

The 3-Dimensional Proposal Sustainable for the Hillside City, Seongnam

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Abstract

The original part of Seongnam City is the first planned city of Korea improvised for renewal of Seoul in southeast of the capital and metropolis, but the fact that a city plan with a 2-d view was applied to the hillside of Seongnam betided many vertically-severed non-continuous planes. Such planes were failed to be used sufficiently, and have expanded as derelict since 1990s when large-scale apartment block began to be developed. Recently urban decline has emerged in the city such as unsold apartments due to decline in population and economic depression around the world. With the limitations of large-scale renewal, the paradigms of urban regeneration were changed, and “sustainability” implies the changes. Urban regeneration contains sustainability, regardless of measures, that can be classified into three domains—sociocultural, economic, and environmental sustainability.

Three-dimensional spatial analysis of daily and public life environments of the communities in the existing city is needed to carry forward the plan for the three types of sustainability. Also, the existing problems were identified according to the three types of sustainability. This study analyzed maps based on formation and expansion of street network in the existing city as slopes and identified directions in changing and individual properties of street networks. Then, it presented three routes including daily & public route for respecting contexts of urban fabrics and sustaining communities for residents, continuous land route for economic development of the hillside area, and eco-friendly route for securing paths of the sunlight, the wind, and the water. In particular, the non-continuous planes as the basic factor in the continuous land route have been abandoned and have severed the contexts of urban fabrics with the retaining walls created by flattening the hill-

sides, however in this study, the planes were identified as an opportunity of securing architectural space with possibility of accepting demands of welfare for the residents and as a main medium in planning housing regeneration with the three types of sustainability such as sustainable development in the city and mutual communication space.

Therefore, this study classified the contexts of urban fabrics with the analysis of the existing street network, comprehensively presenting three-dimensional basic plans of architecture and city consisting of daily & public route, continuous land route, and eco-friendly route for housing regeneration and revitalization of public street network for new Seongnam City in 2020.

Keywords: 3-dimensional proposal, Hillside city, Non-continuous planes, Original part of Seongnam City, Sustainability

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1. Introduction

So far, the original part of Seongnam City have shown improvement in physical environment of some deteriorated residential areas, reformation in deteriorated dwellings, and securing number of houses through city maintenance. However, large-scale development such as apartments caused severance in the existing urban fabrics and excluded humanistic and social considerations for the residents, resulting in dissolution of communities and mass migration of residents. The purpose of this study is to identify not the large-scale redevelopment by onetime removal but the gradual redevelopment of slow recovery, namely sustainability, in which humanities and social sciences and architectural urban engineering are converged.

Studies of Socio-cultural sustainability for daily life and public life space of residents began with analysis and balanced relocation of resident statistics and the location and distribution of the original daily sphere and street network. Social sustainability has been excessively sought in the former APT development, but there has been a problem of equity related to sharing of profits from development. Thus, it is needed to take more consideration of tenants who are mostly the residents. As for environmental sustainability as a main problem of the original city, it is needed to identify principles and methods of density redistribution and regeneration of the existing residential space with appropriately inserting open space to the residential areas having no open space except for streets only. In this context, the existing problems were divided into three domains, and the urban context was classified and identified on the basis of street network to provide proper solutions. The results were presented as the three basic directions for sustainable urban regeneration.

2. Current State of the Original Part of Seongnam City

2.1. Discontinuity in urban contexts: problems of sociocultural sustainability

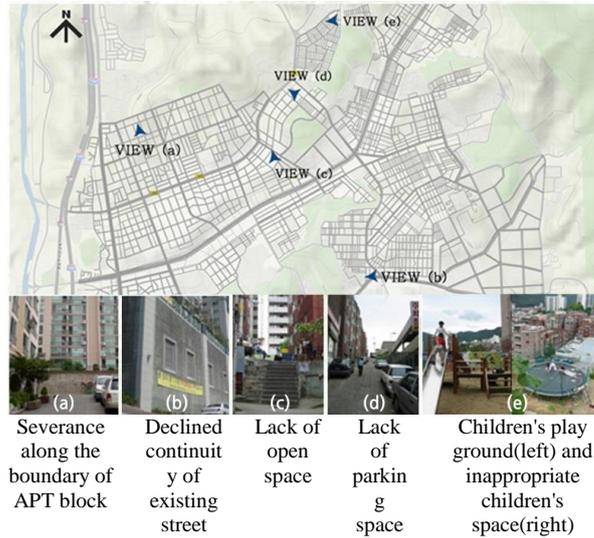


Fig. 1 Severance due to development of large scale apartment block

Fig. 2 Declined residential service due to lack of infrastructure

Large-scale development of apartment complexes produced closed residential complexes severed from the existing urban fabrics in the original part of the city. Large scale complexes present living facilities and certain external space, forming open space within the complexes by developing high-rise, high density buildings and minimizing building-to-land ratio. However, mass migration by the development and exclusive space plans cause severance from the existing urban fabrics and then make it hard to be connected with the

existing communities.

Therefore, the recent renewal method of deteriorated residential area turns from the entire demolition of the rebuilding and redevelopment into gradual, small-scale regeneration of the area, indicating that the residence is not any more a subject of investment and awareness of residential right are on the increase. (Fig. 1, 2)

2.2. Weakened recognition of residential sphere: problems of economic sustainability

The nodes in WSNs are usually powered by batteries, but the batteries are not Local community cannot be separated from residential place and should be approached from a comprehensive view in which physical and social conditions of the relevant area. However, many large-scale APT redevelopment in the city expelled many tenants mostly the residents, consequently not to share any profits from it. This problems should not be overlooked and should be resolved in many ways.

2.3. Lack of green area and infra: problems of environmental sustainability

Because the original part of the city has no public space except for the roads, it is urgently needed to improve residential infrastructure such as increase in frontage ratio, securing parking lots, and formation of public facilities through reducing residential density.

Thus, for residential organization of initial lots for sale with the lowest independence of regeneration, small parks and parking lots with appropriate scales and density should be relocated within the area. As mentioned above, three types of sustainability should be improved in order to enhance daily and public communication in the city. Also, an approach from dailies of the city can be used to research space via the internal view on individual residents and to present measures of urban residence regeneration combined with humanities & sociology in order to improve residential area and enhance.

3. Concepts of Three Routes for Urban Regeneration Plan

3.1. Daily & public life route: sociocultural sustainability

The original part of Seongnam City conserve the urban fabrics in the initial lots for sale and later development lots, and based on such lots, self-sustainable life sphere added by common commercial area are formed sufficiently within the residential area. Given that self-sustainable life sphere can be formed according to distribution of neighborhood life facilities and daily life facility, land use district were classified into common residential zone, semi-residential zone, and commercial zone to identify properties of individual life sphere. In particular, neighborhood life facilities are considered a basic factor in analyzing life sphere and life streets.

The life streets within the residential zone based on land use are distributed of necessary business and other amenities, in addition of residential functions.

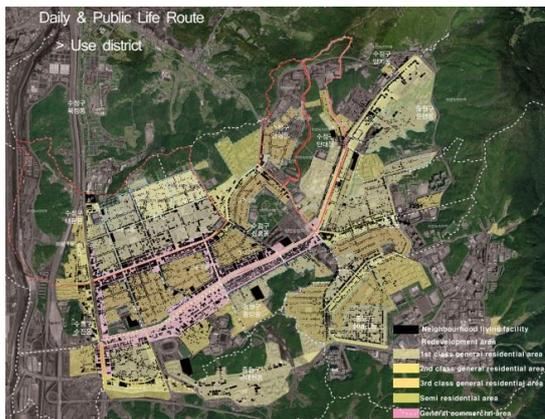


Fig. 3 Daily & Public Life Route
in general residential area could be identified. (Fig. 3, Ref. 6)

Gradual urban regeneration may be essential in the future, a regeneration that is maintained on the basis of urban life streets and the existing urban fabrics. It is needed to analyze and identify locations and properties of the life streets that

With such physical situations, the distribution of neighborhood life facilities and common facilities within the general residential area closely affected the lives of the residents; in particular, the neighborhood life facilities were mutually related to each other within the residential area and played a important role in containing various resident activities. In this context, location and range of the life streets within the life sphere formed in

have been maintained for 40 years in order for them to be sustained and utilized as the basic organization and structure in street network for new generations in the original part of the city with gradual development of residential area. As a proposal for maintaining and activating life streets, the underground of existing elementary school playground will be used as maintaining continuity of commercial district and expanding insufficient parking lots of the life streets. (Fig. 4)

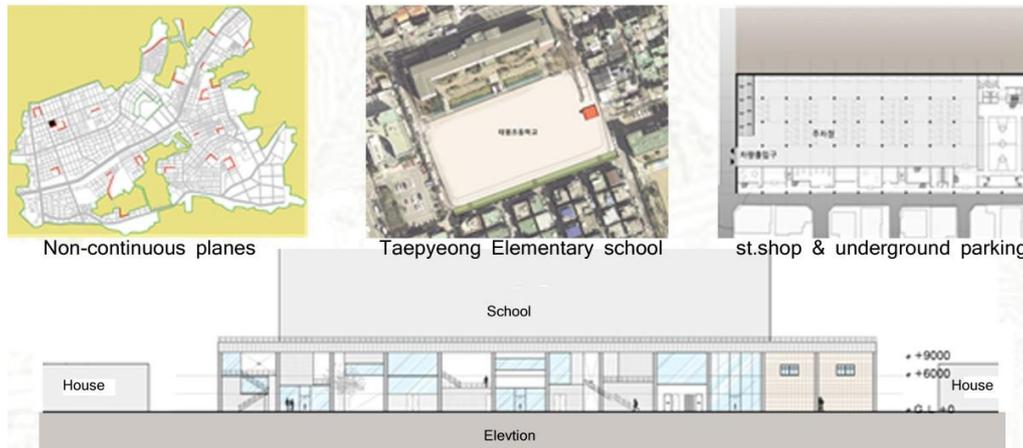


Fig. 4 Proposal for Taepyeong Elementary school

3.2. Continuous land route: economic sustainability

3.2.1. Concepts and use of non-continuous planes

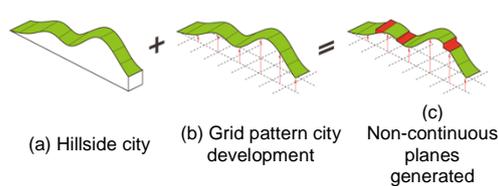


Fig. 5 Concept diagram of generated non-continuous planes

The severed planes that were formed from 2-dimensional urban development without consideration of the geological factor of hillside artificially changed the inherent topography of the city and severed the spatial continuity and context flow of the city. Also, the retaining wall planes with high bumps declined the

quality of urban landscape. Such features of Seongnam are different from those of general roads in suburb of the existing city; the vertical planes within a city should not be retaining walls severing urban continuity but be architectural space integrating and connecting neighborhoods. In this study defined the vertical planes in urban areas as “non-continuous planes,” presenting future plans of its architectural utility. (Fig. 5, Ref. 5)

With newly interpreting the non-continuous planes on the hillside, the sloped topography can be used for accepting complicated functions such as residence, business, education, culture, and welfare in the congested residential areas in order to directly improve the residential environments and to recover urban fabrics by activating communities within the residential areas starting from the small-unit view. (Fig. 6, 7)

3.2.2. Pursuit for genuine economic interests

As it is needed to cut and fill the land to make flat planes to build structures on a hillside area, certain damage on the topography is inevitable. The degree of damage is proportional to size of the building on the slope. Building a detached house causes less damage in topography and does not require high retaining walls, but building collective housing such as high-rise apartments on a hillside area causes greater damage in topography due to excessive cutting and filling and requires higher retaining walls. A large-scale development of residential complexes on a hillside is led to high-rise buildings in order to secure better economic profits from the development, and thus the topography and green areas of the hillside are greatly damaged and the retaining walls get higher, resulting in desolation of urban landscape and increase in risks of the residents.

Therefore, it is needed that housing density on a hillside area should be decreased and instead, Transit – Oriented - Development with sufficient infra-structure should be carried out as the special –planning districts with incentives of higher economic interests.

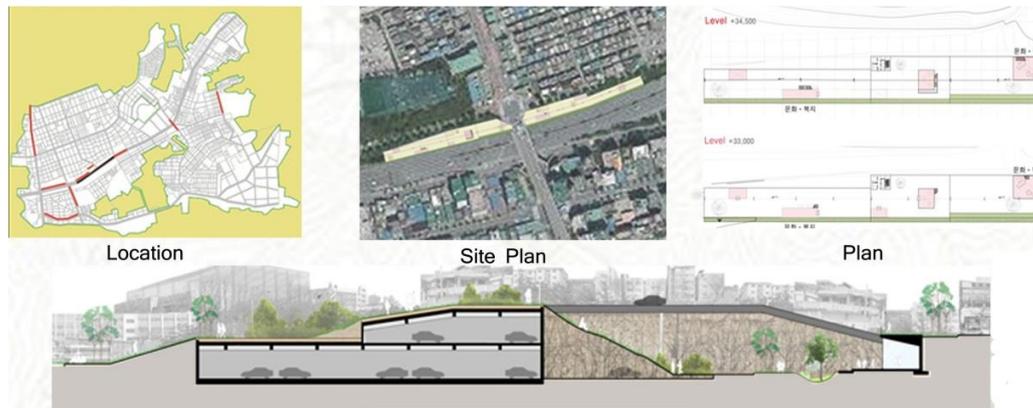


Fig. 6 Proposal for Joongyang Street underground parking & welfare facility with roof park

3.3. Eco-friendly route: environmental sustainability

The residential areas of the original part of Seongnam with small lot size are densely populated and have one of the highest residential density. Also, the area lacks of public infrastructure such as streets and parking lots are insufficient, urgently needing green areas and open space. Moreover, the existing green areas and open spaces within the original part of Seongnam City are distributed with unbalance. Thus, changes in the view of urban planning on schools and their locations are needed firstly in order to secure safety, convenience, and pleasantness of residents' lives and to promote social mutual exchanges among the residents.

Reduction in the number of elementary school students will lead to the merge of existing schools, and the excessive school buildings should be remodeled to be public facilities for the neighborhood or welfare facilities for the senior and the young children. The open spaces produced from relocation of the school buildings may be used to connect the green areas within the city and those surrounding the

city to induce that the green network of the entire city are organically connected and activated at an eco-friendly level. (Fig. 8, 9)



Fig. 7 Continuous Land Route

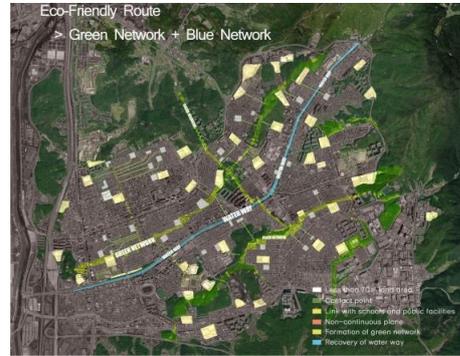


Fig. 8 Eco-Friendly Route



Fig. 9 Proposal for Public park HeeMang with public facilities

4. Conclusion - Urban Regeneration – New Seongnam / Urban Void 2020



Fig. 10 Urban Regeneration - New Seongnam / Urban Void 2020

Large-scale APT development focusing on economic interests inevitably ignore values of existing settlement and lean on providing space only for functional life. However, as mentioned above, when the original part of the city is regeneration to promote not only for physical environment but for innate values as social environment formed on the basis of accumulation of residents' lives, the urban fabrics of the original part of Seongnam City will be developed organically and the urban hillside areas with impro-

ved residential environment will be developed with variety. Thus, it should be considered of not an approach by uniform, macroscopic plans but measures and designs with microscopic, detailed solutions in which the existing order on the original part of the city is respected. This study classified the problems of the original part of the city into three domains of sustainability, and in order to present measures to solve the problems with sustainability, the contexts of the urban fabrics were classified on the basis of analysis of street network to present three-dimensional basic plans of architecture and urban consisting of daily & public route, continuous land route, and eco-friendly route for residential regeneration and recovery of public street network environment for new Seongnam City in 2020. (Fig. 10)

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