**Scope of Services**

PHASE 1| **CONCEPT DESIGN**

**Scope**

* Confirm design deliverables plan.
* Prepare Outline Design Brief and Tender Brief:
* To detail internal noise levels for ventilation and cooling equipment, vibration control measures for roof mounted equipment, sound insulation of separating structures and finishes to suites and common areas to control acoustic reverberation.
* Review the existing design drawings to develop an understanding of the existing building type.
* Undertake environmental noise surveys to determine ambient and background noise levels:
* Undertake a noise survey around the development during the day to create acoustic specifications for the building acoustics. All surveys to be manned in order to ensure sources of sounds are identified and accurately recorded. Survey to include ground level and elevated levels.
* Undertake noise measurements at the nearest noise sensitive location to the proposed development during the evening and night to create specifications which limit the amount of noise from ventilation/cooling machinery on the building(s).
* Room acoustics and specialist areas (spa, meeting rooms, GYM, lobby& bar); perform occupied noise and reverberation time measurements to determine Acoustics acoustic conditions. Measured data will be compared with accepted norms and guidelines. Recommendations to be offered for noise/ reverberation mitigation.
* A general HVAC noise mitigation strategy will be given which will be integrated into the concept design report.
* Provide a site observation / discovery of the existing conditions in the area of work.
* Visit site to inspect the location of the development
* Identify appropriate acoustic standards (such as Accor standard) and the acceptable local planning requirements.
* The acoustic strategy will consider the following key components:
* Environmental acoustics: assessment of general road noise (based on traffic analysis by others) impact from delivery traffic to facilities, **including plane noise impact study.**
* Architectural acoustics: overall analysis of the site, landscape and assessment of façade construction, treatment of internal and external public spaces and guidance on acceptable performance standards.
* Building systems and plant acoustics: location of main plant and the presentation of noise generation, reflection and disturbance.
* Provide target design criteria for the following:
* Building services noise and vibration.
* External noise break-in levels compatible for internal areas.
* Sound insulation of building envelopes and between internal spaces.
* Reverberant noise control provisions.
* Geometry of spaces where there are acoustic implications.
* A desktop review of the building locations to identify acoustic opportunities and cost reductions.

This will include a preliminary assessment of potential environmental noise climate and how it may impact on the building envelope and ventilation strategies.

* Advice on necessity to develop an acoustic model of the sites to develop a cost effective approach to the building envelope design.
* Where value engineering must be undertaken to reduce project costs, acoustic consultant will provide advice on any sensitive areas where alterations are enforced. Acoustic consultant to advise on the implications of the changes and attempt to ensure that any negative acoustic impacts are minimized.
* Prepare design program detailing the activities and inputs necessary to meet the project timeline requirements and work with the Design Team to coordinate program with other disciplines.

**Deliverables**

Contributions to:

* Monthly Report.
* Design Presentation.
* End Stage Report and findings

Define building design standards and criteria in the Concept Acoustic Design Report highlighting:

* Key issues.
* Necessary design parameters.
* Analysis of Initial Briefing Material and Stakeholder requirements.
* Acoustic Strategy

Provide an initial report describing the environmental noise survey, results and specifications to commence the design.

Report should include but not limited to:

* Floor/Ceiling Assemblies
* Demising partitions
* Elevators
* Mechanical systems
* Façade noise Break-in assessment
* Road noise measurement

PHASE 2| **SCHEMATIC DESIGN**

**Scope**

During this phase, acoustical design efforts will define acoustical design criteria and guidelines and provide recommendations and approaches that will achieve these goals.

* With references to Accor Hotel Standards, International and applicable local standards, outline the approach to be used in the acoustical design for the following:
1. Sound insulation between guestrooms and adjacent internal occupied areas,
2. Optimum reverberation time criteria,
3. Maximum permissible noise and vibration levels for building services plant within the guestrooms.
* Study space adjacencies and identify potential intrusive noise transmission between adjoining spaces due to the nature of the various functions in these spaces. Submit comments and recommendations of adjacency changes and/or noise transmission control treatments.
* Recommend the appropriate acoustic design criteria in the following categories:
1. Maximum permissible background noise levels in terms of NR (Noise Rating) or NC (Noise Criterion) ratings and vibration limits due to the operation of HVAC systems, plumbing, electrical and elevator systems.
2. Acoustic separation between different guestroom spaces in terms of STC (Sound Transmission Class) or Rw (Weighted Sound Reduction Index) ratings, to achieve speech with privacy and adequate noise isolation.
3. Impact noise ratings in terms of Impact Insulation Class of ceiling/floor slabs and floor finishes or Weighted Standardized Impact Sound Pressure Level for control of noise transmission between vertically adjoining spaces.
* Review base building architectural and engineering design concepts reports, drawings and provide input in terms of space planning, guestroom internal equipment noise and vibration generating properties, identify and discuss potential problems, and offer suggestions of alternate design approach where applicable.
* Submit acoustic design guidelines with regard to HVAC systems to achieve acceptable background noise level
* ratings for all phases of the project.
* Review mechanical, plumbing and electrical design documents conveying design concepts in terms of equipment noise and vibration-generating properties.
* Develop a section in the overall Schematic Design report for guestrooms that establishes acoustical goals and
* recommends constructions, treatments, and controls to be used by the project team for coordination and incorporation of information into documents for the Design Development Phase.

**Deliverables**

Schematic design report incorporating:

* Acoustic design details.
* Acoustic Strategy

Mock ups review memo.

PHASE 3| **DESIGN DEVELOPMENT**

**Scope**

In this phase, general details, materials, and approaches towards acceptable acoustical criteria will be discussed, and specific approaches will be determined. The intent for this phase is to establish the most cost -effective and viable acoustic, noise and vibration control for the guestroom spaces and systems.

* Provide advice to the Design Team on acoustic aspects of the proposed designs and discuss compliance with the acoustic design parameters as set down in the Schematic Design stage.
* Develop design details of any specialized acoustic constructions.
* Develop detailed performance requirements.
* Review expected noise and vibration evaluation and calculations completed by the MEP Engineer.
* Review cooling, ventilation equipment, pumps etc. to calculate plant room noise levels.
* Provide details of noise control measures necessary to air handling plant and anti-vibration measures for equipment.
* For Acoustic and internal sound insulation; review the proposal made by the contractor against acoustic specifications from previous reports and advise on their suitability. Include review of submissions from the architect and façade contractors regarding proposed details to achieve flanking transmission, external to internal attenuation and cross talk attenuation between rooms.
* Review and evaluate the design development plans and provide recommendations, including the selection of specific types of equipment, acoustical treatment, materials, construction detailing, and isolation techniques.
* Review the structural framing design based on the design operating conditions of mechanical/electrical equipment. This will determine a minimum floor slab thickness and the mass requirements for the guestroom spaces needed to support adequate control of airborne and structure-borne noise transmission.
* Establish partition types, as appropriate and in accordance with STC properties established for the project.
* Provide recommended partition detail sketches, if necessary, for each type, including the joint details and conditions along top and bottom runner channels for the best field performance of recommended constructions.
* Review duct penetration locations for supply and return air and duct routing configurations. Based on the air distribution requirements, we will determine the best air-handling equipment location, orientation and main duct routing and construction.
* Review HVAC design drawings and work with the mechanical engineer to formulate the most cost- effective noise and vibration control approaches and treatments.
* Submit complete recommendations of base-building core and shell constructions in order to achieve adequate sound attenuation from adjacent activities.
* Prepare a design development report that provides comments and recommendations outlining acoustical, noise and vibration control approaches, materials, performance, and general details

**Deliverables**

* Acoustic Design Development Report
* Recommended Partition Detail Sketches, as required,
* General Construction Details and Product Specifications.
* List of Long Lead Materials.
* Façade noise break-in assessment
* Completed requirement specification

PHASE 4| **TENDER & CONSTRUCTION ADMINISTRATION**

**Scope**

During this phase, we will review and approve submittals and shop drawings relating the acoustical, noise and vibration aspects of the project, and we will respond to field submitted Requests for Information (RFI) to ensure that construction means, methods and materials comply with the construction documents and the acoustical design intent.

* Review and evaluate all construction documents at various stages of completion to determine that all vibration and acoustic design criteria can be achieved. Furthermore, ensure that appropriate construction types and detailing have been used, with correct materials and products specified.
* Assist the project team with responding to queries during the tender period.
* Review and respond to requests for information (RFIs).
* Attend up to two meetings when instructed by the Client, to meet the Contractor and define the scope of work and ensure they fully understand the requirement of the Client, the site conditions and project pre -contract programs.
* Review and approve shop drawing, materials, equipment submissions and Contractor proposed alternatives and supplier’s related to acoustical, noise and vibration issues for conformance with design intent and compliance with the Tender Documents.
* Review the installation of interior architecture on site and provide direction as necessary to ensure the materials and finishes are satisfactory to the Owner.
* Comment and/or approved construction systems stating if they are in accordance within the design and manufacturer’s specifications when instructed by the Client.

**Deliverables**

* Specifications and Performance Specifications related to Acoustical, Noise and Vibration Control, as necessary.
* Review Acoustics fit-out and finishes, provide comments where necessary.
* Provide review reports/markups/memos on the shop drawings if required.