State Highway 133 (Carbondale)
Access Control Plan

August 7, 2013

Plan Design Enable

State Highway 133 (Carbondale)
Access Control Plan Report

Prepared for:

Town of Carbondale | **CDOT Region 3** | **Garfield County**

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ES.1 Executive Summary

Recent growth in Garfield County (County) and specifically in and around the Town of Carbondale (Town) has resulted in an increase in traffic on the State Highway (SH) 133, which passes through the middle of the Town. Looking to the future, traffic volumes in the area are expected to increase by more than 55% in the next 20 years. Without changes to the study roadways, the projected increase in traffic volumes will result in increased delay, higher levels of congestion and pollution, an increase in the number of accidents, and consumers choosing to conduct their business in other communities. Furthermore, the ACP was developed in an effort to assist the Town achieve its goal of providing safe movement for all roadway users, including pedestrian and bicyclists. Thus the final recommendations of the ACP do not prohibit the implementation of future non-motorized facilities.

In 2012, the Town, County, and Region 3 of the Colorado Department of Transportation (CDOT) successfully developed an access control plan (ACP), which will guide the agencies' decisions regarding the future access conditions and support the planning objectives of the Town, County, and CDOT. The ACP was developed through an extensive collaborative effort between the stakeholders, a significant public outreach effort to ensure all concerns were heard and appropriately addressed, and informational presentations to elected officials.

The final recommendations of the ACP provide benefit to four primary areas of the transportation system: operations, safety, multi-modal, and future improvements. Some of the major findings and benefits of the ACP include:

- Implementation of the ACP, most likely to occur in a phased approach, will reduce congestion and delay on the roadway through the addition of additional capacity, turn lanes, and turn restrictions at appropriate locations, which will extend the life of the existing roadway and delay the need to expand the roadway width.
- Changes in access conditions, such as the elimination of an access or restriction on the type of turn movements allowed at a specific location are identified. These recommendations will result in a reduction in the number of conflict points (locations where vehicles and/or pedestrians cross paths with each other), which will improve overall safety for all transportation modes.
- Intersections that may warrant the need for a traffic signal or conversion to a roundabout in the future are also clearly identified. These changes in traffic control will reduce the severity of accidents, provide a safety benefit to pedestrians/bicyclists, make left-turns or u-turns safer and easier to accomplish, reduce vehicle speeds, and reduce the overall width of the roadway (no auxiliary lanes are required at roundabouts).
- The recommendations and conclusions contained in the ACP do not prohibit future improvements to the transit, bicycle, and pedestrian facilities in and around the Town.
- The recommendations and conclusions contained in the ACP do not prohibit future improvements to the roadway system in and around the Town. Efforts were made to identify possible future connectivity or roads, which meet the future planning goals of the Town and County.

Another key part of the ACP is the identification of the implementation process. It is important to remember that the ACP is intended to represent a long range plan for the study roadways. Implementation of the full plan can occur as a single project, or over the long term in smaller increments as a phased approach. Implementation of the full plan at a single time is unlikely to be feasible and would only occur as part of a transportation improvement project that included all of the study roadways.

The most likely approach will be implementation of interim roadway improvements that would delay the need to implement the ultimate recommendations of the ACP. Implementing a two-way-left-turn-lane (TWLTL) for portions of the study roadways is one way that the Town could prolong the life of the existing roadway.

CDOT, the Town, and the County are currently pursuing improvements to the SH 133 corridor north of Main Street, including the possible implementation of roundabouts at critical intersections. The ability for CDOT, the Town, and the County to fully implement improvements is accounted for in the access control plan's final recommendations. The next phase of the implementation would be to identify locations where raised medians, traffic signals, roundabouts, or other forms of traffic control are warranted. The most common trigger for the phased approach relates to when a property along SH 133 develops, redevelops, or if a driveway experiences a traffic volume increase of 20 percent or more all of which require a new CDOT access permit. The final aspect of the implementation process is how access is granted to new developments. The Town, County, and CDOT should work with the owner/developer to ensure projects are designed with consideration to where access will be permitted in the ultimate ACP. Access will be provided to the property as shown on the ACP unless it is not feasible to implement at the time of the development. Then, an interim access will be permitted, which will change once the ultimate access conditions can be achieved.

Finally, the process used to develop the ACP was collaborative and thorough, ensuring the many needs of the different stakeholders were considered at each step of the way. The proper balance between the different interests resulted in an ACP that was easily adopted by the local elected officials and fully meets CDOT expectations and requirements. Implementation of the ACP (full or phased) will:

- Provide the appropriate level of access to properties adjacent to the study roadways.
- Provide safer circulation routes for all forms of transportation (vehicular, transit, and pedestrian).
- Keep circulation routes consistent with the Town's goals for future development.
- Provide efficient movement of traffic and other modes of transportation within the study area.
- Provide a balance between the investment in alternative transportation modes and vehicular transportation modes.
- Provide design flexibility including the ability to take a phased approach to improvements that will minimize inefficiencies in the construction of overdesigned roadway widths and lengths
- Provide optimal access with the potential to reduce the number and severity of accidents involving vehicles and/or pedestrians and bicyclists.
- Reduce the delay experienced by motorists, pedestrians, and other alternative modes of transportation.
- Reduce air pollution created by congested traffic conditions.
- Reduce the number of consumers conducting business elsewhere.

1. Introduction

Recent and projected growth in Garfield County, specifically in and around the Town of Carbondale (Town), has resulted in an increase in traffic on the State Highway (SH) 133. Based on historic traffic data, the traffic volumes in the area are expected to increase by more than 55 percent over the next 20 years. This increase in traffic volumes will result in increased delay, higher levels of congestion, and potentially an increase in the severity and number of accidents. The Town, Garfield County (County), and Region 3 of the Colorado Department of Transportation (CDOT) have identified the need for an access control plan (ACP) for SH 133 to minimize the impacts of the projected growth.

The implemented ACP will provide a binding document guiding the agencies' decisions regarding the future access conditions of SH 133. The *State Highway Access Code* (2 Code of Colorado Regulations [CCR] §601-1) requirements were followed in preparing this plan. The ACP will provide the Town, County, and CDOT with roadway access planning documents in an effort to ensure SH 133 in Carbondale remains consistent with its character as indicated in the Town's comprehensive plan and CDOT's assigned access categories. The ACP is intended to support the planning objectives for the Town, County, and CDOT. In addition, the ACP evaluates existing and proposed access points along the study roadway and makes recommendations for appropriate modifications. This report contains the purpose, objectives, and process of the ACP. The following discussion topics are included in this report:

- General access requirements
- Existing conditions
- Projected conditions for the year 2032
- Access control techniques
- Public involvement process
- ACP recommendations
- Next steps

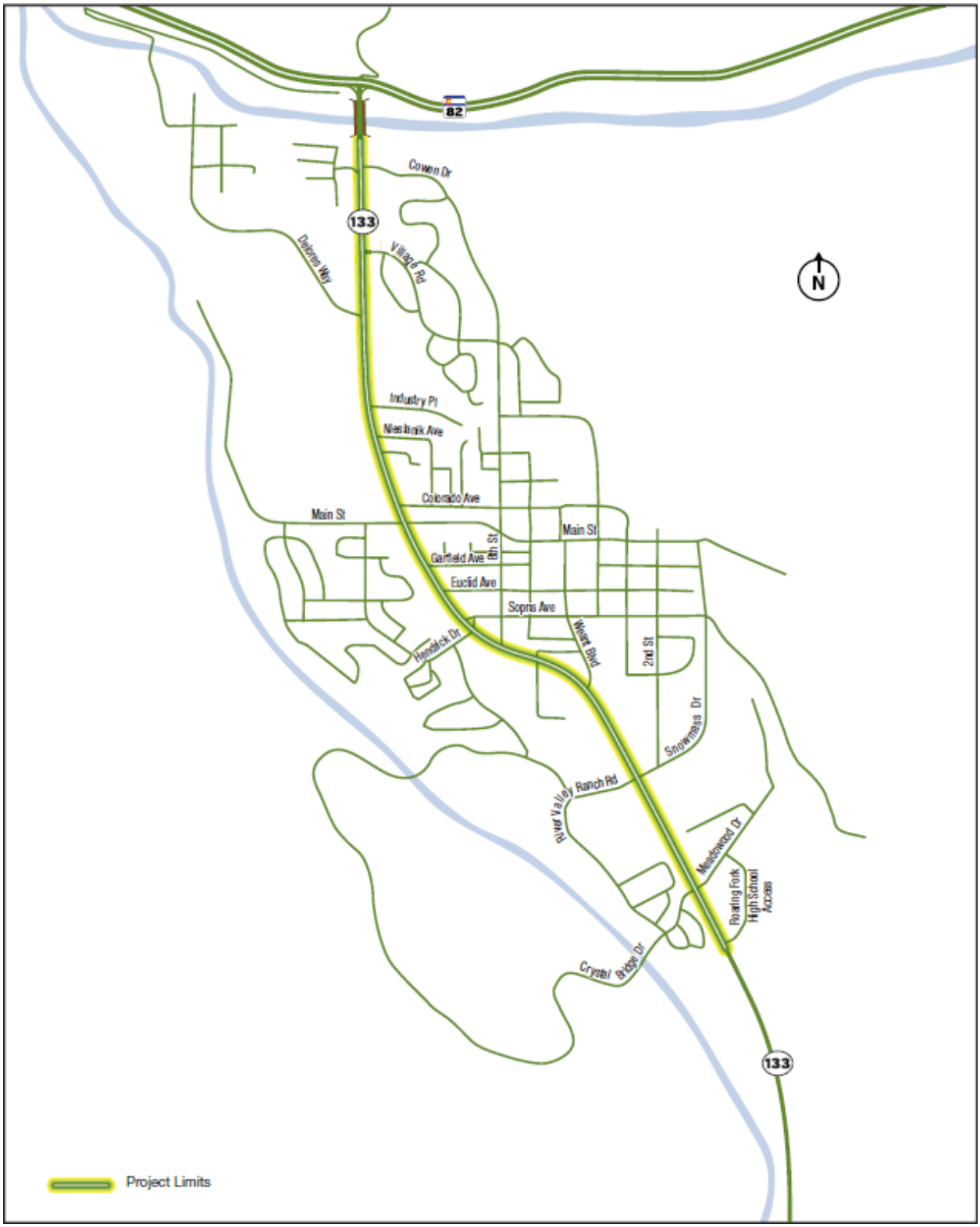
1.1. Study location

This ACP evaluated the portion of SH 133 from just south of the Roaring Fork High School driveway to the bridge over the Roaring Fork River just south of SH 82. The limits of the evaluated portion of SH 133 are between mile points 66.420 and 68.575. The total study area on SH 133 encompasses just over 2 miles of roadway. The study area is shown in Figure 1.

1.2. Purpose

The purpose of the ACP is to identify the location, type, and basic design elements of future access points within the study limits to provide reasonable access to adjacent properties while maintaining safe and efficient movement of all modes of transportation (vehicles, bicyclists, and pedestrians) along, adjacent to, or on alternative routes for SH 133.

Figure 1. SH 133 ACP study area



According to the *State Highway Access Code*, CDOT is required to provide access to individual properties when reasonable alternative access to the general street system does not exists and is not obtainable. CDOT has the ability to modify existing access points for safety and operational reasons and recommend restricting the number of allowable vehicle movements. Changes in access are discussed in Section 2.6, "Changes in Land Use and Access Use" in the *State Highway Access Code*:

> *The Department or issuing authority may, when necessary for the improved safety and operation of the roadway, rebuild, modify, remove, or relocate any access, or redesign the highway including any auxiliary lane and allowable turning movement. The permittee and or current property owner will be notified of the change. Changes in roadway median design that may affect turning movements normally will not require a license modification hearing as an access permit confers no private rights to the permittee regarding the control of highway design or traffic operation even when that design affects access turning movements (p. 25, paragraph 7).*

Furthermore, the ACP establishes when to implement access control from an operational standpoint and what types of access will be allowed, based on the standards set forth in the *State Highway Access Code*. According to Section 2.12, "Access Control Plans" of the *State Highway Access Code*:

> *The access control plan shall indicate existing and future access locations and all access related roadway access design elements, including traffic signals, that are to be modified and reconstructed, relocated, removed, added, or remain (p. 30, paragraph 2).*

1.3. Objectives

Proper application of an ACP will allow all forms of transportation to move efficiently and safely along the study roadway by controlling the design, location, and frequency of access points and by better using the secondary or local roadway network to reduce future strain on the highway. The following are the specific objectives of the SH 133 ACP:

- Provide appropriate level of access to properties adjacent to the study roadway.
- Provide safer circulation routes for all forms of transportation.
- Keep circulation routes consistent with the Town's goals for future development.
- Provide efficient movement of traffic and other modes of transportation within the study area.
- Provide balance between the investment in alternative transportation modes and vehicular transportation modes.
- Provide phased design flexibility to minimize inefficiencies in the construction of overdesigned roadway widths and lengths.

Traffic volume on SH 133 is projected to increase by approximately 55 percent during the next 20 years. The projected increase in traffic on the corridor was obtained from the following Traffic Impact Studies (TIS) that were provided by CDOT and the Town. The value shown in parentheses represents the 20 year growth factor used in each of these approved TIS:

- New Roaring Fork High School (1.48)
- Keator Grove (1.58)
- The Village at Crystal River (1.58)
- Thompson Park (1.58)
- Carbondale Station (1.58)

In addition, these studies are consistent with the current CDOT 20-year horizon growth projections (from CDOT DTD data base) along the corridor. CDOT's growth projections show a proposed growth factor varying between 1.48 and 1.58 on SH 133 within the project limits of the ACP as follows:

- The CDOT growth factor is1.48 between the southern project limits (Roaring Fork High School access) and milepost 67.04 (Snowmass Dr).
- Between milepost 67.04 and 67.42 (8th St), the CDOT growth factor is 1.54.
- North of milepost 67.42 to the intersection with SH 82, the CDOT growth factor is 1.58.

A weighted average of the three growth factors was calculated based on the number of miles each section was located within the study area limits. Calculating this value results in a 1.55 growth factor; this value is recommended as the 20-year factor for the SH 133 ACP. This value is equivalent to an annual increase of 2.2% per year.

Based on the project traffic growth on the corridor, without better access control, the number of conflicts, amount of delay, and level of congestion will increase. Proper control of the frequency, number, and location of access points on the study roadway can lead to the following reductions:

- Number and severity of accidents involving vehicles and/or pedestrians and bicyclists that occur.
- Delay experienced by motorists, pedestrians, and other alternative modes of transportation.
- Pollution created by congested traffic conditions.
- Congestion on SH 133 and the strain on the surrounding roads.
- Number of consumers conducting business elsewhere.

There are a couple of ways to reduce the number and severity of accidents that occur on any roadway. First, accidents generally occur at locations where two vehicles or a vehicle and a pedestrian conflict with each other. A potential conflict occurs each time vehicles turning at an access point cross paths with other roadway users (vehicle or pedestrian). If the number of conflict points increases, which is what occurs if additional access points are allowed, then the number of accidents (vehicle-vehicle or vehicle-pedestrian) on the roadways will also increase. Conversely, if the number of conflict points (access locations) is reduced, the number of accidents should decrease, creating safer roadways.

Second, some of the most severe accidents typically involve left-turn movements by vehicles attempting to cross the roadway without the protection of traffic control devices, such as a traffic signal. With an ACP, most of the vehicle left-turn movements and pedestrian movements can be redirected to locations where, under the protection of a green phase, the vehicles can either turn left or make a u-turn to reach their desired destination and pedestrians can safely cross the roadway under the protection of the “Walk” and “Do Not Walk” phases of a traffic signal. Other options for reducing the potential for left-turn accidents are the use of roundabouts or ¾-movement intersections. All of these options have the potential to reduce the number of severe accidents involving left-turning vehicles or provide a safer crossing opportunity for pedestrians, and thus improve the overall safety for motorists and pedestrians on the roadways.

To reduce vehicle congestion and delay, it is important to control the number of access points along the roadways as traffic increases. By allowing fewer accesses, vehicles do not have to slow as much or stop as often to turn into an access or allow vehicles to enter the roadway from access points. By reducing the friction along the roadway through reducing the number of access points, the roadway will not become strained by congestion and delay. Motorists will experience acceptable travel times and an overall better driving experience, which may translate into maintaining return service for local businesses. Less vehicle congestion will also make the area more appealing for pedestrians to walk/ride along and across the roadways. Another benefit to reducing congestion on study roadway is a reduction in the level of vehicle emissions, which will reduce the level of air pollution within the Town.

In summary, the proper application of an ACP will allow SH 133 to operate more efficiently and safely for both vehicle traffic and pedestrians by controlling the design, location, and frequency of access points.

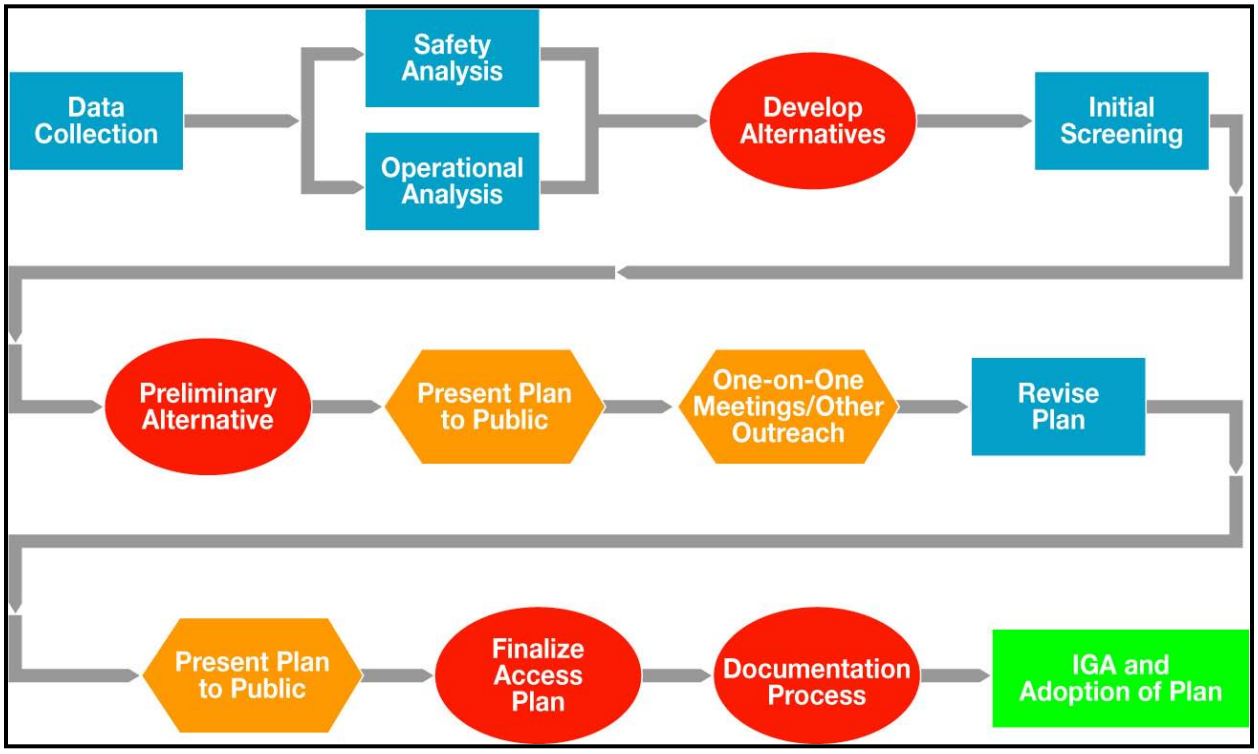
1.4. ACP process

The process followed in developing the SH 133 ACP is summarized in Figure 2. The process began with the data collection phase: all access locations were identified; accident data and traffic volumes were collected;

and copies of relevant traffic/planning studies for the roadway and/or the Town were gathered, including the original Access Management Plan completed in 2002. Once the data were collected, safety and operational analyses were completed. The draft ACP alternatives were created based on results of the 2002 Access Management Plan and the requirements of the *State Highway Access Code*. The project team evaluated the alternatives to create a preliminary alternative, which was then presented to the public at an open house. The initial public presentation served to introduce the project and the concept of access control to the public, as well as to present the preliminary recommendations. Comments were received from the public for further consideration. After the public presentation, additional outreach was conducted in the form of one-on-one property owner workshops to identify solutions that best meet the goals of the project and addressed the needs of the public. The meetings with property owners ensured public input was received and taken under consideration in the process. Based on all of the comments received, the ACP was revised to reflect a preferred alternative. The preferred alternative was presented at a final public presentation.

Additional public outreach included presentations to elected officials for the Town and the County. Documentation of the process occurred throughout the process. The recommended SH 133 ACP is contained within this final report. The plan adoption process started during the documentation process and was anticipated to be completed in early 2013. Materials from the public outreach process, including exhibits, comment forms, and summary letters from one-on-one meetings, are included in the appendices of this document. Appendix B contains the inter-governmental agreement necessary for completing the adoption process.

Figure 2. SH 133 ACP study process



1.5. Town-specific goals for the ACP and SH 133

The Town identified specific goals for the development of an ACP on SH 133 and additional goals for the future geometric design of SH 133. First, the Town requested that the ACP consider all possible modes of transportation, in particular transit and pedestrian/bicyclist. The Town wanted the plan to achieve the following:

- Account for current and future transit routes and stops.
- Consider connectivity to the transit stops for pedestrian/bicyclists.
- Accommodate the Town's plans for future trails/paths as outlined in the Town's Comprehensive Plan that is in the process of being updated.
- Address possible improvements to access that would facilitate the safe movement of pedestrian/bicyclists around/through the community and specifically back and forth across SH 133.
- Consider how and where school-aged children can safely cross SH 133 with residential areas and schools being located on opposite sides of the highway.

In addition, the Town asked that the ACP support the long-range vision of the SH 133 corridor as desired by the Town's elected officials and residents. The Town would like to see SH 133 stay as narrow as possible with the fewest possible number of lanes to prevent a "sea of pavement," to reduce the distance crossing distances for pedestrians/bicyclists, and to avoid "dividing" the community if additional lanes are added to SH 133. CDOT, the Town, and the County are currently undertaking a study of the SH 133 corridor to develop roadway improvement plans that will address these issues and the future capacity, operations, and safety needs of SH 133. At the time this report was produced, the current project was planning to widen SH 133 between Cowen Drive and Main Street to provide one lane in each direction plus a continuous shared two-way-left-turn-lane (TWLTL) and auxiliary turn lanes at some of the major access locations. The proposed corridor improvements also include a roundabout at the intersection of SH 133 and Main Street.

2. General Access Requirements

State highways are classified in accordance with the *State Highway Access Category Assignment Schedule* (2 CCR §601-1a), which was revised on October 30, 2007. According to the schedule, SH 133 from the northern project limits to Village Drive is classified as a Rural Highway (category R-B); SH 133 from Village Drive to Weant Boulevard is classified as a Non-rural Arterial (category NR-B); SH 133 from Weant Boulevard to Meadowood Drive is classified as a Non-rural Principle Highway (category NR-A); and SH 133 from Meadowood Drive to the southern project limits is classified as a Regional Highway (category R-A).

Based on the classification for a highway, the *State Highway Access Code* provides the following information:

- Functional characteristics
- Requirements for the number and spacing of access points
- Auxiliary lane requirements

A brief discussion on each of these topics as they relate to the study roadway is provided in the following sections; a complete description of these items can be found on pages 35-38, 43-44, and 45-46 of the *State Highway Access Code*.

Changes to the speed limit are outside the scope of an ACP. Changes to the speed limits would need to be evaluated using established CDOT procedures.

2.1. Functional characteristics

The functional characteristics of a highway provide a basic description of the highway based upon location, travel speed, traffic volumes, and type of travel. The following are the functional characteristics for a category R-B roadway (SH 133 from northern project limits to Village Drive):

- Rural highway with the capacity to handle moderate to high travel speeds and low traffic volumes for local rural travel needs.
- Provides rural transportation needs including farm to market, farm to farm, and may include high-speed rural frontage roads.
- Assigned to low-volume, minor arterials, secondary collectors, and local highway sections that do not provide significant regional, state, or interstate travel demands.

The following are the functional characteristics for a category NR-B roadway (SH 133 from Village Drive to Weant Boulevard):

- Non-rural highway with the capacity to handle moderate travel speeds and relatively medium to high traffic volumes in a safe and efficient manner.
- Provides intercity, intra-city, and intercommunity travel needs for areas with established roadside development or short sections of regional highways passing through rural communities.
- Provides service to through traffic movements while allowing more direct access to adjacent properties.

The following are the functional characteristics for a category NR-A roadway (SH 133 from Weant Boulevard to Meadowood Drive):

- Non-rural highway with the capacity to handle medium to high travel speeds and medium to high traffic volumes over long distances in a safe and efficient manner.

- Provides for interregional, intra-regional, intercity, and intra-city travel needs in suburban and urban areas.
- Provides service to through traffic movements rather than direct access service to abutting land.

The following are the functional characteristics for a category R-A roadway (SH 133 from Meadowood Drive to southern project limits):

- Rural highway with the capacity to handle medium to high travel speeds and relatively medium to high traffic volumes in a safe and efficient manner.
- Provides interregional, intra-regional, and intercity travel needs.
- Provides service to through traffic movements with a lower priority on providing direct access to adjacent properties.

2.2. Specific access requirements

The number, location, and type of access to adjacent properties are also controlled by the access code depending on the type of highway. The following are access requirements for a category R-B roadway (SH 133 from northern project limits to Village Drive):

- One access shall be granted to each parcel if it does not create a safety or operational problem, or the access does not meet design standards.
- No turning movements shall be restricted if sight distance requirements and auxiliary lane design requirements are met, there is no restrictive median, and 20-year projection volumes at the intersection would be less than 75 percent of the Manual on Uniform Traffic Control Devices (MUTCD) requirements for traffic signal volume warrants.
- Left- or right-turn movements may be restricted only if one or both create significant congestion or safety problems or a restrictive median exists.
- Left turns shall be prohibited if a non-traversable median already exists and a proposed opening in the median does not provide significant benefits.
- Additional access may be granted if the trip generation potential of the parcel necessitates additional access to maintain good operations and land use design and no significant safety or operational problem is created.
- Spacing for full movement intersections should be 0.5-mile intervals.

The following are access requirements for a category NR-B roadway (SH 133 from Village Drive to Weant Boulevard):

- One access shall be granted to each parcel if it does not create a significant safety problem or degrade operation.
- Primary access should be right-in, right-out, or ¾-movement, with full-movement signalized intersections at 0.5-mile spacing.
- Additional right-in, right-out access may be granted where required auxiliary lanes can be provided, where the access will relieve a congested condition, and where the access would not cause hardship to adjacent property or interfere with the operations of the general street system.
- An existing access that warrants a traffic signal, but does not meet the spacing requirements may result in the need to reconstruct the access, add a median to eliminate or restrict access, or the access may be closed if reasonable alternative access if available.

The following are access requirements for a category NR-A roadway (SH 133 from Weant Boulevard to Meadowood Drive):

- One access shall be granted per parcel if reasonable access cannot be obtained from the local street or road system.

- The spacing for full movement intersections with the potential for signalization should be 0.5-mile intervals. Exceptions may be permitted if the proposal documents that no reasonable alternatives exist to achieve the 0.5-mile interval.
- Left turns in ¾-movements may be allowed if it improves operation at an adjacent full movement intersection, meets the appropriate design criteria, and does not cause safety or operational problems. Left turns shall be prohibited if a non-traversable median exists and the proposed opening does not provide significant benefits.
- Additional right-turn access shall be allowed where required acceleration and deceleration lanes can be provided, where it will relieve congestion, where it would not create safety or operational issues, and where it would not cause a hardship to an adjacent property.

The following are access requirements for a category R-A roadway (SH 133 from Meadowood Drive to southern project limits):

- One access shall be granted to each parcel if reasonable access cannot be obtained from the local streets or road system.
- Direct access should not be denied if the alternative local access would create a significant operational or safety problem and the direct access to the highway would not be a significant problem.
- Spacing for full-movement, signalized intersections should be at 0.5-mile intervals, and exceptions shall not be permitted unless there are no other reasonable alternatives to achieve this.
- If a restrictive median exists, left turns at un-signalized intersections should be restricted unless this would cause a safety problem, degrade operation, or cause an out-of-direction movement greater than 1 mile.

2.3. Auxiliary lane requirements

Depending upon the volume of turning vehicles at each access location, the access code defines the thresholds for deceleration and acceleration auxiliary lanes. The following are auxiliary lane requirements for a category R-B roadway (SH 133 from northern project limits to Village Drive):

- A left-turn deceleration lane is required for any access with a projected peak hour left ingress turning volume greater than 10 vehicles per hour (vph).
- A right-turn deceleration lane is required for any access with a projected peak hour right ingress turning volume greater than 25 vph.
- A right-turn acceleration lane is required for any access with a projected peak hour right turning volume greater than 50 vph when the posted speed is 45 miles per hour (mph) or greater and the highway has only one lane for through traffic in the direction of the right turn.
- A left-turn acceleration lane may be required if it would benefit the safety and operation of the roadway. A left turn is not required if the posted speed is less than 45 mph, the intersection is signalized, or the acceleration lane would interfere with the left-turn ingress movements to any other access.

The following are auxiliary lane requirements for a category NR-B roadway (SH 133 from Village Drive to Weant Boulevard):

- A left-turn lane is required for any access with a projected peak hour left-turn ingress volume greater than 25 vph. If the posted speed is greater than 40 mph, a deceleration lane is required with a projected peak hour left ingress turning volume greater than 10 vph.
- A right-turn lane is required for any access with a projected peak hour right-turning volume greater than 50 vph. If the posted speed is greater than 40 mph, a deceleration lane is required with a projected peak-hour right ingress turning volume greater than 25 vph.
- Right- and left-turn acceleration lanes are generally not required for category NR-B roadways unless one of the subsections of Section 3.5, “Auxiliary Turn Lanes” (page 34) of the State Highway Access Code apply.

The following are auxiliary lane requirements for a category NR-A roadway (SH 133 from Weant Boulevard to Meadowood Drive):

- A left-turn deceleration lane is required for any access with a projected peak hour ingress turning volume greater than 10 vph.
- A right-turn deceleration lane is required for any access with a projected peak hour ingress turning volume greater than 25 vph.
- Right-turn acceleration lane is required for any access with a projected peak hour right turning volume greater than 50 vph when the posted speed is greater than 40 mph. A right-turn acceleration lane may also be required at signalized intersections if a free-right turn is necessary to maintain level of service.
- Right-turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right turn.
- A left-turn acceleration lane may be required if it would benefit the safety and operation of the roadway. A left-turn acceleration lane is generally not required where the posted speed is less than 45 mph, the intersection is signalized, or the acceleration lane would interfere with the left-turn ingress movements to any other access.

The following are auxiliary lane requirements for a category R-A roadway (SH 133 from Meadowood Drive to southern project limits):

- A left-turn deceleration lane is required for any access with a projected peak hour left ingress turning volume greater than 10 vph.
- A right-turn deceleration lane is required for any access with a projected peak hour right ingress turning volume greater than 25 vph.
- A right-turn acceleration lane is required for any access with a projected peak hour right-turning volume greater than 50 vph when the speed limit is greater than 50 mph. A right-turn acceleration lane may also be required if a free-right-turn is needed at a signalized intersection.
- A left-turn acceleration lane may be required if it would benefit the safety and operation of the roadway. They are generally not required if the posted speed limit is less than 45 mph, the intersection is signalized, or if the acceleration lane would interfere with the left-turn ingress movements to any other access.

3. Existing (2012) Conditions

The study area on SH 133 is just over 2 miles in length and stretches from south of the Roaring Fork River bridge, through Carbondale, to the Roaring Fork High School driveway. The first step in developing an ACP is defining the existing conditions of the study roadways. This is done by collecting the following data:

- Location and type of each access point.
- Average daily traffic (ADT) and intersection turning movement volumes.
- Accident data.
- Information regarding the current condition of alternative transportation on and around the corridor.

From this data, the study roadway can be analyzed to determine if any safety and operational issues exist. The following sections provide a discussion on the data collection and existing conditions analysis procedures.

3.1. Roadway sections and access descriptions

All access points can be separated into two categories: public ways or private driveways. Definitions relating to types of access are covered in Section 1.5, "Definitions and Abbreviations" of the *State Highway Access Code*:

> *"Public Way" means a highway, street, or road, open for use by the general public and under the control or jurisdiction of the appropriate local authority of Department and includes private roads open to the public.*
>
> *"Driveway" means an access that is not a public street, road, or highway (pages 2-8).*

At a four-leg intersection, such as Main Street, the east and west leg are considered separate access points. Based on these definitions, the study limits include 21 public ways (Main Street is actually considered two public ways because it intersections SH 133 on both sides of the highway) and 58 driveways, or private access locations, for a total of 79 existing access locations. The following is a list of the public ways that intersect SH 133 within the project area:

- Cowen Drive
- Village Drive
- Dolores Way
- Unnamed street (just south of Snowmass Drive)
- Industry Place
- Nieslanik Avenue
- Colorado Avenue
- Main Street
- Garfield Avenue
- Euclid Avenue
- Sopris Avenue
- Hendrick Road
- 8th Street
- Keator Road
- Weant Boulevard
- River Valley Ranch Drive
- Snowmass Drive
- Crystal Bridge Drive
- Meadowood Drive
- Unnamed street (public works access)

All public access points within the study limits have some form of traffic control. Almost all of the access locations have "STOP" signs for traffic approaching SH 133, while traffic on SH 133 is free to move through these intersections without stopping. There are three intersections within the study limits that are currently controlled by a traffic signal: Village Drive, Main Street, and Crystal Bridge Drive/Meadowood Drive. All of the existing access points within the study limits are full-movement with no turn restrictions. Table 1 summarizes the total existing access points within the study limits based upon the different highway category segments.

Table 1. Summary of existing access locations*

Section of SH 133	Category	Public Roads	Private Driveways	Total
Roaring Fork River bridge to Village Drive	R-B (Rural Highway)	2	9	11
Village Drive to Weant Boulevard	NR-B (Non-Rural Arterial)	14	30	44
Weant Boulevard to Meadowood Drive	NR-A (Non-Rural Principal Highway)	5	17	22
Meadowood Drive to Roaring Fork High School driveway	R-A (Regional Highway)	0	2	2
Totals		**21**	**58**	**79**

* CDOT has permitted additional access locations along the SH 133 corridor within the study project limits, but the construction of these permitted access locations had not begun at the time of this study. These permitted access locations were not included within the count of existing access locations.

For SH 133 from the northern project limits to Village Drive (category R-B, 0.3 mile in length), the existing average spacing between full-movement public ways is 0.2 mile (0.03 mile for all access points). For SH 133 from Village Drive to Weant Boulevard (category NR-B, 1.2 miles in length), the existing average spacing for full-movement public ways is 0.09 mile (0.03 mile for all access points). For SH 133 from Weant Boulevard to Meadowood Drive (category NR-A, 0.50 mile in length), the existing average spacing for full-movement public ways is 0.17 mile (0.02 mile for all access points). For SH 133 from Meadowood Drive to the southern project limits (category R-A, 0.02 mile in length), there are no existing public ways, but the existing average spacing for all access points is 0.010 mile.

Based on meeting established signal warrant criteria, each public access location has the potential to become signalized in the future. According to the *State Highway Access Code*, the preferred spacing between signalized intersections is 0.5 mile for highway categories R-B, NR-B, NR-A, and R-A. Not all of the public roadways that currently access SH 133 are appropriate locations for traffic signals if the roadway is to remain in compliance with the *State Highway Access Code*. Another benefit of developing an ACP is that locations where signals are allowed to be installed if warrants are met are identified as part of the ACP process. Without the proper planning, such as the development of an ACP, signals may end up being placed at inappropriate locations, which may preclude the ability to provide appropriate traffic control at needed intersections in the future to benefit the system as a whole.

The following subsections briefly describe the existing roadway configuration and access locations within the study limits of the ACP. The descriptions are arranged from north to south on SH 133. Public road access locations are highlighted in bold. Figure 3 through Figure 9 (at the end of this section) show the location of all existing direct access points to SH 133 within the study limits of this project

3.1.1. Access from the Roaring Fork River Bridge to Village Drive

This section of the SH 133 roadway has one through lane in each direction with turn lanes at some of the access points. The northbound and southbound directions have a speed limit of 35 mph. This section has the following eleven (11) access points:

- **Access 1:** This ¾-movement driveway provides access to the properties (Red Rock Diner and others) located to the west and is uncontrolled.
- **Access 2:** This full-movement driveway provides access to the properties (Red Rock Diner and others) located to the west and is uncontrolled.
- **Access 3:** This full-movement driveway provides access to the property (Thunder River Lodge) located to the west and is uncontrolled.

- **Access 4 (Westbound approach of Cowen Drive):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 5:** This full-movement driveway provides access to the property (Garcia's Café) located to the west and is uncontrolled.
- **Access 6:** This full-movement driveway provides access to the property (Cara Blanca Tire Shop) located to the west and is stop controlled.
- **Access 7:** This full-movement driveway provides access to the field (owned by 133 Limited Partnership) located to the west and is uncontrolled.
- **Access 8:** This full-movement driveway provides access to the property (Coldwell Banker) located to the east and is uncontrolled.
- **Access 9:** This full-movement driveway provides access to the property (The Alpine Center) located to the east and is uncontrolled.
- **Access 10:** This full-movement driveway provides access to the property (RFTA Park-n-Ride) located to the west and is signalized.
- **Access 11 (Westbound approach of Village Drive):** This public roadway approaches SH 133 from the east, is full movement, and is signalized.

3.1.2. Access from Village Drive to Weant Boulevard

This section of SH 133 passes through both industrial and residential areas of the town. The roadway has one through lane in each direction with turn lanes at some of the more major accesses. The speed limit varies from 35 to 40 mph and this section has the following forty-four (44) access points:

- **Access 12:** This full-movement driveway provides access to the property (La Fontana Plaza) located to the east and is uncontrolled.
- **Access 13 (Eastbound approach of Dolores Way):** This public roadway approaches SH 133 from the west, is full movement, and is stop controlled.
- **Access 14:** This full-movement driveway provides access to the property (La Fontana Plaza) located to the east and is uncontrolled.
- **Access 15:** This full-movement driveway provides access to the field (owned by Colorado Rocky Mountain School) located to the west and is uncontrolled.
- **Access 16 (Westbound approach of unnamed public road):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 17:** This full-movement driveway provides access to the property (Roaring Fork Valley Co-Op) located to the east and is uncontrolled.
- **Access 18 (Westbound approach of Industry Place):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 19:** This full-movement driveway provides access to the property (Red Rock Plaza) located to the east and is uncontrolled.
- **Access 20 (Westbound approach of Nieslanik Avenue):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 21:** This full-movement driveway provides access to the property (Amerigas) located to the west and is uncontrolled.
- **Access 22:** This full-movement driveway provides access to the property (E.T. Plaza Commercial Industry Complex) located to the east and is uncontrolled.
- **Access 23:** This full-movement driveway provides access to the property (Crystal River Marketplace) located to the west and is uncontrolled.
- **Access 24:** This full-movement driveway provides access to the property (E.T. Plaza Commercial Industry Complex) located to the east and is uncontrolled.
- **Access 25:** This full-movement driveway provides access to the property (Crystal River Marketplace) located to the west and is uncontrolled.
- **Access 26:** This full-movement driveway provides access to the property (Sopris Shopping Center) located to the east and is uncontrolled.

- **Access 27:** This full-movement driveway provides access to the field (owned by Avalanche Properties) located to the west and is uncontrolled.
- **Access 28 (Westbound approach of Colorado Avenue):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 29:** This full-movement driveway provides access to the property (Remax Mountain West) located to the west and is uncontrolled.
- **Access 30 (Eastbound approach of Main Street):** This public roadway approaches SH 133 from the west, is full movement, and is signalized.
- **Access 31 (Westbound approach of Main Street):** This public roadway approaches SH 133 from the east, is full movement, and is signalized.
- **Access 32:** This full-movement driveway provides access to the properties (Carbondale Plaza) located to the east and is uncontrolled.
- **Access 33:** This full-movement driveway provides access to the property (Carbondale Square) located to the west and is uncontrolled.
- **Access 34:** This full-movement driveway provides access to the property (Carbondale Car Care) located to the east and is uncontrolled.
- **Access 35:** This full-movement driveway provides access to the property (Carbondale Square) located to the west and is uncontrolled.
- **Access 36 (Westbound approach of Garfield Avenue):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 37:** This full-movement driveway provides access to the property (Crystal Valley Mobile Home Park) located to the west and is uncontrolled.
- **Access 38:** This full-movement driveway approaches SH 133 from the east, provides access to the properties located to the east, is full movement, and is stop controlled.
- **Access 39 (Westbound approach of Euclid Avenue):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 40:** This full-movement driveway provides access to the property (Crystal Valley Mobile Home Park) located to the west and is uncontrolled.
- **Access 41:** This full-movement driveway provides access to the property (Wells Fargo Bank) located to the west and is uncontrolled.
- **Access 42:** This access is located directly off of Sopris Avenue just east of SH 133, but falls within SH 133 right-of-way, provides access to the property east of SH 133, and is uncontrolled.
- **Access 43 (Westbound approach of Sopris Avenue):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 44 (Eastbound approach of Hendrick Road):** This public roadway approaches SH 133 from the west, is full movement, and is stop controlled.
- **Access 45:** This full-movement driveway provides access to the property (Crystal River, liquor, laundromat) located to the east and is uncontrolled.
- **Access 46:** This full-movement driveway provides access to the property (Roaring Fork Family Physicians) located to the east and is uncontrolled.
- **Access 47 (Southbound approach of 8th Street):** This public roadway approaches SH 133 from the north, is full movement, and is stop controlled.
- **Access 48:** This full-movement driveway provides access to the property (6911 SH 133) located to the east and is uncontrolled.
- **Access 49: (Northbound approach of Keator Road):** This public roadway approaches SH 133 from the south, is full movement, and is stop controlled.
- **Access 50:** This full-movement driveway provides access to a gated field located to the west and is uncontrolled.
- **Access 51:** This full-movement driveway provides access to a field located to the east and is uncontrolled.
- **Access 52:** This full-movement driveway provides access to the property (1599 SH 133) located to the west and is uncontrolled.
- **Access 53:** This full-movement driveway provides access to the property (address on Grace Drive) located to the east and is uncontrolled.

- **Access 54:** This full-movement driveway provides access to the property (1605 SH 133) located to the west and is uncontrolled.
- **Access 55 (Southbound approach of Weant Boulevard):** This public roadway approaches SH 133 from the north, is full movement, and is stop controlled.

3.1.3. Access from Weant Boulevard to Meadowood Drive

This section of SH 133 passes through developed properties, most of which are residential. The highway has one through lane in each direction with turn lanes at some of the access locations. The speed limit of both the northbound and southbound directions is 40 mph and has the following twenty-two (22) access points:

- **Access 56:** This full-movement driveway provides access to the property (Roaring Fork School District) located to the east and is uncontrolled.
- **Access 57:** This full-movement driveway provides access to the properties (1802/1804 SH 133) located to the east and is uncontrolled.
- **Access 58:** This full-movement driveway provides access to the property (1818 SH 133) located to the east and is uncontrolled.
- **Access 59:** This full-movement driveway provides access to the property (1834 SH 133) located to the east and is uncontrolled.
- **Access 60:** This full-movement driveway provides access to the property (1850 SH 133 main access) located to the east and is uncontrolled.
- **Access 61:** This full-movement driveway provides access to the property (1850 SH 133 secondary access) located to the east and is uncontrolled.
- **Access 62:** This full-movement driveway provides access to the property (1866 SH 133) located to the east and is uncontrolled.
- **Access 63:** This full-movement driveway provides access to the property (1894 SH 133, Apt. A) located to the east and is uncontrolled.
- **Access 64:** This full-movement driveway provides access to the property (1894 SH 133, Apt. B) located to the east and is uncontrolled.
- **Access 65 (Eastbound approach of River Valley Ranch Drive):** This public roadway approaches SH 133 from the west, is full movement, and is stop controlled.
- **Access 66 (Westbound approach of Snowmass Drive):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 67:** This full-movement driveway provides access to the property (1934 SH 133) located to the east and is uncontrolled.
- **Access 68:** This full-movement driveway provides access to the property (1950 SH 133) located to the east and is uncontrolled.
- **Access 69:** This full-movement driveway provides access to the properties (1968/1978 SH 133) located to the east and is uncontrolled.
- **Access 70:** This full-movement driveway provides access to the property (1996 SH 133) located to the east and is uncontrolled.
- **Access 71 (Westbound approach of unnamed public roadway):** This public roadway approaches SH 133 from the east, is full movement, and is stop controlled.
- **Access 72:** This full-movement driveway provides access to the property (CDOT main lot) located to the east and is uncontrolled.
- **Access 73:** This full-movement driveway provides access to the property (CDOT fenced access) located to the east and is uncontrolled.
- **Access 74:** This full-movement driveway provides access to the property (CDOT field access) located to the east and is uncontrolled.
- **Access 75:** This full-movement driveway provides access to the property (CDOT field access) located to the east and is uncontrolled.
- **Access 76 (Eastbound approach of Crystal Bridge Drive):** This public roadway approaches SH 133 from the west, is full movement, and is signalized.

- **Access 77 (Westbound approach of Meadowood Drive):** This public roadway approaches SH 133 from the east, is full movement, and is signalized.

3.1.4. Access on from Meadowood Drive to project end

This short section of SH 133 passes through a residential area. The highway has one through lane in each direction with turn lanes at some access locations. The northbound and southbound directions both have a speed limit of 40 mph. This section has the following two access points:

- **Access 78:** This full-movement driveway provides access to the property (2372 SH 133) located to the west and is uncontrolled.
- **Access 79:** This full-movement driveway provides access to the property (Roaring Fork School District – High School) located to the east and is uncontrolled.

3.2. Traffic volumes

An analysis of the existing traffic conditions was performed based on existing traffic volume data. The project team collected intersection turning movement counts (TMC) at most major intersections and ADT data at two locations on SH 133. The traffic counts were collected in January 2012.

The ADTs for SH 133 are shown in Table 2 and detailed data are available in Appendix D. These values represent a typical weekday traffic level for SH 133. The volumes are highest north of Main Street with more than 14,000 vehicle trips per day. South of Main Street the volumes drop off significantly with approximately 3,300 vehicle trips per day near Snowmass Drive. The TMC data provide distribution information for vehicles entering and exiting the study roadway at key intersections. This traffic data were input into the Synchro traffic model prepared for this study to determine levels of service (LOS) during the peak periods (AM/PM). The TMCs for SH 133 are presented in Appendix E.

Table 2. Existing (2012) average daily traffic

Roadway	Location	Vehicle per day (vpd)
SH 133	North of Colorado Avenue	14,380
SH 133	South of Snowmass Drive	3,320

Figure 3. Existing access locations (Sheet 1 of 7)

Figure 4. Existing access locations (Sheet 2 of 7)

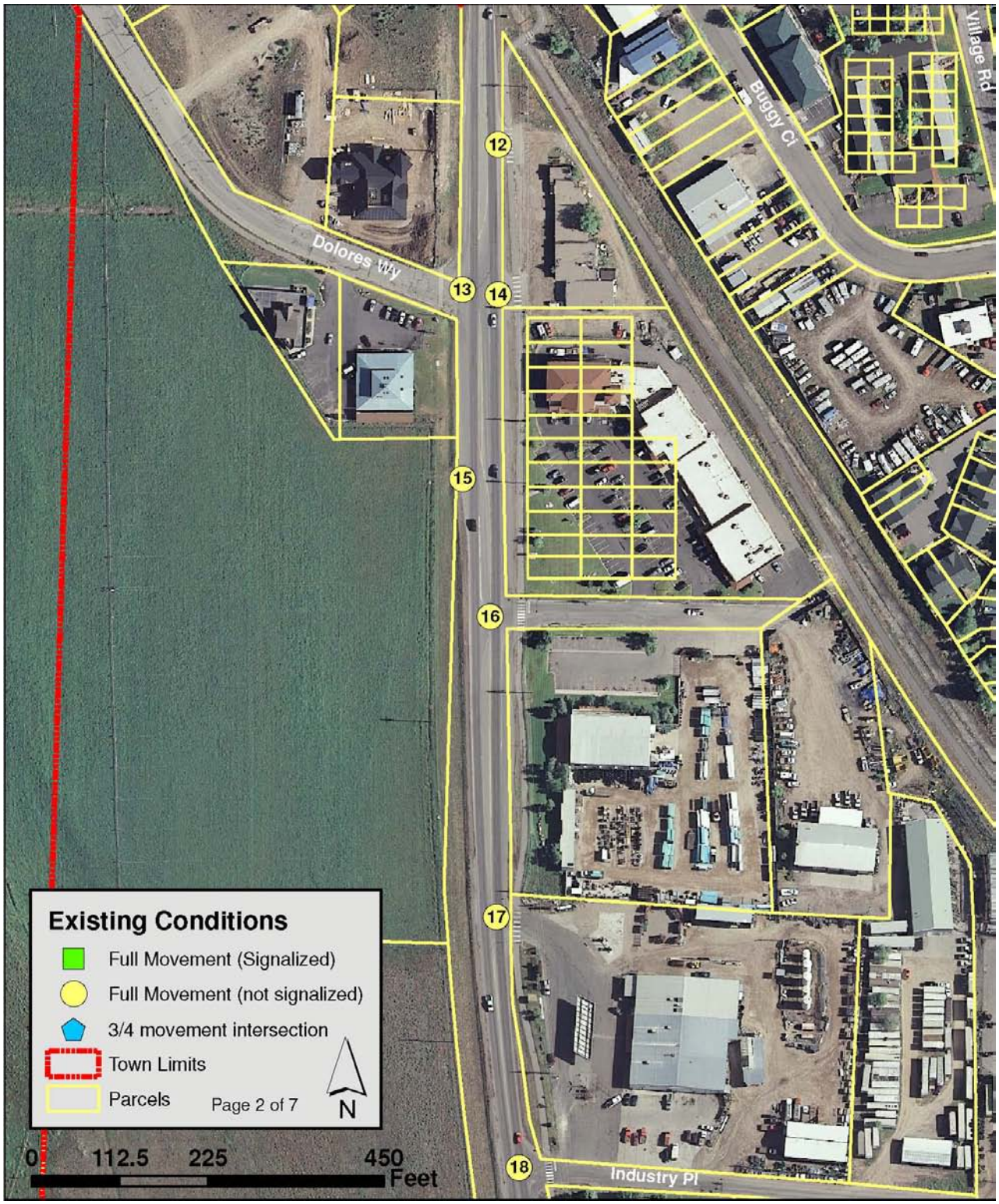


Figure 5. Existing access locations (Sheet 3 of 7)

Figure 6. Existing access locations (Sheet 4 of 7)

Figure 7. Existing access locations (Sheet 5 of 7)

Figure 8. Existing access locations (Sheet 6 of 7)

Figure 9. Existing access locations (Sheet 7 of 7)

3.3. Intersection level of service

Traffic operations for each of the signalized and key un-signalized access points were analyzed using the methods described in the *2010 Highway Capacity Manual* (2010 HCM) (Transportation Research Board, 2010). According to the 2010 HCM, the overall performance of an intersection is determined based on the level of control delay experienced by motorists at the intersection. Depending on the level of delay that is experienced, each intersection can be scored on an LOS scale and given a letter grade from A to F, with "A" being the best possible grade for the intersection. For signalized intersections, the delay for each individual turning movement is evaluated, then entire approaches are graded, and finally the intersection as a whole can be given a single LOS. For two-way stop controlled intersections, each minor approach is given a separate LOS and the worst LOS is reported as a single rating for the intersection. For analysis purposes, all uncontrolled intersections/driveways were treated as stop-controlled access points. Table 3 shows the criteria for establishing the LOS for the signalized and two-way stop controlled intersections within the study area. The results of the LOS analysis for the existing conditions are presented in Table 4, with detailed analysis sheets provided in Appendix F.

Table 3. Intersection level of service criteria

Level of Service	Control Delay per Vehicle (sec/veh)	
	Un-signalized Intersection (Two-way Stop Controlled)	Signalized Intersection
A	0-10	≤ 10
B	>10-15	>10-20
C	>15-25	>20-35
D	>25-35	>35-55
E	>35-50	>55-80
F	>50	>80

Source: 2010 Highway Capacity Manual.

Based on the results of the analysis, the majority of the intersections and driveways operate at LOS D or better (shown with green or yellow backgrounds in the table) during the peak hours of the day. The only significant exception is the intersection of the Snowmass Drive/River Valley Ranch Drive during the AM peak, which operates at LOS F. The poor performance of this location is due to the inability of vehicles to find acceptable gaps in the traffic stream to turn left onto SH 133 due to high volumes in the area from the traffic associated with dropping students off at nearby schools.

Table 4. Existing (2012) intersection level of service results

Intersection	LOS	
SH 133 and	AM	PM
Driveway (North Red Rock Diner)	B	C
Driveway (South Red Rock Diner)	C	C
Cowen Drive	C	C
Driveway (Coldwell Bank)	B	B
Driveway (The Alpine)	B	B
Village Road*	A	A
Dolores Way	C	C
Unnamed Public Road (access #16)	C	C
Driveway (Co-op)	B	C
Industry Place	C	C
Driveway (Red Rock Plaza)	A	D
Nieslanik Avenue	C	C
Driveway (Amerigas)	B	B
Driveway (ET Plaza)	B	B
Driveway (Sopris Shopping Center)	B	B
Colorado Avenue	C	C
Main Street*	A	A
City Market/Carbondale Plaza	B	C
Garfield Avenue	B	B
Euclid Avenue	B	B
Driveway(Mobile Home Park)	B	B
Driveway (Wells Fargo)	C	C
Sopris Avnenue	C	B
Hendrick Drive	D	B
Driveway (Physicians)	C	B
8th Street	C	B
Keator Road	C	B
Weant Boulevard	D	B
Snowmass Drive/River Valley Ranch Drive	F	C
Unnamed Public Road (access #71)	C	B
Meadowood Drive/Crystal Bridge Drive*	B	A
Roaring Fork High School	B	A

Green is for intersections with LOS A or B, Yellow is for intersections with LOS C or D, Red are for intersections with LOS E or F

* Signalized intersection.

3.4. Accident analysis

A 5-year accident analysis (January 1, 2006 to December 31, 2010) was conducted by the Headquarters Safety and Traffic Engineering Branch of CDOT in February 2012. Accidents were classified in ten categories:

- **Rear End.** This accident occurs when one vehicle strikes the rear of the vehicle in front of it because that vehicle is stopped or slowing down.
- **Broadside.** This type of accident occurs when a vehicle traveling through an intersection in the opposite direction strikes a left-turning vehicle at a 90-degree angle.
- **Sideswipe.** This type of accident typically involves the side of one vehicle making contact with the side of another vehicle that is traveling in the same or opposite direction.
- **Fixed Object.** This type of accident occurs when a vehicle travels off the roadway and strikes an object along the roadside.
- **Wild Animal.** This type of accident occurs when a vehicle strikes a wild animal in the roadway.
- **Overtaking Turn.** This type of accident occurs when two adjacent approach vehicles, whose paths are unintended to come in conflict, collide as a result of one or both vehicles over- or under-turning. This type would also include a vehicle initially going straight, but leaving its proper travel lane and colliding with a stopped or moving vehicle on an adjacent approach road or driveway.
- **Pedestrian.** This type of accident occurs when a vehicle and pedestrian collide within the roadway, and when this type of collision is the primary event that has occurred.
- **Overturning.** This type of accident occurs when a vehicle overturns on or off the roadway without first having been involved in some other type of crash.
- **Head-on.** This type of accident occurs when two vehicles, traveling in opposite directions, strike one another front first.
- **Approach Turn.** This type of accident occurs when a vehicle traveling through an intersection in the opposite direction strikes a left-turning vehicle.

The study concluded that highest number of accidents were in the rear end category on this roadway, which could be related to several factors including the number of turning vehicles, poor roadway signing, and geometric factors at intersections. The next highest accident type was broadside accidents, followed by sideswipe accidents. Of all the 196 accidents identified along SH 133, the majority occurred at an intersection (154) and only 18 occurred at driveway access locations. The majority (12) of driveway related accidents occurred at the access to the City Market and Carbondale Plaza driveways located just south of Main Street, with broadside (6) accidents being the highest type of accident. The safety report recommends restricting turning movements at this intersection to help reduce the frequency and severity of the accidents at this location.

The majority of intersection accidents occurred at the signalized intersections of Main Street and Village Road. The vast majority of accidents at these intersections were rear end events. The report recommends that CDOT investigates the existing signal timing at the intersections or add additional advanced warning signs (signal ahead) and possibly flashing beacons on the advanced signs to help reduce the number of rear end accidents. The intersection of Cowen Drive had the most accidents for the un-signalized intersections. Rear end accidents accounted for the vast majority of accidents at this intersection. The report recommends that a study be completed to determine if the intersection has appropriate sight-distance before any additional changes are made to the intersection.

3.5. Alternative transportation modes

Although an ACP deals primarily with vehicle access to and from highways, the Town has the goal of promoting safe and efficient movement of all modes of transportation. This includes pedestrians, transit users, and bicyclists moving in and through the study area.

CDOT has also recently adopted a new policy towards non-vehicular use of highways as follows:

> *It is the policy of the Colorado Transportation Commission to provide transportation infrastructure that accommodates bicycle and pedestrian use of the highways in a manner that is safe and reliable for all highway users. The needs of bicyclists and pedestrians shall be included in the planning, design, and operation of transportation facilities, as a matter of routine.*

The accident analysis indicates eight accidents involving pedestrians/bicyclists occurred between 2006 and 2011. To help the Town achieve their goal, the ACP identifies existing access conditions, identifies opportunities to improve the facilities, and ensures the recommendations of the plan do not prohibit the Town from achieving its ultimate goal for non-vehicle users.

The Town currently has transit service provided by the Roaring Fork Transportation Authority (RFTA), and there are existing bus stops at SH 133/Main Street, Main Street/7th Street, and at the park-n-ride facility located at SH 133/Village Road. All of the existing stops have pedestrian amenities, such as sidewalks or paths, which provide safe movement to and from the stops for the transit riders. The Town would like to see an expansion of the transit services within the community with the addition of a local circulator system.

The Town would like to see future transit riders continue to have safe locations to board and depart the buses and to safely walk about Town once they depart the buses. The best way to provide for this safety is to provide transit riders with sidewalks or pathways. The Town does have multi-use pathways (pedestrian/bicyclists) along one or both sides of SH 133 and has plans for additional pathways to fill in the missing gaps. In addition, the Town has good sidewalk connectivity along with numerous other bikeways/pathways throughout the community with even more planned in the future. As development continues, the conditions for bicycle and pedestrian travel will become safer if the sidewalk/pathway system is constructed to be continuous.

The Town is concerned with the lack of locations where they feel pedestrians/bicyclists can safely cross SH 133 from the east to the west and vice-versa. With only three signalized intersections and long distances in-between these signals, the Town feels that pedestrians/bicyclists do not travel to these locations to safety cross the street on a green light, but rather wait for a perceived large enough gap in traffic and cross and various locations along the corridor. One possible solution could be the addition of safe crossings at mid-block locations throughout the corridor. The design and placement of these crossings is not within the scope of an ACP. The project team worked with the Town, however, to ensure that the final recommendations of the ACP would not limit the possibility that the Town and CDOT could work together in the future to implement marked pedestrian/bicyclists crossings along the corridor.

Finally, the Town has concerns about the safety of schoolchildren crossing the roadway, particularly at the intersection of Hendrick Drive/Sopris Avenue and at Snowmass Drive/River Valley Ranch Drive. A traffic analysis was completed as part of the ACP to investigate these locations and determine if either of them warranted the installation of a traffic signal. The results and findings of that analysis were published in separate reports for the intersections, which are available through the Town. In summary, the reports indicated that the intersection of Hendrick Drive and SH 133 does warrant a traffic signal. The intersection of Snowmass Drive was found to not warrant a traffic signal at this time, but was nearing the volume of traffic that could warrant a signal in the near future. It should be noted that just because an intersection does satisfy the criteria for one or more signal warrants does not mean that a traffic signal must be installed or that a traffic signal is the best solution. The Town and CDOT should work together to develop solutions for these locations, which could include the installation of a traffic signal, additional signing to help make the crossings safer, or other traffic control approaches. In addition, the traffic volumes at the Snowmass Drive intersection should be monitored and the analysis completed again in the future to determine if and when the intersection does warrant a traffic signal.

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4. No-Action (2032) Conditions

In addition to analyzing the existing traffic conditions, it is important to understand future planning horizons in developing recommendations for the ACP. The year 2032 was selected as the long-range planning horizon for this project. Before the future intersection and roadway operational analyses could be performed, future traffic volumes for the year 2032 were developed.

4.1. Roadway sections and access descriptions

For the no action condition, all access locations, type, and traffic control are assumed to remain unchanged from existing conditions (refer to previous sections for description of access location under existing conditions).

4.2. Traffic volumes

Future background volumes were projected by first applying a 2.2-percent annual growth rate to the existing volumes. The 2.2-percent annual growth rate coincides with growth rates used for other transportation studies (including several traffic impact studies) conducted in the area, as well as historic projections from CDOT traffic data collection on the corridor. An annual growth rate of 2.2 percent is considered moderate to high; however, the Town does have the potential to experience growth with several undeveloped parcels as well as potential growth within the County in the areas south and east of the Town. Although growth may not reach the projected 2.2-percent annual rate within the timeframe analyzed, use of this value for analysis purposes will produce conservative results and recommendations for access changes. The analysis also included traffic from previously approved but not yet constructed developments such as the Village at Crystal River and Thompson Park.

The 2.2-percent annual growth was applied over a 20-year period to grow the 2012 traffic volumes to projected 2032 levels by a factor of approximately 1.55. It was assumed that all major movements (all public roadways) would experience the same 2.2-percent annual growth rate, while the private driveways would experience a slightly more conservative growth factor of 1.1 over the same time period. Table 5 shows a comparison between existing (2012) and 2032 bi-directional (northbound plus southbound) traffic along SH 133 at similar locations as was discussed for existing conditions.

Table 5. Comparison of projected 2032 and existing 2012 traffic volumes

Roadway	Location	Vehicles per day*		
		2012	Projected 2032	Percentage Increase
SH 133	North of Colorado Avenue	14,380	22,290	55%
SH 133	South of Snowmass Drive	3,320	5,150	55%

*Bidirectional volumes (northbound plus southbound).

4.3. Intersection level of service

The future traffic volumes were input into the traffic analysis model to determine intersection LOS. For comparative purposes, no changes to the existing roadway network were assumed (including no changes in traffic control at any intersection/access point) for the original No-Action condition analysis. Table 6 summarizes the results of the intersection LOS for the No-Action analysis compared to the existing conditions.

Table 6. Comparison of 2032 and 2012 intersection level of service results

Intersection	Existing (2012)		No-Action (2032) SH 133 with 2 lanes		No-Action (2032) SH 133 with 4 lanes	
	LOS		LOS		LOS	
	AM	PM	AM	PM	AM	PM
Driveway (North Red Rock Diner)	B	C	D	F	D	C
Driveway (South Red Rock Diner)	C	C	E	F	D	D
Cowen Drive	C	C	E	F	E	E
Driveway (Coldwell Bank)	B	B	C	C	C	B
Driveway (The Alpine)	B	B	B	C	B	B
Village Road*	A	A	A	C	A	A
Dolores Way	C	C	E	F	E	D
Unnamed Public Road (access #16)	C	C	F	F	C	F
Driveway (Co-op)	B	C	D	F	C	E
Industry Place**	C	C	A	A	A	A
Driveway (Red Rock Plaza)	A	D	A	F	A	F
Nieslanik Avenue**	C	C	A	A	A	A
Driveway (Amerigas)	B	B	C	C	B	B
Driveway (ET Plaza)	B	B	C	F	B	C
Driveway (Sopris Shopping Center)	B	B	C	E	B	C
Colorado Avenue	C	C	F	F	C	D
Main Street*	A	A	B	C	C	C
City Market/Carbondale Plaza	B	C	C	D	C	E
Garfield Avenue	B	B	C	C	C	C
Euclid Avenue	B	B	C	D	C	D
Driveway(Mobile Home Park)	B	B	D	D	D	D
Driveway (Wells Fargo)	C	C	F	F	F	F
Sopris Avnenue	C	B	E	D	E	D
Hendrick Drive	D	B	F	D	F	D
Driveway (Physicians)	C	B	D	C	D	C
8th Street	C	B	F	D	F	D
Keator Road	C	B	F	C	F	C
Weant Boulevard	D	B	F	F	F	F
Snowmass Drive/River Valley Ranch Drive	F	C	F	F	F	F
Unnamed Public Road (access #71)	C	B	F	B	F	B
Meadowood Drive/Crystal Bridge Drive*	B	A	B	A	B	A
Roaring Fork High School	B	A	B	B	B	B

Green is for intersections with LOS A or B, Yellow is for intersections with LOS C or D, Red is for intersections with LOS E or F.
* Signalized intersection.

**LOS obtained from 50% confidence level analysis for 2030 from approved Villages at Crystal River TIS.

As shown in Table 6, many of the intersections will operate at a failing LOS during the AM and PM peak hours. In addition, the arterial speeds on the corridor are projected to average as low as 12 miles per hour during the peak hour, there are extensive queues if the corridor is a two-lane road, and the Crystal River Village TIS determined that a two-lane roundabout would be required at both Industry Place and Nieslanik Avenue in order to obtain an acceptable LOS. To accurately depict improvements that changes in access may bring, it was decided to analyze SH 133 as a four-lane section between SH 82 and Main Street where volumes are projected to increase the most. Analyzing the road as a four-lane section resulted in fewer failing LOS intersections, the arterial speeds improved, and shorter queues are projected during the peak hours. Detailed analysis of the LOS for year 2032 can be found in Appendix G. The results of the analysis with no changes to the existing access configuration and laneage of the roadways, is provided in Appendix G1. Detailed analysis of the LOS with SH 133 as a four-lane section from SH 82 to Main Street is provided in Appendix G2.

In the year 2032, many of the driveways and intersections within the study limits will operate at LOS E or F during both AM and PM peak hours if no changes are made to access on the corridor. These results indicate congestion levels on SH 133 will continue to increase in the future and will result in poor operations, long delays, and an increase in the number of accidents. As traffic volumes increase, these conditions will be worse if the number, design, and location of access locations along the study roadway are not controlled through the development of an ACP. These results also indicate that SH 133 will have insufficient capacity to service the projected future traffic volumes if SH 133 remains a two-lane highway through the Town of Carbondale. It is likely the overall capacity of SH 133 will need to be increased in the future. The addition of a third lane (a two-way-left-turn-lane) to be used for left turns in both directions may resolve some of the operational issues on SH 133 and significantly delay in the need to widen SH 133 with additional through lanes. The results also indicate that several of the driveways and intersections may be subject to having turn restrictions imposed or full closure to maintain safe and efficient operations if no improvements are done.

4.4. Accident analysis

Although the exact number and frequency of accidents on the study roadway cannot be determined for the year 2032, the results of the future traffic analysis can be used to draw conclusions regarding the overall expected safety of the study roadway. With traffic volumes predicted to grow by significant amounts in the future, combined with a lack of sufficient capacity, the expected result will be an increase in the number and frequency of accidents along the roadways. This will result in a decrease in the safety for all users (motorists and pedestrians/bicyclists). Although the highway currently operates at a level that is above average for safety, the overall safety of the highway is expected to decrease for the No-Action (2032) conditions without the development and implementation of an ACP.

4.5. Alternative transportation modes

For the purposes of the No-Action analysis no significant changes were assumed to the pedestrian and transit facilities within the study area. Pedestrians would continue to use existing facilities to move about the Town, but there would still be gaps in the system that would result in pedestrians having to walk or ride on the roadway to complete some trips. Transit facilities would remain in place and transit vehicles would be able to complete trips to and from the stops similar to existing conditions.

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5. Access Control Techniques

There are several options that allow changes to the existing roadway configuration or geometry to assist in the management of the number, frequency, and location of intersections/driveways along a roadway. Each option provides a different means to manage access along a roadway. In addition, each option has unique benefits and can be used in conjunction with other options to help improve traffic flow, operations, and safety while maintaining adequate access to the adjacent land uses. Figure 10 provides a schematic depicting the following options for access control:

- Elimination
- Conversion/restriction with median treatment
- Relocation
- Consolidation

5.1. Applications of access control techniques

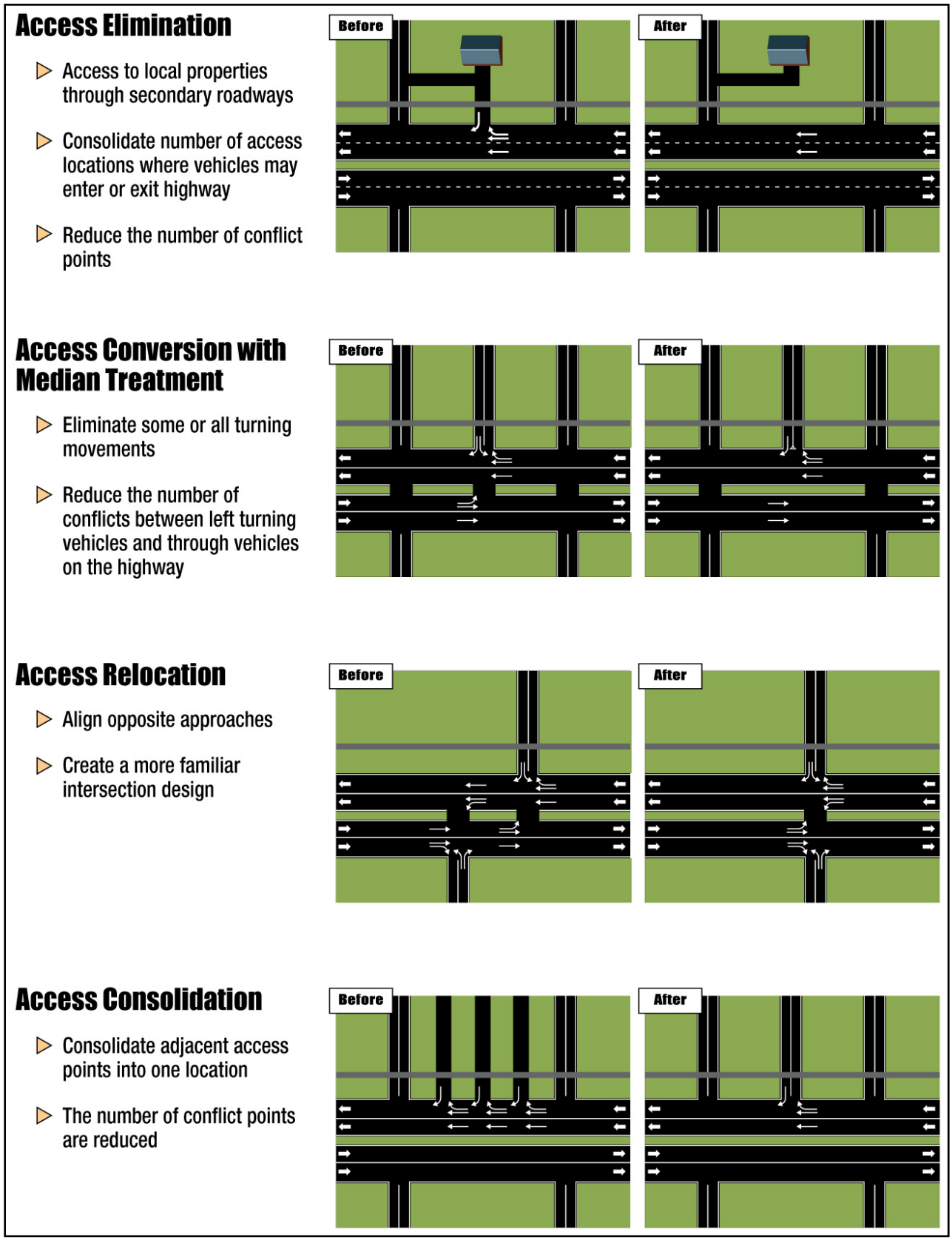
There are several areas along SH 133 where each of the access control methods can be applied. Access elimination is typically used at locations where a property has more than one access point. To meet the objectives of an ACP to reduce the number of access points for safety and operational reasons, all properties adjacent to SH 133 should be limited to a single access in all locations where reasonable access to secondary roads is not possible.

The purpose of access conversion through the use of median treatments is to eliminate some or all turning movements to reduce the number of conflicts between left-turning vehicles and through vehicles on the highway. By creating ¾-movement accesses (left turns are allowed into the driveways, but not out), the number of conflicts will be reduced. The drivers wanting to turn left from these locations can use secondary roads to travel to adjacent improved intersections where left turns can be made, which are much safer than at un-improved locations. At other locations the drivers can make right turns out of the approach roadways/driveways, travel to nearby improved intersections, and make a safe movement (u-turn or left turn) as provided for by the improved intersection or through the use of a roundabout.

Access relocation is an access control method that would either align opposite approaches to create a more familiar intersection design or move an existing access point to a new location. For example, some properties are situated close to existing or planned future roads and many of these properties currently have driveways with direct access to SH 133. As development occurs or as new roads are constructed, many of these direct connection driveways can be closed and moved to align with the new roads. This will create better spacing of intersections and reduce the number of conflict points.

Finally, access consolidation is used to reduce the number of access points along the roadway. This approach to access control is typically used at locations along highways where adjacent property owners have individual driveways fairly close together. In these situations, the multiple driveways could be consolidated into a single point that is shared by adjacent properties to reduce conflicts, improve operations, and maintain adequate access to all properties. This approach is especially favorable for bicyclists traveling along the corridor on a bike path because it reduces the number of conflict points with motor vehicles. While consolidation of access does provide benefits to the corridor, this approach may take years to accomplish because it typically requires redevelopment or site changes to the adjacent properties. If there are multiple property owners then the process cannot be completed until all properties agree to the changes and/or redevelop their sites.

Figure 10. Access control techniques



6. Public Involvement Process

The *State Highway Access Code* requires at least one advertised public meeting be held during the development of an ACP. For this particular ACP, an extensive public involvement process was followed:

- Identification of potentially affected property owner information
- Initial public open house
- One-on-one property owner/representatives workshops
- Second public open house
- Website postings
- Presentations to elected officials
- Additional public outreach

6.1. Property owner information

Property ownership data was obtained from the Garfield County assessors' online database and Geographic Information System (GIS) data files. A mailing list for the public involvement process was provided by the Town. This was done in an effort to ensure accurate and up-to-date information was used for the study, to ensure all parties received equal information, and to allow the property owners to determine whether or not they had an interest in the ACP. Appendix C contains the mailing list used for the public involvement portion of this study.

6.2. Initial public open house

The initial ACP public open house was held on June 27, 2012, at the town hall in Carbondale. The open house was advertised via mailed postcards to property owners, business owners, and residents, as well as on the project website. The purpose of the open house was to introduce the project team, identify the study's purpose, process, and schedule, provide information about the methods and benefits of access management, present the draft ACP, and receive comments from stakeholders and the public. Representatives from the Town, CDOT, and the consulting team were on hand to answer questions from those in attendance. A copy of the meeting materials and received comments is in Appendix H of this report. The received comments were taken into consideration during the development of the recommended ACP.

In addition, this open house was used to identify individual property owners with the potential for the most significant impact caused by the proposed changes to access. Such property owners were provided the opportunity to meet one-on-one with the project team to discuss their access issues in more detail and to determine the final preferred access alternatives.

6.3. One-on-one property owner/representatives workshops

Several property owners/representatives were identified as needing additional time to discuss their specific access issues with the project team. To accommodate these individuals, one-on-one workshops were scheduled for July 17 and July 18, 2012, at the town hall in Carbondale. Copies of letters sent to the participants of the one-on-one workshops, which summarize the discussion topics and agreements made during the meetings, can be found in Appendix I. Staff from the Town, CDOT, and the consulting team was on hand at the meetings to present the draft ACP, listen to comments from the property owners, and when necessary, identify additional access alternatives to address the concerns of the property owners and ensure the goals of the project were met. The comments from the meetings were used to refine the draft ACP and develop a final proposed ACP. The following property owners/representatives took part in the workshops:

- Terry Kirk – Carbondale Plaza

- Joe White – Colorado Rocky Mountain School
- Jim Wheeler and Kirk Swallow – Phillip's 66 service station
- Terry Fattor – Red Rock Diner
- Mike Kennedy – REMAX and Avalanche properties
- Jason White, Dave Iverson, Mike Hermes, and David Johnson – Roaring Fork Transportation Authority
- Yancy Nichols and Raul Gawrys – Stein property
- Bruce Maassen and Mark Chain – Valley View Hospital
- Briston Peterson, Yancy Nichol, and Richard Shierburg – Village at Crystal River
- Tim Lucas – Wells Fargo

6.4. Second public open house

A second public open house was held on October 10, 2012**,** at the town hall in Carbondale. The open house was advertised via mailed postcard and on the project website. The purpose of the open house was to present basic information about what access control is, present the recommended access configuration for the study roadway, provide a project schedule, discuss how the plan would be implemented, and to gather comments and feedback from the public. Representatives from the Town, CDOT, and the consulting team were on hand to answer questions from the attendees. A copy of the meeting materials is in Appendix J of this report. No formal comment sheets were submitted at the second open house but a memo summarizing notes from the public on the preferred alternative is also included in Appendix J. Comments from the final open house were taken into consideration before finalizing the recommendations of the ACP.

6.5. Website postings

A project website was developed for posting information regarding the status of the project, open house materials, and advertisements for upcoming open house meetings. The information was posted at http://www.coloradodot.info/projects/sh133carbondale.

6.6. Presentations to elected officials

As part of the public involvement for this study, presentations to elected officials were completed. The purpose of the presentations was to provide information to the elected officials and to keep them informed about the progress of the project. Two different groups of elected officials were identified at the beginning of the project for these presentations: Town of Carbondale Board of Trustees (Board) and the Garfield County Board of County Commissioners (BOCC). Presentations to these groups were completed at the beginning and end of the project.

The first presentation was in May 15, 2012, to the Board. This presentation focused on providing basic information about the purpose of the project, description of access control, possible recommendations, type of issues may be encountered, schedule for completing the project, and expectations of the Board during the process. Members of the Board were invited to attend the open houses for the project, as well as to visit the project website to keep informed about decisions and other information that would be posted in the future. The second round of presentations was completed on October 2, 2012, to the BOCC and October 9, 2012, to the Board. These presentations focused on summarizing the study processes and recommendations before presenting to the public at the final open house. The Board and BOCC members were presented with a summary of the traffic analysis, recommended changes in access, possible future changes to the roadways in the area, and the public involvement elements of the project. Again, the elected officials were invited to attend the final open house or visit the project website to remain informed of the project. In addition, the elected officials were presented with the next steps in the process to get the ACP adopted, and what their roles would be in the process.

A joint meeting was held on November 13, 2012 with the Board and BOCC. Town and CDOT staff was available to answer questions regarding the final plan before the IGA would be presented for signatures in December 2012/early 2013.

6.7. Additional public outreach

In an effort to complete the approval and adoption process for the ACP, the project team completed additional outreach to elected officials and stakeholders along the SH 133 corridor. In particular, the project

On January 22, 2013, the Garfield County Board of County Commissioners held a working session regarding the SH 133 ACP. The meeting was open to the public and was specifically aimed at addressing the concerns of stakeholders, property owners, and citizens regarding the recommendations of the ACP in regards to the Dolores Way intersection. Members of the project team attended the meeting and took part in discussions regarding the SH 133 ACP. Letters from the public, from the board, and presentation materials from the meeting are included in Appendix K.

As a result of the meeting, the project reviewed the recommendations for modifying the access at Dolores Way in order to obtain direct access to the Village Road intersection and made changes to ACP to provide more flexibility for the Dolores Way access.

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7. ACP Recommendations

The following sections present the recommended ACP based on the results of the operational analysis, safety study, guidelines from the *State Highway Access Code*, and input from the public involvement process. The SH 133 ACP presented in this section contains the recommendations for the location of future access points as well as the type of traffic control at each intersection. No new access locations will be allowed along these sections of SH 133 without modification to the ACP.

7.1. Roadway sections and access descriptions

The recommended access points are shown in Figure 11 through Figure 17 at the end of this section. Appendix A contains a table with the actual ACP legal description for each access point including their location by mile point, the proposed ultimate access configuration, and the conditions for change that must be satisfied before a change in access occurs.

The intent of this study was not to identify design elements of each access location, such as number, length, and types of auxiliary lanes, but rather to focus on where each access should be located and what type of turns should be allowed at each location. The exact design elements for each access would be completed through a study conducted at the time of the final design for any access or roadway improvement project.

It is important to keep in mind that the changes recommended in this study and the legal ACP documents in the appendix will only occur when a roadway improvement project is completed, when the need is identified based on an operational or safety issue, when funding becomes available, and/or as redevelopment occurs. Currently, the Town, CDOT, and the County are in the process of conducting a corridor safety improvement project that may result in changes to the existing roadway geometry between Main Street and Cowen Drive. Coordination between the projects was conducted throughout the process of developing the ACP to ensure the projects were consistent with each other and so that one project would not preclude the recommendations of the other. Development is ongoing along the study roadway and may result in changes contained within this document occurring at any time in the future. The implementation of the plan is discussed in more detail in Section 8.2, Plan Implementation.

The figures presented in this document are for illustrative purposes only and are not to scale. The recommendations in this ACP are based on an ultimate configuration of the study roadway, which may include the need to install median treatments.

The following subsections provide a brief discussion on the ultimate recommended changes to access along the study roadway. For more details regarding the conditions for changes in access along with a description of the existing, interim, and recommended access conditions refer to the ACP table in Appendix A.

7.1.1. Access from Roaring Fork River Bridge to Village Drive

The following changes to access are recommended for SH 133 from Roaring Fork River bridge to Village Drive:

- **Access 1:** Driveway to be closed.
- **Access 2:** Driveway to be closed.
- **Access 3:** Driveway to be closed.
- **Access 4 (Westbound approach of Cowen Drive):** Public roadway to remain full movement, but the ultimate access design shall not include a traffic signal.
- **Access 80 (Future eastbound approach of Cowen Drive):** New public roadway to approach SH 133 from the west to provide full-movement access, but the ultimate access design shall not include a traffic signal.

- **Access 5:** Driveway to be closed.
- **Access 6:** Driveway to be closed.
- **Access 81:** A new driveway approaching SH 133 from the west and will provide right-in, right-out access to the properties directly west of SH 133. Adjacent properties will share this access.
- **Access 82:** A new driveway approaching SH 133 from the east and will provide right-in, right-out access to the properties directly east of SH 133. Adjacent properties will share this access.
- **Access 7:** Driveway to be closed.
- **Access 8:** Driveway to be closed.
- **Access 9:** Driveway to be restricted to right-in, right-out.
- **Access 10:** Driveway to remain full movement.
- **Access 11 (Westbound approach of Village Drive):** Public roadway to remain full movement.

7.1.2. Access from Village Drive to Weant Boulevard

The following changes to access are recommended for SH 133 from Village Drive to Weant Boulevard:

- **Access 12:** Driveway to be closed.
- **Access 13 (Eastbound approach of Dolores Way):** Public roadway to be restricted to right-in, right-out.
- **Access 14:** Driveway to be restricted to right-in, right-out.
- **Access 15:** Driveway to be closed.
- **Access 16 (Westbound approach of unnamed road):** Public roadway to remain full movement.
- **Access 83: (Future eastbound approach of unnamed road):** New public roadway approaching SH 133 from the west to be a full-movement access and align with the unnamed road on the east side of SH 133.
- **Access 17:** Driveway to be closed.
- **Access 84:** A new driveway approaching SH 133 from the west to allow right-in only movement.
- **Access 85 (Future eastbound approach of Industry Place):** A new public roadway approaching SH 133 from the west to provide full movement and align with Industry Place on the east side of SH 133.
- **Access 18 (Westbound approach of Industry Place):** Public roadway to remain full movement.
- **Access 19:** Driveway to be closed.
- **Access 20 (Westbound approach of Nieslanik Avenue):** Public roadway to remain full movement.
- **Access 86 (Future eastbound approach of Nieslanik Avenue):** New public roadway approaching SH 133 from the west to provide full-movement access and align with Nieslanik Avenue on the west side of SH 133.
- **Access 21:** Driveway to be closed.
- **Access 22:** Driveway to be closed.
- **Access 23:** Driveway to be closed.
- **Access 24:** Driveway to be closed.
- **Access 25:** Driveway to be closed.
- **Access 87:** A new driveway approaching SH 133 from the east to provide ¾-movement (left in, but no left out).
- **Access 88:** A new driveway approaching SH 133 from the west to provide ¾-movement (left in, but no left out).
- **Access 26:** Driveway to be closed.
- **Access 27:** Driveway to be closed.
- **Access 89:** A new driveway approaching SH 133 from the east to provide right-in only movement (final location of access must not create operational or safety issues with Main Street).
- **Access 28 (Colorado Avenue):** Public roadway access to be closed.
- **Access 29:** Driveway to be restricted to right-in only access.
- **Access 30 (Eastbound approach of Main Street):** Public roadway to remain full movement.
- **Access 31 (Westbound approach of Main Street):** Public roadway to remain full movement.
- **Access 32:** Driveway to be closed.
- **Access 33:** Driveway to be restricted to right-in, right-out access.

- **Access 90:** New driveway approaching SH 133 from the east to provide right-in, right-out access. Adjacent properties will share this access.
- **Access 34:** Driveway to be closed.
- **Access 35:** Driveway to be closed.
- **Access 36 (Westbound approach of Garfield Avenue):** Public roadway to remain full movement, but the ultimate access design shall not include a traffic signal.
- **Access 37:** Driveway to remain full movement, but the ultimate access design shall not include a traffic signal.
- **Access 38:** Driveway to be restricted to right-in, right-out.
- **Access 39 (Westbound approach of Euclid Avenue):** Public roadway to remain full movement, but the ultimate access design shall not include a traffic signal.
- **Access 40:** Driveway to be closed.
- **Access 91:** New driveway approaching SH 133 from the west to provide right-in, right-out access. Adjacent properties will share this access.
- **Access 41:** Driveway to be closed.
- **Access 42:** (Access is to Sopris Avenue, but falls within the SH 133 right-of-way) Driveway to be restricted to emergency vehicle access only.
- **Access 43 (Westbound approach of Sopris Avenue):** Public roadway access to remain full movement (could be realigned).
- **Access 92:** Realignment of Hendrick Road to be a full-movement access.
- **Access 43 (Eastbound approach of Hendrick Road):** Public roadway access to be closed.
- **Access 44:** Driveway to be closed.
- **Access 45:** Driveway to be closed.
- **Access 46:** Driveway to be closed.
- **Access 47 (Southbound approach of 8th Street):** Public roadway to be restricted to ¾-movement (no left turns from SH 133 to 8th Street).
- **Access 48:** Driveway to be closed.
- **Access 49 (Northbound approach of Keator Road):** Public roadway to be restricted to right-in, right-out.
- **Access 50:** Driveway to be closed.
- **Access 51:** Driveway to be closed.
- **Access 52:** Driveway to be closed.
- **Access 53:** Driveway to be closed.
- **Access 54:** Driveway to be closed.
- **Access 55 (Southbound approach of Weant Boulevard):** Public roadway to remain full movement.
- **Access 93 (Future northbound approach of Weant Boulevard):** New public roadway (Weant Boulevard) approaching SH 133 from the west to provide full movement.

7.1.3. Access from Weant Boulevard to Meadowood Drive

The following changes to access are recommended for SH 133 from Weant Boulevard to Meadowood Drive:

- **Access 56:** Driveway to be restricted to emergency access only.
- **Access 57:** Driveway to be restricted to right-out only movement (with construction of frontage road).
- **Access 58:** Driveway to be closed.
- **Access 59:** Driveway to be closed
- **Access 60:** Driveway to be closed.
- **Access 61:** Driveway to be closed
- **Access 62:** Driveway to be closed.
- **Access 63:** Driveway to be restricted to right-in only (with construction of frontage road).
- **Access 64:** Driveway to be closed.
- **Access 65 (Eastbound approach of River Valley Ranch Drive):** Public roadway to remain full movement.

- **Access 66 (Westbound approach of Snowmass Drive):** Public roadway to remain full movement.
- **Access 67:** Driveway to be closed.
- **Access 68:** Driveway to be closed.
- **Access 69:** Driveway to be closed.
- **Access 70:** Driveway to be closed.
- **Access 71 (Westbound approach of unnamed public road):** Public roadway to be closed.
- **Access 72:** Driveway to be closed.
- **Access 94 (Future westbound approach of Roaring Fork Avenue):** New public roadway approaching SH 133 from the east to provide full movement, but the ultimate design of the access shall not include a traffic signal.
- **Access 73:** Driveway to be restricted to right-in, right-out.
- **Access 74:** Driveway to be closed.
- **Access 75:** Driveway to be closed.
- **Access 76 (Eastbound approach of Crystal Bridge Drive):** Public roadway to remain full movement.
- **Access 77 (Westbound approach of Meadowood Drive):** Public roadway to remain full movement.

7.1.4. Access from Meadowood Drive to project end

The following changes to access are recommended for SH 133 from Meadowood Drive to Roaring Fork High School driveway:

- **Access 78:** Driveway to remain full movement, but the ultimate access design shall not include a traffic signal.
- **Access 79:** Driveway to remain full movement, but the ultimate access design shall not include a traffic signal.

7.2. Traffic volumes

The same traffic volumes that were projected for the 2032 no action conditions were used to evaluate the 2032 conditions with the recommended ACP. However, in order to ensure all traffic is accounted for, engineering judgement was used, at the locations where access restrictions/closures were recommended, to redistribute to access turning volumes back to SH 133 via side streets or adjacent access locations.

Figure 11. Recommended access locations (Sheet 1 of 7)

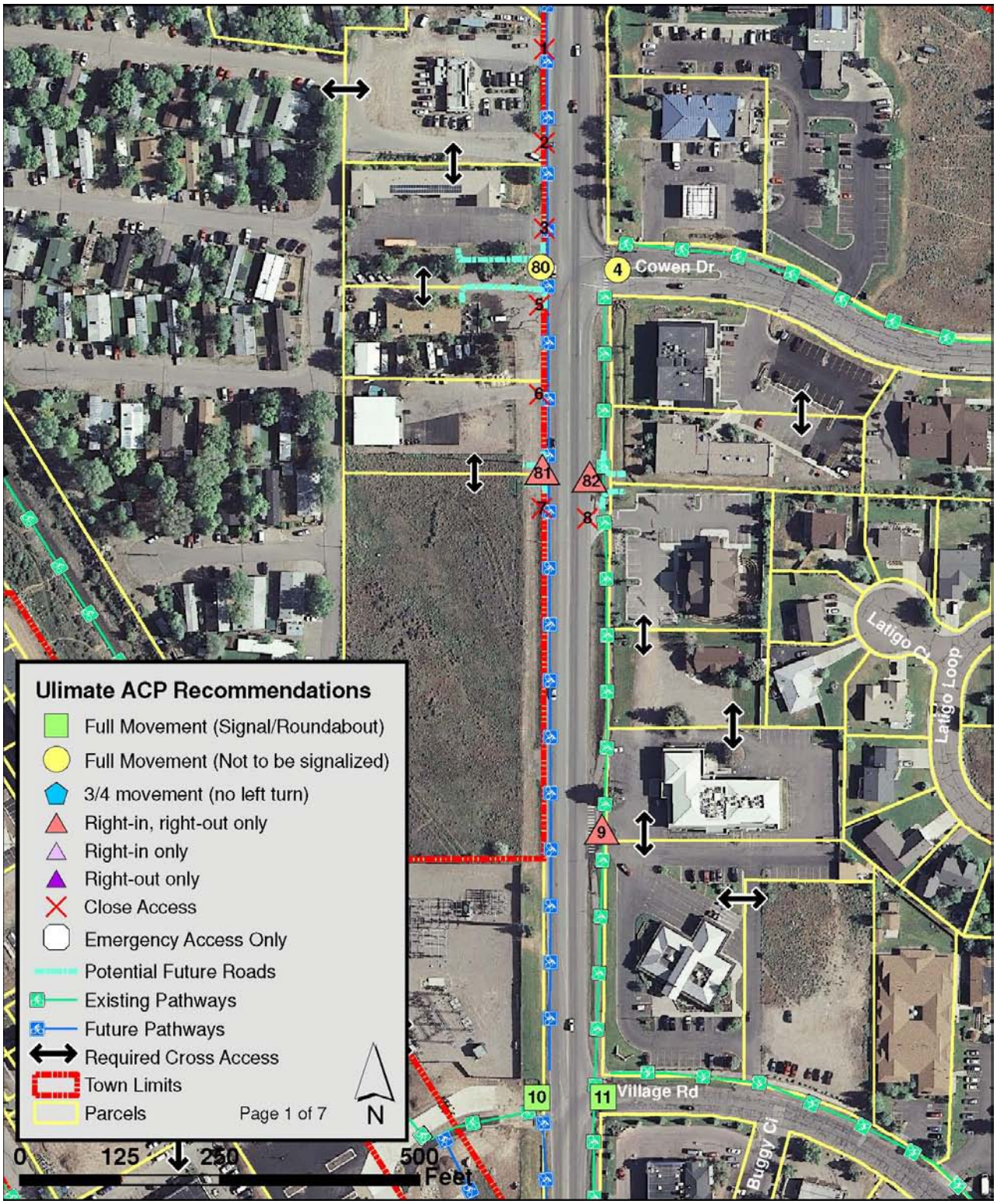

Figure 12. Recommended access locations (Sheet 2 of 7)

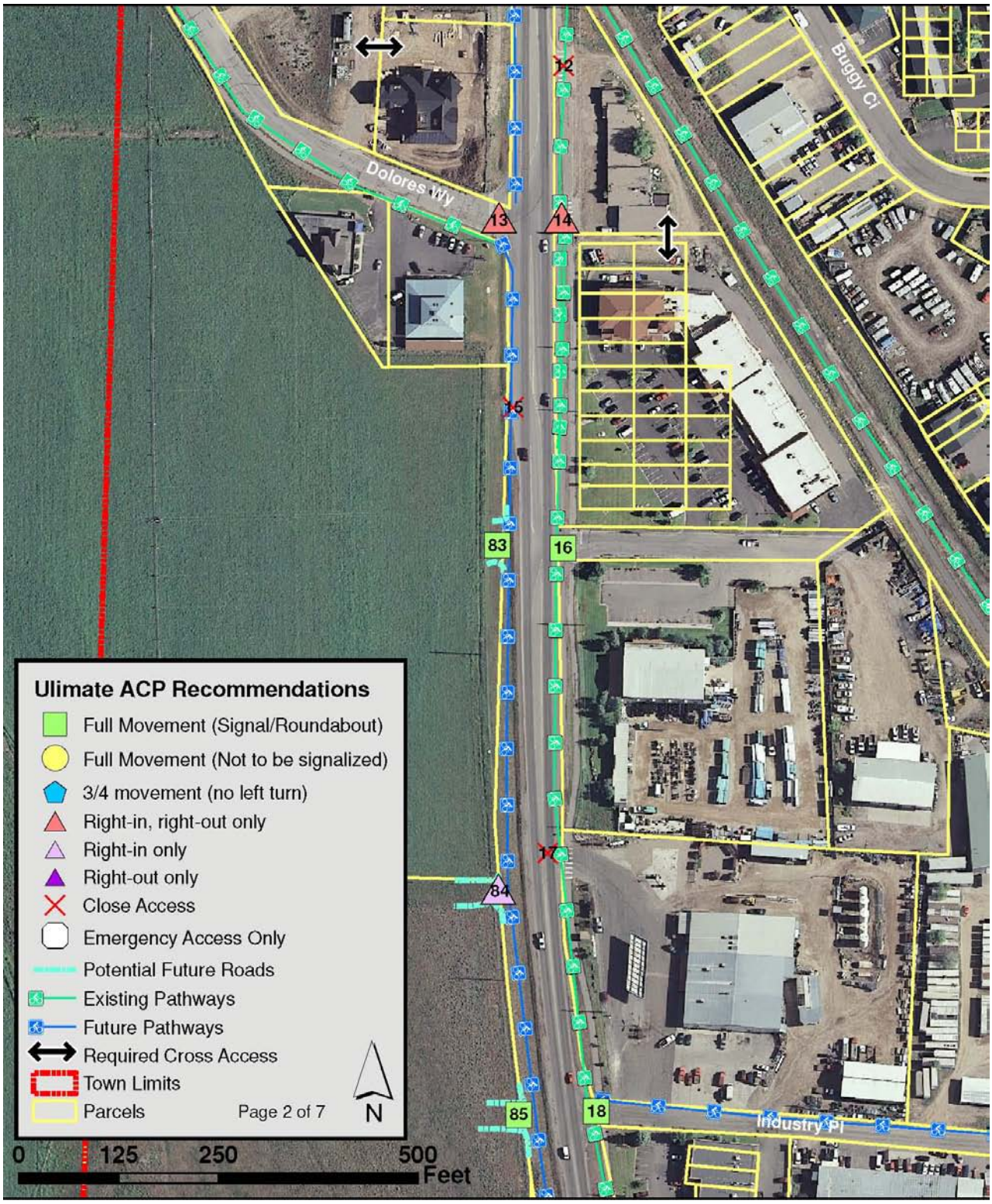

Figure 13. Recommended access locations (Sheet 3 of 7)

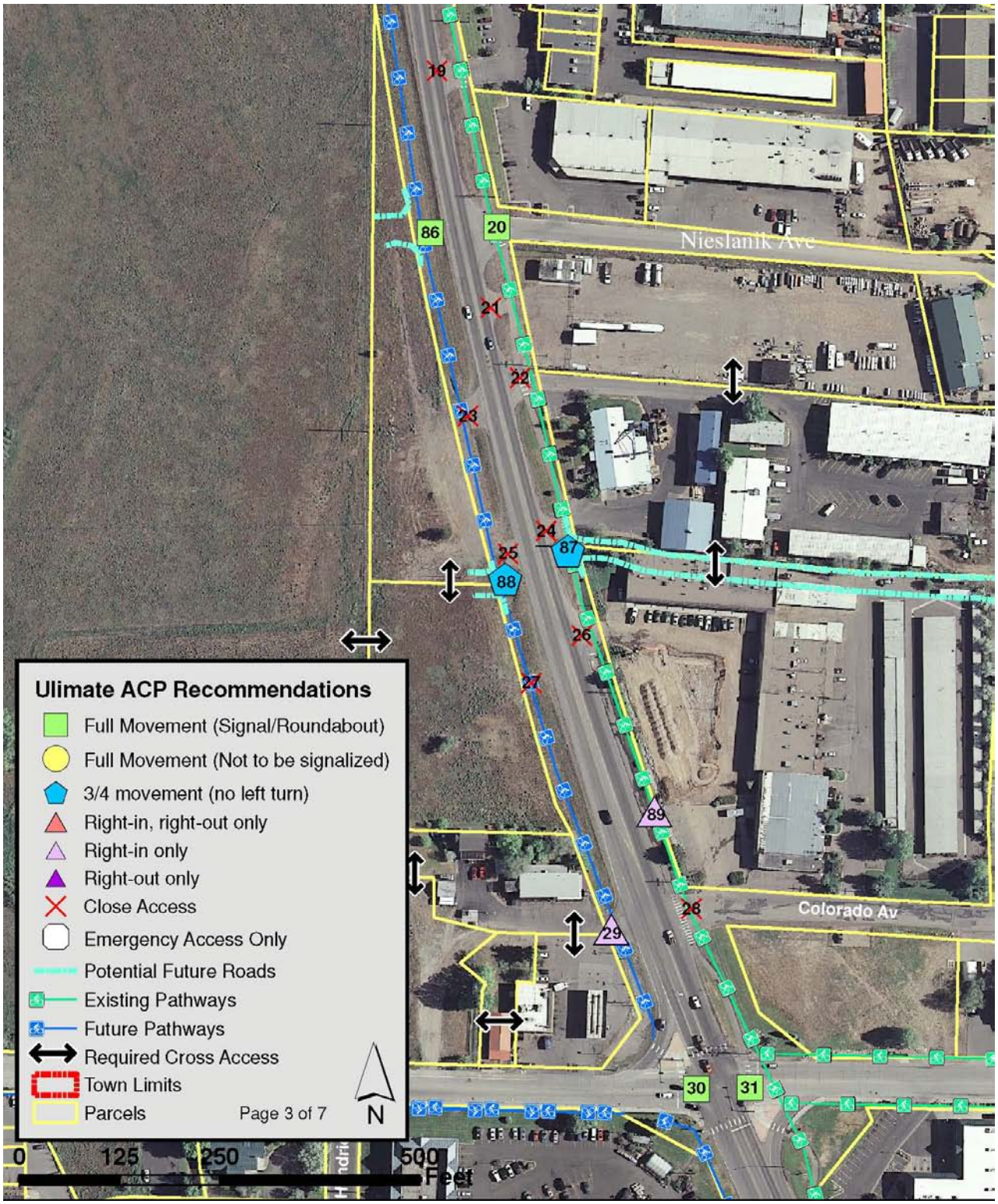

Figure 14. Recommended access locations (Sheet 4 of 7)

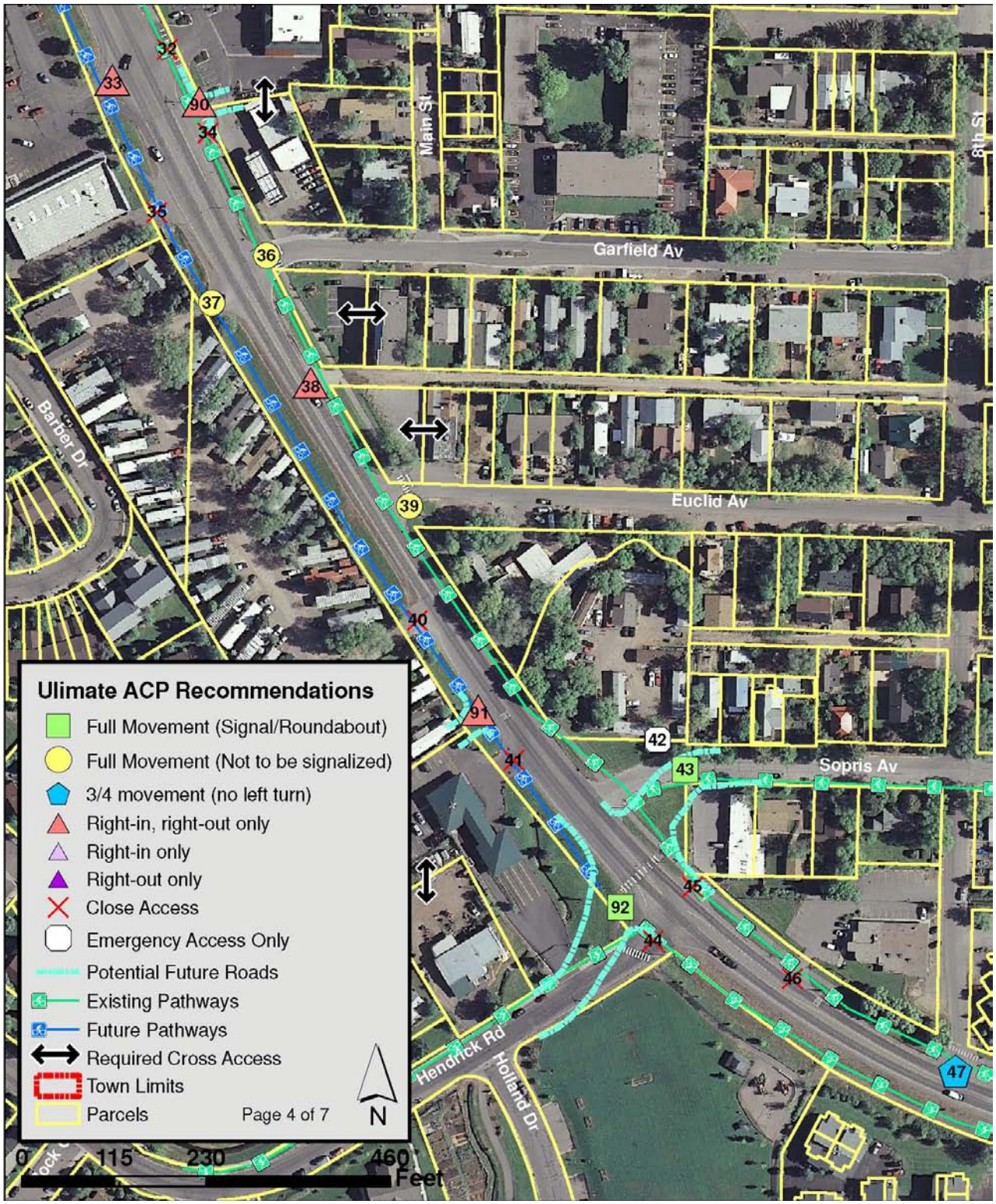

Figure 15. Recommended access locations (Sheet 5 of 7)

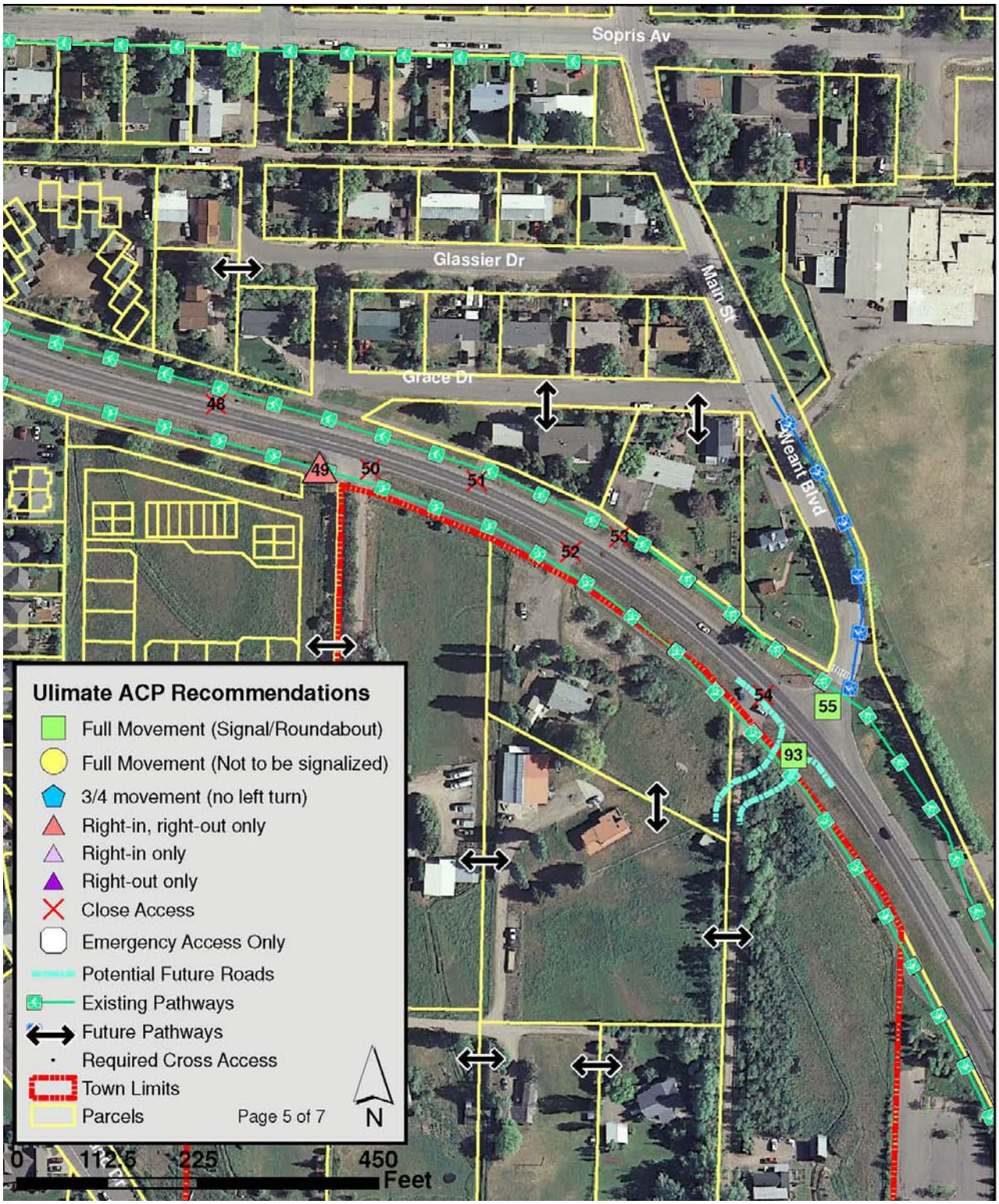

Figure 16. Recommended access locations (Sheet 6 of 7)

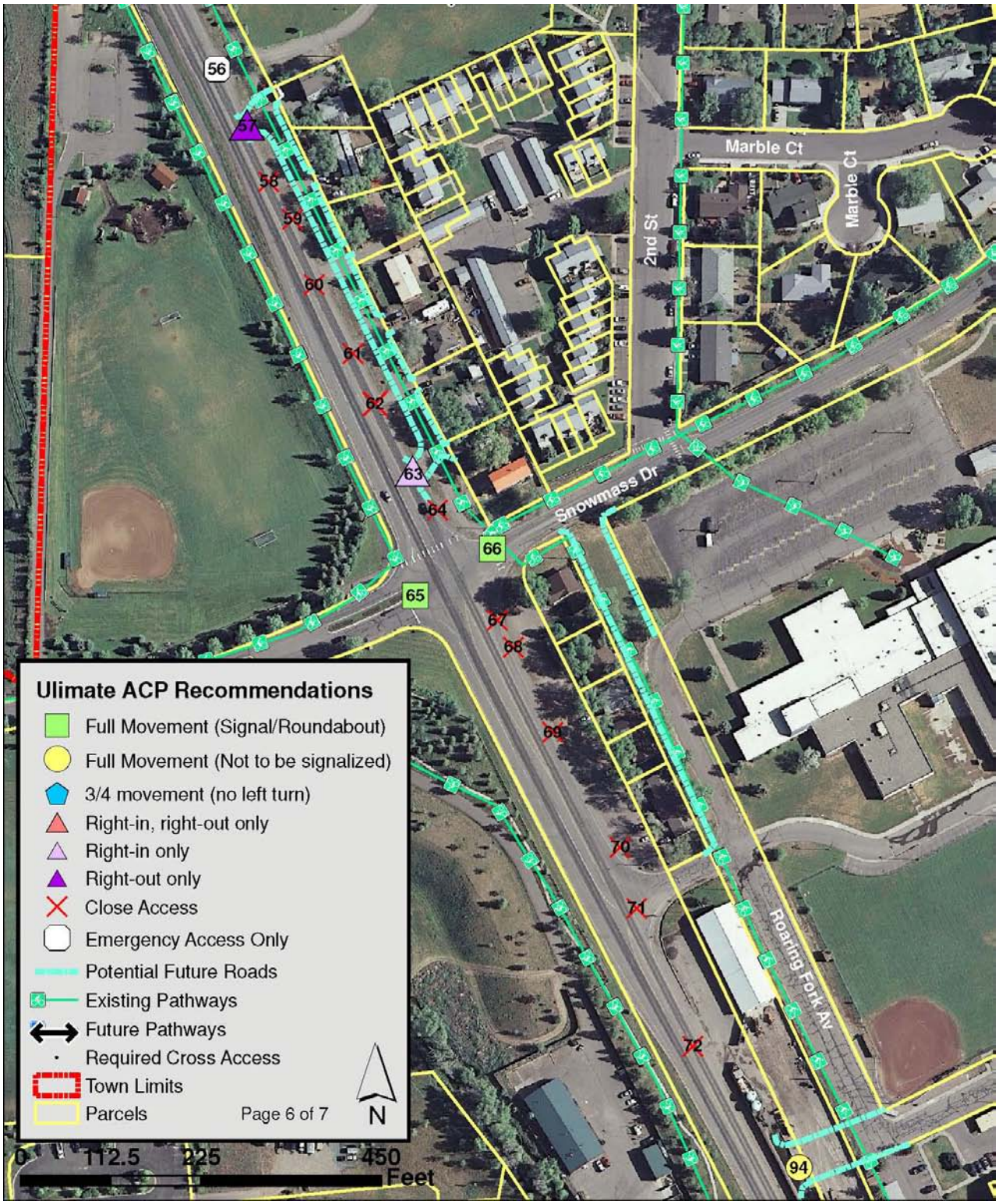

Figure 17. Recommended access locations (Sheet 7 of 7)

7.3. Intersection level of service analysis

Once the final configuration for each access point was determined, another LOS analysis was conducted assuming a four lane cross-section from SH 82 to Main Street. This LOS analysis reflects the proposed access changes to the study roadway. Table 7 contains the intersection LOS and detailed analysis of the future LOS with the recommended access changes as provided in Appendix L.

A roundabout was assumed to be installed at the Unnamed Public Road (access #16/83 south of Dolores Way), Industry Place (access #18/85), and Nieslanik Avenue (access #20/86) for the "With ACP Implemented" scenario. Intersections assumed to be controlled by a signal were Village Way/RFTA (access #10/11), Main Street (access #30/31), re-aligned Hendrick Drive/Sopris Avenue (access #43/92), Weant Boulevard (access #55/93), Snowmass Drive/River Valley Ranch Road (access #65/66), and Meadowood Drive/Crystal Bridge Drive (access #76/77). The intersections modeled as signalized may be constructed as roundabouts, but this should be determined by a future traffic study and designed to obtain a minimum LOC D for the 20-year horizon.

The results of the analysis of the future LOS with the recommended ACP show the majority of intersections and the SH 133 arterial are projected to operate at a better LOS than if no ACP is implemented. The exception is Cowen Drive, which is allowed as a full-movement intersection as part of the ACP and may be required to accommodate traffic from nearby accesses that will be closed, but the intersection shall not be signalized. This intersection should be monitored in the future, and a traffic or safety study should determine whether turning restrictions need to be imposed in the future or if another configuration, such as a roundabout, can be installed without negatively impacting other nearby intersections.

With the ACP implemented, many of the intersections are proposed to be converted to a right-in, right-out, ¾-movement, or to have a signal or roundabout constructed in order to minimize the left turn movements out from side streets onto the highway. Side street delay from vehicles trying to enter SH 133 is greatly reduced when turn restrictions are implemented.

It should be noted that the LOS analysis indicates that some of the driveways will operate with LOS better than LOS D, generally considered acceptable operations, but the ACP is recommending the closure of the driveway. Typically this is because the ACP has recommended or assumed the addition of a new access (new roadway) or that improvements to adjacent access locations (addition of a new roundabout or a signal) will allow for or necessitate the need to close specific driveways.

Table 7. Comparison intersection level of service results for 2032 with and without ACP

Intersection	No-Action (4 lanes)		With ACP (4 lanes)	
	AM	PM	AM	PM
Driveway (North Red Rock Diner)	D	C	CLOSED	
Driveway (South Red Rock Diner)	D	D	CLOSED	
Cowen Drive	E	E	F	E
Driveway (Coldwell Bank)	C	B	A	B
Driveway (The Alpine)	B	B	B	B
Village Road*	A	A	A	A
Dolores Way	E	D	B	D
Unnamed Public Road (access #16)	C	F	A	A
Driveway (Co-op)	C	F	CLOSED	
Industry Place**	A	B	A	A
Driveway (Red Rock Plaza)	A	F	CLOSED	
Nieslanik Avenue**	A	A	A	A
Driveway (Amerigas)	B	B	CLOSED	
Driveway (ET Plaza)	B	C	CLOSED	
Driveway (new roadway)	N/A		A	A
Driveway (Sopris Shopping Center)	B	C	CLOSED	
Colorado Avenue	C	D	CLOSED	
Main Street*	C	C	C	D
City Market/Carbondale Plaza	C	E	B	C
Driveway (new access Carbondale Plaza)	N/A		B	C
Garfield Avenue	C	C	C	C
Euclid Avenue	C	D	C	C
Driveway(Mobile Home Park)	D	D	CLOSED	
Driveway (Wells Fargo)	F	F	CLOSED	
Sopris Avenue	E	D	A	B
Hendrick Drive	F	D	Aligned with Sopris	
Driveway (Physicians)	D	C	CLOSED	
8th Street	F	D	C	C
Keator Road	F	C	B	B
Weant Boulevard	F	F	A	A
Snowmass Drive/River Valley Ranch Drive	F	F	C	B
Unnamed Public Road (access #71)	F	B	CLOSED	
New Access (Roaring Fork Avenue)	N/A		C	B
Meadowood Drive/Crystal Bridge Drive*	B	A	B	A
Roaring Fork High School	B	B	B	B

Green is for intersections with LOS A or B, Yellow is for intersections with LOS C or D, Red is for intersections with LOS E or F.
* Signalized intersection.
**LOS obtained from 50% confidence level analysis for 2030 from approved Villages at Crystal River TIS.

7.4. Accident analysis

Although future accidents cannot be accurately predicted, the recommendations of the ACP will have an impact on the overall safety of the study roadway by reducing the number of conflict points and providing better traffic control at intersections.

The ACP will have an impact on safety because the recommendations reduce the number of conflict points along the study roadway. A conflict point is the location where the paths of two roadway users (vehicles, pedestrians, or bicyclists) cross each other. The ACP makes recommendations that reduce the number of locations where paths of the different users cross each other. The following are examples of conflict point reductions:

- Conversion of access from full-movement to right-in, right-out
- Restriction of access from full-movement to ¾-movement
- Combining multiple access driveways into a single shared driveway

All of these examples eliminate conflict points along the roadways. By reducing the number of possible conflict points along a roadway, fewer accidents are expected to occur resulting in a safer roadway. Pedestrians and bicyclists will have fewer intersections to cross and locations where they will not have to worry about left-turning vehicles.

The ACP also identifies several intersections that may require a change in traffic control such as the installation of a traffic signal or roundabout in the future. The changes in traffic control can have a positive impact on the overall safety of a roadway. While traffic signals may result in a higher number of rear end accidents, they also provide an opportunity to reduce the number of left-turning related crashes by providing protection for left-turning movements. Traffic signals also provide a safer crossing opportunity for pedestrians/bicyclists as they will be able to cross the roadway with the protection of the signal. Roundabouts also provide a much safer intersection experience for vehicle operations as they reduce the severity of crashes while providing a safe location for drivers to make left turns or u-turns to reach their destinations. Roundabouts reduce vehicle speeds and reduce the overall width of the roadway (no auxiliary lanes are required) that the pedestrian/bicyclists must cross. They also provide some safety benefits for pedestrians and bicyclists as well.

The recommendations for changes to access along SH 133 should have an overall benefit to the safety of the study roadway in the future. Even as traffic volumes continue to increase, the reduction in conflict points and the introduction of better traffic control along the study roadway will have a positive impact on the overall safety for the different modes of transportation.

7.5. Alternative transportation modes

The recommendations and conclusions contained in the SH 133 ACP do not prohibit future improvements to the transit, bicycle, and pedestrian facilities in and around the Town.

Although not specifically addressed in the ACP, Figure 11 through Figure 17 show areas where the Town plans to improve the pedestrian/bicyclist facilities parallel to and near SH 133 within Town boundaries. The ACP does identify areas where new sidewalks/pathways could be added to the system to eliminate gaps and improve overall connectivity for non-motorized travelers. In the area where new facilities could be added, it is not necessary that the facilities be constructed directly adjacent to the roadway, but that as development occurs the Town should work with the property owner to ensure that the final design provides for pedestrian facilities to be constructed. The facilities may be along the back of the property or through the middle of the property, as long as the gaps are eliminated.

Improvements to the pedestrian/bicycle path system should be accomplished through the development/redevelopment process and should be a requirement for inclusion before projects are accepted or notice to occupy is issued. The Town, County, and CDOT should work together to make sure that

roadway improvements within the study area include improvements to existing facilities or addition of new facilities in an effort to:

- Meet the Town's goals
- Complete connectivity in and through the area
- Encourage alternative modes of transportation
- Provide safe and efficient movements of non-motorized movements in the area

RFTA participated in the project during the early development phase of the project and provided thoughts regarding possible impacts to transit service in the area. The following critical comments were provided by RFTA:

- Better connectivity of pedestrian/bicycle facilities to stops
- Roadway improvements should not hinder bus operations

Although these issues are not specifically addressed in an ACP, they are important issues that should be planned for as this area continues to grow and develop. The recommendations contained in the ACP would not prohibit the improvements that would address RFTA's concerns. As previously discussed, improvements to the sidewalks/pathways to eliminate gaps and provide better connectivity would not only improve safety, but could promote the use of transit services and help reduce the volume of traffic on the study roadway. Future improvements to the study roadway could be designed to provide bus pull outs, which would improve safety for the buses and the transit riders as they enter and exit the bus.

Finally, transit vehicles are on schedules and with the introduction of traffic control devices such as traffic signals and/or roundabouts, there is the potential to introduce delay for the transit vehicles. Proper design of roadway laneage, roundabout sizing, and signal timing could be accomplished in a manner to minimize possible delay to transit vehicles and thus not hinder operations or scheduling of services.

It should be noted the Town wants to maintain a friendly environment for alternative modes of transportation, especially pedestrians and bicyclists. The Town would also like to see the addition of a future local transit circulator service to the community. While the development of an ACP is anticipated to have many benefits for automobile traffic, the Town gives equal importance to the circulation of alternative modes. Implementation of the ACP should consider methods, such as colored crosswalks, safe crossings at signalized intersections, separated/protected areas for crossing over/under busy roadways or waterways, signage to encourage roadway sharing, and implementation of bicycle lanes, all have the potential to assist the Town in achieving the goals as set forth in the Town's Comprehensive Plan.

7.6. Future roadway connectivity

Figure 11 through Figure 17 include opportunities for roadways that would help improve the overall connectivity of the transportation system. These new roads were identified based on future developments, input from stakeholders, and in an effort to provide drivers with choices on how to get to their final destinations so that local traffic making local trips may be able to do so without the use of SH 133. This will reduce the traffic volumes on SH 133 and may help extend the life span of the existing system and delay the need to make capacity related improvements to SH 133. The future roadways displayed in the figures are concepts of where more connectivity could occur in the future. The exact location and design of these roadways would need to be determined by completion of a more detailed traffic analysis at the time of the improvements. It should be noted the potential future roadways shown on the ACP should be included in the ongoing Comprehensive Plan being completed by the Town.

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8. Next steps

This document describes the process of developing the SH 133 ACP. There are several important steps that need to occur in the short term and long term to ensure the study roadway realizes the maximum benefit of the recommended ACP. These next steps start with the approval process.

8.1. Approval process

Before the study roadways can begin to benefit from the recommendations of the ACP, a few important events must occur:

- Inter-governmental Agreement (IGA) – All parties must develop and agree to an IGA. (See Appendix B for a copy of the draft IGA.)
- Plan Approval – The ACP must be approved by each entity and adopted by resolution. This includes the Board and the BOCC.
- Plan Adoption – The Town and County must sign the IGA.
- Plan briefing to the State Transportation Commission.
- Approval by the Chief Engineer of the Department of Transportation, which puts the plan into law.

Once the ACP is officially adopted by the Town, County, and CDOT, the adopted ACP becomes the basis for future decisions on site access. The current SH 133 ACP, as identified in this document, does not have any implementation timing or schedule. The ongoing SH 133 Safety Enhancement project being done by the Town, County, and CDOT could begin to implement improvements to the highway within the next few years, at which time portions of the ACP may be implemented.

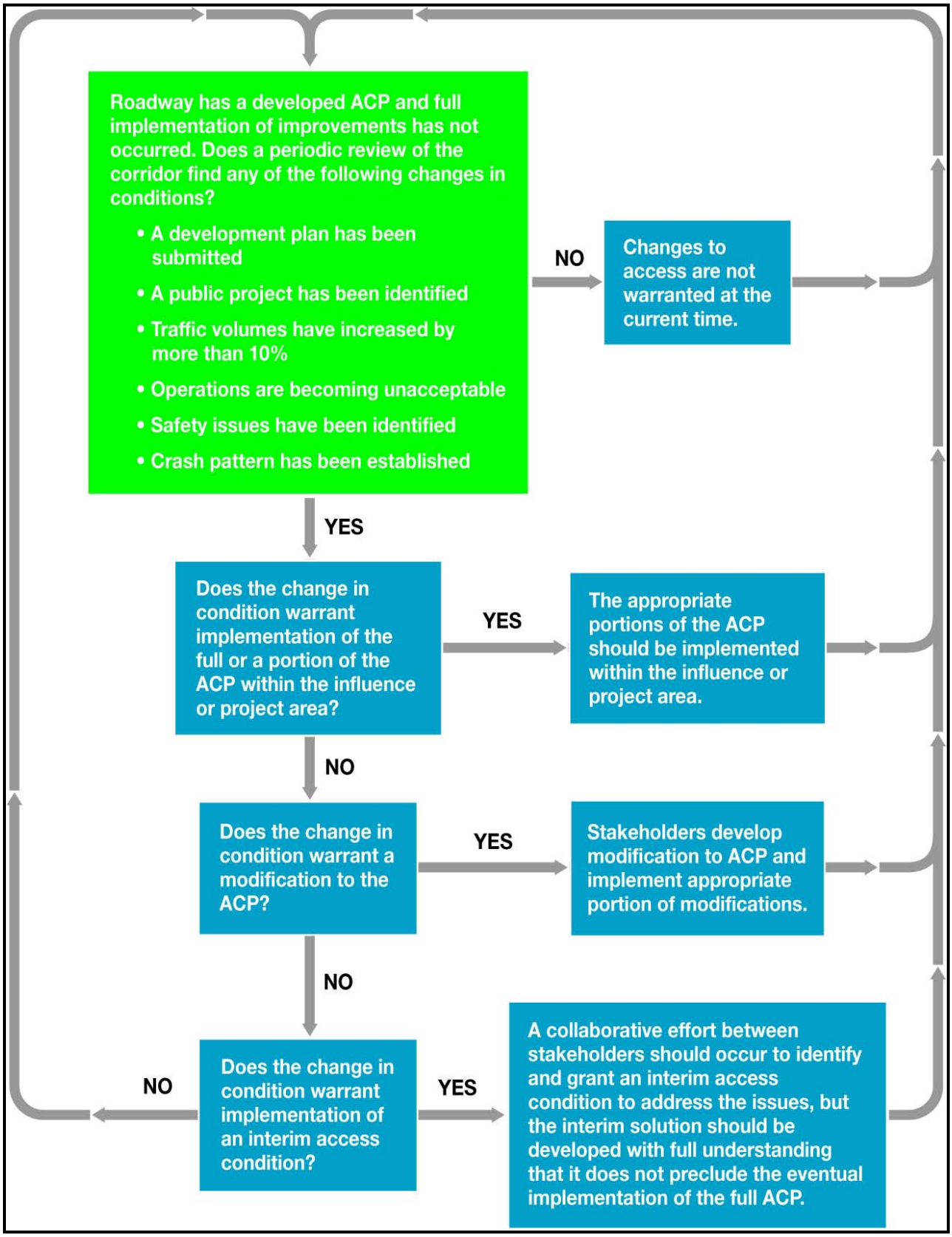
8.2. Plan implementation

It is important to remember that the ACP is intended to represent a long range plan for the study roadway. Implementation of the full plan can occur as a single project, or over the long term in smaller increments as a phased approach. Figure 18 provides details about how the ACP may be implemented over time as a phased approach.

Implementation of the full plan at a single time is unlikely to be feasible. This would be a publicly funded project by any combination of Town, County, and CDOT. A future public project would include the access changes described in the ACP that could be implemented at the time of the project. With the implementation of a roadway improvement project, such as the SH 133 Safety Enhancement project, the government would be responsible for making the access changes to the highway. Even with the planned project, the entire plan will not be implemented at one time because access must still be provided to each property on the corridor. For example, if a property has not redeveloped, it might not be feasible to relocate the driveway, or if the Town street network has not been completed, alternative access may not be available. In cases like this, an interim access to the property would be maintained until the ultimate access configuration could be achieved.

As traffic grows along SH 133, the Town, County, and CDOT will be faced with deciding how to implement the ACP. One approach may be to implement interim roadway improvements that would delay the need to implement the ultimate recommendations of the ACP. Implementing a TWLTL for portions of the study roadway, primarily between Cowen Drive and Main Street, is one way that the agencies could prolong the life of the existing roadway. The addition of a TWLTL would allow many of the existing access locations to remain as full movement further into the future until traffic volumes or safety issues indicate additional turn restrictions should to be considered.

Figure 18. ACP implementation process



With or without a TWLTL, once traffic volumes and/or safety issues indicate changes to access conditions are needed, the next phase of the implementation would be to identify locations where raised medians, traffic signals, roundabouts, or other forms of traffic control are warranted. The presence of a TWLTL would make it easier to construct raised medians (pavement area would already exist) to create three-quarter or right-in, right-out access driveways. Furthermore, should traffic volumes or accident history warrant the need to install a traffic signal, the TWLTL would easily be converted to left-turn lanes at the signalized intersection.

When intersections or access points have operational or safety concerns, the Town, County, and CDOT will look for ways to address these issues. These projects would most likely incorporate portions of the ACP, such as implementing turn restrictions or improving adjacent intersections/access locations, to improve operations or increase safety along the corridor.

The most common trigger for the phased approach relates to when a property along SH 133 develops, redevelops, or if a driveway experiences a traffic volume increase of 20 percent or more (per the *State Highway Access Code*). Under this scenario, a new CDOT access permit is required, and the Town, County, and CDOT would work with the property owner or the developer to make the access changes and highway improvements in the area directly impacted by the development/redevelopment. Coordination through the development process is critical to the ultimate success of the plan. If the ultimate ACP cannot be implemented when a property redevelops, the property should develop in such a way as to not prohibit the plan implementation. For example, buildings should be constructed in such a manner as to use a future access location shown on the plan.

Even if project related traffic volumes do not warrant the full implementation of the plan, the Town should develop a method to collect funds from the owner/developer with the understanding that the changes will be necessary in the future. This may encourage some development to occur now, but the Town will have collected funds to help offset the cost of the future improvements. This is especially important in the case where a property simply redevelops, but does not increase the traffic generated by 20 percent or more. If the Town does not implement the plan at the same time or collect funds for future implementation, it is unlikely the same property would redevelop again before the changes are necessary, creating a missed opportunity to implement the plan or collect contributions toward the improvements.

Another important aspect of the implementation process is how access is granted to new developments. Each property along the study roadway must be provided with reasonable access. The Town, County, and CDOT should work with the owner/developer to ensure projects are designed with consideration to where access will be permitted in the ultimate ACP. Access will be provided to the property as shown on the ACP unless it is not feasible to implement at the time of the development. Then, an interim access will be permitted, which will change once the ultimate access conditions can be achieved. Coordinating with the owner/developer throughout the project development process will ensure the final design of the property does not preclude the implementation of the final ACP configuration on the study roadway.

8.3. Plan modification

The outcome of this study is the SH 133 ACP, which identifies the number, location, and type of access points that will be allowed on SH 133 within the study limits. Future changes to the plan are allowed based upon the guidelines of the *State Highway Access Code*, according to Section 2.12, “Access Control Plans”:

> *The plan must receive the approval of both the Department and the appropriate local authority to become effective. This approval shall be in the form of a formal written agreement signed by the local authority and the Chief Engineer of the Department. After an access control plan is in effect, modifications to the plan must receive the approval of the local authority and the Department. Where an access control plan is in effect, all action taken in regard to access shall be in conformance with the plan and current Code design standards unless both the Department and the local authority approve a geometric design waiver under the waiver subsection of the Code (p. 30, paragraph 3).*

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9. References

State Highway Access Category Assignment Schedule. 2003. 2 CCR §601-1a. 30 October 2007.

State Highway Access Code. 1998. 2 CCR §601-1. March 2002.

Transportation Research Board. (2000). *Highway Capacity Manual*. Washington, D.C.: National Academy of Sciences.

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Appendices

Appendix A. ACP (Table)

Appendix B. Inter-governmental agreement

Appendix C. Public outreach mailing lists

Appendix D. 2012 Average daily traffic data

Appendix E. 2012 Intersection turning movement count data

Appendix F. 2012 Level of service

Appendix G. 2032 Level of service without ACP

G.1. SH 133 with two lanes

G.2. SH 133 with four lanes

Appendix H. First public open house materials

Appendix I. One-on-one meeting materials

Appendix J. Second public open house materials

Appendix K. County Commissioner's work session materials

Appendix L. 2032 level of service with ACP

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