

An aerial photograph of Seoul, South Korea, showing a dense urban landscape. A green line, representing the Cheonggyecheon river restoration project, winds through the city from the top center towards the bottom right. The text "Cheonggyecheon Restoration In Seoul (Beginning and After)" is overlaid in large, bold, orange letters with a black outline.

Cheonggyecheon Restoration In Seoul (Beginning and After)

May 10-12, 2010

II International Seminar on Revitalization of Rivers

Belo Horizonte Minas Gerais Brazil

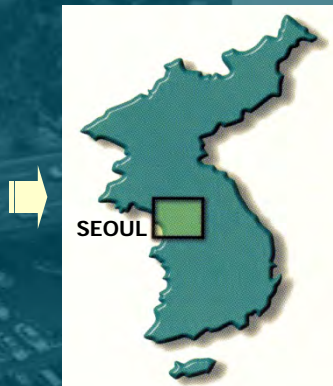
Soo Hong Noh, Professor Yonsei University Korea

Gi Yeon Hwang, Professor Hongik University Korea

Seoul Development Institute

Seoul Foundation for Arts and Culture

Location of Seoul



Seoul, the capital city of Korea, is located in the middle of the Korean Peninsula linking China and Japan'

Seoul center area





Nature & History

- 4 mountains, Cheonggye Stream
- Palaces of Lee Dynasty
- Tourists

Facts About Seoul

With a population of 10 million, Seoul is a world-renowned megalopolis.

It occupies 605 square kilometers or 0.6 % of the nation's territory.

Seoul is the economic heart of Korea, and has been the key driver of Korea's economic growth.

Seoul's GRDP as of 2002 was 128 trillion won, according for 19 % the national GDP.

Basic Statistics

Population	10.3 million	22.2 %
Foreign Residents	102 thousand	1.0 %
Area	605 km ²	0.6 %
GRDP	128 trillion won	18.7 %
Companies	692,616	24.3 %
Parkland	130 km ²	

Urban Sprawl of Seoul Metro Area

1957



1972



1985

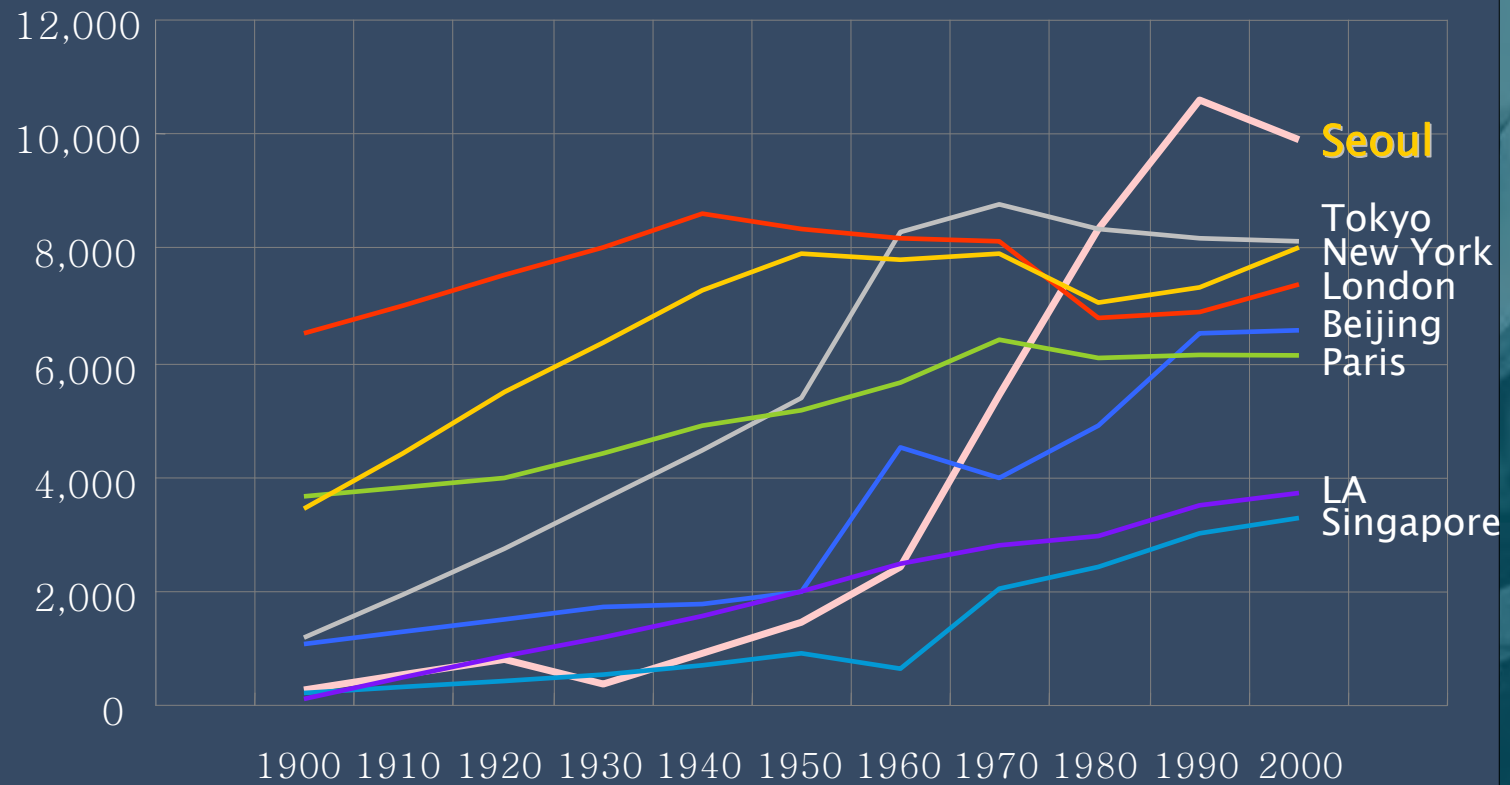


1997



Population Growth

unit:1,000 person



Legacy of Rapid Growth: Urban Problems

Rapid economic growth and development-oriented urban planning caused a number of urban problems in Seoul.

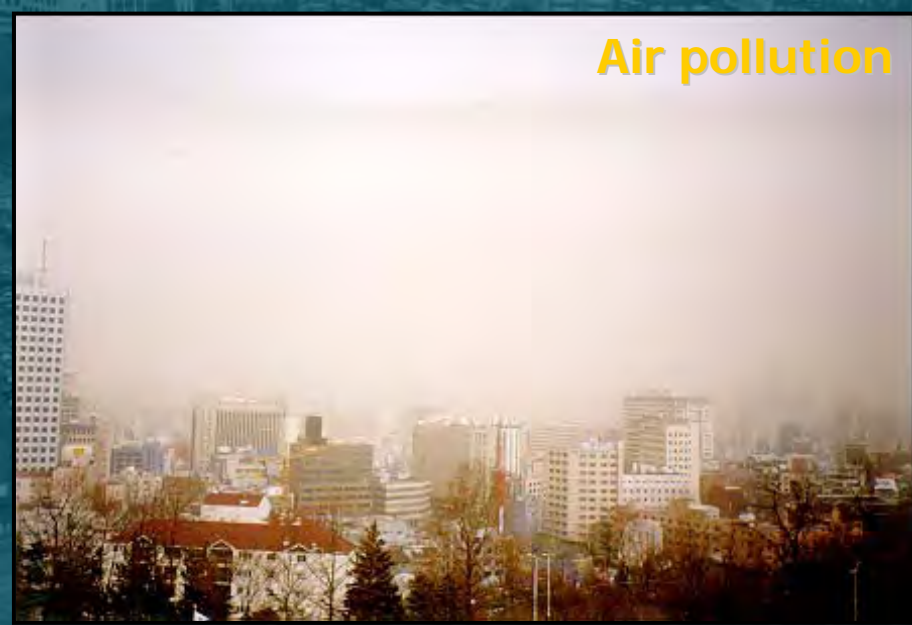
Traffic Congestion

Environmental pollution

Degraded old city area

Spatial Disparity

Air pollution



Traffic Congestion



High-rise & dense development



Degraded cityscape

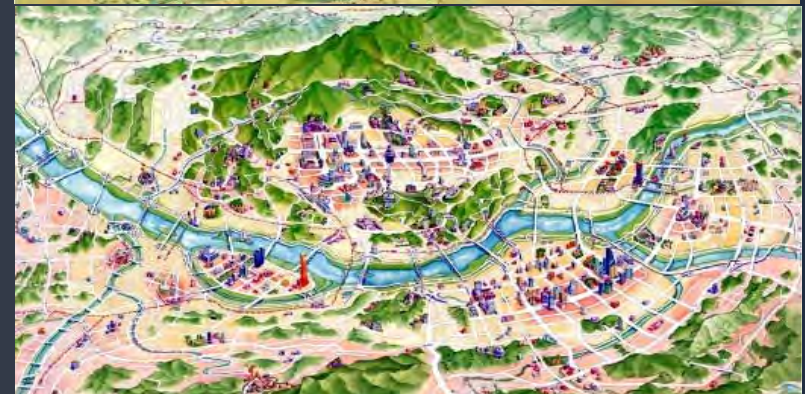


Seoul in the Past & Present

- a very dynamic capital city of 610+ year long history
dating back to the beginning of the ChoSun dynasty in 1394
- heavy demands on the natural environment
in need of sophisticated urban management



2002 World Cup Seoul



Old map of Seoul

CheongGyeCheon (cheon means stream)

The Main Stream into the 610+-year-old Capital city

- opened by the third king, son of the founder of ChoSun dynasty, to cross the heart of busy city, emptying into the Han-river in the form of a natural stream 10.92 km in total length

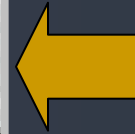


The king used the tomb ornament of his hostile stepmother as bridge stone to lie up-side-down.



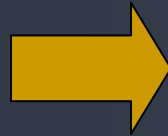


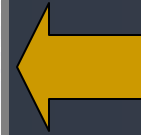
Early 20C



**Place for washing in
Cheonggye Stream**

**Bridge on
Cheonggye
Stream(Ogansu
mun)**

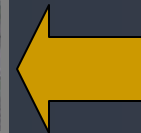
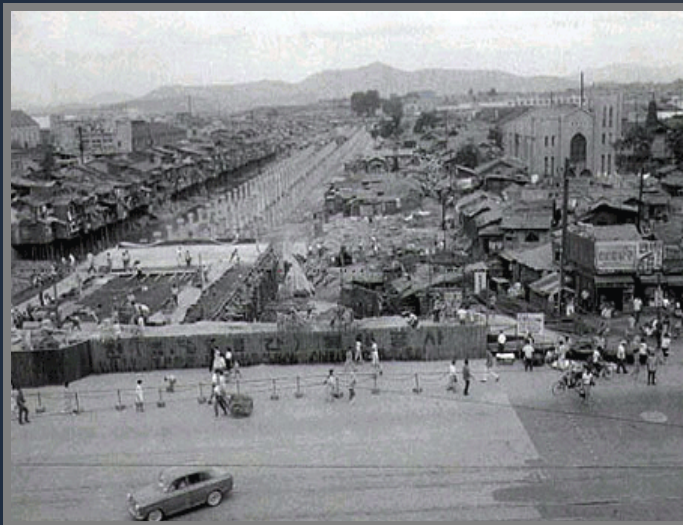




After War: Urban Squatter until 1970's



After the construction of the overpass



Road Building above Cheonggye

Control of CheongGyeCheon

Change of the stream's status

- under the control of different policies of each era

the stream has undergone different states of waterway conditions along with different symbolic status.

	Stream's status	Attitude on the waterway control
1400s ~ 1500s	Natural & artificial stream - opened by King TeaJong in 1406	← Dynasty's & People's interests first
1600s	Stream sustaining the city life - abandoned to natural control	← Scholar's Ideology
1700s	Controlled stream - The Great King YoungCho mobilized 200,000 for 57-day's dredging operation in 1760.	← People's interests first
~1900s	Less-controlled stream - Regularly maintained to keep up with the Great King's standard.	← Following the teaching of the precedent King
~1960s	Unsanitary sewer & slum - Colony government's plan to cover was executed by Korean government in 1958 after the wars.	← Not willing to manage but to cover & hide it
1970s ~ 1980s	Highway for industrialization - entirely covered in 1978, and elevated highway constructed.	← Economic growth first
1900s ~ 2000s	Old market selling-everything - Old market's attraction declined with inclining traffic, population and environment contamination.	← Seeking potential for revitalization

The beginning of restoration

- 1991 Casual conversation between an engineer(Prof. Noh Soo Hong) and a historian(Prof. Lee Hee Duck) of Yonsei university
- 1998 A famous Korean novelist(Pak Kyung Li) and Prof. Kweon Sook Pyo got involved
- 2000 Cheonggyecheon restoration research group was founded by Prof. Noh
- 2002 Became the major election issue for Seoul Mayor
- Mr. Lee Myung Bak who adopted the restoration project won the election and the restoration began



나

제3회 청계천살리기 심포지움

도시하천의 복원과 문화

시: 2002.5.17(금)~18(토) 장소: 토지문화관 주최: 토지문화재단, 한국환경 민간단체 진흥회 후원: 한계령

2002.5.17

제31회 세미나

제3회 청계천살리기 심포지움

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The Objectives

- To restore the cultural and historical heritages of downtown Seoul
- To bring back the ecosystem in the heart of the city
- To initiate a balanced development; old and new city section
- To provide hand-on eco experience to millions of citizens

Details of Restoration

1. Demolition Plan
2. Water Supply Plan
3. River Plan
4. Sewage Improvement
5. Section Plan
6. Bridge Plan
7. Adjacent Roads Plan
8. Landscape Plan
9. Lighting Plan
10. Heritage Restoration

Site Location



※ Plan of Restoring the Upper Stream and the Lower stream of Cheonggyecheon

- Upper stream (Baekwoondongcheon~Junghakcheon) : Restoration planned for long run
- Lower stream (Shindab Bridge~Jungrangcheon) : Launching improvement plan in 2003

1. Demolition Plan

❑ Process of Demolition

• Step 1



• Step 2



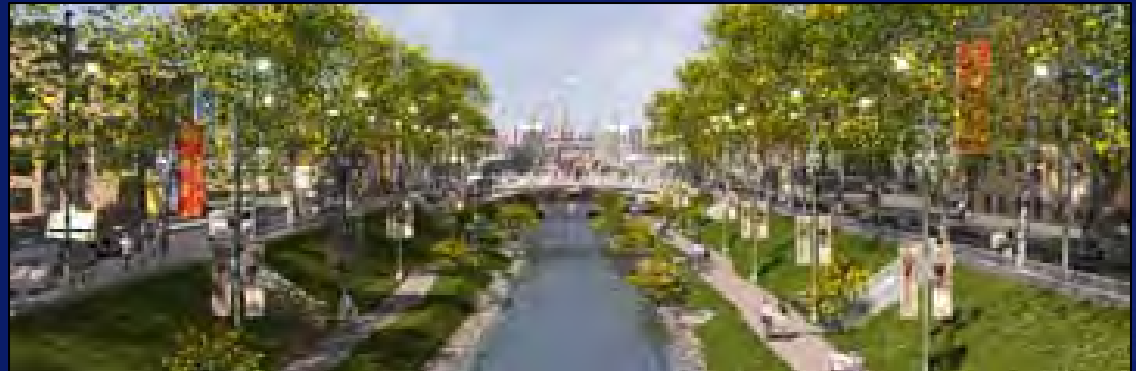
• Step 3



• Step 4



• Step 5



Starting the Work

July.1, 2003



Cheonggye and Samil Elevated Highway
in History

청계천 복원에 따른 도심부 발전계획

Progress of Construction



Before (2004.July)

after (2003. 7 ~ 2003.10)





Upstream



Mid Stream



Cheonggye 4 Ga : 76.70 %

정계천 복원에 따른 도심부 발전계획



Hwang Hak Area : 76.70 %

정계천 복원에 따른 도심부 발전계획

2. Water Supply Plan

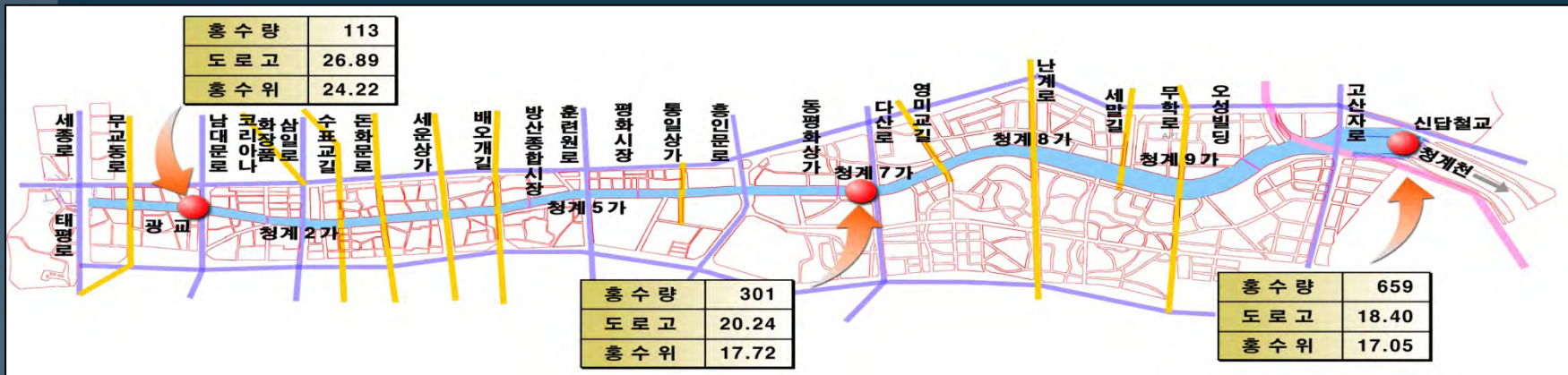


3. River Plan

Design Criteria

- Satisfy with the 2nd grade local river standard
- Secure flood section for 200 years frequency rainfall

Flood Water Level

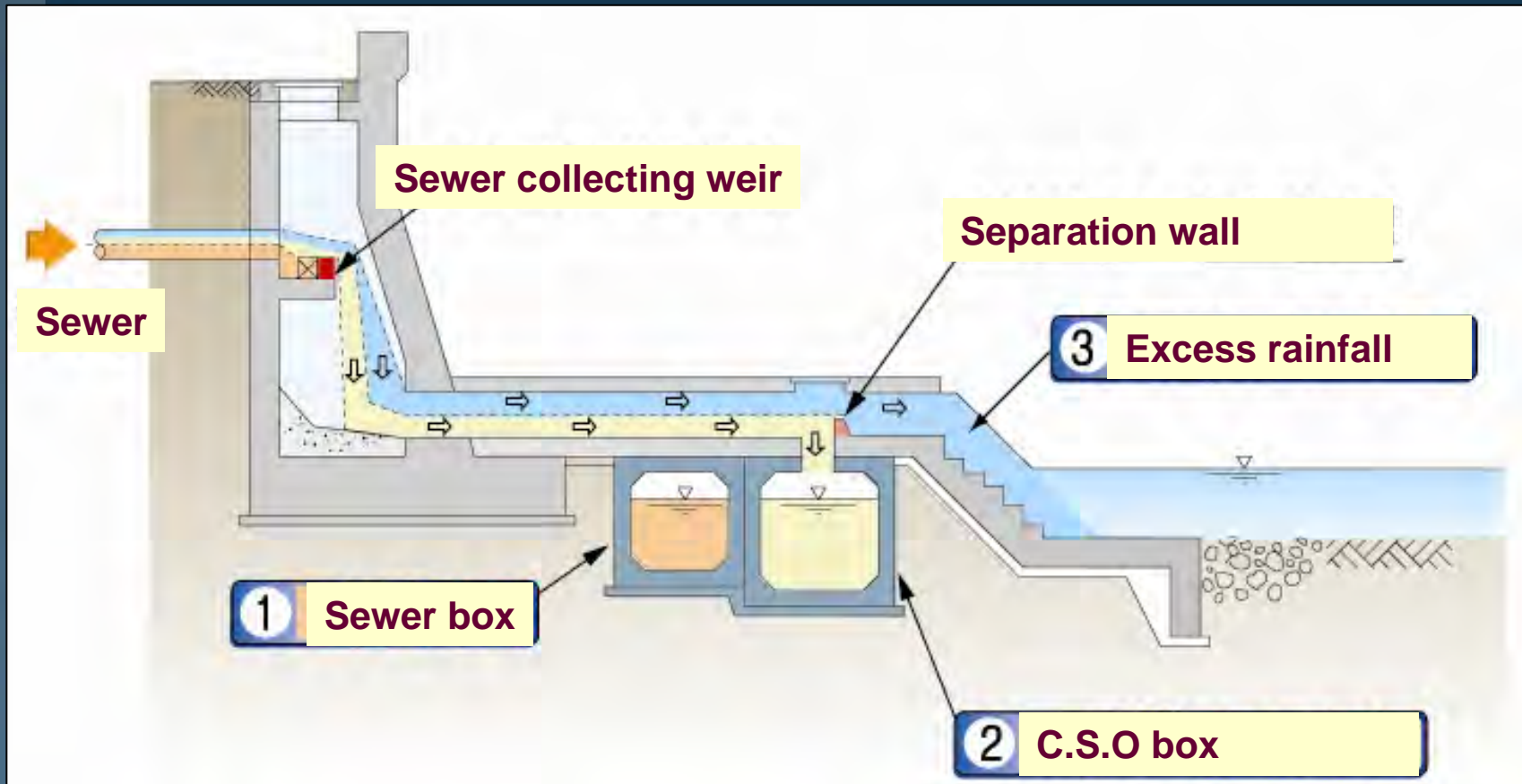


4. Sewage Improvement

❑ Design Criteria

- Combined sewage system for rainfall and waste water
- Capacity : 3 times of planed sewer

❑ Combined Sewer System



4. Sewage Improvement

❑ Design Criteria

- Combined sewage system for rainfall and waste water
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❑ Combined Sewer System



5. Section Plan

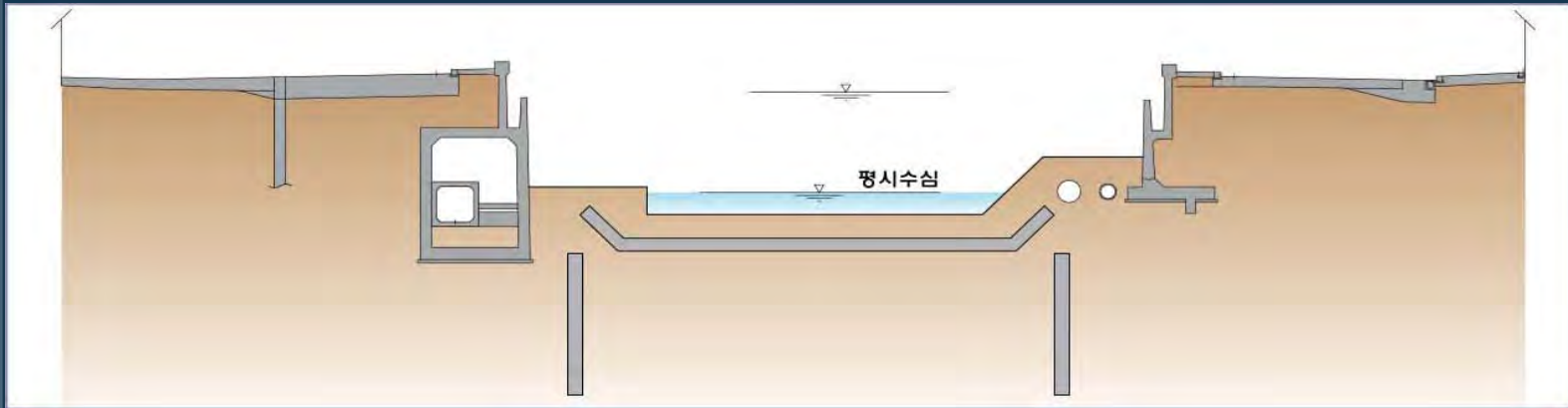
Location



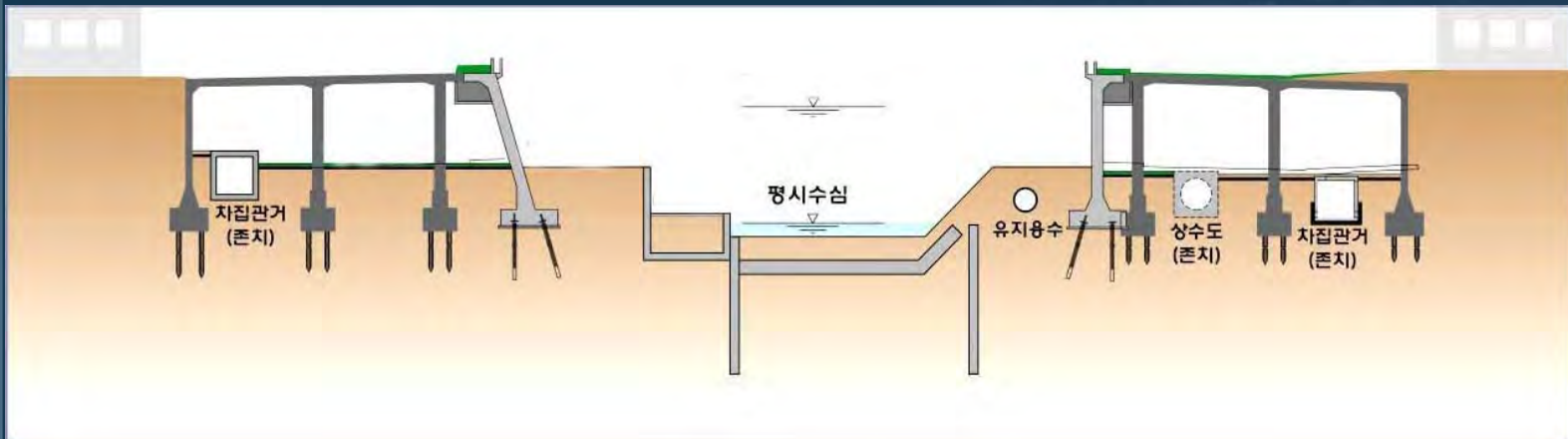
TYPE-1(Beginning Area ~ Moogyo-dong)



5. Section Plan



Beginning~ Samil



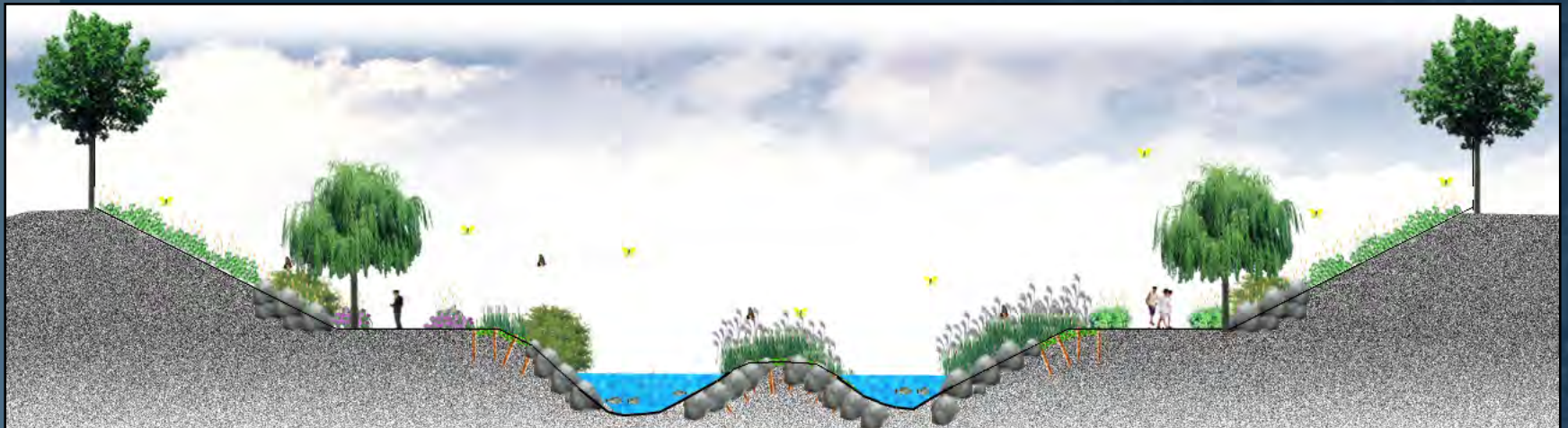
Samil ~ Gosanza
중계선 이전에 따른 도심부 발전계획

5. Section Plan

Location



TYPE-7(Gosanja-ro ~ Finishing Area)



6. Bridge Plan

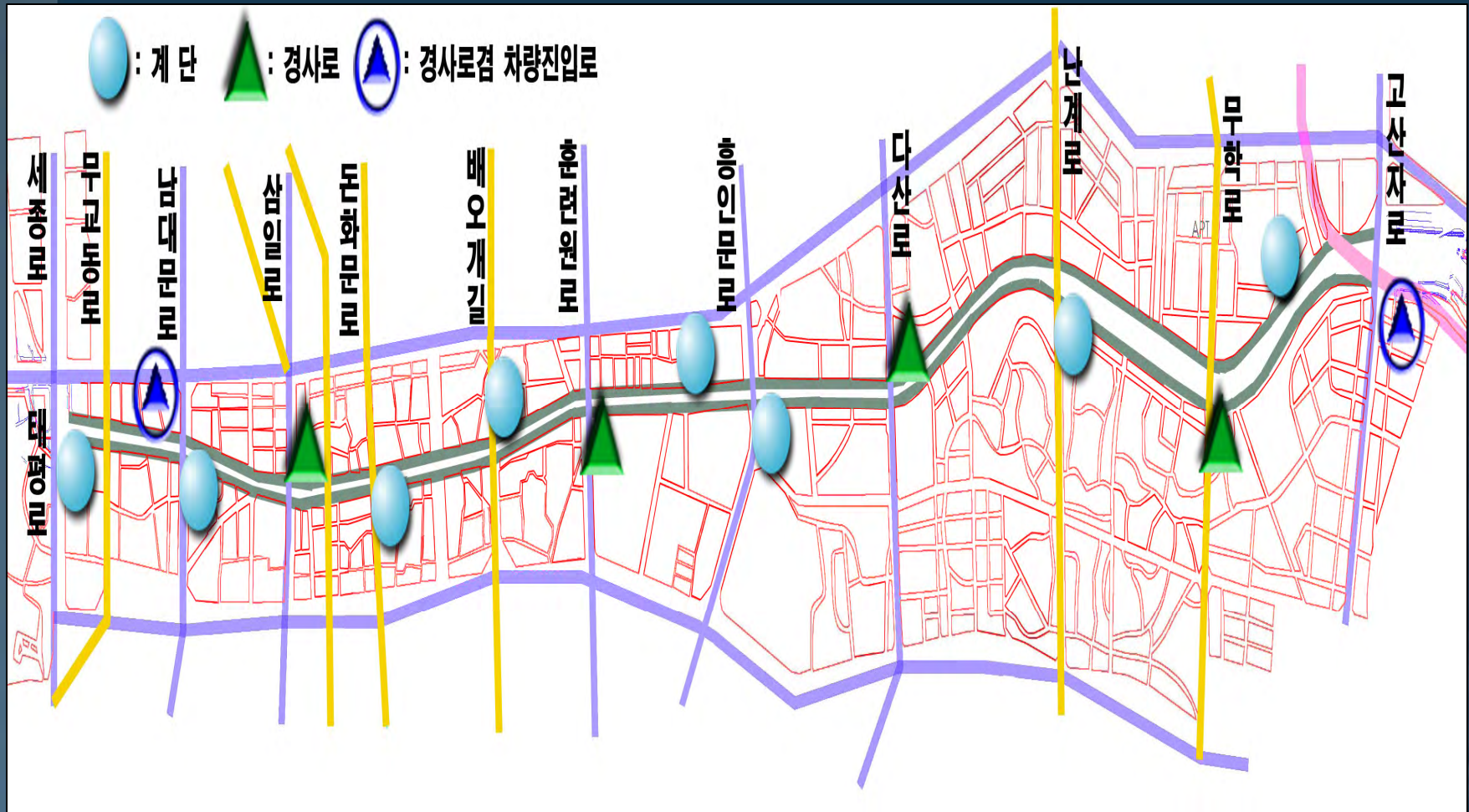
□ Bridge Location

- Historic significance of Seoul and redevelopment concept
- Regional symbol as artistic landmark

□ Bridge Location (22 Bridges)



7. Access Points to Stream

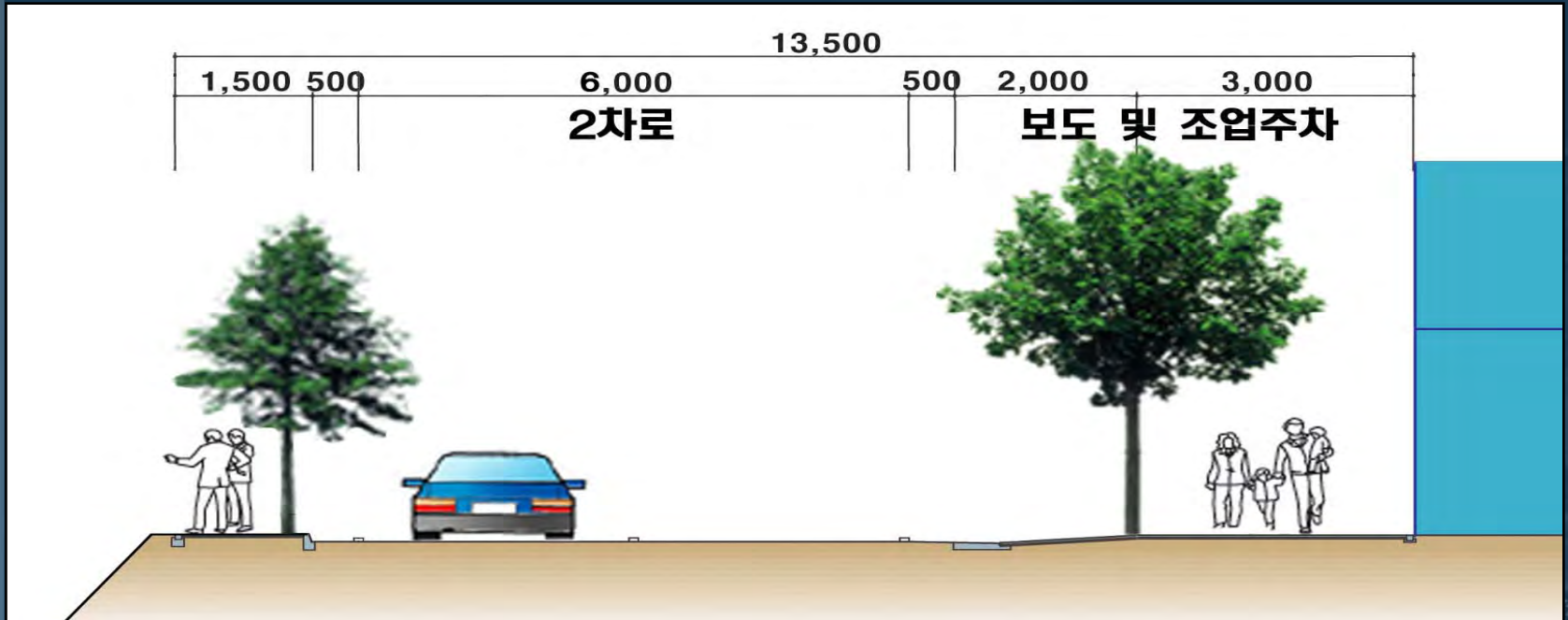


8. Adjacent Embankment Roads Plan

□ Design Criteria

- Allowing 2 lanes per each side of restored riverbank to allow easy access to the stream
- Designate Parking Area for business in crowded areas
- Adhere to road design standard (speed : 60km/hr, R=240m)
- Allow pedestrian convenience for latter development of area

□ Section Plan

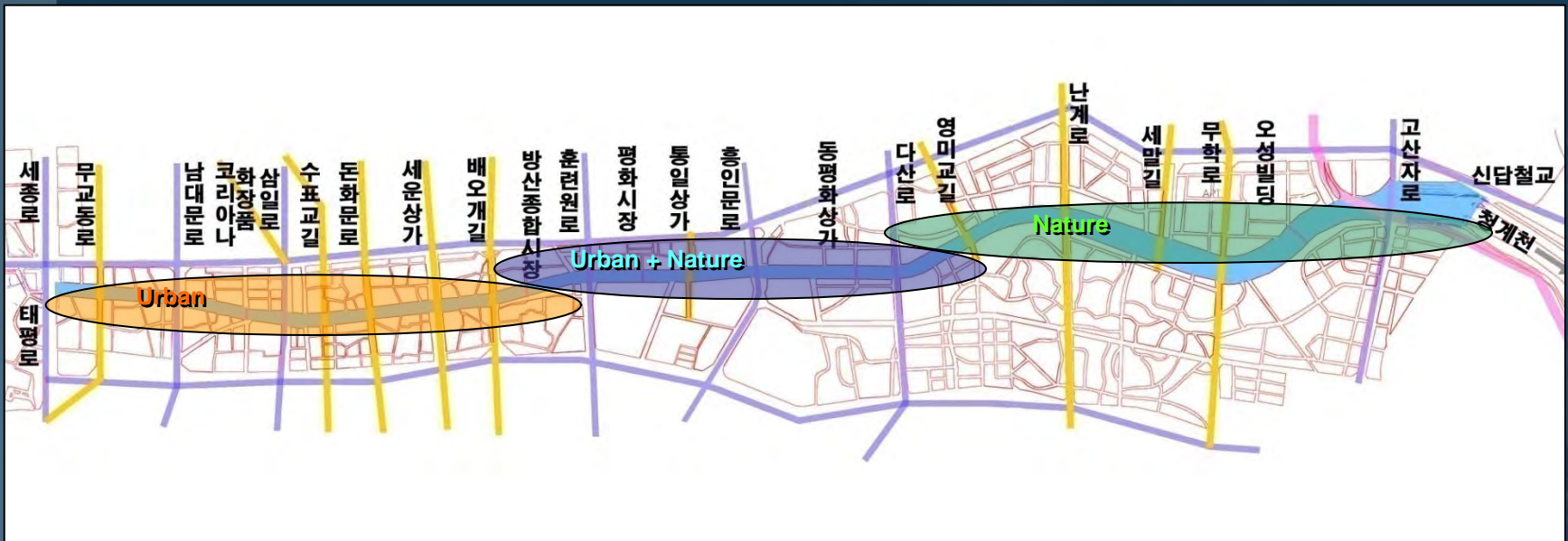


9. Landscape Plan

□ Fundamental Concepts

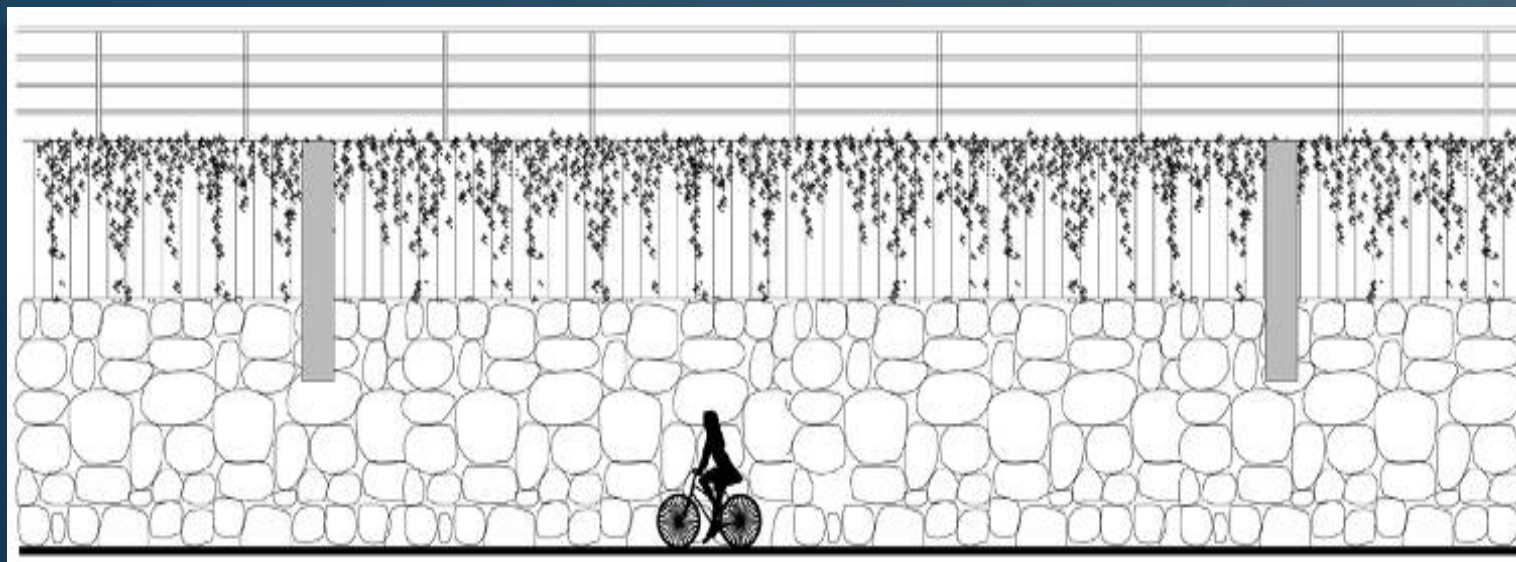
- Gradual transformation from urban landscape to one incorporating nature
 - Section A : Bridge treading, Supyoseok (water gauge)
 - Section B : Ecological area, Rest Area, Deck, Stepping stones
 - Section C : Deck, Larger ecological parkland, Direct interactive with nature

□ Segmentation Diagram





 **Beginning Area Design**



1
1.618



❑ Thematic Places

Traces of the past Cheonggye-cheon



Willow marsh



Stone plate for clothes washing



Resting places



9. Lighting Plan

□ Design Concept

- Select target areas : Start point, Gwang-gyo, Supyo-gyo and Dongdaemun
- Appropriate degree of illumination based on fish and insect life.
- 3-Dimensional consideration
- Implementation of C. I. in pole design for continuity

□ Examples of Lighting Design



○ Water Fire in Providence City



○ The Beginning Area of Restored Cheonggyecheon



9. Lighting Plan

Example of Lighting Design

■ Sungdong-gu Office Area



9. Lighting Plan

Example of Lighting Design

Samil Apartment Area



10. Heritage Restoration

Restored **Gwang Tong Gyo**(廣通橋)



Economic feasibility test: B/C ratio

- **Social cost**

: construction+ congestion + maintenance

- **Social benefit**

**: savings of repair costs + environmental improvement
(willingness to pay)**

- **$B/C = 1.853$**

After CRP

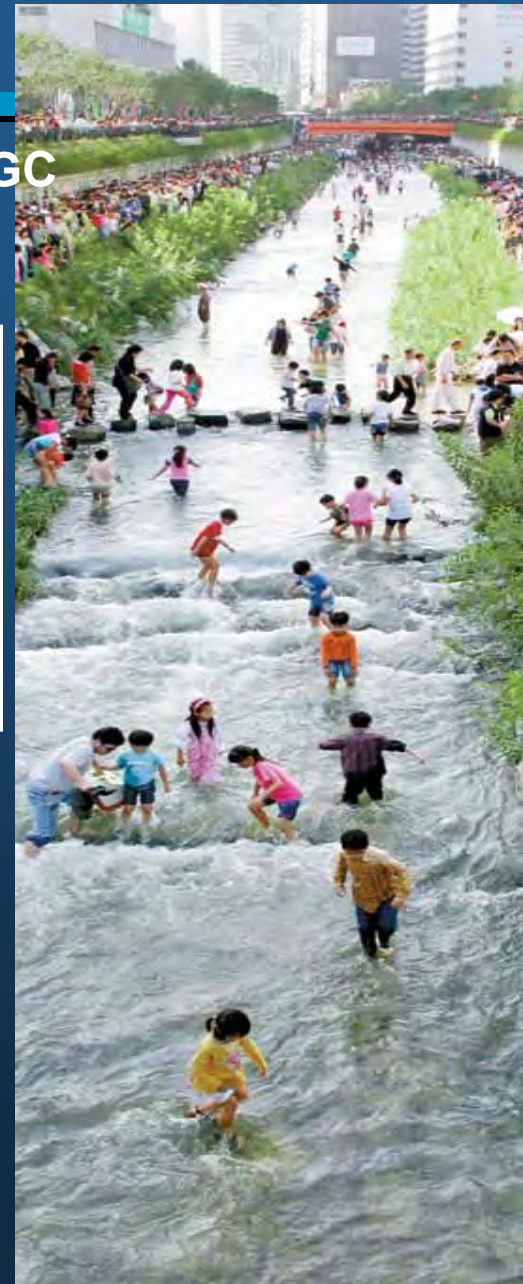


Before CRP



New Attraction for Citizens

-After 3 years of the opening 70 million people visited CGC



Culture along the stream

a) Historically

- CGC was not only geographical but also symbolic boundary in politics, society, and culture, dividing Seoul into the north and south.
- Bridges and the vicinity provided places for the people of lower classes to enjoy diverse cultural entertainment .



Of Lower class, more practical scholars gathered along the stream.



DapKyoNori on SuPyoKyu bridge



The great master, mad painter Jang SungEup drew pictures under the bridges.

Culture along the stream

b) Contemporary

- CGC crossing the heart of city, embraces the most of facilities of Arts & Culture
- “Selling-everything” market area is full of attraction of Seoul’s modern times .
 - * they evoke the controversial dilemma of balancing preservation and development.



Culture along the stream, to go

- People have been inspired by the drastically refreshing change ; they believe and expect that the restoration can be considered complete only when it mainstreams cultural creativity into the metropolitan life and the government system.



Artwork on the City hall

Culture-led regeneration along the stream

City's Plan

- Seoul city government is planning the “CGC regeneration by Digital & Culture”
 - * Digital stream : Mobile tour guide, Wibro service, Digital aquarium, etc
 - * 4 belts of Culture : Art studios, Cultural festivals, Fashion show, etc



Change of people's thinking about their life

- Successful construction inspired different thought about the quality of life and the willingness of sacrifice in the name of public benefit.
- Citizens are now willing to pay for non-economic value and public benefit;
 - * 43% of Seoul citizen are willing to pay for the CGC restoration because of its intrinsic and inheriting value in point of environment.

- * Households in Seoul are willing to pay average 103,309 won every year for next 20 years for the improved environmental benefit.

- * By the “Choice modeling method”, citizens' willingness of payment concludes Social B/C ratio for the CGC restoration is 1.727.

- .Benefit = not-doing Highway maintenances + Environmental improvement
estimated 3,321,620,000,000 won

- .Cost = Construction + Loss by Traffic load + Waterway maintenances
estimated 1,919,200,000,000 won



(“Lee, Young-Sung, 2005, “Cost, benefit, and the economic effect of GCG Restoration”)

Attracting investment

- Delegates from abroad visit to carry out case-studies
- Influx of people attracts more investments.

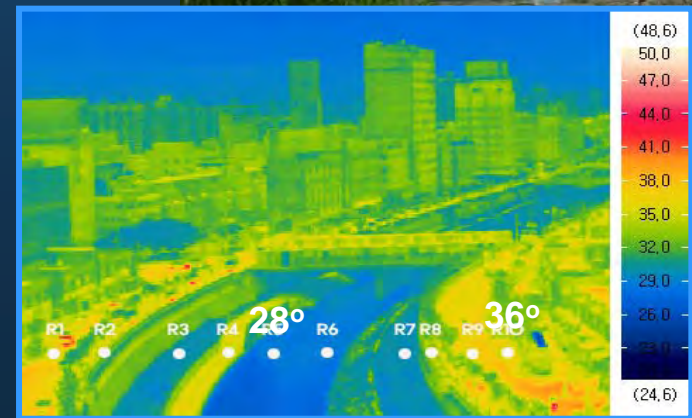


Environmental & Ecological improvement

- The stream declines 10~13% of temperature and reduces 7.1% of dust.
- Wind blows faster along the stream cooling down the heat-islands
- Recovering ecosystem in the heart of city refreshes citizens.



Average 36.3°C
Nearby street

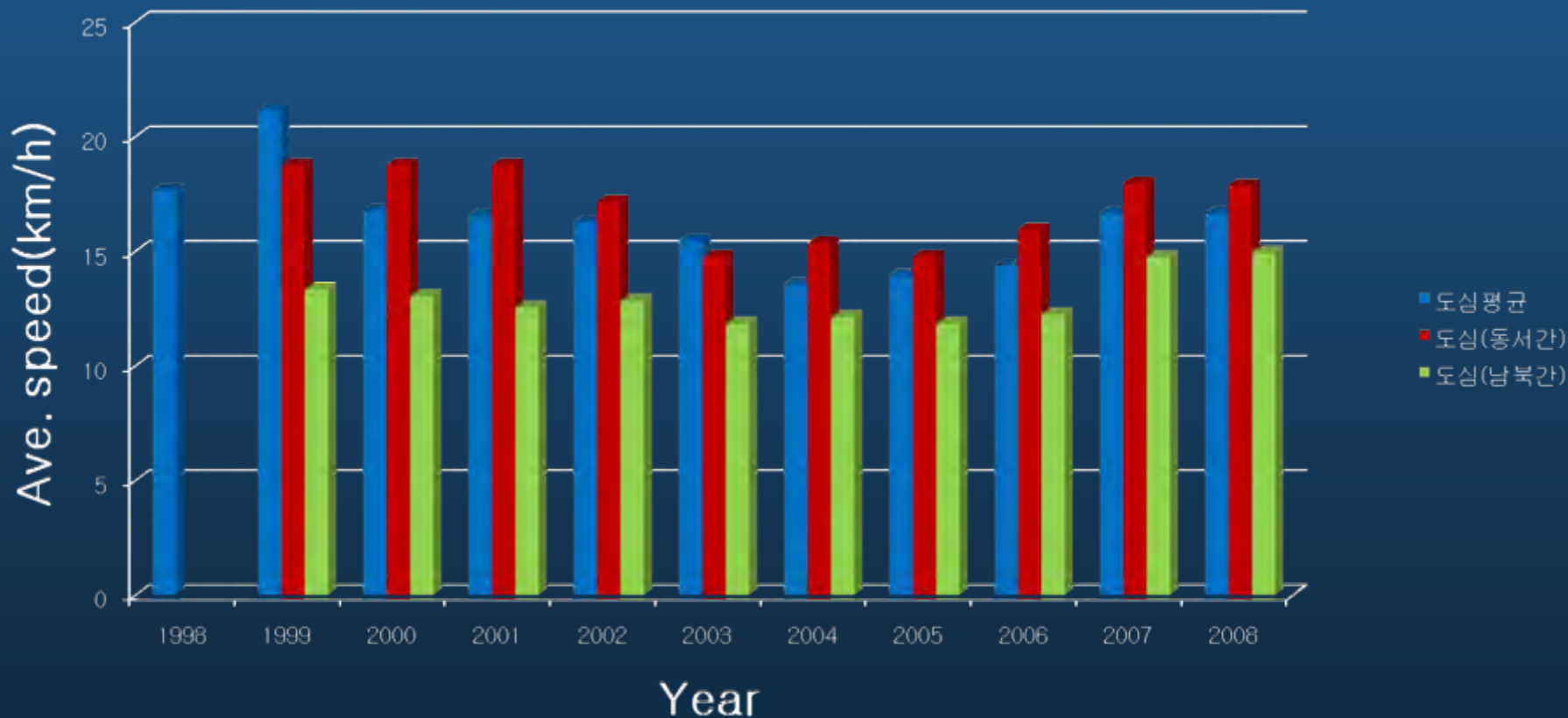


Average 32.7°C
Cheong Gye Cheon

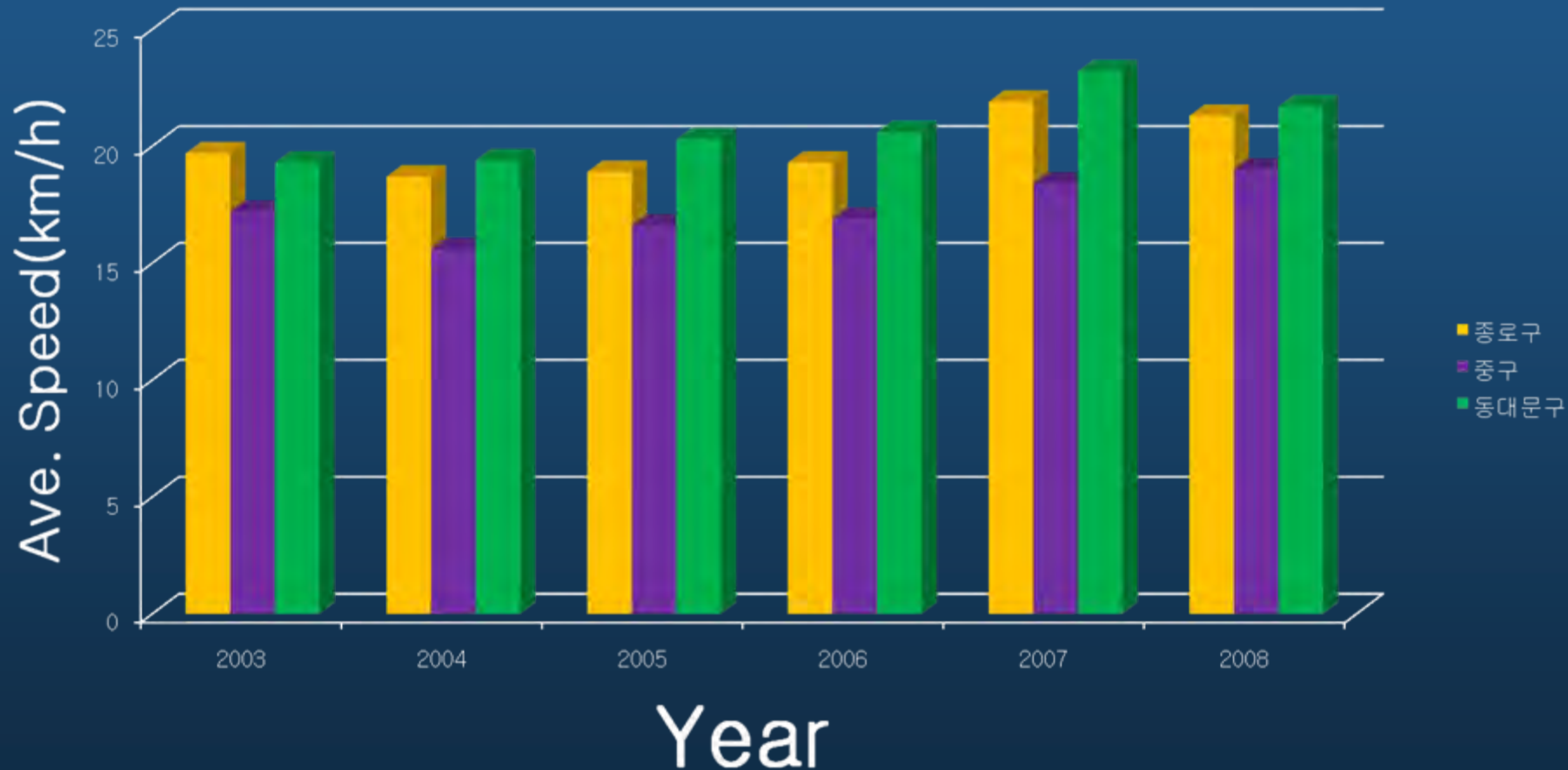
Change of average vehicle speeds before and after restoration in downtown Seoul

Ave. speed (Km/hr)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Overall speed	17.7	21.2	16.8	16.6	16.3	15.5	13.6	14	14.4	16.7	16.7
East- West		18.8	18.8	18.8	17.2	14.8	15.4	14.8	16	18	17.9
South- North		13.4	13.1	12.6	12.9	11.9	12.2	11.9	12.3	14.8	15

Change of vehicle speed before and after the restoration in downtown Seoul



Change of vehicle speed after the restoration in neighboring districts



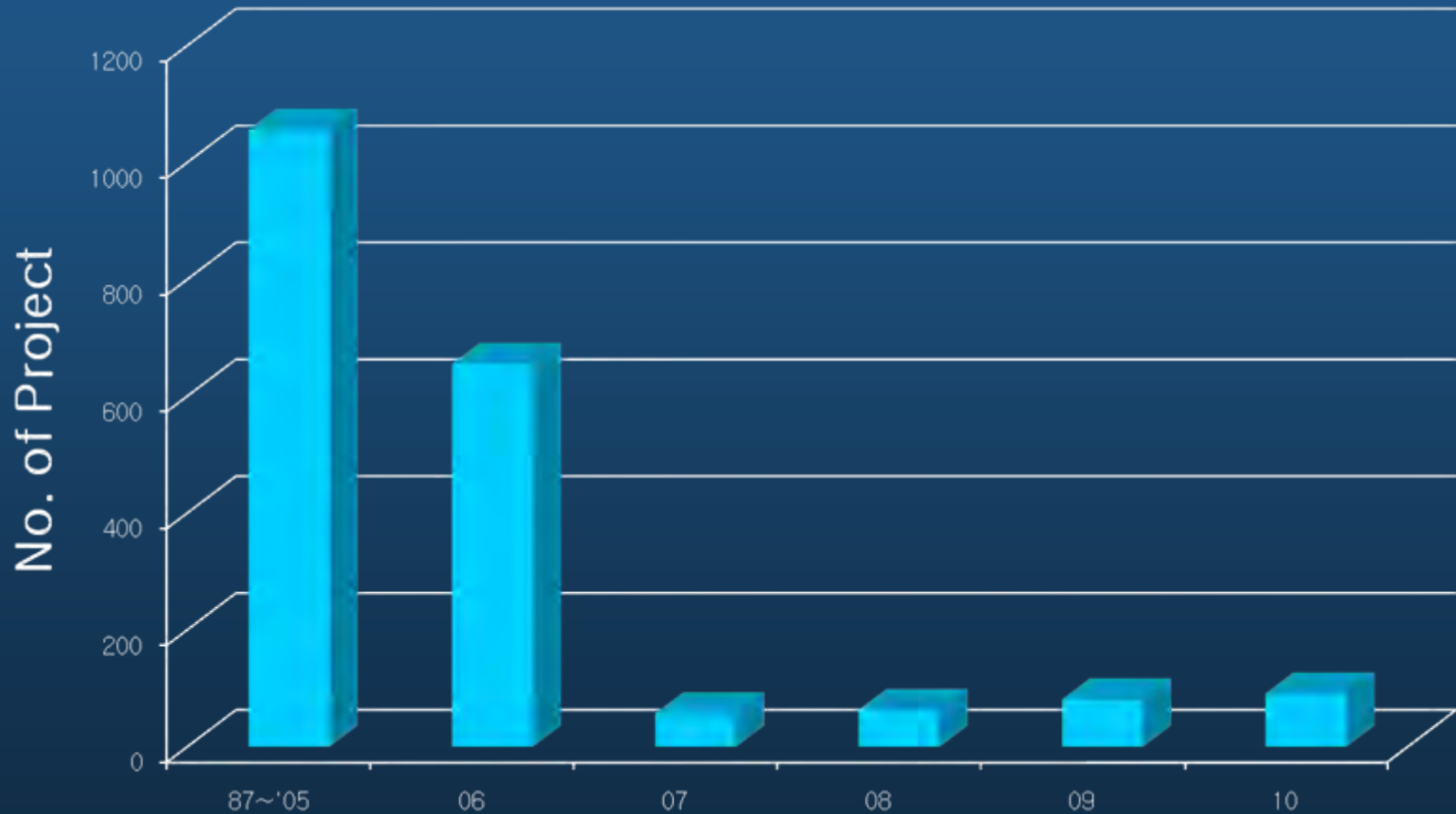
Increase of species after restoration

Year Species	Before restoration('03)	' 05	' 06	' 07	' 08	'09
Total No. of species	98	318	421	573	626	788
Plants	62	156	268	312	308	314
Fish	4	15	23	19	25	27
Birds	6	34	33	29	36	34
Water insects	5	22	39	26	53	39
Land insects	15	84	46	174	192	206
Mammals	2	3	4	4	4	4
amphibians	4	2	8	9	8	7

No. of events and exhibitions at Cheonggye plaza

Year	Total	Municipality ads	Public campaign	Cultural activity	Exhibition	Others
	436	146	n	73	58	27
2009	115	37	41	13	15	9
2008	108	37	29	20	15	7
2007	99	34	28	18	13	6
2006	92	31	29	17	11	4
2005	22	7	5	5	4	1

No. of river restoration project in Korea



Cheonggyecheon+20 project

- Oncheon river in Asan city



What Next?

- To restore the upstream section connecting water ecology
- To widen river to its original state
- To implement distributed water recycle system for the maintenance water
- To cooperate with other cities around the world sharing Seoul experiences