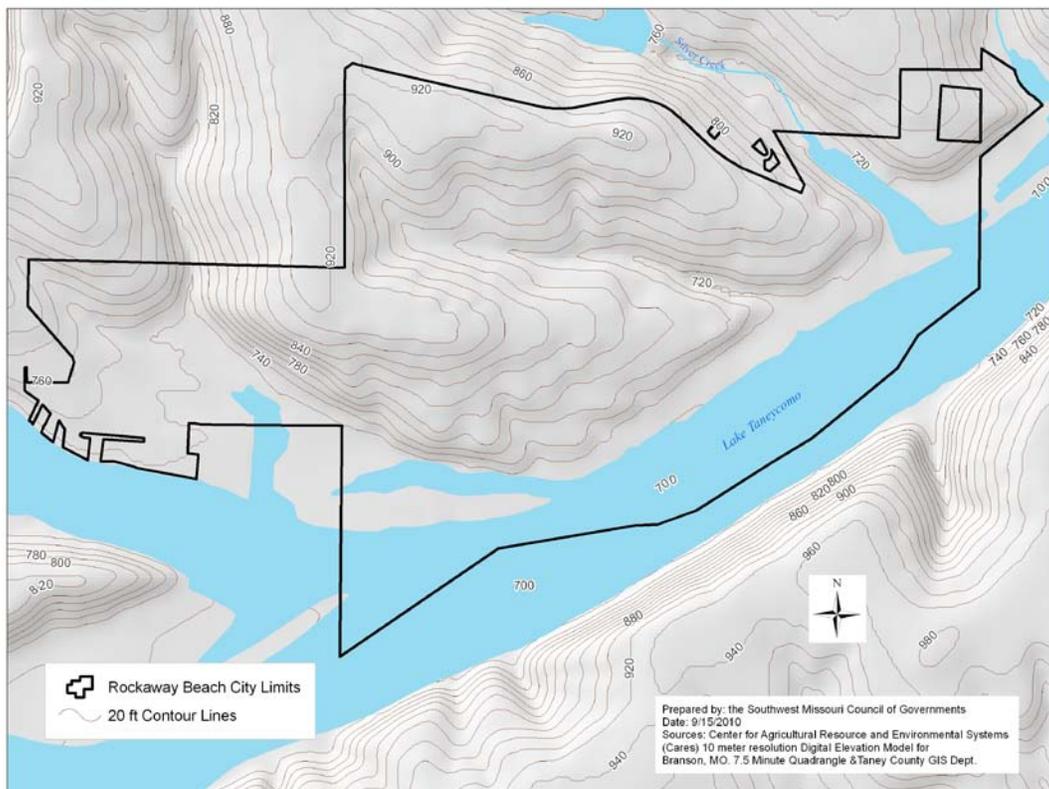


## Chapter 4: Natural Environmental

### Physical Geography and Geology

Physical geography classifies regions by the physical structure of the earth's surface, such as; highlands, lowlands, plains and plateaus. Rockaway Beach lies in the Salem Plateau in the southwestern Ozarks Plateaus of the Interior Highlands physiographic province. Rugged hills, steep ridges and deep, narrowly entrenched stream valleys characterize the Salem Plateau (Southwest Missouri Council of Governments, *Taney County Master Plan 1999*). Elevations within the corporate limits of Rockaway Beach range from 700 feet at the bottom of Lake Taneycomo to roughly 920 feet at highways 176 and EE in the northwest portion of the city. Over one fifth of the land area in Rockaway Beach above lake level has slopes of 20% or greater. Figure 4-1 depicts the topographical relief within Rockaway Beach. The majority of the City occupies two fingers of a ridgeline that has split before approaching Lake Taneycomo. The City also encompasses a relatively flat area to the west occupied by the Rockaway Beach regional wastewater treatment plant and a subdivision of single family homes.



**Figure 4-1: Topographical Features of Rockaway Beach**

Rockaway Beach is underlain by Ordovician age dolomites. The topography of the region reflects that the underlying dolomite bedrock is in the advanced stages of the geologic erosion cycle. Dolomite is a mineral rich in magnesium carbonate. Like limestone, carbonate bedrock is dissolved in a dilute carbonic acid found in the atmosphere, vegetation and shale. Water infiltrates the bedrock and channels its way through joints and faults creating Karst features like caves, springs, losing streams and sinkholes.

## Soils

According to the Taney County Soil Survey published by the National Resources Conservation Service in the United States Department of Agriculture in 1996, Soils in Rockaway Beach are composed of the Ocie-Gatewood-Gasconade association and Britwater soil. Woodlands are dominant in the Ocie and Gatewood soil types. These soils have a very low water capacity, a slow rate of permeability, rapid surface runoff, high shrink-swell potential and a depth to hard dolomite of 20 to 50 inches depending on the slope. The Britwater soil is found in the southwestern portion of the city in the foot slopes south of Boys Camp road from Highway 176 to the westernmost city limits. This is very deep, moderately sloping, well-drained silt loam with a depth to bedrock of 44 to 60 inches.

## Hydrology

### Watershed and Natural Drainage

Rockaway Beach lies in the lower Bull Creek and lower Silver Creek sub-basins of the Lake Taneycomo unit of the Bull Shoals watershed in the Upper White River basin, which eventually flows to the Mississippi River. Almost the entire area of the city is situated in the Silver Creek sub-basin. The Silver Creek and the Bull Creek basins diverge at the apex of the ridgeline to immediate west of the city limit at Highways 176 and EE running directly south to Lake Taneycomo leaving the western appendage of the City in the Bull Creek drainage basin. All surface runoff in Rockaway Beach drains directly into Lake Taneycomo.

### Lake Taneycomo

Lake Taneycomo was formed in 1913 by the construction of Power Site Dam in the White River near Forsyth. From 1913 to 1958 Lake Taneycomo was a warm water lake, but when Table Rock Dam was completed 22 miles upstream from the Power Site Dam the water released by Table Rock Dam during power generation was drawn from the cool lower depths of Table Rock Lake resulting in average temperatures of 48° in Lake

Taneycomo at the foot of the Table Rock Dam. When Table Rock Dam is generating power, the current in Lake Taneycomo becomes very strong throughout its whole length and essentially transforms into a very deep, cold and fast running River. Unlike other Lakes in the area that are owned the U.S. Army Corps of Engineers, Lake Taneycomo is privately owned by the Empire District Electric Company, which holds a license to continue operating the Power Site Dam until 2022.

#### United States Army Corps of Engineers

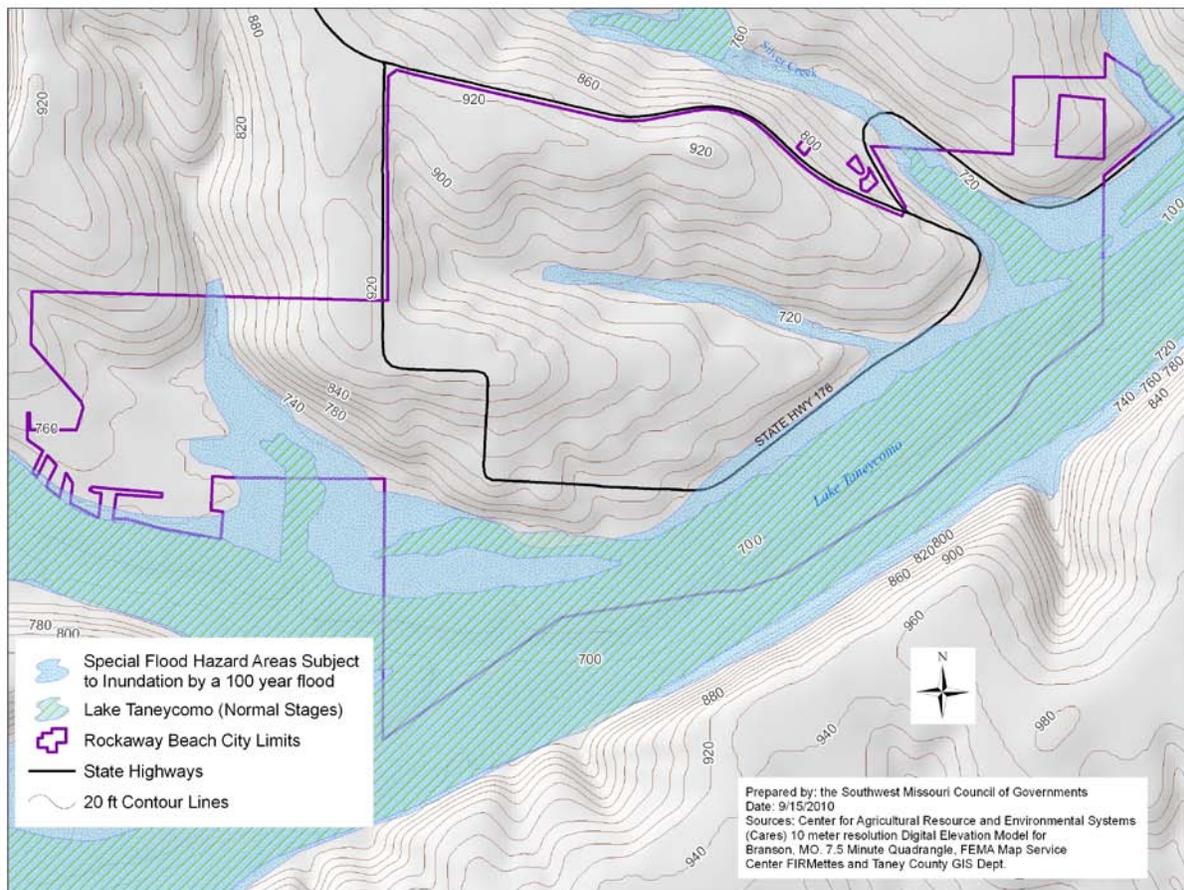
The United States Army Corps of Engineers (USACE) regulates activities occurring in waters of the United States under Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act of 1899. Under Section 404 of the Clean Water Act, authorization must be obtained from the USACE for discharges of dredged and fill material. Under Section 10 of the Rivers and Harbors Act of 1899, USACE regulates work in, or affecting, navigable waters of the United States. Although Lake Taneycomo is a private lake, USACE maintains jurisdiction and regulates any development or proposed change therein.

#### Water Quality

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) List helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs. In 2010, Lake Taneycomo was listed by the Missouri Department of Natural Resources as impaired due to low dissolved oxygen content and high nitrogen levels. Urban and agricultural non-point source runoff is listed as the source of the nitrogen levels while low dissolved oxygen levels at depths drawn through Table Rock Dam account for low dissolved oxygen in Lake Taneycomo.

#### Federal Emergency Management Agency (FEMA) 100-Year Floodplain

The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all federal agencies for the purposes of requiring purchase of flood insurance and regulating new development. The base flood is referred to as the 100-year flood. A 100-year flood is a flood that has a 1% chance of exceeding the base flood surface elevation in any given year. The base flood elevation on Lake Taneycomo at Rockaway Beach is 716 feet according to the current effective Flood Insurance Rate Map (FIRM). Figure 4-2 depicts special flood hazard areas that would be inundated in the event of a 100-year flood.



**Figure 4-2: FEMA 100-Year Floodplain in Rockaway Beach, MO**

The 100-year floodplain in Figure 4-2 was extracted from the FEMA Map Service Center FIRMettes, which are portions of the current effective map dated September 29<sup>th</sup>, 2006 and is for general information purposes only. The official copies of the map panels downloaded from the FEMA Map Service Center are included in Appendix B. Rockaway Beach is a participating community in the NFIP. This allows property owners within the 100-year floodplain to purchase flood insurance from the federal government. As of July 31, 2010 there were 59 NFIP policies in effect in the city covering \$5,148,900 in property value.

## Wildlife and Vegetation

The woodlands in and around Rockaway Beach consist of areas of leaf bearing and needle bearing plants and trees, associated grasses, legumes and wild herbaceous plants. Examples of wild herbaceous plants of the area are foxtail, croton, goldenrod and beggarweed. These areas provide a habitat that attracts wild turkey, ruffed grouse,

woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon and bobcat. Wetland wildlife attracted to the lowlands along Bull Creek and Lake Taneycomo include ducks, geese, herons, shore birds, muskrat, mink and beaver.

After the construction of the Table Rock Dam the cooler temperatures in Lake Taneycomo were ideal for a cold water fish hatchery. To take advantage of this the Missouri Department of Conservation developed the Shepherd of the Hills Trout hatchery at the base of the dam. Today the abundance of rainbow and brown trout in Lake Taneycomo provide some of the best trout fishing anywhere in the world.

## Climate

Rockaway Beach falls within a humid continental, warm summer climatic region. Humid continental climate region characteristics include; coldest month below 32°F, warmest month above 71.6°F and rainfall all through the year. The mean annual air temperature at the Ozark Beach weather monitoring station over the past thirty years has been about 56°F. Average temperature in the winter months is nearly 35°F with average summer temperatures of 89.5°F. The climate in Rockaway Beach is characterized by strong storm events that can produce heavy rain, snow, high wind, hail, ice, lightning, tornadoes and riverine and flash flooding. Consideration to lessening damage to people and property resulting from natural hazard events should be incorporated into land use development and building codes.

## Environmental Quality Objectives and Strategies

### **Objective 4.1:**

**Develop a stormwater management system, which minimizes pollution and erosion.**

#### Strategy 4.1.1:

Review existing regulations and incorporate sound storm water management principles into the zoning ordinance, land development regulations, and site review process.

#### Strategy 4.1.2

Revise codes to encourage the use of permeable pavers and surfaces in the development of parking lots, driveways and walkways in the city.

#### Strategy 4.1.3

Require development on slopes necessitating cut and fill techniques include retaining walls to reduce erosion of fill material.

Strategy 4.1.4

Development on excessive slopes, generally greater than 15%, should be discouraged or limited to low intensity uses.

Strategy 4.1.5

The city should work with Taney County to ensure the coordination of stormwater runoff regulations.

Strategy 4.1.6:

Explore developing a system of check dams in open graded ditches in rights of way to improve storm water management.

Strategy 4.1.7

Work on a regional level to ensure that pollution of area lakes, rivers and streams in the Silver Creek and Bull Creek sub basins of the Bull Shoals watershed is eliminated.

**Objective 4.2:**

**Maintain an efficient wastewater treatment system that meets the needs of existing and future growth and protects the water quality of Lake Taneycomo.**

Strategy 4.2.1:

New development should only be permitted if there is sufficient sewer service capacity.

Strategy 4.2.2:

Development should be approved only if the development assumes the cost of system improvements and maintenance when and if the city is unable to provide expansion of the system.

Strategy 4.2.3:

Ensure that the treatment facility functions properly and will not discharge untreated wastewater during flash flooding and heavy rains.

**Objective 4.3:**

**Accommodate desired growth and development while preserving the natural character of the area.**

Strategy 4.3.1:

Preserve natural areas that are functionally important to the regional ecology and for their contribution to the visual character of the city.

Strategy 4.3.2:

Specify and work towards maintaining a percentage of tree coverage in the city that enhances and promotes resource conservation and the natural beauty of the area.

Strategy 4.3.3:

Identify historic and landmark trees with community participation and take steps to preserve them.

Strategy 4.3.4:

Consider and review landscape credits given for the preservation of existing trees and vegetation to reduce erosion and sedimentation.

**Objective 4.4:**

**Establish resilience to environmental threats to people and property.**

Strategy 4.4.1:

Take any sustained action to reduce or eliminate long-term risk to people and property from natural hazards and their effects.

Strategy 4.4.2:

Floodways and drainage ways should be preserved in their natural state.

Strategy 4.4.3:

Restrict the occupancy of flood hazard areas by uses vulnerable to floods, hazardous to others, inadequately elevated, or otherwise unprotected from flood damages.

Strategy 4.4.4:

Amend or adopt updated building codes that incorporate disaster mitigation standards, such as requiring roof tie downs or hurricane straps to mitigate damage from high wind and tornado events.