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Soundscape Evaluation and Optimization Strategies for an Urban Riverside Wetland Park in Arid Northwest China: A Case Study of Yintan Wetland Park, Lanzhou

Yang Chao

School of Architecture and Urban Planning, Lanzhou Jiaotong University, Lanzhou 730000, Gansu, China

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Abstract: Urban wetland parks in arid regions are simultaneously exposed to ecologically valuable natural sounds and urban acoustic disturbances, yet their soundscape dynamics remain less documented than those of parks in humid regions. This study evaluates the soundscape of Yintan Wetland Park in Lanzhou, a riverside wetland on the Yellow River, by integrating field sound-level measurements, a sound-source inventory, a questionnaire survey, and GIS-based ordinary Kriging interpolation. Twenty-eight accessible measurement locations were surveyed in May 2025 during three periods (08:00–09:00, 12:00–13:00, and 19:00–20:00), and 76 valid questionnaires were obtained. A total of 24 typical sound sources were identified; natural sounds, human-activity sounds, and mechanical/traffic sounds accounted for 38%, 32%, and 30%, respectively. Mean A-weighted sound levels across the 28 locations were 54.04 dB(A) in the morning, 51.71 dB(A) at noon, and 54.25 dB(A) in the evening. Higher levels were concentrated along the northern traffic edge and at localized evening activity nodes, whereas areas with more continuous water and vegetation generally exhibited lower levels. The park-wide mean of the point-based representative values was 53.33 dB(A), corresponding to a mean study-specific relative noise index (PN) of 0.71. Visitors showed stronger preferences for birdsong, rustling foliage, and water sounds, and weaker preferences for construction, motor-vehicle, and broadcast sounds. Based on the combined physical and perceptual evidence, the study proposes traffic-edge buffering, conservation of natural-sound core areas, temporal-spatial management of activity nodes, context-sensitive integration of cultural sounds, and long-term acoustic monitoring. The findings provide planning and management implications for riverside wetland parks in arid Northwest China.

Keywords: A-weighted sound level; Arid region; Kriging interpolation; Soundscape; Urban wetland park; Visitor perception

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1. Introduction

Soundscape research focuses on how people perceive, interpret, and experience acoustic environments in

context, thereby linking physical acoustic conditions, spatial characteristics, and human responses [1–3]. Unlike environmental acoustics approaches that are primarily oriented toward noise control, soundscape studies also consider the meaning and appropriateness of different sound sources—including natural sounds, human activities, and mechanical or traffic sounds—within a specific place. Urban parks, waterfront green spaces, and wetland parks simultaneously support ecological conservation, recreation, and cultural interpretation; consequently, their acoustic environments are often characterized by multiple overlapping sound sources, pronounced temporal variability, and spatial heterogeneity. Evaluating such environments therefore benefits from combining objective measurements with perceptual assessment.

The Yellow River waterfront in Lanzhou forms a representative urban ecological corridor in arid Northwest China. Yintan Wetland Park, located on the north bank of the river, contains wetlands, open water, reed communities, urban roads, residential areas, and recreational facilities within a relatively compact spatial system. The park retains natural sounds such as flowing water, birdsong, and wind-driven vegetation, while also receiving persistent inputs from road traffic, visitor activity, and localized sound-amplification devices. Previous research has addressed soundscape perception, soundwalk methods, and soundscape evaluation in urban parks, wetland parks, and related recreational landscapes [4–9]. However, the composition, spatial differentiation, and user perception of soundscapes in large-river wetland parks in the arid Northwest remain comparatively underexplored. In practice, landscape design and management also tend to prioritize visual qualities over auditory experience, while acoustic management is often treated as post-hoc noise reduction rather than being coordinated with habitat conservation, recreational zoning, and place-based cultural expression.

Against this background, this study investigates Yintan Wetland Park through an analytical sequence of sound-source composition, spatial sound-level distribution, visitor perception, and planning response. The objectives are to: (1) identify the major sound sources and characterize their composition; (2) reveal spatial differences in A-weighted sound levels through multi-period field measurements and GIS interpolation; (3) describe visitor preferences for typical sound sources and their perceived congruence with the environment; and (4) identify priority intervention areas using a study-specific relative noise index and translate the combined physical and perceptual evidence into soundscape optimization strategies. Because the dataset is based on short-duration measurements at representative periods, the results are interpreted as comparative soundscape evidence rather than as a statutory environmental-noise compliance assessment.

2. Study area and methods

2.1. Study area

Yintan Wetland Park is located on the north bank of the Yellow River in Anning District, Lanzhou, and covers approximately 32.86 ha [10]. The park comprises open water, riparian flats, reed and wetland vegetation communities, pedestrian paths, and recreational nodes. Its surroundings include North Binhe Road, Yintan Yellow River Bridge, residential districts, and public activity spaces. The acoustic setting varies markedly across the park: areas close to the river, water bodies, and dense vegetation are dominated by flowing water, birdsong, and vegetation sounds; locations near roads and entrances are more strongly affected by traffic; and several plazas and recreational nodes are influenced by crowd activity and amplified sound during particular periods.

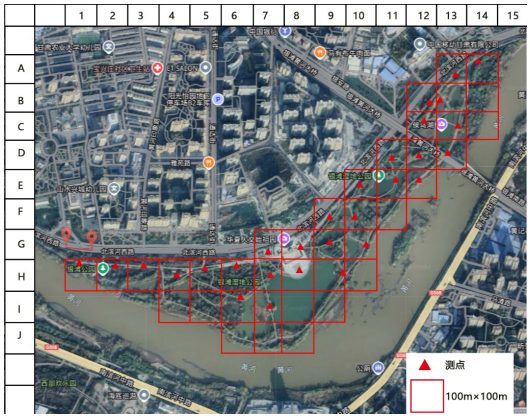

Figure 1. Sampling grid and distribution of sound-level measurement points in Yintan Wetland Park.

2.2. Sound-level measurements and spatial analysis

Field measurements were conducted with a TES-1350A sound level meter using A-weighting, with terminology referenced to the national sound-level-meter specification [11]. Measurement locations were arranged with reference to a 100 m × 100 m grid and adjusted according to the accessibility of roads, paths, and major landscape nodes; a total of 28 accessible locations were included in the final dataset. The survey was undertaken in May 2025 on both working and non-working days. At each location, measurements were collected during the morning (08:00–09:00), noon (12:00–13:00), and evening (19:00–20:00). Each measurement lasted 5 min with a sampling interval of 30 s. The instrument was positioned approximately 1.5 m above ground, and measurements were preferentially carried out under precipitation-free conditions with wind speeds not exceeding 3 m/s. Geographic coordinates were recorded in the WGS84 coordinate system.

Coordinates and A-weighted sound-level data for the three periods were imported into ArcGIS 10.8.1. Ordinary Kriging was used to interpolate continuous spatial surfaces for the study area. The interpolation maps were used to compare relative spatial patterns among areas and survey periods. They were not used to substitute for long-term monitoring or statutory assessment under environmental acoustic functional zoning and related standards [12,13].

2.3. Sound-source survey and questionnaire survey

Recognizable sound sources were recorded during field reconnaissance and grouped, according to source origin, into three study-specific categories: natural sounds, human-activity sounds, and mechanical/traffic sounds. This classification was adopted to describe the local soundscape composition and should not be interpreted as a formal source taxonomy prescribed by ISO 12913-1; the standard primarily establishes the definition of soundscape and its contextual perceptual framework [2].

The questionnaire survey was also conducted in May 2025. A total of 100 questionnaires were distributed to park visitors, nearby residents, and other users, of which 76 were valid, corresponding to a valid-response rate of 76%. A five-point Likert scale was used to assess preference for typical sound sources, perceived congruence between the soundscape and the surrounding environment, perceived disturbance from traffic and broadcast sounds, and recognition of sounds with local cultural characteristics. Because complete respondent-level records were unavailable for the present analysis, the questionnaire results are reported using descriptive statistics only; inferential tests, correlation coefficients, and regression estimates are therefore not presented.

2.4. Study-specific relative noise index

To compare the relative acoustic condition of the measurement locations, this study adopts a study-specific relative noise index (PN) as an internal comparative metric. Because the available data consist of short-duration measurements from three representative periods, the arithmetic mean of the three measured A-weighted sound levels was calculated as the representative value for each location. PN was calculated by dividing the representative A-weighted sound level at each location by 75 dB(A), which served as the reference value for this analysis. PN is used only for internal comparison among locations in this study and is not a statutory exceedance criterion. The classification scheme is shown in **Table 1**. Grades in the point-level results were assigned from unrounded PN values; displayed PN values are rounded to two decimal places.

Table 1. Classification of the study-specific relative noise index (PN)

Grade	Assessment	PN range	Representative sound-level range [dB(A)]
I	Very good	< 0.60	< 45.0
II	Good	0.60 to < 0.67	45.0 to < 50.25
III	Moderate	0.67 to < 0.75	50.25 to < 56.25
IV	Relatively poor	0.75–1.00	56.25–75.0
V	Poor	> 1.00	> 75.0

3. Results and analysis

3.1. Soundscape composition

The field survey identified 24 typical sound sources. By source origin, natural sounds accounted for 38%, human-activity sounds for 32%, and mechanical/traffic sounds for 30%. Natural sounds included egret calls, sounds from flocks of ruddy shelducks, frog calls, cicadas, insects in reed beds, Yellow River flow, reed rustling, and willow rustling. Human-activity sounds included quiet conversation, children playing, camera shutters, footsteps, and sounds generated by use of the wooden boardwalk. Mechanical/traffic sounds included motor vehicles along North Binhe Road and Yintan Yellow River Bridge, shared-bicycle notification sounds, broadcast/public-address sound, and drone noise. Overall, the park retains a diverse natural-sound resource, while traffic edges and several activity nodes interrupt the continuity of the natural soundscape. See **Table 2**.

Table 2. Typical sound sources identified in Yintan Wetland Park

Primary category	Secondary category	Typical sound sources
Natural sounds	Biological sounds	Egret calls; ruddy shelduck flock sounds; frog calls; cicadas; insects in reed beds
Natural sounds	Geophysical sounds	Yellow River flow; reed rustling; willow rustling
Human-activity sounds	Visitor activity	Quiet conversation; children playing; camera shutters; footsteps
Human-activity sounds	Facility-use sounds	Creaking of the wooden boardwalk and related use sounds
Mechanical/traffic sounds	Traffic and notification sounds	Motor vehicles; shared-bicycle notification sounds
Mechanical/traffic sounds	Equipment sounds	Broadcast/public-address sound; drone noise

3.2. Spatiotemporal distribution of A-weighted sound levels

Mean A-weighted sound levels across the 28 measurement locations differed among the three survey periods:

54.04 dB(A) in the morning, 51.71 dB(A) at noon, and 54.25 dB(A) in the evening. The noon period had the lowest overall mean, whereas localized evening activities produced several pronounced high-level locations. The measured ranges were 42–68 dB(A) in the morning, 42–66 dB(A) at noon, and 46–70 dB(A) in the evening.

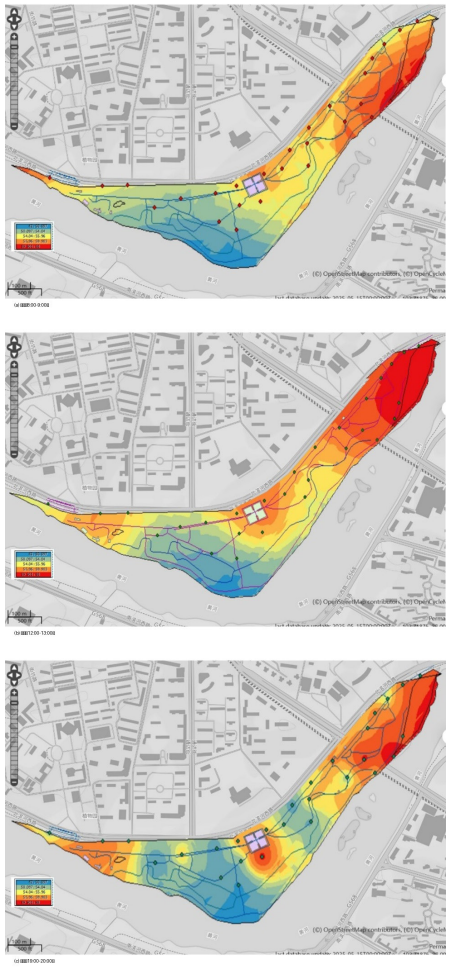

Figure 2. Spatial distribution of A-weighted sound levels in Yintan Wetland Park during (a) morning (08:00–09:00), (b) noon (12:00–13:00), and (c) evening (19:00–20:00).

Spatially, the northern and northeastern parts of the park adjacent to urban roads and the bridge consistently exhibited higher sound levels during all three periods, indicating that traffic is a relatively stable external acoustic disturbance. Interior areas closer to water bodies, denser vegetation, and less accessible spaces generally showed lower sound levels, where natural sounds were more readily perceptible. The highest morning value was 68 dB(A) and occurred near the traffic edge. The maximum decreased to 66 dB(A) at noon, while localized activity spaces reached 70 dB(A) in the evening. These patterns indicate that the park acoustic environment is shaped jointly by a stable traffic background and time-dependent recreational activity.

3.3. Characteristics of the relative noise index

The park-wide mean of the point-based representative sound levels was 53.33 dB(A), corresponding to a mean PN of 0.71 and Grade III under the study-specific classification. Among the 28 locations, 2 were

classified as Grade I, 5 as Grade II, 13 as Grade III, and 8 as Grade IV; no Grade V location was recorded. Grade IV locations were concentrated along traffic edges and at several nodes with pronounced activity-related disturbance, demonstrating that acoustic pressure is spatially clustered rather than uniformly distributed across the park.

For representative landscape areas recorded in the site survey, location 8H in Shizu Garden had a three-period mean of 61.67 dB(A) and a PN of approximately 0.82 (Grade IV). Location 13C near Migratory Bird Lake had a mean of 56.67 dB(A) and a PN of approximately 0.76 (Grade IV). By comparison, location 10G near Yuyue Lake had a mean of 48.00 dB(A) and a PN of 0.64 (Grade II), while location 6I near Waterfowl Lake had a mean of 45.33 dB(A) and a PN of approximately 0.60 (Grade II). These representative areas therefore span Grades II to IV, further illustrating the pronounced spatial heterogeneity of the park.

3.4. Visitor perception and integrated physical–perceptual analysis

The 76 valid questionnaires showed clear differences in visitor responses to sound sources. The five most preferred sound types were birdsong (4.15), wind in foliage (4.10), water waves (4.00), frog calls (3.85), and goose/duck calls (3.70). The least preferred sounds were construction activity (1.78), motor vehicles (2.05), and broadcast/public-address sound (2.20). These descriptive results indicate that natural sounds contribute positively to wetland recreation, whereas persistent or abrupt mechanical, traffic, and amplified sounds are more likely to be experienced negatively.

Comparison of the spatial sound-level patterns with the questionnaire results reveals a consistent directional relationship between the objective and subjective evidence. Traffic edges and localized amplified-activity areas appeared as high-level zones in the measurements, while motor-vehicle and broadcast sounds received low preference scores. Conversely, areas with more continuous water and vegetation generally had lower measured sound levels, and natural sounds such as birdsong, water, and wind-driven foliage received higher preference scores. Because complete individual-level questionnaire data and respondent-to-location matching are unavailable, this study does not infer statistical relationships such as a significant correlation between A-weighted sound level and preference, nor does it estimate a fixed change in preference for a specified increase in sound level. The results are therefore interpreted as descriptive convergence between physical and perceptual evidence.

4. Soundscape planning and optimization strategies

The combined findings suggest that soundscape improvement should not rely on uniform noise reduction across the entire park. Instead, design and management responses should correspond to the distinct acoustic roles of traffic edges, natural-sound cores, high-activity nodes, and culturally expressive spaces. The following strategies translate the measured spatial patterns and visitor perceptions into site-specific planning actions.

4.1. Establish acoustic buffers along traffic edges

Persistent traffic background sound along North Binhe Road and Yintan Yellow River Bridge indicates that the northern park edge should be prioritized for continuous multi-layered vegetation and microtopographic buffering. Existing locally adapted species such as tamarisk, reeds, and willows can be organized in combined tree–shrub–herb and wetland-plant layers to strengthen spatial enclosure and visual screening. Where hydrological and spatial conditions permit, gentle berms, low mounds, or sunken spaces may be used to increase propagation distance and provide additional separation from traffic. These measures should

be integrated with ecological-restoration objectives and should avoid high-maintenance or poorly adapted planting introduced solely for acoustic purposes [14].

4.2. Conserve low-level natural-sound core areas

In areas such as Waterfowl Lake and Yuyue Lake, where natural-sound resources are comparatively rich, management should shift from adding new sounds to protecting the audibility of existing ecological sounds. High-level facilities should be restricted, drone use and portable amplification should be controlled, and nighttime lighting and circulation routes should be managed to reduce disturbance to bird habitat and acoustically tranquil wetland areas. Birdwatching platforms, boardwalks, and pause points should be located where visitors can perceive water sounds, birdsong, and vegetation sounds without intruding into core habitats, allowing natural sound to function as an integral component of the recreational experience.

4.3. Apply temporal and spatial management to high-activity nodes

Shizu Garden, park entrances, and other activity-intensive nodes exhibit time-dependent increases in sound level. At these locations, activity scheduling, volume limits for amplified sound, and spatial zoning can reduce acoustic spillover into adjacent wetland areas. Fitness plazas and group-activity spaces should be separated from quiet recreation areas by adequate distance and vegetated buffers, while signage can define nighttime quiet periods. Temporal zoning, spatial separation, and directional control of sound are more compatible with everyday community use than blanket prohibition and can better balance recreational demand with wetland soundscape conservation.

4.4. Integrate place-specific cultural sounds with restraint

Yellow River culture can be interpreted acoustically through elements associated with waterwheels, local customs, and memories of riverside life, but cultural soundscape interventions should avoid becoming new sources of repetitive mechanical or broadcast disturbance. Priority should be given to authentic environmental sounds, small interactive sound installations, or low-volume, time-limited interpretive elements. These should be coordinated with water, vegetation, pedestrian routes, and interpretive systems so that cultural sound enriches place experience rather than functioning as continuous background noise.

4.5. Establish dynamic monitoring and feedback

Representative long-term monitoring locations should be established at traffic edges, core wetland habitats, major activity nodes, and quiet-experience areas to record seasonal and diurnal changes in A-weighted sound levels and dominant sound sources. Park managers can combine acoustic monitoring with visitor feedback, bird activity, and patterns of spatial use to create a recurring cycle of monitoring, identification, adjustment, and verification. Future studies should incorporate standardized soundwalks, event-based sound-source annotation, and perceptual survey procedures recommended in the ISO 12913 series to improve comparability across seasons and across parks.

5. Conclusions

Yintan Wetland Park contains a diverse soundscape in which 24 typical sound sources were identified. Natural sounds, human-activity sounds, and mechanical/traffic sounds accounted for 38%, 32%, and 30%, respectively. Natural sounds represent an important ecological and experiential asset, while road traffic and

localized amplified activities form the principal acoustic disturbances.

The 28 valid measurement locations exhibited marked spatiotemporal differences. Mean A-weighted sound levels were 54.04 dB(A) in the morning, 51.71 dB(A) at noon, and 54.25 dB(A) in the evening. Higher values were concentrated along traffic edges and at localized evening activity nodes, whereas areas with more continuous water and vegetation were generally quieter. The park-wide mean representative level was 53.33 dB(A), with a mean PN of 0.71. Twenty-one of the 28 locations fell within Grades III and IV, indicating that targeted treatment of traffic edges and activity nodes is more appropriate than uniform intervention across the park.

Visitors expressed stronger preferences for birdsong, wind in foliage, and water sounds, while construction, motor-vehicle, and broadcast sounds received lower ratings. Integrating the objective and subjective findings supports a soundscape optimization framework centered on traffic-edge buffering, conservation of natural-sound cores, temporal-spatial management of activity areas, restrained integration of cultural sounds, and dynamic monitoring. The study is limited by short-duration measurements, a single-season survey, and the absence of complete individual-level questionnaire data and respondent–location matching. Future research should therefore employ multi-season continuous monitoring, standardized soundwalk protocols, and respondent-level statistical analysis to test the observed physical–perceptual relationships more rigorously.

Disclosure statement

The author declares no conflict of interest.

References

[1] Schafer R, 1977, The Tuning of the World. New York: Knopf.

[2] International Organization for Standardization (ISO), 2014, ISO 12913-1:2014 Acoustics—Soundscape—Part 1: Definition and Conceptual Framework. Geneva: ISO.

[3] Axelsson Ö, Nilsson M, Berglund B, 2010, A Principal Components Model of Soundscape Perception. Journal of the Acoustical Society of America, 128(5): 2836–2846.

[4] Kang J, Schulte-Fortkamp B, 2016, Soundscape and the Built Environment. Boca Raton: CRC Press.

[5] Wang D, 2018, Soundscape Evaluation and Design Methods for Xixi National Wetland Park, thesis, Zhejiang Gongshang University.

[6] Zhao J, Yang S, Zhang L, 2017, Effects of Soundscape on Visual Aesthetic Perception. Urban Problems, 2017(4): 41–46 + 51.

[7] Lee H, Lim K, Garg S, 2019, A Case Study of Recording Soundwalk of Fushimi Inari Shrine in Kyoto, Japan Using Smartphone. International Journal of Environmental Science and Technology, 16: 1555–1564.

[8] Li J, 2019, Soundscape Evaluation of Riverside Parks in Shenyang, thesis, Shenyang Agricultural University.

[9] Wang L, Zhang H, Lu L, et al., 2014, Visitor Perceived Value in Wetland Parks: A Comparison of Xixi and Qinhu. Tourism Tribune, 29(6): 87–96.

[10] Yang X, Wang Y, 2025, Usage Conditions and Optimization Strategies of Lanzhou Yintan Wetland Park. Co-Operative Economy & Science, 2025(5): 179–182.

[11] General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, Standardization Administration of China, 2010, GB/T 3785.1—2010 Electroacoustics—Sound Level Meters—

Part 1: Specifications. Beijing: Standards Press of China.
[12] Ministry of Ecology and Environment of the People's Republic of China, General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, 2008, GB 3096—2008 Environmental Quality Standard for Noise. Beijing: China Environmental Science Press.
[13] General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, Standardization Administration of China, 2014, GB/T 15190—2014 Technical Specifications for Environmental Noise Functional Zoning. Beijing: Standards Press of China.
[14] Ding S, 2018, Landscape Planning for Urban Riverbanks Oriented Toward Ecological Restoration: A Case Study of the Comprehensive Landscape Improvement Plan for Both Banks of the Hun River in Shenyang. Urban Housing, 25(11): 78–80.

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Appendix A. A-Weighted Sound-Level Measurements

Table A1. Raw summary of A-weighted sound-level measurements for the three survey periods

Point	Longitude	Latitude	Morning [dB(A)]	Noon [dB(A)]	Evening [dB(A)]
1H	103.7089995	36.0857941	54	45	51
2H	103.7039508	36.0856968	56	55	58
3H	103.7056395	36.0856517	52	50	55
4H	103.7065911	36.0850722	46	42	46
5H	103.7089995	36.0856524	52	50	54
6H	103.7075479	36.0855072	48	46	48
6I	103.7095423	36.0846109	46	42	48
7G	103.7103111	36.0858711	55	52	55
7H	103.7105476	36.0852384	55	46	50
7I	103.7107733	36.0842631	42	44	46
8G	103.7123806	36.0860171	60	56	54
8H	103.7119451	36.0855569	62	58	65
9F	103.7134825	36.0874972	50	48	48
9G	103.7133158	36.0864391	55	50	51
10E	103.7145467	36.0880710	56	48	53
10F	103.7142779	36.0872728	56	50	54
10G	103.7143048	36.0865531	50	45	49
11D	103.7161591	36.0896687	54	58	56
11E	103.7158957	36.0882028	55	46	51
12B	103.7176076	36.0912726	58	60	57
12C	103.7171104	36.0906130	50	54	55
12D	103.7168766	36.0896219	64	60	64

Point	Longitude	Latitude	Morning [dB(A)]	Noon [dB(A)]	Evening [dB(A)]
12E	103.7162988	36.0890575	52	50	54
13A	103.7181423	36.0918694	54	56	58
13B	103.7180133	36.0914921	54	54	52
13C	103.7171104	36.0906130	56	55	59
13D	103.7158062	36.0897507	68	66	70
14A	103.7190291	36.0925382	53	62	58

Appendix B. Representative Sound Levels and PN Values

Table B1. Representative sound levels and study-specific relative noise index (PN) by measurement location

Point	Longitude	Latitude	Representative level [dB(A)]	PN	Grade
1H	103.7089995	36.0857941	50.00	0.67	II
2H	103.7039508	36.0856968	56.33	0.75	IV
3H	103.7056395	36.0856517	52.33	0.70	III
4H	103.7065911	36.0850722	44.67	0.60	I
5H	103.7089995	36.0856524	52.00	0.69	III
6H	103.7075479	36.0855072	47.33	0.63	II
6I	103.7095423	36.0846109	45.33	0.60	II
7G	103.7103111	36.0858711	54.00	0.72	III
7H	103.7105476	36.0852384	50.33	0.67	III
7I	103.7107733	36.0842631	44.00	0.59	I
8G	103.7123806	36.0860171	56.67	0.76	IV
8H	103.7119451	36.0855569	61.67	0.82	IV
9F	103.7134825	36.0874972	48.67	0.65	II
9G	103.7133158	36.0864391	52.00	0.69	III
10E	103.7145467	36.0880710	52.33	0.70	III
10F	103.7142779	36.0872728	53.33	0.71	III
10G	103.7143048	36.0865531	48.00	0.64	II
11D	103.7161591	36.0896687	56.00	0.75	III
11E	103.7158957	36.0882028	50.67	0.68	III
12B	103.7176076	36.0912726	58.33	0.78	IV
12C	103.7171104	36.0906130	53.00	0.71	III
12D	103.7168766	36.0896219	62.67	0.84	IV
12E	103.7162988	36.0890575	52.00	0.69	III
13A	103.7181423	36.0918694	56.00	0.75	III
13B	103.7180133	36.0914921	53.33	0.71	III
13C	103.7171104	36.0906130	56.67	0.76	IV
13D	103.7158062	36.0897507	68.00	0.91	IV
14A	103.7190291	36.0925382	57.67	0.77	IV
Mean			53.33	0.71	III