

CHAPTER FOUR ENVIRONMENTAL DESIGN

INTRODUCTION

The physical geography of an area affects the amount, type, and direction of development. Natural factors such as climate, topography, geology, hydrology and soils are important because they influence the costs of construction and are determining factors in assessing an area's suitability for a given type of development or use. The purpose of this comprehensive plan element is the identification of environmental resources and the assessment of developmental impacts on these resources.

Rapid growth and development can have dramatic and long-term adverse effects on the physical and social environment. As Bullitt County continues to grow, many environmental issues will continue to arise. Issues such as water quality, air quality, noise and light pollution, increased storm water runoff, and decreased open space can combine to affect the overall quality of life for residents. The depletion of natural features such as wooded hillsides, scenic valleys, rivers, creeks, and open fields will become increasingly important as residents realize that these elements contribute to the unique character of an area and are unrecoverable once a parcel of land is developed. In addition, these types of amenities also provide less visible qualities, such as cleaner air, recreational areas and wildlife habitat, all of which are equally important to the community.

LOCATION

Bullitt County, located in north central Kentucky immediately south of Louisville, has an area of approximately 300 square miles and is ranked 37th out of 120 counties in terms of land area. The Salt River and its tributaries, the Rolling Fork and Floyd's Fork drain to the west and empty into the Ohio River at West Point in Hardin County. The county contains Knob State Forest, the Bernheim Arboretum and Forest and ten lakes including, Jim Beam Lake, Duck Lake, and Ben-

Bullitt County



nett Lake. The City of Shepherdsville is the county seat and is located along I-65 near the center of the county.

CLIMATE

The climate in Bullitt County is temperate and humid. Prevailing wind direction is from the south-southwest. The most common severe weather conditions are in the form of thunderstorms, which can bring heavy flooding along the rivers and creeks. Data from the Spatial Hazard Events and Losses Database (SHELDUS, Version 10.1) at the University of South Carolina states that twenty-three floods/flash floods have occurred in the county since 1970. Tornadoes are the most devastating severe weather condition occurring in the area. Tornadoes can occur almost anywhere in Kentucky and in any terrain, hilltop or valley bottom. Since 1970, seven tornadoes have touched down in Bullitt County. Severe storms can occur in any month but are most frequent from March to July. These storms may produce damaging winds and hail. There have been nineteen incidents of hail since 1970.

Long term climatological data for the county is available from a Shepherdsville Weather Station (ID: GH#CND, USC00157334, SHEPHERDSVILLE 5 NE, KY US) and the Bernheim Forest Weather Station (ID: GHCND:USC00150630, BERNHEIM FOREST, KY US). Weather data is available from these station's from the year 1948 to 2013. The coldest days occur in January when the average monthly temperature is 38.3 degrees F. The warmest days occur in July with an average monthly temperature of 82.6 degrees F. During the period from April to November, an average of 19 days will have a maximum temperature of 90 degrees F or higher. The minimum temperature is expected to be 32 degrees F or less for an average of 33 days from December through March. The coldest temperature on record is -24 degrees F on January 20, 1994. The hottest recorded temperature was 106 degrees F on July 9, 1988.

Precipitation averages 44.9 inches annually. Records indicate that April tends to be the wettest month and August the driest. Precipitation is generally evenly distributed throughout the year. An average of seventeen days per year will have precipitation of one inch or more.

PHYSIOGRAPHY AND GEOLOGY

The physiographic regions of Kentucky are shown in Figure 4-1. Most of Bullitt County is located in the Knobs physiographic region (shown in dark-green) with the northeast tip of the county in the Outer Bluegrass region. The Knobs region is characterized by conical shaped hills and long, narrow sloping ridges in the south-east and vey steep hillsides in the western part of the county. The Outer Bluegrass is characterized by deep valleys, with flat land. The bedrock in this area is mostly composed of Ordovician limestone and shale that are easily eroded.

FIGURE 4-1

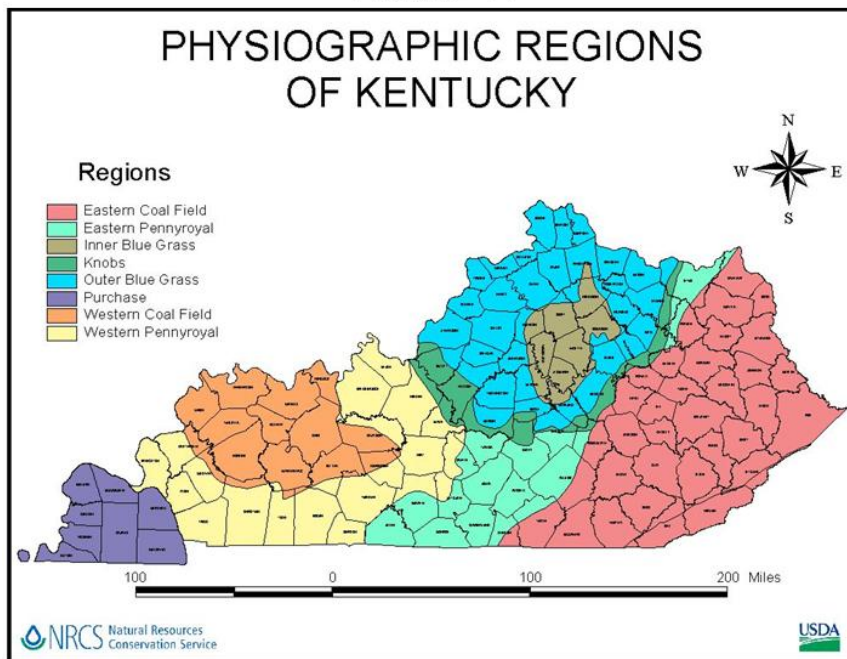


Figure 4-3 is a generalized geologic map of Bullitt County Kentucky prepared by the Kentucky Geologic Survey. According to the geologic map sink holes occur mostly in north central Bullitt County near Hillview and north east Bullitt County near Mt. Washington. Sink holes can also be found in Lebanon Junction and the north western edge of the county. The construction implications of these features must be addressed before any type of development occurs. Bullitt County is underlain by rocks from the Mississippian, Devonian, Silurian, Ordovician and Quaternary age. Alluvium (Quaternary age) is deposited along the western border of the county on the bottom of the Salt River. Big Clifty Sandstone (Upper Missis-

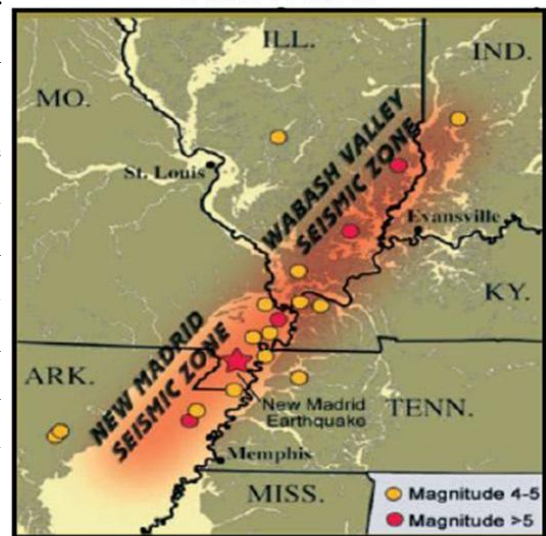
Bullitt County



sippian age) can be found in eastern Bullitt County near Mount Washington. The Louisville Limestone (Silurian age) can be found in the central-north region near Hillview. The primary formations found within the county are limestone and shale. Limestone occurs throughout the county whereas interbedded clay shales, siltstones and sandstones of the Borden Formation (Lower Mississippian age) occur primarily in the north-west and central sections of the county. The New Albany Shale, also called black shale, formed during the Devonian age can be found in the central region near Blue Lick Creek.

The faults zones that lie near Bullitt County include New Madrid fault and the Wabash Valley fault. The fault zones are formed along the edges of a broad rift or crack in the Earth's crust that occurs deep beneath the surface. The New Madrid Seismic zone shown in Figure 4-2 is located in central Mississippi Valley bordered on the north by the Ohio and Mississippi Rivers. The zone runs southwest, through eastern Missouri and western Tennessee and ends in northern Arkansas. The Wabash Valley fault zone shown extends north to southeastern Illinois, west to southwestern Indiana (near Indianapolis) and east into parts of northwest Kentucky.

FIGURE 4-2
SEISMIC ZONES

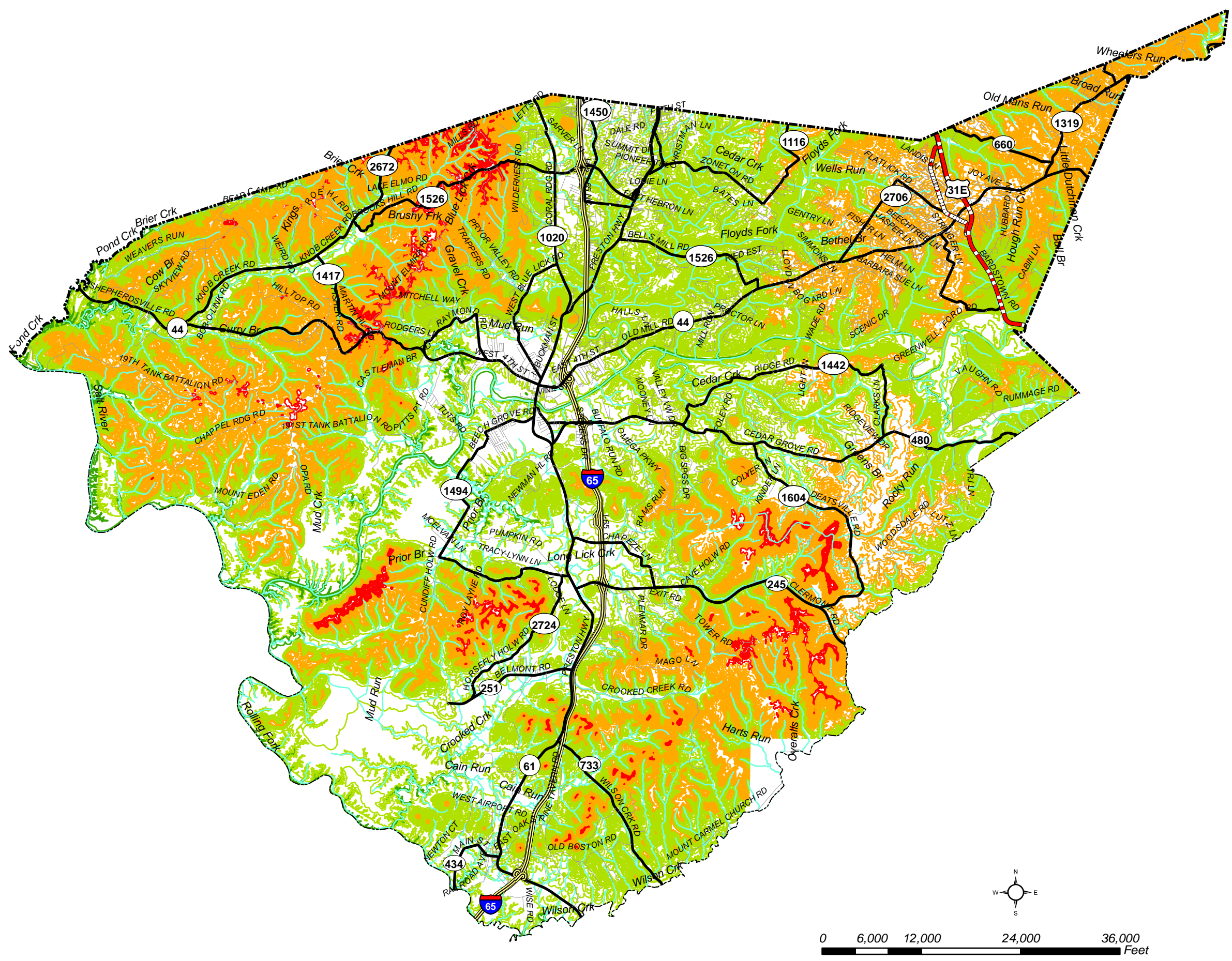


Source: KIPDA "Regional Hazard Mitigation Plan." 2011

The topography and elevation in Bullitt County is shown in Figure 4-4. Figure 4-5 shows the location of known mineral resources in the county. There are various types of mineral resources in Bullitt County which include but are not limited to gas and oil wells, above and below ground mines for Rock Quarrying, Artesian Springs, Sand Pits, Shale Pits and any other type of operation that would fit in an EPA and EPB Zone. According to the Kentucky Geological Survey, there are 74 oil and gas wells within Bullitt County. A well is abandoned when it reaches the

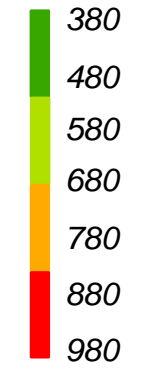
FIGURE 4-4 BULLITT COUNTY TOPOGRAPHIC MAP






2015 Comprehensive Plan
Bullitt County, Kentucky



LEGEND

Elevation (20 ft Contour)



-  Local Roads
-  State Routes
-  US Routes
-  I-65
-  Bullitt County

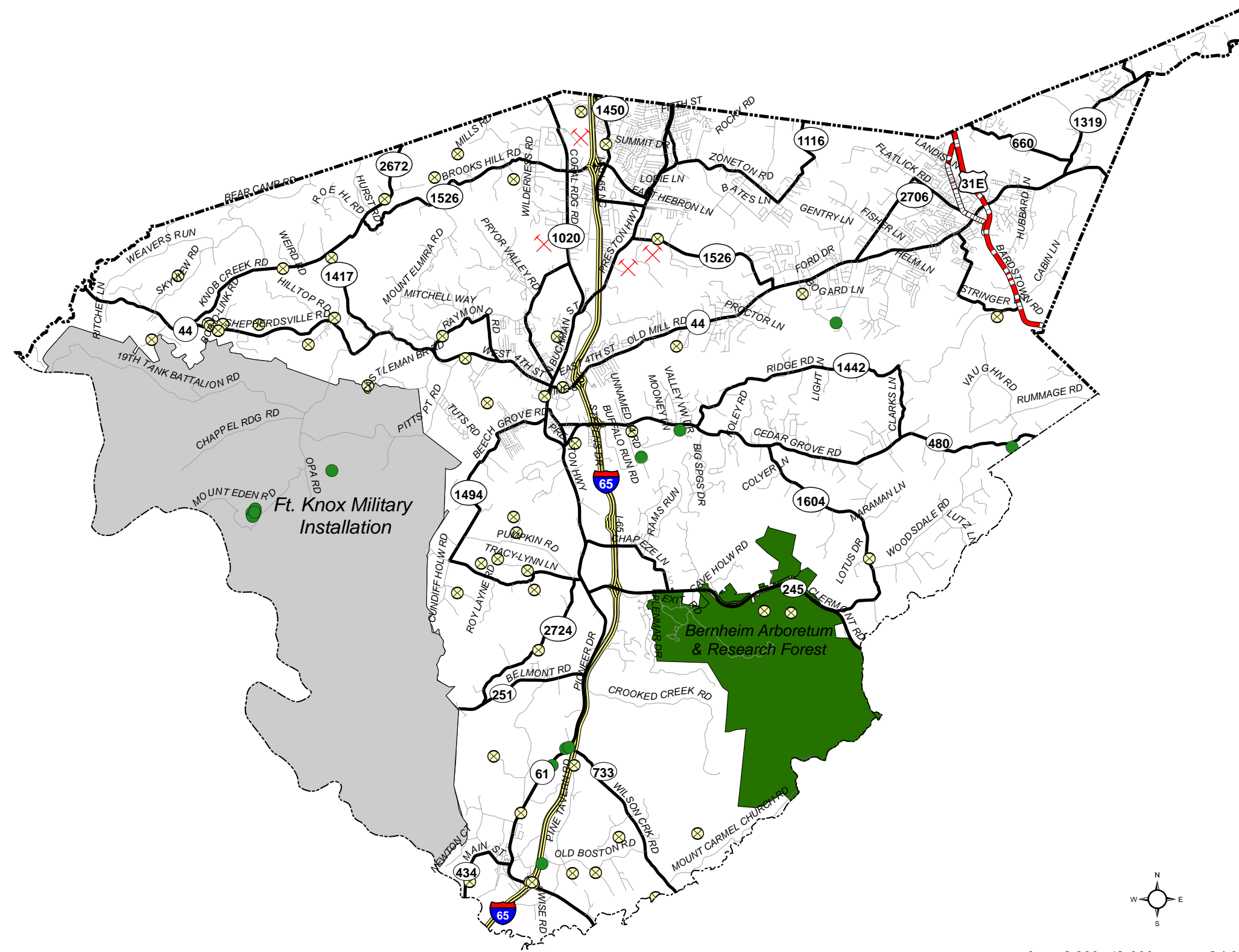
MAP INFORMATION

Data Sources:
Kentucky Division of Geographic Information
Kentuckiana Regional Planning
& Development Agency
2012 US Census TIGER Line Data

Cartography by:
Nikita Moye

FIGURE 4-5 BULLITT COUNTY MINERAL RESOURCES

2015 Comprehensive Plan
Bullitt County, Kentucky



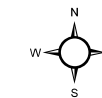
LEGEND

- Oil & Gas Wells
- ⊗ Dry & Abandoned Well
- ✕ Rock Quarry
- Water
- Local Roads
- State Routes
- US Routes
- I-65
- Military
- Parks & Recreation
- Bullitt County

MAP INFORMATION

Data Sources:
April, 2006 KY Geologic Survey,
University of Kentucky
Kentuckiana Regional Planning
& Development Agency
2012 U.S. Census TIGER Line Data

Cartography by:
Nikita Moye



0 6,000 12,000 24,000
Feet

end of its useful life or is a dry hole. At this point, there is nothing visible on the surface or on the site to indicate the presence of an abandoned well. The Kentucky Department for Natural Resources has established well abandonment procedures that ensure public safety. There are no coal exploration sites Bullitt County.

SOILS

Detailed soil information and general soil maps can be found in the Soil Survey of Bullitt County, Kentucky published by the U.S. Department of Agriculture, Natural Resource Conservation Service. The general soil map found in the Soil Survey shows that there are seven soil associations in Bullitt County as described below. More specific soil information is shown on Figure 4-6 which show soils series for the county.

Soil associations are generalized groupings of similar soils with common relief and drainage patterns. While specific soil information must be consulted to determine the suitability of a particular site for various land uses, the associations can provide information for general planning purposes. The following paragraphs summarize the seven associations found within Bullitt County.

NOLIN-OTWELL-SENSABAUGH- The Nolin-Otwell-Sensabaugh soil association is found on the western edge of Bullitt County. Formed on floodplains, foot slopes, and along major streams, these soils are deep, well drained and have moderate and moderately rapid permeability. General woodlands are the primary land uses of this soil association. Soils in this association are most suited for woodland. The hazard of flooding is the main limitation for urban uses.

GARMON-CRIDER - The Garmon-Crider soil association is very steep to gently sloping, located in north-west Bullitt County, primarily in the Fort Knox Military Reservation. Formed on hillsides and ridgetops it tends to be moderately deep with well drained soils that are mainly loamy throughout. Farmland is the primary use of this soil with a few small communities and housing units. Due to the steepness of slope, soils located on hillsides are poorly suited for urban use. Soils located on ridgetops are most suited for urban uses.

Bullitt County



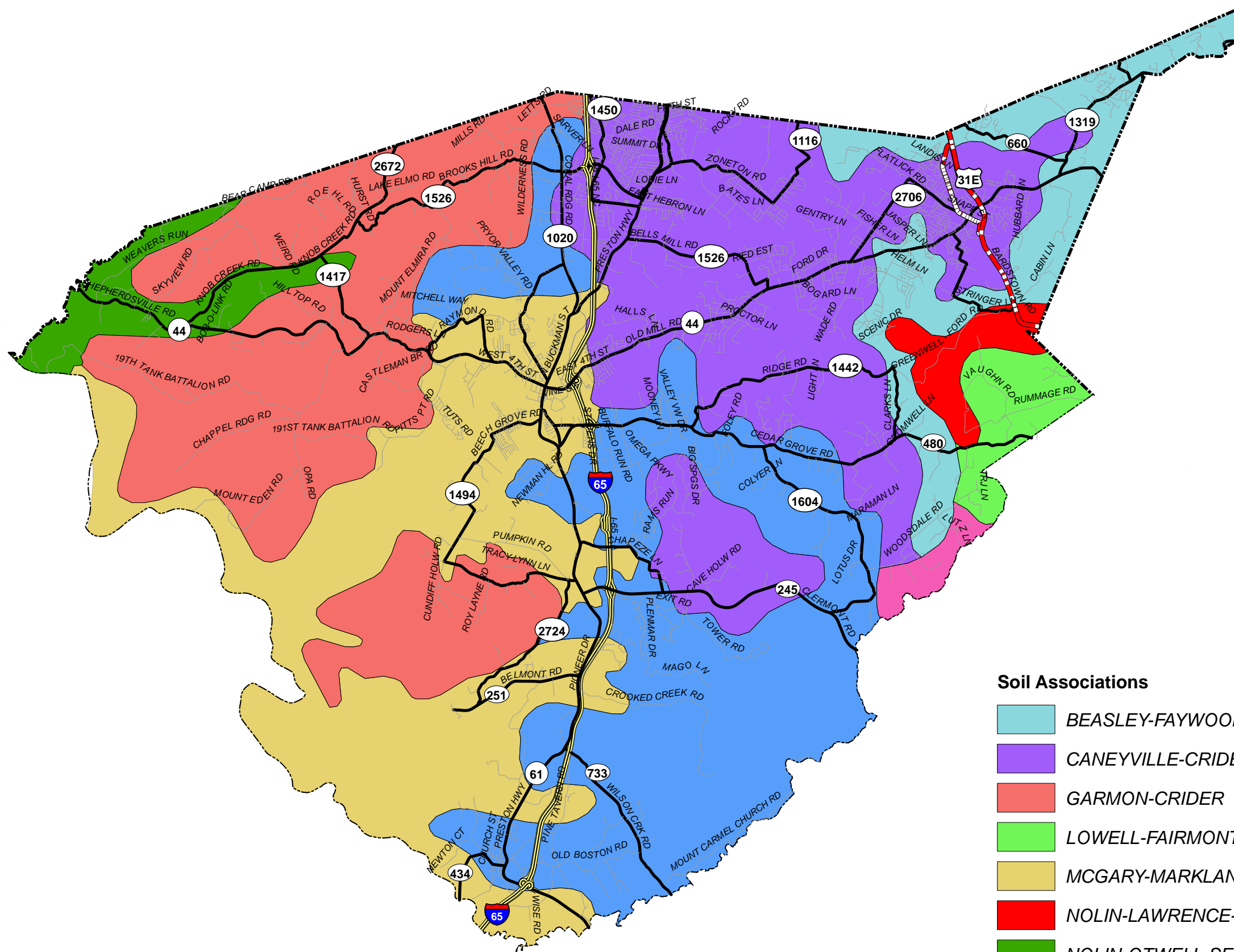
MCGARY-MARKLAND - The McGary-Markland soil association contains nearly level to steep soil found on stream terraces. These poorly drained to well drained soils that have a clayey subsoil, and are found in central and west Bullitt County, in the Fort Knox Military Reservation, and in part of Shepherdsville and Lebanon Junction. About a 18% of Bullitt County is covered by this soil association and it is primarily used for urban development. The soils in this association are poorly suited for most urban uses. Very slow permeability and the hazard of flooding are the main limitations to most urban uses.

ROCKCASTLE-COLYER-TRAPPIST- The Rockcastle-Colyer-Trappist soil association is located on hillsides and ridgetops. These shallow, excessively drained, strongly sloping to steep soils have a fined textured to moderately fine textured subsoil. Located in south-east and north Bullitt County this soil association covers 23% of the county. Most of the acreage found in this soil association is wooded. The soils in forested areas are well suited to woodland and wildlife habitat. This soil association is not suited for most urban uses due to the danger of slippage in the unstable clay shales and the steepness of slope.






CANEYVILLE-CRIDER - The Caneyville-Crider soil association is gently sloping to very steep. It is located in north-west Bullitt County in parts of Hillview, Fox Chase, Hebron Estates, Pioneer Village and Mount Washington. Formed on hillsides and ridgetops it tends to be moderately deep and deep with well drained soils that have clayey and loamy subsoil. This soil association makes up 26% of the county with urban development being the primary land use of the soil. Most of the gently sloping and sloping soils in this association are suitable for urban uses. The moderately slow permeability of the subsoil and depth to bedrock are limitations in some areas.

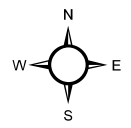
BEASLEY-FAYWOOD - The Beasley-Faywood soil association contains gently sloping to very steep soil found on hillsides and ridgetops. These deep to moderately deep well drained soils have a clayey subsoil. They are found in the western edge of north Bullitt County and in parts of Mount Washington. About seven per-

**FIGURE 4-6
BULLITT COUNTY
GENERAL SOILS
MAP**
2015 Comprehensive Plan
Bullitt County, Kentucky












LEGEND

-  Local Roads
-  State Routes
-  US Routes
-  I-65
-  Bullitt County



Soil Associations

-  BEASLEY-FAYWOOD
-  CANEYVILLE-CRIDER
-  GARMON-CRIDER
-  LOWELL-FAIRMONT-SHELBYVILLE
-  MCGARY-MARKLAND
-  NOLIN-LAWRENCE-NEWARK
-  NOLIN-OTWELL-SENSABAUGH
-  PEMBROKE-BEASLEY-CORYDON
-  ROCKCASTLE-COLYER-TRAPPIST

MAP INFORMATION

Data Sources:
Natural Resources Conservation Services (NRCS)
Kentuckiana Regional Planning
& Development Agency
2012 U.S. Census TIGER Line Data

Cartography by:
Nikita Moye

cent of Bullitt County is covered by this soil association. It is primarily used for urban development with some pasture. Most soils in this association are poorly suited for urban use due to the steepness of slope, depth of bedrock, and the moderately slow to slow permeability. The gently sloped hills are suited for some urban uses.

NOLIN-LAWRENCE-NEWARK- The Nolin-Lawrence-Newark soil association is located on floodplains and low stream terraces. These nearly level, deep well drained and somewhat poorly drained soils are loamy throughout. Located along the Salt River and Cox Creek in east Bullitt County, this soil association covers one percent of the county. Most of the land with this soil is woodland with some residential. This soil association is not suited for most urban uses due to wetness and the hazard of flooding. Most of the soil in this association is suited to cultivated crops.

LOWELL-FAIRMONT-SHELBYVILLE- The Lowell-Fairmont-Shelbyville soil association is located on ridgetops and shoulder slopes. These deep well drained soils have moderately slow permeability. Most of the land with this soil is woodland with some residential and can be found on eastern tip of Bullitt County. Most of the soil in this association is suited to cultivated crops. This soil association is not suited for most urban uses due to the hazard of erosion and shallow soil depths.

PEMBROKE-BEASLEY-SORYDON- The Pembroke-Beasley-Corydon association has deep to shallow well drained to somewhat excessively drained soils. They range from nearly level to moderately steep slopes. The land with this soil is woodland and is found on the eastern tip of Bullitt County near Bernheim Forest. This soil is most suited for raising livestock and farming enterprise. This soil association is not suited for most urban uses due to erosion hazards.

Bullitt County



PRIME FARMLAND SOILS

According to the U.S. Department of Agriculture, Natural Resource Conservation Service, prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. Prime farmland can be cropland, pastureland, rangeland, forest land or land other than those used for urban purposes or covered with water. Prime farmland has the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time. They either do not flood frequently or are protected from flooding. The following soils found in Bullitt County are considered to be potential prime farmland soils:

Symbol	Name	
BeB	Beasley Silt Loam	2-6 percent slopes
Bo	Boonesboro Silt Loam	
CaB	Caneyville Silt Loam	2 to 6 percent slopes
CrB	Crider Silt Loam	2 to 6 percent slopes
EkA	Elk Silt Loam	0 to 2 percent slopes
EkB	Elk Silt Loam	2 to 6 percent slopes
	2 to 6 percent	
EIA	Elk Silt Loam	0 to 2 percent slopes
EIB	Elk Silt Loam	2 to 6 percent slopes
La	Lawrence Silt Loam	(1)
Le	Lawrence Silt Loam	(1)
LoB	Lowell Silt Loam	2 to 6 percent slopes
MaB	Markland Silt Loam	2 to 6 percent slopes
Mc	McGary Silt Loam	(1)
Mv	McGary Variant Silt Loam	(1)
Mo	Montgomery Silty Clay Loam	(1)
Ne	Newark Silt Loam	(1, 2)

List of potential prime farmland soils continued on page 4-15.

Symbol	Name	
NhA	Nicholson Silt Loam	0 to 2 percent slopes
NhB	Nicholson Silt Loam	2 to 6 percent slopes
No	Nolin Silt Loam	2 to 6 percent slopes
OtA	Otwell Silt Loam	0 to 2 percent slopes
OtB	Otwell Silt Loam	2 to 6 percent slopes
OwB	Otwell Silt Loam	2 to 6 percent slopes
Sg	Sensabaugh Gravelly Loam	
ShB	Shelbyville Silt Loam	2 to 6 percent slopes
WoB	Woolper Silty Clay Loam	2 to 6 percent slopes
ZaB	Zanesville Silt Loam	2 to 6 percent slopes

1) Prime farmland if drained properly.

2) Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season.

In addition to prime farmland the Soil Conservation Service has also identified farmlands of statewide importance. This is land that is of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Generally, farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high of a yield as prime farmlands when conditions are favorable. The following soils found in Bullitt County may indicate farmland of statewide importance:

Symbol	Name	
BeC	Beasley Silt Loam	6 to 12 percent slopes
CaC	Caneyville Silt Loam	6 to 12 percent slopes
CrC	Crider Silt Loam	6 to 12 percent slopes
EkC	Elk Silt Loam	6 to 12 percent slopes
FaC	Faywood Silt Loam	6 to 12 percent slopes
HaC	Hagerstown Silt Loam	6 to 12 percent slopes
LoC	Lowell Silt Loam	6 to 12 percent slopes
NhC	Nicholson Silt Loam	6 to 12 percent slopes
OtC	Otwell Silt Loam	6 to 12 percent slopes
WoC	Woolper Silty Clay Loam	6 to 12 percent slopes
ZaC	Zanesville Silt Loam	6 to 12 percent slopes

Bullitt County



SLOPES

Virtually flat land can be used for intensive activity, while slopes in excess of 20 percent present limitations unless efficient adjustment occurs. Residential development can take place on sites utilizing land that industrial development must forego if adjusted. The location and concentration of slopes in the form of hills, ridges, valleys and plains can force development into large clusters or break it up into dispersed patterns. Bullitt County's topography has structured the form of its small communities and guided the location of major transportation routes. The suitability of different degrees of unadjusted slope for development is shown in Table 4-1. Figure 4-4 shows the topography of Bullitt County. Testing for slope stability should be considered before any type of development takes place.

Visual indications of unstable slopes include previous slides or slumps, cracking of the top of the slope, tilting of fences, retaining walls, utility poles or trees, new cracks in foundations and sidewalks and slowly developing and widening cracks in the ground or paved areas.

Development of unadjusted steep slopes can accelerate erosion, increase runoff, and decrease the volume of water absorbed and filtered as groundwater. Damage to buildings and other man made structures can occur on unstable slopes. Commercial and industrial development should be restricted on unadjusted slopes steeper than 12%. Developers of residential property on such slopes should be required to meet standards of efficient techniques. In certain instances, the planning commission should consider requiring the submittal of geotechnical reports prior to approving a site plan or subdivision plat on land with excessive slopes.

Table 4-1

Unadjusted Slope Suitability for Urban Development

Limitations	Suitability Rating	Residential	Commercial	Industrial Park
Slight	Optimum	0-6%	0-6%	0-2%
Moderate	Satisfactory	6-12%	6-12%	2-6%
Severe	Marginal	12-18%	12-18%	6-12%
Very Severe	Unsatisfactory	18%+	18%+	12%+

Source: Kiefer, Ralph W., "Terrain Analysis for Metropolitan Area Planning," Journal of the Urban Planning Division. Proceedings of the American Society of Civil Engineers. Dec, 1967.

FLOODPLAINS

Floodplains are low lying areas that are susceptible to flooding. Bullitt County has areas that have been officially designated by the Federal Emergency Management Agency (FEMA) as flood hazard areas. Bullitt County's effective Flood Insurance Rate Maps (FIRMs) displayed in Figure 8-1 are dated December, 16 2004. The effective FIRM maps are available in PDF and GIS format from FEMA. According to the KY Division of Water, the revised preliminary FIRMs were sent to the communities within Bullitt County on October 25, 2013. As final updated maps were not expected to be available in the near future, they are not included in this plan.

The Floodplain Ordinance for Bullitt County was adopted in December, 2004. Hillview, Shepherdsville, Lebanon Junction and Pioneer Village are the only cities within the County that currently participate in the flood management program. Shepherdsville Floodplain Coordinator is the Deputy City Clerk. Hillview adopted their Floodplain Ordinance in November, 2005 and the Coordinator the City Clerk. Lebanon Junction adopted their Floodplain Ordinance in October, 1989 and the Coordinator is the City Clerk. The Bullitt County Planning and Zoning Director is the Floodplain Coordinator for Bullitt County and Pioneer Village.

Figure 8-1 shows the location of flood hazard areas in Bullitt County, which run parallel to the creeks and rivers. Table 4-2 identifies the percentage of the city that is located within the floodplain. Subdivision or other higher intensity uses can increase flooding if proper storm water management techniques are not implemented during the planning and development process. Watersheds can also be impaired from improper sewage treatment and storm water run-off.

Bullitt County



TABLE 4-2
% OF AREA IMPACT

CITY	% IN FLOODPLAIN
Fox Chase	9.35%
Hebron Estate	1.84%
Hillview	5.21%
Hunters Hollow	0.00%
Lebanon Junction	39.82%
Mt. Washington	0.59%
Pioneer Village	1.72%
Shepherdsville	64.75%

Source: KIPDA "Regional Hazard Mitigation Plan: 2011"

According to the 2004 Flood Insurance Study, major floods have occurred in Bullitt County in January 1937, May 1961, March 1964, and March 1997. "The maximum flood stage recorded was that of the 1937 flood, which reached an elevation of 453.88 feet National Geodetic Vertical Datum of 1929 (NGVD) in Shepherdsville. The May 1961 flood reached an elevation of 447.42 feet NGVD, the March 1964 flood crested at 448.08 feet NGVD, and the March 1997 flood crested at 447.50 feet NGVD. The most recent flood in Bullitt County occurred in April 2011, and reached an elevation of 436.67 feet NGVD. These elevations were recorded at the State Highway 61 gaging station at the Salt River." (Flood Insurance Study, 2004)

SUPERFUND SITES

In 1980 Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments & Reauthorization Act (SARA), better known as Superfund. Superfund is EPA's program to identify, investigate and clean up uncontrolled or abandoned hazardous waste sites throughout the United States. There are currently three identified EPA Superfund sites in Bullitt County as listed below.

Tri-City Disposal Company

Location: KY 1526, Shepherdsville, KY

Affected Media: Ground water, Soil, Surface Water

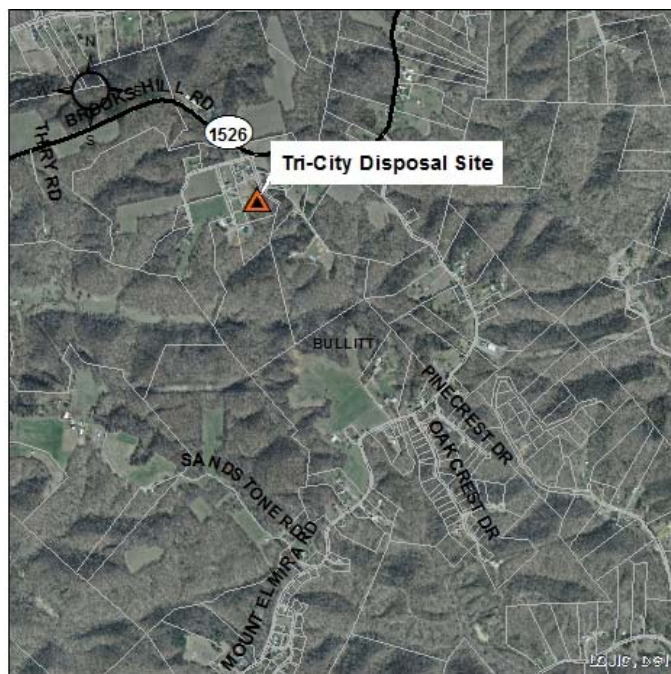
Cleanup Status: Construction Complete - physical cleanup activities have been completed.

Human Exposure Under Control: EPA is working to determine

Groundwater Migration Under Control: There is insufficient data to determine

Sitewide Ready for Anticipated Use: No

The 349 acre site includes a 57-acre landfill and several residential properties. From 1964 to 1967, the Tri-City Disposal Company operated a landfill at the site. The company disposed of highly volatile liquid wastes, lumber scraps and fiberglass insulation materials from various Louisville area industries at the on-site landfill. EPA placed the site on the National Priorities List (NPL) in 1989 because of contaminated ground water, soil and surface water resulting from landfill operations. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) have investigated site conditions and taken steps to clean up the site in order to protect people and the environment from contamination.



Bullitt County



Environmental Design

Smith's Farm

Location: Pryor Valley Rd., Brooks, KY

Affected Media: Ground water, Leachate, Sediment, Soil, Surface water

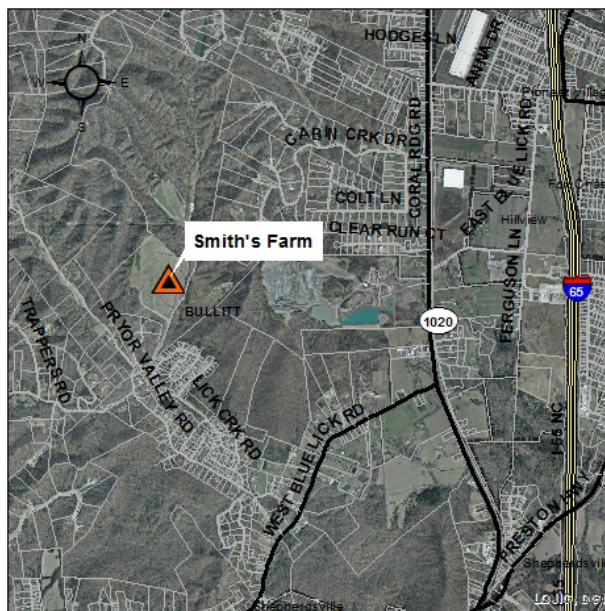
Cleanup Status: Construction complete - physical cleanup activities have been completed

Human Exposure Under Control: Yes

Groundwater Migration Under Control: NA

Sitewide Ready for Anticipated Use: Yes

The Smith's Farm site includes both an uncontrolled dump that received industrial waste from around the 1940s until the 1970s and an industrial landfill operated until 1989. The site originally included an 80-acre unpermitted former drum disposal area; a 40-acre formerly permitted landfill; and several smaller, isolated disposal areas where unpermitted disposal of hazardous waste occurred over at least 30 years. EPA placed Smith's Farm on the National



Priorities List (NPL) in 1986 because of contaminated ground water, sediment, soil, and surface water resulting from waste disposal activities at the site. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) have investigated site conditions and taken steps to clean up the site in order to protect people and the environment from contamination. Site contamination does not currently threaten people living and working near the site.

A.L. Taylor (Valley of the Drums)

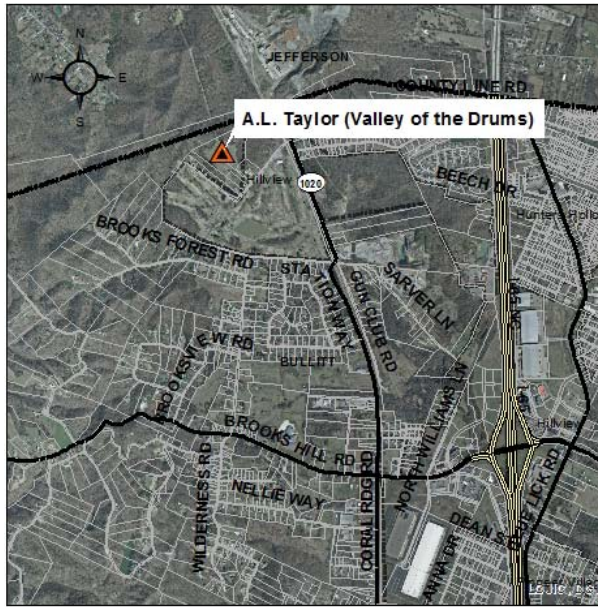
Location: KY 1020, Brooks, KY

Affected Media: Ground water, Soil, Surface water

Cleanup Status: Deleted from the National Priorities List (NPL)

Human Exposure Under Control: Yes

The A.L. Taylor site was used for a waste disposal operation from 1967 to 1977. The owner dug up pits on site and emptied the contents of waste drums from area paint and coating industries into the pits before recycling the drums. After the Commonwealth of Kentucky stopped the owner from burying solvents, the site owner used soil from the nearby hillsides to cover the disposal pits. In addition, the owner stored thousands of drums on site, especially during the later years



of site operations. The owner received and disposed of waste at the site until 1977. EPA placed the site on the National Priorities List (NPL) in 1983 because of contaminated ground water, soil and surface water resulting from waste handling practices. EPA, the Kentucky Department for Environmental Protection (KDEP) and the site's potentially responsible parties (PRPs) investigated site conditions and took steps to clean up the site in order to protect people and the environment from contamination. Site contamination does not currently threaten people living and working near the site.

AIR QUALITY

Air quality is monitored by the Division of Air Quality Control of the Kentucky Natural Resources and Environmental Protection Cabinet, Department for Environmental Protection. The "Kentucky Ambient Air Quality Report" which is produced by the Technical Services Branch of the Kentucky Division of Air Quality is issued annually. The last report issued summarizes statistical results of monitoring conducted during the year 2007 to measure outdoor concentrations of air pollutants in the Commonwealth. The primary source of data for the report is the Air Quality Surveillance Network operated by the Kentucky Division for Air Quality which has operated an air quality monitoring network since July 1967.

Bullitt County



Bullitt County is located within the Appalachian Intrastate North Central Kentucky Intrastate Air Quality Control Region which includes the following 14 counties: Bullitt, Breckinridge, Grayson, Hardin, Henry, Larue, Marion, Meade, Nelson, Oldham, Shelby, Spencer, Trimble and Washington. In 2007, the Air Quality Surveillance Network had three monitors in this area as follows:

LOCATION	AQS ID
2nd Carpenter St.- Shepherdsville, KY, Bullitt County	21-029-0006
801 N. Miles St. - Elizabethtown, KY, Hardin County	21-093-0006
DOT Garage, 3995 Morgan - Buckner, KY, Oldham County	21-185-0004

The Division of Air Quality also has an Air Quality Index (AQI) used for reporting daily air quality for the five major air pollutants regulated by the Clean Air Act: ground level, ozone, particulate pollution, carbon monoxide, sulfur dioxide, and nitrogen dioxide. An AQI value of 50 represents good air quality with little potential to affect public health while an AQI value over 300 represents hazardous air quality. An AQI value of 100 generally corresponds to the national air quality standard. Therefore, AQI values of 100 are generally satisfactory while values above 100 are considered to be unhealthy - at first for certain sensitive groups of people, then for everyone as AQI values get higher. As part of the 2007 Kentucky Ambient Air Quality Report, a map was generated showing the Air Quality Index for the number of days in which the AQI is above 100 for each county (if data is available). On this map, it shows that Bullitt County had 6-10 days above an AQI of 100.

NOISE

Excessive noise levels can impact the quality of life, health and safety. The most offensive noise is primarily created from air traffic, vehicles, railroad, military reservations, earth products and industrial uses. Transportation Corridors are primary sources. Mitigation requirements will be addressed.

As a portion of Fort Knox Military Reservation is located within Bullitt County, noise levels should be considered when new development is proposed. According to the 2008 "Fort Knox Joint Land Use Study" noise from blasting extends off the Fort Knox military installation along the eastern and southeastern boundary

near the city of Lebanon Junction. Figure 4-7 illustrates the noise contours for the large caliber weapons. For the small caliber weapons peak noise levels must also be considered. Figure 4-8 illustrates the noise contours for small arms at Fort Knox. Exposure to noise within this area is severe and development within this area should be limited to activities such as industrial, manufacturing, transportation and resource production. Residential within the Noise II Zone should be prohibited.

The Louisville International Airport (KDFW) is the only large commercial airport within 15 miles of Bullitt County. Figure 4-9 illustrates the 2011 noise contours for KDFW. The Bluelick airport is the only airport within Bullitt County but it does not carry commercial traffic. Godman Army Airfield is located on Fort Knox on the west end near Muldraugh and is used exclusively for military aviation missions.

One primary highway of concern for noise in Bullitt County is Interstate 65 (I-65) which runs from north to south through the county. The 2011 average daily traffic count (ADT) at the north end of I-65 is between 76,935 and 91,625; and at the south end, the ADT is between 52,017 and 66,576. A preliminary noise analysis based on this ADT indicates that a site specific noise assessment should be conducted if any noise sensitive uses such as a residential use, hospital, nursing homes etc are proposed within 1000 feet of I-65 on the north end; 700 feet of I-65 on the south end. Other highways of concern are US 31-E, KY 44 and KY 61.

The CSX Railroad, which crosses Bullitt County from north to south is the only major railroad in Bullitt County. An average of 18 trains per day pass through the Bullitt County planning area. RJ Corman maintains a railroad line that runs from east to west from Belmont to Nelson County; this track has a limited amount of railroad traffic. (For more information on CSX see Chapter 7 Rail Transportation).

The main issues involved in any noise analysis are how much noise a site is exposed to, what types of activities are affected and what design or attenuation measures can be used to keep noise to an acceptable level. Outdoor noise levels are of greatest concern in residential areas especially at night when sleep is disrupted.

Bullitt County



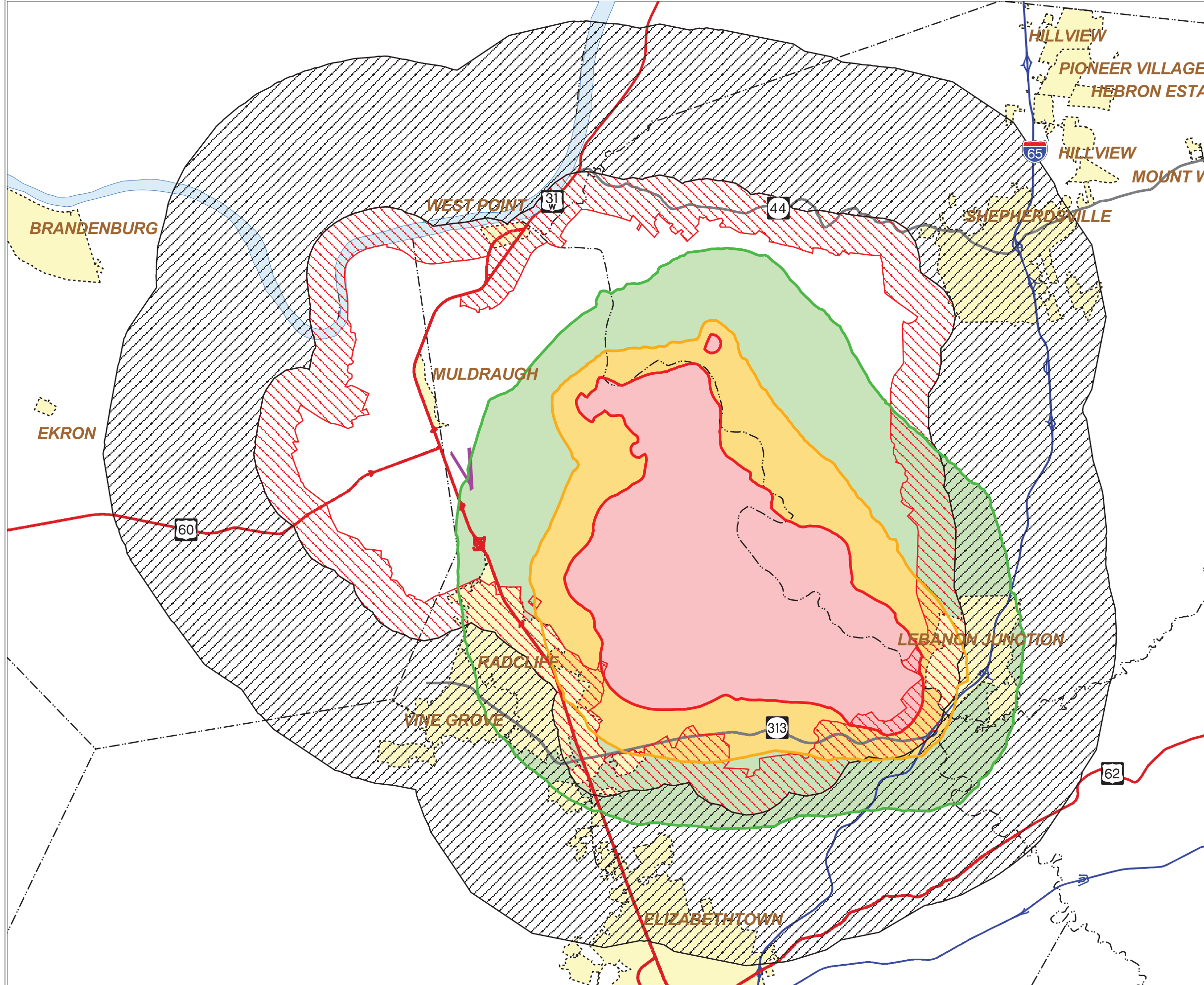
There are three basic way to mitigate high noise exposures. Relocating noise sensitive uses out of the high noise areas is the best and most desirable approach. A second mitigation approach is a noise barrier. Barriers can be actual walls, earthen mounds (called berms) or even other buildings. The barrier has to break the line of sight between the noise source and the noise sensitive use to be effective. The effectiveness of a noise barrier can be reduced by as much as 50% if the barrier is not long enough or tall enough to completely break the line of sight. The third noise mitigation approach is to incorporate noise attenuation measures into the building's themselves. This is not a desirable mitigation method because it leaves the outside areas of the building exposed to high noise levels. Noise attenuation measures incorporated into buildings include: sealing off leaks around windows, doors and vents; reducing the need for open windows by providing central air conditioning; locating windows away from the noise source; and designing exterior walls which attenuate noise.

ENDANGERED SPECIES

The primary concern for the impacts of development on plant and animal life is the effect on rare and endangered species. A total of five species of Federally listed Endangered species potentially exist in Bullitt County according to the Kentucky Department of Fish and Wildlife Resources. Of this number, three are mollusks (or freshwater mussels) and two are bats. In addition one plant species, the Kentucky glade cress has been proposed for listing as a federally threatened species. The species are listed in Table 4-3 as follows:

TABLE 4-3
BULLITT COUNTY ENDANGERED SPECIES

Endangered Species	Federal Status	State Status	Location
Gray Myotis Bat	Endangered	Threatened	Area cave or cave like habitats
Indiana Bat	Endangered	Endangered	Caves with 39-46 deg. f. temps.
Rink Pink Mussel	Endangered	Endangered	Area Rivers and Streams
Orangefoot Pimpleback Mussel	Endangered	Endangered	Area medium to large Rivers
Club Shell Mussel	Endangered	Endangered	Area Rivers and Streams



LEGEND

- Ft Knox Radius
 - 1 Mile
 - 5 Miles
- HIGHWAYS
 - US ROUTE
 - INTERSTATE/PARKWAY
 - State Route
- Airport
- COUNTY BOUNDARY
- Incorporated City
- CDNL (Decibels)
 - 57 LUP Zone
 - 62 Zone II
 - 70 Zone III

C-weighted Day-Night Level (CDNL)
 NOISE ZONES DESCRIPTIONS AND LAND USE GUIDELINES
 Day Night Level Descriptions.

(a) The Noise Zone III consists of the area around the source of the noise in which the level is greater than 70 decibels (dB). C-weighted day-night sound level (CDNL) for large caliber weapons. The noise level within Noise Zone III is considered so severe that noise-sensitive land uses should not be considered therein.

(b) The Noise Zone II consists of an area where the day-night sound level is between 62 and 70 dB CDNL for large caliber weapons. Exposure to noise within this area is considered significant, and use of land within Noise Zone II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. However, if the community determines that land in Noise Zone II areas must be used for residential purposes, then noise level reduction features of 25 to 30 decibels should be incorporated into the design and construction of the buildings.

(c) The Noise Zone I include all areas around a noise source in which the day-night sound level is less than 62 dB CDNL for large caliber weapons. This area is usually acceptable for all types of land use activities.

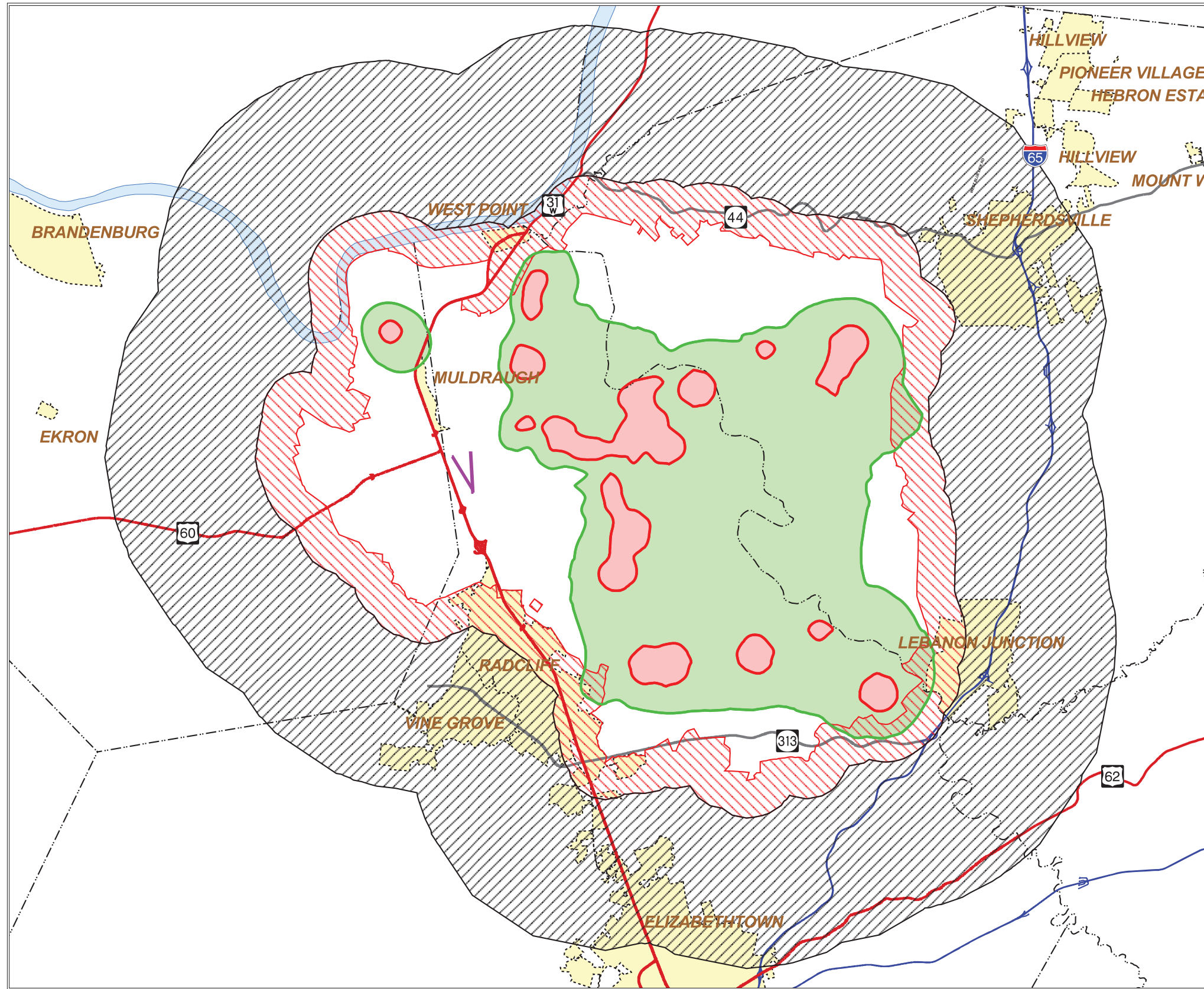
(d) The Land Use Planning Zone (LUPZ) DNL noise contours, 57 dB CDNL, represent an annual average that separates the Noise Zone II from the Noise Zone I. Taking all operations that occur over the year and dividing by the number of training days generates the contours. But, the noise environment varies daily and seasonally because operations are not consistent through all 365 days of the year. In addition, the Federal Interagency Committee on Urban Noise document states "Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider." For residential land uses, depending on attitudes and other factors, a 57 CDNL may be considered by the public as an impact on the community environment. In order to provide a planning tool that could be used to account for days of higher than average operations and possible annoyance, the LUPZ contour is being included on the noise contour maps.



FORT KNOX JOINT LANDUSE STUDY

Figure 4-7
 Noise Contours
 CDNL





LEGEND

Ft Knox Radius

- 1 Mile
- 5 Miles

HIGHWAYS

- US ROUTE
- INTERSTATE/PARKWAY
- State Route
- Airport
- COUNTY BOUNDARY
- Incorporated City

Small Arms PK15 (decibels)

- 87 Zone II
- 104 Zone III

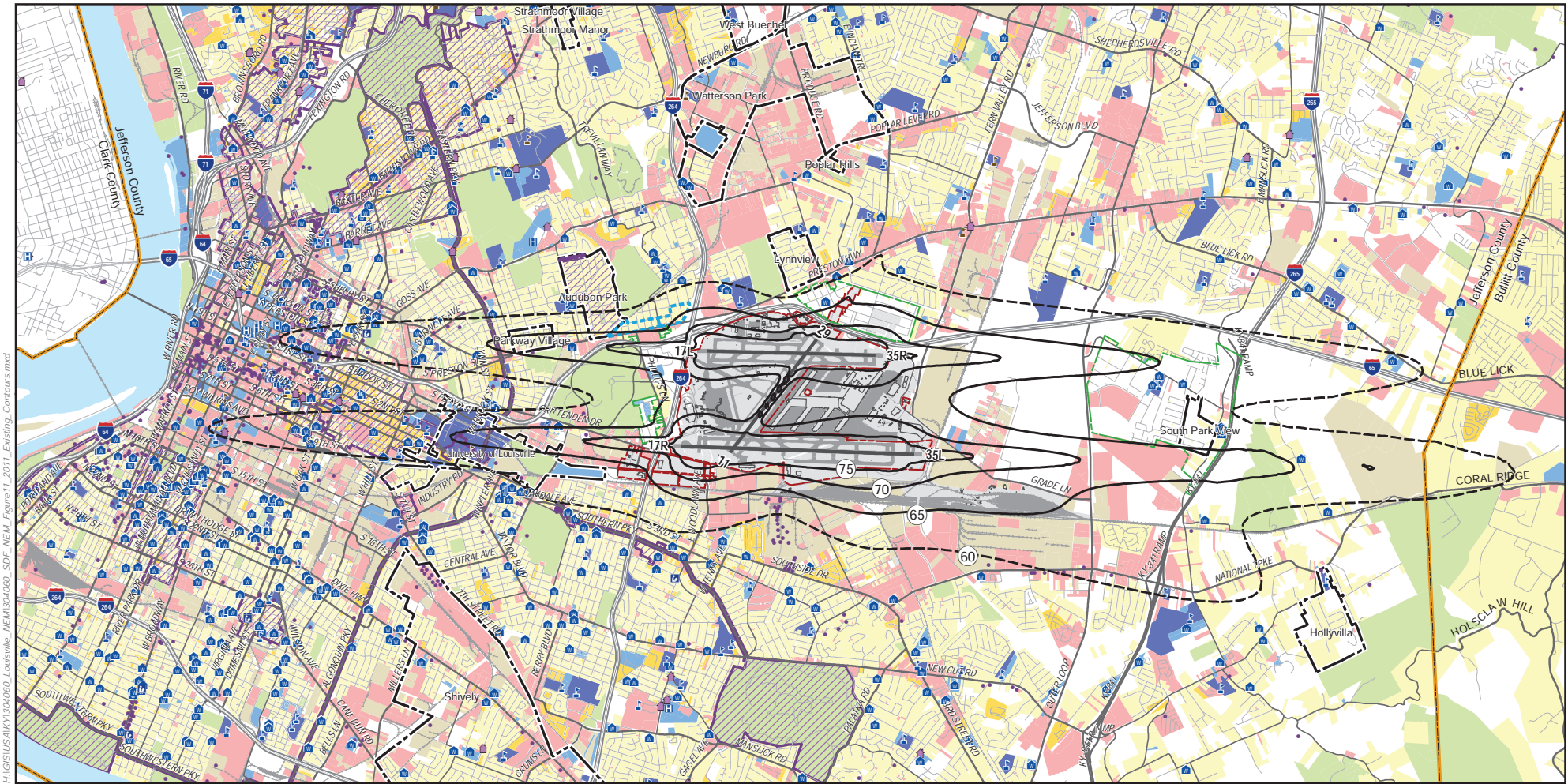
Small Arms PK15
NOISE ZONES DESCRIPTIONS AND LAND USE GUIDELINES
 1. Day Night Level Descriptions.
 (a) The Noise Zone III consists of the area around the source of the noise in which the level is greater than 104 PK15(met) for small arms. The noise level within Noise Zone III is considered so severe that noise-sensitive land uses should not be considered therein.
 (b) The Noise Zone II consists of an area where the day-night sound level is between 87 and 104 PK15(met) for small arms. Exposure to noise within this area is considered significant, and use of land within Noise Zone II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. However, if the community determines that land in Noise Zone II areas must be used for residential purposes, then noise level reduction features of 25 to 30 decibels should be incorporated into the design and construction of the buildings.
 (c) The Noise Zone I include all areas around a noise source in which the day-night sound level is less than 87 PK15(met) for small arms. This area is usually acceptable for all types of land use activities.



FORT KNOX JOINT LANDUSE STUDY

Figure 4-8
Noise Contours
 Small Arms PK15





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Legend

- | | | | |
|-------------------------|----------------------------|---------------------------------|---|
| College/University | Expressway | Residential/Single Family | 2011 DNL Contour |
| Schools | Arterial | Residential/Multi-Family | 2011 DNL Contour (60 dB, for Information Purposes Only) |
| Hospital | Collector | Commercial | |
| Nursing Home | Local | Manufacturing | |
| Library | Railroad | Parks / Cemeteries / Recreation | |
| Place of Worship | Runway | Public / Government Use | |
| Airport Boundary | Historic District | Educational | |
| Municipal Boundary | Non-District Historic Site | Transportation | |
| County Boundary | | Vacant / Undefined | |
| Airport Relocation Area | | | |
| Sound Insulation Areas | | | |

**Figure 4-9
Existing Condition (2011)
Noise Exposure Map**

**Noise Exposure Map Update
Louisville International Airport**



LOUISVILLE
REGIONAL
AIRPORT
AUTHORITY

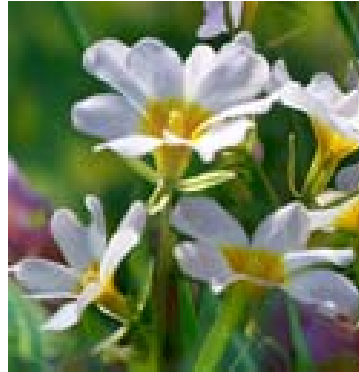
HARRIS MILLER MILLER & HANSON INC.

CMS Coulter Mapping Solutions (CMS), Inc.



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In May, 2013 the U.S. Fish and Wildlife Service proposed to designate critical habitat for the Kentucky glade cress which is only found in southern Jefferson County and Bullitt County, Kentucky. Glade cress grows on areas of flat soil, usually the thin soils and gravel around dolomite rock outcrops. It is also found in lawns and pastures where moist bare soil is predominant in the spring. The natural rock outcrops in this area are another important habitat for glade cress but very few remain today. The surface dolomitic limestone has created unusual conditions for plant growth, generally wet in the spring when water is held near the surface and then very dry due to the lack of soil and other vegetation throughout the summer. Glade cress takes advantage of this moist spring by flowering in March and dispersing its seed in May and June, before the other plants can establish. Figure 4-10 identifies 5 critical habitat areas located in Bullitt County: *Unit 2* - Old Mans Run; *Unit 3* - Mount Washington; *Unit 4* - Cedar Creek, *Unit 5* - Cox Creek; *Unit 6* - Rocky Run. Each unit contains all of the primary physical or biological features essential to the conservation of the Kentucky glade cress.



Unit 2 totals 1,014 acres and extends into Bullitt County and Jefferson County. It is located just south of the Jefferson/Bullitt County line and extends north of Old Mans Run. *Unit 3* consists of 42 acres primarily within or adjacent to the city limits of Mount Washington, north of Old Mills Road (KY 44). *Unit 4* consists of 547 acres and is located south of the Salt River and northeast of Cedar Grove. This seems to represent the core of the remaining high-quality habitat for Kentucky glade cress. The KY State Nature Preserve Commission currently owns 83 acres and the Nature Conservancy owns 91 acres within this unit.

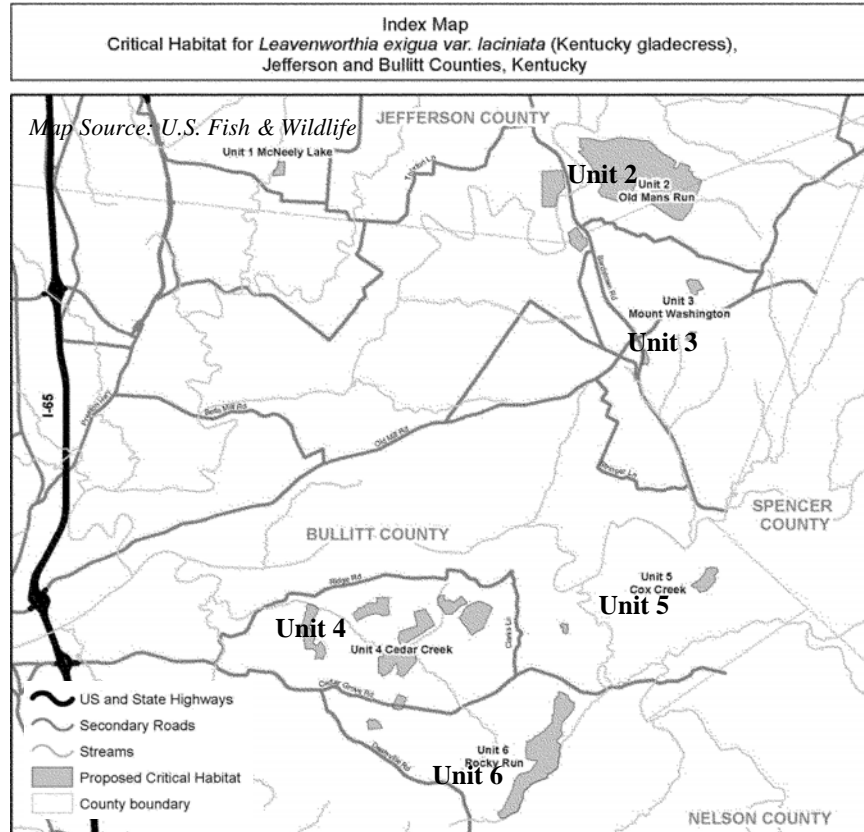
Unit 5 consists of 58 acres and includes two subunits north of Cedar Grove Road (KY 480) and east of Clarks Lane (KY 1442). These subunits are important for maintaining the distribution and genetic diversity of the species. *Unit 6* consists of 374 acres in Bullitt County, Kentucky. This unit appears to represent the largest intact glade habitat remaining within the range of the species. The designated critical habitat's may require special management considerations or protection to ad-

Bullitt County



dress potential adverse effects associated with development on private land, incompatible commercial, or agricultural practices, and horseback riding.

Figure 4-10



SUMMARY

The purpose of this chapter is to identify development impacts on the environment within the planning period and to determine how Bullitt County can continue to develop without destroying its natural resources and quality of life. The following paragraph summarizes recommendations that are a product of this chapter and the goals and objectives.

As Bullitt County continues to grow the environmental resources of the County will be heavily impacted as the need for additional housing, commercial and community facilities increase. As part of the development process, geologic hazards, such sinkholes and Superfund sites should be mapped. Standards should be created that outline the procedures necessary to mitigate the creation of addi-

Environmental Design

tional environmental hazards. Where development is planned a search should be performed for abandoned oil and gas wells near project sites. When environmentally sensitive areas are identified there should be greater collaboration between the County and City governments to discourage development in these areas.

Bullitt County



Comprehensive Plan