



NDY
A TETRA TECH COMPANY

ACOUSTICS

Capability statement

For over 60 years,
we have been at the
forefront of innovation.
We recognise that both
clients and projects are
unique, and we are adept
at tailoring our services
and designs to suit project
requirements.



Arif Zaher

Director
NDY

With a global network of more than 60 acoustic consultants, we provide innovative solutions to all aspects of acoustics, noise and vibration.

INTRODUCTION

We're sensory experts. Whether it's noise and vibration enhancement, reduction, measurement or control, our acoustics team provides specialists, integrated and forward-thinking services on all project types.

Our global team routinely collaborate on projects and share a network of knowledge and expertise that is best of class.

We assist in the design and construction of a range of developments from buildings to data centres and transport infrastructure.

We prefer a hands-on approach to project delivery, offering involvement from the earliest planning stages right through to completion and handover. We provide full onsite testing services for design verification to ensure client satisfaction.

Our team develop solutions using state of the art calculation methods and computer modelling, with particular emphasis being placed on providing our clients with practical, cost effective advice. Our approach is backed by sound relationships with local authorities to help set appropriate criteria and consent conditions.

OUR ACOUSTIC SERVICES

Acoustics is the applied science of sound and its effects on the quality, health and safety of our environment. High quality acoustic design adds value by optimising material use and ensuring user comfort, privacy and functionality.

Our team focuses on all aspects of acoustics including architectural and specialised spaces, environmental noise studies, and physical noise and vibration measurements. We offer the following:



Building design

- Noise control for building services
- Facade design to minimise external noise intrusion from traffic, aircraft and rail
- Internal partition design for acoustic privacy between sensitive spaces
- Sound and impact insulation of residential intertenancy walls and floors for compliance with building code
- Plant and machinery noise
- Green Star acoustic design and assessments
- Noise management plans for building demolition and construction.



Spatial acoustics

- Acoustic design for performance spaces including auditoria, theatres and cinemas
- Acoustic design for spaces requiring speech intelligibility and/or privacy, including lecture theatres, training rooms and meeting rooms
- Acoustic design of recording and broadcasting studios
- Integration of audio visual equipment with room spatial acoustics.



Environmental acoustics

- Noise control for compliance with environmental protection policies
- Traffic, aircraft and rail traffic noise/vibration control and modelling
- Major infrastructure planning.



Acoustic and vibration onsite testing

- Sound and impact insulation testing for compliance with building code
- Long term noise and vibration monitoring and analysis
- Vibration measurements of mechanical equipment, road traffic, rail movements, floor mobility and damping
- Testing of office partitions and doors to determine acoustic ratings
- Demolition and construction noise monitoring.



Vibration control

- Whole building vibration isolation to reduce structure-borne noise and vibration intrusion
- Vibration control for building services and occupant activities.

SOUND ADVICE

NDY's acoustics team provide detailed acoustic advice tailored to each project's needs.

This process begins by gaining a clear understanding of your acoustic expectations, whether this be the level of privacy between offices, a desired background noise level in an apartment bedroom or a particular reverberation time within an auditorium.

Our team has extensive experience in the construction industry, providing acoustic design input from the earliest town planning stages, through to completion and handover of constructed buildings.

Our in depth knowledge of acoustic legislation and policy, enables us to provide practical, accurate and timely advice to developers and town planners alike.

NDY has provided acoustics services on a wide range of projects, including:

- Commercial office buildings and interior fitouts
- Multi-story residential and hotel developments
- Education facilities
- Performance spaces
- Retail and public buildings
- Health facilities
- Community & town planning
- Demolition & construction
- Transport projects
- Industrial sites
- Mission critical & data centres.



SUSTAINABLE ACOUSTICS

We always consider how we can balance the materials and systems required for good acoustics with minimal materials and energy use.

Here's how we do this:

Sustainability accreditations

We design acoustic solutions which contribute to Green Star, WELL and LEED. Buildings we've successfully commissioned include The Hotel Britomart in Auckland (the first 5-star Green Star rated hotel in New Zealand), Murdoch University's Boola Katitjin (Green Star) and Vancouver schools (LEED).

Research into the acoustics of low-carbon timber buildings

We collaborate with clients and suppliers to research and test modern timber building methods so we can improve the advice we give and contribute to industry thinking.

Use of sustainable products

We continually review the acoustic materials, products and accreditations we specify. By offering architects and designers a range of options, we ensure that sustainable products can be explored and whole-of-life best-for-project solutions can be adopted.

Minimising energy use

It's critical that we minimise the operational energy of the systems we propose. Where possible, we specify low-pressure attenuation methods in our heating, ventilation and air conditioning (HVAC) systems to minimise the operational energy required.

NDY ACOUSTICS EXPERIENCE

For more than sixty years NDY has provided consulting engineering services on strategic projects throughout Asia, Australia, Canada, Europe, New Zealand and the UK.

These award-winning projects are testament to the quality of our innovation, expertise and personnel. The following examples of our experience are a snapshot of our ability to deliver world's best practice projects of all sizes.

To view a comprehensive outline of our project experience visit our website.

[NDY Website](#)



Residential, New Zealand

DIAGNOSIS AND CONTROL OF ROAD TRAFFIC INDUCED VIBRATION

Auckland

Services

Acoustics

Client: Lendlease

Completion: 2019

The NDY acoustic team has been working hard in anticipating, identifying and eliminating or controlling future vibration problems in new buildings.

During the first trimester of 2019, NDY's Auckland based acoustic team was involved in the investigation and assessment of road traffic induced vibration in a high end new dwelling constructed in Whenuapai, north of Auckland. Even though the new dwelling met all the mandatory Council and NZ acoustic criteria, the building presented a big and not anticipated vibration issue, noting that an acoustic assessment was not required before and during the design stages of the development as there are no mandatory vibration criteria that protect buildings against vibration generated by activities other than construction.

The developer contacted and engaged NDY to help identify and assess the vibration issue reported by the home owner. The subject building is a new two storey standalone house, located approximately 8 metres from a double way road which has high traffic volumes of heavy vehicles.

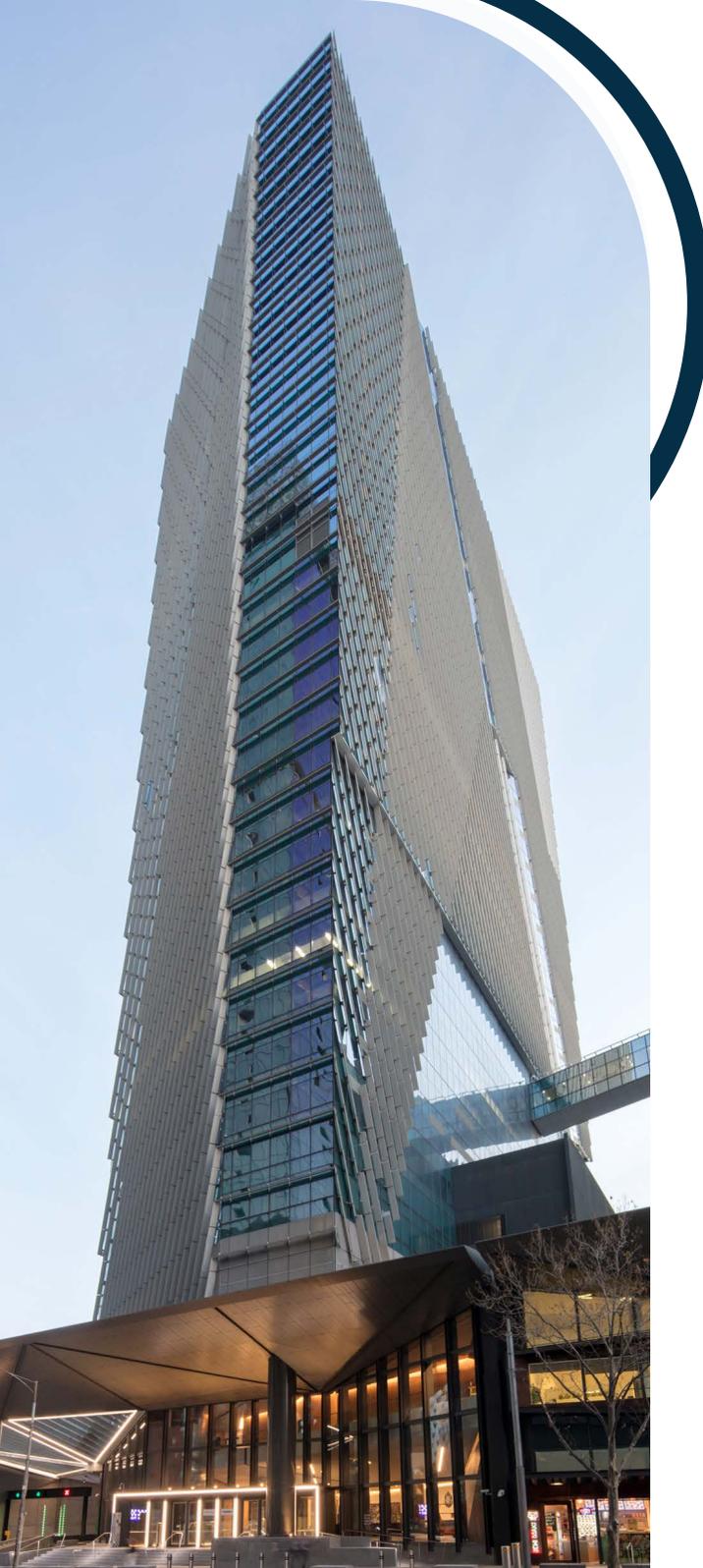
Our acoustic engineers visited the site to witness, identify and evaluate the vibration in the building.

They also installed vibration loggers to measure vibration levels in two of the bedrooms located in the first level of the building as shown in the below image.

To assess this type of vibration, and due to the lack of local regulation, NDY followed the guidelines given by an international standard – the Norwegian Standard NS 8176.E:2005. This standard is commonly referred to by the NZ Transport Agency when they work on the design of a new or altered state highway.

After two site visits, evaluation of the ground conditions, road surface and several vibration measurements in each room, the results of the assessment were conclusive. The measured vibration levels were over the recommended 0.6 $V_{w,95}$ (mm/s) in both bedrooms, which is considered not satisfactory for this type of building. The acoustic engineers identified that the main source of vibration was generated by heavy vehicles driving along the road and passing over small batch present on the road

A report was prepared for the client, providing a summary of our assessment and findings, which was then passed to the local road authority to seek road improvements which could reduce the vibration in the dwelling to acceptable levels according to the international standard.



Offices, Australia

311 SPENCER STREET

Melbourne, VIC

311 Spencer Street accommodates Victoria Police alongside associated support services and other law enforcement agencies. The new building sits adjacent to the existing City West Police Complex at 313 Spencer Street, forming a new precinct that is now known as the Victoria Police Centre.

The centre comprises a 40 storey commercial office building providing approximately 65,500 m² NLA, with secure basement level car parking for 600 cars and end-of-trip facilities including bicycle storage with associated amenities. A helipad is included at rooftop level, whilst a public forecourt acts as a continuation of the external spaces and public realm with the adjacent 313 Spencer Street. The new development has also introduced numerous links and bridges to connect the two buildings.

Featuring an efficient side core design providing large open typical floor plates of approximately 2,000 m², the building contains a low, medium and high rise lift configuration which also serves the car parking levels. A goods lift is provided alongside two car park shuttle lifts.

NDY provided innovative design solutions to meet the specific requirements of various building stakeholders.

Services

Acoustics, Fire Engineering, Fire Protection, Hydraulics, Sustainability, Vertical Transportation

Client: Cbus Property

Architect: Woods Bagot

Value: \$650 m

Completion: 2020

This was a complex task, considering often differing requirements that required a cohesive design solution and delivery.

A high level of acoustic isolation was required throughout the building's various room types. Innovative acoustic modelling and design ensured delivery of acoustic goals during construction, whilst remaining buildable and cost effective. Substantial modelling was also undertaken for the rooftop helipad, to ensure the facade provided was sufficient to reduce noise transmission into the building.

311 Spencer Street is designed to meet PCA A Grade (2012) requirements and includes a high level of environmental credentials to target 5 Star Green Star (Design & As-Built v1.1 and Interiors v1.1), 4.5 star NABERS Energy for base building, 5 star NABERS Energy for tenancy rating, 4.5 star NABERS Water for whole building and NABERS Indoor Environment Quality for base building rating. In addition, Cbus Property has committed to run the building on 100% renewable energy from day one of operation, whereby all of the electricity load utilised will be covered by the Power Purchase Agreement (PPA) under the Melbourne Renewable Energy Project (MREP2) project.



Retail, Australia

FORTRESS MELBOURNE

Melbourne, VIC

Services

Acoustics

Client: Fortress E-Sports Melbourne

Architect: Populous

Value: \$10 m

Completion: 2020

The first of its kind in Australia, Fortress Melbourne is a purpose built e-sports entertainment and gaming venue.

Spanning 3 levels and approximately 2700 m² at luxury shopping centre Emporium, the tenancy fitout includes a 200 seat e-sports arena, live broadcast production facility, dedicated LAN and multifunction rooms, and general purpose gaming and bar areas.

Our client was targeting a visually stunning space, with the acoustic design also considering cost, ongoing maintenance and operational requirements. NDY's team of consultants explored multiple options to ensure Fortress could make informed decisions on how to develop their new venue. One of the main challenges was developing an acoustic brief for this unique project, whilst achieving the aesthetics and maintaining the project budget.

The acoustic design focused on the reverberation control of the arena and lounges, alongside sound insulation of live broadcast production facilities, LAN and multifunction rooms. Collaboration with the architect was paramount, particularly in achieving our proposed acoustic brief targets. NDY's acoustic assessment also included noise emissions with reference to EPA requirements.

With the project an exciting blueprint for potential rollout to other locations, the venue is set to become a landmark for the wildly popular e-sports and video gaming phenomenon, providing a central Melbourne location for fans to gather, watch and play as a community.



Offices, Australia

DARLING QUARTER

Sydney, NSW

Services

Acoustics, Commissioning Management

Client: Lendlease

Completion: 2012

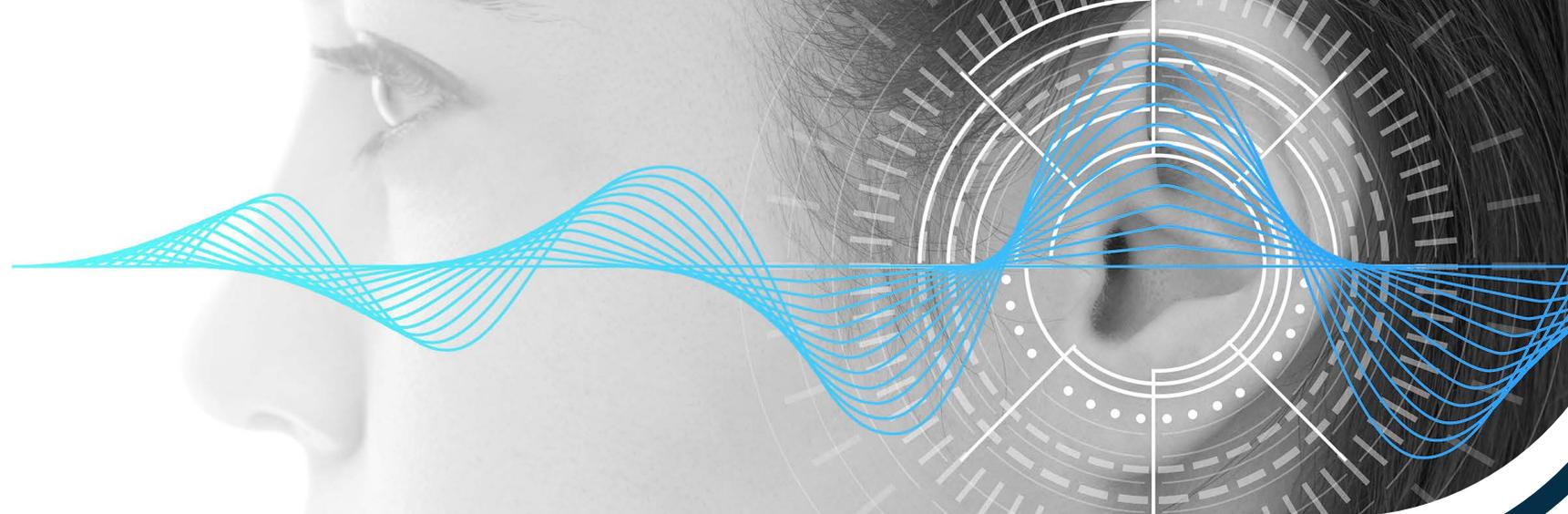
NDY was the fitout acoustic engineer for Commonwealth Bank Place in Darling Quarter.

Our team managed integration with the base building design package to ensure that base building works aligned with fitout acoustic needs.

The acoustic requirements for the integrated fit-out package included:

- Green Building Council of Australia Office Interiors package v 1.1 (IEQ-10)
- Australian/New Zealand Standard AS/NZS 2107-2000
- bespoke building acoustic standards.

These criteria define the noise level requirements for all internal spaces, as well as the mid-frequency reverberation times. The project was delivered in 2012.



Residential, Canada

ELEVATOR MACHINE ROOM ACOUSTICS

Vancouver, British Columbia

Services

Acoustics

Client: Confidential

Completion: 2021

This confidential project focused on an 11-storey existing residential building located in downtown Vancouver, British Columbia.

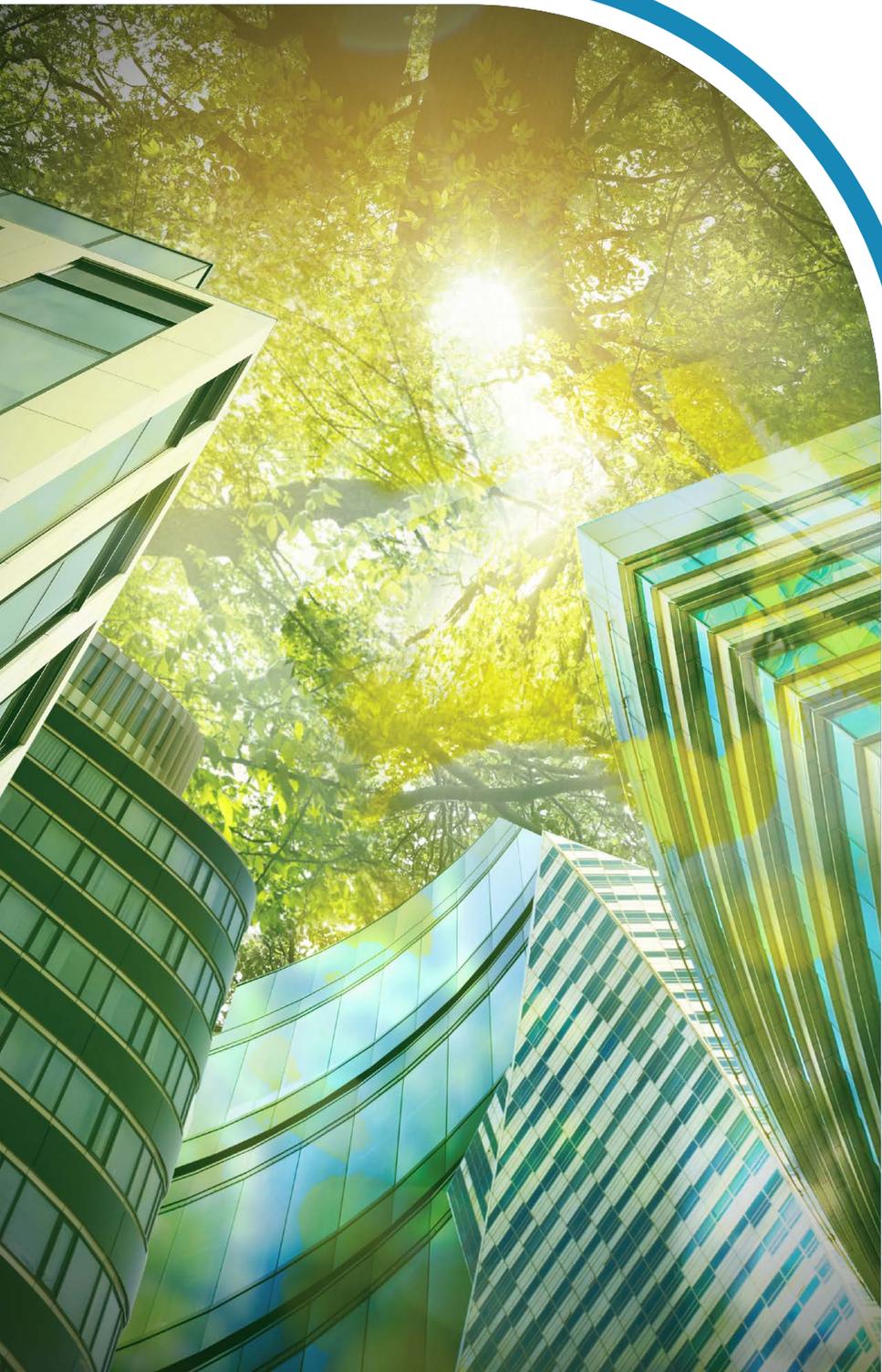
The building was constructed in 1999 and has undergone several renovations; however, there were complaints from building tenants regarding the noise emerging from the elevator room. NDY provided acoustical design solutions to resolve the problem.

COVID-19 restrictions including social distancing were a key project constraint and affected the planning for the measurements. To comply with COVID-19 social distancing requirements, it was essential for NDY and the building manager to access the units when they were unoccupied for acoustical testing.

The measurements were conducted within empty units to determine the noise intrusions from the elevator machine room and the elevator shafts into the units.

NDY identified that certain parts of the elevator were vibrating, and noise was penetrating to the building through the elevator machine room floor. The vibration transmitted to the entire building structure was being perceived as noise by the residents. To resolve the issue, NDY recommended the installation of vibration isolations, sealing the penetrations for the electrical and hosting cables from the elevator machine room floor and addition of acoustical treatments to the elevator machine room.

Upon implementation of NDY's acoustical recommendations, the living conditions of the tenants are expected to dramatically improve.



SUSTAINABILITY

We're pragmatic about sustainability, ensuring every action creates a valuable outcome.

Our team's committed to delivering places that are good for people, good for the planet and align with your environmental, social and governance (ESG) priorities. Whether that's assessing whole-of-life carbon, designing healthy workplaces, or planning for net zero, our world-class sustainability consultants help our clients build asset resilience, invest wisely, and create low-carbon people-centric places.

As a carbon neutral organisation, we're committed to creating sustainable buildings, infrastructure, cities, and communities. We aim to achieve net zero emissions by 2026. Learning from our own journey, the industry bodies we're active in, and the global projects we influence, we work with clients to strengthen and realise their environmental, social and governance priorities. As some of the best collaborators in the market, we partner with clients to shape local, sustainable solutions that balance risk with reward.

We've helped shape hundreds of sustainable projects across the built environment in Australia, New Zealand, the United Kingdom, Ireland and Canada. This depth of experience has taught us how to deliver efficient, affordable and commercially intelligent solutions with exceptional outcomes – outcomes that make your building stand out and get noticed.

OUR MARKETS

We design spaces that perform the way you need them to – spaces fit for your future. Whatever the size or complexity of your project, our global team of trusted advisors engineer integrated and sustainable solutions.



AGED CARE



CORRECTIONS & JUSTICE



DEFENCE



EDUCATION



HEALTH & SCIENCES



INDUSTRIAL



MISSION CRITICAL



OFFICES



**RESIDENTIAL, HOTELS
& MIXED-USE**



RETAIL



**SPORTS, ENTERTAINMENT
& PUBLIC BUILDINGS**



TRANSPORT

OUR SERVICES

Our project teams include technical specialists who span disciplines but share the same project goals, values and vision.



Acoustics



Asset Performance



Audio Visual



BIM Building Information Modelling



Commissioning Management



Communications (ICT) Consultancy



Controls & Integration



Electrical



Fire Engineering



Fire Protection



Hydraulics



Interiors



Mechanical



NDYLIGHT



Property Consultancy



Security



Smart Buildings



Structural & Civil



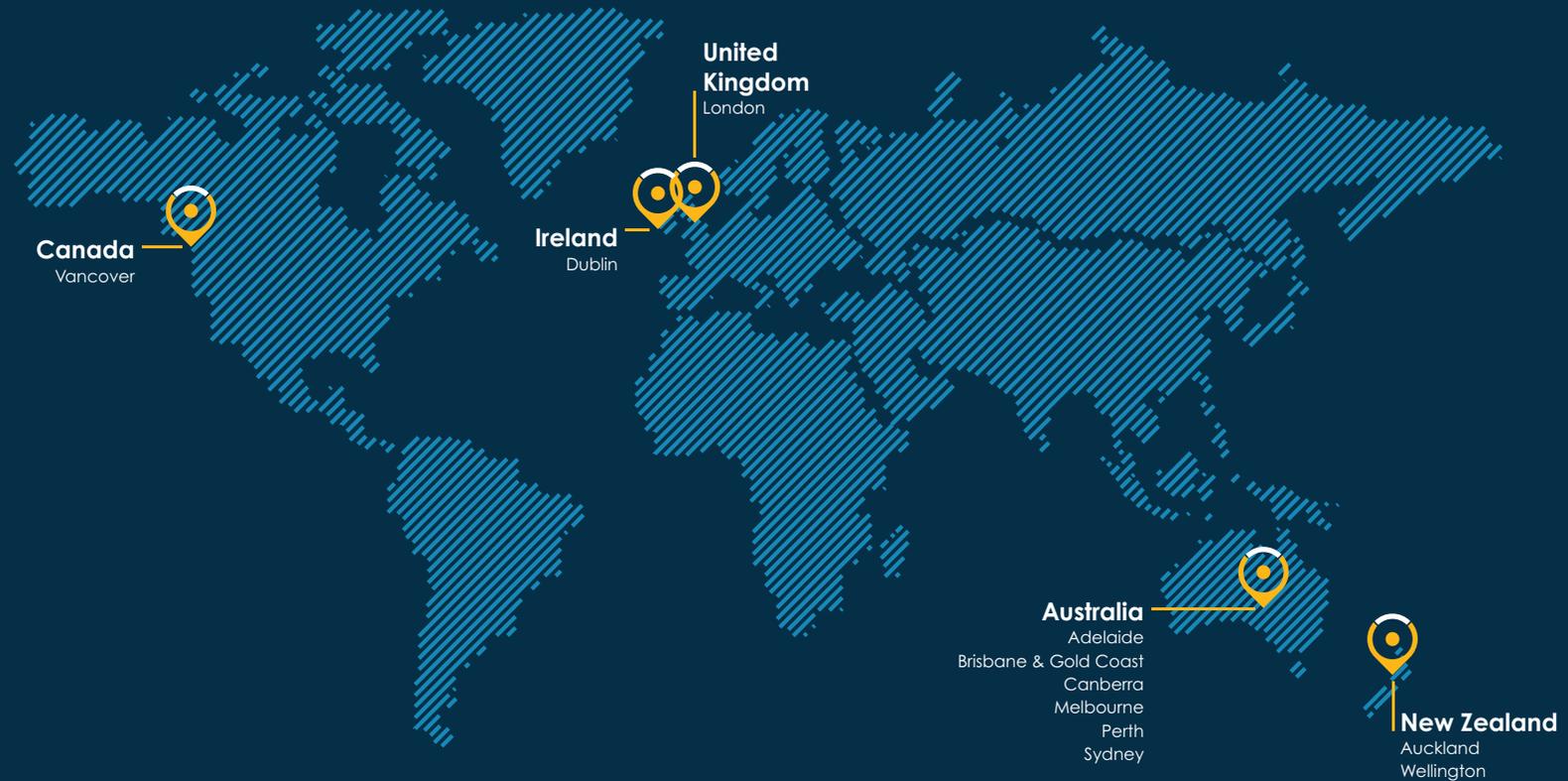
Sustainability



Vertical Transport

NDY AT A GLANCE

We tap into a well-resourced network of technical specialists and consulting engineers from around the world to bring you the best project team.



MAKING SPACES WORK

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