

1. February 5, 2020 - Agenda

Documents:

[020520.PCWM.COURTESY.PDF](#)

2. February 5, 2020 - Packet

Documents:

[2-5-2020 PC REPORT.PDF](#)



118 Lion Blvd ◦ PO Box 187 ◦ Springdale, UT 84767 ◦ (435) 772-3434

PLANNING COMMISSION NOTICE AND AGENDA
THE SPRINGDALE PLANNING COMMISSION WILL HOLD A WORK MEETING
ON WEDNESDAY, FEBRUARY 5, 2020
AT THE CANYON COMMUNITY CENTER 126 LION BOULEVARD, SPRINGDALE, UTAH.
THE MEETING WILL BEGIN AT 5:00 PM.

Attending Clerk: Darci Carlson

Approval of the agenda
General announcements

A. Information/Discussion/Non-Action Items

1. Presentation on updated Town Build-out Analysis
2. Planning for the upcoming General Plan update process

B. Adjourn

This notice is provided as a courtesy to the community and is not the official notice for this meeting/hearing. This notice is not required by Town ordinance or policy. Failure of the Town to provide this notice or failure of a property owner, resident, or other interested party to receive this notice does not constitute a violation of the Town's noticing requirements or policies.

If you have questions regarding any of the agenda items, or other community development comments, please contact the Community Development staff at 435-772-3434 or tdansie@springdaletown.com

The Town of Springdale complies with the Americans with Disabilities Act by providing accommodations and auxiliary communicative aids and services for all those citizens in need of assistance. Persons requesting these accommodations for Town sponsored public meetings, services, programs, or events should call Springdale Town Clerk Darci Carlson (435.772.3434) at least 24 hours before the meeting.

Packet materials for agenda items will be available by January 31, 2020 at: <https://www.springdaletown.com/AgendaCenter/Planning-Commission-7>



Memorandum

To: Planning Commission
From: Thomas Dansie, Director of Community Development
Date: January 31, 2020
Re: **February 5, 2020 Planning Commission Work Meeting
General Plan Update**

The Planning Commission and Town Council discussed the upcoming General Plan update in the January combined work meeting. At that time the Commission and Council gave the following direction concerning the General Plan update:

- The General Plan update should be the Commission's top work meeting priority for the coming year. The Commission will use their work meeting time to prepare the update. The Commission may also decide to schedule additional meetings or working group meetings as needed at the Commission's discretion.
- Staff will pare down the existing version of the Plan by removing repetitious and duplicative material to give the Commission a starting point for the revision process.¹

The Commission should use the February work meeting to establish a specific work plan for the update process. This report contains background material to assist the Commission in making this work plan. Staff suggests the Commission make a plan based on the following actions:

1. Make a Plan for Public Participation
2. Review Guiding Principles in Current Plan and Identify Current Disconnects
3. Identify Substantial Changes Since Adoption of the Current Plan
4. Discuss Anticipated Future Changes that Should be Accounted for in the Plan
5. Discuss the Preferred Format for General Plan

Plan for Public Participation

The General Plan must be based on broad public participation. The Plan should reflect the community's vision for the Town's future. Without significant and meaningful public participation, it will be impossible to develop a vision and General Plan that is representative of the will of the community.

¹ Staff suggests the Commission review the attached General Plan Table of Contents (Appendix A) to identify areas of duplication and overlap. For example, the objectives below contain many of the same themes and ideas and may be duplicative. This is a partial list to illustrate the amount of duplication and overlap. More examples can be found in the specific strategies under each General Plan objective.

- Objective 2.1 and Objective 3.1.
- Objective 2.2 and Objectives 7.4 & 7.6
- Objective 2.3 and Objective 3.2
- Objective 2.5 and Objectives 9.1, 9.4, 8.7, and 12.2
- Objective 3.4 and Objective 8.2
- Objective 7.1 and Objective 8.1
- Objective 8.1 and Objective 12.1

In the 2015 the Town gathered public input during the General Plan update process through two community surveys (one in 2013 at the beginning of the update process and one in 2015 midway through the process), a public open house, a booth at the Earth Day festival, and multiple public hearings. The Town also partnered with students at the University of Utah to do a comprehensive public involvement project entitled "Listening to Springdale." Summaries of this public participation are included in Appendix B.

Staff recommends the Commission discuss a specific plan for public involvement with the current update. Gathering public input regarding the general vision for the Town's future should be one of the first steps in the update process.

The following is a list of potential methods of gathering public input:

- *Town wide surveys* (+ Easy way to get broad public feedback, - difficult to create surveys that are not perceived as leading or biased)
- *Community open houses* (+ Allow robust public input, - usually have lower participation rates than surveys)
- *Focus / stakeholder group meetings* (+ Promote detailed public feedback from individuals with specialized knowledge or experience, - feedback limited to a smaller group of people)

Staff recommends the Commission consider which of these (or combination of these) public input strategies to pursue.

Guiding Principles

The "Guiding Principles" are the core of the General Plan. Everything in the Plan should be based on the guiding principles. Staff recommends the Commission review the Guiding Principles in the current plan. The Commission should identify any disconnects between the Principles and the Town's current land use ordinances, policies, or practices.

The Commission should also determine if the guiding principles are in keeping with the current state of the community.

Finally, the Commission should also determine whether or not the principles are still in keeping with the vision of the community, as determined by public input (discussed above)

If there are any disconnects the Commission should consider whether the Principles need to be modified, or if the ordinance/policy/practice needs to be modified.

Substantial Changes Since Last Plan

The current version of the General Plan was developed five years ago. The Town has changed significantly in the last five years. The Commission should determine if any of these changes need to be reflected in the General Plan update, and what the impact of these changes will be.

Some of the major changes in the Town over the last five years include:

- Increased pace and intensity of development (both commercial and residential)

- Increased visitation to Zion National Park
- Major infrastructure improvements
 - o New water treatment plan
 - o New streets (Winderland Lane connection from Paradise to Lion, other streets in Moenave)
 - o Overhead powerlines placed underground
- Transportation improvements
 - o SR9 reconstruction project
 - o Bike Lanes / Wider sidewalks
 - o Parking program
 - o Transit from St. George to Springdale
- Increased impact of sharing economy
 - o Short-term rentals / travel tech

Anticipated Future Changes

The Town will continue to change and adapt to changing conditions in the future. The Commission should discuss some of the anticipated future changes in conditions, and determine how to best respond to these changing conditions in the General Plan.

Future changes in conditions could include:

- *Climate uncertainty.* The Town partnered with Western Water Assessment last year to identify the Town's vulnerability to extreme weather events (drought and flash flood) associated with a changing climate. The final report of this study is included as Appendix C. The Commission may wish to consider how threats and opportunities associated with a changing climate will impact the Town's future, and plan for adaptations in the General Plan.
- *Zion National Park Visitor Use Management Plan.* Zion has been working on a Visitor Use Management Plan (VUMP) for the past several years. The end result of the VUMP will likely be a reservation system or some other mechanism to control the number of visitors entering the Park. The VUMP and associated reservation system is likely to have an impact on the total number of visitors to the Park. It will also profoundly change the way visitors interact with the Park. The Town should anticipate how these changes in number of visitors and visitor behavior will impact the Town, and plan for adaptations in the General Plan.
- *Technological Advances.* Developing and emerging technologies could have a dramatic impact on the Town over the next 20 years. The Town should consider what these impacts could be, and start planning for accommodations to these impacts now in the General Plan. Technologies that could change the way the Town develops include autonomous vehicles and 5G internet. One expert estimates that by 2030 half of all vehicles on the road will be autonomous or semi-autonomous. Autonomous vehicles will have a dramatic impact on traffic, parking, and transportation in general. 5G internet is the next generation wireless internet, with speeds up to one gigabit per second. 5G internet will be essential for the full deployment of the "Internet of Things (IOT)." IOT includes connected appliances, household items, and autonomous vehicles. To allow residents and businesses full access to IOT devices the Town should start planning now for 5G connectivity. This planning, and the impacts of IOT, should be addressed in the General Plan.

- *Impact of an Aging Community.* The Town's population is increasingly skewing to an older demographic. While there are a number of younger people living in the Town, mostly employees of local businesses, the Town's average age is moving upward. The Commission should consider the impacts of an aging population and plan for the impacts of an older average age.

The Planning Commission should consider these and potentially other future changes, and plan for their impacts in the General Plan update.

General Plan Format

Staff has recommended the Commission consider a more user-friendly and accessible format for the General Plan. The Commission may wish to review other General Plans for format. This review could be used to inform the format the General Plan update will take. The Commission may wish to review the following General Plans as examples of different format.

- [Toquerville](#)
- [Kauai Kakou](#)
- [Plano](#)

SUMMARY RECOMMENDATIONS

Staff recommends the Commission take the following action:

- 1- Direct staff to begin public involvement activities:
 - a. Develop a community-wide survey to assess the community's attitudes about the current general plan Guiding Principles, current state of the Town, and future vision for the community.
 - b. Schedule a community open house in late February / early March to gather public input on the future vision for the community.
- 2- Appoint a sub-committee of Commission members to analyze changes over the last five years, and identify disconnects between the current General Plan guiding principles and current ordinances/policies/practices, conditions, and community vision. The sub-committee will make recommendations on whether or not the guiding principles need to be amended.
- 3- Appoint multiple sub-committees of Commission members or citizen focus groups to address anticipated future changes in the community, and how such changes could impact the Town's future development. One sub-committee / focus group could be appointed to address each of the following:
 - a. Climate uncertainty.
 - b. Impact of Zion VUMP.
 - c. Technological advances.
 - d. Aging population.
- 4- Make general recommendations for the format of the General Plan update.

Appendices attached. Note: It is not anticipated that Commissioners will read all the material in these appendices word for word. The information in the appendices is provided for reference only.

APPENDIX A – EXISTING GP TABLE OF CONTENTS

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION & EXECUTIVE SUMMARY

PAGES 1-7

INTRODUCTION

ORGANIZATION OF THE DOCUMENT

1. INTRODUCTION
2. PLAN ELEMENTS
3. ELEMENT ORGANIZATION
4. IMPLEMENTATION

THE GENERAL PLAN

LAND USE AND ZONING

PRINCIPLES

IMPLEMENTATION

PRIORITIES

1. ENFORCEMENT OF BUILDING ORDINANCES & PLANNING DECISIONS
2. PEDESTRIAN ORIENTATED STREETScape
3. PARKING TRAFFIC & TRANSIT
4. VIRGIN RIVER PROTECTION
5. LODGING ESTABLISHMENTS THAT ARE COMPATIBLE WITH VILLAGE ATMOSPHERE & SCALE
6. HOUSING DIVERSITY & AFFORDABILITY
7. OPEN SPACE & TOWN TRAILS

CHAPTER 2: TOWN APPEARANCE

PAGES 8-38

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. SPRINGDALE'S IDENTITY AS A UNIQUE RURAL VILLAGE
 - A. DISTINCTIVE NATURAL SURROUNDINGS
 - B. SMALL SIZE OF COMMUNITY
 - C. REFLECTIONS OF SPRINGDALE'S HISTORY & RURAL HERITAGE
 - D. MODEST SCALE OF BUILDINGS & OTHER STRUCTURES
 - E. NEIGHBORHOOD DIVERSITY
 - F. A PEDESTRIAN-FRIENDLY STREETScape
 - G. A "HOMETOWN" FLAVOR
 - H. TOURIST SERVICES
2. CURRENT SPRINGDALE TOWN POLICIES ON TOWN APPEARANCE
 - A. DESIGN RELATED POLICIES & ORDINANCES
 1. PLANNED DEVELOPMENT OVERLAY ZONE
 2. DESIGN/DEVELOPMENT REVIEW
 3. ARCHITECTURAL STANDARDS & DESIGN GUIDELINES
 4. COLOR PALETTE
 5. DESIGN STANDARDS MANUAL

- 6. GRADING, LANDSCAPE & LIGHTING ORDINANCES
- B. TOWN CITIZENS' SUPPORT FOR VILLAGE ATMOSPHERE & TOWN APPEARANCE
COMPATIBLE WITH NATURAL SURROUNDINGS
 - 1. SURVEYS
 - 2. PUBLIC INVOLVEMENT EVENTS
 - 3. PRIOR PARTICIPATION IN GENERAL PLAN UPDATES
- 3. ZION PARK SCENIC BYWAY

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 2.1 – VILLAGE ATMOSPHERE

- 2.1.1 TOWNSCAPE
- 2.1.2 RESIDENTIAL ADJACENT TO COMMERCIAL
- 2.1.3 GATED STREETS/COMMUNITIES
- 2.1.4 OPEN SPACE
- 2.1.5 SPRINGDALE'S HERITAGE THROUGH ARCHITECTURE
- 2.1.6 MUNICIPAL PROPERTIES SERVE AS AN EXAMPLE

OBJECTIVE 2.2 – VISUAL FOCUS ON NATURAL FEATURES

- 2.2.1 PROTECT SCENIC VIEWS
- 2.2.2 PROTECT THE VIRGIN RIVER CORRIDOR
- 2.2.3 DEVELOPMENT COMPLEMENTS NATURAL SURROUNDINGS
- 2.2.4 PRESERVE THE NIGHT SKY
- 2.2.5 ENCOURAGE NATIVE, DROUGHT TOLERANT VEGETATION

OBJECTIVE 2.3 – BUILDING DESIGN

- 2.3.1 BUILDINGS REFLECT VILLAGE ATMOSPHERE
- 2.3.2 ENSURE ADHERENCE TO APPROVED PLANS

OBJECTIVE 2.4 – CLEAN & WELL-MAINTAINED TOWN

- 2.4.1 MAINTENANCE

OBJECTIVE 2.5 – FACILITIES FOR PEDESTRIANS, BICYCLES, & VEHICLES

- 2.5.1 STRATEGIC PEDESTRIAN IMPROVEMENTS
- 2.5.2 BICYCLE TRAVEL
- 2.5.3 TRAFFIC & PARKING

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

- 1. LAND USE
- 2. ZONING
- 3. DEVELOPMENT/GROWTH POTENTIAL
- 4. ANALYSIS OF FUTURE GROWTH

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 3.1 – MANAGING GROWTH

- 3.1.1 SUSTAINABLE LEVEL OF DEVELOPMENT
- 3.1.2 NEW DEVELOPMENT AND UTILITIES
- 3.1.3 LODGING FACILITIES AND VILLAGE ATMOSPHERE
- 3.1.4 OPEN SPACE

OBJECTIVE 3.2 – LAND USE PATTERNS

- 3.2.1 REZONING
- 3.2.2 RESIDENTIAL USES AND OPEN SPACE ALONG SR-9
- 3.2.3 DEVELOPMENT IN FOOTHILL RESIDENTIAL ZONE
- 3.2.4 APPROVED PLANS
- 3.2.5 PEDESTRIAN-ORIENTATED TOWN

OBJECTIVE 3.3 – OPEN SPACE

- 3.3.1 PRESERVE OPEN SPACE
- 3.3.2 ACQUIRE OPEN SPACE

OBJECTIVE 3.4 – REDUCTION OF DEVELOPMENT PROCESS IMPACTS

- 3.4.1 TIME LIMITS ON DEVELOPMENT PROJECTS
- 3.4.2 GRADING
- 3.4.3 CONSTRUCTION SITE
- 3.4.4 STORM RUN-OFF
- 3.4.5 DEVELOPMENT IMPACTS
- 3.4.6 DISTURBANCE OF NATURAL LANDSCAPE
- 3.4.7 INCREASES IN TRAFFIC

OBJECTIVE 3.5 – NON-CONFORMING PROPERTIES

- 3.5.1 PATHWAY FOR CONFORMITY

CHAPTER 4: ECONOMIC DEVELOPMENT

PAGES 67-75

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

TAX REVENUE SOURCES (CHART)

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 4.1 – ENCOURAGING SMALL BUSINESSES

- 4.1.1 SMALL, INDEPENDENT BUSINESSES
- 4.1.2 WEBSITE INTEGRATION
- 4.1.3 COMMUNICATION INFRASTRUCTURE

OBJECTIVE 4.2 – MANAGING TOURISM

- 4.2.1 ARTS COMMUNITY
- 4.2.2 ZION NATIONAL PARK

4.2.3 VISITOR'S EXPERIENCE

CHAPTER 5: HOUSING

PAGES 76-94

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 5.1 – GENERAL HOUSING

- 5.1.1 HOUSING DENSITIES
- 5.1.2 HOUSING DESIGN
- 5.1.3 BUILDING TO THE APPROVED PLANS
- 5.1.4 MIXED-USE ZONES
- 5.1.5 DIVERSITY THROUGH HOUSING

OBJECTIVE 5.2 – AFFORDABLE HOUSING

- 5.2.1 MIXED-USE RE/CONSTRUCTION
- 5.2.2 MULTI-FAMILY DWELLINGS
- 5.2.3 LOCAL RESIDENTS AND EMPLOYEES
- 5.2.4 PRIVATE/PUBLIC PARTNERSHIPS
- 5.2.5 LOWER COST HOUSING

OBJECTIVE 5.3 – EMPLOYEE HOUSING

- 5.3.1 EMPLOYERS PROVIDE HOUSING

CHAPTER 6: HISTORIC PRESERVATION

PAGES 95-101

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 6.1 – HISTORIC ELEMENTS AND FEATURES

- 6.1.1 INVENTORY
- 6.1.2 PRESERVE AND REHABILITATE
- 6.1.3 HISTORIC EXHIBITS

CHAPTER 7: ENVIRONMENTAL RESOURCES

PAGES 102-121

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. PLANT & ANIMAL HABITAT

2. VIRGIN RIVER CORRIDOR & FLOOD PLAINS
3. WATER & AIR QUALITY
4. NATURAL HAZARDS
5. NIGHT SKY
6. VIEW CORRIDORS & SCENIC VIEWS
7. NOISE POLLUTION & NATURAL QUIET

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 7.1 – WATER QUALITY

- 7.1.1 WATER QUALITY PROTECTION
- 7.1.2 DEVELOPMENTAL IMPACTS

OBJECTIVE 7.2 – AIR QUALITY

- 7.2.1 AIR QUALITY PROTECTION
- 7.2.2 VISIBILITY

OBJECTIVE 7.3 – WILDLIFE

- 7.3.1 WILDLIFE CORRIDOR PROTECTION

OBJECTIVE 7.4 – LIGHTING/NIGHT SKY

- 7.4.1 DARK SKY PROTECTION
- 7.4.2 PEDESTRIAN-ORIENTED LIGHTING

OBJECTIVE 7.5 – NOISE/NATURAL QUIET

- 7.5.1 PROTECTION OF NATURAL QUIET
- 7.5.2 PHYSICAL NOISE BUFFERS
- 7.5.3 OVER FLIGHTS

OBJECTIVE 7.6 – VIRGIN RIVER CORRIDOR

- 7.6.1 DEVELOPMENT ON THE VIRGIN RIVER CORRIDOR
- 7.6.2 VIRGIN RIVER CORRIDOR PROTECTION
- 7.6.3 APPROPRIATE USES OF THE VIRGIN RIVER CORRIDOR

CHAPTER 8: PUBLIC WORKS

PAGES 122-148

GENERAL GOAL

EXISTING CONDITIONS & KEY FINDINGS

1. WATER
2. SEWAGE
3. STREETS & SIDEWALKS
4. TRASH & RECYCLING
5. PUBLIC RESTROOMS

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 8.1 – WATER

- 8.1.1 WATER CONSERVATION
- 8.1.2 WATER CONSERVATION ON MUNICIPAL PROPERTIES
- 8.1.3 LOW WATER USE PLANTING
- 8.1.4 WATER QUALITY PROTECTION
- 8.1.5 TOWN WATER SYSTEM
- 8.1.6 WATER RIGHTS
- 8.1.7 WATER RIGHTS & NEW DEVELOPMENT

OBJECTIVE 8.2 – DRAINAGE & SEWER

- 8.2.1 STORM WATER RUN-OFF & NEW DEVELOPMENT
- 8.2.2 STORM WATER & DRAINAGE INFRASTRUCTURE
- 8.2.3 TOWN SANITARY SEWER SYSTEM

OBJECTIVE 8.3 – PUBLIC RESTROOMS

- 8.3.1 PUBLIC RESTROOMS IN PUBLIC AREAS

OBJECTIVE 8.4 – TRASH & RECYCLING FACILITIES

- 8.4.1 TRASH & RECYCLING RECEPTACLES
- 8.4.2 RECYCLING
- 8.4.3 RECYCLING: ZION NATIONAL PARK & WASHINGTON COUNTY
- 8.4.4 COMMUNITY COMPOSTING

OBJECTIVE 8.5 – MANAGEMENT OF HAZARDOUS WASTE

- 8.5.1 HAZARDOUS WASTE
- 8.5.2 DISPOSAL

OBJECTIVE 8.6 – SERVICE UTILITIES

- 8.6.1 VISUAL INTEGRITY
- 8.6.2 DEPENDABLE, ENVIRONMENTALLY SOUND UTILITY SERVICES

OBJECTIVE 8.7 – SIDEWALKS & STREETS

- 8.7.1 SIDEWALKS
- 8.7.2 SAFETY

CHAPTER 9: TRANSPORTATION

PAGES 149-169

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 9.1 – NON-MOTORIZED & PEDESTRIAN

- 9.1.1 PEDESTRIAN-ORIENTED TOWN
- 9.1.2 SAFETY

- 9.1.3 MAINTENANCE
- 9.1.4 BICYCLE LANES
- 9.1.5 TRAIL SYSTEM
- 9.1.6 INFORMATION & EDUCATION
- 9.1.7 ACCESSIBILITY

OBJECTIVE 9.2 – MOTORIZED

- 9.2.1 SAFE SR-9 CORRIDOR
- 9.2.2 SR-9 CORRIDOR PRESERVATION
- 9.2.3 TRAFFIC SPEEDS
- 9.2.4 VISIBILITY
- 9.2.5 TRAFFIC FLOW

OBJECTIVE 9.3 – SHUTTLE SYSTEM

- 9.3.1 SHUTTLE SYSTEM

OBJECTIVE 9.4 – PARKING

- 9.4.1 EFFICIENT PARKING FOR VISITORS AND LOCALS
- 9.4.2 ALTERNATIVES TO PARKING

CHAPTER 10: PARKS, RECREATION & THE ARTS

PAGES 170-180

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. PARKS
 - a. TOWN PARK
 - b. RIVER PARK
2. RECREATION
3. ARTS
4. COMMUNITY CENTER
5. TRAILS
6. FESTIVALS

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 10.1 – PARK FACILITIES

- 10.1.1 SAFETY, FUNCTIONAL, ACCESSIBLE
- 10.1.2 NEW RECREATIONAL OPPORTUNITIES
- 10.1.3 LAND ACQUISITION FOR PARK/RECREATION SITES

OBJECTIVE 10.2 – PUBLIC ART

- 10.2.1 ENCOURAGE PUBLIC ART

OBJECTIVE 10.3 – ARTS & RECREATION PROGRAM/CENTER

- 10.3.1 PUBLIC FACILITIES FOR ART AND RECREATION
- 10.3.2 AFTER SCHOOL AND SUMMER ACTIVITIES

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. PUBLIC SAFETY
2. FIRE & AMBULANCE SERVICE
3. MEDICAL CLINIC

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 11.1 – LAW ENFORCEMENT

- 11.1.1 TRAFFIC VIOLATIONS/CRIME RATE
- 11.1.2 COMMUNITY RELATIONS
- 11.1.3 DRUG PREVENTION
- 11.1.4 COMMUNITY SAFETY

OBJECTIVE 11.2 – EMS & FIRE

- 11.2.1 VEHICULAR ACCESS
- 11.2.2 FUNDING AND FUTURE GROWTH

OBJECTIVE 11.3 – HEALTH SERVICES

- 11.3.1 EXISTING MEDICAL SERVICES
- 11.3.2 EXPANDED MEDICAL SERVICES

OBJECTIVE 11.4 – EMERGENCY MANAGEMENT

- 11.4.1 EMERGENCY MANAGEMENT PLAN

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. RENEWABLE ENERGY
2. ALTERNATIVE TRANSPORTATION
3. GREEN BUILDING PRACTICES

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 12.1 – SUSTAINABLE BUILDINGS

- 12.1.1 ENERGY EFFICIENCY IN BUILDINGS
- 12.1.2 SUSTAINABLE BUILDING PRACTICES
- 12.1.3 WATER EFFICIENT DEVELOPMENT

OBJECTIVE 12.2 – SUSTAINABLE TRANSPORTATION

- 12.2.1 NON-MOTORIZED TRANSPORTATION

12.2.2 EFFICIENT MOTORIZED TRANSPORTATION

OBJECTIVE 12.3 – SUSTAINABLE FOOD PRODUCTION

12.3.1 LOCALLY GROWN FOOD

CHAPTER 13: FUTURE LAND USE MAP

PAGES 194-203

GENERAL GOAL & OVERVIEW

EXISTING CONDITIONS & KEY FINDINGS

1. MIXTURE OF LAND USES ON SR-9
2. LOW DENSITY RESIDENTIAL DEVELOPMENT IN THE FOOTHILLS
3. POCKETS OF INTENSE COMMERCIAL & HIGHER DENSITY RESIDENTIAL ON VALLEY FLOOR

COMPONENTS OF THE FUTURE LAND USE MAP

GENERAL PLAN LAND USE DESIGNATIONS

FEDERAL LANDS
CONSERVATION
CONSERVATION RESIDENTIAL
AGRICULTURE
AGRICULTURAL RESIDENTIAL
TRANSITION RESIDENTIAL
MIXED USE
COMMERCIAL CORE
CIVIC

OBJECTIVES & IMPLEMENTATION STRATEGIES

OBJECTIVE 13.1 – FUTURE LAND USE MAP

13.1.1 DEVELOPMENT AND THE FUTURE LAND USE MAP

CHAPTER 14: IMPLEMENTATION

PAGES 204-211

OVERVIEW

HOW TO USE THE PLAN

1. OBJECTIVES & STRATEGIES
2. ANNUAL BUDGET
3. DEVELOPMENT APPROVALS
4. CAPITAL IMPROVEMENT PLANS
5. PRIVATE DEVELOPMENT DECISIONS

MOVING THE PLAN FORWARD

UPDATING THE PLAN

PRIORITIES

1. ENFORCEMENT OF BUILDING ORDINANCES & PLANNING DECISIONS/BUILDING APPEARANCE ORDINANCES
2. PEDESTRIAN ORIENTED STREETScape
3. PARKING TRAFFIC AND TRANSIT
4. VIRGIN RIVER PROTECTION
5. LODGING ESTABLISHMENTS THAT ARE COMPATIBLE WITH VILLAGE ATMOSPHERE AND SCALE
6. HOUSING DIVERSITY AND AFFORDABILITY
7. OPEN SPACE AND TOWN TRAILS
8. CAPITAL FACILITIES PLANNING/PUBLIC INFRASTRUCTURE

IMPLEMENTATION TABLE

APPENDIX A - EDUCATION

PAGES 212-218

OVERVIEW

EDUCATION PROGRAM

1. DEFINE THE ISSUE
2. GET THE WORD OUT
3. GET COMMUNITY BUY-IN
4. FOLLOW THROUGH

PRIORITY EDUCATION ITEMS

1. EMERGENCY PREPAREDNESS
2. RECYCLING
3. TOWN HIKING TRAILS

EDUCATION IMPLEMENTATION STRATEGIES BY GENERAL PLAN CHAPTER

CHAPTER 2 – TOWN APPEARANCE

CHAPTER 4 – ECONOMIC DEVELOPMENT

CHAPTER 5 – HOUSING

CHAPTER 7 – ENVIRONMENTAL RESOURCES

CHAPTER 8 – PUBLIC WORKS

CHAPTER 9 – TRANSPORTATION

CHAPTER 10 – PARKS AND RECREATION

CHAPTER 11 – PEACEKEEPING HEALTH AND SAFETY

CHAPTER 12 – SUSTAINABILITY

OVERVIEW

WATER

1. WATER CONSERVATION & MANAGEMENT PLAN
2. STORMWATER MANAGEMENT PLAN
3. CULINARY WATER MASTER PLAN
4. CULINARY WATER MASTER PLAN UPDATE
5. WASTE WATER MASTER PLAN

PARKS & TRAILS

1. PARKS & RECREATION MASTER PLAN
2. TRAIL MASTER PLAN & MAP
3. ZION CANYON TRAIL FEASIBILITY REPORT

TRANSPORTATION

1. TRANSPORTATION MASTER PLAN
2. HURRICANE TO ZION CANYON TRANSIT STUDY

SAFETY

1. EMERGENCY MANAGEMENT PLAN

GENERAL

1. ZION SCENIC BYWAY CORRIDOR MANAGEMENT PLAN
2. ZION SCENIC BYWAY INTERPRETIVE PLAN
3. VISION DIXIE REPORT
4. OPEN SPACE VISIONING AND CORRIDOR EXPERIENCE
5. CONSTRUCTION DESIGN STANDARDS & DETAILS MANUAL

REFERENCE

1. WASHINGTON COUNTY WATER CONSERVANCY DISTRICT - VIRGIN RIVER MASTER PLAN
2. VIRGIN RIVER RESOURCE MANAGEMENT & RECOVERY PROGRAM
3. FIVE COUNTY AOG CONSOLIDATED PLAN ON HOUSING & COMMUNITY DEVELOPMENT

OVERVIEW

CAPITAL PROJECTS BY GENERAL PLAN CHAPTER

- CHAPTER 2 – TOWN APPEARANCE
- CHAPTER 3 – LAND USE & ZONING
- CHAPTER 4 – ECONOMIC DEVELOPMENT

CHAPTER 6 – HISTORIC PRESERVATION
CHAPTER 7 – ENVIRONMENTAL RESOURCES
CHAPTER 8 – PUBLIC WORKS
CHAPTER 9 – TRANSPORTATION
CHAPTER 10 – PARKS AND RECREATION
CHAPTER 11 – PEACEKEEPING HEALTH AND SAFETY
CHAPTER 12 – SUSTAINABILITY

APPENDIX D - RECOMMENDED ORDINANCE REVISIONS

PAGES 227-229

OVERVIEW

RECOMMENDED ORDINANCE REVISIONS BY GENERAL PLAN CHAPTER

CHAPTER 2 – TOWN APPEARANCE
CHAPTER 3 – LAND USE & ZONING
CHAPTER 4 – ECONOMIC DEVELOPMENT
CHAPTER 5 – HOUSING
CHAPTER 6 – HISTORIC PRESERVATION
CHAPTER 7 – ENVIRONMENTAL RESOURCES
CHAPTER 9 – TRANSPORTATION
CHAPTER 11 – PEACEKEEPING HEALTH AND SAFETY
CHAPTER 12 – SUSTAINABILITY

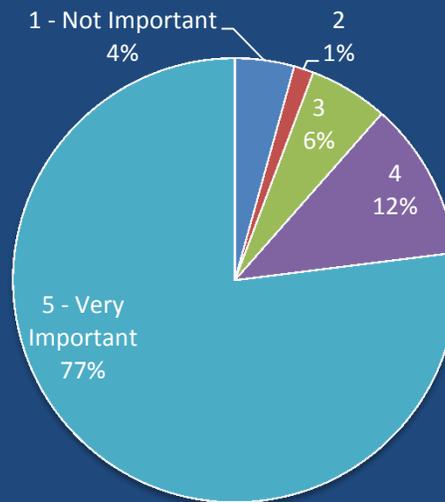
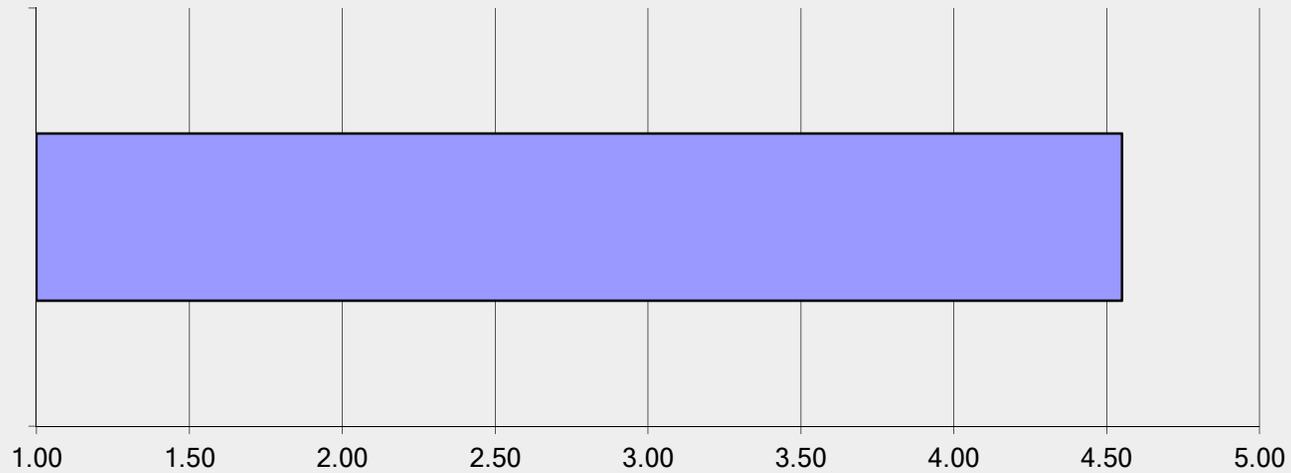
APPENDIX B – SUMMARIES OF PRIOR PUBLIC PARTICIPATION

Future of Springdale

Survey Results

August 2013

On a scale of 1 to 5, with 1 being "not important" and 5 being "very important," how important is the town's village atmosphere and village scale to you?



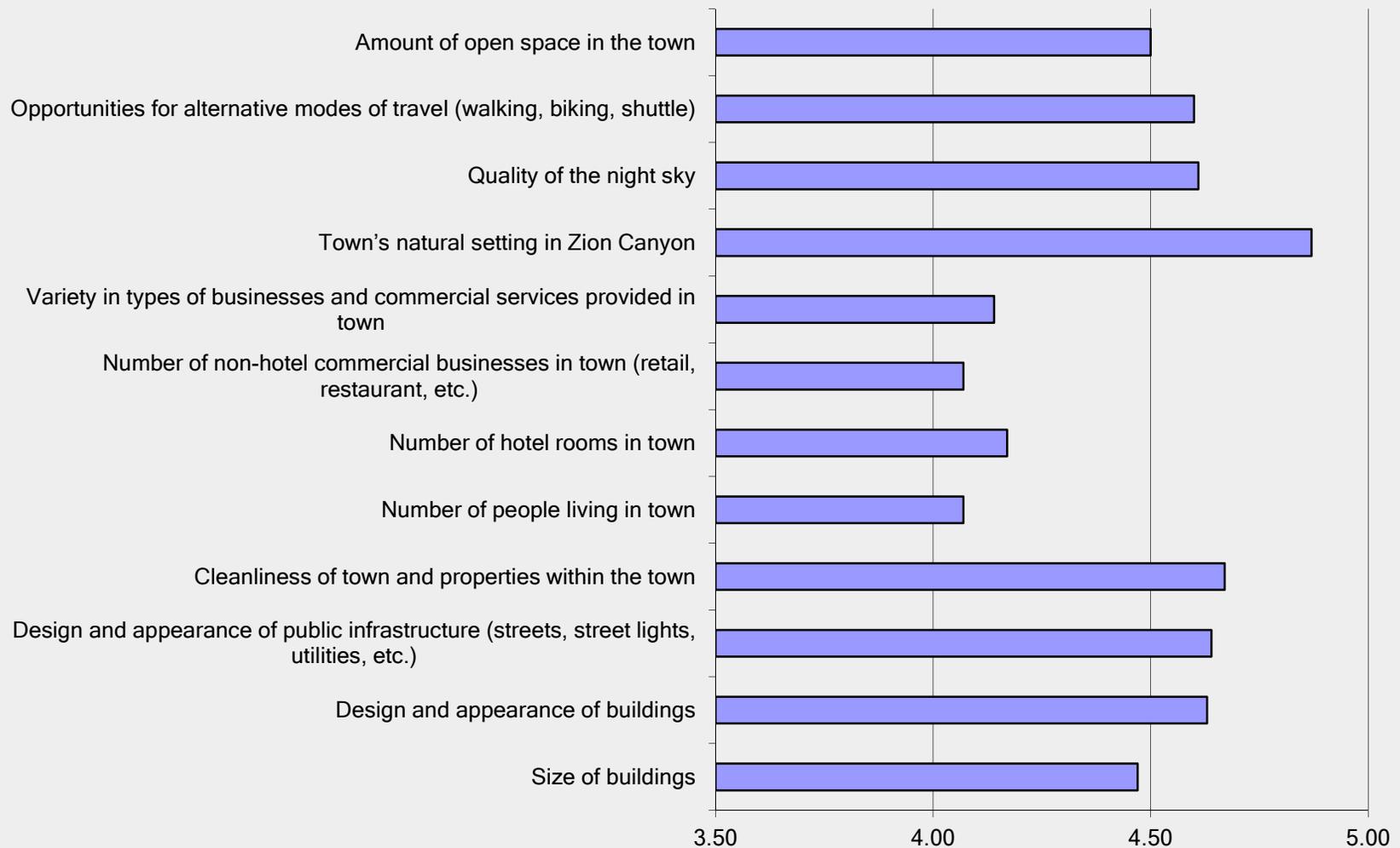
What five words best describe “village atmosphere” for you?

- Friendly – 39
- Small – 37
- Walkable / Pedestrian – 28
- Quiet – 21
- Quaint – 18
- Community – 16
- Local – 16
- Unique – 13
- Open Space – 9
- Welcoming – 8
- Rural – 8
- Charming – 8

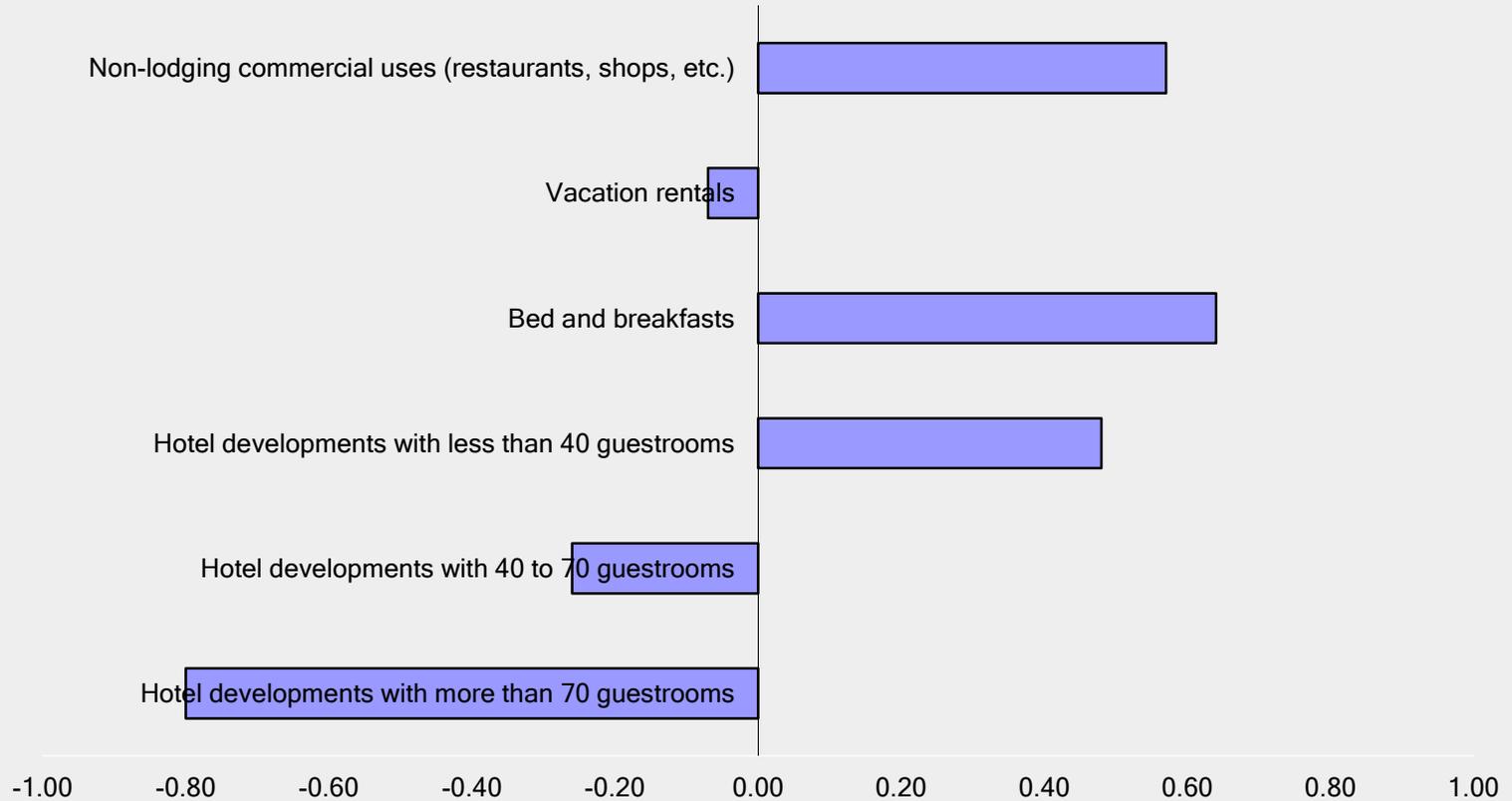
What five words best describe “village scale” for you?

- Small – 56
- Walkable – 25
- Local / Local Businesses – 12
- Green Space / Open Space – 12
- Quaint – 9
- Low / Low Buildings – 8
- Friendly – 7
- Uncrowded / Uncongested – 6
- Parkitecture / Design – 6

How important are the following factors in preserving and enhancing Springdale's village atmosphere and village scale? Rate each factor on a scale of 1 to 5, with 1 being "not an important factor" and 5 being "a very important factor."

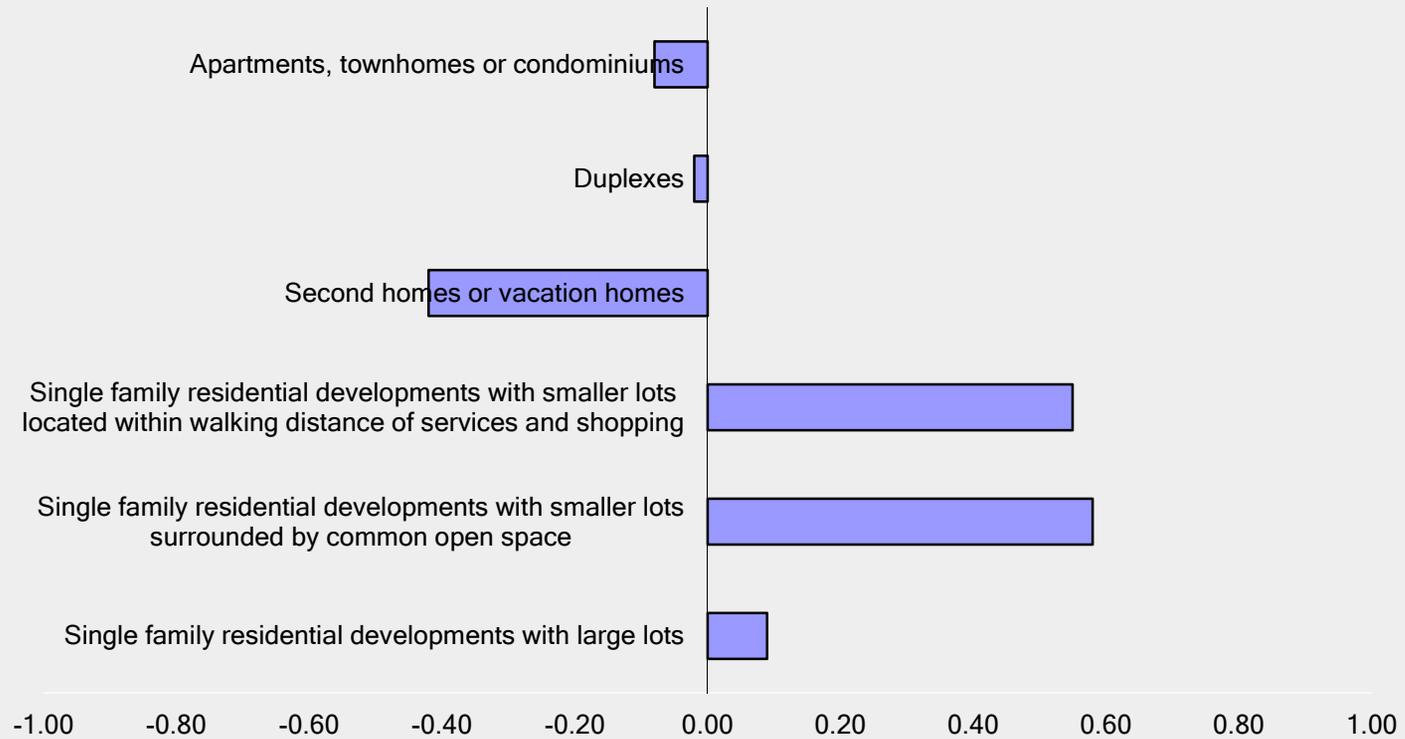


In general, do each of the following types of commercial development positively or negatively impact village atmosphere and village scale? Choose whether each item has a greater potential to have a positive impact, negative impact, or no impact on the t



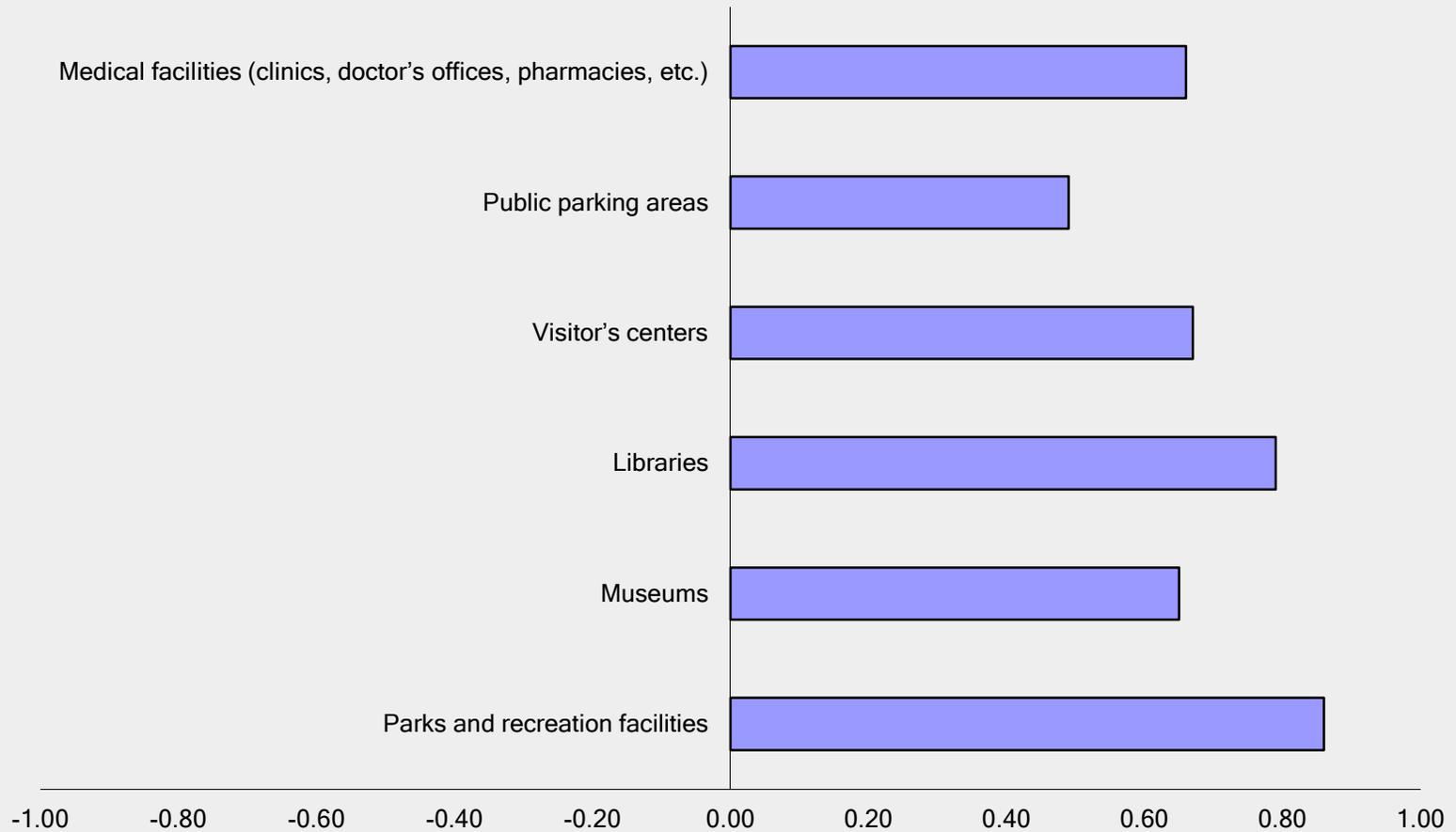
	Hotel developments with more than 70 guestrooms	Hotel developments with 40 to 70 guestrooms	Hotel developments with less than 40 guestrooms	Bed and breakfasts	Vacation rentals	Non-lodging commercial uses (restaurants, shops, etc.)
Series1	-0.80	-0.26	0.48	0.64	-0.07	0.57

In general, do each of the following types of residential development positively or negatively impact village atmosphere and village scale? Choose whether each item has a greater potential to have a positive impact, negative impact, or no impact on the



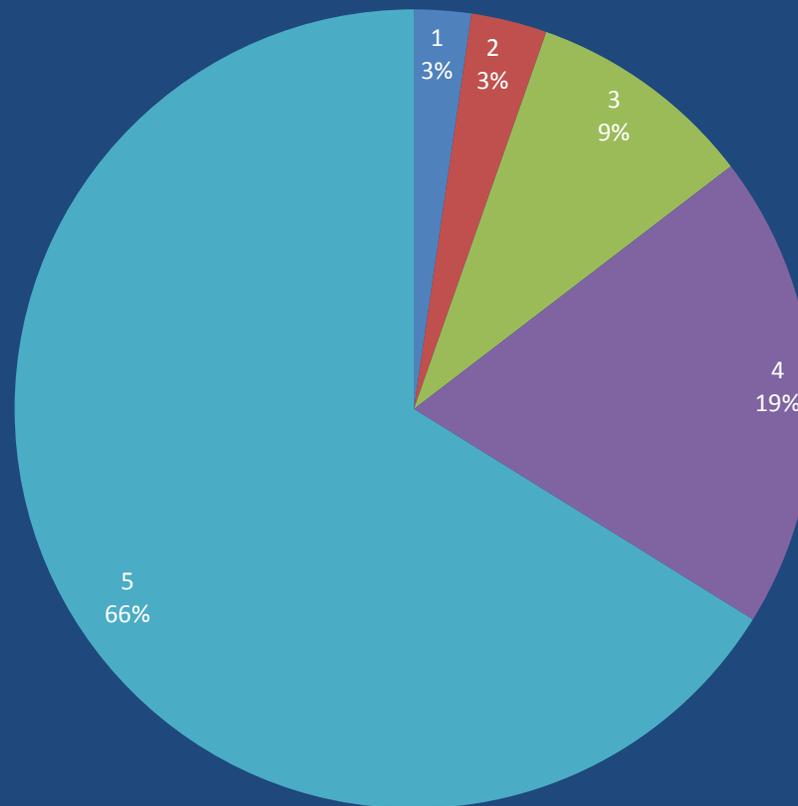
	Single family residential developments with large lots	Single family residential developments with smaller lots surrounded by common open space	Single family residential developments with smaller lots located within walking distance of services and shopping	Second homes or vacation homes	Duplexes	Apartments, townhomes or condominiums
Series1	0.09	0.58	0.55	-0.42	-0.02	-0.08

In general, do each of the following public uses and services positively or negatively impact village atmosphere and village scale? Choose whether each item has a greater potential to have a positive impact, negative impact, or no impact on the town's v

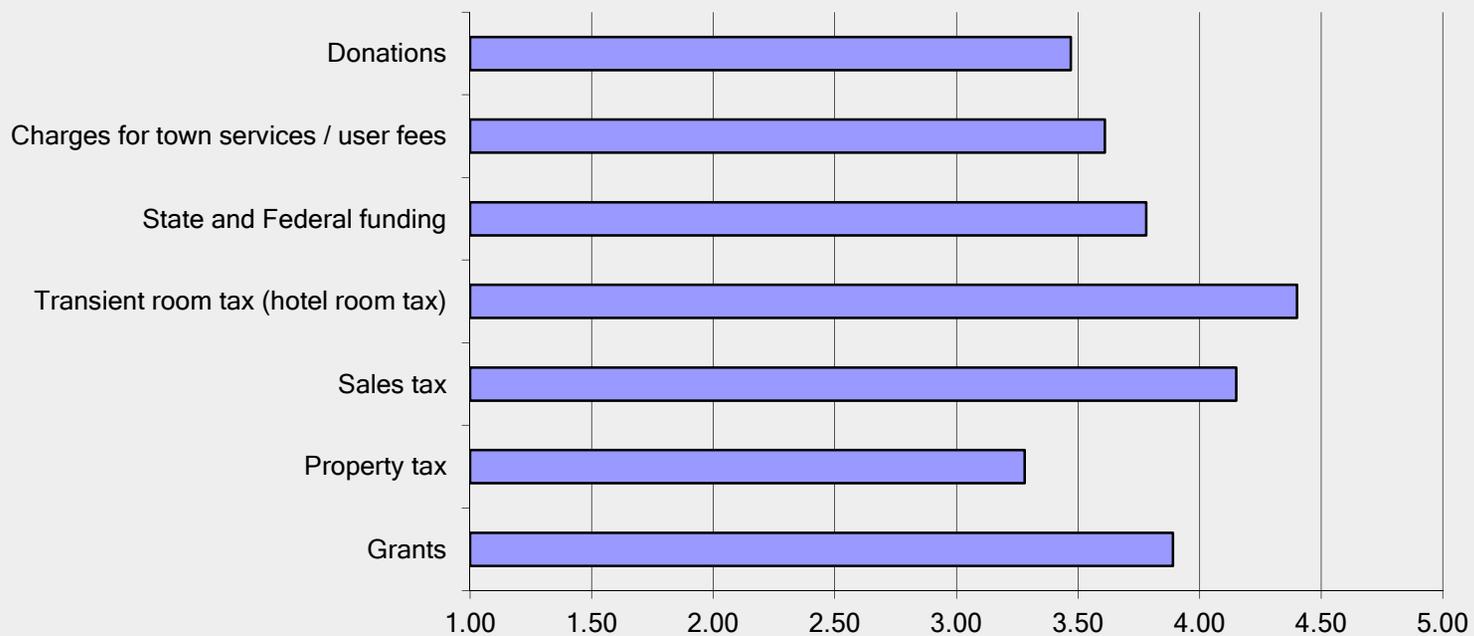


	Parks and recreation facilities	Museums	Libraries	Visitor's centers	Public parking areas	Medical facilities (clinics, doctor's offices, pharmacies, etc.)
Series1	0.86	0.65	0.79	0.67	0.49	0.66

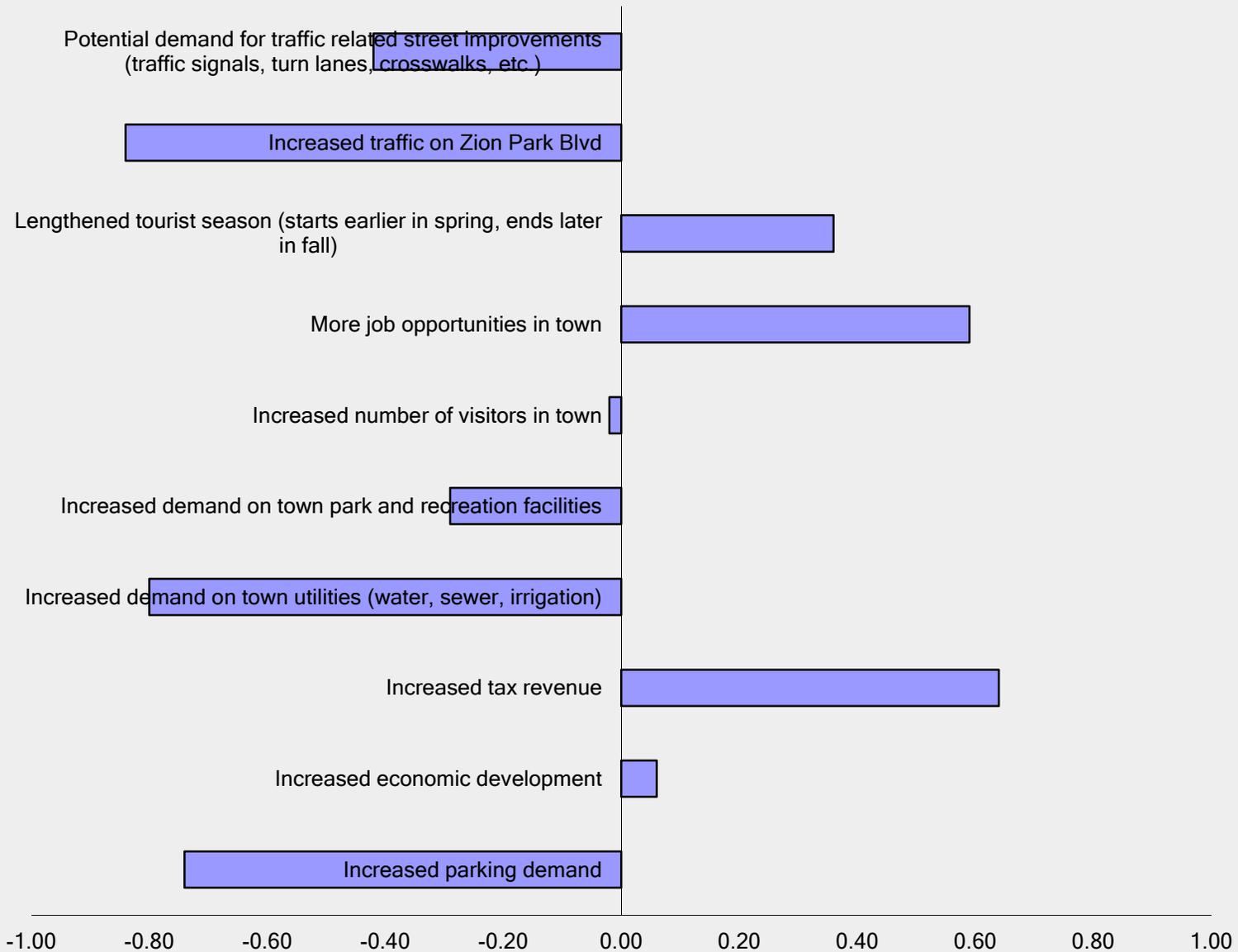
The Town of Springdale provides a wide array of services to its residents and guests—more services than most cities several times the size. These services include a full time police department, extensive water and waste water systems, parks and recreation



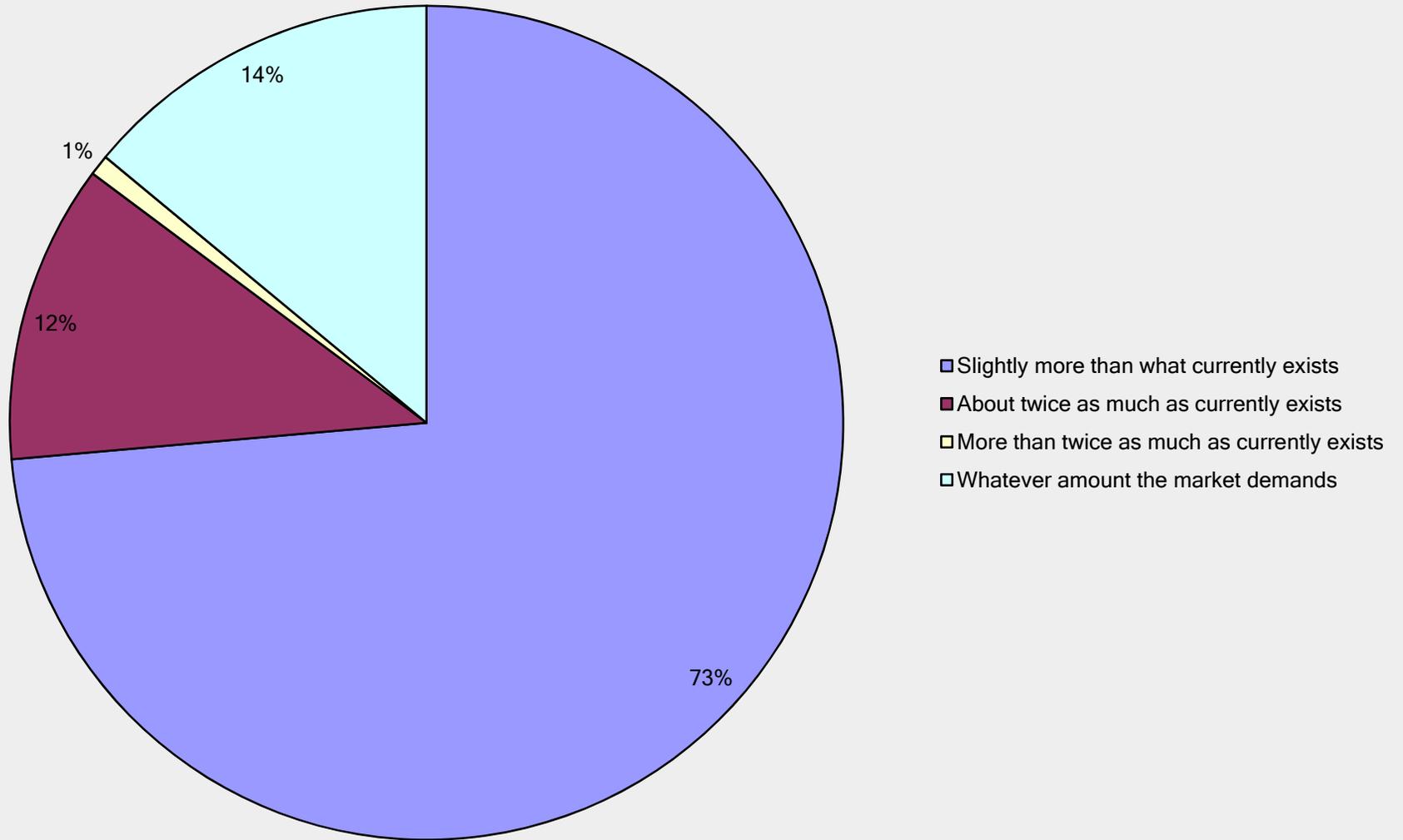
How should the Town pay for the services described in the question above? Rate each of the following funding sources on a scale of 1 to 5, with 1 being "not an important funding source" and 5 being "a very important funding source."



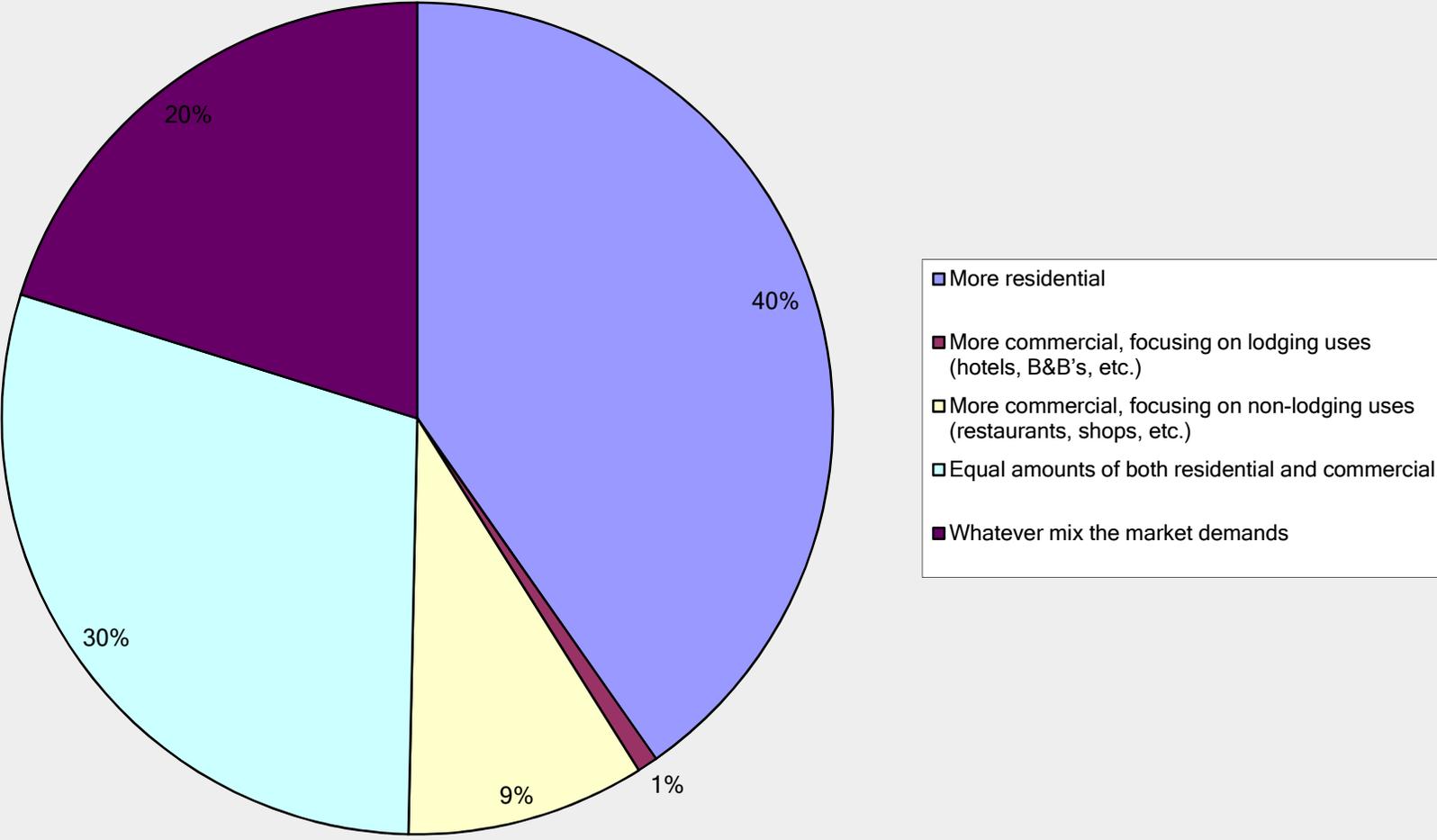
Visitation to Zion National Park has steadily increased over the past ten years. There are now nearly three million visitors to Zion each year. How do the following issues associated with increasing visitation to the National Park impact the village atmosphere?



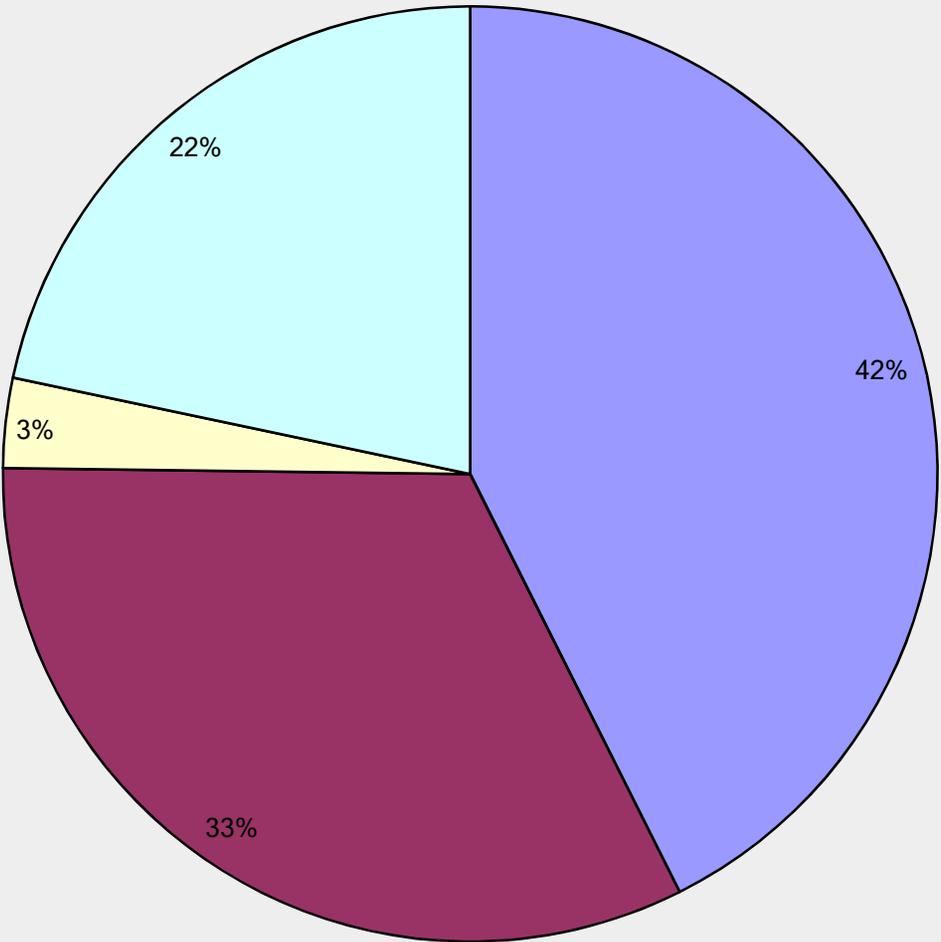
What is the ideal amount of development (residential and commercial) for Springdale?



Realizing that new growth will occur in town, would you rather see more commercial development or more residential development in Springdale?

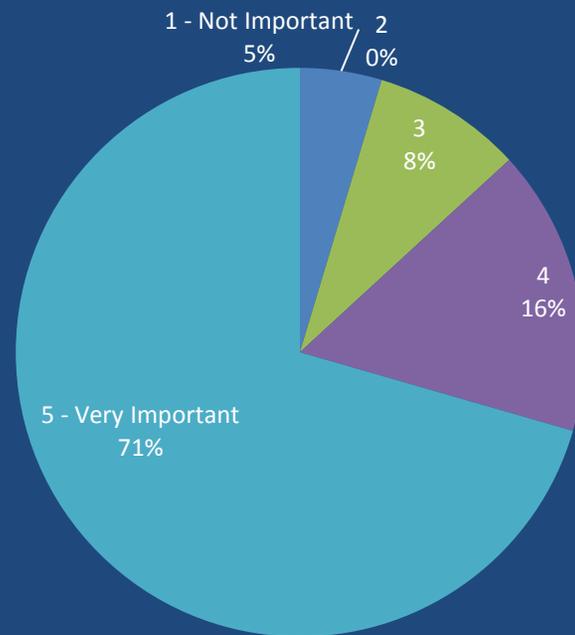
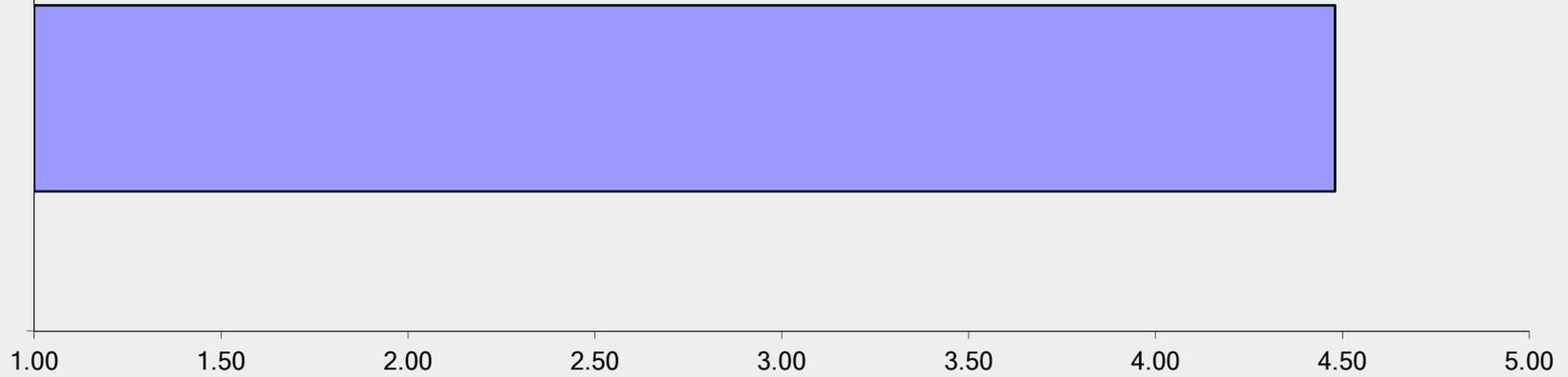


What ratio of hotel rooms to housing units do you feel best preserves the village atmosphere and village scale?

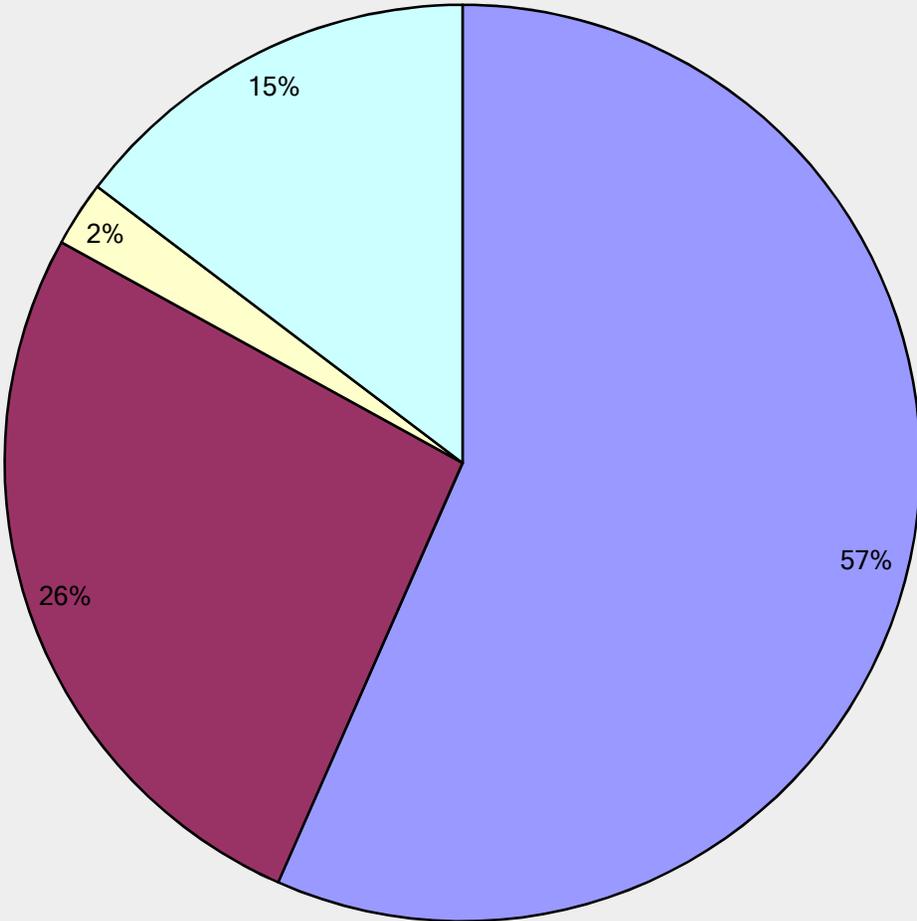


- Less than 2.5 (fewer hotel rooms per housing unit than the historic trend for the last 20 years)
- Between 2.5 and 3.5 (the same mix of hotel rooms to housing units as the historic trend for the last 20 years)
- More than 3.5 (more hotel rooms per housing unit than the historic trend for the last 20 years)
- Whatever mix of hotel rooms to housing units the market demands

On a scale of 1 to 5, with 1 being "not important" and 5 being "very important," how important is the pace of new development in preserving village atmosphere and village scale?



What pace of new development do you feel best preserves the town's village atmosphere and village scale?



- A slower pace than the town has experienced in the last 20 years
- About the same pace as the town has experienced in the last 20 years
- A faster pace than the town has experienced in the last 20 years
- Whatever pace the market demands

General Plan Survey : 2015

Town of Springdale



OVERVIEW OF THE SURVEY

- 2 SETS OF SURVEY:

- » VISUAL SURVEY

- » COMMENTS SHEETS

SURVEYS WERE COLLECTED

- » ONLINE

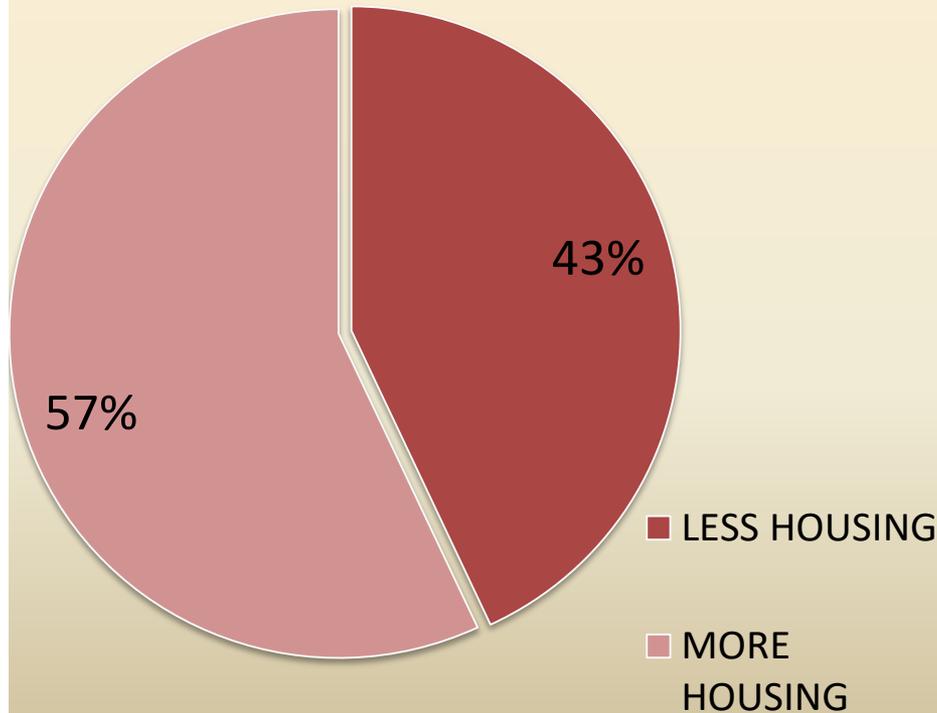
- » EARTH DAY EVENT

- 83 RESPONDENTS FOR VISUAL SURVEY

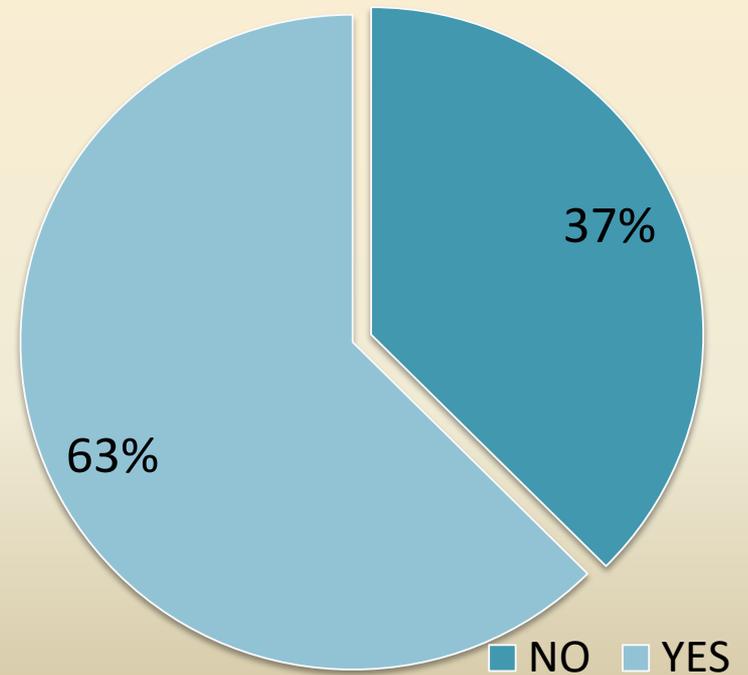
- 8 RESPONDENTS FOR COMMENTS SURVEY

HOUSING DEVELOPMENT: 1

HOW DO YOU WANT TO SEE HOUSING DEVELOPMENT IN SPRINGDALE?

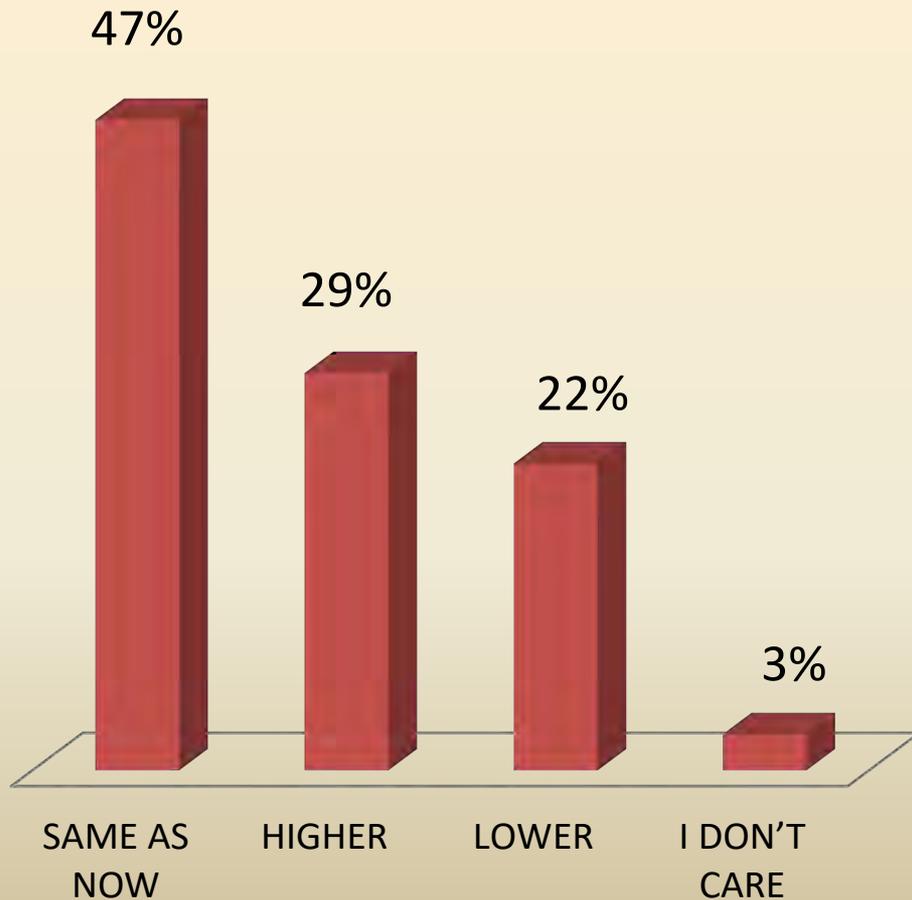


DOES AFFORDABILITY OF HOUSING IN SPRINGDALE BOTHERS YOU?

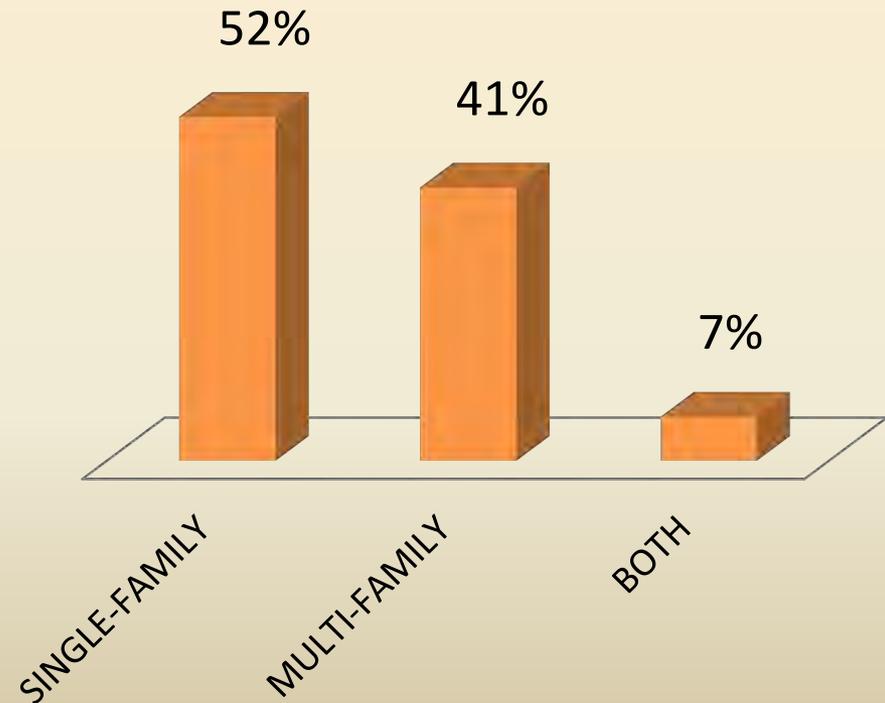


HOUSING DEVELOPMENT: 2

FUTURE HOUSING DENSITY OF TOWN OF SPRINGDALE



KIND OF FUTURE HOUSING YOU WANT TO SEE IN TOWN OF SPRINGDALE



VISUAL SURVEY: FUTURE HOUSING



A

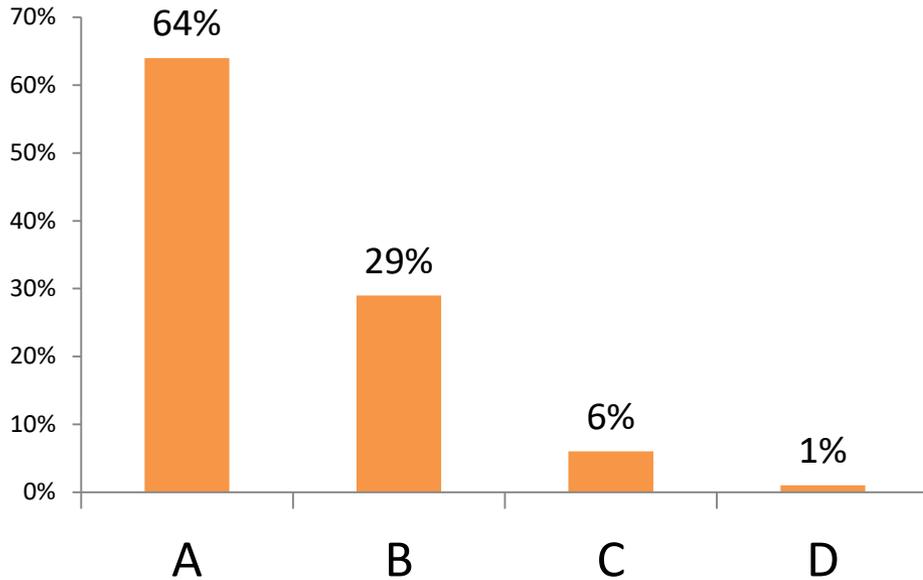
64%

B

29%

C

6%

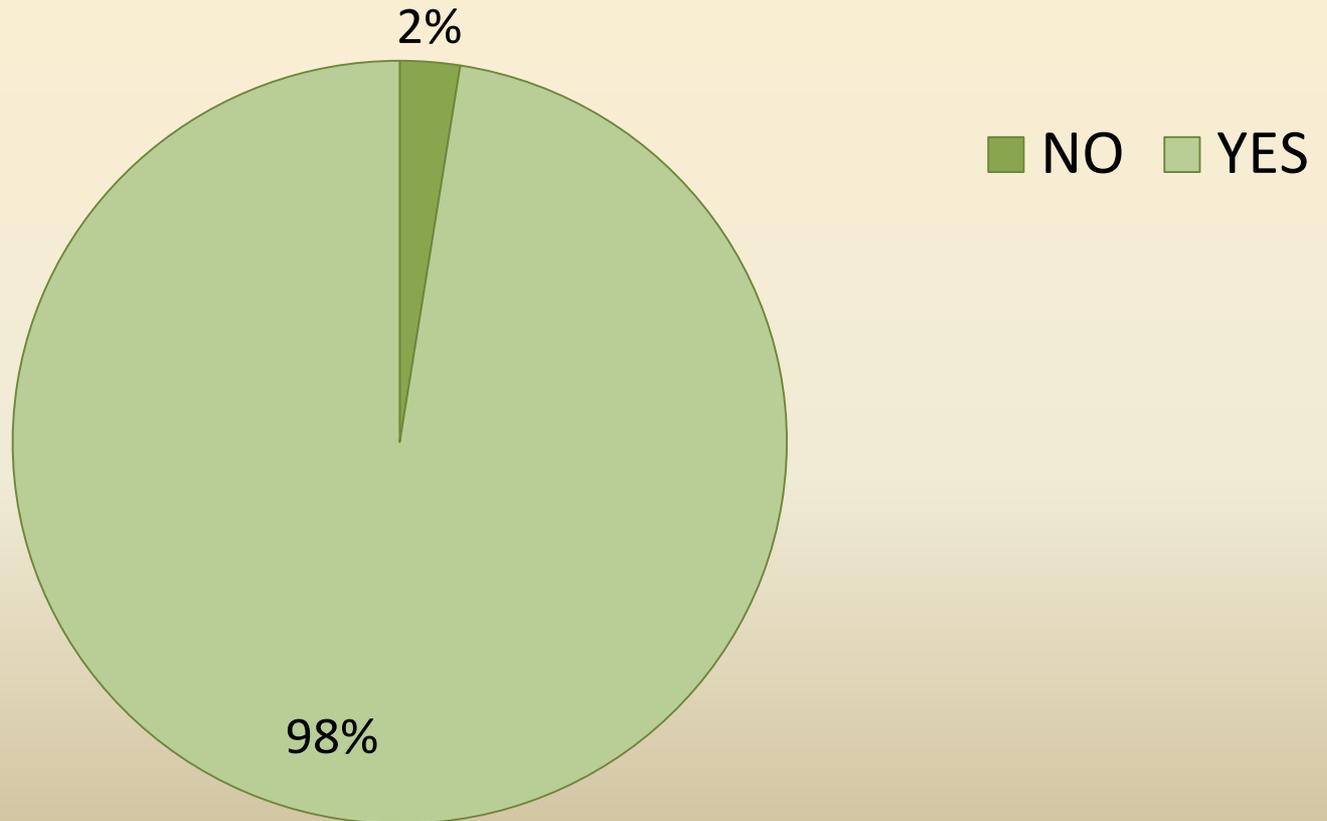


D

1%

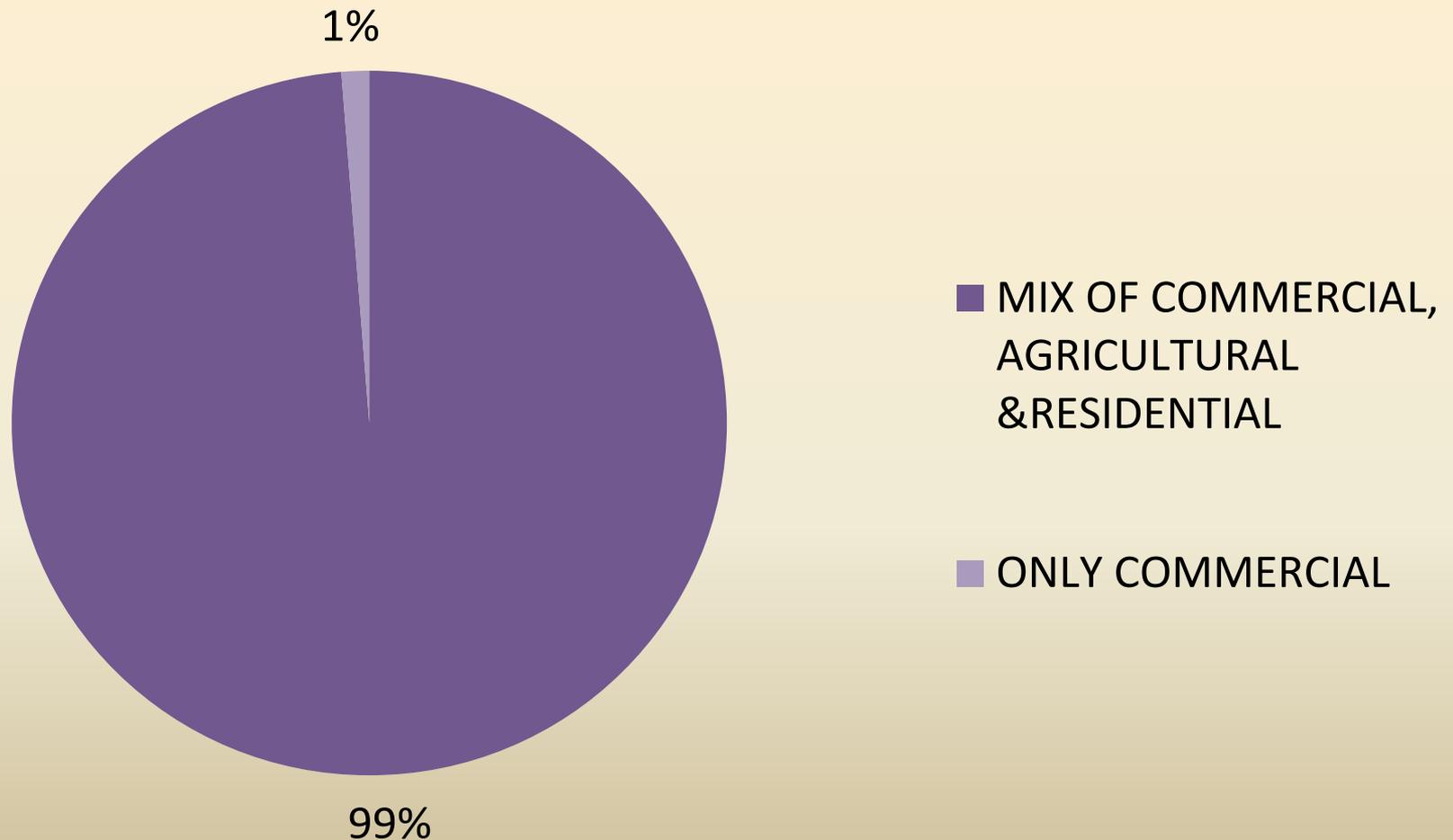
OPEN SPACE

DO YOU FEEL MPORTANCE OF PRESERVING OPEN SPACE



COMMERCIAL ZONE

DEVELOPEMENT ON ZION PARK BOULEVARD



VISUAL SURVEY: COMMERCIAL STREET LOOK



A

0 %



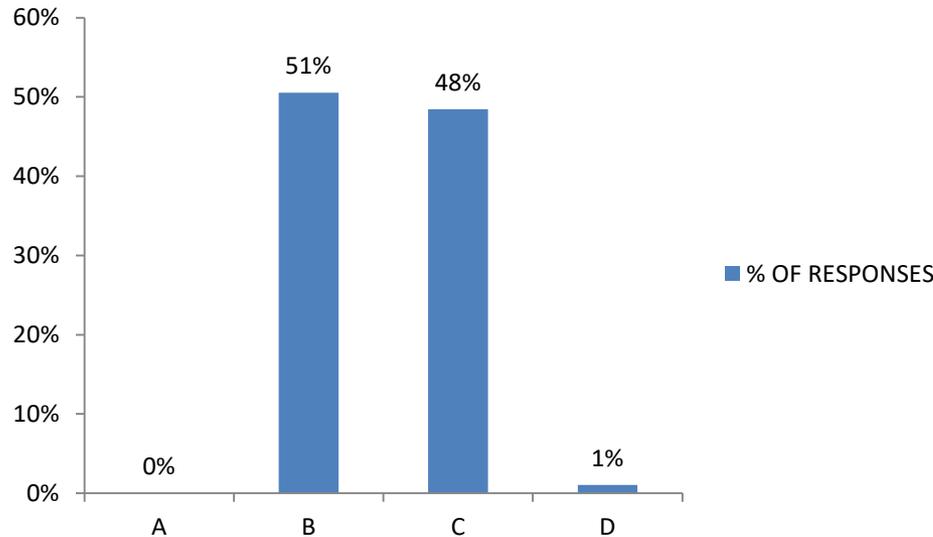
B

51 %



C

48 %

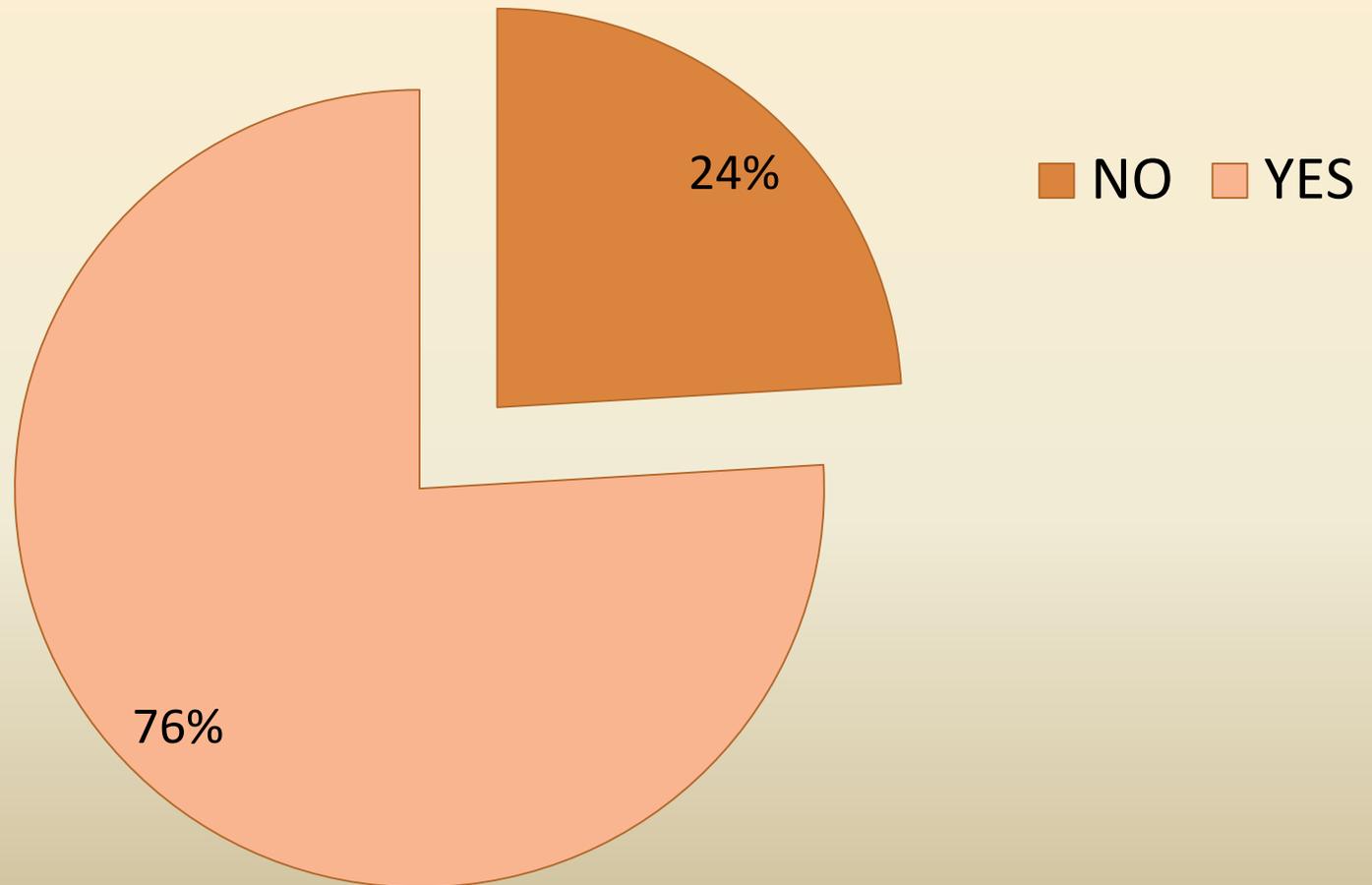


D

1 %

PARKING

**DO YOU WANT TO SEE MORE PARKING IN TOWN OF
SPRINGDALE**



VISUAL SURVEY: TYPE OF PARKING THAT FITS BEST WITH TOWN'S CHARACTER



A 67%



B 8%



C 4%



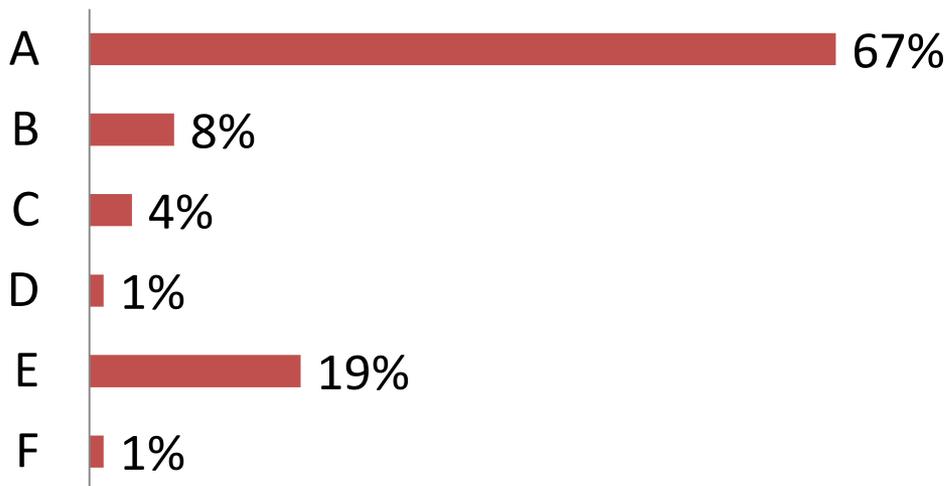
D 1%



E 19%



F 1%



COMMENTS: VISION FOR SPRINGDALE 20 YEARS FROM NOW



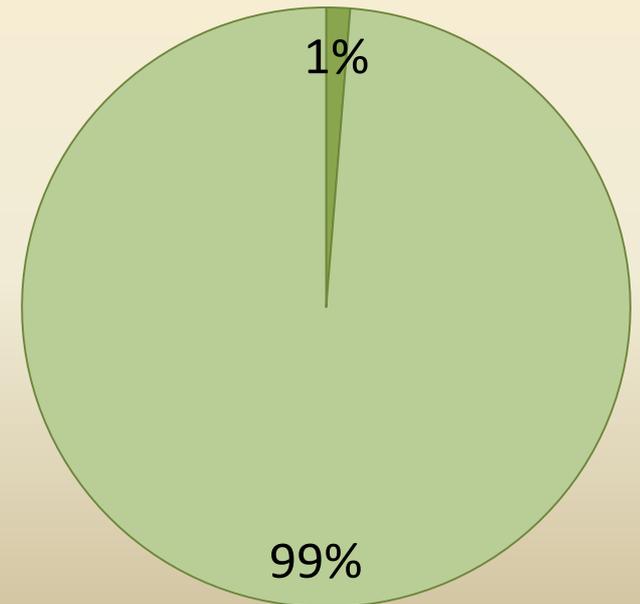
Frequently used 50 words

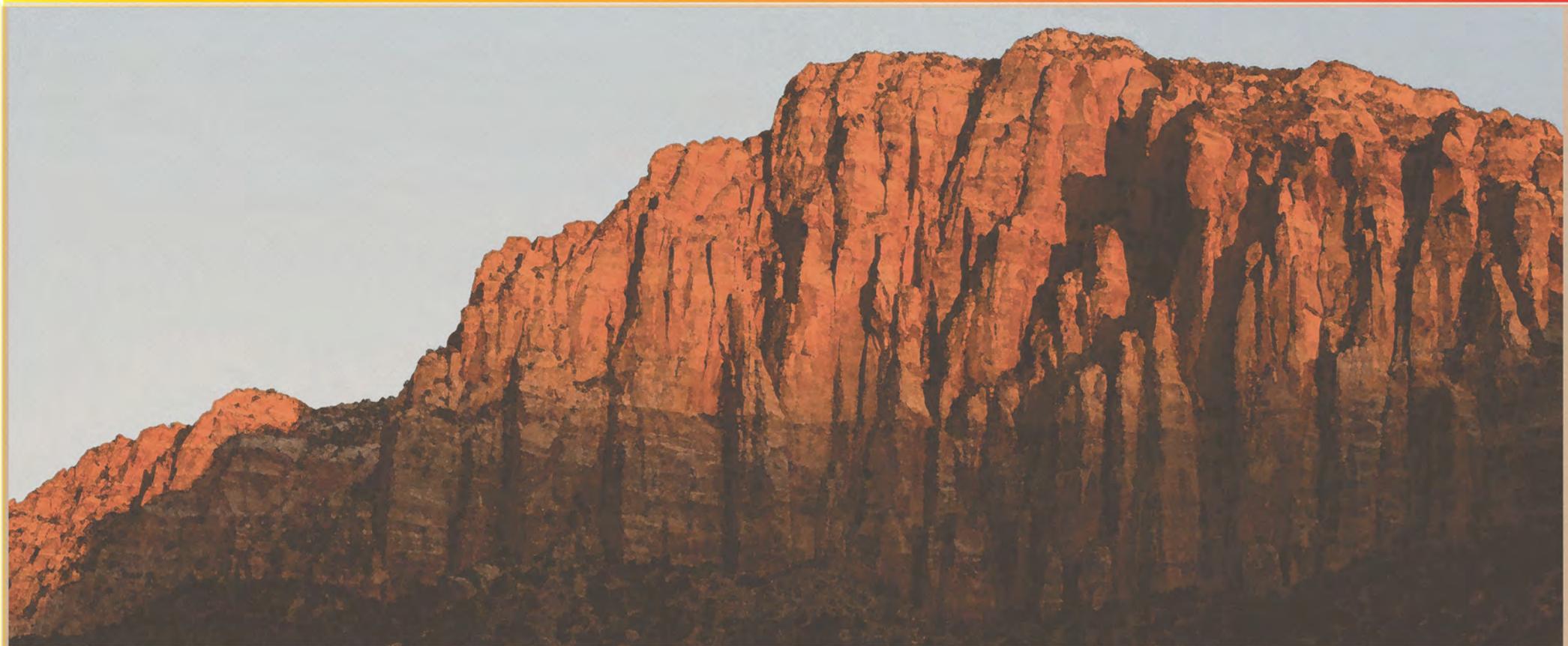
VILLAGE ATMOSPHERE IN SPRINGDALE



DO YOU VALUE THE SMALL TOWN FEEL OF SPRINGDALE

■ NO ■ YES





LISTENING TO SPRINGDALE

IDENTIFYING VISIONS FOR SPRINGDALE



Table Of Contents

Introduction	2	Formula Businesses	25
		Local Food	26
About Springdale	3		
History of Springdale	4	Housing	27
Connection with Zion National Park	6	Overview	28
Sense of Place	7	Residential Build-Out	30
Arts and Culture	8	Dwelling Units	32
Mobility and Connectivity	10	Public Information and Involvement	33
Trails and Walkability	11	Springdale Stories	34
Local Roads	12	Surveys	40
Biking in the Area	14		
		Recommendations	54
Zion Park Scenic Byway	15		
Overview	16	Conclusion	56
Transit System	18		
Interpretive Sites	19	Acknowledgements	58
Parking	22		
		Resources	59
Economic Development	23		
Commercial Development	24		

Introduction

In the fall of 2014, officials from the Town of Springdale approached the Department of City and Metropolitan Planning at the University of Utah, to listen to citizens and assist Springdale by offering a perspective that may inform choices for advancing community-oriented goals.

As a group, we developed and launched a website, www.listeningtospringdale.com, with the objective to collect stories and surveys from Springdale citizens and the byway communities. During our visit in November, we held an Open House and invited everyone to share their story. Our goal was to understand what the people valued, wanted, and needed. In combination with the “Listening to Springdale” Open House, we also sought to understand the social, economic, and environmental concerns of the community.

Within this document, we share the insights and information we collected. Our findings reflect the desire to maintain the small town feel, preserve the natural beauty, and address the concern of future development and quality of life. Through the use of graphics, maps, and surveys, we offer short-term, medium-term, and long-term implementation strategies that coincide with Springdale’s vision and values.

About Springdale

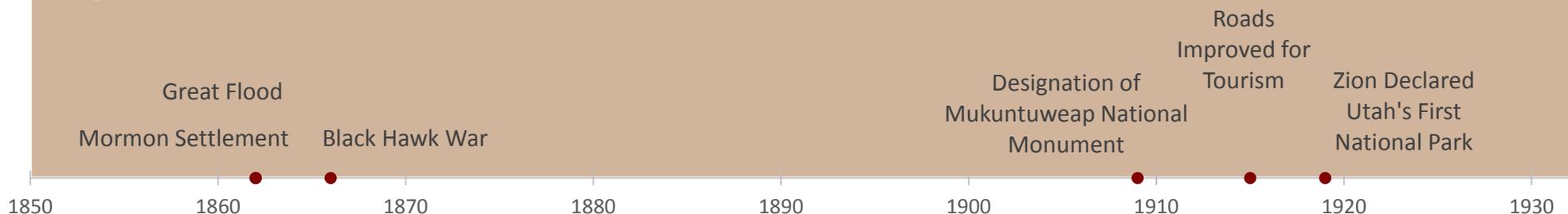


History

Springdale, Utah is a town with rich history dating back to approximately 500 A.D. Archeological evidence shows that the first settlement lasted from 500 A.D. until 1200 A.D. when the Anazasi abandoned the Zion area. Before the earliest Europeans arrived, the Nuwuvi shared the land near present day Toquerville, Virgin, Rockville, and Shonesburg as Parrusits, Tonaquints, Kaibab, and Shivwit communities, cultivating crops along the Virgin River. Nephi Johnson was one of the first explorers of Mukuntuweap (Zion Canyon) and the surrounding area. Johnson recommended locations for settlement and instructed to complete a road into the area, which is known as Johnson's Twist. Life was difficult for these early residents along the Virgin River. One of the major events that influenced the development of settlements was the Great Flood of 1862. The flood caused settlements to be abandoned and new sites created. Springdale was settled after the flood in 1862 by a group of Mormon pioneers that had decided to move further up the north fork. Springdale was surveyed in 1863 acting as a satellite town of Rockville.

In the late 19th century and early 20th century, many visitors began arriving in the area. They saw the beauty, peacefulness, and wonder of the canyon and fought to preserve it. In 1909, President William Howard Taft declared Mukuntuweap Canyon a National Monument. In 1918 the monument's territory was expanded to 76,800 acres and renamed Zion National Monument. In 1919, Zion gained National Park status. For nearly a century after settlement, Springdale had seemed isolated because of the closed nature of the canyon. It wasn't until the construction of the Zion-Mt. Carmel Highway and Tunnel that Springdale began to boom. In 1959, Springdale incorporated to become a municipality. Over the years, Mormon pioneer features have been replaced by contemporary structures necessary to sustain the demand of visitor growth each year. The history of Springdale is a core value to the people. After talking to numerous residents, a common topic emerged from the citizens of Springdale and the byway communities who want visitors to value and understand their history as well as be remembered by how they defended and preserved this place the best they could.

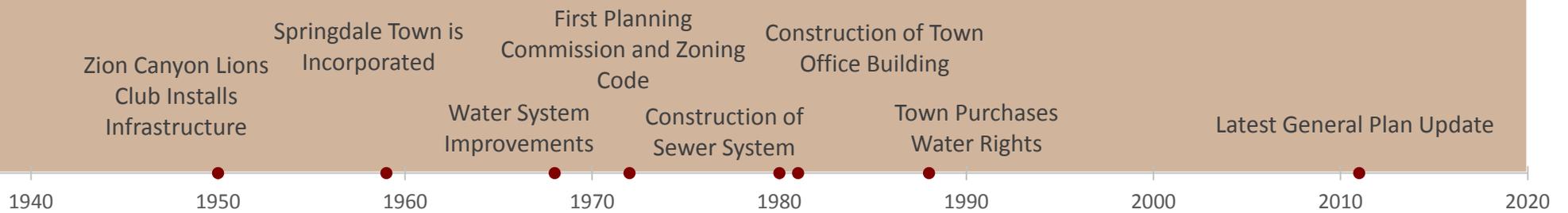
Springdale Timeline





1880's Granary Structure

<http://www.stgeorgeutah.com/news/archive/2015/01/17/springdale-makes-move-preserve-history/#.VNmWwC7Hl6Y>



Connection with Zion National Park

Springdale, Utah is located at the west entrance of Zion National Park. Following the construction of the Zion-Mt. Carmel Highway and Tunnel, Springdale became the gateway town to the park. Zion's ecosystem is home to a diverse number of plants and animals as well as enchanting steep mountain facades, canyons, buttes, mesas, monoliths, rivers, slot canyons and arches. Zion National Park brings people from around the world to visit. The park provides activities for residents year round and is a "way of life". Springdale's website encourages people to stay in town while visiting the surrounding parks and recreational areas. Zion is what brings people, and the land's natural beauty is what encourages them to stay. From our survey responses, it is clear there is a large connection between the park and Springdale. When asking people what would make them leave Springdale, 40% said over development, 20% said too many people, and 15% said traffic. When asking people what they would like to see less of in Springdale, nearly 30% said hotels, 20% said cars, 15% said chain businesses, and almost 13% said second home owners. Throughout the rest of the document we discuss strategies that address these concerns.



*“Springdale is a charming, small, safe community that also plays host to a wide variety of visitors.”
-Springdale Resident*

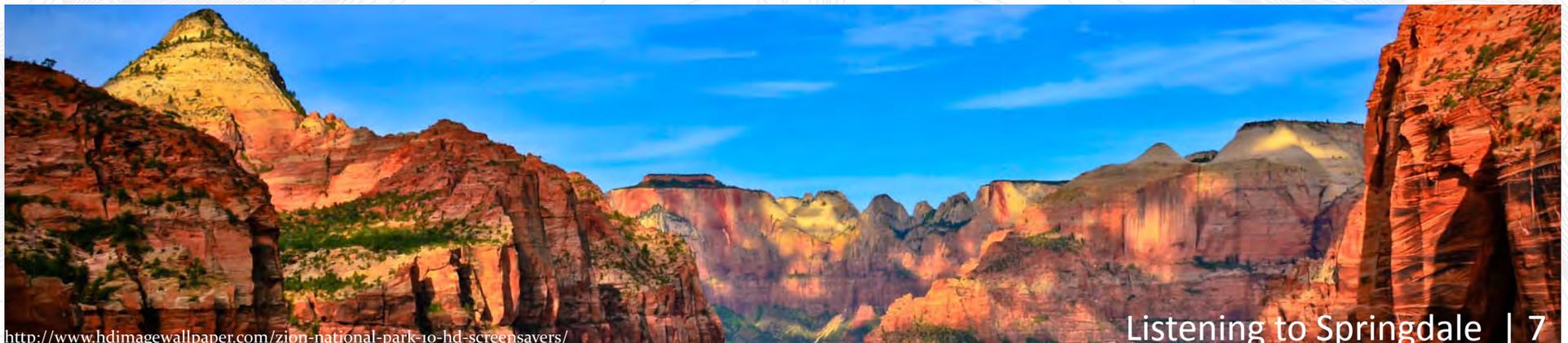
Sense of Place

Springdale is a unique, small town connected to Interstate 15 by Zion Park Scenic Byway (SR-9), which travels through Rockville, Virgin, LaVerkin, and Hurricane. The highway heads uphill, twisting and turning through several mesas, following the Virgin River before arriving to Springdale.

Though home to only 547 people, Springdale hosts nearly 3 million visitors every year. The town has been shaped as the Gateway to Zion National Park. Carved by the Virgin River, Zion Canyon is the highest visited National Park in the United States. The park's terrain is captivating with slot canyons and spectacular views.

Springdale's charm is amplified by encouragement of small independent businesses including various restaurants and shops. With the pressure of tourism and economic growth, Springdale strives to maintain the town's enduring small town feel and natural beauty. Arts and culture give this community its meaning, value and character. We discovered that the most important values to Springdale citizens are community, natural beauty, lifestyle, recreation, peace, dark sky, local businesses and open space. This is reflected through Springdale's sense of place.

*"The canyon is a magical place and it pulls you in! Springdale is a unique town in this unique setting. Once our family had a taste of this beautiful area we kept coming back. We worked hard to find a way to finally be here. It is wonderful to be part of this community."
-Springdale Resident*



Arts and Culture

Springdale's arts and culture is supported by the variety of local businesses. The beauty of the park inspires artists to paint, sculpt, and recreate their own interpretations to share with others, including tourists. Many rock shops and galleries can be found along Zion Park Boulevard.

The mantra of the laid back, small town life can still be felt around the town. Many locals gather at coffee shops, restaurants, or somewhere to avoid the "touristy" places altogether. However the people, the culture, and the land work together to give Springdale its unique atmosphere.



Worthington Gallery



O.C. Tanner Amphitheater

“Coming to Springdale is unlike a visit to other gateway communities. We have a long and proud heritage. Don’t expect to see the same restaurants and businesses you would see everywhere else. Come appreciate nature and the amazing surroundings. Come appreciate a simpler way of life. Experience animals and agriculture. Be pulled out of the hustle and bustle of everyday life and just breathe. Connect with your family, friends and the surroundings. Create a lasting memory of your trip to Springdale and Zion Canyon. Value the unique place our community is and understand why we are proud to share it with visitors.”

-Springdale Resident



Zion Canyon Music Festival



Zion Rock & Gem

Mobility and Connectivity



<http://davidpulsar.com/blog/springdale-utah/>



<http://www.bikemag.com/photos/sterling-lorenc-may-28-2011/>

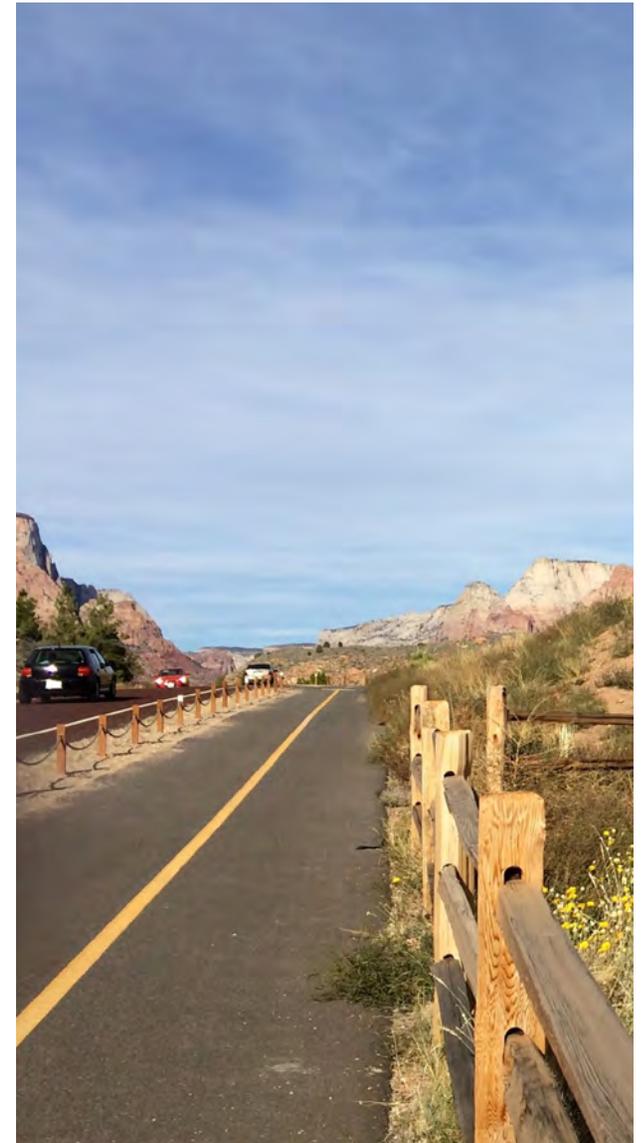


Trails and Walkability

Springdale's community thrives on having the identity of a 'village'. The small town feel is very popular and is a large incentive on why to stay in Springdale. In our survey we found that many residents would leave if this character of the town was absent. One aspect that attributes to the village feel is the walkability of the town, and how it relates to congestion and traffic. In response to the question, 'What would you like your primary mode of transportation to be?' the two most preferred forms of transportation were walking and biking. With the current bike lanes ending at the town boundary and no trail connectivity to the Zion National Park, it can be hard to facilitate the preferred mode of transportation. In order to build upon the success Springdale already has, we propose an increase in connectivity through the implementation of walking and biking lanes. These lanes would provide an alternate entrance to Zion National Park thus relieving the unwanted traffic along Zion Park Boulevard and further connecting the town residents to the central business district.



*"Springdale needs better pedestrian walkways."
-Springdale Resident*



Local Roads

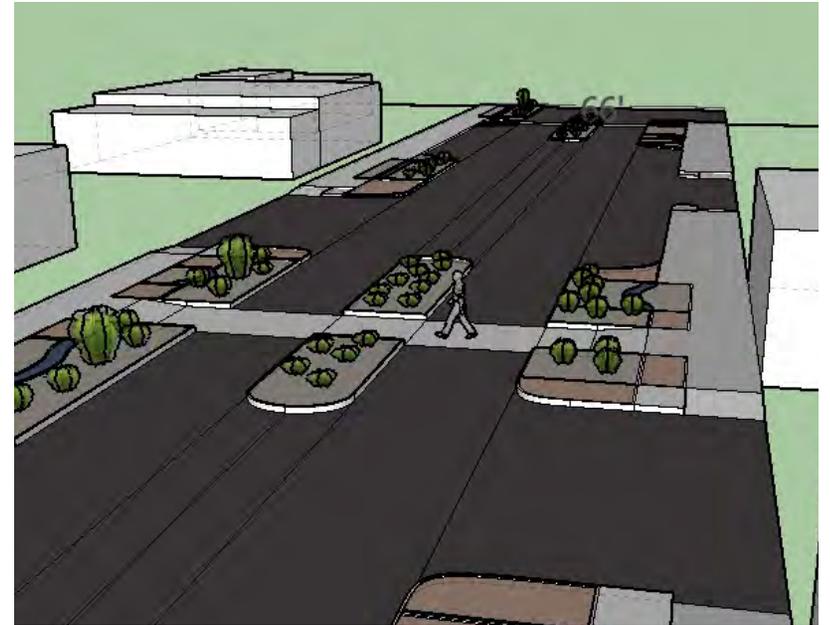
Zion Park Boulevard is the main road in Springdale. Thousands of cars drive it every day to get to Zion National Park. The amount of cars and traffic throughout the day make it uncomfortable to walk and bike along the boulevard. Many residents and non-residents who participated in our survey stated that they would love to bike, but are too scared to bike on the road. Essential to creating a walkable and safe biking environment is the importance of helping residents and visitors feel safe. Crosswalks help facilitate that safe feeling, along with a visual or physical barrier to separate bicyclists from cars. In order to keep this appeal, we suggest traffic calming measures starting from Sol Foods to Lions Boulevard. Slowing down the oncoming cars and creating more opportunities for crosswalks will create a safer environment for the pedestrian. Creating a multi-use path (pedestrian and bike only path) would facilitate the need for more walking spaces.

*“Too many cars on road into the canyon making biking less feasible.”
-Visitor from Alaska*



http://www.johnscreekga.gov/news2014/2014-06-26_traffic-circle-tips.aspx

The next page shows a rendering of the traffic calming measures suggested on the goals page. In addition to these, a roundabout placed at the intersection of Lions Boulevard and Zion Park Boulevard would allow for easier mobility throughout the intersection.



Biking in the Area



*"I would like to see the bike trail go all the way to Rockville."
-Springdale Resident*

Overview

The warm temperatures and picturesque scenery, coupled with the winding road form an ideal area for road and mountain biking. Not to mention the abundance of suitable infrastructure for bicycle touring in Zion National Park. Therefore, implementing bike lanes on the 19.5-mile stretch of byway from LaVerkin into Springdale, provides a number of opportunities for residents and tourists alike.

Existing Conditions

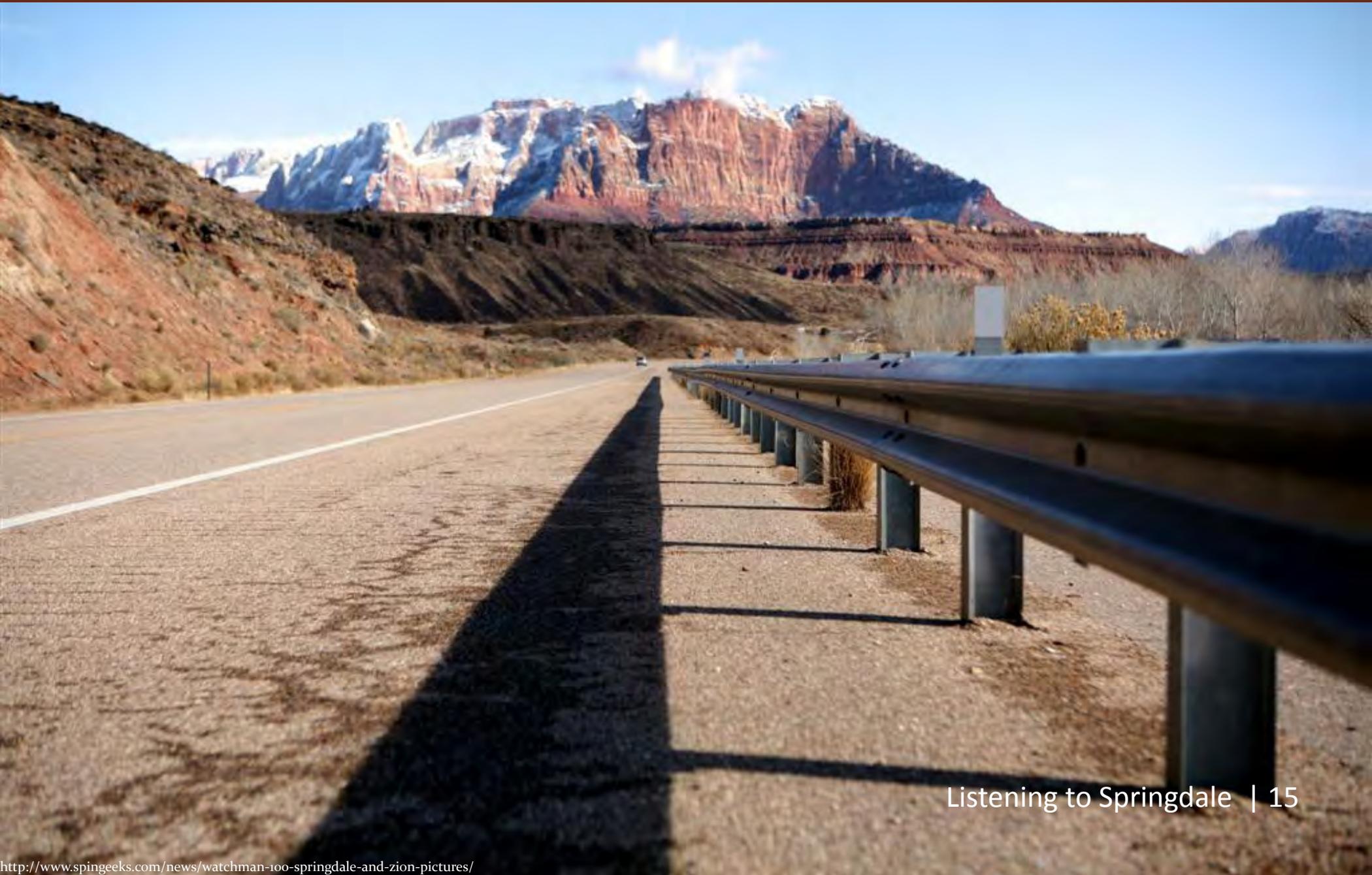
While a patchwork bike trail runs along SR-9 through the town limits of Springdale, the stretch between LaVerkin and Springdale is void of bike infrastructure. Springdale and the surrounding area is a mecca for cycling and many residents use bicycles as a form of daily transportation.

Community's Thoughts

Survey findings reveal that almost 15 percent of individuals living in Springdale and the surrounding area would like to use a bicycle as their primary mode of transportation.

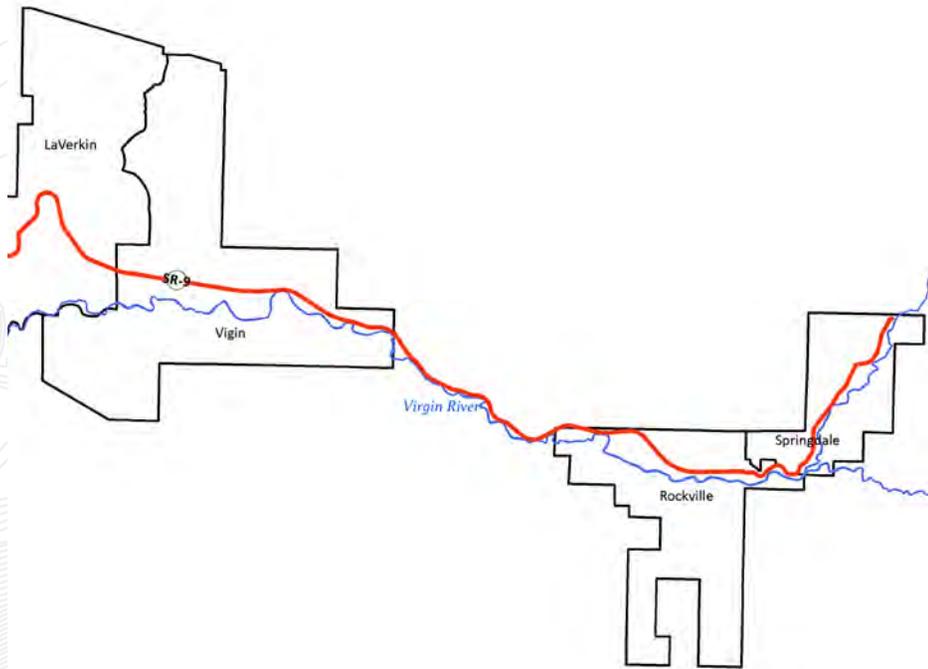
*"A pegasus would be ideal, but I'll take biking."
-Rockville Resident*

Zion Park Scenic Byway



Zion Park Scenic Byway

The Zion Scenic Byway, also known as SR-9 begins in the town of LaVerkin and winds its way through the lithic scenery before welcoming visitors to Springdale and later through Zion National Park. The route, which embraces the Virgin River, provides opportunities to view magnificent desert landscape while subtly showcasing early settlement in the area. The canyon walls, historic buildings, cemeteries, and the ghost town of Grafton all pay tribute to the populations past. In addition to the scenic byway, the road connects the small towns of LaVerkin, Virgin, Rockville and Springdale. These towns serve as the homes and places of work for those that host the many millions of visitors the park brings in annually. Despite the minimal and often historic development, the emphasis along the byway focuses on the natural. Warm monolithic canyon walls extend high above the peaceful brush covering the valley floor, which are transected by the cottonwood-dappled Virgin River, a place like no other.



As the road passes through Springdale and enters Zion National Park, it becomes known as Zion-Mt. Carmel Highway. Inside of the park boundary, the road provides views to amazing scenery including the historic Zion-Mt. Carmel Tunnel and Checkerboard Mesa before finally terminating at the junction of US-89.

To be considered for National Scenic Byway status, a road must significantly meet one of the six intrinsic qualities: archeological, cultural, historic, natural, recreational, and/or scenic. Zion Scenic Byway possesses several of these qualities. In addition, Zion Scenic Byway provides audiences with an indescribable sense of place that few other roads have the power to deliver. Despite the history and qualities that exist, there are a number of untapped opportunities for the byway.



Transit Systems

The Zion Canyon Transportation System was launched on May 23, 2000. The shuttle system was established to reduce traffic congestion, parking problems, and noise; protect wildlife and vegetation, and restore cleaner air and tranquility to Zion Canyon. Prior to the shuttle system, Zion National Park received about 2.4 million visitors a year. In 2013, visitation jumped 2.8 million. In 2014, park visitations reached up to 3.2 million people. By 2050, the number of visitors to Zion National Park is expected to be over 5 million.

With little room to add parking in Zion, the town of Springdale is expected to furnish the parking for these visitors. However, the town of Springdale can only supply a limited amount of parking. Other towns along the byway will have to cover the leftover demand. This will mean that the Zion Canyon Shuttle will have to expand their service further, or SunTrans will have to add service along SR-9 between St. George and Springdale. A similar plan was proposed and discussed at the June 11, 2014 Town Council Meeting.

“To have a bus going from Springdale to St. George and Hurricane. To get the park shuttle to start earlier in the season and stop later in the season.”

-Virgin Resident



*“Use the shuttle system and get out of your cars”
-Springdale Resident*

According to the Zion Canyon Trail Feasibility Study, both van-pools and the new SunTrans bus system show that there is enough demand and population around that could support a new transit system. This system would help those that are unable to drive travel between Springdale and St. George. It would also help alleviate such high parking demand in Springdale during the peak season by allowing visitors to park along SR-9.

Interpretive Sites

Overview

The construction of interpretive sites along roadways and scenic byways is a common practice that serves a number of purposes including:

- Providing motorists with a physical and historical context of the area
- Highlighting local flora and fauna
- Allowing motorists a safe location to pull off the road and take photos
- Encouraging motorists to leave the safety and comfort of their vehicles thus becoming engaged in the area
- Increasing recreational opportunities



“I would like to see more turn outs for tourists to pull over and take photos so they don’t create slow traffic”
-LaVerkin Resident

Existing Conditions

Without shuttle stops, interpretive sites are an untapped opportunity along the Zion Scenic Byway.

Community’s Thoughts

It is apparent that residents and visitors are protective of the views along the byway. However, dangerous conditions can exist as a result of visitors engaging in photography and sight-seeing while driving. Many individuals voiced the need for pullouts along the roadway allowing opportunities for recreation and photographs.

Recommended Interpretive Sites

Interpretive Site 1 – Crescent Park (La Verkin)

1

Resources to Promote:

- Confluence Park
- Entry to and overview of corridor

Interpretive Site 2 – CCC Corals

2

Resources to Promote:

- CCC Corals /Sheep Bridge/Sheep grazing history
- Hurricane and La Verkin Canals / Chinatown
- La Verkin Overlook
- Mesa Panorama
- Trail System (Rim, JEM, Guacamole, Gooseberry)

Interpretive Site 3 – New Kolob Road Intersection Pullout (Virgin)

3

Resources to Promote:

- Virgin Meetinghouse
- BMX Regional Track
- Hurricane Mesa Test Track

Interpretive Site 4 – Zion Shuttle Info Pull Out

4

Resources to Promote:

- Early settlement of Zion Canyon
- Duncan's Retreat
- Adventure
- Shonesberg
- Grafton
- Nancy Pearl Ott Memorial
- Virgin River

Interpretive Site 5 – Pullout west of “Rockville” Stone Sign

5

Resources to Promote:

- Historic Rockville
- Rockville Bridge
- Grafton
- Eagle Crag photo opportunity

Interpretive Site 6 – Majestic View Lodge Pullout (Springdale)

6

Resources to Promote:

- Springdale Pioneer Cemetery
- Springdale Jail
- Zion Canyon photo opportunity





Parking

With limited parking availability during peak season in Zion National Park, Springdale has inflated parking demand based on visitors using Springdale's on street parking and then taking the shuttle into the park. This has created a perceived parking supply problem, since on street parking is the most prevalent type. Compounded with this is a lack of signage and painted parking spaces to indicate where parking is, and is not allowed. With these variable parking problems, visitors and residents alike cause congestion along SR-9 while searching for a space. All of these factors have made it very clear that parking is a serious problem within Springdale, as indicated from our survey results.



*“We’re in need of a multi-level parking garage”
-Springdale Resident*

Proposed Ideas:

- Parking Garage placed on north side of town, possible location near Lion Road.
- Add public parking area near south side of town.
- Encourage “Park Once” strategies.
- Create interpretive sites along SR-9 and bring shuttle further out of town.
- Eliminate parking regulations for new businesses under 2000sf in central area.
- Increase pedestrian friendly development.
- Institute parking shares with hotels and motels, so day travelers can use existing infrastructure.

Economic Development



Commercial Development

“I don’t want to see the streets lined with chain restaurants or businesses. Local mom & pop places are what keeps the character alive and sets us apart from other travel destinations.”

-Springdale Resident

Commercial development in Springdale has been traditionally small businesses. These businesses market towards tourist’s interests. According to the survey results, residents indicated they would like to avoid large scale retailers. Though due to the large number of visitors to the area each year, commercial development interests continue to grow. Many survey respondents indicated that increased development would make them to leave Springdale.

Springdale’s main corridor is delicately balanced to accommodate both residents and tourist desires. But with more residents and tourists coming each year, it becomes vital that Springdale maintains its small town feel while still meeting the needs of every party involved.

Some residents voiced strong opinions about the lack of shops within Springdale that cater to their needs. They find that a number of stores and t-shirt shops take away from the small town charm that they enjoy living in.



“Commerce would be nice. Local businesses charge visitors too much!”

-LaVerkin Resident

Formula Businesses



<http://usatoday.go.usatoday.com/news/nation>

In 2006 Springdale passed an ordinance forbidding formula restaurants and delicatessens. The ordinance stated that they were “incompatible with the town’s general plan...because of the limited amount of private land available within the town’s boundaries; the large size or scale required of such uses; excessive noise, odor or light emissions; their excessive use of limited resources and the undue burden they place on public utilities and services, or because they are of a character hereby found to be in conflict with the town’s general plan.”

On June 17, 2010, Izzy Poco LLC filed suit against the Town of Springdale claiming the ordinance was unconstitutional after the town refused to renew the business permit it had issued and the fire marshal refused to inspect it. On October 28, 2011 the US District Court of Utah, Central Division ruled that: “Because Springdale’s ordinance banning formula restaurants did not violate clearly established law, the Individual Defendants who enforced the ordinance are entitled to qualified immunity for their actions. Therefore, summary judgment is GRANTED in their favor.”

While the Subway decision has released some defendants from personal liability, the topic is still much debated and being followed throughout the country, which could become the legal precedent for other town’s anti-formula establishment legislation.

From the survey, citizens expressed concern about formula establishments gaining traction in such a highly visited area. And while local restaurants like Wildcat Willies are preferred to national chains, the current ordinance prevents restaurants like Subway from opening.

“Don’t allow franchise food. I remember it changing Moab for the worse. It will happen here if it starts.”

-Springdale Resident



Local Food



*“We are a tourist town with a short season. Shop local and support us regardless of the prices.”
-Springdale Resident*



Current Conditions

While Sol Foods has existed in the community for many years and operates on a foundation of community values and ethics, many opportunities exist for local grocers and household product suppliers. Residents and community members have voiced concerns on the cost of living, and traveling several dozen miles down the byway to find more affordable and diverse options.

Goals

Unique solutions such as Community Supported Agriculture (CSA) programs have the ability to reduce the cost of food, all while boosting the number and production within local farms. The construction of a community garden also provides opportunities for affordable food and education, while bringing the community closer together. Finally, the town’s entrepreneurial spirit could capitalize by empowered citizens creating innovative grocery delivery solutions, such as FreshDirect, Instacart, or one of many smaller services found in communities all over the United States.

Housing



Listening to Springdale | 27

Housing

Existing Conditions

In 2000, the estimated median house value was \$213,500. In 2012, that value nearly doubled to \$408,337, which is double Utah's median house value of \$199,700. The Springdale median house value has grown by 91% since 2000. The growth rate for the price of a house in Springdale is much higher than the state average of 49.08% and is even higher than the national average of 51.67%. As housing prices continue to rise, Springdale's median household income is slowly dropping. In 2000, the estimated median household income was \$41,607, which dropped to \$39,892 by 2012. After reviewing the survey results, many residents expressed the need for more affordable and work force housing. Many that work in Zion National Park and Springdale have to live further out along the byway in order to afford their cost of living.

“We need more affordable housing opportunities to attract the worker so desperately needed for the local businesses.”

-Springdale Resident

“No reasonable place to live for the working class.”

-Springdale Resident

“If my business wasn't successful I couldn't afford to stay living here.”

-Springdale Resident

The majority of responses regarding housing in the survey stated that there is a lack of workforce housing, lack of low income housing, and the median value of a house is too expensive. Residents also mentioned about 210 out of 300 units are 1-unit dwelling structures rather than multi-family housing, and that the average monthly rent is \$700-\$999 per month. Another common response was that there are too many huge seasonal and second homes. Asking citizens what they would like to see more of, they responded with more workforce and low income housing, more affordable housing, less huge houses, and less hotels.

As Springdale continues to grow, the total current population of 529 is estimated to possibly reach 1,800, which is a 240% population growth projection. Using the 2010 Census, the average household size is 2.1. This means that Springdale's current 327 housing units would need to become about 860 units to house all 1,800 people. After talking to a few members of the Planning Commission, we decided to put the 860 units to the test by creating a maximum residential build-out located on the next page.

“Just because a place is so special and unique, does not mean that it should be over-developed and over-built. An open space is not necessarily an invitation to build something there...The infrastructure of the town is not able to absorb all the development.”
-Springdale Resident



Residential Build-Out

We have created a maximum housing build-out for Springdale. This means that every buildable square foot that doesn't interfere with existing constraints can be built on. This build-out shows the maximum number of housing units Springdale can have within the municipal boundary under each zoning ordinance.

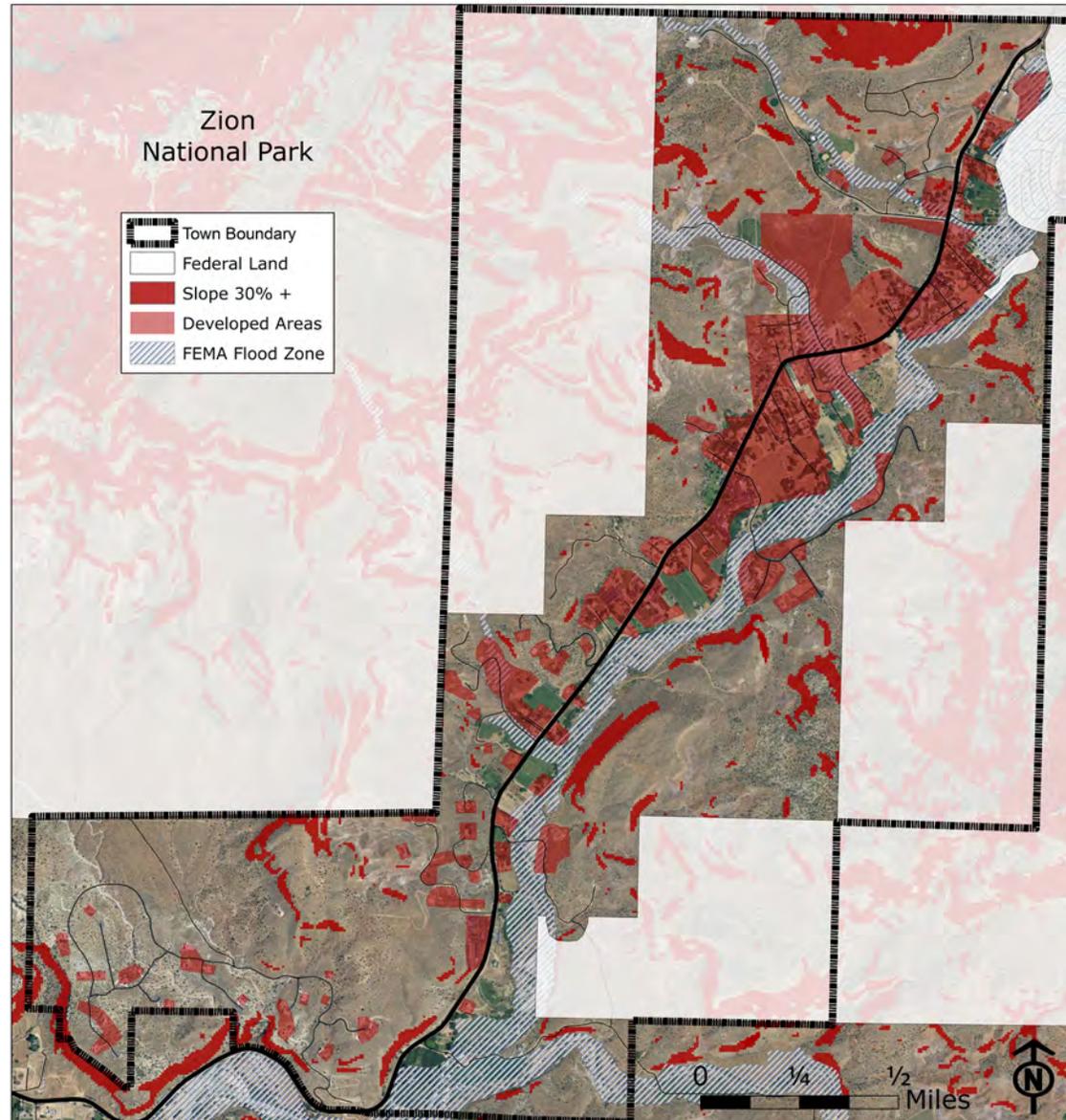
Existing Constraints

The map on the right shows the physical constraints within Springdale. These constraints include the town and National Park boundary, current and future developments, FEMA flood zones, and slopes of 30% or greater.

Build-Out

From this map we traced every area that is accessible and does not overlap any constraints to come up with buildable areas, shown on the next page. Then we separated the buildable areas by zone to get the correct density of dwelling units.

Existing Constraints



Dwelling Units

“Appreciate we are a overall community with unique amenities. We don’t need to grow. Growth doesn’t equate to better quality of life.”

-Springdale Resident

Zone	Estimated Total Area SqFt	Min ROW	Estimated Total Buildable Area SqFt	Min Lot Size SqFt	Dwelling Units	Single/Duplex	Total Dwelling Units
Agriculture	197,509	10%	177,758	217,800	0***	1	0***
Central Commercial	580,800	10%	522,720	10,890	48	2	96
Foothill Residential-2	11,519,200	10%	10,367,280	87,120	119	1	119
Foothill Residential-5	20,812,000	10%	18,730,800	217,800	86	1	86
Public Use *	0	10%	0	0	0	0	0
Valley Commercial	1,282,600	10%	1,154,340	21,780	53	2	106
Valley Residential	1,815,000	10%	1,633,500	32,670	50	2	100
Valley Residential-A	72,600	10%	65,340	10,890	6	2	12
Estimated Total Dwelling Units							519

Public Use *	Does not permit residential use
0***	Buildable area is less than min lot size

The spreadsheet above represents the total number of dwelling units using the estimated total square footage of each zone. All of the maps and data are available online at www.listeningtospringdale.com.

“Open space is necessary and must be preserved.”

-Springdale Resident

Public Information and Involvement



Springdale Stories

From October 6, 2014 to December 2, 2014 we received stories from residents of Springdale, the region, and visitors. These stories provided insight to the hopes, dreams, aspirations, and experiences of the residents of Springdale. We have included these stories in the document.

The stories are also available on our website:
<http://www.listeningtospringdale.com/hear-your-stories/>



“Springdale is so unique” is a phrase that I have heard often from many visitors coming to Springdale over many years. A village, quaint, charming, walkable, comfortable, full of unique businesses- these are other words of praise I have heard to describe Springdale. Don’t let it grow so much that it loses its charm, I hope you can keep out franchise foods, I hope the hotels don’t just fill the road and start to look like any town USA- these are words of caution I hear from visitors. May we strive to keep Springdale livable for locals, and a special place for visitors.

-Anonymous



<http://www.history.com/photos/utah>

I had the great fortune of spending nearly two years in the Springdale area - unfortunately, this involved three different “illegal” housing situations! There is a serious lack of available/affordable housing options in the area for those of us with limited financial means. I resent the attitude that small houses (less than 1000 sq ft) will negatively impact property values! You don’t have to be rich to love and appreciate the canyon or be a productive, involved citizen.

-Anonymous

“Springdale insight. We bought the Zion Rest Motel from John and Lena Dratter in 1978. The property had twelve overnight rentals and a two pump gas station that included the Utah State liquor agency and store. We sold local fruit and eggs plus regional cheese and basic food staples and supplies. The liquor and wine selection was sophisticated and extensive, sales were robust. Many customers were retired gents who had found needed employment with early CCC projects and new park jobs who met and married local young ladies. Their influence and the National Park was an important part of Springdale’s history... dreams and aspirations. Springdale is a uniquely diverse Utah community...

After Zion was created in 1919, the composition of the valley changed from the “Dilly Holler” mentality; up-river hicks, to a creative self-sufficient type of resident that had adjusted to the outside world. The composition was inclusive of all ages and religions. Music, art and nature drove the ethos of ranchers, small business owners and park employees in harmony with the needs of park visitors. Survival was important but money was not the master.”

-Larry McKown



“Thank you for this opportunity. I grew up in Springdale and have lived here nearly all my life, leaving only for the time that I was away at college. I will be 68 years old in a few weeks, so I have seen stunning changes in Springdale in my lifetime. I remember when the road going through town and into Zion was largely unpaved; I remember when no one had a telephone at home, the only phone in town being a pay phone at Allred’s Café. I was about 12 when we first got TV signals into the canyon. I remember when the only tourist lodging in Springdale were the little cabins at Allred’s Motel and the Canyon Motel and tourists could choose between Allred’s Café and the Canyon Inn, owned by my parents. I had the best childhood a kid could ever imagine. My schoolmates and I played all summer long on the hillsides, where we pretended to be Indians or gold miners, or along the banks of the Virgin River running through town. I remember on Saturdays we would all pack a lunch and ride our bicycles to Rockville and spend the entire day playing with our friends down river. Our parents never worried about us; they knew we would be home when we got hungry. In the summertime, we went to movies, first in the recreation hall of the old LDS Church, then at an outdoor theater located where the Thai Sapa Restaurant is now located, and lastly, and the Orchard Theater, another outdoor movie venue located behind the present Flanigan’s Villas. It was literally in the orchard! I would love a Springdale where children could grow up as I did--where they could play outside as much as they wanted and their parents wouldn’t have worry about them. I would love a Springdale where mom-and-pop businesses could thrive and pressure to create chain or formula businesses didn’t outweigh what is best for the community. I would like a Springdale where the night skies are the brightest, splashiest show in town. I would like a Springdale that would allow kids in 4-H--or just kids whose parents want them to know where food really comes from--to raise some rabbits or a few chickens in their back yard, even if they live next door to a motel. When I was a young adult, my father grazed a few head of beef cattle and a couple of horses in a pasture immediately adjoining the Driftwood Lodge, which he owned at the time. The guests were crazy about those animals--no one ever complained about “smelly, noisy” animals in the pasture. But now, such a thing could not happen in Springdale.

I would like a Springdale where our once-abundant mega-fauna--mule deer, coyotes, foxes, ring-tailed cats, cougars, and skunks, even--could find a way from their hillside homes to the river for life-giving water. I would love people in Springdale to respect one another, to open their hearts and minds to different ideas, different opinions, and different ways of negotiating community needs and desires. One of my current favorite people in the world is Harvey Locke, an environmentalist and philosopher. He told me not long ago that we ought to “build a place, a community, a society for The people who live there, not for the people who simply come here to cash in. To those people we have to say: ‘Here’s a ticket. There’s the bus stop. Have a nice trip.’”

-Louise Excell

"We moved to Springdale because we loved the "small town" feel of this gateway community. We loved the concept of "village Scale" that is referenced in the General Plan. To me this means that buildings will be smaller, with an historic look and a Central Business District that allowa for strolling through unique shops with one-of-a-kind restaurants. It also conjures up visions of a Central Square with areas to sit and watch kids play in a fountain or eat an ice cream cone, while visiting with neighbors or visitors. Villages all over the country have preserved this kind of atmosphere in their Central Commercial areas. It creates a gathering place and promotes community spirit. Springdale is so small that I thought it would be this kind of town.

I've been disappointed over the last multiple years when the projects that have been approved by the Planning Commission and Town Council don't seem to fit into the definition of the "Village" that I expected. Maybe we need to more carefully define what we mean by "Village Scale" by identifying specific elements and sizes of these elements that would lead to a more cohesive look. Instead of "Village Scale" buildings, our town has approved square, stucco boxes, large roof spans and urban looking buildings. Springdale is so small that each new building either adds or detracts to the "Village" atmosphere and most of them have detracted. The only building built in the last few years that fits my definition of "Village Scale" is the new hardware store.

I see a lot of lip service in the General Plan and hear a lot of it, but evidently our ordinances allow for a broad spectrum of non-village looking buildings. Springdale has the opportunity to be a very charming, unique community, but it will never be that if we continue to approve projects that detract from that goal. Once a building is completed, it is there forever. I wish we could have ordinances that are crafted to follow the General Plan to create an enchanting, lovely, beautiful place that is in concert with the beauty that surrounds us. While driving through the Italian countryside last year I was impressed by the look of all the villages built into the hills and along the cliffs of the sea. I inquired and was told that they have a "Minister of Good Taste," who approves colors, repairs, additions, etc. They work hard to preserve what they have that is uniquely Italian. I wish we would work as hard to preserve the "Village Scale" and Village Atmosphere in our community.

On another note, I am continually distressed that we are over regulating ourselves and I can't see who those regulations help. For instance: We say we want affordable housing, yet the requirements for building, density and increasing fees make it impossible for housing to be affordable. We say we need employee housing, yet "no more than three unrelated people can occupy a single dwelling." This not only eliminates possibilities, but makes them all more expensive.

I also believe that Springdale is first and foremost a Gateway Community to the National Park. Most of us would not be here without all the services that are here for the 3,000,000 tourists and the Park. It is no longer and agricultural or farming community like it was - no one can sustain themselves anymore with those occupations. But, those of us who live here are incurring additional costs, as a result of the increase in taxes, fire and water fees. Those fee increases are because we are providing for a large tourist population, not because our community is growing. Therefore, it would make sense to me that the members of the community should be able to recoup their rising costs by renting their homes or guest houses for vacation rentals. That would help defray the costs of living here.

The way the ordinances read now on this issue doesn't help either the community members with cost or help provide rental options for the tourists. It makes me wonder who we are protecting?

Thank you for the opportunity to express my feelings.

-Anonymous

“Visions for Springdale/Rockville must include how to address the changes with the environment regarding erosion and falling boulders that create a danger to people. As the climate fluctuates with more extreme temperatures and weather patterns, there are more falling boulders. Recently, the area has been deemed, “High Risk” for injury or death due to falling boulders. Springdale and Rockville do not address this issue to improve the safety for the residents. There are several things leaders could do such as educate residents and visitors about the dangers of falling rocks. There are certain precipitating events that occur before boulders fall. People need to be aware. Leaders could provide information to residents as to what they could do to create a safer environment, but instead this is not publicly talked about; or have a special resident meeting and or committee to address options that people can do to protect themselves and property. It is known there are no government grants, or finances to assist residents, but leaders could get residents together about this issue and possibly share protection costs.”

-Deb Reid

“I’m so glad that this University of Utah project is so well-titled, “Listening to Springdale,” as I imagine it will inspire us to listen warmly to each other. Listening is the key to a harmonious community....I love Springdale. I still have my home there and I hope to move back home one day, when I can wake up once again to Zion’s extraordinary beauty and peace, and to our vibrant and hospitable community. But I don’t live there now, so I am not informed enough to comment on current issues the town is facing. And even if I was better informed, I wouldn’t feel that it’s appropriate for me to weigh in on them from 300 miles away. Still, I’d love to contribute something to the project,“In music, it is exciting to hear the transformations that can emerge and develop over a pedal point. In Springdale, it was gratifying to witness the transformations that emerged and developed over common ground.”

-Phillip Bimstein

“NOBODY who LIVES in Springdale Except a FEW development minded people want the growth and development we are being subjected to. Springdale hired PROFESIONAL MANAGERS to see that the development was managed and well done. What I see us having are MANAGERS who see their job as DEVELOPING GROWTH. OUR TOWN does NOT want to approach BUILDOUT.

Where will the MONEY foe water development and sewer improvements come from? The citizens can’t ALL afford the future costs involved with the development SOME see as their DUTY! WE as a TOWN can DO BETTER. WE CAN SAVE our village IF ABIG IF OUR LEADERS ACCEPT THEIR JOBS ARE TO SAVE SPRINGDALE. JUST look at HOW WE have ZONED the FEW AGRICULTAL FIELDS we have left. GIVE the developers the rock and desert if YOU MUST but stop THE STUPID BUILDING on the land THAT gives our town the small VILLAGE [not my words] FEEL. BY THE WAY I DON’T THINK ANYONE IS REALLY LISTENING TO THIS INPUT!”

- William Basset

Survey Results Data Guide

There were four different surveys administered and some responses fell into multiple categories, therefore percentages will not equal 100%. Some responses may not be included due to surveys being taken after responses were collected or permission to share responses was not given. Each question on the Visual Preference Survey consists of two photos, residents and visitors were asked to indicate which photo they liked more.

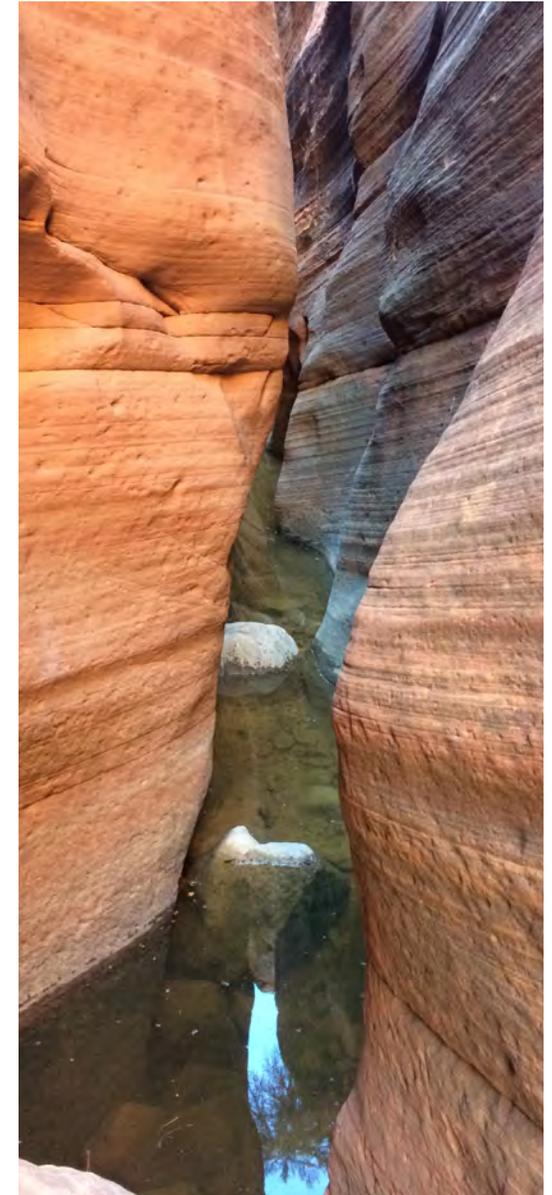
Questions 1- 2: Every Respondent

Questions 3-12: Springdale Residents

Questions 13-25: Residents of the Surrounding Region

Questions 26-33: Visitors of Springdale

Questions 35-49: Visual Preference Survey



Springdale Resident Survey

1. Are you a resident of Springdale? (89 responses)

60.67%	Yes
39.33%	No

2. How long have you lived in Springdale? (42 responses)

16.67%	5 years or less
23.81%	5-10 years
40.48%	10-20 years
19.05%	20+ years

3. What brought you, your family or your ancestors to Springdale? (43 responses)

30.23%	Business Opportunity/Work
27.91%	Zion National Park
25.58%	Natural Beauty
13.95%	The People
11.62%	Community and Culture
11.62%	Family
9.3%	Peace
6.97%	Retirement
6.97%	The Unique Town Feel
4.65%	Climate/weather
4.65%	Recreation
2.32%	Better elementary school for special needs
2.32%	International Visitors
2.32%	Rural feeling
2.32%	School

4. What aspects of encourage you to stay? (42 responses)

50%	Natural Beauty
33.33%	The Unique Town Feel
30.95%	Zion
21.43%	Community
19.05%	The People
16.67%	Recreation
14.28%	Culture and arts
11.9%	Climate/weather
7.14%	Lifestyle
4.76%	Open Space
4.76%	Peace
4.76%	Family
4.76%	Good Business
4.76%	Clean Air
4.76%	Walkability
2.38%	Quality of life
2.38%	Rural feeling
2.38%	International Visitors
2.38%	Business Opportunity/Work

5. Is there anything that would make you leave Springdale? If yes, what would that be? (49 responses)

81.63%	Yes
18.37%	No

If yes, what would that be?

40%	Over Development
20%	Other
20%	Too Many People
17.5%	Chains
15%	Traffic
12.5%	Cost of Living
12.5%	Tourists
7.5%	Natural Disaster
5%	Loss of Character
2.5%	Dark Sky Disappearing
2.5%	Family
2%	Noise

6. What do you value about Springdale? (48 responses)

37.5%	Community
29.16%	Natural Beauty
12.5%	Lifestyle
8.33%	Recreation Opportunities
6.25%	Peace
4.17%	Dark Sky
4.17%	Open Space
4.17%	Local Business
2.08%	Access to Nature
2.08%	Art
2.08%	Buses/Shuttles
2.08%	Clean Air
2.08%	Community Garden
2.08%	International Visitors
2.08%	Library
2.08%	Local Events
2.08%	Parkitecture

7. What would you like to see less of in Springdale? (47 responses)

27.66%	Hotels
20.83%	Traffic/Cars/Parking
14.89%	Chains/Franchises
12.77%	General Development
12.77%	Second Homes/Wealth
8.51%	Noise
8.51%	Tourists
6.38%	Restrictive Government/Building Restrictions
6.38%	More People
6.38%	Big Houses/Buildings
6.38%	Commercial Development
4.25%	Community Tension
4.25%	Lawns
4.25%	Lights
4.25%	Littering
2.13%	Helicopters
2.13%	Sprawl

8. What would you like your primary mode of transportation to be within Springdale? (48 responses)

41.67%	Walking
33.33%	Driving
31.25%	Public Transportation
31.25%	Biking
2.08%	Other

9. Are you concerned about the future development in Springdale? If yes, what are your concerns? (50 responses)

100%	Yes
0%	No

10. What about Springdale would you like visitors to value and understand? (49 responses)

26.53%	Natural Beauty
22.92%	Small Town Feel
22.45%	The Need to Protect/Preserve Open Space
16.33%	Zions National Park
12.5%	Local Businesses
12.5%	Peaceful Atmosphere
8.16%	Community
8.33%	History
8.16%	People Live Here
6.25%	Recreational Opportunities
4.17%	Quality of Life
2.04%	Resources are Precious
2.04%	Walkability
2.04%	Art
2.04%	Use the Shuttle

11. What are some of your community traditions and where do they take place?

Craft Fairs
Music Festivals
St. Patty's Day Parade
Butch Cassidy Race
4th of July Fireworks
4th of July Parade
Turkey Shoot
Zion Joy to the World
Volunteering at the Community Center
Farmers Market
Hanging by the River
Hiking
Earth Day Celebrations
The Tree Lighting
Church Oriented
Coffee with Locals
Slow Season in Winter
Plein Air Invitational
Annual Desert Tortoise Birthday Bash
Hiking to the top of Angels Landing on Easter Morning
TZ-Arts
Volunteering at the Park
Volleyball

12. How would you like your heritage to be remembered in Springdale?

"We prevented over development."
"We preserved surroundings."
"Small scale living and atmosphere that protects our canyon corridor."
"Giving back to the community."
"We were stewards of the land, protecting it and the views of Zion."
"I would like to leave no trace."
"Just remember, appreciate and take care of this beautiful area."
Creating independent jobs.
"Live and let live."
"Through Art work."
"The volunteer work I do is important to me so that other residents may enjoy a higher quality of life."
"Continued community events like music fest, continued access to public spaces."

Byway Region Survey

13. Where do you live? (18 responses)

38.89%	Rockville
33.33%	LaVerkin
16.67%	Virgin
11.11%	Other

14. How long have you lived in this area? (18 responses)

33.89%	10-20 years
33.33%	More than 20 years
16.67%	Less than 5 years
5.56%	5-10 years
5.56%	Do not live in this area

15. What brought you, your family, or your ancestors to this area? (17 responses)

35.00%	Town Environment
29.40%	Family
29.40%	Natural Beauty
23.50%	Community
17.60%	Zion National Park
6.00%	Climate
6.00%	Culture and art
6.00%	Luck
6.00%	Recreation

16. What aspects of this area encourage you to stay? (17 responses)

47.00%	Community
41.00%	Natural Beauty
23.50%	Zion National Park
17.60%	Town Environment
11.80%	Family
11.80%	Recreation
5.90%	Climate
5.90%	Culture and Art
5.90%	Local Businesses
5.90%	Work

17. Is there anything that would make you leave this area? (17 responses)

76.47%	Yes
23.53%	No

If yes, what would that be?

53.8%	Development
15.4%	Politics
7.7%	Car Congestion
7.7%	Cost of Living
7.7%	Family
7.7%	High Property Taxes
7.7%	Job Security
7.7%	Lack of Diversity

18. What do you value about this area? (16 responses)

68.70%	Community
62.50%	Natural Beauty
18.75%	Zion National Park
12.50%	Local Business
6.25%	Culture and Art
6.25%	Dark Sky
6.25%	Open Space
6.25%	Recreation

19. What would you like to see less of in this area? (17 responses)

41.20%	Development
23.50%	Hotels
11.76%	Coffee Shops
11.76%	Traffic
5.90%	Drugs
5.90%	Helicopters
5.90%	Litter
5.90%	Police/Law Enforcement
5.90%	Tourists
5.90%	Transients

20. What would you like your primary mode of transportation to be along the byway? (18 responses)

55.55%	Biking
44.44%	Driving
33.33%	Public Transit
16.67%	Walking
11.11%	Motorcycles
5.56%	Other

21. Are you concerned about future development along the byway? (16 responses)

100%	Yes
0%	No

If so, what are your concerns?

18.75%	Over Development
18.75%	Too Commercialized
18.75%	Want More Sustainable Development
6.25%	Congestion
6.25%	Need More Commerce
6.25%	Noise
6.25%	Want More Bike Trails
6.25%	Want More Public Transit

22. What about this region would you like visitors to value and understand? (17 responses)

35.30%	Community
29.40%	Natural Beauty
23.50%	Town Environment
11.76%	Sustainable Living
5.90%	Driving Regulations
5.90%	Don't Litter
5.90%	History
5.90%	People Live Here
5.90%	Respect the Existing Community

23. What are some of your community traditions and where do they take place? How did they begin? (12 responses)

- 4th of July
- Art Festivals
- Butch Cassidy 10K
- Full moon bike rides to Zion to the end of the canyon
- Tanner Summer Concerts
- Races and Bike Rides
- Rockville Christmas Party
- Springdale parades
- St. Patty's Day
- Thanksgiving Craft Fair
- Tree Lighting Downtown
- Turkey Shoot
- Earth Day
- Z-Arts
- Zion Canyon Music Festival

24. How would you like your heritage to be remembered in this region? (17 responses)

- "A friendly and cute town, where you can come to relax, take wonderful hikes and enjoy nature."
- "By a long line of family that offered something amazing to the city."
- "If not by a local business, than by just being a great family."
- "I left the area similar to when I got here, so those in the future can experience a beautiful, mostly undamaged area."
- "That we left it as much like we found it as we could."

Visitor Survey

25. Where are you from? (13 responses)

15.40%	Salt Lake City, UT
15.40%	Canada
15.40%	Alaska
7.70%	Palo Alto, CA
7.70%	Covina, CA
7.70%	Las Vegas, NV
7.70%	Farmington, UT
7.70%	Cedar City, UT
7.70%	Seattle, WA
7.70%	Michigan

26. How often do you visit Springdale? (13 responses)

92.31%	At Least Once a Year
7.69%	First Time
0%	At Least Once a Month

27. What brought you and or your family to Springdale? Are you passing through or is this area your destination? (13 responses)

38.46%	Zion National Park
38.46%	Recreation
15.4%	Restaurant
7.7%	Photo Workshop
7.7%	Race
7.7%	Climate

28. What aspects of Springdale encourage you to visit again? (12 responses)

66.60%	Stores/Restaurants/Hotels
41.60%	Recreation
33.30%	Zion National Park
25.00%	Town Environment
16.60%	Culture
8.30%	Landscapes
8.30%	Climate
8.30%	Accommodations

29. Is there anything that would discourage you from staying in Springdale? If yes, what? (12 responses)

25.00%	No
25.00%	Not Enough Recreation
25.00%	Congestion of People/Cars
16.60%	High Prices
16.60%	Development
8.30%	Chains
8.30%	Access to the River
8.30%	Not Dog Friendly

30. What did you enjoy about your visit to Springdale? (12 responses)

33.3%	Town Environment
33.3%	Restaurants
25%	Everything
25%	Zion National Park
16.2%	Climate
8.3%	Natural Beauty
8.3%	Recreation
8.3%	Community

31. What was your primary mode of transportation during your visit? (13 responses)

61.54%	Driving
15.38%	Public Transit
15.38%	Walking
7.69%	Biking

32. What do you think others would value about Springdale? (12 responses)

41.60%	Recreation
33.30%	Hotels/Restaurants/Stores
33.30%	Zion National Park
25.00%	Town Environment
8.30%	Walkable
8.30%	Seclusion
8.30%	Same as Us
8.30%	Climate
8.30%	Beauty

33. Is there anything that captured your attention along the byway? (11 responses)

63.6%	Natural Beauty
9%	Recreation
9%	Trash
9%	Lack of Pedestrian Walkways
9%	Shoe Tree No Longer There
9%	High Prices
9%	Congestion

Visual Preference Survey

A Visual Preference Survey is a method used for public feedback that specifically looks at the physical environment. The following pages contain a series of images that participants scored based on their visual preference. The images were selected as design ideas for Springdale's future built environment. Through this survey we focused on streetscape, walkability, parking, public spaces and bike paths.



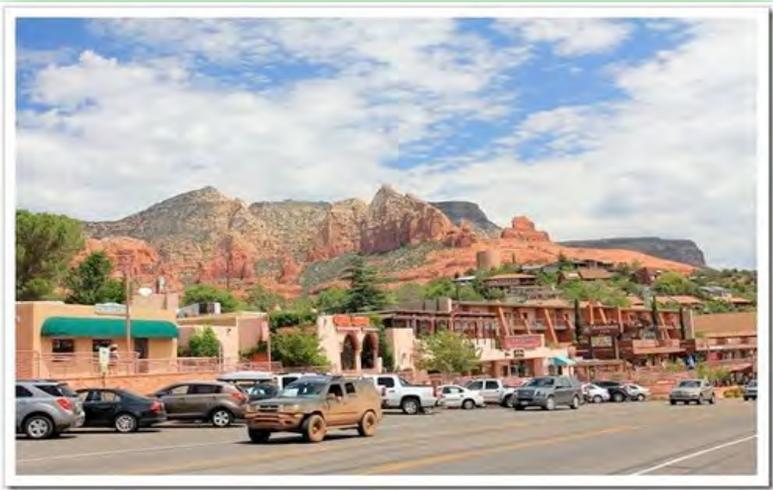
<http://louisvillebeer.com/louisville-craft-beer-week/2012-louisville-craft-beer-week-recap/>

Streetscape

40%



60%



Walkability

100%



0%



Parking

Parallel Parking 61%



Angled Parking 39%



Public Spaces

Less Refined 91.6%



More Refined 8.4%



Bike Paths

Not Raised 83%



Seperated by a Traffic Barrier 66.6%



Raised 16%



With Traffic 33.3%



Short Term

Byway Community Goals

- Improve signage along Zion Scenic Byway.
- Use of existing O.C. Tanner Amphitheatre for community events.
- Incorporate Nuwuvi culture and history.
- Preserve journal entries and other artifacts from pioneers.
- Recognize Springdale Pond as the name sake for the town.

Mobility and Connectivity Goals

- Encourage “Park Once” strategies in Springdale and along Byway.
- Increase pedestrian friendly development.
- Institute parking shares with hotels and motels.
- Enhanced shuttle service in Springdale.
- Determine ideal conditions and add a separated bike path.

Economic Development and Housing Goals

- Continue to promote small business culture.
- Create a plan to incorporate the housing needs for a growing population over the next 40 years.
- Create an Affordable Housing Plan.
- Encourage Mixed-Use Development.
- Create new formula establishment legislation that matches values.
- Begin an Open Space Plan

Survey Goals

- Continue relationship with Zion National Park to promote a balance in the community.
- Celebrate local farming.
- Encourage Buy Local Program.
- Continue to promote arts and culture.

Medium Term

- Use GoogleEarth to promote significant sites along Byway with photos.
- Recognize all historical areas.
- Create interpretive sites along SR-9.
- Extend shuttle service further out of town.

- Eliminate parking regulations for new local businesses.
- Improve bike trails on SR-9.
- Daily bus service from St. George to Springdale.
- Implement crosswalks on Zion Park Boulevard.
- Create parking area at south side of Springdale.

- Encourage commercial development in tune with residents of Springdale.
- Give incentives to developers by relaxing density constraints in commercial zones where housing development is involved.
- Develop further incentives for affordable housing.
- End litigation in Poco vs. Springdale.

- Continued to display art in the community.
- Provide community education classes regarding safe recreation and environmental hazards.
- Discuss a possibility of building an ecotone between the park and the town.

Long Term

- Restore water to the community streets.
- Incorporate Nuwuvi and Latter-Day Saint history into interpretive sites.
- Connect the Byway community residents and community organizations.

- Parking garage placed on north side of town and remove unnecessary in town parking.
- Continuous bicycle right-of-way connecting to LaVerkin.
- Bus service along SR-9 between St. George and Springdale.
- Complete traffic calming measures throughout Springdale.

- Incentivize innovative housing solutions for affordable housing by using mixed-use and incorporate parking garages.
- Renew formula establishment legislation to keep up with current definitions.
- Create seamless transition between Springdale and Zion National Park, with accommodation amenities for all.

- Encourage families to grow and stay in Springdale by understanding their heritage and values.
- Strengthen existing arts and culture sector to preserve heritage and history.
- Encourage farming by creating more community gardens.

Conclusion

Springdale is a community in transition. Data shows that the population will surely grow in the next few decades. Through the survey, the community voiced a strong opinion regarding the expected growth rate. Within this document we have provided short-term, medium-term, and long-term recommendations to attempt to address this transition. This interpretive plan was created based on community values. We have collected and assembled ideas to envision the town in the future. We hope participation does not end with this document and that residents and officials can work together to see these ideas through. We believe Springdale can protect the natural beauty of the town. Years from now, this document will serve as a reminder that these ideas were important to the community at a period of great change.



Acknowledgments

“Listening to Springdale” was a collaborative process between community leaders, residents and the region. We send a special thanks to the residents of Springdale for sharing their time and their stories with us. We had the guidance of many respected persons who made valuable suggestions on this proposal which gave us inspiration. We would like to thank everyone involved for their help directly or indirectly.

City Government & Organizations

- Mayor Stan Smith, Town of Springdale
- Tom Dansie, Director of Community Development
- Springdale Planning Commission
- Kezia Nielsen, National Park Liaison
- Phillip Bimstein, Former Mayor of Town of Springdale
- Mary Rodin, Kimley-Horn
- The League and Towns

Facilities & Restaurants

- Sol Foods | Groceries & Hardware
- The Park House Café
- Springdale Post Office
- Deep Creek Coffee Company
- Lazy Lizard Boutique
- Zion National Park

Layout and Graphic Design

- Stephanie Ainsworth
- Meagan Booth
- Brian Kenny
- Brandan Booth
- Stephen Hanamaikai

Students

- Stephanie Ainsworth
- Meagan Booth
- Georgie Corkery
- Stephen Hanamaikai
- Aaron Johnson
- Brian Kenney
- Charles Swensen
- Carlie Teague
- William Toney
- Jonothan Tucker

Editors/Reviewers:

- Chelsea Gauthier
- Zohra Choudhury
- Grant Allen
- Tam Guy
- Brian Tonetti

Website Design

- Carlie Teague
- Georgie Corkery

College of Architecture + Planning: University of Utah

- Professor Stephen A. Goldsmith
- Sumner Swaner (Instructor)
- Jeannette Benson (Administrative Assistant & Advisor)
- Professor Ingrid Weinbauer

Resources

Utah American Indian Digital Archive: Nuwuvi: A Southern Paiute History (2014)

Zion Canyon Trail: Feasibility Study (2007)

Springdale Utah Official Website ~ The Gateway to Zion National Park! Retrieved from <http://www.springdaletown.com/about-springdale/history/>

Zion National Park | Utah.com. Retrieved from <http://www.utah.com/nationalparks/zion.htm>

Oswald, D. (2009). A journey through Mukuntuweap: The history of Zion National Park. Scotts Valley, California: CreateSpace.

History of Washington County, Alder Grafton Heritage Partnership

Utah American Indian Digital Archive /Nuwuvi: A Southern Paiute History Toquerville

Historytogo.utah.gov / Utah history encyclopedia Black Hawk War Peterson Herit-age.utah.gov Isaac Behunin Memorial Committee

"Utah Mapping Portal | The Utah Automated Geographic Reference Center." Utah Mapping Portal RSS2.

"Utah Department of Heritage & Arts - Utah Department of Heritage and Arts." Utah De-partment of Heritage and Arts.

"How Arts and Cultural Strategies Create, Reinforce, and Enhance Sense of Place." How Arts and Cultural Strategies Create, Reinforce, and Enhance Sense of Place. APA.

American FactFinder - Community Facts." American FactFinder - Community Facts.

Urban Street Design Guide." Urban Street Design Guide.. Web.

Zion Park Scenic Byway." Zion Park Scenic Byway. Web

Rodin, Mary, Kimley Horn Email interview.

Utah League of Cities and Towns

Springdale, Utah (UT 84737) profile: population, maps, real estate, averages, homes, statis-tics, relocation, travel, jobs, hospitals, schools, crime, moving, houses, news, sex offenders. (n.d.). Retrieved from <http://www.city-data.com/city/Springdale-Utah.html>

Washington County QuickFacts from the US Census Bureau. (n.d.). Retrieved from <http://quickfacts.census.gov/qfd/states/49/49053.html>

This document claims no credit for any images shown in this document unless otherwise noted. Images in this document are copyright to its respectful owners. If there is an image appearing in this document that belongs to you and do not wish for it appear in this document, please E-mail listeningtospringdale@gmail.com with a link to said image and it will be promptly removed.



THE  UNIVERSITY
OF UTAH


UNIVERSITY OF UTAH COLLEGE OF ARCHITECTURE+PLANNING

APPENDIX C – CLIMATE VULNERABILITY REPORT

Vulnerability, Consequences, and Adaptation
Planning Scenarios (VCAPS)

Cities of Springdale, Rockville and Hurricane

Final Workshop Report
April 2019

Submitted by:

Western Water Assessment

Cooperative Institute for Research in Environmental Sciences
University of Colorado Boulder
University of Utah



**WESTERN WATER
ASSESSMENT**

A NOAA RISA TEAM

About the Western Water Assessment

Western Water Assessment (WWA) is a university-based applied research program that addresses societal vulnerabilities to climate variability and change, particularly those related to water resources. While we are based in Boulder, Colorado and Salt Lake City, Utah, we work across Colorado, Utah, and Wyoming. Our mission is to conduct innovative research in partnership with decision makers, helping them make the best use of science to manage for climate impacts. WWA is part of the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder. Our primary source of funding is NOAA's Regional Integrated Sciences and Assessments (RISA) Program, and we are one of 11 RISA programs operating across the United States.

Authors & Facilitation Team

Seth Arens
Katie Clifford
Danya Rumore

Acknowledgements

Thank you to all participants of the Zion region VCAPS workshop for your enthusiasm for this process and thoughtful feedback on this report. Thank you, especially, to Tom Dansie for his support in pre-workshop planning, encouraging participation from the cities of Rockville and Hurricane, securing the venue, and other logistics for the workshop. Thank you to Pam Leach for providing refreshments for the meeting. Thank you as well to Kirstin Dow, Jess Whitehead, and Seth Tuler from the Carolina Integrated Sciences and Assessment (CISA), North Carolina Sea Grant, and the Social and Environmental Research Institute (SERI), the creators of VCAPS, for training us, answering our questions, and providing valuable support as we prepared for this process.

Recommended Citation

Arens, S., K. Clifford and D. Rumore (2018). Final Workshop Report for Vulnerability Consequences and Adaptation Planning Scenarios (VCAPS) for the Cities of Springdale, Rockville and Hurricane. Western Water Assessment: Salt Lake City, UT.

Note

This material is based upon work supported by the National Oceanic and Atmospheric Administration (NOAA). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of NOAA.

1. Introduction	4
2. Local Climate and Weather Hazards in the Zion Region: Concerns and Existing Initiatives (from pre-workshop interviews).....	5
3. Local weather and climate impacts: recent trends and future projections for the Zion region of southern Utah.....	6
a. The water budget and drought	6
b. Observed precipitation: high variability, no recent trend.....	7
c. Observed Temperatures: A strong recent warming trend.....	8
d. Observed snowpack and streamflow: A little earlier, a little less	9
e. How recent trends in the Zion region are connected with expected future changes.....	9
f. Future temperatures: Even warmer, and into uncharted territory.....	10
g. Future precipitation: Unclear changes, but large variability will continue	11
4. VCAPS workshop : highlights and themes	12
a. Description of the workshop process	12
b. Discussion of the drought scenario (2015-type drought)	14
c. Discussion of the extreme precipitation scenario	20
5. Participant reflections and next steps	26
6. Conclusion	26
7. Appendix: Table of management actions	28

1. Introduction

The Cities of Springdale, Rockville and Hurricane, Utah are located along the Virgin River in Washington County and are gateway communities to Zion National Park. Springdale and Rockville are towns with small permanent populations of 592 and 272, respectively, are located directly west of Zion National Park. Springdale supports a robust tourism economy based on visitation to Zion National Park and experiences large seasonal



Figure 1. Virgin River in Zion Canyon.

population increases due to tourism. Rockville is a residential community with little commercial or tourism related development. Hurricane is about 20 miles west of Zion National Park and has a population of 17,135. The three cities draw municipal and agricultural water from a variety of sources. Springdale has relatively senior water rights to Virgin River (Figure 1) water and is planning to build a new water treatment facility, while Rockville uses groundwater as its primary source and the town's development is limited by water availability. Hurricane also uses groundwater as its primary source of municipal and agricultural water. All three communities experience regular drought, but water availability typically exceeds demand even in drought years. During late summer and fall, monsoonal rain impacts the region and severe thunderstorms can produce extreme precipitation and flash floods.

On November 15-16, 2018, the cities of Springdale, Rockville and Hurricane participated in a Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) workshop, organized by Western Water Assessment (WWA), an applied research program based at the University of Colorado Boulder. VCAPS is a facilitation technique designed to support municipalities in building resilience to weather and climate impacts. Prior to the two-day workshop, WWA staff worked with the City Planner of Springdale as our primary contact, as well as staff from various departments in city governments of Springdale, Rockville and Hurricane.

In advance of the workshop, WWA staff conducted phone interviews with each of the ten workshop participants to collect background information on key concerns and local knowledge associated with climate and weather hazards. Drought and extreme precipitation were identified as the key climate risks concerning the three towns. Springdale and Hurricane were particularly interested in incorporating the impact of climate change on these risks in their planning strategies for future development. Based on the individual interviews conducted in advance of the workshop, the WWA team crafted the following goals and objectives for the workshop:

1. To develop planning strategies for future development that account for the impact of climate change on drought and extreme precipitation.

2. Create actions items for use in hazard response plan.
3. Develop water conservation strategies.
4. Make connections between the three towns to aid in inter-community disaster preparedness and response.
5. To understand short-term climate outlooks and climate change projections so that all three communities have the same information and understanding.
6. Formulate future disaster response staffing requirements.

During the workshop, which consisted of two half-day meetings, WWA staff gave a brief presentation on the observed and projected impacts of climate change in southern Utah (see Appendix C for the workshop agenda). The WWA team then led the group in participatory diagramming exercises in which participants mapped out the causal structure of drought and extreme precipitation events, analyzed existing and anticipated community impacts of drought and extreme precipitation, identified gaps in knowledge, and brainstormed strategic short- and long-term actions for mitigating and adapting to increasing drought and extreme precipitation risks. The remainder of this report will summarize key aspects of the VCAPS process, highlight themes that emerged during the workshop discussions, and synthesize actions identified by workshop participants.

2. Local climate and weather hazards in the Zion region: concerns and existing initiatives (from pre-workshop interviews)

According to participants in the VCAPS workshop interviewed as part of the pre-workshop research process, the cities of Springdale, Rockville and Hurricane are exposed to a number of climate- and weather-related hazards, including extreme precipitation events and to a lesser degree, drought.

Extreme precipitation and flash flooding caused by late summer through fall monsoonal rains are the most significant weather hazards to Springdale, Rockville and Hurricane. The steep topography of Zion Canyon, its geology, soils, sparse vegetation and the occurrence of strong monsoonal thunderstorms create a significant risk for flash flooding in all three communities. Although monsoonal thunderstorms are very isolated in their direct impact, a heavy rainfall event in any of the sub-drainages of the Virgin River can cause the river to rise from a trickle (30 cubic feet per second) to a torrent (6,000 cubic feet per second) in an hour. These flash floods can cause extensive damage to infrastructure, property and loss of life. In 2015, a monsoonal thunderstorm dropped approximately an inch of rain in less than an hour and swept seven hikers to their death in Keyhole Canyon in Zion National Park. Roads, especially State Route 9 through Zion Canyon, frequently close due to sedimentation, mudslides and rock fall. Road closure can bring the region's tourist-based economy to a standstill and isolate communities from the outside

world until the road re-opens. During times of flash flood conditions, Springdale, which draws its water from the Virgin River, must shut down all water treatment due to high sediment loads in river water.

Drought is a secondary climate concern for the cities of Springdale, Rockville and Hurricane. Although drought is a common climate condition in southern Utah, Springdale and Rockville have not experienced many negative impacts of drought, largely due to ownership of senior Virgin River water rights in Springdale and a reliance on groundwater for municipal and agricultural water in Rockville and Hurricane. The City of Rockville has resisted development of additional residential and commercial properties as tourist visitation expanded; city officials feel that Rockville's ability to further develop is constrained by their water supply. In times of drought and water shortage, Rockville receives additional water supply from Springdale. Although drought conditions existed in the Virgin River basin in 2018, water supply for all three towns exceeded demand. Priority calls on Virgin River water have occurred in the past, most notably in 2015 when all post-1900 water rights were cut off by the Utah State Engineer.

Springdale, Rockville and Hurricane were introduced to the impacts of climate change on extreme precipitation and drought through the Zion Regional Collaborative (ZRC), a regional planning group facilitated by the Environmental Dispute Resolution Group at the University of Utah. The ZRC was assembled to address problems associated with rapid increases in tourist visitation. Changes in natural hazards due to climate change are one of many issues discussed by the group. Representatives from Springdale, Rockville and Hurricane participated in the ZRC and were particularly interested in building greater resiliency to climate change, extreme precipitation and drought as population and tourist visitation increases.

3. Local weather and climate impacts: recent trends and future projections for the Zion region of southern Utah

a. The water budget and drought

Before describing the observed climate trends and projected future climate for the Zion region, it will be helpful to review the basic water budget (Figure 2). Over the course of the year, Precipitation minus Evapotranspiration (ET) roughly equals Runoff (or streamflow). Evapotranspiration (ET) is the combined loss of water vapor from the soil, water, snowpack, and vegetation—and it has a profound influence on water availability. In a typical water year (October-September), high elevations of the Virgin River basin receive about 27.5” of precipitation¹, mostly

¹ Annual water year precipitation was calculated using data from 7 snotel sites located within the upper Virgin River basin. Data was from 1986-2018 and site elevation ranged from 6,055 – 9,827 feet with a mean elevation of 8,532 feet.

as snow during November – April and rain during other months. The cities of Springdale, Rockville and Hurricane, at low elevations of the Virgin River basin, receive significantly less precipitation. About 60% of this precipitation will return to the atmosphere (that is, ET) without reaching the Virgin River (Figure 2, left). The remaining 40% will run off and be available for use by people, and in the stream by riparian ecosystems.

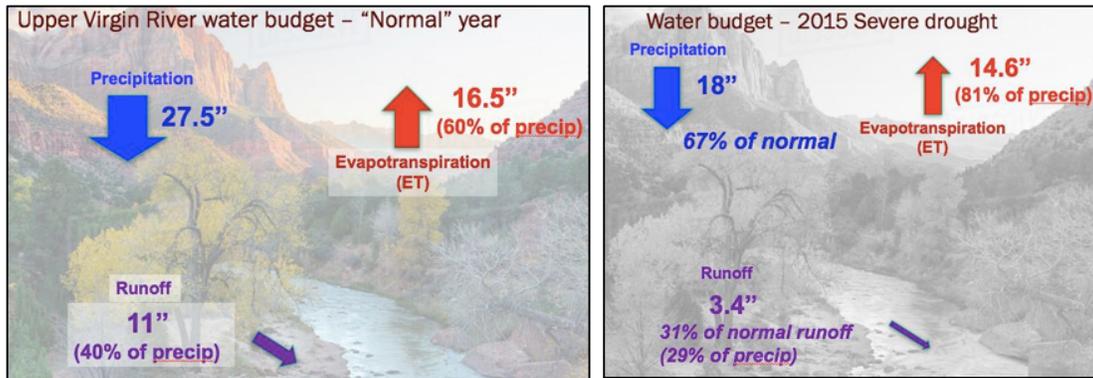


Figure 2. Schematic of Virgin River basin water budget in a normal-precipitation year (left) and in a severe drought year (right). During severe drought years, such as in 2015, the fraction of precipitation that is taken back up by the atmosphere (evapotranspiration; ET) goes up, so runoff is disproportionately reduced compared to precipitation

In drought years like 2015, precipitation in the upper Virgin River basin was about one-third lower than normal (18”). Because dry weather patterns are also associated with warmer temperatures, severe drought years are typically hotter than normal, as well as having more sun and lower humidity. All of these factors tend to increase ET—the atmosphere is “thirstier” during a drought. The fraction of precipitation going to ET increases to around 70%, and thus runoff is disproportionately reduced, to only half of normal (Figure 2, right). So, the smaller snowpacks, lower streamflows, and parched soils and vegetation associated with severe droughts result from both reduced precipitation *and* greater moisture loss through ET.

b. Observed precipitation: high variability, no recent trend

Since 1897, annual precipitation, averaged across all of Washington County (not just the upper Virgin River basin), is extremely variable from year-to-year; some decades are wet while others are dry. This *natural variability* is caused by fluctuations in both the prevailing tracks of storms in winter that bring moisture from the Pacific Ocean and in late summer monsoonal rains. Average annual precipitation across all of Washington County is about 14”; during dry years, less than 10” falls and wet years see greater than 20” of precipitation. The driest and wettest years on record in Washington County both occurred in the early 2000s. In 2001, only 6” of precipitation fell; just three years later, in 2004, over 30” of precipitation was recorded across Washington County. The timing and type of precipitation is very important to water supply in the Virgin River basin. In the drought year of 2015, slightly above average precipitation was recorded in Washington County,

but a significant portion of that precipitation came in the form of extreme precipitation events during fall monsoonal rains which does little to alleviate drought.

c. Observed Temperatures: A strong recent warming trend

The record of annually-averaged temperatures (over the water year, October-September) for Washington County shows a very different picture than precipitation. There has been a strong upward trend in temperatures over the past 40 years that stands out from the year-to-year natural variability (Figure 3). The average temperature since 2000 has been 1.8°F higher than the 20th-century average, with 3 of the 5 warmest years coming in the 21st century: 2000, 2012 and 2018. By themselves, warmer temperatures have an overall *drying effect*: ET tends to increase as a fraction of precipitation, snowpacks and streamflows tend to decrease, snowmelt and runoff come earlier, and soils become drier in the summer. Extreme temperature events in Zion National Park have increased dramatically in the 21st century. Heat waves where daily maximum temperatures exceeded 110°F for three or more consecutive days occurred only twice before 2002 (1950, 1989). Since 2002, nine such events occurred in Zion National Park.²

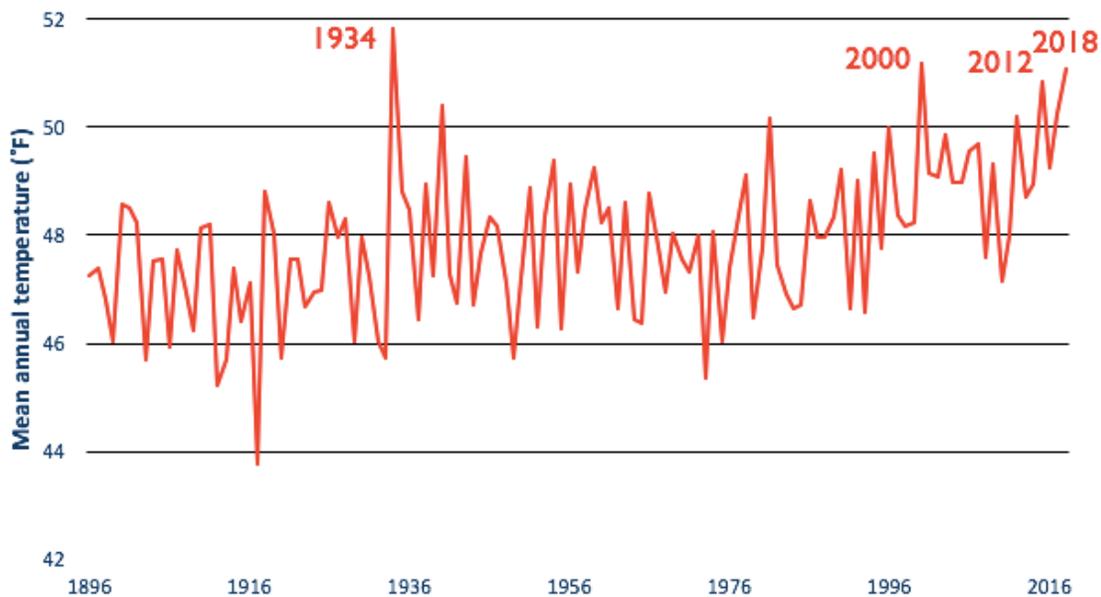


Figure 3. Annual (water-year) average temperature for Washington County, 1896-2018. Temperatures since 2000 have been nearly 2°F warmer (WRCC/DRI;<https://cefa.dri.edu/Westmap/>)

² Personal communication with Dave Sharrow, hydrologist for Zion National Park. Temperature data from Zion National Park headquarters.

d. Observed snowpack and streamflow: A little earlier, a little less

Unlike many other mountainous watersheds in the western United States, the Virgin River receives significant portions of annual streamflow volume from melting snowpack *and* late summer monsoonal rains. Snowpack acts as an enormous seasonal reservoir that accumulates water during the cold season (November-March) and releases it during the spring runoff season, mainly April and May. A secondary peak in streamflow often occurs during late summer when the North American monsoon brings thunderstorm-driven rainfall to southern Utah. Unlike spring runoff from melting snow, which slowly increases Virgin River flows, runoff from late summer monsoonal rains tends to come in short-duration, high flow pulses and flash floods.

The record of annual *naturalized* streamflow volume for the Virgin River in Virgin, UT (adjusted for diversions and depletions) from 1910-2018 shows extremely large year-to-year swings, with annual streamflow volume varying by a factor of ten, which is similar to the record of annual precipitation. Since 2000, Virgin River average annual streamflow volume was 24% lower than the 20th-century average. Since 2000, 4 of the 5 lowest annual streamflow volumes, and the lowest 2-, 3-, 4-, and 5-year cumulative streamflow volumes were recorded. It is likely that at least some of the recent reduction in streamflows is due to the effect of the warmer temperatures. Despite extremely low annual streamflow volumes since 2000, streamflow has been characterized by extreme variability with the lowest flow year occurring in 2000 and the highest flow year in 2004.

e. How recent trends in the Zion region are connected with expected future changes

The recent warming observed in the Zion region and across Utah is part of broader warming trends documented regionally, nationally, and globally. This unusual and widespread warming is attributed to increasing levels of greenhouse gases, such as carbon dioxide (CO₂), in the atmosphere; CO₂ is now at its highest level in at least 1 million years, according to evidence from Greenland and Antarctic ice cores.

How much will the climate change in the future, and in what ways? Global climate models, or GCMs, give us our best view of the future climate. GCMs are computer-based tools that incorporate fundamental laws of atmospheric physics, weather observations and knowledge of the Earth system to project future climate given assumptions about greenhouse gas emissions. Figure 4 shows climate projections from 20 different climate models run forward for the 21st century under two such assumptions: A higher-emissions scenario (Representative Concentration Pathway or RCP 8.5), with no global efforts to restrain emissions, and a lower emissions scenario (RCP 4.5), which assumes that annual global emissions are reduced by two-thirds after 2040.

f. Future temperatures: Even warmer, and into uncharted territory

All climate models indicate that the climate of the Zion region will continue to warm well into the 21st century. Figure 4 shows modeled (gray shading) and observed (gray bars) historic temperature and future temperature projections for a low emission scenario (blue line and shading) and a high emission scenario (red line and shading). For future temperature projections, the shaded area represents the range of 20 model projections of future temperature and the line represents the median of 20 model projections. Under the lower-emissions scenario, by 2050, average temperatures are projected to be 4°F warmer than the late-20th century average, and 5°F warmer by 2080. Under the higher-emissions scenario, warming will be even greater, with temperatures projected to increase 5°F by 2050 and increase 9°F by 2080. Under both emissions scenarios, by 2050, the typical year in the Zion region will be warmer than the hottest years of the 20th century. Returning to the water budget described above, this much warmer future climate would create mild drought conditions even during years of average precipitation by increasing evapotranspiration.

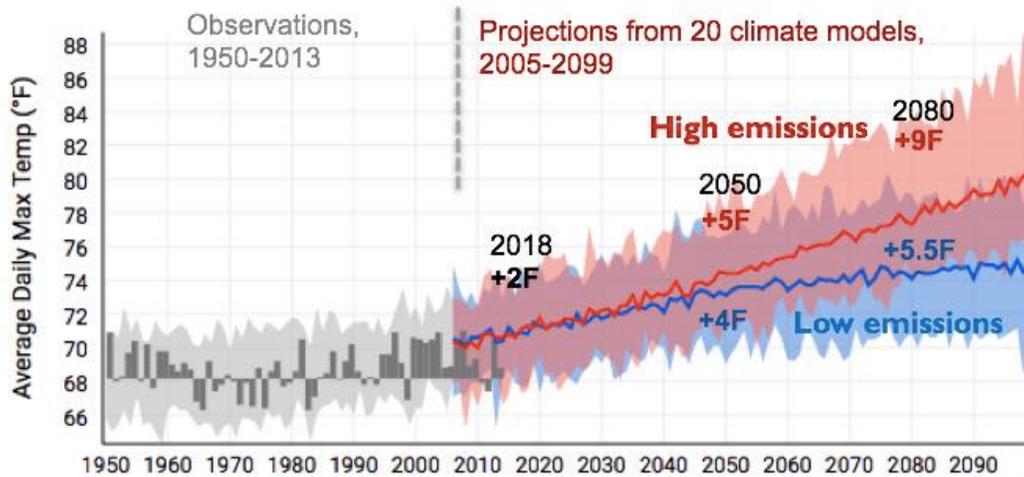


Figure 4. Projected annually-averaged daily maximum temperatures for Washington County, 2005-2099, from 20 climate models under high (RCP 8.5) and low (RCP4.5) emissions scenario, compared to observed temperatures, 1950-2013 (Source: NOAA Climate Explorer; <http://https://crt-climate-exporer.nemac.org>)

Extreme temperature days, defined as days with maximum temperatures greater than 105°F, will increase dramatically by the end of the 21st century, especially under a high emissions scenario. Figure 5 shows the number of extreme temperature days under a moderate (RCP4.5) and high (RCP 8.5) emissions scenario. Historically, only one day per year exceeded 105°F (based on modeled historic data from 1950-2005 for a higher elevation than the entrance to Zion National Park). Under a moderate emissions scenario, the number of extreme temperature days rises to 5 in 2035, 12 in 2060 and 13 in 2085. Under a high emissions scenario, the number of extreme temperature days increases to 7 in 2035, 23 in 2060 and 44 in 2085.

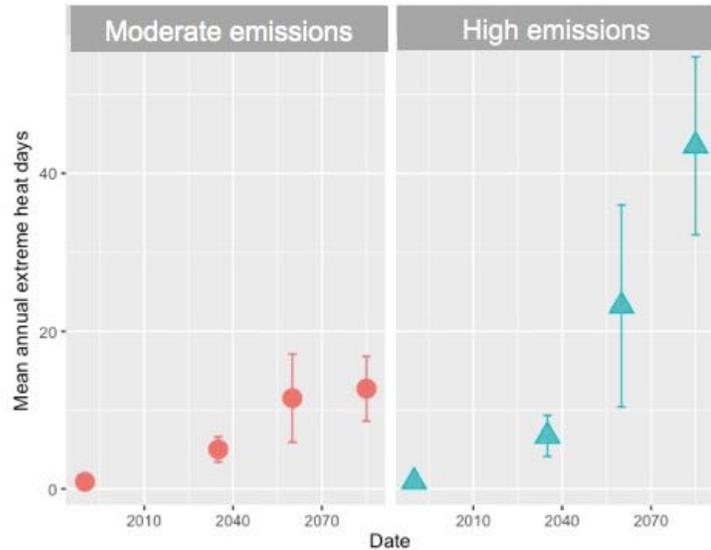


Figure 5. Number of extreme temperature days (>105 °F) under a moderate and high emissions scenario. Data is the median of 17 GCMs from the MACA dataset. Each data point is the represents a 30 year mean; bars represent standard deviation (<https://climate.northwestknowledge.net/MACA/>).

g. Future precipitation: Unclear changes, but large variability will continue

In contrast with the near-certainty of future warming, it is unclear how annual precipitation will change in the Zion region, relative to the late 20th century. Regionally, precipitation in the desert Southwest is projected to decrease. However, in the Zion region, some climate models show modest increases in annual precipitation, some models show modest decreases, and some models show it remaining about the same. All models show continuation—if not enhancement—of the large year-to-year variability in annual precipitation.

As global and regional climate warms, the frequency and severity of extreme precipitation events will increase. Historically, extreme precipitation events associated with monsoonal rains are a relatively common occurrence in the Zion region; warmer temperatures in the atmosphere will likely cause an increase in the amount of precipitation that falls in short duration (≤ 1 hour), high intensity events such as monsoonal

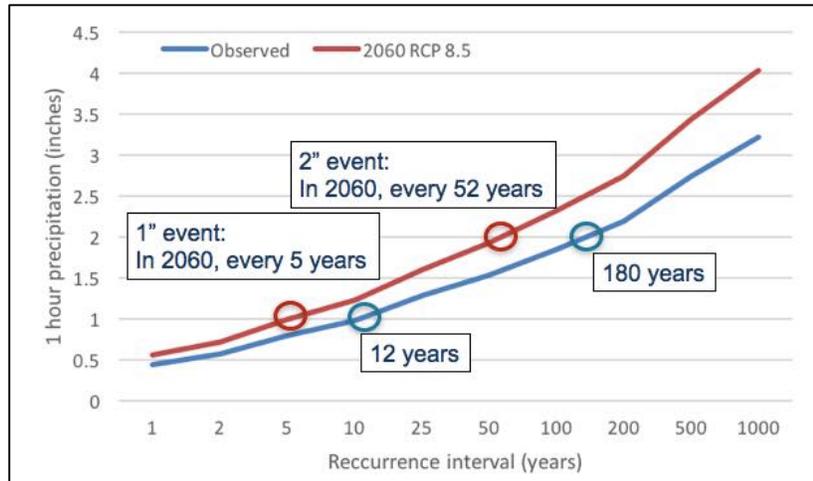


Figure 6. Historic and projected recurrence interval of a 1-hour precipitation event of different amounts for Springdale. Historic data is from the NOAA ATLAS-14 database (https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=pa).

thunderstorms. The atmosphere holds more water at higher temperatures; for every degree-Celsius of warming (1.8°F), precipitation amounts are projected to increase by 7% during events like monsoonal thunderstorms.³ The concept of increasing precipitation amounts as temperature warms can be applied to the recurrence interval of hourly precipitation events for the Zion region. Figure 6 shows the historic recurrence interval of hourly precipitation events of different amounts (blue line) and projected changes in the recurrence interval of hourly precipitation events (red line) based a high emissions scenario for 2060. Historically, a 1” in 1-hour rainfall event occurs once every 12 years. Assuming 3.6°F of warming, a 1” in 1-hour rainfall event will occur every 5 years. The historic recurrence interval of a 2” in 1-hour rain event is 180 years; by 2060, that recurrence interval is projected to decrease to 52 years. While extreme precipitation is a difficult climate parameter to project into the future, this technique gives an estimation of both frequency and intensity of future extreme precipitation events for the Zion region.

4. VCAPS workshop : highlights and themes

a. Description of the workshop process

During the workshop on November 15-16, 2018, participants took part in two discrete diagramming exercises/discussions: one exercise examining drought and one exercise examining extreme precipitation. At the beginning of each exercise, the WWA facilitator solicited from the group a specific drought or extreme precipitation scenario to discuss. During the discussions, one WWA team member facilitated the group discussion while another team member diagrammed

³ Prein, A.F., R.M. Rasmussen, K. Ikeda, C. Liu, M.P. Clark and G.J. Holland. 2016. “The future intensification of hourly precipitation.” *Nature Climate Change*. doi:10.1038/nclimate3168

the conversation in real-time, using discrete “building blocks” (see Figure 7). WWA built the diagram on a computer and projected it onto the screen so that the participants could see the diagram being populated with ideas as they were being generated. The group chose the following scenarios to diagram:

- Drought Scenario: moderate drought (2015)
 - Warm and extreme temperature variation
- Extreme Precipitation Scenario: short-duration, high-intensity rainfall (monsoon)

During each diagramming exercise, the WWA facilitator led the group through the process of mapping out the causal structure of the hazardous event – starting with a *management concern* (e.g., water supply management) and *climate stressor* (e.g., increased temperature and decreased precipitation), and then identifying the physical and social *outcomes* and *consequences* that stem from the relevant climate stressors. The WWA facilitator asked questions such as “Why do we care about [climate stressor]?” to guide the group to identify the potential outcomes that would be problematic or concerning for the community. The causal structure of the hazard was completed when the outcomes being generated by the discussion started to be related to loss or harm to things the community cares about, such as people, assets, and ecosystems.

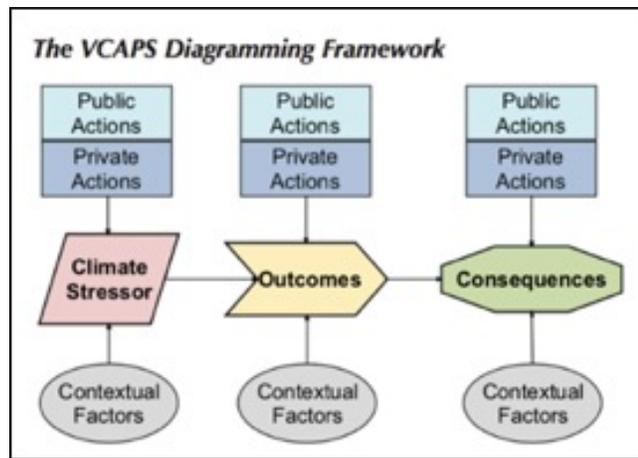


Figure 7. VCAPS building blocks, borrowed from www.seri-us.org

Throughout the process, WWA staff listened for mention of *contextual factors*, or factors unique to the Zion region’s specific management or community context that influence the region’s ability to cope with a particular outcome or consequence. Once the causal structure was completed, the WWA facilitator then led the group in a discussion of potential *actions* that the region could take to address different outcomes and consequences.

The final versions of the diagrams, broken out by theme, are embedded in the following text. Tables listing management actions for each scenario are included in the Appendix. **All diagrams are a reflection of the opinions of the participants, not Western Water Assessment staff.**

b. Discussion of the drought scenario (2015-type drought)

During the discussions for the first diagramming exercise, in which participants mapped out the causal structure of a 2015-type drought, the group started with *warmer temperatures* and *reduced precipitation* as the key climate stressors relevant to water supply management, the management concern selected to frame the overarching discussion. A second scenario of more severe or longer duration drought was not discussed, but participants noted outcomes that would only occur if the drought occurred with extreme temperatures. The diagram

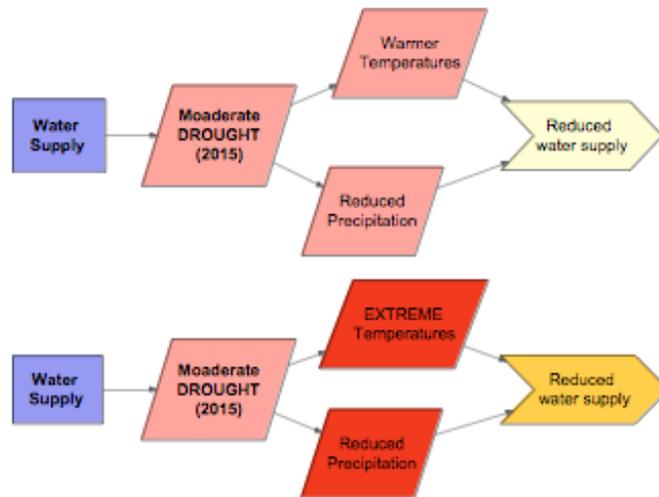


Figure 8. Drought scenario with management concern, climate stressors and example of an outcome. Yellow outcome box for warm temperature variation and orange outcome box for extreme temperature variation. This portion is truncated from subsequent diagrams.

generated through the group discussion focused on seven issue areas: 1) reduced municipal water supply, 2) sustained reduction to irrigation water, 3) prioritization of water use, 4) reduced groundwater, 5) increased energy demand, 6) reduced riparian ecosystem health and 7) wildfire. Increased incidence of wildfire during drought and reduced Virgin River riparian ecosystem health were discussed and diagrammed, but management actions for these themes were not determined.

i. Reduced municipal water supply

Reduced municipal water supply is caused by reduced precipitation and extreme temperatures, which lead to reduced runoff and stress on groundwater resources through decreased aquifer recharge and increased demand for water to maintain outdoor landscapes during times of drought. For the Zion region, moderate drought caused by reduced precipitation and only warmer temperatures does not typically lead to reductions in municipal water supply. Figure 9 shows the outcomes, consequences, contextual factors and management actions during a moderate drought. Outcomes impacted by warmer temperatures are shaded yellow and outcomes impacted by only extreme temperatures (more significant drought) are shaded orange.

All three towns have water supplies that are resilient to moderate drought. Springdale obtains most of its municipal water from its senior water rights to the Virgin River; Rockville obtains its municipal water from groundwater *and* Springdale's treatment facility during times of shortage; Hurricane also obtains its municipal water primarily through groundwater sources and owns an

emergency backup water supply. Reduced municipal water supply through drought with extreme temperatures can lead to drying of irrigated landscapes on city and private properties, water restrictions, changes in landscaping to more xeric plants and potentially a positive feedback to further increases in temperatures. An outcome of moderate drought with warm temperatures is water conservation. Water conservation efforts by the three towns may be hampered by the large number of tourists that have less incentive to conserve water than local residents. Two important contextual factors include: 1) the State of Utah allows the transfer of water rights out of the Virgin River to adjacent basins; and 2) Springdale uses a tiered-rate structure based on quantity of water used. Because hotels use large quantities of water they are typically in the highest priced tier. Management actions to mitigate the impacts of reduced municipal water supply include educating the public about xeriscaping, replacing turf grass with drought-tolerant plants, metering secondary water and placing a cap on water use. Other management actions focus on persuading tourists to conserve water through various strategies. The Zion region depends heavily on tourist revenue; severe drought could reduce the amenity value of attractions such as the Virgin River and Zion Narrows, causing a decrease in tourist visitation.

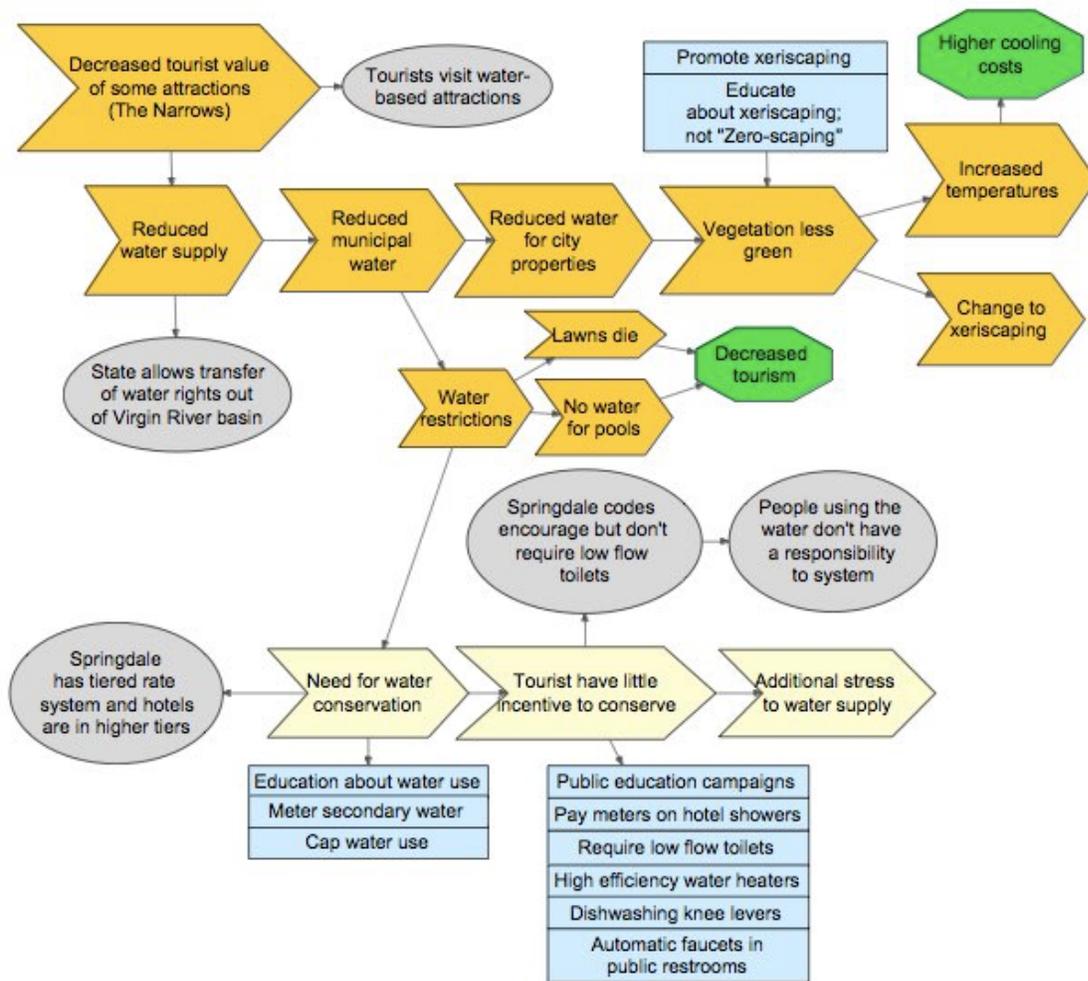


Figure 9. Diagram for drought scenario theme 1; reduced municipal water supply.

ii. Sustained reduction to irrigation water

Sustained reductions to irrigation water are caused by severe drought (reduced precipitation, extreme temperatures), which causes very low Virgin River flows, reduced groundwater recharge and declining groundwater levels. Hurricane, which has the most land in agricultural production, obtains its irrigation water from the Virgin River. Long-term reductions in irrigation water would certainly cause a reduction in agricultural production and could cause an increase in the sale of agricultural land. The sale of agricultural lands could lead to increased residential and commercial development or vacant, unirrigated lands which could increase the prevalence of dust pollution. Any reductions to agriculture in the Zion region would cause economic losses to both the agricultural sector and the businesses that support the agricultural sector (Figure 10).

Many of the management actions proposed in discussion of this theme were related to improving the efficiency of agricultural irrigation practices. Suggested management actions include changes to irrigation practices, water delivery and aquifer recharge. Raising water rates, instituting a more progressive rate structure, or a progressive rate structure that gives each lot a specific water quota based on lot size and use, were suggested to deter the use of culinary water for residential irrigation and education efforts were suggested to raise awareness about efficient irrigation and proper irrigation amounts.

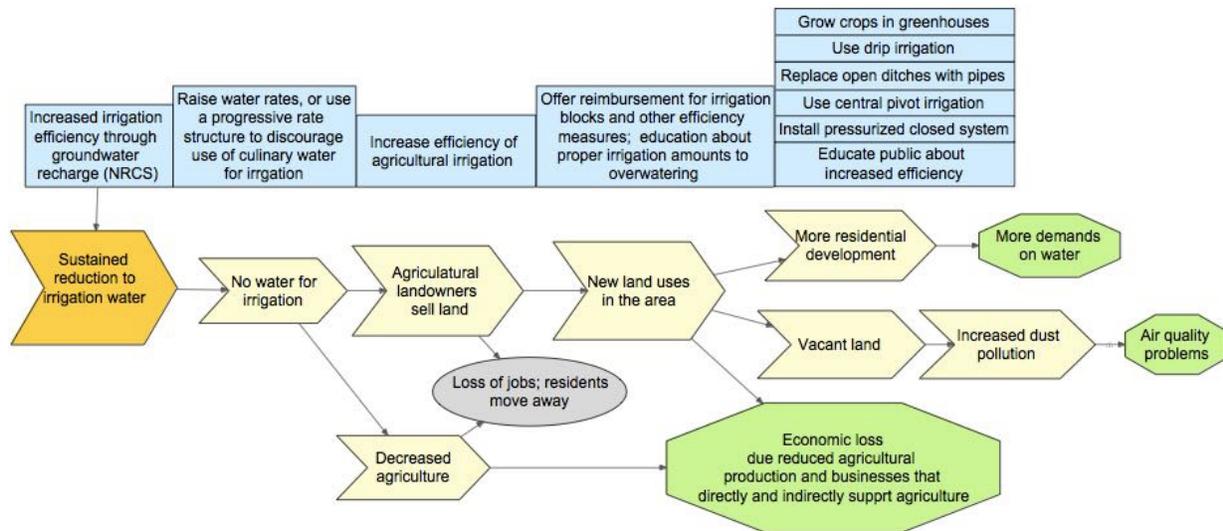


Figure 10. Diagram for drought scenario theme 2; sustained reductions to irrigation water

iii. Prioritization of water use

Severe drought, caused by reduced precipitation, extreme temperatures and reduced runoff, stresses water supply and leads to the need to prioritize water uses in the Zion region. Conflicting water uses during times of shortage require some level of prioritization between

municipal, residential and agricultural uses and storage in Kolob, Sand Hollow, and Quail Creek Reservoirs which are important for recreation, aquatic life and wildfire suppression (Figure 11). There are several important contextual factors that create conflict between water users. Washington County is one of the fastest growing counties in the nation; Hurricane and Springdale are experiencing rapid residential and commercial development; and water conservation is not part of the culture of Washington County.

The development of a drought management or mitigation plan was the most important management action discussed related to the prioritization of water use. None of the three towns currently have a drought plan, but Hurricane does have a scarcity of water plan; the development of a drought management/mitigation plan by the individual towns or the region would provide a framework for dealing with conflicting water uses during periods of drought and water shortage. Changing building codes and ordinances in the three cities and Washington County was also discussed as a mechanism to promote water conservation. Management of Kolob, Sand Hollow and Quail Creek Reservoirs are important to the community; the reservoir provides water for multiple uses, including water supply, recreation, aquatic life, agriculture and fire suppression. Despite the reservoir’s multiple uses, Washington County Water Conservancy District did not consult users before entirely draining the reservoir in summer 2018 to eradicate invasive species.

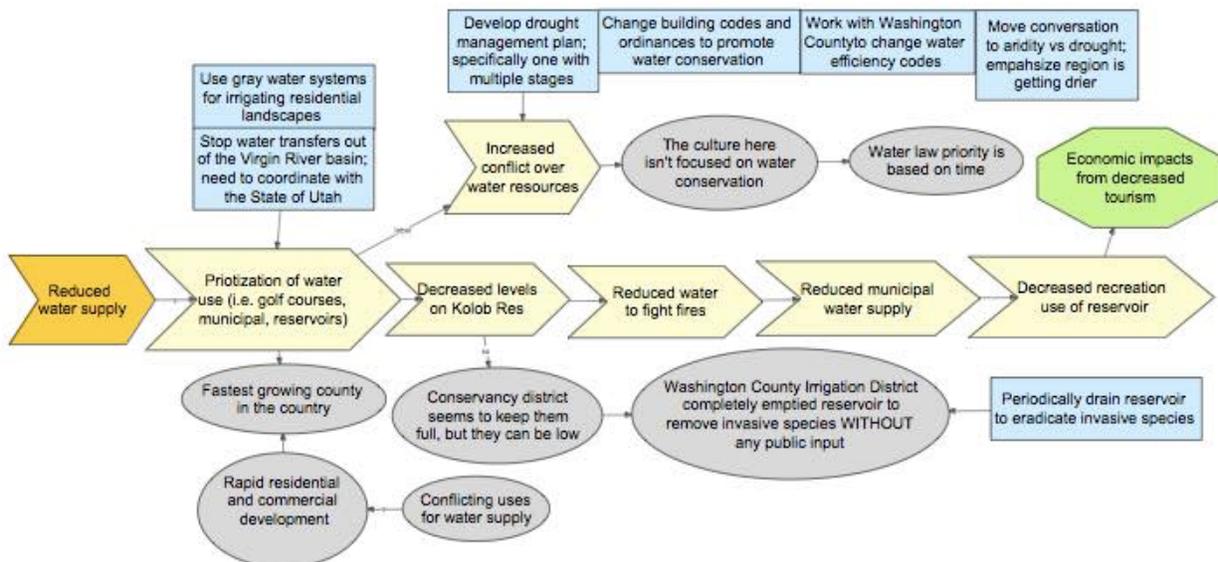


Figure 11. Diagram for drought scenario theme 3; prioritization of water use.

iv. Reduced groundwater

Groundwater, which includes springs, is the primary water source for Hurricane and Rockville and was identified as an important outcome of moderate and severe drought. Reduced precipitation and extreme temperatures will lead to reduced runoff, higher evapotranspiration, lower soil moisture and reduced recharge of groundwater aquifers. High temperatures and low precipitation will also likely increase outdoor water use and withdrawal of groundwater resources.

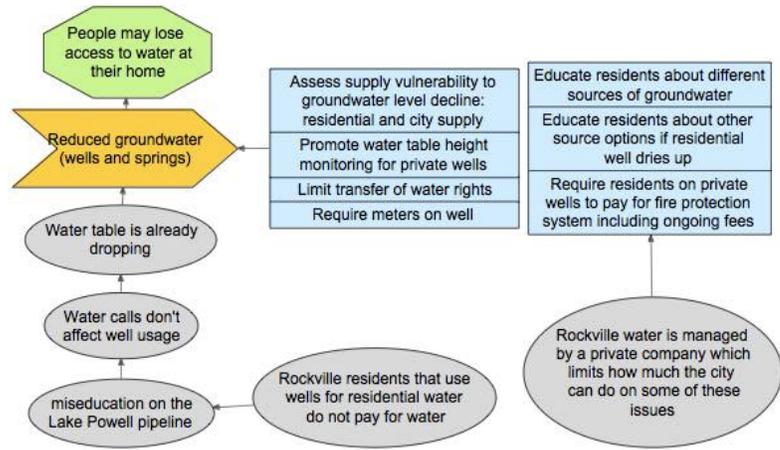


Figure 12. Diagram for drought scenario theme 4; reduced groundwater.

Two important contextual factors include: 1) the water table in the Zion region has been dropping in recent years; and 2) residents using water from wells do not pay for water and therefore have no financial incentive to conserve water during drought. A groundwater vulnerability assessment for both municipal and residential properties was suggested as a strategy to better plan for future water supply and development. There is not a clear and comprehensive understanding of the status and trends in groundwater in the Zion region; monitoring water table height, installing meters on wells and limiting the transfer of water rights were suggested as management strategies to conserve groundwater resources.

v. Increased energy demand

During severe drought, extreme temperatures will likely cause significant increases in demand for energy used to cool residential and commercial properties. If high energy demand leads to power outages

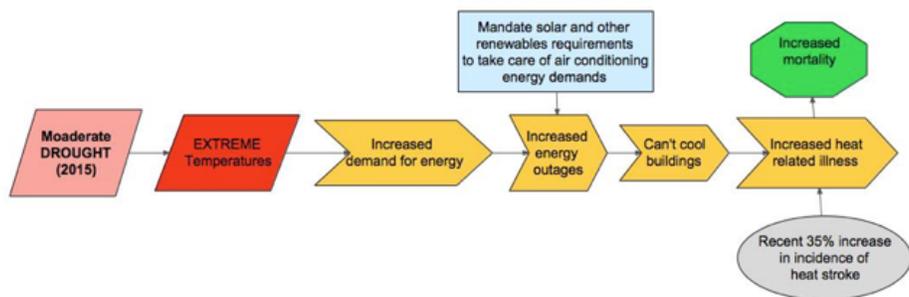


Figure 13. Diagram for drought scenario 5; increased energy demand

for a prolonged period, the risk of heat-related illness and mortality could increase (Figure 13). Recently, the Zion region has experienced a 35% increase in the incidence of heat stroke.

vi. Reduced riparian ecosystem health

High temperatures, reduced precipitation, higher evapotranspiration and low flows during periods of severe drought could degrade the health of riparian ecosystems along the Virgin River. Drought conditions, especially prolonged drought, could decrease both aquatic life and riparian willow health. A loss of willows along the Virgin River would tend to increase erosion and make areas adjacent to the river at greater risk to damage during floods. Increased flooding risk from degraded riparian ecosystems could threaten water transport and treatment infrastructure. While there is community disagreement about the appropriate solutions to reduce flood risk, additional flood mitigation strategies would likely be needed to repair ecosystem damage from drought.

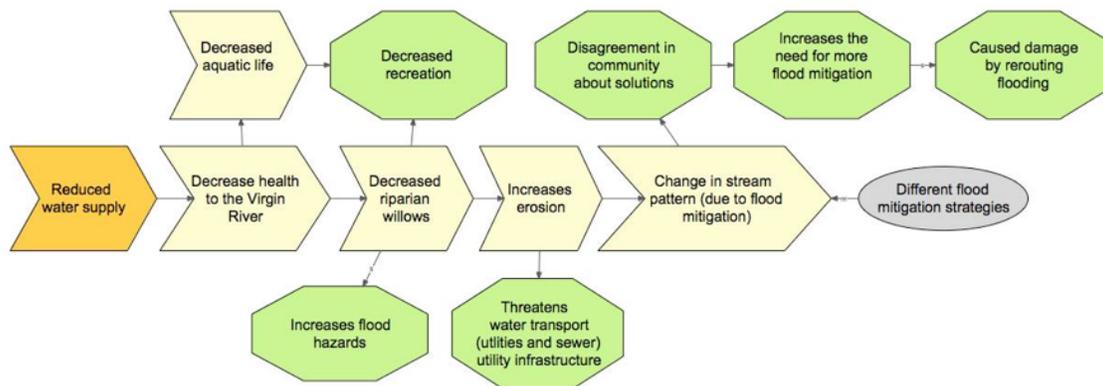


Figure 14. Diagram of drought scenario theme 6; reduced riparian ecosystem health

vii. Wildfire

Drought would have two primary impacts on wildfire incidence and severity. One, extreme temperatures and reduced precipitation would increase evapotranspiration, lower fuel moisture and dry vegetation which would tend to increase the incidence and severity of wildfire. Reduced water supply from drought would decrease the availability of water (especially in Kolob Reservoir) and make it more difficult and costly to suppress wildfire. Increased incidence and/or severity of wildfire would increase the risk of mudslides on burn scars and decrease the availability of forage for wildlife. Mudslides have the potential to degrade Virgin River water quality by increasing the river's sediment load. Mudslides could also create challenges evacuating residents and tourists because there is only one road out of Zion Canyon and there are many wilderness areas with no road access. It is often difficult to inform people of evacuations due to a lack of reliable and consistent cellular service in Zion Canyon; often people ignore evacuations and some may not speak English. Tourists often camp on Bureau of Land Management land on top of the mesas where fire risk is higher and deteriorating roads make

evacuation more difficult. The group identified that increased incidence of wildfire will increase total annual costs of fire suppression, damage property, decrease tourist revenue and potentially increase risk of exposure to wildfire smoke.

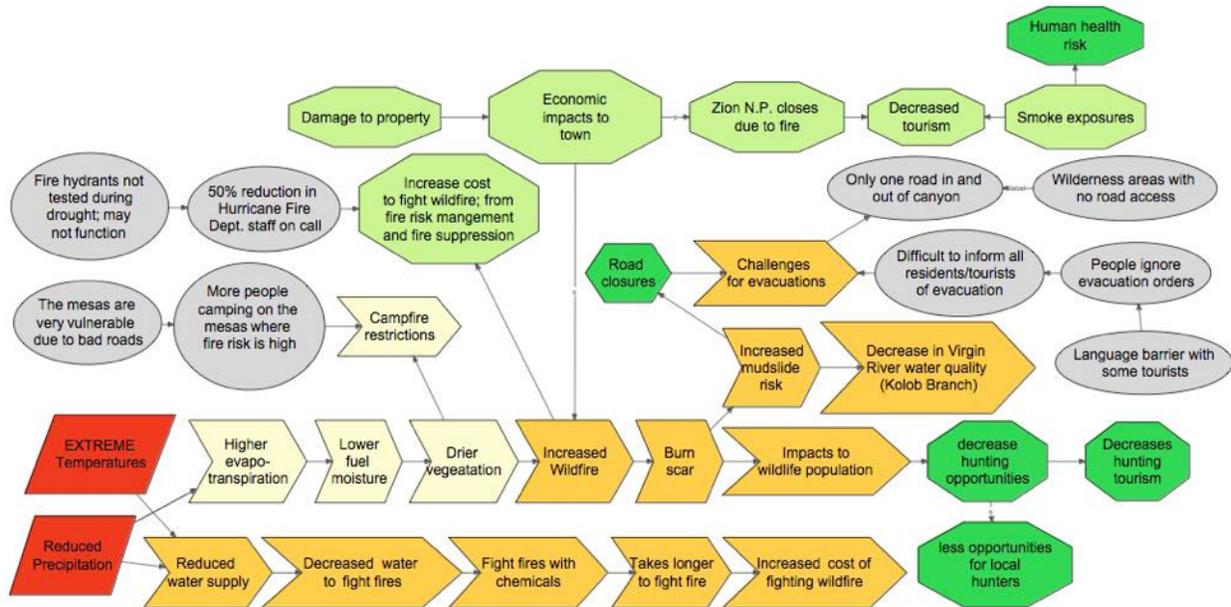


Figure 15. Diagram for drought scenario theme 7; wildfire.

c. Discussion of the extreme precipitation scenario

While there are two primary types of extreme precipitation events in the Zion region, the group chose to focus on extreme precipitation from late summer monsoonal rainfall events. There was not an overarching management concern because extreme precipitation has an impact on many management concerns. The discussion covered **five main issue areas or themes**: 1) infrastructure damage; 2) reduced water supply; 3) urban runoff; 4) human risk; and 5) drought feedback on flood risk. Many of these themes are management concerns, but for the purpose of diagramming the discussion, these themes are considered outcomes of extreme precipitation.

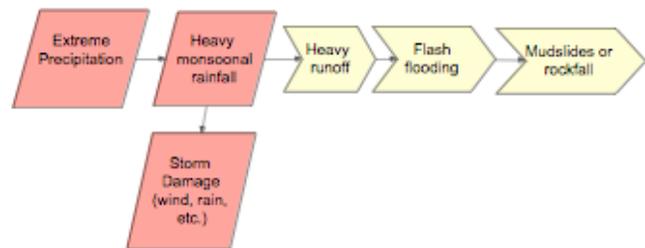


Figure 16. Extreme precipitation scenario with climate stressors and three important initial outcomes. Climate stressors and heavy runoff outcome are omitted from subsequent diagrams.

The North American monsoon typically affects the Zion region between July and October. Rainfall typically occurs from convective thunderstorms that drop rain in short-duration, high-intensity events. These events often cause severe flash flooding due to the topography, geology and ecology of the Zion region. Thunderstorms associated with extreme precipitation in the Zion region have a very uneven spatial distribution making the location of specific impacts difficult to

predict and challenging for public warning and safety. Also, climate change is driving changes in the frequency and intensity of these types of extreme precipitation events.

Strong winter storms, especially those associated with atmospheric rivers or “pineapple expresses”, were identified as a second important type of extreme precipitation, but outcomes and consequences of these events were not discussed in detail. Atmospheric river- or “pineapple express-” type events can cause extreme basin-wide flooding due to extended periods of heavy rain and snow, and the warm temperatures associated with these storms often result in rain falling on snow which causes additional flooding to the Virgin River and its tributaries.

i. Infrastructure damage

Extreme precipitation from late summer monsoonal thunderstorms causes rapid runoff, flash floods, mudslides and rockfall. Flash flood, mudslides and rockfall damages infrastructure including roads and bridges, property and trails (Figure 17). The city of Rockville is named because rocks very commonly fall from the canyon walls during heavy rainfall. In 2013, rockfall landed on a house in Rockville, killing its two occupants; the property is now abandoned. Damage to or loss of bridges and roads due to flash flooding, mudslides and rockfall causes several outcomes and consequences, including: isolation of residents or the entirety of Zion Canyon, reduced ability to respond to emergencies, high costs of helicopter rescues, high cost to repair roads and bridges, decreased tourist visitation, loss of tourist revenue and loss of life. Damage to trails in Zion National Park or surrounding areas can impact tourist visitation, cause a decrease in tourist revenue and incur costs to repair trails. Repairing trails within the national park can be especially problematic due to reduced funding of the national park system. Private and public property damage due to extreme precipitation can cause a long-term decrease in property values and potentially permanent loss of properties due to high flood or rockfall risk.

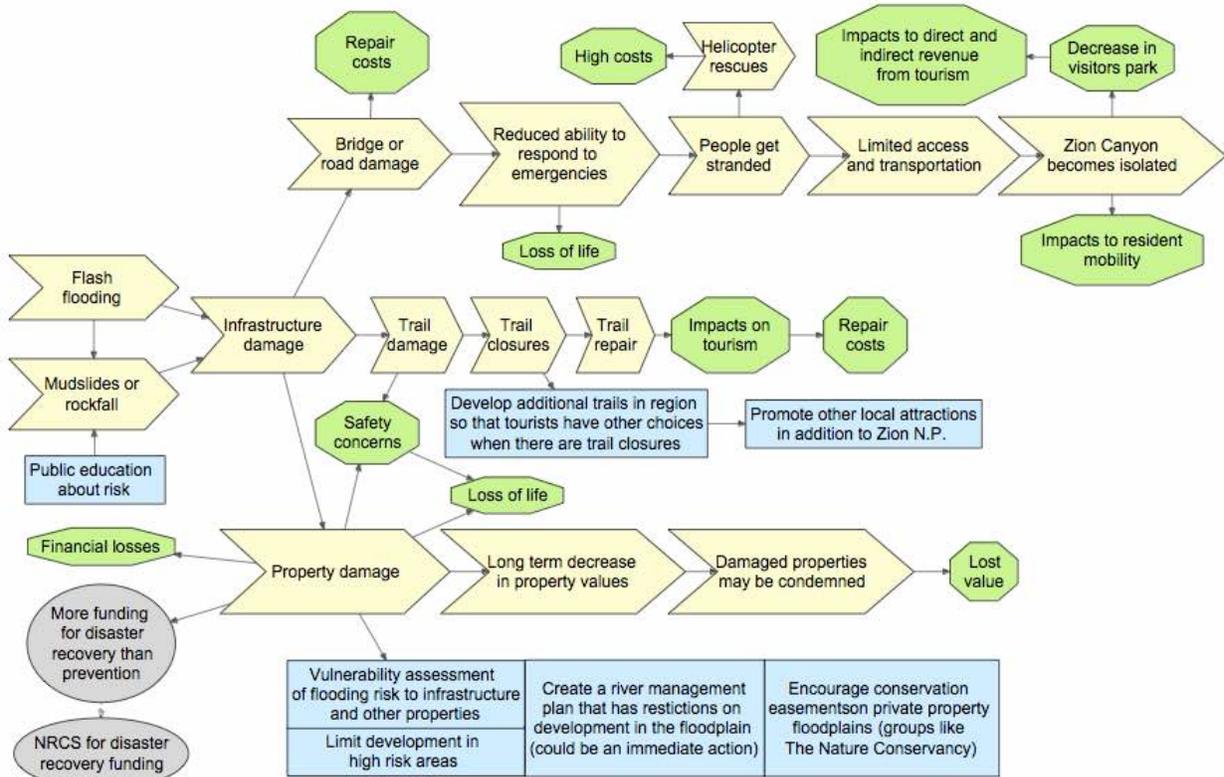


Figure 17. Diagram for extreme precipitation, theme 1; infrastructure damage.

Many people in the Zion region, especially tourists, do not fully understand the risks associated with flash floods, mudslides and rockfalls; greater public education about these risks could reduce some impacts from extreme precipitation. Participants in the workshop expressed strong support for each town developing a vulnerability assessment of municipal and private properties to flooding, mudslide and rockfall. Floodplain maps created by FEMA do not often include the risk of flash flooding in dry streambeds; limiting development in these areas would reduce future costs associated with flood damage. The development of a river management plan that places restrictions on development in floodplains (including ephemeral streams that only run in flash flood events) would also reduce future flood risk. Conservation easements to portions of private property that lie in flood plains would limit the possibility of future development in high flood risk areas. Management actions that could reduce the consequences of trail damage include: developing additional trails so that tourists have more hiking options when trail closures occur and specifically developing more trails outside of Zion National Park.

ii. Reduced water supply

One surprising outcome of extreme precipitation and flash flooding for Springdale is reduced municipal water supply. Springdale obtains its municipal water supply from the Virgin River and must draw water from the river through intake pipes for transport to the water treatment

plant. During flash flood events, intake pipes that carry water from the river to the water treatment plant fill with sediment and the water has too high of a sediment load to be treated for drinking (Figure 18). Consequently, Springdale must stop treatment of water pulled directly from the river and

must rely on water stored in storage tanks to provide water for the city. The reduced water supply from flash flooding leads to shortages for both municipal and irrigation water. To reduce the impact of flash flooding on Springdale’s water supply, participants identified that supply tanks and settlement ponds should be kept as full as possible, especially during late summer and voluntary or mandatory conservation measures can be taken during times of flash flood and high sediment load in the Virgin River.

iii. Urban runoff

Flash flooding from extreme precipitation causes runoff in areas where there are no natural streambeds or water courses. High-intensity rainfall from monsoonal thunderstorms causes urban runoff in Springdale, Rockville and Hurricane. Urban runoff in areas where there is no natural drainage can cause erosion, silt deposition, clogged drainage culverts and a general decrease in water quality due to high sediment loads. Consequences of erosion include damage to municipal, commercial and private property, damage to ecosystems and lost tourist revenue. The three communities involved in the workshop have different plans for future development, and the group identified that community disagreement in appropriate development patterns influences urban runoff and flood risk. Management actions to reduce the impact of urban runoff from extreme precipitation events focus on infrastructure solutions to increase the capacity of stormwater systems, strategies to increase ecosystem resiliency to flooding and

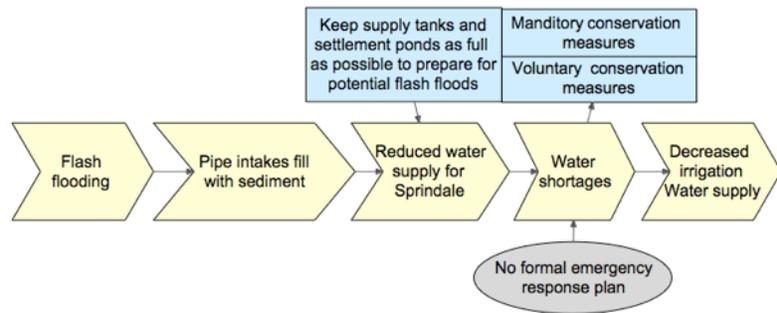


Figure 18. Diagram for extreme precipitation theme 2; reduced water supply.

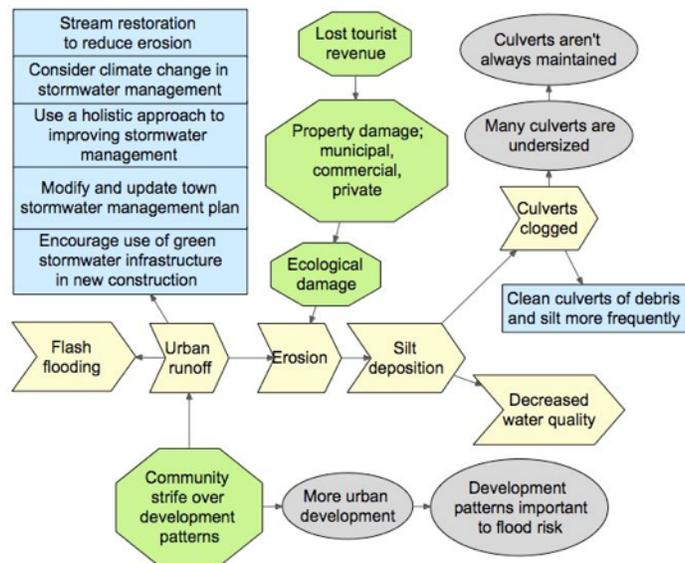


Figure 19. Diagram for extreme precipitation theme 3; urban runoff.

strategies to reduce erosion. One suggestion was to consider a more holistic approach to dealing with stormwater. Participants also suggested that town stormwater management plans be updated to consider changing frequency and intensity of extreme precipitation events. Finally, participants suggested that when replacing damaged infrastructure or in new construction, green stormwater strategies should be used.

iv. Human risk

Extreme precipitation presents a significant human risk due to flash floods, mudslides and rockfall. That human risk occurs when people are in locations with high flood risk, such as camping or recreating in dry streambeds or slot canyons, or when viewing the destruction of flash floods from places like river banks and bridges (Figure 20).

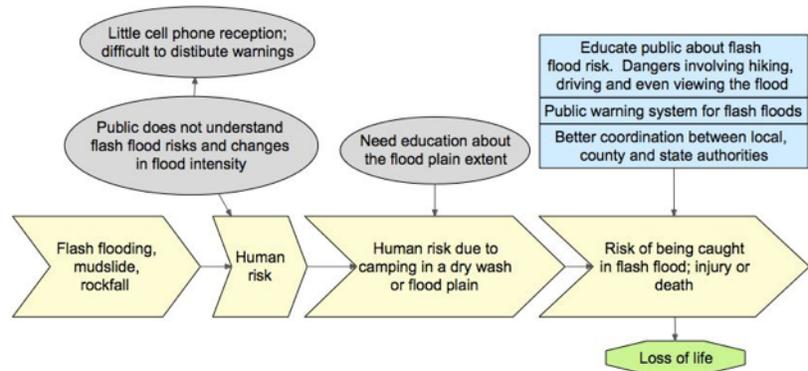


Figure 20. Diagram for extreme precipitation theme 4; human risk.

Some contextual factors that increase human risk from extreme precipitation include challenges in distributing flash flood warnings due to limited cellular service in the Zion region and the lack of public understanding about flash flood risks. The group identified that public education about flash flood risk, the development of a flash flood warning system and better coordination between state, county and local authorities are all management actions that could reduce human risk from extreme precipitation.

v. Drought feedback to flood risk

Workshop participants identified an important link between drought and flash flooding caused by extreme precipitation. Natural riparian vegetation along the Virgin River and its tributaries make the entire system more resilient to flood events. Drought, especially severe or multi-year drought, can cause the mortality of willows, cottonwood trees and other native woody

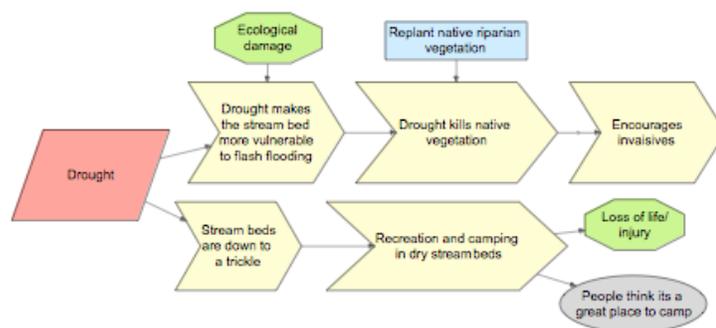


Figure 21. Diagram of extreme precipitation theme 4; drought feedback to flood risk.

Native vegetation protects streambanks from

erosion and helps to minimize damage from flash floods. The loss of native vegetation along rivers and streams can lead to the establishment of invasive species and an increase in vulnerability to flash flooding. A secondary outcome of prolonged drought is that tourists may camp or recreate in dry streambeds more frequently and become complacent to the danger of flash floods. An important management action to increase resilience to flash flooding and mitigate the impacts of drought-induced riparian plant mortality is the restoration of native vegetation along rivers and streams.

d. Cross-cutting themes: planning, coordination, regulation and education

- *Planning:* Response to natural disasters like drought and flood can occur more effectively if there is a response plan. Springdale and Rockville do not currently have a drought or flood response plan; Hurricane has a water scarcity plan and flood response plan. All three towns expressed a desire to develop response plans to drought and floods during the workshop. Drought and flood mitigation plans could be used as tools to plan for building community infrastructure that is more resilient to drought and flood *and* learning how to respond to disasters. Several workshop participants also expressed interest in developing a comprehensive river management plan that outlines strategies such as ecosystem restoration, floodplain delineation and limits to development in floodplains as tools to limit the impact of future flood events.
- *Coordination:* Coordination between different levels of government and organizations was mentioned as a necessary area of improvement for response to drought or flood emergencies. For example, the Hurricane fire department is responsible for emergency response in the entire Zion region, which has eight separate political subdivisions. There are many aspects of disaster response that require smooth coordination between local, county state and federal government agencies.
- *Regulation:* The development of new local or county regulations were mentioned as management strategies to mitigate the impacts of drought and flooding. New ordinances and changes to local building codes were suggested as tools to encourage or mandate specific water conservation strategies. Participants also suggested the addition of new regulations to promote conservation of irrigation water. Some development in the Zion region is vulnerable to flooding because buildings or infrastructure are located in a floodplain that is not recognized by FEMA floodplain maps, but is impacted by flash flooding in dry washes that only occurs during extreme precipitation events. Finally, several workshop participants mentioned the existence of state regulations that hamper the ability of towns to manage specific risks. One example is that county and local governments in the Zion region do not have the authority to ban the use of fireworks during times of high fire danger even though using fireworks presents a significant fire risk to Springdale, Rockville and Hurricane.
- *Education:* Education of Zion region residents and tourists was mentioned as an important management action for both the drought and extreme precipitation scenarios.

Discussion of education in the drought scenario focused around the topic of water conservation, especially for tourists. Participants also mentioned that there is not a culture of water conservation in the Zion region and that proper education could change that culture. The most important role of education in discussion of the extreme precipitation scenario was to inform residents and visitors about the danger of flash floods in the region. In this case, better education could result in preventing serious injury or loss of life.

5. Participant reflections and next steps

During the final session of the workshop, participants shared reflections on the two-day process. Participants found the following aspects of the process to be valuable:

- The presentation of climate change projections, particularly projections about future temperatures and extreme precipitation, was very informative and called “eye-opening” by one participant.
- Gathering staff from Springdale, Rockville and Hurricane together to discuss climate risk and planning was extremely valuable and served as a good starting point for coordination between the three towns for future planning efforts.
- The workshop served as an impetus to begin more proactively planning for drought, flood and response planning for natural disasters in Springdale, Rockville and Hurricane.

Participants also shared a number of general next steps they would like to see themselves as individuals and as a group take:

- Develop a list of action items to begin more proactive planning for drought and flash flood.
- Conduct an infrastructure vulnerability assessment (Hurricane has nearly completed an assessment).
- Develop a drought response and mitigation plan.
- Develop a flood response plan.
- Update the water scarcity plan (Hurricane)
- Examine the size requirements of water conveyance infrastructure, such as culverts, in relation to projected changes in extreme precipitation.

6. Conclusion

The VCAPS methodology is one of many approaches available to empower local climate and weather adaptation through structured, deliberate dialogue. Over the course of two half-day meetings, the Cities of Springdale, Rockville and Hurricane convened key staff and decision-makers to systematically examine and document local climate concerns; experienced and anticipated impacts of climate hazards; knowledge of past, current, and planned efforts to mitigate climate risks; and potential new solutions to address risks across city operations. Nearly all workshop participants expressed the need to continue these discussions. We hope that this report and the diagrams generated from the meetings can support this group to continue the

conversation and generate a plan for examining the broad range of vulnerabilities, questions, existing assets, and new ideas that emerged through this process.

7. Appendix: Table of management actions

Scenario	Issue Area	Action Status	Action*	Consequence /Trade-Offs Opportunity
Moderate drought scenario	Reduced municipal water availability		Educate people on how much water they are actually using	There is only one master meter at town level
			Meter secondary water (at the household level)	
			Change water laws based on "use it or lose it" to incentivize conservation	
			Put caps on water use	
			Public education campaigns about water conservation	
			Pay meters on the hotel showers	
			Require low flow toilets and other water efficient fixtures in hotels	
			Encourage use of recycling water heaters	
			Add knee levers for dish washing	
			Install automatic faucets in public restrooms	
			Educate the public about xeriscaping; xeric landscapes can still look beautiful; not "Zero-scaping"	
			Promote xeriscaping in the lower canopy (less grass, less bushes) but keep trees for shade	
			Research other pricing structures used in communities facing drought	
			Change water pricing. Use the CA or CO model where each house has an allotment and it is automatically reduced during drought	
		Develop drought mitigation plan		
	Sustained reduction to irrigation water		Increased irrigation efficiency through groundwater recharge (NRCS)	
			Raise water rates, or use a progressive rate structure to discourage use of culinary water for irrigation	
		Increase efficiency of agricultural irrigation		

*Action is defined here as "Workshop Conceptual Solutions" and do not represent the Political agenda, promises or action of the workshop group. These actions are part of viable solutions to outcomes and consequences identified during the VCAPS workshop.

Scenario	Issue Area	Action Status	Action*	Consequence /Trade-Offs Opportunity
	Prioritization of water use		Offer reimbursement for irrigation blocks and other efficiency measures, education about proper irrigation amounts to overwatering	The culture here is not focused on water conservation
			Stop water transfers out of the Virgin River basin, need to coordinate with the State of Utah	
			Use gray water systems for irrigation residential landscapes	
			Develop drought management plan, specifically one with multiple stages	
			Change building codes and ordinances to promote water conservation	
			Work with Washington County to change water efficiency codes	
			Move conversation to aridity vs drought, emphasize that the region is getting drier	
			Periodically drain reservoir to eradicate invasive species	
	Increased energy demand		Mandate solar and other renewables requirements to take care of air conditioning energy demands	Recent 35% increase in incidence of heat stroke
	Reduced groundwater		Limit transfer of well water rights	Rockville water is managed by private company which limits how much the city can do on some these issues
			Promote monitoring of water table depth in private wells	
			Require meters on wells to limit overuse	
			Educates residents on different types of sources of groundwater	
			Asses vulnerability of town water sources if aquifer declines	
			Asses vulnerability of residents if aquifer declines	
		Educate residents about options if a residential well runs dry, there may be no alternative water source		
		Require residents using well water to pay for fire control water system		
	Require residents on well water to pay ongoing fees for fire protection			

*Action is defined here as "Workshop Conceptual Solutions" and do not represent the political agenda, promises or action of the workshop group. These actions are part of viable solutions to outcomes and consequences identified during the VCAPS workshop.

Scenario	Issue Area	Action Status	Action*	Consequence /Trade-Offs Opportunity
Extreme Monsoonal Precipitation Scenario	Infrastructure damage: Property damage		Limit development in high risk areas	NRCS are a great avenue for repair funding
			Create a river management plan that has restrictions on development in the floodplain	
			Encourage conservations easements on private property floodplains (groups like The Nature Conservancy)	
			Town Vulnerability assessment of flooding risk to infrastructure and other properties	
			Public education about rockslides dangers (perhaps at the community events like the jazz festival)	
	Infrastructure damage: Trail damage		Develop additional trails in the region so that tourists have other choices when there are trail closures	
			Promote other local attraction in addition to the Zion National Park	
	Reduced water supply		Maintain supply tanks and ponds and keep them as full as possible to prepare for when water gets cut off	No emergency response plan with directives
			Mandatory conservation measures	
			Voluntary conservation measures	
	Urban runoff		Increase catchment of runoff (like design golf courses to capture runoff, make it part of the water catchment system)	
			Require hotels to add a new catchment basin	
			Encourage green stormwater infrastructure in new construction and replacing damaged infrastructure	
			Modify and update town stormwater management plan	
			Use a holistic approach to improve stormwater management, think about the entire system not just one property	
		Consider future development and climate change projections in stormwater management plan update		
		Review historic stormwater issues, ensure that they are considered in the update		

*Action is defined here as "Workshop Conceptual Solutions" and do not represent the Political agenda, promises or action of the workshop group. These actions are part of viable solutions to outcomes and consequences identified during the VCAPS workshop.

Scenario	Issue Area	Action Status	Action*	Consequence /Trade-Offs Opportunity
			State has installed rip-rapping along river to reduce flooding	
			New stream restoration projects to reduce erosion (i.e. planting native riparian vegetation)	
			Clean culverts of debris and silt more frequently	
	Human risk		Better coordination between local, county and state authorities	
			Get more independence from the state to regulate at the local level (ex: fireworks, and fining people who don't evacuate)	
			Public warning system for flash floods	
			Educate public about flash flood risk. Dangers involving hiking, driving and even viewing the flood	People don't understand the risk

*Action is defined here as "Workshop Conceptual Solutions" and do not represent the Political agenda, promises or action of the workshop group. These actions are part of viable solutions to outcomes and consequences identified during the VCAPS workshop.