

2

case  
study

## 1636 Charles St

making space for heritage

"a heritage home is a means to create roots in the community and connects you to the story of a city"

Stephanie Maingot + John Flipse

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**

When Stephanie Maingot and John Flipse bought this four-storey home, it had already housed dozens of families. Like many homes on this street, it started out as an upper-class residence, but after two world wars, an economic depression, and shifts in demography, it became difficult for just one family to sustain. In 1951 this home was converted into a duplex, a common trend in many large single-family dwellings of the time; often a necessary adaptation to the increased demand for housing and higher cost of living in Vancouver post-World War II.

## building at a glance

building type	single-family dwelling with suite
location	1636 Charles St.
size	1000 sf additional space
original building	1910
rehabilitation	2003
original use	single-family dwelling
cost	\$158/sf



## building team

owner	Stephanie Maingot & John Flipse
architect	Maison D'etre
contractor	self-managed



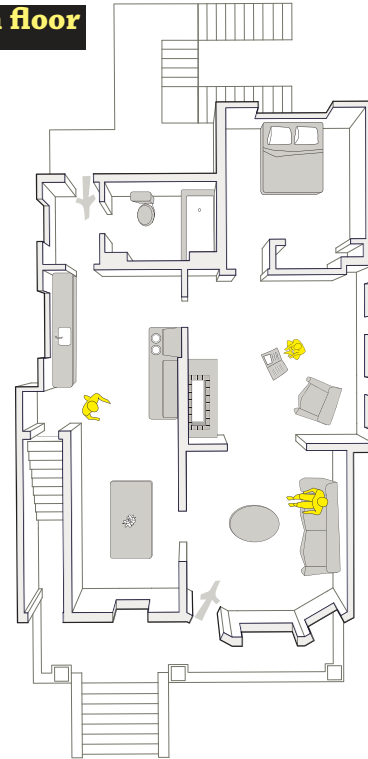
“we decided to use every square inch of space”



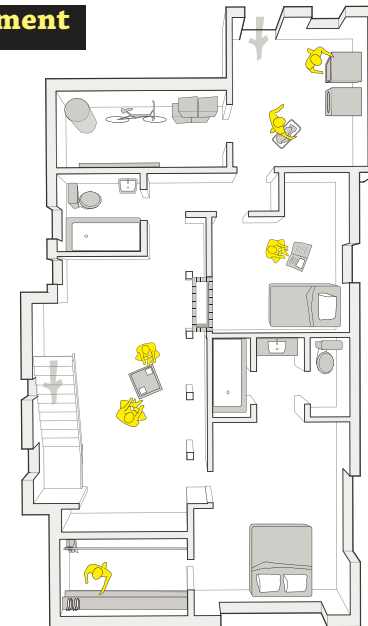
For John and Stephanie, the existing rental unit on the upper two floors made the purchase of the home and the mortgage payments feasible in an inflated real estate market. They settled in the lower level suite, which comprised 1000 sf of habitable space, and accepted the reality that they had just bought a typical drafty old house, in which the winter months are barely liveable. When their family expanded with the birth of their son, they looked to the basement, previously a dank, dark rabbit warren of many tiny rooms for additional living space. In 2005, they made the unconventional and creative decision to relocate their bedrooms and home office to the basement. This nearly doubled their living space and allowed the main floor to return to its historical function as reception rooms.

The removal of an existing forced air heating system to open up headroom in the basement was an opportunity to rethink their heating system. They choose underfloor water-based radiant heating over electric baseboard as the replacement heating system. This new system not only halved their monthly heating costs but also produces a comfortably inviting heat. They introduced salvaged hot-water radiators to reinforce the heritage feel of the home. A similar attitude towards material preservation and re-use led the owners to creatively incorporate salvaged bannisters, doors and vanities to achieve an aesthetic more akin to an urban loft than a detached, duplex home.

main floor



basement



a salvaged bannister frames the basement stairs



the new common living area



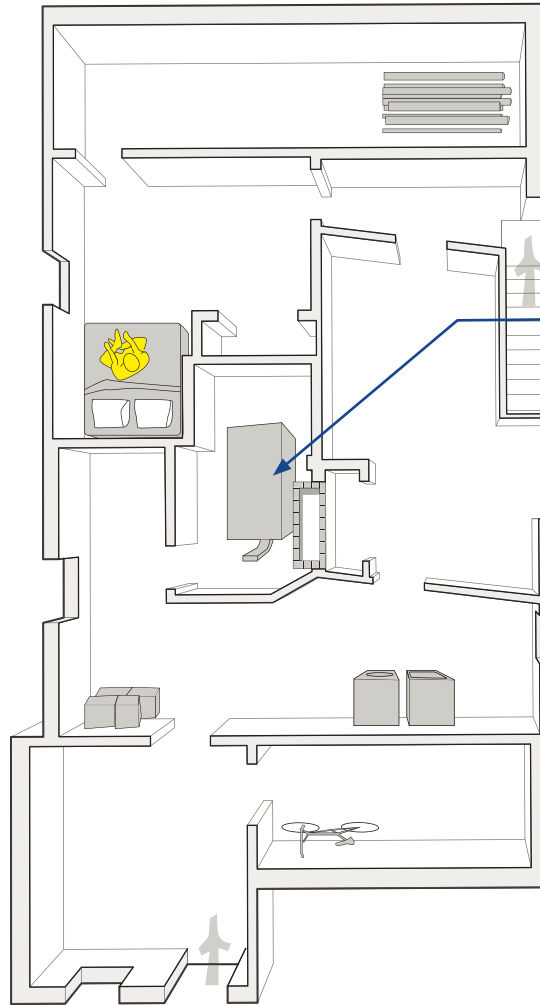
radiant heating under the original fir flooring



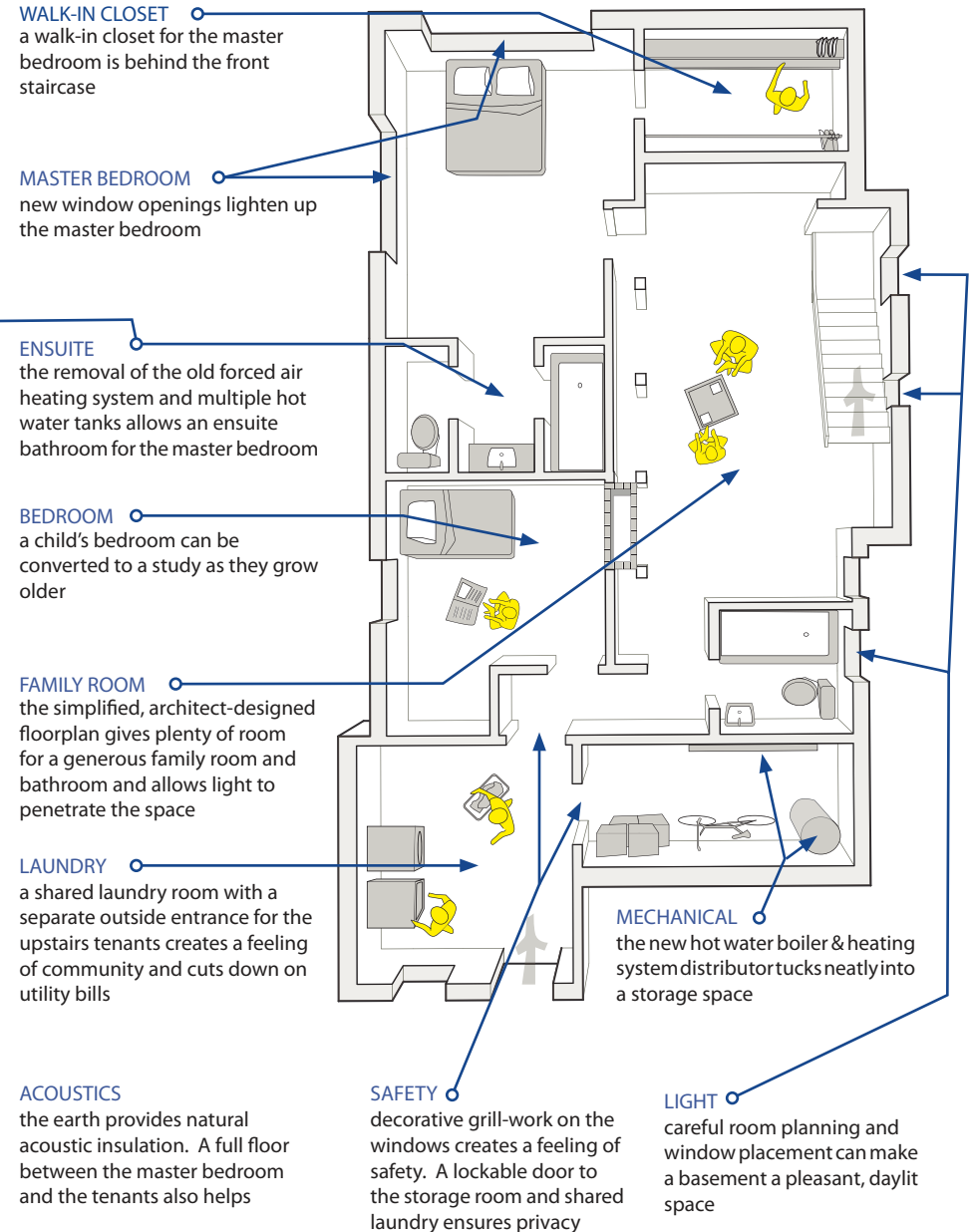
# rethinking spaces

Basements have a poor reputation for creating desirable space. Understanding this made John and Stephanie prioritize comfort, light and spatial efficiency for their project. Rooms and windows have been carefully placed to maximize connection to the outdoors, as in the master bedroom, laundry room and common space. Storage and mechanical spaces that formally dominated the basement have been carefully repositioned to allow a more human-centric habitation. New underfloor insulation and an effective moisture barrier combined with in-floor radiant heat to create a comfortable, dry space in a typically damp part of the house. The basement was transformed from an unlivable, dark space suitable only for storage into an integral part of their daily lives.

**basement before**



**basement after**



**WALK-IN CLOSET**  
a walk-in closet for the master bedroom is behind the front staircase

**MASTER BEDROOM**  
new window openings lighten up the master bedroom

**ENSUITE**  
the removal of the old forced air heating system and multiple hot water tanks allows an ensuite bathroom for the master bedroom

**BEDROOM**  
a child's bedroom can be converted to a study as they grow older

**FAMILY ROOM**  
the simplified, architect-designed floorplan gives plenty of room for a generous family room and bathroom and allows light to penetrate the space

**LAUNDRY**  
a shared laundry room with a separate outside entrance for the upstairs tenants creates a feeling of community and cuts down on utility bills

**ACOUSTICS**  
the earth provides natural acoustic insulation. A full floor between the master bedroom and the tenants also helps

**SAFETY**  
decorative grill-work on the windows creates a feeling of safety. A lockable door to the storage room and shared laundry ensures privacy

**LIGHT**  
careful room planning and window placement can make a basement a pleasant, daylit space

## SPACEPLANNING

"go and hire an architect, right now"

# efficient energy systems

During the basement's renovation, they installed radiant in-floor heating beneath the original fir flooring planks of the main floor and under a newly poured polished concrete floor in the basement. The owners replaced two inefficient hot water tanks and two old furnaces with one high grade boiler system. They either removed or sealed all forced air ducting in both units. They installed salvaged radiators to heat the rental unit. This cutting-edge boiler system discreetly provides for all the hot water and heating needs of the entire house. The introduction of this efficient energy system has halved their heating bill making the mostly un-insulated home cosy even in the coldest months of the winter.



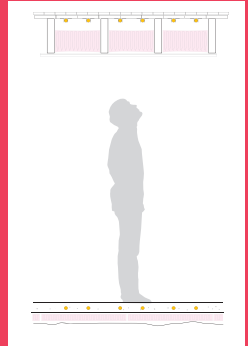
## installing hydronic systems



**1** Existing forced air system is removed. This frees up headroom in the basement.

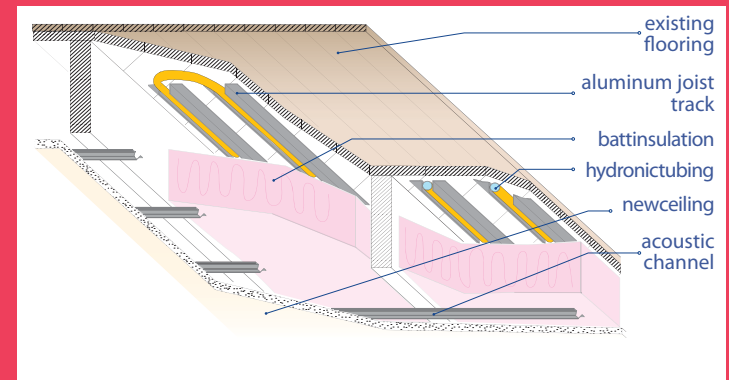


**2** Hydronic, radiant heating system is inserted from below the existing hardwood floor.



**3** New batt insulation and ceiling is installed, to finish the basement space.

## under the floor boards



Aluminum transfers heat more easily than air. Thus the heat moves from the radiant tubing directly into the fir flooring through the aluminium brackets. The warmed, wood surface then radiates the

heat upwards. Insulation and air space located below the tubing prevents too much heat radiating toward the basement below, which has its own in-floor hydronics system below the concrete flooring.



The radiant heat has also retrospectively solved another conflict which is so common in old homes. The forced air system was blowing hot air which was immediately lost through the leaky, cold surfaces of the home's single-paned, historic windows. The new type of heating system warms the floor and radiates from it, as opposed to raising the temperature of the air, making for a cleaner, more even heat that allows the original windows to function at their best. The elimination of the inefficient furnace system not only allowed for gained ceiling height in the basement through the removal of its cumbersome ducts but also "took the pressure off" the home's beautiful double-hung wood windows, which when maintained properly, can easily have a lifespan of 200 years.



BASEMENT

MAIN

Zoning allows heating and cooling loads to be customized using individualized digital thermostats for each room or area. Because water carries heat much more efficiently than air, smaller zones are made possible than with an air-based system. When combined with a digital thermostat, heat can be directed exactly where it is needed, saving on heating costs and energy use.

Boiler type: Laars Endurance

Heating coils: 1/2" hePEX

Accessories: Wirsbo Joist Trak

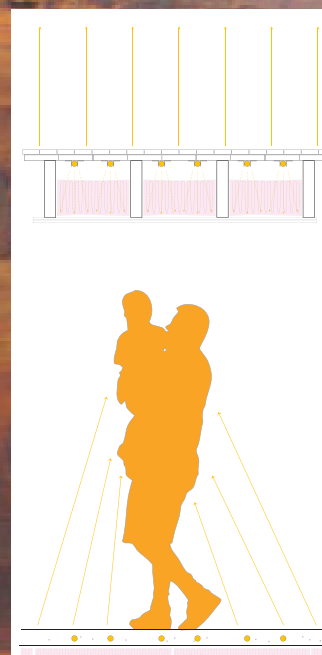
**BEFORE**

**AFTER**

## why choose radiant heat?



**FORCED AIR** raises the ambient air temperature to make you feel warm. It is drier, and can be dustier but does respond more quickly to thermostat adjustments.



**RADIANT HEAT** is experienced directly on your skin. The ambient air temperature can be cooler, but you will still feel warm. It is a comfortable heat (think campfire) and is more energy efficient. However, it does not respond as quickly as a forced air system.

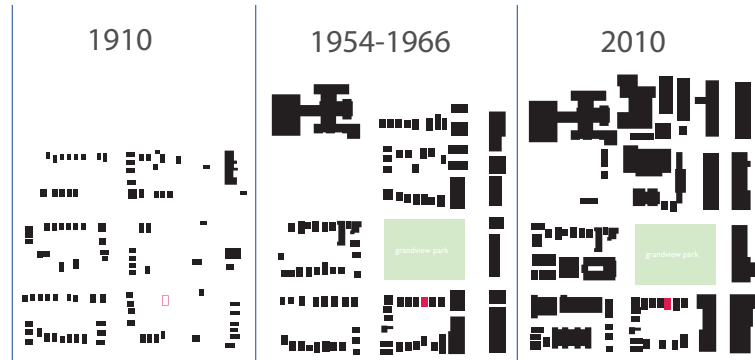
**\$350/month** heating only

**\$195/month** heating + hot water

# urban

Like previous occupants, the owners find it a convenient pleasure to live in a historic neighbourhood near Commercial Drive, which offers public transportation and a plethora of local grocery markets, shops and cafés. Historically a working class neighbourhood, today the area is a vibrant, mixed-income neighbourhood. It has seen an increasing number of detached homes cleared to make way for low-rise apartments and townhomes due to rising land costs and a sensible municipal focus on urban density over suburban sprawl. The Charles Street case study offers an alternate example of density through the inclusion of secondary suites, student rooms, laneway homes and multiplex conversions to existing homes.

# densification



Increasing density of Grandview neighbourhood, 1636 Charles St in red

For most families, the largest purchase they will make is their home. The second largest purchase will be any renovations they carry out to this home. The additional upfront cost of investing in a good designer, cost-saving systems such as in-floor radiant heat, or deciding to maintain and upgrade an existing building before demolishing and building new can be daunting. A simple payback calculation showing a long cost recovery period can make these decisions even more difficult. However, the social role of a home as the centre of a growing family, and the desire to maintain a heritage feel made John and Stephanie's decision easy. As a result, they have a comfortable, flexible, future-friendly home that can respond to their needs as well as providing additional income with space for a tenant and student.

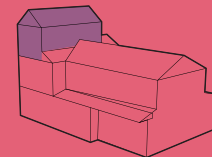
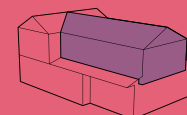
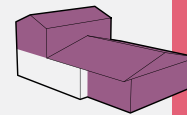
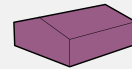
AVERAGE SIZE OF NORTH AMERICAN SUBURBAN SINGLE FAMILY DWELLING

800 sf

1500 sf

2266 sf

2500 sf



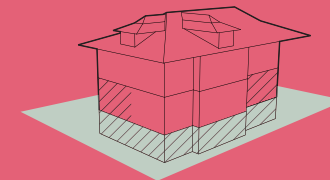
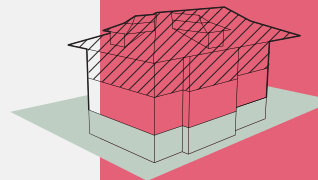
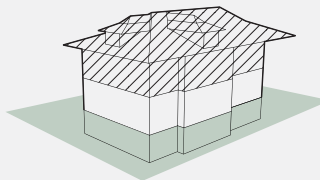
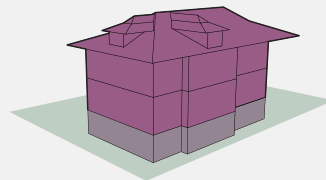
1910

1950

1970

2000

2010



1636 Charles St. is constructed as a single family dwelling

Single family dwelling is converted to duplex.

Inside renovation to upper apartment

Basement renovated and occupied. Student/guestroom added to main floor.

**heritage flexibility**



# creative recycling

When choosing finishes for their new space, John and Stephanie's priorities were to maintain a heritage feel, while still being conscious of a contemporary aesthetic. A focus on both pragmatics and aesthetics led them to choose durable, warm finishes for the new downstairs living spaces. Integrating specific elements of a salvaged building from an off-site location into a new project can be challenging. Sizing does not always match or there may be an uneven or unusual number of a certain item. John and Stephanie's creative spirit meant that these challenges became opportunities to express their desire for a beautiful, lived-in space.

"why should we cover up these beautiful materials?"



## salvaged structure

structural upgrades required an additional post in the basement. A salvaged post matches the existing and adds to the heritage aesthetic.



## fine furniture and fixings



vintage hot-water radiators



John modified a vintage cabinet into a beautiful washbasin



original hardware and doors are stripped for reuse



the old garden gate makes a feature on the outside deck

## creative concrete

acid-stained concrete floor keeps allergies at bay, is easy to maintain and clean and allows in-floor heating to operate at maximum efficiency

