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World heritage cities: Amsterdam's canal district case study

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ABSTRACT: The aim of this paper is to describe the occurrence and impact of building consolidation within the architectural ensemble of the Amsterdam canal district and the effects of building consolidation on the Outstanding Universal Value (OUV) of the canal district as a World Heritage property. The consolidation of individual buildings into larger scale buildings is analysed over time and the results are related to the analysis of other architectural attributes of the property such as façade composition, function and typology. The research clarifies the occurrence and nature of building consolidation and the threat it poses to the scale of facades, the function of buildings and the historic building typology. The results of the research contribute to the current discussion of the management and monitoring of World Heritage within Amsterdam’s dynamic urban context.

1 INTRODUCTION

This paper presents part of the results achieved in a research project taking the World Heritage property *The seventeenth-century canal ring area of Amsterdam inside the Singelgracht* (Fig. 1) as case study. The case study not only aims to assist local authorities on monitoring and managing the property in relation to urban development but the output on a local level also contributes to a larger research program short-titled: “Outstanding Universal Value, World Heritage cities and Sustainability” led by the Eindhoven University of Technology, the Netherlands; and UNESCO World Heritage Centre in Paris, France. This is a collaborative and comparative research program that aims to make a significant contribution to both research and practice on World Heritage management and sustainable development (Pereira Roders & van Oers, 2010).

1.1 Background

The research presented takes World Heritage within the urban environment as broader theme and was conducted within a research studio of the Technical University of Eindhoven (TU/e) called “Cultural Heritage and Sustainability, World Heritage as case study”. The research of Amsterdam as a World Heritage case study aims to contribute to the current management and research efforts of the Amsterdam municipality and was conducted in collaboration with Amsterdam’s local authorities, including the Central Borough of Amsterdam, the Amsterdam Bureau of Monuments and the Amsterdam World Heritage Bureau.

The Amsterdam canal district was inscribed to the UNESCO World Heritage list in 2010 as a “group of buildings” and an “inhabited historic town” (ICOMOS, 2010). The nomination process leading up to this inscription and its successful conclusion add a new layer to an already active debate on the city’s cultural heritage and the implications of efforts to manage and protect it.

The Amsterdam canal district is described as a unique ‘urban ensemble’ (Kingdom of the Netherlands, 2009). Its significance is explained by ICOMOS (2010) as follows: “designed at
the end of the 16th century and completed in the 17th century. It was a project for a new ‘port-
city,’ to be built around the old town between the old defence canal and the new Singelgracht
Canal. The network of canals in concentric arcs forms the main infrastructure, along with radial
canals and streets.” In addition, the regular building plots and the successive construction cam-
paigns “permitted the development of a vast, homogeneous urban ensemble.” The canal district
includes “a large architectural variety, with gabled houses and numerous monuments” and its
model town planning is considered “the first truly ‘ideal city’ in Europe.”.

Being listed as World Heritage means that a property is considered to be of "Outstanding
Universal Value" (OUV), with its cultural and/or natural significance being "exceptional as to
transcend national boundaries and to be of common importance for present and future genera-
tions of all humanity” (UNESCO, 2008). The property is nominated on the basis of three out of
the six cultural criteria as defined in the Operational Guidelines for the Implementation of the
World Heritage Convention (UNESCO, 2008), namely: criteria (i), (ii), and (iv).

Criterion (i) is to “represent a masterpiece of human creative genius,’’ which the canal district
justifies by being a “new, large-scale 'port city' built around the medieval core of Amsterdam”
and “a masterpiece at once of hydraulic engineering, of town planning, and of a programme of
architectural construction” (ICOMOS, 2010).

Criterion (ii) means to “exhibit an important interchange of human values, over a span of
time or within a cultural area of the world, on developments in architecture or technology, mon-
umental arts, town planning or landscape design.” The criterion is confirmed by ICOMOS
(2010) because the property is considered to be a testimony to a considerable exchange of ideas
over a period of almost two centuries, with respect not only to civil engineering, town planning,
and architecture but also in a series of technical, maritime, and cultural fields.

Criterion (iv) is justified when the property is “an outstanding example of a type of building,
architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in
human history.” The canal district is considered an “outstanding type of built urban ensemble
that required and illustrated a diverse range of expertise in hydraulics, civil engineering, town
planning, and building and architectural techniques” (ICOMOS, 2010).

1.2 Problem field

Often, as in the case of the Amsterdam canal district, World Heritage properties are part of a
larger dynamic urban environment. With ongoing urbanization globally and a growing list of
properties inscribed on the World Heritage List, cities containing World Heritage have become
an increasingly relevant phenomenon (Pereira Roders, 2010). These World Heritage cities often
face difficulties in reconciling conservation and development (UNESCO, 2011) and they need
to manage development without adversely affecting the “Outstanding Universal Value” (OUV)
of their cultural heritage, because “the permanent protection of this heritage is of the highest
importance to the international community as a whole” (UNESCO, 2008). The challenge now
set for Amsterdam is protecting the OUV of the canal district while it remains a living part of a
continuously evolving urban context. So, just as any other UNESCO World Heritage property
the evolution of the property should find an appropriate balance between development and the
protection of cultural significance. The monitoring of this balance is done both by the World
Heritage Committee and, more regularly, by the national and local stakeholders who should
manage the property to prevent that such evolution would cause irreversible damage to the at-
tributes conveying the OUV of the property. As the canal district was only inscribed on the
World Heritage list in November 2010, too short a time passed to evidence factors affecting
the property only since its inscription. It is however possible to try to uncover past and current
trends that possibly affect the property.

Identifying the OUV and the factors affecting the OUV of a World Heritage property is a dif-
ficult task, however, it is the basis of a discussion on how to protect the unique value of the
property for future generations. As with other World Heritage properties, the OUV in Amster-
dam canal district is defined in terms of attributes, which are tangible or intangible elements
conveying the characteristic values of the property. The research focused both on understanding
how changes over time provide insight into the success and failures of conservation efforts and
defining trends that have an impact on the OUV of the property.
Figure 1: The Amsterdam canal district as World Heritage site, definition of core and buffer zone

Figure 2: Map indicating building consolidations on the Herengracht, Amsterdam
Figure 4: Visual data used for streetscape and facade analysis over multiple time periods.
1.3 *Specific problem field: Building consolidation*

One of the factors assumed to currently affect the property is the unseen consolidation of canal houses behind the facade into larger scale building units. The occurrence of building consolidation can be explained by the following example: A series of buildings is at one point in time drawn on geographical records as separate buildings, separately outlined and indicated with separate street numbers. At a later moment in history these separate buildings are consolidated and subsequently drawn on geographical records as a single building, with a single outline and often indicated by a single street number (Fig. 5). The exact nature of these building consolidations can vary: Separate buildings could have been demolished and replaced with a single larger scale structure or in a series of buildings could be connected to each other by creating internal openings between the shared side or back walls of the buildings. The latter type of consolidation (by internal connection) covers about two thirds of consolidations found and was still found occurring in the recent past, thus currently raising a threat to the OUV of the property.

The consolidation of buildings (Fig. 2) is a current topic of concern for local authorities involved and was mentioned often during interviews. The consolidations could affect important attributes of the property such as the exemplary town planning consisting of a regular building plot layout and the historic building typology of “single neck gabled house.” The phenomenon of building consolidation implies a general change to the scale of buildings in the property which directly affects the original layout of the urban structure, an important attribute of the property. This parcellation, making up the original layout of the urban structure divided into regular sized building plots, is important because it creates uniformity within the urban ensemble and was the foundation for the development of specific building types and architectural styles; as explained by ICOMOS (2010): “The network of canals creates and defines the structure of an urban landscape into regular plots, the basis for a vast new city forming a homogenous ensemble”. As such, building consolidation is an imminent threat which needs to be researched further to understand how the local authorities can improve the management of development in their property in relation to those changes. The research identifies the nature of building consolidation and maps its occurrence over a period of time. The effects of building consolidation on other aspects of the architectural ensemble are uncovered by a comparative analysis, in order to find if other attributes (such as facade, function and typology) are possibly affected by the consolidation of buildings.

2 METHODOLOGY

2.1 *Theoretical starting point*

The research takes the World Heritage status of the Amsterdam canal district and its statement of Outstanding Universal Value (OUV) as point of departure. Desk research uncovered the nature of the OUV of the property and was followed by fieldwork and mapping to analyse a set of attributes within the property that represent this OUV.

Within the desk research phase, a content analysis of the official UNESCO nomination documents for the Amsterdam canal district revealed the set of attributes that convey the outstanding universal value of the property. The results of this content analysis were confirmed by interviews with stakeholders and filtered to provide a selection of attributes that represent the architectural characteristics of the canal district to further elaborate on in the fieldwork/mapping phase of the research.

2.2 *Content Analysis*

Documents used for the content analysis are the official UNESCO Decision File (DF), the Advisory Body Evaluation (ABE) as prepared by ICOMOS and parts of the Nomination File (NF) as prepared by national government. The attributes stated within these documents to represent the OUV of the property were identified, grouped and classified. These attributes are described by ICOMOS (2010): “the main architectural characteristics are linked to a type of private house that was also focused on port trade... The facades are aligned and of similar dimensions... and along with the canals and the tree-lined embankments they form a very characteristic architec-
tural ensemble and a reference urban landscape.” The attributes from the content analysis to be analysed further in the fieldwork/mapping phase are the ones that define this collective architectural characteristics of the property and include the following attributes: Facades, streetscape composition, stylistic categories, silhouette, building scale, function, typology and roofscape.

Figure 5: Method of mapping building consolidation occurring between 1876 and 2011

Figure 6: Case study indicating a building consolidation that incrementally expand over time
2.3 Fieldwork and mapping

The *Herengracht*, which comprises about one-third of the property and is one of the three main canals covering the full length of the property, was selected as study area. The occurrence of building consolidation and the attributes (facade composition, function and typology) used to understand the effects of building consolidation are further detailed, interpreted and revealed within this defined context (Fig. 2). The identified attributes are revealed within this part of the property (the *Herengracht*) by fieldwork. This included mapping the visual changes to the property since 1770 and as far as data was available and mapping the changes behind the facade, both formally and programatically. This mapping of changes to buildings over time confirmed the occurrence of building consolidation, expected to be a main factor affecting the property by the local authorities. The mapping of building consolidation was then related to the mapping of other architectural attributes in order to study the impact of building consolidations on these attributes. This comparison is structured into three parts: Comparison with 1) Facade composition, 2) Function and 3) Typology.

Building consolidation is analysed by comparing geographical maps at multiple times. This reveals the occurrence of building consolidation, as well as, the general changes to the general building scale and parcellation of the property over time.

The attributes and the changes to these attributes are also mapped over time by using both fieldwork and archival research. Facades are analysed by comparing architectural drawings and photograpical evidence over time (Fig. 4). Function is analysed by comparing archival data from multiple times and typology is analysed through a field survey of the current facades and an analysis of current aerial photos.

In addition, the analysis was conducted on three different scales (Fig. 3): a) The individual architectural unit: specifying the qualities assigned per building; b) Building block: a graphical representation per street segment and c) The *Herengracht* as study area showing the overview data and positioning the data on within the complete study area. The analysis mediates between the three scales in order to connect individual qualities of attributes to their collective value and broader scale data.

As the study area only covers a part of the Amsterdam canal district, the *Herengracht*, further research is needed to present overall conclusions on the property. However, there is uniformity across the urban areas of the property thus isolating the study area is not expected to compromise the research or the reliability of the results.

3 RESULTS

The results presented evidence the increasing occurrence of building consolidation (3.1) and the effect of building consolidation on three selected attributes within the property: Facade composition (3.2; 3.3), function (3.4; 3.5) and typology (3.6).

3.1 Building consolidation

The analysis of building consolidation compares data (Fig. 5) from the 1876 municipal atlas (Loman, 1876) with similar and current data from the municipality of Amsterdam (2011). The results of this comparison indicate a high percentage of building consolidation between the two time periods and an average increase in building scale. The amount of individual buildings in the study area decreased from 610 buildings in 1876 to 452 buildings covering the same area in 2011. This means that 26% of the original individual buildings were consolidated into larger buildings over this time period. The number of individual buildings consolidated into one single building varies between two and nine with an average of 3.23 individual buildings from 1876 per consolidated group in 2011. The occurrence of consolidated buildings is equally spread over the study area (Fig. 2).

In depth studies (Fig. 6) were done on all the consolidated buildings within the Herengracht by including geographical data from six additional dates between 1876 and 2011. It was found in all of these studies that the consolidation of buildings grew incrementally over time with various individual buildings added to a neighbouring consolidated group over time. The con-
solidations grow steadily over time and at this point there are no explicit indications that consolidation was stimulated or discouraged at a certain period of time.

The data does indicate a trend that could be defined as an ‘incremental consolidation process’ within the property. If continued, this trend will affect the OUV of the property further by its influence on parcelling. Further, building consolidation is confirmed as a potential cause for changes to the other attributes such as façade composition, function (mixed use), and typology (Dutch single dwelling). Therefore, as explained in the following text, the changes to these attributes are analysed in the research and related to building consolidations.

3.2 Façade composition

The building façades of the canal district are of great importance to the visual character of the property, their typical scale and dimension create a uniform visual character within the property while the variety of styles reflect the rich history of the canal district.

The analysis of façades compared architectural data between 1770 and 2011 and compared the number of individual façades found in both times, thus determining the average change in the scale of the façades in the study area. The amount of individual façades decreased from 582 in 1770 to 529 in 2011, a general decrease of 9%. This decrease in amount of individual façades occur where a single, larger scale façade replace multiple smaller individual façades.

In depth studies were done that included data from additional dates between 1770 and 2011, it was found that data from 1943 onwards show no changes to the scale of the façades (Fig. 4) which means that the changes previously noted between 1770 and 2011 all occurred before 1943, since then the general scale of façades remained unchanged.

3.3 Façade composition and building consolidation

A comparison between building scale and façade scale reveals that all occurrences of scale increase of building façades correspond to building consolidation behind the façades. However, the opposite does not apply; not all building consolidation behind the façades causes a scale increase on the façade itself. To clarify: When the 9% decrease in the amount of individual façades between 1770 to 2011 is compared to the 26% decrease in the amount of individual buildings behind the façade over an even shorter amount of time (1876 to 2011), a clear discrepancy between the change of scale to the façade and the change of scale to buildings behind the façade becomes visible. This becomes even clearer when results from only 1943 until 2011 are compared. As previously stated, the amount of individual façades has remained unchanged since at least 1943, yet building consolidation behind the facade continued. Thus, since the second half of the 20th century building consolidations behind the façades did not cause major changes to the scale of façades.

3.4 Function

The balance of residential and commercial functions in the canal district has always been important and relates back to the development of the gabled house as “a type of building used both as a dwelling and for the family’s commercial operations” (ICOMOS, 2010). The mapping of building function provides a basic overview of changes to the multi-functionality of buildings between 1958 and 2011. This analysis (figure 7) indicates whether a single building contains a residential function (A), a commercial function (C) or both (A+C). When comparing data between 1958 and 2011 it was found that the percentage of mixed function buildings (A+C) within the total amount of buildings was 56% in the 1958 and in 2011 the mixed function buildings make up only 22% of the total amount of buildings. This data illustrates that the amount of multifunctional buildings decreased and that there is a general trend towards mono-functionality within individual buildings.
Figure 7: Mapping of functions

Figure 8: Explanatory image of the method behind the mapping of typology
3.5 Function and building consolidation

The results of mapping functions revealed a decrease in the amount of buildings that contain mixed functions (both residential and commercial). This trend can be related to the changes of building scale to investigate the relationship between building consolidation and monofunctionality within buildings. The functional change between 1958 and 2011 indicate that amongst all buildings within the study area, 54% of buildings that contained a mixed function in 1958 still contain a mixed function in 2011. When the same data is counted only within buildings that were consolidated in the past it is found that 36% of the consolidated buildings that contained a mixed function still contain a mixed function in 2011. Thus the decrease of mixed functions within consolidated buildings is more significant than in buildings that have not been consolidated.

Further, these changes from mixed function to single functions within consolidated buildings can be analysed to indicate how many of the consolidated buildings that became monofunctional changed to only residential functions and how many changed to only commercial functions. It was found that 46% of the changes lead to residential functions and 54% of changes lead to commercial functions. Thus, building consolidation relates almost equally to residential and commercial functions.

3.6 Typology and building consolidation

The “Dutch single dwelling” is a specific building typology that was developed and established in the Amsterdam canal district (ICOMOS, 2010). This typical Dutch single dwelling is defined by Killiam (2006) as a building that has its own facade, its own roof and its own entrance. Following this definition, the effect of building consolidation on typology could be analysed by comparing building scale with facade composition (3.2) and the mapping of two additional themes: roof structure and use of entrances. The combination of these three themes provides the basic set of criteria for the Dutch single dwelling as building typology. The roof structure and use of entrances have only been mapped for the buildings which have been consolidated.

When mapping (Fig. 8) the effect of building consolidation on these typological criteria, the occurrence of consolidated buildings is isolated and related to an analysis of the three typological criteria within the consolidated building: 1) The amount individual facades retained within the consolidated building, 2) The amount of individual entrances retained within the consolidated building, and 3) The amount of individual roof structures retained within the consolidated building.

Thus for example the state of a consolidated building group is tested against the typological criteria (1: entrance, 2: facade, 3: roof), to see whether the consolidated group retained (after consolidation) retains the individual qualities of the original buildings, namely having its own/individual entrance, its own/individual facade and its own/individual roof. Building consolidation could affect none, one, two or all three of the typological criteria.

Of the individual buildings in 1876 that was subsequently involved in a building consolidation, analysis of the 3 criteria in 2011 reveal the following: 18% of buildings lost the quality of having its own/individual entrance after consolidation, 32% of buildings lost the quality of having its own/individual facade after consolidation and 50% of buildings lost the quality of having its own/individual roof after consolidation. If these three criteria are overlapped, a total 82% of all consolidated buildings were affected in terms of at least one of the three criteria. Thus we can conclude that building consolidation, in a high percentage of cases, affected the historic building typology within the canal district. Considering the fact that 32% of the facades was affected (a change indicating a new building) and considering the high percentage of affected roofs (50%), we can conclude that consolidation have caused major structural changes to the buildings of the canal district. As previously indicated (3.2), the mapping of facade composition shows that the facades did not undergo major changes since the 1943 mapping, thus the effect of building consolidation on criteria 2 of typology (individual facade) is not a current trend. However, the evidence shows the effect of building consolidation on the other two typological criteria (individual entrance and individual roof) occurred throughout the second half of the 20th century and the consolidation of buildings is an ongoing concern.
4 CONCLUSION & DISCUSSION

4.1 Summary

The results presented in this paper contribute to a better understanding of the effect of building consolidation by describing the occurrence of it and uncovering the effects that consolidation has on other attributes found within the canal district’s architectural ensemble. The main results show the extent and nature of scale increase due to building consolidation. Moreover, they reveal the relationship between building consolidation other trends such as 1) the transformation of building facades, 2) the trend towards mono-functionality within buildings and 3) the decrease in buildings that correspond to the canal district’s historic building typology.

4.2 Effects on OUV

The Amsterdam canal district was only inscribed on the World Heritage list in 2010. Therefore the research does not attempt a comparison between the inscription date of 2010 and the current state of conservation but rather between the current state of conservation and earlier dates as discussed for each part of the research.

To relate the results of the research back to earlier periods was necessary to explain the effects that building consolidation had and has on the attributes that represent the OUV of the property.

Building consolidation caused dramatic change to the scale of individual buildings and the uniformity of building sizes in the urban ensemble since at least 1876. These changes mark a decrease in the integrity of the original layout of building plots (parcellation), an important feature of Amsterdams’s urban layout.

A decrease of buildings that contain mixed functions indicate a decrease of integrity of the functional composition of buildings. The typical Dutch single dwelling or Amsterdam canal house as building typology is an important attribute of the OUV of the property, the results of the research show that the typological integrity of buildings are affected by building consolidation in multiple ways. The high occurrence of cases where the building typology was affected by changes to the roof structures of buildings also leads to further questions regarding the integrity of the property’s rooftscape and the structural authenticity and integrity of individual buildings.

4.3 Discussion

The trend in the 20th century - that consolidation cause dramatic changes to the buildings on the Herengracht which are often unnoticed from the streets - should be of concern. Attributes are being affected and this tension between façade appearance and underlying attributes could even increase in the future due to the fact that the monument status of buildings within the property protects the façade from dramatic visual changes and the historic facades are valued by investors and property owners. Further, economic and development pressure increasingly demand for dramatic changes to building structures behind the facades and developers seek larger floor areas that lead to a demand for building consolidation and interior reconstruction. Building consolidation, if not executed with respect to the typology of the buildings, threaten the basic historic character of Amsterdam by leading towards modern, larger scale and mono-functional urban buildings. In addition, it may lead to façadism and musealization, both general threats often mentioned in other cases of the heritage management of historic centers (Yang, 2003).

However, this of course does not mean all larger-scale buildings should now be replaced with the original typology. To achieve the goal of protecting and enhancing OUV instead of threatening or damaging it, these pressures for change within the property should be managed by limiting the impact of consolidated buildings and future consolidation on other attributes such as typology. This could be done by locating larger functions within already consolidated buildings. Further, research on the building construction and interior in relation to parceling and typology could help clarifying the impact of consolidation. This could also help Amsterdam authorities to create strategies for its mitigation.

As stated before, building consolidation, as a threat to the significance of the property, is currently under discussion within the Amsterdam municipality; however, so far, it hadn’t been
proven with facts. The fact that policy has to allow for the city to change and evolve means that Amsterdam municipality needs to discern areas of significance from areas where such changes will do no harm to the cultural significance. Thus, to manage OUV, in addition to policy, further research is highly recommended to help uncover the attributes within the property and assess the affecting changes through periodic monitoring. With such information, Amsterdam municipality can, together with the other stakeholders, make informed decisions which will place them closer to achieve the goal of a sustainable balance between World Heritage and development.

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