



UBC Quantum Matter Institute – Project Description

The Quantum Matter Institute (QMI) is an addition to the Brimacombe Building located in the Campus Core District and is bounded by the Engineering Lane to the north, East Mall to the east, the Pulp and Paper Centre to the south and the Brimacombe Building to the west.

The addition is comprised of 5 storeys of research and support space including a below grade basement level. An enclosed mechanical penthouse is located on the west half of the roof above these. It is connected at all levels to the existing Brimacombe Building and utilizes the existing loading dock and elevator to service the building. To the south of the building a portion of the site has been left vacant to allow for a potential, future, below grade, low vibration EM suite. It would connect to the addition at the basement level.

The QMI is an interdisciplinary initiative comprised of researchers, supporting labs and offices currently located in several buildings around the campus. This expanded high quality research space will support recruitment of world class quantum materials researchers, expansion of research activities, and co-location of quantum materials researchers from the Faculty of Science and the Faculty of Applied Science. This will make UBC one of, if not the, world leaders in quantum materials research and will enhance Canada's ability to be a leader in this potential breakthrough technology. QMI research has important potential applications such as a new platform for electronic devices, lossless power lines, computing and wireless communications, solar and fuel cells, and new medical devices for diagnosis and treatment.



UBC Quantum Matter Institute – Design policy compliance

DEFINE THE APPLIED SCIENCE PRECINCT

To define the edge of the Applied Science Precinct the QMI massing aligns with the Engineering Design Centre (EDC)'s east edge. It holds the Engineering Lane corner and defines a portal to the Applied Science precinct. QMI's east facade adopts a strict 6m set back from East Mall. The EDC's landscape palette and street trees are strengthened and carried across to QMI. The East Mall maple trees are retained and enhanced with further planting.

STRENGTHEN SENSE OF PLACE

The research pursuits of the facility along the north and east street frontages are communicated at the building scale through representative masonry detailing. The masonry is predominantly white to acknowledge the campus core palette. A smaller proportion of the brick work is two tones of grey laid in a repeating pattern to subtly reference the YBaOCuO₂ molecule (a component of QMI research) and add interest to the white palette. The grey patterning also occurs in the landscape paving.

At grade the QMI mission is clearly communicated through windows into research labs and curated vitrines at the building's main entry.

CONNECT TO THE COMMUNITY

QMI's most public corner becomes a new main entry to the QMI/AMPEL complex which opens on to a multifloor lounge space. Vertical circulation systems are highlighted to encourage social interaction. Rain protection is provided along Engineering Lane and East Mall.

EXCEPTIONAL RESEARCH AND LEARNING

Collaboration between interdisciplinary faculty, students and staff is maximized with a space that supports leading research on advanced materials through low vibration and nonferrous construction. Labs are configured to be as flexible as practical to support long term flexibility, efficient utilization of space and new research activities. QMI and AMPEL are united with multifloor social hubs to

encourage interactions and exchanges of ideas between research groups. The connections to AMPEL are seamless to foster sharing of labs, equipment, and support functions between researchers.

RIGHT SIZED SPACES

The design team has worked closely with the QMI stakeholder working group to create an efficient building layout that responds to the current and perceived future needs of the users and on area with respect to the functional program. In addition to bi-weekly meetings the team has met individually with users to understand their spatial and servicing specific needs required by their research.

A HIGHLY COORDINATED DESIGN PROCESS

A closely coordinated project has developed from day one through bi weekly design meetings that include construction manager and the full consultant team. In addition to the building design there is on going coordination of on site adjacent site services including the relocation of the steam line and the connection to the district energy.

BIM

Building Information Modelling (BIM) is being used for Architectural, Structural and major mechanical systems on the project.

PERFORMANCE ASSESSMENT TOOLS

Room data sheets have been used to collect information from users to ensure spaces and their servicing are right sized for current and future needs and reflect the requirements outlined in the functional program.

MINIMIZE BUILDING ENVELOPE, SERVICE RUNS AND OPERATIONAL EFFECTIVENESS

The lab spaces are stacked and connected to vertical service shafts that connect to basement and rooftop mechanical spaces to effectively and efficiently service the building and to minimize the

building footprint. Building systems have sought to be aligned with the UBC Technical Guidelines from the start of design. The addition makes use of the existing AMPEL loading bay, garbage and recycling areas, janitor room, elevator and some service spaces to minimize duplication and costs. The team is continuing to develop synergies with respect to the existing AMPEL building services and spaces.

ENVIRONMENTAL SUSTAINABILITY

The QMI has been registered with the CAGBC and will be pursuing certification at the gold level. In addition to the normal best practices regarding materials and resources the team will be avoiding materials from the LBC's Red List.

The team's largest hurdle to overcome will be the energy consumption required for the process loads. There will be more certainty on this issue when the energy modeling process is completed. At this point the team will hold a second sustainability charrette. Key strategies the QMI team are working through with UBC include acceptable setbacks from the 10 ACH required by the Technical Guidelines in lab areas and a fume hood sash management program.

QMI will share a common mechanical plant with AMPEL. It's heat/cooling load will be satisfied with:

1. ventilation heat recovery
2. free cooling and cooling system heat recovery
3. heat recovery from AMPEL
4. supplemental heat from the district energy system