EXHIBIT I
NOISE EMISSIONS AND COMMUNICATION INTERFERENCE

In accordance with Arizona Administrative Code R14-3-219, the Applicant provides the following information:

Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.

Background and Existing Conditions

Corona discharge from electrical transmission lines generates audible noise and radio and television interference. Corona is a luminous discharge that emanates from an energized conductor due to ionization of the surrounding air and is caused by a voltage gradient which exceeds the breakdown strength of air. Corona is a function of the voltage gradient at the conductor surface. This voltage gradient is controlled by engineering design and is a function of voltage, phase spacing, conductor diameter, conductor bundle, height of overhead conductors, line geometry, and meteorological conditions. Irregularities on the surface of the conductor such as nicks, scratches, contamination, insects, and water droplets increase the amount of corona discharge. Consequently, during periods of rain and foul weather, corona discharge increases. This corona activity contributes to a small increase in power loss and is the source of transmission line audible noise and radio and television interference. For the various transmission line designs considered for the proposed South Mountain Transmission Project (SMT Project or Project) the maximum calculated voltage gradient at the conductor surface is lower than corona inception and extinction levels. Successful operation of 230 kilovolt (kV) transmission lines with similar gradients indicates that the Project would only create modest corona effects.

Noise

Audible noise associated with transmission lines produced by corona discharge is a function of line voltage. The amount of audible noise is directly related to the level of corona activity, which in turn is affected by the conductor's physical condition, contamination, and meteorological conditions, most notably rain. Transmission line audible noise is characterized by crackling, frying, sputtering, and low frequency tones which are best described as humming sounds. Audible noise from transmission lines primarily occurs during foul weather conditions. Audible noise increases with rain or during dust storms, although it is generally masked by the noise of rain and wind. In dry or fair-weather conditions, the conductors operate below the corona-inception level, therefore, noise would be typically only slightly audible at the edge of the proposed 230 kV transmission line rights-of-way (ROWs).

Noise levels can be measured by sound-level meters and are quantified in decibels (dB). Zero dB corresponds roughly to the threshold of average human hearing and 120 to 140 dB corresponds to the threshold of pain. Human response to noise is subjective and can vary from person to person. Factors that can influence individual response include intensity, frequency, and time pattern of the

noise; the amount of background noise prior to the intruding noise; and the nature of work or human activity that is exposed to the noise. **Table I-1** depicts average decibel levels for everyday sounds.

TABLE I-1: Common Noise Levels		
Type	**Description**	**Decibel Level**
Painful	Firearms, air raid siren, jet engine	140 dB
	Jet take-off, amplified rock music at 4-6 feet, car stereo, band practice	120 dB
Extremely Loud	Snowmobile, chain saw, pneumatic drill	100 dB
	Lawnmower, shop tools, truck traffic, subway	90 dB
Very Loud	Alarm clock, busy street	80 dB
	Conversation, dishwasher	60 dB
Moderate	Moderate rainfall	50 dB
	Quiet room	40 dB
Faint	Whisper, quiet library	30 dB
Source: American Speech-Language-Hearing Association (ASHA), 2019		

Environmental noise is usually measured in A-weighted decibels (dBA). Environmental noise typically varies over time, and different types of noise descriptors are used to account for this variability. The noise descriptor most commonly used to establish noise exposure guidelines for specific land uses is the day/night average noise level, commonly referred to as DNL. The noise level experienced at a particular site or area depends on the distance between the source and a specific receptor (e.g., humans, wildlife, etc.), presence or absence of noise barriers and other shielding features, and the amount of noise reduction provided by the intervening terrain. Some land uses are considered more sensitive to noise levels than others due to the amount of noise exposure and the types of activities typically involved. Audible noise from transmission lines next to a roadway is less perceptible due to the noise of the vehicular traffic on the road, whereas next to an isolated area free from other sources of audible noise, audible noise from transmission lines may be more noticeable.

Sources of noise in the Project area are primarily related to industrial and commercial type land use and developments, South Mountain Loop 202 Freeway (Loop 202), local transportation, and residential uses. Specifically, the area around the proposed 230 kV transmission line route options includes the following land uses: Commerce / Business Park, Commercial, Higher Density, Industrial, Large Lot, and Parks / Open Space in the City of Phoenix and Agriculture, Single-Family Low Density, Transportation, and Vacant in Maricopa County. Typical ambient noise levels for these densities range from 50 to 65 dBA (FHWA, 2003). Loop 202, a major transportation corridor, and major roads such as West Elliot Road, West Baseline Road, and West Dobbins Road are located adjacent to and/or in the vicinity of the Project routes. Levels of highway traffic noise typically range from 70 to 80 dBA at a distance of 50 feet from the highway (FHWA,

2003). In addition to being located predominantly in commercial, industrial, and mixed land uses, the Project is located in the South Mountain Tech Corridor and the Laveen Village Primary Core where there is significant planned growth in the technology, industrial, and other employment sectors.

Land uses that are considered sensitive to noise impacts are referred to as "sensitive noise receptors". In this Project area, there are residential receptors, which are single family or multi-family places where people reside and non-residential receptors which consist of, but are not limited to, schools, libraries, churches, hospitals, and other care facilities.

Existing residential communities within 1,000 feet of the Project include Estrella Vista, Paseo Pointe, Sienna at South Mountain, Cottonfields Ranch, and Weylyn Apartments. The nearest residence is located in Estrella Vista, on the corner of West Magdalena Lane and South 63rd Avenue, approximately 120 feet northwest of Route S1 and Route S2. There is a singular residence on the east side of South 63rd Avenue, located approximately 530 feet north of Route S1 and S2. There are three residences on South 62nd Drive located approximately 200 feet west of Route N1. In the Cottonfields Ranch neighborhood, there are residences located approximately 470 feet east and 500 feet east of Route N2 and Route N1's interconnection points on the Anderson – Orme 230 kV transmission line, respectively. The Weylyn Apartments are located approximately 900 feet east of Route S3.

There are proposed residential communities on both the east and west side of Loop 202. These properties are at various stages of planning, permitting and construction. A multi-family apartment complex on the east side of Loop 202 is becoming occupied.

There are non-residential noise receptors located within 1,000 feet of the Project. The closest non-residential receptor is Betty H. Fairfax High School, which is located directly south of the Laveen Area Conveyance Channel (LACC) and east of South 59th Avenue. The closest point to a Project route is the edge of the Betty H. Fairfax High School's sports fields, which are approximately 150 feet south of Route N3 and Route N4. The closest school building is approximately 1,200 feet south of Route N3 and Route N4.

There is a proposed elementary school north of West South Mountain Avenue and west of Loop 202 and east of South 63rd Avenue. The proposed elementary school has not started construction. Route S1, Route S2 and Route S3 are located along the south side and/or east side of the proposed school property.

Delicare Assisted Living and Memory Care is located in the Estrella Vista Neighborhood, west of South 63rd Avenue. Delicare Assisted Living and Memory Care is located approximately 950 feet northwest of Route S1 and Route S2.

There is a proposed hospital planned for the property owned by Banner Health south of West Baseline Road and west of Loop 202 and east of South 63rd Avenue. The proposed hospital

development is in the planning and permitting phase. Route N1 and Route N2 are located along the east side of the property.

The nearest hospital is Dignity Health - Arizona General Hospital Laveen located approximately 0.84 miles northeast of the Route N4 interconnection point east of Cheatham Substation. The hospital is beyond 1,000 feet of the Project.

There are no other schools, medical facilities, assisted living homes, and no daycares, or churches within 1,000 feet of the Project.

During construction of the Project, equipment used for clearing and grading (substation, access roads, and structure sites), assembly and erection of structures, wire pulling and splicing, and rehabilitation activities will generate noise. This heavy equipment will include cranes, trucks, and tractor graders. **Table I-2** identifies typical construction equipment noise levels.

TABLE I-2: Typical Construction Equipment Noise Levels

Equipment Type	Noise Level at 50 Feet
Backhoe	80 dB
Front-end loader	85 dB
Concrete truck/mixer	85 dB
Pump	76 dB
Grader	85 dB
Truck	88 dB
Source: Federal Highway Administration (FHWA), 2006	

Construction activities will primarily occur during daytime hours when tolerance to noise is higher. In addition, Loop 202 highway traffic noise would be present, at a similar level to the typical construction noise levels.

Construction will comply with applicable laws, including City of Phoenix ordinances (City of Phoenix, 2024b).

During operation and maintenance activities, noise could be generated from a vehicle driving along the access roads for structure and line inspection or equipment and crew conducting maintenance or repairs.

Communication Interference

High voltage transmission line radio frequency noise is not expected to be noticeable outside the immediate vicinity of the transmission lines. Radio interference is likely to affect the amplitude modulation (AM) broadcast band; frequency modulation (FM) radio is rarely affected by transmission lines. AM receivers located immediately adjacent to the proposed 230 kV transmission line have the potential to be affected by radio interference and the effect may be amplified during foul weather.

FM radio reception and cellular telephone communication are above the frequency range where radio interference has been experienced with previous projects. At the frequency range of FM radio or above, any rare instance of interference would generally be due to microsparks[1], which can be identified and corrected.

Applicant utilizes field intensity instrumentation capable of measuring radiated noise and interference from 150 kilohertz up to one gigahertz. These instruments are used for investigating reports of unusual or relatively high transmission line noise, as well as for compiling ambient noise level data.

Corona-caused radio interference by the Project is expected to be minimal due to the predominantly industrial, commercial, office, and residential character of the area along the Project and the proposed ROW widths for the Project. Furthermore, the Applicant is ready to address radio interference resulting from construction and operation of the proposed 230 kV transmission lines with corrective measures such as smoothing nicks on the conductor surface or tightening hardware, which can be implemented to help reduce radio interference complaints. In addition to any transmission repairs, relevant corrective actions may include adjusting or modifying receivers; adjusting, repairing, replacing, or adding antennas; antenna signal amplifiers; filters or lead-in cables; or other corrective actions. Based on the design parameters and physical configuration of the proposed facilities for the Project, no objectionable interference with radio signals is anticipated.

Potential Effects

The Project is located predominantly in commercial, industrial, and mixed land uses with some residential land use in close proximity as described above. The Project is located in the South Mountain Tech Corridor and passes through the Laveen Village Primary Core. The South Mountain Tech Corridor and Primary Core are planned to accommodate multiple land uses and growth in employment and housing opportunities, as designated by the PlanPHX 2025 General Plan (City of Phoenix General Plan). The Project routes are all in the vicinity of or adjacent to Loop 202, a major transportation corridor, and/or major roads such as West Elliot Road, West Baseline Road, and West Dobbins Road that intersect the Project routes.

[1] Microsparks can be caused by loose or damaged hardware that is used to support energized conductors.

As stated above, there will be audible noise emitted from the transmission lines and more so in inclement weather, however, it is not likely that noise from the two 230 kV transmission lines would be discernable because of the existing noise from Loop 202 and the mix of land uses and planned land uses in the area. During maintenance activities, noise could be generated from a vehicle accessing the transmission poles. However, any such noise is expected to be compatible with the existing noise in the area. Therefore, the Project would result in negligible impacts to noise emission levels. The Project would create noise during construction; however, due to the existing noise setting in the area and by following best management practices, the impacts would be negligible to the community.

Radio interference is expected to be minimal, due to the predominantly industrial, commercial, office and residential character of the area along the Project and the proposed ROW widths for the Project. Based on the design parameters and physical configuration of the proposed facilities for the Project, no objectionable noise and interference with radio signals is anticipated.

References

American Speech-Language-Hearing Association (ASHA). 2019. Noise. Accessed 7/24/2024. Located at: https://www.asha.org/siteassets/ais/ais-noise.pdf

City of Phoenix. 2024a. Plan PHX 2025 General Plan. Accessed 7/3/24. Located at: https://www.phoenix.gov/pddsite/Documents/City%20Council%20Adopted_PlanPHX%202025%20Update%20Final_8.5x11.pdf.

City of Phoenix. 2024b. The Phoenix City Code. Accessed 7/24/2024. Located at: https://phoenix.municipal.codes/CC/23-14.

Federal Highway Administration (FHWA), 2006. Construction Noise Handbook. Accessed 7/24/2024. [Online] Located at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/

Federal Highway Administration (FHWA), 2003. Living with Noise. Accessed 7/24/2024. Located at: https://highways.dot.gov/public-roads/julyaugust-2003/living-noise#:~:text=Levels%20of%20highway%20traffic%20noise%20typically%20range,the%20ability%20to%20carry%20on%20a%20conversation.