



**MARSHALL DAY**  
Acoustics 

COMPANY PROFILE  
HEALTHCARE PROJECTS



## WHO IS MARSHALL DAY ACOUSTICS?

Marshall Day Acoustics is one of the world's leading firms of acoustic consultants, providing the highest standard of architectural and environmental acoustic consulting to our clients. For over 30 years, we have been providing innovative acoustic designs on major projects in over 15 countries and employ over 85 professional staff in offices in Australia, New Zealand, China, Hong Kong, and France.

As one of the largest acoustic engineering firms worldwide, we are able to provide our clients with the greatest range and depth of experience and expertise available.

Our strength in acoustic design comes from the diversity of our team members who have been drawn from engineering, architectural, musical and academic backgrounds, with one common focus; to provide innovative acoustic designs of the highest standard.

From highly specialised Hospitals to Sports Stadiums and everything in between, we have experts in every field of acoustics who have the specialist knowledge required to deliver quality project outcomes.



*"I regard the acoustic designs of Marshall Day Acoustics to be amongst the finest and probably the most innovative in the world"*

Dr Anders Gade, Associate Professor Technical University of Denmark

## A COLLABORATIVE APPROACH

We have a collaborative approach to design and work as part of an integrated team with the client, architect and other consultants. We do not specify acoustic performance that “must” be achieved, but instead we work with the project team to develop acoustic criteria and treatments that meet the desired project outcomes, whatever they may be. Recognising commercial realities and achieving an appropriate balance between quality and cost objectives is something we take very seriously.

## QUALITY ASSURANCE

Marshall Day Acoustics is a professional organisation with a quality management system certified in accordance with ISO 9001:2015. We have a number of quality assurance procedures in place to ensure that:

- All reports are checked and then countersigned by a senior member of staff prior to issue
- Measurement procedures are standardised
- Calculations are performed using standard data and validated methods defined in our technical binder system. Standard calculation checklists will be used on this project
- We have a range of software that has been developed in-house. Together with our master technical binder system, this allows us to adopt a uniform approach to calculations, which can then be more readily checked
- Use of the online intranet design advice and document register system

*“Marshall Day Acoustics brought imagination and resourcefulness to the task... Their work has set a new standard.”*

Donald L. Bates, Project Director,  
Federation Square, Melbourne –  
Lab Architecture Studio



## TECHNICAL AND DESIGN CAPABILITIES

We are at the cutting edge of development in the acoustic industry. We are committed to being at the forefront of research and development in our field and have employed significant time, energy and resources into ongoing development of our in-house and commercially available tools across a range of sectors including concert halls, theatre design, building acoustics, environmental noise modelling, intelligent noise loggers, underwater acoustics and more.

Marshall Day Acoustics provides a unique combination of design skills, research knowledge and predictive techniques to ensure the client's requirements are achieved.

The firm has a range of acoustic design tools including the facility to carry out computer modelling and also scale model testing on physical models as small as 1:50. This allows the accurate prediction of the objective acoustic properties and simulation of subjective qualities before they are constructed.

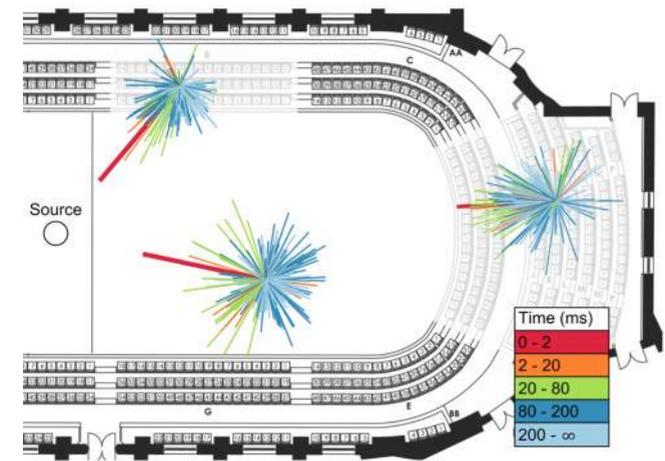
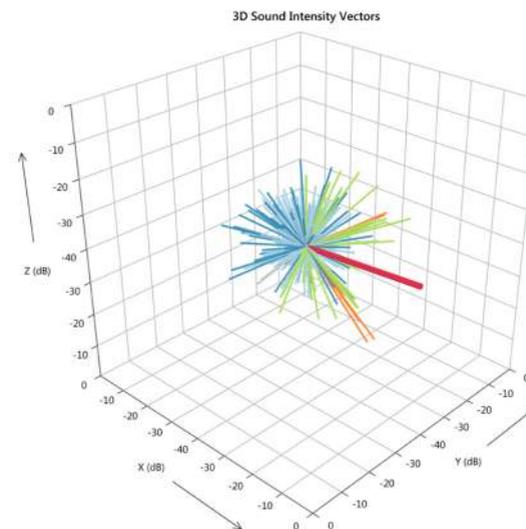
Marshall Day Acoustics is a world leader in the development of commercially available sound insulation predictive tools for consultants and engineers. Our proprietary software has sold more than 1900 licences in 22 countries.

All of the Marshall Day Acoustics offices are linked via a company intranet which indexes the collective experience of our consultants, providing access to solutions developed over many years of consulting projects.

Marshall Day Acoustics is committed to improving our delivery of quality and to enhancing our reputation as suppliers of quality acoustic consulting services, in all of our markets.

*“MDA has developed a unique collaborative process involving 3-dimensional technologies to deliver proficient, yet original design accomplishments. The internationally recognised success in the acoustic designs of the Guangzhou Opera House is a reflection of this testament.”*

Woody K.T. Yao, Associate Director, Zaha Hadid Architects



## CONSULTANCY SERVICES - WHAT WE DO

### ARCHITECTURAL ACOUSTICS

Design or corrective work to make the acoustical environment effective and comfortable. Sound insulation, acoustic quality, speech privacy and the total acoustic design of projects such as music teaching facilities, offices, hotels, reception centres, broadcast facilities and apartments.

### AUDITORIUM ACOUSTICS

Complete acoustic consultancy for all communication and performing arts spaces, including theatres, churches, conference rooms, multi-purpose halls and concert halls. Design techniques include state-of-the-art computer and scale modelling.

### ELECTRO-ACOUSTIC SYSTEMS

Specialist consulting services for the design and commissioning of sound reinforcement and communication systems for performing arts applications, churches and convention facilities.

### ENVIRONMENTAL NOISE AND VIBRATION

Assessment of noise and vibration impact of development proposals, including new roads, railways, air transportation developments and industrial projects. Site noise and vibration surveys, sound and vibration propagation predictions. Recommendations for the enforcement of environmental standards. Presentation of expert evidence for prosecutions or planning hearings. Assistance with development of noise and vibration control policy.

### MECHANICAL SERVICES NOISE AND VIBRATION CONTROL

Design, specification, supervision and commissioning of noise and vibration control systems for mechanical plant. Control of all duct, pipe and structure-borne noise.

### INDUSTRIAL NOISE CONTROL

Occupational noise surveys, noise abatement, factory planning, design of specialist silencers, screening and industrial enclosures.

Building vibration and structural dynamics estimation of vibration propagation factors in buildings and other structures. Estimate of re-radiated structure-borne noise. Recommendations for vibration control measures. Empirical, theoretical and numerical modelling.

### SOFTWARE DEVELOPMENT

Development of acoustics and vibration software, including software for the estimation of sound insulation properties, sound absorption coefficients and environmental noise propagation. Developer of INSUL, Zorba, dBSea and IRIS, and agent for SoundPLAN.

### COURSES AND SEMINARS

Provision of courses and seminars in the areas of building acoustics, mechanical services noise control, sound system design, town planning acoustics and SoundPLAN training.



*“New Hamer Hall restores clarity and vitality to the symphonic sound. The acoustic is focused, bright, naturalistic and responsive across a vast dynamic range.”*

Eamonn Kelly, *The Australian* - on Melbourne's Hamer Hall Refurbishment

## HEALTHCARE

Research in recent years has shown that ill people, such as patients in hospital, have a lower threshold for noise and suffer more adverse effects than healthy people do.

Good acoustic design and quieter wards can help increase patient recovery speed and therefore reduce the associated costs of treating a patient in hospital. The design must also consider doctor/patient consultations in order to ensure confidential speech privacy. Maternity, operating and administration areas all have their own unique and demanding acoustic criteria - effective and practical solutions must be developed, taking into account a myriad of other requirements including infection control, hygiene, wall impact, safety and security.

The challenge for the acoustic designer in the Healthcare sector is to provide an effective acoustic environment within tight budgetary constraints.

Our services relating to healthcare projects include:

- Baseline noise & vibration measurement to assist site selection
- Sound insulation design of building façades to protect from external noise sources
- Control of internal sound transfer
- Mechanical services noise & vibration control
- Acoustic design of specialist areas such as operating theatres, consulting rooms, sensitive imaging equipment, lecture theatres and training areas



## BUILDING ACOUSTICS

The design of industrial, commercial and residential buildings encompasses many fields of acoustics, which must be designed and co-ordinated to comply with a myriad of regulations and to accomplish the client's needs.

Factors such as controlling sound and vibration transmission between rooms, reverberation control within spaces, control of intrusive noise from external sources, HVAC and services noise and compliance with relevant boundary noise criteria may be necessary considerations.

Marshall Day Acoustics specialises in all aspects of acoustic prediction, development, assessment and mitigation advice. Since 1981 we have become the largest acoustic consultancy firm in Australasia, with project experience around the globe.

*“We have no hesitation in recommending Marshall Day Acoustics for their services in both acoustic and vibration consulting”*

David Waldren,  
GROCON Constructors Pty Ltd

Our building acoustics services include:

- Acoustic design and assessment for healthcare facilities, stadia, apartments, concert halls, theatres, offices, art galleries, museums, libraries, recording studios, swimming pools, education facilities, mechanical plants airport terminals, factories, mixed-use developments, churches and many other building types
- Expert monitoring and measurement of noise and vibration
- Acoustic assessment of building elements (e.g. Building Code Compliance testing, Reverberation Time, etc.)
- Detailed acoustic analysis using proprietary modelling software such as IRIS, dBSea, Insul, Odeon, EASE and Zorba
- Assessment and specification of noise control measures
- Research and assistance with preparation for of policy government and private sector
- Acoustically designed office fitouts, including speech privacy system design for open plan offices
- Presentation of evidence as Expert Witness



## OFFICE ACOUSTIC DESIGN

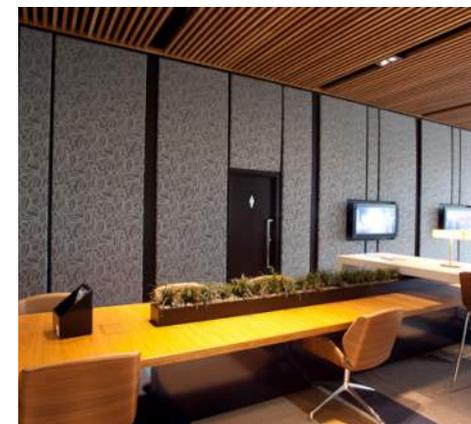
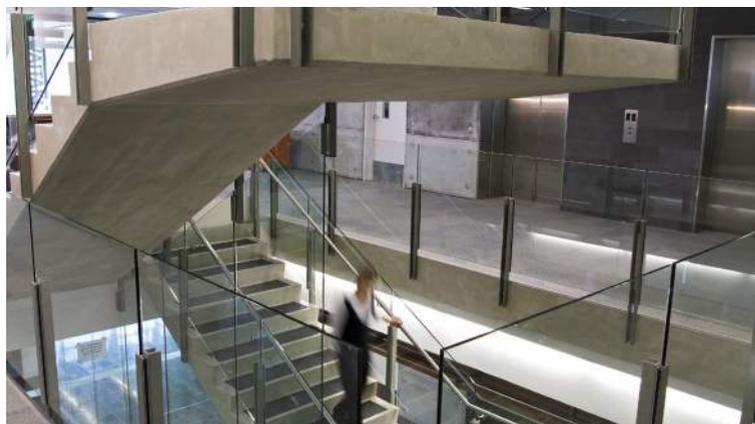
In any office, a good acoustic environment means a good work environment which, in turn, increases employee productivity. Within offices, the acoustic design must strike a careful balance between controlling intrusive noise from external sources to permit effective communication and providing enough “masking sound” to provide adequate speech privacy.

We have developed a series of subjective criteria that enable clients to easily determine the appropriate speech privacy required for each area. Furthermore, auralisation techniques are commonly employed to physically demonstrate building ambient noise levels and speech privacy performance to the end users, facilitating an informed decision process.

Open-plan areas, cellular offices, meeting rooms, receptions areas, atria, corridors, staff canteens and mechanical plant rooms all require acoustic design input.

Our services relating to office design and fit-out include:

- Baseline noise & vibration measurement to assist site selection
- Sound insulation design of building façades to protect from external noise sources
- Control of internal sound transfer
- Control of reverberant sound in atria and circulation spaces
- Specification of partitions and sound masking systems to meet clients’ speech privacy expectations
- Mechanical services noise and vibration control
- Acoustic design of specialist areas such as call centres, boardrooms and lecture theatres



## ROYAL CHILDREN'S HOSPITAL REDEVELOPMENT, MELBOURNE, AUSTRALIA

Client: State Government of Victoria, Department of Health

Officially opened by Her Majesty Queen Elizabeth in October 2011, the new Royal Children's Hospital in Melbourne has delivered a world-class paediatric hospital.

The project provides state-of-the-art medical, research, education and technology facilities in an environment that is stimulating and interesting, yet feels safe and secure for the young patients. Tremendous effort has been applied to create a space that is warm, inviting and engaging rather than stark and imposing. Key features include a two storey high aquarium, interactive science displays, a live animal enclosure and an enormous central atrium "Street" with shops, cafés, amenities, sculptures and a sky garden. Support services include a childcare facility, a supermarket, various retail stores and a hotel on site. Environmental features incorporated throughout the building make it one of Australia's greenest hospitals.

The complexities of the various areas created many acoustic challenges. The range of noise and vibration issues was extensive and required a pro-active and imaginative participation. Of particular note were:

- An audiology suite including ISO certified audiometric sound booths
- The acoustic design of the building façade and vibration isolated helipad to control helicopter noise
- Fixed MRI and an intra-operative MRI system, including innovative vibration isolated track
- Compliance with stringent structural vibration criteria in sensitive laboratory facilities
- An animal house and research facilities, including the Murdoch Children's Research Institute
- Reverberation control in the large (120 m long x 30 m high) central atrium "Street"
- Environmental noise emission from extensive plant to the surrounding residential areas
- A hydrotherapy pool on vibration isolation mounts
- Music rooms and a recording studio
- A large suite of operating theatres
- A 230 seat tiered lecture theatre, 90 room hotel for on-site accommodation, cinema and "Starlight Express" entertainment zone



## HEALTHCARE - LARGE HOSPITALS

### EAST MALAYSIA HOSPITALS

Architect: Bintai Kinden Corp Bhd

Three major hospital projects in Sabah and Sarawak, East Malaysia.



### OLIVIA NEWTON JOHN CANCER CENTRE, MELBOURNE

Architect: Daryl Jackson

This project saw the expansion of Australia's largest health provider to the Department of Veterans Affairs. Marshall Day provided a full scope of acoustic consultancy services, including baseline noise site surveys; consulting rooms and wellness centre; and vibration control of sensitive medical equipment for all back of house facilities.



### GEELONG HOSPITAL, VIC

Client: Barwon Health

The Geelong Hospital, situated on the corner of Bellarine and Ryrie Streets, has a full suite of medical and surgical services, including cardiothoracic surgery and is one of the busiest hospitals in the State of Victoria.



### ROYAL WOMEN'S HOSPITAL, MELBOURNE

Architect: DWI Architects

Structural vibration analysis, internal sound insulation, noise control and acoustic design of this major hospital project.



### BALLARAT REGIONAL INTEGRATED CANCER CENTRE, VIC

Architect: Billard Leece Partnership

Large regional hospital dedicated to the treatment and care of cancer patients.



### AUCKLAND CITY HOSPITAL, NZ

Client: Auckland District Health Board

The Auckland City Hospital, at 80,000 m<sup>2</sup> and spread over nine floors, is the largest public building in New Zealand and provides 3,500 rooms, 710 acute beds and 24 operating theatres.



## COMMUNITY HEALTHCARE & AGED CARE

### **MASONIC HOMES SOMERTON PARK INDEPENDENT LIVING, SA**

Client: Auckland District Health Board

Provision of acoustical consulting services for 23 medium density style independent living units over 2 levels, with undercroft carparking.



### **MARYSVILLE COMMUNITY HUB, VIC**

Architect: Spowers Architects

Acoustic design, sound insulation and noise control for the new Marysville Community Hub, which was constructed as part of Victoria's Bushfire Recovery program and includes community health facilities.



### **PENINSULA GRANGE COMMUNITY CENTRE, MORNINGTON, VIC**

Client: Australian Unity

Acoustic design of the community centre for the Peninsula Grange residential developments including roocs, sound insulation and noise control of multi-purpose rooms, workshop areas, meeting rooms and administration areas.



### **MARK MORAN RESIDENTIAL AGED CARE FACILITY, LITTLE BAY, NSW**

Client: Norwent

Marshall Day was engaged to provide design advice and operational noise mitigation advice for alterations to the existing aged care facility and the construction of a new wing to the existing aged care facility.



### **BUPA AGED CARE FACILITY, NSW**

Client: Bupa Care Services Pty Ltd

140 Bed Aged Care facility in Bankstown, Sydney. Marshall Day provided full acoustic design consultancy services for the facility that had a construction budget of \$19 m.



### **LOCKLEYS HIGH CARE FACILITY, SA**

Client: Padman Health Care

2-storey, 80 bed aged care facility for the Padman Group.



## HEALTHCARE PROJECTS - WELLINGTON

### BOULCOTT HOSPITAL

Architect: CCM Architects

Boulcott Hospital is a private hospital committed to a high degree of patient comfort and amenity. Marshall Day Acoustics provided design advice for sound and impact insulation, services noise, patient amenity, mechanical services noise, and compliance with resource consent conditions..



### BOWEN HOSPITAL (\$16.5M)

Client: Opus International

Bowen Hospital is a private surgical hospital in Crofton Downs, Wellington. Marshall Day Acoustics provided resource consent advice and design advice for building envelope design, internal sound insulation, footfall noise, room acoustics, and building services noise.



### CHRISTCHURCH/BURSWOOD HOSPITAL (\$650M)

Architect: Jasmax

Burwood Hospital is a major hospital redevelopment in Christchurch. Our Wellington and Christchurch offices provided design advice for building envelope design, internal sound insulation, footfall noise, room acoustics, and building services noise. The project includes significant seismic design.



### WELLINGTON HOSPITAL (\$343M)

Architect: de Carlo Potts / CCM Architects

Wellington Hospital is Wellington's primary public hospital. Marshall Day Acoustics provided design advice for building envelope design, helicopter sound attenuation, internal sound insulation, footfall noise, room acoustics, and building services noise, and management of construction noise.





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