



Sponsored By:

Comune di
Venezia
Assessorato
all'Urbanistica



In collaboration with:

UNESCO



An Integrated, Multi-Agency Approach to the Preservation of Venetian Palaces

This *Preliminary Qualifying Project* Proposal, submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements of the Degree of Bachelor of Science, was completed by the team members listed below:

A. Kari Fletcher

Andrew G. Halloran

Reem M. Malik

Kevin H. Rohleder

Advisors:

Fabio Carrera

David DiBiasio

Natalie Mello

July 31, 2002

AUTHORSHIP

All members of the project team contributed equally to the authorship of this paper and the completion of the project.

ABSTRACT

The palaces of Venice are historical monuments which are constantly being modified to keep them current with present-day standards so that they remain usable. When a modification to a palace is requested, it is studied by several government agencies and preservation organizations to ensure that the requested modification does not jeopardize the historical integrity of the structure. However, each of the agencies works off of different sources to acquire information necessary to reach an appropriate decision. The sources may contain similar information, but it is information that is not always shared. With the purpose of aiding the City of Venice in preserving the palaces, the goal of our project was to combine the resources of all the agencies and integrate them into one easily accessible, easily searchable computerized database. The intention was that the digitization and centralization of all the data would make them more accessible and utilizable to the various city departments. Five different agencies contributed records and information on palaces, which we verified, organized and linked through the database. Analysis of the process for obtaining a building permit confirmed that our database will help make it more efficient. Besides being a comprehensive source of information, the database establishes a standard institutional link between the different departments to share information and cooperate with each other more effectively, thus streamlining their efforts towards the preservation of palaces.

Executive Summary

The palaces of Venice define the city's landscape and history. There are about four hundred palaces within the historic center of Venice, and more than one hundred of these monumental buildings line the Grand Canal. While most of these buildings, known in Italian as *palazzi*, were built around the 16th century, some date as far back as the 1200's. Despite



Figure 0-1: Palaces along the Grand Canal

their age, they stand even today, proud and awe-inspiring, a constant reminder of the power and wealth of the *Serenissima*, the most serene Republic of Venice, and its artistic contribution to the culture of Europe. Figure 0-1 depicts five major palaces on the Grand Canal.

Originally, *palazzi* served as residences combined with offices and warehouses for the merchant-aristocracy of Venice. These were families of noble origins, with a great amount of wealth and influence within Venetian politics and society. The beauty of the facade, the location of the palace, and the value of the art within were conspicuous symbols of the social importance of that specific family. Unfortunately, as time took its toll on the buildings, they naturally started to deteriorate, and the city faces the danger of losing their historic and cultural value.



Figure 0-2: Facade of palace in need of restoration

There is an obvious need for the restoration and preservation of *palazzi* (Figure 0-2), simply to keep their history and beauty alive. While the City of Venice places great value on the maintenance of these buildings, it has other considerations to make. Within the historic center of Venice, construction of new buildings is not allowed due to lack of space. The buildings that already exist need to be used to meet the needs of the city in a modern world. The purpose of our project was to make a valuable contribution towards the safeguarding of these beautiful buildings.

Each building undergoes considerable renovation to keep it usable in modern society. Most palaces today have been converted to apartments, museums, hotels and offices. Basic amenities of modern living, such as electricity and plumbing, are added. Structural changes are often necessary to create more rooms and increase wall space, depending on the use of the building. If not carefully considered, these renovations can destroy the original architectural designs, endangering the history and beauty of the palace. This would affect not only one specific building, but on a larger scale would diminish a defining trait of this historical city.

Many different city departments exist to regulate renovation through the use of permits. Our project sponsor, Comune di Venezia Assessorato all'Urbanistica (the Venetian planning department), as well as Edilizia Privata (building department), Soprintendenza (Ministry of Culture) and Commissione di Salvaguardia (Landmarks Commission) are all involved in regulating modifications to buildings. A permit must be obtained before renovations can be applied to any building in Venice, with each permit decision requiring a great deal of information about the building being renovated.

Because palaces are considered monuments, a permit for a palace requires even more information and consideration than other Venetian buildings. Usually, at least three separate departments are involved in the decision to approve a modification to a palace. The departments work relatively independently of each other, approving or disapproving different aspects of a proposed modification. These efforts are all targeted at transforming the building for modern use without endangering its original qualities.

To make an appropriate decision, the departments often require the same kind of information on the palace. There exist many sources with information about palaces that may

be relevant to the decision to approve a change. Unfortunately, many of these sources are in separate locations and contain contradictory information. These sources are difficult to use, since most are recorded in paper form, which is hard to transmit and duplicate. They are also not convenient to update and may contain information that is outdated or inaccurate.

The goal of our project was to contribute to the preservation of palaces in Venice by gathering all this disparate information into one centralized, computerized database. The database contains information that is up to date, accurate, and potentially accessible to all city departments and the public. We also suggested ways for the database to be implemented and updated in a way that would maximize its benefits to the city departments and streamline their efforts in the preservation of palaces.

The project involved accessing and gathering all of the existing data sources. The primary source of information was a catalog of Venetian palaces, created in 1968 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). This catalog contains a great deal of useful information identifying and describing each palace. The only disadvantages to the catalog were its age, and the fact that the catalog only existed in paper form. We entered all the information from this catalog into our database. We also gathered information from many other sources: city departments (namely Urbanistica and Edilizia Privata), books, etc. This collected information was entered into our database as well.

In addition to using existing sources, we visited each palace to gather our own data. Our sources were often contradictory in such simple facts as addresses, so there was a need to verify this information to ensure the completeness and correctness of our database. We collected updated use and ownership information for each building. Our field data collection also entailed taking digital pictures of each palace to create a permanent visual record of each palace. The UNESCO database occasionally had photographs, but it was by no means consistent in this regard, and we wanted to correct this apparent lack of visual information. These pictures also served as a record of the current state of restoration of each building.

Our principal result was the database containing all the available information on the palaces. This database can be endlessly duplicated and distributed, which makes it easier to access, and therefore more likely will be used. We came across incomplete or lost records in the paper catalogs, but computerized records will stay complete. The computerized database can be easily updated and kept current, and we suggested ways for this in our Recommendations section.

We linked our database to a geographical information system. This allows the creation of computer generated maps, as in Figure 0-3. Using our database, other maps can



Figure 0-3: Locations of palaces in Venice

be generated for more specific purposes. This makes it possible to display database information in a visual manner.

After creating this database, we studied ways that it can be utilized. We took an actual example of a permit for the conversion of Palazzo Foscari into a hotel. We followed the permit through the entire process, from the initial application to the final approval. We traced its progress through Edilizia Privata, the Soprintendenza and the Commissione di Salvaguardia. At each step, we looked at the palace renovation and identified specific points along the way where our database would be useful. Using this information and our research on the operations of various city departments, we recommended possible implementations and uses within the offices.

We have collected extensive information on the Venetian palaces but there is still much more work to be done. Along with our recommendations for the implementation and maintenance of our database, we also recommended ways to extend our work. We discussed ways of collecting information on more palaces that are not currently included in our database, as well as ways of collecting new and different types of information on the palaces already included.

Our project has contributed to the effort to preserve the palaces of Venice by centralizing, updating, and preserving the previous records on the historical buildings. Whereas before, many types of information had to be collected individually from different locations, making the gathering of complete information difficult and inefficient, the new database contains all the information in one place. The information is more accessible to all departments, establishing lines of communication between the departments and facilitating

the sharing of information. This centralization of information allows permit requests to be processed more efficiently. An efficient process leads to educated response to requests for renovation, aiding in the preservation of Venetian palaces for generations to come.

TABLE OF CONTENTS

AUTHORSHIP	II
ABSTRACT	III
EXECUTIVE SUMMARY	IV
TABLE OF CONTENTS	IX
LIST OF FIGURES	XI
1 INTRODUCTION.....	1
2 BACKGROUND.....	3
2.1 VENETIAN PALACES	3
2.1.1 <i>Historical Role of Palaces</i>	4
2.1.2 <i>Current Role of Palaces</i>	6
2.1.3 <i>Building a Palace</i>	6
2.2 VENETIAN ARCHITECTURE.....	7
2.2.1 <i>Byzantine Architecture</i>	8
2.2.2 <i>Gothic Architecture</i>	9
2.2.3 <i>Renaissance Architecture</i>	9
2.2.4 <i>Baroque Architecture</i>	10
2.2.5 <i>Neoclassical Architecture</i>	11
2.2.6 <i>Modern Architecture</i>	11
2.3 SPONSOR INFORMATION	11
2.3.1 <i>Urbanistica: Venice Planning Department</i>	11
2.3.2 <i>Other Contributing Agencies</i>	12
2.4 MODIFYING PRESERVED BUILDINGS.....	13
2.4.1 <i>U.S. Building Permit Process</i>	14
2.4.2 <i>Venetian Building and Permit Process</i>	15
3 METHODOLOGY.....	17
3.1 DOMAIN OF INQUIRY AND STUDY AREA.....	17
3.2 COMPUTERIZED DATABASE OF PALACES.....	18
3.3 LAYOUT OF DATABASE	19
3.3.1 <i>Information Requirements</i>	20
3.3.2 <i>Existing Data Sources</i>	23
3.3.3 <i>Collection of Field Data</i>	24
3.3.4 <i>Data Archival Methods</i>	25
3.4 DEMONSTRATION OF USEFULNESS.....	27
4 RESULTS.....	28
4.1 GENERAL PALACE INFORMATION	28
TYPOLOGY INFORMATION.....	29
4.2.....	29
4.3 PROGRAMMED USE INFORMATION.....	31
4.4 VINCOLI INFORMATION.....	32
4.5 PUBLIC PROPERTY AND STANDARDS INFORMATION	35
5 ANALYSIS.....	36
5.1 SAMPLE PERMITS	36
5.1.1 <i>Specific Permit</i>	36
5.1.2 <i>Building References</i>	39
6 CONCLUSIONS.....	42
7 RECOMMENDATIONS.....	44
7.1 IMPLEMENTATION OF THE DATABASE.....	44
7.1.1 <i>Technical Recommendations</i>	44
7.1.2 <i>Maintenance</i>	45

7.1.3	<i>Training Users</i>	45
7.2	EVALUATION OF THE DATABASE	46
7.2.1	<i>Short Term</i>	46
7.2.2	<i>Long Term</i>	46
7.3	DISTRIBUTION	47
7.4	FUTURE PROJECT POSSIBILITIES	47
7.4.1	<i>Expansion of the Palace Database</i>	47
7.4.2	<i>Condition Assessment</i>	48
7.4.3	<i>Implementation of the Database</i>	49
8	BIBLIOGRAPHY	50
APPENDIX A:	GLOSSARY OF TERMS	51
APPENDIX B:	SOURCE SAMPLES	52
	UNESCO	52
	TYPOLOGY DOCUMENTS	53
	SAMPLE EDILIZIA PRIVATA MODIFICATION RECORD	54
	<i>Iter</i>	54
	<i>Scheda Lavori</i>	55
	<i>Istruttoria</i>	56
	<i>Salvaguardia Conditions</i>	57
	<i>Calcolo degli Oneri</i>	58
	<i>Invito al Ritiro – Concessione Edilizia</i>	59
	<i>Concessione Edilizia</i>	60
	<i>Recommendation</i>	61
APPENDIX C:	FIELD DATA COLLECTION	62
	PALAZZI FIELD DATA COLLECTION FORM	62
	SAMPLE FIELD DATA	62
	<i>Sample Form</i>	62
	<i>Visuals</i>	63
APPENDIX D:	DATABASE DETAILS	64
	TABLES IN E02_PALAZZI.MDB	64
	0) UNESCO	64
	1) NOMI	64
	TABLES IN E02_PALAZZI_FOTOGRAFIE.MDB	66
APPENDIX E:	SHORT TERM EVALUATION OF DATABASE	67
APPENDIX F:	TYPOLOGY AND USE TRANSLATIONS	68
APPENDIX G:	ANNOTATED BIBLIOGRAPHY	70
G.1	VENETIAN ARCHITECTURE	70
G.2	PALACES	71
G.3	UNESCO	72
G.4	HISTORICAL CONSERVATION	72
G.5	VENICE	73
G.6	URBAN PLANNING	73
G.7	CITY OF VENICE PLANNING DEPARTMENT	73

LIST OF FIGURES

FIGURE 0-1: PALACES ALONG THE GRAND CANAL	IV
FIGURE 0-2: FACADE OF PALACE IN NEED OF RESTORATION	V
FIGURE 0-3: LOCATIONS OF PALACES IN VENICE	VII
FIGURE 2-1: ROYAL DANIELI HOTEL	4
FIGURE 2-2: INTERIOR OF THE DANIELI	4
FIGURE 2-6: FONDACO DEI TURCHI	8
FIGURE 2-7: PALAZZO BERNARDO	9
FIGURE 2-8: PALAZZO CORNER SPINELLI	10
FIGURE 2-9: PALAZZO PESARO	10
FIGURE 2-10: PALAZZO VALMARANNA	11
FIGURE 2-11: PERMIT PROCESS FLOW DIAGRAM	14
FIGURE 2-12: PERMIT PROCESS FLOW DIAGRAM (VENICE)	16
FIGURE 3-1: STUDY AREA	18
FIGURE 3-2	18
FIGURE 3-3: INFORMATION IN THE DATABASE	19
FIGURE 3-4: PALAZZO FRESCADA AND ITS ADDRESSES SHOWN IN A MAP	20
FIGURE 3-5: PALAZZI IN SAN MARCO AND SAN POLO	27
FIGURE 4-1: LOCATION OF ALL PALACES ACCORDING TO UNESCO	28
FIGURE 4-2: PALACE DISTRIBUTION BY SESTIERE	29
FIGURE 4-3: AVERAGE PALACE SIZE	29
FIGURE 4-4: TYPOLOGIES OF ALL BUILDINGS	30
FIGURE 4-5: TYPOLOGIES OF ALL PALACES	30
FIGURE 4-6: TYPOLOGY DISTRIBUTION	31
FIGURE 4-7: PROGRAMMED USE OF ALL BUILDINGS	31
FIGURE 4-8: PROGRAMMED USE OF ALL PALACES	32
FIGURE 4-9: DISTRIBUTION OF PROGRAMMED USES	32
FIGURE 4-10: PALACES WITH AND WITHOUT <i>VINCOLI</i>	33
FIGURE 4-11: BUILDINGS WITH AND WITHOUT <i>VINCOLI</i>	33
FIGURE 4-12: PERCENTAGES OF <i>VINCOLATI</i>	34
FIGURE 4-13: CS3769 SHOWN AS TYPE C	34
FIGURE 4-14: CS3769 SHOWN AS <i>VINCOLATO</i>	34
FIGURE 4-16: PALACE OWNERSHIP STATISTICS	35
FIGURE 4-17: PALACE STANDARDS	35
FIGURE 5-1: PALAZZO FOSCARI	36
FIGURE 5-2: INTEGRATED INFORMATION FROM DATABASE	37
FIGURE 5-4: ELIMINATE INCONSISTENCIES THROUGH SPATIAL REPRESENTATIONS OF INFORMATION	40

1 INTRODUCTION

Venice is known throughout the world as a historical treasure, and much of its charm comes from its unique landscape and architecture. Venice is defined by the surrounding water, the canals, gondolas, churches, and palaces. While the role of the palaces has evolved with the history of Venice, the buildings remain a significant part of Venice's cultural heritage. These structures have housed many generations of illustrious families and institutions, both public and private. The palaces have witnessed and often tell stories of the changing tides of Venetian power and politics.

Over the years, the palaces, *palazzi* in Italian, have increasingly been in danger of decay and transformation due to lack of maintenance or unregulated modification. The primary goal of this project was to aid the Comune di Venezia All'Assessorato Urbanistica (the "planning department" of the city of Venice) in protecting and preserving the palaces of Venice.

Several agencies are involved in the protection and preservation of palaces. Urbanistica is responsible for the zoning laws and regulations that apply to each building in Venice, and is partially responsible for regulating their condition. Other departments in the city are involved in different aspects of authorizing permits for modifying palaces, to ensure that they remain suitable for modern use without compromising their historical integrity. Even though the departments often need the same information for their considerations, each keeps its own records on the renovations and conducts its data collection independently. They cooperate with each other and work to protect palaces from inappropriate modifications, but Venice lacks a system that allows all departments to have access to the same data and communicate with each other in an efficient manner.

This lack of communication within the city administration leads to an inefficient use of resources. Often, efforts are repeated to collect one set of data, sometimes even within the same department. Because of inconsistent data collection and archival practice, discrepancies are frequent between the information that each department holds. Even if the information is accurate, it quickly becomes obsolete without a system for updating it.

Our project looked specifically at gathering records about each palace from various sources and government departments, and integrating them all into one computerized database. We demonstrated how the database would be useful in establishing a standard for communication between departments and increasing the efficiency of the permit process. We made recommendations for the implementation of the computerized database to incorporate

into city operations and procedures. We also developed steps to make this information readily accessible to the public. The information can be used as a reference for data, or as a foundation for analyzing different aspects of the transformation of palaces over time.

This paper is divided into several chapters. The Background chapter presents all relevant information that is needed to understand the context in which we conducted the project. Information regarding the project sponsors, architectural periods, and the definition of a palace are all covered. The Methodology section describes the project objectives, underlying principles, and tasks that were completed. All information that is directly related to the execution of the project is located in this section. The Results and Analysis chapters hold the information that was gathered from the project and a proper analysis of the data. The Recommendations chapter provides our ideas for future implementation and updating of our database.

2 BACKGROUND

The following chapter provides background information about various aspects of our project. The first section contains definitions and descriptions of a palace. The second section contains the history of Venetian architecture, and the final section contains information on modifying buildings in the city of Venice. Each of these sections is important in providing context to our project.

2.1 Venetian Palaces

The word ‘palace’ stirs thoughts of grand majestic buildings, and these images come alive in the city of Venice. The palaces are monumental buildings with a unique history and an important part in Venetian society and history. There are many buildings in Venice referred to as *Palazzo* or *Ca’*. These buildings usually took on the name of the family that owned the palace, acquiring many names over the centuries.

The present-day Hotel Danieli is a great example of the stories that a palace reveals through the study of its history. Originally known as the Palazzo Dandolo, it was built towards the end of the 14th century by the wishes of the Doge Enrico Dandolo. Its prime location gave it high visibility, being situated right on the Riva degli Schiavoni, at the entrance of the Grand Canal and next to Piazza San Marco. The imposing façade and priceless artwork in the beautiful interior courtyard of the palace served as a flawless declaration to the power and wealth of the Venetian Republic. Any princes, cardinals, ambassadors and such guests of honor in the city were bound to be awed by buildings such as the Palazzo Dandolo.



Figure 2-1: Royal Danieli Hotel

As time passed, the *palazzo* changed ownership between many families, equally as distinguished as the Dandolo. The Grittis, the Mocenigos, and the Bernardos all lived there at one point. Over the years, the Mocenigo family provided the Republic of Venice with generals, ambassadors, procurators of San Marco, and seven doges; their coats of arms still adorn rooms in the

building.¹ Eventually, one Giuseppe Dal Niel, known as Danieli, came to purchase the entire palace after the fall of the Republic and turned it into one of the city's most prestigious hotels, which it remains today.

The Royal Danieli Hotel has been host to visitors such as King William of Prussia, the queen of Greece, Dickens, Wagner, Honoré de Balzac, Percy Shelley and Proust. It was in "The Hotel" that George Sand and Alfred de Musset played out their famous love story between 1833 and 1834.²

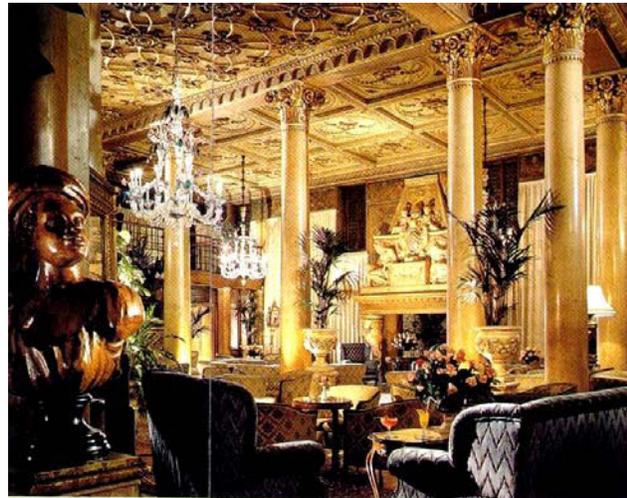


Figure 2-2: Interior of the Danieli

The Danieli is just one of the hundreds of *palazzi* in Venice, each with its own unique story. The following sections will elucidate our understanding of *palazzi* and what sets them apart from other buildings.

2.1.1 Historical Role of Palaces

Venetians have always prided themselves in having no apparent class distinction. The *palazzi*, however, have traditionally served as a symbol of social importance by housing the

¹ Russo, Raffaella. *Venetian Palaces*. Hazan, Paris, 1998.

² *How The Palazzo Dandolo became The Danieli Hotel*, Poligrafica Venezia, Italy.

nobility and the merchant-aristocrats of Venice. A family displays its social and economic status through the splendor of its palace *façade* and location on the Grand Canal.

Originally, the buildings would function both as the residence and the commercial headquarters for the family. The plan of the building lends itself to its intended use. The ground floor level was usually devoted to business, containing a large hall, the *androne*, flanked by offices and warehouses on both sides. The first floor is the *piano nobile*, the main floor of the house, where the owners usually lived. The *piano nobile* contains the *pòrtego*, the great hall that runs the whole length of the house. On either side of the *pòrtego* are smaller rooms intended for both family and guest use, depending on the preference and need of the owner.

The *piano nobile* and *pòrtego* distinguish the *palazzo* from lesser buildings. This floor has a very high ceiling with a central bank of windows on the *façade* side which lights the entire *pòrtego*. These windows are usually large and decorative. Three to six windows on the land side also provide light for the central room.

A second *piano nobile*, with a lower ceiling, is the family living area. The third floor, with its notably low ceiling, served as the servant quarters.

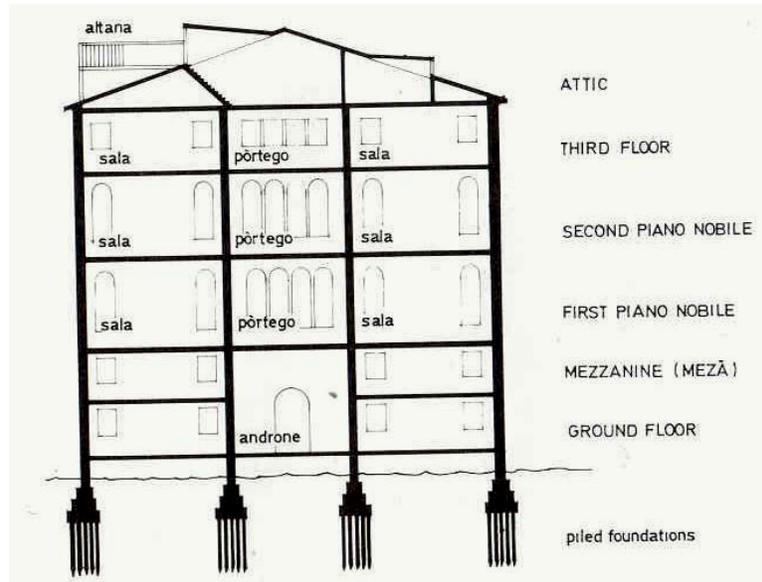


Figure 2-3: Vertical cross-section of a palace

Other typical characteristics of Venetian

palazzi include the presence of both a land and water entrance. Also, since *palazzi* are mostly flat rectangular buildings with nothing jetting out of the sides, the balconies are sometimes the most interesting parts of the palaces. *Palazzi* almost always have many balconies, far more than corresponding palaces in Florence or Rome, and can be used to emphasize the *façade*.

2.1.2 Current Role of Palaces

Over the past few centuries, the role of the palace has changed, accompanied by consequent structural modifications of the buildings. The large size and flexible layout of a palace enable it to accommodate many uses. While some *palazzi* are still homes to old families, many now serve as apartments, hotels, museums, or space for offices. Some *palazzi* have been purchased by the city and are open for public use, while others remain in the hands of private owners.

Development of areas such as tourism has had an impact on the role of the palaces. The large number of tourists that visit the city has supported remodeling the palaces into hotels. In this case, the exterior of the palace remains the same but the interior is divided into many sections to make more rooms. Pipes for plumbing and electrical work are needed. Bathrooms with toilets and showers are added where they would not have originally existed. Every fancy hotel has a restaurant, and a large kitchen with a ventilation system, stove, grill, and oven must be built in order to adjust for this.

Many palaces have also been converted into museums. A museum is a logical use for the large palaces because the spacious rooms provide ample space to view art, and can also be divided into smaller rooms to display smaller exhibits.

2.1.3 Building a Palace

Building in the Venetian lagoon presented many challenges because of the yielding nature of the ground and the types of building materials available. It was necessary that the materials used be both lightweight and strong. Flexibility to accommodate shifting of the ground and the ability to resist the environmental effects of the sea and lagoon were also necessary characteristics. The materials widely used in Venice include timber from the mainland, clay bricks produced in the lagoon, and stone quarried from Istria, the Adriatic peninsula across from the Venetian lagoon.

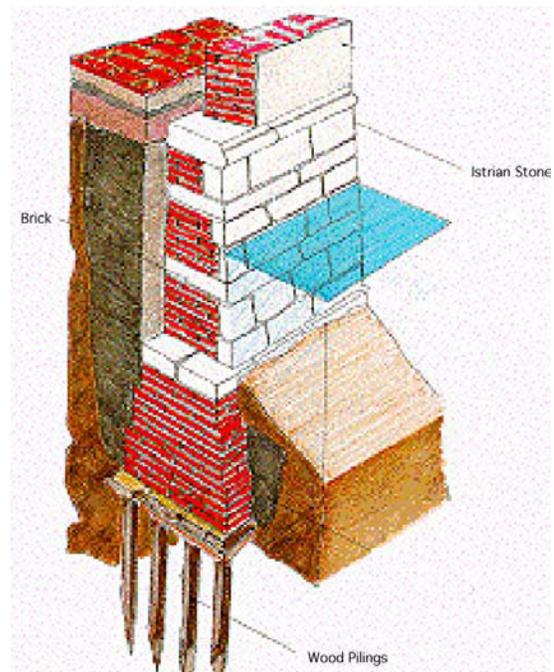


Figure 2-4: Foundation of a palace

The Venetians expanded their city by draining marshes and filling in reed thickets. However, this land was not fit for the development of large structures that would place a heavy load on the soft earth. Stakes were driven into the ground to allow for more support and to establish a base that could be built upon (Figure 2-4). These piles in the foundation could be made of wood or stone, with Istrian stone being favorable because it was cheap,

available, and able to support high loads. The non-porous stone does not absorb much water, making it significantly more durable than other materials in the lagoon environment.

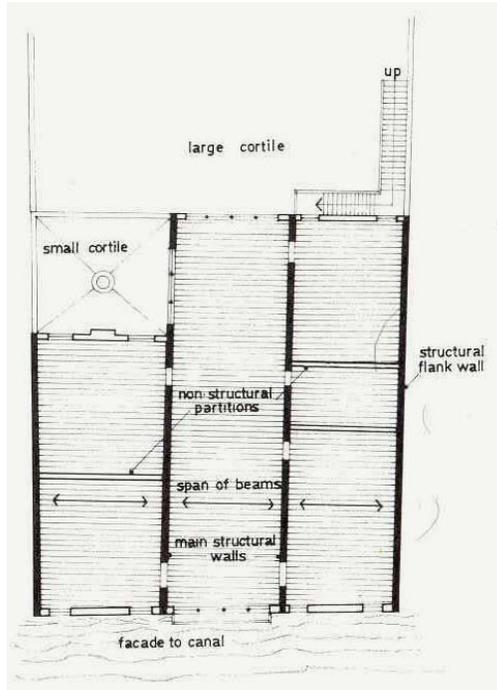


Figure 2-5: Typical layout of a palace

A combination of factors led to the general structural plan seen in Venetian palaces and other buildings in the lagoon. Four parallel structural walls, dividing the palace into three sections, bear the load of the roof and upper floors. Consequently, it is possible to have many large windows on the *façade*, because it does not carry any weight. The division of the building into three parts (a large central hall flanked by smaller rooms) is known as the tripartite plan, and is obvious in the symmetrical designs of the *façade*.

Floors are typically made up of large wooden beams to bear weight, and a layer of Venetian *terrazzo*. The *terrazzo* is a mixture of clay, lime, and Istrian stone, which results in an elastic material that can withstand shifting of the ground or foundation, and is attractive and easy to maintain. As decoration, a layer of marble may be placed on the floor. This material is extremely durable and is able to withstand decades of use.

2.2 Venetian Architecture

The architecture of Italy is fairly unique, each city retaining its individual personality through its buildings. This section is a short guide to the various periods and styles of architecture seen among Venetian buildings, and focuses on palaces in particular. Knowledge of architecture of the buildings is another way to become more familiar with the type of structure that the group is working with. It also serves as another way to identify and describe each palace, making each building distinctive.

Apart from the *palazzi*, the other two major types of buildings in Venice are houses and churches. Churches have styles that are not important to this project, and will not be discussed here. Houses are similar to palaces, and some contain a few of the arches and other details that can be found on palaces. Houses are usually much smaller, however, and lack the palaces' three-tiered façade. A standard house would only have a small number of windows as well, whereas palaces often have multiple rows of arches and windows.

A definition of a palace is dependent on architecture and different styles thereof, and this section will give the reader enough knowledge to understand what each style implies.

2.2.1 Byzantine Architecture

The earliest Venetian buildings, palaces included, are similar to those in Byzantium and other parts of the Eastern Empire, as opposed to the 'Romanesque' style, which was influenced by Rome and the Western Empire. The Byzantine style was most prominent from the 8th to the 12th centuries, though examples of Byzantine architecture can be found in later centuries as well. The typical Byzantine structure has tall, narrow arches, which can be seen in Figure 3, and is often adorned with mosaics³. One of the best examples of a Byzantine

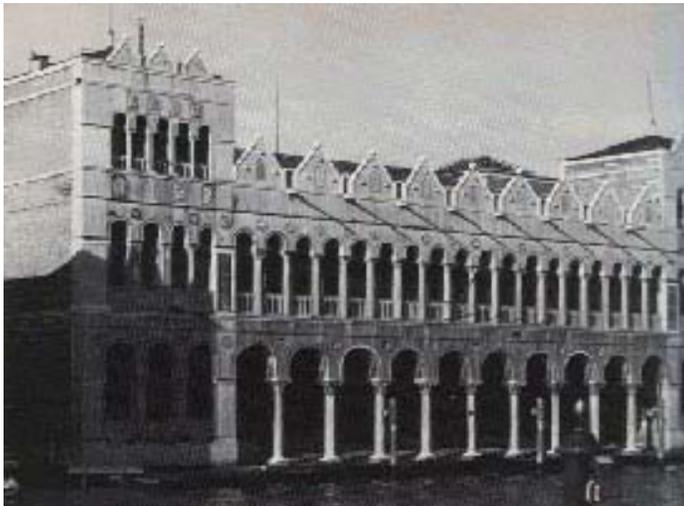


Figure 2-6: Fondaco dei Turchi

it was restored in the 19th century the architect in charge of the restoration heavily accented the Byzantine features of the original design.

Features of Byzantine palaces include ground floor arcades, open galleries along the first floor, and no projecting balconies (balustrades were sometimes inserted between the columns of the arcades). Most Byzantine structures contain some ornamentation in the form

³ Russo, Raffaella. Venetian Palaces. Hazan, Paris, 1998.

of *patere* and *formelle*, which are plaques carved with Christian or classical imagery. However, the structures themselves are relatively simple.

2.2.2 Gothic Architecture

Around the 13th century, palaces in Venice began to exhibit features similar to what would become known as Gothic architecture. Gothic style was predominant in the 14th and the 15th centuries and in Venice, Gothic palaces are more widespread than any other style.

Gothic characteristics include tall spires and large windows as well as continued use of mosaics for decoration. Gothic arches are elegant and tend to come to a point at the top (see Palazzo Bernardo, Figure 2-7), rather than the Byzantine rounded style of arch. Fine tracery and the use of Istrian stone in arches are also common in Gothic palaces³.

Mostly due to the unique location of the city, Venetian Gothic architecture is slightly different than its northern European counterpart. Massive stone structures with large flying buttresses are normally considered Gothic but are not practical in Venice. Due to the soft nature of the land of the Venetian islands, the weight of the stone used to construct the flying buttresses would cause them to sink into the ground. To avoid this, Venetian Gothic buildings make use of more lightweight brick, making the elaborate stone carvings seen on Gothic buildings in northern Europe unfeasible.



Figure 2-7: Palazzo Bernardo

2.2.3 Renaissance Architecture

The Renaissance arrived late to Venice. The first example of the period is generally considered to be the gate to the *Arsenale*, built in 1460. Renaissance architecture is noted for being simple and balanced, taking elements from classical Greek and Roman architecture. Just as with the Gothic period, the Renaissance in Venice was distinct from that seen in other parts of Italy and Europe. Renaissance architecture made wide use of heavy stone carvings, impractical in Venice and affordable only by the very rich.



Figure 2-8: Palazzo Corner Spinelli

The Renaissance was the first time that individual architects began to be recognized as artists, instead of as stonemasons. Sanmicheli, Sansovino and Codussi are all recognized as architects of various Renaissance style palaces, the Palazzo Corner-Spinelli (Figure 2-8⁴) being one of Codussi's famous works.

Some structures are not quite 'pure' Renaissance style and are known sometimes as 'mannerist'. Mannerism is basically the same as Renaissance architecture but not as simple and sparse, and is less influenced by the Byzantine style. The freedom of expression that mannerism allowed paved the way for the lavish Baroque period.

2.2.4 Baroque Architecture

Baroque architecture is very detailed and complex, decorated by elaborate sculptures and stone carvings. The most famous architect of the Venetian Baroque period was Baldassarre Longhena, known for his work on the Santa Maria della Salute and the Palazzo



Figure 2-9: Palazzo Pesaro

Pesaro (Figure 2-9).

In most previous periods, the conservatism of the Venetians showed through in their architecture. However, during the Baroque period everything was very flamboyant and the conservatism vanished. Intricately carved balconies, garlands, balustrades, columns, and solid structures all showed up on various Baroque buildings.

⁴ <http://www.lib.virginia.edu/dic/colls/thumbs2www/arh102/html/index.html>

2.2.5 Neoclassical Architecture

During the last centuries of the Venetian Republic (the 17th and 18th centuries) a return was made to the simplicity and conservatism of the earlier Renaissance period⁵. Important architects of this period included Visentini and Massari. Many Neoclassical palaces, such as the Palazzo Mangili Valmaranna (Figure 2-10) are evolutions from Longhena's work in the Baroque period, but with the added restraint from the Renaissance. While a few of these Neoclassical palaces are unique and interesting, many of the palaces built during this period are very traditional, hardly different from the many that had come before.



Figure 2-10: Palazzo Valmaranna

2.2.6 Modern Architecture

After the fall of the Republic in 1797, palaces were, no longer built, though there were a few exceptions. The vast majority of the palaces remained intact, at least on the exterior. Centuries since then have brought many redecorations of the interiors, as well as conversions into offices, apartments, and so forth. Very few palaces have kept the original interior. Walls were added to make extra rooms and many internal courtyards and gardens were converted into enclosed areas. Top floors were added to the buildings to make them even larger and more inhabitable. Many palaces also underwent restoration in later centuries, usually not with restraint and attempts to keep the palace true to its original design.

2.3 Sponsor Information

This section provides basic information about our sponsor and the other groups that have supported our project. These are groups that provided us with data and information, or may benefit from the results of our project in the future. Providing the background history and purpose of these agencies gives more depth to the data that each group provided.

2.3.1 *Urbanistica*: Venice Planning Department

The *Urbanistica* is the office responsible for updating and interpreting the zoning laws and regulations that apply in Venice. Every building in Venice is assigned a zone and typology, based on structure, history, and *ambiti*, or environment and neighborhood. Each

⁵ Lauritzen, Peter and Zielcke, Alexander. Palaces of Venice. Viking Press, 1978.

typology has with it associated laws, building rules and compatible uses. These laws must be referred to anytime the owner of a building wants to modify it in any way.

2.3.2 Other Contributing Agencies

The following government and private groups are in some way involved in the restoration and preservation of buildings in Venice. They have contributed records and information to add to our database.

2.3.2.1 *Edilizia Privata*: Venice Building Department

The *Edilizia Privata* in Venice is the equivalent of any City Building Inspection agency in the United States. If a modification to a building requires official approval, then the *Edilizia Privata* will be involved in both the approval process and follow up once the requested change has been applied. They ensure that all modifications comply with the zoning laws and regulations provided by *Urbanistica*.

2.3.2.2 UNESCO

UNESCO (*United Nations Educational, Scientific, and Cultural Organization*) has been involved in protecting the cultural heritage of Venice since the flood in 1966. It works with other public and private offices to collect funds and distribute them to appropriate causes through out the city. In 1968, as a step towards the preservation of buildings in Venice, in particular the *palazzi*, UNESCO compiled an extensive catalog of Venetian palaces, with details on each. The information in the catalog included basic identification of the palaces, as well as details on the condition, use, and history of each. It can be used as a reference but is also important simply as a record of the value of the buildings. After the flood, it helped identify the buildings that were in need of repair and restoration. This catalog was the foundation of our data collection.

2.3.2.3 *Commissione de Salvaguardia*

The *Commissione de Salvaguardia* is equivalent to the Landmarks Commission in the United States. It is an office of the regional government of the *Regione Veneto*, and is specifically concerned with maintaining the integrity of the historical center of Venice.

2.3.2.4 *Soprintendenza*

The *Soprintendenza* is one of the offices under the federal Ministry of Culture. There are separate Superintendents for each region in Italy that deal with any issues regarding artifacts, monuments, anything of historical or cultural value. In concern with our project, they are involved in ensuring that the historical properties of monuments such as palaces are properly conserved.

2.3.2.5 *Legge Speciale*

The office for the *Legge Speciale* administers the Special Law in Venice. The Special Law is a grant from the national government to the City of Venice towards the historic preservation of the city. The office determines which projects get funded for restoration and how much money they get. They sponsor both private and public projects, and funds are distributed either as direct cash, or as low-interest loans. For our project, we used records from the *Legge Speciale* on past palace restoration projects that they have funded.

2.4 *Modifying Preserved Buildings*

The lack of new construction in the historical center of Venice demands that old buildings be converted to accommodate modern use. If a family or business is to be housed in a 14th century *palazzo*, many modifications are needed to the original structure. Over the years, most palaces have been used for several purposes other than residential, and many of the same modifications are seen with each change in use. Electrical systems are installed throughout the entire *palazzo* for the use of lights and appliances. Modern plumbing and heat fixtures are needed to provide water and heat in the building.

Dividing up the huge halls in a *palazzo* make it more livable and have it serve multiple purposes by creating more useful space. Several families and businesses can rent out this space in their buildings after making modifications. Smaller rooms in a building are also more cost efficient as the dropped ceilings and added walls help the residents of a *palazzo* reduce heat costs. While this efficiency of space is needed in the city of Venice, the changes applied run the risk of altering the original structure and value of a palace. These modifications often require many internal alterations to the building. If the changes are not implemented properly, it can decrease the visual appeal of the interior of the *palazzo*.

At the same time, these modifications are essential to maintain the functionality of the building. An unused *palazzo* is sure to fall into disrepair and decay. Guidelines are

established to ensure that any modifications are moderated to balance the historical value and modern potential of the property.

2.4.1 U.S. Building Permit Process

To understand more about the preservation of important buildings and how modifications are conducted, we decided to study the permitting system that is in place in Worcester, Massachusetts. This knowledge can be translated in part to the Venetian system and will help us understand how their process works.

If an owner wants to make a modification to their building, they first have to research the property. They need to know if the building is registered. There are several organizations at which a building can be registered for preservation. There is the local commission of preservation, the state commission of preservation, and the national commission of preservation.

If the building is not registered at any preservation commission then the owner can proceed to the Building Inspector for approval. However, if the building is registered, the owner must contact the appropriate commission and notify them of the requested modification. The owner then presents the modification and the commission takes it on as a case. The owner attends and participates in the commission meetings and if the modification is approved the owner goes to the Building Inspector.

The Building Inspector checks the current laws, regulations, and codes that apply to the building and makes sure that the modification is consistent with the rules. After the Building Inspector approves the modification, the owner is free to make the changes, which are

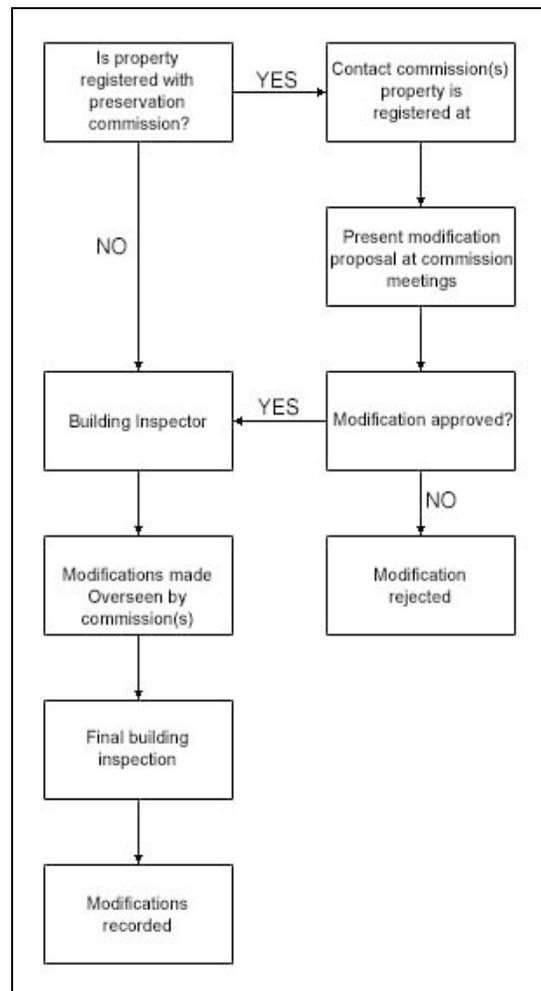


Figure 2-11: Permit process flow diagram

overseen by the preservation commission during construction.

After the modification has been made, there is a final building inspection to make sure the changes were made as described. The result is recorded and kept on file by both the Building Inspector and the preservation commission⁶.

2.4.2 Venetian Building and Permit Process

The urban planning in Venice is unique, focusing on the regulation of change in buildings rather than the construction of new ones. Due to the limited space on the islands, there are very few new buildings being constructed in the city; instead, existing buildings are converted to accommodate changes in use. The city of Venice places great value on the historical and structural integrity of its buildings and works to preserve it. While the different departments involved in planning want to allow for modernization, so that the buildings can be used, they have to ensure that the original qualities are not lost. Many laws and regulations are in place as a system of safeguarding the palaces as they go through various modifications.

2.4.2.1 City of Venice Planning

In 1963, the city government drafted a master plan for the municipality of the ancient city to regulate change. This plan classifies each building into specific zones and typologies. Each classification includes specific rules that regulate modifications made to the buildings and determines which uses are compatible with the structure and area.

The historic classification of buildings separates them into one of three categories: pre-eighteenth century, eighteenth century, and nineteenth century. Apart with this historical classification, there are thirty typologies, based mostly on floor plans and building layout, which determine the types of regulations that can apply. Some of the typologies are similar to each other, and occasionally a building will be classified inaccurately. This requires city officials to do more research on the building to determine whether a reclassification is in order.

As a part of this plan, or a later variance of it, all the *palazzi* in Venice are labeled as monumental buildings. They are registered as such with the Soprintendenza and come under special consideration which specify acceptable modifications (included in laws No.1497 and 1939).

⁶ Preservation Worcester

When a historical building such a palace undergoes any change, it is necessary to get approval from several government agencies. To make a modification to a building, an owner has to refer to Planning Department plans and regulations for information and direction. In the case of a palace, the owner is usually referred to the Soprintendenza.

The Soprintendenza checks historical records and laws to ensure that the plans for modification are harmonious with the structure and historical importance of the

building. This is done with the cooperation of the Planning Department that provides the laws and regulations that apply to the specific building.

If the Soprintendenza approves the permit request, it comes under the jurisdiction of the Building Department, which regulates the plan for construction. If the plan involves any exterior changes, the Commissione de Salvaguardia must approve it as well. The Salvaguardia ensures and verifies all of the laws for alteration to the exterior of the building.

Each time these departments deal with a permit request they have to collect information on the property. They have to determine exactly what the requested modification is and how it affects the historical, structural, and aesthetic value of the property. Currently, this requires obtaining data from numerous sources and departments. In order to start any work on the palace, all agencies must approve the plan prior to the start of any work. We proposed to create the prototype of a database that contains all of the information, available to all of the departments in one place.

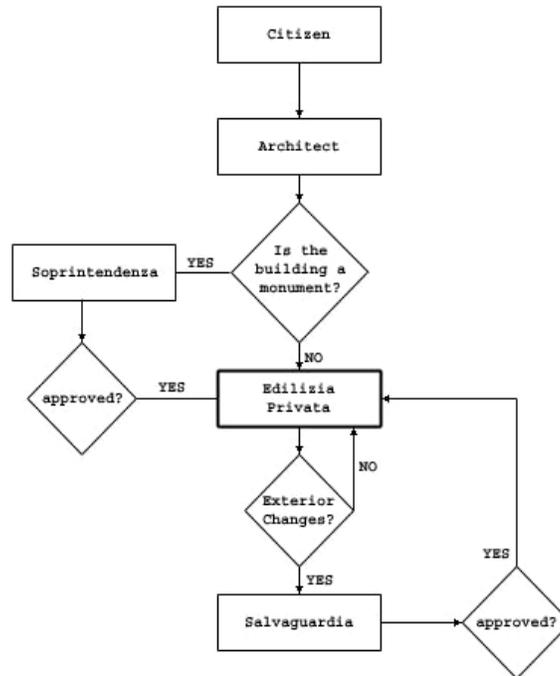


Figure 2-12: Permit process flow diagram (Venice)

3 METHODOLOGY

The overall goal of this project was to help the city of Venice in preserving the city's palaces. The team identified the palaces, collected information from existing sources in city departments, and then visited each palace to record and to verify necessary information. This information was then cataloged in a computerized database to make it easily accessible.

The primary objectives of our project were to:

1. Consolidate information about Venetian palaces into a database to allow easy information management by separate city departments.
2. Demonstrate usefulness of the database in a specific permit situation.
3. Recommend implementation, evaluation, and maintenance of the database in the future.

The following sections of this chapter describe our field of study and how we achieved the objectives. They are divided as follows:

- **Section 3.1** supplies the definition of a palace and our study area, which provided structure to our project.
- **Section 3.2** discusses our database, and how we gathered the information for it.
- **Section 3.3** describes our process in demonstrating the usefulness of our database.

3.1 Domain of Inquiry and Study Area

Creating a list of palaces was the first step in this project. We used the list of palaces provided in the UNESCO catalog as the basis for our database. We considered this catalog to be complete. A specific description of a Venetian palace can be found in the Background section; each of the palaces contained in our database are consistent with this definition.

All the palaces we studied were located in the historical center of Venice (see Figure 3-1). General information was collected for all palaces in this area. More detailed information was collected from several *palazzi* that are owned by the city. These buildings were chosen because they were easiest to gain interior access to and find the history of restoration that was applied to the building.

We did not include private residential palaces in our detailed studies because of the inaccessibility of the building and the information related to its renovation. Also, due to the time constraints of the term it was not feasible for the group to pursue every palace in the city.



Figure 3-1: Study Area

3.2 Computerized Database of Palaces

The final product of our data collection was a computerized database of palaces in Venice. This database contained all the information we gathered, linked together to facilitate search and retrieval of any information needed. It included information from many sources; the specifics of these sources, their methods of storage and their significance are discussed in this section.

Previously, there was no central location to store information on palaces that was relevant to their restoration. Each separate city department involved in the permit process to modify a palace (refer to Background chapter) has its own records and data on different palaces, collected over many years. Unfortunately, these records are often not accessible to other agencies that need the information. We observed that this lack of cooperation results in inconsistent information between sources and repeated efforts to collect data that might already be available somewhere. Our database and its future implementation is a means of uniting the different departments, by making the information more accessible to everyone.

The information in the database is also linked to maps made in a Geographical Information System. Maps can be generated with specific details. The map can be printed out or accessed electronically. Electronic maps provide all the information in an easily accessed format, and allow visual comparison and analysis not possible with the textual information in the database.

3.3 Layout of Database

The database holds all the information on the palaces that was gathered from the existing data sources (see Figure 3-3). Any information needed to make a decision on a requested modification is located in the database which is accessible to any user. The

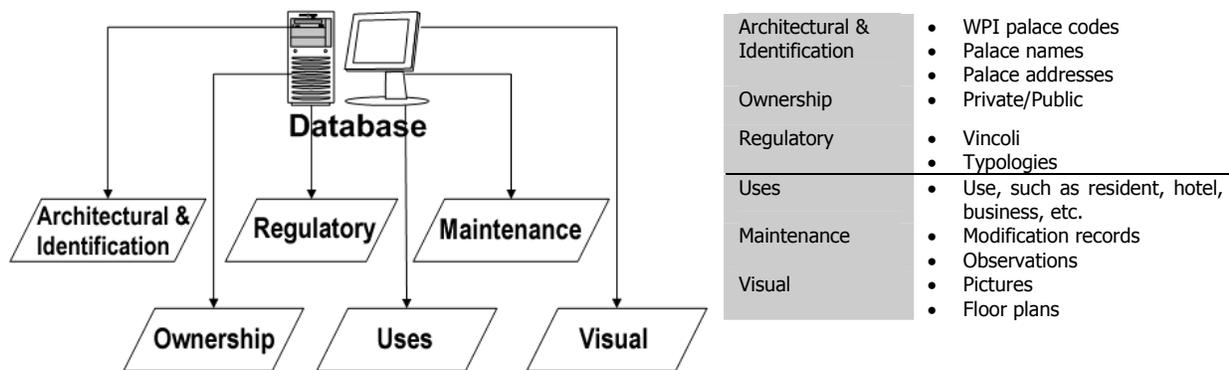


Figure 3-3: Information in the database

specifics of this are discussed in the Analysis chapter.

The most valuable part of the database is the architectural and identification information, which contains the WPI palace codes, names of the palaces, and the addresses. The database could not exist coherently without these because they connect all the data. The names of the palaces and their addresses are important for identifying and locating the actual buildings. The WPI palace codes are used to refer to the palaces throughout the database and link data that exists in separate tables. With the codes, data on a specific palace can be extracted from all the tables.

The addresses and WPI palace codes can be used to search for the location of a palace in the “Palazzi” layer of Venice with the GIS. For example, **Error! Reference source not found.** shows a search by address for the Palazzo Frescada. Once the palace was found, the code, which in this case is “FRESCAD” was used to retrieve information in the database.

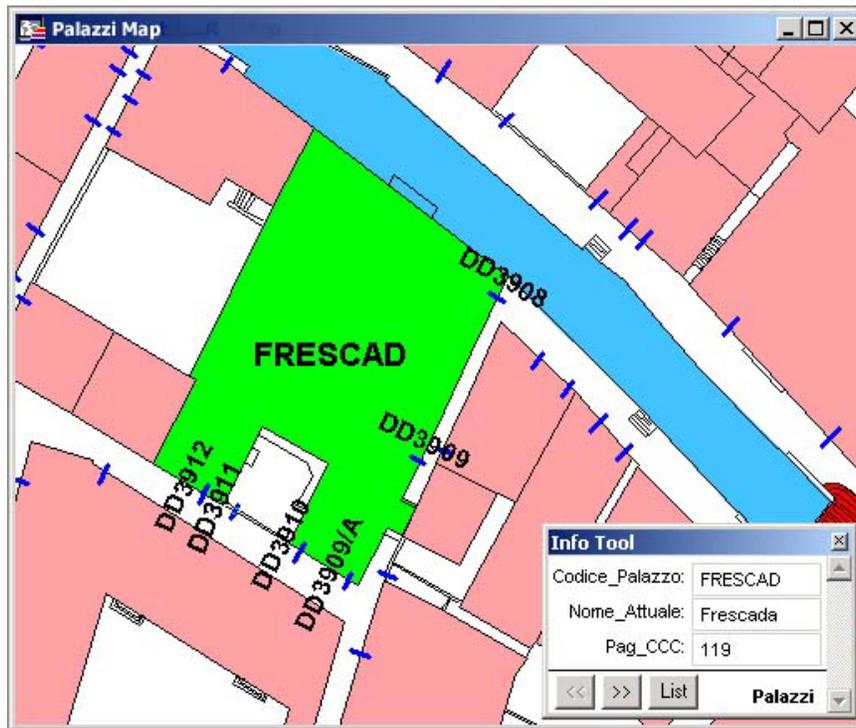


Figure 3-4: Palazzo Frescada and its addresses shown in a map

3.3.1 Information Requirements

The task of consolidating all the information that the city departments require first involved determining what information is currently used. We did this by talking to representatives from each department and studying the permit process. Once we determined the information requirements, we collected any that was available from the city department records and also referred to other sources not usually used by the city.

Upon completion of this task, we had a list of all the *palazzi* with links to related information. The list includes cross-references to other names by which the *palazzo* is known to avoid redundancy. While not all information was available or applicable for every palace, each palace in the database has a majority of the following information:

- Architectural and Identification Information
 - Name(s) of the Palace
 - Location (address)
 - Date of construction
 - Architect (if known)
 - Architectural style

- Ownership Information

- Public vs. Private
- Dates of ownership
- Regulatory Information
 - Typology
 - Applicable Regulations and Codes
- Information on Use
 - Current and previous uses
 - Dates for uses
 - Users
- Maintenance Information
 - Description of previous restoration/renovation
 - Dates of previous restorations
 - Costs of previous restorations
- Visual Documentation
 - Picture of facade
 - Picture of surrounding area
 - Floor plan

3.3.1.1 Names of the Palaces

The names of the *palazzi* are a source of history about the buildings. A palace is generally named after the family that owns it. However, when the buildings change ownership, which happens quite often, the old name is still sometimes used. This can lead to one palace being referred to by several different names. The name of the palace is a major form of identification of the building and if confusion exists in that area, it leads to the possibility of inaccurate data collection taking place. We collected many names from several different sources to get a complete record of all names that refer to a given palace.

3.3.1.2 Date of Construction

The date that the *palazzo* was erected was useful in identifying the period of a palace. We used the dates of construction to group palaces of similar age for purposes of analysis and information gathering.

3.3.1.3 Dates of Restoration

Knowledge of previous restorations to *palazzi* is important in tracking changes in use. If too many modifications were allowed in the past, further modifications may not be allowed because the structure has strayed too far from the original. All knowledge and dates of previous restorations and modifications were added to the database.

3.3.1.4 Location of Palace

It is customary that a palace has several entrances, usually one opening to the canal and at least one to the street. Each doorway has its own address, so one palace may have multiple addresses. All current addresses were entered into the database. The location of the *palazzo* is also important in determining the zoning laws and building codes that are applied.

3.3.1.5 Regulations and Building Codes

The regulations and building codes that pertain to each *palazzo* were recorded and stored in the database. We got the typology for each palace from Urbanistica and appended restrictions from the Soprintendenza. This made the regulation information more accessible and coherent, saving time being wasted in tracking down information in multiple places.

3.3.1.6 Current and Previous Use

Palaces can be used for many different purposes. The use of a given palace can change over time, often dramatically. Each change in use that we could find a record of was recorded in the database; this gave us a historical overview of each palace and enabled us to determine what transformations a building may have gone through depending on its use.

3.3.1.7 Ownership

Ownership is primarily divided into two types: public or private. Buildings owned by the government are considered public, and everything else is private. Also included in the ownership is the name of the department, agency, company, or, when possible, individual owner of the palace. This information was available in documents received from city

departments, primarily Urbanistica and Edilizia Privata, and in some cases we could determine the owner during our field data collection.

3.3.2 Existing Data Sources

Much of the information that we entered into the database came from researching and gathering information from existing data sources. This involved translating and understanding computerized and paper documents to extract the information that was useful to our project.

3.3.2.1 UNESCO Catalog of Palaces

In 1968, UNESCO compiled a catalog listing all the palaces in Venice along with important information regarding each. This was the first source we used to create our database. Each palace had several sheets associated with it. One sheet contained names, locations, addresses, and other useful information. This sheet was included with every palace. A second sheet contained historical text and architectural observations. Since these observations were in Italian, we did not translate or attempt to summarize them; we instead transcribed the information verbatim into the database. A third sheet contained similar information to the first sheet, plus additional information on size, ownership, etc. While this third sheet was often very helpful, it did not appear to exist for each palace in the UNESCO catalog; only about one-third of the palaces had this sheet associated with them. Examples of all these sheets are included in Appendix B.

3.3.2.2 Vincoli Documentation

Vincoli are restrictions placed upon specific buildings by the Soprintendenza that describe modifications that are allowed to be applied to the palace. We were given documentation of each *vincolo*: the building it refers to, and the laws describing the restriction. Each building described in these documents was referred to by an address. Using the list of *palazzi* addresses we compiled, we cross-referenced the *vincoli* list with the *palazzi* addresses to extract all the *palazzi* with *vincoli*. The applicable *vincoli* were then linked into our database in a separate table.

3.3.2.3 VPRG Documents

We received many electronic documents from Urbanistica regarding laws and regulations that applied to buildings within the city. Collectively, these documents are part of

the VPRG: the *Variante al Piano Regolatore Generale*. The VPRG is the master plan for all zoning regulations and restrictions that apply to Venice. One example of information within the VPRG documents includes *tipologie*, or typologies, which are classifications applied to buildings based on structure. Information on usages and functions, and regulations applying to specific functions, was included as well. Many of these documents were provided in the form of map layers, which were linked to our own map layer in order to select the information we needed.

3.3.2.4 City of Venice Modification Records

The various departments within the City of Venice that are involved in the permit process for palaces have records about changes that have been approved for the buildings over the years. Access to this information gave us our only information regarding cost, as well as other information relating to past uses and owners, all of which was helpful. Specifics on modifications for about twenty palaces were given to us by Edilizia Privata, and we matched these with cost information from the Legge Speciale office.

3.3.3 Collection of Field Data

We physically visited each palace in Venice to collect any data that was missing from the existing data sources. We also verified the information we already had to eliminate inconsistencies between sources. Since a single building can have multiple addresses (one for each entrance), it is often inconvenient to identify it based on its address alone. Each source we used might have different addresses to identify a palace, but that does not necessarily mean that the information is wrong; it is simply inconsistent and possibly incomplete. Our field data collection enabled us to verify the addresses and assign a primary reference address to each *palazzo*. Appendix C contains our field data collection form, showing everything we wanted to collect upon visiting a palace.

To collect our field data as efficiently and accurately as possible, we established set procedures. We completed one *sestiere* at a time, visiting the palaces more or less in the order in which they were entered in the UNESCO database. We had two digital cameras available, so two people went out at a time to collect data. Besides the camera, each person had their field data collection forms to record information, and maps of the area with the palaces marked out. They carried a list of the palaces in the *sestiere*, with the names and addresses included. Once they had identified the palace, they verified its name and address, took pictures, and tried to determine the use of the building.

3.3.3.1 Visuals

Two pictures were taken of the outside of the building. One was taken of the facade, attempting to include all of the main windows. The second is of the building and surrounding area. The surrounding area includes buildings, canals, or statues that are located on either side of the palace. We included as much of the surrounding area in the picture that was possible. The angle of the picture was dictated by the way to capture the greatest amount of the building in the photograph.

Sometimes, we took a picture of the doorbell or a nameplate on the building. This allowed us to determine the use and ownership of some of the buildings.



Figure 3-5: Facade, Area, and Nameplate for *Palazzo Molin*

3.3.4 Data Archival Methods

It is important that all information is archived in an orderly fashion to ensure that it is complete and concise. It is easier and more efficient to present data if the palace characteristics are already in a reference friendly format. The following sections explain how we organized the collected information.

3.3.4.1 Databases

Our database is the central repository for all information we collected. We used Microsoft® Access 2000 for our database work so that we remained consistent with previous and future projects. The final database file is simply called E02_Palazzi_Database.mdb. Other databases were used for entering and collecting data, but all the final information ended

up in this single database with the exception of pictures and other visuals, which were housed separately to speed access.

Along with other identifiers, each palace was assigned a unique code, up to nine characters long, within our database. We created this code by taking the first seven letters of each palace's name. Each name was taken from the UNESCO catalog's "main" name of the palace. The palaces were sorted by code and then by the UNESCO "*Scheda*" field, effectively grouping the palaces with the same code together by sestiere; for example, there were 15 palaces with the code CONTARI, due to the high number of palaces built for the Contarini family, and after the aforementioned sort, the CONTARI palaces in Cannaregio appeared first in the list, followed by Castello, and so on. After this sort, numbers were added to any duplicate palaces: CONTARI01, CONTARI02, and so on up to CONTARI15. This unique code identifies the palace throughout the database, allowing tables to be linked together.

Tables were numbered starting with 0. Table 0 includes all the UNESCO information. Tables 1 and 2 contain names and addresses, allowing a palace to be searched for by any of its multiple names or addresses. Other tables exist for the other information sources: a VPRG table, a Vincoli table, etc.

Reference tables were also included for printing or internal purposes. Each reference table begins with an R followed by the number of the table. Within the many tables, sestiere are represented by code letters: CN is Cannaregio, CS is Castello, and so on. The reference table R1) Sestiere_Codes links each of these codes to the full name of the sestiere, so when necessary, the full name can be related to each record.

More details on each table, as well as their important fields, can be found in Appendix E.

3.3.4.2 Digital Imagery

Each *palazzo* has at least two pictures associated with it. The images are filed with their unique code from the database, followed by a letter signifying which angle is shown in the picture. For example, contari01-f.jpg and contari01-a.jpg would contain the façade picture and area picture of the first Palazzo Contarini. Each picture is also linked to from inside the database, making access even easier.

3.3.4.3 Map Layers

We used the geographical information system MapInfo Professional™ 6.5 to create the map of the *palazzi* in Venice. The addresses from the UNESCO database enabled us to find the corresponding buildings in the GIS and create a separate layer of just *palazzi*.

Figure 9 shows a screen shot of the palaces that have been located in San Marco and San Polo. The green polygons represent the palaces that we archived in the database; the pink polygons are other buildings.



Figure 3-5: Palazzi in San Marco and San Polo

3.4 Demonstration of Usefulness

After we created our database we used a sample permit request to test the usefulness of the database. The group looked at the overall time that it took for the given permit to be approved by the city. This was done by looking at what information was processed by a department at each step. Using the same data we identified points along the permitting process where our database was useful. Comparing the actual working of the permit process and our hypothetical process we found the areas where the created database would be of optimal use. More details are included in the Analysis chapter of the paper.

4 Results

The database contains consolidated information gathered from all agencies involved in the preservation of palaces. Not only have their existing records been computerized, the records are linked and organized in a manner enabling cross-referencing and manipulation of data. This section of the paper describes results produced using the data collected by the group over the course of the entire project. We have generated visual examples and explained the connections in this section.

4.1 General Palace Information

We obtained a list of 386 palaces from the UNESCO catalog. Figure 4-1 is a map, created with a GIS, of all of the locations of these palaces. The highest concentration is along the Grand Canal, with the remaining palaces being spread throughout the city.

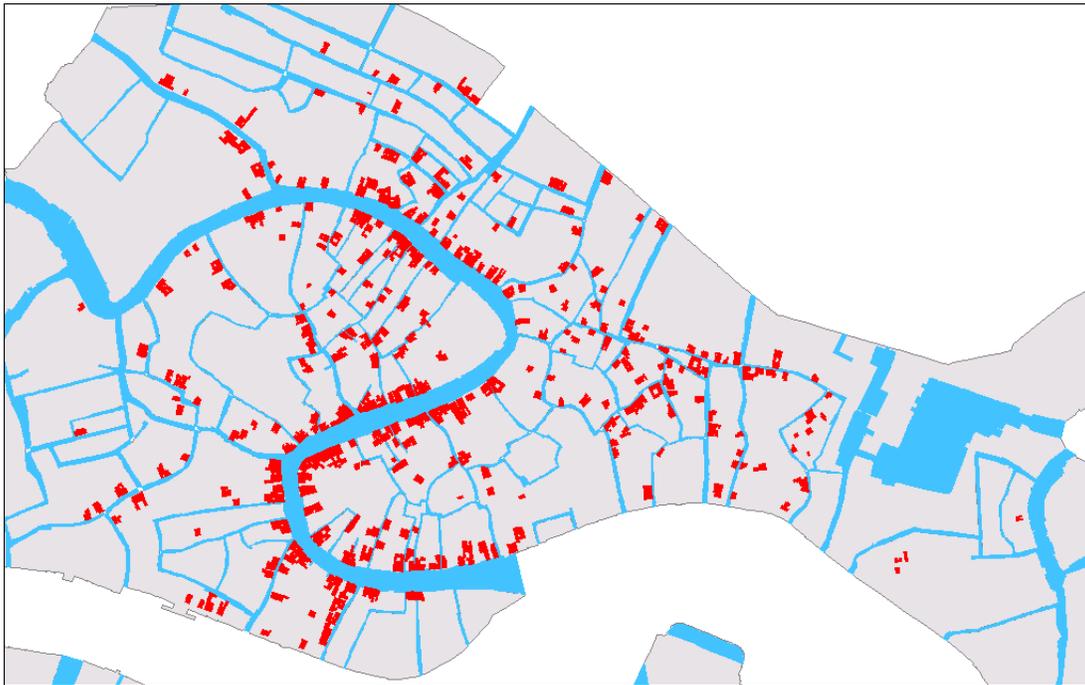


Figure 4-1: Location of all palaces according to UNESCO

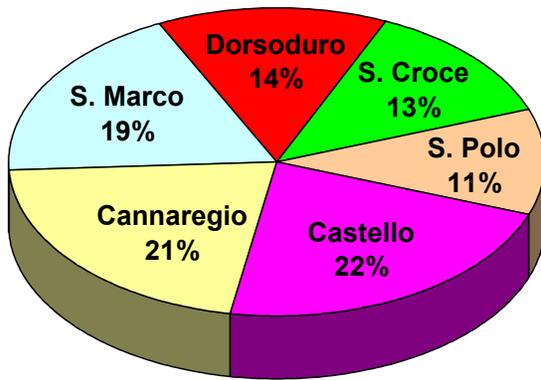


Figure 4-2: Palace distribution by sestiere

Figure 4-2 shows the distribution of the palaces across the six *sestieri* that make up the historical district of Venice. Figure 4-3 shows the average total surface area (total surface area includes all floors of the palace) of palaces located in each *sestiere*. On average, palaces in San Marco are the largest, having an average surface area of 2943 square meters. If

compared with Figure 4-2, it is interesting to note that Castello has the most palaces, but on average these are the smallest palaces (1804 square meters).

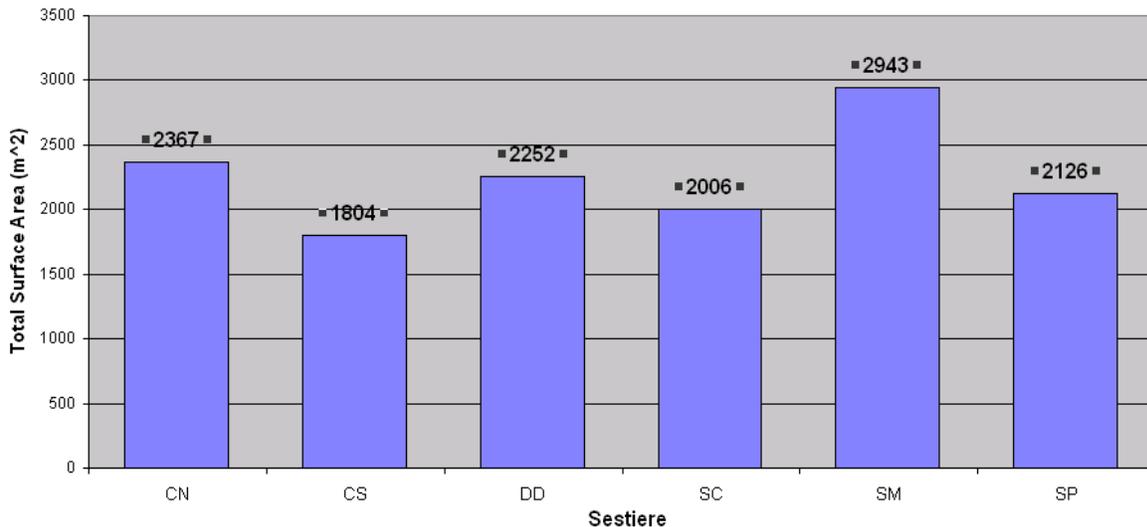


Figure 4-3: Average palace size

4.2 Typology Information

Assessorato all'Urbanistica is the organization in Venice responsible for urban planning. To regulate the use of buildings, Urbanistica classifies each building based on its structure. These classifications are called typologies. Accompanying the typologies is a list of acceptable uses for each building. A building cannot be used for a purpose not compatible with its typology. The typology codes and use categories are shown in Appendix F.

With the typologies for the buildings in Venice, we used the GIS to assign a color to each typology, and then assign the appropriate typology to each building. This produced the map shown in Figure 5-4 in which you can thematically see the typology of any building.

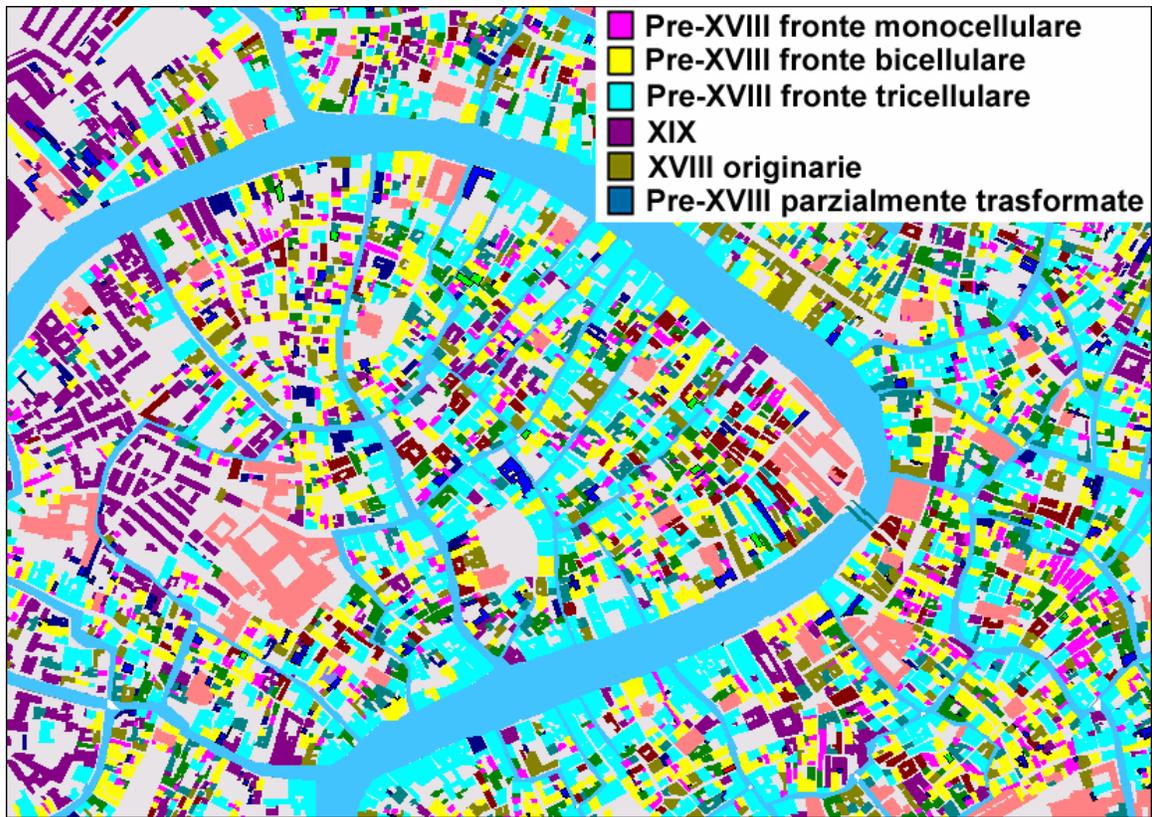


Figure 4-4: Typologies of all buildings

Because we were only interested in palace typologies, we intersected this map with the list of *palazzi*, eliminating any building not in our database. This gives us the map shown in Figure 4-5.

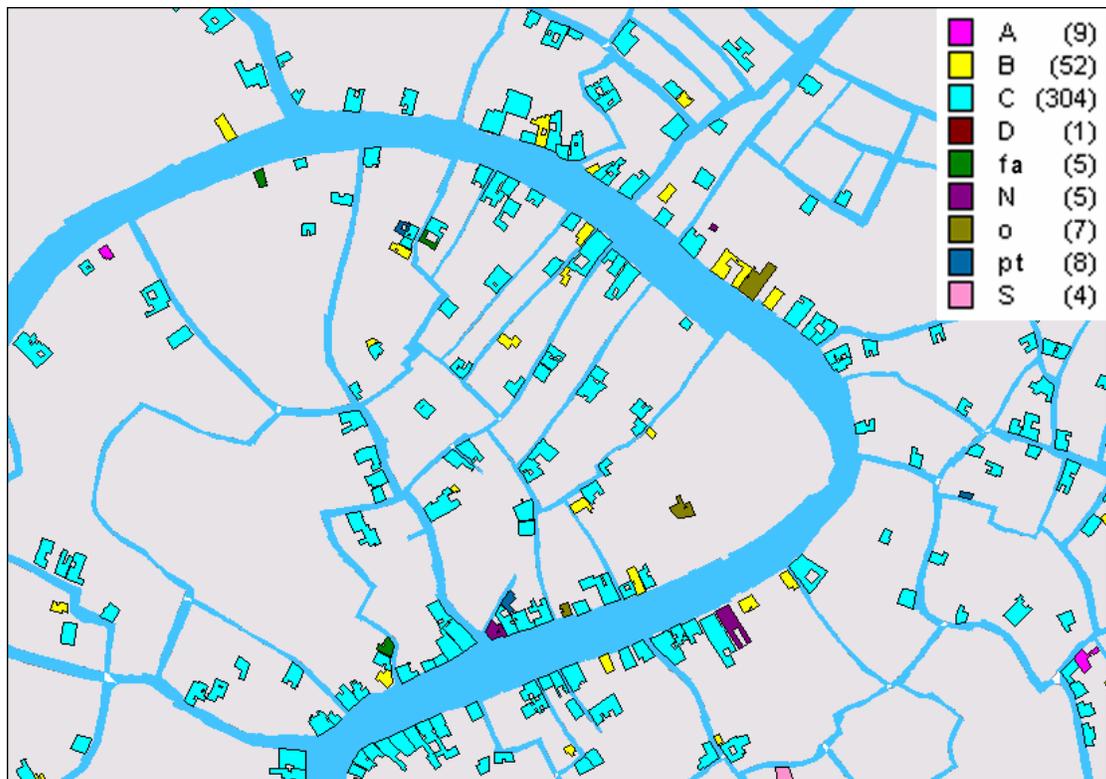


Figure 4-5: Typologies of all palaces

Figure 4-6 shows the distribution of typologies among palaces. The majority of palaces are classified as Type C, which includes pre-eighteenth century buildings with a tripartite front. This is a general description of a typical palace. We will use this factor later to identify buildings as potential palaces.

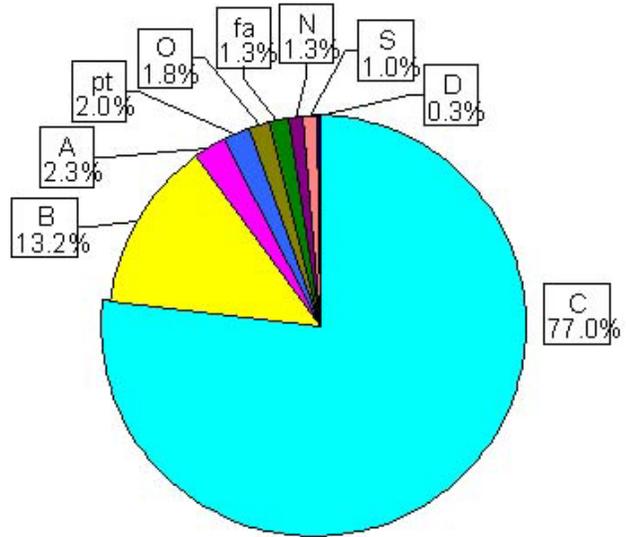


Figure 4-6: Typology distribution

4.3 Programmed Use Information

The map in Figure 4-7 shows the *Usa Programmato* (Programmed Use) of every building in Venice. The programmed use describes the intended or most desirable use for each building in the city.

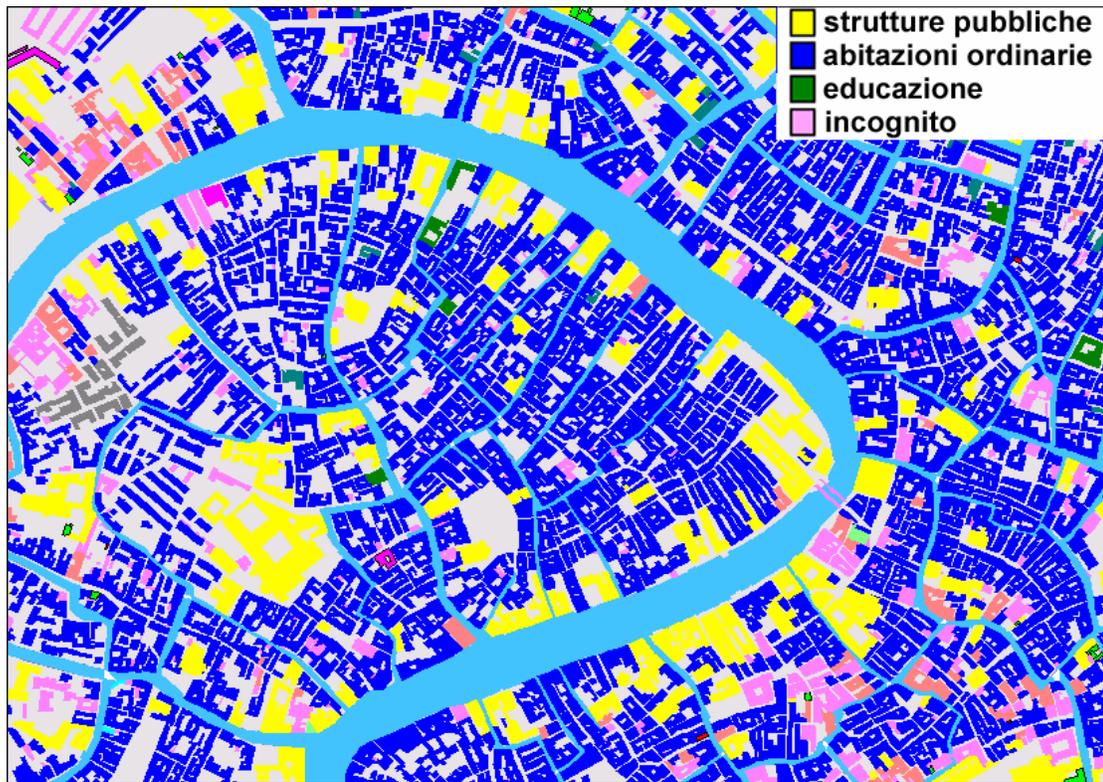


Figure 4-7: Programmed use of all buildings

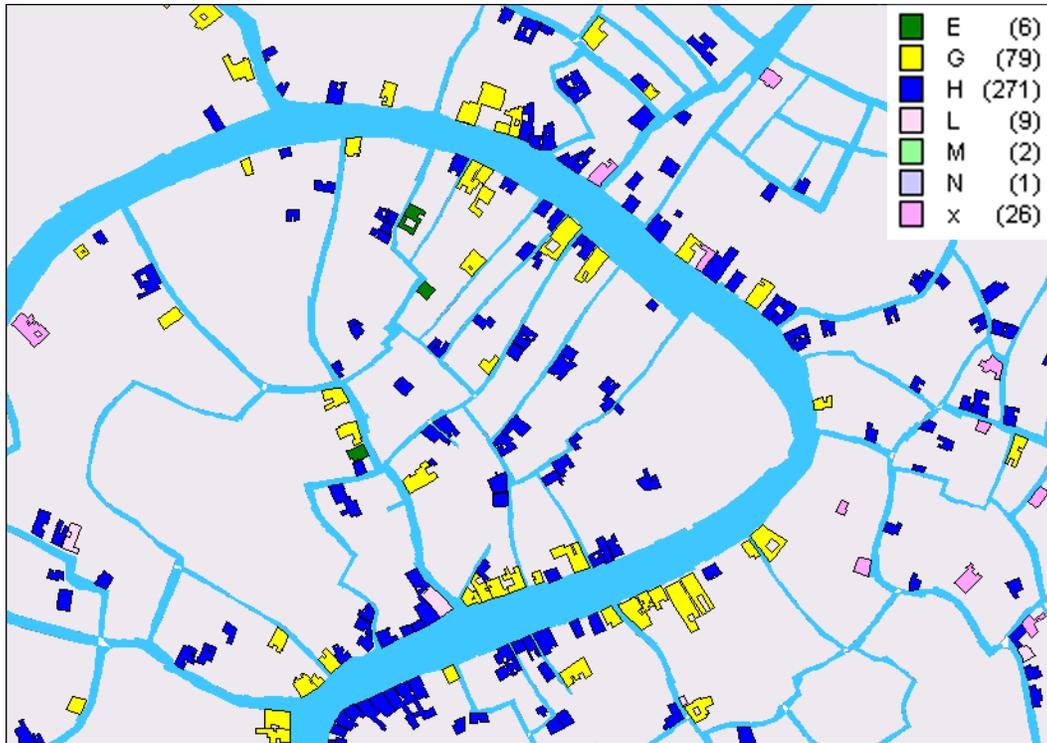


Figure 4-8: Programmed use of all palaces

Again, intersecting the map in Figure 4-7 with our list of *palazzi* produced a map indicating the programmed use of all palaces, shown in Figure 4-8.

The chart in Figure 4-9 shows the distribution of palaces by programmed use. In Figure 4-8, it is apparent that blue and yellow are predominant, representing Use types H and G respectively. The chart shows that 68% of palaces are use type H, which is a residence; Use type G refers to any publicly owned building or structure.

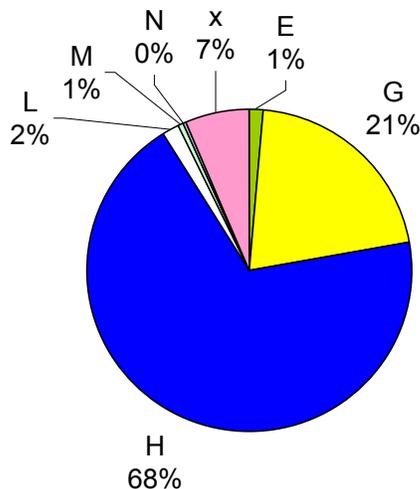


Figure 4-9: Distribution of programmed uses

4.4 Vincoli Information

This section gives information about *vincoli*, the restrictions placed on buildings by the Soprintendenza. Figure 4-11 shows an area of the Grand Canal. Buildings in purple are *vincolati* (a building with a *vincolo* placed on it), and buildings in blue are *non-vincolati*. Figure 4-10 shows the intersection of this map with the list of palaces.

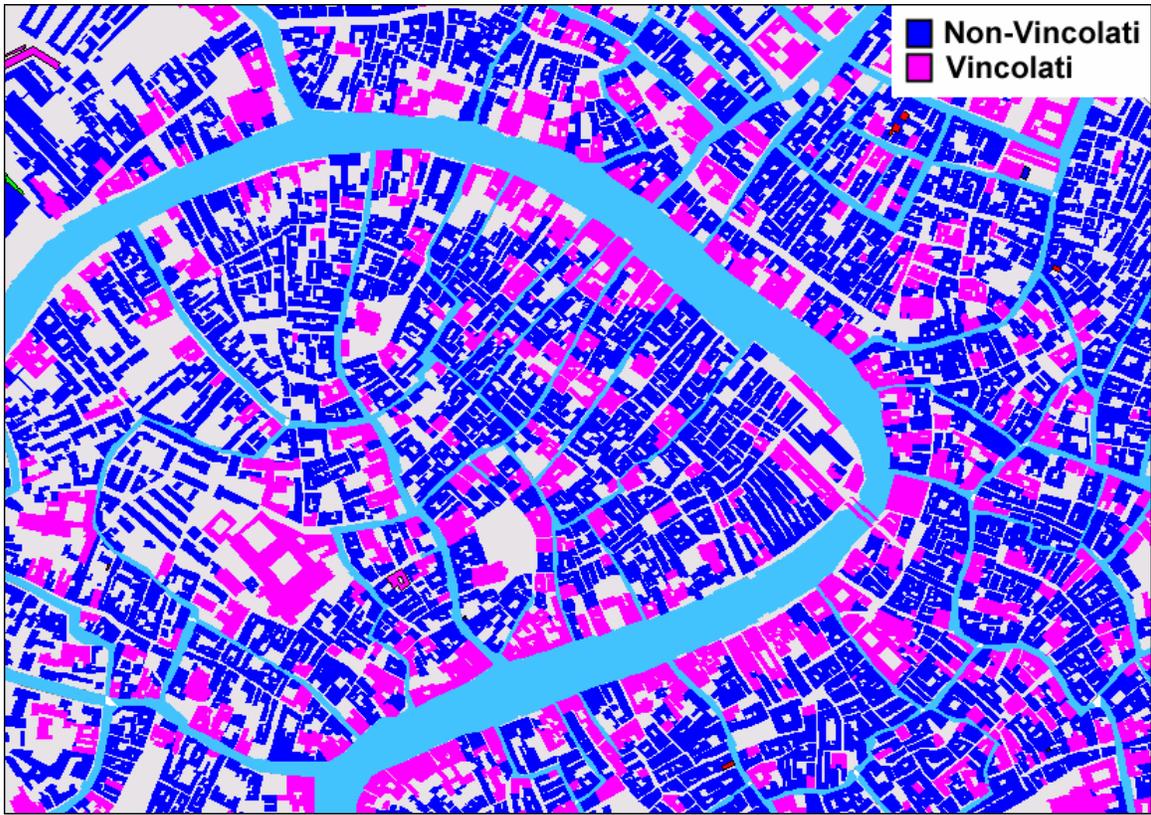


Figure 4-11: Buildings with and without *vincoli*



Figure 4-10: Palaces with and without *vincoli*

Figure 4-12 shows the percentage of palaces that are *vincolati*. All palaces are considered historical monuments, but according to Soprintendenza records, 21% of them are *non-vincolati* and have no restrictions placed on them. This implies that the owners of these palaces have the freedom to modify the buildings with fewer regulations than otherwise, because approval from Soprintendenza would not be necessary.

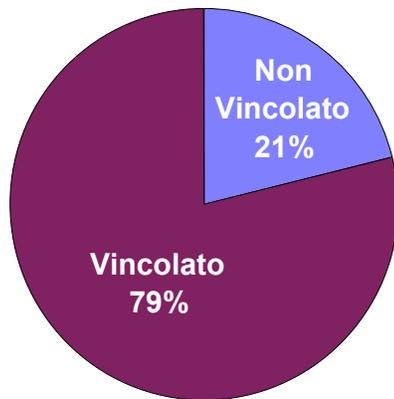


Figure 4-12: Percentages of *vincolati*

While studying the results from our database, we noticed that there are a large number of buildings not included in the database that most likely are palaces. We concluded that buildings classified as pre-eighteenth century with a tripartite front (known as typology C) which are also *vincolati* are probably palaces. These buildings have the same structure typical of palaces, and also have the modification restrictions that are on palaces. There are 248 buildings not listed as *palazzi* that satisfy these conditions. It is

logical to think that these building are palaces but simply were not included in the UNESCO catalog, and so we consider these buildings to be potential palaces.



Figure 4-13: CS3769 shown as type C



Figure 4-14: CS3769 shown as *Vincolato*

The group visited a number of these potential palaces, and many did have the same exterior structure typical of a palace. An example of one of these buildings is the building located at Castello 3769. Figure 4-13 shows that this building is of type C and Figure 4-14 shows that address CS3769 has a *vincolo*. However, this address was not listed in the UNESCO catalog classifying it as a palace.



The group found that this building had the exterior structural characteristics of a palace. Figure 4-15, a picture of the facade of CS3769, shows that this building has the symmetrical structure typical to a palace, and also that the façade is accented with larger windows and a balcony.

Figure 4-15: Facade of CS3769

4.5 Public Property and Standards Information

The database also contains information on ownership. Figure 4-16 shows that the majority of palaces are still privately owned, with only 10% owned publicly. Each palace within this 10% has standards associated with it. Standards are laws and regulations relating to use and function. The breakdown of the different standards are shown in Figure 4-17.

57% of the publicly owned palaces have standards relating to general public interest; the remaining standards on palaces refer to different types of laws relating to educational and instructional functions.

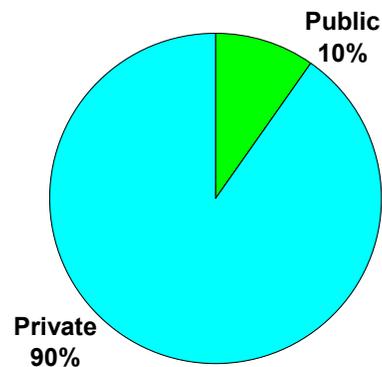


Figure 4-16: Palace Ownership Statistics

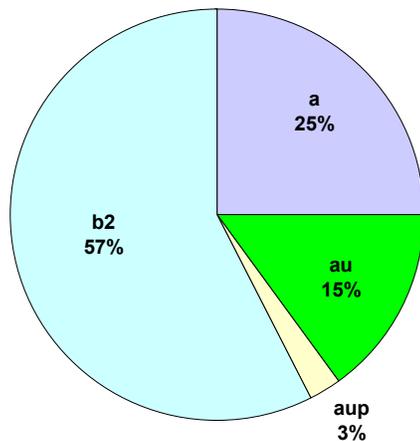


Figure 4-17: Palace Standards

5 ANALYSIS

Perhaps the most significant and challenging part of our project was the analysis of our collected data. It was necessary to demonstrate the usefulness of the computerized database within the context of city planning operations to give credibility and practical value to our work.

5.1 *Sample Permits*

To demonstrate the usefulness of the database, we obtained a few sample permit requests for palaces from Edilizia Privata and followed their progress through the entire permit process (refer to section 2.4.2 in the Background chapter for an overview). At each step, we examined which information was accessed so that the responsible department or official could make an appropriate decision. We studied the efficiency of the present procedures for obtaining, using, and updating the information each department uses. To assess the practical value of our database, we then judged how much faster and smoother each permit would progress if the departments had easy access to our database.

We looked at several factors in evaluating the usefulness of the database. Then compared the present situation of information availability to the hypothetical situation. In this which our database would be a standard in the operations of that department. These factors include time needed to access to information, procedures or clearance for access, accuracy of the information, ease in finding necessary records, and clarity of the records.

5.1.1 **Specific Permit**

We obtained one complete permit from Edilizia Privata approving the restructuring of Palazzo Foscari to convert it into a hotel. The application was submitted on April 11, 2001 to the zonal chief of the Cannaregio sestiere, where the palace is located. The final approval came through on July 11, 2002, more than a year later.

The process started at Edilizia Privata, with the general proposed changes getting



Figure 5-1: Palazzo Foscari

entered into two different forms (attached in Appendix B.3.2). Information was then collected from the archives of Edilizia Privata and summarized into the first draft of an *Istruttoria*, or preliminary investigation (attached in Appendix B.3.3). The *Istruttoria* has a brief historical note on the palace, a description of the building and its condition, and records of past approved modifications. The cover page provides basic information on the palace such as its address(es), owner, architect, the type of modification requested, and any restrictions placed on the building. This supplies background information on the palace for anyone directly considering the proposed change. The drafting of the document took over two months and was completed on June 18, 2001.

If our database was implemented appropriately, we imagine that this one step would be much quicker. The information contained in the *Istruttoria* would already be in the database. The only action necessary to acquire it would be to run a query, bringing up all the relevant information (Figure 5-2). A report could be designed in the format of an *Istruttoria*. The electronic application for the permit, made by the owner, could also be linked to the database and the information in it easily added to the new *Istruttoria*.

The next step sent the application to the Soprintendenza, where it was received on July 11, 2001.⁷ The Soprintendenza checks proposed restructuring plans to make sure they comply with the *vincoli* (restrictions) placed on monumental buildings. In this case, there was a discrepancy and the Soprintendenza sent the permit request back to **Identification** with a suggested new approach to the conversion of the palace into a hotel. It was received

The screenshot displays a complex database interface with the following sections:

- Top Left:** 'Codice' (FOSCARII), 'Aggancio' (WES506), and 'Note Storiche' containing historical text about the palace's origin and ownership.
- Top Right:** 'Nome Principale' (Foscari) and 'Alias' (Longin).
- Middle Right:** 'Codice' (CN4279) and 'Indirizzo' (Calle dalla Pegola).
- Bottom Right:** 'Comune' (Venezia), 'Localita' (Cannaregio), and various administrative codes and dates.
- Bottom:** 'Tipologia' and 'Destinazione Uso' sections with checkboxes for different building types and uses.
- Left Column:** 'Osservazioni', 'Sommario 1', 'Sommario 2', 'Sommario 3', and 'Condizioni'.

Three red boxes highlight specific areas: 'Modification History' (pointing to 'Osservazioni'), 'Vincolo' (pointing to 'Comune'), and 'Use Information' (pointing to 'Destinazione Uso').

Figure 5-2: Integrated information from database

on August 29, 2001, one and a half months later.

This new solution once again went through Edilizia Privata officials. By October 11, 2001, an alternative version of the original request was finally cleared by the Soprintendenza. To reflect this revision, another draft of the *Istruttoria* was completed on November 5, 2001, three months after the Soprintendenza got involved.

It is necessary for department officials to take careful consideration in each decision they make to find an appropriate balance between preservation and modernization of the palace. It takes time not only to study the details of the proposal to restructure a building, but also to understand the building's specific historical significance. This understanding is important when determining which structural and aesthetic elements to preserve, and which can afford alteration.

However, a lot of time is also spent looking for old records, going through files, and waiting for paperwork to arrive in the mail from other departments. If the Soprintendenza and Edilizia Privata were connected through a server and our database, any revisions on a specific permit would be entered into the database, and it would be instantaneously updated and available to everyone. This would eliminate the wait for official papers to arrive in the mail before starting any work.

If information was kept in the database and shared between Edilizia Privata and Soprintendenza, it would be beneficial to everyone. Both departments require background

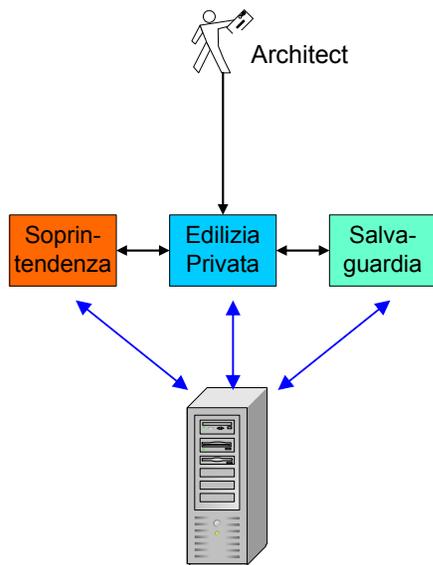


Figure 5-3: Sharing information through database

information on the palace for which a permit is requested. Edilizia Privata compiles an *Istruttoria*, but that is only for its internal use. Any material that the Soprintendenza gathers on its own when verifying the *vincoli* repeats this effort without assurance that the information the two departments refer to are consistent with each other. The use of our database would eliminate inconsistencies and the need to gather information each time a permit is applied for.

After the Soprintendenza approved the request, it was considered by the Commissione di Salvaguardia because it involved change in use and external modifications. A clarification of the technical and structural plans was requested and provided to the

Salvaguardia two days later. Salvaguardia and Edilizia Privata work closely together and

communication between them is direct and prompt. However, it still took five months before Salvaguardia gave a conditional approval for the permit on April 9, 2002 (attached in Appendix B.3.4).

At this point, the permit was essentially approved, but there were still administrative tasks to be completed. A tax was calculated, to be paid to Edilizia Privata, which was approximately one-third of the construction costs (Appendix B.3.5). This tax goes towards the city's costs to accommodate another hotel. On June 4, 2002, the applicant was notified of the conditional approval, and invited to pick up the permit and pay the tax (the *Invito al Ritiro – Concessione Edilizia* is attached in Appendix B.3.6).

After all the paperwork was completed, the applicant received the final official authorization on July 11, 2002 as the *Concessione Edilizia* (Appendix B.3.7), 15 months after the initial application. With this final document, Edilizia Privata attached a suggestion for the applicant to contact Urbanistica and apply for reclassification, in terms of zoning and typologies (Appendix B.3.8). This would be a logical step, considering the proposed change in use and structure of the building.

Unfortunately, the recommendation by the Edilizia Privata by no means guarantees that Urbanistica will ever receive official notification of the conversion of Palazzo Foscari into a hotel. By linking the two departments through the database, Urbanistica could automatically be notified of any relevant changes in a building and be able to take appropriate action.

5.1.2 Building References

While examining the permit process, we noticed other small details that, while not directly part of the permit sequence, could still be improved by the use of our database. One example is the way that palaces, and buildings in general, are referenced. While some departments, Urbanistica in particular, use their own identifying codes or GIS spatial representations, the only identification that everyone currently agrees on is address. However, even something as simple as an address can create problems. Buildings often have multiple doorways, each with their own address. Palazzo Foscari, the example used in the previous section, was referred to in the Edilizia Privata documentation as CN4200, CN4201, CN4278, and CN4279. Even this may not be complete: our own database lists CN4201/A as a valid address for this building as well.

Addresses are further complicated by differences in formatting. The exact format of the address in the Edilizia Privata documentation is “CANNAREGIO (VENEZIA) N. 4200”. Another document from another department might give the short form of CN4200 that we use

in our own database. Another might say “CANNAREGIO” but not “VENEZIA”. Letters complicate things even more: “4201/A”, “4201-A”, and “4201A” are all valid representations of the same address, but inconsistency makes cooperation difficult.



Figure 5-4: Eliminate inconsistencies through spatial representations of information

Yet another problem with addressing in Venice is the inconsistency within the city itself. The historical center of Venice and the area of Mestre on the mainland are both technically part of the “Comune di Venezia”, but each uses a completely different addressing system. Therefore, the city departments’ databases must account for both types of addresses if they are to include the entire city.

In general, addresses are not the best way to refer to a specific building. With the advent of Geographic Information Systems, a spatial representation, showing the exact building on a map of the city, is a far superior reference mechanism. Our database and map layer, linked by unique codes, take a step towards this systematic approach, and would help city departments to combine their information and remain consistent.

In conclusion, we found that our database would be very useful if incorporated into procedures for the permit process. The format inherent in a computerized database lends

itself to expedite the permit process, and provides the people involved with a tool that is convenient and powerful.

6 Conclusions

The fundamental purpose behind the project was to produce something that would be practical and useful to the City of Venice in its commitment to preserve the *palazzi* of the historical city. As a step towards this, our group created a computerized database, consolidating information on palaces from several sources. The intention was that the digitization and centralization of all the data would make them more accessible and utilizable to the city departments involved in the renovation, modification, and restoration of the buildings. Consequently, the permit process, through which a palace is approved for such changes, would become more efficient since all of our sources are used as references for information in making that decision.

Over the past two months, we visited the various departments, studied their specific involvement in approving changes to *palazzi*, and gathered records and information. The outcome of our efforts was a centralized database, integrating many types of information on palaces. It contains identification, historical and regulatory information and records, which are now available in only one location.

The database is organized to link different sources and types of information in a logical and easily accessible manner. A connection to a Geographical Information System allows users to spatially represent the information through maps, which often makes it easier to understand and apply. The database is also linked to digital pictures of the palaces, providing a visual reference that was not available earlier.

The group also verified and updated the information that was collected. The UNESCO catalogue that was used as a primary source of information was created more than 30 years ago. Much of the information was outdated, incomplete or inconsistent with other sources. This includes the address, use and ownership. During field data collection, the group was able to clear up such inconsistencies.

Our analysis of the process for obtaining a building permit confirmed that our database will be useful to the city departments involved. Each permit request requires gathering a large amount of information; our database makes this information readily available and keeps track of updates for future reference.

The accessibility of data that is accurate, current, and shared leaves potential for time and resources in city departments to be allocated to tasks other than repetitive data collection. Our work provides a prototype structure for the long-term storage of records on any

modifications made to palaces. It also establishes a standard institutional link between different government departments to share information and cooperate with each other more effectively.

We know that our database will facilitate Urbanistica operations by making all their records available in a digitized, transferable and revisable format. We hope that the results of our project will also be used as a foundation to streamline the efforts of all City of Venice departments towards the preservation of palaces.

7 Recommendations

The preservation of palaces in Venice is an extensive and ongoing endeavor, with many resources put into it by the city itself. Our IQP⁸ was targeted at helping the people who are involved in this effort by providing them with an integrated information source in the form of our computerized database. However, we realized very early on that our project would not end simply at the completion of the database. To make it useful, the database must be implemented and used in an appropriate way. In this chapter, we make recommendations for implementation of our work. We also identify several areas related to our cause in which future WPI projects could make valuable contributions and continue our work.

7.1 *Implementation of the Database*

The database and the information contained within have vast potential for benefiting the preservation of palaces, and expediting the whole process associated with it. In our analysis of a sample permit, we demonstrated the real usefulness of the database with positive results. However, for the database to reach its full potential value, it must be implemented in a manner consistent with the infrastructure of the departments that will use it. Procedures for accessing and maintaining the database must be established.

7.1.1 Technical Recommendations

The most basic step in implementing the database is setting it up on a server and creating electronic means of communication between departments to access the information. We recommend establishing a Wide-Area Network connecting the departments, and that it be administered through Edilizia Privata, since that is the department involved in all permit requests.

Security is very important to maintain the integrity of the information, so it would be necessary to fix different levels of access. There might be users who can access only certain limited information, users with read-only access, and users with clearance to change records. For example, architects, who are directly responsible for changes to a building, may require information from the database, such as building plans and restrictions. However, once a

⁸ The *Interactive Qualifying Project* is a degree requirement for all students attending Worcester Polytechnic Institute in Worcester, Massachusetts. The students apply their knowledge and experience in engineering to relating science and technology to society.

modification has been applied, the new building plans are entered into the database only through an Edilizia Privata official.

Another necessary step in implementing the database is the development of a friendly Graphical User Interface (GUI). Most of the offices we visited already have an internal network for storing and sharing records. Unfortunately, these systems are quite apparently outdated and difficult to use, without an accompanying friendly GIS or GUI. Most users will not be advanced users, and need a visual interface that is logical and coherent. Given the depth of information contained in the database, there might be users who simply want to look up information and other users who want to perform complicated manipulations of the data. The GUI needs to allow for such a wide range of skill levels.

7.1.2 Maintenance

It is necessary to develop a system of ensuring that updated information is entered into the database keeping all information at a current status. One person at each department should be tasked with ensuring that changes are made when they are applied to the buildings.

Besides being a valuable information source, if the database is updated and maintained correctly, it will eventually serve as a great historical archive of palace information. The setup of the database and GUI has to enforce strict guidelines to ensure that any updates to the information are accurate and complete. The administrator would also have to ensure that information is not corrupted or lost due to technical problems. To have sufficient storage capabilities and ample space for appropriate back up of the information, four gigabytes of disk space would be recommended.

7.1.3 Training Users

Training future users of a new system is always crucial in the success of its implementation. In regards to our database, they would need a step-by-step demonstration of the different tools available to them and the kinds of information they can extract using them. The training would provide the users with a higher degree of comfort with the new system. Reassurance and examples of the usefulness of this new tool will also be shown and stressed during the training.

Our recommendation is that a small group be selected, with three people from each department using the database. This would be a small-scale prototype for the actual implementation. Those selected would go through the proposed training, and then make use of the database in their daily professional activities. This small group will in turn serve as

supervisors and will be tasked with training the remainder of employees at their individual department. This is done so that it is possible to choose an initial user that has database knowledge. The initial user will be able to demonstrate department specific features to the remainder their fellow colleagues.

It would also be an advantage to develop a training manual for each department. Providing written descriptions of the workings of the catalogue and its structure is helpful to all users. A step by step process for the specific needs of each department would be described in the user manual. It is necessary to develop a system for the maintenance of the user manual to ensure that it is amended to reflect any changes that would need to be applied to the database.

7.2 Evaluation of the Database

Prior to actual implementation of the database, an evaluation is necessary. The short term analysis of user ability and the overall effectiveness of the database in the permit process would enhance the capabilities of this tool. A valuable evaluation could take up to a few years, so we could obviously not conduct it ourselves. This section describes how the evaluation would proceed.

7.2.1 Short Term

The initial group that was chosen from each department would be asked to complete an evaluation sheet about the database (Appendix E) at the conclusion of every month. The user is asked for information and their opinion on the current status of data and usefulness of the database in everyday work. A short term evaluation is important to show if the catalogue was user-friendly and being utilized by users on a day by day basis. Small changes are applied to enhance the use of the database.

The monthly sheet would provide specific feedback on the advantages and disadvantages of using the database. The evaluation sheet is just an example of what should be considered when weighing the attributes of the database.

7.2.2 Long Term

The short-term evaluation sheets amassed would be influential in an extensive long term evaluation process. How well the information was kept at a current status needs to be evaluated on a long term basis. The evaluation would uncover areas in the design of the

system that need improvement. Suggestions from the users are implemented to improve the database in area that was found to be hard to use.

7.3 Distribution

We have already mentioned the advantages of a computerized database in comparison to its paper counterpart. Taking full advantage of the technology available to us, we would like to empower the public with access to information about palaces. Our recommendation is the development of a web site for public access to the database. Applications for permit requests would be available online along with limited information from the database. Information from the electronic application would be added to the database automatically. The information available from the database can be a quick reference for owners who want to modify their building, or it can be used by art historians simply interested in increasing their knowledge.

The information made accessible to the public might be limited, because official documents and such might be classified. However, the benefit of any increased knowledge is boundless and cannot be quantified. Access to this information has the ability to spawn awareness and preservation of the palaces.

The maintenance of the web site could be handled by the same group that administers the database. An effective way to make the site available would be to provide a link to it from the Comune di Venezia homepage⁹.

7.4 Future Project Possibilities

There were many aspects related to the preservation of palaces that the group did not pursue during the course of the project. The database of information that was created possesses the ability to be expanded and updated. Several other factors of preservation can be studied using the data that was collected and computerized. This opens the potential to create future projects. Potential projects are described in the sections below.

7.4.1 Expansion of the Palace Database

We have compiled a vast amount of information on palaces in our database. However, there is still data to be collected that is available in the streets and offices of Venice. The first possibility is the expansion of our database to include information on other palaces that are not currently in the database. Expanding the database to include palaces that

⁹ <http://www.comune.venezia.it>

exist on the Giudecca, on Murano, and on other islands in the Venetian lagoon is the next logical step.

Even within the historical center of the city, there are other buildings that should be labeled as palaces that were not entered into our database. Our database only includes palaces that were contained within the UNESCO catalog; there are other ways of identifying palaces that could be used. The structural definitions of a palace can be used to classify a building as a palace. Pairing the typology and *vincoli* listed buildings can also classify a building as a palace. The same information that currently exists in the database could then be collected on building now identified as a palace.

The database does not include a vast majority of renovation information for converted palaces. It also lacks updates on the condition and structural changes. Much of this information has been researched and published. An example of this is the information contained in the book *Palazzi di Venezia*, by Elena Bassi. Fields in our database were created for this information. However, none of the information was entered due to time constraints.

The database and maps of the palaces could also be extended into a realm that is on the cutting edge of computer technology, 3D architectural modeling. The time that is needed to create a 3D model of each palace in Venice would be well worth the visual representation of the information that would result. Along with the aerial view that the current GIS supplies, there would be the option to have a virtual walk-through of any particular palace. Instead of looking at a small colored polygon on a map with long list of codes and numbers which correspond to information that isn't readily understandable, one could have a 3-dimensional tour of the building with all modified areas highlighted. With a click on a highlighted modification a visual explanation of the changes that occurred would be provided.

7.4.2 Condition Assessment

A superficial condition assessment, similar to what has been done in the past with churches, is another possibility. Palaces would be rated based on their current condition and history of modification. This could lead to estimating citywide cost of restoration. It would concentrate on identifying the palaces that are in need of restoration. Estimating the cost to update and maintain each building at a good state. Using this cost it would be possible to total the yearly cost for the city of Venice to maintain all of the palaces at renovated state.

7.4.3 Implementation of the Database

In our recommendations for the implementation of the database, there are many areas that can be developed by WPI students. These include the development and testing of the user interface, design of the network that would link the departments, user training procedures, and design of the web site. Also, the role of the database in the communication of the city departments could be explored.

While we have made great strides in gathering information pertaining to the palaces, and created the basic structure for our database, it is necessary for our work to be continued. Our work has created possibilities for many new projects, both in the area of expansion on our own project and in the creation of original projects that make use of the collected data.

8 Bibliography

Donnelly, Hart, Pilotte, Scherpa. *Safeguarding the Churches of Venice, Italy: A computerized Catalogue and Restoration Analysis*. IQP #99A006I, 1999.

Fortini, Patricia, B. Harry, S. Abrams. *Art and Life in Renaissance*. Inc. Publishers: New York, 1997.

Goy, Richard J. *Building in the Venetian Lagoon*. Cambridge University Press: Cambridge, 1989. 30.

Goy, Richard J. *Venetian Vernacular Architecture*. Cambridge University Press: Cambridge, 1989.

<http://www.UNESCO.org>

Lauritzen, Peter and Zielcke, Alexander. Palaces of Venice. Viking Press, 1978.

Michelangelo Muraro. *Venetian Villas*. Rizzoli International Publications Inc. 1986, Italy

Russo, Raffaella. Venetian Palaces. Hazan, Paris, 1998.

Zorzi Alvise. *Venetian Palaces*. Rizzoli: New York, 1990, WPI ref:NA7755Z6713.

Appendix A: Glossary of Terms

Acqua alta	high water
Altre famiglie	other families
Androne	large entrance hall on the ground floor of a palace, opens to the canal entrance
Arsenale	dockyard
Ca'	palace, house
Codice	code
Façade	the front elevation of a building
Fondaco	warehouse building
Formelle	formal
N anagrafici	address
Nomi dell famiglie	family name
Palazzi	palace (plural)
Palazzo	palace (singular)
Patere	small circle decorative element
Piano nobile	first residential floor in a palace
Pórtego	central hall on the <i>piano nobile</i>
Scheda	
Sestiere	borough (there are 6 <i>sestieri</i> in Venice)
Terrazzo	terrace

Appendix B: Source Samples

UNESCO

This is a sample entry from the 1968 UNESCO catalog of palaces. All the textual information was entered directly into our database. Page one contains most of the useful information, but this page was not included with every entry. Page two shows an old map and some more information. Page three has two sections of historical and observational text, as well as summary and condition information. Page four shows an old picture. A picture was not included with every entry either. The low quality of the included picture and the lack of pictures for all entries were the main reasons for us wanting to take our own digital pictures.

Typology Documents

We received documents from Urbanistica regarding typologies. The attached documents show the detailed descriptions and schematics of typologies Bg and C. These two types encompass the majority of palaces.

Sample Edilizia Privata Modification Record

This appendix contains all the forms and parts leading to the final permit for restructuring Palazzo Foscari to convert it into a hotel.

Iter

The *Iter* is attached in its two formats. It is a document that tracks the sequence of administrative actions involved in approving the permit. It shows any paperwork that was requested, which departments the permit request went through, decisions that were made, and the dates associated with everything.

Scheda Lavori

The *Scheda Lavori* is the first form filled out at the start of the permit request. It identifies the palace, names the owner and architect, and briefly describes the type of modification applied for.

Istruttoria

Istruttoria e Parere degli Uffici translates to “preliminary investigation and opinion of the office.” The document starts out with the type of permit being requested, a list of the addresses of the palace, date of application, owner of the palace, and the *vincoli* associated with the palace. It continues with historical information on the palace and description of any previous modifications made. The *Istruttoria* is attached in two different formats.

Salvaguardia Conditions

This document, again in two formats shows the results of the considerations of the Commissione di Salvaguardia. The most important part is the conditions that are placed on the requested conversion. These conditions are included in the final permit.

Calcolo degli Oneri

This shows the calculations that are made to determine the tax or fee placed on the proprietor making the modification.

Invito al Ritiro – Concessione Edilizia

This document is received by the applicant, inviting him to pick up the permit and pay the *oneri* before receiving authorization to start construction.

Concessione Edilizia

The *Concessione Edilizia* is the final authorization, approving the permit. An official copy has the Edilizia Privata official stamp. The document includes conditions placed by Salvaguardia and description of the work that is authorized.

Recommendation

This last document recommends that the architect responsible contact and inform Urbanistica about the conversion of the palace into a hotel, so that the building can be reclassified if necessary.

Appendix C: Field Data Collection

Palazzi Field Data Collection Form

1. Code: _____
2. Palace Name(s): _____

3. Address: _____
4. Use: _____
5. Name of Offices or Establishments:

6. Picture: Façade _____ Area _____ Doorbell _____
7. General Observations: _____

Sample Field Data

Sample Form

1. Code: *Molin5* _____
2. Palace Name(s): *Molin* _____

3. Address: *San Polo 2514B* _____
4. Use: *City Offices* _____
5. Name of Offices or Establishments:
 See pictures _____
6. Picture: Façade *pic#25* Area *pic#26* Doorbell *pic#27*
7. General Observations: *Nameplate picture taken from outside courtyard* _____

Visuals



Figure C-1: Facade, Area, and Nameplate for *Palazzo Molin*

Appendix D: Database Details

This appendix describes the structures of the tables and forms included as part of our database. There are two database files created for our project: E02_Palazzi.mdb and E02_Palazzi_Fotografie.mdb; both are in Microsoft® Access 2000 format. All field names are in Italian, but important translations are provided in this appendix.

All tables contain the field *Codice_WPI* (WPI code). This is the code we created (see section 3.2.4.1) to identify each palace throughout the database. This code also identifies the palace in our GIS map layer (see section 3.2.4.3).

Tables in E02_Palazzi.mdb

0) UNESCO

This table contains all the information from the UNESCO catalog. Along with the *Codice_WPI* field, it contains a *Scheda* field which contains the identifying code that UNESCO used in their catalog. All information from the UNESCO catalog, including the field names, was transcribed directly; any summarizing or reformatting of the data is in a different table.

1) Nomi

The table Nomi (names) contains the different names of each palace. Each record contains the *Nome_Principale* (principal name). If a palace has one or more additional names besides the principal name, then each *Alias* is put into a separate record.

2) Anagrafici

The table Anagrafici (addresses) includes the many addresses of each palace. Each record contains a single address, including the street name (*Indirizzo*), the *sestiere*, the address number (*Numero*), the address letter (*Lettera*) if any, the combination of the sestiere, the number, and the letter into one field (*Codice*), the *Codice* field without a slash separating the number and letter (*Codice_Finale*) and a combination of the sestiere and the number without the letter (*Codice_Semplice*). These varied fields allow the greatest number of possibilities for searching.

3) Vincoli

The Vincoli table (see 3.2.2.2 for a discussion of what *vincoli* are) contains each *vincolo* that applies to a palace. The structure of the *vincoli* table is unchanged from the

original files given to us by the Soprintendenza; our only changes were the deletion of non-applicable *vincoli* and the addition of the *Codice_WPI* field to allow linking with other tables.

4) VPRG

The VPRG (*Variante al Piano Regolatore Generale*: the master plan for zoning laws and regulations) table contains information on other laws and regulations applicable to palaces. This table contains an *Aggancio* field, which contains a code used by Urbanistica to identify all buildings in the city. This table contains *Tipologie* (typology) information as well.

4-1) Proprieta_Pubbliche

This table, also part of the VPRG, contains information on publicly owned buildings. This table contains the *Aggancio*, which was used to link to the main VPRG table and add the *Codice_WPI*. This table includes information on restricted uses and functions, as well as ownership information.

5) Usi

This final table contains information on uses. Included is the field *Usa_UNESCO*, which contains use as recorded in the 1968 UNESCO catalog. The three fields *Usa_VPRG_Piano_Terra*, *Usa_VPRG_Piani_Superiori*, and *Usa_VPRG_Programmato* (respectively, use on the ground floor, use on the upper floors, and ‘programmed use’) contain codes that correspond to uses (see table R2) that we received along with the other VPRG information. The final field, *Usa_Attuale* (actual use) contains the use that we recorded during field data collection.

R1) Codici_Sestiere

Throughout the database, the codes CN, CS, DD, SC, SM, and SP are used to refer to the six sestiere of Venice. This table links each of these codes to each sestiere’s full name to facilitate printing or formatting.

R2) Codici_Usa

The VPRG information received from Urbanistica contains codes corresponding to different uses. Both the VPRG table and the Usi table make use of these codes. This table contains the actual description of each code, and can be used for reference or formatting.

R3) Codici_Tipologie

The VPRG information also includes typologies (see 3.2.2.4). Each typology code (A, B, C, D, etc.) refers to a different type of structure. This table provides a short description of the structure that the code refers to. For example, most palaces are of type C, which is “*preottocentesche originarie a fronte tricellulare*” (an original pre-eighteenth century building with a three-part facade).

R4) Codici_Funzione_Insediate

Several fields for *Funzione Insediate* (‘installed function’) exist in the VPRG tables. This reference table provides translations for each code to the actual description of the function.

R5) Codici_Proprieta

Some of the VPRG tables also contain information on property ownership. Again, the tables themselves contain codes corresponding to different owners; this reference table provides the actual names of the owners along with their code.

R6) Codici_Standards

Standards are laws and restrictions relating to the actual use of a building, rather than to the building itself. For example, *farmacie* must be evenly distributed throughout the city. Some of the VPRG tables contain information on standards, and this table provides the descriptions of each code.

Tables in E02_Palazzi_Fotografie.mdb

Fotografie

Due to the large size of the pictures, it was necessary to put the Fotografie (photographs) table in a separate database file. The Fotografie table contains the *Codice_WPI* fields used in the first database, followed by embedded objects containing our pictures of the facade and area of each palace.

Appendix E: Short Term Evaluation of Database

Feedback Form

Date:

Department:

Date received by Edilizia Privata Official:

1. How often did you use the database daily?
2. What problems were encountered while using the database?
3. How often was new data entered?
4. Was all information kept current?
5. Did you find incorrect data?
6. General Comments:

Appendix F: Typology and Use Translations

R3) Codici_Tipologie		
CODIFICA	DESCRIZIONE	INGLESE
A	Preottocentesche originarie a fronte monocellulare	Original pre-eighteenth century structure with a one part front
B	Preottocentesche originarie a fronte bicellulare	Original pre-eighteenth century structure with a two part front
C	Preottocentesche originarie a fronte tricellulare	Original pre-eighteenth century structure with a three part front
D	Preottocentesche originarie a blocco	Original pre-eighteenth century structure with block
fa	Preottocentesche oggetto di fusione od addizione	Pre-eighteenth century structures combined together or added on to
Ka	Preottocentesche a capannone a fronte acqueo	Pre-eighteenth century structure with dock and waterfront
N	Novecentesche originarie o di complessivo pregio architettonico	Original nineteenth century structure with architectural value
O	Ottocentesche originarie	Original eighteenth century structure
P	Preottocentesche di impianto non ripetuto	Pre-eighteenth century structure
pt	Preottocentesche parzialmente trasformate	

R2) Codici_Usi

CODIFICA	DESCRIZIONE	INGLESE
A	Spazi per la mobilità meccanizzata terrestre	Parking lot, garage
B	Spazi per la mobilità ferroviaria	Railway space
D	Impianti scoperti per pratica sportiva e lo spettacolo sportivo	Sport arena
E	Strutture per l'istruzione obbligatoria	Educational structure
F	Attrezzature tecnologiche	Technological infrastructure
G	Altre strutture pubbliche e/o per attività collettive - attrezzature militari	Publicly owned structure
H	Abitazioni ordinarie e/o specialistiche - attrezzature cimiteriali	Dwelling
I		
L	Attività ricettive	Hotel, etc
M	Strutture culturali private	Private cultural structure
N	Edifici non utilizzati	Unutilized building
O	Magazzini e depositi	Warehouse
xx	Incognito	Unknown

Appendix G: Annotated Bibliography

G.1 Venetian Architecture

<http://www.boglewood.com/cornaro/xcornaro.html>

The link provided a listing of the advancements that the Coraro family has commissioned in the city of Venice. The family feels that it is important to preserve the heritage of the city. The site provided good visual examples of the palaces.

<http://www.worldarchitecture.org/startIEDHTML.html>

The site is a collection of web pages for current architects who operate in Venice. Listings of Pritzker Architecture prize winners. This was not very helpful for Palace architecture and style.

Goy, Richard J. Venetian Vernacular Architecture. Cambridge: Cambridge University Press, 1989.

Provides a bit of history and description of architecture in the Venetian lagoon, and issues related to building in such an environment. It goes into housing typology, including structure and appearance of the palazzo. It includes pictures of some palaces, and has mapped out locations of some as well.

Goy, Richard J. Venice: The City and its Architecture. Hong Kong: Phaidon Press Limited, 1997.

This is a large book, text accompanied by many illustrations of buildings and architecture in Venice. It describes not only the history and architecture of buildings in Venice, including the palaces, but also their purpose and their place in the history and development of Venice.

Teague, Edward H. World Architecture Index: A Guide to Illustrations. New York: Greenwood Press, 1991: 318-319.

This is a reference source containing lists of lists of buildings all over the world, arranged by site, architect, and type. I got a list of about 20 palazzi in Venice.

Venetian Villas By: Michelangelo Muraro Rizzoli International Publications Inc. 1986, Italy

This text provides an excellent background of many of the houses. The pictures are excellent and will be useful in studying the structure and architecture from here at WPI. I hope to use this source to begin to build the list of the current Palaces.

Art and Life in Renaissance Venice By: Patricia Fortini Brown Harry S. Abrams Inc. Publishers 1997, New York, NY

There is a useful chapter on the “Private Worlds”, this will be useful in the figuring out of the uses of the Palaces in the Renaissance Age. The source also has a detailed map pinpointing 14 Palaces.

Venice from the Air Photography By: Guido Rossi, Text By: Franco Masiero Rizzoli International Publications Inc. 1988, New York. NY

This book is a wealth of beautiful aerial pictures of Venice. It will be helpful in familiarizing ourselves visually with the different types of architecture. The detailed map will also be useful when we try to place the different Palaces in their correct locations prior to traveling to Venice.

Donnelly, Hart, Pilotte, Scherpa. Safeguarding the Churches of Venice, Italy: A computerized Catalogue and Restoration Analysis. IQP #99A006I, 1999.

This source provides for a good example of an IQP dealing with preservation and cataloging of architectural structures.

G.2 Palaces

Abercrombie, Stanley. “Palazzo Fortuny.” Interior Design, Oct. 1985, v55, p210.

This article is mostly about a textile designer, Mariano Fortuny, but contains references to the renaming of the palaces (“...it was originally known... as the Palazzo Pesaro... it spent most of its seven centuries as the Palazzo Pesaro degli Orfei... it came to be called Palazzo Fortuny...”) as well as mentioning its current use (a museum, in this case).

Goy, Richard J. The House of Gold: Building a Palace in Medieval Venice. Cambridge: Cambridge University Press, 1992.

This book contains a lot of information about the Ca d’Oro, one of the most famous of Venice’s palaces, such as many records of the masons that built the palace. Other information includes how old stone and building supports were reused to build the Ca d’Oro, and the designs of the stone carvings were often based on other palaces’ carvings.

Lauritzen, Peter and Zielcke, Alexander. Palaces of Venice. Viking Press, 1978.

This contains a little information about Venetian palaces in general, and has a list of quite a few palaces, divided up by architectural style (Byzantine, Gothic, Renaissance, or Baroque). Each palace contained in the book has photographs and a couple pages of text describing that palace’s history as well as any other interesting information.

Russo, Raffaella. Venetian Palaces. Hazan, Paris, 1998.

This is a pocket sized book, listing many of the palaces of Venice, with a brief description and history of each building and its respective occupants. It includes many reference pictures.

Wiener, Samuel Gross. Venetian Houses and Details. The Architectural Book Publishing Co., 1929.

This book is full of photographs and drawings of Venetian houses and palaces, along with their names. Some of the drawings are details of specific parts of the house or palace, including chimney tops, arches, and so on.

http://dir.yahoo.com/Arts/Design_Arts/Architecture/Buildings_and_Structures/Residential/Palaces/

This is a listing of palaces worldwide. It has some excellent visual examples of the buildings. It also provided many helpful factors about the palaces, such as architect and style. The sight proved some basic information on different styles, in order to notice differences.

<http://www.canaan.demon.co.uk/roleplaying/venice/VenGeog-Arch.html>

This site provides a quick reference to palaces and architectural characteristics in Venice.

G.3 UNESCO

<http://www.UNESCO.org>

This is the official website of UNESCO. It contains a lot of useful information about the organization and what they do. It also includes the UNESCO mission statement.

<http://www.unesco.org/whc/news/8newseng.htm#story3>

The sites inscribed on the World Heritage in Danger List are naturally the subject of close attention from the World Heritage Committee and the international community. The Royal Palaces of Abomey recount this history as much in their general arrangement as in the detail of the architectural decoration.

<http://www.unesco.org/culture/development>

The site provides a short history of UNESCO's culture and development agenda. It thus became UNESCO's responsibility is to stimulate a process

G.4 Historical Conservation

<http://www.icomos.org/>

Website of the International Council on Monuments and Sites. Contains information on preservation and conservation of other historical sites around the world. Particularly notable is http://www.icomos.org/docs/burra_charter.html which contains definitions of “historical conservation” and similar concepts, and principles by which the conservation should be done.

<http://www.donhead.com/Journal%20of%20Architectural%20Conservation.htm>

Abstracts from the Journal of Architectural Conservation. Articles from this could also give ideas on how best to proceed with conserving the historical palaces.

G.5 Venice

<http://www.italy.emb.org/usefullinks.htm>

The site of the Italian embassy in the US, contain many useful links and information on Italy.

G.6 Urban Planning

<http://www.state.ma.us/bbrs/index.htm>

This is the home page for the State Board of Building Regulations and Standards of Massachusetts. It provides building codes and regulations for the state.

<http://www.cmrpc.org/>

Home page of the Central Massachusetts Regional Planning Commission, which deals with issues of land use, and regulations etc.

<http://www.hud.gov/>

US Department of Housing and Urban Development.

G.7 City of Venice Planning Department

<http://www.comune.venezia.it/urbanistica/home.asp?ipo=&C=>

The City of Venice Planning Department website.