ARCHITECTURAL INTERVENTIONS FOR SOCIAL SUSTAINABILITY: THE RENOVATION OF MODERN HOUSING

T. Peters¹*

¹ Daniels Faculty of Architecture, Landscape and Design, 230 College Street, Toronto, Canada

*Corresponding author; e-mail: terri.peters@daniels.utoronto.ca

Abstract

Retrofitting existing buildings can offer enormous energy savings, economic advantages, and community benefits contributing to a more sustainable built environment. Many studies have highlighted the implications of economic and environmentally focused renovations but this paper focuses on what social sustainability looks like from an architectural perspective. In particular, the focus is on the spatial and architectural manifestations of social sustainability aspirations. This paper identifies and discusses specific architectural interventions that resulted in inhabitable and tectonic examples of social sustainability. Three strategies are analyzed: selective demolition and re-densification of the building form; the creation of a palette of customizable architectural elements for the façade; and the reconfiguration of interior partitions to facilitate the inclusion of a wider range of residential environments. The examples are of social housing renovations from the 1960s and 1970s recently renovated in a national sustainability program in Denmark. The findings of this paper are relevant in the sustainable transformation of future housing and offer practical and built examples of how architectural interventions can support social sustainability to deliver tangible and inhabitable results.

Keywords:
social sustainability; renovation; social housing; Modernism; Denmark

1 INTRODUCTION: RENOVATION AS A GLOBAL SUSTAINABILITY CHALLENGE

In the context of climate change and reducing reliance on fossil fuels, the sustainable renovation of existing buildings offers the greatest potentials to lower emissions and reduce energy use [1, 2]. Sustainable renovation generally has three broad components: environment, economy, and society. The ‘society’ pillar is least defined, developed, and valued, of the three. The most used definition for sustainability, the so-called Brundtland definition (1987), defines sustainable development in terms of balancing needs and priorities and concepts of social justice [1]. However, it makes no explicit mention of economic budgets or human experience, making it highly abstract and impractical to use as guidance in an actual building project or even as design inspiration. Sustainability is a complex concept, an aggregate of countless human decisions, many of them spatial and architectural that come together in often-conflicting ways in a sustainable building. A growing number of researchers are critical of how energy efficiency has dominated the way that sustainability is measured, calling for a fundamental shift towards more critical, interpretive, participative and pragmatic approaches that encourage a wider range of site-
specific responses[3]. This paper focuses on what social sustainability looks like from an architectural perspective. This paper identifies and discusses three architectural moments of social sustainability in renovations, brings them to the forefront as built examples of this concept.


Sustainable buildings are ‘culturally specific contingent hybrids’ [4] (p.3), because their meaning and value is relative, depending on the contexts. This paper focuses on examples of sustainable renovations to 1960s and 1970s social housing in Denmark, in particular the prefabricated, concrete social housing located on housing estates currently undergoing renovation. In Denmark, these buildings are seen as a significant part of the social democratic Danish Welfare State [5]; the funding for their renovation and maintenance are guided by the particular complexities of the Danish tenant democratic system [6, 7]; and they are highly valued, subject to renovation rather than demolition [8]. Many popular examples of the housing estates from the 1960s and 1970s exist, and many estates from this time have retained their generous floorplans and well-equipped community facilities, including daycares and recreation facilities [9]. To the Danes, this housing is worth investment in renovation, as it is recognized as an important part of the Danish housing heritage [10].

These housing estates have already undergone significant renovations. In the 1990s, renewal of these buildings involved surficial colour or material treatment and these were unsuccessful and needed to be re-renovated soon after. These repair-focused renovations were poorly conceptualized, the scope of works was not sufficient, and the workmanship and quality of ideas were low [11]. Learning from this expensive and ineffective program of renovation, since 2008 the focus has been on social sustainability to holistically improve the experience of this housing [12-15].

The local political and economic contexts have informed the renovations. The strong political tenant democratic system in Denmark is structured so that each social housing estate is managed by a housing association and all tenants have significant input into decisions about the housing [7]. In 1970 the Housing Provision Act established that tenants should run their estates themselves through democratically elected tenant boards [6]. This means that currently, to undertake a renovation a tenant board must typically apply for funding and also raise rent payable by the tenants. The largest source of funding for this kind of renovation comes from the National Building Fund, Landsbyggefonden (LBF), who will finance the renovation of about 100,000 homes between 2012-2016 [16]. The LBF is an independent organization that manages joint capital and public subsidies for the physical and social benefit of social housing areas. Social housing clients can apply for financial support in larger renovations by submitting a masterplan of repair [2].

The focus has been on social sustainability to holistically improve the experience of this housing [12-15].

3 THREE ARCHITECTURAL STRATEGIES FOR SOCIAL SUSTAINABILITY

Currently, many socially-focused issues of sustainable design are being effectively examined from outside of architecture, in particular in the fields of environmental psychology, sociology, geography, public policy, and political science. These have resulted in new concepts, policies and guidelines but few practical examples of how social sustainability can be manifested spatially and architecturally.

Social sustainability has been defined in relation to architecture as “a process for creating sustainable, successful places that promote well-being, by understanding what people need from the places they live and work. Social sustainability combines design of the physical realm with design of the social world – infrastructure to support social and cultural life, social amenities, systems for citizen engagement and
The examples outlined below offer spatial experiences and environments that are designed to enhance people's experiences and wellbeing. The main strategies are: selective demolition and densification to create hierarchy and variety; customizable facades using a designed palette of components to promote resident engagement and investment; and fostering community connectivity through a mix of programs and uses.

3.1 Selective Demolition and Densification: Himmerland Housing Estate Creates Hierarchy and Variety

Fig. 1: Himmerland Estate, Aalborg Denmark. Left: The prefabricated concrete social housing was built in 1977. Right: The housing was extensively renovated to Energy Class 2020 standards 2009-2016 by CF Møller. Photos courtesy: CF Møller

Himmerland Housing Estate was built in 1977 as ‘crane track housing’ meaning that it was prefabricated, designed and built for ease of construction. Typical of housing of this time, it had poor insulation, thermal bridging, and high energy costs. It also had a poor reputation in the community and difficulty attracting diverse tenants. It was radically renovated between 2009-2016 by CF Møller with the aim of improving the social sustainability of the estate. A secondary but important goal was energy efficiency, and this renovation achieved Energy Class 2020 thanks largely to the new high performance facades which are ambitious for a renovation of this kind [19]. Three main architectural interventions can be identified as productively contributing to improved social sustainability in this example. First, hierarchy and variation have been introduced through the selective demolition and replacement of the facades and interiors to create fewer but larger dwellings. Second, the building form has been densified, with new prefabricated penthouse apartments added to the buildings. These additions offer apartments over two stories, a significantly more desirable living arrangement compared to the typical one story apartments in the original design. Third, the interventions extend beyond the building envelope, the physical access to the housing has been redesigned and improved with new open staircases and individual exterior front doors to access the top level apartments, rather than one main door for the building.

The introduction of interior and exterior variation was designed to help attract new tenants. Families and more affluent tenants will be attracted to the larger apartments and more choices of dwelling sizes create more flexibility in resident groups. The choice of façade renovation materials, in particular the timber and metal cladding promote feelings of small scale and intimacy, making the housing reminiscent of a Danish summer house, rather than a standardized social housing estate. The visible staircases and removal of the original white walls that obscured the building entrances offers a chance to see neighbours and have spontaneous meetings on the estate. The main renovation approaches of selective demolition and densification have improved the social and environmental performance of the estate.
3.2 Customizable Facades Using a Designed Palette of Components to Promote Resident Engagement and Investment: The Urban U2 Renovation at Urbanplanen

Fig. 2: The Urban U2 renovation of Urbanplanen Estate in Copenhagen, Denmark tested an extreme approach to resident engagement by allowing tenants to choose their facades from a designed palette of size and colour options. Photos: Terri Peters

Urbanplanen was built in 1971 as one of the largest social housing estates in Denmark. 33 buildings were renovated 2007-2010 in the “Urban U2” renovation by JJW Architects. When the buildings were constructed there were purposefully no ‘better’ apartments. No units had more light or more amenities than any others. The exterior materials were intentionally machined-looking and undetailed. It was considered a virtue that the democratic intentions of the housing matched the standardized, unified, expression. However, these conceptual social experiments had never before been carried out at such a large scale and there were many problems [11, 20]. JJW was appointed the renovation architect with the brief of improving the social environment and engaging with tenants. The ambitions for environmental performance were low, and the buildings were required to meet the minimum requirements only.

The most significant architectural intervention that is linked to improved social sustainability is the customizable facades. The tenants were actively consulted in the design process, with workshops and mockups explaining the renovation and allowing them to contribute their personal opinions for how the building should look and perform. A radical and untested approach to socially focused regeneration was undertaken: tenants could choose their own facade from a palette of balcony sizes and colours. Residents could select a new extruded balcony, a French balcony, the enclosed existing balcony, or they could choose no changes. There was an associated cost payable either as an increase in rent or as a lump sum. As a result, the façade expression and the building performance are uneven as tenants opted in or out of the various renovations. The tenants’ short-term financial situation dictated the appearance of the building and the quality of the interiors [17]. Similarly tenants could elect to have new kitchens and bathrooms. The tenants, despite not owning their apartments, were able to greatly impact the design of the renovations. The tenants were able to engage actively in the design process and feel a sense of ownership in the renovation.
3.3 Expanding the Brief To Other Living Environments To Offer a Mix of Uses: Transforming Varbergparken Estate

Fig. 3: Varbergparken Estate was built as a series of nearly identical housing blocks in the 1970s and three have been reconfigured as an assisted living facility and Dementia care center. This provides jobs and increased community integration with the surrounding town. Floorplan: CF Møller, Photo: Terri Peters

The Varbergparken Estate in Haderslev Denmark was built between 1970-1980 and is undergoing comprehensive renovation by architects C.F. Møller according to an area masterplan. There are 15 buildings in total and they are being renovated one by one, with new facades, windows, rooflights, lifts, staircases, common areas and new landscaping around the buildings. The architects wanted to add a mix of uses in the estate, to create local jobs, new amenities and help connect the community to the estate [17](p.109).

In a radical renovation strategy, three blocks were partially demolished and rebuilt with as an assisted living facility. The buildings had new, highly performing façades. The renovation improved the environmental building performance greatly improving the overall investment for the housing association. The interiors were reconfigured and converted to an assisted living facility for Dementia patients, a public health center and a municipal service center. The introduction of this mix of uses, even though it is largely still dwellings, increases the diversity of people visiting the estate, added a community amenity and created 300 jobs. The nursing home residents, their carers, and family and visitors, are now regular users of the Estate and its outdoor parking and garden spaces, offering diversity and increased activity. The renovation extends beyond the building itself, with new balconies overlooking new textured and varied outdoor gardens, courtyards and open areas designed for a range of activity levels. This example is significant because it shows that it is possible to transform this kind of prefabricated low cost housing stock into other uses. For example there are few examples of introducing retail or offices into these buildings, but here the nursing home and health center offers a way to add diversity and density to the site with a mix of community focused uses.

4 DISCUSSION AND CONCLUSIONS: RENOVATING FOR SOCIAL SUSTAINABILITY

This paper identified a range of architectural responses to social sustainability in specific built examples. The particular political and economic context of Denmark, and the local conditions on the site were important factors determining the renovation scope and success. In each of the three examples, the architects tried out untested and extreme approaches. These spatial, social and architectural interventions
should be seen as a series of 'moments' of social sustainability that can be learned from as strategies, and that can inspire other renewals, and help inform a new architecturally focused definition of sustainability, rather than prescriptions for future building renovations.

The strategy of selective demolition and densification illustrated by the renewal of Himmerland Housing Estate successfully promoted social sustainability through creating hierarchy and variety in the building forms. The interventions offered increased functionality, for example the added density of the penthouse additions at Himmerland also offered dwellings over two levels, and increased daylight into the apartments. These desirable features will likely make people want to move in or stay in the Estate.

The experiment of presenting a palette of designed façade components and encouraging residents to participate in selection successfully promoted resident engagement and investment in the example of Urban U2 renovation at Urbanplanen. In this case, there were significant trade offs with social and environmental sustainability because some residents opted not to get better performing facades. The increased resident engagement may have contributed to an improved sense of community but it was not formally measured, and but the general social and architectural qualities at Urbanplanen are mixed [17](p.138). From a building performance perspective, the experiment of allowing tenants to choose the façade components and interior upgrading of their dwelling, means that the housing is unevenly renovated and it could be costly and difficult to renovate in the future. Additionally, the approach of letting residents design their buildings could have had a negative architectural outcome, but in this case due to the skillful design of the palette of options by the architects, the appearance is varied and interesting.

In the case of Varbergparken, the transformation of the housing into a mix of use with assisted living and other community services offered important social, economic and environmental benefits. The masterplan for the whole estate is very ambitious in that there is a different renovation strategy for each of the blocks with a partial demolition and densification similar to Himmerland planned for the next phase. The staged nature of the renovations on the site means that there is feedback about what works and what needs improvement, and residents see the progress.

In each of the examples, extended the sustainability strategy beyond the building envelope to impact the access to the site and the common areas strengthened the interventions. Given the costly and disruptive nature of renovations of housing, future work should keep in mind the next renovations, and try to anticipate changing needs. While the above three strategies illustrated through examples are not conclusive, they indicate that approaches identified here, selective demolition and densification, designing customizable palettes of components and extending programs to include a mix of uses, can lead to more socially sustainable renovations.

5 ACKNOWLEDGMENTS
This paper is based on some findings from the author’s PhD which was carried out at Aarhus Architecture School in Denmark from 2009-2015.

6 REFERENCES