USAG Fort A.P. Hill– Public Affairs Office

(804) 633-8324/8120

After Hours/Weekends

Please Contact Fort A.P. Hill Police

804-633-8888

Noise Reporting Guidelines

Citizens may call **(804) 633-8324/8120** (Public Affairs Office) anytime with questions or concerns. After hours, on weekends, or depending on immediate staff availability, your call may be directed to voicemail. A Public Affairs Office staff member will contact you on the next business day.

When filing a report please provide:

- Name, phone number and your location relative to the reported noise.
- Date, time, and frequency of occurrence.
- Any other pertinent information.

All calls are logged-in and investigated to determine the source of the noise. If mission requirements permit, Fort A.P. Hill will address and mitigate the situation.

A Citizen's Guide

Training Noise Management at Fort A.P. Hill

September 2011

If you live in Caroline, Essex, Spotsylvania, Stafford or King George Counties, you likely have heard sounds of military training at Fort A.P. Hill, Marine Corps Base Quantico or the Dahlgren Naval Base. You may have heard low-flying Air Force C-130 aircraft or had windows rattled as an Army helicopter passed near your home. If you live along the southern boundary of Fort A.P. Hill, you may have heard small caliber weapons firing or you may have noticed window vibrations that coincided with sounds of artillery firing.

The information in this brochure summarizes Fort A.P. Hill's Operational Noise Management Plan. The Operational Noise Management program helps the Army analyze noise associated with military operations and provides land use guidelines designed to help achieve compatibility between the noise generated by Army combat training and the surrounding communities.

The Army has an obligation to citizens and local government decision makers to recommend land uses around its installations. The ultimate goals are to protect citizens from noise and other hazards and protect the public's investment in the installation and the military readiness it provides our nation.

Our goal in developing this brochure is to help our neighbors understand the nature of noise emanating from Fort A.P. Hill and how we can work together to share information to better manage that noise in a way that ensures our military readiness and National Defense Objectives are not compromised.

BASICS OF NOISE MODELING AND NOISE CONTOURS

Noise is defined as any unwanted sound, a highly subjective concept.

Most noise from Fort A.P. Hill comes from weapons firing and aircraft operations. These activities produce very different types of sound and we measure and assess them differently.

A human ear is not uniformly sensitive to all frequencies of sound. Most common sound sources are measured using *A-weighted* decibels (dBA). The A-weighting corresponds to the ear's sensitivity. In military environments, this includes sounds from generators, aircraft, and general transportation. *C-weighted* decibels (dBC) quantify sounds containing large amounts of low frequency energy. Though people cannot hear low frequencies well, they may feel vibrations that low frequency energy can generate. At Fort A.P. Hill, large caliber weapons firing, and detonations are assessed with C-weighted decibels. In addition, *unweighted* peak levels correlate well with community perception of low frequency sounds.

We analyze aviation, demolition and large caliber weapon noise using *"Day-Night average Levels" (DNL)*. The DNL is a 24-hour cumulative average noise level that includes a 10-decibel adjustment, or penalty, for activity occurring between 10 p.m. and 7 a.m. The 10-decibel penalty considers that people are more sensitive to noise during these hours. Additionally, sounds may seem louder since background noise levels are generally lower at night. For land use planning, the DNL is usually averaged over a year. Therefore, DNL will include days of no, light, and heavy training loads.

Small caliber weapons (.50 caliber and below) Noise Zones are developed using *"peak"* levels and therefore will not vary based on number of rounds fired.

Noise contours are not absolute demarcation lines. Since changing meteorological conditions constantly influence noise levels, daily noise levels can vary accordingly. Even more importantly, a receiver's perception of the source often influences the level of impact, with little dependence on noise level. Noise contours do not clearly divide noise zones with one side of the line compatible and the other side incompatible.

NOISE MANAGEMENT AT FORT A.P. HILL

The Department of Defense's Environmental Planning Program promotes development and implementation of noise programs on military installations. The noise programs strive to guide compatibility between both the activities and operations within the installation, and between the activities and operations of the installation and neighboring civilian communities.

Army Regulation 200-1 outlines the noise management policy. The policy includes:

- Evaluate and document the impact of noise produced by ongoing and proposed actions/activities and minimize annoyance to humans to the extent practicable.
- Develop installation noise management plans as appropriate. The noise plan is a tool used by the installation and local planning committees to facility compatible development.

Fort A.P. Hill's noise management practices are intended to minimize noise levels and/or impacts on the community. Key components of the management program are:

- Community outreach
- Fly-neighborly procedures
- Joint Land Use Study with the local community
- Noise monitoring system

A Joint Land Use Study (JLUS) is a collaborative land use planning effort involving the military installation and adjacent local governments. It is a designed to support and encourage compatible development of land surrounding the installation. It is a means for the installation and local governments to develop land use plans addressing the long-term land use needs of the of the surrounding communities, while providing the military with the mission flexibility needed to meet training doctrine.

A JLUS of the area around Fort A.P. Hill is expected to begin this year. A representative from Department of Defense's Office of Economic Adjustment has visited surrounding local governments and presented information on the JLUS program. A JLUS offers the means for Fort A.P. Hill and surrounding communities to proactively work together to find solutions beneficial to all parties.

Fort A.P. Hill has a sophisticated noise monitoring system in place, as well as weather monitoring, since atmospheric conditions can be the dominant factor in how noise travels and how it is perceived off the installation.

NOISE EXPOSURE IN THE COMMUNITY

SMALL CALIBER WEAPON ACTIVITY

Figure 7 depicts the small caliber weapons Noise Zones. These are called "noise contours." For small arms, the Noise Zones are delineated based on Peak (dBP) levels. The Zone II, and to a much lesser extent, Zone III extend beyond the boundary. People living within or near the Noise Zones will routinely hear the sounds of small caliber weapons firing.

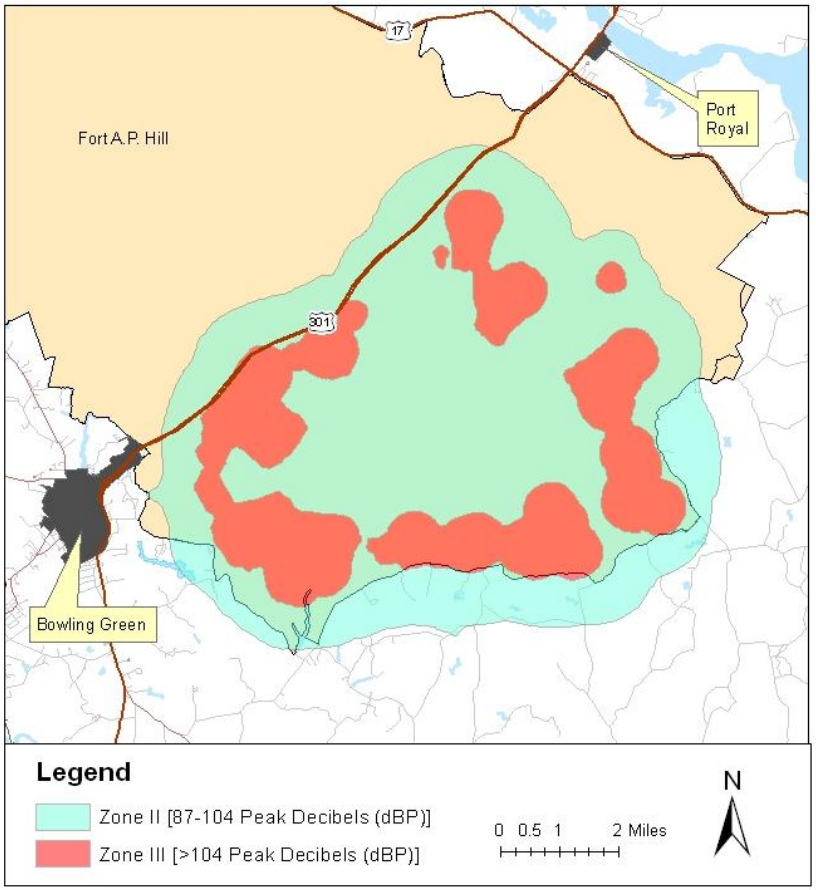

Figure7. Small Caliber Weapon Activity Noise Zones.

Army Regulation (AR) 200-1 lists housing, schools, and medical facilities as examples of noise-sensitive land uses.

The noise exposures on the communities translate into Noise Zones, defined by the level of decibels within those zones. The program defines four Noise Zones:

- Noise-sensitive land uses are not recommended in *Zone III*.
- Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in *Zone II*, this type of land use is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in *Zone II* to non-sensitive activities such as industry, manufacturing, transportation and agriculture.
- Noise-sensitive land uses are generally acceptable within the *Zone I*. However, though an area may only receive *Zone I* levels, military operations may be loud enough to be heard- or even judged loud on occasion. *Zone I* is not one of the contours shown on the map; rather it is the entire area outside of the *Zone II* contour.
- A *Land Use Planning Zone (LUPZ)* is a subdivision of Zone I. The *LUPZ* is 5 dB lower than the Zone II. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures out beyond the Zone II limits. Additionally, implementing planning controls within the *LUPZ* can develop a buffer to avert the possibility of future noise conflicts.

Often, some communities have existing "noise-sensitive" land uses that would be inadvisable under the guidelines. In most cases, this is not a risk to community quality of life or mission sustainment. This is because long-term neighbors often acknowledge hearing military training, but they are not alarmed or bothered. AR 200-1 offers land use recommendations, which if adopted both on and off the installation, facilitate future development that mitigates the potential for conflict and citizen concern.

Noise Zone	Aviation (ADNL)	Small Arms (Peak)	Large Arms, Demolitions (CDNL)
Land Use Planning Zone (LUPZ)	60-65	N/A	57 – 62
Zone I	<65	<87	<62
Zone II	65-75	87 – 104	62 – 70
Zone III	>75	>104	>70

Land Use Guidelines. (Army Regulation 200-1)

The Influence of Weather on Noise

Weather conditions significantly affect sound propagation. Wind and temperature influence how far sound travels and how loud it will be at the receiver's location. Sound levels are typically higher downwind than upwind from the source.

When temperature inversions are present, training operations may sound much louder, being heard at further distances than normal. The inversion layer acts as a boundary for the sound, trapping it close to the ground. This can create areas of high intensity sound far from the source. As a result, on most days it may be possible to conduct demolition training without disturbing the community (neutral weather conditions), while on another day with a temperature inversion, the detonation of as little as 1 pound at the same location may cause some annoyance (unfavorable weather conditions).

Figure 1 illustrates how temperature inversions bends (refracts) the sound created by a typical explosion. The sound waves from the explosion initially travel upward, but the inversion reflects the sound back down toward the ground, generating high noise levels many miles away. Noise levels at that distance would otherwise be much lower.

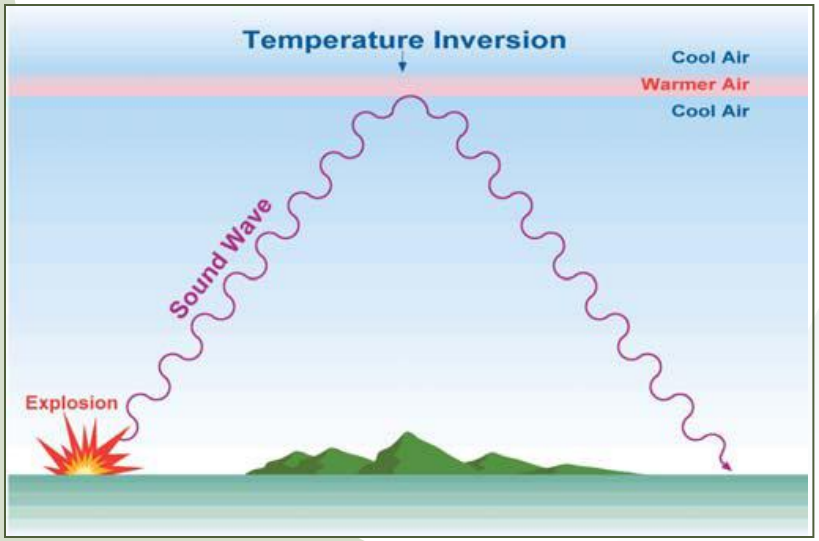

Figure 1. A temperature inversion changes the way sound travels through the air.

The FAPH ALZ is located 4 miles from the intersections of Route 2 and Route 17 and approximately 1 mile from Route 2 directly to the west. The ALZ is operationally available seven days a week, day and night. The ALZ is a 4,100 foot semi-improved runway capable of handling C-17 Globemaster III and C-130 Hercules aircraft. The ALZ primary purpose is for aircrews to practice their off-pavement landings and takeoffs, including varied approach and departure procedures designed to replicate operations in a combat environment. The power settings necessary for departure produce high noise levels within the takeoff fan when the aircraft is below 3,500 feet AGL (Above Ground Level). Up to six aircraft may simultaneously circle the ALZ closed-pattern airspace. Figure 6 depicts areas where noise from ALZ activity may be noticeable in the community.

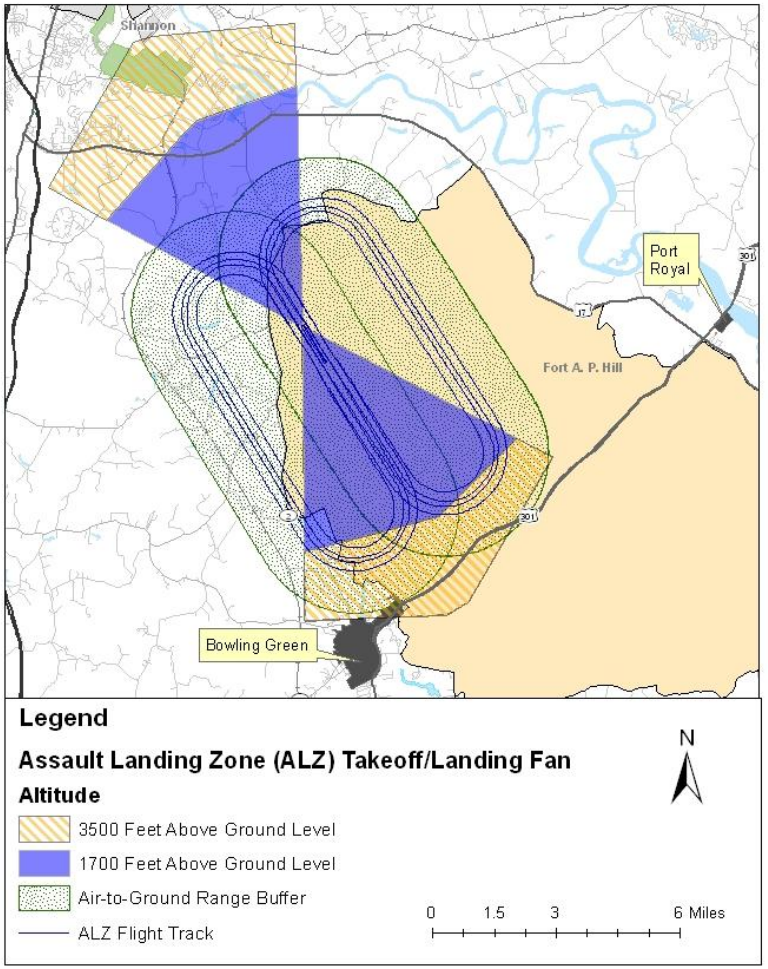

Figure 6. ALZ Operational Areas.

AVIATION ACTIVITY

Fort A.P. Hill (FAPH) has one Army Airfield (AAF), one Drop Zone (DZ), one Assault Landing Zone (ALZ), and many authorized Landing Zones (LZ) to support airborne and aviation training for rotary-wing, tilt-rotor, fixed-wing and unmanned aircraft. Approximately 500 aircraft train at FAPH annually. Figure 5 depicts a buffer around the perimeter rotary-wing routes where noise levels may sometimes be objectionable to the community.

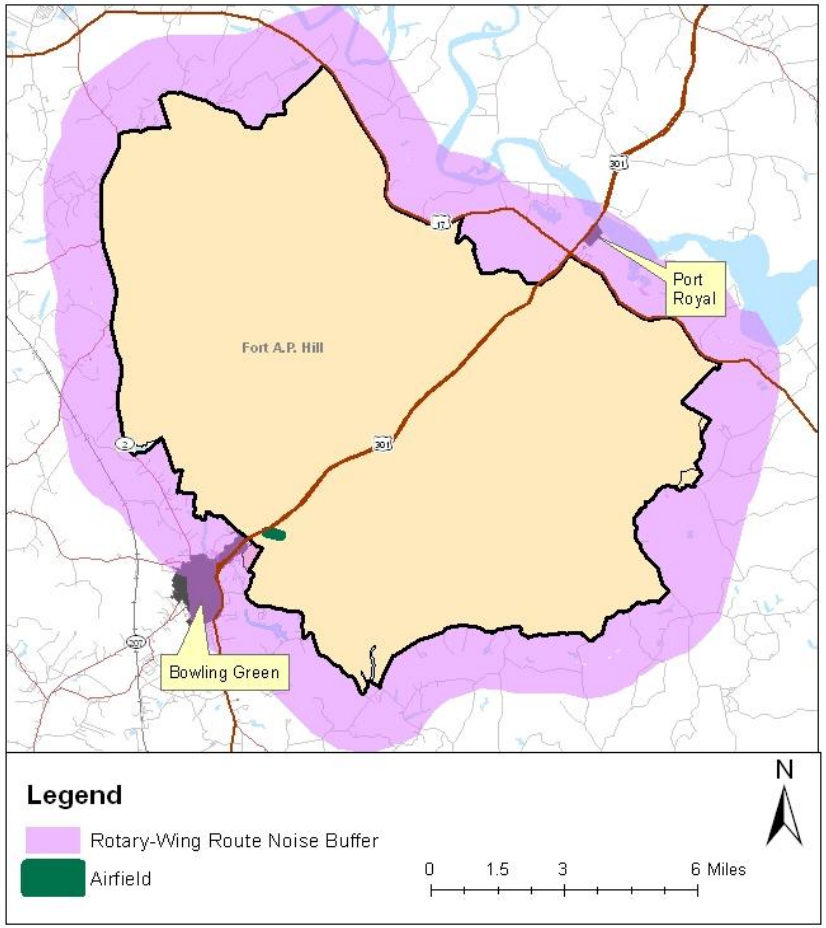

Figure 5. Rotary-Wing Route Noise Impacts.

SOURCES OF NOISE AT FORT A.P. Hill

We strive to train our Soldiers in the same types of environment and under the same physical and mental stresses they will face in combat. Live training gives America's fighting men and women hands-on experience in firing and handling the weapons and ammunition they use on the battlefield, flying aircraft at night, and operating armored vehicles under combat-like conditions.

Figure 2. Fort A.P. Hill Military Noise Sources.

NOISE EXPOSURE IN THE COMMUNITY

DEMOLITION AND LARGE CALIBER WEAPON ACTIVITY

Figure 3 depicts the annual average Noise Zones. The Noise Zone III is contained within Fort A.P. Hill. The Land Use Planning Zone and the Noise Zone II extend beyond the boundary. Implementing land use planning controls in these areas would help avert the possibility of future noise conflicts

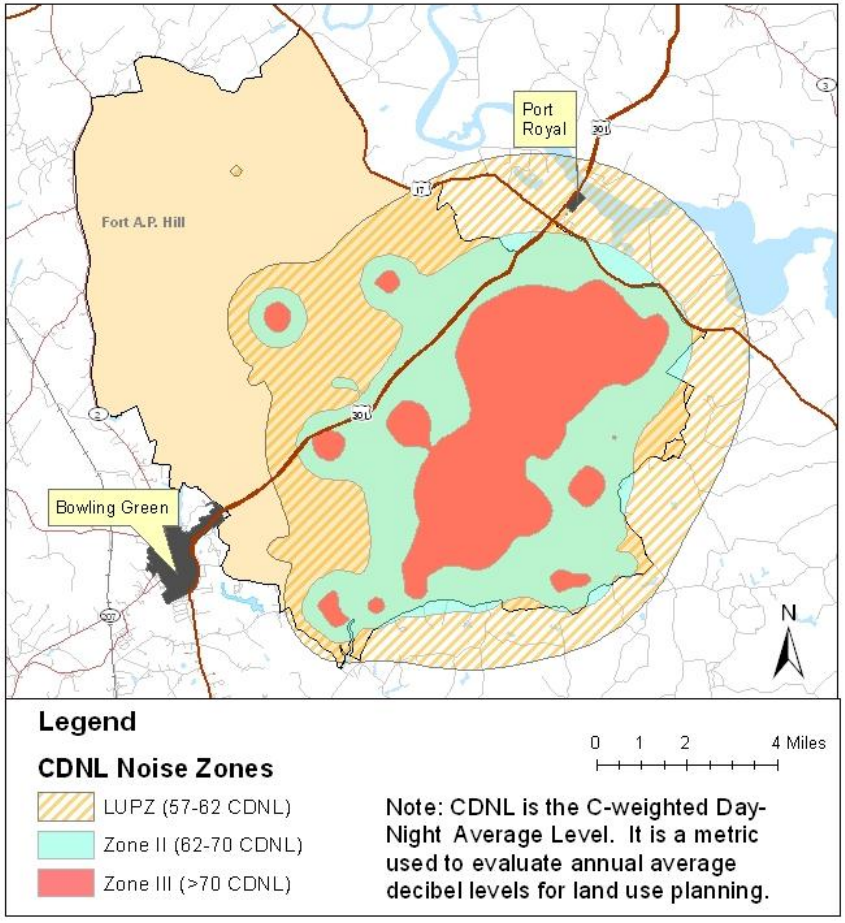

Figure 3. Demolition and Large Caliber Weapon Noise Zones.

By using Peak level (unweighted) assessments, we can forecast where sound may focus under adverse weather conditions. Figure 4 depicts where noise from demolition charges and large caliber weapon may be noticeable, and some may find objectionable, when weather conditions enhance sound propagation. Under neutral or favorable weather conditions, noise levels from the ranges will be lower than indicated on the map.

Interestingly, vibration that sometimes accompanies noise from large caliber weapons and demolition activity is air-borne (not ground-borne). Neighbors located near the "loud" area in the map below may occasionally notice picture or window rattling from air-borne vibration; however, this rattling does not indicate damage.

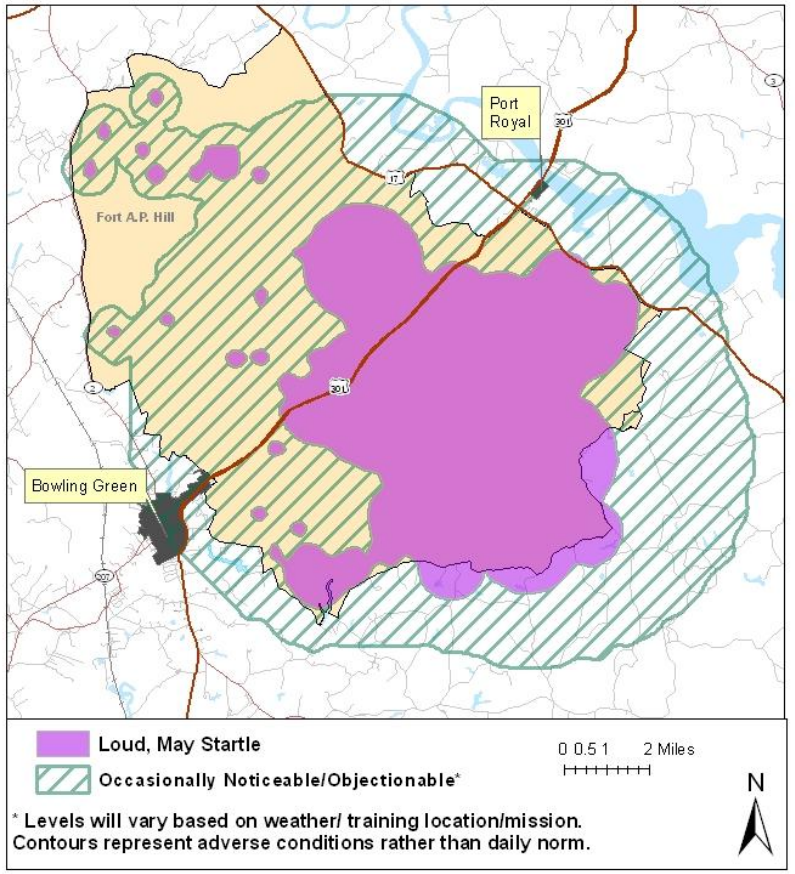

Figure 4. Perceptibility of Noise Generated by Demolition and Large Caliber Weapon Activity.