vehicular safety concerns at site	Major improvement in safety with reduced grades, improved curves, and room for two-way traffic Maximum grades reduced from some areas above 20% to <9%	Moderate improvement in safety with reduced grades, improved curves, and room for two-way traffic Maximum grades reduced from some areas above 20% to <15% and most areas <10%
Core Value: Respecting Corridor Character		
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes or road surface	Rural feel maintained with no change in number of lanes or road surface
Potential right-of-way (ROW) impacts to private property	About 27 - 28 acres of potential ROW impacts to one private property and BLM	About 2.5 - 3 acres of potential ROW impacts to one private property and BLM
Potential visual impacts	Major visual impacts with shifting roadway and walls along new alignment	Moderate visual impacts with shifting roadway and walls
Core Value: Natural Resource Preservation		
Potential impacts to wildlife habitat and waterways	Potential impacts to Cottonwood Creek and associated wetlands, presumed to be jurisdictional waters No federal or state-listed T&E species habitat	Potential impacts to Cottonwood Creek and associated wetlands, presumed to be jurisdictional waters No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements		
Concerns and support from adjacent property owners	Strong concern with property impacts	Concern for property impacts and requested further reduction in new road to be constructed off existing alignment
Concerns and support from corridor travelers and general public	Strong concern with property impacts and cost	General agreement with benefits of improvements, but concern for cost
Conceptual Construction Cost Estimate: (not including ROW or easements)	$350 - $360 M	$55 - $59 M

T&E = Threatened and Endangered Species

Figure 21. Eagle County Site 5 (Blue Hill) Option 1 – Improved Grades and Curves with New Alignment

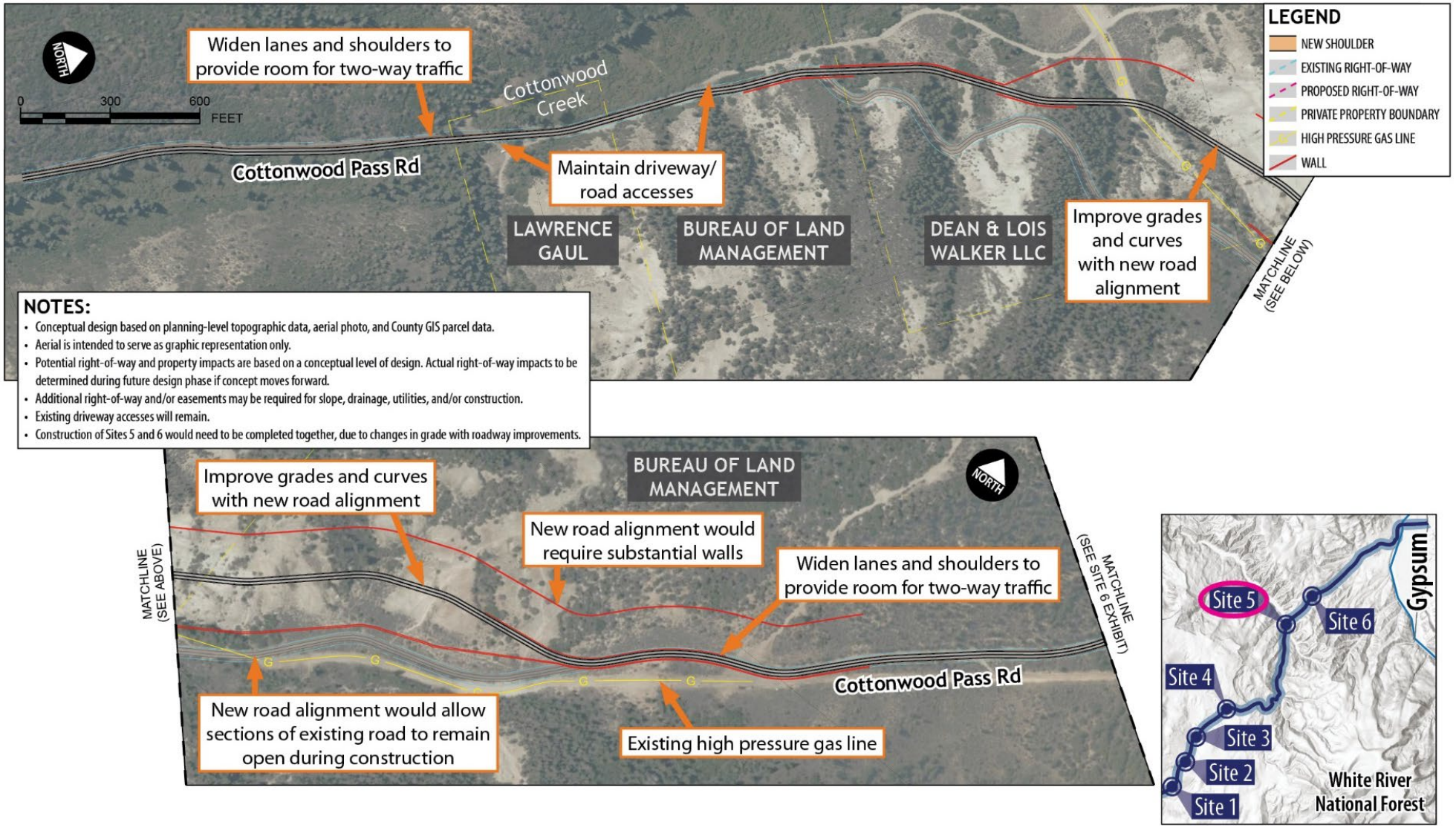
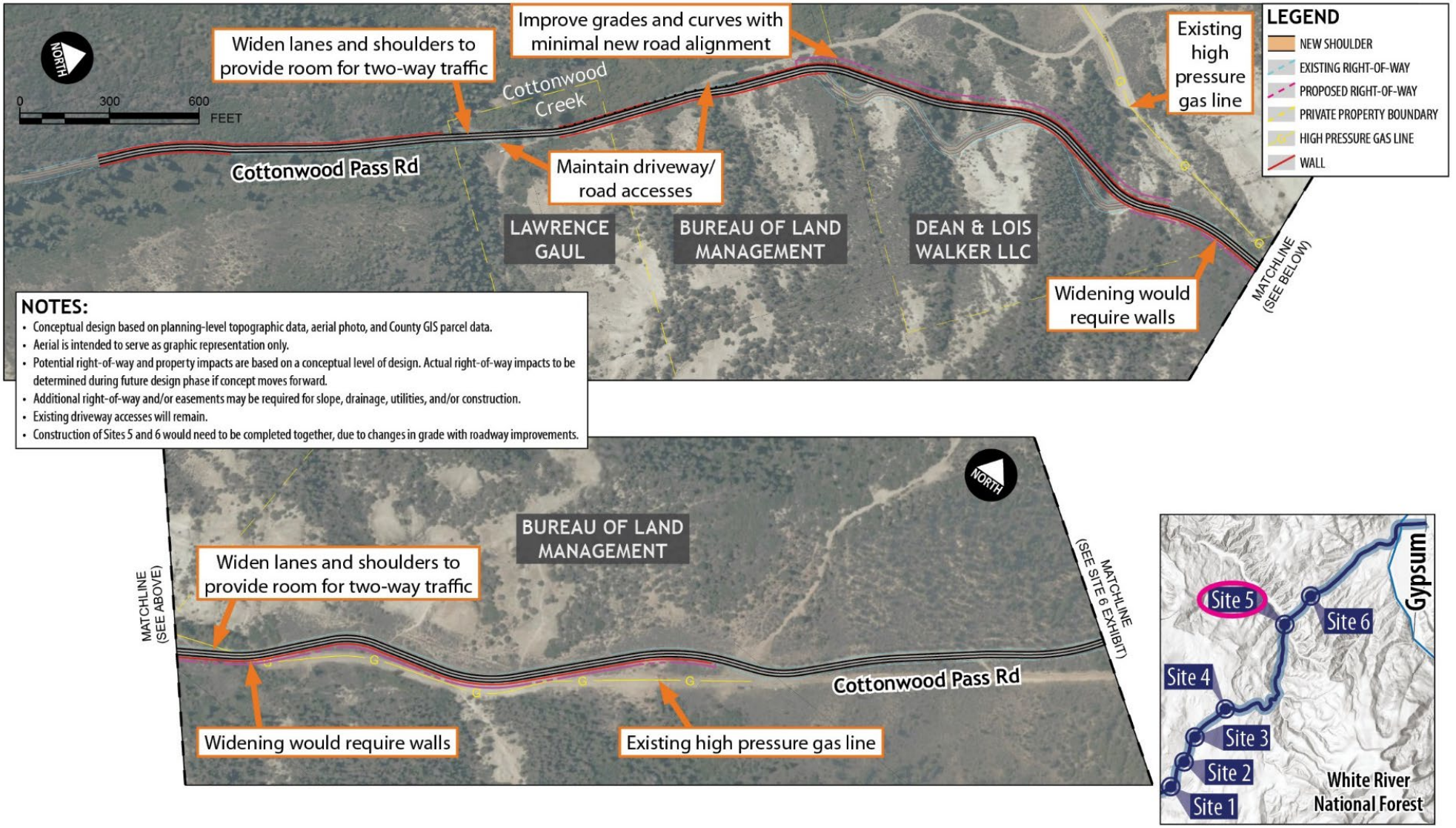


Figure 22. Eagle County Site 5 (Blue Hill) Option 2 – Improved Grades and Curves



EAGLE COUNTY SITE 6

Safety issues at this site include two-way traffic conflicts through the curve.

Road modifications are being considered to improve safety by realigning the road through the tight curve to guide drivers through the curves and widening lanes to provide more room for drivers through the area. Due to changes in grade, improvements at this site would be constructed together with the improvements at the adjacent Eagle County Site 5 (Blue Hill). The concepts developed for the two sites were designed to work together.

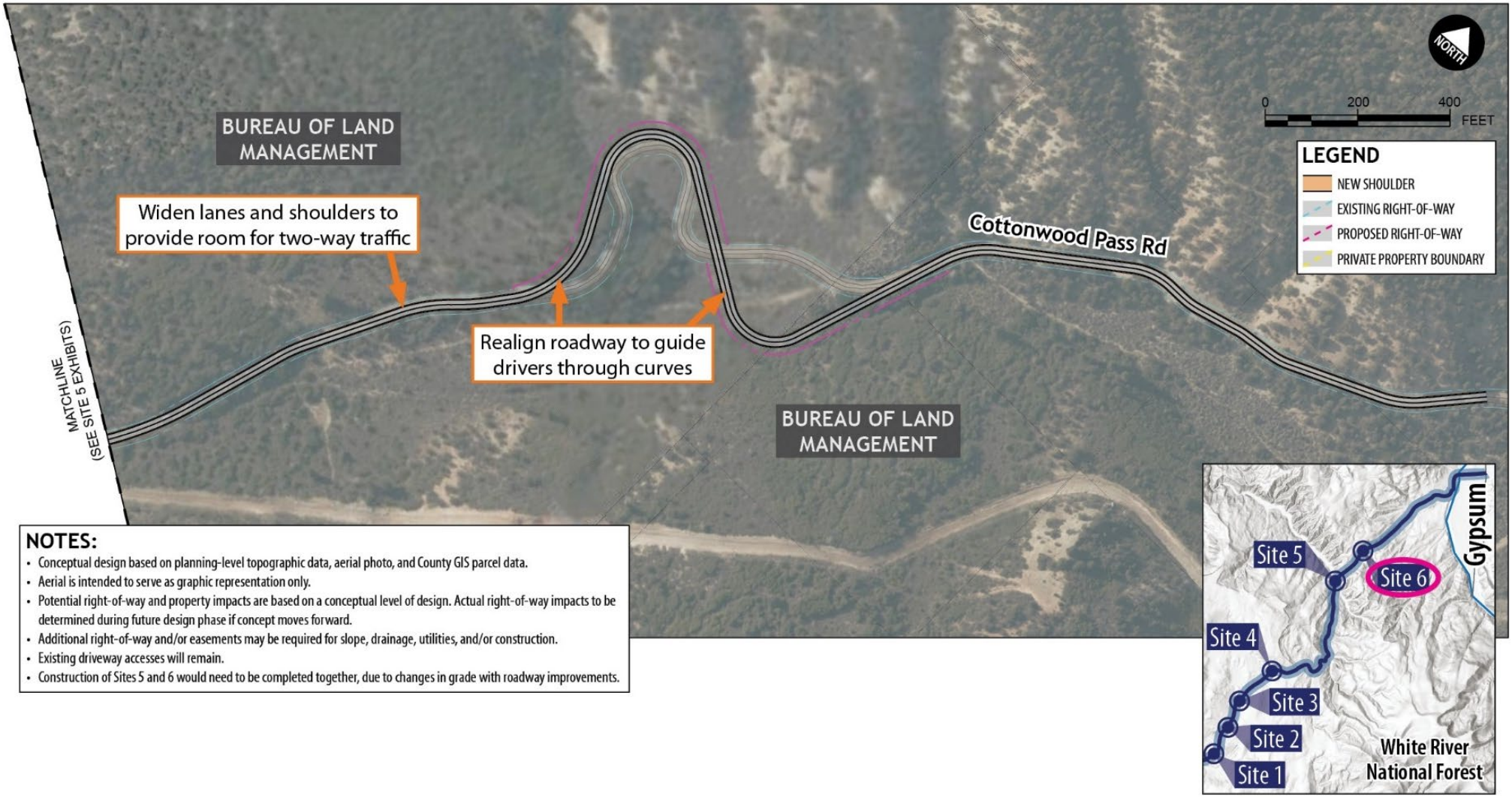
Table 21. Eagle County Site 6 - Design Option Evaluation

CORE VALUE AND EVALUATION CRITERIA	DESIGN OPTION – ROAD REALIGNMENT THROUGH CURVES
Core Value: Safety	
Changes to vehicular safety concerns at site	Moderate improvements in safety with curve realignment and widened lanes for more room through area Grades reduced from 7-8% to areas with <5%
Core Value: Respecting Corridor Character	
Ability to maintain rural feel of road	Rural feel maintained with no change in number of lanes, road surface, or roadside environment
Potential right-of-way (ROW) impacts to private property	No expected permanent private ROW impacts, but would have temporary construction easements to BLM property around curve
Potential visual impacts	Moderate visual impacts with grading and road realignment
Core Value: Natural Resource Preservation	
Potential impacts to wildlife habitat and waterways	No mapped streams or wetlands No federal or state-listed T&E species habitat
Core Value: Collaborative Improvements	
Concerns and support from adjacent property owners	No comments or concerns received
Concerns and support from corridor travelers and general public	General agreement with benefits of improvements

T&E = Threatened and Endangered Species

Conceptual Construction Cost Estimate: (not including ROW or easements)	Included with Eagle County Site 5 (to be constructed together due to grade changes)

Figure 23. Eagle County Site 6 – Road Realignment through Curves



AGENCY COORDINATION AND PUBLIC ENGAGEMENT

The concept design process emphasized involvement from Federal, State, and local agencies and the general public. Feedback was solicited from agency partners and the community to lead to development of design options and recommendations.

AGENCY COORDINATION

This study included a Project Management Team (PMT), County Team, PLT-TT, and a Natural Resources ITF. These groups were formed to facilitate close coordination between the project team and local and regional partners.

PMT MEETINGS

The PMT was comprised of CDOT project leadership staff and consultant team leadership staff. During PMT meetings, the overall project process was discussed. Meetings were held every two weeks throughout the project.

COUNTY TEAM MEETINGS

The County Team included representatives from Eagle and Garfield counties, CDOT staff, and consultant team members. County representatives kept their elected officials apprised of project progress. Twelve meetings were held as listed below:

- County Team Meeting #1 (Kick-off meetings and field visits): June 7, 2022 with Eagle County; June 8, 2022 with Garfield County
- County Team Meeting #2: July 13, 2022
- County Team Meeting #3: August 17, 2022
- County Team Meeting #4: September 14, 2022
- County Team Meeting #5: October 5, 2022
- County Team Meeting #6: October 19, 2022
- County Team Meeting #7: November 9, 2022
- County Team Meeting #8: December 7, 2022
- County Team Meeting #9: January 11, 2023
- County Team Meeting #10: February 9, 2023
- County Team Meeting #11: March 8, 2023
- County Team Meeting #12: June 5, 2023

In addition to those regular coordination meetings, a meeting was held on December 20, 2022 to discuss enforcement along Cottonwood Pass with county law enforcement staff. The meeting included a Patrol Commander from the Garfield County Sheriff's Office and two Sergeants from the Eagle County's Sheriff's Office. A project overview was provided and enforcement-related public comments were shared and discussed to consider with potential improvements.

PLT-TT Meetings

The PLT-TT was made up of technical experts from multiple disciplines and agencies, including CDOT, Eagle County, Garfield County, Town of Gypsum, U.S. Forest Service, and BLM. This group focused on moving the decision-making process forward. Four meetings were held as listed below:

- PLT-TT Meeting #1: June 30, 2022
- PLT-TT Meeting #2: August 30, 2022
- PLT-TT Meeting #3: December 1, 2022
- PLT-TT Meeting #4: February 23, 2023

Natural Resources ITF

The Natural Resources ITF was comprised of regulatory agency staff from CDOT, U.S. Forest Service, BLM, CPW, USFWS, USACE, and Eagle County. This group focused on the presence of existing natural resources such as wetlands, water quality, and wildlife, identifying potential impacts with design options, and discussing potential mitigation of impacts. Two meetings were held as listed below:

- Natural Resources ITF Meeting #1: September 12, 2022
- Natural Resources ITF Meeting #2: November 17, 2022

Public Engagement

Public engagement included public meetings, ITF meetings of property owners and nearby residents, direct coordination with adjacent property owners, and general public outreach efforts.

Public Open House Meetings

The project included two main public engagement points to facilitate two-way information sharing with the larger community.

Engagement Point #1

The first round of public engagement for the Cottonwood Pass Concept Design project consisted of two public open house meetings. The meetings were held on July 19, 2022 in Glenwood Springs and July 20, 2022 in Gypsum to introduce the project and gather feedback regarding the project Core Values and conditions at project sites.

Approximately 60 members of the public attended the meeting in Glenwood Springs and 45 attended in Gypsum. Display boards focused on outlining the project background, concept design process, and Core Values. Maps and photos were used to illustrate the existing conditions and potential types of improvements at each of the 14 project sites.

Meeting display boards and handouts were posted to the project web page following the meetings and two additional weeks were allowed for public comment. Comments received during the first engagement point can be found in **Appendix C**.

Engagement Point #2

The second round of public engagement for the Cottonwood Pass Concept Design project consisted of two public open house meetings. The meetings were held on March 22, 2023 in Glenwood Springs and March 23, 2023 in Gypsum to present design concept options and evaluation of those options.

Approximately 45 members of the public attended the meeting in Glenwood Springs and 55 attended in Gypsum. Display boards focused on providing a project overview, presenting site design options and the draft evaluation, and outlining next steps.

Meeting display boards and handouts were posted to the project web page the day following the meetings and an additional week was provided for public comment. Comments received during the second engagement point can be found in **Appendix C**.

Property Owner/Residential ITF

The Property Owner/Residential ITF met three times during the project to discuss the needs for residents along Cottonwood Pass and provide input to inform decision making. More than 70 property owners and residents were included in this group, with less than half of the group participating in each meeting. Meetings were held via videoconference to make participation convenient and were interactive, including a presentation by the project team combined with interactive survey questions with real-time displayed results and an open discussion portion reserved for answering audience questions and gathering comments.

All ITF members (including those unable to attend) received a link to the presentation following each meeting and the survey remained open for an additional day or two to allow their input.

Property Owner/Residential ITF Meeting #1: August 15, 2022

The information presented was largely the same as was displayed at the round 1 public open house meetings, with discussion focused on issues important to property owners and residents along Cottonwood Pass. Participants were asked to provide thoughts about the Core Values and issues and opportunities for improvement at each of the project sites.

Property Owner/Residential ITF Meeting #2: November 15, 2022

The draft concepts for each site were shared, along with a summary of existing conditions being considered. Participants were asked how improvements at each site would benefit or impact private properties, and suggestions for design tweaks were solicited.

Property Owner/Residential ITF Meeting #3: February 15, 2023

The draft concepts were reviewed (they had been presented at the second meeting of this group) and newly developed refined options for some sites and design options for Eagle County Sites 5 and 6 (Blue Hill sites) were shared, along with a summary of differentiators found during the design option evaluation. Participants were asked to share their thoughts on the refined options and Blue Hill options, and to give suggestions for best presenting this information at the upcoming public meetings.

Detailed summaries of conversations during the Property Owner/Residential ITF meetings are included in **Appendix C**.

Adjacent Owner Coordination

Once conceptual design options were developed, personalized letters were sent to notify property owners adjacent to the potential improvements being considered at each site. Feedback was requested and considered as design options were refined and before conceptual design recommendations were made for each site. After design refinements were made, additional outreach occurred with some owners that could be more impacted by the new design option. Property owners submitted comments via email, the project web page, phone calls, and letters.

Information Distribution

A robust media campaign was used to spread the word to inform travelers in the surrounding area of each round of public open house meetings. Advertisements were placed in the print versions of the Glenwood Post Independent, Vail Daily, and Aspen Times that ran twice in the week prior to the public meetings. A digital campaign also ran in the online versions of those publications targeting Eagle and Garfield counties. This resulted in more than 120,000 total impressions and 80 new visits to the project web page.

To notify adjacent and nearby property owners and tenants, a postcard was mailed to 2,400 people prior to each round of public meetings. Other advertisements included news releases distributed to CDOT, Eagle County, and Garfield County's contact lists, articles by Vail Daily, Denver Gazette, and 9 News, CDOT social media posts, emails to the project contact list, and notice on Town of Gypsum's welcome board on US 6.

Throughout the concept design effort, project information and updates were made online at: www.codot.gov/projects/cottonwood-pass-concept-design.

Public Comments

Comments were gathered from community members and potentially impacted property owners throughout the concept design process. **Table 22** includes a list of public comment overall themes and how they were addressed.

Table 22. Public Comment Themes and Responses

Public Comment Theme	Response
Safety and respecting corridor character are the most important Core Values.	Noted and reflected in recommendations and design options for each site that minimize impacts to neighboring properties and strike a balance of improving the safety without full improvements to bring the roadway to meet roadway design standards throughout (which would be much more impactful).
Improving Cottonwood Pass will draw more traffic, which is detrimental to the rural way of life residents prefer. Additional traffic is already being experienced when Glenwood Canyon closes, causing a host of issues.	Comment noted and shared with Eagle and Garfield counties. The counties will determine if and when improvements at individual project sites should move forward.
Widening narrow sections and improving curves will encourage drivers to speed more than they already do. Speed bumps should be considered.	Speed mitigation strategies such as increased signage, enhanced signs with lights, speed feedback signs, and rumble strips could be implemented with projects as they move forward at individual sites. Speed bumps/humps/dips are not appropriate for this situation.
Safety improvements along Cottonwood Pass are supported because this is a crucial route for many people, including emergency services.	Agreed.

PUBLIC COMMENT THEME	RESPONSE
Google Maps and other wayfinding apps direct travelers to Cottonwood Pass when Glenwood Canyon is closed. Cottonwood Pass should not be a detour for I-70 traffic.	Eagle County has been actively working with wayfinding companies to ensure Cottonwood Pass is not shown as a detour route. This project is not working towards making Cottonwood Pass an official I-70 detour, but safety improvements are needed for those who will travel the road whether Glenwood Canyon is open or closed.
Additional traffic may use Cattle Creek Road and something should be done to prevent this.	This project is considering modifications to the geometry of the intersection of Catherine Store Road and Cattle Creek Road (Garfield County Site 7) to a T intersection with free-flow through movements between Cottonwood Pass and Catherine Store Road, rather than the current configuration that naturally directs southbound traffic onto Cattle Creek Road. Other improvements such as advanced intersection and wayfinding signage will be considered to direct traffic and distinguish the routes.
Large trucks often go over the roadway edge causing damage and they also can get stuck on the road blocking traffic.	The current length and size restrictions on large vehicles are proposed to remain.
More enforcement is needed for speeding, trash, and large truck restrictions.	Enforcement-related comments were shared with deputies from Eagle and Garfield county Sheriff's offices in a meeting convened with them by CDOT to draw attention to the matter.
Additional maintenance on Cottonwood Pass would help alleviate some of the safety issues.	Comment noted and shared with Eagle and Garfield counties.
Blue Hill is the location most in need of improvements along Cottonwood Pass.	Blue Hill (Eagle County Sites 5 and 6) has been identified as Eagle County's top priority but will require a substantial amount of funding that is not available at this time. CDOT assisted Eagle County in pursuing a grant to fund a first phase of Blue Hill improvements and funding will continue to be pursued.
Focus on improving I-70 through Glenwood Canyon to mitigate issues that cause I-70 closures rather than spending money changing Cottonwood Pass.	Minimizing closures of Glenwood Canyon and making I-70 through the canyon more reliable remains a focus for CDOT; funding is actively being pursued for this effort. CDOT and Eagle and Garfield counties agree that spot safety improvements are also needed on Cottonwood Pass.

RECOMMENDATIONS

The Cottonwood Pass Concept Design project assessed existing conditions and defined and evaluated concept level safety improvements at 14 specific locations along the Cottonwood Pass corridor through both Eagle and Garfield counties. The safety improvements are intended to serve local traffic with roadway modifications to reduce the occurrence of vehicular crashes (and near-misses) while minimizing property impacts and preserving the character of the area. Corridor-wide changes to the curved alignment, grades, and road surface were not considered.

Garfield County plans to take all of the information from this study to make decisions later and any future action on potential projects will be at the discretion of the Board of County Commissioners.

At sites in Eagle County with multiple options, Eagle County staff identified the following recommendations that the County would likely move forward at the site, if funding is secured:

- Eagle County Site 1: Realign and Soften Curves
- Eagle County Site 2: Further Widened Lanes and Shoulders
- Eagle County Site 3: Further Soften Curves
- Eagle County Site 5 (Blue Hill): Improved Grades and Curves

SPEED MITIGATION

Property owner and general public feedback noted many comments about speeding along the corridor, and concerns that the safety improvements will make it worse. In addition to the roadway design concepts, the project team is considering other ways to address speeding concerns that could be implemented with projects as they move forward at each site:

- Increased signage – more curve warning and reduced speed signs
- Enhanced signs – signs with flashing yellow lights above or in the sign
  - These can reduce speeds by a few miles per hour, but they are relatively expensive
  - They are difficult to maintain in unpopulated and low volume areas
  - There are visual impacts to adjacent homes with lights at night
- Speed feedback sign – speed limit signs with radar that tells drivers their speed
  - Similar benefits and constraints to the enhanced signs, but these are even more expensive and costly to maintain
- Rumble strips – grooves in the pavement (paved portions only) along shoulder or centerline that create a loud sound when driven over
  - Keeps drivers in the lane and generally slows down drivers as they go around curves
  - There can be substantial noise impacts to adjacent homes

Speed bumps, humps, or dips were also frequently requested in adjacent property owner and general public feedback. These are not recommended with the site concept designs along Cottonwood Pass. A speed bump is a bump of asphalt placed laterally across the travel lane in parking lots to discourage cut-through traffic. A speed hump is an elongated mound in the roadway pavement surface intended for use on short-distance, neighborhood streets with limited through traffic, not on mainline county roads. When used, they are installed in a series and while they can be effective at reducing vehicular speeds between the speed humps, studies have shown that they are ineffective at reducing speeds for a notable distance beyond the approach and exit of consecutive humps. In addition, tests show that speed bumps are ineffective in controlling all types of vehicles. The driver of a softsprung sedan is encouraged to increase speed for a better ride over a speed bump, while other drivers may lose control at the same speed, which would degrade safety for drivers entering significant curves. They are also not recommended for roads with grades like those on Cottonwood Pass and speed bumps and dips introduce new issues with increased noise and impacts to drainage and plowing/maintenance.

BICYCLISTS

The project identified that portions of Cottonwood Pass, particularly Catherine Store Road, and other area roads are frequently traveled by bicyclists. This project is not recommending specific bicycle infrastructure, such as bike lanes. However, the roadway safety improvement recommendations, such as increased lane and shoulder widths at curves and improved sight distance, will benefit bicyclist as well as driver safety.

BLUE HILL – POTENTIAL PHASING

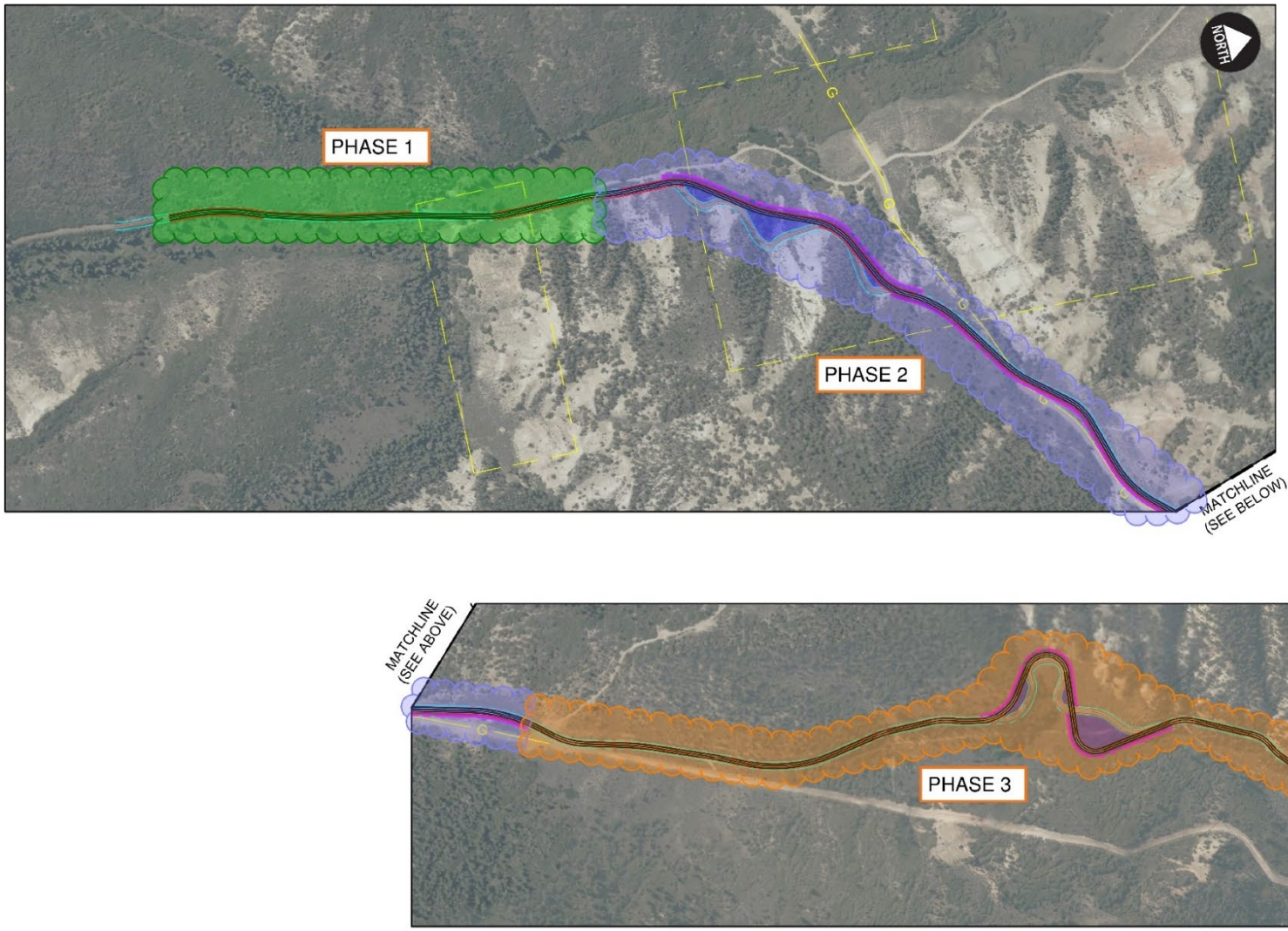
The full improvements developed at Eagle County Sites 5 (Blue Hill) and 6 are relatively high cost compared to the other study site improvements. However, based on public and stakeholder input gathered during the study, improvements at Blue Hill are the highest priority need. The following potential projects were developed to potentially secure funding to construct the improvements in separate phases (shown in **Figure 24**):

- Phase 1:
  - Improvements consist of widening the road and constructing the retaining walls or grading to accommodate the widening
  - The horizontal alignment and profile in this area is close to the existing road, making it easier to transition to the existing profile
  - Conceptual Construction Cost Estimate: approximately $16M (2025 dollars with 3.5% escalation)
- Phase 2:
  - Project consists of mitigating the sharp curves and adjusting the grades to reduce the steep profile
  - The project includes the most substantial work with widening, retaining walls, full roadway reconstruction with realignment and profile adjustments
  - Conceptual Construction Cost Estimate: approximately $30M (2025 dollars with 3.5% escalation)

- Phase 3:
  - Improvements consist of widening the road and minor adjustments to profile with realignment
  - The profile in this area transitions to the existing roadway and the widening does not require major retaining walls
  - Conceptual Construction Cost Estimate: approximately $13M (2025 dollars with 3.5% escalation)

CDOT Subaccount: 24970

Figure 24. Eagle County Sites 5 and 6 (Blue Hill) – Project Phasing



NEXT STEPS

The Concept Design Study is the first of many steps required before identified safety improvements would be constructed along Cottonwood Pass. Each county will independently determine if and when improvements within their jurisdiction will move forward. The site concepts, information, and evaluations are being provided to the counties by CDOT for them to determine priorities and funding. The timeline for construction of improvements is dependent on funding availability. Funding has not yet been secured for full design or construction at any of the 14 project sites. However, completing the Concept Design Study provides more information about the recommended improvements for Eagle and Garfield counties to consider in the pursuit of funding. It is possible portions of the improvements would be constructed in phases as funding becomes available.

Overall widening and broad scale paving of the corridor was not considered by this Concept Design Study due to mixed local support of a large-scale effort to improve the road and the need to financially prioritize short-term solutions so improvements can happen in a timely manner. Had paving been the initial approach, it is expected conversations on overall needs would have stalled and prevented consensus on any future work.

CDOT is committed to continue to work with and support the counties and impacted stakeholders for both short- and long-term improvements on Cottonwood Pass. Cottonwood Pass is a vital connection for local residents who rely on the county road to safely travel between Gypsum and CO 82 in the Roaring Fork Valley. CDOT recognizes it is often used as an undesignated alternate route when Glenwood Canyon is closed, which has escalated the urgency of continuing to define improvements that allow for more reliable use of this key roadway.

POTENTIAL FUNDING

CDOT will continue to support the counties in applying for funding through grants and other sources which, if successful, would be distributed to the counties through an Inter-governmental Agreement for future design and construction. For example, CDOT plans to apply for a Federal PROTECT (Promoting Resilient Operations for Transformative, Efficient and Cost-Savings Transportation) Program grant in Summer 2023. This is a competitive grant program, so funds are not guaranteed (awards are expected in Winter 2023).

If the application is successful, $20M PROTECT grant funds would be applied towards a Cottonwood Pass project which CDOT would match with an additional $3M of resiliency funds, for a total of $23M towards the prioritized Blue Hill improvements. This section of Cottonwood Pass was identified by Eagle County, Garfield County, and CDOT as a priority project that fits within the potential funding package. CDOT previously applied for a Federal RAISE (Rebuilding American Infrastructure with Sustainability and Equity) grant in Spring 2023 for $6.5M of improvements for Eagle County Site 2 on Cottonwood Pass, but unfortunately was not successful. Congresswoman Boebert and Colorado's Senators have requested earmark support for the safety work on the Blue Hill project.

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