

GENERAL
PLAN
UPDATE

2020

Town of Castle Valley, Utah

TABLE OF CONTENTS

Introduction	1
1) Community Goals	7
2) Land Use	9
3) Housing	12
4) Transportation and Roads	14
5) Water and Wastewater Disposal Systems	16
6) Fire Protection and Emergency Preparedness	19
7) Environmental Concerns	22
8) Town Government	25
Appendix I: Castle Valley Town Map	27
Appendix II: Map of Castle Valley Geologic Hazards	28-31
Appendix III: Map of the Castle Valley Watershed	32-35

TOWN OF CASTLE VALLEY GENERAL PLAN UPDATE

ADOPTED SEPTEMBER 16, 2020

INTRODUCTION

Castle Valley is a small incorporated Town in Grand County, Utah. Castle Valley was initially a large ranch which was subdivided into five-acre minimum lots, platted, and recorded on May 11, 1973. The Town of Castle Valley was officially incorporated on July 26, 1985, and developed its Master Plan in 1988. Subsequent General Plan updates were prepared in 1987, 1996, 2001, 2007, and 2014.

The Town of Castle Valley promotes the interests of the residents that live within the Town limits and protects the quality of life here. In addition to the basic responsibilities of the Town that include managing water rights and maintaining the roads, there are many other benefits of having a Town structure incorporated within Grand County. Some of these benefits include:

- Independence in creating ordinances that fit the needs and wishes of Castle Valley residents
- Improved standing with other regional governmental agencies, including the City of Moab and Grand County.
- Increased chance of cooperative interaction with Federal and State agencies that affect the Town directly, such as the Bureau of Land Management, US Forest Service and the Utah Department of Wildlife Resources.
- Improved opportunity for cooperative interaction with Private entities including Utah Open Lands, Day Star Academy, Canyonlands Field Institute, International Dark Sky Association and the Castleton Community.
- Greater possibility of obtaining “Cooperating Agency” status with Federal agencies such as the US Forest Service and Bureau of Land Management.
- Greater ability to pursue goals specific to the Town of Castle Valley that may not be important to entities outside the Town.

Reason for the Castle Valley General Plan

The General Plan provides the legal basis for land use ordinances and policy issues and gives guidance to the Town government for future decision-making. In order to be effective, it should also embody the goals and desires of the community. One of the most important objectives of the Plan is that it provides a framework for zoning and land use consideration by the Town’s government bodies.

Long-range planning with a General Plan will help the Castle Valley Planning and Land Use Commission and the Castle Valley Town Council to:

- set Town-wide goals that reflect the desires of residents and property owners.
- anticipate and prepare for the future.
- establish sound policies for land use.
- assure efficient use of limited public funds.
- promote the health, safety and welfare of all residents and property owners.
- formulate appropriate land use ordinances.

General Plan Implementation

In order to ensure that the General Plan reflects the changing needs of residents and land owners, it shall be the policy of the Planning and Land Use Commission and the Town Council that:

1. The Castle Valley General Plan will be implemented by a zoning ordinance, a capital improvements program, a subdivision ordinance or other ordinances, regulations, studies, or programs as deemed appropriate by the Town Council, including recommendations by the Planning and Land Use Commission.
2. All ordinance changes, re-zonings, or improvement programs shall be in compliance with the expressed policies contained in the Castle Valley General Plan, Utah State Code, and applicable federal policies, and be subject to public hearings.
3. The Castle Valley General Plan shall receive a comprehensive review approximately every five years to assure that its policies, programs, and future goals are consistent in reflecting the goals and needs of the Town residents and property owners.
4. Requests for General Plan amendment and review may be made by the general public in March and September of each calendar year. The burden of establishing that any amendment to the General Plan is in the best interest of the Town shall rest on the applicant, who must demonstrate that the change will promote the general welfare of the Town and will not result in a decrease in the quality of life in Castle Valley.
5. Local talents and expertise of residents and property owners will be utilized to inform the greater community on issues outlined in this General Plan whenever possible.

Nature of the Town

The 2010 U.S. Census reported the population of the Town of Castle Valley at 319 as compared to the 2000 U.S. Census at 349. This update predates the 2020 Census, but it seems likely that the Town’s population may have increased slightly since 2010, perhaps to 330 or so. Almost 50 percent of survey respondents were full-time residents of the Town; 31 percent were part-time residents; nearly 19 percent were non-resident property owners; and one and one-half percent were renters. Thus, the Town is composed of many properties that are either vacation or second homes.

The 2010 U.S. Census also showed the following demographics for Town residents:

Male	166	White	310
Female	153	African American	0
Under 18	26	American Indian or Alaska Native	1
20-34 years old	23	Asian	2
35-49 years old	42	Native Hawaiian and Pacific Islander	0
50-64 years old	159	Other	2
65 years old & over	62	Identified by two or more	4

In July 2019 the Planning and Land Use Commission conducted a Town survey of all current full-time residents, part-time residents and non-resident property owners. Recipients were informed that its purpose was to gather information from the community as part of the Town’s

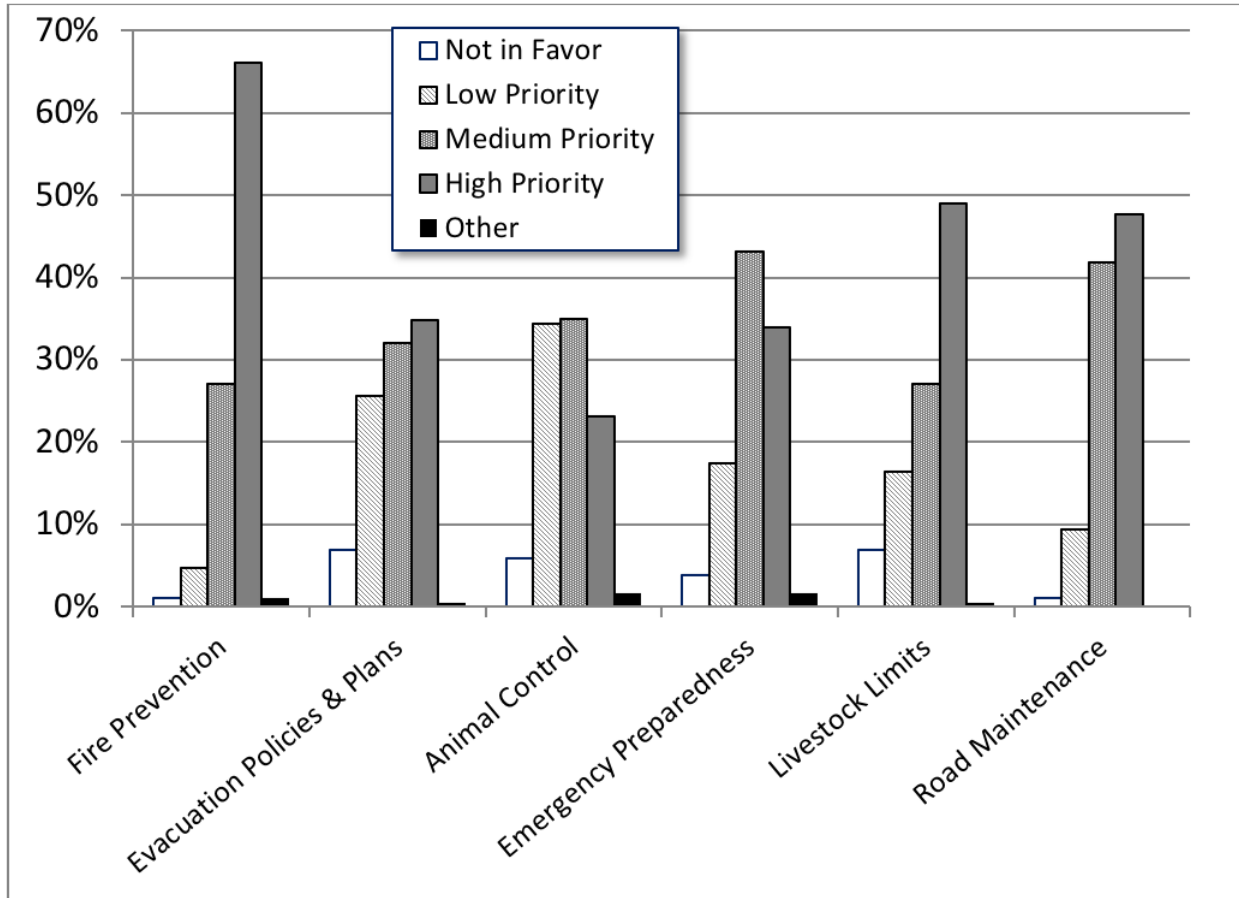
General Plan review and update process, which is done about every five years. A survey was mailed to the 360 property owners of record.¹ Of the surveys mailed, 205 were returned (57%). One notable change was that residents are becoming older. The median age of all respondents to the survey was 62 years. Of residents, the median age was 65. This is a result of two trends: (1) long-term residents aging, many now in their 60s or 70s, and (2) residents having moved into Castle Valley after they have completed their paid work life. Some authorities refer to this aging trend as a Naturally Occurring Retirement Community (NORC). Yet, “retirement” does not realistically convey the multiple activities of Castle Valley residents.

The most common household size of all respondents was two people (68%); the next most common size was one person in the household (nearly 18%). Of all respondents, the largest household size was six. Only one resident household had six members.

Nearly 80 percent of respondents have permanent housing in Castle Valley and a similar percentage obtained their water from a well.

Past Town surveys conducted in 1987, 1996, 2001, 2007, and 2012 have shown that the vast majority of both residents and all property owners wish to preserve the unique quality of life in Castle Valley and have been opposed to commercial and industrial development. Findings from the 2019 survey affirm similar attitudes and many of the same values reflected in past surveys.

¹ Property owners with multiple lots received only one survey. If a second adult in a household wished to complete a survey, they were permitted to do so. Fourteen second household surveys were returned and those findings were incorporated into the overall data.



Survey Question J2: Which issues do you believe the Town should make a high priority to develop or improve upon?

The 2019 Town survey revealed that residents and property-owners value Castle Valley for its natural beauty and open space, quiet and tranquility, strong sense of community and friendly people, dark night skies, rural atmosphere, privacy, and remoteness. The unique natural setting is a primary factor in the quality of life in the Town. Enjoyment of the natural surroundings is inherent to the character of the Town.

The 2012 Town survey found that property owners placed a high value on protecting open spaces, the integrity of the natural landscape, and the natural and scenic resources of the area. The 2019 Town survey reflected particular emphasis on maintaining dark skies (75.9%) and reducing the number of permitted livestock (80%).

While there are diverse notions of how a sustainable community might be defined, the most applicable definition for the purposes of this General Plan includes those practices that enhance and preserve the natural and scenic environment and the natural resources and environmental quality of our community for future generations. Sustainability applies to the natural, social, economic, and built environments that are shaped by human impact. The following examples illustrate sustainable practices and policies included throughout this General Plan:

- Ensure a long-term, sustainable drinking water supply by protecting the Town’s uncontained aquifer from identifiable contaminants and through water conservation efforts.

- Maintain the 5-acre minimum size for lots and only one dwelling per lot.
- Support low-impact agriculture and livestock activities.
- Provide a level of services for citizens that assures efficient use of limited public funds.

Findings of the 2012 Town survey revealed that emergency medical services in Castle Valley and improvement of Castle Valley Drive were the new services most supported. Both have occurred over the past five years. From the 2019 Town survey, the most supported new initiatives include reducing the number of livestock permitted on lots, finding ways to expand enforcement of existing or new ordinances, supporting the creation of a non-profit organization to raise finances for services normally outside of the Town’s budget or responsibilities, and preserving the quality of Castle Valley’s dark skies.

One of the ongoing challenges facing the Town of Castle Valley is recruiting and retaining skilled employees and volunteers for Town government and related committees. Over past years, many longer-term residents have served in some capacity in the Town government. The 2019 Town survey found only 10% of respondents said “Yes” to the question of whether they would consider serving the Town government in some capacity. Yet many respondents expect the Town to do more than it currently does, especially in terms of enforcement of existing ordinances, road maintenance, and numerous other issues.

Community Activities

Castle Valley is more than just a municipality. Numerous groups, clubs, events, and activities are held throughout the year and serve the many interests of property owners. With the exception of summer months, a community potluck dinner is held monthly at the Church of Jesus Christ of Latter-day Saints. Also meeting monthly throughout the year are a photography group, a book group, a women’s group, and a hiking group. The annual October Gourd Festival has been held for 18 years and attracts visitors from Moab and far beyond. Its festivities include booths for sale of gourds, a parade led by the Gourdess of the Year and her giant consort Gourdie, live music, a potluck lunch, a puppet show, and many other activities for adults and children. For the past two years, a 4th of July pancake breakfast with a parade has been organized by supporters of the fire department. They hope it will become an annual event.

Within the Castle Valley Community Center, the Grand County Library provides services for Castle Valley and surrounding areas. In recent years, over 3500 patron visits to the Castle Valley Library were recorded annually and nearly 11,000 books, DVDs, and other materials were borrowed each year. In addition, the Castle Valley Library provides access to laptop computers, a printer, and the internet. The Library hosts over 100 events each year, including presentations on topics of community interests, films, a bridge group, a weekly Children’s Story Time, and even a venue for ping pong enthusiasts. New activities are added each year.

The Grand County Library has added a number of improvements to the Community Center, including a free 24/7 Wi-Fi hot spot and computer access to the internet; blackout window shades; gallery railing and hardware for hanging photos and paintings; a new book drop at the entrance; and, in cooperation with WabiSabi and the Town, audiovisual equipment and a full-size screen for multi-media use by both the Town and the Library.

Most people in Castle Valley enjoy outdoor recreation, from walks to longer hikes, mountain biking, rafting, horseback riding, fishing, and similar activities. The varied landscape surrounding Castle Valley provides these and other opportunities for people and is one of the

reasons we value owning property here. Many people grow gardens and tend orchards that provide vegetables and fruit for themselves and neighbors. A few residents raise livestock.

As this General Plan update was nearing completion in early 2020, the coronavirus pandemic hit. The Town was quick to respond. The Town office was closed and all meetings in the Community Center were either canceled or held online. The Town government conducted its business through teleconference meetings. Members of the community stepped up in several ways: collecting groceries for others unable or unwilling to go to Moab, doing a variety of small and large errands for others, and making masks for first responders in Castle Valley and for Moab Regional Hospital. Overall, the community demonstrated its willingness to take the risk of Covid-19 seriously and maintain risk-reduction behaviors.

Town Achievements

Since the 2014 General Plan update, a number of changes have occurred in the Town. Among the achievements are:

- Chip sealed Castle Valley Drive.
- Extended east Shafer Lane as far as the Fire Department's Station 1.
- Clarified language in several ordinances and forms.
- Provided ongoing training for Town employees, members of the Planning and Land Use Commission, and the Town Council.
- Conducted a study of available water in the aquifer from which property owners draw water.
- Assured that the Town's budget is spent efficiently.
- Replaced the former three-member volunteer Appeal Authority with a contracted professional from outside the Town.
- Prepared and approved a Town Hazard Mitigation Plan.
- Cooperated with various local and Federal agencies to promote the interests, health, and safety of town residents.

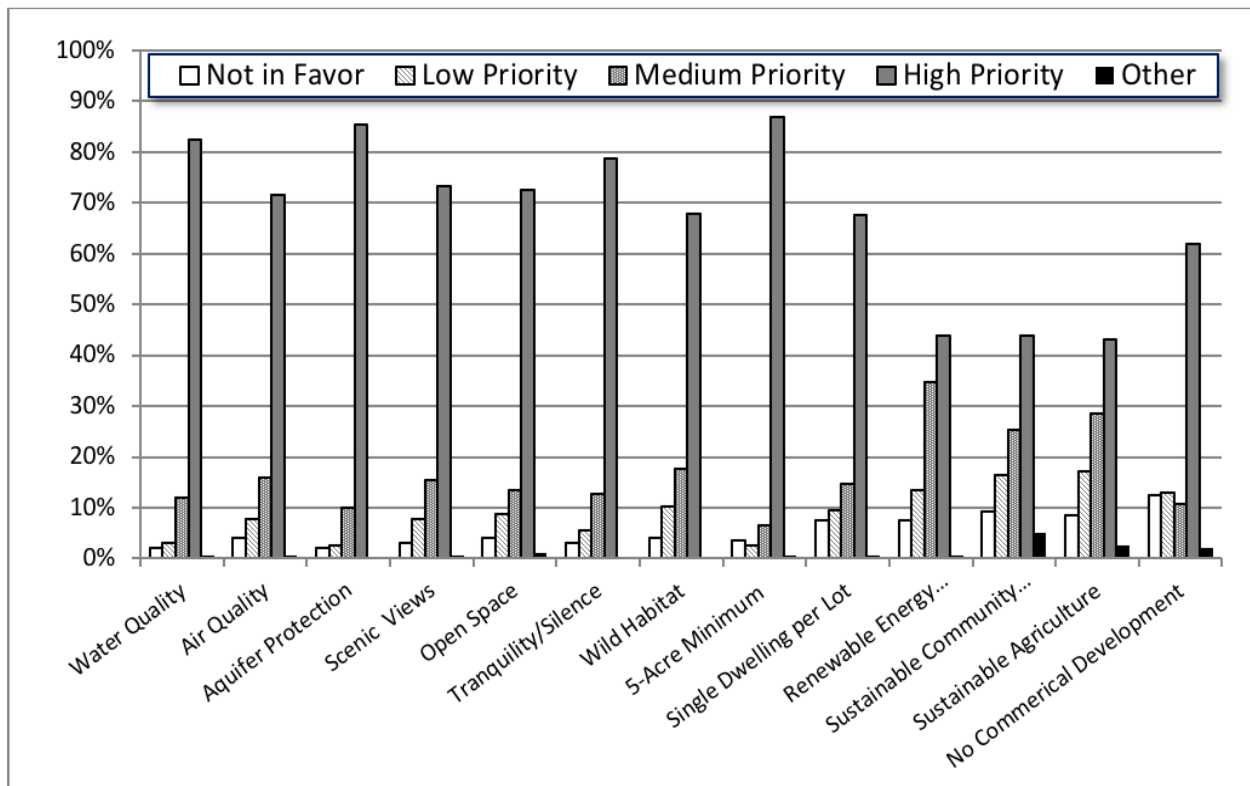
General Plan

The Castle Valley General Plan is divided into the following sections. Each section includes a short narrative, overarching goals, and policies.

- 1) Community Goals
- 2) Land Use
- 3) Housing
- 4) Transportation and Roads
- 5) Water and Waste-Water Disposal Systems
- 6) Fire Protection and Emergency Preparedness
- 7) Environmental Concerns
- 8) Town Government

1. COMMUNITY GOALS

Castle Valley is surrounded by large tracts of open space and minimally developed public land that provide a natural setting, integral to the character of the Town. The sensitive nature of the land and water of Castle Valley and the effects of climate change call for creative and new ways of managing Town and surrounding lands and our local and global environments. As in past General Plan updates, the 2019 Town survey showed a continued appreciation of the viewshed and open space, quiet and tranquil environment, strong sense of community, clean water and air, and diverse lifestyles. To achieve these goals, the Town will also strive to work cooperatively with the Federal, State and private entities that control land and/or easements within the Town boundaries.



Survey Question J1: Which community values and policies do you believe the Town should continue to protect and maintain?

Property owners and residents expressed a strong desire to preserve this unique quality of life. All ordinances will be carefully crafted and enforced with the following goals in mind:

- Preserve and enhance Castle Valley as a scenic, rural, residential community that allows low impact agricultural activities.
- Protect the unique character and scale of the Town, including the absence of commercial store-front businesses. Protect our clean water and air.
- Protect the quality of life, viewshed, sense of open space, and dark night skies.
- Preserve the strong sense of community and diversity of lifestyles.

- Protect, wherever practicable, persons and property from unreasonable exposure to hazards, potential disasters, and identifiable vulnerabilities, such as wildfires.
- Preserve and enhance the surrounding area's natural environment and the natural resources of our community for future generations.

2. LAND USE

Existing Conditions

Castle Valley is a rural residential and agricultural community, made up of five-acre minimum lots with single-family homes and accessory buildings in association with low-impact agricultural uses. The Town currently allows home and premises businesses to operate with a conditional use permit, but no other commercial or industrial activity is permitted (with the exception of the Castle Valley Inn which operates under a contract with the Town). As of the end of 2019, there were 30 Home or Premises Occupations permitted in the Town.

A large parcel of unplatted public land exists as undeveloped open space in the upper part of the valley within Town boundaries. It is zoned as Range and Grazing with fifteen-acre minimum lot sizes required if ever subdivided and developed. A majority of respondents to the 2012 Town survey favored preserving these lands as open space and keeping them from being developed.

The Town's boundaries include lands owned by the Federal Bureau of Land Management (BLM) and Utah Open Lands (UOL) that are open to hunting, some of which abut or surround residential areas. As the population has grown in the upper valley, conflicts have increased. The Town has sought to mitigate conflicts between residents and public land users by adopting an ordinance in 1998 which was amended in 2007 (Ordinance 2007-7 Regarding Hunting And Discharge Of Firearms Within The Boundaries Of The Town Of Castle Valley), which restricted firearm uses on privately owned property and limited hunting on federal land to archery only.

In 2018, Ordinance 2007-7 was found to be invalid by the Utah Division of Wildlife Resources. The hunting designation reverted to the previous designation of hunting with shotguns, muzzleloaders and archery weapons only. Due to continuing safety concerns, in December 2019 the Town petitioned the Utah Division of Wildlife Resources Board of Directors to officially change the hunting designation to "Archery Only". The DWR Board declined the request and the hunting designation ordinance remained as Ordinance 1998-1 which allows hunting with shotguns, muzzleloaders and archery weapons only. The risks to public safety that the Town was trying to reduce by changing the designation to "Archery Only" remain. Citizens that live in the residential area adjoining the hunting areas and recreational users of the area remain especially at risk.

The Town has a modest level of public facilities and services. The Community Center was built on the Town lot in 2004 and serves as a gathering place for community and Town government events. The Town building houses the Town office, meeting rooms, and a branch of the Grand County Public Library. The Town lot is home to a fire station owned and managed by the Grand County Special Service Area for Castle Valley Fire Protection, a shed for Roads Department equipment, a basketball court, an outdoor picnic area, and playground equipment. The Town has a small part-time staff. The Town has a cemetery that is maintained by the Grand County Cemetery District. There is no municipal water delivery system or wastewater treatment facility nor is there any municipal garbage removal service for residents. Optional garbage and recycling pickup services are provided by private companies. Improvements in electrical infrastructure are currently being made by Rocky Mountain Power (RMP). An additional internet service provider, River Canyon Wireless, recently installed fixed Wi-Fi to Castle Valley, and fiber optic internet/phone service through Emery Telecom is in process, to be completed in 2020 or 2021.

In early 2020, the Town explored several options for self-supplying gravel to improve the condition of the Town's roads, including reviving existing gravel sources in nearby locations. The Town focused on the previously used "Quaky Shake" site. There were several advantages of the Town managing its own gravel source. These included self-sufficiency, increased work opportunities for existing road staff and possible lower material costs. The discussed disadvantages included potential noise and dust pollution and other negative environmental problems like wildlife disruption and ground water disturbance, increased wear and tear on Town road equipment, de-prioritizing of ongoing road maintenance, possible higher material costs and lack of suitable material at the site. The Town has also been actively involved in working with other outside entities in the area to reduce or prohibit other surface occupancy projects, so approval of a Town managed gravel pit could weaken that ongoing cooperation. After much deliberation and public comment, the Town Council decided to continue to use outside commercial sources for its gravel supply.

Goals

- Remain a peaceful, quiet rural residential/agricultural community characterized by scenic views, a sense of open space, clean water and air, and the ability to enjoy wildlife, landscape, and sky.
- Enable residents to work at home and grow food locally while protecting our aquifer and the character, scale, and residential/rural atmosphere of the Town.
- Strive to achieve a reasonable balance between residential and agricultural values.

Policies

1. All lots in the Rural Agricultural Residential Zone will remain 5 acres or more including easements, with no more than one dwelling permitted on each lot (there was strong support for this in the 2019 Survey). In the Range and Grazing Zone, no future subdivided lot shall be permitted to be developed at an average density greater than one single-family dwelling per 15-acre minimum lot.
2. No land within the Town will be zoned for any commercial or industrial purpose.
3. The Town will improve its standards for home-based businesses and other activities conducted on occupied lots in order to ensure the following: low impact on neighbors, compatibility with residential uses, fire prevention and protection, and aquifer protection.
4. The Town will streamline and simplify the conditional use permit process, in part by replacing routine conditional use permits for home or premises occupations with standardized permitted uses and operating standards.
5. The Town will define and promote low-impact agriculture and support small-scale production for home consumption and local markets. Due to strong support in the 2019 Survey, the Town will undertake revision of livestock limits, the goal being to balance property rights with realistic preservation of aquifer protection, vegetation, environmental, and residential values.
6. The Town will improve coordination and consultation with private landowners and with the various agencies and entities that have authority over adjacent lands in order to encourage land use practices that are compatible with the Town's approach to land use including interest in: air quality and a peaceful and quiet atmosphere; water conservation, availability, quality, and drainage; all to be consistent with the Subdivision Ordinance 2004-3.
7. Open space shall be preserved to ensure the rural residential nature of the Town of Castle Valley, especially along the greenbelt parcels owned by the Town and unplatted areas within

the Town boundaries. The Town will explore or discuss options, as needed, regarding undeveloped lands in Castle Valley (i.e. conservation easements, memoranda of understanding with agencies, purchase or annexation) in order to exert greater influence over lands and potential uses or activities that could impact the quality of life in Castle Valley.

8. The Town will work with local service providers to enhance the efficiency of our telephone and internet services.
9. The Town will maintain policies and practices that protect the viewshed, such as the underground electric utility installation requirement, height restrictions, and the combined square footage maximum for buildings.

3. HOUSING

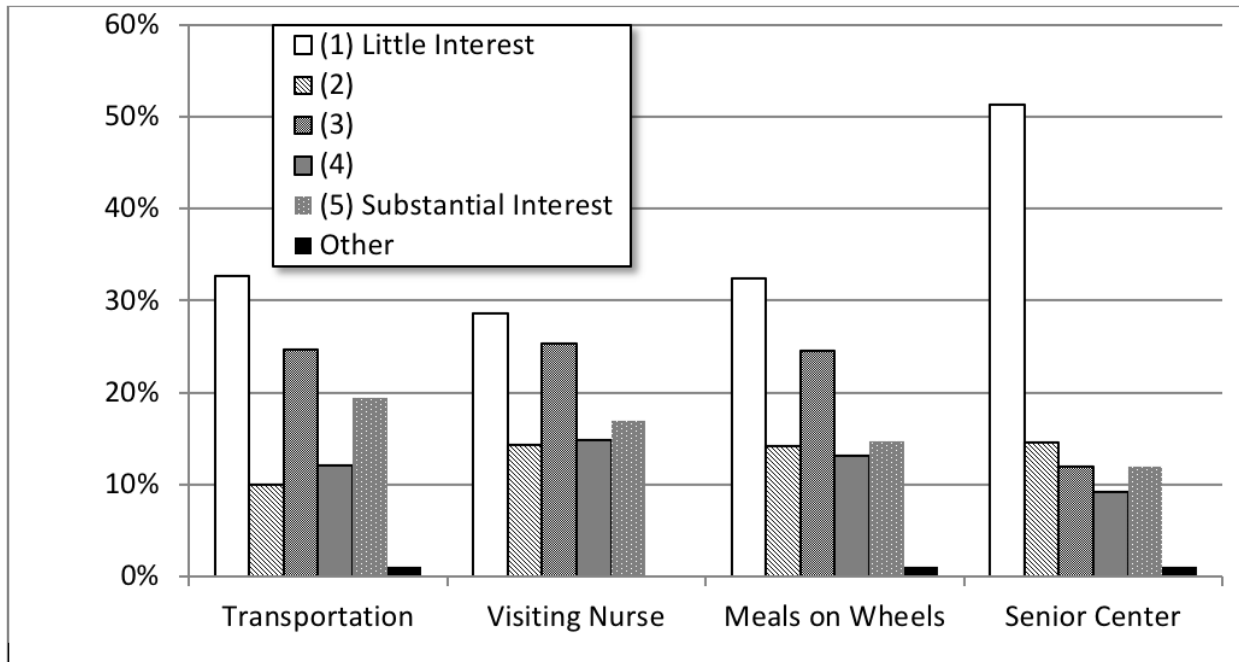
Existing Conditions

The 2010 US Census stated that the population of the Town of Castle Valley was 319. It also stated that the Town has 291 housing units occupied by 150 (52%) resident property owners; 20 (7%) resident renters; and 121 (42%) lots that are non-occupied because of seasonal/occasional use or are vacant. Castle Valley currently has 435 privately owned residential lots. Building activity has increased substantially over the past five years since the last General Plan was created. As of December 2019, there were 340 housing units, for a 78% build-out rate.

The median age of residents in Castle Valley is 65. The survey asked how concerned people are about aging in place or staying in their homes with a major health challenge; 170 replies broke down as follows:

Not concerned	28	16%
Low concern	38	22%
Medium concern	67	39%
High concern	33	19%
Other	2	1%

As might be expected, 81 of 170 replies (47%) that had medium or high concern about aging/health were from those aged 60 through 80. As in prior surveys, there is again a low level of support overall for public transportation to and from Moab, commercial facilities, or senior housing options.



Survey Question E4: Indicate your level of support for the listed senior services.

According to federal government definition, a community in which 40% of the heads of household are “older individuals” living in a community that was not specifically planned or designed to meet the needs of seniors living independently in their homes can be considered a NORC. Healthy NORCs place great emphasis on features such as walkability and social activities. Supportive services are created to maximize the health and well-being of resident seniors so they can maintain their independence and comfortably remain in their homes as they age in place. These programs are generally funded by a mix of public and private sources. A formal designation as a NORC could help the Town obtain grants and services. The Town could create a committee or a nonprofit organization to explore this avenue.

Goals

- Manage growth of houses and other structures in a way that guards the health, safety and welfare of residents and property owners.
- Manage growth of houses and other structures in a way that preserves the values of viewshed, open space, aquifer protection, quiet rural atmosphere, and privacy.
- Manage growth of the community in a way that preserves a wide variety of housing types and a diversity of economic, social, and age groups.
- Encourage water, energy, and resource conserving technologies and practices such as the following: energy efficient structures, green building standards, passive solar orientation, glare reduction in existing and future development, and rainwater harvesting and gray water usage that is compliant with all applicable State regulations.
- Continue permitting modern modular housing and tiny houses as a way of encouraging younger individuals and families to settle in the Town.

Policies

1. In May 2008, the Town Council implemented a Combined Square Footage Maximum for all buildings on a lot, along with new building height restrictions. This regulation was enacted in order to protect a sense of open space and the viewshed in the Town. The Combined Square Footage Maximum for all buildings on a lot shall remain in effect.
2. Dwellings which have been determined by the Grand County Building Inspector to endanger the public health, safety, or welfare will be “red-tagged” for demolition.
3. The Town will improve and enforce its policies prohibiting the alteration of natural drainages by requiring approval for any building or surface alteration that has direct or indirect impact upon Town easements and/or drainage channels.
4. The Town will create regulations for group homes for the disabled because such homes are required by federal law.
5. The Town will continue to support and enforce the current Ordinance 85-3, Section 4.4 PROHIBITED USES FOR RAR-1 AND RG-15 ZONES that establishes a minimum property rental period of 25 days.

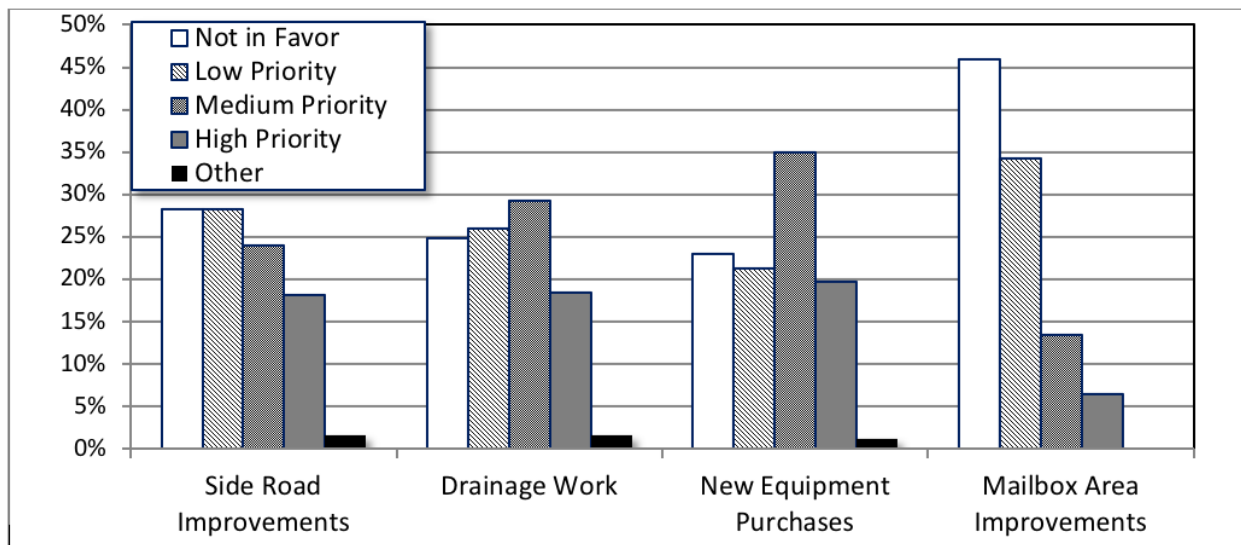
4. TRANSPORTATION AND ROADS

Existing Conditions

Castle Valley is served by County Road 96. State Highway 128, which is about 1.7 miles outside of the Town’s municipal boundary, is the principal transportation access to the Town. Castle Valley Drive serves as the main road leading in and out of the Town. Shafer Lane has been upgraded and designated as an emergency ingress and egress road for emergency responders and for the public should Castle Valley Drive become impassable. Castle Valley Drive is the only paved (chip sealed) Town road and is paved for the first 4.67 miles. The remaining portion is gravel and dirt. All other Town roads, either crowned dirt and/or gravel, are approximately 17 miles in combined length. Roads on the west side of Castle Valley Drive proceed to the base of Porcupine Rim. This results in progressively steeper grades, some exceeding 20%, making winter maintenance difficult and in some cases impossible.

The Town Road Department is responsible for maintenance and improvements of all Town roads and for all drainages within the Town's easements. This includes flood control, dirt work, signage for all Town roads, snow removal for dirt roads that receive winter maintenance, and Town vehicle and equipment maintenance and repair. Castle Valley contracts with Grand County Road Department to provide winter snow removal from Castle Valley Drive, due to a lack of suitable equipment and because it is far less expensive than acquiring and maintaining the equipment needed. Chip sealing of Castle Valley Drive is subcontracted to a private entity.

Dirt and gravel roads are highly susceptible to erosion and therefore require extensive maintenance. The chip seal pavement is approximately 1 inch in thickness, without road base, which causes structural weakness, cracking and surface failure. Two streams pass through the Town boundaries: Castle Creek which is perennial and Placer Creek which is intermittent. Numerous drainage channels begin within or pass through the Town’s boundaries, feeding into Castle Creek or Placer Creek, which merge within the Town. Seasonal storms present numerous challenges as runoff can be excessive and destructive, threatening both surface access and private property.



Survey Question I1: Prioritize projects that may require additional taxes or fees.

In early 2020, a supply of Reclaimed Asphalt Pavement (RAP) became readily available. It was proposed that this material be used to improve the condition of the roads in the Town. Because of the possibility of this material leaching and polluting Castle Valley's aquifer and streams and the opinion that there did not appear to be a cost advantage over regular gravel, the Town Council recommended that RAP not be used on the Town's roads.

The Castle Valley Town Council has designated a Road Committee to provide direction and set priorities for the maintenance of the Town's roads and related drainages within the framework of the Town's annual budget.

Goals

- To improve and actively maintain our road and storm drainage infrastructure.
- To maintain and expand its capital outlay for road improvement projects.

Policies

1. The Town will have an active Road Committee to define, prioritize and implement projects, based on annual budgets to: a) make road improvements and b) identify and address areas of potential storm flood erosion which may threaten or damage Castle Valley roads.
2. The Town will assure through a well-equipped and well-staffed Road Department that roads, culverts, bar ditches, etc. are properly maintained.
3. The Town will continue to make it a budgetary policy, when available, to annually set aside funds in a Capital Account for periodic repaving and the ongoing maintenance of Castle Valley Drive.
4. The existing restricted emergency access on Shafer Lane will be maintained as a four-season emergency egress and ingress for the public. Additional emergency routes will be explored and developed where practicable.
5. Future road easement encroachments must receive written approval by the Town prior to any work being done.
6. The Town will purchase, rent or lease needed equipment for the Road Department.
7. The Road Department and the Town will explore ways to mitigate dust emanating from unpaved roads in the valley.
8. In order to reduce wear on the roads, the Town will communicate with commercial users and educate them on the need to adhere to the Town's speed limits.
9. In order to reduce the chance of contamination to the Castle Valley Sole Source Aquifer or Castle Creek, the Town will not use RAP (reclaimed asphalt pavement) on any public road or parking area.

5. WATER AND WASTEWATER DISPOSAL SYSTEMS

Existing Conditions

Water is provided through individual wells and waste is managed by individual septic wastewater disposal systems. Castle Valley's aquifer is the sole source of drinking water for its residents and an irreplaceable resource. There is no reasonable alternative source available at an economical cost and contamination of this source would pose a significant hazard to public health.

In 1996, the Town passed a Watershed Protection Ordinance (96-1). The Town is committed to working with private landowners, agencies, and authorities that own property in the Castle Valley Watershed to protect water quality and availability.

Our aquifer is extremely vulnerable to contamination. It is an unconsolidated valley-fill type and exposed at the surface with no overlying confining geologic formation. This allows contaminants to move more quickly downward to the water supply. The Utah Geologic Survey septic density study conducted in 2004 determined that the lot size for most of the Town of Castle Valley should have been 15 acres, i.e. one septic system per 15 acre lot, instead of the 5 acre lot size platted in the original subdivision. Combined with the UGS study finding that the Castle Valley aquifer is extremely vulnerable to surface infiltration and contamination, great care needs to be made that additional sources of contamination do not jeopardize future water quality for the community. Past and current surveys have shown that respondents consider aquifer protection a high priority, as well as protection for Castle Creek and the artesian spring surface water, from nitrate and other possible contaminants.

The Castle Valley Aquifer was declared a Sole Source Aquifer by the Federal Environmental Protection Agency² in 2012 and classified by the Utah Geological Survey³ as "pristine" in certain areas. However, water quality varies, with a wide range of potability and usability in different parts of the Town. About 40% of the Town's lots have very hard water that must be purified in order to drink, and some lots do not have access to potable water. The Town now has six monitoring wells for measuring water quality changes over time and publishes, on its website, water quality information on an annual basis.

The Town owns four large water rights which it holds for current use and the long-term development of the Town. With proper management, the Town believes there should be sufficient water rights for all future development in the Town. The State has designated the Town of Castle Valley as a Public Water Supplier. The Town Council has developed procedures to promote efficient management of its water rights. Property owners must sign a Water Use Agreement and Permit with the Town and are allocated a portion of the Town's water rights so they may drill wells and use water for domestic, irrigation, and stock watering purposes. At the time of this update, 167 lots have a Water Use Agreement and Permit with the Town. Of those, 83 lots also have state-issued water rights, and there are 87 lots that have only state issued water

² Environmental Protection Agency, August 6, 2001, Sole Source Aquifer Notice [of final determination] for the Castle Valley Aquifer System, Castle Valley, UT: Environmental Protection Agency, (FRL-7024-2).

³ Utah Geological Survey, 2004, Ground-Water Quality Classification and Recommended Septic Tank Soil-Absorption-System Density Maps, Castle Valley, Grand County Utah, (Special Study 113).

rights. There are 161 lots that currently have no water rights but may obtain an allocation of Town rights in the future.

Goals

- Maintain water quality and availability in the Watershed by expanding our knowledge, developing policies, and taking action as needed.
- Provide oversight to ensure that our sole source “pristine” drinking water resource is available for future generations. (See Appendix III for map of the Castle Valley Watershed).
- Remain diligent, as a Public Water Supplier, in allocating and tracking the use of the Town’s water rights.
- Develop appropriate procedures for monitoring and maintaining septic health on Town lots.

Policies

1. The Town will use existing data and collect new data in order to monitor water quality and availability.
2. The Town will develop regulations that protect and maintain our water quality and availability.
3. The Town will continue to identify and address potential hazards and contaminants to our drinking water supply through public awareness, incentives, and/or regulations to mitigate their impacts.
4. The Town will continue to provide information to residents and property owners regarding the best septic system maintenance practices and promote public awareness through the Town’s website and handouts with new septic permits.
5. The Town will inform residents and property owners of any new septic regulations made by the State of Utah.
6. The Town will inform residents and property owners of the geologic properties and vulnerability of our aquifer, best water conservation practices, best practices regarding the disposal and management of household hazardous materials (motor oil, pesticides, electronics, pharmaceuticals), and make recommendations for alternative least toxic and non-toxic household and gardening products.
7. The Town will explore ways to prohibit large-scale use of pesticides, especially in areas that drain into any open waterway or natural stream such as Castle Creek.
8. The Town will ensure that ordinances are developed to protect open waterways, natural streams, and other drainages from agricultural and livestock runoff.
9. The Town will update its Watershed Protection Plan and implement/enforce the existing Watershed Protection Ordinance (96-1). The Town will clarify and implement the permit process required before any developments or activities occur that have the potential to pollute the Watershed recharge area. The Town will coordinate Memoranda of Understanding with regional water stakeholders to implement this permit process.
10. The Town will actively coordinate cooperation among all regional water stakeholders to achieve a watershed protection management plan, to be applied to the Watershed recharge area as identified and mapped in the Town’s U.S. Sole Source Aquifer determination. The plan should address water quantity and climate change probabilities, sustainable water use,

wastewater and storm water management, protection of water quality, flood prevention, and the protection of wildlife and vegetation along riparian habitats.

11. The Town will actively participate in County, State, and Federal land use planning processes to ensure that any proposed developments/activities in our Watershed are thoroughly reviewed by the Town to meet our watershed protection goals. This may include researching and seeking a Municipal Watershed designation for the Castle Valley Watershed with the appropriate County, State and Federal entities.
12. The Town will continue to explore ways to assure its supply of water in terms of quantity and quality. This includes the designation of “Drinking Water Source Protection Zones” by the State for our drinking water sources. It also includes having the State close the Town’s water supply to new appropriations by other users.
13. The Town will use the EPA designation of a sole source aquifer to maximum advantage in protecting our watershed.
14. The Town will track/review water applications within the watershed and reserve the right to protest as per State law on applications deemed to jeopardize the availability and quality of our water.
15. The Town will encourage enforcement of County, State and Federal regulations and policies throughout the watershed that protect our water quality and availability.
16. The Town will, as a Public Water Supplier, maintain its water rights and continue to make them available for property owners.
17. The Town will continue to implement policies to support the viability of individual water supply systems and state-approved individual waste disposal systems.
18. The Town will explore and develop a preliminary Water Master Plan to guide current and future Town Councils on managing and maintaining the Town’s water rights, ensuring quality and availability of water, identifying threats to the aquifer and watershed, developing policies to mitigate the identified threats, and determining the long-term category of water provider that best meets the community’s ongoing needs.

6. FIRE PROTECTION AND EMERGENCY PREPAREDNESS

Existing Conditions: Fire Department

The Town and outlying areas are served by the Grand County Special Service Area for Castle Valley Fire Protection (“Castle Valley Fire District”), founded in 1982, which funds and manages the Castle Valley Volunteer Fire Department. Both entities are administered by the Castle Valley Fire Commission, a three-member elected Board. Castle Valley has received Firewise Communities/USA recognition status for over 15 years. On behalf of Castle Valley, the Castle Valley Fire District maintains this status with its annual membership in Firewise Communities, a project of the National Fire Protection Association. The Fire District is a separate governing and revenue-raising entity from the Town of Castle Valley, but both work closely together to promote fire prevention and protection.

The Castle Valley Fire District is an all-volunteer force of 18 people. The District maintains nine firefighting engines. The newest addition is a used water tender, purchased in 2019. Training for members of the Fire District occurs at semi-monthly meetings. In 2019 the Fire District acquired a property in Town with a large well, thereby providing a ready source of water for the engines. Recruitment, especially of younger members, is a challenge. In the 2019 survey, one respondent suggested: “A notice of need for volunteers could be included in [Town] building permit packets....Periodic notices on website and bulletin board of need.”

A Community Wildfire Protection Plan (CWPP) for the Castle Valley Fire District was updated in 2019 (available on the Fire District website, <http://castlevalleyfire.org/>). The CWPP is administered by a local, volunteer committee representing the public, affected government land management agencies, and the Utah Division of Forestry, Fire and State Lands. The CWPP identifies policies and action strategies for reducing potential loss of life and property in the community due to wildfire. Program goals include community and residential hazard and risk assessments, coordination of fire prevention and protection resources, public education, and implementation of fuels reduction strategies.

The Castle Valley Fire District maintains an emergency satellite telephone service at the Community Center for residents whenever there is a prolonged power or telephone outage.

Castle Valley is in a wildland urban interface – a place where residential areas border and interact with undeveloped wildland vegetation. Fire is a very serious hazard in Castle Valley, especially given the annual and widespread presence of cheatgrass and Russian thistle (tumbleweeds) across the valley. These conditions, combined with periods of prolonged drought, present a number of firefighting challenges due to Town and residential proximity to large areas of fire-prone vegetation. Trees, shrubs, grasses, and weeds all provide significant fuel for fires; winds, topography, and difficulty of access add to fire hazards. Periods of drought, invasive vegetation, and modern fire suppression practices have helped to increase heavily overgrown areas of dry combustible vegetation. During “monsoon” season, frequent thunderstorms and cloudbursts occur, posing a threat to life and property from lightning-triggered wildfires and debris flow (flood) events. All these existing threats will be enhanced by climate change.

The Utah Division of Forestry, Fire and State Lands conducts Firewise inspections of owners’ property. The 2019 survey found that over 70% of property owners had never had such an inspection. Some of those property owners may be aware of Firewise prevention strategies (available on the Fire District website) and have taken appropriate measures to reduce risks on their properties, but a full Firewise inspection will further help. At the same time, over 90% of respondents to the 2019 survey indicated that fire prevention is of high or medium priority.

Both the Town and the Fire District regularly provide information to property owners on fire prevention resources and measures they can take. In addition, the Fire Commission will consider training Fire District members to conduct Firewise inspections, a service that over 80% of property owners said they would welcome or consider using.

Existing Conditions: Emergency Preparedness

Two streams pass through the Town boundaries: Castle Creek which is perennial, and Placer Creek which is intermittent. Drainage along Castle and Placer Creeks presents a number of potential hazards for property owners and risks for emergency service responders. Flood run-off and erosion in these drainages may affect travel by residents and access for emergency vehicles. Heavy rains can result in the drainages and creeks flowing out of their banks or impacting culverts and ditches.

Residents with medical emergencies can experience a response time of 45 to 60 minutes as the Grand County Emergency Medical Services (EMS) travels from Moab to Castle Valley. Within Castle Valley, three people are trained as EMS responders, thus providing more immediate attention of medical and health emergencies until the unit from Moab arrives. These local responders do not transport patients but offer critical care as First Responders. An equipped ambulance supports the Castle Valley EMS responders. An emergency helicopter contractor exists in Moab and has provided needed support in a number of situations.

The Town developed a Hazard Mitigation Plan in 2015 and will update it in 2020. The Plan looks at a variety of potential threats to communities, including fire, flood, rock- and landslides, and drought. The Plan outlines means to mitigate such threats, including describing resources available in the events of a hazard emergency. A copy of the 2014 Plan is available on the Town of Castle Valley website (<http://www.castlevalleyutah.com/hazard.cfm>).

New property owners are informed by the Town of risks from geologic hazards on individual lots, such as rockfalls, flooding, soil problems, suitability, subsidence, or similar geologic hazard, as part of the building permit process and are required to sign a Geologic Hazards Release Agreement.

To expedite evacuations in the event of an extreme event, the Town has upgraded the east end of Shafer Lane to Fire Station 1. The extension is not open for regular use, but in emergencies, people can use the road to reach the Castleton Road.

Communication is critical in emergency situations. Until recently, telephone and internet service was provided by a single company. Those services were seriously disrupted for three months in 2019 and have remained occasionally problematic since then. The single telephone provider is reported to be considering bankruptcy and reorganization which leaves the Town vulnerable. Electricity disruptions have been significantly reduced since the electricity provider upgraded its infrastructure in 2018. In the event of a prolonged telephone disruption the Fire Department offers its satellite phone for emergency calls.

Goals

- Support the Castle Valley Fire District in its efforts to protect life and property within the Town and community.
- Improve fire prevention awareness among property owners and take steps that will help ensure that firefighting can be effective and safe for fire personnel.
- Update plans and projects, both immediate and long-term, to mitigate and respond to foreseeable emergency situations.

- Protect, wherever practicable, people and property from unreasonable exposure to hazards, potential disasters, and identifiable risks.

Policies

1. The Town will strive to improve and maintain good relations with Castle Valley Fire District.
2. The Town will assist the Castle Valley Fire District in efforts to communicate information to citizens regarding fire prevention and protection actions they can take.
3. The Town will implement, wherever practicable, Town-financed actions regarding roads, mowing, etc. that would reduce fire hazards and/or improve firefighting.
4. The Town will consider adopting the updated Community Wildfire Protection Plan (CWPP) and ensure that residents and property owners implement Firewise practices on their properties, developed or otherwise. This will be accomplished through programs, incentives, and/or regulations that reflect the ongoing need to properly manage fuels to complement the efforts of the Castle Valley Fire District and to protect life and property.
5. The Town will update its comprehensive all hazard pre-disaster mitigation plan using requirements for public sectors as amended in the Disaster Mitigation act of 2000; the update will identify hazards, risks and vulnerabilities within and affecting the community. It will describe actions to mitigate hazards, risks, and vulnerabilities identified, and it will establish strategy and seek funding to implement these actions.
6. The Town will inform residents and property owners, and make available to them, emergency policies and procedures, and will maintain identified evacuation routes and safety zones in the community. Alternative emergency access routes for the public and emergency responders will be explored and developed where practicable. The Town will work to improve communication systems and methods that will help establish a faster response to emergencies and to public health and safety threats.
7. The Town will support the Castle Valley Fire District and Grand County EMS to maintain an emergency medical response team capable of providing a rapid first response and interim lifesaving care for critical patients awaiting higher-level EMS personnel from Moab. The Town will seek to collaborate with other residents, organizations, and businesses in the Colorado River corridor to establish and maintain this program.
8. The Town will support the Castle Valley Fire District decision to train its members to conduct Firewise prevention inspections for Town property owners and encourage property owners to take advantage of such a service.

7. ENVIRONMENTAL CONCERNS

Existing Conditions

Town surveys conducted since 1987 have repeatedly shown that residents and property owners have a strong desire to preserve Castle Valley's natural beauty, peace and quiet, rural atmosphere, dark skies, and clean air and water. Responses from the 2019 Survey show strong support for strengthening the Town's Lighting Ordinance and for pursuing official recognition as a Dark Sky Community.

Castle Valley is in a wildland urban interface – a place where residential areas border and impact native vegetation, wildlife habitats, and ecosystems. Its setting presents several human-environmental conflicts. Promotion of ecological principals and a conservation ethic have been reinforced through previous Town planning efforts and land use regulations to help minimize these conflicts.

The Utah Division of Wildlife Resources has identified areas within the southern boundaries of the Town of Castle Valley as critical winter habitat for the La Sal Mountain Mule Deer herd. Utah Open Lands Conservation Trust also owns some land adjacent to Town residential boundaries. Land within the Town boundaries has been identified by the Utah Division of Wildlife Resources as critical calving grounds for the La Sal Mountain Mule Deer herd. Safeguarding these areas as open lands is essential for protection of wildlife and for the preservation of our rural atmosphere.

Residents and property owners continued to show strong support for sustainable community practices and renewable energy as evidenced by the 2019 Town survey. In response to that historical support, the Town installed a solar array on the Town lot in May 2011, which provides most of the electric power for the community building. As part of its commitment to sustainable energy, the Town subscribes to Rocky Mountain Power's Blue Sky program which supports renewable energy in fixed price, 100 kilowatt-hour "blocks" of 100% western region wind (40%) and solar (60%) energy.

The Town has encouraged other sustainable practices. In 2019 the Town passed a resolution to participate in the recently enacted Community Renewable Energy Act (House Bill 411 State of Utah Section 1 54-17-901) that provides a mechanism for municipalities within the State, in collaboration with RMP and the Utah Public Service Commission, to achieve net-100 percent electric energy from renewable resources by 2030. While the Town can opt out at certain points during the process, the program would obligate all RMP customers within the Town to become part of the program. Town residents can opt out of the program within the first three billing cycles of the increased rate change. Thereafter, residents would be required to pay a fee to opt out.

Encouraging the removal of noxious weeds such as cheatgrass and Russian thistle (tumbleweeds) and the removal of excess vegetation that can fuel wildfires continues to be a priority for the Town. For the past few years, the Town has promoted the use of the state chipping program once or twice a year, depending on the availability of state funds, which not only reduces the fire danger from burning yard waste but also eliminates the smoke, soot, and other air pollutants released during those burns. The Town has also collaborated with the BLM to identify vegetation to be removed from land surrounding Round Mountain to reduce the fuel and potential for wildfires.

Responses from the 2019 survey regarding synthetic pesticides/herbicides reflect the community's support for restricting their outdoor application within the Town's boundaries. However, several respondents suggested that information on which toxins to avoid and suggestions for safe alternatives would be a more practical approach and would avoid the difficulty of enforcement.

Generally, air quality is very good in the valley; however, local and regional emissions coupled with weather and inversion conditions create noticeable air quality issues. At this time, the Town does not have baseline data about how our airshed functions or what the existing air quality conditions are.

Goals

- Recognize the sensitive nature of the land and water of Castle Valley and the effects of climate change and growth by considering and encouraging policies and practices within our community that protect the quality of our water, air, soil, and wildlife as we plan for the future.
- Ensure a sustainable environment for current and future Town residents and property owners.
- Recognize and respond to local, regional, national and global environmental issues that may affect the quality of life in the Town.

Policies

1. All household solid waste will be removed to a legal transfer station by a certified private waste carrier or by the homeowner in a timely manner.
2. The Town will strive to control and eradicate noxious weeds in Castle Valley through direct action and by providing relevant information to residents and property owners. Information shall focus on methods that prioritize non-toxic management of noxious weeds.
3. The Town Government shall be proactive in addressing both local and broader regional issues that have the potential to affect the quality of life in Castle Valley (i.e. water quality, air quality, rural character, peace and quiet, enjoyment of natural surroundings, sense of open space, and viewshed) in collaboration with other conservation groups, responsible agencies, and regional stakeholders (BLM, US Forest Service, SITLA, Utah Open Lands.)
4. To protect the rural character and dark skies of Castle Valley, the Town will strengthen and continue to enforce its Lighting Ordinance. The Town will also pursue official recognition as a Dark Sky Community.
5. To help protect the diversity and health of local wildlife, the Fencing Ordinance, which limits the use of exclusionary fencing to encourage the movement of deer within the Town, will be improved and enforced.
6. The Town government will encourage energy conservation and promote the use of renewable energy sources. As per the resolution passed in December 2019, the Town will collaborate with RMP and the Utah Public Service Commission pursuant to HB 411 to achieve 100 percent of electrical energy from renewable resources by 2030.

7. The Town will promote policies and practices that protect air quality in the valley by researching current air quality conditions. Local expertise, grants, or other avenues of funding will be sought to cover the costs for the Town. To reduce air pollutants and fire hazards, the Town will continue to promote the state chipping program. The Town will research and provide information to residents and property owners to help minimize and reduce personal contributions to air quality degradation.

8. TOWN GOVERNMENT

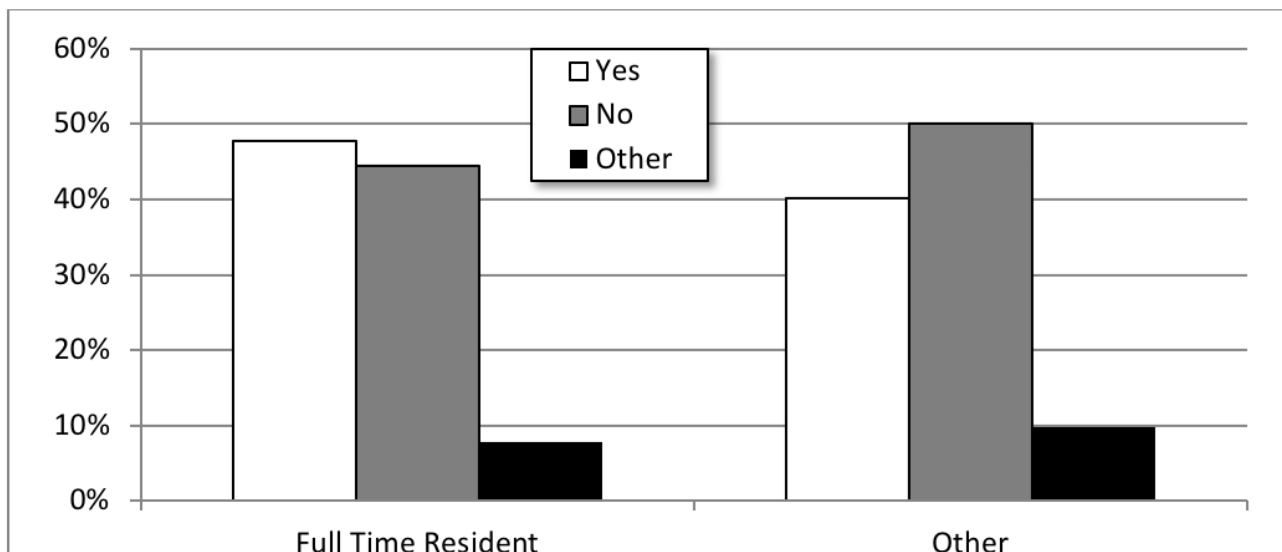
Existing Conditions

The Town of Castle Valley was officially incorporated on July 26, 1985, and is classified as a Town by the Utah State Legislature, because it has a population under 1,000. A five-member council, which includes the Mayor as a full voting member, is the governing body. The Mayor is responsible for enforcing the laws and ordinances of the Town. There is a five-member Planning and Land Use Commission which has some responsibilities for overseeing land use issues and amending, updating, and revising land use ordinances.

In 2008, the Town adopted a complaint resolution process to assist the Mayor with enforcement. This policy seeks to solve ordinance violations first through discussion and mediation with property owners. If violations are not remedied in those ways, the Town has the option of issuing enforcement letters and injunctions, or fines. The complaint resolution process begins when a citizen files an anonymous complaint. This initiates a review process before a Complaint Resolution Board. As of the 2019 Survey, 57% are still satisfied with this policy, but there was support (62%) for additionally allowing the Town to initiate complaints. Slightly weaker was support for hiring a code enforcement officer (51%). Many residents expressed frustration about lack of enforcement and “toothless” ordinances.

The Town had an operating income of \$242,346 for the fiscal year of 2020. Revenues from property taxes provide approximately half (51%) of the operating income. Other sources of revenue include: 22% from sales and miscellaneous tax, 16% from intergovernmental sources **such as class “C” roads, 4% from permit fees, donations/grants and interest, and 6% transferred** from the previous year’s budget. The Town has a small population with limited capacity for future growth.

There was limited interest in a tax increase, although full-time residents showed greater support than non-resident property owners.



Survey Question F5: Do you favor raising property taxes, as needed?

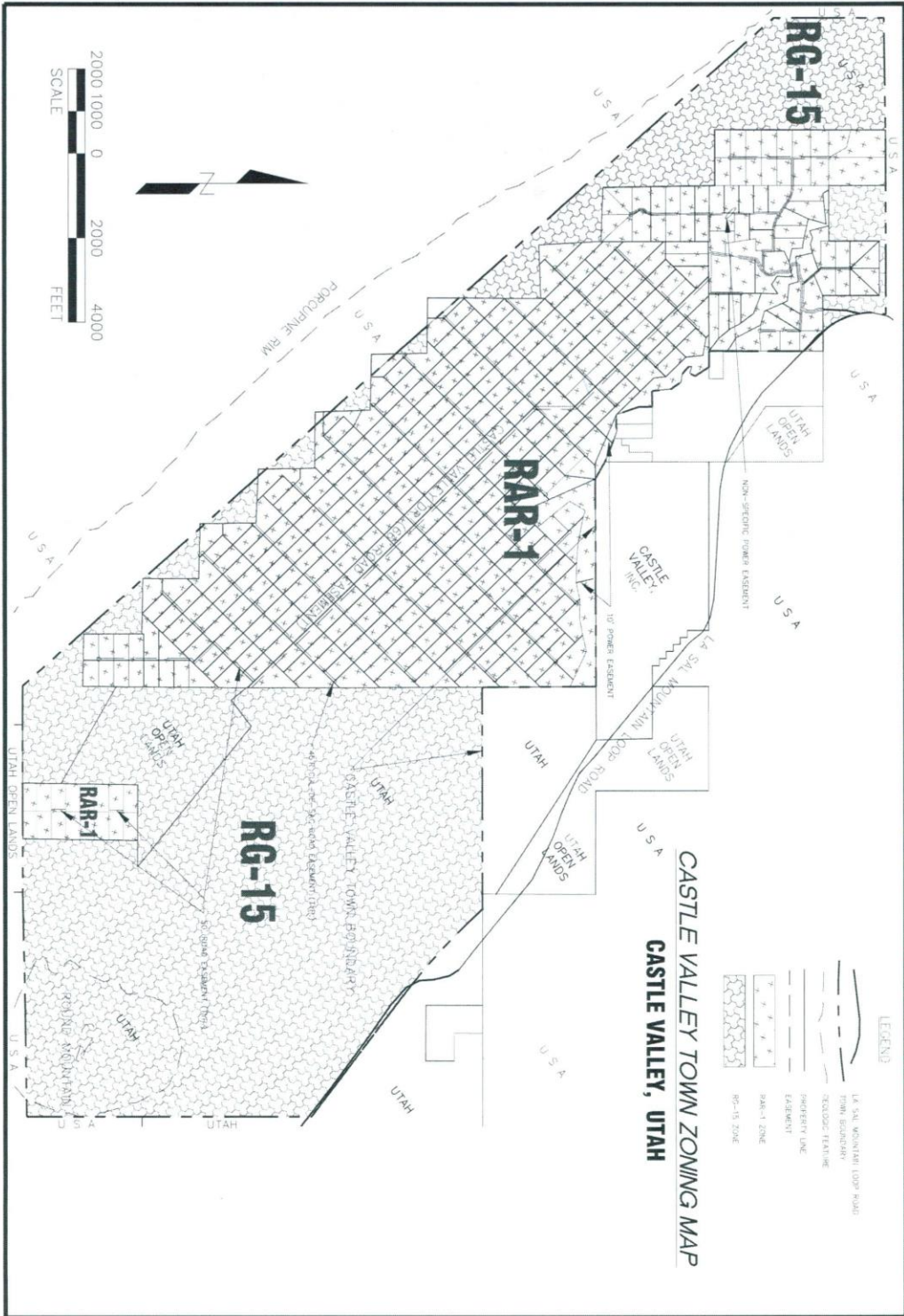
Goals

- Ensure a Town government that implements this General Plan and other Town regulations in a manner that is effective, efficient, open, and fair.

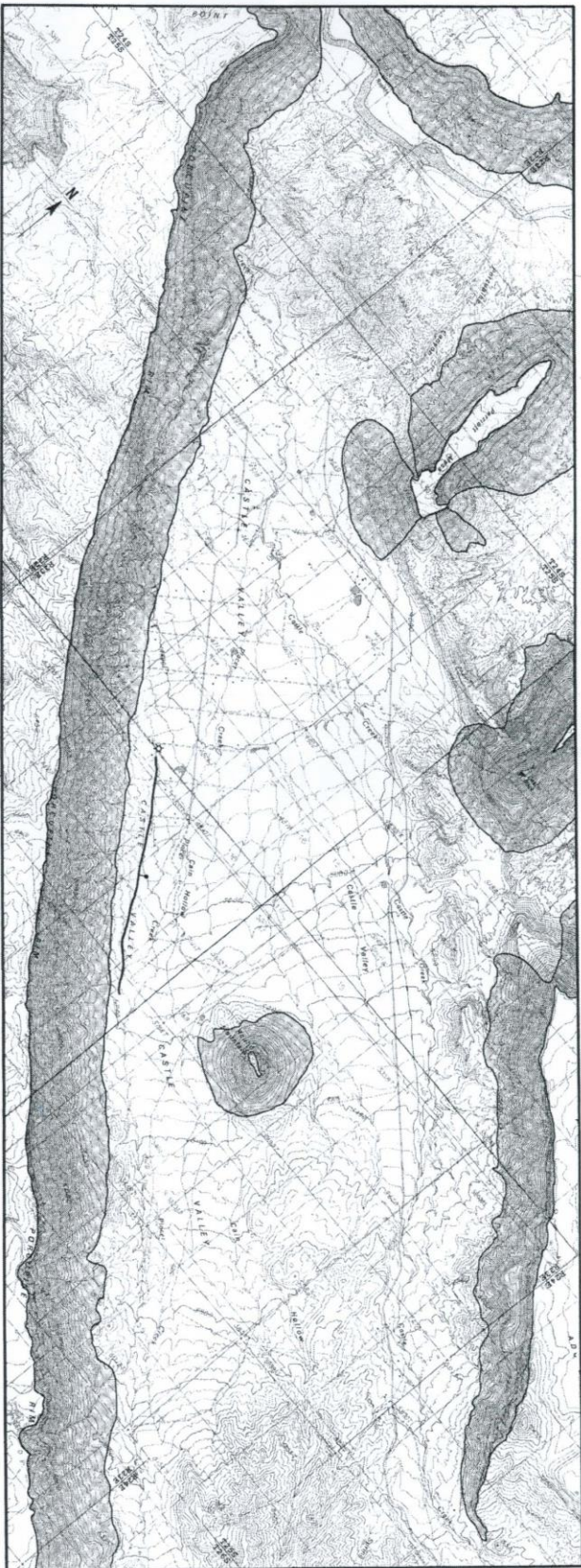
Policies

1. The Town will continue to improve its administrative processes and will assure adequate training of Town officials and employees.
2. The Town will improve information available to the public by maintaining a well-designed website.
3. The Town will endeavor to simplify its ordinances and forms and better provide residents and property owners with ways to understand and comply with those ordinances and forms more easily.
4. The Town will continue to improve and clarify language in its ordinances, forms and contracts so as to reflect their true intent and meaning.
5. The Town will investigate ways to improve its enforcement capabilities, assess and improve its use of the Complaint Resolution Process, and ensure the enforcement sections of all Town Ordinances are consistent with one another and conform to applicable requirements of Utah State Code.
6. The Town will seek through our Complaint Resolution Process and Nuisance Ordinance to help solve noise pollution issues that disturb the peace and quiet of neighbors.
7. The Town will continue to work with Federal and State agencies to limit the risks to residents and visitors from hunting within the Town's boundaries.
8. The Town will work with the City of Moab to strengthen and enforce the adopted Animal Control Ordinance.
9. The Town will continue to provide a modest level of services for its citizens, keeping Town staff and infrastructure at a minimum in order to ensure efficient use of limited public funds.

APPENDICES



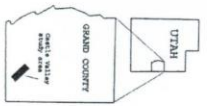
APPENDIX II - B GEOLOGIC HAZARDS - ROCKFALL



ROCK-FALL AND SURFACE-FAULT-RUPTURE
 HAZARDS IN CASTLE VALLEY,
 GRAND COUNTY, UTAH

Utah Geological Survey
 Open-File Report 238
 Plate 3

By
 William E. Malvey



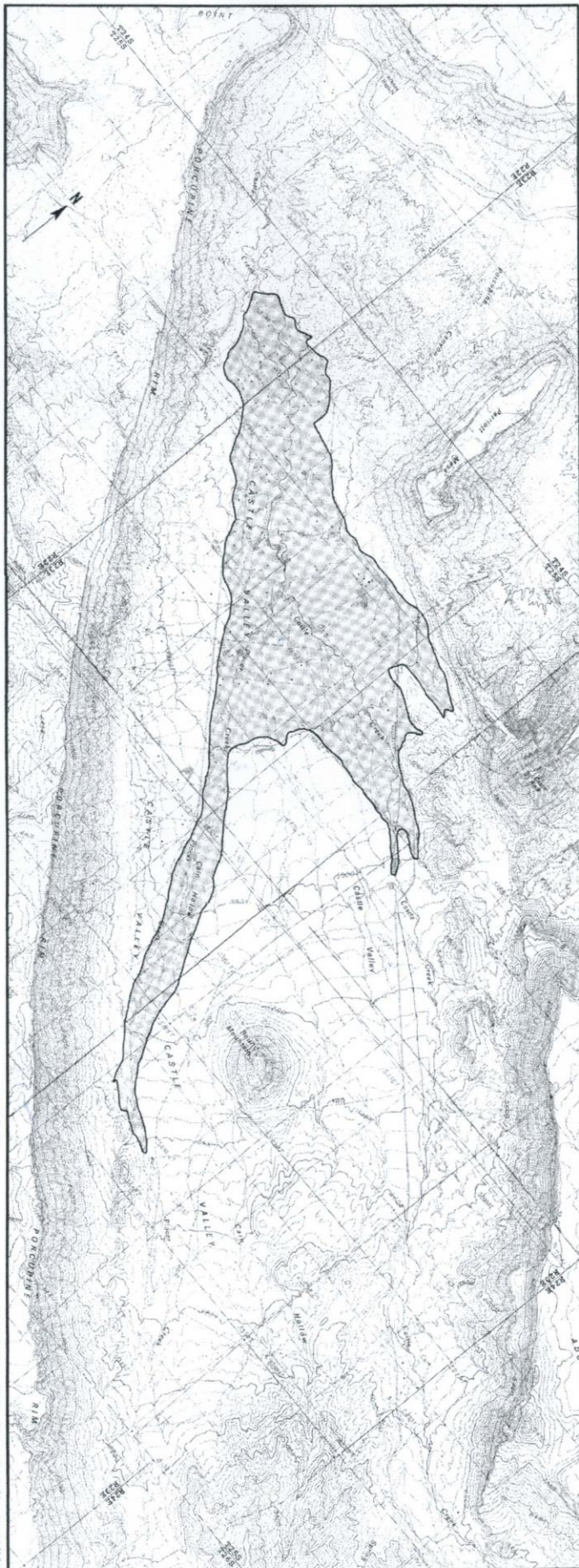
SCALE 1:24,000
 Hazard map based on unpublished geologic mapping by
 M.L. Ross and R.K. Doolittle.
 Base map from USGS 1:24,000-scale topographic maps of
 Big Bend, Werner Lake, Fisher Towers, and Bill Creek.

EXPLANATION

Rock-fall-hazard areas.
 Area of possible surface fault rupture
 and associated landslide formation.
 Slide.

DISCUSSION

Rock falls originate when erosion and gravity dislodge blocks of friable-to-very friable sandstone and shale. Although impressive during 50-100 year time frames, surface ruptures are possible on this type of rock. Surface ruptures along the fault indicate dissolution or piping along the fault zone. Such phenomena may occur locally if water is introduced into the rock. Areas where site-specific studies concerning rock-fall hazards are recommended prior to development. The mapping represents only site-specific studies should evaluate hazards and, if needed, be prepared by qualified professionals engineering geologists, geotechnical engineers, or geologists. The possibility exists that some small rock-fall hazards may occur in areas not recommended for critical facilities even outside the hazard areas.



**SOIL SUSCEPTIBLE TO PIPING AND EROSION IN
CASTLE VALLEY, GRAND COUNTY, UTAH**

Utah Geological Survey
Open-File Report 238

Plate 4

By

William E. Mahony



Hazard map based on unpublished geologic mapping by
M.L. Ross and R.N. Dowling.
Base map from USGS 1:24,000-scale topographic maps of
Big Sand, Werner Lake, Fisher Towers, and Hill Creek.

EXPLANATION
Soil susceptible to piping and erosion.

DISCUSSION
Piping is subsurface erosion by ground water that moves along permeable, noncohesive layers in that intersects the layer. Removal of fine-grained particles (silt and clay) by this process creates channels through which water can flow. As channels enlarge, water moving through the voids increases the pipe becomes a preferred avenue for ground-water drainage and enlarges as more water is intercepted, increasing the head and causing eventual collapse. Collapse features form on the surface above the pipes, eventually local collapse forms a only that concentrates erosion along the line of collapse.

Recurring is common in arid climates where fine-grained, unconsolidated Holocene-age (10,000 years ago to present) alluvium is intruded by water-saturated sand and gravel. The water table is high and the sand and gravel are fine-grained alluvium (sand, silt, and clay) and concentrates erosion along the line of collapse (Mahony).

The characteristics that make soil susceptible to piping are those that are subject to rapid erosion. Erosion is the removal of material, particularly unconsolidated deposits by running water. It is common, as is vertical and lateral cutting of stream channels, during cloudbursts, snowmelt can cause severe piping and erosion can damage roads, bridges, culverts, and structures. In certain areas, roads cut in-lined drainages. Roads can contribute to piping and erosion by altering natural runoff and infiltration and potential for pipes to develop, as well as erosion. Archival structures such as dams may be hazardous. This hazard map shows areas susceptible to piping and erosion may be found in planning purposes only, and site-specific studies are needed to evaluate hazards and, if necessary, remedial actions. This map was prepared by qualified professionals (engineering geologists, geotechnical engineers, hydrologists) (1:24,000), the possibility exists that some small hazard areas are not shown; studies are therefore needed to evaluate the hazard areas. The hazard areas are of critical facilities even outside the hazard areas.

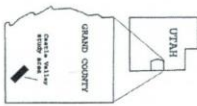
APPENDIX II - D GEOLOGIC HAZARDS - EXPANSIVE SOIL



EXPANSIVE AND GYPSIFEROUS SOIL AND ROCK
IN CASTLE VALLEY, GRAND COUNTY, UTAH

Lulu G. Local Stone
Open-File Report 238
Plate 1

by
William E. Malvey



Base map from USGS 1:24,000 scale topographic maps of Big Bend, Navajo Lake, James Canyon, and Hill Creek.

Expanded map based on unpublished geologic mapping by
W.E. Malvey and R.H. Doolittle

DISCUSSION

Expansive soil and rock in Castle Valley contains clay minerals capable of absorbing quantities of water. The Tertiary-age Montpelier and are the source of these expansive minerals. As and contract, causing as much as a 10 percent expand in volume. When clay minerals expand due to the horizontal, vertically separated with the vertical and and rock are cracked foundations and soil structures damage, heaving and cracking of roads, piping of wastewater disposal system drain fields. Because foundation loads (1,500 to 2,500 lbs/sq ft) 5088 to 12,209 kg/m²) are less than expansive 14,646 to 46,078 kg/m²), settling structures subject to unsupportable. Heavy, behavior buildings are less and rock are subject to the dissolution of

gypsum, creating a loss of lateral structure and volume within the deposit. Gypsum is present in the immediate vicinity of the beds. When water is introduced to gypsiferous soil or or wastewater disposal systems, gypsum soil grains may desolve causing settling, structure distortion, develop and collapse, causing subsidence. Gypsum is can cause problems for heavy structures. Soil in and structures. Gypsum weather with concrete, brick and cement and weaker foundations, may potential hazard stress for planning purposes only. In mapped hazard areas site specific studies are needed to evaluate reduction measures. The studies must be prepared by geotechnical engineers, hydrologists. Because of the relatively small scale of the maps (1:24,000), are not shown; studies are therefore recommended for critical facilities even outside the hazard areas.

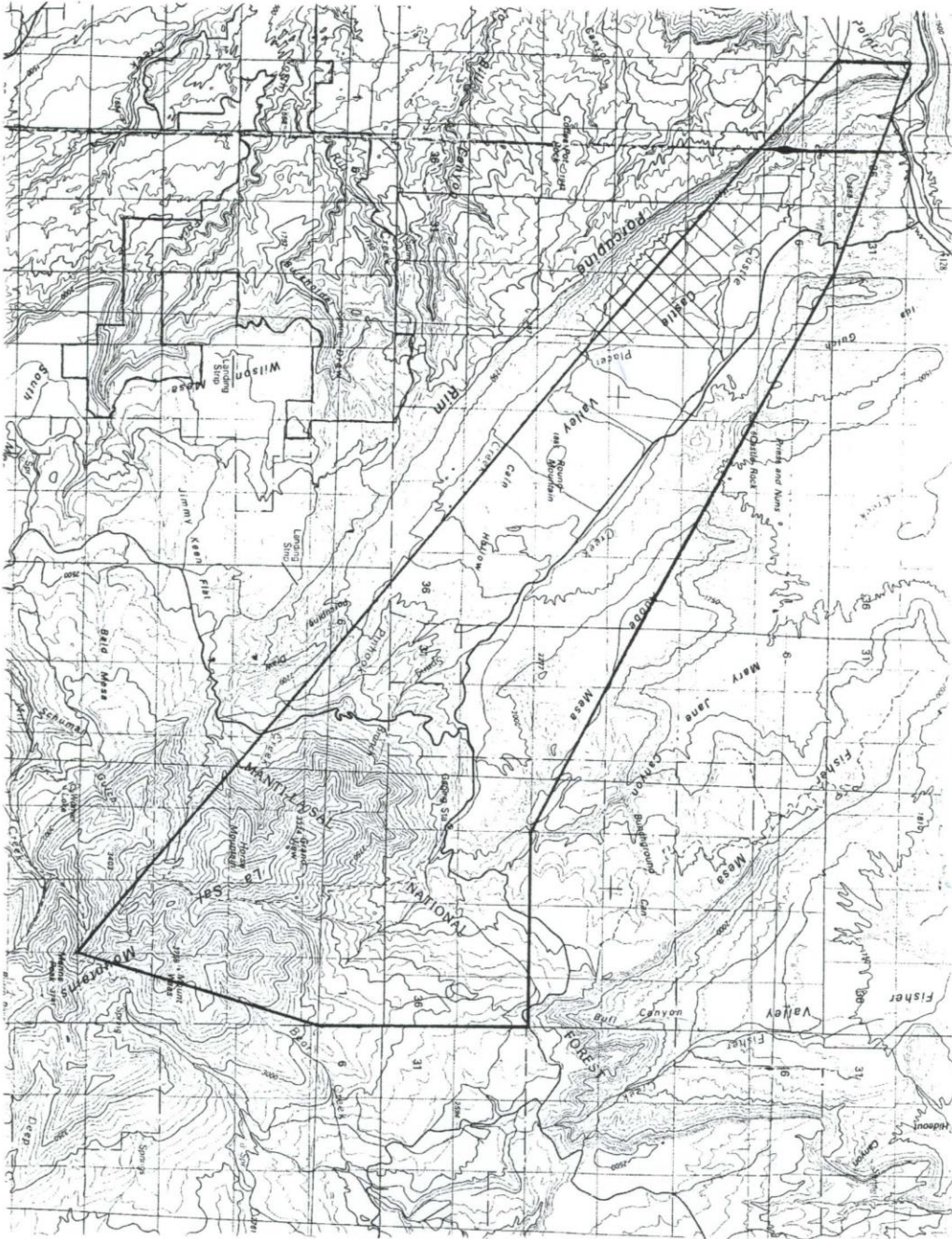
EXHIBIT B.**DESCRIPTION OF THE APPROXIMATE BOUNDARIES OF THE TOWN OF CASTLE VALLEY'S WATERSHED PROTECTION DISTRICT IN GRAND COUNTY.**

Beginning at the N.W. Corner of Section 35, T24S, R22E, S.L.B.&M. (said beginning point is also the most Northwesterly point of this protection district), and proceeding thence in a Southeasterly direction to the N.E. Corner of Section 6, T25S, R23E, S.L.B.& M., thence in a Southeasterly direction to the S.E. Corner of Section 21, T25S, R24E, S.L.B.& M., thence East along the South line of Sections 22, 23 & 24, T25S, R24E, S.L.B.& M. to the S.E. Corner of said Section 24, thence South along the East Section lines of Sections 25 & 36, T25S, R24E, S.L.B.& M. and the East Section line of Section 1, T26S, R24E, S.L.B.& M. to the S.E. Corner of said Section 1, thence in a Southwesterly direction to the S.W. Corner of Section 24, T26S, R24E, S.L.B.& M., thence in a Northwesterly direction to the S.E. Corner of Section 18, T26S, R24E, S.L.B.& M., thence in a Northwesterly direction to the S.E. Corner of Section 29, T25S, R23E, S.L.B.& M., thence in a Northwesterly direction to the S.W. Corner of Section 35, T24S, R22E, S.L.B.& M., thence along the West line of said Section 35 to the Northwest Corner of said Section 35 to the point of beginning.

Said area involves properties within the following Sections in Grand County; Utah, S.L.B.&M.:

T24S., R22E., Sections 35 & 36. T25S., R22E., Sections 1-2 & 12. T24S., R23E., Section 31. T25S., R23E., Sections 5, 6, 7-11, 13-18, 19-24, 25-29, 33-36. T25S., R24E., Sections 18, 19, 20, 21, 25-30, 31-36. T26S., R24E., Sections 1-6, 7-12, 13-18, 20-24. T26S., R23E., Sections 1, 2 & 12.

APPENDIX III - C Castle Valley Watershed - Watershed Boundary



APPENDIX III - D Castle Valley Watershed - Watershed Boundary Map
 CASTLE VALLEY AQUIFER SYSTEM
 CASTLE VALLEY, UT

