3 case study

1220 Homer St

adapting Vancouver's industrial heritage

"Old ideas can use new buildings. New ideas must come from old buildings"

Jane Jacobs

The Death and Life of Great American Cities [1993]

- **passive strategies**
- **smart material selection**
- **daylighting**
- **efficient energy systems**
- urban densification
- creative recycling
- **rethinking spaces**
- prioritizing community
- **sensitive adaptation**
- **balancing high performance + character**
- **retrofitting historic architecture**
- **green building rating systems**
- **adaptive reuse**
- **economic feasibility**

From the outside the Yaletown offices of renowned architects Busby Perkins + Will are unassumingly simple. Originally designed and built in 1946 as a biscuit warehouse and factory, the ordinary-looking facade is composed of painted concrete punctuated by narrow, wood-frame windows. Bright green wall-boxes, intended to test vertical urban gardens, hang beside each window. They are the only indication of the exciting, experimental intervention that has happened inside.

building at a glance

building name	Busby Perkins+Will office
location	1220 Homer St
size	2,174 m^2 (23, 400 sf)
original building	1946
rehabilitation	2000
original use	warehouse
new use	architect's offices
cost	$1.1 million
distinctions	BC Section award, 2002 IIDA Lighting Design Awards

building team

owner	Busby Perkins+Will
architect	Busby Perkins+Will P. Busby D. Dove S. Gushe S. Ockwell Designlines Ltd S. Schou
structural engineer	Glotman Simpson
skylight	Fast + Epp
electrical engineer	FlagelLewandowski
mechanical engineer	Keen Engineering

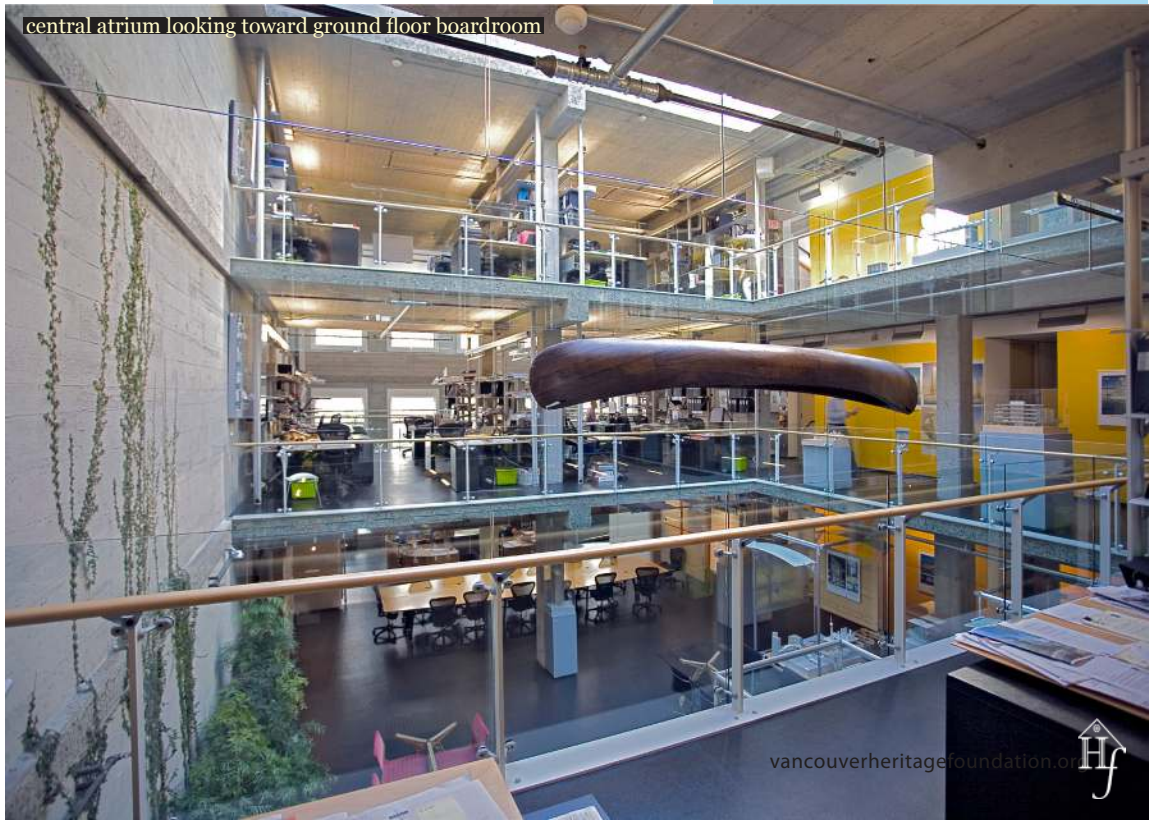

atrium at night

In his seminal work, How Buildings Learn, Stewart Brand suggests there are high-road, low-road and no-road buildings. The 'high-road' buildings are those that are iconic and expensive, like churches or train stations. Communities tend to tenaciously support their preservation because they are beautiful and unique. At the opposite end of the spectrum are the 'low-road' buildings, those that were built in a highly functional manner and offer flexible floorplans like warehouses or factories. In between these two are a wide variety of 'no-road' buildings; those that are too specialized, not well built, or of an undesirable style or era. Heritage buildings span all of these categories and each requires a unique kind of intervention.

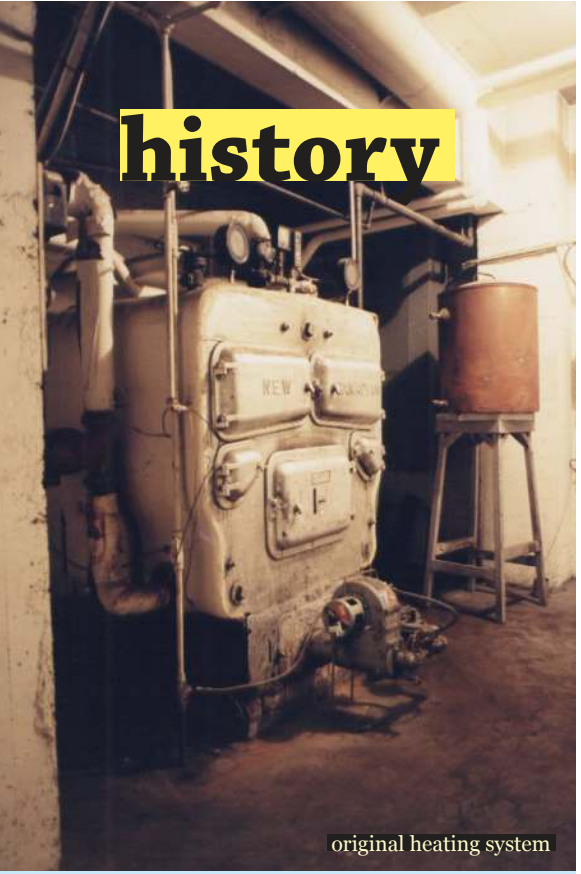
The Vancouver offices of Busby Perkins + Will demonstrate the creative possibilities of the 'low-road'. Originally designed to support the heavy loads of machinery and storage, the structural concrete frame required few upgrades to become an architectural office.

The most substantial intervention to the building was the cutting of a four-storey atrium from roof to ground floor. It was sized to provide every workstation with natural daylight and air circulation. Operable skylights pour light into the formerly gloomy floorplates. A second cut was made by the front door to create a triple height welcome area, and to assist with the natural ventilation and daylighting of the whole office. Supplemented by two heat-recovery ventilators and a small quantity of electric baseboard, the bulk of the office's heating needs are provided by the interaction between the body heat and activity of the occupants, and the thermal mass of the exposed concrete finishes. There is no artificial chill of air-conditioning or blasting of a hot-air system. As a consequence of this passive approach to design, the office uses a third of the energy of a comparable building in the downtown core. In the interests of economy, aesthetics and waste reduction, finishes were limited to sandblasted concrete, recycled-tire flooring, steel details and glazed balconies. The resulting office environment is comfortable, productive and welcoming, while also incorporating green design principles; truly representative of the design ambitions of a successful and growing firm, concerned with designing a better future.


workstation


central atrium looking toward ground floor boardroom

history


original heating system

"Existing buildings give a project a set of natural restraints and force creative design solutions"

David Dove
Principal, Busby Perkins + Will

Homer Street first appears in 1887 on a Canadian Pacific Railway survey map that established the streetscape of much of the Vancouver peninsula.[1] Like many other streets in the area, it was named after a prominent figure in the provincial government, New Westminister MP Joshua Homer. At this time the neighbourhood was slated to be an industrial area due to its proximity to the CPR rail lines occupying the northern bank of False Creek. In 1946, Walter Lowney applied for a water permit to build a warehouse and office at 1220 Homer Street and constructed a plainly functional building, as a biscuit and chocolate warehouse. Over the years numerous businesses occupied the building, but following the redevelopment of Yaletown after Expo 86, the neighbourhood changed character, and in 2000 the commercial building was up for sale.

By this time, architect Peter Busby and his associates had been actively practicing for more than fifteen years and his growing firm was looking for new office space. This old building gave them an opportunity to expand as well as apply their belief in socially responsible architecture and the greening of our built environment.[2] The building at 1220 Homer Street was now fifty years old, and reaching the end of its effective lifespan as a warehouse. The character of the area had changed from industrial to a mixed-residential and commercial neighbourhood, and contemporary warehousing standards were vastly different. With their rehabilitation of the building, Busby and his associates extended the lifespan of this rather ordinary, dilapidated structure by decades. They saw the potential spatial flexibility of the interior, recognized the value in maintaining the historic fabric of the neighbourhood, and worked to economically create a space suitable for the needs of their expanding architectural practice. The result is a beautiful, effective rehabilition of an existing heritage building.

1 Hayes, D. Historical Atlas of Vancouver, [2005]
2 Busby: Learning Sustainable Design, ed. J. Taggart, P. Busby [2007]


view of facade pre-rehabilitation

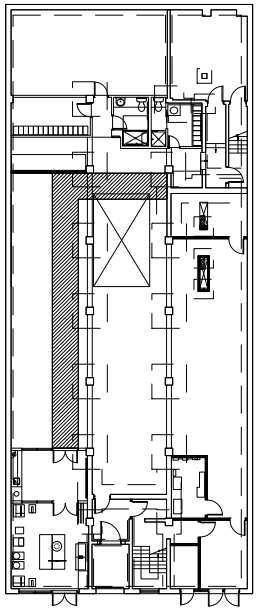

interior views pre-rehabilitation

CPR survey map of Granville townsite extended to False Creek — 1887

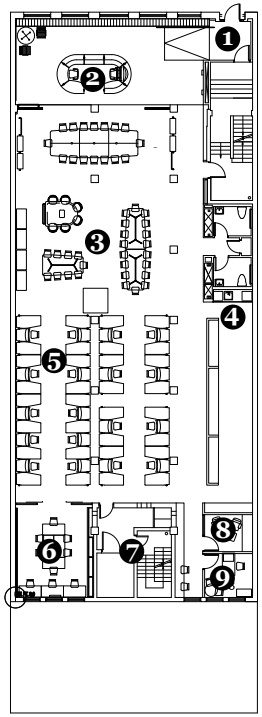
Walter Townley constructs 1220 Homer Street as biscuit warehouse and office — 1946

Busby and Associates rehabilitates 1220 Homer Street — 2000

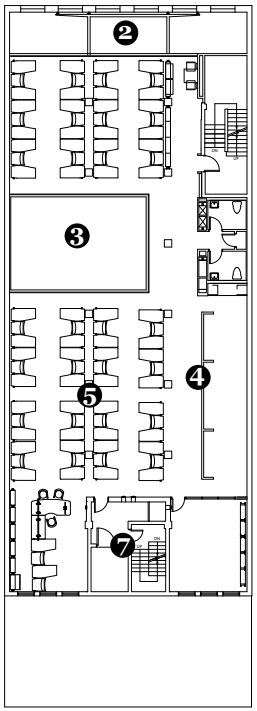
basement



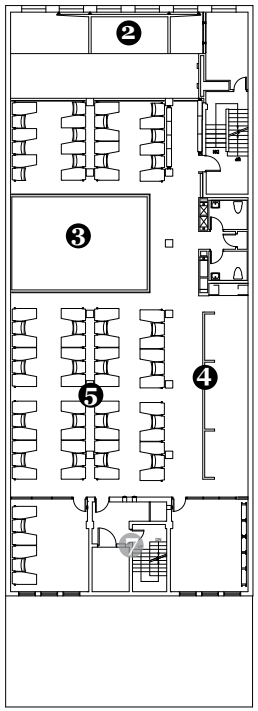
main floor



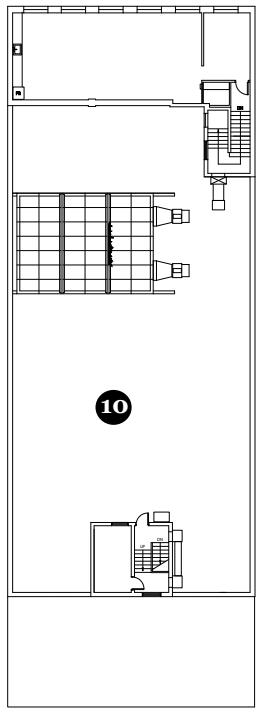
second floor



third floor



roof



❶ entry

❷ reception atrium

❸ atrium meeting spaces

An atrium is a space that vertically connects several floors for the purposes of light, visual connection and ventilation. At Busby, Perkins + Will, this space is intended to be highly flexible as well as serving as the ventilation and heating system. Generally used for client meetings (five can occur simultaneously without disturbing each other), the atrium is also used for everything from yoga classes to sport-event watching and parties.

❹ circulation and service

The workstations are divided from the service areas by a circulation spine, separating the noise and smells of kitchenette, photo-copiers and assorted services from the productivity of the workplace.

❺ workstations

Custom-designed by Designlines, the workstations are composed of a system of easily reconfigurable parts. They are situated to maximize design-team communication while still providing privacy for individual staff.

❻ meeting rooms

These areas are separated from the workstations by partial-height glazing, enabling privacy while still allowing daylight to reach both areas.

❼ elevator and stairs

Preserving the freight elevator and existing stair cores saves money while also framing the composition of layout and building circulation. They also act as supplementary air shafts for the passive ventilation system and heat recovery systems.

❽ quiet room

❾ human resources

❿ future expansion

The flexibility of low-road construction means that as the office expands, two floors can be added to the roof without a daunting amount of structural retrofits. The atrium can also be expanded into the basement for additional space. In the meantime, the roof has become a live-testing area for experimental cladding materials and other building science explorations.

"We took our design cues from the building"

David Dove
Principal, Busby Perkins + Will

passive design

Busby Perkins + Will believe in a systems-based approach to design. This is clear from their office rehabilitation. At approximately 100 kWh/m2/year, the office's energy consumption for heat, light and hot water is less than a third of an average Canadian office building and as much as six times less than the average downtown Vancouver glazed tower. This also beats the passive-building standard. There is no mechanically directed, forced-air central heating or cooling system in the building. Rather, the architecture itself acts as an integrated heating and cooling system in concert with its occupants activities. The building naturally vents heated air through the two atria in the summer, and absorbs and re-releases people's body heat in the winter.

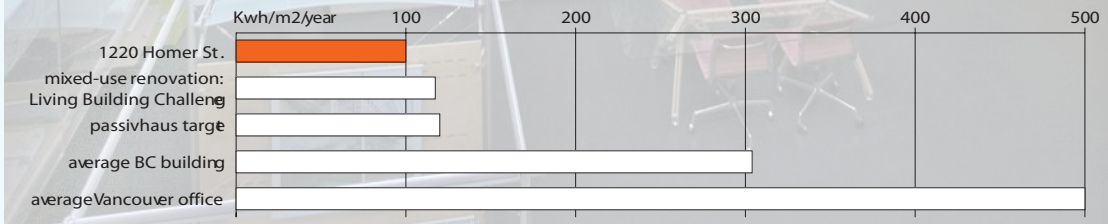
passivehaus standard passivedesign.ca

The Passivhaus Institute promotes the idea of highly-efficient, passive buildings (not just houses); buildings that use very little active heating or cooling systems.

living building challenge ilbi.org

The Living Building Challenge is an initiative of the Cascadia Region Green Building Council to encourage the design of beautiful, net-zero energy and water-use buildings.

view looking into central atrium

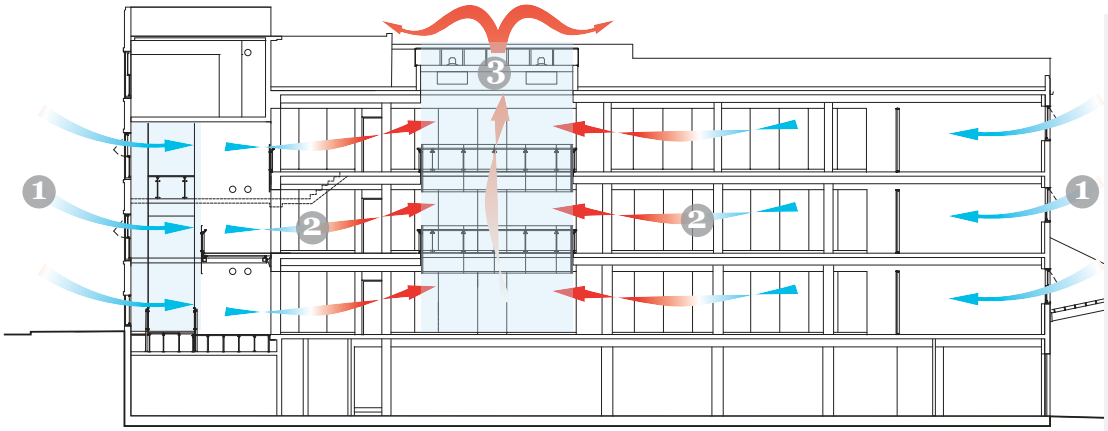


building energy intensity index

automatic vs. manual temperature controls

Should a heating system be manually or automatically controlled? Generally speaking, manual controls encourage personal responsibility for heating and cooling needs. "Treat your building like your home" says David Dove. However, these controls need to be accessible and the users need to be educated. 1220 Homer St. uses a live, internet-accessible 'dashboard' system to display and track water and energy use, which helps with individual and group accountability.

The stairways act as additional natural ventilation stacks. Two heat recovery units were installed to recapture heat from the kitchens and bathrooms as well as the heat generated by computers, lights and occupants, and return it to the building. Using minimal-energy strategies is also made possible because of the building's original concrete ceiling and walls. The thermal mass of concrete tends to slowly absorb both heat and cold and then equally slowly re-radiate the heat or cold into its surroundings. Utilizing the concrete to regulate the temperature also minimized finishing materials. Often finishes are used in an office to hide potentially unsightly service spaces or aesthetically 'inferior' surfaces. Sandblasting the rough concrete and careful placement of the utility services made the space aesthetically pleasing. To work with the heat recovery system, workspaces and service spaces are separated. This allows clustering of heat-generating elements (bodies, computers) further reducing energy use. The roof was also retrofitted with insulation to help with heat retention throughout Vancouver's mild winter.

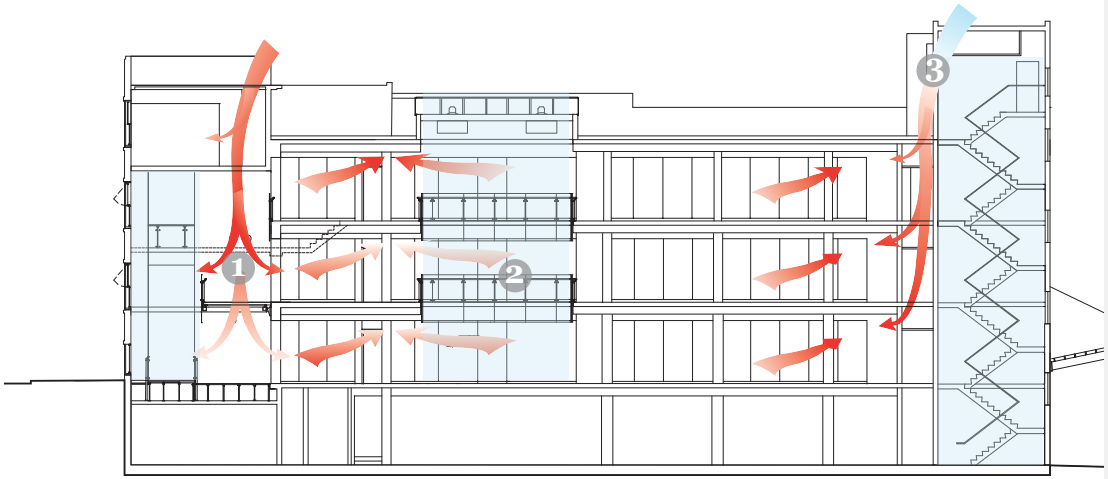


cooling

1. Fresh, cool air is drawn in from the outside through operable windows on facades of buildings.
2. As the air passes through the office, it is naturally warmed.
3. The warmer air rises via the stack effect through the central atrium and is vented by the operable skylight.

the stack effect

The 'stack effect' is caused by the natural tendency of hot air to rise and cool air to sink. Connecting floors with atria, shafts, and stairwells can take advantage of this natural behaviour to move air and heat around a building. These connecting spaces must effectively sized, and linked to operable windows to function as ventilators that are able to naturally provide fresh air and remove stale air from a building.



heating

1. Supplementary heating is provided by baseboards, heat-recovery units and a few small radiant heaters.
2. Staff activity produces heat, which is absorbed and re-released by the thermal mass of the concrete.
3. Fresh air for ventilation is pre-heated and drawn into the building through the heat recovery units.

thermal mass

"Thermal mass" means any kind of material that is able to absorb heat slowly, and then release it over a long period of time. Durable materials like stone, brick, ceramic and concrete are common examples of thermal mass, although water can act in a similar way in larger quantities. Thermal mass helps to naturally regulate the temperature swings in an environment, as it is able to trap heat when it is hot, and then release the same heat when the surrounding temperature is lower.

smart material selection


reception and display area

sandblasted concrete

Sandblasting can be a low-impact way of retaining the industrial aesthetic of an existing building while providing the benefits of an exposed thermal mass. Acoustics can be problematic with these types of hard, exposed surfaces, but this can be mitigated with the simple intervention of hanging acoustic baffles or soft furnishings.

ceiling

While a white-painted ceiling would technically bounce more daylight into the space, the exposed, sandblasted concrete is also used as an aesthetic highlight to the glass, steel and aluminum detailing.

flooring

The reception area formally served as an office for the warehouse and was situated lower than the warehouse floor. Busby Perkins + Will raised the floor level to be more accesible from street level.

recycled content

Typically used underneath ice rinks, this attractive flooring is made of 100% recycled tires. Busby, Perkins + Will clients often request it as a floor finish for all kinds of buildings, despite its 'usual' application.

exposed structure + services

An exposed structure generally means exposed service ducts, electrical cables and the like. In this case, the fact that the building is naturally ventilated means there is little or no hanging ductwork and noisy fans to muffle and hide behind acoustic panels. However, careful placement of electrical services is essential to maintain aesthetic control over the ceiling. Cutting, drilling and fastening services on and through structural members also requires careful planning to avoid the ceiling falling down!

daylighting

The large, open atrium not only allows the stack effect of natural ventilation to effectively cool-down and provide fresh air to the entire office, it also pours daylight down to the ground floor. Daylight penetrates to every work station from the enormous, yet simple and inexpensively installed skylights at the top of this space. The occupants are aware of the natural rhythms of the day and seasons as sun and rain moves across the transparent skylights. The rattle of the occasional hail storm causes staff to congregate at the atrium railings in admiration. A second cut through the floor plates at the entrance adds to the daylighting of the interior space as well as providing an expansive display area for the firm's numerous project models and awards.

Unusually, the main meeting spaces are placed in the open, underneath the atrium. One would think that this would create poor acoustics, but the subtle placement of hanging wood screens and elegant layout of the larger meeting areas mean there are few disruptions. This creates a culture of client-staff transparency, as well as gaining maximum utility out of a limited floor plate.

reception atrium with operable windows

"It is not precious, but we love it"

David Dove

Principal, Busby Perkins + Will

experimentalism

Busby Perkins + Will are committed to constant self-enrichment and learning. In 2000, when this rehabilitation project was completed, natural ventilation, daylighting and other passive design strategies were not well-understood by much of the construction industry. The first winter was very chilly, as the computer model used to size the ventilation and heating systems had anticipated a fully occupied building. However, as the staff grew and learned how to manipulate windows, ventilation and space heating, the space became increasingly comfortable while still maintaining the energy efficiency goals the firm had set. The office has become a kind of living laboratory, a testing ground for progressive design strategies. Learning from their own work environment, Busby Perkins + Will is able to apply these lessons to their design work.