***ENVIRONMENTAL STUDIES TAB***

*(Updated 4/5/2021)*

**WIDEN, RESURFACE & BRIDGE SH-100: FROM 3 MILES NORTH OF CHEROKEE C/L EAST APPROXIMATELY 6 MILES**

**ADAIR COUNTY, J/P 32098(04)**

**Cultural Resources**: Cultural resources—including both historic resources and archaeological sites—are currently being evaluated by ODOT. The general project area has important tribal considerations as well; consequently, several tribes were consulted initially. A cultural resources survey is currently underway. The survey will identify standing historic resources and archaeological sites within the project footprint, and determine whether these properties will be affected by the project. Once the study is complete, the finding will be circulated to the tribes, the Oklahoma Archeological Survey and the State Historic Preservation Office, and other consulting parties for review and comment. Any adverse impacts to historic properties will be avoided, minimized and/or mitigated.

**Floodplains:** A small portion of the project is located within a floodplain. During large rain events and wet seasons, the floodplain helps to manage flood waters and prevent impacts to homes and property. ODOT will avoid or minimize any impacts to an acceptable level.

**Hazardous Materials**: An initial site assessment was conducted to determine the potential impact from hazardous materials or contaminants. Some areas were identified that could pose an environmental risk within the proposed project footprint adjacent to the study area (e.g., gas stations). ODOT is currently assessing the potential impacts, but these sites are not considered to be a high risk. No adverse impacts are anticipated.

**Noise:**

A traffic noise study was completed for the proposed project to estimate how the newly aligned roadway would affect noise-sensitive land uses in the area. Noise sensitive land uses are those areas where the perception of noise could be changed by the project. For this project the primary noise sensitive land uses consist of homes.

Sound from highway traffic is generated primarily from a vehicle’s tires, engine and exhaust and technically described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Decibels are based on the logarithmic scale, as opposed to the more common linear units such as that of temperature. In terms of human response, most observers perceive an increase or decrease of 10 dB in the sound pressure level as doubling or halving of the sound. For example, 70 dB will sound twice as loud as 60 dB. In addition, studies have shown that a 3 dB increase or decrease is barely perceptible by the human ear.

Noise has been defined as unwanted sound. Highway traffic noise is a major contributor to overall transportation noise and is considered to be a line source of energy from which the energy levels dissipate vertically and laterally from the roadway. Traffic noise is not constant. It varies as each vehicle passes a point. The time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure.

Noise metrics (measurements) can be divided into two categories: single event and cumulative. Single-event metrics describe the noise levels from an individual event such as an aircraft fly over or perhaps an emergency vehicle pass-by. Cumulative metrics average the total noise over a specific time period, which is typically 1 or 24-hours typically applied in evaluating community noise. For this type of analysis, cumulative noise metrics were used. For traffic noise, since humans are not equally sensitive to all frequencies, noise is adjusted or weighted using an A-weighted scale. The A weighting scale is widely used in environmental analysis because it closely resembles the nonlinearity of human hearing. The unit of A-weighted noise is dB(A). Because highway traffic sounds fluctuate over time, an equivalent sound level is used to represent a single number to describe varying traffic sound levels. The noise standard used by the FHWA is related to the peak one-hour noise level and is described in terms of the Equivalent Noise Level (Leq). The term Leq (h) refers to the energy-average noise level during the hour period, i.e., the average noise based on the acoustic energy of the sound. Peak hour noise refers to the hour with the highest Leq(h) whether or not it is the peak traffic hour. All traffic noise levels are expressed in dB(A) Leq (h).

The noise analysis for this project had utilized the FHWA Traffic Noise Model (version 2.5) to determine noise levels for the existing (year 2020) and future (design year 2040) conditions based on the project’s roadway geometry, traffic data and receptor site locations. Receptors are the “human ears” and the site location represents an area where frequent exterior human activity occurs. For residential dwellings, the receptor site location is generally the patio/backyard or front yard areas near the house structure. A total of forty-one (41) noise receivers were evaluated, including 40 residences, and 1 recreational facility (Country Cycle & Marine). For this analysis, the peak hour volumes and corresponding speeds for automobiles, medium trucks and heavy trucks result in the noisiest conditions. Exterior noise impacts occur when noise levels are expected to reach 66 dB(A) for homes. Noise impacts also occur when future noise levels are expected to be 15 dB or higher over existing noise levels even if the future level is below 66 dB(A). It is noted that a noise level at 66 dB(A) is known to interfere with communication between people 3-6 feet apart.

Based on the proposed project and future traffic volumes, seven (7) receptors will approach or exceed the 67 dB(A) Leq (h) criteria for NAC Activity Category B (h) with noise levels ranging from 66.1 to 69.7 dB(A) Leq (h). No receptors will experience a substantial increase (15 dB) in future levels over the existing levels, with highest increase being 7.2 dB. A barrier analyses was performed in consideration of abatement for two (2) of seven (7) the impacted receivers. Although both barriers proved feasible in achieving a 7-dB reduction, they were determined to exceed the reasonableness cost per benefitted receptor allowed under the ODOT Noise Policy, and therefore, mitigation is not reasonable. For the remaining five receivers (5) impacted receptors, consideration of abatement is not feasible because of driveway connections. Without access control, the gap that would be required for driveway connections would make noise abatement measures ineffective. Therefore, mitigation in the form of a freestanding sound walls are not recommended as part of this project.

**Threatened and Endangered Species:** Habitat surveys were conducted for federally listed threatened and endangered species, as well as for protected bird species. Due to the proximity to the existing highway and development of the area, habitat for threatened and endangered species was observed within the proposed project area. There was potential habitat for several protected species, including birds, bats, and insect species. As such, consultation with the U.S. Fish and Wildlife Service was conducted, and avoidance and minimization measures will be implemented. Overall, no significant adverse impacts to protected species are anticipated.

**Waters and Wetlands**: The proposed project will cross Smith Hollow Creek and a tributary to Smith Hollow Creek, an unnamed Tributary to Stilwell City Lake, and multiple non-mapped drainage features. The proposed stream and river crossings will incorporate water quality protection best management practices to prevent erosion and keep sediment and unwanted materials out of streams. As proposed, the project will be permitted by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act with a Nationwide General Permit. No significant, permanent adverse impacts to waterbodies are expected.