HOUSING TOOLKIT

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First published Aug 8, 2018 (Updated Feb 20, 2019)

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CONTENTS

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INTENT & ACKNOWLEDGMENTS

Well designed homes have the ability to help inhabitants feel like they belong and are secure. Smart design can increase the suitability and affordability of housing (like reducing energy costs, or being the "right-size"). Design thinking is one of the tools in our arsenal to respond to the growing housing crisis across Canada and in St. John's. This guidebook is intended to give those not formally trained in design (ie. architecture, urbanism, interior design) enough knowledge to ask the right questions to continue pushing for well designed affordable housing.

This Toolkit is in no way intended to be used as a substitute to hiring a professional (ie. architect, landscape architect, engineer, interior designer). Each home, site and circumstance are unique and will require that judgment calls be made by someone with knowledge, experience and the appropriate certifications. Professional associations like the Newfoundland and Labrador Association of Architects can provide guidance on when a professional is needed and how to select one. Any building work within the City of St. John's requires a building permit. The City's staff can provide some advice on building code, zoning and heritage regulations.

This Toolkit is intended to be a general overview of the design considerations surrounding affordable housing with tangible examples to illustrate the concepts. The breadth of topics covered creates a starting or reference point to help generate ideas rather than a prescriptive guide (how-to) like building codes.

While other topics, such as operations or social support, may be touched on, the focus of this document is design. Additional sources will be required to address the many other factors and considerations needed for a successful affordable housing project like: engagement with the neighbourhood, social supports, operations and maintenance, economics, and adaptations over time.

The views, thoughts, and opinions expressed in the text belong solely to the author.

Many people and organizations helped make this project a reality. The Toolkit as published in February 2019 was funded primarily through the City of St. John's Catalyst Grant. A complete list of those who contributed can be found on the following page. Input from people with diverse perspectives helps to bring light to blind spots and create a more holistic and useful document.

All sketches in this document were completed by the Author. Unless otherwise noted, all images and diagrams are from Pexels, Pixabay or Shutterstock.

The Housing Toolkit outline was pinned up as the focus of a Feedback Session on March 19th. These cards were modified, reorganized and added to during this session, which became the foundation of this document.

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METHOD

DEVELOPMENT OF TOOLKIT CONTENTS, JANUARY, 2018

- The following City of St. John's publications were reviewed:
  - Affordable Housing Business Plan (2014)
  - Seniors Housing Research Project (City of St. John's, 2014) and Update (City of St. John's, 2016)
  - Affordable Housing Strategy (City of St. John's, 2019-2028)
- The Method and Contents of this document were arrived at in collaboration with City of St. John's staff: Simone Lilly, Affordable Housing and Development Facilitator and Judy Tobin, Manager of Non-Profit Housing.

FEEDBACK SESSION, MARCH 19 + 20, 2018

A draft of the housing principles were pinned up as a work in progress (see photo on the previous page). City staff and people involved in the design and construction industry provided feedback.

DRAFT SUBMISSION, AUGUST 10, 2018

A draft of the Toolkit was reviewed by the Affordable Housing Working Group and relevant staff within the Non-Profit Housing Division and the Department of Planning Engineering and Regulatory Services. The draft with specific questions and comments were also delivered to a group of industry professionals for feedback. The draft was modified based on input received.

REVISION BASED ON AFFORDABLE HOUSING STRATEGY, NOVEMBER 22, 2018

The document was revised based on the approval and launch of the City of St. John's Affordable Housing Strategy 2019-2028.

FEEDBACK

The following groups or individuals have provided input at some point throughout the process.

- The City of St. John's
- Rowsell Appleby Newton Engineering
- Mills and Wright Landscape Architecture
- Powers Brown Architecture
- Sable Design and Building
- Fougere Menchenton Architecture
- Canadian Homebuilders - NL
- Bruce Knox, Public Health
- Ian Higenell and Mark Whalen, Architects
- Roman Halitzki, Architect
- Affordable Housing Think Tank
- Wendy Reid Fairhurst, Interior Designer
- Choices for Youth
- St. John's Native Friendship Centre
- Canada Mortgage and Housing Corporation
- End Homelessness St. John's
- Stella's Circle

CONCEPTS

The following concepts are seen throughout the discussion around Affordable Housing and help to frame a more thorough understanding of this Housing Toolkit. The definitions below outline the stance of the author, or lens that these concepts become part of the conversation within this document.

AFFORDABLE HOUSING
When housing costs (rent/mortgage plus utilities) are more than 30% of gross household income then housing is not considered affordable. Affordable housing may be subsidized and/or operated by governments and non-profits, or it could be owned and operated by the private market. Housing affordability is considered across various income levels. However, affordability is just one piece of the puzzle. The principles presented in this document strive to create affordable housing that serves its inhabitants by being a safe and stable place of refuge and private life.

NIMBY
Many affordable housing projects (new construction or renovation) come up against public opposition by neighbouring residents. NIMBY, or "Not in my Backyard" is used to define this opposition. While motives are varied, it frequently stems from the unknown and negative stereotypes (sometimes unfair or unfounded) of those living in affordable homes or housing projects.

EMPOWERMENT
Affordable housing projects run under very tight margins with maintenance often under-funded. Empowering inhabitants to care for their homes requires significant social support, but has the potential to reduce maintenance costs and improve the lives of residents.

EQUALITY
Housing as a human right means all should have access to high quality and suitable housing. Although the size and finishes may differ from market housing to achieve affordability, overall affordable housing should not be of lesser quality than market housing. Something that is not 'good enough' for your home (unless a matter of preference) is likely not good enough for an affordable home either. The same choice and process for obtaining housing should be accessible to all regardless of their socioeconomic status.

STIGMATIZATION
Those living in subsidized or other affordable housing projects face a number of social barriers associated with assumptions or stereotypes. Unkept or uniform affordable homes can further reinforce that stigma as it becomes evident to passers-by that the inhabitants are of lesser means. Stigmatization can occur because of the condition of housing, or the location if an area is uniformly poor and marginalized (i.e ghetto).

PRINCIPLES

1. Value for Cost

In many construction projects in this province, upfront capital savings are valued more than design elements that show their value over the life of a building. Take for example something like a window, which is more expensive than the wall it sits in, and doesn't perform as well in terms of heat loss/gain. Natural light has been shown to have significant benefits to wellbeing[1] and a reduction in energy use, but those benefits can be more difficult to quantify than say the insulation value (R-value). The following items can be tempting to overlook, but will serve the inhabitants in the long run:

Photo above by Alexy Saltekoff

1. Davis, Carla. "Shining Light on What Natural Light Does For Your Body." NC State University. https://sustainability.ncsu.edu/blog/changeyourstate/benefits-of-natural-light/ Accessed July 30, 2018.

HIGH QUALITY MATERIALS

High quality materials can lead to increased durability, which also means decreased maintenance costs. Materials like vinyl siding are inexpensive, but not durable. To consider this take the approximate costs for professional installation (including materials and labour, but not HST) for vinyl vs. wood siding for a two storey 1,500 sq. ft. house:

Vinyl siding is quickly installed and economical at $24,200. In a harsh climate, like ours, strong wind or flying branches can easily put knicks or cracks in siding. In most circumstances vinyl can't be easily repaired and has to be replaced.[2] To avoid stigma, and keep homes looking well maintained vinyl siding should be replaced every 15 - 25 years.

Wood clapboard has been used traditionally in this province for hundreds of years. It is durable, environmentally friendly and if properly installed and maintained, can last the lifetime of a home. The installation will cost approximately $35,200 and can expect to be repainted and caulked every 15 to 20 years depending on the conditions and location, at well below the cost of replacing vinyl ($8,000-$10,000). Wood siding also has the benefit that the inhabitant can choose or change the colour increasing pride and ownership. Many people have the skills (or can easily acquire the skills) to maintain wood siding. (See Principle 5 - Simply Built with Common Materials)

2. Vinyl siding often needs to be replaced instead of repaired as the profiles change rapidly enough that sometimes the same type is no longer available by the time it needs to be replaced. Furthermore, the colours fade under sunlight, meaning a new piece of siding is often distinguishable from the old. A mismatched or unkept siding can contribute to stigma.

NATURAL LIGHT AND VENTILATION

Access to daylight and fresh air make for improved physical and mental wellbeing and can also contribute to lower operating costs due to decreased reliance on electricity and active ventilation systems.

As a rule of thumb, a house should be bright enough to read a book without any lights on if it's an overcast day. The lighting levels required in residential construction are 10-50 foot candles. The amount of light outside on an overcast day is approximately 200 foot candles.[3] It follows that every inhabited room should have windows.[4] Inhabited rooms are where activities take place like living rooms and bathrooms, but would not include storage rooms. Reflective or light coloured materials can increase light reflection in situations where it is difficult to achieve sufficient daylight.

The home should have windows on at least two opposing sides of the dwelling to encourage a cross-breeze. The airflow will be increased if the windows are located along the direction of prevailing winds. The 'stack effect'[5] can also be used to help with cooling in homes that have more than one floor or skylights. Since hot air rises, higher windows will draw the warm air out of the house, and lower windows will allow cool air to replace it. Wherever possible, windows should open so the inhabitants have control over their environment.

Sufficient natural ventilation is not possible in our climate year round.[6] Well oriented operable windows should be supplemented by active systems that draw in fresh air and exhaust stale air (like a heat recovery ventilator, which is a code requirement for all new construction). Inhabitants need to know how to operate the system. Regular follow up is usually necessary to ensure the system is being used and maintained. Many dwellings develop problems with moisture (like mould) because the people who live there don't understand how to use the systems or the systems are not properly cleaned and maintained.

GOOD NEIGHBOUR

In the same way a municipality has a responsibility to maintain parks and open spaces, homeowners have the responsibility to maintain their properties and ensure that the home's presence on the street contributes to the overall neighbourhood. Wilson and Kelling's "broken window theory"[7] implies that an unkept built environment is a signal that

3. Value of 10-50 foot candles comes from IESNA handbook, table of illumination values, taken in the horizontal plane. The amount of 200 foot candles was taken outside with a light meter.

4. In fact it is a requirement of Canada's National Building Code 2015 that all bedrooms have windows. The code requirement however is not intended for sunlight, but egress in the case of a fire.

5. The Stack Effect causes air to move vertically from low to high due to differences in air density (temperature and humidity)

5. Most homes have very simple ventilation systems like exhaust fans in the bathrooms and kitchen and a heat recovery ventilator. Operable windows may have less benefit in very large homes or multi-unit dwellings with central ventilation systems more similar to a small commercial building.

6. Opening windows in the winter isn't feasible as it'd cool the house to a point of being uncomfortable and would be wasteful if the heat was on.

7. Wilson, James and Kelling, George. "The police and neighborhood safety: Broken Windows." https://www.manhattan-institute.org/pdf/_atlantic_monthly-broken_windows.pdf. Accessed Dec, 2018.

Archival photo of Churchill Park garden suburb during construction showing a single and one and a half storey variation of a similar plan. These buildings each respond to their site and become diverse due to the position of windows and the way the home is entered.

no one cares and begets other careless or criminal behavior.

Frequently the perception is that, due to their transitory nature, renters aren't good neighbours or the homes aren't well maintained (NIMBY). In fact there is no reliable data to show any significant difference in the quality of owner or renter occupied dwellings. Social supports and funding can be put in place to foster pride and responsibility for any home. With the right supports, an inhabitant can maintain their street presence so an affordable dwelling contributes positively to the urban fabric of the street.

2. Diverse

Homes should be as varied as the individuals that live in them. In the housing market there can be a lot of homogeneity. The construction industry and housing market are becoming more and more standardized. In developing new affordable housing it is important to work, despite this trend, to develop site specific diverse housing. All good housing, by nature, is diverse.[1] Affordable housing should be no different. Diversity can be achieved in the following ways:

SITE SPECIFIC

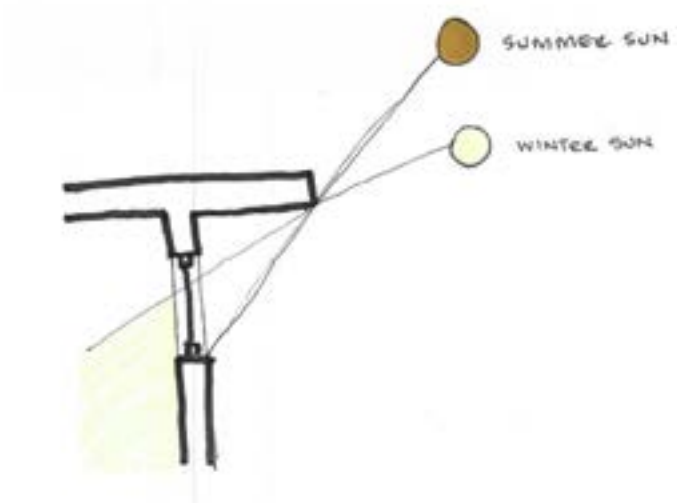
Buildings can take advantage of the site they are placed on to increase the quality of housing and decrease the cost. In the early 1940s the Commission of Inquiry on Housing and Town Planning began creating the Churchill Park garden suburb in response to severe housing shortage. The homes built in this area were built over a fairly rapid period (for the era) and although similar they have slight variations that respond to site creating a beautifully diverse built fabric. Some factors to consider when orienting a home on a site are as follows:

- **Position the building and rooms to take advantage of topography.** Is the site flat or sloping? If sloping, take advantage of the slope by having a walk-out basement and locating the front door on the higher portion of the site so you won't need steps. Working with the site could increase or decrease costs by up to 20% and will depend on the specific site. Alternative foundation systems[2] can be used to work with challenging sites, but will likely result in additional costs.

Above: Sketch showing how to take advantage of landscape to provide privacy. Notes on drawing: "If floor is raised inhabitant can see out, but maintains privacy (not on grade can present difficulties with accessibility)" The strategy of level changes should only be used on a sloping site where an accessible entrance can be provided on the side or around the back of a home.

1. Diversity is recognized as a value in many housing policies including by the following organizations: Canadian Institute of Planners, BC Centre for Disease Control, City of Lafayette, Better Town Toolkit, City of Ann Arbor, City of Fremantle, Regional Plan Association, Orange County, Lincoln Institute of Land Policy, Land Use Law Centre and the National League of Cities.

2. Like helical piers.



Above: Sketch showing how an overhang can allow sun to warm a building during the winter, but prevents solar heat gain and glare in the summer when the sun is higher in the sky. Using trigonometry, the size of an overhang can be calculated for what is called "passive solar heat gain". Sun angles can be found at www.suncalc.org

- **Orient the windows towards views and to selectively provide privacy.** This may mean having windows for private spaces facing a garden instead of the street, or using window height and landscape features (like trees) to provide privacy and pleasant views. Having opportunities to see and encounter your neighbours should be balanced with privacy, as casual encounters build community.[3]
- **Orient the building towards sun.** To achieve passive solar heating, the majority of the windows and building area should be on the South facing wall. The other walls should have fewer openings and increased insulation. Shading or overhangs must be used to prevent excessive solar heat gain and glare.
- **Orient the building to take advantage of prevailing winds.** There are two types of winds, let's call them common winds and storm winds. Storm winds often come with adverse weather, like precipitation. Therefore the building should be oriented to have windows on either side of the common winds (more like a gentle breeze). Each site will be unique as winds are affected by surrounding structures and landscapes. Orienting towards storm winds can create wind tunnels and should be avoided.[4]

DIVERSE DWELLING TYPES

Since the 1950s there has been a trend in housing development to assume a specific income and family type, developing homogeneous or 'cookie cutter' neighbourhoods.[5] We all know those split level homes.

As a person's situation changes, desired size and ownership model of their home changes too. A single young adult may want to rent a one bedroom apartment, a young family may want to own a three bedroom detached home, whereas an empty nesting couple may choose to downsize to a condominium.

Including many different types of people in a neighbourhood fosters vibrant communities and can increase the longevity of a community. When choosing where to locate affordable housing, consider the demographic and land ownership make-up of the neighbourhood and compliment that. A rule of thumb is that if 20%[6] of dwellings in a neighbourhood are affordable housing they are "invisible." To be specific, this means indistinguishable from the surrounding dwellings, well kept and beautiful.

MIXED USE

Many different uses create a more vibrant, safe and walkable neighbourhood. Page 14 has a map/sketch of a St. John's neighbourhood that integrates varying demographics and uses successfully.

3. Kathryn McCamant and Charles Durrett. Creating Cohousing: Building Sustainable Communities. Gabriola Island, BC: New Society Publishers, 2011.

4. Predominate common winds in St. John's are West in the winter and South-West in the summer. Surrounding buildings and landscape can effect the wind direction and intensity, so a specific site should be observed to confirm data. General data for wind based on location is available at www.windfinder.com

5. A quick analysis of the houses currently for sale show the downtown neighbourhood ranging from $79,900 to $699,900 with the Kenmount Terrace neighbourhood having a much smaller range of $299,900 to $529,900. The appearance of these neighbourhoods also reinforces this difference.

6. Information on inclusionary zoning (like including 20% of affordable housing) can be found at inclusionaryhousing.ca.

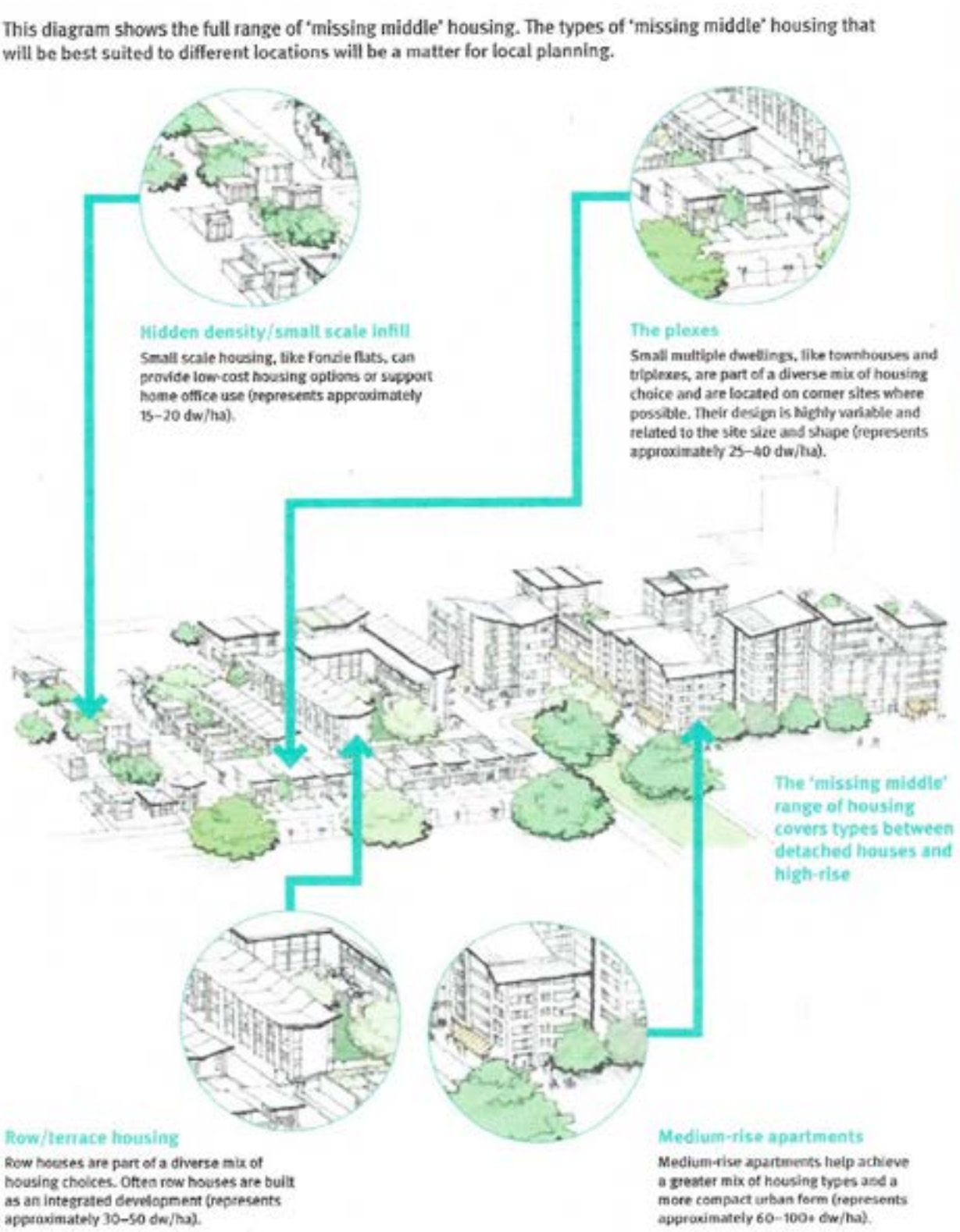


Diagram of housing types that the Government of Queensland has identified as missing, referred to as the "Missing Middle". Taken from: Shaping SEQ - South East Queensland Regional Plan 2017, Queensland Government - Department of Infrastructure, Local Government and Planning, p. 45. The 'Missing Middle' can be defined as housing types between single family homes and high-rise apartment or condominiums. This diversity of housing options doesn't readily exist in St. John's and could be a way to develop affordable housing at a density that allows land costs to be greater distributed. In this diagram dw/ha refers to dwelling per hectare. For reference, the 2016 Census puts the density in the St. John's Metropolitan Area at 1.15 dw/ha, whereas a downtown block may have 127 dw/ha. This number is an approximation of the block bounded by Gower, Victoria, Bond and Prescott.

The neighbourhood sometimes referred to as 'Rabbitown' is successfully diverse, both in terms of demographic and building use. The diversity is represented by the items picked out on the map. Take for example that there are large detached homes, small attached homes and condos. There is a mix of income and housing tenure (renters and owners). There are lots of commercial buildings, both small and large ranging from a grocery store to a mechanic or tailor.

St. John's Tool Library has tools that members can borrow and also provides workshops, support and advice. Photo from SJTL Facebook Page.

3. Sharing and Integration

SHARING ECONOMY

In response to increasing costs, more and more forums using sharing as a way to reduce costs are popping up. Online formats like Facebook Marketplace or Airbnb exist, as do in-person sharing hubs like the St. John's Tool Library, carshare or community gardens. The following are ways that capitalizing on the sharing economy may increase housing affordability:

- **Smaller units can be made possible by sharing less used spaces.** Frequently there are just one or two people in a house, but they have a perceived need for a shed or basement for their tools. People feel they need a large enough dining and living space to entertain and a spare room for guests, despite the relatively rare occurrence of an occasion for many. Sharing spaces or

items can reduce the overall size needed by a family or individual. Many people are surprised to find they can live comfortably in a very small space, then have shared communal spaces like guest suites, kitchen or storage area. To see evidence of this, consider the rising popularity of cohousing, which is effectively making these sharing models fit the North American housing market.

- **Shared resources.** Reducing the amount of items people have to purchase can increase housing affordability, because it decreases the costs associated with maintaining a home. An example of a shared resource may be a lawn mower that's available from the local Tool Library.
- **Increasing suitability of existing housing stock.** Sharing a home can increase the suitability of the existing housing stock. In St. John's it can be difficult for single people or couples to find suitable affordable housing, but there is the potential for an empty nester to take on a student tenant in a homeshare program, like Home Share St. John's. The student is able to find affordable housing and the older adult is able to stay in their home for longer. In another example a single person may be able to buy a three bedroom house and afford it by renting out the rooms on Airbnb.[1]

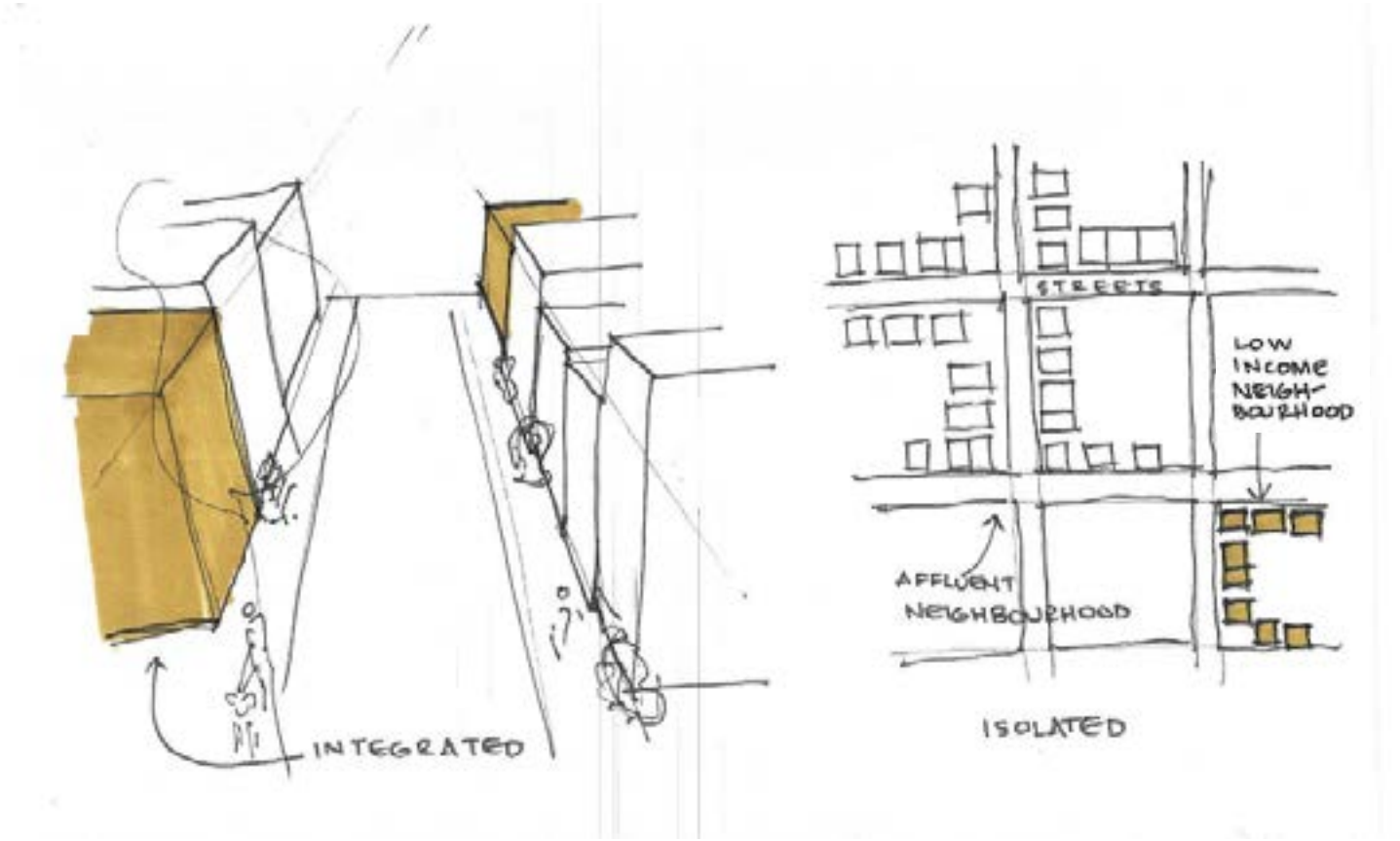
Above: This sketch from Pocket Neighbourhoods by Ross Chapin shows private dwellings in red, and communal spaces in orange in the centre.

1. In some cities informal vacation rentals have decreased the affordable housing stock. In recent times (2016-18) St. John's has had a high vacancy rate and deteriorating building stock. While there is no data yet, home sharing may provide an impetus to improve the building stock. Currently (Dec 2018) websites like Airbnb do not collect and remit municipal tax in St. John's. They do however, collect tax in other municipalities and may collect and remit tax to the municipality in the future. More information can be found on the affects of vacation rentals on Airbnbcitizen.com.

Communal meal at a co-housing project helps to build community

Above: Sketch shows an individual's home and a guest flat that could accommodate an aging parent, semi-independent child or function a rental property which could provide for additional revenue. OR does the guest flat share the house's amenities like the kitchen?

Below: Shops and homes in one building.

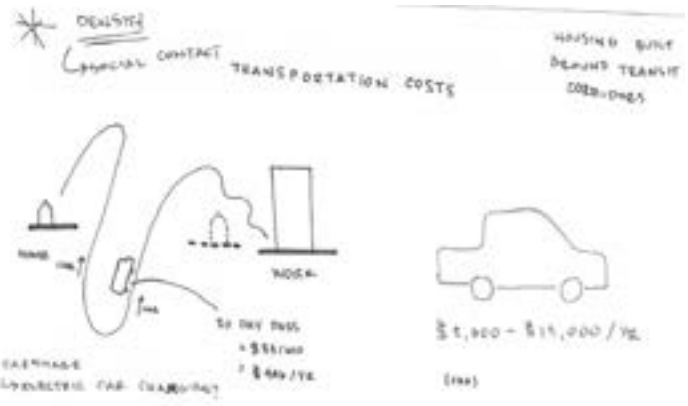


INTEGRATION

Integration into a community means inhabitants of affordable housing have greater access to shared facilities and resources. Integration has the potential to reduce the stigma associated with being of lesser means. The following are some specific examples of how integration can improve affordable housing:

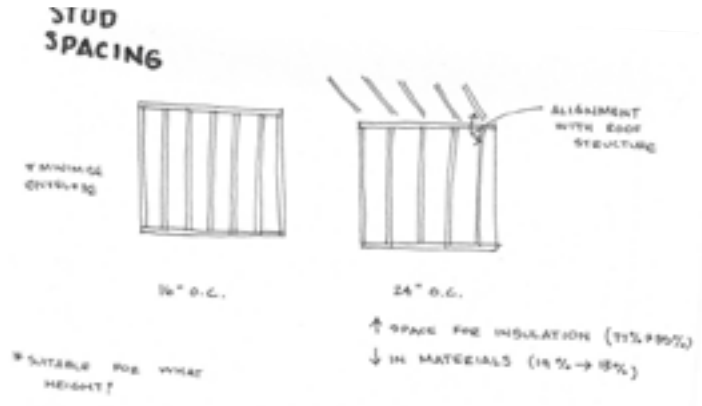
- **Housing integrated into a community with amenities and work places:** By living in an area that has amenities like public transit, grocery stores, public spaces and work places, inhabitants of affordable housing can spend less time getting around and more time focusing on their daily lives.
- **Housing integrated within the transportation network:** The definition for housing affordability by the CMHC or Statistics Canada only accounts for costs associated directly with housing, like rent and electricity. However the cost of owning and operating a vehicle or using public transportation can be a significant portion of household costs. Housing should be located in an area that is integrated into an affordable and efficient transportation network.

Above: To avoid ghettoized affordable housing, dwellings should be integrated into a community of market housing. Some say if 20% of the dwellings in a neighbourhood are affordable, it is invisible. That is, the presence of affordable housing won't negatively change the appearance or feeling of a neighbourhood.



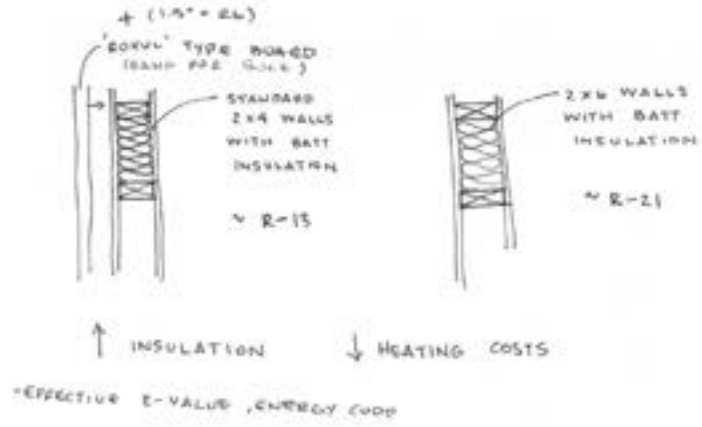
This sketch estimates the transportation costs. A 30 day bus pass costs $83/mo or $996/year and may add a two hour commute daily. A car saves time but is estimated to cost $8,600-$13,000/year in fuel and maintenance. Housing built around transit corridors (shown in this diagram by the dashed house) could save inhabitants money and time in transportation. There is also a small note about carshare and potentially frequent electric car charging stations, which could also remove transportation barriers and reduce associated costs.

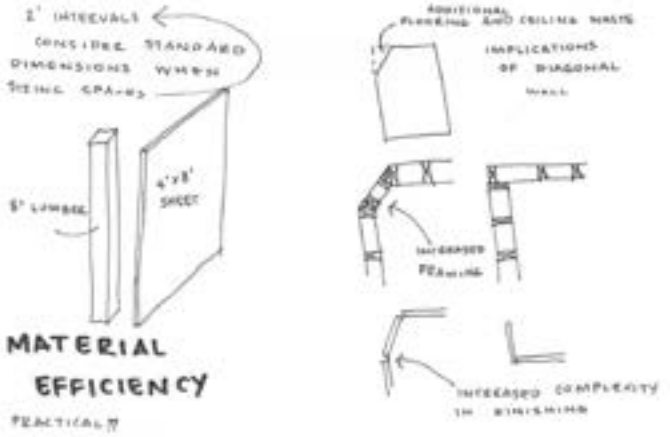
- **'Invisible' aesthetic to reduce stigma.** (See Principle 2- Diversity) Integration into a community both in terms of use and appearance can help reduce prejudice. Affordable housing should be indistinguishable from market housing so the appearance of a home doesn't contribute to a stigma towards the inhabitants. This may mean preserving historic elements in a renovation, or new home construction that is suitable in scale, massing and materials in a new neighbourhood.



Above: See "Optimize stud spacing" to right for description.

Below: Increasing insulation can decrease energy costs and can have a fairly short payback period. The above sketch shows two wall assemblies that both provide R21 insulation. The Energy Code now requires calculation of the effective rather than nominal insulation value. Effective R-value takes into account thermal bridges (places where there are gaps in insulation, like studs). The wall assembly on the left has a continuous exterior layer of insulation (labeled as 'Roxul' type board) which decreases thermal bridging and provides an overall better wall assembly. How a floor, wall or roof is insulated can cause condensation, because the dew point occurs within the wall assembly. A spreadsheet to calculate dew point can be found at CCHR.ca/calculators





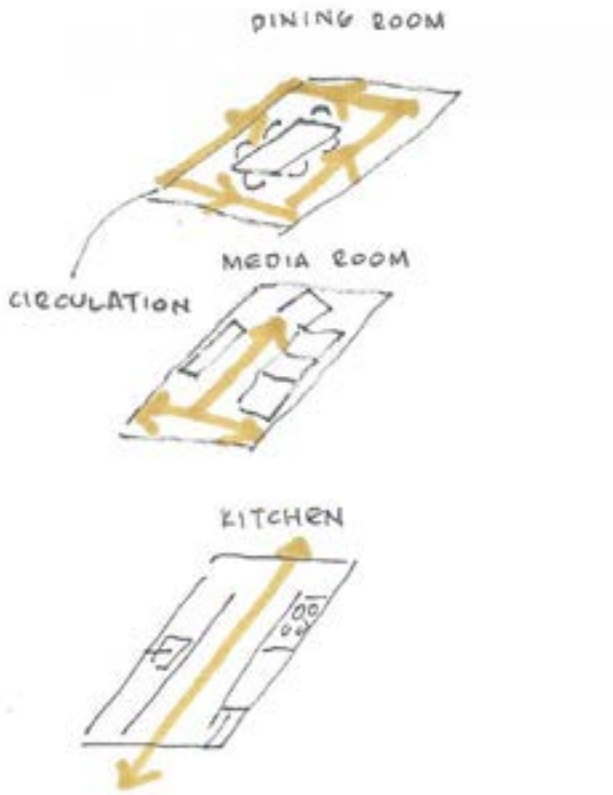
Dimensions of standard materials should be considered. Frequently materials are locally available for residential construction in increments of 2'. The sketch on the right hand side shows the implications of a diagonal wall which includes increased framing and complexity in finishing. There is also wastage in the ceiling and flooring materials.

4. Efficiency:

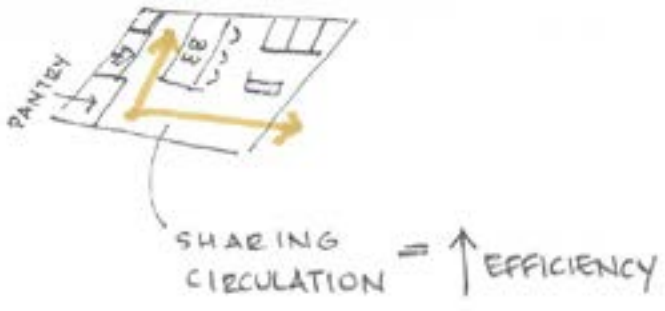
Efficiency can be thought of in terms of reducing initial construction costs by using materials more efficiently or reducing operating costs.

MATERIAL EFFICIENCY:

- **Optimize stud spacing** by placing studs and floor joists 24 inches on centre and aligning them with the roof trusses (which are normally 16 inches on centre), not only are materials conserved, but the structural stability and insulation of the building is increased. Cavity space increases to 85% from 77%, plates and studs are reduced from 19% to 13% and headers are reduced from 4% to 2%. All of this results in less heat loss and lower heating costs. This requires more care on behalf of the builder as stud placement must be more precise and may require the use of thicker gypsum board (like 5/8" thick) to accommodate the larger spans. Stud spacing is a structure choice. The required structural strength of the wall must be considered when choosing stud spacing.
- **Careful consideration of building elements** like framing and ceiling height. For example an 8' ceiling requires one sheet of gypsum board, whereas a ceiling height of 8' - 6" will require an additional sheet and



Above shows fairly typical and efficient dining, living and kitchen arrangements. The below sketch shows how much the circulation area and floor space decrease in an open layout. Increased efficiency in the layout means less floor space which is less expensive both upfront and over the life of a home (maintenance and utility costs)



associated waste in labour and materials. Material efficiency should always be balanced with the overall scale and proportion of a space to keep it feeling comfortable. Simple wall configurations like a straight wall rather than a diagonal wall, or one with many jogs will also be more efficient to build.

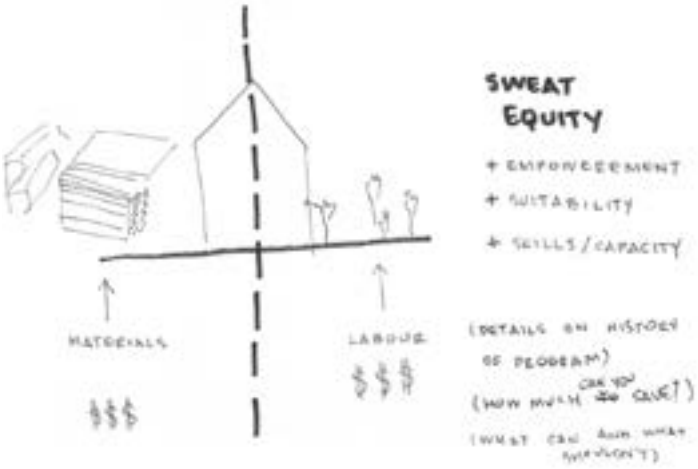
OPERATING COSTS:

Costs like heat, lights and maintenance factor into the ongoing affordability of a home. Sometimes investments can be made upfront that reduce ongoing costs and consequently increase the overall affordability of the homes. Considerations the following options:

- Heat recovery in ventilation or hot water systems
- Heat pumps (like mini-splits)
- Increasing the insulation value of floor, wall and roof assemblies (be weary of position of membranes and dew point within wall)
- Decreasing the overall surface area of exterior envelope, a home with a square plan or shared walls (ie. row house) will have less exterior area and space for heat to be lost

Operating costs can be a big part of monthly expenses. Adding efficient insulation to a home can help to reduce energy costs and may bring an older home from market to affordable housing rates.

- Decreasing circulation space and creating an efficient layout can decrease the building area
- Consider passive systems like passive solar and natural ventilation. See the previous Principle (Diverse) for discussion on how the orientation of a building can reduce operating costs.
- Consider window style, glazing, coatings and window coverings which can control solar heat gain and minimize heat loss.
- For prefabricated modular buildings, an economy of scale can be achieved by building many similar or same elements



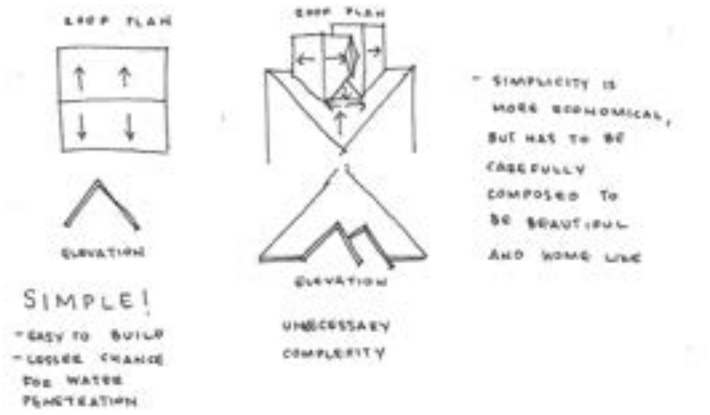
Sweat equity (or self-building) can empower the inhabitants of a home and result in them having a more suitable home. If someone builds their own home, they then will also have the skills/capacity to maintain the home. It can be assumed that roughly half of the cost of a home is materials and the other half is labour.

The above photos are of a project called Quinta Monroy by architectural office Elemental (Alejandro Aravena) in Chile, before photo by Cristobal Palma, after photo by Elemental. This incremental housing project provided half-built dwellings where the inhabitant finished the home on their own schedule to their own specifications. The parts that were built contained the more complicated elements like plumbing and electrical, whereas the part the inhabitant was responsible for building had more simple construction such as non-load bearing walls. The architecture studio went on the publish a guide to "Incremental Housing and Participatory Design".

5. Simply Built with Common Materials:

In Newfoundland (more typically in outport communities than within St. John's) there is a long tradition of self-building or building with sweat equity. There is an excellent book written locally on the topic: *Sweat Equity - Cooperative Housing-Building in Newfoundland, 1920-1974* by C. A. Sharpe and A. J. Shawyer. If a home is designed to be simply built with common materials, with the right supports, the inhabitants can take an active role in both construction and

Jess Puddister and Tim Ward in front of their Tiny Home, image from the David Maher, the Telegram.



Two roof plans and elevations demonstrate the difference between simple and unnecessarily complex construction. On the left hand side a simple gable roof is easier to build and has less of a chance for water penetration (leaks). On the right hand side the roof has unnecessarily complexity that is more difficult to build and more likely to leak. Simplicity is more economical, but has to be carefully composed to be beautiful and home-life.

1. Choices for Youth explored this model locally with their Train for Trades program. This program was piloted during the construction of the Lilly and now has evolved into Impact Construction. Fougere Menchenton Architecture were the architects for the project.

2. Tamene, Sewit, Empowerement: Deliberative Democracy and Empowerment: An Analysis of the Toronto Community Housing Corporation's Tenant Participation. August 2011.

maintenance[1] of a home. The following are considerations and examples:

- **Empowerment.** The inhabitants of a home are empowered to make a home their own and are therefore more likely to feel increased ownership and pride. For example, the inhabitant may select materials and colours.[2]
- **Aesthetic complexities to be avoided.** Elements like dormers and bay windows can increase cost and decrease building performance. It's important that a house be aesthetically pleasing and contribute to the street fabric, but this should be balanced with ease of construction and maintenance.
- **Homes can be partially built** with elements that could be challenging for a homeowner to do like masonry (ie. concrete), plumbing and electricity.
- House plans are available so people can take advantage of sweat equity
- Locally two young people have self-built a Tiny Home. This lifestyle choice will allow them to live debt free after 5 years as opposed to a traditional 25 year mortgage. Most municipalities on the Avalon Peninsula do not currently have zoning regulations that allow for this type of construction.

6. Safety and Privacy:

It is vital to feel safety and privacy in your home. Philosophies such as 'Housing First' acknowledge this basic human need. The design of a space contributes greatly to how safe and private a home feels in the following ways:

- **How a building relates to the street.** (See Principle 2 - Diverse) Windows can be placed in a way that increases privacy, by being higher than the street level. Additionally having 'eyes on the street' helps to make for a safe place.
- **Distance of public to private spaces.** Not all rooms within a home need the same amount of privacy. An inhabitant would be more likely to be okay with someone seeing into their living room (a more public space) than say into their bathroom or bedroom (more private

spaces). A floor plan should be organized to place the more public spaces closer to the street, and more private spaces further away.

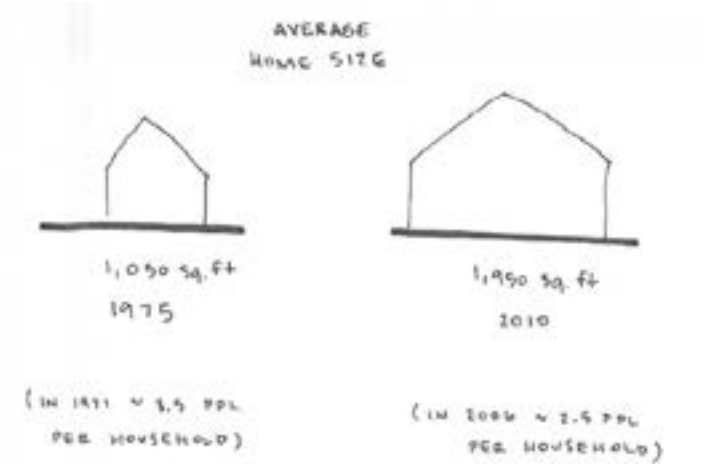
- **Balance security devices.** While security devices (like locks) are necessary, these elements must be balanced to keep a 'home-like' safe feeling. Hardware like bars or cameras can feel institutional, and if possible should be avoided in homes.
- **Establishing a safe place.** For new neighbourhoods, or those that have been identified as problem places, additional measures are required to establish a safe place. This may mean increased security and policing for a period of time or increased social supports and focused efforts such as neighbourhood watch.
- **Smart neighbourhood planning.** Certain spaces are more likely to draw criminal or dangerous activity. Assuring a neighbourhood is well lit and free of hiding spaces can help to increase safety. Drive through neighbourhoods (not dead ends) can also increase the number of 'eyes on the street' and make for a safer place, but these drive through streets should be narrow so traffic moves slowly. Connections of streets by pathway and shared parking areas also have the potential to increase interaction and safety.
- **Having social programs.** Supportive programs for residents can increase safety overall and help fight against NIMBY.
- **Integrated window coverings.** Window coverings are a simple way to add privacy (and control heat gain/loss) but can be prohibitively expensive for those living in affordable housing. Including window coverings in the building can increase the quality of a home (especially if the inhabitant has input in the style). This has the added benefit of reducing the stigma that using a blanket or sheet as a window covering may carry and decreasing heat costs. (See Principle 4 - Efficiency)
- **Mature Trees.** Trees can provide privacy seasonally or year round, depending on whether they shed their leaves/needles.

The above are drawings are micro units which were an entry to the adaAPT NYC competition., This proposal came from The Durst Organization and Dattner Architects. Image from NYC Mayors Office.

7. 'Right Size':

In Canada, house size continues to increase while average number of people per household is decreasing.[1] Movements such as tiny houses are gaining popularity in the media. Country Living suggests the reason may be a "Simpler yet fuller life, connecting them with family, friends and nature while freeing them from mortgages and an urge to keep up with the Joneses" A 300 sq. ft. (or less) home may not be for everyone, but houses can be 'right sized' much smaller than is currently the norm. A smaller house is more economical to build, operate and maintain.

A smaller home doesn't have to be lesser. Smart design can provide the same features while decreasing size. A big waste of space in a home is circulation space, the area you need to move around. Simple straight circulation will be more efficient than a path that zig zags. Smaller homes can be kept feeling large and open by using light coloured materials, increasing ceiling height and adding smart storage to reduce clutter in the inhabited spaces. 'Right sized' homes achieve affordability by increased efficiency instead of decreased quality.

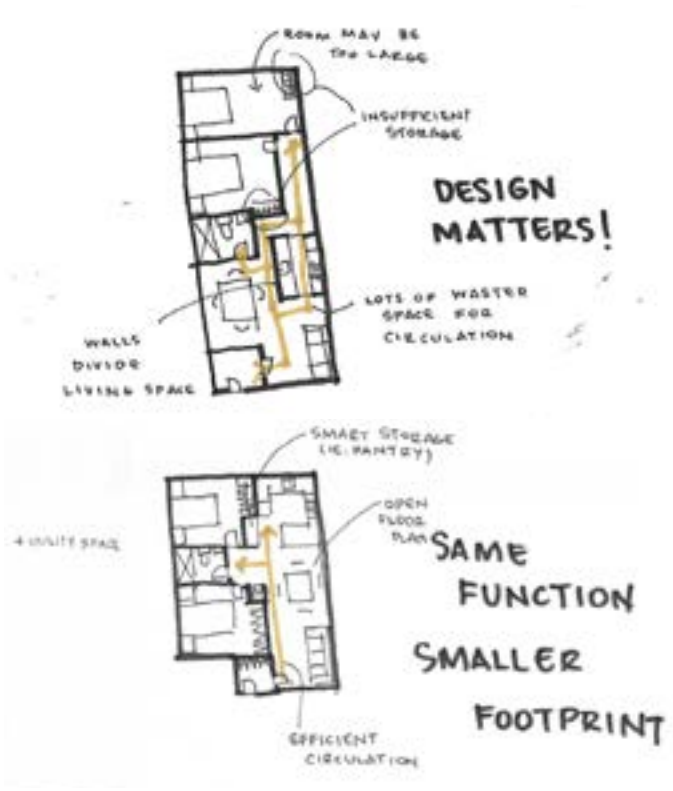


In 1975, the average house size was 1,050 sq. ft. for an average household of 3.5 people. In 2010 the average house size had grown to 1,950 sq. ft. but the number of people per household had decreased to 2.5.

1. House size data from "Our love affair with home ownership might be doomed ", Globe and Mail, Jan 12, 2012. Household size data from Statistics Canada.

The winner of a public design competition, adaAPT NYC, the above micro unit building is aimed at achieving affordability by spreading out high land costs in New York among more units. The units are adaptable and have a different plan during the day and night. Image from NYC Mayors Office. The image above was created by the winning team composed of Monadnock Development LLC, Actors Fund Housing Development Corporation and nARCHITECTS.

The below two sketches demonstrate similar spaces that are more or less efficiently designed. The top sketch shows a less efficient plan with walls that divide up the living space (making it feel smaller), lots of wasted space for circulation, and insufficient storage. The lower sketch shows increased storage and more efficient circulation.



Homes should be the right size in association with the neighbourhood they are in. For example, a six storey apartment block in a neighbourhood of single storey single detached homes is not likely to be suitable. To add smaller dwellings in that neighbourhood a more suitable approach may be small bungalows in the backyards, row housing, or duplexes.

The 'right size' of a home depends on who will be living there. A family will need more space than an individual.

It is important that any innovation (like tiny houses[1]) be widely accepted in the private market before they are used in the affordable housing market. A building type that is used exclusively or more widely in the affordable housing market can contribute to the stigma associated with these dwellings.

8. Flexibility:

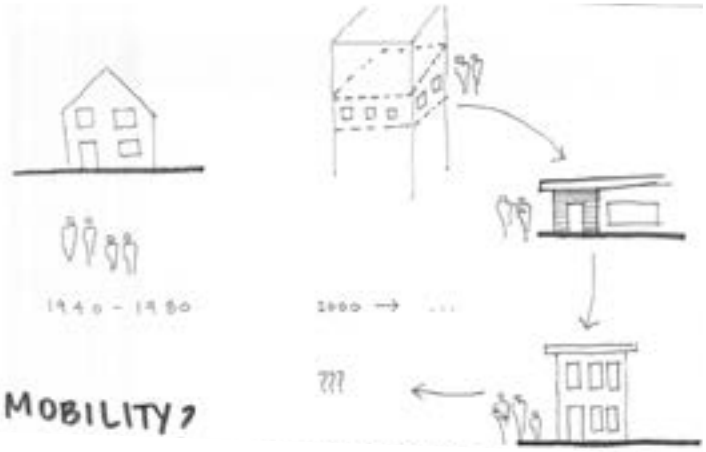
Flexibility in design allows a home to grow as a family grows, or living situation changes. Throughout life changes inhabitants can then maintain a connection to their community and stay in their neighbourhood (ie. age in place). The following design considerations can help facilitate future modifications and therefore increase flexibility:

- Stacking closets can more easily accommodate an elevator when needed.
- Blocking installed in walls or plywood sheathing can allow for cabinets to be moved or future grab bars or other features that increase accessibility to be added.
- Pre-plumbing and pre-wiring for future needs significantly reduces the cost of installing services later. This may include the provision for a second bathroom, or apartment.
- Locating services (like the electrical panel and water entry) in an area that is unlikely to be modified (like front wall) and would continue to be accessible if the house was turned into multiple units.
- Limit interior load bearing partitions (walls) so interior walls can be freely moved, this can be achieved by load bearing exterior walls or a post and beam structural system.
- In areas where an addition is feasible, design exterior walls so large openings can be cut in the walls to allow for an expansion. For example, design the framing under a window so it can be removed without reframing the entire wall to make a passage into a future room.
- Locate windows and doors on a logical regular grid to allow interior reconfiguration, like a large bedroom converted to two smaller rooms or the reverse. Three

1. Tiny houses or secondary stand-alone suites are not permitted in the Development Regulations (as of version revised Nov 2018), but the City's Affordable Housing Strategy 2019-2028 supports building a diverse and inclusive housing stock. The City has committed to including provisions for Tiny Homes in the new Development Regulations. Secondary stand-alone suites are not under municipal legislative authority however it has been suggested that the City will advocate for changes to be made to the Urban and Rural Planning Act, 2000 so that this could be considered on appropriate property locations.

windows with two feet in between them will facilitate a change like this more than three windows located directly beside each other.
- Increased service capacity (more electrical service, or larger water supply/waste) can allow a home to grow. Adding a few outlets with larger capacity so a stove or dryer can be accommodated in multiple places also increases flexibility.
- Among other things, step free entry, wider corridors and doors make a home visitable to more people and more easily adapted into a fully accessible dwelling. [2]

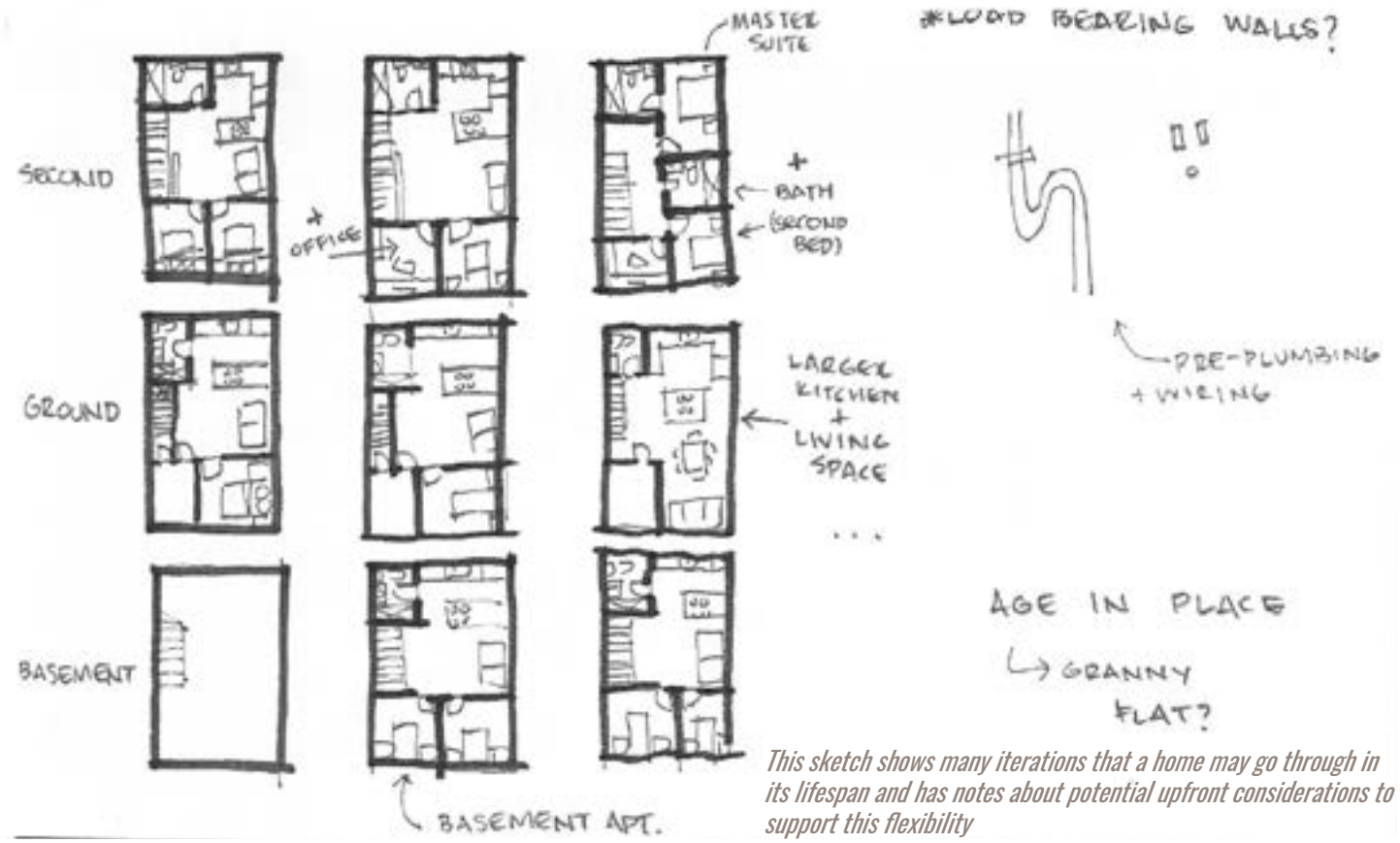
Common reconfigurations are as follows:
- Adding a secondary suite (like apartment or granny flat)[3]
- Adding accessibility features to accommodate decreased mobility (ie. grab bars, entry ramp or moving laundry to main floor)
- Changing the function or size of rooms (ie. from an office to a child's room)



The above sketch questions if increased mobility means a home may have more owners than it previously had.

2. Many of the modifications that lead to flexible housing are known as "Adaptable Housing." The British Columbia Building Code has been adapted to include these elements in standard new construction. See http://www.housing.gov.bc.ca/building/reg/accessible/faq.htm

3. Make sure this is permitted in your zone first.



This sketch shows many iterations that a home may go through in its lifespan and has notes about potential upfront considerations to support this flexibility

Housing should be accessible to people, and it is challenging for a developer to understand unique lifestyles, or future changes in technology. If a home is flexible, a homeowner or renter can make simple changes to their home so it works for their lifestyle, physical abilities and mental wellbeing.

CONCLUSION

Written December 13, 2018 in St. John's, NL

Dear Reader,

Thank you for taking the time to reach the end of this document. With the input of many, I have done my best at qualifying the design elements that make good affordable housing. It has been tough to define 'quality housing' and to capture the elements that make a house feel like a home. This definition could continue to be expanded for a long time.

Many, including me, believe housing is a human right. It is more than a house that we need, and we may not know the gravity of that statement without direct experience of the opposite of having a home.

Homes build families and communities.

Homes provide a safe and stable place of refuge.

Homes have the potential to lift us up, but houses can drag us down.

I believe a healthy home is directly correlated with healthy and happy inhabitants. Likewise being unwell is directly correlated with a poor housing condition, whether it's unaffordable, unsuitable or unstable. This is something I'll continue to investigate and seek to better understand.

This concludes the project which was funded under the City of St. John's Affordable Housing Catalyst Grant 2018. For this document to contribute to better designed affordable housing in St. John's, the province of Newfoundland and Labrador and Atlantic Canada it needs to continue to undergo modifications and continually improve in ways that makes it more useful and compelling to those who's hands and heads it finds itself in.

Right now, a team of us have applied for some (and are in the process of applying for more) funding to apply the principles in this document to real homes. We intend on designing five small scale prototypes of affordable housing. We will then take care of the homes and in close collaboration with their inhabitants, learn what works really well and how these prototypes can be improved. This document will then be updated with the lessons learned, open source design documents and costing information.

Please share this document, let me know how we can make it better and if you'd like to work with us in moving forward the agenda of affordable homes in Atlantic Canada.

Sincere thanks,

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