

Environmental Resources & Hazards

In order to implement the vision and policies of Smithfield City, it is important to understand the physical characteristics and cultural resources of the community, both man-made and natural, which provide opportunities and constraints that affect quality of life for residents.

Natural Resources

Smithfield City is part of the greater Bear River watershed. It is bordered by two mountain ranges which include the Bear River Range to the east and the Wellsville Mountain Range to the west. The Bear River Range immediately east of the city contains Three Canyons, an area that has been tied historically and culturally to Smithfield City throughout the city's history. The Three Canyons area has provided water, timber, stone, food, recreation, and many other "quality of life" benefits since settlers first came to the area in 1859. Smithfield residents and visitors alike use the canyons for reunions, family hunting trips, and church public service activities. With such close and easy access to the canyons and their many trails the residents of Smithfield consider these area as part of their recreation facilities.

Smithfield City's climate is an integral part of the community. It is characterized by cold, snowy winters and relatively dry summers. The temperatures range from 100° to -30° Fahrenheit (F). The average high is 88° F in July. The average low is 15° F in January. The frost-free growing season is 150 to 160 days, usually lasting from May to October. The annual average precipitation is 16.6 inches. More than 50 percent of this moisture comes in the form of snow. The spring months receive the most rain, whereas the summer months

receive the least. More important is the natural storage of snow in the mountains above the city. Because of the dry summers, the city relies on mountain water for culinary and irrigation purposes.

The cold winters require that certain design elements be considered in future development. Because of the amount of snow that tends to linger throughout the winter, city standards must account for snow loads, and snow storage areas must be provided within parking lots and along roadsides. This also requires larger setbacks from property lines to prevent snow from spilling onto adjacent properties and installation of parking island strips for snow storage adjacent to roadways, to allow pedestrian sidewalks to function in the winter months

Additionally, the increased snowmelt as spring and summer approach can cause problems with flooding. In heavy snow years, natural drainage patterns (such as that of creeks, rivers, and ravines) should be protected. A thorough study of flood areas and other major drainage collectors should be made before allowing any development within these areas of the city. Development in such areas should be discouraged to protect businesses and residents from flooding problems.

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Hillsides and Geologic Hazards

Slopes

The natural landscape of the older part of the city has a general slope of about 3 percent, from an elevation of 4,880 feet on the eastern side of the city limits to an elevation of 4,500 feet on the western edge. The east-to-west slope is less than 1 percent. Summit Creek runs laterally at the high point of the city. Water from Summit Creek flows in any of the three directions at nearly any point in the city. Ideal for agriculture in the early days of natural flow agricultural practices, this is also ideal for storm water drainage, because all water flows out from the city center.

Slopes in the Canyon Road area of the city range from 20 percent to 80 percent. The terraces (commonly called benches) run generally north and south along the ancient Lake Bonneville shoreline, and approach a 30 percent slope.

Some of the city issues relating to slopes include:

- » Emergency access
- » Landslides and slope failure
- » Cost of utility installation and maintenance
- » Snow removal
- » Sight problems for vehicles and pedestrians
- » Water drainage
- » Landslides or slope failure
- » Erosion
- » Storm water control failure
- » Traffic access problems

In addition to these concerns, the visual aesthetics could be negatively affected by development of hillsides and foothills. This would significantly impact the visual character and potential for recreational development (such as trails) that define the Smithfield City community. The citizens of Smithfield City have always valued wildlife, and many types of wildlife rely on the bench areas for winter range.

Development on steep slopes is expensive—both for the city and for developers—and should be avoided whenever possible. Restrictions on building and mining development in these areas should be encouraged. It is recommended that slopes greater than 30 percent be left undisturbed and that the Zoning Ordinance provide guidelines for protecting these areas. (See *Attachment 3 - Sensitive Lands Map*)

Geology

The greatest influence on the location and the type of surface materials in the Smithfield City area has been Lake Bonneville. Lake Bonneville was an Ice Age lake that filled much of northern Utah and southern Idaho (including all of Cache Valley) 10,000 to 20,000 years ago.

Lower alluvial fans make up the gentle slopes at the eastern edge of the city. These slopes are fertile agricultural areas and suited for development. However, the development in these agricultural zones should be in a manner that protects open space while maintaining the ability to develop housing in the future.

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The East Cache Fault Zone runs along the base of the eastern foothills. Several earthquakes in the region have caused structural damage in the city limits. Evidence indicates that this fault zone is capable of generating earthquakes of much greater magnitude than any that have occurred during historic times. This fault line will need more accurate mapping, and future development near the fault should be discouraged or prohibited. Notices should be included with building permits when such hazards are known. Requirements for development in proximity to these areas will need further defining in the Zoning Ordinance.

Soils

The soils of Smithfield City are generally suitable for development. The soils range from predominantly gravel (which contains aggregate sizes from sand to rocks of 6 inches or more) to loam topsoil and heavy clay.

The most predominant soil type is silty-gravel, which is found throughout the city. This soil type is overlaid by a layer of gravelly-loam topsoil ranging in depth from one to several feet. An exception to this soil type can be found in the southeast

and southwest corners of the city, where silt predominates. The extreme northern area is also an exception, where the soil types are silt-clay and clay. Soils in the Smithfield City area also vary highly as one moves vertically and laterally. Because the soils are so unevenly distributed, each specific site should be tested individually.

Earthquake and Fault Line

Hazard mapping found within the Pre-Disaster Mitigation Plan (PDMP) for the Bear River Region prepared by BRAG for Cache County identifies several structures and infrastructure at risk from surface fault rupture. There are two forks of the fault damage zone that run parallel along the eastern bench of the Cache-Wasatch Mountains. This threatens development along the Smithfield's far eastern boundary, and also along the secondary fault line that bisects the area between U.S. 91/ Main Street and the eastern boundary of the Smithfield. See *Attachment 4* to view the Smithfield element of the BRAG Pre-Disaster Mitigation Plan. (See also *Attachment 3 - Sensitive Lands Map*)



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Hillsides and Geologic Hazard Areas Policies

- » Where hillsides are in private ownership and development rights exist, reduce the impact of development on steep hillsides through measures such as low-density zoning, set-backs, and transfer acquisition and/or dedication.
- » Public safety should be preserved by assuring the stability, proper maintenance, and development of hillsides and slopes.
- » A geological/soils report, addressing site conditions, should be required for all proposed subdivision and major construction projects.
- » The aesthetic qualities of hillsides should be preserved by minimizing the amount of hillside excavation and requiring that, where hillside excavation occurs, cuts are fully reclaimed to a natural appearance through regrading and landscaping or through screening from general view of buildings.
- » Problem soils should be properly mitigated in all aspects of development.
- » As a part of development review, the city should evaluate potential impacts as a result of irrigation (such as those encountered with the installation of lawns) that might be applied above the hillside and create erosion on the downslopes below.
- » Where development occurs on ridge lines, the city might require setbacks for buildings to avoid hazardous geological conditions and to decrease negative visual impacts.
- » Improve data and mapping of landslide areas that are located in the city.



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Hydrology

Hydrology is the science dealing with the properties, distribution, and circulation of water. Hydrology, its related interests, and resulting laws and regulations account for the “life blood” of Smithfield City. Smithfield City owns rights to water from several deep wells, Summit Creek, Birch Creek, and the Logan River drainage area. Through long-established water exchanges, Smithfield City has many sources of water. State and federal water laws directly and indirectly mandate that the water claimed and allotted by these water rights must be used effectively.

The groundwater in Smithfield City occurs in the unconsolidated basin-fill deposits of sand and gravel layers collectively termed the principal aquifer. The distance from ground level to the

water table varies from approximately 300 feet at the extreme east side of the city to only a few feet at the western and southwestern portions. All irrigation and culinary wells in Smithfield City tap this aquifer.

The flow of water in the principal aquifer is from east to west, with discharge occurring west of Smithfield City. Shallow secondary aquifers located above the principal aquifer, and separated from it by a confining layer of clay, are found at some locations in Smithfield City, including the Summit Creek floodplain. There is a perched water table underlying the east bench, which feeds several springs.



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Floodplains

Floodplains are those areas impacted by the overflow of banks when runoff quantities from snowmelt and rain exceed the capacity of the creek channels. Floodplains are nature's way of dissipating the energy from periodic high flow of rivers. As water levels rise from snowmelt or storms, the increased velocity of water puts greater pressure on banks. Under normal conditions, vegetation adequately protects river banks; trunks, stems, branches, and boulders slow the water near the banks, and the soil is held in place by fibrous root systems. Runoff quantities may exceed the stream or river channel capacity. As the water spreads out, it slows down and erosive energy is dissipated. Also, as water slows down, the river deposits sediment, creating fertile soils that are usually associated with floodplains. Levees occur when floodplains are artificially restricted by development, and the river is not allowed to expand and slow down. This causes river velocity to increase its energy, which results in flooding and bank erosion downstream. Once this process has taken place, it is very difficult and expensive to reverse.

In addition to serving flood-storage and energy-

dissipating functions, floodplains provide important wildlife habitat and locations for passive recreational activities.

Floodplains exist along Summit Creek and Birch Creek. The major floodplain along Canyon Road is to the south side of Summit Creek, approximately 600 feet. After leaving the steeper portion of the canyon, the floodplain continues along both sides of the creek for 300 feet on each side. From there, the floodplain extends down through the town center and then to the west, out to the Bear River. Within the BRAG PDMP hazard maps several residential structures and infrastructure are at risk from flooding in the 100-year floodplain. There are over 200 structures in the floodplain, with the majority in the Summit Creek drainage through the middle of town. However, in post-settlement history the impacts to Smithfield residences have been minimal from Summit Creek. During the 1983 flooding that impacted nearly the whole state; Smithfield did experience some rising flows in Summit Creek that were contained by sandbagging. There are also some structures in the floodplain in the drainage north of Saddleback Road. (See *Attachment 3 - Sensitive Lands Map*)



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Floodplain Policies

- » Natural detention areas (such as wetlands and floodplains) should be protected to minimize increased flow due to runoff. This runoff includes that which results from hard surfaces formed as a result of new development. Thus, development within these areas should be restricted.
- » The city should discourage all development within the 100-year floodplain. Current regulations for floodplain preservation should be strictly enforced and refined as necessary.
- » The city should also preserve streams that may not be included in the 100-year floodplain by regulating development in these areas.
- » Channelization of perennial flowing streams should be discouraged.
- » The city should work with agricultural interests and the state to keep debris out of drainage areas.
- » Trail/recreational development and/or natural landscaping barriers should be encouraged along the floodplain areas to preserve and enhance the floodplain. Facilities, such as parks and trails, that are compatible with periodic flooding should be considered only if they allow floodwater to flow freely through these facilities.
- » Update, enforce and follow the city's general plan to reduce development in the floodplain areas.

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Wetlands

Wetlands generally include swamps, marshes, bogs, and similar areas. Federal law provides strict protection for wetlands. The city must conform with these laws at all times when planning for such areas.

The majority of the area's existing wetlands are found west of the Smithfield City annexation boundaries. However, some wetlands lie within city boundaries on the east bench. These wetlands are typically minor, although a Wetlands Delineation

Study will be needed on a case-by-case basis. The U.S. Army Corps of Engineers regulates the protection of wetlands and should be consulted before any changes are made around these sensitive areas. Development in such areas should be discouraged unless it is accomplished in a responsible manner and in accordance with federal, state, and local guidelines.

Wetlands Policies

- » The city should cooperate with federal agencies to ensure the preservation and enhancement of wetlands. Development plans and land-use modifications that could adversely affect wetlands will be required to eliminate or adequately mitigate the adverse impacts before permits will be issued.
- » The city should work with the U.S. Army Corps of Engineers and other appropriate government agencies to identify significant wetlands as the city expands.
- » The city should work to protect the wetlands in the Birch Creek and Summit Creek regions.
- » The city should not allow the encroachment of wetlands by projects, whether public or private, without the proper mitigation of impacts.

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Wildfire

The BRAG PDMP indicated that wildfire has always had an impact on Cache County and over the past few years four wildfires burned on the hillsides east of Providence, River Heights, and Logan City which were all fueled by dry grasses and juniper. The PDMP hazard mapping identifies moderate-to-high wildfire risk areas along the Smithfield's eastern bench and extending into the urban

canopy. It also indicated that 2,037 home and 40 commercial structure are at risk from wildfire. By understanding the risk of wildfires near and in Smithfield, the City, can plan better and prepare in advance to reduce the risk to the City and its residents.

See *Attachment 4 - Pre-Disaster Mitigation Plan*

Wildfire Policies

- » Identify, map and assess potential wildfire hazard areas to help prepare access management and evacuation plans for the city.
- » Update city ordinances to create a wildfire overlay zone including special conditions for development in these areas and work with the County to also participate in the overlay zone for their development in these areas.

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Cultural Resources

Because of the value placed on the pioneer and agricultural heritage of Smithfield City and the desire to preserve the “hometown” atmosphere, it is important to maintain open space, address identity, and identify and develop areas that present recreational opportunities for all ages (including the elderly). This includes maintaining the many unique structures such as business faces, older homes, barns, and other such structures. Consideration should be given to restricting height of buildings when height might prevent views from or into areas of the city.

Many old barns in the city remain in use. Although the use may not be for agricultural purposes, the care and maintenance of such structures should be encouraged. Other examples for preservation include:

- » Carnegie Library
- » Miles Store (Smithfield Implement)
- » Thornley Barn at 600 South and Main
- » Tabernacle (city youth center)
- » Old First Security Bank at 100 North
- » Old train station at Center Street (bank building)
- » First Ward Scout House (Historical Society building)
- » Cemetery entrances
- » Mack Park entrance
- » West side of the 100 North block
- » Historic town center



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Zion Plat Road Configuration (Street Grid)

Since the early settlement of the intermountain west, towns have been developed using the form of the Zion Plat. The Zion Plat is based on a conventional street grid with 10-acre blocks for development. Each block faces the cardinal ordinals for mapping. This type of city development pattern has been repeated throughout the west, and is still recognized as an efficient way to move traffic and create neighborhoods throughout a city. Because it is an important part of the cultural heritage of Smithfield City, this pattern of development should be continued whenever possible.

Where possible, all streets should be through streets. Dead-ends and cul-de-sacs should be discouraged so that development is structured to accommodate future roadway extensions. Where possible developments should allow for a minimum of two points of access to homes, neighborhoods, public buildings, and recreational facilities.

When cul-de-sacs are approved, walkways from ends of cul-de-sacs should be evaluated for access to parks, trails or other public rights of way.

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Goals, Objectives & Actions

GOAL		
<p>Environmental Goal 1: All new development should be located and designed for compatibility with sensitive natural areas. Resources and environmental conditions potentially impacted by proposed development should be identified in the initial stages of the project, to best design a development that protects these resources.</p>		
OBJECTIVE		
<p>Guidelines should be established to require construction practices that protect lands surrounding development by developing transition zones between residential development, sensitive lands, and public lands.</p>		
ACTION	TIMING	RESPONSIBILITY
<p>Action A: A sensitive land review should be a formal, required process beginning at the concept stage of all new development projects. Applicants should be required to identify all sensitive lands. A checklist could be developed to give to developers so that they understand what needs to be identified on their plan submissions helping them indicate sensitive lands and conditions that exist on the site. Performance standards for sensitive lands should be added to the Zoning Ordinance.</p>	<p>0 - 4 years</p>	<p>Staff/Planning/City Council</p>
<p>Action B: Land buffers should be established and standards set for how and what will be required as buffers between residential uses and public lands to protect their natural qualities.</p>	<p>0 - 3 years</p>	<p>Staff/Planning/City Council</p>
<p>Action C: Review and update ordinances regarding development on slopes greater than 10% to specify buildable areas on lots, require a geologic report and consider fault lines.</p>	<p>0 - 2 years</p>	<p>Staff/Planning/City Council</p>