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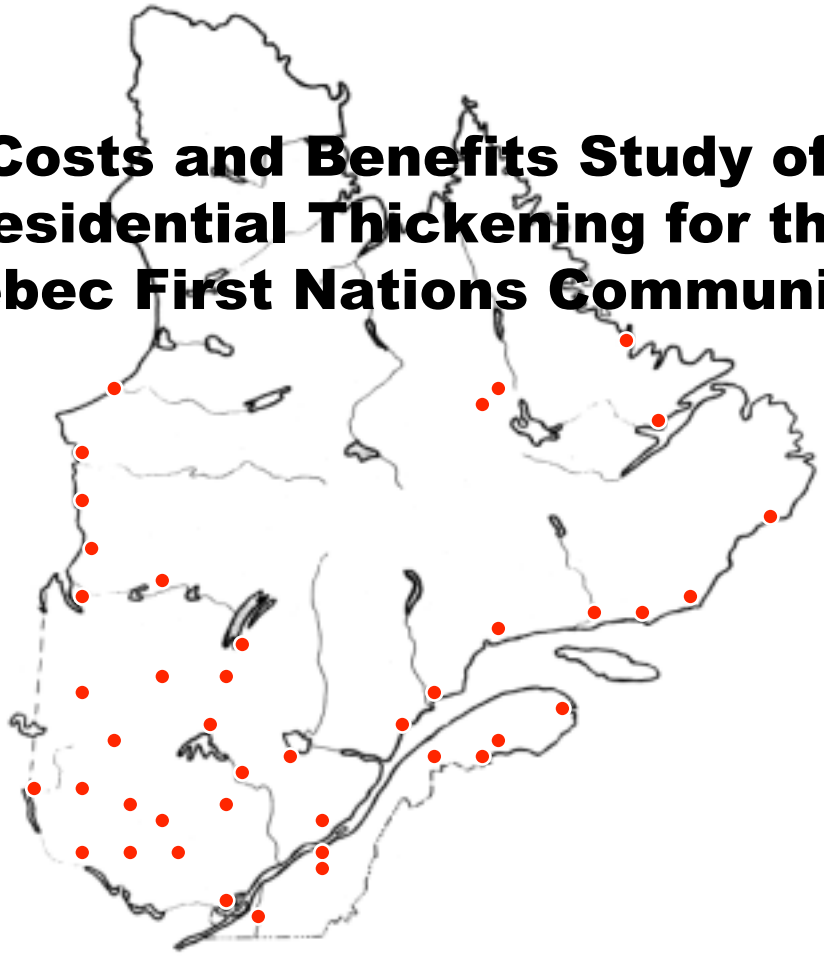
Costs and Benefits Study of Residential Thickening for the Quebec First Nations Communities



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May 2010

Assembly of the First Nations of Quebec and Labrador

Costs and Benefits Study of Residential Thickening for the Quebec First Nations Communities

May 2010

Our ref: 8-2557-01

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Introduction

The Quebec First Nations are facing important housing needs. Reports produced for the AFNQL in 2003 and 2006 show the extent of the housing crisis, which plagues the communities. The government of Canada has committed itself in the scope of the Social Economic Forum held in Mashteuiatsh, in October 2006, to financially support the setting-up of experimentation projects allowing the exploration of innovative approaches regarding housing in the First Nations communities. Among them, we find the creation of a costs and benefits study of the residential thickening in the First Nations communities. The thickening, which normally brings about a reduction of costs regarding building and substructure construction, would normally increase the housing supply. The **Assembly of First Nations of Quebec and Labrador** (AFNQL) has appointed *Gaston St-Pierre and Associates*, *urban planners*, to carry out this study.

The housing developments, within the First Nations communities, generally lean toward the single-detached house, therefore of weak density. It is the development convention that uses the most space and consequently, the kind whose capital cost price per housing unit is generally the highest (construction cost of substructures and houses).

This study is based on the assumption that the housing thickening translates into benefits in terms of space and financial considerations and that the costs that are associated with them are more the matter of social domain. It is based on experiences lived by ten or so communities of the Quebec First Nations.

The first three (3) sections linger over definition of terms, the description of theoretical models of space organization and to the savings attributable to the various stages of thickening (stages 1 to 6). The others specifically focus on the experience of the Quebec First Nations communities, which were consulted in the scope of this study. The consultation with the First Nations has allowed to characterize the thickening in the communities and to point out the advantages and disadvantages that follow that practice.

1. Definitions

The following terms are defined in order to facilitate the comprehension of the text.

Residential Thickening
Increase of the number of dwellings in regard with the land surface area.

Rough Density
Ratio of the number of dwellings on a land surface area of one (1) hectare (10,000 m^2) including the streets area and the pedestrian paths.

Net Density
Ratio of the number of dwellings on a land surface area of one (1) hectare (10,000 m^2) excluding the streets area and the pedestrian paths.

Street Right-of-Way
Total width reserved for the implantation of a street and generally including the sidewalks, the roadway, the shoulders and the drainage ditches.

Housing (types) see chart 1, page 4

- **Single-Detached House**
  One single dwelling unit non adjacent nor linked to another house and located on an individual lot.
- **Single-Family Semi-Detached House**
  Single-family unit linked to another single-family unit by a lateral party wall or part of a party wall and located on an individual lot.
- **Single-Family In-Row House (adjacent)**
  Single-family unit being part of a row of single-family units linked between them by one or more lateral party walls or part of lateral party walls and located on an individual lot.
- **Isolated Two-Family House**
  House of two superposed units, neither non-adjacent nor linked to another house and located on an individual lot.
- **Isolated Three-Family House**
  House of three superposed units, neither non-adjacent nor linked to another house and located on an individual lot.
- **Isolated Multi-Family House**
  House of four (4) or more superposed units, neither non-adjacent nor linked to another house and located on an individual lot.

Densified Housing

Increase of the number of houses or dwellings on a given surface area (number of houses or dwellings in a hectare) or the reduction of the number of square metres occupied by a house or a dwelling.

Non-Densified Housing

For the actual study purposes, it signifies a development composed of single-detached houses implanted on lots with average dimensions of 20 by 30 metres.

Islet

Part of the territory served by streets creating a whole of lots intended for construction.

Infrastructure

Indicates the equipment (generally public services) necessary to service the housing units such as:

– roadways and surface;
– aqueduct network;
– sanitary sewage network;
– storm sewer network;
– basin of retention and/or sedimentation;
– electrical and communication distribution.

Set Back

Distance calculated between a building or a construction and the front, the rear or the lateral boundary.

Front Set Back

Distance calculated between a building or a construction and the front boundary of a lot. An angle lot situated at a street intersection may have to take into consideration two (2) front set backs.

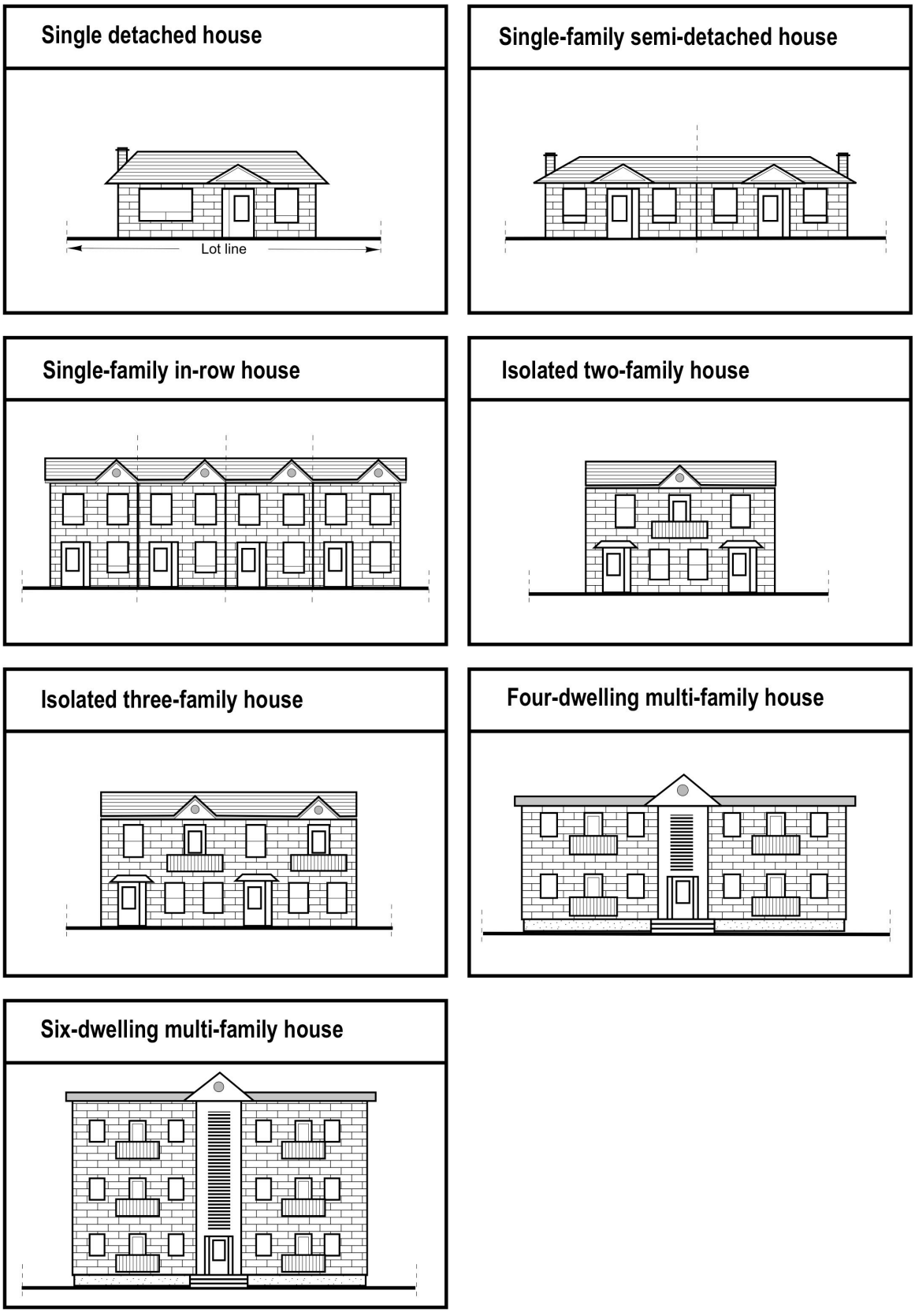
Lateral Set Back

Distance calculated between a building or a construction and the lot lateral lines. An angle lot may have one of its lateral set backs considered as a front set back.

Public Service

Designation of various equipments or services administered by the Band Council or a higher government.

Figure 1 : Studied types of dwelling



2. The Space Organization Theoretical Models

2.1 Typical Islet

For the actual study purposes, a typical islet has been conceived in order to allow the comparison between different housing types. This typical islet allows comparing:

– the average lot surface area;

– the average street length per lot;

– the rough density of the islet (dwellings per hectare);

– the net density of the islet (dwellings per hectare);

– the infrastructure cost per dwelling.

The basic data characterizing the typical islet (see chart 1) are as follows:

– Dimensions and surface area of the islet (rough surface area)
  340 m x 150 m = 51,000 m^2 (5,1 ha)

– Length and surface area of the streets

Street A	340 m:	5,100 m^2
Street B	386,5 m:	5,798 m^2
Total:		10,898 m^2 (21%)

– Net surface area of the lots that can be developed
  51,000 m^2 – 10,898 m^2 = 40,102 m^2 (79%)

2.2 Technique Used to Establish the Comparison Between the Various Types of Housing

Starting with the typical islet (plan 1), a theoretical fitting-out plan is put into effect as per the considered houses. Each of the houses refers to lot dimensions allowing the denseness of the territory. In every cases, the width of a lot is used as the basis to set-up the houses. In order to be as realistic as possible, the fitting-out of the lots is adapted to the dimensions of the islet. It follows from this that the dimensions of the lots are sometimes modified to take into consideration the angle lots whose width is increased to make sure that the set backs are abided by. The other lots are allocated as per the available space.

2.3 Housing Considered for Each Stage of Thickening

The various types of houses, in general, correspond to the ones found in the communities of the Quebec First Nations:

– the single-detached houses on conventional lots of 20 m wide (plan 2), which result in a standard non- thickening development;

– the single-detached houses on lots whose width is reduced to 18 m (plan 3), which result in a thickening development of stage 1;

– the single-detached houses on lots whose width is reduced to 15 m (plan 4), which result in a thickening development of stage 2;

– the single-family semi-detached houses on average lots of 11 m wide (plan 5), which result in a thickening development of stage 3;

– the single-family in-row houses on average lots of 6 m wide (plan 6), which result in a thickening development of stage 4;

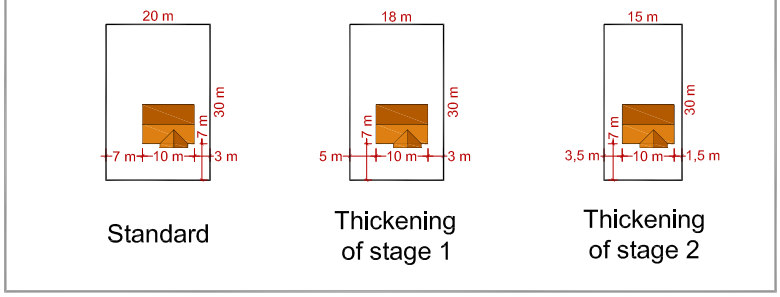
– the isolated multi-family houses of 4 units on lots of 30 m wide (plan 7) which result in a thickening development of stage 5;

– the isolated multi-family houses of 6 units on lots of 30 m wide (plan 8) which result in a thickening development of stage 6;

See chart 2 and the plans in the following pages.

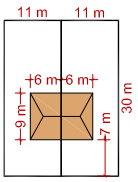
Figure 2 : Housing Types Depending on the Thickening Development Stage

Single-family
detached houses



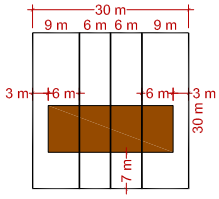
Standard | Thickening of stage 1 | Thickening of stage 2

Single-family
semi-detached houses



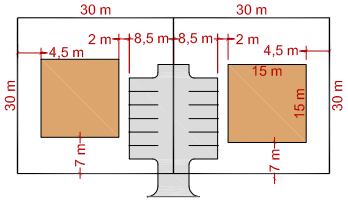
Thickening of stage 3

Single-family
in-row houses



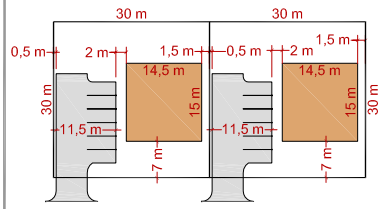
Thickening of stage 4

Four-dwelling
multi-family houses



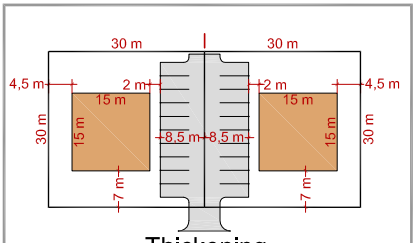
Thickening of stage 5

Four-dwelling
multi-family houses



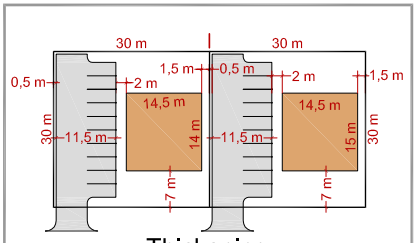
Thickening of stage 5

Six-dwelling
multi-family houses



Thickening of stage 6

Six-dwelling
multi-family houses



Thickening of stage 6

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Plan 1 : Typical Islet

Characteristics

Street width:	15,0 meters
Lot depth:	30,0 meters

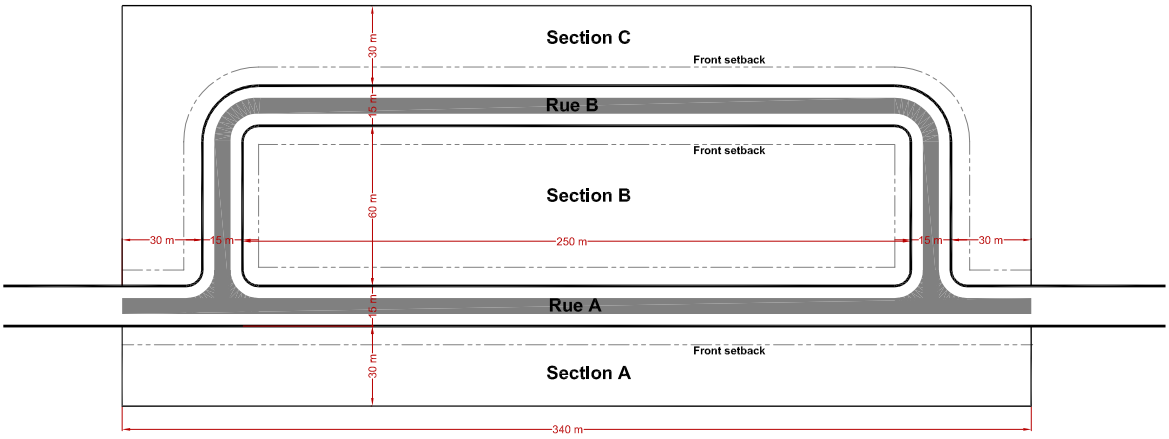
Street lenght and area

	Lenght	Area
Street A :	340,0 m	5 100,0 m²
Street B :	386,5 m	5 797,5 m²
Total :	726,5 m	10 897,5 m²

Islet's suitable area (net area)

	Area
Section A :	10 200,0 m²
Section B :	15 000,0 m²
Section C :	14 902,5 m²
Total :	40 102,5 square meters

Total area : (rough area) : 51 000,0 square meters



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Plan 2 : Standard Development (No Thickening)

Single-family detached units : **Total of 62 lots**

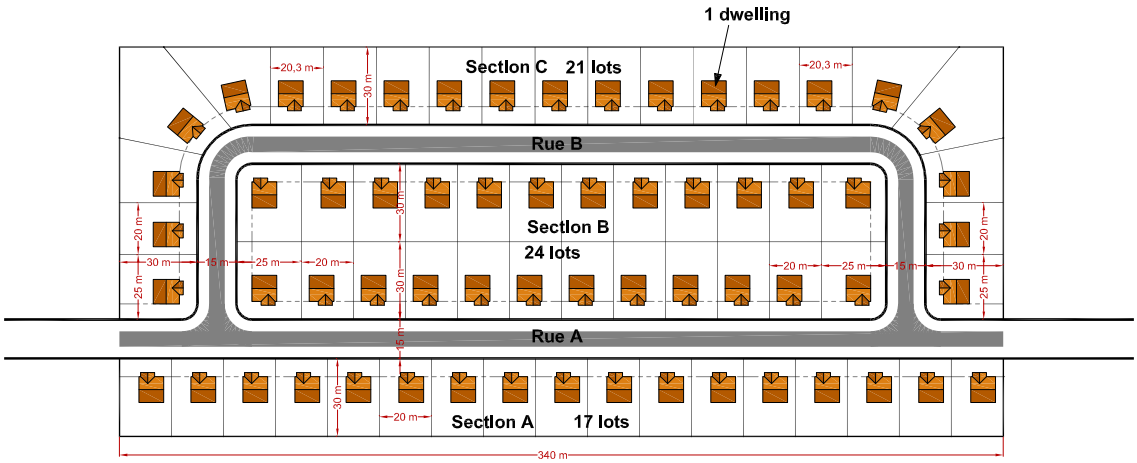
Lot description

General planning goals : Average lot dimensions of 20,0 meters by 30,0 meters

Corner lot dimensions of 25,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	646,8 m²
Average lot area per dwelling :	646,8 m²
Total street lenght :	726,5 m
Average street lenght per lot:	11,7 m
Average street lenght per dwelling :	11,7 m

Rough density :	12,2 dwellings per hectare
Net density :	15,5 dwellings per hectare



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Plan 3 : Thickening Development of Stage 1
Single-detached units : **Total of 70 lots**

Lot description

General planning goals : Average lot dimensions of 18,0 meters by 30,0 meters

Corner lot dimensions of 21,0 meters by 30,0 meters

Total area of the islet:	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	572,9 m²
Average lot area per dwelling :	572,9 m²
Total street lenght :	726,5 m
Average street lenght per lot:	10,4 m
Average street lenght per dwelling :	10,4 m

Rough density :	13,7 dwellings per hectare
Net density :	17,5 dwellings per hectare

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Plan 4 : Thickening Development of Stage 2
Single-detached units **: Total of 81 lots**

Lot description

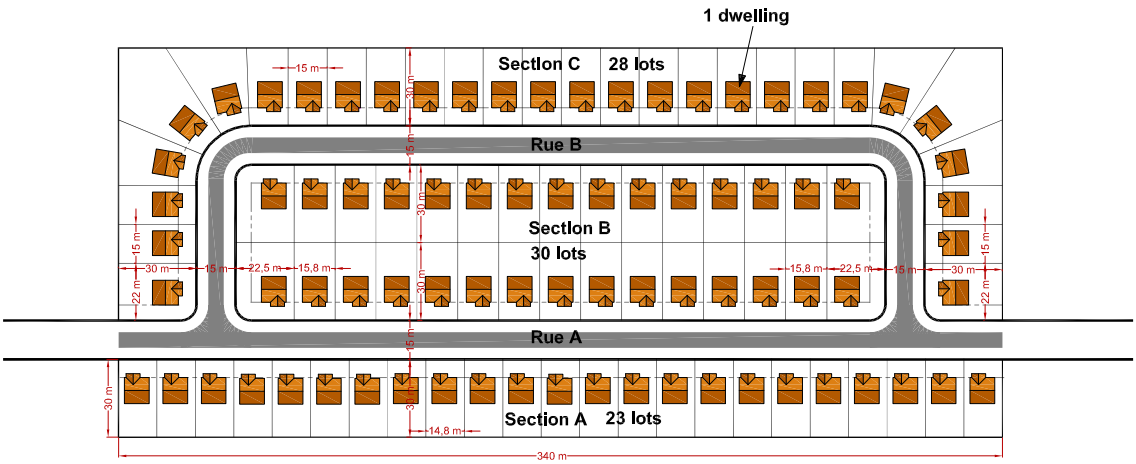
General planning goals : Average lot dimensions of 15,0 meters by 30,0 meters

Corner lot dimensions of 21,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	495,1 m²
Average lot area per dwelling :	495,1 m²
Total street lenght :	726,5 m
Average street lenght per lot:	9,0 m
Average street lenght per dwelling :	9,0 m

Rough density : 15,9 dwellings per hectare

Net density : 20,2 dwellings per hectare



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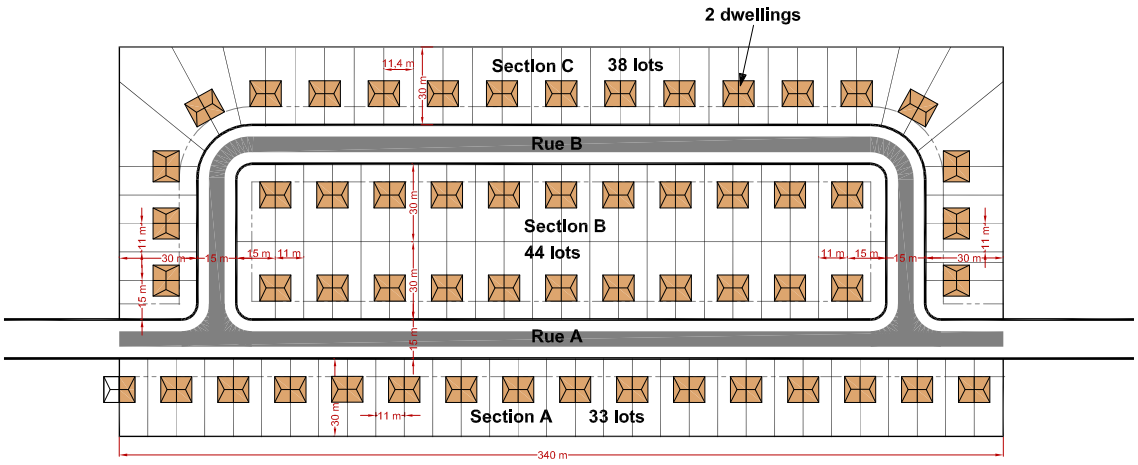
Plan 5 : Thickening Development of Stage 3
Single-family semi-detached units : **Total of 115 lots**

Lot description

General planning goals : Average lot dimensions of 11,0 meters by 30,0 meters
Corner lot dimensions of 15,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	348,7 m²
Average lot area per dwelling :	348,7 m²
Total street lenght :	726,5 m
Average street lenght per lot:	6,3 m
Average street lenght per dwelling :	6,3 m

Rough density :	22,5 dwellings per hectare
Net density :	28,7 dwellings per hectare



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Plan 6 : Thickening Development of Stage 4
Single-family in-row units **: Total of 169 lots**

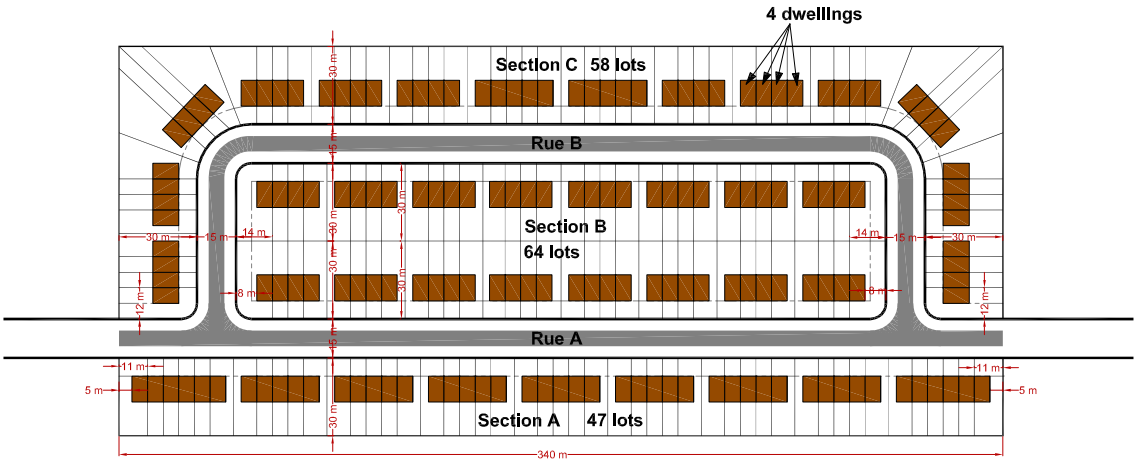
Lot description

General planning goals : Average lot dimensions of 6,0 meters by 30,0 meters and 9,0 meters by 30,0 meters for the side units
Corner lot dimensions of 12,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	237,3 m²
Average lot area per dwelling :	237,3 m²
Total street lenght :	726,5 m
Average street lenght per lot:	4,3 m
Average street lenght per dwelling :	4,3 m

Rough density : 33,1 dwellings per hectare

Net density : 42,1 dwellings per hectare



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Plan 7 : Thickening Development of Stage 5

Four-dwelling multi-family : **Total of 41 lots - 164 dwellings**

Lot description

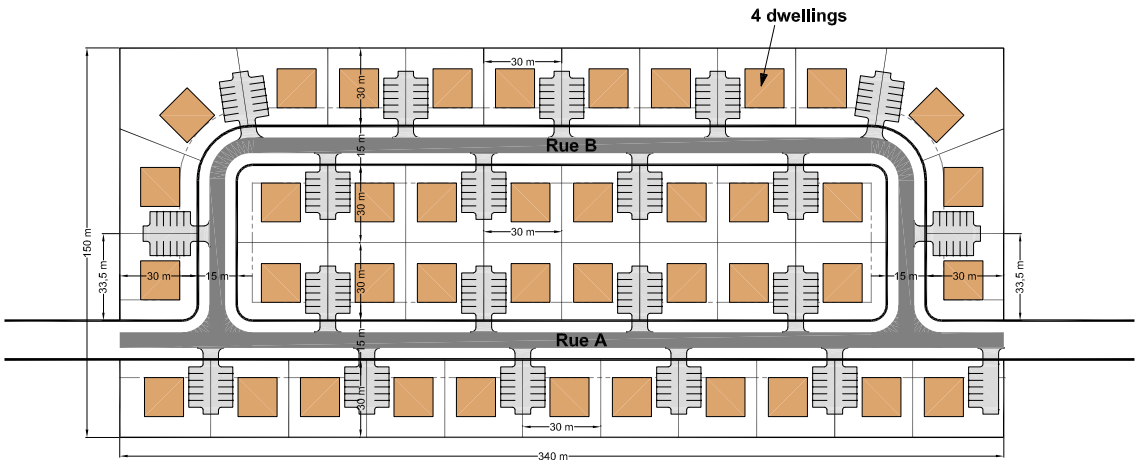
General planning goals Average lot dimensions of 30,0 meters by 30,0 meters

Corner lot dimensions of 35,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	978,1 m²
Average lot area per dwelling :	244,5 m²
Total street lenght :	726,5 m
Average street lenght per dwelling :	4,43 m

Rough density :	32,2 dwellings per hectare *
Net density :	40,9 dwellings per hectare *

* About the same density as the single-family in-row homes development.



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Plan 8 : Thickening Development of Stage 6
Six-dwelling multi-family : **Total of 41 lots - 246 dwellings**

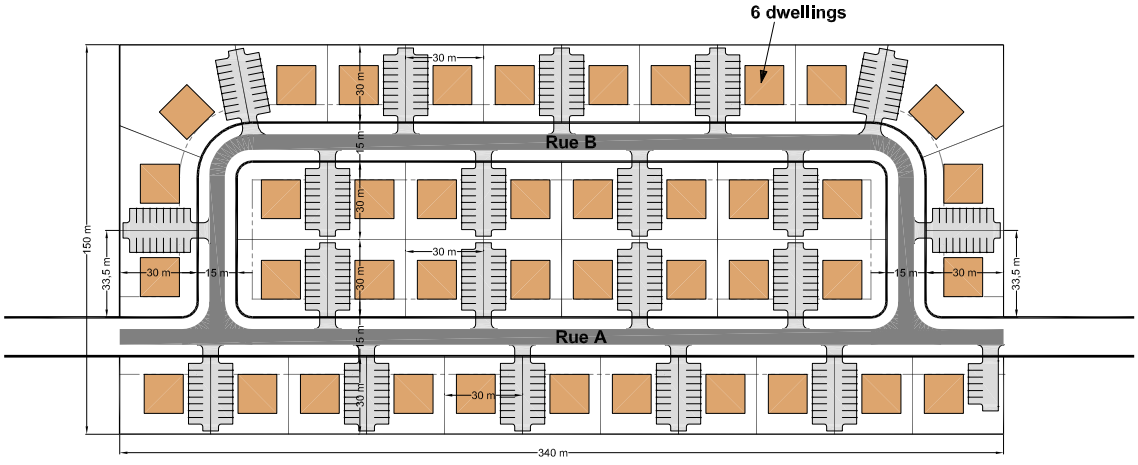
Lot description

General planning goals : Average lot dimensions of 30,0 meters by 30,0 meters

Corner lot dimensions of 35,0 meters by 30,0 meters

Total area of the islet :	51 000,0 m²
Street area :	10 897,5 m²
Residential net area :	40 102,5 m²
Average lot area :	978,1 m²
Average lot area per dwelling :	163,0 m²
Total street lenght :	726,5 m
Average street lenght per dwelling :	3,0m

Rough density :	48,2 dwellings per hectare
Net density :	61,3 dwellings per hectare



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3. The Potential Savings Depending on the Thickening Type

Each spatial organization theoretical model studied and illustrated in the preceding pages is evaluated and compared from the angle of surface space needs, the length of the infrastructures and the cost price of these infrastructures per dwelling.

Chart 1 in the following page allows comparing various types of implementation. We notice that the ratio of the percentage is equal for each of the considered data (number of units, surface area of the lot and the length of the street).

Among the most significant data, we note that the single-family semi-detached units offer an interesting potential of saving, in the order of 46% in surface space and infrastructure length in comparison with a standard non-thickening development model. This potentially translates by almost two (2) times more housing units (85%) for a same street length. This type of housing has the advantage to allow certain autonomy between the units that are separated by a party wall.

This same autonomy acknowledgement applies to the single-family in-row houses (adjacent) that have one (1) or two (2) party walls. This housing type offers an important potential of saving (in the order of 63%) compared to the standard development model and allows getting worthwhile comparables with the single-family semi-detached units. This translates by three (3) times more units than a conventional model.

Chart 2 shows that thickening may bring noticeable savings in the infrastructure investments (up to $18,707 per dwelling). Stage 3 thickening, thus mostly aimed at single-family semi-detached houses, offers a saving potential on the infrastructure investments in the order of $11,523 per unit compared to a cost of $25,000 for a standard non-thickening development.

To evaluate all the economical advantages related to thickening, we must consider other costs attributable to each of the housing types. Besides the service space and public services savings (infrastructures) that is in question here, we must also consider:

– the cost of units construction as per the housing type;

– the dwellings maintenance cost;

– the heating cost.

These variables have not been the subject of an exhaustive analysis in the scope of this actual study. However, based on comments received from the housing personnel of a few First Nations, thickening may bring about savings varying from 15% to 20% on the construction cost of a housing unit. The maintenance and heating savings have not been evaluated.

Chart 1: Attainable Surface Space Savings as per the Thickening

Type of development	Number of lots	Number of units	Net surface per unit	Average street length per unit	% of supplementary units in regard with the standard development (non-thickening)	Potential saving in space in regard with a standard lot
Standard development Single-detached Lot of 20 m x 30 m	62	62	646,81 m^2	11,717 m	——	——
Thickening of stage 1 Single-detached Lot of 18 m x 30 m	70	70	572,89 m^2	10,378 m	13%	11%
Thickening of stage 2 Single-detached Lot of 15 m x 30 m	81	81	495,09 m^2	8,969 m	31%	23%
Thickening of stage 3 Single-fam. semi-detached Lot of 11 m x 30 m	115	115	348,71 m^2	6,317 m	85%	46%
Thickening of stage 4 Single-family in-row Lot of 6 m x 30 m	169	169	237,29 m^2	4,298 m	173%	63%
Thickening of stage 5 Multi-family of 4 units Lot of 30 m x 30 m	41	164	244,50 m^2	4,430 m	165%	62%
Thickening of stage 6 Multi-family of 6 units Lot of 30 m x 30 m	41	246	163,00 m^2	2,950 m	297%	75%

Chart 2: Infrastructure Potential Savings Depending on the Thickening

Cost price in infrastructure of a densified lot or dwelling in regard with a standard development			
Type of lot	**Applicable clue**	**Cost per lot or per unit**	**Potential saving in infrastructure per lot or per unit**
Standard development Single-detached Lot of 20 m x 30 m	100,00%	$25,000 (Reference cost for purposes study)	——
Thickening of stage 1 Single-detached Lot of 18 m x 30 m	88,57%	$22,142	$2,858
Thickening of stage 2 Single-detached Lot of 15 m x 30 m	76,54%	$19,135	$5,865
Thickening of stage 3 Single-family semi-detached Lot of 11 m x 30 m	53,91%	$13,477	$11,523
Thickening of stage 4 Single-family in-row Lot of 6 m x 30 m	36,68%	$9,170	$15,830
Thickening of stage 5 Multi-family of 4 units Lot of 30 m x 30 m	37,80%	$9,452	$15,548 $3,887 x 4 units
Thickening of stage 6 Multi-family of 6 units Lot of 30 m x 30 m	25,17%	$6,292	$18,708 $3,118 x 6 units

Note : The reference cost per lot is for information only. The clues are applicable to the real cost for each community taking into consideration their own characteristics (soil conditions, drainage, size of the lots, the distance and isolation clues, etc.).

4. Consultation with the Quebec First Nations

Pertinent information allowing the analysis of the residential thickening phenomena with the First Nations have been gathered through a survey conducted with the housing administrators of 10 communities. This sampling represents well enough the whole of the Quebec First Nations because it is composed of a variety of communities in terms of size, distance and isolation in relation with urban centres. Most of the nations are represented and the same thing applies for the different regions where the Quebec First Nations can be found.

The survey has been done by telephone interviews. Beforehand, a questionnaire had been sent to the housing administrators. The questionnaire contained a series of closed-type questions. The interviews were done in February and March of 2010. It was agreed to preserve the anonymity of these people. The sampling, in the beginning, was made of 11 communities. Only one (1) of them withdrew. The participation rate is therefore 91%.

The pursued goal by this survey was to document the residential thickening experiences of the Quebec First Nations communities and to evaluate the advantages and disadvantages of this practice.

The people answering the questionnaire made us aware that certain information was not available such as more particularly, precisions concerning the years of the densified construction and the average surface area as per the housing type. The information collected on that subject is therefore more general. For example, we notice that the dwellings for the Elders and the single persons are smaller than the ones reserved for families.

Furthermore, the data obtained regarding the occupation period for the dwellings is rather vague. In the majority of the cases, it seems that the tenants keep their dwellings for many years except when it concerns transitional dwellings that are left as soon as a dwelling with more adequate size becomes available.

The questionnaire in the following pages has been modified in order to be able to insert the results obtained through this survey.

QUESTIONNAIRE REGARDING THE RESIDENTIAL THICKENING ON THE RESERVE/COMMUNITY OF

COMPILATION OF THE 10 QUESTIONNAIRES, SECTIONS 2 TO 8D

Person to contact: _____ **Title:** _____

Date: _____

1. EXISTING DENSIFIED HOUSING

1a) Are there densified dwellings on the reserve territory ? ☐ Yes ☐ No

1b) If so, what type of dwelling is it ?

- ☐ Single-detached house with lots of 15 meters or less
- ☐ Single-family duplex unit (one party wall)
- ☐ Single-family in-row unit (2 party walls)
- ☐ Isolated 2 family (2 superposed units)
- ☐ Isolated 3 family (3 units)
- ☐ Isolated multi-family (4 units)

1c) Total number of housing units on the reserve: _____

1d) Total number of housing units that corresponds to the above-mentioned housing types: _____ %

If varied, explain in detail: _____

Among these units, how many were built expressly for a housing usage ? _____

1e) Are there among these units, buildings recycled into apartments (for example: community building recycled as apartments) ? _____

2. DESTINATION FOR THE DENSIFIED HOUSING BUILDING

2a) Are these buildings intended for a particular clientele ? ☐ Yes ☐ No

2b) If so, which type of clientele is it ? ***Respondents***

- ☒ Units for families: ***8 out of 10***
- ☒ Units for single-parent families: ***8 out of 10***
- ☒ Units for couples without children: ***7 out of 10***
- ☒ Units for elders: ***4 out of 10***
- ☒ Units for people living alone: ***9 out of 10***
- ☒ Other, specify: ***2 out of 10***

2c) When were these densified housing units built ? ***Respondents***

- ☒ In the last 5 years: ***Variable 25 % to 100 %***
- ☒ Between 5 and 10 years: ***Variable 25 % to 100 %***
- ☒ More than 10 years: ***Variable 25 % to 100 %***

2d) Do the densified housing units cause problems or challenges ? ☒ Yes ☐ No

2e) If so, what are they ? ***Respondents***

- ☒ Dwellings for families: ***8 out of 10: space, social problems, other***
- ☒ Dwellings for single-parent families: ***1 out of 10***
- ☐ Dwellings for couples without children:
- ☐ Dwellings for the elders:
- ☐ Dwellings for people living alone:
- ☒ Other, specify: ***1 out of 10: creation of ghetto***

3. CHARACTERISTICS OF THE BUILDINGS

- ☐ Number of floors: 1 floor _____ % _____
  2 floors _____ % _____
  3 floors _____ % _____
- ☐ Basement used as an apartment _____ %
- ☐ Other, specify _____
- ☐ Units for families: average area per apartment _____ m^2
- ☐ Units for single-parent: average area per apartment _____ m^2
- ☐ Units for elderly: average area per apartment _____ m^2
- ☐ Units for people living alone: average area per apartment _____ m^2
- ☐ Other type of dwelling: average area per apartment _____ m^2

4. QUALITIES OR DEFECTS OF THE DENSIFIED HOUSING ***Respondents***

- Area of the apartments ☒ Adequate: ***7 out of 10*** ☒ Not adequate: ***3 out of 10***
- Quality of the interior finish ☒ Adequate: ***8 out of 10*** ☒ Not adequate: ***2 out of 10***
- The soundproofing ☒ Adequate: ***4 out of 10*** ☒ Not adequate: ***6 out of 10***
- The thermal insulation ☒ Adequate: ***8 out of 10*** ☒ Not adequate: ***2 out of 10***

Respondents *(Continuation)*

- Quality of the material ☒ Adequate: ***9 out of 10*** ☒ Not adequate: ***1 out of 10***
- Quality of the exterior finish ☒ Adequate: ***8 out of 10*** ☒ Not adequate: ***2 out of 10***
- The aesthetic of the sites ☒ Adequate: ***8 out of 10*** ☒ Not adequate: ***2 out of 10***

5. LENGTH OF THE AVERAGE OCCUPANCY TIME PER UNIT

- Units for family _____ years
- Units for single-parent families _____ years
- Units for couples without children _____ years
- Units for elders _____ years
- Units for people living alone _____ years
- Other, specify: _____ years

6. BENEFITS ATTRIBUTABLE TO DENSIFIED HOUSING PROJECTS

Respondents

- Savings when building the infrastructures ☒ Yes:***10 out of 10*** ☐ No
- Allows the construction of more units with the budgeted amount ☒ Yes: ***9 out of 10*** ☒ No: ***1 out of 10***
- Temporary solution for people in transition ☒ Yes: ***5 out of 10*** ☒ No: ***5 out of 10***
- Allows substantial savings when building units or housing ☒ Yes: ***8 out of 10*** ☒ No: ***2 out of 10***
- Easier to manage ☒ Yes: ***4 out of 10*** ☒ No: ***6 out of 10***
- Allows space savings (reserve lands) for other urban installations ☒ Yes: ***8 out of 10*** ☒ No: ***2 out of 10***
- Upkeep savings for units and housing ☒ Yes: ***7 out of 10*** ☒ No: ***3 out of 10***
- The product is in demand (waiting list for additional units) ☒ Yes: ***9 out of 10*** ☒ No: ***1 out of 10***

7. DISADVANTAGES ATTRIBUTABLE TO DENSIFIED HOUSING PROJECTS

7a) Disadvantages:

Respondents

- Numerous complaints by the residents concerning the quality of the units ☒ Yes: ***5 out of 10*** ☒ No: ***5 out of 10***
- Difficulties regarding the architectural integration with non-densified housing units ☒ Yes: ***3 out of 10*** ☒ No: ***7 out of 10***
- Additional requirements for the surveillance of densified housing units ☒ Yes: ***3 out of 10*** ☒ No: ***7 out of 10***

- Difficult cohabitation between neighbours of a same densified housing grouping — ☒ Yes: ***8 out of 10*** ☒ No: ***1 out of 10***
- Difficult cohabitation between neighbours living in non-densified housing — ☒ Yes: ***3 out of 10*** ☒ No: ***7 out of 10***
- Shortage of available space — ☒ Yes: ***7 out of 10*** ☒ No: ***3 out of 10***
- Accelerated deterioration of housing — ☒ Yes: ***6 out of 10*** ☒ No: ***4 out of 10***

7b) Types of densified housing units the most problematic, if it's the case, specify: ***Respondents***

☒	Units for family:	***Shortage of space, soundproofing and security:***	***6 out of 10***
		Other:	***1 out of 10***
☒	Units for single-parent families:	***Overcrowding :***	***2 out of 10***
☐	Units for couple without children:		
☒	Units for elders:		***1 out of 10***
☐	Units for people living alone:		
☐	Other, specify:		

8. THICKENING PROJECTS

8a) Do you have residential thickening projects for the future ? ☒ Yes ☐ No

8b) If so, these projects are aimed to what kind of clientele ? ***Respondents***

☒	Units for families:		***7 out of 10***
☒	Units for single-parent families:		***4 out of 10***
☒	Units for couple without children:		***7 out of 10***
☒	Units for elders:		***2 out of 10***
☒	Units for people living alone:		***6 out of 10***
☒	Other, specify:	***Particular private dwellings :***	***1 out of 10***

8c) If so, what type of dwellings is considered ? ***Respondents***

☒	Single-detached house with lots of 15 meters or less:	***1 out of 10***
☒	Duplex single-family (a party wall):	***5 out of 10***
☒	In-row single-family (2 party walls):	***1 out of 10***
☐	Isolated 2 family (2 superposed units):	
☐	Isolated 3 family (3 units):	
☒	Isolated multi-family (4 units):	***5 out of 10***
☐	Other, specify:	

8d) If you do not have thickening housing projects, what are the reasons ? ***Respondents***

• Unpopular with the clientele	☒ Yes: ***2 out of 10***	☐ No:
• Financing shortage	☐ Yes:	☒ No: ***2 out of 10***
• Shortage of space allowing the realization of a project	☐ Yes:	☒ No: ***2 out of 10***
• No demand or need for that type of housing	☐ Yes:	☒ No: ***2 out of 10***
• Too complicated to manage	☒ Yes: ***2 out of 10***	☐ No:
• Other reason, explain:	***1 out of 10: Difficult management, deficit, maintenance costs of the dwellings***	

5. The Main Characteristics of the Residential Thickening in the Quebec First Nations Communities

5.1 Housing Characteristics

The ten (10) communities consulted have on their territory a certain proportion of densified housing in their housing park. This proportion varies from one community to another and is distributed in the following manner:

Chart 3 : Densified Housing in the Consulted Communities

Community	Total number of units	Percentage of densified units	Type of house			
			Single-family semi-detached	Single-family in row	Multi-family	Other
1	150	13,0%	20 units			
2	116	22,0%	24 units			2 units
3	310	11,3%	4 units	12 units	17 units	2 units
4	324	45,6%	32 units	6 units	126 units	
5	122	44,0%	42 units		12 units	
6	215	5,0%	6 units		4 units	4 units
7	133	11,0%	2 units	9 units	4 units	
8	686	31,0%	58 units	79 units	39 units	20 rooms
9	873	5,5%	8 units		40 units of which 4 three-family	
10	260	3,0%	8 units			
Total: 552 densified units			204 (37%)	106 (19%)	242 (44%)	——

The densified housing types most seen in the Quebec First Nations communities are the isolated multi-family houses (44%) and the single-family semi-detached houses (37%). We notice that 85% of the isolated multi-family houses are found in three (3) of the ten (10) consulted communities. On the other hand, the single-family semi-detached is found in the ten (10) communities.

5.2 Preferred Housing Types for Future Developments

It emerges from this consultation that only two (2) types of densified housing are the option of the communities' future projects. These housing types are most often aimed at a particular clientele as indicated in the following chart.

Chart 4 : Types of Densified Housing Favoured for the Future Developments of the Communities Consulted

Clientele	Single-detached densified (Stages 1 & 2)	Single-family semi-detached (Stage 3)	Single-family in-row (Stage 4)	Isolated two-family (Stage 3)	Multi-family 4 or 6 units (Stage 6)	No project
Dwelling for families	1/10	5/10	1/10	✔	2/10	1/10
Dwelling for single-parent families	✔	5/10	1/10	✔	1/10	3/10
Dwelling for couples without children	✔	2/10	✔	✔	4/10	4/10
Dwelling for Elders	✔	1/10	✔	✔	1/10	8/10
Dwelling for people living alone	✔	3/10	✔	✔	3/10	4/10

The type of densified housing favoured by the consulted communities is the single-family semi-detached house. This type of housing is considered mostly for the conventional and single parent families. The isolated multi-family houses (4 to 6 units) seem to be planned for couples without children and the single persons.

The other types of densified housing, such as the single-family in-row houses are a very marginal choice in the majority of the communities (9 out of 10).

6. Advantages and Disadvantages of the Residential Thickening in the Quebec First Nations

The residential thickening fills a housing need in nine (9) of the ten (10) consulted communities who confirm a waiting list for this type of housing.

6.1 Advantages Related to Thickening

The people who have answered the questionnaire are under the impression that thickening has many advantages, notably at the financial level.

The Outstanding Positive Facts

- Savings in the construction of infrastructure: 10 out of 10
- Possibility to build more units within the same budgetary envelope: 9 out of 10
- Temporary solution for people in transit: 5 out of 10
- Substantial savings when building houses: 8 out of 10
- Allows savings in surface space for other urban uses: 8 out of 10
- Savings on housing maintenance: 7 out of 10
- Product in demand (waiting list): 9 out of 10

6.2 Disadvantages Related to Thickening

Furthermore, the main identified problems concern family housing in eight (8) cases out of ten (10), as far as surface space is concerned (overcrowding of units), social problems and other various problems resulting from the lack of privacy or the quality of the construction. Densified housing is a source of complaints from the tenants in half of the consulted First Nations.

The Outstanding Negative Facts

- The acoustic isolation: 6 out of 10
- Architectural integration: 3 out of 10
- Additional surveillance: 3 out of 10
- Difficult cohabitation between neighbours: 8 out of 10
- Management more difficult: 5 out of 9 (one abstention)

Conclusion

This study shows that there are costs and benefits associated with housing thickening. This practice involves benefits from a financial point of view and you can put figures on them. The cost price in capital per housing unit (investment in buildings and infrastructure) in general, decreases as we advance in the different thickening stages. Another benefit associated with thickening, being the savings in surface space, is more difficult to put figures on, but ultimately it could be done. The costs and the drawbacks of thickening are hard to put figures on, because they refer to cohabitation problems caused by the proximity of the units. This is an important thickening stake. We could even say that in order to get the full benefits of the potentially attainable savings in capital, a community must necessarily set up and apply measures favouring a harmonious cohabitation by the tenants.

The main points to consider in the planning of a residential thickening project were clearly expressed while consulting with the First Nations. In nine (9) out of the ten (10) consulted communities, there is a waiting list for densified housing types. The majority of the demands concern dwelling for families.

The communities acknowledge the fact that thickening is a mean to materialize important infrastructure and surface space savings and that it increases the number of available dwellings compared to conventional non-thickening projects.

Comments Concerning the Single-Family Semi-Detached Houses

The stage 3 density allows surface space and infrastructure savings in the order of 46% compared to traditional housing (chart 1). The cost per unit is $11,522 less than a standard lot of $25,000 (chart 2).

The single-family semi-detached house represent the main type of housing considered by the First Nations that have thickening projects because they offer a good compromise compared to conventional housing (single-detached house), being:

– individual units;

– an independent outside surface space;

– a saving on the construction of infrastructures;

– a saving on the construction of houses;

– a surface space saving for other urban uses.

Comments Concerning the Isolated Multi-Family Houses

That type of construction (4 units) allows a surface space and infrastructure saving in the order of 63% compared to conventional housing (chart 1). The unit cost is $15,548 less than a standard lot of $25,000 (chart 2). The infrastructure cost per dwelling comes to $9,452, which is quite reasonable.

The isolated multi-family houses of 4 units are a kind of densified housing (stage 5) seen notably in the Quebec First Nations communities. We do not find that in the smaller communities. A few First Nations are planning to build some. Although quite economical, density (stage 5) must be well planned to avoid the problems identified following the numerous complaints received by the communities consulted:

– shortage of inside surface space;

– deficient soundproofing;

– shortage of outside surface space.

By judiciously dealing with these elements, it is possible to obtain a heighten quality of construction to favour better life conditions for the tenants.

The same remarks (amplified) apply to isolated multi-family houses of six (6) units (thickening of stage 6), mostly because of the strong density, which increases the shortage of outside surface space and the problems of neighbourhood closeness.

Paths to Explore

The actual survey puts into evidence that the stage 4 thickening is rare in the Quebec First Nations. However, it allows important savings while conserving the possibility to create autonomous units with an individual lot consequently fitted-out. The theoretical fitting-out plan brings out the fact that the single-family in-row houses allow more surface space and infrastructure savings than the single-family semi-detached houses, being a net cost of $9,170 per housing unit, a saving of $4,307 per lot (stage 4 vs 3). However, we must make sure that the quality of the construction respects all the criteria concerning the soundproofing of the party walls and that the exterior fitting-outs offer the hoped for intimacy by the tenants. This type of housing is actually not much widespread in the Quebec First Nations communities.

In general, an adequate planning of the surface space area reserved for the development of densified housing allows a good integration of this type of housing for the surrounding environment. We may have to resort to the fitting-out of community equipment or surface space to assure some good life conditions for the clientele of the densified housing. Important savings are at stake.