CHEONGGYECHEON RESTORATION AND DOWNTOWN REVITALIZATION

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Abstract

The Cheonggye stream restoration work is to remove the roads covering the stream and the elevated highway with four lanes of the total length of 5.84km, then to restore the urban stream, Cheonggye, which used to flow through the central part of downtown Seoul from west to east until mid 1970's. Until now, no concerned traffic crisis was broken out, and the conflict with Cheonggyecheon merchants was settled. With this project, Seoul city aims at drastic change in its urban paradigm from development to sustainability. Therefore, this project is beyond a simple restoration work, rather can be a litmus test to see if Seoul can turn into a globally competitive world city.

Keywords: Cheonggyecheon, highway removal, stream restoration, sustainability, paradigm change, world city.

1. Introduction

The Cheonggyecheon restoration work started on July 1st 2003. The restoration work consists of three major steps: dismantling Cheonggye elevated expressway, uncovering the road over the river and the actual restoration work. Cheonggyecheon is a stream which used to run through the central part of downtown Seoul from west to east until mid 1970's (see blue part in the middle of northern part of Han river in Figure 1). The total length is 8.14km and the restored section is 5.84km long.

Cheonggyecheon was originally a brook, and then developed into a stream with 14 waterways by King Taejong in 1412 at the beginning of the Joseon Dynasty. The covering of Cheonggyecheon started in 1958 and was done in 1978. The water was very dirty and unmanaged because the stream was considered as a large-scale sewage system. The government had neither money nor engineering skills to manage the stream in 1950's right after the Korean war. Along the stream, many refugees from the North Korea built temporary shanty houses and discarded their night soil and discharged contaminated water directly to the stream. Over the covered Cheonggyecheon, 5.84km long Cheonggye elevated highway was constructed during 1967-1976. It had been a symbol of Korean development era for many years.

There are several reasons to restore Cheonggyecheon in Seoul. First, there were safety problems on the plate and piers of the covered structures and highway. To fix the problems, it was estimated 100 billion won is needed, and in addition the highway should be closed at least for 3 years. In addition, the improvement of downtown resident's quality of life and accomplishment of balanced regional development in Seoul, are among the reasons of restoration.

The removal of expressway was completed within two month and the rest of the stream restoration work was completed on Sept. 30, 2005. When the restoration was done, there left only the 13.5 meter-wide road at each side of the Cheonggyecheon which consists of two lanes for vehicular traffic, sidewalks and riverside walks (see Figure 2).

As its restoration work started, no concerned traffic crisis was broken out, and the conflict with Cheonggyecheon merchants was settled for the most part after Seoul city decided to arrange an alternative site for their new businesses. Main reason why all the eyes home and abroad fixate on this project is that Seoul city is geared toward a drastic change of its policy paradigm from development to sustainability with its inception. Therefore, this project is beyond a simple restoration work, rather can be a litmus test to see if Seoul can turn into a globally competitive world city.

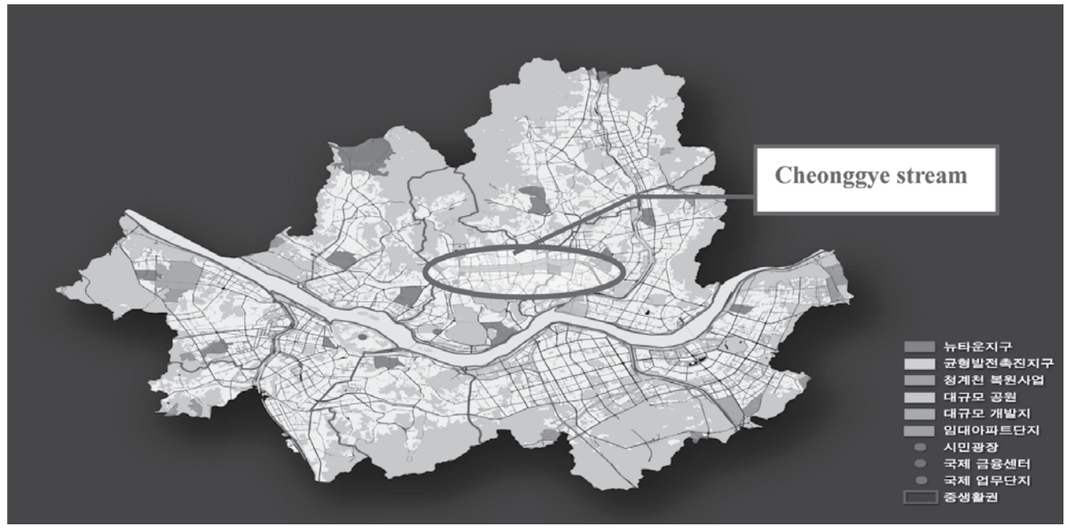

Figure 1: The Location of Cheonggyecheon

Figure 2: Before and After the Cheonggyecheon Restoration

The purpose of this paper is to introduce basic directions and key elements of Cheonggyecheon restoration project. It is organized as follows: Chapter 2 discusses the Cheonggyecheon environment and urban problems surrounding it. Chapter 3 introduces the main contents of its master plan. Chapter 4 proposes the basic directions and revitalization plan of the downtown area. Chapter 5 presents monitoring results, and the study concludes in chapter 6.

2. In and Around Cheonggyecheon (SDI, 2003C)

Along with the rapid urbanization of the City of Seoul and the Seoul Metropolitan Area (SMA), the population in Seoul and SMA area also had grown quickly over the last 20 years. In 2002, about 10 million people were living in Seoul City and an additional 12 million people were living outside the city of Seoul in the SMA area. This was approximately a half of the total population of South Korea. Cheonggyecheon is located at the core of downtown Seoul where as of 2000, 49,510 people lived, and whose population share was decreased by 66% for the last 20 years.

Before the restoration work started, Cheonggyecheon was covered by 6km long and 50-80m wide covered road, and upon it does the 5.86km long and 16m wide of Cheonggye elevated highway exist. More than 168 thousand cars a day were running on them, and 62.5% of them were through-traffics. According to a study, however, serious repair works should be launched quickly to fix critical defects of these structures. It was for this reason that the Cheonggyecheon restoration project started to be realistically discussed.

Neighboring area near Cheonggyecheon is about 688.5 acres with 22blocks. Urban structure of the neighboring area consists of three categorized areas: a traditional district featuring

small lots and narrow streets, a grid-type district rearranged through subdivision, and a large lot district adjusted through redevelopment. In the case of building height, 75% of total buildings in the area have less than four stories. As 53% of structures over the whole area are made of wood or brick and also decrepit, they are very vulnerable to fire (see Figure 3)

Figure 3: Typical street near Cheonggyecheon

Total five subway lines are operating in 27.8 km, and more than 20 subway stations are located in this area. Due to a relatively unpleasant environment caused by the elevated highway, the floor area ratio (FAR) in the downtown is merely 270%, especially 150% in northern/southern blocks along the Cheonggyecheon. As of 1997, roads in the central area were 357km long and small ones less than 12m wide accounted for 72%. In 15 out of total 41 roads, the level of service (LOS) is F, indicating a severe traffic condition in the area. 18 bus service routes are available in the area, but the average boarding/alighting passengers per bus per bus-stop was only one person. Illegal on-street parking was a common practice. In spite of the large volume of pedestrians, there were lack of pedestrian crossings, resulting in hampering the continuity of walking on streets. Also various obstacles and many motor cycle traffics on sidewalks cause inconvenience to pedestrians.

To make things worse, the air pollution along Cheonggye street was very serious. In particular, the emissions of criteria pollutants except fine particle (PM10) were above the average of Seoul, and the level of nitrogen oxide exceeded the environmental air quality standard of Seoul. The noise level also surpassed the roadside noise standards for commercial areas, which became a major hindrance to pleasant living and business environment in the downtown. And the level of benzene, one of carcinogenic Volatile Organic Compound (VOC), is high. As a reflection of these facts, the health awareness survey conducted for those who live or work near Cheonggyecheon revealed that the residents were more than twice as likely to suffer from respiratory diseases (SDI, 2003A).

For the last 10 years, the population in the downtown has decreased by 66%. As of 2000, the number of businesses in the central area decreased to 77,000, which was 24.1% point decline since 1991. The number of business along Cheonggyecheon was only 38,145 which accounted for only 2.8% of Seoul's, and only 8% of urban industrial activities were related to financial and business industries. Cheonggyecheon area was excessively full of small-scale traditional manufacturing industries and short of knowledge-based industries.

3. Stream Restoration Plan (SDI, 2003D)

Cheonggyecheon restoration project started in 2003.7.1 and finished in 2005.9.30. We could shorten the construction period almost the half than expected, as the construction progressed simultaneously in 3 relatively evenly divided sections.

3-1. Sections of Cheonggyecheon to be Restored

The restoration project extents almost 6km. Some deep ecologists argued that the restoration should start from the upper reaches of Cheonggyecheon. However, due to traffic problems and costs, it was decided to consider the inclusion of the original water source in a long term basis. Instead, pipes are to be installed between Cheonggyecheon and its origins to provide the clean water in the future.

3-2. Demolition of Structures

The demolition work started on July 1, 2003, and the Cheonggye elevated highway was completely dismantled on October 5, 2003. The demolition of structures covering the stream began on August 18, 2003 and was completely dismantled by December 30, 2004. In order to reduce noise and dust during the work, the city used diamond wire saws and wheel saws. A total 680,000 tons of waste was generated during the demolition work. Of these, 100% of the scrap iron and steel was recycled and 95% of the waste concrete and asphalt was recycled.

3-3. Stream Design

The Cheonggyecheon was designed to be restored as an urban natural stream, and as a human and environment friendly space with waterfronts and sidewalks along the banks. The flood management was placed the top priority in designing the stream. To respond to increasing incidence of floods and heavy volume of torrential showers during summer, the city built embankments that can withstand 200 year level extreme flood. Also, the minimum number of bridges were planned in order to transmit maximum amount of water, and some covering road structures were reserved to further the amount of water flow during the heavy rain season. Terraces and lower-level sidewalks was built along the upper and lower reaches of the stream for a water-friendly environment.

3-4. Water Supply and Management

Cheonggycheon is an intermittent stream which requires additional water provision to maintain the design guideline of water depth, a maximum 40cm depth of water throughout a year. The water amount needed was estimated more than 120,000 tons a day. The water is pumped from the three sources, Han river, underground water, and water treated at the Jungnang Sewage Treatment Plant. Water from the Han River will be used until the expansion of the Jungnang sewage treatment system is completed. The waters are discharged from four locations. Targeted level of water quality is the 2nd class, BOD 3mg/l. The sewer system is designed to transmit a total of 1.95 million tons a day, three times of the maximum sewage generated from the Cheonggyecheon area.

3-5. Roads and bridges

Both sides of the stream is wide as much as at least 13.5m to accommodate one-way two-lane roads, sidewalks and loading/unloading space for business. The restored stream can be accessible at 17 locations. Concerning the traffic plan, the left turn was limited to its least and U-turn is allowed only at three designated locations to protect the environment from car emissions. Five pedestrian bridges and 17 bridges for motorists was built across Cheonggyecheon.

3-6. Restoration of historical relics

The restoration of Gwanggyo bridge from the underground, one of the main relics, gives challenges, because its original form has been severely damaged, and the location is at the center of the important traffic intersection. It was very difficult to restore it in its original location because of traffic problems. Therefore, experts on cultural properties decided the bridge be moved to the upstream without traffic problems. Relocating another old stone bridge called Supyo bridge to where it was originally placed needs to redesign the stream due to the discrepancy between the length of the bridge and the width of the stream. As for the Ogansu bridge, it was considered to have a slim chance to restore its original form, although its existence was confirmed. Restoration of all the old bridges will be determined based on the results of the detailed index survey on relic restoration.

3-7. Construction management

In order to reduce public inconveniences during the construction, various measures was suggested: to set up screen to unharm commercial activities during the construction period, and to keep operating loading/unloading parking spaces along Cheonggye street. One drastic measure to respond to street parking shortages during the construction and to erupting street-vendors' complaints doing their businesses along Cheonggye street was to close down the Dongdaemun Soccer Stadium located near the Cheonggyecheon and to reshuffle it into temporary parking lots and business ground for street-vendors.

4. Downtown revitalization plan (SDI, 2005)

4-1. Downtown management framework

For the last several decades, Seoul city exerted its efforts to develop Gangnam area (the southern part of Seoul). As a result, the Gangnam area has emerged as a prospering new downtown, while the old CBD located in the Gangbuk (the northern of Seoul) became dull. Some argue that environmentally unfriendly structures like the Cheonggye elevated highway served as obstacles to the development of the downtown in Gangbuk. Now that the obstacles was removed through the restoration of Chenggyecheon, the Gangbuk area should be revived into an eco-friendly downtown.

Along with the restoration, the old downtown will be regenerated as a historical and cultural center, a business and commercial center, and a center of tourism and shopping. The revitalization plan intents two goals, one is the preservation of history and environment, and the other is the pursuit of sustainable development. The sustainable development means harmonizing area's history and waterside eco-friendly environment with redevelopment. To achieve these goals, the downtown revitalization plan designated types of target areas, one for strategic development, the other for conservation, and then adjust height, development density, and the floor area ratio to these schemes.

To facilitate the development process, the downtown is managed by dividing it into four parts: "Strategic Redevelopment District", "Preservation District", "Self-Rehabilitation District" and "Comprehensive revitalization District." To have a better landscape, it is necessary to place a building height cap. For some areas, the current limitation of 60 meters was strengthened, while the height limit was relieved in the redevelopment region based on incentive system. In other words, a building can be built higher if a certain portion of its land is donated for public uses such as pedestrian space, road, and park.

Floor space ratio in downtown is an important barometer to measure the balance between development and conservation. According to the Compact City theory, intensive downtown development with good accessibility to public transport is the most environmentally sustainable. Considering the current downtown capacity and the expected increase in demand for offices and housing, it is considered possible to maintain the present level of floor space ratio at 600 percent. Controls and incentives regarding the ratio are very significant, since it serves as a means to secure the profitability of redevelopment projects.

4-2. Restoring history and culture

In efforts to restore the history of the downtown, the following restoration works will be conducted: to restore Seoul castle walls, to beautify historic streets, to create longitudinal and circular green axis inside the four historical gates, and to preserve modern cultural legacy. To restore culture, it is needed to implement strategies to utilize the cultural assets abundant in the urban center as tourism resources. One of them is designating 7" cultural belts. Along with the introduction of the cultural belts, special routes have been drawn up for walking, sightseeing and shopping. Four courses are available for tourists to walk (see Figure 4).

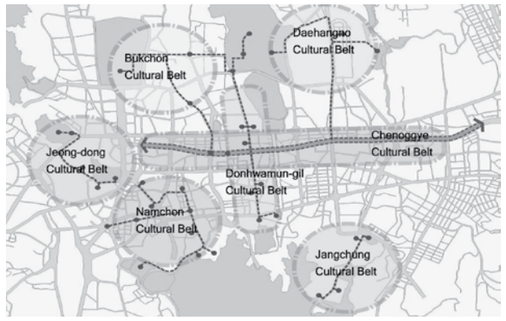

Figure 4: Cultural belt and pedestrian tour routes

A new plan that aims to digitalize the stream is on the way, too. It will add more contents into the Cheonggyecheon to create a more attractive stream that is filled with cultural fun and activities. By next year, visitors will be able to hear about the history of Cheonggye stream and the local area by using personal digital assistant, and information on shopping and performances will also be played through the system. Also, wireless internet will be available and a digital media wall with a stock market ticker will be installed to mark Korean status as one of the most economically-developed country.

4-3. Strengthening residential development

Currently the urban center is hollowing out seriously, so it is necessary to strengthen the residential function of downtown for its revitalization. To this end, several suggestions were considered such as downtown village improvement, traditional house district conservation, and high-quality modern residences. For example, high-quality residential area can be introduced through the redevelopment for midrise/lowrise housings in the downtown. Downtown village improvement plan will be conducted in the area within 500m of 25 elementary schools. For saving traditional housings, the city offers various supports to residents who are willing to preserve their houses voluntarily.

One of the most important purposes of Cheonggye Stream restoration is to revive aging and economically sagging Gangbuk area. To solve the problem of regional disparity problem especially in their living environment of Gangbuk, Seoul proposed several efforts under the name of Revitalization Gangbuk. Among several innovative schemes, Newtown in town project is a key one. The contents of this project are two-fold, one is to improve residential living conditions, and the other is to develop local core area where commercial activities and offices are lively.

The Newtown project primarily targets underdeveloped or undeveloped areas with concentration of dilapidated building and urban districts that were previously developed in a disorderly manner. To solve the problems, it focuses on stronger role of the public sector, including increased financial investment. In general, projects pursued by the private sector emphasized only on providing housing without sufficient consideration on the supporting infrastructure, often resulting in a short supply of green spaces and pedestrian access routes. It has as its goal the comprehensive redevelopment of existing neighborhoods into fully functioning urban 'living complexes' equipped with every imaginable facility. It intended to create community where people of different social strata and generations live together in harmony. There are three types of Newtowns; residential towns, local center towns, and new local towns. The basic principles behind Newtown development are : environmentally-friendly development and renovation, mixed use, and urban renewal. In 2002, three pilot new towns were selected, and 12 more towns were designated in 2003. The Seoul Metropolitan Government plans to add ten more to the list, and to complete 25 Newtowns by 2012.

4-4. Revitalizing downtown industries

Urban functions and industrial structure are required to be sophisticated to enhance the status of the downtown in Seoul. In particular, it is urgent to revitalize industries in the Cheonggyecheon area. In addition, industrial competitiveness should be strengthened through the restructuring of various sectors. The pollution emitting industries and the out-fashioned manufacturing industries need to be reshuffled and clustered to make best use of the linkage among them. Also, Seoul city needs to find an alternative place for these industries.

The industrial structure of the urban center needs to be enhanced to sharpen its competitive edge. International business complex consisting of multinational regional headquarters and international financial institutions will be developed at the core of the. Convention facilities and hotels will be added to support these industries. The redevelopment of Sewun shopping district will be a turning point for industry revitalization in the downtown. Under the trust redevelopment plan, land owners of Sewun district will be paid certain amounts from the trust company, and after the trust period being over, they will be given a share in the profits from the redevelopment project.

Cheonggye 6 ga around Dongdaemun market will be a "Total Fashion Industry District" where clothing and accessories are made and sold. And the government will support logistics and distribution facilities. Cheonggye 7 ga and 8 ga will be improved into the downtown industrial complex, where shoes and stationery are produced. On the other hand, Munjeong and Jangji districts in Songpa-gu are appointed as an alternative site for merchants' new businesses.

4-5. Establishing environmentally friendly transport system

It is essential to upgrade transportation system in order to revitalize urban functions. The vehicle-oriented transportation environment should be changed into a human-oriented and eco-friendly one to enhance the competitiveness of the downtown. For that purpose, the city will introduce a new form of mass transit system, and improve pedestrian environment. Moreover, the transportation demand management(TDM) will need to be strengthened to alleviate traffic congestion and air pollution due to excessive auto uses.

Active investment on public transportation is required to improve the accessibility to the urban center. First of all, in the short-term the bus service will be dramatically reformed into a system of trunk and feeder. Also, the city is considering to introduce median bus lane system in the downtown to better manage bus flows accessing the urban center. In addition, new urban rail system serving Incheon Internation airport, and Metropolitan A line(Sinansan line) and B line(Sinbundang line), as well as Gyeongbu KTX(Korean bullet train) will pass through Seoul station in the downtown.

So far, road transportation system has been operated mainly by focusing on vehicle flows. That is why the walking continuity is lost, and then as a result more and more cars are running on streets in the urban center. The most important thing to improve pedestrian environment is to expand pedestrian crossings and to promote sidewalk environment. The main road called Gwangwhamun in Seoul will be reborn as a pedestrian-friendly street as the city reduces traffic lanes and introduces pedestrian mall instead (see Figure 5).

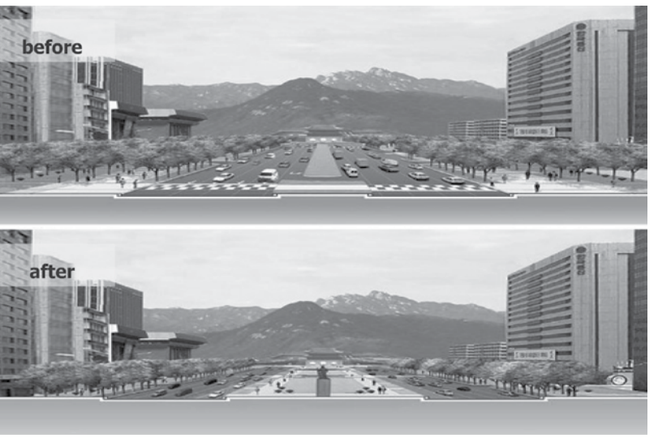

Figure 5: Gwangwhamun Pedestrian mall plan

Along with that, there are also some other things to be concerned for better pedestrian environments such as a signal system considering walking flow, the additional installation of crossings, the expansion of crossing width, and crossroads structure improvement for more crossings.

5. Monitoring Results (SDI, 2006)

The Cheonggyecheon stream restoration work is to remove the roads covering the stream and the elevated highway with the four lanes of the total length of 5.84km, then to restore the urban stream. Until now, no concerned traffic crisis has been broken out as opposed to the expectation from some transportation specialists. There was no significant LOS fall even in the downtown where the construction had been taking place, and only 1.3% of the downtown residents complained worsened traffic. The subway users increased 3.6% overall in Seoul, while the traffic volume plunged to a significant level.

The air quality and temperature in the downtown area have already shown a noticeable sign of improvement. The cool air mass was formed along the stream, which led to 50% of the average wind speed increase compared with last year. The fastest one recorded 3m/sec in the summer of 2005. In addition, beyond the previous temperature estimation of 0.3 – 0.8C fall with the restored stream, a recent study revealed that the temperature recorded 3C degree drop in summer of 2005. Because of reduced traffic, the estimate of economic value of air pollution reduction will reach up to 40 billion won per year in Seoul. The citizen survey shows that each household is willing to pay 103 thousand won per year in a form of compulsory tax to these environmental improvements. This amount adds up to 356.2 billion won per year in the entire Seoul, and approximates the total restoration cost of 390 billion won.

The conflict with Cheonggyecheon merchants was well settled. About 7,000 merchants decided to move to a new business park prepared by the Seoul city, and at least 25% of businesses located around Cheonggyecheon area expressed their plans of either changing their business types or moving to other business sites.

Through this restoration project, the business environment of the Cheonggyecheon area will be greatly improved and its industrial structure will be reorganized, contributing to the booming of the downtown economy. According to a monitoring study on the real estate price changes in the downtown, the land value increased 30% on average, and soared up to 100% especially in the redevelopment site as well as in the inner city "Newtown" site. The rent of commercial buildings increased 5% on average, while the luxury Kangnam area's rent did not agitate at all. When the full-fledged redevelopment comes into action, the direct economic impact of capital investment is expected up to 22 trillion won to its maximum.

6. Conclusion

Since its opening in Oct. 1, 2005, Cheonggyecheon stream invited 100 billion visitors within 50 days. Cheonggyecheon became the most attractive tourist attraction in Seoul as well as in the CBD. It also helped trigger the Gangbuk regeneration project called 'Newtown in town'. Because of massive inflow of visitors, the CBD area has been resurrecting as the center of Seoul again. The businesses are booming and real estate price is skyrocketing, and redevelopment projects are now going on in many sites. Eventually, this restoration project will provide the opportunity that Seoul be transformed into the hub city in the North East Asia and the international finance center, and most importantly help achieve a balanced growth between Northern and Southern part of Seoul.

References

Seoul Development Institute (2003A), Feasibility study and master plan of Cheonggyecheon restoration, midterm report.

Seoul Development Institute (2003B), Forum on Downtown Development With Cheonggyecheon Restoration.

Seoul Development Institute (2003C), Feasibility Study and Master Plan of Cheonggyecheon Restoration, Non-Technical part, Final report.

Seoul Development Institute (2005), Downtown Revitalization according to Cheonggyecheon Restoration in Seoul, Final report.

Seoul Development Institute (2006) Monitoring study of Cheonggyecheon Restoration Project, Final Report.