RESEARCH REPORT

External Research Program

Universal Accessibility Performance Criteria

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UNIVERSAL ACCESSIBILITY

PERFORMANCE CRITERIA

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October 1994

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CMHC EXTERNAL RESEARCH PROGRAM - 1992

UNIVERSAL ACCESSIBILITY PERFORMANCE CRITERIA

FINAL REPORT

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Without these people, this study would not have been possible.

We also wish to thank Mrs. Maria-Hanna Siedlikowski with Canada Mortgage and Housing Corporation for her judicious comments following the progress report and following the preliminary version of the final report. Her remarks allowed us to make the required clarifications to facilitate comprehension of the report.

Lastly, all our gratitude goes out to Mrs. Patricia Falta for her involvement, support and encouragement throughout this project.

From all members of the team at La Société Logique Inc.

EXTRACT

Universal accessibility is a concept defined to meet the needs of a varied client group, including people with functional limitations. This concept can be implemented at costs identical to those for traditional construction.

The research project "Universal Accessibility Performance Criteria" has as its goal to verify the functionality of the universal accessibility criteria used in building three multi-family housing projects and to propose improvements and avenues of research in order to define new performance criteria to be used in future housing projects.

A survey involving 67 tenants living in universally accessible units made it possible to collect information on the use, satisfaction level and difficulties with the various architectural elements in the building and in the individual units.

The respondents accurately reflect the diversity of the client group for which this concept was designed. These are seniors, people with functional limitations, the nature and gravity of which vary widely, or people without limitations, households with children, etc.

The results showed that, on the whole, the performance criteria used for the execution of the housing projects studied adequately satisfy the respondents' expectations. Most of these criteria, moreover, required adjustments, the scope of which may vary considerably. The report proposes, for each criteria, improvement avenues which may be integrated as part of future housing projects, and which eventually will have to be evaluated.

It is observed that a number of respondents use the adaptability characteristics made available to them in the housing units. Most of the adaptations implemented consist in installing specialized equipment. Very few required any architectural work. Compared to adaptation work required for traditional housing, the adaptation of universally accessible units is clearly advantageous for people with disabilities and for agencies providing grants to adapt housing units.

Moreover, this study shows that a unit meeting the needs of a person with functional limitations may also adequately meet the needs of people without limitations, an essential fact for a housing promotor or builder wishing to reach people with limitations without, at the same time, losing its regular clients.

SUMMARY

Universal accessibility is an architectural concept making it possible for all individuals, regardless of their functional limitations, to function without constraints in a particular place or building.

Applied to housing, this represents a promising alternative to provide a vast choice of units to people with disabilities and to make it possible for a promoter or a builder to broaden its client group in a context where competition is becoming increasingly stiff and where the population is aging. It has to be understood that universal accessibility is not intended solely for people with functional limitations, the latter are only one of many groups for whom this concept is beneficial.

The products and equipment available on the market offer a wide range of possibilities for promoters wishing to adequately meet the needs of their clients. Universal accessibility means that compromises have to be made to adequately meet the needs of a client group with functional limitations and the needs of other client groups also targeted in the housing project, and this has to be done at acceptable costs.

Since 1983, la Société Logique has been concretely experimenting with the concept of universal accessibility through the execution of housing projects. The compromises which this agency has chosen to make are the following: 100% of units in buildings are universally accessible, the client group targeted is that which corresponds to the demographic profile of the district where the project will be located and the costs will be maintained at a level generally accepted for traditonal construction (maximum unit price for social housing programs).

These compromises have made it possible to define the performance criteria used for the housing projects executed by la Société Logique. The goal of this study is to verify the functionality of these criteria and to propose improvements and research avenues to define new performance criteria to be used in future housing projects.

A survey was conducted among the tenants in three universally accessible buildings to find out their level of use, degree of satisfaction, as well as the difficulty experienced with, the various architectural elements in the buildings and in the individual units. Sixty-seven people were met with in interviews during the months of August and September 1993.

These respondents which formed our sample, can be characterized as follows:

. 50% have functional limitations, the nature and gravity of which vary;
. 50% do not have functional limitations;
. 22% are seniors, and;
. 38% are families with children.

Thus, these respondents represent a demographic profile which is different from that of the Canadian population, but which, on the other hand, faithfully reflects the diversity of client groups which are targeted under this universal accessibility concept.

Section 7 in the research report presents the results of the tenant survey. The elements which are assessed therein form the performance criteria used by la Société Logique for the three housing projects.

It is observed that these criteria adequately meet the expectations of the respondents, whether they be seniors with or without limitations, people with severe limitations, children or people without limitations.

The compromises chosen by la Société Logique are thus valid: it is possible to adequately meet the needs of all the client groups at costs which are comparable to traditional housing.

It is also observed that the performance criteria which were used to design and execute les Habitations Perras (1992) rank higher than those used in the other two buildings (Quesnel, 1983, St-Joseph, 1988).

These criteria required still further adjustments, however, the scope of which varies depending on the element studied.

By analysing the results it is possible to identify improvements for most of the elements studied. These enhanced elements thus become the new performance criteria for universal accessibility. It is important, however, to know that these improvements were not user-tested.

On the other hand, certain criteria do not function as well as others and we cannot affirm exactly how to replace them. We have to limit our intervention to proposing improvement avenues, which are, in fact, development avenues.

On the other hand, it is also noted that a number of respondents used the adaptability features made available to them in the housing units.

It is thus important to keep the features which provide for adaptability and to assess the possibility of making provision for incorporating the adaptations which certain respondents had to have executed to make their units more adequate.

Concerning these adaptations, it is observed that, with very few exceptions, they did not require any architectural modifications. In most cases, this involved the addition of specialized equipment. Compared to traditional units which usually require major interventions in the entrance, the bathroom and kitchen, universally accessible units are clearly more user-friendly for the residents with disabilities and more economical for agencies providing grants to finance unit adaptation.

In conclusion, it can be affirmed that the universal accessibility concept and its performance criteria mesh well with the needs of a diversified population, that certain adjustments are still necessary to optimize the extent which this concept meets the needs of the population and of the various component client groups and that these criteria offer substantial advantages compared to traditional design criteria.

The challenge of the concept of universal accessibility? To be adopted by private promoters to produce a residential stock which can easily evolve to keep pace with the needs of the Canadian population.

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1.0 CONTEXT

The social integration of people with disabilities is an irreversible phenomenon.

Over the years, a number of solutions have been developed to resolve the architectural problems faced by those with disabilities in public places. Starting in 1976, the introduction of barrier-free design requirements in various regulations attests to this. In the United States, progress has been even more rapid since the adoption in 1990 of the "Americans with Disabilities Act" (ADA).

However, the production of high performing housing units for people with disabilities still represents a major problem for builders and promoters, both private as well as public.

Housing remains a private space. To be ranked as highly performing, housing must meet the specific needs of residents wishing to personalize their living space and who are not prepared to accept, within their residence, solutions which have been developed for public places.

The fact is that consumers with functional limitations are now asking for the possibility of choosing their type of habitat, a possibility which is offered to all other Canadians.

Building a range of units intended solely for those with disabilities is a possibility. There are constraints in terms of location, and of the resale market, however, since the original target market, although it is large, is not nearly as large as that for by the population without limitations.

This constraint is felt by private promoters and builders and this explains, partially as least, the fact that the production of units intended for people with disabilities continues to be the end result of isolated initiatives, most of which are public.

Another avenue for promoters and builders.

This involves producing housing units which are designed for people with and without disabilities. These units are referred to as universally accessible. They have two main characteristics: the absence of architectural barriers and the possibility of installing specialized adaptation equipment without having to proceed with major architectural modifications.

These units are adequate for all unchallenged residents, meet the particular needs of most people with disabilities and are easily adaptable for those with greater needs.

By opting for this avenue, promoters are thus capable of offering a wide range of units to people with disabilities, to better meet the needs of an aging client group or a group with young children, without taking the financial risk of losing their regular clients.

The execution of a universally accessible project for a promoter means that his client base is broadened. Results of 1991 Statistics Canada Census indicate that 15.5%(1) of the Canadian population have one or more functional limitations.

La Société Logique Inc. has been developing the concept of universal accessibility since 1981. During this time, the agency has developed performance criteria which are specific for housing. These criteria have been used, among others, in the execution of universally accessible projects.

We believe that the performance criteria developed by la Société Logique Inc. may be used by private or public builders and promoters who opt for universal accessibility. One of the goals of this study is to verify whether the performance criteria used by la Société Logique represent advantages or disadvantages for the diversified population which makes up the survey universe.

(1) The Health and Active Limitation Survey, 1991 Statistics Canada

2.0 UNIVERSAL ACCESSIBILITY: DEFINITION

Designing a universally accessible project consists in designing common interior and exterior spaces, and the spaces in all the housing units in residential projects so that all residents or visitors may have access to the building, enter the building, find their way once inside the building, move about in the building and use the spaces.

Six objectives are set for such a design:

1) Providing obstacle-free access to the building, to the housing units and to the services for people with limitations in terms of mobility, hearing or seeing.

2) Making provision in the housing units and in the building's public spaces, for adequate turning and work space for people in wheelchairs.

3) Improving functional security in the execution of daily tasks.

4) Providing for layouts which increases security in case of emergency.

5) Making provision for layouts which facilitate the use and maintenance of the various components and equipment in the housing units.

6) Making provision for adaptability by designing spaces to facilitate conversion or the installation of equipment required by people with limitations or by seniors losing their independence.

It is easy to imagine the multiple possibilities offered by products and equipment (electronics in particular) available on the market to attain these objectives.

An initial series of compromises between the "ideal project" and the "realistic project" is arrived at by considering the client group mix.

The development concepts proposed must be suitable for all current or future residents in housing units. An adequate workspace for people in wheelchairs must also be adequate for a person who is standing up, for seniors or for persons with visual limitations. Universal accessibility is not limited solely to people with limitations, the latter is only one group among others for which it is designed.

The second series of compromises is dictated by execution costs. These compromises are contingent on the budget made available to the designer and on the choice as to the proportion of accessible units in the building (5%, 50%, 100% ...).

Thus, it is easy to understand why there is such a range in the performance ratings of universally accessible projects. A certain number are similar to traditional housing and others are much closer to completely adapted housing. This merely reflects the different compromises which have been made by the designers as pertains to performance in terms of client needs and cost. And one should not take for granted that those concepts which are closer in design to completely adapted housing units better meet the needs of diversified client groups.

The housing projects analysed in this study were executed under assistance programs sponsored by the Canada-Québec Social Housing Agreement and, as such, must respect maximum unit price criteria. Compromises in terms of costs had a large influence on the performance criteria defined for these projects. The execution cost for les Habitations Perras (1992) represents 93% of the maximum budget authorized for traditionally designed units of this construction type (concrete - four storeys and more). An additional budget of 12%, provided for units adapted to accommodate people with disabilities, was not used for this project and was not included in the maximum authorized budget.

Now comes the time to decide whether these compromises, which seem valid on a theoretical level, actually meet the needs of the residents.

3.0 STUDY'S GOAL AND OBJECTIVES

The goal of this study is to verify the functionality of the performance criteria used by la Société Logique to execute housing projects, and to propose improvements to define new performance criteria to be used for future projects.

The aspects considered are the following:

- adequately meets the needs of most people with disabilities;
- is not restrictive for people without disabilities, and;
- allows for adaptation to meet particular needs, without the necessity of major architectural modifications.

We postulate that architecture must increasingly eliminate architectural and communication barriers, in a context where the population is aging and where social integration of people with limitations has become an imperative. Thus, this study does not challenge the relevancy of universal accessibility.

Our queries focus more on determining the relevancy of the performance criteria used in order to proceed with modifications making it possible to better attain the three objectives mentioned above and thus, to re-define our initial criteria.

The nature of the information sought is both qualitative and quantitative. We are interested in finding out how many people are satisfied with a particular performance criterion and the difficulties these people are experiencing with this criterion.

4.0 THE THREE BUILDINGS

This study deals with three housing projects executed based on the universal accessibility performance criteria developed by la Société Logique.

These buildings are located in Montréal, they were designed and built in line with these criteria. These are all multi-family buildings, housing a tenant groups with a varied demographic profile much like that in Montréal as a whole. In these building we find approximately 15% of the people have disabilities, 10% are seniors and 75% are categorized as "others" for the purposes of our study.

100% of the units in each of the housing projects are universally accessible.

Two of these projects are newly built and the third is recycling project. Thus, these represent different execution contexts which may possibly influence the results of this study.

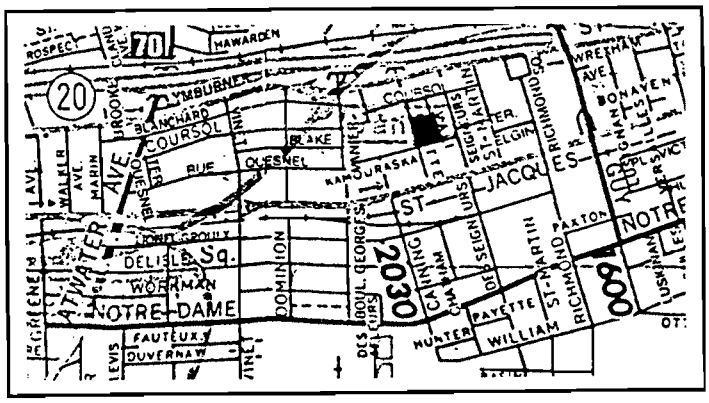
The three buildings were built/recycled over ten years, i.e. from 1982 to 1992. Thanks to the experience gained, to the development of further knowledge and especially to the growing trend toward the social integration of the physically challenged, the performance criteria used evolve from one project to another. We thus expect to observe differences in the results obtained for each of the buildings.

The following sections present a brief overview of each of the buildings studied.

4.1 Habitations Quesnel - 1982

Les Habitations Quesnel is a former school in the Petite Bourgogne districtin Montréal, which was recycled to produce 17 residential units.

Executed under a Section 56.1 National Housing Act Agreement, the building offers units at rents slightly under market levels. In addition, under an agreement with La Société d'habitation du Québec, the rents in 8 of the 17 units are subsidized. The residents in these units pay rents which are equivalent to approximately 25% of their respective incomes.



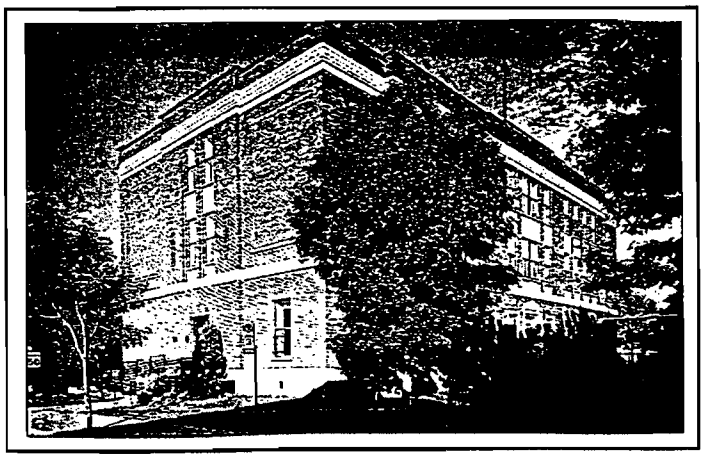
LOCATION

The building is located across from a park and near a metro station. A number of stores in the neighbourhood are adequate for the tenants' daily needs. Habitations Quesnel is a three-storey building with an elevator. On the ground floor, there is a common room, a laundry room and a garbage disposal area.

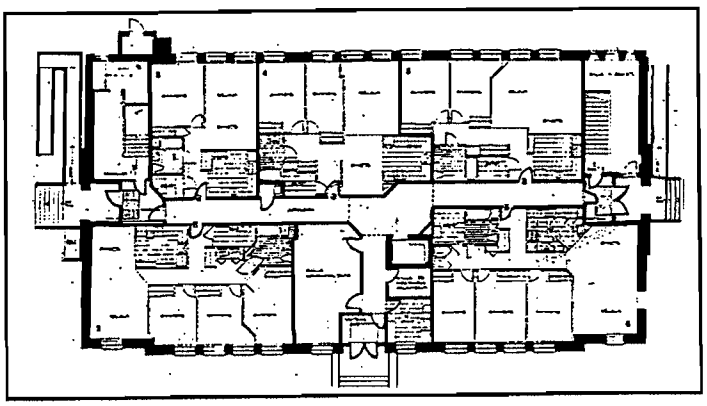
Intervening in an existing building may present certain constraints. The relation between grade level and the entrance level is one of these. In this particular case, as the entrance level is above grade, relatively long 1:12 slope access ramps have proven necessary. The ramp for the main entrance way, in particular, is a borderline case in terms of what is usually acceptable.

The existing windows represent a second constraint. The height and the depth of window sills do not make it possible for a person who is seated to open these windows and to look outside. The units do not have any balconies.

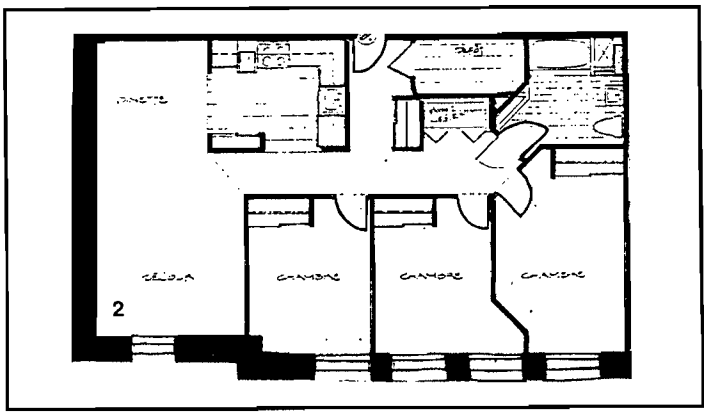
On the other hand, respecting the building's existing structural network makes it possible to obtain slightly larger units than could be the case in new buildings. The rooms are large and the circulation spaces are more than sufficient. The building has 5 one-bedroom units, 6 two-bedroom units and 6 three-bedroom units. The three-bedroom units are the only ones with washer/dryer included. The other tenants use the laundry room on the ground floor.



HABITATIONS QUESNEL



GROUND FLOOR PLAN



PLAN FOR TYPICAL UNIT

The building does not have a garbage chute. The tenants must carry their garbage to an area which has been set aside for this purpose, on the ground floor.

The two stairwells are the original ones and are used as an exit.

The off-street parking is outside and there are sufficient spaces for all the tenants.

Unit Type	Average area
1-bedroom	61 m^2
2-bedroom	87 m^2
3-bedroom	113 m^2

AVERAGE UNIT AREA

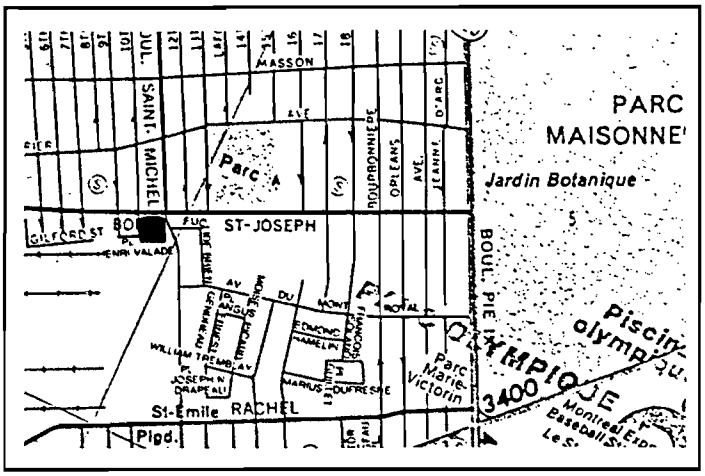
4.2 Habitations St-Joseph-1988

Habitations St-Joseph is a new 42-unit building located on Angus Lands in the Rosemont district in Montréal.

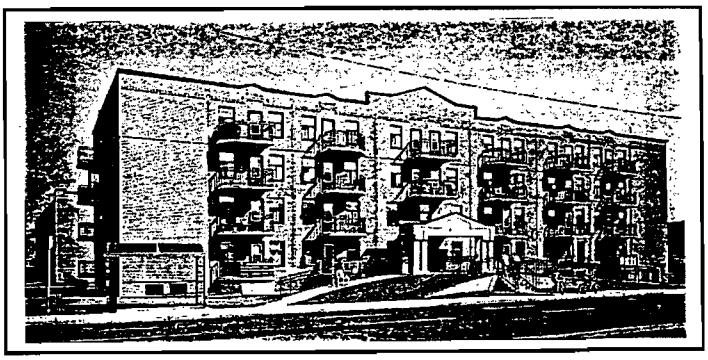
Executed under a National Housing Act Section 56.1 Agreement, the building offers units at market rents. A certain number of units occupied by people with disabilities are covered by special agreements with la Société d'habitation du Québec under which the residents pay rents equivalent to 25% of their incomes.

The building is located at the intersection of two bus routes, allowing for rapid access to the subway. It is located near a major business artery, Masson Street, where a number of neighbourhood stores are also found.

Habitations St-Joseph is a four-storey building, with an elevator. In the basement is found a childcare centre, administrative offices, the laundry room and a common room.



LOCATION

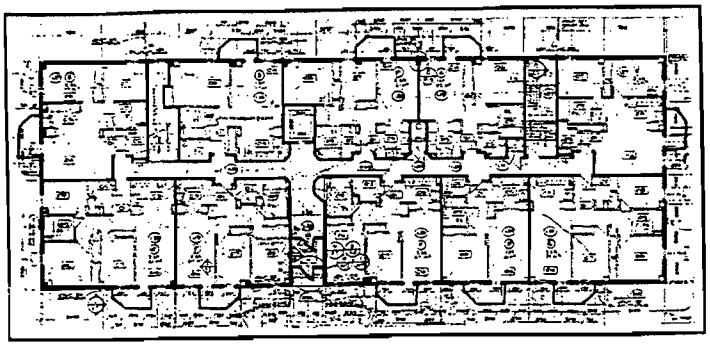


HABITATIONS ST- JOSEPH

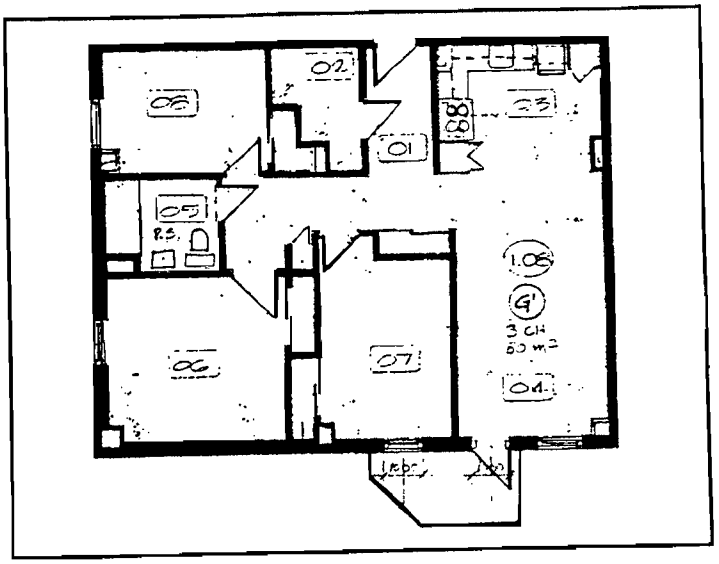
To provide sufficient glazing for the premises in the basement, the ground floor is approximately 900 mm above grade. Access to the front entrance (to the ground floor) involves two ramps incorporated in a crescent-shaped entranceway which is used as a vehicle loading/unloading area. The back entrance is at the basement level and an access ramp is also used.

Each unit has a balcony. The average area of the units is comparable to that for new traditionally designed units. The building includes 12 one-bedroom units, 21 two-bedroom units and 9 three-bedroom units. None of these units has washer/dryer facilities and all the tenants have to use the laundry room in the basement.

The building has a garbage chute with a chute hatch on all floors. Off-street parking is at the back and the number of spaces is not sufficient for the number of housing units. Certain tenants must park in the street.



GROUND FLOOR PLAN



PLAN FOR TYPICAL UNIT

Unit Type	Average Area
1-bedroom	51 m²
2-bedroom	63 m²
3-bedroom	80 m²

AVERAGE UNIT AREA

4.3 Habitations Perras - 1992

Habitations Perras is a new 44-unit building, located in the Rivière-des-Prairies district in Montréal.

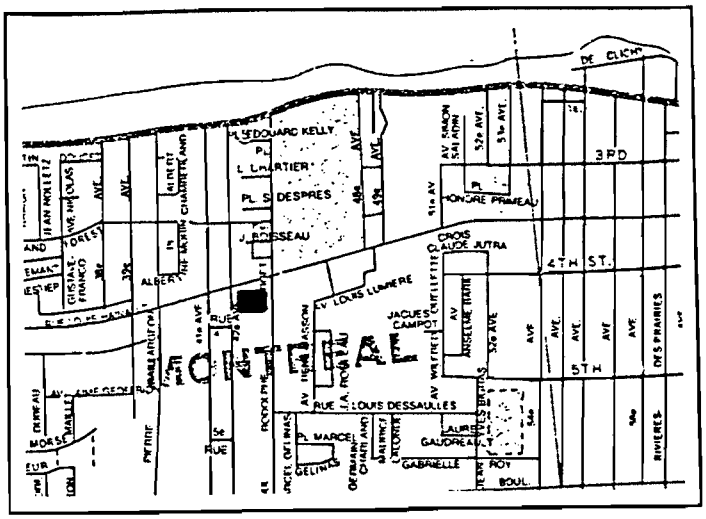
Executed under the Federal-Provincial Social Housing Agreement, the building offers sub-sidized housing units exclusively, with all the residents paying rents equivalent to 25% of their incomes.

There is a bus route close to the building, but the building itself is located a good distance from the subway station and from downtown Montréal. The sector is currently being developed and, at the present time, there are few stores in the neighbourhood. On the other hand, a number of recreational facilities are located in the immediate vicinity of the building.

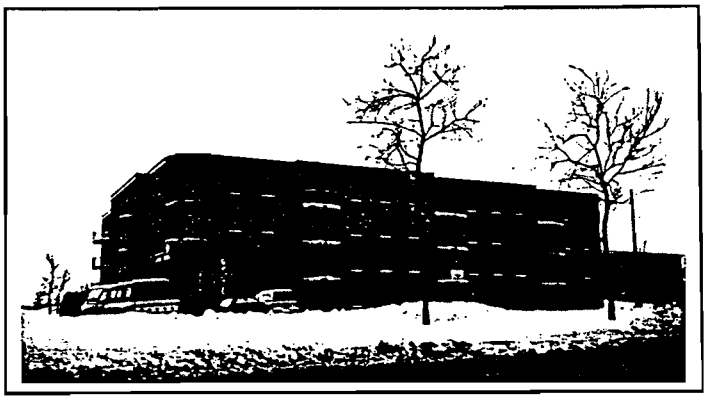
Habitations Perras is a four-storey building with an elevator. The basement contains interior parking and individual storage compartments. Thus, as no glazing is required in the basement, the entrance is virtually at ground level.

Access to the front of the building is along a slightly sloping path incorporated in a crescent- shaped driveway used as a vehicle loading/ unloading area. The back entrance is also at ground level.

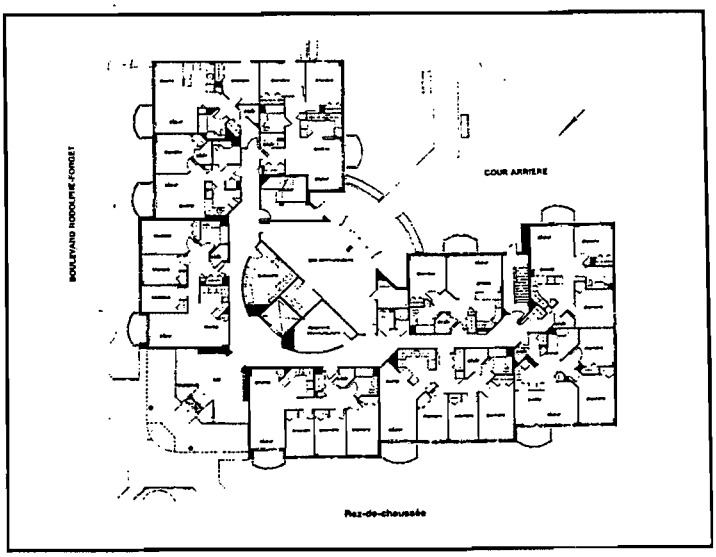
Each unit has a balcony. The average unit area is comparable to that for new traditionally designed units.



LOCATION



HABITATIONS PERRAS

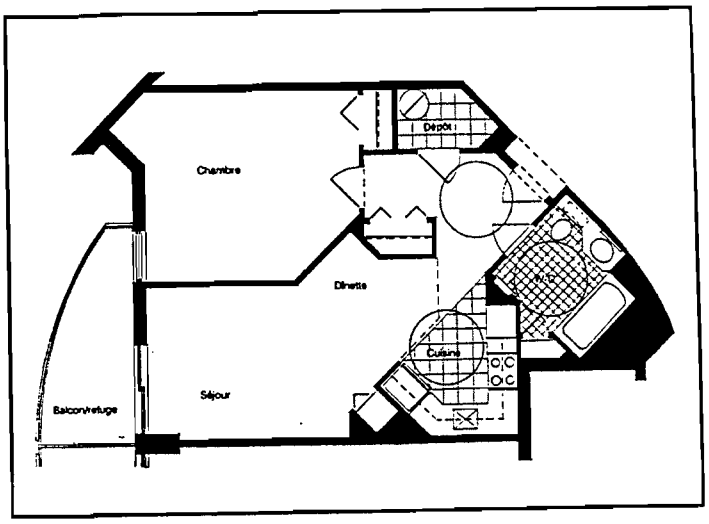


GROUND FLOOR PLAN

The building has 18 one-bedroom units, 14 two-bedroom units and 12 three-bedroom units. None of the units has washer/dryer facilities and all the tenants must use the laundry room on the ground floor.

The building has a garbage chute with a hatch on each floor. Parking spaces are all interior, and tenant access to the parking area is by elevator.

On the ground floor, there is also a very large common room with a kitchenette. The backyard is landscaped with plants and bushes, park benches and a community garden.



PLAN OF TYPICAL UNIT

Unit Type	Average Area
1-bedroom	56 m^2
2-bedroom	71 m^2
3-bedroom	86 m^2

AVERAGE UNIT AREA

5.0 METHODOLOGY

To be able to define the universal accessibility performance criteria to be used for future housing projects, we had to assess the performance of the criteria used for each of this three buildings under study.

It is based on this evaluation that we will be able to identify the criteria used which are adequate and the criteria used which require modifications.

5.1 The Interview as a Data Collection Tool

To proceed with this evaluation, we had to question the tenants in the three buildings. We had to know the use the tenants made of the features made available to them, their level of satisfaction with the latter and the various difficulties experienced.

We chose to collect this information in interviews. As we wanted to collect information on a large number of features and as certain respondents feel more deeply about some of these than others, individual interviews make it possible to structure the meeting and to thus collect the maximum volume of relevant information.

Factors such as where the interview took place, the length of the interview and the initial contact with the person being interviewed have an influence on the person being interviewed and on the climate of the whole conversation. Given that the subject of the survey was the unit and its various elements, we chose to conduct the tenant interviews in their respect units. In addition to creating a climate of comfort and confidence, this location refreshes the person's memory and increases the number of people ready to participate by minimizing the effort involved in moving to other premises.

The length of the interview was set at 30 minutes, with this being the optimum time span in terms of respondent participation. The interviews were not recorded and the interviewer noted the replies directly on the questionnaire form.

5.2 Survey Participants

The three residential buildings targeted contained a total of 103 residential units. We consider that the residents in these buildings form a group which is representative of the population of Montréal in general.

For social integration purposes, the client group in these buildings does indeed have a profile which is similar to that for the whole city. La Société Logique tries, through rental policies, to maintain at approximately 15% the proportion of people with disabilities, at 10% the proportion of seniors and at 75% that of other tenants, in each of the buildings.

The comments collected from these tenants will thus make it possible to get a relatively clear idea of the appreciation of the universal accessibily concept by the population in general.

The only shortcoming as pertains to the representative nature of the group is that those people with sensory or intellectual limitations are underrepresented in the buildings, in relation to their demographic weight. We thus ensured that these few tenants were part of the respondents.

All the tenants were informed in writing of the survey's goal, of the nature of the participation desired and of the probable length of the interview.

This letter was followed by a telephone contact to set the hour and the date of the meeting. Sending out letters in conjunction with the telephone calls made it possible for us to attain a reply rate of 65%, i.e. sixty-seven households. These households are spread out proportionally over the three buildings.

5.3 Preparation of the Questionnaire

An inventory of all the features impacting accessibility made it possible to specify the scope of the survey.

These features were grouped into eleven sections representing the themes which were broached in the interviews. Questions intended to guide the interviewer were prepared for each of the themes.

The questionnaire was then tested with five tenants to verify whether the respondents understood the terms used and questions asked. At the same time we verified the length of the interviews to ensure that they did not exceed the thirty-minute target. Indeed, we observed that once the interviews extend past 30 minutes, it is very difficult to keep the respondents' attention and interest.

This pretest proved to be conclusive and only a few modifications had to be made in the initial questionnaire. The final version of the questionnaire administered to the respondents is found in Appendix 1.

5.4 Questionnaire

The objective of the interviews was to collect the maximum volume of information from the respondents, and that is why the questionnaire has many open-ended questions and ample provision was made for comments from the respondents and/or the interviewer. Although open-ended questions make the analysis of the results more difficult, we believe that the degree of refinement obtained justifies the additional compilation and analysis work.

In the same line of thought, a control list is proposed to the respondents for certain questions to stimulate their reflexion.

The questionnaire was divided into twelve sections: the first contains questions on the respondent's socio-demographic profile, and the eleven others concern the features included in the building and in the unit.

The section on the socio-demographic profile made it possible to collect information on the:

- respondent's age group;
- number of people in household;
- unit occupancy length;
- functional limitations of one or more members of the household;
- technical devices used;
- assistance provided for daily activities;
- adaptations made to unit by the tenant since his/her arrival

The eleven sections listed below focus on the various features and are designed in sequence so as to follow the path that tenants would usually take from their arrival in front of the building until they reach their units. This procedure helps the respondents visualise the features being dealt with as it is based on their daily routine.

- Exterior approach and parking area
- Entrance, lobby and entrance hall
- Circulation, stairs, elevator
- Public spaces
- Fire security
- Circulation within the unit and on the balcony
- Door, windows, environmental control and hardware
- Bathroom
- Kitchen
- Communications system
- Storage

The sections dealing with the various features include four types of questions:

- The first type makes it possible to verify whether the tenant uses the feature being dealt with. These questions are asked in case an alternative is offered to the respondent. For example, the question on use is asked for the access ramp since it is possible for the respondent to use the stairway to enter the building. The question of use is always followed by a question on the difficulty experienced which is put solely to people who have replied affirmatively to the first question.

- The second type of question is limited solely to the difficulties experienced. These questions are asked for those features where the respondent has no alternative. For example, circulation in the building, letter boxes, etc. It may be that the respondent does not use the features; in this case, this is not a matter of free choice but of a choice motivated by the fact that the feature is too difficult to use.

- In the third type of question, the respondents are asked to compare the ease with which accessible equipment can be used vis-à-vis more traditional equipment. For example, the respondents are asked to compare a lever door handle to other types of handles.

- Lastly, a fourth type of question was directed solely to those tenants with disabilities and dealt with matters such as use of the toilet, transfers, etc.

5.5 Survey

The interviews were all conducted by the same person and were organized over a one-month period, from August 30 to September 29, 1993.

5.6 Analysis

5.6.1 First Stage: Establishment of Categories

One of the objectives of this study was to verify whether the accessibility performance criteria used in each of the buildings suited all the clients with varied profiles in terms of limitations.

An analysis of the survey results must thus highlight the degree of satisfaction felt by each group of residents as well as the difficulties experienced: those people with motor limitations, with sensory limitations, seniors and others.

An initial data processing operation must make it possible to identify in which category each of the respondents is to be placed.

In addition, the information available on the respondents makes it possible to interpret the replies more clearly. Someone with motor limitations and in a manual wheelchair may have more difficulty with the access ramp than a person in a motorized wheelchair. If most of the respondents with motor limitations are in motorized wheelchairs, the survey results may suggest that the performance criteria used for the access ramp were adequate, which is not necessarily the case.

Thus, the breakdown of respondents into categories must be detailed.

We have chosen to categorize the respondents according to four parameters:

- degree of mobility;
- number of people in household;
- number of children under 18 years of age in the household, and;
- age (65 years old and over or under 65 years old).

The degree of mobility parameter is subdivided as follows:

A Motorized wheelchair with assistance
B Motorized wheelchair without assistance
C Motorized and manual wheelchair with assistance
D Motorize and manual wheelchair without assistance
E Manual wheelchair with assistance
F Manual wheelchair without assistance
G Manual wheelchair and orthotic device with assistance
H Manual wheelchair and orthotic device without assistance
I Orthotic device with assistance
J Orthotic device without assistance
K Sensory limitations
L Other limitations
M No limitations

Each respondent thus received a four-character code.

Example:	Mobility	Number of residents	Children	Persons 65 years of age and over
	F	2	1	-

This household thus contains one person (F) using a manual wheelchair without assistance; it is made up of (2) residents including 1 child and no one (-) 65 years of age and over.

5.6.2 Second Stage: Qualitative Approach

Above all, we were interested in the qualitative elements provided by the respondents. In fact, although it is interesting to find out that 50% of the people questioned experienced difficulty with the access ramp, it is even more relevant to identify the particular aspects of the ramp which caused these difficulties, as the intervention required will, indeed, vary depending on whether the problem is one of ramp slope, snow removal or lighting. The compilation of the data should thus make it possible to highlight the qualitative information contained in the comments.

Another important aspect: since the accessibility performance criteria used varied from one building to another, it is essential to have a compilation tool by building allowing for a direct comparison between the buildings (access ramp at Quesnel vs St-Joseph and Perras). Such a comparison will assist the evaluation of the relevancy of the changes made over the years.

Lastly, the compilation tool must make it possible to compare the nature of the client groups experiencing difficulties.

Thus, we chose to compile the information by building. For each building, we used a compilation sheet by question. On each of the sheets there is a choice of possible replies as well as the list of respondents identified by a number and appropriate coding.

DATA TAKEN OFF A COMPILATION SHEET
HABITATIONS QUESNEL
QUESTION 1. ACCESS RAMP

183 compilation sheets were thus completed. One can ascertain on reviewing the data shown on the Habitations Quesnel sheet, question 1, how easy it is to identify the significant comments.

5.6.3 Third Stage: Quantitative Approach

Even if the qualitative approach is preferred for analysing the results, the quantitative approach can certainly be useful in identifying the recurring nature of certain comments.

The quantitative analysis was conducted using in-house software. The coding work, the work involved in data collecting and in processing the questionnaire data was contracted out to a consultant working at le Centre François-Charron, a rehabilitation centre in the Québec City area.

The results obtained are presented in the form of cross tabulations making it possible to compare most of the variables in the questionnaire.

5.6.4 Fourth and Fifth Stages: Combined Approach

The fourth analysis stage consisted in collating the qualitative and quantitative results to come up with the portrait of a particular feature. Thus, we combined the questions and the buildings so that all significant information collected on one particular feature is on the same page. This information is divided into "strengths" and "weaknesses".

DATA FROM ANALYSIS SHEET, QUESTION 1. ACCESS RAMP

The fifth stage consisted in collating the information collected during the survey with the accessibility performance criteria used for each of the buildings.

First of all, we proceeded with an exhaustive inventory of the features being studied, for each of the buildings. This inventory was drawn up based on the construction plan for each building, which was validated and supplemented subsequently by a visit to the buildings.

Lastly, these features were looked at in light of the comments made by the respondents. We were able to identify, for each feature, the accessibility performance criteria used which proved most appropriate to meet the expectations of diversified client groups as well as the improvements to be made in these criteria.

This analysis is presented in the form of 36 data sheets, one per feature. These data sheets form an integral part of this report and can be found in Section 7.

6.0 RESPONDENT PROFILE

The three buildings under study contain a total of 103 housing units.

At the time of the survey, none of these units were vacant. Thus, 103 households were able to participate in the project. 67 accepted, for a participation rate of 65%.

Table 6.1 indicates the breakdown of respondents by building. It can be observed that this breakdown is comparable to that for the base population.

Building-	# units	%	# respondents	-%
Quesnel	17	16	11	16
St-Joseph	4	41	25	37
Perras	44	43	31	46
TOTAL	103	100	6	100

TABLE 6.1 - BREAKDOWN OF RESPONDENTS BY BUILDING

6.1 Make-Up of Respondent Households

Nearly half of the respondents lived alone.

The households are small and a large number of single-parent families (25% of the respondents) was noted.

63% of the single-parent families (10 families) lived in Perras, whereas nearly 20% (3 families) lived in Quesnel. This can be explained by the fact that these two buildings offered subsidized units.

	No.	%
1 person	28	42
2 people	18	27
3 people	9	13
4 people	10	15
5 people and more	2	3
TOTAL	67	100

TABLE 6.2 - NUMBER OF PEOPLE PER HOUSEHOLD

	No.	%
Singles	28	42
Couple	12	18
Single-parent family	16	25
Family	9	13
Others	1	2
TOTAL	67	100

TABLE 6.3 - HOUSEHOLD COMPOSITION

6.2 Respondent Age

Nearly half of the respondents are between 31 and 50 years old.

La Société Logique was hoping to find, in its buildings, a proportion of seniors in the vicinity of 10%. The fact that 22% of the respondents were 65 years old or older, demonstrates how difficult it is to obtain this objective without discriminating. This proportion is particularly high for Habitations St-Joseph where 28% of the respondents are 65 years old or more.

Three hypotheses can be used to explain this observation: the high proportion of seniors in the district where the three buildings are located, the popularity among seniors of multi-family buildings with elevators, or quite simply the appeal of barrier-free structures and units making it possible for seniors to continue to live independently at home for a longer period of time.

	No.	%
Between 18 and 30 years old	8	13
31 to 50 years old	27	42
51 to 64 years old	15	23
65 years old and older	14	22
TOTAL	64	100

TABLE 6.4 - RESPONDENT AGE

6.3 Length of Occupancy

It is to be noted that a large majority of respondents have been living in their units for over a year. It can be assumed that they have had the opportunity to use the features in the building and in their units and that they all have sufficient experience with these features to be able to answer the questions in the questionnaire.

	Quesnel	St-Joseph	Perras
1 year or less	0%	12%	10%
from 1 to 2 years	36%	16%	90%
from 2 to 5 years	45%	32%	N/A
5 years or more	19%	40%	N/A

TABLE 6.5 - LENGTH OF OCCUPANCY IN UNIT

It is also noted that a large proportion of the respondents have been in their units for 5 years or more. This shows good tenant stability at a time when vacancy rates are high and this is an indication of tenant satisfaction with the housing conditions.

6.4 Functional Limitations

It is observed that most of the respondents live in households in which one person has functional limitations.

This can be explained by the fact that when the appointments were made for the interviews, emphasis was put on contacting households containing one member with functional limitations so as to have good sample of the variety of limitations involved. Table 6.6 indicates the variety of limitations declared by the tenants.

It is noted that most of the residents with limitations declared mobility limitations.

Habitations St-Joseph has the highest proportion of people with severe limitations. 5 people are quadriplegic and 7 used motorized wheelchairs. As a total, 13 people used wheelchairs in the St-Joseph building.

All the people who declared mobility limitations use wheelchairs in the Quesnel building. This technical aid is used by 9 of 13 people with mobility limitations in Perras and 3 of these people are under 18 years of age.

Limitations	Quesnel	St-Jopseh	Perras	Total
None	6	10	14	30
Mobility	4	15	13	32
Agility	0	0	2	2
Visual	1	0	0	1
Auditive	0	0	2	2
TOTAL	11	25	31	67

TABLE 6.6 - TYPES OF LIMITATIONS

Impairments	Quesnel	St-Jopseh	Perras	Total
Paraplegia/ paraparesis	0	1	2	3
Quadriplegia	1	5	0	6
Cerebral palsy	1	1	4	6
Operation/ spine	0	0	2	2
Amputation	0	1	1	2
C.V.A.	2	2	1	5
Arthritis/ arthrosis	0	1	4	5
Visual	1	0	0	1
Auditive	0	0	1	1
TOTAL	5	11	15	31

TABLE 6.7 - TYPES OF DEFICIENCIES

It is interesting to observe how the residents evaluated their situations. For example, for the St-Joseph building, 15 people declared that they had mobility limitations as opposed to only 11 who considered that they had limitations and 19 use various technical aids to assist them... Thus, people hesitate when asked to qualify their conditions.

Among the tenants questioned, 15 received exterior assistance for daily activities. Most of these people live in the St-Joseph building where the highest concentration of people with severe limitations live.

Typesof technical assistance	Quesnel	St-Joseph	Perras	Total
Manual wheelchair	2	6	8	16
Motorized wheelchair	1	2	1	4
Manual/ motorized wheelchair	1	5	0	6
Cane	0	5	2	7
Walker	0	1	1	2
Crutches	0	0	1	1
TOTAL	4	19	13	36

TABLE 6.8 - TYPES OF TECHNICAL AID USED

	Quesnel	St-Joseph	Perras	Total
Receives assistance	3	8	4	15
Does not receive assistance	8	17	27	52
TOTAL	11	25	31	67

TABLE 6.9 - PEOPLE RECEIVING EXTERIOR ASSISTANCE

7.0 STUDY'S RESULTS: UNIVERSAL ACCESSIBILITY PERFORMANCE CRITERIA

This section presents the results of the analysis of the comments collected from the respondents for each of the features studied.

These results are presented on a data sheet, one per feature, and each of the data sheets contains the following information:

- performance criteria used for each of the three housing projects studied;
- a summary of the degree of respondent satisfaction as concerns the performance of this feature, in line with various performance criteria use;
- major qualitative observations based on the respondents' comments (difficulties, preference, suggestion, etc.); and,
- improvements which we propose in the performance criteria used to more adequately meet the needs of all the residents.

You will observe that the contents of the data sheets are always closely related to the performance criteria used as well as to the replies from the people questioned. In fact, it was the criteria that were being tested and evaluated in this exercise to find out whether they functioned properly.

On the other hand, for the criteria which did not function as well, we are not in a position to specify substitutes as no other criteria were tested. Thus, we must limit ourselves here to proposing certain avenues for improvement.

For example, as pertains to the access ramp, it is observed that a slope of 1:12 (12 feet in length for 1 foot in height) presents a problem, whereas the 1:20 slope functions much better. This study does not make it possible for us to stipulate particular ramp slopes to be used in the future. We can only propose that the slope of the access ramp be reduced.

It is certain that choices will have to be made in executing future residential projects. The goal of this study is not make all these choices beforehand. Our goal here is to validate the choices which have been made to date and to propose improvements in the performance criteria evaluated.

1. Parking
2. Access ramp
3. Automatic door-opening device
4. Lobby
5. Intercom
6. Letter boxes
7. Elevator
8. Threshold
9. Garbage chute
10. Laundry room
11. Fire alarm
12. Common corridor and entrance to units
13. Interior circulation in unit
14. Kitchen
    - 14.1 Turning space
    - 14.2 Counter height
    - 14.3 Clearance under sink
    - 14.4 Cabinets
    - 14.5 Work surfaces
    - 14.6 Built-in oven
    - 14.7 Foot recess
    - 14.8 Positioning of controls
15. Bathroom
    - 15.1 Turning space
    - 15.2 Wash basin
    - 15.3 Toilets
    - 15.4 Medicine cabinet
    - 15.5 Electrical outlet
    - 15.6 Positioning of wall reinforcement
16. Plumbing equipment
    - 16.1 Central lever faucets
    - 16.2 Hand shower
17. Linen closet
18. Storage space
19. Positioning of controls
20. Windows
21. Balcony
22. Door handles
23. The aesthetic aspect of the unit

TABLE 7.1 - LIST OF FEATURES STUDIED

Reference to Question
No: 2

1. PARKING

Element Evaluated

QUESNEL	ST-JOSEPH	PERRAS
No designated parking spaces	2 parking spaces accessible for automobiles, widened 3,400 mm x 5,500 mm	Standard spaces

User Satisfaction

- 37% of the tenants use the parking area
- 84% of the users have no difficulty with the parking area

Observations

- 60% of the parking lot users are physically challenged.
- Of the 16% of the users having difficulty with the parking area:

  -1 person with disabilities finds the parking space too small
  -1 person with disabilities finds that the widened parking space is still too small
  -1 senior finds that the lighting is not sufficient

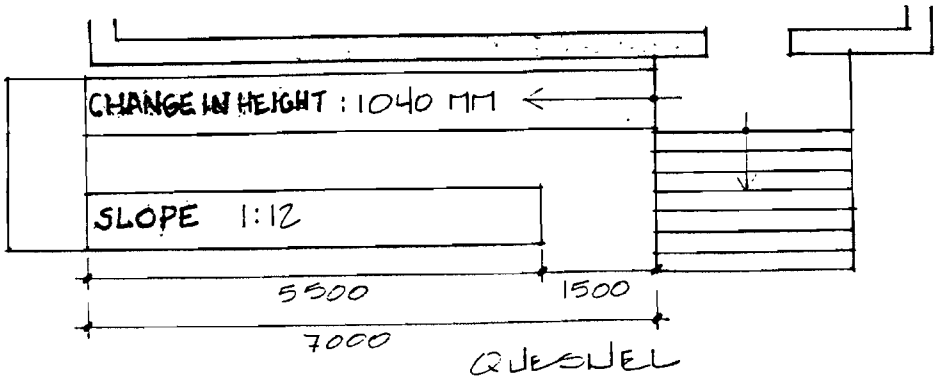
Proposed Improvements

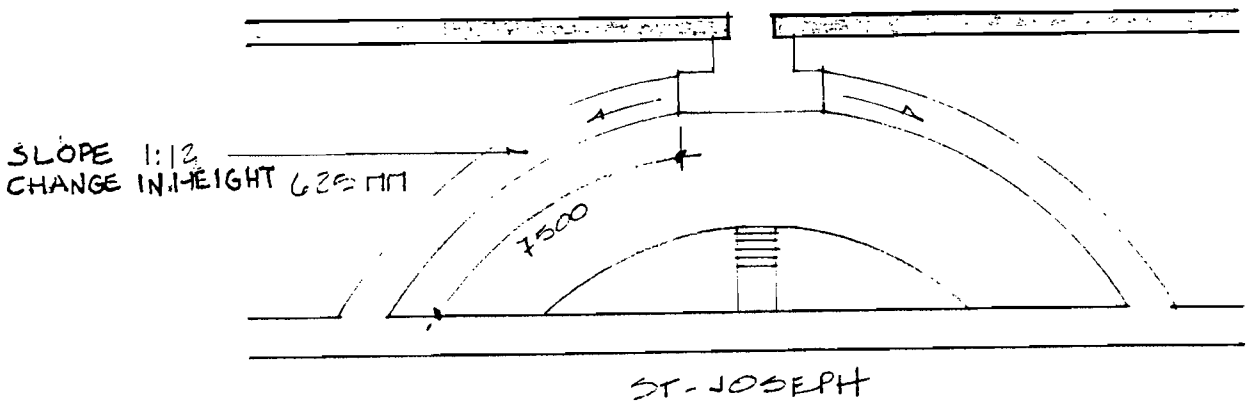
- Increase in number of accessible spaces.
- Accessible spaces for automobile and accessible spaces for vans.
- Widening of accessible spaces (the CSA standard recommends a width of 3,900 mm for automobiles).
- Better lighting.

Reference to Question
No: 1

2. ACCESS RAMP

Elements Evaluated





	QUESNEL	ST-JOSEPH	PERRAS
Access Ramp for Main Entrance:			
. Slope	1/12	1/12	less than 1/20
. Landing (used to change direction or as a rest area)	1	0	0
. Hand rail	each side	1 side	none
. Height of handrails	760 and 910	770 and 920	NA
. Access landing for ramp or stairway (width by depth)	±3,000 x 900	±3,000 x 1,500	±3,000 x 1,500
. Change in height	1,270	900	± 300

Reference to Question
No: 1

2. ACCESS RAMP (cont'd)

User Satisfaction

- The ramps are used very frequently by all the residents in spite of the fact that they may still represent a certain level of difficulty for approximately 30% of these people.

Observations

- The 30% of the users who experience difficulty with the ramps are mostly people with disabilities and seniors. Only 2 people without disabilities mentioned this difficulty.
- The ramps are also use for bicycles and strollers. Where the ramps are situated along the normal axis leading to the entrance way, they are also used by pedestrians.
- A number of comments were gleaned from the survey:
  - excessive change in level or critical height spanned by the ramp
  - absence of horizontal rest surfaces along the ramp
  - absence of handrails on both sides
  - slope too steep

Proposed Improvements

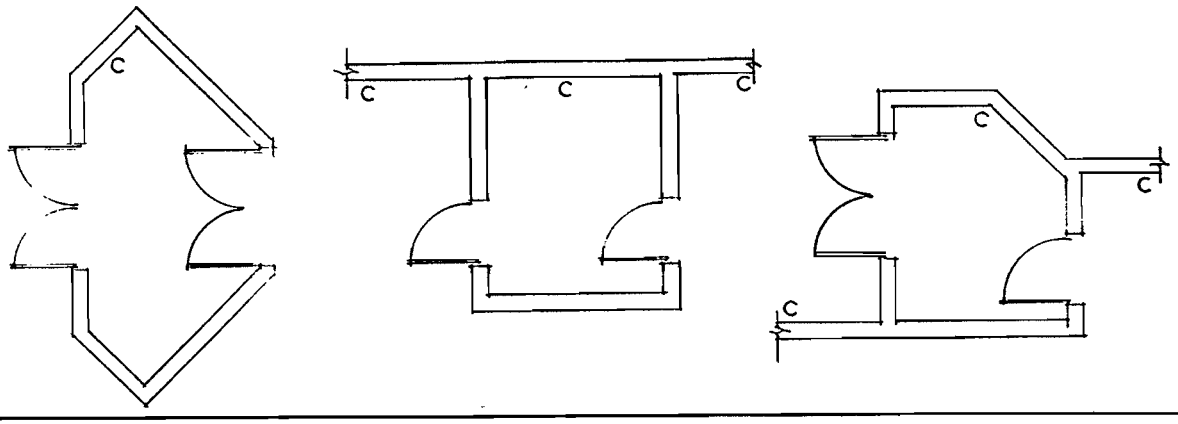
- The elements of satisfaction identified above will have to be evaluated to determine the maximum lengths, the maximum heights and the rest stations required. A maximum change of height of 600 mm will have to be evaluated for the main entrance to the building (the 1:12 slope should be re-evaluated).
- On the upper ramp landing, if access to the ramp is positioned in front of a stairway, this landing will have to be deeper than that at Habitations Quesnel (900 mm).

Reference to Questions
Nos: 3 and 4

3. AUTOMATIC DOOR-OPENING DEVICE

Element Evaluated

Automatic door-opening devices installed on main entrance and lobby doors. Operated by wall controls, with or without locks (or remote control). The controls are positioned at 1,000 mm above floor level, as shown on the following sketches:



User Satisfaction

- 92% of the tenants use the door-opening device.
- 97% of these people can use the controls.
  (3% use a remote control).

Proposed Improvements

- Wall control located only 200 mm from wall corner is difficult to reach. A minimal distance between the wall controls and interior wall corners will have to be determined.
- Provision could be made for an automatic door-opening device on other "public" doors such as elevator doors, exit doors and secondary entrances...
- Provide for a push plate to operate the automatic door-opening device in the lobby where the strike has been activated by the intercom system in an individual unit. This push plate should be situated in the building lobby. Add a visual signal for those with hearing limitations.

3. AUTOMATIC DOOR-OPENING DEVICE (cont'd)

Proposed Improvements (cont'd)

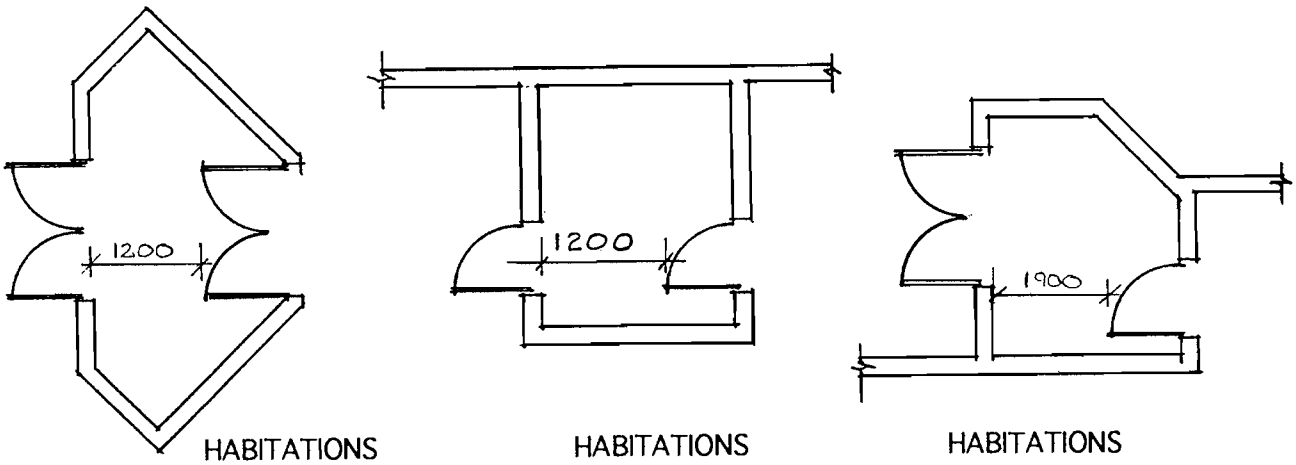
- The choice of a type of control must be made based on user needs, namely: movement detection, "push'n-go", keys easy to manipulate, other code detection systems,...
- The door-opening time must be determined based on where the controls are located, on the opening sequences of both lobby doors and on the types of client groups.

Reference to Question
Nos: 3, 4 and 5

4. LOBBY

Element Evaluated

MINIMAL DIMENSIONS APPLIED:



HABITATIONS PERRAS

HABITATIONS ST-JOSEPH

HABITATIONS QUESNEL

User Satisfaction

- 98% of the users are satisfied with the space provided in the lobby.
- In one of the buildings, this degree of satisfaction is 80%. The lobby in this building also provides access to the letter boxes. (See Section 6)

Observation

- A larger lobby containing the letter boxes did not generate any negative comments.

Proposed Improvements

- No improvement required.

Reference to Questions
No: 54, 55 and 56

5. INTERCOM

Elements Evaluated

1) Telephone model
(Habitations Perras)

- At the entrance to the building:
  microphone, loudspeaker
  and large control buttons
- In the unit:
  telephone with special small control
  button to intercom ring,to unlock the door

2) Wall control model
(Habitations St-Joseph and
Habitations Quesnel)

- At the entrance to the building:
  microphone, loudspeaker
  and small control buttons
- In the unit:
  telephone speak/listen/unlock
  control buttons

User Satisfaction

- Telephone model in the unit: 94% of users are satisfied.
- Wall control model: 74% of the users are satisfied.
- 92% of the users prefer, or would prefer, an intercom connected to the unit telephone, in particular for the following reasons:
  - volume control
  - flexibility for positioning

Observation

- 20% of those in wheelchairs find that the positioning of the wall control buttons is too high (see Section 19, Location of Controls).

Reference to Questions
No: 54, 55 and 56

5. INTERCOM (cont'd)

Proposed Improvements

- Concept chosen: telephone model.
- Make provision for a push plate to operate door-opening device for lobby door, where strike has been activated by unit intercom system. This push plate should be located in the building lobby.

Another Avenue to be Explored

- For adaptation needs which are frequently requested, study the technologies and the equipment best adapted to certain client groups, for example, devices to assist those with hearing limitations to communicate, and hand-free telephones, home automation systems, the needs of the blind or of amblyopes.

Reference to Question No: 12

6. LETTER BOXES

Element Evaluated

The positioning of the letter boxes varies depending on the building:

	QUESNEL	ST-JOSEPH	PERRAS
Location	in the lobby	in the lobby	in the entrance hallway

The letter boxes are located between 680 mm and 1400 mm from floor. Certain boxes are larger to accommodate documents in braille.

Users Satisfaction

- 88% of the users experience no difficulty with the letter boxes. However, certain people with disabilities ask others to assist them in removing letters from their boxes.

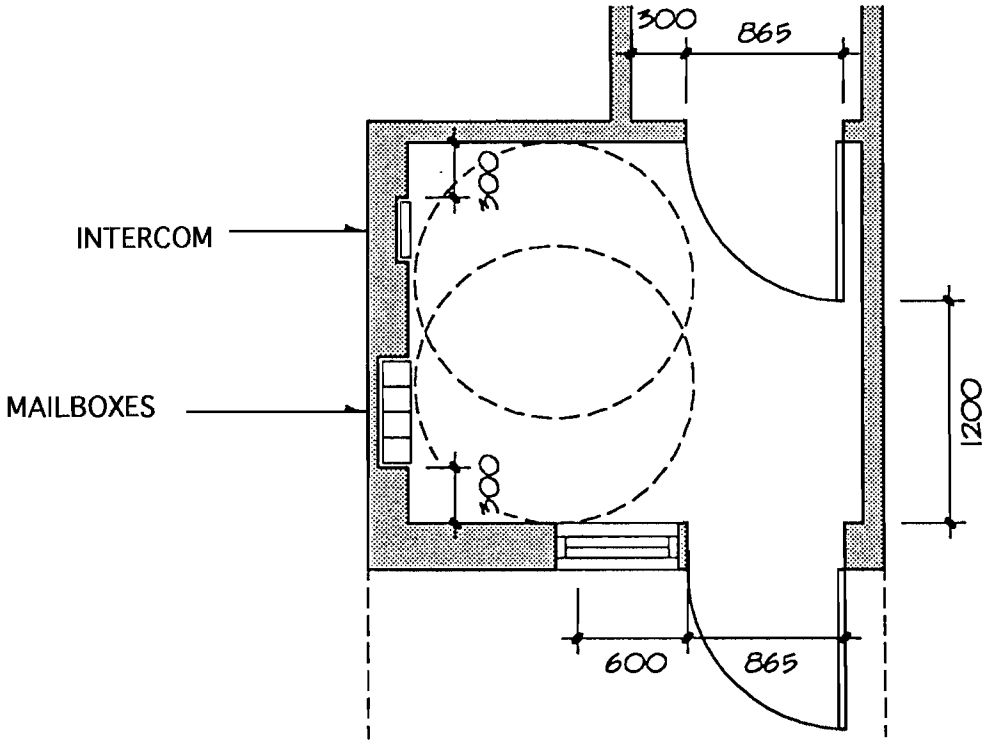
Observations

- Those people dissatisfied (12%) are people in wheelchairs or using orthotic devices.
- The degree of dissatisfaction is particularly high (20%) at Habitations St-Joseph, as the lobby is very small and access to letter boxes difficult.
- Certain users have difficulty with the opening mechanism (key is difficult to turn).

6. LETTER BOXES (cont'd)

Proposed Improvements

- The letter boxes must be located so that people in wheelchairs have lateral or front access to them, are able to turn around in front of the letter boxes and without hindering the circulation of anyone else.

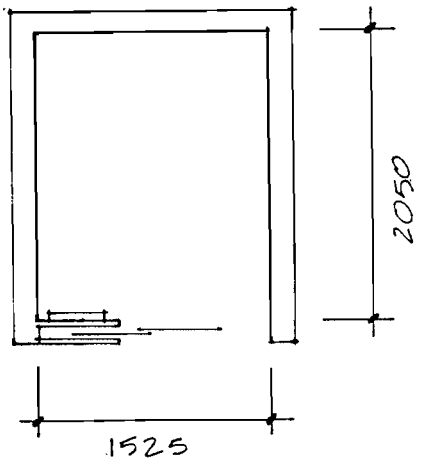


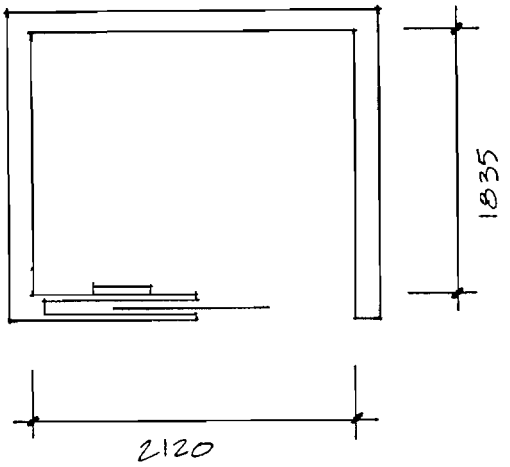
- There is no guarantee that "accessible" letter boxes will be granted to those in wheelchairs. Any new physically challenged tenant whose box is not accessible will have difficulty obtaining one.
- Letter boxes must be placed at a minimum distance (to be determined) from a perpendicular wall, or from any obstacle, to allow easy access to the mail boxes.
- The letter boxes, ideally, would be located in the entrance hallway rather than in the lobby to allow for more clearance in front of the boxes.
- The quality of the opening mechanism used must also be taken into consideration, i.e. it must be easy to use.

7. ELEVATOR

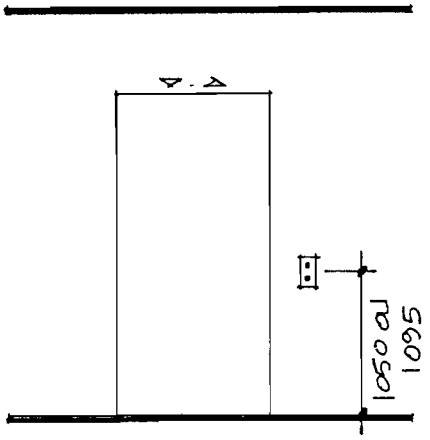
Elements Evaluated

ELEVATOR DIMENSIONS

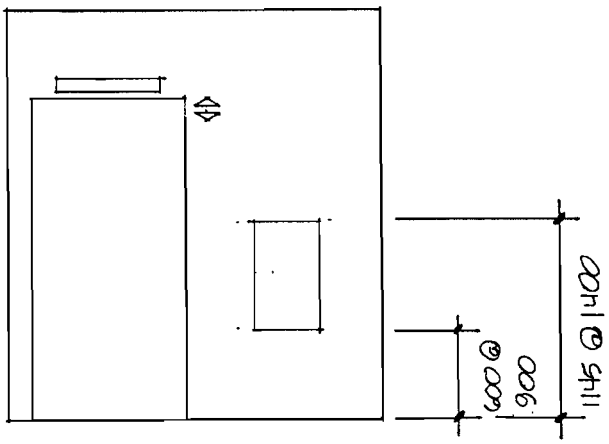




CONTROLS ON EACH FLOOR



CONTROL PANEL



Reference to Question
No: 7

7. ELEVATOR (cont'd)

User Satisfaction

- 97% of the tenants use the elevator. (The 3% who do not, live on the ground floor).
- 88% of the users have no difficulty with the elevator.
- 100% of the users are satisfied with the dimensions of the elevator.
- 89% of the users are satisfied with the security system.
- 98% of the users are satisfied with the height of the control panel.
- 98% of the users are satisfied with the door-opening time.

Observations

- 12% of the users have difficulty with the elevator. Comments collected from the users:
  - 5 experience difficulty with the emergency telephone (understanding, vandalism, connected to a private line, door handle difficult to turn)
  - 1 person experiences difficulty with the security system (person with hearing limitations)
  - 1 person would like an emergency battery
  - 1 person experiences difficulty with the height of the controls (too high: 1,300 mm)
  - 1 person finds that the opening time is too rapid (9 sec.)
- No difference in satisfaction is noted as to the shape of the elevator (width/depth ratio).

7. ELEVATOR (cont'd)

Proposed Improvements

- The elevators must comply with the Appendix E of standard CAN/CSA-B44-M. "Safety Code for Elevators", in addition to the following additional requirements:

E8. Controls Inside Elevator
E8.2 This requirement is to be co-ordinated with Section 19, "Location of Controls".
E8.4 Make provision, in addition to Arabic numerals, for instructions in braille.

E9. Elevator Height Indicator
E9.1 Make provision, in addition to the visual indicator, for a vocal indicator of the elevators position (vocal synthesis).

E10. Telephone Sets
E10.1 Make provision for a emergency communication system with the outside, connected to a central station on an independent line. Clearly identify the device and include instructions. The system shall be usable by everyone.

- Use of elevators wider than they are deep would make it easier to get on and off the elevator when a number of people are inside.

Other Avenues to be Explored

- Supplement the vocal messages received in the elevator from the central station with visual messages for people with hearing limitations.
- Battery-operated emergency system or generator in case of electrical failure.
- System where the installation of receivers for an elevator remote-control system is easily feasible.
- Second control panel on the lateral elevator wall.
- Special device for activating the emergency system (by blowing on it, etc.).

Reference to Questions
No: 3, 5, 10, 16 and 18

8. THRESHOLDS

Elements Evaluated

- No thresholds for interior doors (entrance to unit, exits and common spaces).
- Main entrance doors: flat threshold, 8 mm at protected entrances, bevelled.
- Other exterior doors (including balcony door): flat threshold, maximum elevation 13 mm with weatherstripping, bevelled to facilitate movement.

User Satisfaction

- 100% of the users appreciate flat, bevelled thresholds with a maximum elevation of ±8 mm, at protected entrances.

Observations

- The elevated weatherstripping increases the threshold to over 13 mm and thus presents a problem for seniors and people in wheelchairs.
- The patio doors are not performing well, due to the difficulty of obtaining built-in thresholds in concrete slabs.

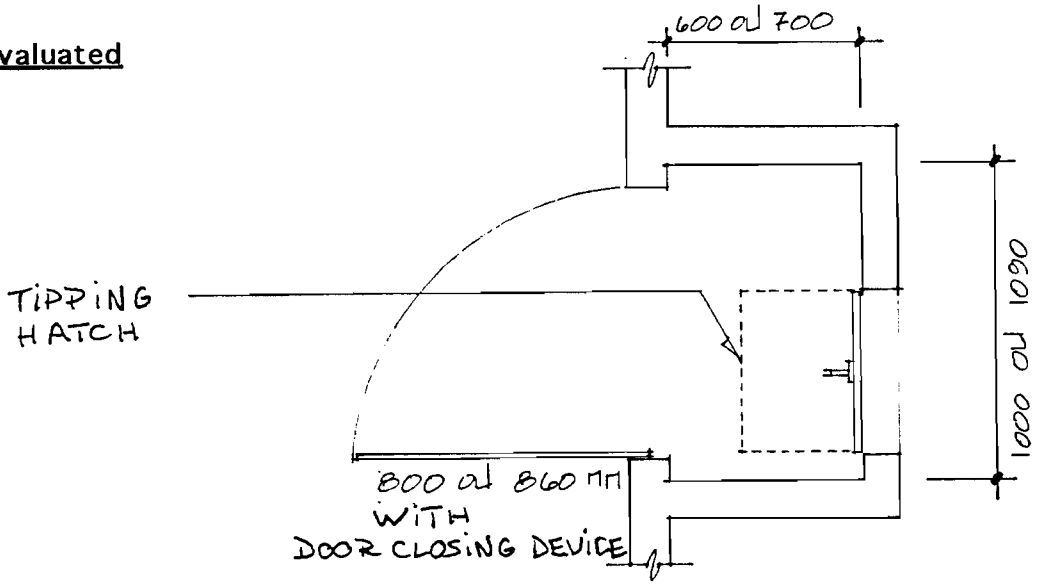
Proposed Improvement

- Concept chosen.
- If a patio door is chosen: improve the procedures for built-in thresholds in concrete slabs.

Reference to Question
No: 9

9. GARBAGE CHUTE

Element Evaluated



User Satisfaction

This element was evaluated for two of the three buildings.

- 84% of the tenants use the garbage chute.
- 83% of the users have no difficulty with the garbage chute.

Observations

- 16% of the tenants (people with disabilities) do not use the garbage chutes; other people operate the chute for them.
- Out of 17% of users having difficulty with the garbage chute:
  - 8 people (5 people with disabilities and 1 senior) find that the hatch is too heavy
  - 2 people with disabilities find that the access door to garbage chute is too heavy
  - 1 person with disabilities finds that the hatch is too high

Reference to Question
No: 9

9. GARBAGE CHUTE (cont'd)

Proposed Improvements

- Access door to the garbage chute 860 mm wide.
- Automatic door-opening device for the door giving access to the garbage chute space.

Another Avenue to be Explored

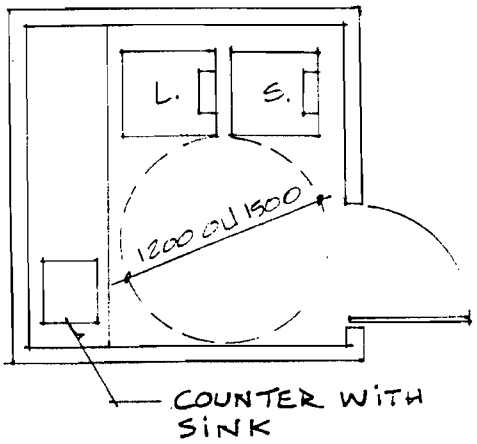
- Tipping hatch replaced by a laterally opening door operating above knee level for those in wheelchairs.

Reference to Question
No: 11

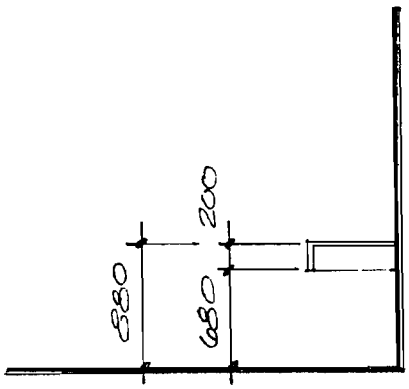
10. LAUNDRY ROOM

Element Evaluated

TURNING SPACE IN FRONT OF APPLIANCES



COUNTER HEIGHT



User Satisfaction

- 78% of the tenants use the laundry room
- 95% of the users do not experience any difficulty
- 100% of the users are satisfied with access to the laundry room (door, threshold...)

Observations

- Certain users have their own appliances and/or certain users receive assistance from other people.
- Of the 5% of the users who have difficulty with the laundry room:
  - 3 are in wheelchairs and experience difficulty using the room:
    .1 cannot see the clothes in the washer
    .1 finds that one of the appliances located in the corner is not accessible
    .1 experiences difficulty with the change mechanism

10. LAUNDRY ROOM (cont'd)

Proposed Improvements

- Clearance of 1,500 mm x 1,500 mm in front of each appliance, measured from the centre of the appliance.
- Clearance to be determined between the last appliance and the lateral wall.
- Inclined mirrors above the washers, or front loading washers (keep the top loading washers, in any case, as they are more practical for seniors).
- New system for putting change in the washers and dryers, easier to manipulate.

Reference to Question
No: 14

11. FIRE ALARM

Element Evaluated

Habitations Quesnel et Habitations St-Joseph:

- Traditional system

Habitations Perras:

- Traditional system with stroboscopic light component connected to traditional fire alarm system (visual signal).

  The stroboscopic lights are installed in the public corridors and the common spaces. In the individual units, an outlet is installed and connected to the general alarm system. A stroboscopic light bulb, or any other warning system provided by the tenant, can be inserted into this outlet, located in the entrance to the individual units.

User Satisfaction

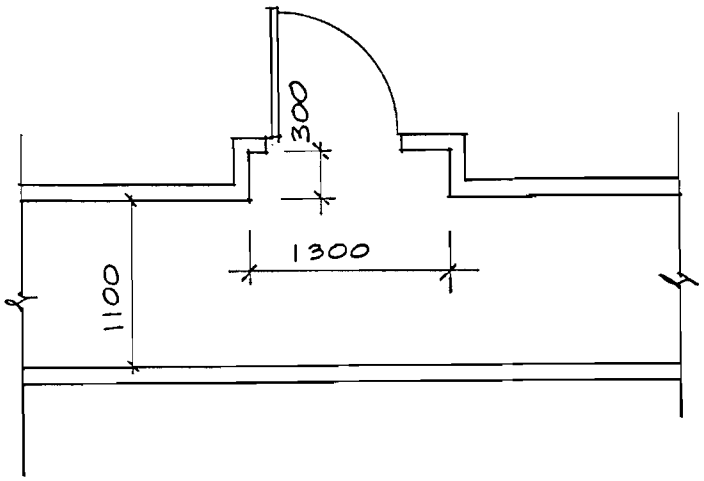
- 66/67 tenants can hear the alarm signal.
- 1/67, a person with hearing limitations can perceive the stroboscopic fire alarm system (visual) when it is in a space other than in a close area in the unit, such as the bedroom or the bathroom.

Proposed Improvement

- Concept chosen.

12. PUBLIC CORRIDOR AND ENTRANCE TO INDIVIDUAL UNITS

Element Evaluated



User Satisfaction

- 97% of the tenants are satisfied with their doorway which is recessed back from the public corridor or with corridor widths in excess of 1,100 mm (often 1,400 mm) wide in front of their doorways.

Observations

- Corridor sections measuring 1,100 mm wide are not sufficiently wide to allow two wheelchairs going in opposite directions to pass each other in the corridor. 1/67 respondents.
- 1/67 respondents (1 senior) would appreciate a handrail.
- Corridor sections measuring 1,100 mm wide do not make it possible to install handrails on both walls while respecting the width required by regulations governing the construction public buildings under Québec law.

Proposed Improvement

- Concept chosen.

12. PUBLIC CORRIDOR AND ENTRANCE TO INDIVIDUAL UNITS (cont'd)

Another Avenue to be Explored

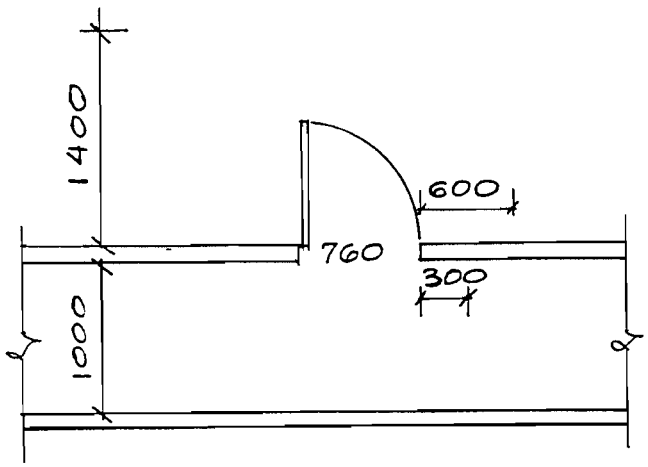
- To make provision for eventually installing handrails in corridors would require widening the corridors to compensate for the width of the handrails (NBC 90, Minimum public corridor). The performance criteria proposed here do not allow for this possibility due to the costs inherent in widening the corridors.

  Evaluating the cost/benefit relevancy of such a choice.

Reference to Questions
Nos: 10, 16 and 18

13. CIRCULATION WITHIN THE UNITS

Element Evaluated



User Satisfaction

- The satisfaction rate was measured solely among people in wheelchairs or people using orthotic devices.
- 90% of the users are satisfied with the clearance to open and move through the doors.

Observations

- A door 810 mm wide, with a clearance 760 mm:
  -makes it possible for all users to circulate, except 3/29
  (29 = number of people in wheelchairs or using orthotic devices)
- Two cases where the 600/300 clearance was not respected on the door handle side produced access problems.
- One respondent uses a wheelchair 760 mm wide. The door-opening clearance is thus critical for him.

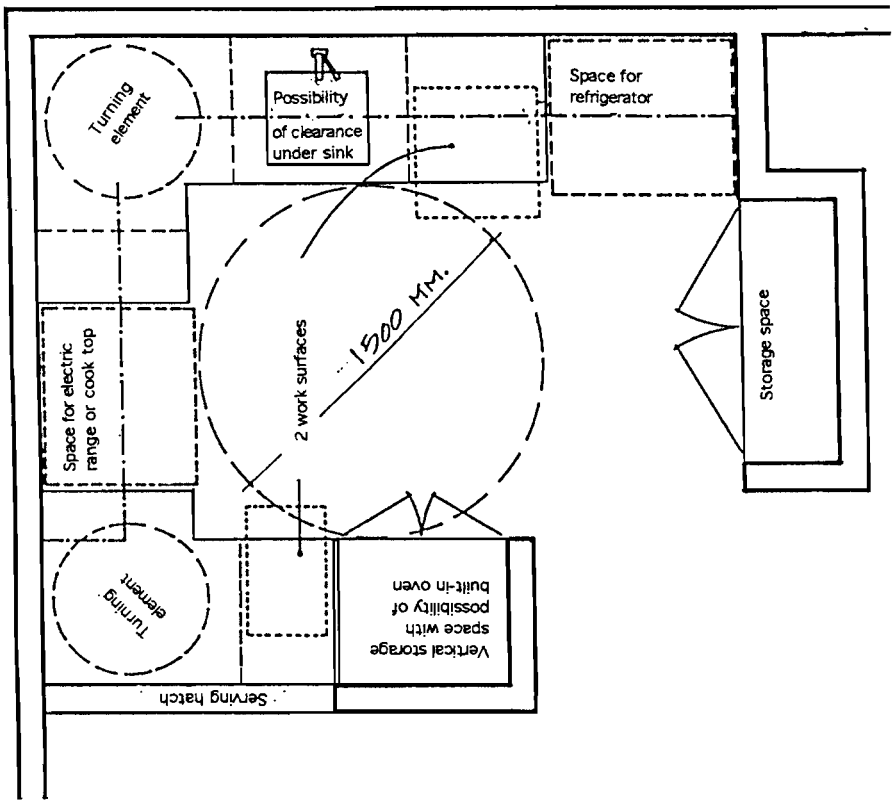
Proposed Improvement

- Increase the door width to 860 mm to obtain a clearance of 810 mm. This will also make it possible to comply with both the CSA B651-M90 and with the NBC 90.

Reference to Question
No: 52

14.1 KITCHEN: TURNING SPACE

Element Evaluated



Various kitchen layouts provide for an open floor area of 1,500 mm in diameter in front of all counters, storge areas and appliances. These layouts make it possible to move around and to access the appliances.

User Satisfaction

- Satisfaction was verified solely among those in wheelchairs:
  - 82% of the users found that the turning space in the kitchen was perfect for them.

Reference to Question
No: 52

14.1 KITCHEN: TURNING SPACE (cont'd)

Observations

- The dissatisfied respondents (3) have a kitchen layout with separate pantry without a 1,500 mm diameter turnaround space in front. They mentioned that the position of the pantry makes it impossible to turn around in front of the counters and equipment and prevents easy access to the appliances (refrigerator, built-in oven).

- The open U- or L-shaped kitchen is the one with most potential. This layout makes it possible to position the appliances so as to reduce to a minimum the necessity to move back and forth while at the same time allowing sufficient floor surface clearance to turn a wheelchair around. The various work areas can be accessed while merely turning from one central location.

- No information was collected concerning the usefulness of the serving hatch.

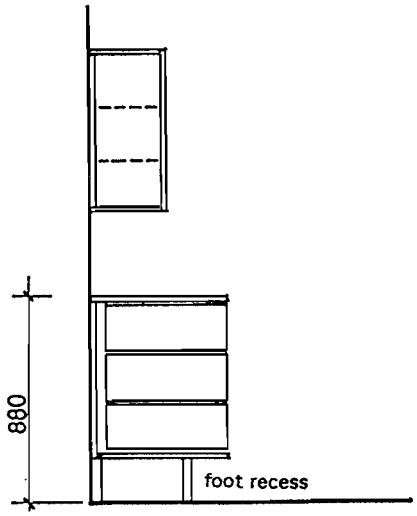
Proposed Improvement

- Concept chosen.

Reference to Question
No: 39

14.2 KITCHEN: COUNTER HEIGHT

Element Evaluated



User Satisfaction

- Most of the users (98%) operate satisfactorily with this counter height.
- This counter height is perfect for 80% of the respondents.

Observations

- People without mobility limitations are satisfied and noted that this height is perfect for them (94%). The dissatisfied respondents (3) would prefer a higher counter.
- 8 people using wheelchairs (30% of this category) are satisfied with the current height (880 mm) but would ideally prefer a lower one.
- The height is not suitable for one respondent (a person in a wheelchair).

Reference to Question
No: 39

14.2 KITCHEN: COUNTER HEIGHT (cont'd)

Proposed Improvement

- Concept chosen.

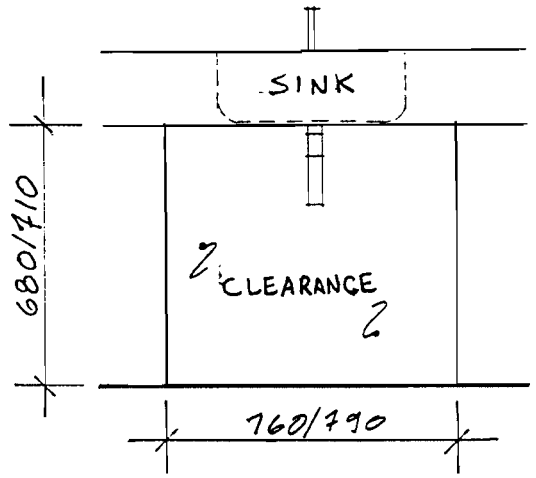
Other Avenues to be Explored

- Verify the possibility of slightly lowering the counters while, at the same time, satisfying all the various client groups: people in wheelchairs, people with walkers, people standing...
- Clearances under the counter, other than those under the sink and the cook top, would be required to provide accessible work-tops. The other possibility is the use of retractable work surfaces. Also possibility of providing some counter space on lower level for people in wheelchairs or seniors using chairs with castors.

Reference to Questions
Nos: 40 and 53

14.3 KITCHEN: CLEARANCE UNDER THE SINK

Element Evaluated



Minimal clearance:
-height, 680 mm
-width, 760 mm

QUESNEL	ST-JOSEPH	PERRAS
. Without offset drain	. Without offset drain	. With offset drain . With thermal pipe insulation . With movable storage compartment under counter

User Satisfaction

- Clearance under sink
  - The clearance under the sink is used by people in wheelchairs (without assistance) to gain access to the sink.
  - The dimensions of the clearance are satisfactory for 88% of the people in wheelchairs using this clearance to access the sink.
- Plumbing under sink
  - All the respondents (100%) are satisfied with the location of the plumbing under the sink.

Reference to Questions
Nos: 40 and 53

14.3 KITCHEN: CLEARANCE UNDER THE SINK (cont'd)

Observations

- Clearance under sink:
  - Those who do not use this space to access the sink, use it as storage areas.
  - The movable storage option offered under the sink in one of the buildings is very much appreciated by the users.
  - Of the dissatisfied people, 2 respondents find that the clearance is too low. These 2 respondents are in motorized wheelchairs and receive assistance for certain domestic activities.

Proposed Improvement

- Make provision for a movable storage compartment to free-up clearance under the sink.

Another Avenue to be Explored

- Verify the necessity of insulating the underside of the sink to prevent burns.

Reference to Questions
Nos: 42, 43, 44 and 45

14.4 KITCHEN: CABINETS

Element Evaluated

- The location of the upper cabinets: the first shelf is located between 1,230 mm and 1,260 mm from floor level.
- The door handles on the cabinet doors and drawers are D-shaped, with a diameter of 6 mm.

User Satisfaction

- The respondents find that the specific height of the upper cabinets, which are lower than standard, makes it easier to use them, 78%.
- The height of the first shelf in the upper cabinet is adequate for 82% of the respondents and facilitates the use of the cabinets.
- 67% of people in wheelchairs can reach the first shelf.
- The handles for the doors and drawers are easy to use for 96% of the people. This satisfaction rate (easy and very easy) applies to all respondents regardless of whether they have limitations.

Observations

- A number of respondents would prefer the upper cabinets lower, i.e. 38% of the people using wheelchairs.
- 3 people in wheelchairs and/or using orthotic devices can reach the first shelf from a standing position.
- The second shelf is accessible to all ambulatory tenants and to 20% of those in wheelchairs; in addition, 2 people in wheelchairs can reach the second shelf from a standing position.

14.4 KITCHEN: CABINETS (cont'd)

Proposed Improvements

- Given that 38% of those in wheelchairs cannot easily access the upper cabinets and that lowering the upper cabinets is not a feasible solution (the space between the counter and the upper cabinets must allow for the use of appliances such as microwave ovens, coffee makers, etc...), other spaces for the storage (pantry) are required, including, among others, the storage spaces as illustrated in data sheet 14.1, Kitchen: Turning Space.

- The storage area must be easy to reach and, as far as possible, allow for lateral access:

  - lower storage areas will be designed to slide or rotate;

  - vertical storage areas (example: pantry) will be sliding elements. Otherwise, provision will have to be made for doors opening at 180° against partitions; in this case, provide for the clearance required in front of the pantry.

Reference to Question
No: 46

14.5 KITCHEN: PULL-OUT WORK SURFACES

Element Evaluated

- Two pull-out work surfaces are located under the counter. They are usually found near the sink and/or refrigerator.
- Another work surface is located under the built-in oven.
- Various heights of pull-out work surfaces are found, i.e. 670 mm to 820 mm (above floor level).

User Satisfaction

- Most of the people use the pull-out work surface, 82%.
- They mention that the surface is useful or very useful, 66%.

Observations

- This element is appreciated and used (cutting food, setting down plates, eating) most by the ambulatory tenants (85%) as well as those in wheelchairs (77%).
- 2 respondents indicate that the pull-out work surfaces do not function properly: the quality of the work surfaces per se and the hardware is important.
- The proper height for a pull-out work surface has yet to be established. In the three buildings, the height varies and, based on the comments, we are not in position to specify an ideal height.
- 1 respondent stipulated that he did not like work surfaces with edges.

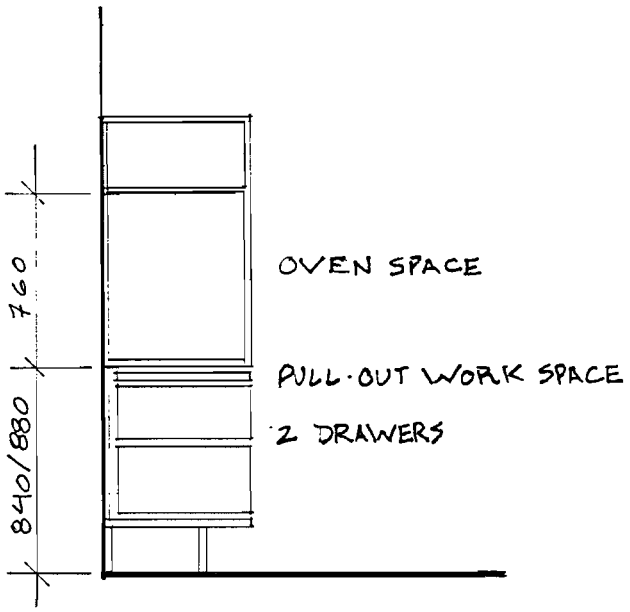
Proposed Improvement

- Concept chosen.

Reference to Question No: 50 and Additional Questions 5 to 9

14.6 KITCHEN: BUILT-IN OVEN MODULE

Element Evaluated



Vertical storage module with the possibility of built-in oven, electrical outlet already installed.

Observations

- Most the of tenants have electric ranges.
- 73% of them use the oven space for storage.
- The following respondents installed a built-in oven:
  - 39% of the people with disabilities (reduced mobility) at Habitations St-Joseph and Quesnel
  - 80% of the people with disabilities at Habitations Perras who had the choice of accepting the model provided.

Reference to Question No: 50 and Additional Questions 5 to 9

14.6 KITCHEN: BUILT-IN OVEN MODULE (cont'd)

Observations (cont'd)

- Those in wheelchairs who have vertical built-in ovens or microwaves made the following comments:

  - 4 respondents found the height of the oven suitable
  - 4 others found that the oven was too high
  - most were satisfied with the location (8/9)
  - the location of the controls on the top of the oven, is not suitable. Lateral positioning of the controls (micro-ovens) is satisfactory

  -the respondents use the work surface under the oven (7/8)

Proposed Improvement

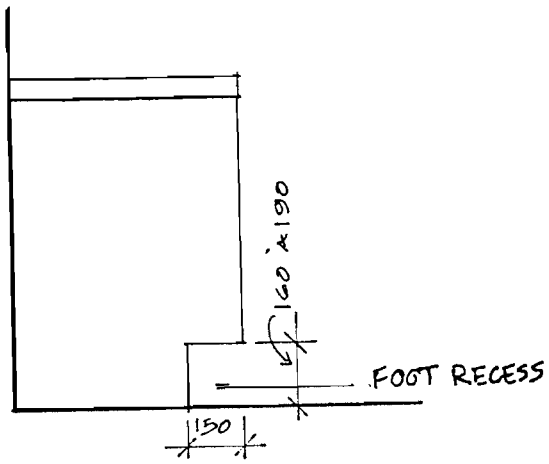
- Better performance should be attained if the following conditions are respected:

  - the built-in oven must be accessible to people in wheelchairs in central pivoting position
  - the door of the oven must open above the knees of those in wheelchairs
  - it must be possible to install the pull-out work surface, with a minimum clearance of 685 mm in height, under the oven
  - the controls must be accessible
  - the built-in oven located at approximately 730 mm from the floor meets these conditions (?). In this case, the average height of the cooking elements is 1,000 mm above floor level.

Reference to Question
No: 51

14.7 KITCHEN: FOOT RECESS

Element Evaluated



Foot recess: -the height varies from 160 to 190 mm
-the depth is 150 mm

User Satisfaction

- Satisfaction was measured solely among respondents in wheelchairs:
  - the 180/190 mm height is satisfactory for 70% of the users
  - the 160 mm height is satisfactory for 25% of the users
  - the depth is satisfactory for a 83% of the users

Proposed Improvement

- Establish a new foot recess height satisfactory for most users. To be considered: the height of the foot support elements on existing wheelchairs.

Reference to Questions
Nos: 47, 48 and 49

14.8 KITCHEN: LOCATION OF CONTROLS

Element Evaluated

- Electrical Outlets

  . the outlets are located under the upper cabinet
  . the outlets are located on the wall, above the counter
  . the outlets are located on the counter edge

- Ventilation Hood Controls

  . the lighting and ventilation controls are placed on the edge of the counter
  . the lighting and ventilation controls are placed under the upper cabinets

User Satisfaction

- Electrical Outlets

  . 85% of the users are satisfied with the number of electrical outlets
  . 81% are also satisfied with access to electrical outlets
  . the electrical outlets along the edge of the counter are very popular (94% of users)

- Ventilation Hood Controls

  . Where controls are positioned along the edge of the counter, 94% of the users prefer this to controls installed directly on the hood. The users, both ambulatory and those with disabilities, find this option practical and appreciate it.
  . Where the controls are located under the upper cabinets, 72% of the residents use them.

Reference to Questions
Nos: 47, 48 and 49

14.8 KITCHEN: LOCATION OF CONTROLS (cont'd)

Observations

- Electrical Outlets

  . The highest rate of satisfaction (96%) is reached in one of the buildings as pertains to access to electrical outlets in kitchens where the electrical outlets were located along the edge of the counter, in conjunction with wall outlets and outlets above the counter.
  . One respondent whose kitchen outlets are under the upper cabinets had an outlet added along the edge of the counter and finds this very pratical.
  . One respondent is not satisfied with the electrical outlets under the upper cabinet. They are difficult to use.
  . One respondent stipulates that the electrical outlets on the wall above the counter are difficult to access.

- Ventilation Hood Controls

  . 3 respondents would prefer 2 separate switches for the controls (ventilation, lighting) instead of only one.
  . 4 respondents find that the ventilation hood controls placed under the upper cabinets are not very practical.

- 3 respondents note that the telephone jacks are poorly positioned.

Proposed Improvements

- The controls in the kitchen should be placed along the edge of the counter for the electrical outlets and the ventilation hood controls. Provision must also be made for electrical outlets on the wall above the counter.

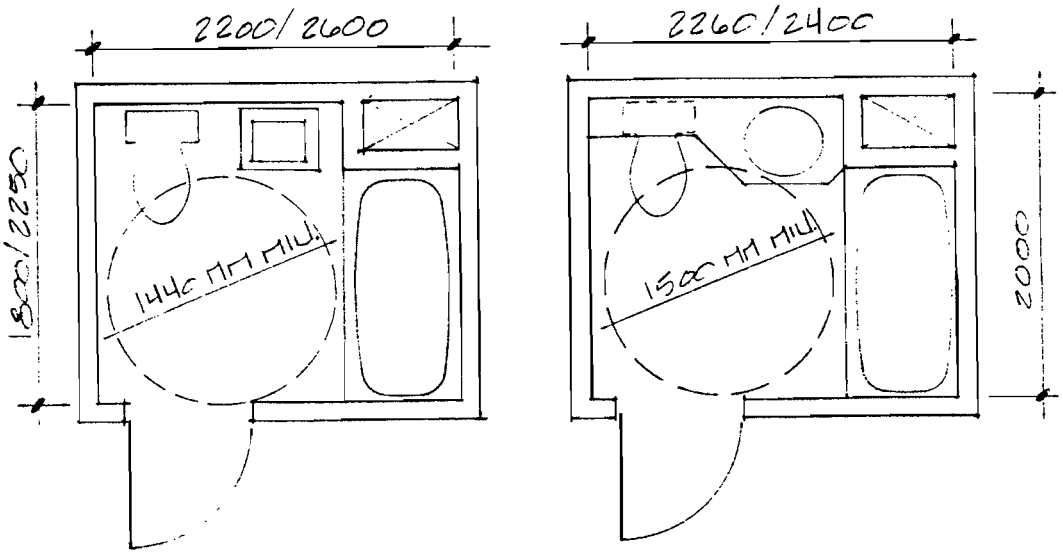
- The electrical outlets along the edge of the counter should be equipped with breakers (safety).

- For the ventilation hood control, two switches must be installed, i.e., one for lighting and the other for ventilation, allowing for separate use.

Reference to Questions Nos: 34, 33 (Location of Toilet)

15.1 BATHROOM: TURNING SPACE FOR ACCESS AND TRANSFER TO FIXTURES

Element Evaluated



WITH WALL SINK

WITH BUILT- IN COUNTER SINK

The floor turning space allows for access and transfer to fixtures.

User Satisfaction

- Satisfaction was verified solely among those in wheelchairs: 96% of these people are satisfied with the turning space in the bathroom.

Observations

- 5 people who use the facilities in the bathroom with someone assisting them even said that they were satisfied with the turning space.
- 2 people who use a lift for transfer purposes are satisfied with their access to the facilities.
- 1 respondent (person with disabilities) mentioned that he would prefer a lateral clearance for transfer to the toilet.

Reference to Questions Nos: 34, 33 (Location of Toilet)

15.1 BATHROOM: TURNAROUND SPACE FOR ACCESS TRANSFER TO TOILET/BATH

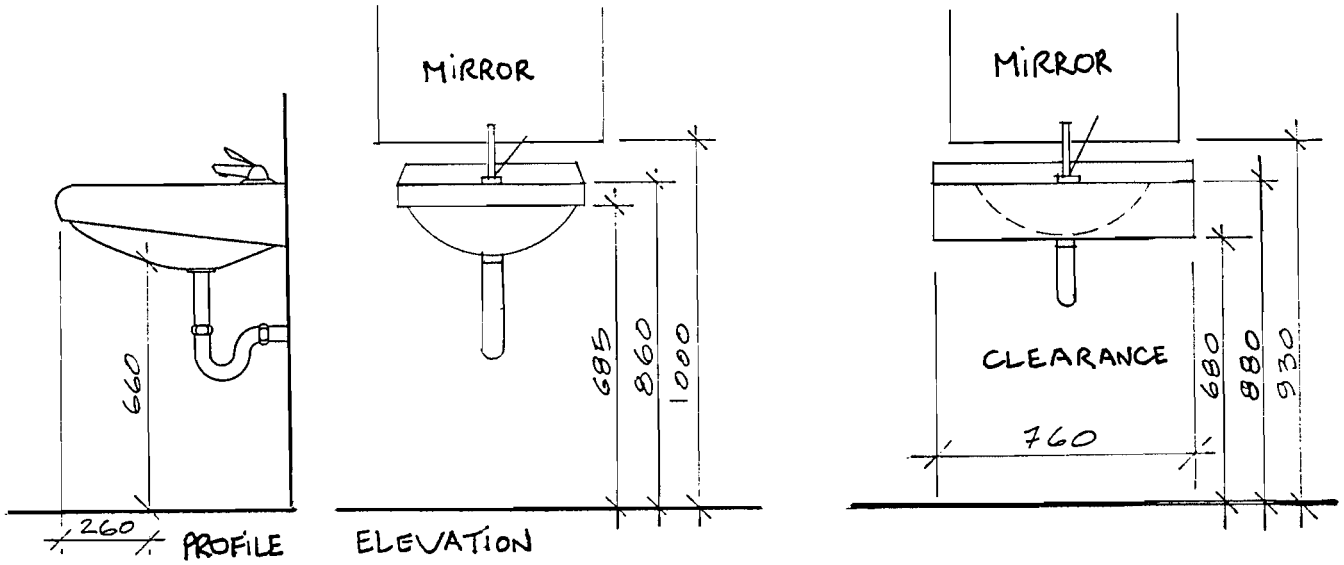
Proposed Improvements

- Even if the 1,440 mm dimension between the bathtub and the opposite wall satisfies the users, this dimension should be increased to 1,500 mm. Indeed, this dimension corresponds to the minimum acceptable turning space.

- To obtain a higher performing layout, the space between the bathtub and the opposite wall should be increased to 1,660 mm. This dimension corresponds to the space for the toilet, located on an axis 450 mm from the wall and 450 mm from the wash basin or built-in counter, together with the clearance necessary for the wash basin, 760 mm wide, for a total of 1,660 mm.

15.2 BATHROOM: WASH BASIN

Element Evaluated



MURAL WASH BASIN WITHOUT OFFSET DRAIN

COUNTER WITH BUILT- IN WASH BASIN WITH OFFSET DRAIN AND TRAP SET BACK CLOSER TO THE WALL

User Satisfaction

- Height of wash basin or counter:
  - 100% of users are satisfied with the height of the wash basin or counter.

- Clearance under the wash basin or counter:
  - 81% of those in wheelchairs use the clearance under the wash basin.
  - Clearance under the counter with built-in wash basin satisfies users completely (100%).
  - Clearance offered by the mural wash basin in china satisfies 77% of users.

- Plumbing under wash basin:
  - Most of the users (97%) are satisfied with the positioning of the plumbing trap (whether or not it is offset).

- Height of mirror:
  -96% of the users are satisfied with the mirror height.

15.2 BATHROOM: WASH BASIN (cont'd)

Observations

- The height of the wash basin or counter:

  - 100% of users are satisfied.
  - Three people using wheelchairs would ideally prefer the wash basin to be lower.
  - One person using a manual wheelchair would prefer the wash basin higher.
  - One tall person would prefer a higher wash basin.

- The clearance under the wash basin:

  - A number of people use this space as a storage area; a certain number note that leaving this as a clearance is a waste of storage area and propose a movable storage compartment.
  - Three people in wheelchairs are not satisfied with the shape of the mural china wash basin.
  - One person made a lateral modification in the faucet.

- Plumbing under the wash basin:

  - One respondent in a wheelchair finds that the plumbing is not set back far enough; in this case, the drain was not offset.

- Mirror height:

  - One respondent finds the mirror too high.
  - One respondent would prefer a longer mirror.

- The offset plumbing drain remains a useful element; it makes it possible to add thermal isolation to the waste water plumbing under the wash basin. Moreover, it makes it possible to add a movable storage compartment under the counter or an inclined panel to hide the plumbing. (See Section 23, Aesthetics)

- The respondents requested additional storage area near the wash basin.

15.2 BATHROOM: WASH BASIN (cont'd)

Proposed Improvements

- A counter with built-in wash basin with 680 mm clearance in height and 760 mm in width satisfied the users completely (100%). This feature should be promoted over the wall module.
- However, if a wall module is installed, the shape of this wash basin and the clearance are critical to ensure adequate access: respect the minimal clearance under wash basins as described in Appendix A-3.7.3.10. 1) in NBC 1990.
- Under the counter with built-in wash basin element, provide for a movable storage compartment.
- If the layout allows for this, introduce an additional storage area: integrate lateral shelves near the wash basin, or a series of drawers under the counter to one side of the wash basin.

Reference to Question
No: 33

15.3 BATHROOM: TOILETS

Element Evaluated

There are two types of toilets:
- elongated, 370 mm high for the bowl and 400 mm with the seat;
- elongated, 400 mm high for the toilet bowl and 430 mm with the seat.

User Satisfaction

- The rate of satisfaction was established solely among those with disabilities:
  - The rate of satisfaction among people with disabilities using the toilet concerning the height of the toilet bowl was 76% and concerning the shape, 100%.

Observations

- 19% of those with disabilities who answered this question do not use the toilet.
- Of those who were dissatisfied with the toilet bowl (too low), 5 respondents use an elevated seat.
- The use of an elevated seat on the toilet bowl remains a necessary adaptation for people who require a higher toilet bowl, as the element evaluated is found to be satisfactory by most of the users.
- Respondents added grab bars for the toilet.
- For the location, see the section: "Bathroom: Turning Space for Access and Transfer to Fixtures".

Proposed Improvement

Concept chosen: 400 mm height (430 mm with toilet seat).

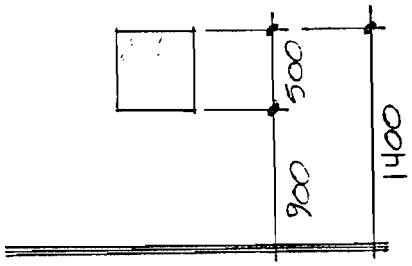
Reference to Question
No: 36

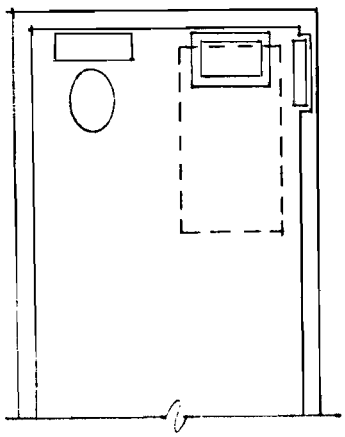
15.4 BATHROOM: MEDICINE CABINET

Elements Evaluated

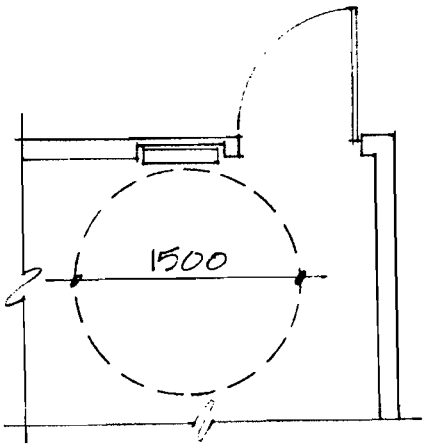
HEIGHT

LOCATION





Lateral Access
MODEL 1



Front or Lateral Access
MODEL 2

OPENING MECHANISM: Along edge of cabinet under the mirror.

User Satisfaction

- Height of medicine cabinet is suitable for 85% of the users.
- Position of the medicine cabinet is suitable for 90% of the users.
- The medicine cabinet opening mechanism is suitable for 99% of the users.

Reference to Question
No: 36

15.4 BATHROOM: MEDICINE CABINET (cont'd)

Observations

- Of the 15% of users dissatisfied with the height of the medicine cabinet:

  - 3 people with disabilities find this too high (people in wheelchairs)
  - 5 people without physical limitations find this too low (dangerous for children)

- Of the 10% of the users dissatisfied with the location of the medicine cabinet:

  - 2/10 people with lateral access to the medicine cabinet are dissatisfied, i.e.:
    . 1 person with disabilities (approach to medicine cabinet in wheelchair difficult)
    . 1 person without physical limitations

  - 4/50 people with direct or lateral access to the medicine cabinet are dissatisfied, i.e.:
    . 2 people with disabilities
    . 2 people without physical limitations (in one of these cases, the medicine cabinet is located behind the door)

Proposed Improvements

- Concept chosen: model 2.
- Turning space in front of the medicine cabinet.
- Security locking system for children.
- Additional storage area in the bathroom.

Reference to Question
No: 37

15.5 BATHROOM: ELECTRICAL OUTLET

Element Evaluated

- Electrical outlet with breaker on the wall near the wash basin
- Height: ± 900 mm
- Location: on wall to which the wash basin is attached, on one side of the wash basin.

User Satisfaction

- 48% of the tenants use the outlet.
- User satisfaction is as follows:
  - height is adequate - 100%
  - location is adequate - 97%

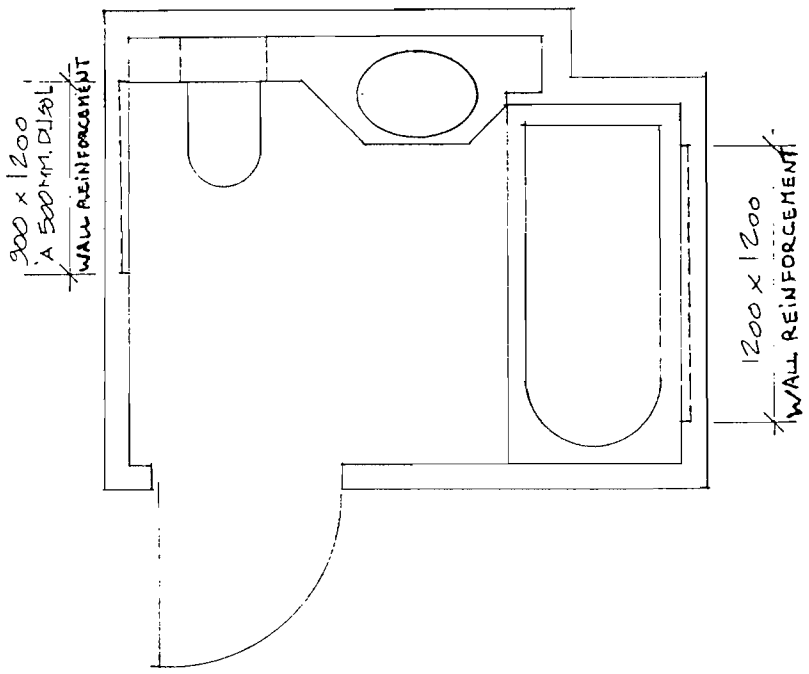
Proposed Improvement

- Concept chosen.

Reference to Additional Questions Nos: 1 to 5

15.6 BATHROOM: LOCATION OF WALL REINFORCEMENT

Element Evaluated



Wall reinforcement on lateral toilet wall and on lateral bathtub wall.

User Satisfaction

- Satisfaction was verified among people with mobility limitations:
  - 76% of the respondents with mobility limitations have grab bars in their bathrooms
  - 95% of the respondents who have grab bars installed them in areas where reinforcement has been provided for.

Reference to Additional Questions Nos: 1 to 5

15.6 BATHROOM: LOCATION OF BACKING FOR NAILS (cont'd)

Observations

- The respondents installed (or need to install) grab bars in the location where reinforcement has been provided:

  - on the wall alongside the toilet: 11/25
  - on the wall alongside the bathtub: 18/25

- Grab bars are also installed in other locations (where no provision has been made for reinforcement):

  - on the wall at the head of the bathtub (where the faucets are located): 2 respondents
  - on the wall at the foot of the bathtub: 1 respondent
  - on the wall behind the toilet: 1 respondent

Proposed Improvement

- Concept chosen.

Other Avenue to be Explored

- Certain respondents noted that they had installed, or need to install, grab bars in other locations:

  - wall at the head and foot of the bathtub
  - wall behind the toilet

  Would it be advisable to make provision for reinforcement in these locations?

Reference to Questions Nos: 29, 30, 31, 32 and 41

16.1 CENTRAL LEVER FAUCET

Element Evaluated

Bathroom: -Basin: central lever faucet
-Bathtub: central lever faucet, on wall at head of bathtub (normal)

Kitchen: -Sink: central lever faucet

User Satisfaction

- The central lever faucet is appreciated by the users:
  - Without this type of faucet in the wash basin, 10% of those with disabilities (reduced mobility) could not be independent (i.e. 4% of all users)
  - This type of faucet facilitates use for:
    . 58% of users as pertains to the wash basin
    . 60% of the users as pertains to the bathtub
    . 70% of the users as pertains to the sink
  - The other users remain indifferent to this feature: there is no difference between this type of faucet and the standard faucet.

- Bathtub faucets:
  - The location on the wall at the head of the bathtub suits 95% of the users.
  - Manner of adjusting water temperature is satisfactory for 95% of the users.

Observations

- The central lever faucet:
  - 4 respondents find the use of the wash basin faucet difficult, they have to exert too much pressure to move the lever.
  - 1 respondent experiences difficulty adjusting the wash basin water temperature.
  - Certain physically challenged people use the wash basin with assistance.
  - One senior finds that the wash basin faucet is difficult to use.

Reference to Questions Nos: 29, 30, 31, 32 and 41

16.1 CENTRAL LEVER FAUCET (cont'd)

Observations (cont'd)

- Bathtub faucet:
  - Even residents with disabilities who have people to assist them appreciate the current positioning of the faucet.
  - 4 respondents would prefer the faucet to be located on the wall alongside the tub.
  - 3 respondents find it difficult to adjust the water temperature.

Proposed Improvements

- Concept chosen.
- It must be possible to operate the central lever faucet with the hand closed in a fist position. Reference: CSA-B651-M90 (5.52).

Other Avenues to be Explored

- 4 respondents expressed a preference for bathtub faucets to be placed on the wall alongside the tub. This positioning is requested by people with disabilities who require assistance with their bath. These respondents assume that they would be more independent if the faucet was positioned differently.

  It would be advisable to verify whether putting the faucet on the wall alongside the tub would be a useful adaptation for certain users (positioning vs balance/access to controls by the person in the bathtub; risk of getting caught on lateral wall faucet installation..).

- Would an offset location for the faucet on the wall at the head of the bathtub prove more effective and satisfactory? This allows easy access to the faucet from outside the bathtub (to fill up the bathtub) but, on the other hand, makes access to the controls from inside the bathtub more difficult.

- A thermostat to regulate the bathtub faucet has advantages: this makes it possible to set maximum water temperature, to keep the temperature of the water constant (in spite of pressure variations) and thus prevent burns.

- Should the faucet in the wash basin have a swinging spout, as is the case in the sink?

Reference to Question
No: 31

16.2 HAND SHOWER

Element Evaluated

Shower: Hand shower with flexible tube 1,800 mm long connected to the lateral side of the bathtub spout, with a 1,015 mm long vertical slide bar on the wall (upper part at 1,980 mm).

User Satisfaction

- 97% of the users are satisfied with the type of hand shower installed.

Observations

- 2 respondents with disabilities would prefer a longer tube.
- The slide bar must not be shaped that it can be used as a grab bar. A grab bar with just this shape was installed in Habitations Perras.

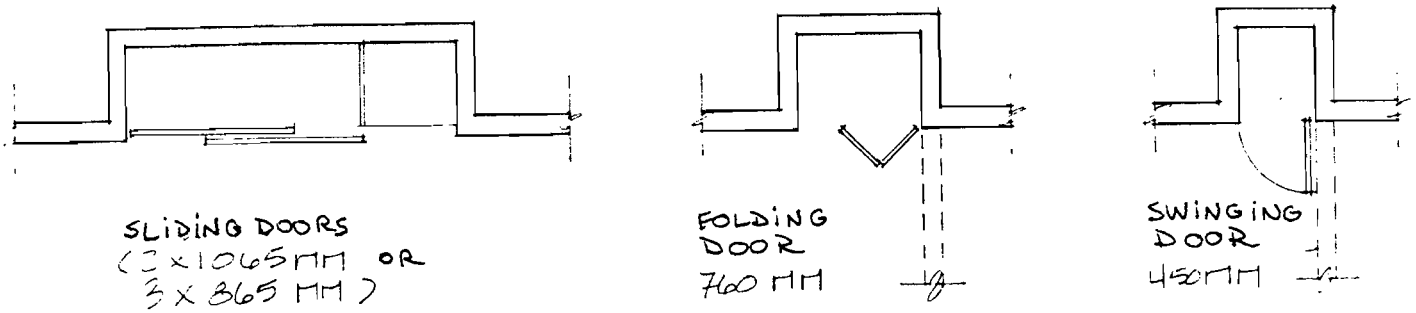
Proposed Improvement

- Add a control to the hand shower to stop and start water flow. Such a control, always available to the user, facilitates the use of the shower.

Reference to Question No: 38

17. LINEN CLOSET

Element Evaluated



User Satisfaction

- The location of the linen closet makes it possible for 93% of the users to have easy access.

Observations

- 4 people (including 3 with disabilities) using linen closet models with folding or swinging doors experience difficulty with the location of the linen closet.
- It is noted that where the linen closet is located in the corner, access to it is difficult.

Proposed Improvements

- Possibility of front or lateral approach by:
  - sliding door OR
  - swinging door opening 180° against adjacent partition allowing a turning space of 1,500 mm in front of the linen closet.
- If a lateral approach was not possible, provision should be made for a clearance measuring at least 760 mm wide allowing for front access to the shelves in the linen closet.
- Adjustable shelves located between 450 mm and 1200 mm.
- Sliding shelves (particularly where the linen closet is located in corners).
- Linen closet located as near as possible to the bathroom.

Reference to Questions
Nos: 57 and 58

18. STORAGE SPACE

Element Evaluated

- The storage spaces in general including clothes closets, linen closets, pantries, etc.
- Height of clothes closet's rods:
  - adjustable rod: possibility of two heights
  - stationary rod: height 1,400 mm

User Satisfaction

- 94% of the users are satisfied with the location of the storage spaces.
- 89% of the users find that the height of the clothes closet's rod is ideal.

Observations

- 4 people (including 2 with disabilities) are dissatisfied with the location of the storage spaces (often locate in corners).
- Of the 11% of the users who are dissatisfied with the height of the clothes closet's rods:
  - 4 people with disabilities do not have adjustable rods.
  - 2 people with disabilities find that both rod heights are too high.

Proposed Improvements

- Refer to Section 17, "Linen Closet" for door types and widths.
- Adjustable rods offering still more flexibility.
- Increase in quantity of storage space.
- Movable storage compartment under the wash basin in the bathroom and under the kitchen sink. (See Section 23 "Aesthetics")

Reference to Questions
Nos: 13, 22, 23, 24 & 25

19. LOCATION OF CONTROLS

Element Evaluated

The elements dealt with here: the wall switches, electrical outlets, thermostats and manual fire alarms. The height of the controls from floor level is as follows:

-Electrical outlets	450 mm
-Switches	from 1,050 to 1,275 mm
-Thermostats	from 1,200 to 1,275 mm
-Fire alarm	from 1,100 to 1,300 mm

User Satisfaction

- In general, the users are (99%) satisfied with the controls.
- 66% of the users even observed that the specific heights of the controls facilitate use thereof.
- Moreover, 6% could not use these controls independently if the height had not been changed.
- Among the tenants with disabilities (reduced mobility), 80% find these changes necessary whereas 20% are indifferent.
- Electrical Outlet:
  . 97% of the users are satisfied with the location of the electrical outlets.
- Switches:
  . 94% of the users find this control easy to operate and are satisfied with the location. 15% of the people in wheelchairs find that the switches which are located at 1,200 mm are too high.
- Thermostats:
  . 88% of the users have no difficulty reaching the thermostats. On the other hand, 19% of the users in wheelchairs find the location too high.
- Fire Alarm:
  . 100% of the users can reach the fire alarm.

19. LOCATION OF CONTROLS (cont'd)

Observations

- Electrical Outlets
  All the users are satisfied except 4 people with disabilities who find that the outlets are too low. However, 2 of these people noted that, in any event, they would not be able to use them. One person with disabilities is not able to insert the plug into the electrical outlet.

- Switches
  4 people in wheelchairs (with assistance) find that the switches are too high. It cannot be affirmed whether these people would be able to use them if they were lower.

- Thermostats
  5 people in wheelchairs experience difficulty with the height of the thermostats.

- Fire Alarm
  2 users mentioned that they are able to reach the fire alarm but would not have the strength necessary to activate it.

- Telephone Jacks
  Additional comments bring out the fact that certain telephone jacks are not accessible.

- There are no comments making it possible to determine user satisfaction in relation to the positioning of controls near adjacent perpendicular walls or obstacles.

- The study does not make it possible to draw any conclusions as to satisfaction vis-à-vis the position of other controls (example: electrical panel, telephone ...).

19. LOCATION OF CONTROLS (cont'd)

Proposed Improvements

- The highest satisfaction rate for this element was scored in Habitations Perras. The satisfaction rate there as very high (97%).

  The respondents are satisfied with the heights of the controls as follows:
  (Habitations Perras):
  - Electrical outlets 450 mm from floor level
  - Switches 1,050 mm from floor level
  - Thermostats 1,200 mm from floor level
  - Fire alarm 1,050 mm from floor level

- The building equipment controls must not be located higher than 1,200 mm from floor level and no lower than 450 mm from floor level. These controls must also be located at a minimum distance of (to be determined) from an interior corner in a room or from an obstacle.

- It would be advisable to qualify the controls, for example: can be activated with one hand, push-plate controls, switch clusters but with adequate separation between them.

Reference to Questions
Nos: 20 and 21

20. WINDOWS

Element Evaluated

	QUESNEL	ST-JOSEPH	PERRAS
Type of window:	Sliding	Sliding	Casement
Type of handle:	Aluminum extrusions	Plastic extrusions with locking clip	Roto-gear operated with tandem locks
Height of handle:	Adjustable (1,400 mm minimum)	1,400 mm	±900 mm
Sill height:	1,000 mm minimum	700 mm	700 mm

User Satisfaction

- Quesnel:
  - 45% of the users experience no difficulty opening/closing windows
  - 64% of the users can see outside in a seated position
- St-Joseph:
  - 50% of the users experience no difficulty opening/closing the windows
  - 100% of the users can see outside in a seated position
- Perras:
  - 73% of the users experience no difficult opening/closing the windows
  - 100% of the users can see outside in a seated position

20. WINDOWS (cont'd)

Observations

- Out of the 31 users of the element evaluated:
  - 6 people experience difficulty opening and closing the windows (5 with disabilities).
  - 1 person experiences difficulty with the locking mechanism.
  - 1 person experiences difficulty with the opening mechanism.
- The opening mechanism is fragile and the difficulties which people are experiencing may have more to do with the fact that they do not know how to properly operate the mechanism than with any accessibility aspect.
- Although this element is satisfactory for most users, it should be noted that the opening and closing operation requires particular dexterity and that, regardless of the solution proposed, certain people will always have difficulty and consequently will use an automatic door-opening device.

Proposed Improvement

- The element evaluated chosen is the one which performs best, i.e., a casement window with a lever handle, 900 mm from floor level, with a tandem locking system, as found at Habitations Perras.

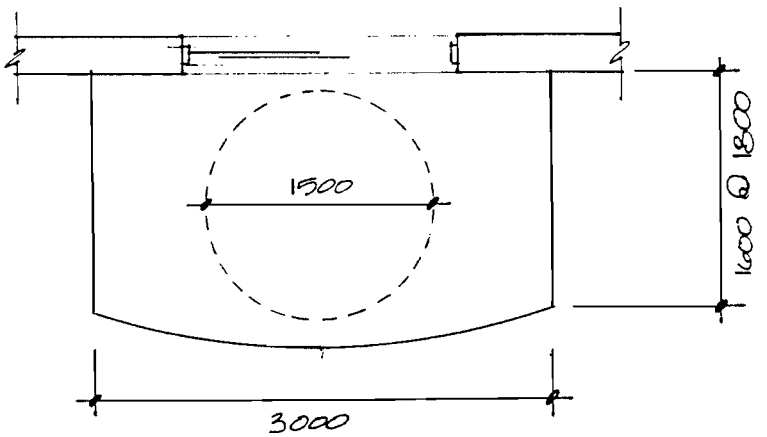
Other Avenue to be Explored

- Other models could also be studied, such as the sliding window on rollers (similar to the patio door model).

Reference to Question No: 17

21. BALCONY DIMENSIONS

Element Evaluated



1,500 mm diameter turning space beyond door swing

User Satisfaction

This element was evaluated in two of the three buildings.

- 83% of the residents use the balcony.
- 94% of the users are satisfied with the dimensions of the balcony.

Observations

- 6% of the users experiencing difficulty with the dimensions of the balcony have disabilities and their balconies have turning spaces of only approximately 1,200 mm.
- 30% of those with disabilities using balconies where the turning spaces are only approximately 1,200 mm, are dissatisfied with the dimensions of the balconies.

Proposed Improvement

- Railings anchored on the outer sides of the balconies rather than on balcony surfaces to obtain the required clearance if one of balcony's dimensions is 1,500 mm.

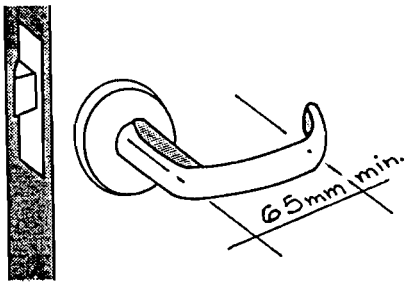
Reference to Questions
Nos: 3, 5, 19 and 45

22. HANDLES

Element Evaluated

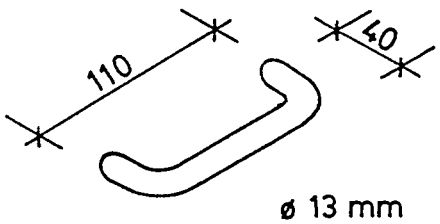
Passage lever-type:

- curved lever handles, 65 mm long (inside measurement) or 75 mm long on outside



Stationary hardware:

- D-shaped handle



User Satisfaction

- 100% of those with disabilities find that the curved lever handles are easier to use.
- Among those without disabilities, this handle makes no difference or is easier.
- D-shaped handles used on kitchen cabinet doors, on pull-out work surfaces and on other storage compartments are judged very easy to use, or easy to use, by most users. 99% of the users are satisfied.

Reference to Questions
Nos: 3, 5, 19 and 45

22. HANDLES (cont'd)

Observation

- Being able to unlock doors using only one hand and lever action handles are the characteristics which are preferred by people with disabilities.
- One person finds that it is easy to get one's clothes caught on straight lever handles.

Proposed Improvement

- Concept chosen.

Reference to Question
No: 60

23. AESTHETICS

Do the accessibility elements in your unit modify its aesthetic quality?

User Satisfaction

- 83% of the users consider that the accessibility elements have no effect on the aesthetic quality of the unit.

Observations

- Most of the negative comments involve the clearance under the sink or wash basin.
- However, no negative comment was formulated concerning the clearance under the sink where provision was made for a movable storage compartment under the counter to allow easy clearance for a wheelchair.
- 1 user considers that vinyl tiles on the floor change the aesthetic quality.

Proposed Improvements

- Movable storage compartment allowing easy access space for wheelchairs, under the kitchen sink and under the wash basin in the bathroom.
- For people in wheelchairs, cover up the clearance/plumbing under the sink with a panel.

8.0 OBSERVATIONS AND DRAFT OF NEW PERFORMANCE CRITERIA

This study's goal is to verify the functional nature of the performance criteria used in the construction of the three buildings evaluated and to propose improvements to define new better performing criteria.

This section summarizes the main observations and improvements proposed for the 23 types of features studied.

This data is presented in detail in the preceding section and we recommend that the reader refer back to this. In this respect, the name of the particular feature and the page number are specified for each point dealt with in this section.

It is observed, on reading the preceding section, that most of the features are operating well as installed. Certain design criteria have improved from one project to another and, as a general rule, the most recent project (Habitations Perras) is that which functions best.

Those features which satisfy all the respondents are very rare, indeed; hence the importance of the improvements suggested for most of them. Certain improvements are mere details whereas others are more substantial.

Lastly, it is difficult to draw conclusions concerning certain features in that the comments are so divergent. These features are difficult to make universally accessible and the compromises necessary generate dissatisfaction among certain users.

Below we have listed the most significant observations, gleaned from the data sheets in the previous section:

. Accessible parking spaces are small and dimensions could be increased *(Parking, page 34)*.

. Both those with and without disabilities use the Access Ramp *(Access Ramp, page 36)*.

. The slope of the access ramp must not be too steep, since even with reduced slopes, the users will still have difficulty. The landing in front of the entrance area and the intermediate landings are very important *(Access Ramp, page 36)*.

. The electric door-opening devices are used very frequently by all the residents *(Door-Opening Device, page 37).*

. The lobby functions well, provided that the letter boxes are located in the entrance hallway. When the letter boxes are in the lobby, the dimensions of the lobby must be larger *(Lobby, page 39).*

. The intercom system using the tenants' telephones is the best type *(Intercom, page 40).*

. All the letter boxes should be accessible (height) and the opening mechanism must be easy to manipulate *(Letter Boxes, page 42).*

. A wider than deeper elevator would facilitate getting on and getting off when a number of people are using the elevator *(Elevator, page 44).*

. The emergency telephone is the element which causes the most problems in the elevator *(Elevator, page 45).*

. The respondents prefer flat, bevelled, ±8 mm high thresholds. The performance level for sliding doors leaves to be desired due to the difficulty of obtaining built-in thresholds *(Thresholds, page 47).*

. The garbage chute hatch also represents a problem for a number of users. Certain fire protection requirements governing this equipment limit the possibility of improving its performance, however *(Garbage Chute, page 48).*

. The laundry room functions well, provided that clearance is provided in front of the appliances as well as between the last appliance and the wall. The system used to put money in the machines should be made easier to manipulate *(Laundry Room, page 50).*

. The traditional fire alarm system is easily heard by most of the respondents, with the exception of one resident with severe hearing limitations. The use of a stroboscopic warning device in the corridors and in the common spaces, and an outlet for an adapted warning system in the units, is a good alternative for this client group *(Fire Alarm, page 52).*

. The width of the common corridors is adequate. However, it is not wide enough to provide for the installation of a handrail while still complying with the regulations in force (NBC 1990). The recess in front of the doors is also adequate *(Public Corridor, page 53).*

. The width of the door used (810 mm) prevents certain respondents from moving in and out of the units easily. This width should be increased to 860 mm *(Circulation Within the Unit, page 55).*

. The respondents experienced difficulty where the 600 mm clearances on the handle side of a pull door and the 300 mm clearance on the handle side of a push door are not respected *(Circulation Within the Unit, page 55).*

. The 1,500 mm diameter turning space is required in the kitchen. In units where an element encroaches on this turning space, the respondents mentioned that they experience difficulty. Open L- or U-shaped kitchens offer the best possibilities *(Kitchen, page 57).*

. A large majority of the users function satisfactorily with the proposed counter height. A few respondents without limitations would prefer higher counters, whereas approximately 30% of the respondents in wheelchairs would prefer lower counters. The current compromise as to counter height seems to be acceptable *(Kitchen, page 58).*

. The clearance under the sink is used by people in wheelchairs for access to the sink and as storage space for other people. In this case, the movable storage compartment under the sink is quite appreciated *(Kitchen, page 60).*

. All the users are satisfied with the position of the plumbing under the sink, whether the plumbing is offset and insulated or not. This result is surprising as the offset and insulated plumbing trap is regularly mentioned in literature and by occupational therapists as an important element for the security of the users (risk of burning) and for the additional space which it frees-up under the sink or wash basin *(Kitchen, page 60).*

. The upper kitchen cabinets are lowered thus making it possible for a larger number of people to reach the first shelf. However, 38% of the respondents in wheelchairs have difficulty doing this. It would be advisable to increase the storage space available in pantry-type modules *(Kitchen, page 62).*

. The pull-out work surfaces are appreciated both by ambulatory people as well as people in wheelchairs. However, they must be designed well to be easily manipulated. The height of the surfaces studied is variable and the diversity of the comments received does not make it possible to specify any ideal height *(Kitchen, page 64).*

. Most of the users use the oven space as storage space, whereas nearly half of those with disabilities use it for built-in ovens or microwave ovens. Most of these people find that the oven is too high, especially where the controls are located. It would be advisable to make provision for an oven space which is lower, while keeping the pull-out work surface under the oven *(Kitchen, page 65).*

. The foot recess should be at least 190 mm high as any dimension under this causes much dissatisfaction among people in wheelchairs. Any higher dimension should be determined considering the foot support heights on existing wheelchairs, the dimensions of the storage space and the aesthetic aspect of the storage compartment *(Kitchen, page 67).*

. The respondents prefer electrical outlets along the edge of the counter to wall outlets or to outlets under the cupboards. These outlets must include breakers *(Kitchen, page 68).*

. Most of the respondents use and appreciate the stove hood switches (lighting and ventilation) located on the edge of the counter. Two switches are required for separate use *(Kitchen, page 68).*

. Most of the respondents in wheelchairs are satisfied with the turning space in the bathroom in spite of the fact that none of the layouts studied allows for lateral clearance beside the toilet. Only one respondent would prefer the latter. Among those satisfied, a number use the services of an attendant, whereas others use lifts.

  This result contradicts declarations by occupational therapists and a good number of authors who affirm that clearance beside the toilet is required for people with severe limitations (Bathroom, page 70).

. The counter with built-in sink was preferred to the wall sink in china due to the shape of the sink installed and to the space available to set objects down. Most of the respondents are satisfied with the location of the plumbing under the wash basin, whether the plumbing drain is offset and insulated or not. This result confirms that obtained for the kitchen sink *(Bathroom, page 72).*

. The height of the counter in the bathroom represents the same compromise as that for the kitchen counter. All the residents can use it, but they would prefer either a lower or a higher counter, depending on the case *(Bathroom, page 72).*

. Provision should be made for a movable storage compartment under the wash basin and additional storage space is required near the wash basin (Bathroom, page 72).

. The height and the dimensions of the mirror are adequate (Bathroom, page 72).

. Certain respondents find that the toilet is too low despite the fact that the model which was installed is a little higher than the traditional toilet. However, these people would need elevated seats even if they had adapted toilets. All the respondents are satisfied with the elongated toilet seat *(Bathroom, page 75).*

. Most of the respondents are satisfied with the height, location and opening mechanism for the medicine cabinet. A ±1,500 mm diameter turning space must be provided in front of the cabinet. The latter should have a childproof locking system *(Bathroom, page 76).*

. All those using electrical outlets in the bathroom are satisfied with the height and location of this feature *(Bathroom, page 78).*

. Three-quarters of the respondents with mobility limitations installed grab bars for the bathtub and/or toilet. Most of these grab bars were installed in areas where provision had already been made for wall reinforcement. The others were installed on the wall at the head of the bathtub or at the foot of the bathtub or on the wall behind the toilet. It would perhaps be advisable to add reinforcement in these areas *(Bathroom, page 79).*

. The central lever faucet in the kitchen sink and the bathroom wash basin, as well as central lever faucets, located on the wall at the head of the bathtub, are elements which are appreciated by all the respondents. Without this type of faucet, 10% of those with disabilities could not be independent. A few respondents would like to have faucets on the wall alongside the bathtub. However, the information obtained to date concerning this feature is not conclusive *(Bathroom, page 81).*

. Certain respondents had difficulty using the faucets. Particular attention must be paid to the model chosen *(Bathroom, page 81).*

. A large majority of the users appreciate the hand shower, although two respondents would prefer longer flexible tubes. A hand control is suggested on the hand shower to make it possible to start and stop the water, thus facilitating the use of the shower *(Bathroom, page 83).*

. Most of the users are satisfied with the proposed linen closet. When the latter is located in corners, access is difficult *(Linen Closet, page 84).*

. As is the case for the linen closet, the storage areas are difficult to access when they are located in corners. Adjustable clothes closet rods could be a solution but should offer more flexibility (especially on the lower end). The quality of storage space offered should be increased *(Storage, page 84).*

. In general, the users are satisfied with the height of the controls. With the exception of the electrical switches, satisfaction is higher among respondents where the control height is lowest. The thermostat presents the most difficulty as the height must make it possible for ambulatory people and for people in wheelchairs to read the temperatures *(Controls, page 86).*

. The window with the highest performance rating is the roto-operated casement window with a lever handle and tandem locking system. This type of mechanism is, however, delicate to operate. The sill, located at 700 mm from floor level, makes it possible for all respondents to see outside *(Windows, page 89).*

. There must be a turning space of 1,500 mm beyond the door swing on the balcony. People with disabilities who are experiencing difficulty on the balcony do not have this turning space due to either the location of the door or to the railing which encroaches on the required area *(Balcony, page 91).*

. All the respondents find that lever handles make no difference or are easier to use. Clothes do not get caught in lever handles with ends curving toward the door *(Handles, page 92).*

. Most respondents considered that the accessibility elements do not affect the aesthetic quality of the units in any way. The only negative comments concern the clearance under the kitchen sink or the wash basin. No negative comments were made concerning the clearance under the kitchen sink in the Perras building, as a movable storage compartment was offered to the tenants in this building. This module should also be installed in the bathroom *(Aesthetics, page 94).*

9.0 MODIFICATIONS MADE BY PEOPLE WITH DISABILITIES

26 respondents indicated that they had made adaptations in their units. These respondents, on the average, made 1 adaptation per respondent in the Perras building, 1.6 adaptations per respondent in St-Joseph building and 2.2 adaptations per respondent in the Quesnel building.

Quesnel	St-Joseph	Perras	Total
5	11	10	26

TABLE 9.1 - RESPONDENTS WHO MADE ADAPTATIONS

Type of adaptation	Quesnel	St-Joseph	Perras	Total
Electric door-opening device	-	3	-	3
Unlocking device	2	-	-	2
Ceiling lift	-	1	-	1
Elevated bathtub	1	-	-	1
Toilet seat	1	2	-	3
Shelves in bathroom	1	1	-	2
Grab bars	2	3	8	13
Lower built-in oven	-	-	1	1
Sliding microwave	-	1	-	1
Lateral faucet kitchen	1	-	-	1
Adaptation on faucet	-	1	-	1
Pull-out baskets	1	1	1	3
Raise clothes closet rods	-	1	-	1
Lower intercom	1	-	-	1
Adaptation on thermostat	-	1	-	1
Tumble switch	-	1	-	1
Environmental control	1	-	-	1
Widen a door	-	1	-	1
Raise the balcony	-	1	-	1
TOTAL	11	18	10	39

TABLE 9.2 - TYPES OF ADAPTATION

It is observed that the average number of adaptations per respondent decreases as the quality of the performance criteria used in the construction increases. At Habitations Perras, representing the last generation of performance criteria, the number of adaptations made per respondent was lowest.

The installation of grab bars accounted for one-third of the adaptations made.

A large majority of the adaptations made required minor interventions as provision had already been made, in the concept used, for the building to accommodate these adaptations.

These results indicate to us that it is easy to adapt universally accessible units to the particular needs of people with disabilities. A large majority of the interventions made by the respondents did not cost more than $500 whereas, on the average, it costs $10,000 to adapt traditional units to the needs of those with disabilities(1).

It is also observed that, in Habitations Perras, the adaptations there were almost exclusively limited to the installation of grab bars. This confirms our hypothesis that the performance criteria used for this building are more adequate.

(1) Source: Programme d'adaptation de domicile de la Société d'habitation du Québec (Home Adaptation Program - Quebec Housing Corporation)

10.0 CONCLUSION

Those questioned during this study were people of all ages, some having no functional limitations and others experiencing a variety of the latter, and these people live in diversified family contexts. It can be said that this sample accurately reflects the variety of client groups found in the Canadian population. Of course, in terms of proportion, the concentration of people with disabilities questioned is much higher in our sample than in the Canadian population at large: however, the diversity which was required for this survey was respected.

The results of this survey show that, on the whole, the performance criteria used adequately meet the expectations of the respondents regardless of their conditions. Independent seniors, seniors with functional limitations, people with severe limitations and children are all generally satisfied with their universally accessible units.

Thus, it can be said that the compromises made to balance the needs of individuals, as well as those of various groups, with costs are adequate.

No feature is perceived as irrelevant. On the other hand, in light of the comments received, it is observed that adjustments are required in most of the performance criteria used. The extent of the adjustments varies depending on the criterion studied.

These adjustments, suggested in the results presented in Section 7, will make it possible to refine the performance criteria used. However, the compromises made to date will not be completely lost when choosing those adjustments as universal accessibility is based on the concept that 100% of the clients are served, at the same cost as for traditional construction.

This comment is particularly true in the case of features which remain unsatisfactory for a large proportion of the respondents, the height of the kitchen counters, for example. Changing the height of the counters offered or making it possible to adjust the counter height to meet individual demands would involve studying the advantages and the disadvantages of the process and, in particular, this would mean cost increases.

Two of the results obtained are particularly interesting in that they contradict the procedures outlined in current literature on architectural accessibility and home adaptations. Those people with disabilities questioned are satisfied with the clearance under the kitchen sink or under the bathroom wash basin, whether the plumbing trap is offset or not and whether it is insulated or not. This result is all the more surprising in that insulation is an important security factor and that the offset plumbing trap makes it possible to free-up more space under the sink or wash basin.

Another interesting result, none of the bathrooms studied provide for a clearance alongside the toilet, and all the people in wheelchairs who were questioned replied that they could function adequately without this lateral clearance regardless of the severity of their limitations. This result contradicts most of the layouts used in adapted housing.

In addition, it is observed that a number of respondents used the adaptability characteristics made available to them within the housing units. It is thus important to keep the features allowing for adaptability and to assess the possibility of providing for new features which correspond to the adaptations which certain respondents had added to make their units more adequate.

Concerning these adaptations, it is observed that, with few exceptions, they did not involve any changes in the actual architecture. Most of the changes involved the addition of specialized equipment. Compared to traditional units, which usually require major interventions in the entrance, the bathroom and kitchen, universally accessible units are more user-friendly for people with disabilities and at the same time represent savings for agencies providing home adaptation grants.

In conclusion, it can be affirmed that the universal accessibility concept and its performance criteria clearly meet the needs of a diversified population, that certain adjustments are still necessary to optimize the extent to which the solutions meet the needs for this population, and for the various component client groups, and that it represents major benefits when compared to traditional design criteria.

The challenge of universal accessibility? To be incorporated by private promoters to build a residential stock which can adapt to the needs of the Canadian population.

APPENDIX

QUESTIONNAIRE

C M H C R E S E A R C H P R O J E C T

"UNIVERSAL ACCESSIBILITY PERFORMANCE CRITERIA: ECONOMIC IMPLICATIONS"

TENANT QUESTIONNAIRE

BUILDING:	___ Perras	___ St-Joseph	___ Quesnel
GROUP:	___ With Disabilities	___ Without disabilities	___ 65 years old with disabilities
	___ 65 years old without disabilities		

GENERAL INFORMATION

NAME: _____

ADDRESS: _____

AGE GROUP: (Respondents) ___ 18-30 ___ 31-50 ___ 51-64 ___ 65 and over

NUMBER OF RESIDENTS: ___ children ___ adults

OCCUPANCY DATE: _____

DO YOU, OR A MEMBER OF YOUR HOUSEHOLD, EXPERIENCE DIFFICULTY IN TERMS OF:

___ mobility (walking, moving above, standing up, ...)

___ agility (reaching or holding on to object, bending over)

___ vision

___ hearing

___ others

In the affirmative, who? _____ Since when? _____

In the affirmative, in which age group is this person? ___ 18-30 ___ 31-50

___ 51-64 ___ 65 and over

ARE YOU, OR A MEMBER OF YOUR HOUSEHOLD, IN A WHEELCHAIR?

___ YES ___ NO

Frequency _____

IN THE AFFIRMATIVE, WHAT TYPE OF WHEELCHAIR?

___ manual ___ motorized

IN THE AFFIRMATIVE, CAN THIS PERSON STAND UP OR WALK?

___ YES ___ NO

BESIDES THE WHEELCHAIR, DO YOU, OR ANY OTHER MEMBER OF YOUR HOUSEHOLD, USE ANOTHER TYPE OF TECHNICAL AID?

___ YES ___ NO

In the affirmative, specify: _____

IN THE AFFIRMATIVE, WHAT TYPE OF LIMITATION OR IMPAIRMENT:

_____

IN THE AFFIRMATIVE, DOES THIS PERSON RECEIVE EXTERNAL ASSISTANCE?

___ YES ___ NO

IN THE AFFIRMATIVE, FOR WHAT DAILY ACTIVITIES?

_____

_____

HAVE YOU MAKE CHANGES IN THE UNIT TO MEET YOUR NEEDS?

___ YES ___ NO

IN THE AFFIRMATIVE, SPECIFY WHICH ONES: _____

_____

HAVE YOU NOTICED DIFFERENCES BETWEEN YOUR CURRENT UNIT AND THE UNITS IN WHICH YOU HAVE PREVIOUSLY LIVED?

_____

_____

EXTERIOR PATHWAY AND PARKING AREA

1. DO YOU USE THE ACCESS RAMP?

___ YES ___ NO

Why: _____ Why: _____

Frequency: _____ _____

		FOR WHOM?
In the affirmative, do you have difficulty with:	___ slope too steep	_____
	___ type of surfacing	_____
	___ handrail	_____
	___ lighting	_____
	___ others: _____	_____
	_____	_____

2. DO YOU USE THE PARKING LOT? (interior or exterior)

___ YES ___ NO

Why: _____ Why not: _____

Frequency:

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ pathway to the building	_____
	____ dimension	_____
	____ location	_____
	____ lighting	_____
	____ others _____	_____
	_____	_____

Comments: _____

3. DO YOU HAVE DIFFICULTY USING THE MAIN ENTRANCE TO THE BUILDING?

___ YES ___ NO

		FOR WHOM?
In the affirmative, do you have difficulty with the:	___ landing	
	___ door too heavy	
	___ door handle	
	___ threshold	
	___ floor surfacing	
	___ lobby	
	___ others	

4. DO YOU USE THE ELECTRIC DOOR-OPENING DEVICE?

___ YES ___ NO

Why: _____ Why not: _____

Frequency: _____

		FOR WHOM?
In the affirmative, do you have difficulty with the:	___ position of the push plates	
	___ opening time	
	___ position of the lock	
	___ others	

5. DO YOU HAVE DIFFICULTY USING THE SECONDARY ENTRANCE TO THE BUILDING?

___ YES ___ NO

		FOR WHOM?
In the affirmative, do you have difficulty with the:	___ landing	
	___ door too heavy	
	___ door handle	
	___ threshold	
	___ floor surfacing	
	___ lobby	
	___ others	

Comments: _____

6. YOU HAVE DIFFICULTY CIRCULATING IN THE BUILDING (corridors)?

___ YES ___ NO

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ width of corridor	
	____ clearance in front of doors	
	____ floor surfacing	
	____ lighting	
	____ others	

7. DO YOU USE THE ELEVATOR?

___ YES ___ NO

Why: _____ Why not: _____

Frequency: _____

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ dimensions	
	____ security system	
	____ height and location of controls and call buttons	
	____ opening time	
	____ others	

8. DO YOU USE THE STAIRS?

___ YES ___ NO

In the affirmative, do you have difficulty with them?

_____

Comments: _____

_____

_____

_____

9. DO YOU USE THE GARBAGE CHUTE?

___ YES ___ NO

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ in the door	
	____ hatch	
	____ turning space	
	____ others	

10. DO YOU USE THE COMMUNITY ROOM?

___ YES ___ NO

If no, why not? _____

_____

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ equipment	
	____ door	
	____ window	
	____ threshold	
	____ others	

11. DO YOU USE THE LAUNDRY ROOM?

___ YES ___ NO

		FOR WHOM?
In the affirmative, do you experience any difficulty with the:	____ door	
	____ threshold	
	____ dimensions	
	____ appliances	
	____ others	

12. DO YOU HAVE DIFFICULTY USING YOUR MAILBOX?

___ YES ___ NO

If the affirmative, why: _____

_____

Comments: _____

_____

_____

_____

FIRE SAFETY

13. CAN YOU EASILY REACH THE ALARM CONTROL?

___ YES ___ NO

If no, why not? _____

_____

14. CAN YOU CLEARLY HEAR THE FIRE ALARM?

___ YES ___ NO

If no, why not? _____

_____

15. ARE YOU AWARE OF THE PROCEDURE IN CASE OF FIRE?

___ YES ___ NO

Comments: _____

_____

_____

_____

CIRCULATION IN THE UNIT AND ON THE BALCONY

16. DO YOU HAVE DIFFICULTIES CIRCULATING WITHIN THE UNIT?

___ YES ___ NO

In the affirmative, where exactly? _____

_____

		FOR WHOM?
In the affirmative, do you have difficulty with the:	____ door width	
	____ door-opening direction	
	____ turning space	
	____ scratched walls	
	____ corridor/door relation	
	____ others	

17. DO YOU USE YOUR BALCONY?

___ YES ___ NO

If no, why not? _____

_____

		FOR WHOM?
In the affirmative, do you have difficulty with the:	____ threshold	
	____ door	
	____ dimension	
	____ railing height	
	____ others	

Comments: _____

_____

_____

_____

18. DO YOU HAVE DIFFICULTY OPENING OR CLOSING THE DOORS IN YOUR UNIT?

___ YES ___ NO

In the affirmative, why: _____

_____

		FOR WHOM?
In the affirmative, do you have difficulty with the:	____ doors being too heavy	_____
	____ handles	_____
	____ opening direction	_____
	____ backing up	_____
	____ locking mechanism	_____
	____ others	_____

19. BASED ON YOUR EXPERIENCE, HOW DO LEVER TYPE DOOR HANDLES COMPARE TO OTHER TYPES OF HANDLES:

___ very much easier to use

___ much easier to use

___ no difference

___ more difficult to use

___ very much more difficult to use

20. DO YOU HAVE DIFFICULTY OPENING OR CLOSING THE WINDOWS?

___ YES ___ NO

		FOR WHOM?
In the affirmative, why:	____ opening mechanism	_____
	____ locking mechanism	_____
	____ others	_____

21. DOES THE HEIGHT OF THE WINDOWS MAKE IT POSSIBLE FOR YOU, IN A SEATED POSITION, TO SEE CLEARLY OUTSIDE?

___ YES ___ NO

If not, why not? _____

_____

22. DO YOU EXPERIENCE DIFFICULTY USING YOUR WALL SWITCHES?

___ YES ___ NO

In the affirmative, why? _____

_____

23. DO YOU EXPERIENCE DIFFICULTY USING THE ELECTRICAL OUTLETS?

___ YES ___ NO

In the affirmative, why? _____

_____

24. DO YOU EXPERIENCE DIFFICULTY USING THE THERMOSTAT?

___ YES ___ NO

In the affirmative, why? _____

_____

25. IN YOUR UNIT, THE HEIGHTS OF THE SWITCHES, ELECTRICAL OUTLETS AND THERMOSTATS ARE DIFFERENT THAN THOSE IN A STANDARD UNIT. THE SWITCHES AND THERMOSTATS ARE LOWER AND THE ELECTRICAL OUTLETS ARE HIGHER. FOR YOU:

___ without these modifications, I could not be independent

___ these modifications greatly facilitate the use of the above- mentioned elements

___ these modifications facilitate use

___ these modifications make no difference for me nor for the members of my family

___ these modifications make use more difficult

___ these modifications make use impossible

Comments: _____

_____

_____

_____

26. THE HEIGHT OF THE VANITY IN THE BATHROOM:

___ is perfect for you

___ is ok but would ideally be _____

___ is not suitable at all because _____

27. DO YOU USE THE CLEARANCE UNDER THE WASH BASIN?

___ YES ___ NO

Why: _____ Why not: _____

In the affirmative, are the dimensions of the clearance suitable for you?

___ YES ___ NO

If no, why not: _____

28. DOES THE PLUMBING INSTALLATION UNDER THE WASH BASIN, MAKE IT POSSIBLE FOR YOU TO USE THE WASH BASIN WITHOUT ANY DIFFICULTY?

___ YES ___ NO

If no, why not: _____

29. BASED ON YOUR EXPERIENCE, COMPARING THE ( ) FAUCET IN YOUR WASH BASIN WITH THE STANDARD FAUCET:

___ without this type of faucet, you could not be independent

___ greatly facilitates the use of the wash basin

___ facilitates use

___ makes no difference

___ makes use difficult

___ makes use very difficult

30. BASED ON YOUR EXPERIENCE, COMPARING THE ( ) BATHTUB FAUCET WITH THE STANDARD FAUCET:

___ without this type of faucet, you could not be independent

___ greatly facilitates the use of the wash basin

___ facilitates use

___ makes no difference

___ makes use difficult

___ makes use very difficult

Comments: _____

31. IS THE LOCATION OF THE ( ) BATHTUB FAUCET SUITABLE FOR YOU?

___ YES ___ NO

If no, why not: _____

_____

IS THE USE OF THE HAND SHOWER EASY FOR YOU?

___ YES ___ NO

If no, why not: _____

_____

32. THE WATER TEMPERATURE CAN BE ADJUSTED:

___ ideally

___ easily

___ with difficulty

___ with much difficulty

QUESTIONS 33 and 34 ARE LIMITED TO RESIDENTS WITH DISABILITIES

33. DO YOU USE THE TOILET?

___ YES ___ NO

In the affirmative, are the following elements suitable for you?

	YES	NO	WHY
. height	___	___	_____
. Location	___	___	_____
. shape	___	___	_____

34. DO YOU HAVE SUFFICIENT CLEARANCE TO ACCESS THE FIXTURES AND TRANSFER?

___ YES ___ NO

If no, why not: _____

_____

35. IS THE MIRROR HEIGHT SUITABLE FOR ALL MEMBERS OF YOUR FAMILY?

___ YES ___ NO

If no, why not: _____

_____

36. AS FOR THE MEDICINE CABINET, ARE THE FOLLOWING ELEMENTS ADEQUATE?

	YES	NO	If no, why not?
. height	___	___	_____
. location	___	___	_____
. opening mechanism	___	___	_____

37. DO YOU USE THE ELECTRICAL OUTLET IN THE BATHROOM?

___ YES ___ NO

Why: _____ Why: _____

_____ _____

As pertains to the electrical outlet, are the following items adequate?

	YES	NO	If no,why not?
. height	___	___	_____
. location	___	___	_____

38. DOES THE LOCATION OF THE LINEN CLOSET ALLOW YOU TO USE THIS SPACE:

___ very easily

___ easily

___ with difficulty

___ with much difficulty

Comments: _____

_____

_____

_____

39. KITCHEN COUNTER HEIGHT

___ is perfect

___ is suitable but would ideally be _____

___ is not suitable at all because _____

40. DO YOU USE THE CLEARANCE UNDER THE SINK?

___ YES ___ NO

Why: _____ Why not: _____

_____ _____

In the affirmative, are the dimensions of the clearance suitable for you?

___ YES ___ NO

If no, why not: _____

_____

41. BASED ON YOUR EXPERIENCE, COMPARING THE ( ) FAUCETS IN YOUR KITCHEN TO STANDARD FAUCETS

___ without this type of faucet, you could not be independent

___ greatly facilitates the use of the faucet

___ facilitates use

___ makes no difference

___ makes use difficult

___ makes use very difficult

42. CAN YOU, WITHOUT DIFFICULTY, REACH THE FIRST SHELF IN THE UPPER KITCHEN CABINET?

___ YES ___ NO

If no, why not: _____

_____

_____

43. CAN YOU, WITHOUT DIFFICULTY, REACH THE SECOND SHELF IN THE UPPER KITCHEN CABINET?

___ YES ___ NO

If no, why not: _____

_____

_____

44. THE KITCHEN CABINETS IN YOUR UNIT ARE LOWER THAN IN STANDARD UNITS; FOR YOU:

___ without this change, I could not use the cabinets

___ this facilitates use of the cabinets

___ makes no difference

___ represents a difficulty

___ prevents you from using the cabinets

45. FOR YOU, THE HANDLES ON THE CABINET DOORS AND DRAWERS ARE:

___ very easy to use

___ easy to use

___ difficult to use

___ very difficult to use

46. DO YOU USE THE PULL-OUT WORK SURFACES?

___ YES ___ NO

Why: _____ Why not: _____

_____ _____

For you, these pull-out work surfaces are:

___ very useful

___ useful

___ not very useful

___ not useful at all

47. HOW DO TURN ON THE LIGHT AND THE FAN IN THE KITCHEN VENTILATOR HOOD?

___ control on the hood

___ control in front of counter

___ both

For you, the ventilator hood control at the front of the counter is:

___ very practical

___ practical

___ not practical

___ not practical at all

48. AS PERTAINS TO THE ELECTRICAL OUTLETS, ARE THE FOLLOWING ELEMENTS ADEQUATE?

	YES	NO
number of outlets	___	___
ease of access	___	___

If no, why not: _____

49. DO YOU USE THE ELECTRICAL OUTLETS AT THE FRONT OF THE COUNTER?

___ YES ___ NO

Why: _____ Why not: _____

50. HOW DO YOU USE THE SPACE FOR THE BUILT-IN OVEN?

Comments: _____

_____

_____

QUESTION 51, 52 AND 53 LIMITED TO RESIDENTS WITH DISABILITIES

51. AS PERTAINS TO THE FOOT RECESS LOCATED AT THE BOTTOM OF THE CABINETS, ARE THE FOLLOWING ELEMENTS ADEQUATE?

	YES	NO	If no,why not?
. height	___	___	_____
. depth	___	___	_____

52. THE TURNING SPACE IN THE KITCHEN:

___ is perfect for you

___ is suitable but _____

___ is not suitable for you at all _____

53. THE LOCATION OF THE PLUMBING UNDER THE SINK:

___ makes it possible for you to position yourself to use the sink

___ makes it possible for you to manoeuver without difficulty

___ prevents you from manoeuvering

Comments: _____

_____

_____

54. FOR YOU AND YOUR VISITORS, THE INTERCOM SYSTEM LOCATED IN THE LOBBY IS:

___ easy to use

___ difficult to use

If difficult, why: _____

_____

55. DO YOU HAVE DIFFICULTY OPERATING THE INTERCOM IN YOUR UNIT?

___ YES ___ NO

In the affirmative, why: _____

_____

56. WHAT TYPE OF INTERCOM DO YOU PREFER?

___ standard intercom

___ telephone

___ others

Why: _____

_____

Comments: _____

_____

_____

_____

STORAGE

57. ACCORDING TO YOU, THE LOCATION OF THE STORAGE SPACE IN YOUR UNIT IS:

___ satisfactory

___ not satisfactory

If not satisfactory, why not: _____

_____

58. FOR YOU, THE HEIGHT OF THE RODS IN THE CLOTHES CLOSET IS:

___ ideal

___ too high

___ too low

59. DO YOU EXPERIENCE OTHER DIFFICULTIES IN YOUR UNIT WHICH YOU HAVE NOT MENTIONED IN ANSWERING THE PRECEDING QUESTIONS?

___ YES ___ NO

In the affirmative, specify: _____

_____

60. DO THE ACCESSIBILITY ELEMENTS IN YOUR UNIT AFFECT ITS AESTHETIC VALUE?

___ YES ___ NO

In the affirmative, how: _____

_____

61. HAVE YOU NOTICE DIFFERENCES BETWEEN YOUR CURRENT UNIT AND OTHER UNITS THAT YOU HAVE OCCUPIED IN THE PAST?

_____

_____