

BKL – ENGINEERING A BETTER SOUNDING WORLD

Mark Bliss*, Paul Marks†, and Tiberiu Spulber‡

Suite 308, 1200 Lynn Valley Road, North Vancouver, BC, V7J2A2

Abstract

BKL Consultants Ltd. is an employee-owned independent consulting firm that has worked exclusively in the field of acoustical engineering since 1966. BKL's team works with builders, owners, architects, consultants, governments, managers, and other professionals to provide practical architectural and environmental acoustics, noise, and vibration solutions. BKL provides sound and vibration monitoring, diagnostics, predictions, assessments, management, and mitigation advice to the latest standards and guidelines, using an array of specialized instrumentation—including more than 25 sound and vibration monitors—and computing facilities.

Keywords: acoustics, noise, vibration, consulting, design services, remedial advice, noise control, vibration isolation, architectural acoustics, building acoustics, environmental noise and vibration assessments, LEED

Résumé

BKL Consultants Ltd. est une firme de génie-conseil indépendante qui travaille exclusivement dans le domaine de l'ingénierie acoustique depuis 1966. L'équipe travaille avec constructeurs, propriétaires, architectes, consultants, gouvernements, gestionnaires et autres professionnels afin d'offrir des solutions pratiques dans le domaine de l'acoustique architecturale et environnementale et du contrôle du bruit et des vibrations. Suivant les plus récentes normes et directives, BKL fournit des systèmes de surveillance, des diagnostic, des prévisions, des évaluations, de la gestion et des conseils en acoustique et en contrôle du bruit et des vibrations, en utilisant une gamme d'instruments spécialisés—incluant plus de 25 moniteurs de son et de vibrations—et d'installations informatiques.

Mots clefs : acoustique, bruit, vibration, consultation, services de conception, proposition de mesures palliatives, contrôle du bruit, isolation vibratoire, acoustique architecturale et du bâtiment, évaluation du bruit et des vibrations dans l'environnement, LEED

1 Introduction

BKL has been solving acoustical problems for over 50 years. It all started when company co-founder Ken Barron designed a Leo Beranek-inspired muffler to hush the gas-fired ovens at Dino's Pizza on Broadway in Vancouver. Today BKL serves clients on projects large and small across every sector—residential, transportation, healthcare, marine, cultural, industrial, education, and more.

BKL provides independent reviews and advice for mitigating sound and vibration-related risks. The company's services mainly relate to the design or renovation of buildings and infrastructure, delivered through P3, design-build or traditional methods; environmental assessments of major infrastructure projects; and addressing specific acoustical problems inside buildings or in surrounding environments.

Continue reading to learn more about BKL's expert contributions to three recent highlight projects in British Columbia: the Jim Pattison Outpatient Care and Surgery Centre, Port Mann / Highway 1 Improvement Project, and Telus Garden.



Figure 1: Jim Pattison Outpatient Care and Surgery Centre

2 Jim Pattison Outpatient Care and Surgery Centre

BKL joined the BC Healthcare Solutions team for this P3 project, a new four-storey, 188,000 square-foot facility. The centre is LEED Gold certified, and is the first in BC to bring together more than 50 services and programs, including day surgery, exclusively for outpatients.

First, BKL established a comprehensive list of criteria to guide all acoustics-related decisions. Next, BKL evaluated the impacts of traffic noise on the building and made recommendations to upgrade the building envelope's sound-isolation performance.

* bliss@bkl.ca

† marks@bkl.ca

‡ spulber@bkl.ca

Consulting on the interior acoustics, BKL reviewed interior sound isolation requirements, partition construction, and door and seal selection. The team calculated reverberation time in the main lobby, waiting areas, and other spaces, and recommended acoustical treatments to control reverberation and reduce overall noise levels.

To control noise from mechanical and electrical services, BKL recommended silencers for air-handling units, which delivered excellent results in controlling background noise from mechanical equipment in occupied spaces. In addition, BKL assessed noise from the emergency generators and made recommendations for sound isolation enclosures to mitigate the impacts of generator noise outside. The team analyzed vibration levels due to mechanical and electrical equipment and recommended vibration isolation that, when installed, limited floor vibration to levels lower than those required by the MRI manufacturer.

For this project, BKL took a hands-on approach and ensured the highest standards of quality were met. The team attended design meetings, reviewed shop drawings and carried out site visits to inspect and confirm the correct implementation of the acoustical recommendations. Upon completion, BKL tested noise, vibration, reverberation, sound isolation, confirmed compliance with the project criteria, and obtained LEED point IDC1 as a result.



Figure 2: Port Mann / Highway 1 Improvement Project

3 Port Mann / Highway 1 Improvement Project

Highway 1 in Metro Vancouver is BC's busiest transportation corridor. The \$3.3 billion Port Mann / Highway 1 Project involved widening 37 kilometres of highway, and reconstructing 15 interchanges. The project also included the construction of the new Fraser Heights Connector linking Highway 1 with South Fraser Perimeter Road and the Golden Ears Crossing.

During the bid process, the design-build contractor asked BKL to join their team to carry out noise impact and mitigation assessments. BKL provided all acoustics-related information during the bid process and the pre-construction, construction, and post-construction phases.

To assess noise impacts and noise mitigation against the Ministry of Transportation and Infrastructure's policy and the design-build contract requirements, BKL developed a 3-D noise model of existing and future road traffic noise for the entire project. This included over 450 lane kilometres of roadways and more than 1,000 residences and schools.

BKL monitored construction noise and vibration, and consulted on the design of more than 35 noise walls. BKL also monitored post-construction noise to confirm compliance with project criteria, and tested noise barrier insertion loss to ANSI S12.8.



Figure 3: Telus Garden

4 Telus Garden

Telus Garden features two main buildings: a 22-storey office tower and a 47-storey residential tower. When it opened in 2015, the office tower was the first building in Vancouver to earn LEED Platinum certification. The residential tower, opened in 2016, is certified LEED Gold.

For Telus Garden, BKL's project engineers provided comprehensive acoustical engineering services, establishing acoustical design guidelines for ambient noise (HVAC, traffic), sound isolation (speech privacy and transmission loss), and room acoustics (reverberation time) in open-plan and cellular office spaces, meeting rooms, and common areas. The team reviewed mechanical and electrical equipment, and developed noise control and vibration isolation for AHUs, elevators, generators, and the cooling tower. BKL also reviewed shop drawings, conducted testing in a mock-up suite, and provided acoustical partition design and STC reviews.

BKL also designed the internal acoustics for the television studio and support space that occupies almost 10,000 square feet of the office tower's second floor. Addressing the needs of acoustically disparate spaces including an encoding room, an audio suite, editing suites, meeting areas, and an open-plan office with 18 workstations, BKL worked with the interior designers to optimize sound isolation and room acoustics for noise-sensitive areas, like the studio and audio suite, while ensuring an appropriate level of speech privacy among individual workspaces in the open-plan office.

5 Conclusion

These three projects are examples of BKL's recent success in sharing its expertise in acoustics and vibration while contributing to projects that are important to British Columbians. If you're interested in learning more about BKL's services or project portfolio, visit www.bkl.ca/what-we-do