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Urban development under World Heritage constraints

Cultural Heritage & Sustainability /
Historic Monuments Zone of Querétaro

Book 4 of 5

by
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Preface

The process and results of a research on Querétaro as a World Heritage case study, are presented in a series of five books. This research was carried out as part of the graduation studio 'Cultural Heritage and Sustainability: World Heritage cities as case study', as part of a research on sustainable development, carried out by the AUDE Unit (Architectural Urban Design and Engineering) of the Eindhoven University of Technology (TU/e). The studio focuses on the topic of Cultural Heritage and Sustainability, by taking World Heritage cities as case studies and is supervised by Prof. dr. B.J.F. (Bernard) Colenbrander, Dr. A.R. (Ana) Pereira Roders, L. (Loes) Veldpaus and P.C. (Paloma) Guzmán Molina.

This booklet is the first part of a series of five. This series explores the urban development of the Historic Monuments Zone of Querétaro and its cultural heritage in depth in order to provide adequate insights on sustainable development in a World Heritage city. This part explores how to optimize urban development under the constrains of World Heritage by finding potentials for modern architecture to comply with both user needs and architectural guidelines defined in conservation and planning policies. The main aim of this report is that results and conclusions can be used by local authorities in Querétaro, as a source to help them in decision making processes on the Historic Monuments Zone of Querétaro and also by students for further studies on this property.

I would like to thank the supervisors of the studio of the TU/e and the staff in the Secretary of Urban Development and Public Spaces (SDUOP), IMPLAN and INAH for their help in accelerating this project by providing required data, during the three month of field research in Querétaro. Thanks also go to the University of Querétaro (UAQ) for providing accommodation. Special thanks in particular go to Ir. Manuel Vilarruel Vázquez (SDUOP), David López Carranza (SDUOP), Luis Alejandro Morales Rodriguez and Leonor Monroy (IMPLAN) and Yanet Lezama-López (INAH) for contributing to my research and a pleasant time in the beautiful city of Querétaro.

Tijmen Stuurman

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Background

1.1 Introducing World Heritage, OUV and the World Heritage Committee

The term World Heritage (WH) is defined in the Convention Concerning the Protection of the World Cultural and Natural Heritage of 1972. WH is being found of such value for mankind it should be preserved for present and future generations. The cultural and natural significance of properties are referred to by the term Outstanding Universal Value (OUV). When a site is deemed of OUV it is listed in the World Heritage list. (UNESCO, 1972).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity (UNESCO, 2008).

The 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage is widely acknowledged as the most universal international legal instrument in heritage conservation (Rössler, M., 2006). Together with the latest (2012) Operational Guidelines for the Implementation of the World Heritage Convention (OG), they are the main working tools on World Heritage (UNESCO, 2008).

In the OG the current vision on OUV of the World Heritage Committee can be found. These OG's are often revised (UNESCO, 2012a). Nominated properties are evaluated by the independent Advisory Bodies based on one or more of ten criteria, listed in the OG. There are six cultural and four natural criteria (UNESCO, 2012a).

To be deemed of OUV, a property must also meet the conditions of integrity and authenticity and must have an adequate protection and management system to ensure its safeguarding. "Integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. (…) Authenticity relates to the ability of the attributes of a property to express adequately its OUV, truthfully and credibly" (UNESCO, 2012a, p.p. 21-23).

1.2 Emerging development

Bandarin et al. (2010) notes that "many of the most important urban historic areas existing in Europe, Asia and Latin America have lost their traditional functions and are under pressure from transforming agents". Rapid urban development can negatively affect Cultural Heritage of this kind, unless measures are taken to prevent this.

Latin America (LA) has growing and globalized economies, and escalating urban growth has been predicted for emerging cities in developing countries and Latin America in particular (Ernst & Young, 2011).

Saldaña (2012) states that the state of Querétaro is the third state of Mexico in population growth with an increase of 2.6% between 2000 and 2010. The state of Querétaro has low crime rate and high standard of living which made it an attractive place for immigrants and investors.

The city of Querétaro was kept within the historic boundaries until the mid-20th century, but its industrial and population growth accelerated after

1970. Nowadays it has an average growth rate of 3.6% a year, the city is one of the fastest growing cities in Mexico. This has turned Querétaro into a destination for immigrants from other parts of Mexico. (Lezama-Lopez, 2006)

1.3 Valuation

The area known as the Historic Monuments Zone of Querétaro (HMZQ) (see map 1.1 on page 9) was established by presidential decree in March 1981. It comprises 203 building blocks including about 1400 historic buildings that cover an area of 4 km2. These buildings of historical value were constructed between the 16th and 19th century and were originally used for religious and educational purposes, care services, public administration. (IMPLAN, 2012) [1].

The HMZQ was inscribed by UNESCO as a World Heritage site on December 7, 1996 on basis of cultural criteria (ii) and (iv). It was considered to be of Outstanding Universal Value and an exceptional example of a colonial town whose layout is reflecting its multi-ethnic population. In addition there are numerous buildings constructed in 17th and 18th centuries that convey the OUV. (UNESCO, 1996).

"Considering that the site is of Outstanding Universal Value and an exceptional example of a colonial town whose layout symbolizes its multi-ethnic population. It is also endowed with a wealth of outstanding buildings, notably from the 17th and 18th centuries" (UNESCO, 1996, p. 71).

1.4 Problem statement

IMPLAN (2012) diagnoses that exploiting Heritage for tourism as an economic resource causes pressure and factors affecting its conservation and integrity. Given the importance of cultural tourism as a factor of economic development of the historic center of Querétaro, it is essential to develop comprehensive and sustainable, without adversely affecting the habitability and preservation of its cultural values.

According to the development plan of Querétaro between 2012 and 2015 (Municipality of Querétaro, 2012a) one of their aims is to maintain historic buildings. Chapels and museums are specified within this document, but not the residential buildings. More is said about how the center of Querétaro can be used for economic activities. An example from this report is that the center of Querétaro is a great place for tourism. Tourists can use the hotels which used to be original 18th or 19th century houses.

One of the existing problems in Querétaro is the replacement housing uses by economic purposes. Replacing residential uses by uses with economic purposes can negatively affect the quality of life in the area. (Lezama-Lopez, 2005). Policies on land use have changed to mixed use. This phenomena results in a replacement of residential uses by commercial and services, with consequent loss of dwellers. The rise in the real estate market is a reason for inhabitants to sell or rent their properties to be changed in economical uses. The habitability of historic areas is an essential condition for preservation. (Lezama-Lopez, 2006).

In a previous research Stuurman et al. (2013) showed that mixed land use has a negative impact on the state of conservation and valued façade

1. IMPLAN, "El Instituto de Planeación del Municipio de Querétaro";
English translation: Institute for Urban Planning of the Municipality of Querétaro

attributes of residential buildings. Also maintaining the original residential use does not safeguard the authenticity and integrity of houses in terms of state of conservation and façade attributes.

INAH [2] is an organization that pleads for the maintains of residential uses in building that were originally residential. They state that the original layout of the houses can be maintained by keeping its compatible use (Lezama-Lopez, 2013).

The Municipality of Querétaro (2008) pleads for a mixed balance of residential uses and uses of economical purposes.

Besides this, conservation on the integrity of the buildings in the blocks is inadequate due to the under-utilization at the back of the plots, especially within buildings of uses with economical purposes (IMPLAN, 2012).

1.5 State of the art

The Management Plan (MP) (IMPLAN, 2012) of the HMZQ contains an analysis of the elements that have shaped the urban morphology of the HMZQ. The emphasis of this analysis is on historical housing typologies as one of the main factors of the morphological evolution of the urban layout. As result of a desk analysis from Stuurman et al. (2013) in part 1 of this series the urban layout of Querétaro is considered to be the most valued attribute in the city of Querétaro.

The research of part 1 focuses on change in façade attributes, change of land use and state of conservation within its field research. Façade attributes are mentioned in the MP of the HMZQ as part of the original housing typologies that exist in Querétaro (IMPLAN, 2012). In part 1 of this series

it was recommended to further research these typologies and the development of the architectural layout behind the façades (Stuurman et al., 2013).

In a recent study from Lezama-Lopez (2012) the historic housing typologies and transformations of historic houses were examined. It gives an overview of these historic houses and makes a statement on the impact of transformations on the typology attributes.

1.6 Aims and Objectives

This research aims to cooperate with the pressure of economic needs on typology attributes of historic houses and the habitability in the HMZQ.

To be in line with recent studies this research further explores the effect of transformations in housing typologies. This is done to contribute to the identification of opportunities to enhance current practices and guidelines for protection of the HMZQ. With this identification this research aim to find a solution that cooperates with the mentioned problems existing in the HMZQ.

To do this the research explores the potentials for modern architecture to comply with both user needs and the design guidelines defined in conservation and planning policies for protected urban areas such as HMZQ, through means of designing the design solution based on research results. The main objectives are:

1.   To identify the architectural guidelines defined in conservation and planning policies;

2.   To assess how far the architectural guidelines defined in conservation and planning policies are being followed;

2. INAH: "Instituto Nacional de Antropología e Historia";
English translation: National Institute of Anthropology and History

3.	To discuss the potential reasons why the architectural guidelines defined in conservation and planning policies are not being followed as an indication on what the user needs are; and

4.	To simulate a design solution which complies with both user needs and architectural guidelines defined in conservation and planning policies.

1.7 Area of research

To frame the area of research a building block was chosen as sample from HMZQ (see map 1.1). The block is situated aside Cinco de Mayo, which is the street with most bars and restaurants. It is situated relatively near to the center of the HMZQ and at the border of the residential area Santa Cruz. It was purposely chosen for being one of the blocks which was originally built with a residential use. It was considered representative for the problems happening in the HMZQ described by the MP: The conservation of the integrity of the buildings in the blocks is inadequate due to the under-utilization at the back of the plots, especially within building of uses with economical purposes (IMPLAN, 2012). The block is situated in a residential area were also commercial activities are occurring. Another reason for choosing this block is that it is one of the blocks with most information in the catalogs. Parts of plot or plots where it was not possible to enter them during the survey in 1990 and 2000. That is why limited data is available on the plots (INAH, 1990 and 2000).

1.8 Methodology

This research follows a mixed approach, mixing quantitative and qualitative methods. To better operationalize the research process, the objectives have been converted in research questions.

1.8.1 Research question and sub-questions

"What are the potentials for modern architecture to comply with both user needs and architectural guidelines defined in conservation and planning policies of protected urban areas such as HMZQ?"

1.	What are the architectural guidelines defined in conservation and planning policies?

2.	How far are the architectural guidelines defined in conservation and planning policies being followed?

3.	Why are the architectural guidelines defined in conservation and planning policies not being followed?

4.	How can modern architecture comply with both user needs and architectural guidelines defined in conservation and planning policies?

1.8.3 Research program

1.	What are the architectural guidelines defined in conservation and planning policies?

There are two main sources of data used to answer the first sub-question.

The first contains the conservation and planning policies, which were respectively, the MP (IMPLAN, 2012) and the "Plan Parcial de Desarrollo Urbano" (city development plan) from the municipality of Querétaro (2008). These are used to identify the existing architectural guidelines. The MP is of importance because it is the management mechanism for the indentified attributes and values in it. The city development plan describes the specified regulation on the HMZQ.

map 1.1 - Defining the area of research
1:10 000

Area of research (chosen block)
center of the HMZQ
Santa Cruz
HMZQ
Sector G
Cinco de Mayo
building plots

The second is a recent research focusing on the typology and changes in time within the buildings in HMZQ (Lezama-López, 2012): "Transformaciones en la vivienda histórica en la zona de monumentos de Santiago de Querétaro" (translated: Transformations in historic houses in the monuments zone of the city of Querétaro). The conservation and planning policies are based on the maintenance of attributes. The attributes are described in the Management Plan and further specified in the research from Lezama-López (2012). These are used to identify the specific attributes related to the typologies.

A content analysis of the mentioned documents resulted into a selection of architectural guidelines to be further elaborated in the next sub-questions. Those were respectively: area of construction, area of green, gross floor area, building heights, plot uses, maintenance of the organization of spaces within the buildings and the maintenance of façade attributes.

2.   How fare are the architectural guidelines defined in conservation and planning policies being followed?

Two types of data were used for answering this sub-question.

The first data type contains the identified architectural guidelines from sub-questing 1. These are used to reconstruct an ideal situation within the existing plots.

The second data type contains all the plot data for the reality situation at multiple points in time.

Source of data used were:

Catalogs, first and second version of monitoring catalogs (INAH, 1990; INAH, 2000). These catalogs were made by "Instituto Nacional de Antropología e Historia" (INAH). In each edition, the buildings considered as historic monuments in the respective year, are listed. Data that could be found for each building is e.g. address, date of construction, a valuation and description on the state of conservation, floor plans, and pictures from inside and outside. The catalog from 1990 comes in four books, and the one from 2000, is in the form of three CDs. These catalogs are the only available data source with data from inside the buildings on the plots. This is why these are used to show the reality situation. The 1990 catalogs are sometimes used to see if changes occurred between 1990 and 2000, when no ideal situation could be reconstructed.

Google Earth (2008, 2013). It shows where has been built. This is used in addition to the catalogs, where they are incomplete.

Fieldwork data of a fieldwork carried out in 2013 for part 1 of this series (Stuurman el al., 2013). It contains data on the façade attributes, amount of stories and uses. It also contains pictures of the façades. This data is used to recognize trends on uses and the amount of stories by comparing with the ideal situation.

Database of IMPLAN, updated until 2012. It contains all plot information in a Geographic Information System (GIS) database e.g. use in 2011, shape of plots, surroundings, specified regulation defined in planning policies, façade heights etc.

First a representation of the existing situation is recreated from the most updated data available. For most buildings these were the floor plans from the building surveys in 2000 (INAH, 2000). When no data is available on buildings or parts of buildings in

2000, Google Earth (2008, 2013) and data from the fieldwork in 2013 is used.

Secondly a representation of the original situation is created by relating the original building typology characteristics from sub question 1 and the existing building characteristics. This leaded to the recognition of the original building types described and shown by Lezema-Lopez (2012) and IMPLAN (2012) within the existing buildings. The integration of the original type characteristics in the existing buildings led to a reconstruction of the original situation, which from now on is referred to as the ideal situation. If insufficient type characteristics could be recognized, the older floor plans from the building surveys in 1990 were used to create an ideal.

The comparison between the ideal situation and the existing situation allowed the researcher to reveal how far architectural guidelines defined by conservation policies are being followed.

Then the ideal situation and the architectural guidelines defined by planning policies from sub-question 1 for each plot have been compared. This revealed whether the planning policies support the guidelines for conservation. This also indicates where there is room for change within the ideal situation when the planning policies guidelines are being followed.

Finally the reality situation and the architectural guidelines defined by planning policies from sub-question 1 for each plot is compared. This also indicates where there is room for change within the reality situation when the planning policies guidelines are being followed.

3.   Why are the architectural guidelines defined in conservation and planning policies not being followed?

By analyzing the results from the previous sub-question, the researcher was able to respond to sub-question 3. The trends on where the architectural guidelines defined in conservation and planning policies are not being followed have been interpreted. Unlike the previous research questions, it is a more interpretative exercise, complemented with observations from living in Queretaro during the fieldwork (3 months) and informally discussing with the local citizens their needs. The main contact persons during this stay were two employees from the office of IMPLAN (Leonor Monroy Ortiz and L. Alejandro Morales Rodrígue) and one from the office for the urban development of the state of Querétaro (Manuel Villarruel Vázque). Next to these informal sources, two structured interviews have been taken during the stay in Querétaro. One with David López Carranza, a former employee of the Municipality of Querétaro, who had a responsibility in approving building permits within the protected zone of Querétaro. The second is Yanet Lezama-Lopez. She is a conservation officer at the National Anthropology and History Institute of Mexico (INAH) since 1987, who did several researches on urban design, conservation of the built heritage, community involvement, participatory methodologies and conflict management.

4.   How can modern architecture comply with both user needs and architectural guidelines defined in conservation and planning policies?

A design proposal is developed to comply with both user needs and architectural guidelines defined in conservation and planning policies. This is a practical exercise that gave a solution where the

existing needs get merged in the room for change within the architectural guidelines defined in conservation and planning policies found in sub-question 2 and 3. The intervention got implemented in such a way that the architectural guidelines are being followed. By doing so it is tried to maintain the OUV as much as possible. This means no irreversible changes on attributes related to the typologies are made within the solution. With the solution it is tried to make the system of these typologies compatible again with the user needs found in sub-question 4.

5.   What are the potentials for modern architecture to comply with both user needs and architectural guidelines defined in conservation and planning policies of protected urban areas such as HMZQ?

A final reflection is presented on the potentials for modern architecture to comply with both user needs and architectural guidelines defined in conservation and planning policies of protected urban areas such as HMZQ. This is a reflection on whether the found solution in sub-question 4 is not affecting the OUV and if it is likely that the OUV will be maintained after applying the solution. A value on the quality of the found solution is given by the researcher.

2

Identification of architectural guidelines

2.1 Conservation policies (typology attributes)

According to the MP, housing stands out amongst the constructed elements that make up the morphology of the city. It is through housing that the different identifiable spaces are organized in their own ways; the streets, the plazas, the blocks, the neighborhood and the entire city. Housing is also one of the elements which reflects the change process a society is going through. Therefore the attributes of housing typologies are described for conservation. (IMPLAN, 2012)
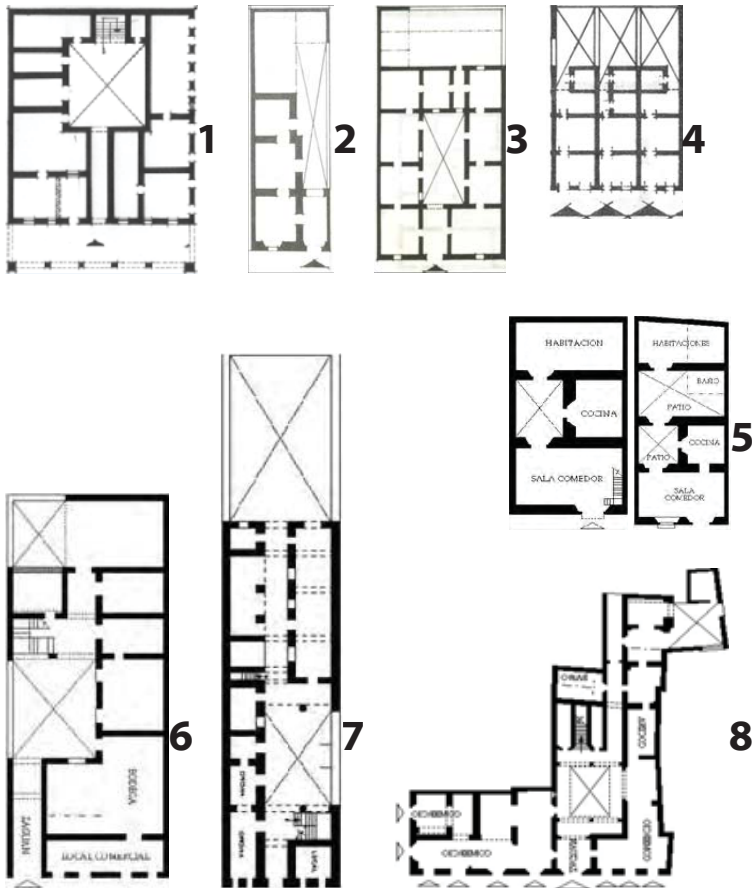
Fig. 2.1 - floor plans of all described types in the MP (IMPLAN, 2012)

Fig 2.2 - facade and floor plan, type 3 (IMPLAN, 2012)

Fig. 2.3 - facade and floor plan, type 4 (IMPLAN, 2012)

Fig. 2.1 - facade and floor plan, type 2 (IMPLAN, 2012)

Fig. 2.5 - facade and floor plan, type 8 (IMPLAN, 2012)

map 2.1 - types described in MP
adapted from GIS database IMPLAN
1:2 000

- type 2
- type 3
- type 4
- type 8
- not type
- surrounding plots

2.1.1 Typology description and examples from MP

In map 2.1 the plots are shown with their categorization of housing types according to the GIS database from the office IMPLAN. These type belong to typology descriptions from the MP (IMPLAN, 2012). This data is gathered by IMPLAN during fieldwork in 2006 and exists within the GIS database from IMPLAN.

Within the data from IMPLAN (2012) there are 8 housing types (see figure 2.1). Examples of the four types found within the investigated block are shown below including images of their façades, a floor plan and a description. The types found in the investigated block are by far the most representative types within the HMZQ, 80,5% of the originally residential buildings fit within these types (IMPLAN, 2012).

Type 2 – see figure 2.2
One-story housing with side access whose layout consists of two rows of spaces. The access can be on the left or right side. The access is preceded by the hallway that leads to the side courtyard. In some cases there is a fountain in the courtyard. The spaces for living are around the courtyard. The façade presents a door and window framework. These frameworks consist of a jamb and lintel made of stone or is plain. Cornices are present above the door openings. This type of housing belonged to people of the social middle class. (IMPLAN, 2012).

A note as a reflection to the example of this type in the MP needs to be made. The floor plan shown in the image has experienced some contemporary changes. IMPLAN used the floor plans and images for the examples from the catalog of 2000 (INAH,

2000). In these floor plans the dashed dotted lines represent contemporary separating constructions (as shown in the top space of the floor plan of type 3 in fig. 2.3). These separations are not part of the original typology.

Type 3 – see figure 2.3
These are one-story houses with central access. Its layout consists of three rows of spaces. The access is in the center and is preceded by the hallway that leads to the courtyard. This courtyard may or may not be in the center. The spaces for living are found around this courtyard. The façade generally presents the building's access in the center. This access is flanked by two window openings with railings. The frameworks are made of stone, although they can be plain as well. These buildings also belonged to people of the social middle class. (IMPLAN, 2012)

Type 4 – see figure 2.4
All houses that have one row of spaces belong to this typology. Behind the access there are two living spaces in a row. These spaces are preceded by the kitchen and bathroom with a patio at the back, or a patio preceded by the kitchen and bathroom. Regarding their size and the formal treatment of the façades, they tend to be modest. These houses have two openings. One opening is the access, which is framed in stone and finished off with a cornice. The other opening is a window, which has a railing and a framework that is either plain or also made of stone. (IMPLAN, 2012)
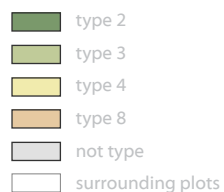
Type 8 – see figure 2.5
This is not really a type. These are all houses with a floor plan that presents special or different features, and therefore cannot be included in any of the other types mentioned in the MP. (IMPLAN, 2012).
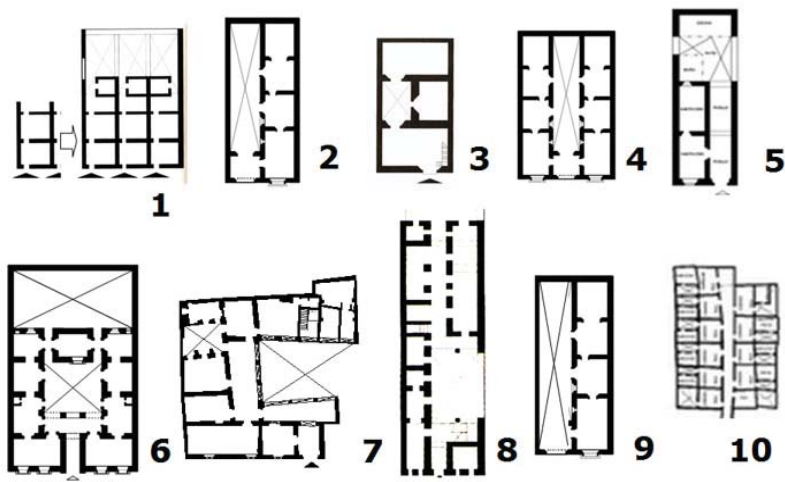
Fig 2.6 -floor plans of all described types by INAH (2008)

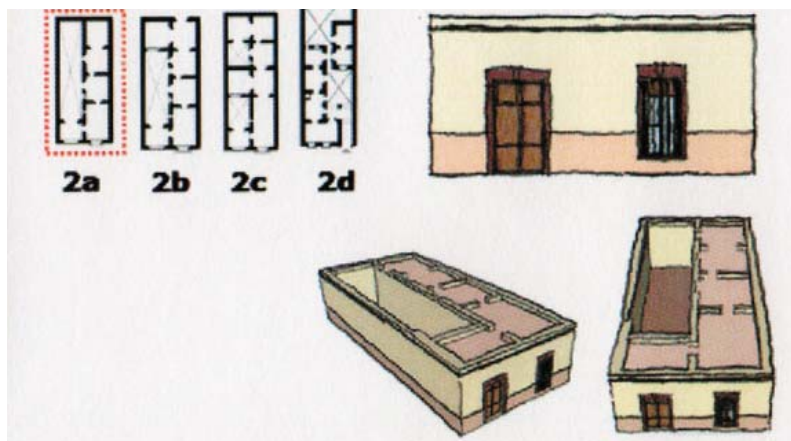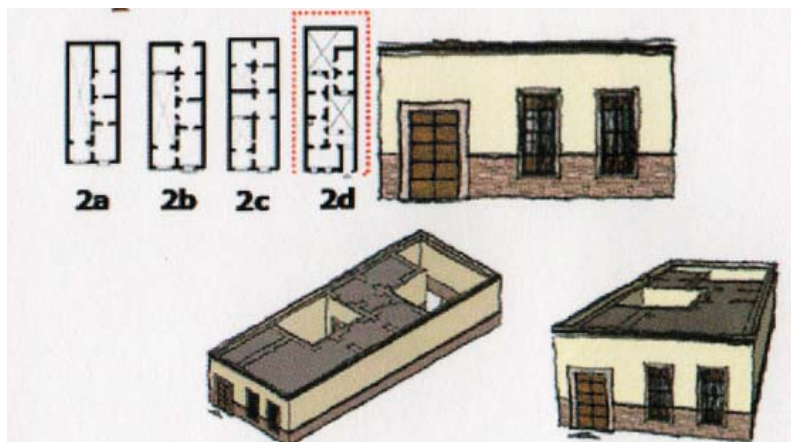Fig 2.7 - 3D and floor plan, type 2A (Lezama-Lopez , 2012)

Fig 2.9 - 3D's and floor plans, types 4 and 6 (Lezama-Lopez , 2012)

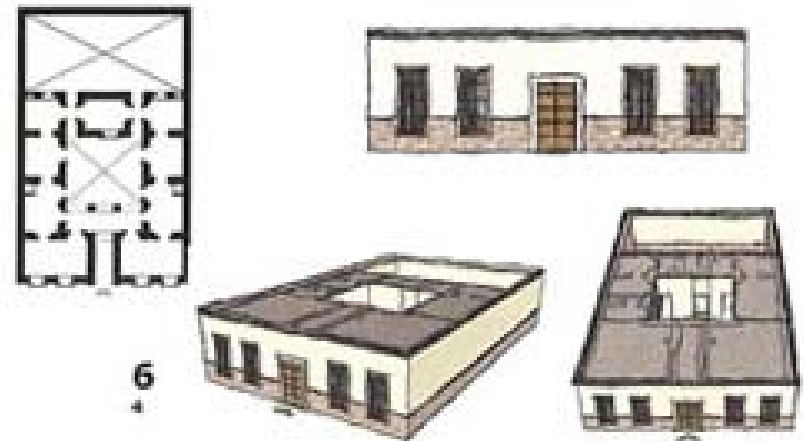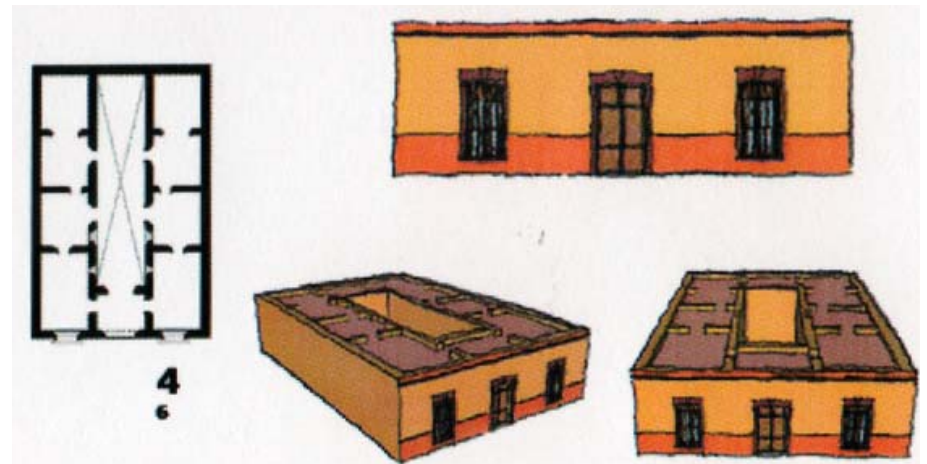Fig 2.8 - facade and floor plan, type 2D (Lezama-Lopez , 2012)

Fig 2.10 - Façade and floor plan, type 1 (Lezama-Lopez , 2012)

2.1.2 Typology examples from Transformaciones en la vivienda histórica en la zona de monumentos de Santiago de Querétaro

In "Transformaciones en la vivienda histórica en la zona de monumentos de Santiago de Querétaro" from Lezama-Lopez (2012) the following representations for the different housing types are shown. For further research 10 housing types identified by INAH (2008) are used as a base (see figure 2.6). These types are numbered slightly different.

In the document these types are only shown as examples. No description is included.

Type 2 (figures 2.7 and 2.8), which is also type 2 in the MP, is divided into 4 different types, of which 2 are found in the investigated block.

Type 4 and type 6 (figure 2.9) fit within the characteristics of type 3 from the MP. They seem to be related in this document as well. Type 6 has a small 4 underneath and type 4 shows a small 6.

In the floor plan of type 4 there is a courtyard that leads to the back of the building, while the 3d drawing presents a space at the end of this courtyard. In reality only the second one is found in plot 012.

Type 1 (figure 2.10) fits within the characteristics of type 4 in the MP.

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard

transition - courtyard -transition - backayard - service

Possible sequences of uses in routing

transition

transition - courtyard

transition - served

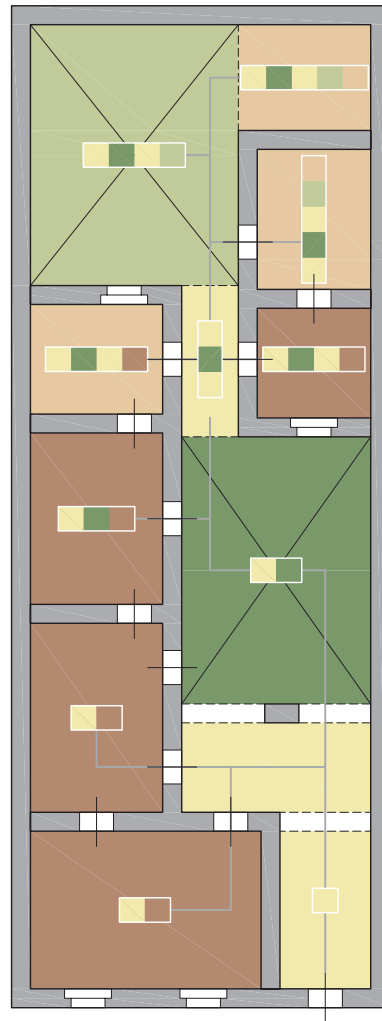transition - courtyard -served

transition - courtyard - served - service

Possible sequences of uses in routing

Plan 2.1 - typology characteristics type 2A

Plan 2.2 - typology characteristics type 2D

plan 2.1 and 2.2 - typology characteristics of
type 2A and 2D
1:200

▬	served
▬	service
▬	transition
▬	courtyard
▬	backyard
—	routing
▬	wall
▬	door
▬	window

map 2.2 - combined typology overview
1:2 000

▬	type 2A
▬	type 2B
▬	type 3a
▬	type 3b
▬	type 4
▬	type 8
▢	not possible to reconstruct ideal situation
▢	surrounding plots

2.1.3 Overview type properties

Within this sub-chapter the features for each type described in the previous two sub-chapters are summarized. Clear drawings of type examples are made for later comparison with the reality situation. In these examples all defined characteristics of the types are shown. The distribution of types is shown in map 2.2. Because type 3 in the MP and types 4 and 6 in the document of Lezama-Lopez (2012) share the same characteristics, they were defined as type 3 in this document. Type 3 is subdivided into type 3a (with backyard) and type 3b (without backyard).

In the descriptions from the MP a distinction is made between the spaces for living and the kitchen and bathroom. The distinction between these kinds of spaces is in the hierarchy of spaces. Spaces for living, like bedrooms, dining rooms, living rooms, study rooms etc. are served by the spaces that are lower in the hierarchy of uses (served). Spaces that serve these served spaces are kitchens, bathrooms, washing rooms etc. (service). This distinction has also been made for the use of spaces in reality, which leads to the possibility of comparing. Behind the access of the building there is always a hallway (transition), because this is an open connection to the courtyard it could be seen as part of the courtyard. The served spaces are connected to the courtyard and hallway. The only place left for service spaces is in the back of the building often connected to the backyard.
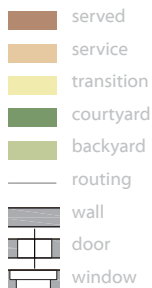
Type 2A – see floor plan 2.1

Amount of stories: 1
Rows of spaces: 2
Courtyard: side, leading to the back of the building, served spaces connected to courtyard
Backyard: None
Main sequence within building: access, transition, courtyard
Access type: side
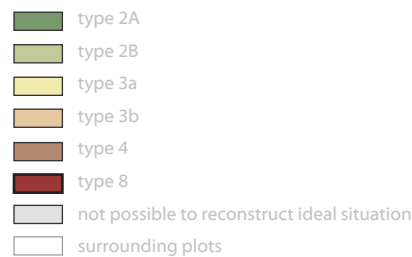Amount of windows: at least 1

Type 2D – see floor plan 2.2

Amount of stories: 1
Rows of spaces: 2
Courtyard: side, served spaces connected to courtyard
Backyard: side, spaces for service connected to backyard
Main sequence within building: access, transition, courtyard, transition, backyard
Access type: side
Amount of windows: at least 1

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service
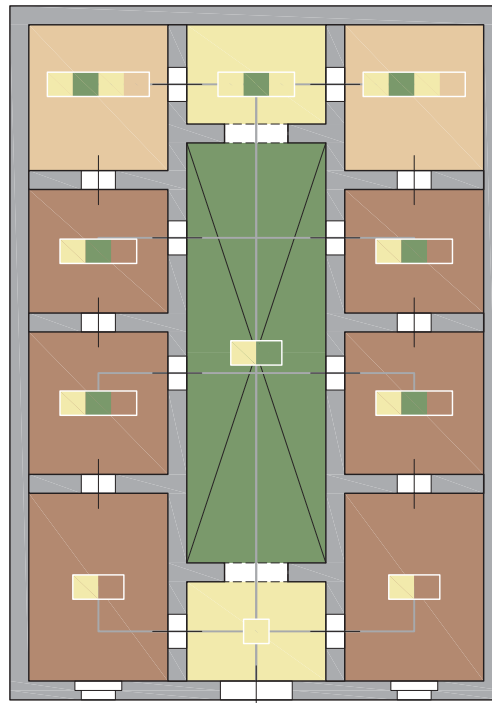
transition - courtyard -transition - backayard

Possible sequences of uses in routing

service

service - service

service - service - transition

service - service - transition - courtyard

service - service - transition - courtyard - service

Possible sequences of uses in routing
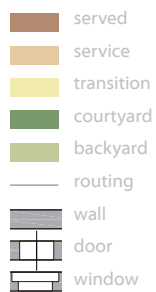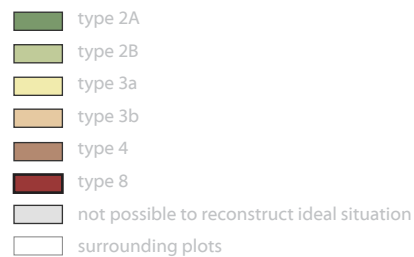
Plan 2.3 - typology characteristics 3a

Plan 2.4 - typology characteristics 3b

Plan 2.5 - typology characteristics 4

Type 3a – see floor plan 2.3

Amount of stories: 1
Rows of spaces: 3
Courtyard: side or central, served spaces connected to courtyard
Backyard: yes
Main sequence within building: access, transition, courtyard, transition, backyard
Access type: central
Amount of windows: at least 2

Type 3b – see floor plan 2.4

Amount of stories: 1
Rows of spaces: 3
Courtyard: side or central, served spaces connected to courtyard
Backyard: none
Main sequence within building: access, transition, courtyard, transition
Access type: central
Amount of windows: at least 2

Type 4 – see floor plan 2.5

Amount of stories: 1
Rows of spaces: 1
Courtyard: none
Backyard: yes, functions as main yard of the building in the back
Main sequence within building: served space, served space, transition, backyard
Access type: side

Amount of windows: at least 1

plan 2.3, 2.4 and 2.5 - typology characteristics of
type 3a, 3b and 4
1:200

	served
	service
	transition
	courtyard
	backyard
—	routing
	wall
	door
	window

map 2.2 - combined typology overview
1:2 000

	type 2A
	type 2B
	type 3a
	type 3b
	type 4
	type 8
	not possible to reconstruct ideal situation
	surrounding plots

CATEGORISED REGULATION (if not specified)					
catogories	CAC Constructed Area Coefficient (constructed area divided by plot area)	GAC Green Area Coefficient (green area divided by plot area)	GFAC Gross Floor Area Coefficient (total floor area divided by plot area)	MaxH Maximum Height in meters (if CAC and GDAC are specified divide GFAC and multiply CAC by 3,5)	allowed uses all specified uses are indecated in "Plan Parcial de Desarrollo Urbano" from the municipality of Querétaro
HMCS1	1,00	0,10	1,60	7,00 m	mixed use, 100 users per hectare allowed
HMCS2	0,80	0,25	4,00	17,50 m	mixed use, 200 users per hectare allowed
HMCS3	0,60	0,05	1,75	10,21 m	mixed use, 300 users per hectare allowed

Table 2.1- general regulation on area of construction, data adapted from Development Plan of the City of Querétaro (Municipality Querétaro, 2008)

map 2.3 - plot classifications for planning policies
data adapted from Municipality of Queretaro (2008)
1:200

HMCS3 plot
HMCS2 plot
HMCS1 plot
surrounding plots
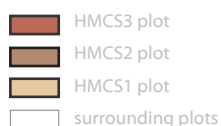
2.2 Planning policies

There are four different kinds of planning policies found, which can be used for defining where can be build. Together with the possible uses of the buildings and these regulations it is possible to determine restrictions on the built space. The following regulations are defined by the zoning within the city of Querétaro. On different areas different rules apply. The zone the investigated block fits into is what is called monumental zone with mixed use. Within this zone specified classifications are applied based on the compatibility of the plots (see table 2.1). The distributions of these classifications are shown in map 2.3. (Municipality of Querétaro, 2008)

On the city development plan it is mentioned that the regulation within the classifications can be overruled when specified differently in additional regulations (Municipality of Querétaro, 2008). These specifications are available within the database from IMPLAN.

The "Coeficiente de Ocupación de Suelo" (COS) or Constructed Area Coefficient (CAC) is the constructed area divided by the total plot area. This defines the amount of area that can be used to build upon.

The second regulation found is the "Coeficiente de Absorción de Suelo" (CAS) or Green Area Coefficient (GAC). This is the total area of green on a plot divided by the total plot area. This determines the minimum area of green that every plot should at least have.

This is followed by the "Coeficiente de Uso de Suelo" (CUS) or Gross Floor Area Coefficient (GFAC). This is the total used floor area divided by the total plot area. This determines the amount of floors on a plot.

At last there is the maximum building height in meters (MaxH). This building height is determined by dividing GFAC by CAC and multiplying by 3,5 (height of one floor). This is specified for new construction. The buildings in the investigated block are always higher than 5 meters, but in most cases do not have more than 1 floor as described in the type specifications.

The general regulations on CAC, GAC, GFAC and MaxH apply for the building plots except when specified differently for a building by IMPLAN (Municipality of Querétaro, 2008).

For all three classifications (HMCS1, HMCS2 and HMCS3) it is allowed to have mixed use within the plot. All allowed mixed uses are shown in an extensive table in the City development plan (Municipality of Querétaro, 2008). Commercial uses, bars and restaurants etc. are all allowed as long as the plot partly remains residential.

The Municipality of Querétaro (2008) states in the urban development plan that if any property listed in the catalogs of historical monuments of the city of Querétaro, the integrity of the property must be respected. The heights, walls and the organization of interior spaces must be conserved.
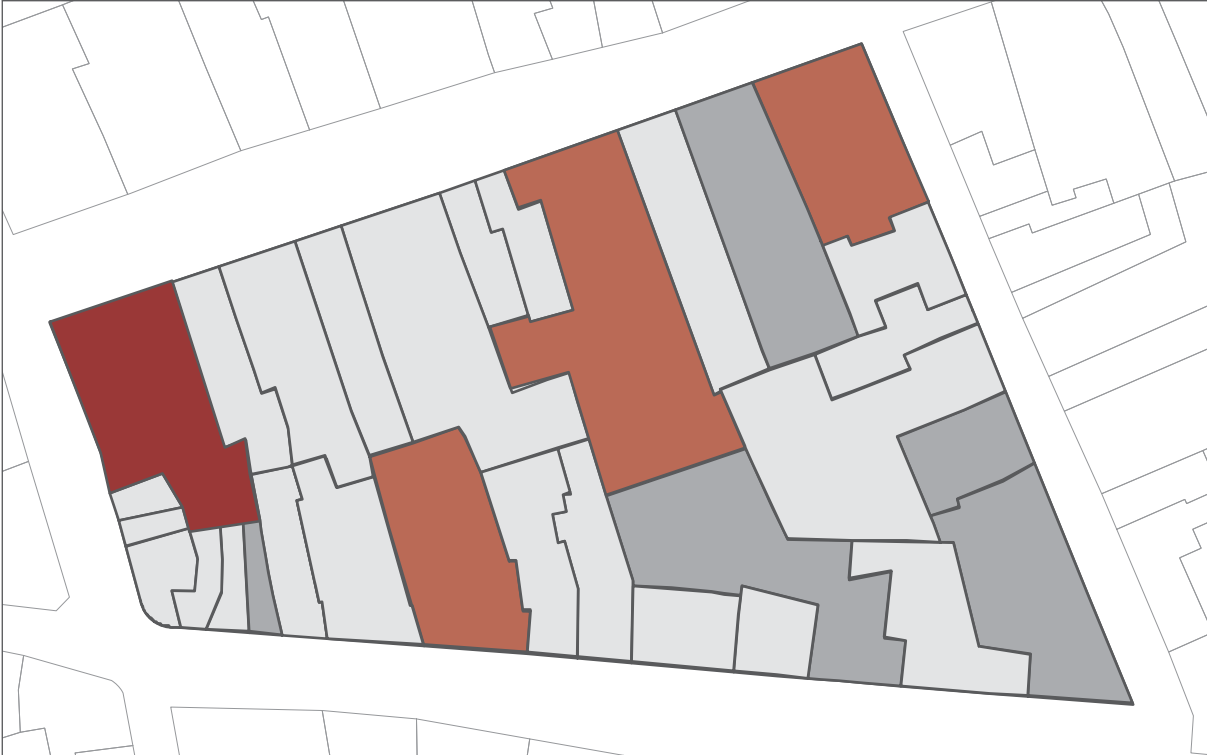
Nothing is stated on the façade attributes. Although Lezama-Lopez (2013) stated in an interview that a changes of doors and windows are not allowed by the authority INAH. Carranza (2013) stated in an interview that modifications of construction elements in the HZMQ need to be approved by INAH.
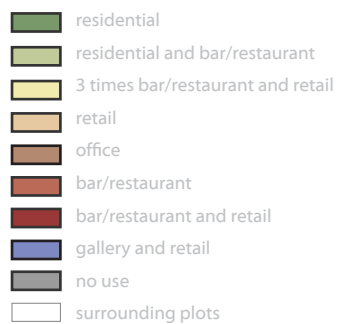
3

Defining the area

map 3.1 - plot use
data adapted from field research in 2013
1:1 000

- residential
- residential and bar/restaurant
- 3 times bar/restaurant and retail
- retail
- office
- bar/restaurant
- bar/restaurant and retail
- gallery and retail
- no use
- surrounding plots

maps 3.2 - amount of uses
data adapted from field research in 2013
1:1 000

- 4 uses
- 2 uses
- 1 use
- no use
- surrounding plots

3.1 Plot use - reality

All buildings on the investigated block have originally been built for residential use (INAH, 1990 and 2000). The buildings on plot 7, 8 and 26 are not cataloged. These buildings are the only buildings that are built in the 21st century. The buildings that were originally on these plots don't exist anymore. There is a good chance they have been of residential use as well, but this can only be assumed.

The data of these maps come from the research done for part 1 of this series where the façade attributes of the typologies are researched. The plots are not drawn as they exist today, but are drawn as a reconstruction of how the plots where originally divided (Stuurman et al.).This is done to in order to recognize the characteristics of these façade attributes. For example: If a type is supposed to have 2 windows and is divided into two plots in-between these windows the amount of windows do not correspond to the original typology. Note that this reconstruction is not done with the same method as the reconstruction of the ideal in chapter 4. For this reconstruction the oldest data on the division of plots are used from the catalogs of 1990 and 2000 (INAH, 1990 and 2000). Because of this the plots are not corresponding to the reconstruction of plots in chapter 4 where not only data from 1990 and 2000 is used but also the characteristics of the types are

map 3.3 - plot numbers
1:2 000

- Reality plots, incuding plot numbers
- surrounding plots
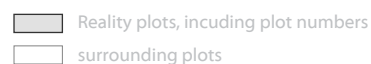
taken into account.

Where plot 1 and 2 used to be one building plot, in 2013 it is divided into 2 ownerships. With this also the use is divided.

Of all the 32 plots, 17 (53,1%) still have residential use only. Of the remaining 46,9% of the plots 6 (18,8%) are (partly) used as bar or restaurant, 3 (9,4%) of the plots are (partly) used for retail, 2 (6,3%) plots are used for offices and there is one (3,1%) gallery. There are 5 (15,6%) plots with no use. The buildings on these plots are for rent or sale.

This shows that next to dwellings there is also interest for commercial uses like bars, restaurants and shops. These commercial uses are represented mostly on the larger street at the north of the block (Cinco de Mayo).

Except for plot 1 and 2 every plot has one owner, but when looked at the amount of uses it is sometimes observed that there is a division in use (for example with multiple tenants). Of the 32 plots 5 (15,6%) have multiple uses. All the plots with multiple uses have a commercial function within them. 4 of the 5 buildings that have multiple uses are situated at the Cinco de Mayo.

Like with division of ownership this can have influence on the interior of the building. A possible consequence is that more entrances are needed or connections between spaces are being broken. Whether this has negative influence on the OUV will be observed in the comparison between the ideal situation and the situation in reality in chapter 6.
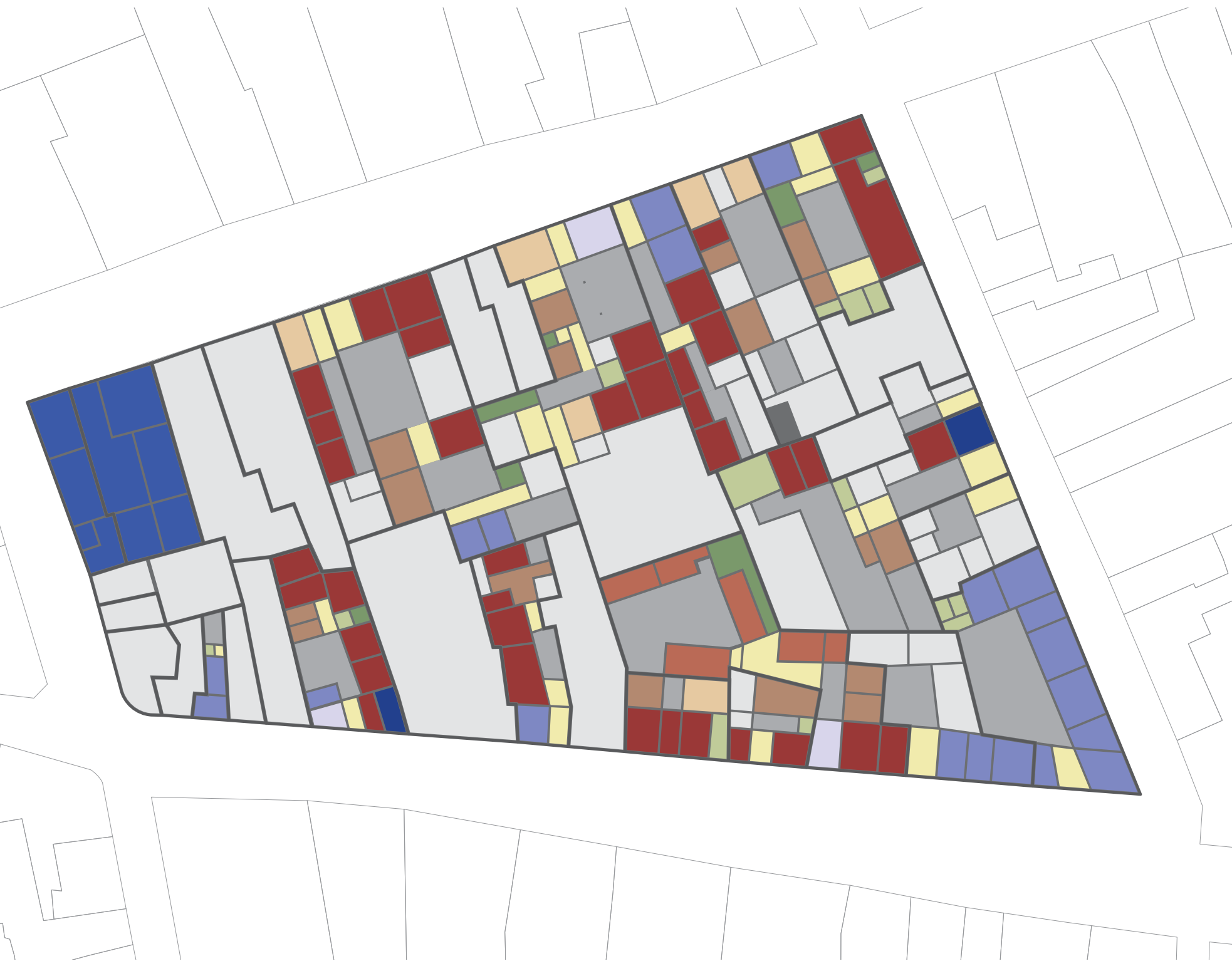
3.2 Functions of spaces - reality

Map 3.4 shows the functions of spaces. During the field research in Querétaro it was hardly possible to enter the buildings. Only for the outside spaces and plot 1, 2 and 19 there is more up to date info available, the rest is from the INAH catalog from 2000. Because the floor plans in the catalogs are from 2000, the use of spaces don't match with the use of plots in 2013. Because this report is testing a strategy in a case study this data is still useful for showing a possible happening development within a block.

Another note to map 3.4 is that during the field work done by INAH in 2000 not for all spaces and plots access was granted by the owners or users of these buildings. This is why not all plots and spaces have data.

The spaces that have no relation with the original use of the buildings are colored blue in the map. All these kind of spaces are directly connected to the public area or connected to other spaces of this kind (except for one office space). This shows

that these kind of spaces need to be connected to the public area. There are some garages integrated in the buildings for parking a vehicle, which need a connection to the public road. Bar and commercial spaces logically have an interest to be visible and accessible from outside. Because the offices are connected to the public area as well, this indicates that these spaces have an interest on being visible and accessible from outside as well. Also the spaces that are used as study rooms are often connected to the façade. This could mean that spaces for living get pushed more to the back of the plot, whether this has bad influence on the OUV will be observed in the comparison between the ideal situation and the situation in reality in chapter 7.

The map is showing that clusters of uses are formed. There are clusters visible of spaces for living, spaces for sleeping and spaces for eating/cooking. Also offices and commercial uses are represented in clusters most of the times.

map 3.3 - plot numbers
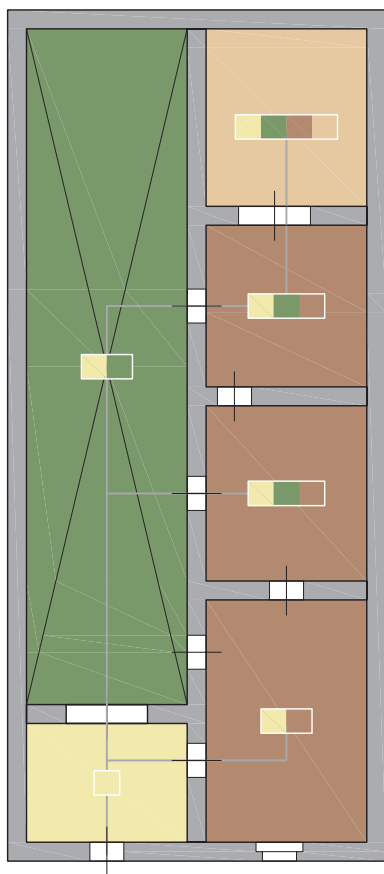1:2 000

- Reality plots, incuding plot numbers
- surrounding plots

4

Reconstruction of the ideal situation

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard - served - service

Possible sequences of uses in routing

Plan 2.1 - typology characteristics type 2A

Plan 4.1 - reality, plot 5

Plan 4.1 - ideal situation, plot 5

Plot 5, type 2A

When looking at the difference between the type example 2A (plan 2.1) and reality (plan 4.1) it can be seen that the backyard doesn't lead all the way to the back. If the backyard and the space without data in the back are left out, the spaces are in the same way arranged as the typology example. To be completely coherent with the sequence of spaces, one use of space in the ideal (plan 4.2) is determined as being service.

plan 2.1, 4.1 and 4.2 - reconstruction ideal situation
1:200

	served
	service
	transition
	courtyard
	backyard
	routing
	added or removed wall
	wall
	door
	window
	not existing within the ideal sequence

map 4.1 - situation plot
1:2 000

	plot 5
	reality plots, incuding plot numbers
	surrounding plots

Fig. 4.1 - floor plan catalog INAH (1990)
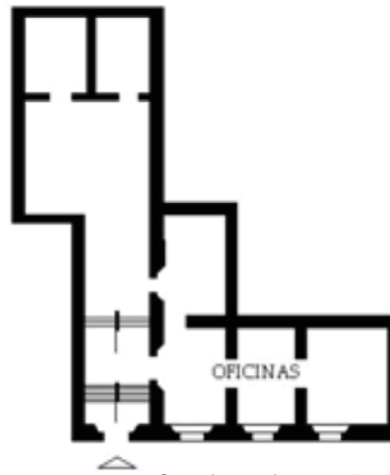
Fig. 4.2 - floor plan catalog INAH (2000)
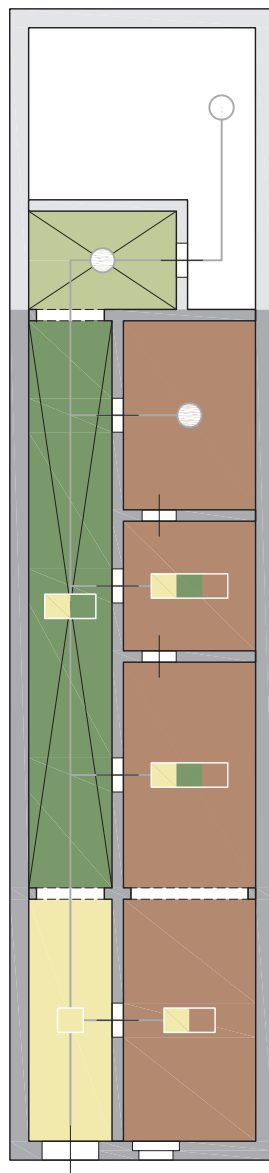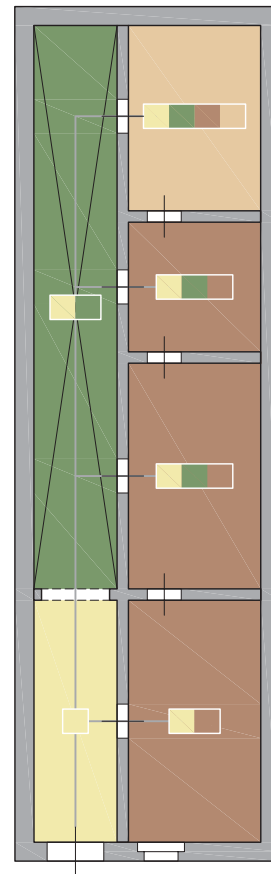

Fig. 4.3 - Google Earth statellite image (2008)

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard - served - service

Possible sequences of uses in routing
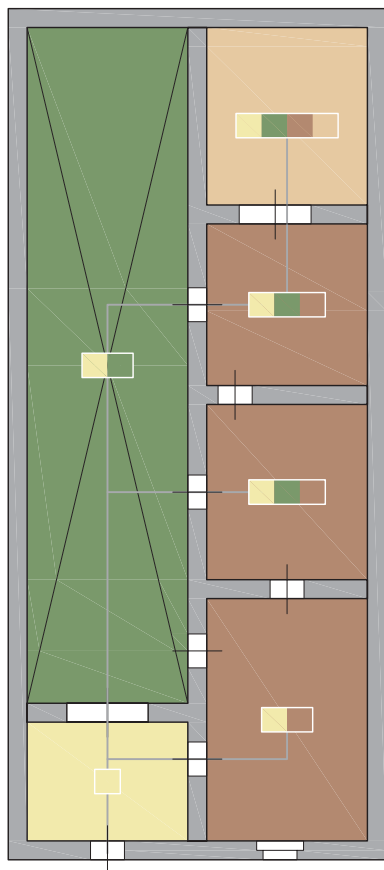
Plan 2.1 - typology characteristics type 2A
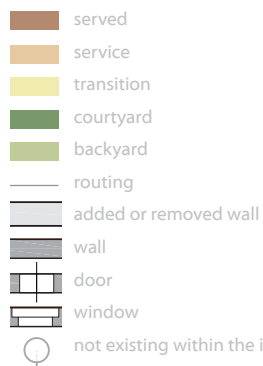

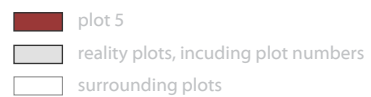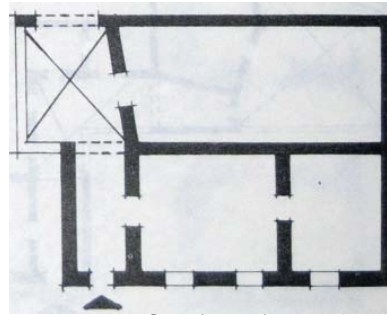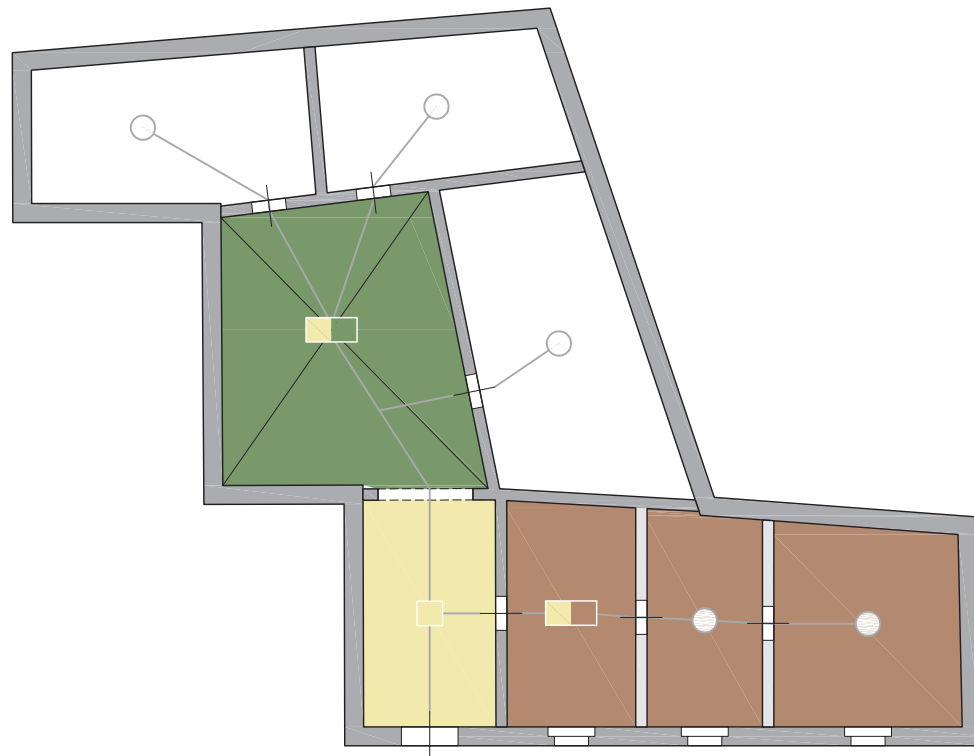Plan 4.3 - reality, plot 18

map 4.2 - situation plot
1:2 000

■ plot 18
▨ reality plots, incuding plot numbers
□ surrounding plots
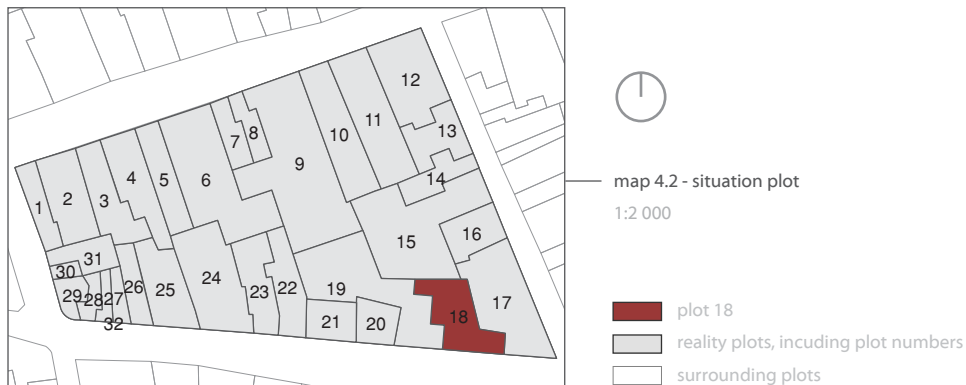
Plot 18, type 2A

The typology description of type 2 in the MP describes 2 rows of spaces, which means 2 space are supposed to be connected to the main façade. In reality there are 4 spaces connected to the main façade (plan 2.??). This indicates on a division within the original type. Also the INAH catalog of 1990 shows 3 rows of spaces for this plot (fig. ..)and the INAH catalog of 2000 shows 4 rows of spaces (fig. ..). Which means it can be assumed that it got divided once more before 1990 and there is a reference that proves that it got divided once between 1990 and 2000.

The difference in shape that the catalogs show from the plot shape can be explained by inaccurate measurements (counting steps) and limited access during the surveys carried out by INAH in 1990 and 2000. The Google satellite image confirms the shape of the plot drawn in the GIS database of IMPLAN.
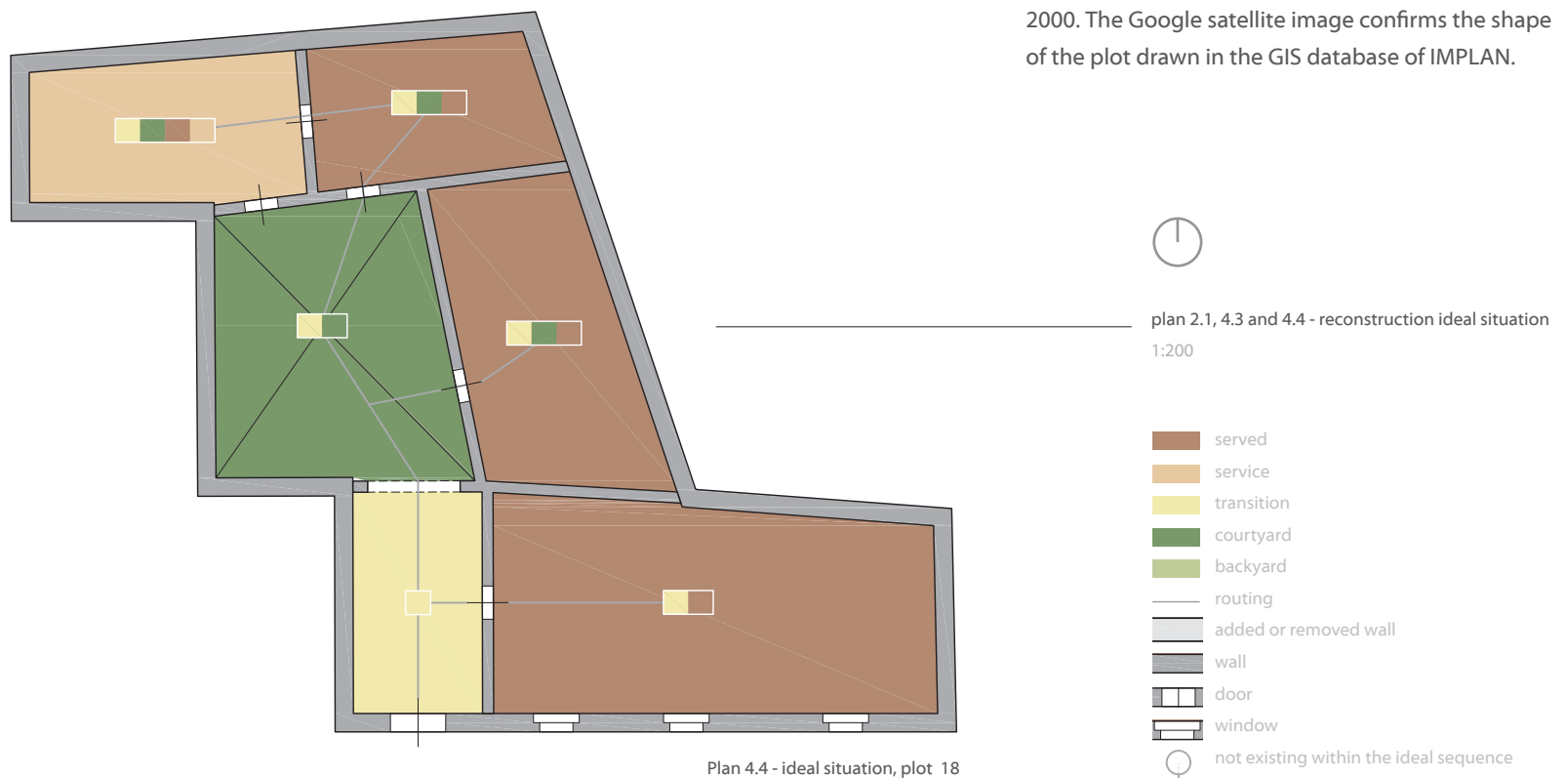
plan 2.1, 4.3 and 4.4 - reconstruction ideal situation
1:200

■ served
■ service
■ transition
■ courtyard
■ backyard
— routing
▨ added or removed wall
▨ wall
▥ door
▥ window
○ not existing within the ideal sequence

Plan 4.4 - ideal situation, plot 18

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard

transition - courtyard -transition - backayard - service

Possible sequences of uses in routing

Plan 2.2 - typology characteristics type 2D

Plan 4.5 - reality, plot 6

Plot 6, type 2D

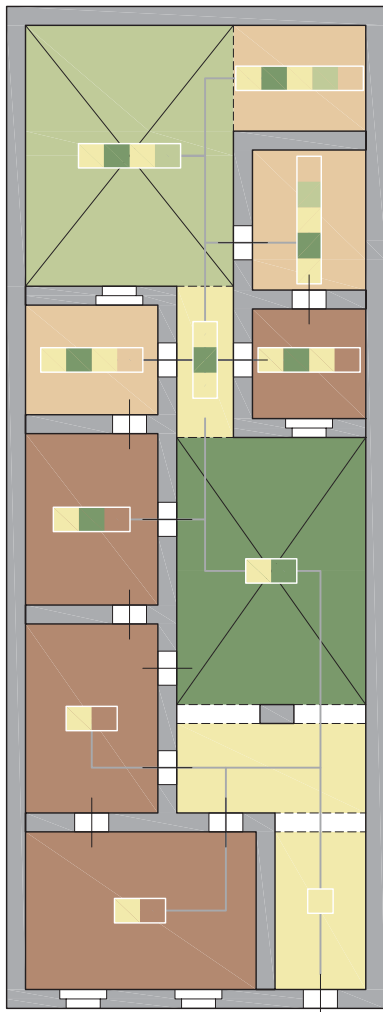The interior of the building in reality (plan 4.5) almost exactly matches the type 2D example (plan 2.2), except for the back part of the plot. This would mean that the back part is added to the plot. Although the addition to the plot doesn't affect the existing building, it makes it harder to recognize what is part of the original layout (plan 4.6) and what not.

Because there are always 2 rows of spaces within the plots of type 2, it can be assumed that the served space at the façade is divided in two. Although the served space at the end of the plot on the left side fits within the existing sequences of type 2D, it is assumed that this space had a serving use. In the example this space is also a served space.

map 4.3 - situation plot
1:2 000

- plot 6
- reality plots, incuding plot numbers
- surrounding plots

plan 2.2, 4.5 and 4.6 - reconstruction ideal situation
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

Plan 4.6 - ideal situation, plot 6

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard
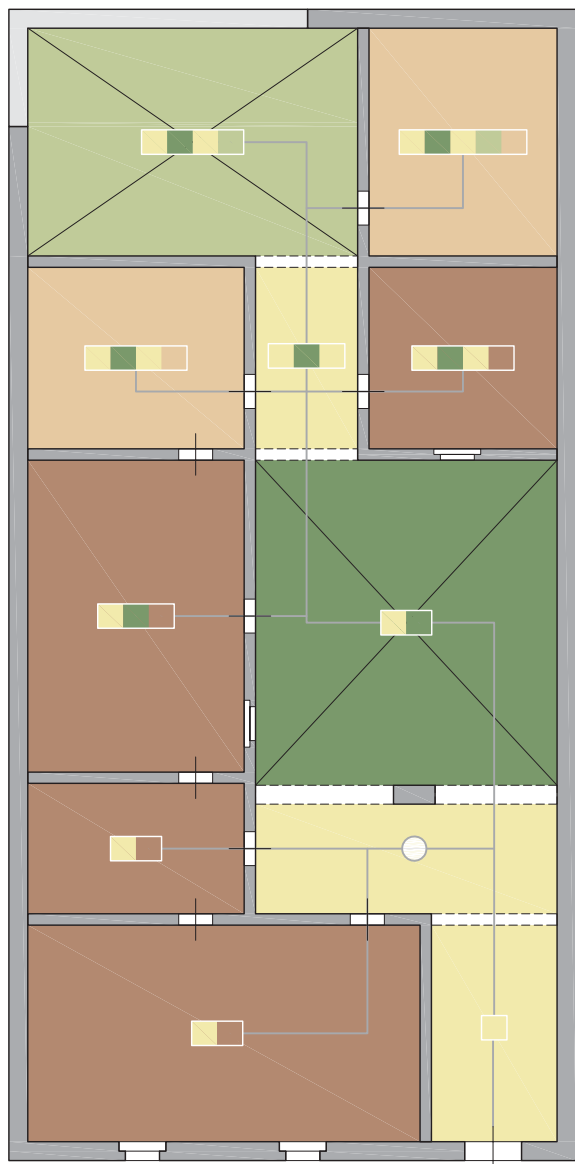
transition - courtyard -transition - backayard - service

Possible sequences of uses in routing

Plan 2.2 - typology characteristics type 2D
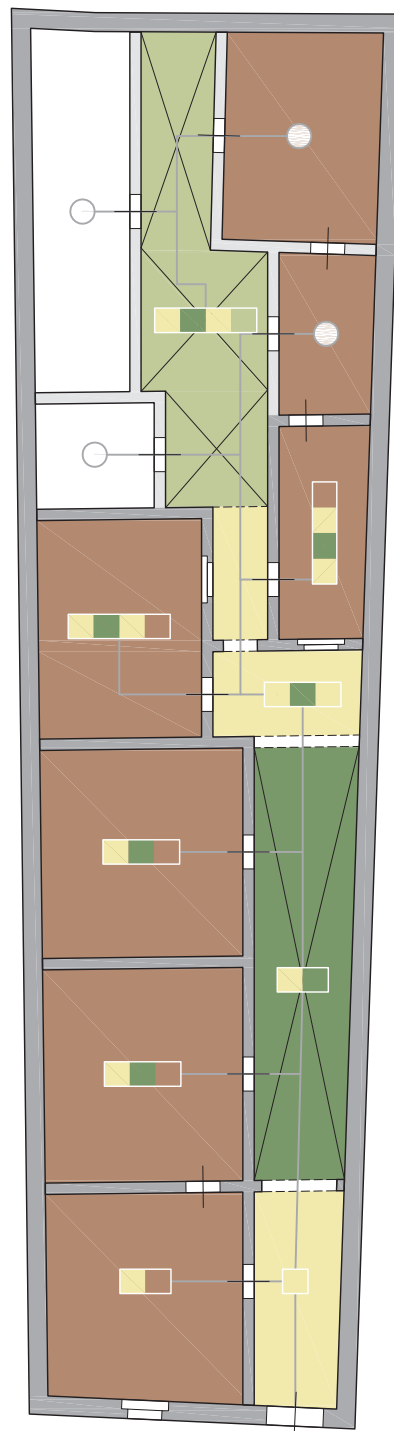
Plan 4.7 - reality, plot 10
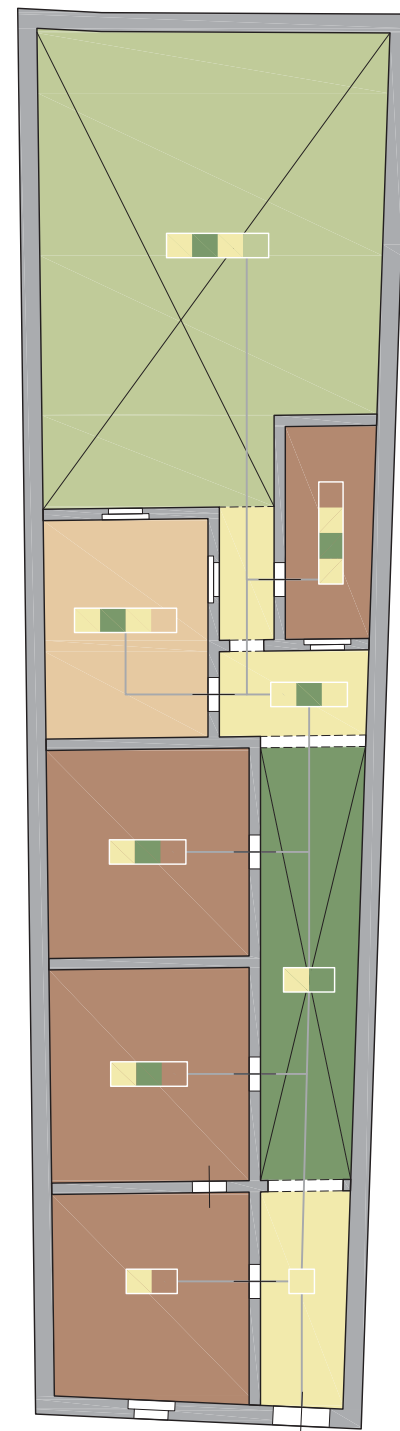
Plan 4.8 - ideal situation, plot 10
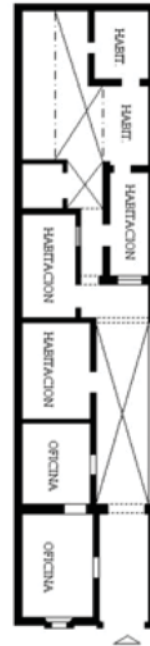
Plot 10, type 2D

Some spaces got added in the backyard. These spaces don't fit the existing sequences within this type. In the floor plan of the catalog of 2000 most of these spaces are drawn as contemporary spaces with dashed-dotted lines (fig. 4.4).

Within the description of type 2 in the MP (IMPLAN, 2012) it is stated that the spaces for living and sleeping are around the courtyard. This means that if a space has any kind of connection with the courtyard it gets determined as served space. In the case of the served space, shown in the ideal on the right side of the plot (plan 4.8), this connection is made by a window. The space on the left of this space is determined as being for service, because it is connected by a window to the backyard.

Fig. 4.4 - floor plan catalog INAH (2000)

plan 2.2, 4.7 and 4.8 - reconstruction ideal situation
1:200
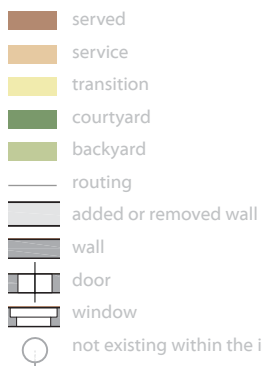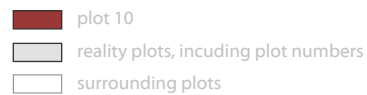
served
service
transition
courtyard
backyard
routing
added or removed wall
wall
door
window
not existing within the ideal sequence

map 4.4 - situation plot
1:2 000

plot 10
reality plots, incuding plot numbers
surrounding plots

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard

transition - courtyard -transition - backayard - service

Possible sequences of uses in routing
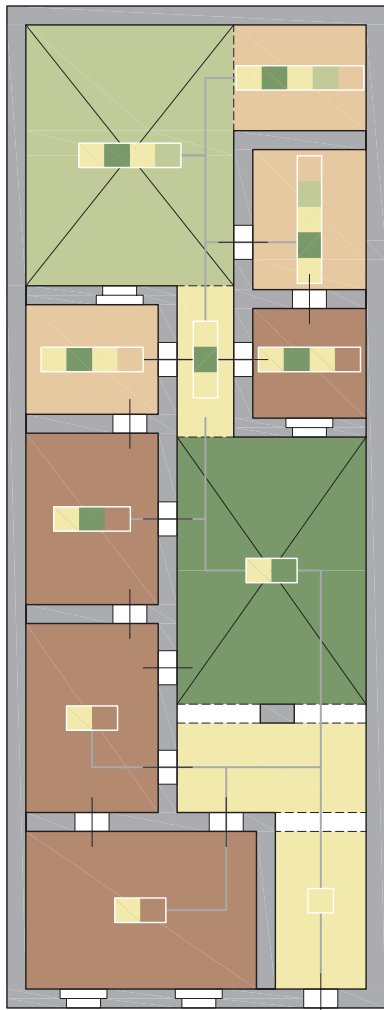
Plan 2.2 - typology characteristics type 2D

Plan 4.9 - reality, plot 10

Plan 4.10 - ideal situation, plot 10

plan 2.2, 4.9 and 4.10 - reconstruction ideal situation
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
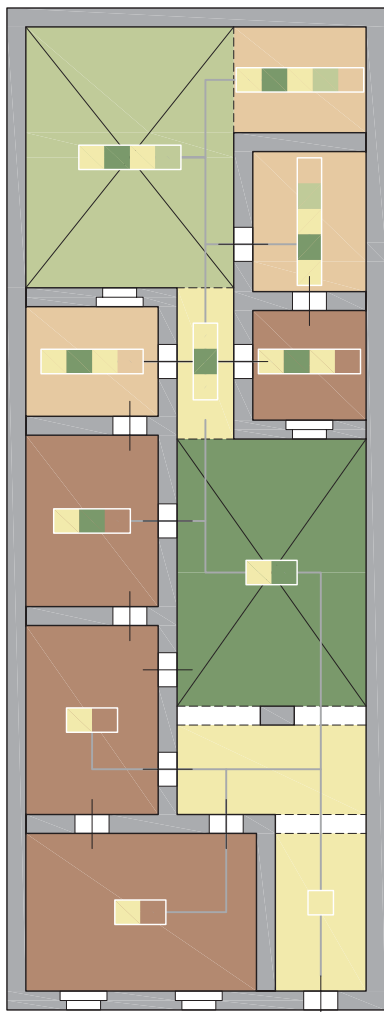- not existing within the ideal sequence

map 4.5 - situation plot
1:2 000

- plot 11
- reality plots, incuding plot numbers
- surrounding plots

Plot 11, type 2D

Because the backyard in reality (plan 4.10) doesn't lead all the way to the back as it does in the example of type 2D, it can be assumed the spaces in the backyard are contemporary.

Also behind the courtyard some changes have happened. To be able to reconstruct the existing sequence of spaces to the backyard a space for transition is needed. There are two opening in the reality floor plan in plan 4.9 that lead to the space behind the courtyard. The one on the right is assumed to be leading to this transition space.

At the side of the façade is seems to be that the served spaces used to be wider, like in the type 2D example in plan 2.2. There is a part of a wall drawn in the floor plan that could indicate on a wall that used to be there.

To make the arrangement completely the same as the example of type 2D (plan 2.2) a space for service is drawn in the ideal situation in the backyard.

Looking at the façade of the type 2D example in plan 2.2 and the façade in reality in plan 4.9, it appears a window have been removed. Because of lack of reference this indication is neglected.

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard

transition - courtyard -transition - backayard - service

Possible sequences of uses in routing

Plan 2.2 - typology characteristics type 2D

Plan 4.11 - reality, plot 15

map 4.6 - situation plot

1:2 000

■ (dark red)	plot 15
■ (light grey)	reality plots, incuding plot numbers
☐	surrounding plots

Plot 15, type 2D

The rectangular plot from the example (plan 2.2) compared to reality (plan 4.11) show different shapes. Parts of plot appear to be added at the left and right side of the plot. The space in the back of the plot without data is drawn with dashed-dotted lines in the floor plan of the survey done by INAH in 2000 (fig 4.5), which is an indication of a contemporary construction.

There are two spaces without data in the reality situation. When the space has a direct connection to the courtyard it is judged as a served space in the ideal situation (plan 4.12). The space that has an indirect connection to the courtyard is judged as service space in the ideal situation.

Because this building, as any other building in the block, had a residential use no commercial spaces exist within the ideal situation. The commercial space is judged to be a served space based on the typology example.

plan 2.2, 4.11 and 4.12 - reconstruction ideal situation

1:200

■	served
■	service
■	transition
■	courtyard
■	backyard
—	routing
☐	added or removed wall
▬	wall
⊡	door
▭	window
○	not existing within the ideal sequence

Plan 4.12 - ideal situation, plot 15
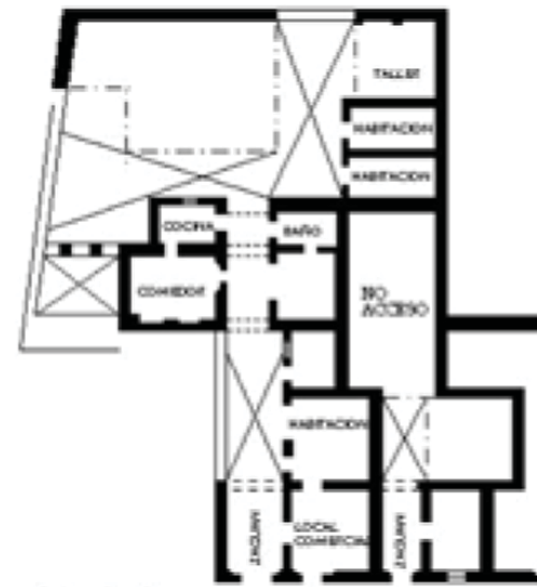
Fig. 4.5 - floor plan catalog INAH (2000)
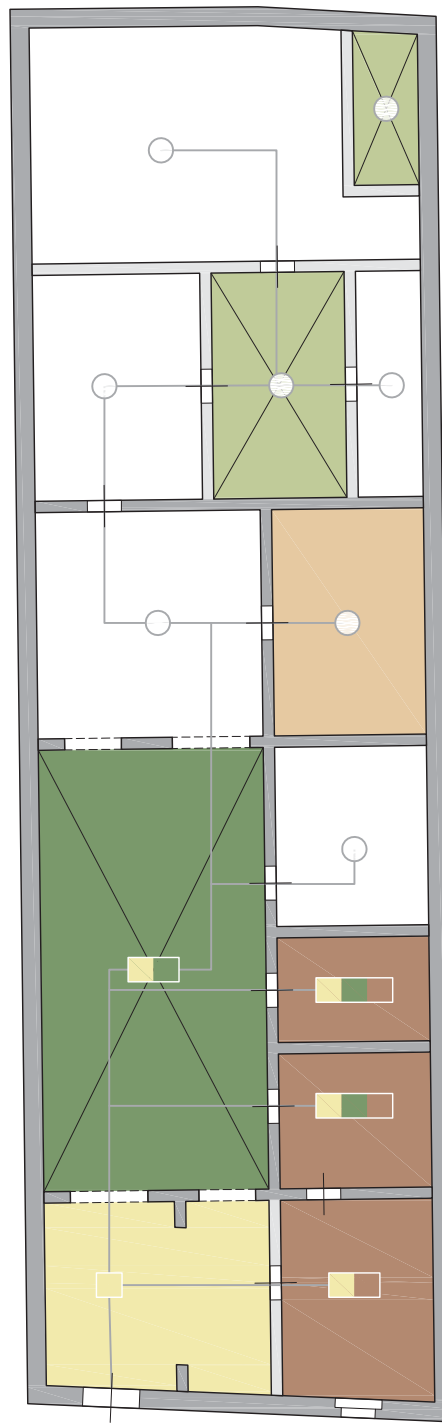
transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard
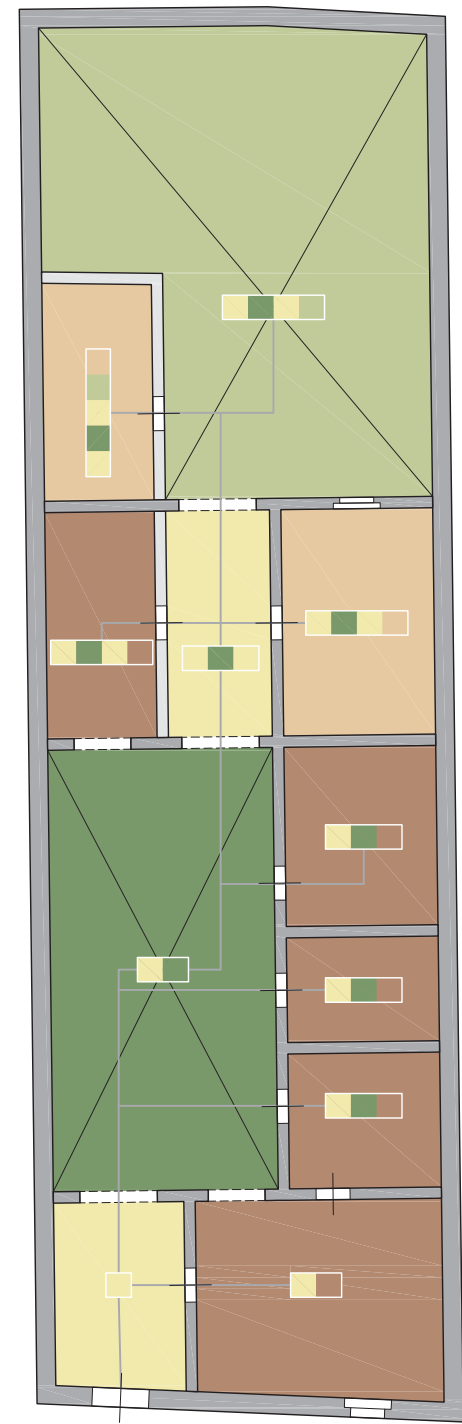
transition - courtyard -transition - backayard - service

Possible sequences of uses in routing
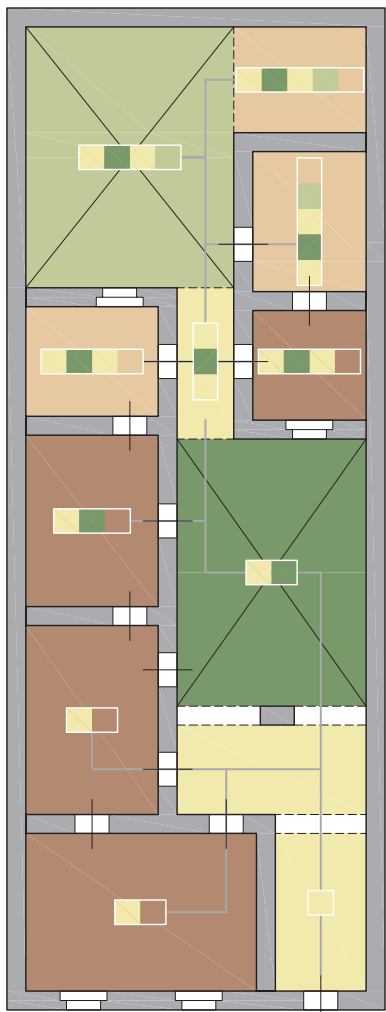
Plan 2.2 - typology characteristics type 2D
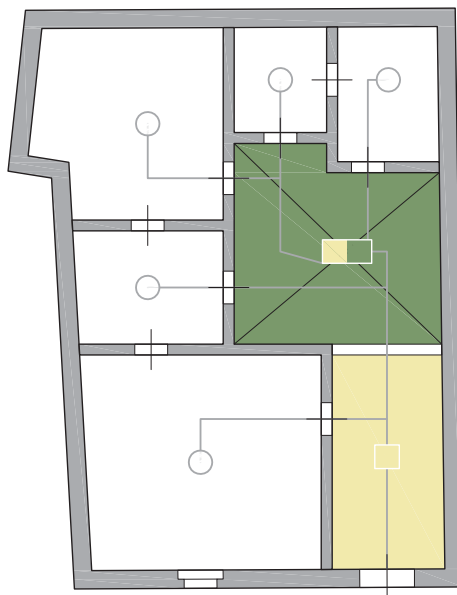
Plan 4.13 - reality, plot 16

Plan 4.14 - ideal situation, plot 16

50

plan 2.2, 4.13 and 4.14 - reconstruction ideal situation
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

map 4.7 - situation plot
1:2 000

- plot 16
- reality plots, incuding plot numbers
- surrounding plots

Plot 16, type 2D

The backyard of plot 15 is smaller in the ideal situation (plan 4.12 (previous page)) than in reality (plan 4.11 previous page). This plot (plan 4.13) still needs a backyard in the ideal situation. Part of the backyard of plot 15 is judged to be part of plot 16 ideally (plan 4.14). All spaces in reality (plan 4.13) without data are connected to the courtyard or façade. The space in the middle in the back of the plot is judged to be the transition space to the backyard, like in the typology example (plan 2.2). Because the other spaces without data also have a connection to the courtyard or façade, they are judged to be served spaces in the ideal situation (plan 4.14). Because every plot needs space for service, one of the existing spaces of plot 15 in reality (plan 4.11) was judged to be service space in the ideal situation of plot 16 (plan 4.14).

Fig. 4.6 - floor plan catalog INAH (1990)

33 pasos

SIN USO

Fig. 4.7 - floor plan catalog
INAH (2000)

TERRAZA
CUBIERTA

JARDIN

RECAMARA

AREA DE
SERVICIO

RECAMARA
PRINCIPAL

ESTANCIA
FAMILIAR

RECAMARA

PATIO

COCINA

COCHERA

SALA - COMEDOR

Fig. 4.8 - floor plan plot 19 anno 2013
Photo field research, Stuurman T.M. (2013)
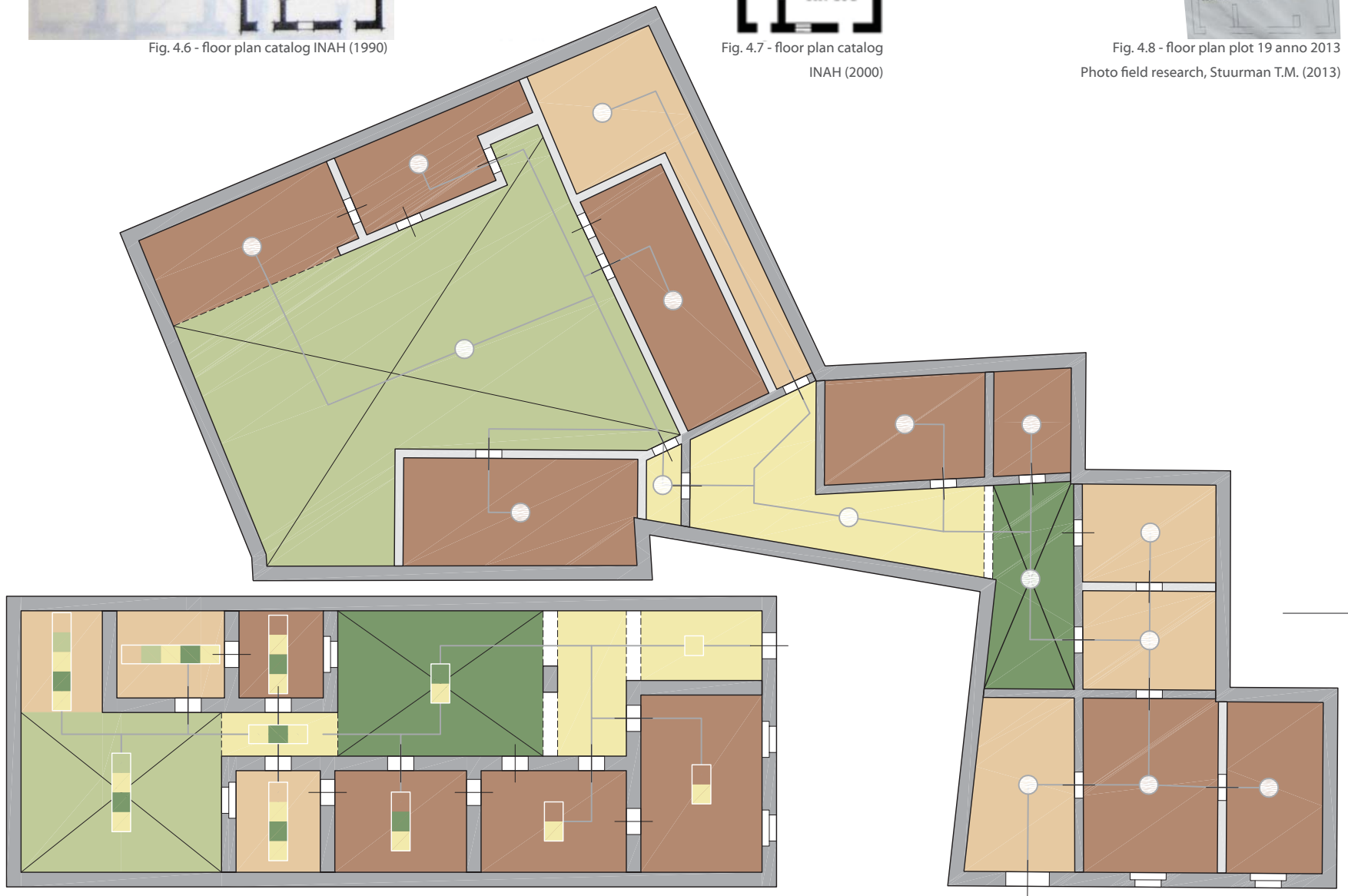
Plan 2.2 - typology characteristics type 2D

Plan 4.15 - reality, plot 19

52

map 4.8 - situation plot
1:2 000

plot 19
reality plots, incuding plot numbers
surrounding plots

Plot 19, type 2D

This plot has more up to data information than most of the other plots. During the fieldwork an up to data floor plan hung on the façade (fig 4.8). This is used to reconstruct reality.

Because of the plots position in the block this plot has a deviating shape in reality (map 4.15). For this reason the plot is not judged to be rectangular in the ideal situation.

Because the ideal situation is similar to the original situation in terms of attributes the oldest data available is used for deciding on what is contemporary and not ideal. In the ideal situation (plan 4.16) the organization of spaces is similar to the situation in 1990 (fig 4.6).

At the time of origin of this building there existed no garages (service space at entrance (plan 4.15)). This space is ideally a transition space. Further spaces that are connected to the courtyard are ideally served spaces and spaces connected to the backyard are ideally service spaces.

plan 2.2, 4.15 and 4.16 - reconstruction ideal situation
1:200

served
service
transition
courtyard
backyard
routing
added or removed wall
wall
door
window
not existing within the ideal sequence

transition
transition - courtyard
transition - served
transition - courtyard -served
transition - courtyard -transition
transition - courtyard -transition - served
transition - courtyard -transition -service
transition - courtyard -transition - backyard
transition - courtyard -transition - backyard - service

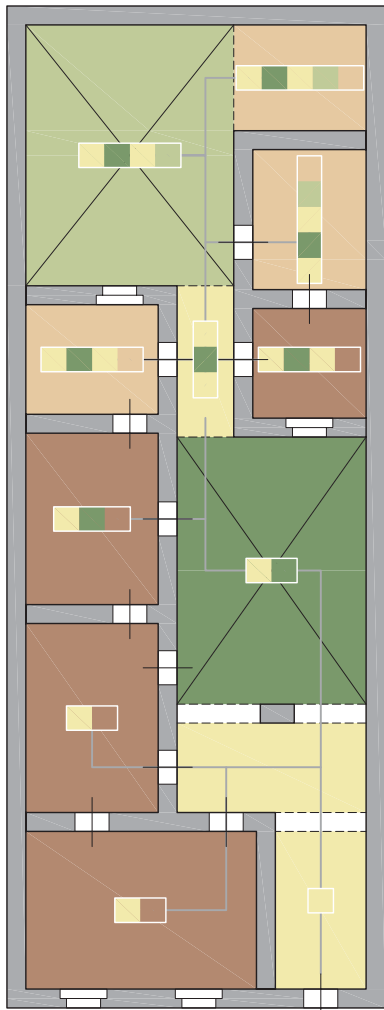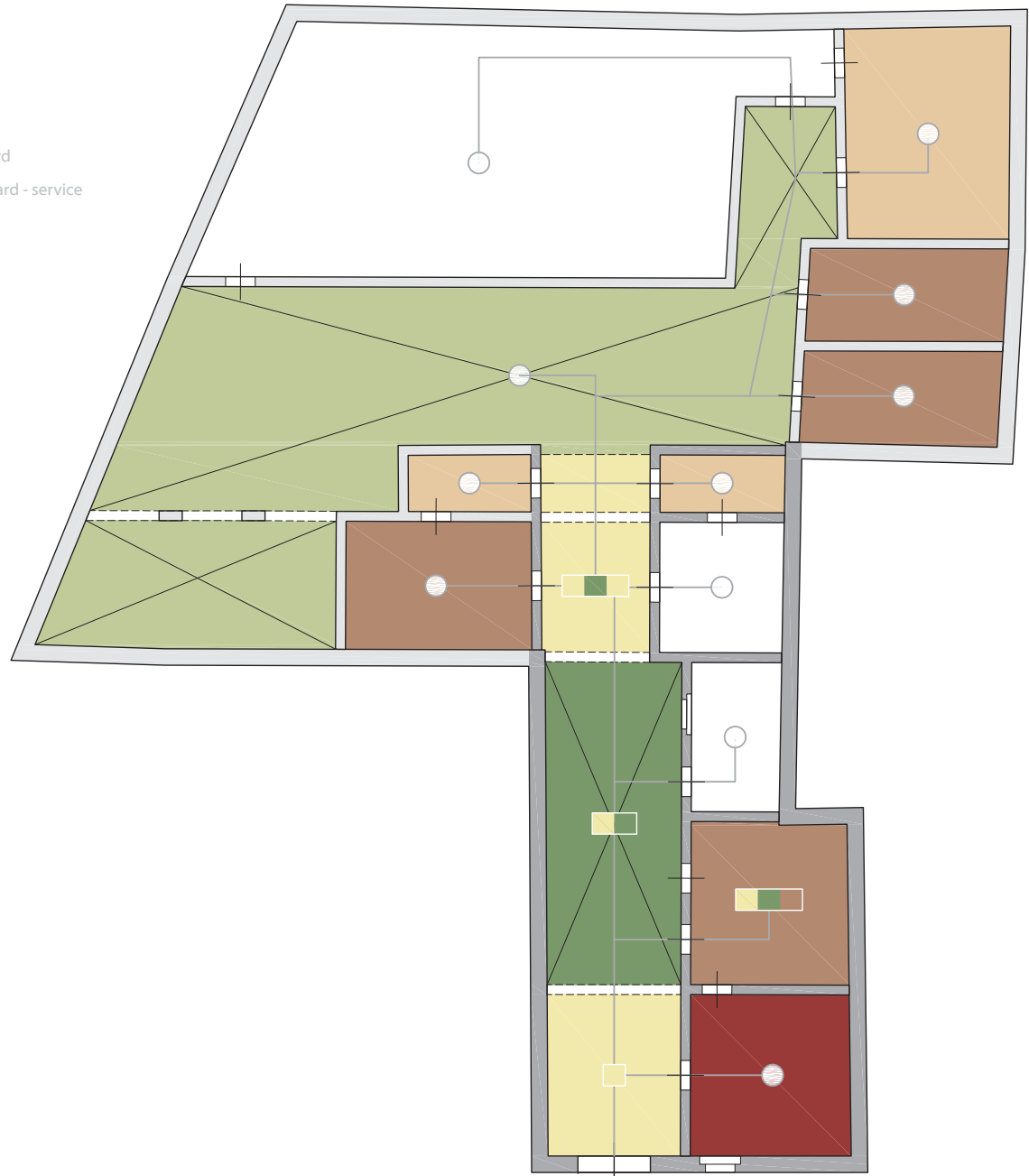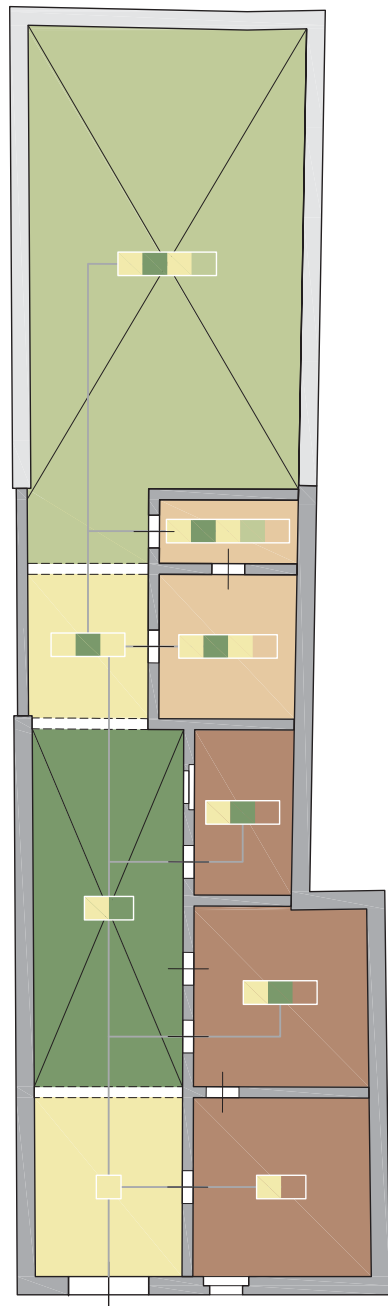Possible sequences of uses in routing (as part of typology characteristics)
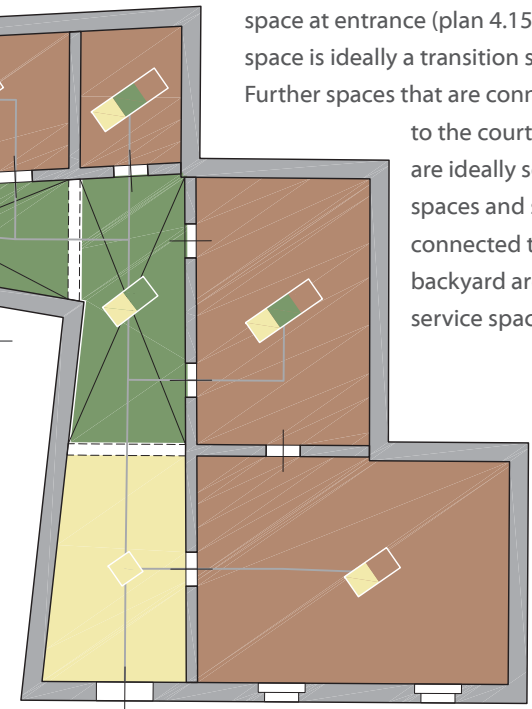
Plan 4.16 - ideal situation, plot 16

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard -transition -service

transition - courtyard -transition - backyard
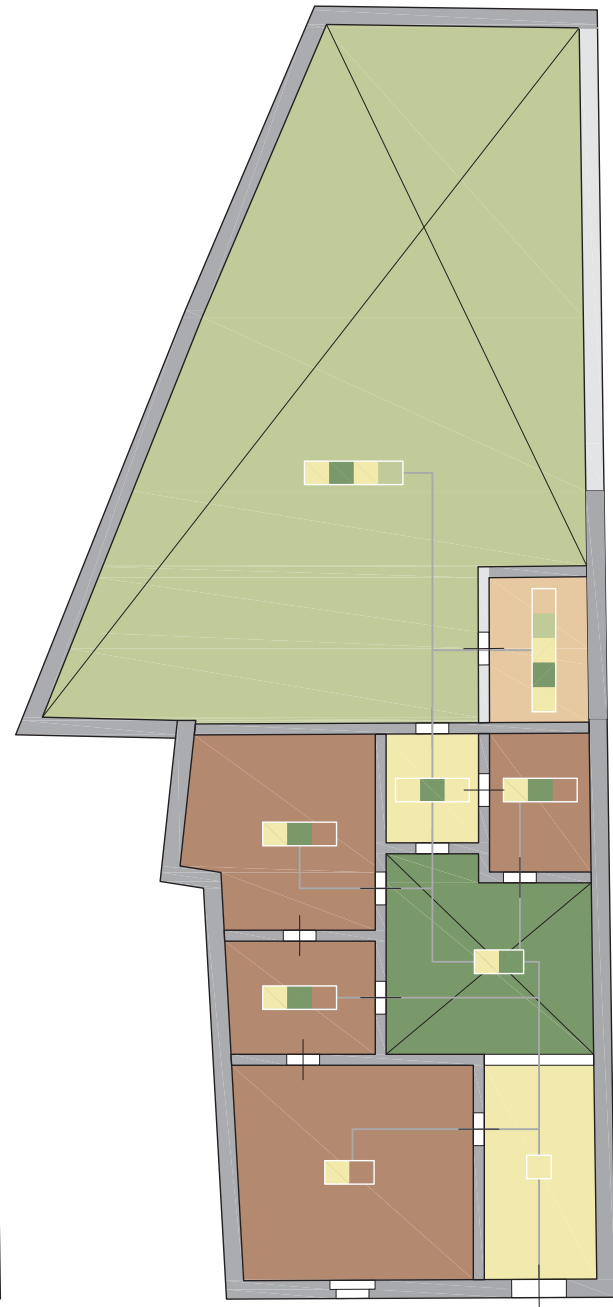
transition - courtyard -transition - backayard - service

Possible sequences of uses in routing
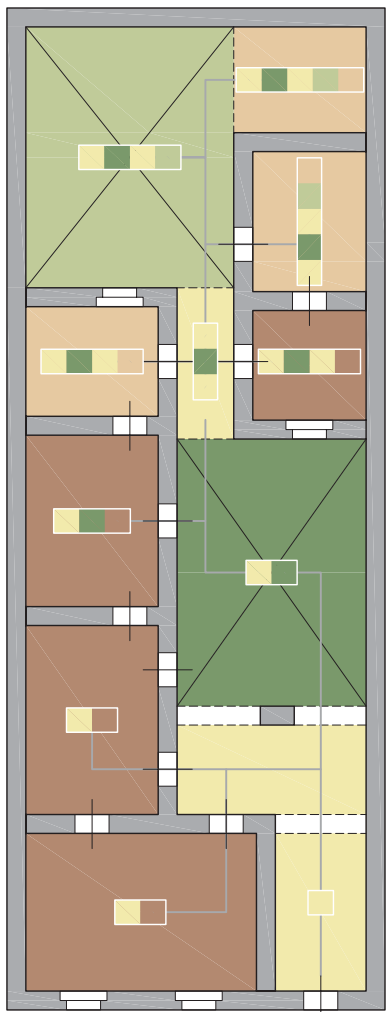
Plan 2.2 - typology characteristics type 2D

Plan 4.17 - reality, plot 23

Plan 4.18 - ideal situation, plot 23

Plot 23, type 2D

Spaces in the backyard drawn as being contemporary in the floor plan from 2000 (figure 4.9). For this reason this spaces are not judged to be part of the ideal situation (plan 4.18). In the ideal situation there is a backyard to fit the typology examples sequences of uses (plan 2.2). To fit the spaces with the typology sequences the spaces in the backyard that are not contemporary are judged to be service spaces, because they only have a connection to the backyard.

Fig. 4.9 - floor plan catalog INAH (2000)

plan 2.2, 4.17 and 4.18 - reconstruction ideal situation
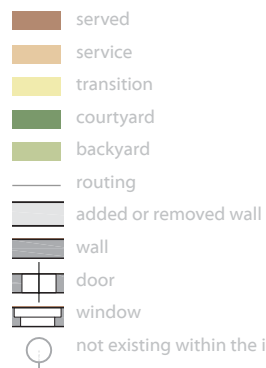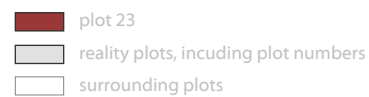
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

map 4.9 - situation plot

1:2 000

- plot 23
- reality plots, incuding plot numbers
- surrounding plots

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing

Plan 2.3 - typology characteristics 3a

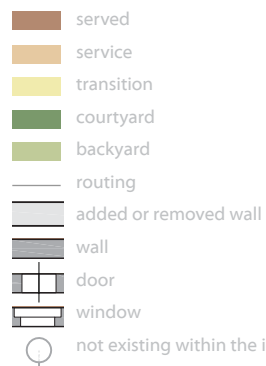Plan 4.19 - reality, plot 1/2

Plan 4.20 - ideal situation, plot 1/2

map 4.10 - situation plot
1:2 000

- ▮ plot 1/2
- ▮ reality plots, incuding plot numbers
- ▯ surrounding plots

plan 2.3, 4.19 and 4.20 - reconstruction ideal situation
1:200

- ▮ served
- ▮ service
- ▮ transition
- ▮ courtyard
- ▮ backyard
- — routing
- ▮ added or removed wall
- ▮ wall
- ⊞ door
- ⊟ window
- ○ not existing within the ideal sequence
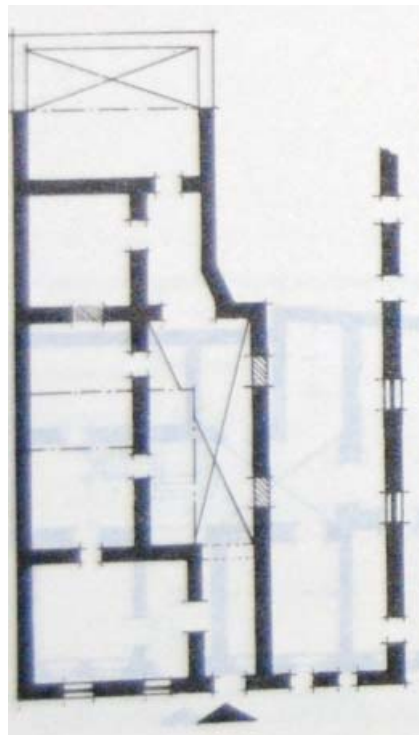
Fig. 4.10 - floor plan catalog INAH (1990)
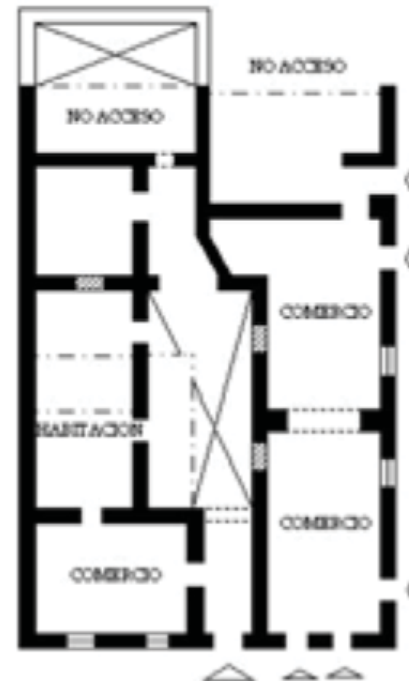
Fig. 4.11 - floor plan catalog INAH (2000)

Plot 1/2, type 3a

These plots have more up to data information than most of the other plots. During the fieldwork this building is visited and a floor plan is drawn on this bases. This is used to reconstruct the reality.

These two plots used to be one building in the original situation. This is based on that it fits better with the typology characteristics (shown in plan 2.3) and there used to be a connection between the plots (fig. 4.10 and 4.11).

The whole building is used for economical purposes in reality (plan 4.19). When spaces are directly connected to the courtyard they are ideally served spaces and when there is an indirect connection to the courtyard spaces are service spaces (plan 4.20).

The floor plans of 1990 and 2000 show that there is a backyard at the left back end of the plot (figures 4.10 and 4.11). Also on the satellite image of Google from 2008 (fig 4.12) it appears to be that this back part is not part of plot 31, but of plot 1/2.

In reality there is a second floor in the space at the right back end of the plot. The typology description from the MP describes only one floor for this type (IMPLAN, 2012), this means that the building in the ideal situation only has one floor.

Fig. 4.12 - Google Earth satellite image (2008)

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing

plan 2.3, 4.21 and 4.22 - reconstruction

ideal situation

1:200

served

service

transition

courtyard

backyard

routing

added or removed wall

wall

door

window

not existing within the
ideal sequence
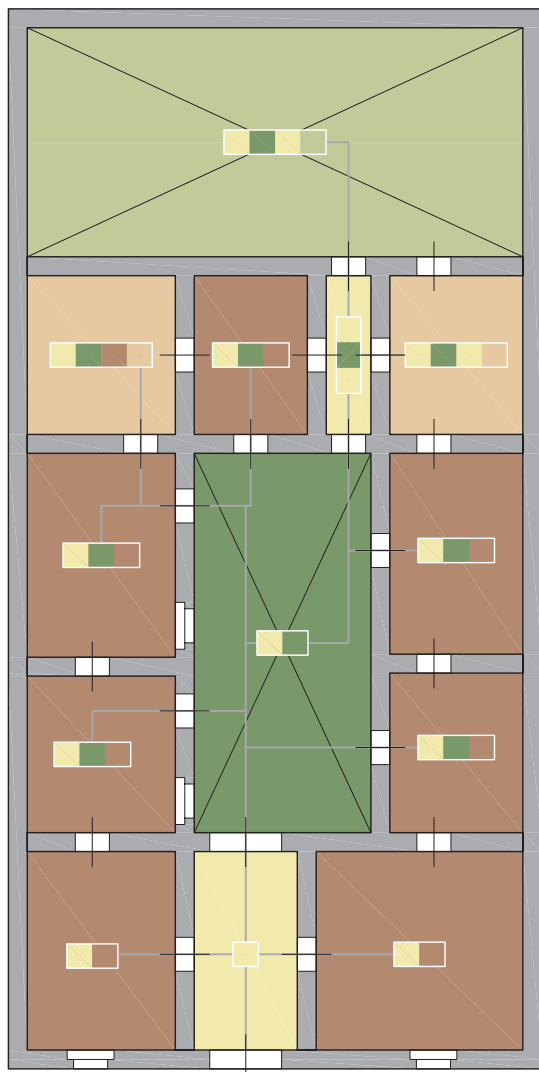
Plan 2.3 - typology characteristics 3a

Plan 4.21 - reality, plot 9

map 4.11 - situation plot
1:2 000

plot 9
reality plots, incuding plot numbers
surrounding plots

Plot 9, type 3a

The rectangular plot from the example (plan 2.3) compared to reality (plan 4.21) show different shapes. Part of the plot appears to be added at the right side of the plot. This part also doesn't follow the sequences that exist within the characteristics of this type (plan 4.22).

To make the organization of spaces in ideal situation similar to the typology example, spaces that in reality are connected to the backyard are not judged to be ideal. In the example there is a transition space in the middle that connects the courtyard to the backyard. In reality there are two service spaces behind each other at this spot. These spaces appear to have been a transition space in the original situation.

Spaces that in reality are connected to the courtyard are judged to be ideally served spaces and the space that in reality is only connected to the backyard is judged to be service space.

Plan 4.22 - ideal situation, plot 9

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing
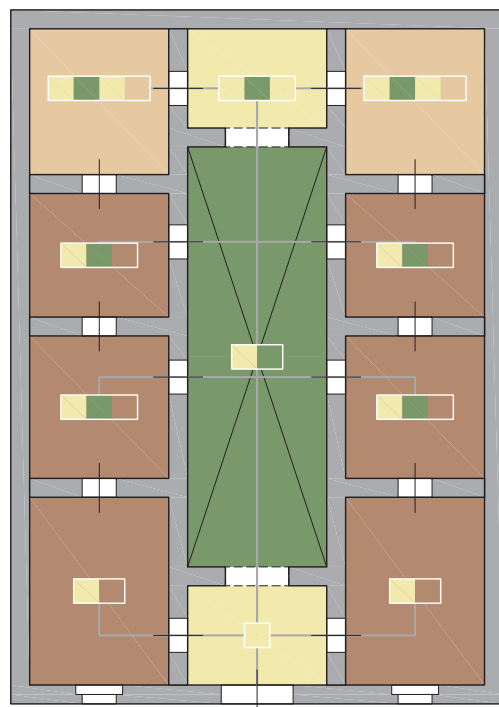
Plan 2.4 - typology characteristics 3b

Plan 4.23 - reality, plot 12
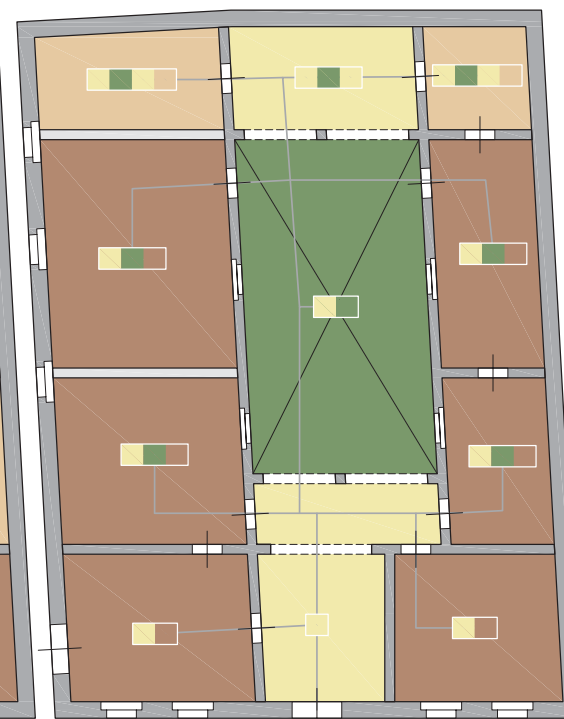
Plan 4.24 - ideal situation, plot 12

plan 2.4, 4.23 and 4.24 - reconstruction ideal situation
1:200
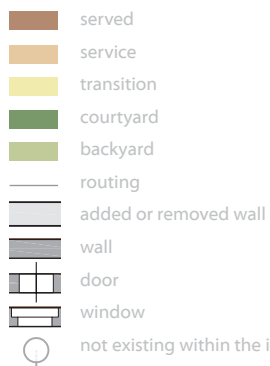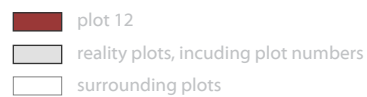
- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

map 4.12 - situation plot
1:2 000

- plot 12
- reality plots, incuding plot numbers
- surrounding plots

Plot 12, type 3b

This ideal situation (plan 4.22) of this plot is completely reconstructed from the typology example that belongs to its type (plan 2.4). Without the additional space at the back of the plot (plan 4.23), it has the same shape as the example. Plot 13, which is also of type 3 according to the GIS database of IMPLAN, is also more rectangular when these spaces are part of that plot.

The difference in the size of the space in the left indicates the possible removal of interior walls.

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing
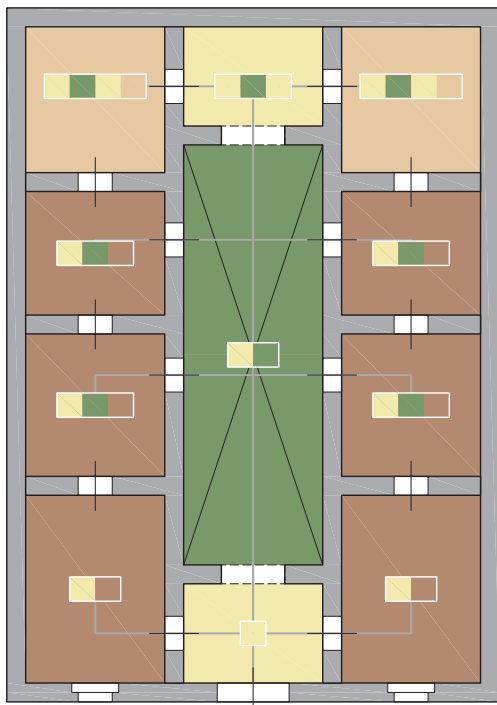
Plan 2.4 - typology characteristics 3b
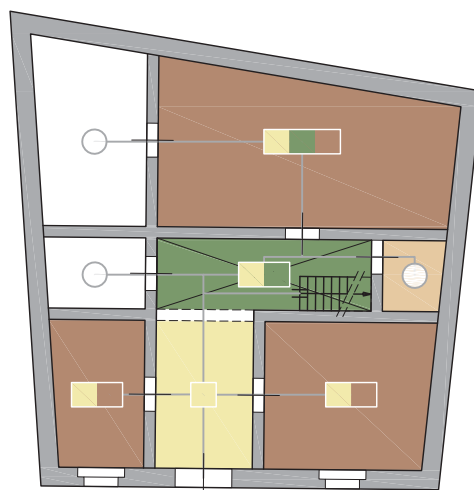
Plan 4.25 - reality, plot 20
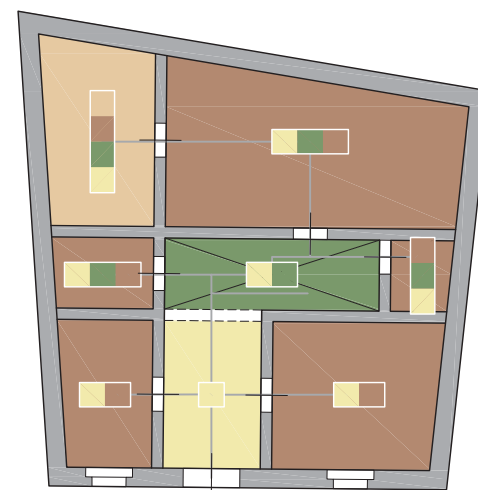
Plan 4.26 - ideal situation, plot 20

plan 2.4, 4.25 and 4.26 - reconstruction ideal situation
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

map 4.13 - situation plot
1:2 000

- plot 20
- reality plots, incuding plot numbers
- surrounding plots

Plot 20, type 3b

To reconstruct the ideal situation (plan 4.25) of this plot, sequences of the uses of spaces from the real situation (plan 4.26) are matched with the available sequences of uses from the typology characteristics (plan 2.4). Spaces that have a direct connection to the courtyard are ideally served spaces. The space at the left back end of the plot is not directly connected to the courtyard, which makes it ideally a service space.

Also it is assumed with reference that this plot ideally has 1 story, as it is stated in the typology description of the MP (IMPLAN, 2012). This is to the contrary of the situation in reality.

transition

transition - courtyard

transition - served

transition - courtyard -served

transition - courtyard -transition

transition - courtyard -transition - served

transition - courtyard - served - service

transition - courtyard -transition - service

transition - courtyard -transition - backayard

Possible sequences of uses in routing

Plan 2.3 - typology characteristics 3a

Plan 4.27 - reality, plot 25

Plan 4.28 - ideal situation, plot 25

plan 2.3, 4.27 and 4.28 - reconstruction ideal situation
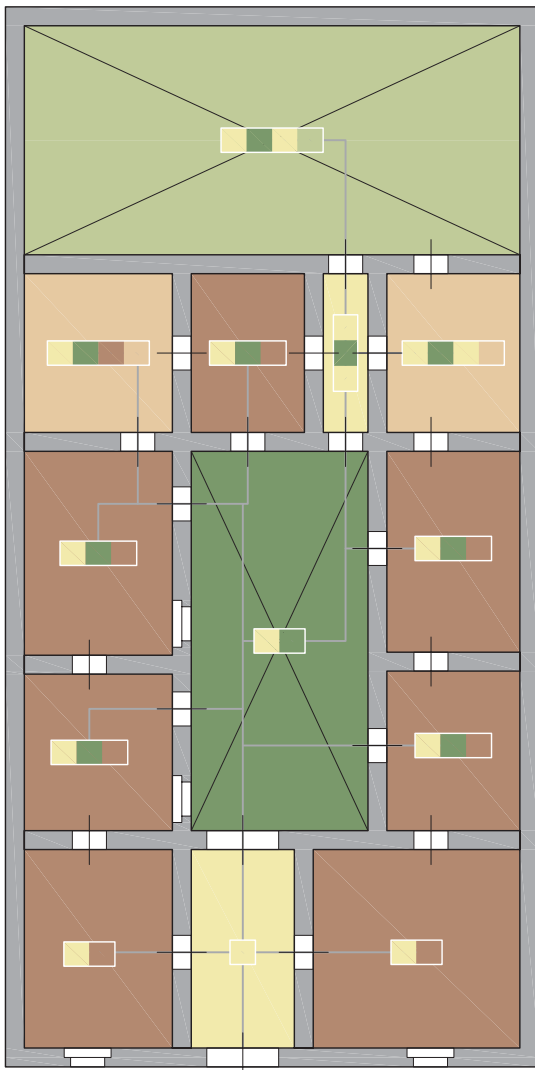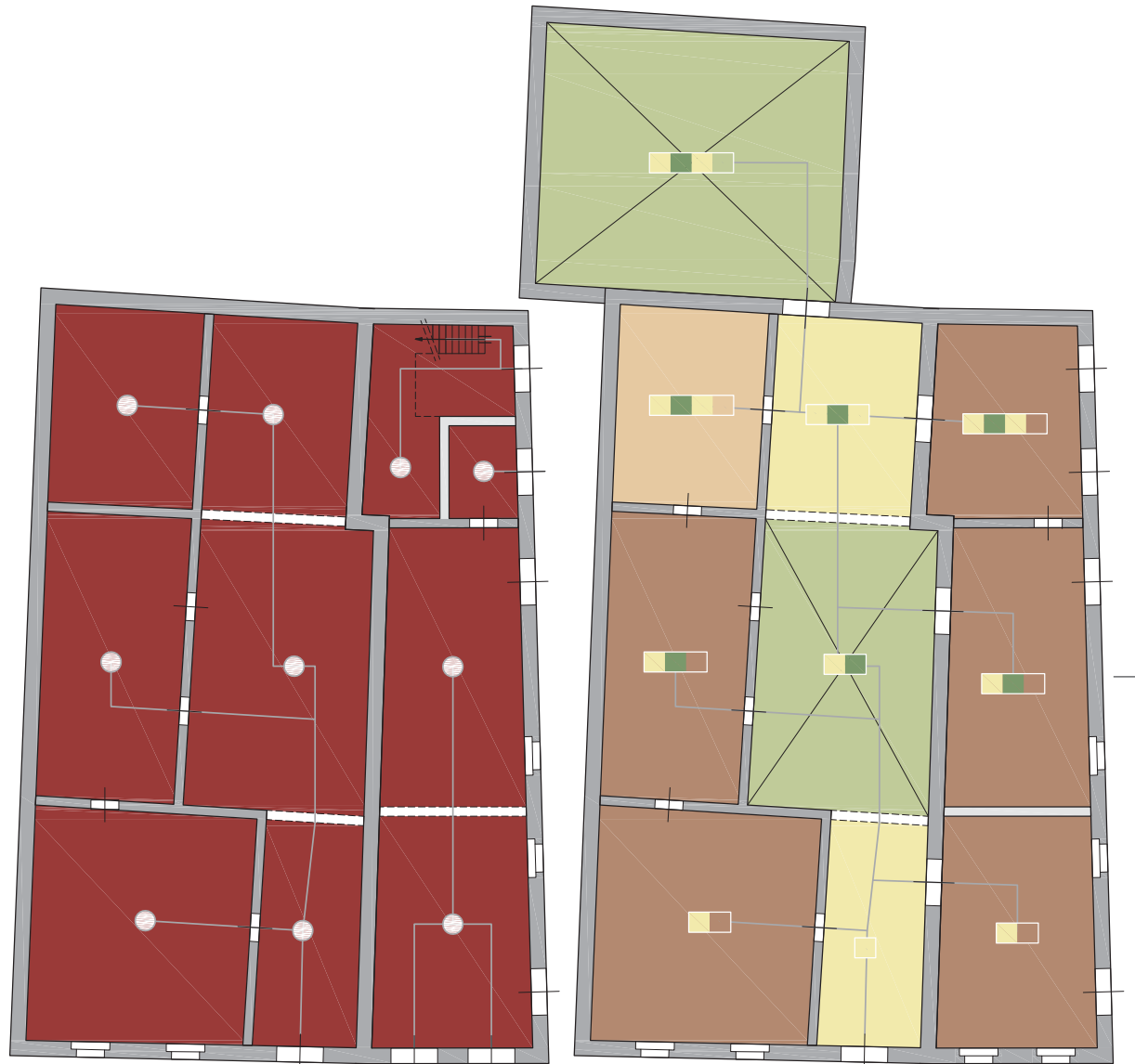1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence

map 4.14 - situation plot
1:2 000

- plot 25
- reality plots, incuding plot numbers
- surrounding plots

Plot 25, type 3a

This plot has a side courtyard in reality (plan 4.27). As a central courtyard, a side courtyard is mentioned in the typology descriptions from the MP (IMPLAN, 2012) as well. There are some other differences between the reality situation and the typology characteristics (plan 2.3).

At the front of plot there are two spaces that are not coherent with the typology characteristics. The first is a service space on the left, which is a garage, and the second is a commercial space on the right. These spaces are both accessible from the streets, through a secondary entrances. The typology characteristics show that a plot of this type only has one entrance flanked by window on each side. This indicates that there has been a division in spaces. In the ideal situation (plan 4.28) of this plot these door are judged to be windows and the spaces are together with the spaces next to them, which do fit the existing sequences belonging to the typology characteristics.

At the back of the plot in the situation in reality spaces don't fit the available sequences belonging to the assigned type. Behind the second space transition there is a backyard in the ideal situation. Also spaces that are not directly connected to the courtyard or façade are ideally served spaces.

service

service - service

service - service - transition

service - service - transition - courtyard

service - service - transition - courtyard - service

Possible sequences of uses in routing

Plan 2.5 - typology characteristics 4

Plan 4.29 - reality, plot 32   Plan 4.30 - ideal situation, plot 32

plan 2.5, 4.29 and 4.30 - reconstruction ideal situation
1:200

served
service
transition
courtyard
backyard
routing
added or removed wall
wall
door
window
not existing within the ideal sequence

map 4.15 - situation plot
1:2 000

plot 32
reality plots, incuding plot numbers
surrounding plots

Plot 32, type 4

This plot has one difference between reality (plan 4.29) and the typology characteristics (plan 2.5). The service space in reality is connected to the inside transition space, while in the ideal situation (plan 4.30) it is connected to the backyard outside.

plan 2.5, 4.29 and 4.30 - reconstruction
ideal situation
1:200

- served
- service
- transition
- courtyard
- backyard
- routing
- added or removed wall
- wall
- door
- window
- not existing within the ideal sequence
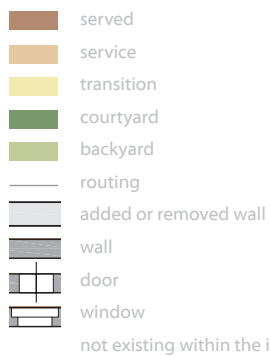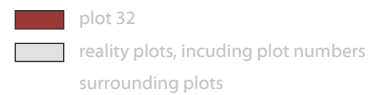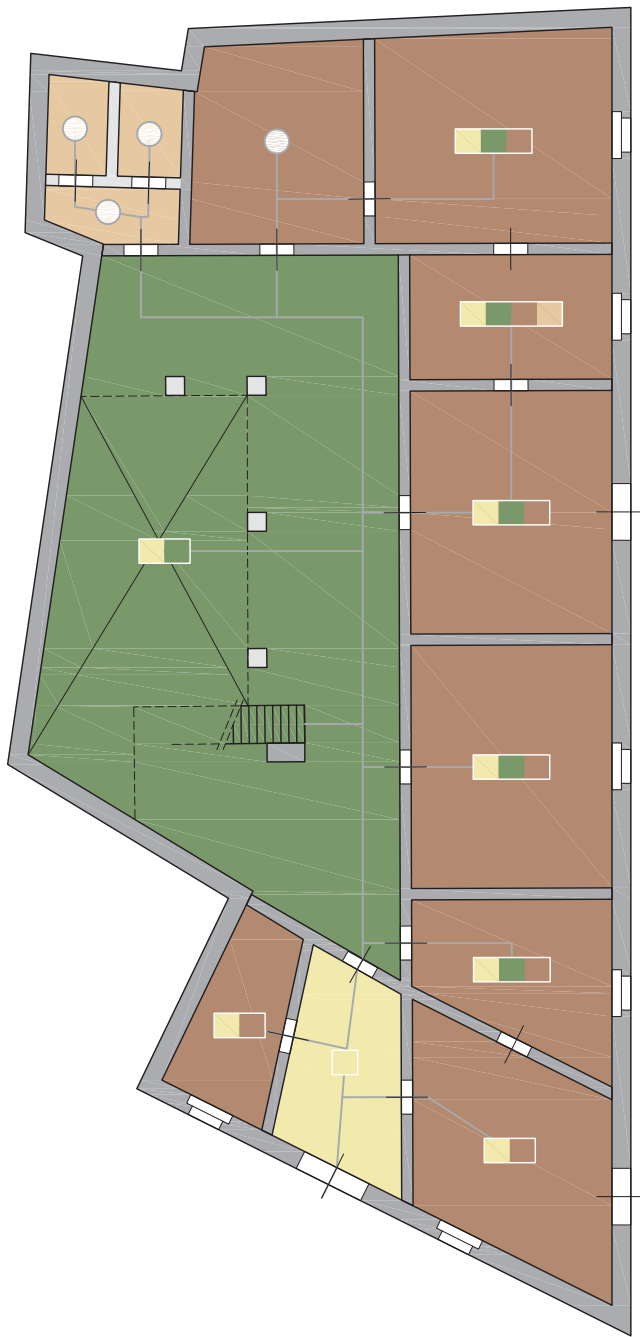
Plan 4.31 - reality, plot 17
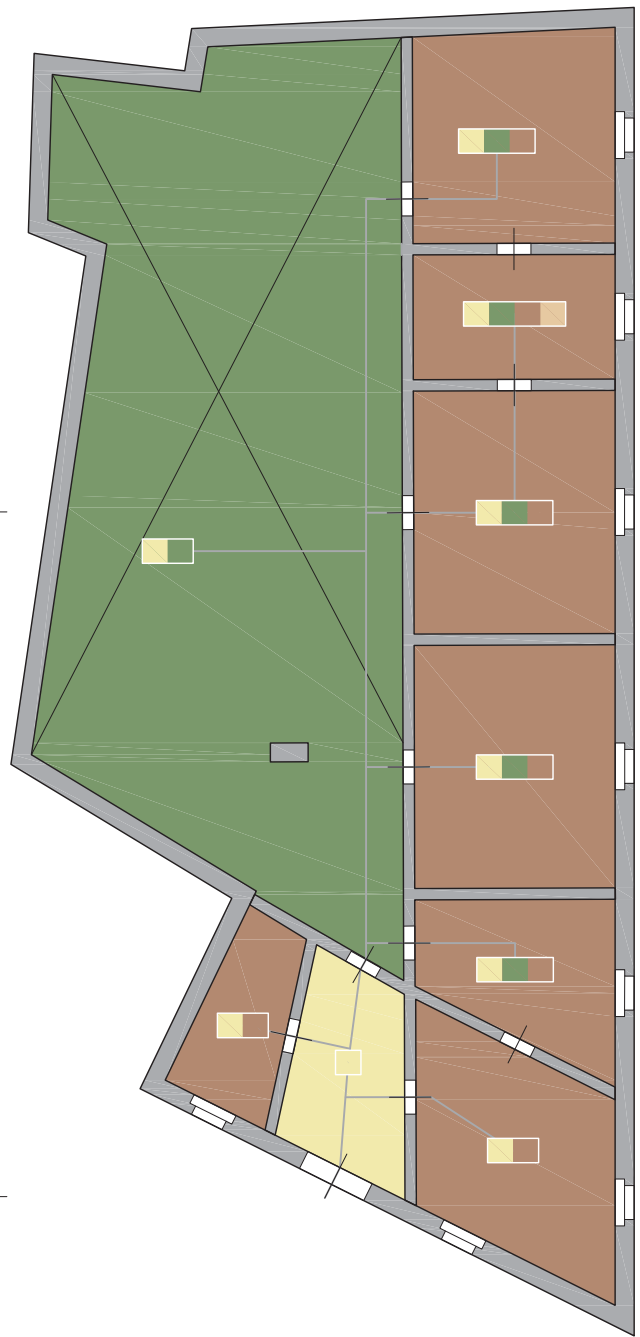
Plan 4.32 - ideal situation, plot 17
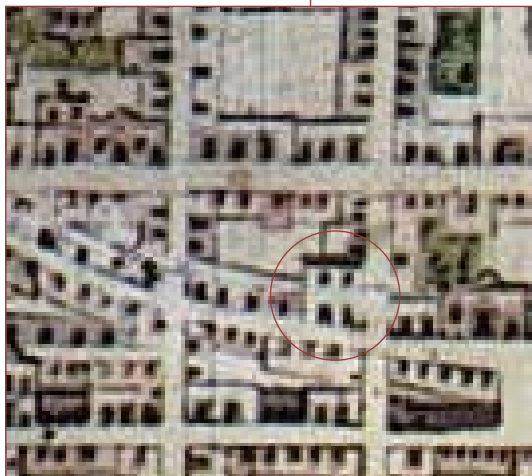
Fig. 4.13 - archive image from 1790

map 4.16 - situation plot

1:2 000

plot 17 and 21

reality plots, incuding plot numbers

surrounding plots

Plot 17 and 21, no specified types

These plots have no types specified, because they don't fit the typology characteristics described in the MP (IMPLAN, 2012).

Although according to the database of IMPLAN plot 17 belongs is of typology 3, proof is found that it has been a two story house since 1790. Figure 4.13 shows an archive image of a map of Querétaro in 1790 and an image of this map that is zoomed on the researched block. From this image it appears that the building on the South East corner of the block (plot 17) is drawn as a two story building. In reality the second floor of this building is coherent with the first floor, it looks like they have been build at the same time. The original amount of floors is an attribute, this is why this building is judged to have two floor in the ideal situation.

For plot 17 there is only information available from the catalog from INAH (2000). The spaces that were drawn as contemporary are judged not to be part of the ideal situation.

For plot 21 there is information available from catalogs of 1990 and 2000 (INAH, 1990; INAH, 2000). The information from the catalog of 1990 is the oldest information available for this plot. This is used to reconstruct the ideal situation.
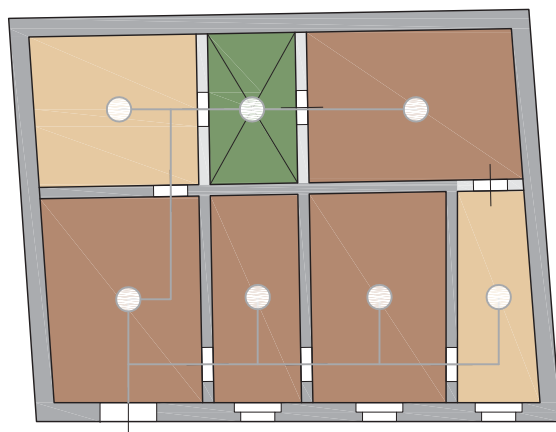
Plan 4.33 - reality, plot 21
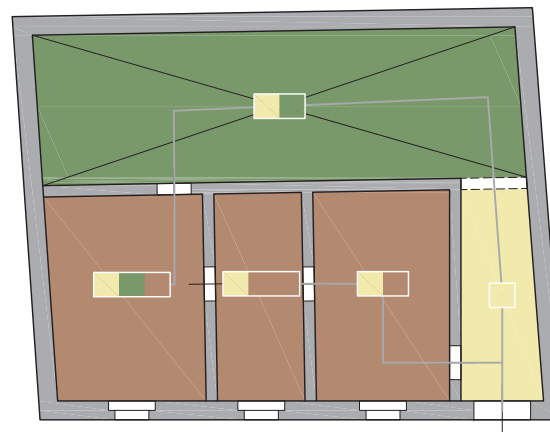
Plan 4.34 - ideal situation, plot 21

5

Ideal situation analysis

map 5.1 - typology attributes - ideal
1:500

- served
- service
- transition
- backyard
- courtyard
- door
- window
- not possible to reconstruct ideal
- seperation plot - ideal
- seperation plot - reality
- seperation space
- surrounding plots

5.1 Typology attributes

In map 5.1 a clear organization of spaces is visible. Like mentioned in the typology descriptions from chapter 2 all plots, except for plot 032 that is a type 4, have a similar organization. There is always a hallway leading to a courtyard surrounded by all the served spaces with in the back service and often a backyard. According to IMPLAN (2012) the backyards are used for keeping cattle and agriculture, this could explains their large dimensions in the ideal situation.

What is visible from this ideal situation is that there are large backyards in comparison to the rest of the building. All these backyards are more or less arranged together on the center of gravity of the block. In table 5.1 it is shown that the average area for a backyard is 129,4m2, which is 2,3 times as much as the average area for courtyards. Courtyards are used for daylight and ventilation (IMPLAN, 2012). Of the total area 42,3% is built upon, the rest is outside space (courtyard or backyard).

map 5.2 - plot numbers
1:2 000

- Reality plots, incuding plot numbers
- surrounding plots
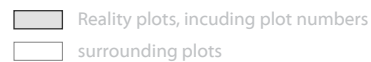
The spaces connected to the façade always have transitional or served uses, except when the plot is on the corner of the block. The amount of doors and windows are not specified for secondary façades. It is likely that spaces connected to the façade like on the main façade have served uses, but this is not described in the MP. The matter of insufficient specification for the properties of the different types is also mentioned in the discussion, chapter 11.

There are 71 served spaces which is 46,7% of the 152 spaces that are there in total. The area used for served spaces is 35,6% of the total amount of area.

In the ideal situation there are 40 doors and 61 windows.

		commerce	served	service	transition	courtyard	backyard	no data	total	total with data
ideal	area	0,0 m2	1727,5 m2	395,2 m2	412,6 m2	889,4 m2	1423,6 m2	0,0 m2	4848,3 m2	4848,3 m2
	percentage of total area with data	0,0%	35,6%	8,2%	8,5%	18,3%	29,4%	0,0%	100,0%	100,0%
	amount of spaces	0	71	23	31	16	11	0	152	152
	percentage of total spaces with data	0,0%	46,7%	15,1%	20,4%	10,5%	7,2%	0,0%	100,0%	100,0%
	avarage area per space		24,3 m2	17,2 m2	13,3 m2	55,6 m2	129,4 m2		31,9 m2	31,9 m2

Table 5.1 - numbers ideal situation

CAC:
0,83
GAC:
0,17
GFAC:
0,83

CAC:
0,57
GAC:
0,43
GFAC:
0,57

CAC:
0,59
GAC:
0,41
GFAC:
0,59

CAC:
0,77
GAC:
0,23
GFAC:
0,77

CAC:
0,66
GAC:
0,34
GFAC:
0,66

CAC:
0,35
GAC:
0,65
GFAC:
0,35

CAC:
0,52
GAC:
0,48
GFAC:
0,52

CAC:
0,71
GAC:
0,29
GFAC:
0,71

CAC:
0,42
GAC:
0,58
GFAC:
0,42

CAC:
0,39
GAC:
0,61
GFAC:
0,39

CAC:
0,67
GAC:
0,33
GFAC:
0,67

CAC:
0,68
GAC:
0,32
GFAC:
0,68

CAC:
0,78
GAC:
0,22
GFAC:
0,78

CAC:
0,55
GAC:
0,45
GFAC:
1,34

CAC:
0,63
GAC:
0,37
GFAC:
0,63

CAC:
0,91
GAC:
0,09
GFAC:
0,91

CAC:
0,82
GAC:
0,18
GFAC:
0,82

5.2 CAC, GAC and GFAC

In the ideal situation 52,3% of the whole block is built upon. All plots have a courtyard except for plot 32. Of the 18 reconstructed original plots 11 have a backyard (61,1%). There are never multiple backyards on a plot. The backyards are similar sized or bigger in comparison to the courtyards. The backyards are always at the back side of a plot. There are 7 of the 18 plots (38,9%) where less than 40% is built upon. These plots all exist within the East half of the block.

map 5.3 - CAC, GAC, GFAC - ideal
1:500

- backyard
- courtyard
- not possible to reconstruct ideal
- seperation plot - ideal
- seperation plot - reality
- surrounding plots

map 5.2 - plot numbers
1:2 000

- Reality plots, incuding plot numbers
- surrounding plots

5.3 Number of stories and building heights

All typologies existing in this block are described in the MP as houses with one story. For plot 17 proof is found that it has been a two story house since 1790 as shown in chapter 4. It appears that the building on the South East corner of the block (plot 17) is drawn as a two story building. In reality the second floor of this building is coherent with the first floor, it looks like they have been build at the same time.

map 5.4 - number of stories - ideal
1:500
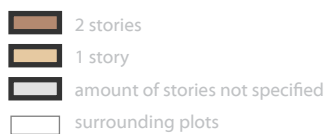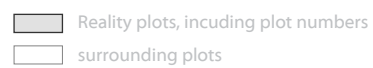
- 2 stories
- 1 story
- amount of stories not specified
- surrounding plots

map 5.2 - plot numbers
1:2 000

- Reality plots, incuding plot numbers
- surrounding plots

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Situation reality analysis

map 6.1 - typology attributes - reality
1:500

- commerce
- served
- service
- transition
- backyard
- courtyard
- door
- window
- no data
- seperation plot
- seperation space
- surrounding plots

map 6.2 - plot numbers
1:2 000

- Reality plots, incuding plot numbers
- surrounding plots
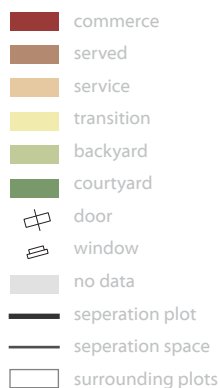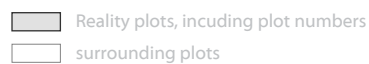
6.1 Typology attributes

Map 6.1 and table 6.1 show the proportion of uses of spaces within the block.

Most area is used for served spaces, 37,8% of the total area. Of the total amount of the 180 spaces 76 are served spaces, this is 42,2%. Almost equal to the area that is used for the served uses are 1618,1m2 is the area used for outside space 1522,2m2.

Four plots (three buildings) have commercial uses within them, which is 8,7% of the total area. Most data for this map comes from the year 2000. The map of uses for each plot from 2013 (map 3.1) indicates a growth in commercial uses. This map shows that in the year 2013, 7 plots have commercial uses within them. This indicates a growth of 233,3% between 2000 and 2013. Except for plot 1, 2, 30 and 31 in the west of the block every plot has an outside space. Plot 30 and 31 lay within a cluster of smaller plots (plot 27 to plot 32), which could explain why they don't have an outside space. This is no explanation for plot 1 and 2, which are larger and once together (map 5.1). It could have something to do with the division or that these plots are used for commerce only.

In reality there are 50 doors and 51 windows.

		commerce	served	service	transition	courtyard	backyard	no data	total	total with data
reality	area	371,1 m2	1618,1 m2	394,3 m2	379,1 m2	731,8 m2	790,4 m2	698,9 m2	4983,8 m2	4284,9 m2
(plots with the	percentage of total area with data	8,7%	37,8%	9,2%	8,8%	17,1%	18,4%	14,0%	91,3%	77,3%
possibility of	amount of spaces	11	76	35	29	15	14	28	208	180
reconstructing	percentage of total spaces with data	6,1%	42,2%	19,4%	16,1%	8,3%	7,8%	15,6%	93,9%	78,3%
the ideal)	avarage area per space	33,7 m2	21,3 m2	11,3 m2	13,1 m2	48,8 m2	56,5 m2	25,0 m2	24,0 m2	23,8 m2

Table 5.1 - numbers ideal situation

CAC:
0,84
GAC:
0,16
GFAC:
0,84

CAC:
0,74
GAC:
0,26
GFAC:
0,74

CAC:
0,84
GAC:
0,16
GFAC:
0,84

CAC:
0,62
GAC:
0,38
GFAC:
0,62

CAC:
0,64
GAC:
0,36
GFAC:
0,64

CAC:
0,83
GAC:
0,17
GFAC:
0,83

CAC:
0,5
GAC:
0,5
GFAC:
0,5

CAC:
0,9
GAC:
0,1
GFAC:
0,9

CAC:
0,59
GAC:
0,41
GFAC:
0,59

CAC:
0,78
GAC:
0,22
GFAC:
0,78

CAC:
0,68
GAC:
0,32
GFAC:
0,68

CAC:
0,73
GAC:
0,27
GFAC:
0,73

CAC:
1
GAC:
0
GFAC:
1

CAC:
1
GAC:
0
GFAC:
1

CAC:
0,83
GAC:
0,17
GFAC:
0,83

CAC:
0,67
GAC:
0,33
GFAC:
0,67

CAC:
1
GAC:
0
GFAC:
1

CAC:
1
GAC:
0
GFAC:
2,4

CAC:
0,7
GAC:
0,3
GFAC:
0,7

CAC:
0,88
GAC:
0,12
GFAC:
1,88

CAC:
0,82
GAC:
0,18
GFAC:
1,82

CAC:
0,96
GAC:
0,04
GFAC:
0,96

CAC:
0,93
GAC:
0,07
GFAC:
1,86

CAC:
0,83
GAC:
0,17
GFAC:
0,83

CAC:
0,8
GAC:
0,2
GFAC:
0,8

CAC:
0,89
GAC:
0,11
GFAC:
0,89

CAC:
0,82
GAC:
0,18
GFAC:
0,82

CAC:
0,81
GAC:
0,19
GFAC:
0,81

CAC:
0,93
GAC:
0,07
GFAC:
1,87

CAC:
0,91
GAC:
0,09
GFAC:
1,58

CAC:
0,82
GAC:
0,18
GFAC:
0,82

CAC:
0,66
GAC:
0,34
GFAC:
1,54

map 6.2 - plot numbers
1:2 000

6.2 CAC, GAC and GFAC

It was possible to reconstruct all the outside areas from the Google Earth (2008 and 2013) within the block. 35,5% of the whole block is built upon. Most plots have a courtyard and about half of the plots also have a backyard. There are often multiple backyards on a plot and are in 9 cases small in comparison to the courtyard. The backyards are not always at the end of a plot, which is normally the case with a backyard. They can also be referred to as secondary patios. In the West of the block where the plots get a higher density, there is less space for a court- and backyard and the CAC and GFAC gets higher. The CAC gets 1 or near 1, which means the whole or almost the whole plot is used for construction. The GFAC often is higher than the CAC in the South-West of the block, which indicates on multiple floors. There are 2 of the 32 plots (6,3%) where less than 40% is built upon, these are plot 4 and plot 9.

map 6.3 - CAC, GAC, GFAC - reality
1:500

backyard
courtyard
not possible to reconstruct ideal
seperation plot
surrounding plots

Reality plots, incuding plot numbers
surrounding plots

map 6.4 - number of stories - reality
1:500

3 stories, top floor higher than facade
2 stories, top floor higher than facade
2 stories, within height of facade
1 story, within height of facade
surrounding plots

map 5.2 - plot numbers
1:2 000

Reality plots, incuding plot numbers
surrounding plots

6.3 Number of stories and building heights

Within the database from IMPLAN the results from a fieldwork survey in 2006 is included. At that time the height of the façade is measured. The results (shown in map 6.4) from this survey are checked with a representation of roofscapes made by the researcher by merging photos (figures 6.1, 6.2, 6.3 and 6.4). Plot 7 and 8 are higher according to the photo merges. These plots contain contemporary buildings that are not cataloged by INAH in 1990 or 2000. It seems that these facades have been made higher between 2006 and 2013.

Like observed in the previous sub-chapter the West of the block has more buildings with more than 1 floor. The biggest plots and the smallest plots have buildings with multiple floors on them.

Fig. 6.1 - roofscapes on the West of the block

Fig. 6.2 - roofscapes on the East of the block

Fig. 6.3 - roofscapes on the North of the block

Fig. 6.4 - roofscapes on the South of the block

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Comparative analysis between the ideal and real situation

map 7.2 - plot numbers
1:2 000

	Reality plots, incuding plot numbers
	surrounding plots
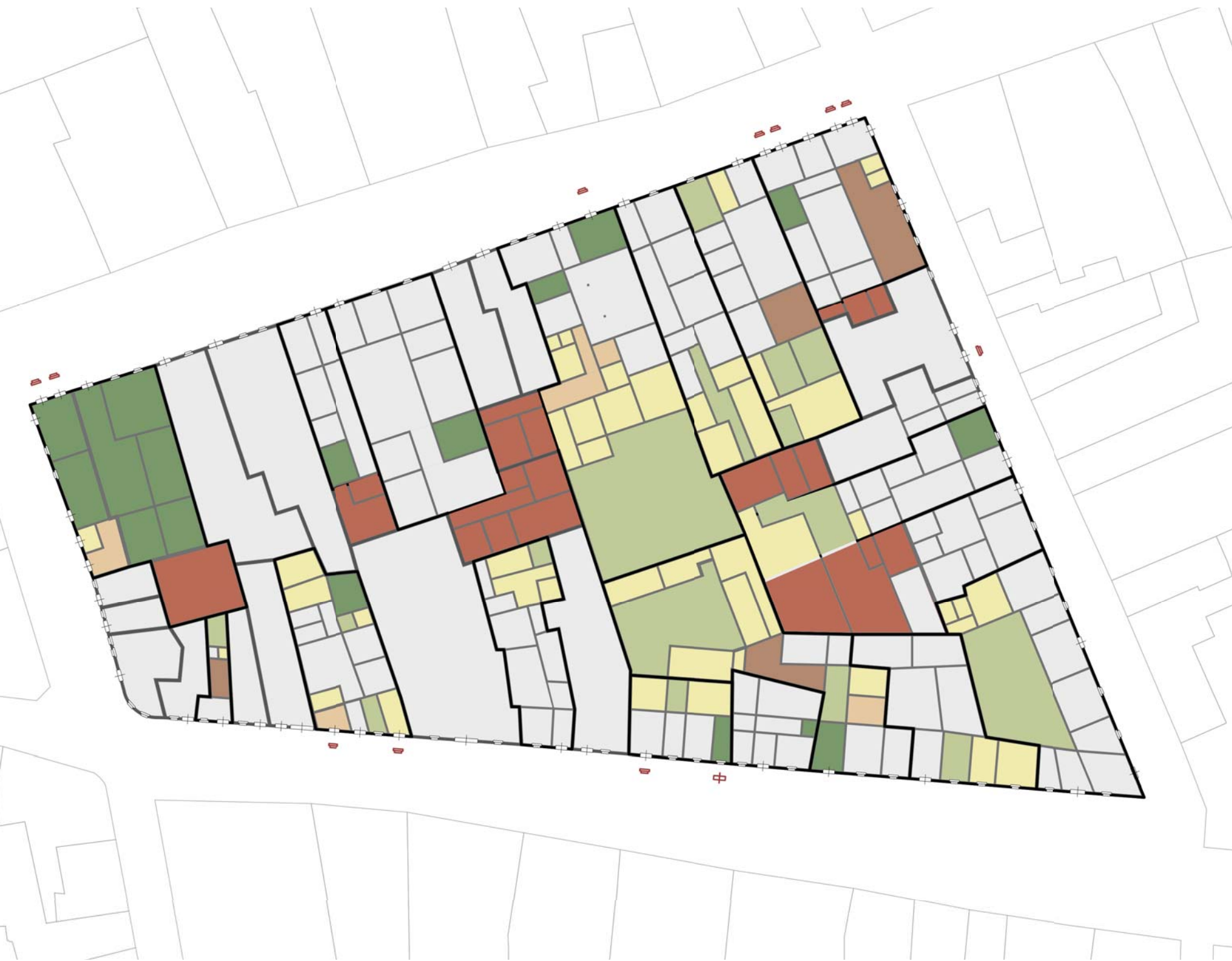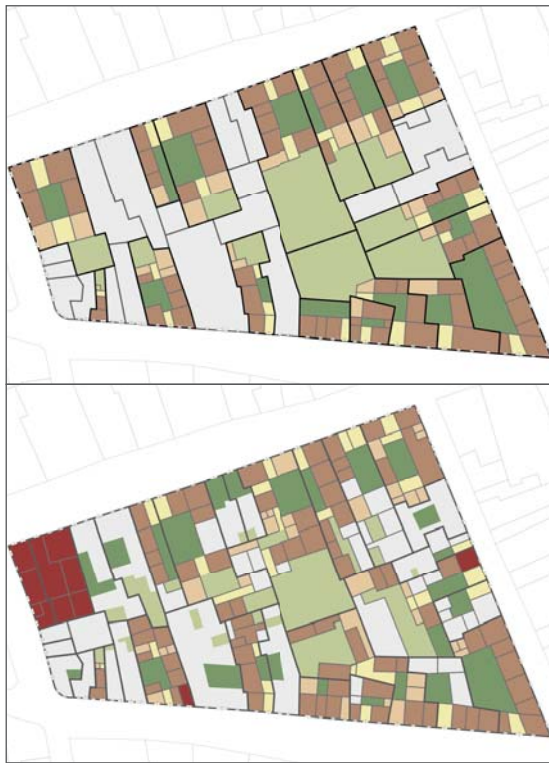
map 7.1 - typology attributes - types of changes
1:500
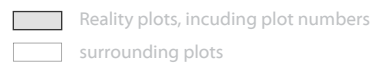
	space added or removed from plot
	space consolidated
	space smaller (division) and use change
	added space (division)
	space smaller (division)
	use change
⊕	opening reality (door)
⬭	opening ideal (window)
	no change found
	seperation plot - ideal
	seperation plot - reality
	seperation space
	surrounding plots

map 5.1 and 6.1 - typology attributes - ideal and reality
(used maps for comparative analysis)
1:2 000

	commerce
	served
	service
	transition
	backyard
	courtyard
⊕	door
⬭	window
	no data
	seperation plot
	seperation space
	surrounding plots
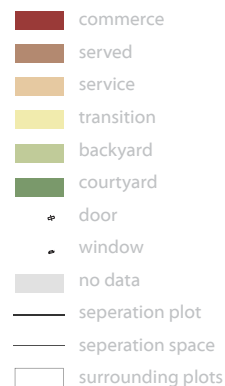
7.1 Type of changes

There are types of changes in typology attributes shown in map 7.1. Those are respectively: spaces that were added or removed from plot, spaces that consolidated, spaces that divided, space that changed use and changes in façade attributes (doors and windows). Added and removed spaces from plot concern the spaces that changed plot. Consolidations concern the spaces where at least one wall has been demolished to put 2 or more spaces together. Divisions concern the spaces that were split up into 2 or more spaces, spaces have been added within another space in this situation. Changes in use concern the spaces that have a different use in reality than in the ideal situation. This map presents the results of a comparative analysis between the real and ideal state both concerning typology attributes (see map 5.1 and map 6.1).

One of the most prominent type of changes from map 7.1 are the added spaces in the backyards of the plots (divisions). Every backyard is in reality different than in the ideal situation. Backyards get smaller, because of this division of uses within the area of the backyards (indicated as light green in the map).

Like in backyard, division also occur in served spaces. Of the 71 served spaces 8 divided.

There are 4 cases where a consolidation takes place. This is half of the times that a division happened within inside spaces. This points out to the need of smaller spaces.

Spaces that change use are either connected to the courtyard or to the main façade. This could be explained by the uses that don't have a relation

map 7.2 - plot numbers
1:2 000

▢ Reality plots, incuding plot numbers
▢ surrounding plots

(used maps for comparative analysis)
1:2 000

■ commerce
■ served
■ service
■ transition
■ backyard
■ courtyard
• door
• window
▢ no data
— seperation plot
— seperation space
▢ surrounding plots
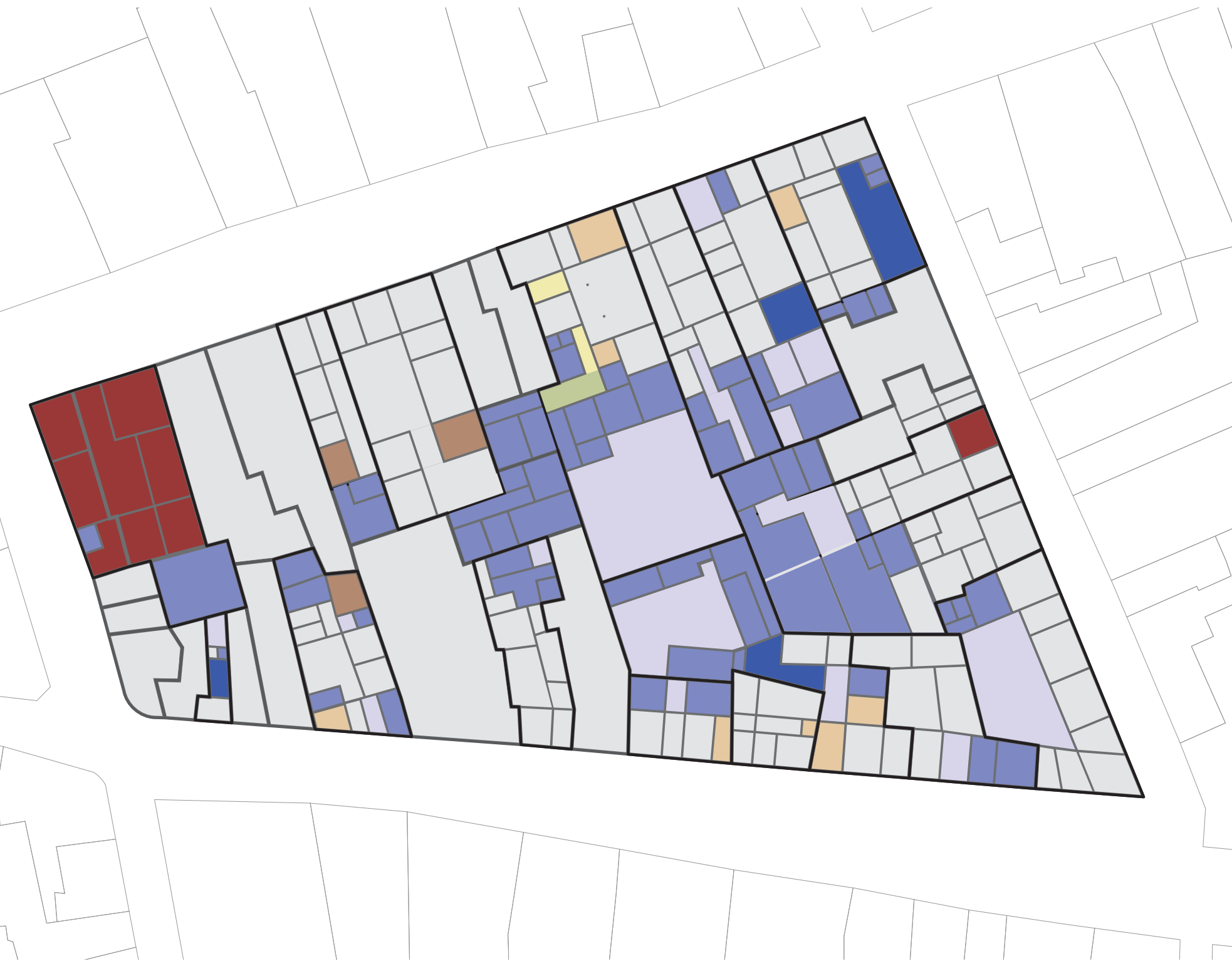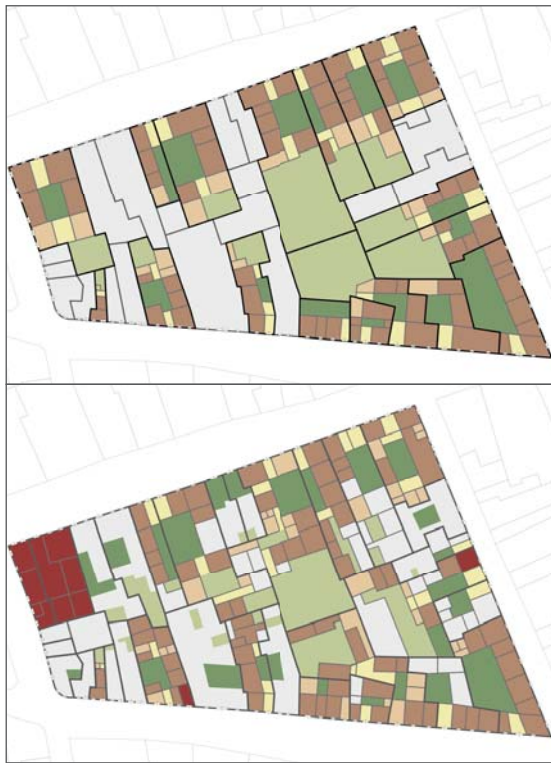
map 7.3 - typology attributes - changes uses
1:500
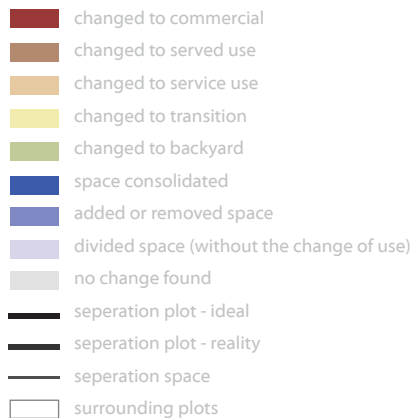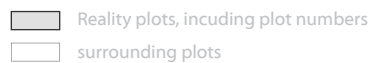
■ changed to commercial
■ changed to served use
■ changed to service use
■ changed to transition
■ changed to backyard
■ space consolidated
■ added or removed space
■ divided space (without the change of use)
▢ no change found
— seperation plot - ideal
— seperation plot - reality
— seperation space
▢ surrounding plots
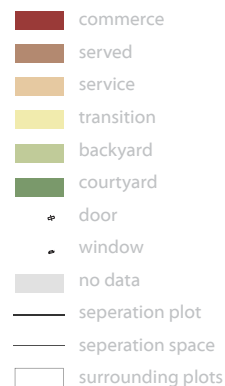
with the original use of the buildings emerging in the spaces connected to the main façade, which could be for example garages like shown in map 2.3 of chapter 2.

Noticeable are as well the spaces that change plots. In the backside of the plots parts of plots get added to one plot and removed from the other.

From part 1 of this series it have been concluded that there is a relation between multiple uses and changes in façade attributes. Where multiple uses take place often more doors are created, to get multiple accesses to the building (Stuurman et al., 2013). In 5 plots (plot 1/2, 9, 12, 13 and 25, see map 7.2) 11 windows changed into doors and 4 of these plots have multiple uses. On 3 of the 4 plots that have multiple uses there is a change of window(s) into door(s). Of the 5 plots with window(s) changing into door(s) 3 plots have multiple uses.

Only on one plot (plot 21) there is a switch of window and door (door changed into window and another window changed into door), which was probably caused by the need for a more efficient interior arrangement.

7.2 Changed uses

Map 7.3 presents the results of a comparative analysis between the real and ideal state both concerning the organization and uses of spaces (see map 5.1 and map 6.1). In this map all spaces that changed use are colored like the color of the use they have in map 5.1 and map 6.1, all other changes are colored blue.

In the map it is visible that: 10 spaces on 2 plots changed into commercial use, 3 spaces on 3 plots changed into a served use, 8 spaces on 6 plots

map 7.2 - plot numbers
1:2 000

Reality plots, incuding plot numbers
surrounding plots
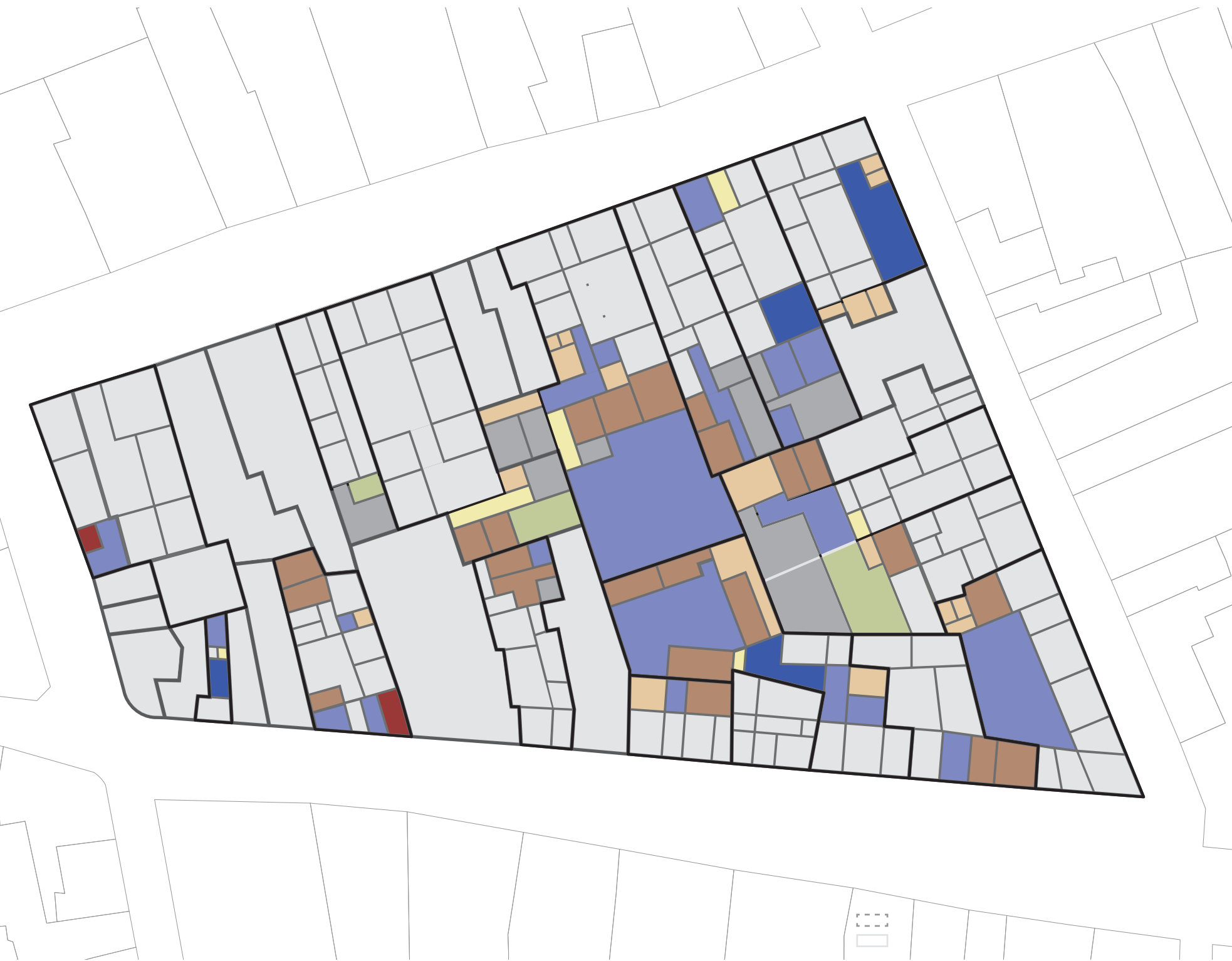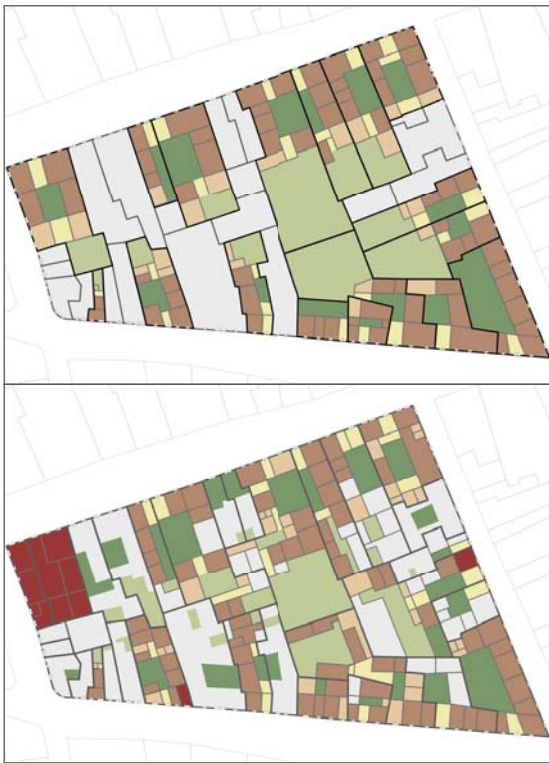
map 7.4 - typology attributes - added spaces
1:500
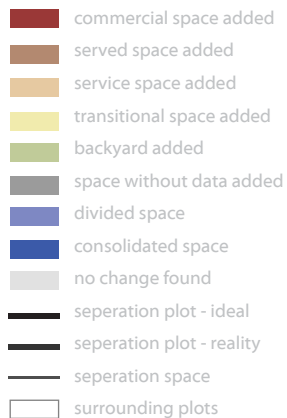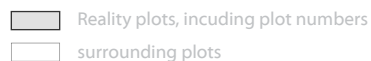
commercial space added
served space added
service space added
transitional space added
backyard added
space without data added
divided space
consolidated space
no change found
seperation plot - ideal
seperation plot - reality
seperation space
surrounding plots

map 5.1 and 6.1 - typology attributes - ideal and reality
(used maps for comparative analysis)
1:2 000

commerce
served
service
transition
backyard
courtyard
door
window
no data
seperation plot
seperation space
surrounding plots
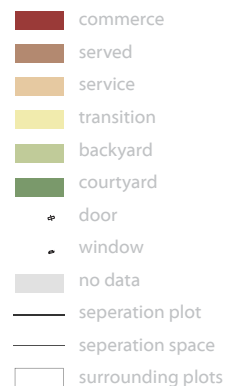
changed into service, 2 spaces on 1 plot changed into transition and 1 space changed into backyard. Most spaces changed into commercial, followed by service.

Changes of space use happen anywhere in the building, from the façade to the back of the building plot. The courtyard is an exception, it changed use just ones in plot 1/2. Normally a change of use doesn't impact the building itself except for when a inside space turns into an outside space or the other way around. This happened in 2 plots.

There is a big area of blue colors in the central gravity point of the block, where the backyards are in the ideal situation (map 5.1). These changes are discussed in the next sub-chapter.

7.3 Added spaces

Map 7.4 shows the results of a comparative analysis between the real and ideal state concerning the organization of spaces and uses (see map 5.1 and map 6.1).

Unlike changed uses, added spaces or spaces that changed the plot geometry have an impact on the actual building or plot. There is a relative large amount of spaces added in the central gravity point of the building block, where the backyards in the ideal situation were located (map 5.1). In 5 building plots spaces were divided that are connected to the main façade, compared to one space that was divided connected to the courtyard in the middle of the plot.

Of the spaces that are added 2 spaces on 2 plots have a commercial use, 23 spaces on 10 plots have a served use, 20 spaces on 7 plots have a serving

CAC dif.:
0,01
GAC dif.:
-0,01
GFAC dif.:
0,01

CAC dif.:
0,17
GAC dif.:
-0,17
GFAC dif.:
0,17

CAC dif.:
0,24
GAC dif.:
-0,24
GFAC dif.:
0,24

CAC dif.:
0,01
GAC dif.:
-0,01
GFAC dif.:
0,01

CAC dif.:
0,02
GAC dif.:
-0,02
GFAC dif.:
0,02

CAC dif.:
0,15
GAC dif.:
-0,15
GFAC dif.:
0,15

CAC dif.:
0,16
GAC dif.:
-0,16
GFAC dif.:
0,16

CAC dif.:
0,29
GAC dif.:
-0,29
GFAC dif.:
0,29

CAC dif.:
0,22
GAC dif.:
-0,22
GFAC dif.:
0,22

CAC dif.:
0,41
GAC dif.:
-0,41
GFAC dif.:
0,41

CAC dif.:
0,03
GAC dif.:
-0,03
GFAC dif.:
0,03

CAC dif.:
0,14
GAC dif.:
-0,14
GFAC dif.:
0,14

CAC dif.:
0,32
GAC dif.:
-0,32
GFAC dif.:
0,32

CAC dif.:
0,11
GAC dif.:
-0,11
GFAC dif.:
0,2

CAC dif.:
0,3
GAC dif.:
-0,3
GFAC dif.:
1,24

CAC dif.:
0
GAC dif.:
0
GFAC dif.:
0,67

CAC dif.:
0
GAC dif.:
0
GFAC dif.:
0

map 7.2 - plot numbers
1:2 000

Reality plots, incuding plot numbers

surrounding plots

map 7.5 - CAC, GAC, GFAC - changes
1:500

- outside area ideal
- outside area reality
- constructed area
- not possible to reconstruct ideal
- seperation plot - ideal
- seperation plot - reality
- surrounding plots
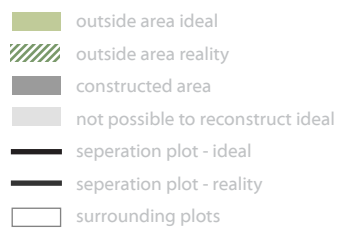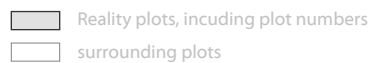
map 5.3 and 6.3 - CAC, GAC, GFAC - ideal and reality
(used maps for comparative analysis)
1:2 000

- courtyard
- backyard
- constructed area
- not possible to reconstruct ideal
- seperation plot - ideal
- seperation plot - reality
- surrounding plots
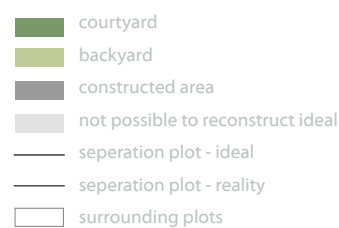
use, 6 spaces on 6 plots have a transitional use and 3 spaces on 3 plots have backyard as their use. This proportion is different in the spaces that changed use. Where spaces that changed use had more than twice as much changes to service uses than to served uses, spaces that are added more often have served uses. In the front of the plots served uses change into service or commercial and in the backyards served spaces got added. This means that there is a shift within uses, which is observed in chapter 3 as well. Served spaces get pushed more to the back of the plot by commercial uses and uses for service that were added in the spaces connected to the façade. This is affecting the ideal layout in such a way that it is no longer recognizable anymore what is part of the original structure and what is added.

7.4 CAC, GAC and GFAC

Map 7.5 presents the results of the comparative analysis between map 5.3 and map 6.3 both concerning the construction area, green area and gross floor area.

Outside spaces are always the same size or smaller when the reality is compared to the ideal situation. This means the outside spaces disappear. For courtyards there are mostly no differences, but there are two exceptions. In one of the exceptions the courtyard disappeared plot 1/2 became smaller for each plot, except for one (plot 6). This means more area is used for construction. This is an indication that backyards aren't compatible with the uses that exist on the plots today and more space on the plots is used for other purposes. This is causing an increase of the CAC. The GFAC increases even more in some cases. This occurs when the ideal situation has fewer floors than in reality. This gets elaborated on in the next sub-chapters.

map 7.2 - plot numbers
1:2 000

| | Reality plots, incuding plot numbers |
| | surrounding plots |

map 7.6 - amount of stories and building heights - changes
1:500
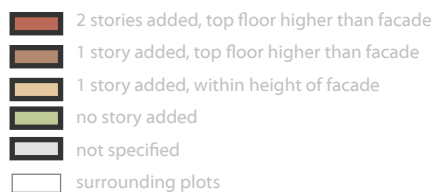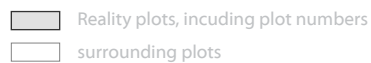
map 5.4 and 6.4 - amount of stories and building heights - ideal and reality
(used maps for comparative analysis)
1:2 000

	2 stories added, top floor higher than facade
	1 story added, top floor higher than facade
	1 story added, within height of facade
	no story added
	not specified
	surrounding plots

	3 stories
	2 stories
	2 stories
	1 story
	not specified
	surrounding plots

7.5 Number of stories and building heights

Because the original height is not specified for the ideal situation only the number of stories can be compared regarding to conservation policies. The original height for the buildings and the height of spaces are being recognized as being of value according to Lezama –Lopez (2012b). Also to know what changes relate to the trends of the happing development in Querétaro, the differences in heights of the original situation and the situation in reality are important for this research. In the ideal situation only one building has multiple floors (plot 17). The two floors this building contains fit within the height of the façade. The buildings that contain only one story fit within the height of the façade as well. For this reason, it can be concluded that the buildings with a top floor have been extended above the maximum allowed height of the main façade and consequently the buildings got higher than it was in its original form.

In 5 of the 28 cases with data a new story was added. In one of these cases 2 stories were added. In 3 of the 5 cases the building got higher than its original situation, based on its top floor rising above the height of the façade. Although a small proportion of the buildings have an extra floor, such changes have an impact on the homogeneity of the typologies. The original typologies can no longer be recognized within these buildings.

Whit the addition of floor the gross floor area increases. This is an indication that one story is not compatible with the current uses that exist on the plots for these buildings. This indicates on the need for more usable inside spaces within the building.

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		commerce	served	service	transition	courtyard	backyard	no data	total	total with data
ideal	area	0,0 m2	1727,5 m2	395,2 m2	412,6 m2	889,4 m2	1423,6 m2	0,0 m2	4848,3 m2	4848,3 m2
	percentage of total area with data	0,0%	35,6%	8,2%	8,5%	18,3%	29,4%	0,0%	100,0%	100,0%
	amount of spaces	0	71	23	31	16	11	0	152	152
	percentage of total spaces with data	0,0%	46,7%	15,1%	20,4%	10,5%	7,2%	0,0%	100,0%	100,0%
	avarage area per space		24,3 m2	17,2 m2	13,3 m2	55,6 m2	129,4 m2		31,9 m2	31,9 m2
reality *(plots with the possibility of reconstructing the ideal)*	area	371,1 m2	1618,1 m2	394,3 m2	379,1 m2	731,8 m2	790,4 m2	698,9 m2	4983,8 m2	4284,9 m2
	percentage of total area with data	8,7%	37,8%	9,2%	8,8%	17,1%	18,4%	14,0%	91,3%	77,3%
	amount of spaces	11	76	35	29	15	14	28	208	180
	percentage of total spaces with data	6,1%	42,2%	19,4%	16,1%	8,3%	7,8%	15,6%	93,9%	78,3%
	avarage area per space	33,7 m2	21,3 m2	11,3 m2	13,1 m2	48,8 m2	56,5 m2	25,0 m2	24,0 m2	23,8 m2
difference	area	371,1 m2	-109,4 m2	-0,8 m2	-33,5 m2	-157,5 m2	-633,3 m2		135,4 m2	-563,5 m2
	percentage of total area with data	100,0%	5,6%	11,4%	3,8%	-6,9%	-37,2%			
	amount of spaces	11	5	12	-2	-1	3		56	28
	percentage of total spaces with data	100,0%	-9,6%	22,2%	-21,0%	-20,8%	7,5%			
	avarage area per space	33,7 m2	-3,0 m2	-5,9 m2	-0,2 m2	-6,8 m2	-73,0 m2		2,4 m2	-8,1 m2
	percentage avarage area per space		-12,5%	-34,4%	-1,8%	-12,2%	-56,4%		7,6%	-25,4%

Table 7.1 - prominant numbers

percentage of total area with data
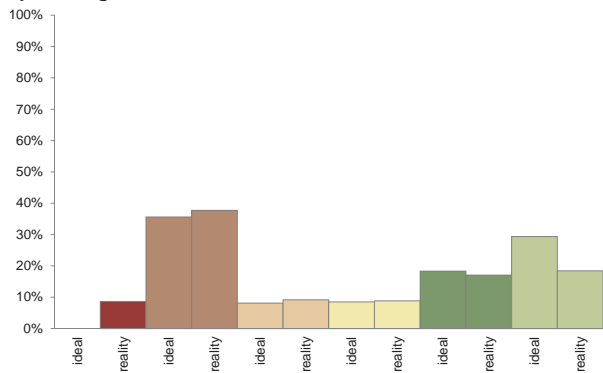
Fig. 7.1 - total area

percentage of total spaces with data
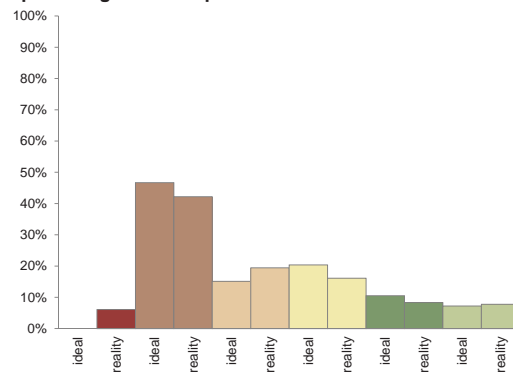
Fig. 7.2 - total spaces

avarage area per space
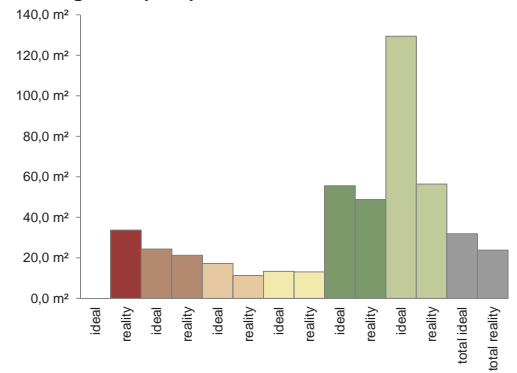
Fig. 7.3 - avarage area

7.6 Changes in numbers

Within this sub-chapter the trends were recognized by showing the results on the comparative analysis of the ideal and real situation concerning the organization and uses of spaces. The results of the total area, amount of spaces and average area of spaces for each use is shown in the form of statistics (table 7.1). The noticeable numbers on the area and amount of spaces of each use are made bold. The results were made more graphical to recognize trends, this is shown in figures 7.1, 7.2 and 7.3.

All buildings on the investigated block originally had residential uses. The use of commerce is a more contemporary need within this block. With a rise from 0% to 8.7% and 371,1m2 of the total area it is the fastest growing use within the block. In chapter 3.1 it was proven that between 2000 and 2013 there is even a greater increase of commercial use. There are twice as many plots with a commercial use in them. It is estimated that the total area of commerce has also been doubled between 2000 and 2013. This is remarkable, because the previous research revealed a less prominent increase from 16,1% to 17.5% in economical uses (commercial and service) between 2000 and 2011 within the whole HMZQ (Stuurman et al., 2013). This confirms the assumption of the research area being an area with more commercial activities, which was mentioned in the chapter where the area of research was defined (chapter 1). The block is situated in a residential area were also commercial activities are occurring. That is why the block was considered representative for the problems happening in the HMZQ described by the MP: The conservation of the integrity of the buildings in the blocks is inadequate due to the under-utilization they are subjected to in tertiary uses (defined as uses for economic exploitation) and some housing uses (IMPLAN, 2012). Figure 7.3

shows that the average area of commercial spaces is the largest of all inside spaces. This means that the spaces inside the residential buildings are not ideal for putting in commercial uses. Larger spaces are needed for commercial uses than there ideally are in the residential buildings.

It is noticeable that other inside spaces were increased as well in percentage of the total area. Spaces that serve increase 11,4% of the total area. The amount of spaces with a use of service even increased with 22,2%. The average area of each space with a service use decreased with more than one third. Together with the findings of the added and changed spaces and uses it can be concluded from this research that within the modern use of a residential building, service spaces are getting smaller and equally distributed over the plot. Not only spaces for service, but every space with a use that is not commercial are getting smaller (see figure 7.3), while they increase in total area (see figure 7.1). Of the inside spaces, served uses are decreasing in size with 12,5% and transitional space has a smaller decrease of 1.8%.

Figure 7.2 shows that the number of served and transitional spaces decrease and the number of spaces that serve increase. Outside spaces are decreasing in size as well. Its remarkable that courtyard decreased with 12,2% and that there is one courtyard less in reality. According to IMPLAN (2012) the courtyard is the regulator of its architectural division, around which the other spaces related to rest, work and recreational activities are distributed. Because of this courtyards can be deemed of significant cultural value. Backyards are most decreasing in size and percentage of total area, as shown on previous sub-chapters of chapter 7.

8 Planning policies

8.1 Specified regulations

In chapter 2 regulations, which are used as the architectural guidance, have been identified. On the city development plan it is mentioned that the regulation within the classifications can be overruled when specified differently in additional regulations (Municipality of Querétaro, 2008). These specifications together with the classified specifications were available within the GIS database from IMPLAN.

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,6
GAC-law: 0,05
GFAC-law: 1,75

CAC-law: 0,7
GAC-law: 0,05
GFAC-law: 1,25

CAC-law: 0,7
GAC-law: 0,05
GFAC-law: 1,25

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,6
GAC-law: 0,05
GFAC-law: 1,75

CAC-law: 0,6
GAC-law: 0,05
GFAC-law: 1,75

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 1

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 1
GAC-law: 0
GFAC-law: 1

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 1,2

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 1,6

CAC-law: 0,7
GAC-law: 0,05
GFAC-law: 1,25

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 1

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 1
GAC-law: 0
GFAC-law: 1

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 1,2

CAC-law: 0,6
GAC-law: 0,05
GFAC-law: 1,75

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

CAC-law: 0,8
GAC-law: 0,05
GFAC-law: 0,8

8.1.1 CAC, GAC and GFAC

There are different regulations within categories. It depends on the categories to which regulations a plot is exposed. Most of the buildings have specified regulation other than the defined categories. All regulations on CAC, GAC and GFAC are shown in map 8.1 No explanation has been found on why plots have specified regulations.

Most times it is allowed to build on 80% of the plot and there needs to be 5% area for green.

map 8.1 - CAC, GAC, GFAC regulations specified
1:500

☐ plot with specified policies
☐ plot which need to follow general regulations
☐ surrounding plots

map 8.2 - regulations on building heights specified
1:500

3,50 meters
3,51 - 4,38 meters
4,39 - 5,25 meters
5,26 - 7,00 meters
7,01 - 10,21 meters
surrounding plots

map 8.3 - plot numbers
1:2 000

Reality plots, incuding plot numbers
surrounding plots
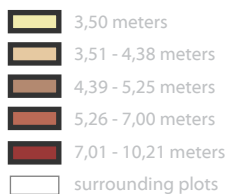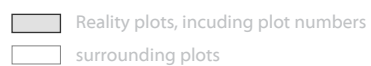
8.1.2 Number of stories and building heights

Map 8.2 shows the allowed building height, which is related to the amount of floors a building is allowed to have.

It needs to be noted that in the urban development plan of Querétaro it is also stated that the original heights of cataloged buildings need to be respected. It is still noticeable that of the 29 cataloged buildings in this block 21 have a maximum height of 3,5 meters, while no building in this block is lower than 5,1 meter. When checked it appears that often this number is generated by dividing the GFAC by the CAC and then multiplying by 3,5. This means that when a building is not allowed to have more than 1 floor it is 3,5 meters.

The cataloged buildings that are allowed to have more than one floor (higher than 3,5 meters) are categorized in HMCS2 or HMCS3 or have multiple floors in reality, except for plot 31 (category HMCS1 and has 1 floor).

There are three plots within this block that are not cataloged, which are the plots 7,8 and 26. All the non cataloged buildings are within the category HMCS2. All buildings that are not cataloged have a maximum allowed height of 6,25 meters.

CAC-dif.:
-9,66m2
GAC-dif.:
-38,63m2
GFAC-dif.:
-8,24m2

CAC-dif.:
90,56m2
GAC-dif.:
-149,62m2
GFAC-dif.:
88,9m2

CAC-dif.:
69,45m2
GAC-dif.:
-119,07m2
GFAC-dif.:
71m2

CAC-dif.:
4,37m2
GAC-dif.:
-26,2m2
GFAC-dif.:
3,93m2

CAC-dif.:
60,8m2
GAC-dif.:
-125,94m2
GFAC-dif.:
62,89m2

CAC-dif.:
338,43m2
GAC-dif.:
-451,23m2
GFAC-dif.:
341,03m2

CAC-dif.:
81,81m2
GAC-dif.:
-125,63m2
GFAC-dif.:
83,06m2

CAC-dif.:
42,57m2
GAC-dif.:
-113,52m2
GFAC-dif.:
136,21m2

CAC-dif.:
148,31m2
GAC-dif.:
-206,85m2
GFAC-dif.:
147,9m2

CAC-dif.:
27,35m2
GAC-dif.:
-58,91m2
GFAC-dif.:
69,4m2

CAC-dif.:
0,85m2
GAC-dif.:
-7,23m2
GFAC-dif.:
0,99m2

CAC-dif.:
29,89m2
GAC-dif.:
-67,24m2
GFAC-dif.:
29,2m2

CAC-dif.:
209,88m2
GAC-dif.:
-286,67m2
GFAC-dif.:
212,2m2

CAC-dif.:
107,33m2
GAC-dif.:
-171,73m2
GFAC-dif.:
-231,53m2

CAC-dif.:
23,26m2
GAC-dif.:
-43,79m2
GFAC-dif.:
78,2m2

CAC-dif.:
-37,66m2
GAC-dif.:
-4,86m2
GFAC-dif.:
101,78m2

CAC-dif.:
-5,1m2
GAC-dif.:
-33,18m2
GFAC-dif.:
-4,14m2

map 8.3 - plot numbers
1:2 000

Reality plots, incuding plot numbers
surrounding plots

map 5.3 and 8.1 - regulations on CAC, GAC and GFAC- ideal and policies
(used maps for comparative analysis)
1:2 000

map 5.3
courtyard
backyard
constructed area
not possible to reconstruct ideal
seperation plot - ideal
seperation plot - reality
surrounding plots
map 8.1
plot with specified policies
plot which need to follow general regulations
surrounding plots

map 8.4 - regulations on CAC, GAC and GFAC
ideal situation checked with policies
1:500

CAC and GFAC not within regulations
CAC not within regulations
GFAC not within regulations
CAC, GAC and GFAC within regulations
not possible to reconstruct ideal
surrounding plots

8.2 Ideal and planning policies

8.2.1 CAC, GAC and GFAC

Map 8.4 shows which plots in the ideal situation fit within the regulations of CAC, GAC and GFAC. This map presents the results of a comparative analysis between the ideal state, concerning the organization of spaces and its uses, and policies on CAC, GAC and GFAC (see map 5.3 and map 8.1). Of the 17 plots of which the ideal situation could be reconstructed 13 fit within the regulations of CAC, GAC and GFAC (76,5%).

For most of the plots that fit within these regulations there is more than 20 m2 left to build upon. For plot 5 and 32 there is relatively few area left to build on (less than 5 m2). Because INAH only needs to approve constructions when alterations are made on the construction elements of the cataloged buildings, there can be freely build within the backyard and courtyard, as long it is within the restrictions of CAC and the regulations for daylight and ventilation. For plot 1/2, 21 and 23 there is a bigger difference in GFAC and the ideal situation than there is a difference between the CAC and ideal situation. This means it is allowed to use more floor area within these buildings than there exist within the ideal situation.

Buildings in the ideal situation that are not within the restrictions of CAC, GAC and GFAC have no backyard. Plots 12, 18 and 20 don't fit within the regulations of CAC, where plot 12 and 18 have a difference of less than 10 m2 and plot 20 has a difference of 37,7 m2.

Plot 17 doesn't fit within the regulations for GFAC only in the ideal situation. This is can be explained by that this building is of typology 3 based on the

map 8.3 - plot numbers
1:2 000

| | Reality plots, incuding plot numbers |
| | surrounding plots |

map 5.4 and 8.2 - regulations on building heights and amount of stories
ideal and policies
(used maps for comparative analysis)
1:2 000

map 5.4
	2 stories
	1 story
	amount of stories not specified
	surrounding plots

map 8.2
	3,50 meters
	3,51 - 4,38 meters
	4,39 - 5,25 meters
	5,26 - 7,00 meters
	7,01 - 10,21 meters
	surrounding plots

map 8.5 - regulations on building heights and
amount of stories
ideal situation checked with policies
1:500

	3 stories allowed, plot ideally has 1
	2 stories allowed, plot ideally has 1
	1 story allowed, plot ideally has 2
	1 story allowed, plot ideally has 1
	ideal amount of stories not specified
	surrounding plots

GIS database from IMPLAN. This means no second floor supposed to be there in the ideal situation. As it appears that this building does have an extra floor in the ideal situation after reconstruction it in chapter …

8.2.2 Number of stories and building heights

Map 8.5 shows where policies on the amount of floors stories match the ideal situation. This map presents the results of a comparative analysis between the ideal state, concerning the amount of floors, and policies on CAC and GFAC, which indicated the amount of floors allowed (see map 5.4 and map 8.2). When the GFAC is higher than the CAC it is allowed to use more gross floor area than building area. This indicates when more floors are allowed. Although the Municipality of Querétaro (2008) states that the original building height should be respected, this indicates on how far building policies support the ideal situation according to typology descriptions. Because the actual height of the building is not specified for the ideal situation, only the amount of floors are shown.

Of the 27 buildings with a specified amount of floor 6 plots exceed the ideal amount of floor in building regulations (22,2%). In the ideal situation there is one plot (plot 17) that has 2 floors of which building regulation allow 1 floor.

CAC-dif.:
-14m2
GAC-dif.:
-38,49m2
GFAC-dif.:
-13,85m2

CAC-dif.:
23,66m2
GAC-dif.:
-82,8m2
GFAC-dif.:
23,94m2

CAC-dif.:
-7,43m2
GAC-dif.:
-20,44m2
GFAC-dif.:
-7,95m2

CAC-dif.:
-9,91m2
GAC-dif.:
-39,65m2
GFAC-dif.:
-9,66m2

CAC-dif.:
7,28m2
GAC-dif.:
-30,02m2
GFAC-dif.:
57,25m2

CAC-dif.:
6,45m2
GAC-dif.:
-33,35m2
GFAC-dif.:
65,55m2

CAC-dif.:
-41,01m2
GAC-dif.:
-6,83m2
GFAC-dif.:
116,18m2

CAC-dif.:
245,87m2
GAC-dif.:
-368,81m2
GFAC-dif.:
246,56m2

CAC-dif.:
68,57m2
GAC-dif.:
-154,28m2
GFAC-dif.:
71,19m2

CAC-dif.:
3,89m2
GAC-dif.:
-33,09m2
GFAC-dif.:
4,26m2

CAC-dif.:
54,28m2
GAC-dif.:
-93,05m2
GFAC-dif.:
53,54m2

CAC-dif.:
16,48m2
GAC-dif.:
-51,8m2
GFAC-dif.:
16,21m2

CAC-dif.:
-51,76m2
GAC-dif.:
12,94m2
GFAC-dif.:
0m2

CAC-dif.:
-49,29m2
GAC-dif.:
6,16m2
GFAC-dif.:
92,42m2

CAC-dif.:
-4,94m2
GAC-dif.:
-19,77m2
GFAC-dif.:
-4,33m2

CAC-dif.:
78,59m2
GAC-dif.:
-169,28m2
GFAC-dif.:
77,97m2

CAC-dif.:
60,1m2
GAC-dif.:
-124,5m2
GFAC-dif.:
-317,64m2

CAC-dif.:
-24,94m2
GAC-dif.:
6,23m2
GFAC-dif.:
24,94m2

CAC-dif.:
0m2
GAC-dif.:
0m2
GFAC-dif.:
-42,55m2

CAC-dif.:
-5,82m2
GAC-dif.:
-5,09m2
GFAC-dif.:
-20,36m2

CAC-dif.:
-18,94m2
GAC-dif.:
-12,62m2
GFAC-dif.:
22,84m2

CAC-dif.:
51,19m2
GAC-dif.:
-127,98m2
GFAC-dif.:
50,62m2

CAC-dif.:
0m2
GAC-dif.:
-59,34m2
GFAC-dif.:
1,55m2

CAC-dif.:
-7,47m2
GAC-dif.:
-29,89m2
GFAC-dif.:
-6,53m2

CAC-dif.:
-26,16m2
GAC-dif.:
-2,28m2
GFAC-dif.:
-69,39m2

CAC-dif.:
2,2m2
GAC-dif.:
-2,2m2
GFAC-dif.:
2,43m2

CAC-dif.:
-3,99m2
GAC-dif.:
-25,93m2
GFAC-dif.:
-4,4m2

CAC-dif.:
-5,1m2
GAC-dif.:
-33,18m2
GFAC-dif.:
-4,14m2

CAC-dif.:
-1,09m2
GAC-dif.:
-7,08m2
GFAC-dif.:
-55,3m2

CAC-dif.:
-0,43m2
GAC-dif.:
-5,95m2
GFAC-dif.:
-0,45m2

CAC-dif.:
-17,79m2
GAC-dif.:
-2,74m2
GFAC-dif.:
-91,02m2

CAC-dif.:
-37,66m2
GAC-dif.:
-4,86m2
GFAC-dif.:
20,78m2

map 8.3 - plot numbers
1:2 000

Reality plots, incuding plot numbers	
surrounding plots	

map 8.6 - regulations on CAC, GAC and GFAC
reality checked with policies
1:500

- CAC and GAC not within regulations
- CAC and GFAC not within regulations
- CAC not within regulations
- GFAC not within regulations
- CAC and GAC not within regulations (no ideal)
- CAC and GFAC not within regulations (no ideal)
- CAC not within regulations (no ideal)
- GFAC not within regulations (no ideal)
- CAC, GAC and GFAC within regulations
- not possible to reconstruct ideal
- surrounding plots
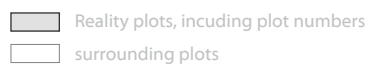
map 6.3 and 8.1 - regulations on CAC, GAC and GFAC- reality and policies
(used maps for comparative analysis)
1:2 000

map 6.3
- courtyard
- backyard
- constructed area
- seperation plot
- surrounding plots

map 8.1
- plot with specified policies
- plot which need to follow general regulations
- surrounding plots

8.3 Reality and planning policies

8.3.1 CAC, GAC and GFAC

Map 8.6 shows which plots in reality fit within the regulations of CAC, GAC and GFAC. This map presents the results of a comparative analysis between reality, concerning the organization of spaces and its uses, and policies on CAC, GAC and GFAC (see map 6.3 and map 8.1). As with the heights of buildings, this map indicates on how far building policies support the ideal situation. Of the 17 plots of which the ideal situation could be reconstructed 6 fit within the regulations of CAC, GAC and GFAC in reality (35,3%). Of the 32 that there are in total 12 fit within the regulations of CAC, GAC and GFAC in reality (37,5%). Plot 32 almost fits within the regulations of CAC and GFAC, with a difference of 0,4 m2 for CAC and 0,5 m2 for GFAC.

For most of the plots of which the ideal situation could be reconstructed and fit within the regulations of CAC, GAC and GFAC there is more than 20 m2 left to build upon in reality. Only plot 5 has relatively few area left to build upon, which is on 3,9 m2.

Buildings in the ideal situation that are not within the restrictions of CAC, GAC and GFAC have no backyard. Plots 12, 18 and 20 don't fit within the regulations of CAC, where plot 12 and 18 have a difference of less than 10 m2 and plot 20 has a difference of 37,7 m2.
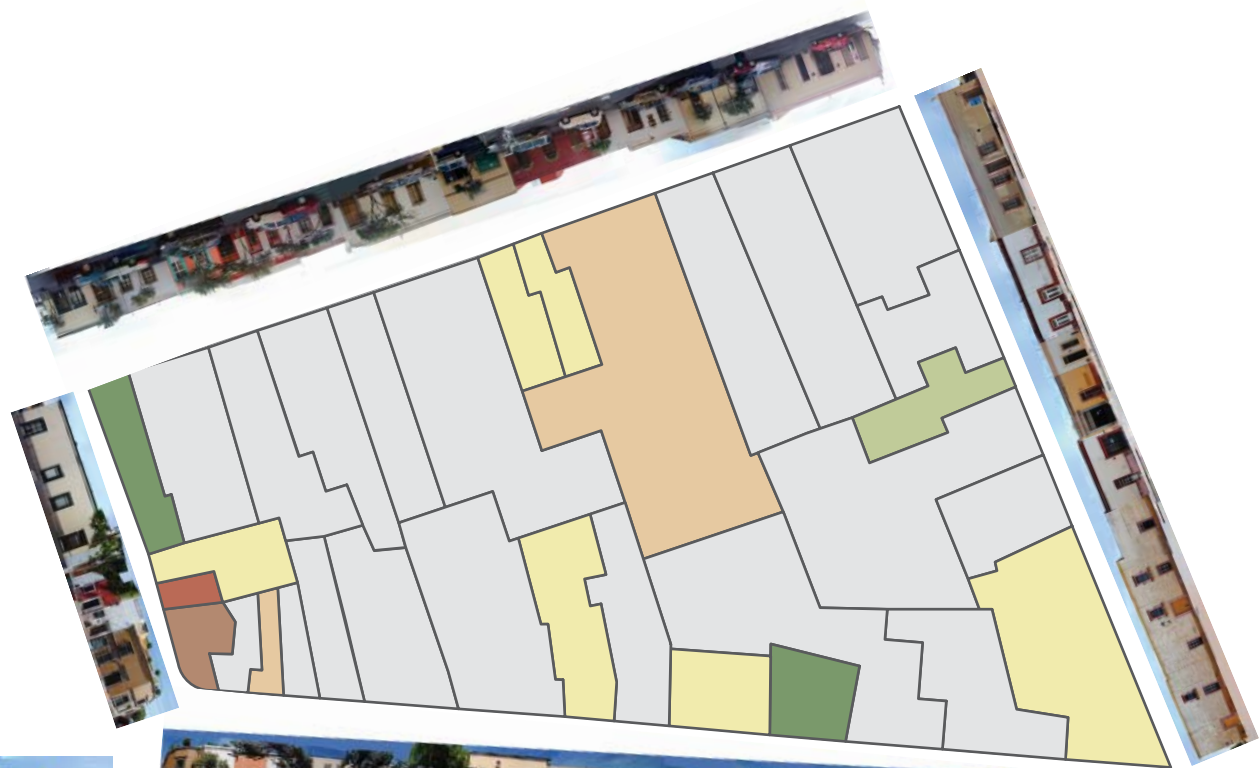
Fig. 8.1 - roofscapes on the West of the block

Fig. 8.2 - roofscapes on the East of the block

Fig. 8.3 - roofscapes on the North of the block

Fig. 8.4 - roofscapes on the South of the block

map 8.3 - plot numbers

1:2 000

Reality plots, incuding plot numbers

surrounding plots

map 8.7 - regulations on building heights and
amount of stories
reality checked with policies

1:1 000

1 story allowed, plot has 3 in reality

2 stories allowed, plot has 3 in reality

1 story allowed, plot has 2 in reality

2 stories allowed, plot has 1 in reality

3 stories allowed, plot has 1 in reality

3 stories allowed, plot has 2 in reality

allowed amount of stories simular to reality

figures 8.1, 8.2, 8.3 and 8.4 - regulations on building heights
reality checked with policies

height facade

maximum height
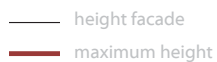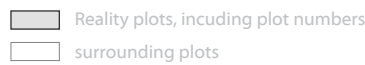
map 6.4 and 8.2 - regulations on building heights and amount of stories
reality and policies
(used maps for comparative analysis)

1:2 000

map 6.4

3 stories

2 stories

2 stories

1 story

not specified

surrounding plots

map 8.2

3,50 meters

3,51 - 4,38 meters

4,39 - 5,25 meters

5,26 - 7,00 meters

7,01 - 10,21 meters

surrounding plots
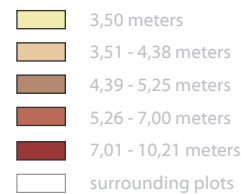
8.3.2 Number of stories and building heights

Map 8.7 shows where policies on the amount of floors stories match reality. This map presents the results of a comparative analysis between reality, concerning the amount of floors, and policies on CAC and GFAC, which indicated the amount of floors allowed (see map .. and map …). When the GFAC is higher than the CAC it is allowed to use more gross floor area than building area. This indicates when more floors are allowed. Figures 8.1, 8.2, 8.3 and 8.4 show the height of the building compared to the maximum allowed height (see map 6.4 and map 8.2).

Of the 32 building plots 4 plots contain building that exceed the amount of floor in building regulations (12,5%). On 8 buildings a minimum of one extra floor can be added without exceeding the regulations on CAC and GFAC. This is 25,0% of the total amount of plots in the block.

Plot 32, 29 and 30 all have more floors than allowed. These three plots are small compared to the average size of plots in this block. These plots are situated in the South-West corner of the block, where the block is getting more narrow.

The regulations on building heights do not correspond to the building heights in reality. There are 6 plots on which buildings correspond to the maximum building height. The plots of these buildings are 7, 8, 21, 26, 29 and 31. Noticeable is that of these 6 building plots, plot 7, 8 and 26 are all the plot that are not cataloged.

9 Needs and interests

9.1 use of plots

The ex-employee of the municipality of Querétaro who worked there for 8 years Carranza (2013) stated in a structured interview that there are often conflicts between INAH and the Municipality of Querétaro on the regulations for Querétaro. INAH is a Federal organization making laws for the whole country, not specifically for Queretaro. INAH tends to be conservative. The Municipality of Querétaro is engaged with the issues of the city, so they work specifically on HMZQ. That's the reason sometimes there seems to be a conflict between them. Lezema-Lopez (2013) states that the Municipality of Querétaro is less concerned with the preservation of cultural heritage of private houses for future generations than they are in economically exploiting its value.

Vilarruel (2012) from the office for urban development of the state of Querétaro states that the original inhabitants of Querétaro have a value for the city. They keep the city with its culture and traditions alive.

As mentioned in the problem statement (in chapter 1) there are contradictory differences between the maintenance of inhabitants and the interest in uses of economical purposes. Within the urban development plan the Municipality of Querétaro (2008) pleads for a balance between economic and residential uses in the HMZQ. This is done by allowing economical uses when residential uses are included, which gives a building mixed use.

As a result of previous research (Stuurman et al., 2013), it is proven that mixed uses, with or without residential use included, have a negative influence on the façade attributes and state of conservation. This research confirms in the comparative analysis

Fig. 9.1 - complaints inhabitants

between the ideal and real state (chapter 7) the negative influence of mixed use on typology attributes in the façades of the researched block.

A threat of economical uses influencing attributes is not found in previous researches. As stated in the problem statement it is found that economical uses have a bad influence on the habitability of the area. According to Lezema-Lopez (2013) bars and restaurants in particular are influence on the habitability of the area.

The noise of music and loud people brings complains in the area around the street Cinco de Mayo (street North of the studied block). In this area posters that hang on façades can be found (fig 9.1), which can be translated as: "Querétaro, Cultural Heritage and her citizens; we demand! respect, quality of life and a solution to the problem of the bars and clubs in the historical center and surrounding neighborhoods".

During the three months stay in Querétaro it was observed that indeed lines occurred for entering bars after 11 o'clock around the weekends. More people were on the streets during these times getting in and out of bars, which have residential uses next to them.

All this indicates that there is a need for both residential uses and economical uses. Putting these uses together in the same buildings does not appear to be the solution, it brings complains from inhabitants and it has a negative influence on the integrity of the residential buildings. There is a need for separation between the residential and economical uses.

9.2 use of space

In an interview with Lezema-Lopez (2013) it is mentioned that ground is expensive in the HMZQ. From the previous research of Stuurman et al. (2013) it is concluded that investments have a positive impact on the state of conservation of buildings. In the problem statement it is mentioned that poverty is a threat to the integrity of residential buildings. This is a possible indicating on the need for more efficient ground use.

The results of this research show that spaces with uses related to residential use (service and served spaces) are getting smaller because of divisions. Backyards are less than half the sizes in reality than they are ideally, because of additional service and served spaces in these backyards. In reality there also exist more stories than in the ideal situation. And in chapter 2 it shows that also multiple uses appear. This confirm the indication on the need for efficient ground use.

Along the façade uses change into commercial or service uses concerning: bars, restaurants, retail uses and garages for parking a car. During the stay in Querétaro it was mentioned by multiple inhabitants that the need of parking a car close to the house is important. This could explain why spaces connected to the façade are often a garage in reality. Because of this, there is a need for more served spaces in the back of the plot. Served spaces seem to get pressed more to the back of the plot, and do not stay around the courtyard where the served spaces ideally are.

Commercial spaces are larger than the average size of spaces in the ideal situation. These indicates a need for larger spaces for commercial uses.

Fig. 9.2 - satellite image Google Earth (2008)

building height in meters	dimension patio/light cubes in meters	
	for living, commercial and working uses	for other uses
<=4	2,50 x 2,50	2,00 x 2,00
<=8	3,25 x 3,25 (all buildings)	2,25 x 2,25
<=12	4,00 x 4,00	2,50 x 2,50
>12	1/3 x building height	1/5 x building height

Table 9.1 - Regulations on patio's and light cubes,

adapted from general construction regulations for the State of Querétaro (Municipality of Querétaro, 2012b)

9.3 Backyards

In the problem statement it is mentioned that under-utilization at the back of the plots has a negative influence on the integrity. The back of the plots is where originally the backyards were situated.

In chapter 7 it was concluded that the ideal backyards aren't compatible with the contemporary needs. Within two blocks North of the investigated block the back of the plots turned into parking garages (figure 9.2), which confirm the lack of compatibility. In chapter 7 it was found that parts of the backyards in the ideal situation is still backyard in reality. As explained, the backyards were originally used for keeping cattle and agriculture. Agriculture and cattle don't fit within the uses that exist today in a city core such as the HMZQ. Though in reality a new use for the backyards is applied related to residential uses. This is the use of ventilation and daylight for its surrounding spaces. There are regulations on the minimum size of the areas for daylight and ventilation. Those are called patio and light cubes within the general construction regulations for the State of Querétaro (Municipality of Querétaro, 2012b), shown in table 9.1.
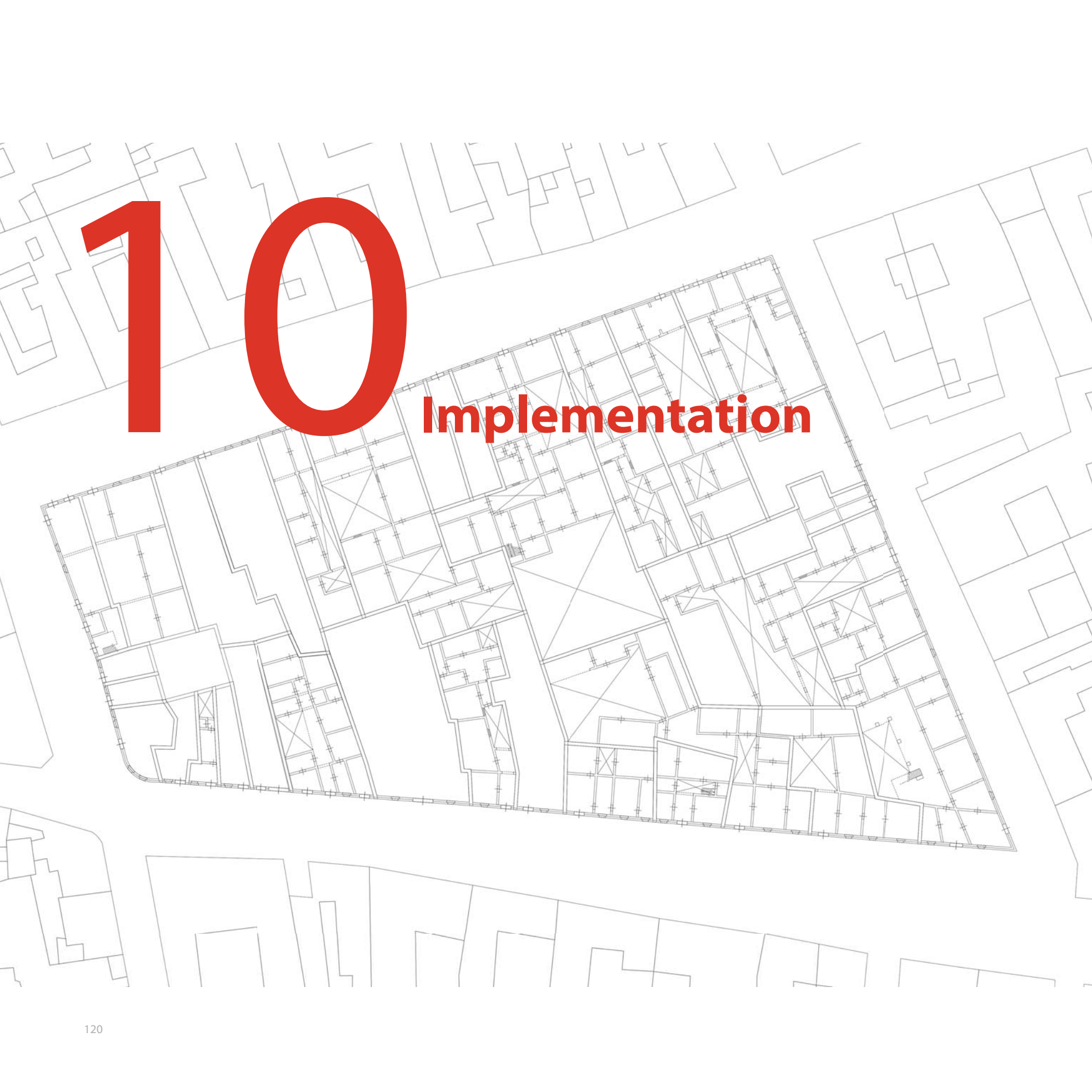
These regulations are defined by the use and the height of the built around the patio. All buildings that are lower than 8 meters and higher than 4 meters (see map 6.4 for heights). All patio's connected to served uses should be at least 3,25m x 3,25m and patio's connected to uses that serve should be at least 2,25m x 2,25m. The regulations on the patio dimensions applies for every building in the state of Querétaro. (Municipality Querétaro, 2012).

During the stay in Querétaro another use for the backyards was observed. It was for hanging laundry, which gives that backyard a service use. It is thinkable that this use of the backyard already existed at the time of origin of the buildings, one to two centuries ago.

Keeping these uses could help in maintaining the original layout according to the typology descriptions of the historic houses. There is one difference, these uses don't need the same size of backyards as they originally were.

10 Implementation

CAC-dif.:
-9,66m2
GAC-dif.:
-38,63m2
GFAC-dif.:
-8,24m2

CAC-dif.:
46,15m2
GAC-dif.:
-105,21m2
GFAC-dif.:
44,5m2

CAC-dif.:
0,51m2
GAC-dif.:
-50,12m2
GFAC-dif.:
2,06m2

CAC-dif.:
4,37m2
GAC-dif.:
-26,2m2
GFAC-dif.:
3,93m2

CAC-dif.:
45,1m2
GAC-dif.:
-110,24m2
GFAC-dif.:
47,19m2

CAC-dif.:
0,45m2
GAC-dif.:
-113,26m2
GFAC-dif.:
3,05m2

CAC-dif.:
0,61m2
GAC-dif.:
-71,56m2
GFAC-dif.:
94,24m2

CAC-dif.:
11,16m2
GAC-dif.:
-54,99m2
GFAC-dif.:
12,42m2

CAC-dif.:
10,91m2
GAC-dif.:
-69,45m2
GFAC-dif.:
10,5m2

CAC-dif.:
12,79m2
GAC-dif.:
-44,35m2
GFAC-dif.:
54,84m2

CAC-dif.:
2,37m2
GAC-dif.:
-79,15m2
GFAC-dif.:
4,68m2

CAC-dif.:
0,85m2
GAC-dif.:
-7,23m2
GFAC-dif.:
0,99m2

CAC-dif.:
12,27m2
GAC-dif.:
-49,63m2
GFAC-dif.:
11,58m2

CAC-dif.:
13,93m2
GAC-dif.:
-34,45m2
GFAC-dif.:
68,86m2

CAC-dif.:
-37,66m2
GAC-dif.:
-4,86m2
GFAC-dif.:
101,78m2

CAC-dif.:
-5,1m2
GAC-dif.:
-33,18m2
GFAC-dif.:
-4,14m2

CAC-dif.:
107,33m2
GAC-dif.:
-171,73m2
GFAC-dif.:
-231,53m2

10.1 Defining area
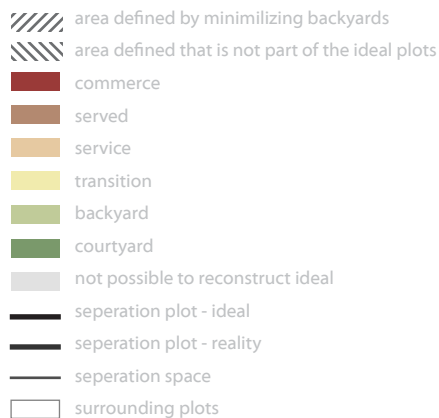
10.1.1 Area of intervention

Concluded from changes in typology attributes in chapter 3.1.5 is that the homogeneity of the building typologies has been affected because the served spaces are pushed to the backyards by the commercial and serving spaces. It is believed that this can be prevented by putting these served and commercial spaces somewhere else. In chapter .. it shows that the backyards are partly underutilized and are not compatible with the use it has in reality. Although these backyards are part of the original typologies, the integrity of these backyards is not intact.

For this reason it can be justified that the area for backyard in the ideal situation partly gets new uses that satisfy the needs that belong to more modern times. Parts of the backyards still need to be kept backyard. This is because the backyards are part of the organization of spaces and homogeneity which are significant for the typologies. By using only a part of the backyards for contemporary needs, the homogeneity and organization of spaces within the typologies are kept intact. To determine the space that is available for intervention, the identified architectural guidelines are used. These are CAC, GAC and GFAC that can't be transgressed. Next to this there are also modern regulations for comfortable living in terms of daylight and ventilation. The general construction policies are used (Municipality of Querétaro, 2012b) to determine the minimum size of outside area connected to the spaces in the backyard. These guidelines are applied in map 10.1. As a result is shows the possible area of intervention.

As concluded in chapter 7 there is a need for efficient ground use. By giving these backyards a new use, plots get smaller. The parts of the plots that are underutilized can be used as a dynamic zone that reacts on the needs that are not compatible enough to be integrated in the ideal situation of the historic houses.

map 10.1 - defining area for intervention
1:500

/////	area defined by minimilizing backyards
\\\\\	area defined that is not part of the ideal plots
■	commerce
■	served
■	service
■	transition
■	backyard
■	courtyard
■	not possible to reconstruct ideal
▬	seperation plot - ideal
▬	seperation plot - reality
—	seperation space
▭	surrounding plots

map 10.2 - defining use
1:500

primary entrance/exit
secondary entrance/exit
commercial zone
served
service
transition
backyard
courtyard
not possible to reconstruct ideal
seperation plot - ideal
seperation plot - reality
seperation space
surrounding plots

map 10.3 - plot numbers
1:2 000

Reality plots, incuding plot numbers
surrounding plots
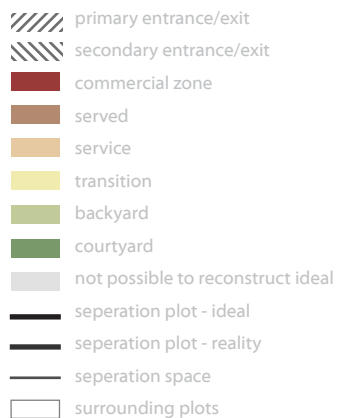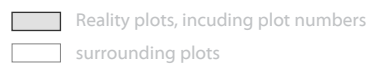
10.1.2 Use and accessibility

In the studied real situation it revealed that economical activities are not compatible with the ideal situation of the residential buildings. Today's need is integration of economical activities within the residential area without affecting its habitability and typology attributes.

Chapter 7 indicates that commercial and service spaces that are situated along the façades in reality need a connection to public area. The area that will be used for intervention is not directly connected to the public area. This means the public area should reach the center of the block within the solution. For this to happen a route is created trough the block by adding two entrances/ exists to the center of the block.

The entrance/ exit at the North of the block (see map 10.2) are plots 7 and 8. On these plots non cataloged buildings are situated. Because these buildings are not cataloged, they can be transformed into an opening to the center of the block without affecting attributes. To make the center of the block a obvious part of the public area, this opening should be created with as little physical barriers as possible.

To create a continuous public area the rear entrance/ exit is created at a secondary street in a historic house without use (plot 16). By doing this it does not only give new purpose to this plot, it is also an opportunity for investments on the maintenance of the historic house. In this way the interior of this plot is not kept for future generations, but also accessible for present generations.

10.2 Zonification (2D)

For the integration of economical uses in the residential area, a solution is presented for the problems of that restaurants, bars and clubs bring. The problems of noise from music and loud people are the origin of the complains and need to be solved.

By making use of an existing barrier a separation is being creating between the area of living and the commercial zone (see map 10.4). By adding two other barriers within the area of intervention (commercial/ service zone and transitional zone) a greater separation is created between the area of living and the area where alcohol is permitted. The middle area, where alcohol is permitted is the zone that brings most of the nuisance and is now as far away from the area of living as possible.

In the ideal situation there already exists a barrier of spaces for service and backyards behind the served area, which is the area for living. This barrier of service spaces and backyard (also of service use, as mentioned in chapter 9) is the first and most important barrier that prevents visual and noise pollution coming from the commercial area. By giving a new function to the way of organizing the structure of plots there is a greater chance that the original layout will be maintained. The service zone has an estimated average width of 8 meters.

The second barrier is a commercial and service zone. This area can still be part of the plots. If the owners of the plots don't have any interest of using this zone, it can be sold or rent to an external user. In this zone no permissions for serving alcohol should be granted to prevent nuisance. The commercial and service zone has a width of 3,5 meters.

The third barrier is the barrier of transition. To prevent nuisance during the night this area should have the least amount of people as possible during the night. In the best case scenario people only come here to get in and out of the commercial area during the night. During the day this area could be the extension of the public area on the streets where commercial activities occur. A possible problem also mentioned in the discussion chapter of part one of this series (Stuurman et al., 2013) and by IMPLAN (2012) is visual pollution in the form of advertisements on historic façades. By shifting commercial activities from the streets to the inside of the block, no visual pollution occurs in the form of advertisements on historic façades. This transitional zone has a width of 3,2 meters between the commercial and service zone and the commercial center.

The commercial center of the block can be made in the form of a sound proof building. This building can be partly build underground depending on the need of bars and restaurants that have alcohol permits. Part of the solution could be that this building has an entrance hall for people getting in and out of bars or from one bar to the next, to have as little amount people that can cause nuisance outside as possible. This commercial center has a ground floor area of 181,0 m2.

By allowing residential uses only in the residential zone on the map, this area can be maintained habitable. The least used parts of the plots are used for the intervention. Because plots are smaller and now more efficient, they cost less. This could be part of the solution against the problems of poverty and more can be spend on the maintenance of the historic houses.

There is another advantage of only allowing residential uses in the residential zone. As mentioned in the problem statement (chapter 1) mixed uses are a threat for the historic buildings. This is solved within this solution because mixed uses don't exist within this solution.

map 10.4 - Zonification
1:500

- commercial center with alcohol permit
- commercial
- transitional zone
- residential service area
- residential living area (served)
- surrounding plots

10.3 Final result (3D)

By adding heights to the area's, volumes are being formed (see figure 10.1). By making the new buildings not higher than the existing residential buildings, the barriers keep their effect of separating the commercial area from the residential area, visually and in terms of sound. If there is need for more inside space within the commercial zone, there can be build underground.

Without building underground the new buildings can have two floors with a total height of 6 meters. Within the regulation of the Municipality of Querétaro (2008) a floor height is 3,5 meters, including construction elements. The building can win one meter if the transitional zone is lowered. In this way the total building height would be 7 meters and can fit two floors of 3,5 meters in height.

The commercial and service zone is drawn with a height of 3,5 meters (one story). By not making these buildings higher it creates the possibility of using the roofs for roof terraces or something else. Another reason for limiting the heights of these buildings is the presents of the transitional zone. Although during the three month of field research in Querétaro it is observed that people almost always walk and sit in the shadow, higher buildings surrounding the transitional zone could prevent enough light coming in for a pleasant stay.

figure 10.1 - Result
1:500

intervention
historic residential buildings
maintained outside space

11

Discussion and conclusion

11.1 Discussion

Many problems occurring in the HMZQ are already acknowledged within the MP (IMPLAN, 2012). Specified identifications of guidelines on how to approach these problems are still insufficient. Historic private buildings are not sufficiently been monitored on integrity, due to the problem that buildings can only be entered if allowed by the owner. The planning policies from the Municipality of Querétaro (2008) concerning the construction area, green area, gross floor area, building heights and uses of plots are specified, but the results of this research show that these regulation are not being followed in reality.

Typology attributes within conservation policies stated in the MP (IMPLAN, 2012) can still be further specified. Although an ideal situation could be recreated from the typology descriptions, sometimes assumptions had to be made doing this. For example in some of the cases the oldest data available is used to reconstruct the ideal situation for the described attributes, it can't be confirmed if this also was the original valued situation. Besides this the descriptions sometimes mention multiple possibilities in what the situation is for a certain type in the ideal situation. For example type 3 may have a backyard, but it is also possible that it doesn't. If a new version of catalogs for historic buildings will be made, it could include a value assessment, which makes it more easy to make decisions for further development.

There is little information found on the bases of which INAH approves alteration in historic buildings. Two source state in interviews that INAH is conservative. Publishing documents on the management of historic building can give more transparency in the INAH organization. Documents

on the management of historic buildings can also be used as architectural guidelines for future developments and evaluations.

This research shows how conservation and planning policies can be used as guidelines for approaching the problems occurring in the HMZQ. By doing this exercise it revealed where gaps exist within the conservation and planning policies.

Planning policies do not always support the maintenance of valued attributes. From the results of this research and the previous research in part one of this series (Stuurman et al., 2013) it is concluded that mixed uses, which are approved in the area of research, have a negative influence on typology attributes and the state of conservation. Besides this regulations on building heights and gross floor area don't support the ideal situation.

Planning policies on the area of construction and the area of green on a plot seem to be more coherent with the ideal situation than with reality.

Policies are not only a way to comply with conservation, they can comply with user needs as well. As the results of this research show that these regulation are not being followed in reality, they do not fully support user needs. The policies allowing mixed use bring problems of nuisance for the inhabitants in and around the area of research.

The design is finished until a 3D functional division for the block. It is not shown how a bar or restaurant within the design can compete with the existing bars in the monumental residential buildings on a base of ambience. The further complementation of the design is the challenge of the future designer. It´s believe that it could compete with the existing bars if this is done right.

Because the future can't be predicted and the needs of users always change it is important that there always will be room for development. The area used for intervention could become a dynamic zone, so there is always room for adaption when needs and interests of stakeholders change. The found solution isn't static. It can be seen as the start of a discussion on which can and should be evaluated.

11.2 Conclusion

This report shows the results of a chosen strategy on finding the potentials for modern architectural to comply with both user needs and architectural guidelines defined in conservation and planning policies. It was a successful exercise wherein possible solutions for the problems that come with the happening development in the HMZQ were found. Using architectural guidelines defined in conservation and planning policies as a design tool show potentials for sustainable development.

Conservation policies in Queretaro include architectural guidelines, related to the organization of spaces, sequence of space uses, number of stories and façade openings defined for specified historic housing typologies. Planning policies in Queretaro include architectural guidelines, concerning the area of construction, area of green, gross floor area, building heights and plot usage defined for all building within the HMZQ.

Conservation policies are not always being followed in reality. Differences resulted in user needs that are not coherent with the conservation policies. It showed that there is a need of integration of economical activities within the residential area without affecting its habitability. Besides this it is found that backyards have less applications than they originally had. The large backyards are not

compatible with either residential uses as uses with economical purposes.

Architectural guidelines included in conservation and planning policies are generally complementary to the maintenance of historic buildings. Planning policies fail to support conservation policies on architectural guidelines such as building heights and plot usage. Typology attributes are affected by the way economical activities are integrated in reality. Mixed uses have a negative impact on typology attributes and the state of conservation of historic houses.

For modern architecture to comply with both user needs and architectural guidelines defined in conservation and planning policies only works if conservation and planning policies are well defined. The intervention found that is more a reaction on planning policies, instead of complying with it. The planning policies are not being followed which indicates it does not comply with user needs. From the conservation policies an ideal situation is reconstructed. Within this ideal situation needs existing in reality can be identified. This can give the heritage a value to today's use and not only for its history. On this way there occurs an interest in maintaining the valued attributes, not only for conservation, but also to comply with user needs.

Planning policies on land use are being reconsidered within the found solution. Instead of combining residential and economic uses within the original houses, they are separated. The original houses are made more compatible with residential uses. A dynamic zone is being applied, which reacts on the need for economic uses. The uses are disturbed in such a way that nuisance coming from economic uses have as little impact as possible on residential uses.

Complying with user needs within the restriction of conservation policies serves in maintaining the Outstanding Universal Value. If done right it is believed that less adjustments will take place within the valued attributes.

This project explored a solution that is not only maintaining history, but taking part in the revolution of that history by using the valued attributes as a quality in today's use.

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13

Abbreviations

13. Abbreviations

AHT: Chair Architecture Theory and History

AUDE: Unit Architectural and Urban Design and Engineering

HMZQ: Historic Munuments Zone of Queretaro

MP: Management Plan

OG: Operational Guidelines for the implementation of the World Heritage Convention

OUV: Outstanding Universal Value

TU/e: Eindhoven University of Technology

UNESCO: United Nations Educational, Scientific and Cultural Organization

WH: World Heritage