Chapter 7

NOISE AND SAFETY

KEY FINDINGS

- Wheatland is located within a low-intensity earthquake zone.
- Wheatland is located within an area potentially susceptible to liquefaction.
- Soil in the Wheatland area is characterized by a moderate to high shrink-swell potential.
- Wheatland is within the lower grasslands area and is less susceptible to fire risk than other areas within Yuba County.
- The city of Wheatland is located within the Beale AFB Comprehensive Land Use Plan overflight zone, which indicates an area that is under the traffic pattern of the base. Certain land uses are restricted in this zone for safety reasons.
- The noise environment in and around the city of Wheatland results primarily from vehicular traffic on SR 65, Union Pacific railroad operations, and aircraft operations associated with Beale Air Force Base.
- New development within the city of Wheatland should consider using noise control techniques such as the use of setbacks, barriers, careful site design, building design, and use of vegetation.

Union Pacific Engine

7.1 | INTRODUCTION

The Safety and Noise chapter provides information on safety hazards within Wheatland, including environmental hazards associated with seismic, geological and soil-related conditions, fire, flood, hazardous waste disposal, noise, and airport safety. Background information on these safety hazards provides a basis for land use planning that would reduce unreasonable risks and protect public health and welfare. Information used in this chapter has been compiled from the 1980 General Plan, the 1996 Environmental Setting for the City of Wheatland General Plan Update, and various other local and regional policy and implementation documents. In addition, City Staff and project consultants have performed research and data collection on existing conditions within the Study Area. This chapter is a summary of those findings, and has been divided into five sections:

- Geological Hazards
- Wildland Fires
- Flooding
- Hazardous Materials
- Noise

7.2 | GEOLOGICAL HAZARDS

EXISTING SETTING

The City of Wheatland is located within the northeastern portion of the Sacramento Valley, which is within the Great Valley geomorphic province. The Great Valley, an elongated lowland, extends 500 miles north and south, separating the Sierra Nevada from the Coast Ranges. This elongated asymmetric structural basin or trough was formed by the westward tilting of the Sierra Nevada block against the eastern flank of the Coast Ranges. The basement rock complex of the Sierra extends westward, beneath the valley, on a gentle slope reaching points near the Coast Ranges. Elevation in the valley is generally several hundred feet above sea level, but ranges from a low point below sea level to approximately 1,000 feet above sea level.

The Great Valley is filled with thick sedimentary rock sequences or strata which began deposition approximately 200 million years ago. Large alluvial fans have developed on each side of the Valley. The larger and more gently sloping fans are located on the east side of the Valley and overlie metamorphic and igneous basement rocks. This basement rock is exposed in the Sierra Nevada Foothills and consists of metasediments, volcanics, and granites. The sediments that form the Valley floor were largely derived by erosion of the Sierra Nevada. The smaller and steeper slopes on the west side of the Valley overlie sedimentary rocks more closely related to the Coast Ranges.

Regional Seismicity

A fault is defined as a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. A fault zone is a zone of related faults that commonly are braided and subparallel, but may be branching or divergent. Movement within a fault causes an earthquake. When movement occurs along a fault, the energy generated is released as waves which cause groundshaking. Groundshaking intensity varies with the magnitude of the earthquake, the distance from the epicenter, and the type of rock or sediment the seismic waves move through.

The Alquist-Priolo Special Studies Zone Act of December 1972 (AP Zone Act) regulates development near active faults so as to mitigate the hazard of surface fault rupture. The AP Zone Act requires that the State Geologist delineate "special study zones" along known active faults in California. Cities and counties affected by these zones must regulate certain development projects with these zones. The AP Zone Act prohibits the development of structures for human occupancy across the traces of active faults. According to the AP Zone Act, "active faults" have experienced surface displacement during the last 11,000 years. "Potentially" active faults are those that show evidence of surface displacement during the last 1.6 million years. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist.

The Great Valley is generally considered less seismically active than other areas of California. The majority of significant, historic faulting (and ground shaking) within the City of Wheatland has been generated along distant faults, within a 100-mile radius of the city. Minor seismicity has been noted along the Foothills Fault System east of the site that may align with that fault system to some degree. The nearest significant earthquake was the Oroville earthquake of 1975. The epicenter for this earthquake (Richter magnitude of 5.7) was located approximately 30 miles north of the site and is generally associated with the Cleveland Hill fault, a portion of the Foothills Fault System.

Local Seismicity

The city of Wheatland is not located within an Alquist-Priolo Special Study Zone (AP Zone) nor is any active fault near the city. The closest AP Zone is the Bangor Quadrangle, including the AP Zone for the Cleveland Hill Fault to which the 1975 Oroville earthquake is attributed. This zone is located 27 miles north of the city. The next nearest active fault is the Dunnigan Hills fault, located 35 miles southwest of the city.

The closest branches of the seismically active San Andreas Fault system are the Green Valley and Rodgers Creek faults located approximately 60 to 70 miles southwest of the site. The San Andreas Fault is located approximately 100 miles to the west. Faults typically considered inactive in the vicinity of the project area include the Willow fault zone, which traverses Yuba County from north to south and is located approximately 12 miles to the west of Wheatland, and the Spenceville fault in the Foothill Fault System (located in eastern Yuba County) approximately 10 miles east of Wheatland.

Groundshaking

Groundshaking is motion that occurs as a result of energy released during an earthquake. Much of southwest Yuba County (referred to as the Valley portion of the County), which includes the city of Wheatland, is located on alluvium. In areas characterized by loose, water-saturated materials, such as alluvium, energy waves are amplified, extending the intensity and duration of groundshaking beyond that which occurs on solid rock. Though documented faults do not exist within the city, the region has experienced instances of groundshaking originating from faults located to the west and east.

The city of Wheatland is located in an area rated as a low-intensity earthquake zone (Seismic Zone II). A low-intensity zone is defined by the United States Geological Survey (USGS) as an area that is likely to experience an earthquake measuring a maximum of 5.0-5.9 in magnitude on the Richter scale, and a maximum intensity of VII or VIII on the Modified Mercalli scale. The Richter scale measures the amplitude of seismic waves recorded by a seismograph. The Modified Mercalli scale measures the intensity of an earthquake by the way it is felt and responded to by humans, and by the amount of damage it does to buildings and structures. A VII reading on the Modified Mercalli scale represents general fright among the public, pictures thrown off walls, and books thrown off shelves. A VIII on the Modified Mercalli scale represents difficulty standing, waves on ponds, and slides or cave-ins on sand and gravel banks. The Modified Mercalli scale is shown in Table 7-1.

Liquefaction

Another response to severe groundshaking that can occur in loose soils is liquefaction. This transformation from solid state to liquid state ("quicksand"), as a response to seismically induced groundshaking, can cause structures supported on the soils to tilt or settle (sometimes very violently and rapidly) as the supporting capabilities of the soils diminish. Water-saturated, clay-free sediments in the most recent Holocene unit are generally expected to have a high susceptibility to liquefaction. Notably, soils having a high clay content may also be considered to have moderate-to-high liquefaction potential. As identified in the Yuba County General Plan Environmental Setting and Background Report,[1] the portion of the County that includes the Wheatland area is potentially susceptible to liquefaction because it is underlain by unconsolidated sands and finer grained materials.

[1] Yuba County General Plan, Volume 1: Environmental Setting and Background, Section 2.4. May 1994

TABLE 7-1 MODIFIED MERCALLI SCALE OF EARTHQUAKE INTENSITY	
Scale	**Effects**
I.	Earthquake shaking not felt.
II.	Shaking felt by those at rest.
III.	Felt by most people indoors; some can estimate the duration of shaking.
IV.	Felt by most people indoors. Having objects swing, windows and doors rattle, wooden walls and frames creak.
V.	Felt by everyone indoors; many estimate duration of shaking. Standing autos rock. Crockery clashes, dishes rattle, and glasses clink. Doors close, open, or swing.
VI.	Felt by everyone indoors and most people outdoors. Many now estimate not only the duration of the shaking, but also its direction and have no doubt as to its cause. Sleepers awaken. Liquids disturbed, some spilled. Small unstable objects displaced. Weak plaster and weak materials crack.
VII.	Many are frightened and run outdoors. People walk unsteadily. Pictures thrown off walls, books off shelves. Dishes or glasses broken. Weak chimneys break at roofline. Plaster, loose bricks, unbraced parapets fall. Concrete irrigation ditches damaged.
VIII.	Difficult to stand. Shaking noticed by auto drivers, waves on ponds. Small slides and cave-ins along sand or gravel banks. Stucco and some masonry walls fall. Chimneys, factory stacks, towers, elevated tanks twist or fall.
IX.	General fright. People thrown to the ground. Steering of autos affected. Branches broken from trees. General damage to foundations and frame structures. Reservoirs seriously damaged. Underground pipes broken.
X.	General panic. Conspicuous cracks in ground. Most masonry and frame structures destroyed along their foundations. Some well-built wooden structures and bridges are destroyed. Serious damage to dams, dikes, and embankments. Railroads bent slightly.
XI.	General panic. Large landslides. Water thrown out of banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flatland. General destruction of buildings. Underground pipelines completely out of service. Railroads bent greatly.
XII.	General panic. Damage nearly total, the ultimate catastrophe. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Source: California Division of Mines and Geology, 1973.

Other Geologic Hazards

Primary hazards associated with seismicity include surface rupturing and groundshaking. The major secondary effect of groundshaking is landsliding; other potential effects include liquefaction, settlement, and lateral spreading.

Subsidence is downward settling of surface materials caused by natural or artificial removal of underlying support. Land subsidence would occur from one or more causes, including withdrawal of fluids (oil, gas, or water) or the application of water to moisture-deficient unconsolidated deposits. The potential for collapsible soils exists in areas underlain by silt and fine sand, particularly where these have been deposited solely, or in part, by wind. The valley portion of Yuba County, which includes the Wheatland area, has a low-to-moderate potential for ground surface subsidence due to the withdrawal and extraction of groundwater from the Wheatland area.

Soil Conditions

The U.S. Soil Conservation Service (SCS) has recently identified and mapped soils in Yuba County; however, detailed soil information was not available at the time of this analysis. The following information regarding site soils for the Wheatland area was summarized from the Yuba County General Plan Environmental Setting and Background Report.[2] Each identified soil complex has characteristics that affect soil behavior. Soil characteristics may or may not make the soils suitable for accommodating uses such as shallow excavations, levees, and berms, and local roads and streets. Soil limitations can include slow or very slow permeability, limited ability to support a load, high shrink-swell potential, moderate depth to hardpan, low depth to rock, and frequent flooding. Each soil has characteristics that affect soil behavior. Characteristics discussed include:

- *Shrink-swell potential:* the potential for volume change in a soil with a loss or gain in moisture. If the shrink-swell potential is rated moderate to high, damage to buildings, roads, and other structures can occur.

- *Erosion:* the susceptibility of soil to water or wind transport.

Soil complexes identified for the Wheatland area are described below:

- Columbia-Hollilipah-Shanghai association, 0-2% slopes: a very deep, poorly and somewhat excessively drained soil found on stream terraces. Characteristics include a slight erosion and a low-to-moderate shrink-swell potential.

- Conejo-Kilaga association, 0-2% slopes: very deep, well drained alluvial soils found on stream terraces. Characteristics include a slight erosion and moderate to high shrink-swell potential.

- San Joaquin soils, 0-2%: Moderately deep, well drained alluvial soils that have a dense clay subsoil on low fan terraces. Characteristics include a slight erosion and moderate to high shrink-swell potential.

- Redding-Corning-Pardee association, 0-2%: Moderately deep, well drained alluvial soils with a dense clay subsoil on low alluvial terraces. Characteristics include a slight erosion and moderate to high shrink-swell potential.

[2] Yuba County General Plan, Volume 1: Environmental Setting and Background, Section 2.5, May 1994.

7.3 | WILDLAND FIRES

EXISTING FIRE PROTECTION SERVICES

Wheatland Fire Department

The City of Wheatland Fire Department provides fire protection services to the city. The Department, which consists entirely of volunteers, maintains a roster that varies from 12 to 16 positions. The department operates four vehicles: a rescue unit; a Class A, 1000 GPM engine; a Class B, 500 GPM engine; and a brush truck for fighting fires. All vehicles are run out of a two-bay equipment house located beside city hall. The Department has a mutual response agreement with the Plumas-Brophy Fire District, which is described below. Hazardous materials emergencies are handled by the Marysville Fire Department under a mutual aid agreement. The Wheatland Fire Department maintains an Insurance Service Office (ISO) rating of Class VI. ISO's ratings range from I to X, with I being very close to perfect and X being no fire protection.

Plumas Brophy Fire Protection District

The Plumas Brophy Fire Protection District (PBFD) is classified a 'Special District' by the State of California. The PBFD serves an area west of the existing City of Wheatland (encircling the city limits), approximately 80 square miles. The PBFD consists of sixteen (16) volunteers. The station is at 4514 Dairy Road and includes four (4) Class A, 1,000 GPM engines, two (2) water tenders, three (3) Grass Units (CEF) Type 1, and two (2) light rescue units.

Marysville Fire Department

The Marysville Fire Department consists of:

- Three (3) personnel on duty 24 hours a day;
- One (1) fire station; and
- Reserve force of 15.

EXISTING WILDLAND FIRE CONDITIONS

Factors most affecting wildland fires are vegetation, climate, and topography. These factors are used by the California Department of Forestry and Fire Protection (CDF) to develop the Fire Hazard Severity Scale for California wildlands. The resulting classification system provides a practical, objective means for delineating areas of varying fire hazard severity.

Vegetation is a primary fuel source for wildland fires. Three (3) vegetation categories are recognized in terms of fuel capacity: grass, brush, and timberland. Grasslands, the lightest fuel group, provide from one to three tons of fuel per acre and are easily ignited when dry. Of the three fuel types, grasslands are the easiest in which to suppress fires. Heavy brush and timberlands represent the heaviest fuel loading. Agricultural areas on the Valley floor are the

least fire-prone areas of the county. The most serious problems in the valley relate to structural fires and grass fires.

While vegetation provides fuel for fires, the Mediterranean climate of Yuba County helps fires to start and spread rapidly. During the annual dry season, from about May to October, vegetation becomes very dry. Hot, dry conditions increase the combustibility of fuels. Although the valley has a hotter, drier climate than the foothills and mountains, the presence of croplands, orchards, and irrigation makes the wildland fire danger less critical in the valley.

The third component of the fire hazard rating system is topography. Steepness of terrain can contribute to the outbreak, spread, and severity of fires in several ways. The relatively flat terrain in the Wheatland area makes wildland fire danger less critical.

The city of Wheatland is within the lower grasslands and is therefore among the most fire secure areas in Yuba County.

7.4 | FLOODING

See discussion of flooding issues in Section 5.4.

7.5 | HAZARDOUS MATERIALS

HAZARDOUS MATERIALS SPILL RESPONSE

The Marysville Fire Department handles hazardous materials emergencies in Wheatland under a mutual aid agreement. In the event of a hazardous waste emergency in Wheatland, the Wheatland Fire Department and Plumas Brophy Fire District are the first responders to the scene.[3] Should the Wheatland Fire Department or PBFD determine that additional assistance is needed, the Yuba County OES would be contacted, which would then contact the Marysville Fire Department via dispatch. The protocol of the Marysville Fire Department is to send four (4) personnel to the scene where the hazardous spill has occurred.

EXISTING HAZARDOUS MATERIALS

According to the Yuba County General Plan, hazardous substances are used, stored, and transported throughout the county. Hazardous substances include but are not limited to, petroleum products, pesticides and herbicides, chemicals, and radiation. Title 22, *Section 66260.10* of the California Code of Regulations (CCR) defines hazardous material as follows:

> *"[...] a substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or*

[3] Personal Communication with Mr. Scott Witt, Marysville Fire Department Engineer, May 24, 2004.

potential hazard to human health or environment when improperly treated, stored, transport or disposed of."

Hazardous wastes are a problem not confined to highly industrialized areas. Waste oils and other petroleum products are among the several hundred substances classified as hazardous wastes. Every gasoline service station and automobile repair facility in Wheatland is a hazardous waste generator. School chemistry laboratories and automotive shops use and store hazardous substances and/or generate hazardous waste.

The greatest risks of upset or accidental release of hazardous substances and wastes into the environment are during transport, during transfer from a mobile tank to a fixed storage tank, or from leaking storage tanks. Hazardous substances and hazardous wastes are transported through the city by truck and railroad. Until recent improvements in storage tank technology and installation, use, inspection, and disposal procedures, most storage tanks would eventually leak contents into soil and water.

Household hazardous wastes are a potential source of risk that should not be overlooked. Although they constitute only a small percentage (typically 5 percent or less) of all household wastes, household hazardous wastes are a particular danger to the environmental. Typically, they include waste oil, solvents (such as paint thinners and cleaning solutions), pesticides, dyes and paints, metal-containing liquids (such as the contents of batteries), and a variety of other liquids such as drain cleaners and bleaches.

Agricultural Uses

The city of Wheatland is surrounded by agricultural uses. With the exception of limited residential uses near the center of the Wheatland area, most of the land to the northeast, the southwest, west, and northwest of the city limits consists of agricultural uses. Agricultural uses include orchard and row crop cultivation as well as cattle grazing and pastureland uses.

Agricultural land in the Wheatland area is primarily used for orchards with limited areas of open grassland used for grazing. Agricultural use of this sort includes the use of fungicides, pesticides, and pre-emergent chemicals. The fungicides and pesticide/insecticides are applied to the trees, while the pre-emergents are applied to grasses and weeds prior to their spread. The chemicals typically used over the last 15 to 20 years break down shortly after application. However, long-term use of the Wheatland area for similar agricultural purposes could leave residual chemicals in the soil.

Toxicological studies indicate that persistent pesticides/herbicides have long half-lives in soil. However, the soil must be ingested to significantly expose an individual to the associated chemical hazards. Although the chemicals are considered persistent over long periods of time, their concentrations degrade over time, rendering them less hazardous

Industrial Uses

The large-scale use of hazardous materials for industrial purposes is common and can include the use and storage of large amounts of solvents and fuel oils. Over long periods of use spills and undetected leaks contaminate the surrounding soils and shallow groundwater.

The only industrial use in the city of Wheatland since 1996 is an HVAC storage and distribution operation at the old Rice Mill on Third Street. This facility does not use any hazardous materials

Beale Air Force Base

Beale Air Force Base is located in Yuba County approximately 13 miles east of Marysville, and 6 miles northeast of Wheatland. Created in 1942 as an army training base, the base today is under the authority of the Air Force's Strategic Air Command (SAC). The base is the only location for the nation's U-2 and TR-1 reconnaissance aircraft. In addition, the base operates Global Hawk reconnaissance aircrafts, NASA T-38 chase/trainer jets, and KC-135 jet tankers. Aside from reconnaissance aircrafts, the base is also the home to various missile warning and information/intelligence systems such as the DGS-2 and Pave Paws systems.

Furthermore, Beale Air Force Base (Beale AFB) maintains one (1) active runway, which is 12,000 feet long and 300 feet wide, with asphalt overrun areas to the north and south. Flight paths followed by aircraft arriving and departing from Beale AFB have been integrated to minimize conflict with civilian aircraft operations at Sacramento Metro Airport, the Yuba County Airport, the Sutter County Airport, the Lincoln Airport, and McClellan Air Force Base. Further, flight paths have been designed to minimize community disturbance and public reaction.

The Beale AFB Comprehensive Land Use Plan (CLUP) (1992) designates three safety areas: the clear zone, the approach-departure zone, and the overflight zone (see Figure 7-1). The clear zone is near the end of the runway and is the most restrictive. The approach-departure zone is located under the takeoff and landing slopes and is less restrictive. The overflight zone is the area under the traffic pattern and is even less restrictive.

Wheatland is located within the CLUP overflight zone. The overflight zone dimensions are determined by reviewing the flight patterns for Beale AFB and developing a zone that would include that land overflown by aircraft in a take-off or landing phase, aircraft using flight paths associated with training touch and go operations, and aircraft maneuvering near the airfield after take-off or before landing.

The Beale AFB Comprehensive Land Use Plan includes a table entitled "Beale Air Force Base Land Use Compatibility Guidelines for Safety." Although the overflight zone is the least restrictive of the zones, the table shows that certain land use is permitted in the overflight zone. Prohibited land use include: chemical and allied products manufacturing; petroleum refining; rubber and plastics manufacturing; regional shopping centers; colleges and universities; hospitals; jails and detention centers; motion picture theater complexes; professional sports developments; stadiums and arenas; auditoriums, concert halls and amphitheaters; fairgrounds and expositions; racetracks; and theme parks.

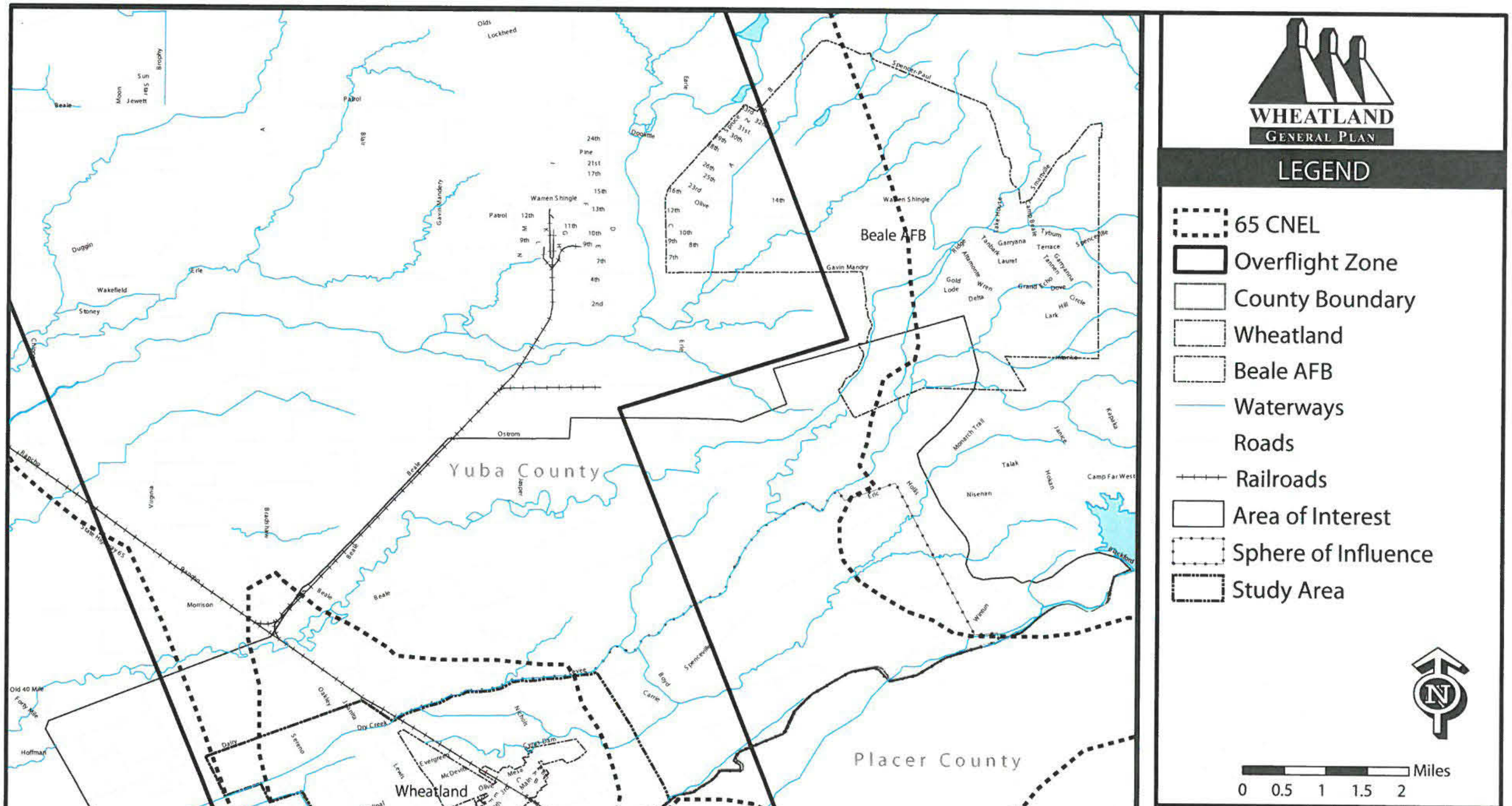

Figure 7-1
Beale AFB
Area of Influence

Source: Beale Air Force Base, Comprehensive Land Use Plan, May 1986; and Mintier & Associates; May 2004