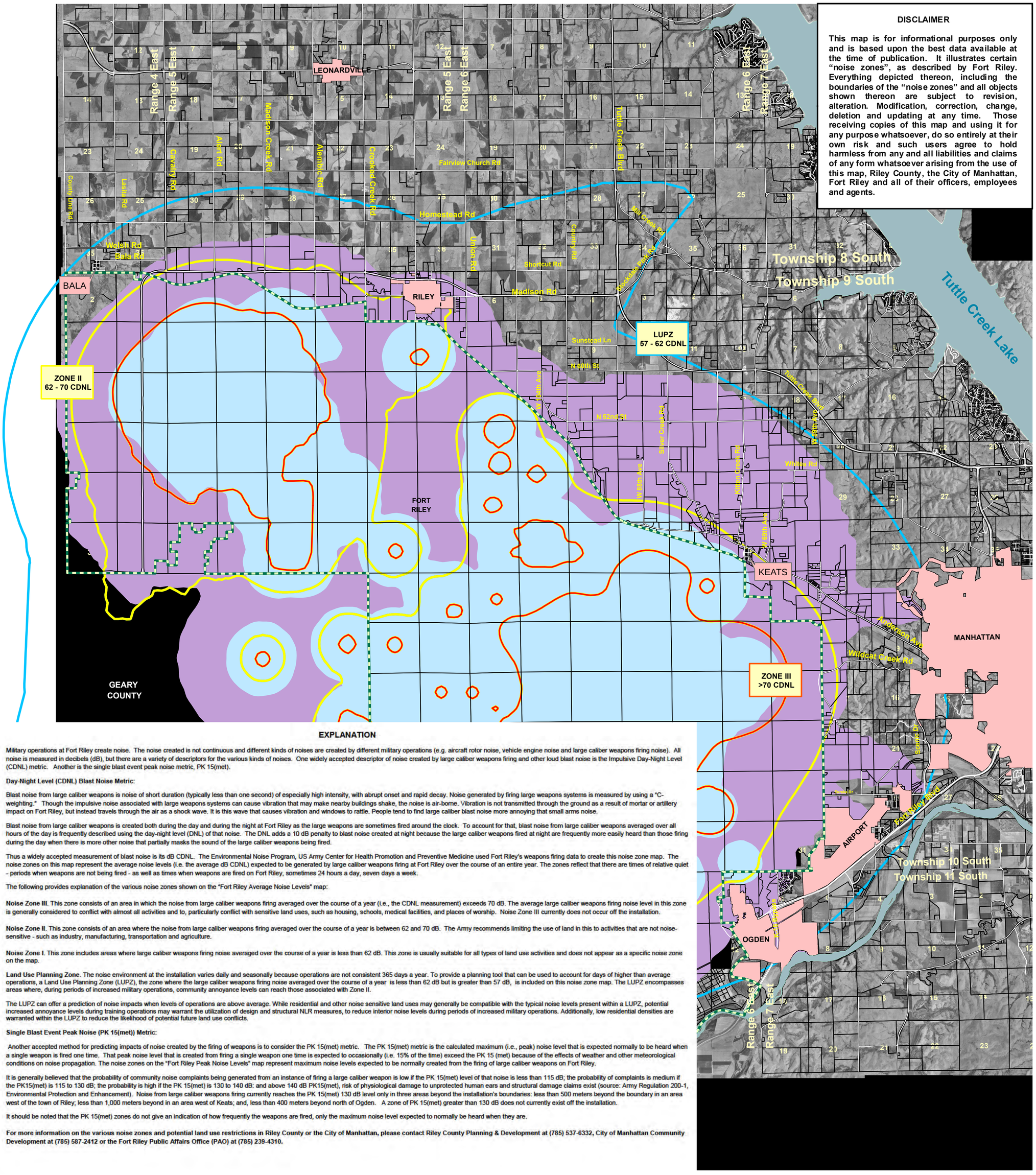
Geographic Information Systems

RILEY COUNTY

FORT RILEY NOISE ZONES
AVERAGE AND PEAK NOISE LEVELS



LEGEND

Noise Levels

- LUPZ
- ZONE II
- ZONE III
- Large Caliber 115
- Large Caliber 130

Fort Riley Boundary

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October 2011

EXPLANATION

Military operations at Fort Riley create noise. The noise created is not continuous and different kinds of noises are created by different military operations (e.g. aircraft rotor noise, vehicle engine noise and large caliber weapons firing noise). All noise is measured in decibels (dB), but there are a variety of descriptors for the various kinds of noises. One widely accepted descriptor of noise created by large caliber weapons firing and other loud blast noise is the Impulsive Day-Night Level (CDNL) metric. Another is the single blast event peak noise metric, PK 15(met).

Day-Night Level (CDNL) Blast Noise Metric:

Blast noise from large caliber weapons is noise of short duration (typically less than one second) of especially high intensity, with abrupt onset and rapid decay. Noise generated by firing large weapons systems is measured by using a "C-weighting." Though the impulsive noise associated with large weapons systems can cause vibration that may make nearby buildings shake, the noise is air-borne. Vibration is not transmitted through the ground as a result of mortar or artillery impact on Fort Riley, but instead travels through the air as a shock wave. It is this wave that causes vibration and windows to rattle. People tend to find large caliber blast noise more annoying that small arms noise.

Blast noise from large caliber weapons is created both during the day and during the night at Fort Riley as the large weapons are sometimes fired around the clock. To account for that, blast noise from large caliber weapons averaged over all hours of the day is frequently described using the day-night level (DNL) of that noise. The DNL adds a 10 dB penalty to blast noise created at night because the large caliber weapons fired at night are frequently more easily heard than those firing during the day when there is more other noise that partially masks the sound of the large caliber weapons being fired.

Thus a widely accepted measurement of blast noise is its dB CDNL. The Environmental Noise Program, US Army Center for Health Promotion and Preventive Medicine used Fort Riley's weapons firing data to create this noise zone map. The noise zones on this map represent the average noise levels (i.e. the average dB CDNL) expected to be generated by large caliber weapons firing at Fort Riley over the course of an entire year. The zones reflect that there are times of relative quiet - periods when weapons are not being fired - as well as times when weapons are fired on Fort Riley, sometimes 24 hours a day, seven days a week.

The following provides explanation of the various noise zones shown on the "Fort Riley Average Noise Levels" map:

Noise Zone III. This zone consists of an area in which the noise from large caliber weapons firing averaged over the course of a year (i.e., the CDNL measurement) exceeds 70 dB. The average large caliber weapons firing noise level in this zone is generally considered to conflict with almost all activities and to, particularly conflict with sensitive land uses, such as housing, schools, medical facilities, and places of worship. Noise Zone III currently does not occur off the installation.

Noise Zone II. This zone consists of an area where the noise from large caliber weapons firing averaged over the course of a year is between 62 and 70 dB. The Army recommends limiting the use of land in this to activities that are not noise-sensitive - such as industry, manufacturing, transportation and agriculture.

Noise Zone I. This zone includes areas where large caliber weapons firing noise averaged over the course of a year is less than 62 dB. This zone is usually suitable for all types of land use activities and does not appear as a specific noise zone on the map.

Land Use Planning Zone. The noise environment at the installation varies daily and seasonally because operations are not consistent 365 days a year. To provide a planning tool that can be used to account for days of higher than average operations, a Land Use Planning Zone (LUPZ), the zone where the large caliber weapons firing noise averaged over the course of a year is less than 62 dB but is greater than 57 dB, is included on this noise zone map. The LUPZ encompasses areas where, during periods of increased military operations, community annoyance levels can reach those associated with Zone II.

The LUPZ can offer a prediction of noise impacts when levels of operations are above average. While residential and other noise sensitive land uses may generally be compatible with the typical noise levels present within a LUPZ, potential increased annoyance levels during training operations may warrant the utilization of design and structural NLR measures, to reduce interior noise levels during periods of increased military operations. Additionally, low residential densities are warranted within the LUPZ to reduce the likelihood of potential future land use conflicts.

Single Blast Event Peak Noise (PK 15(met)) Metric:

Another accepted method for predicting impacts of noise created by the firing of weapons is to consider the PK 15(met) metric. The PK 15(met) metric is the calculated maximum (i.e., peak) noise level that is expected normally to be heard when a single weapon is fired one time. That peak noise level that is created from firing a single weapon one time is expected to occasionally (i.e. 15% of the time) exceed the PK 15 (met) because of the effects of weather and other meteorological conditions on noise propagation. The noise zones on the "Fort Riley Peak Noise Levels" map represent maximum noise levels expected to be normally created from the firing of large caliber weapons on Fort Riley.

It is generally believed that the probability of community noise complaints being generated from an instance of firing a large caliber weapon is low if the PK 15(met) level of that noise is less than 115 dB; the probability of complaints is medium if the PK15(met) is 115 to 130 dB; the probability is high if the PK 15(met) is 130 to 140 dB: and above 140 dB PK15(met), risk of physiological damage to unprotected human ears and structural damage claims exist (source: Army Regulation 200-1, Environmental Protection and Enhancement). Noise from large caliber weapons firing currently reaches the PK 15(met) 130 dB level only in three areas beyond the installation's boundaries: less than 500 meters beyond the boundary in an area west of the town of Riley; less than 1,000 meters beyond in an area west of Keats; and, less than 400 meters beyond north of Ogden. A zone of PK 15(met) greater than 130 dB does not currently exist off the installation.

It should be noted that the PK 15(met) zones do not give an indication of how frequently the weapons are fired, only the maximum noise level expected to normally be heard when they are.

For more information on the various noise zones and potential land use restrictions in Riley County or the City of Manhattan, please contact Riley County Planning & Development at (785) 537-6332, City of Manhattan Community Development at (785) 587-2412 or the Fort Riley Public Affairs Office (PAO) at (785) 239-4310.