The Sustainable Urban Design and Underground Networks in TOKYO, MADRID AND BILBAO

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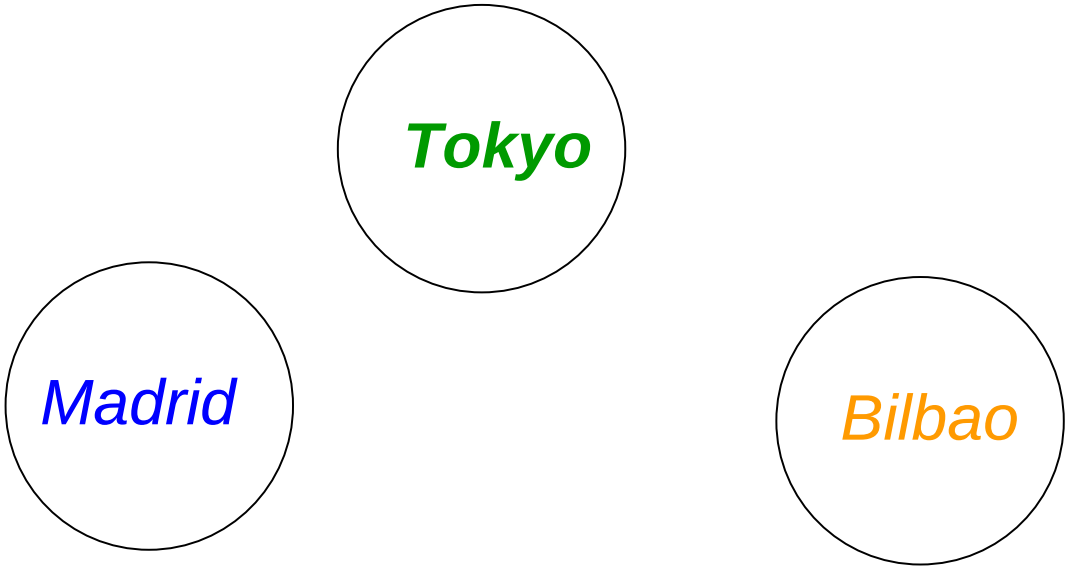
Japan



*A case study on the efficiency of the underground networks related to the urban development in **Tokyo** , **Madrid** and **Bilbao**.*

Part 1 is Tokyo related to underground plaza.

Part 2 is Madrid related to highway M-30.

Part3 is Bilbao related to railway Ametzola station.

1. INTRODUCTION

Main concepts of **Urban redevelopment**

- **Sustainability**
- **Multipurpose**
- **Beautiful environment in the urban space.**

Our objective is to realize the concept utilizing a limited urban space as effective as possible, especially using the underground space as same as surface and sky space.

2. THE CASE STUDY OF TOKYO STATION UNDERGROUND PLAZA IN MARUNOUCHI AREA IN JAPAN

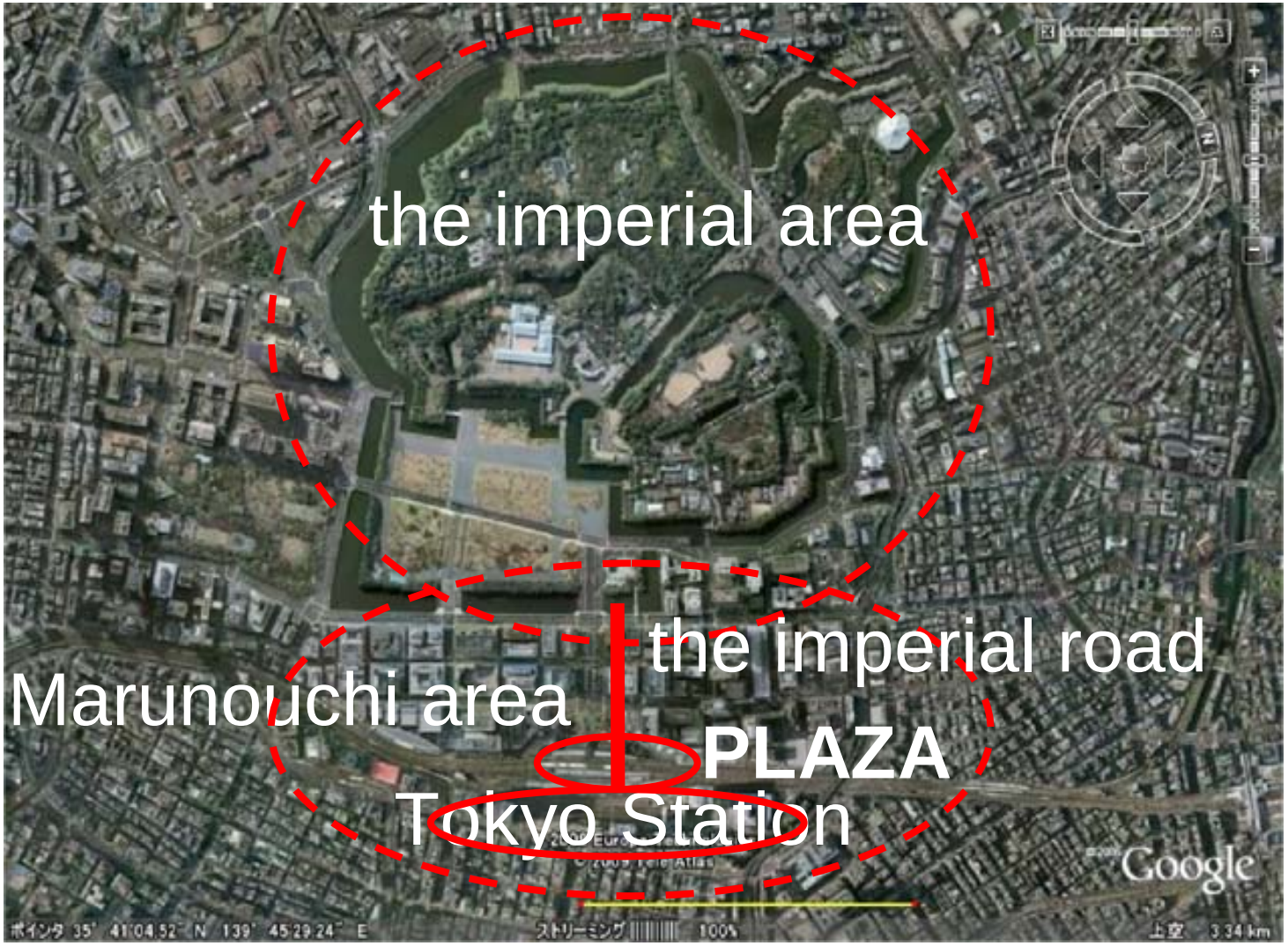


Fig. 2.3. Area of Marnouchi

2.1 The situation of Marunouchi

In Marunouchi many new buildings are under construction in accordance with the urban development rules.

Marunouchi area is not only the principal business zone in Japan but also the most important and historical landscape area located in the center of the capital, next to the imperial area.

Underground networks to connect buildings with subway stations.

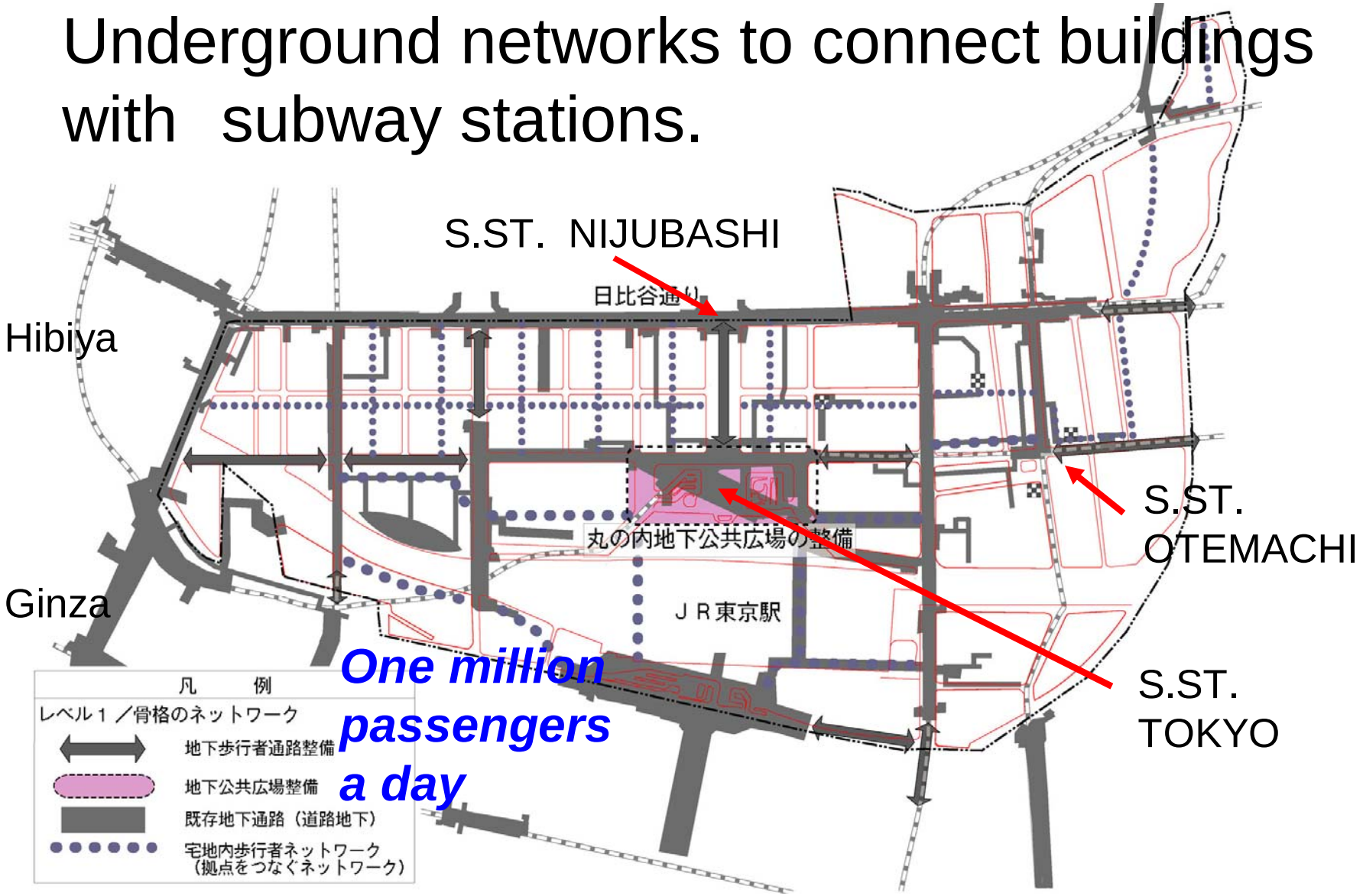


Fig. 2.2 Underground networks from the guideline

2.2 The underground network

Underground networks for pedestrian have been expanded in order to connect buildings with subway stations.

Several under pass ways are provided below the plaza, but it is not enough to keep up with the increasing passengers to a million and also it was necessary to reconstruct the environment suitable for the entrance of Tokyo.

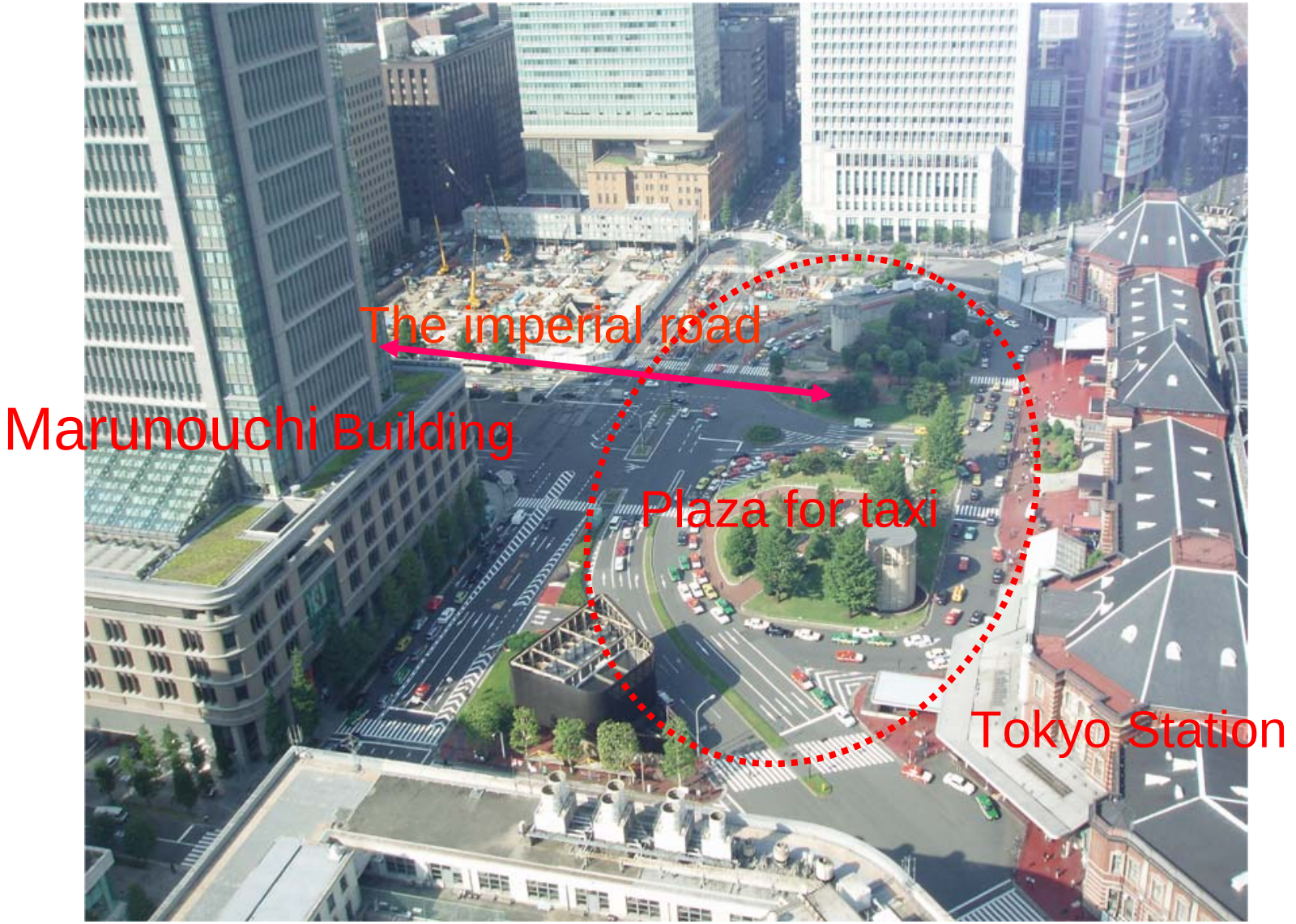


Fig. 2.4. Plaza in front of Tokyo station

2.3 The design concept of the center zone of Marunouchi

The center zone is composed of three factors.

- Tokyo station and the plaza.
- The imperial area.
- The imperial road located between Tokyo station and Imperial zone.

Millions of businessmen and passengers use this station every day.

The landscape of the Tokyo station and plaza is the most important, famous and impressive vista in Tokyo.

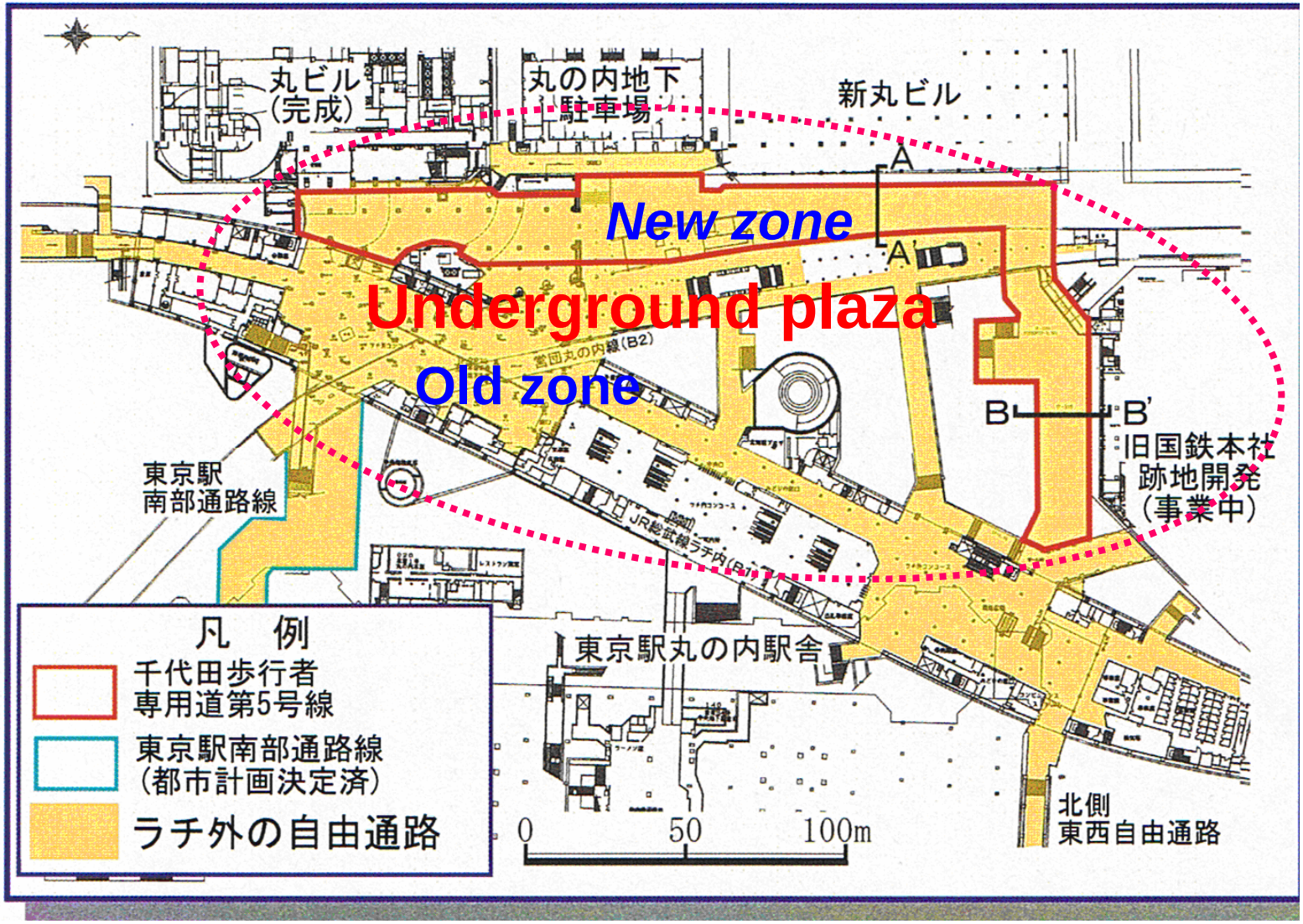


Fig. 2.5. Plan of Underground plaza

2.4 The project of the underground plaza (1997~2002)

• An organization composed by public sector and private companies cooperated for the redevelopment of the area.

•The plaza was constructed according to a guideline for the city planning designed by the organization it.

•The lifeline, such as electric and water pipelines, was an obstacle to construct underground network, but the efforts of the people led the project to a great success.

Fig. 2.6. The situation of construction

The lifeline (electric cables , water pipes) was an obstacle to construct underground network. A new technology and the efforts led the projects to a great success. The study of the project was started from 1997.

Fig. 2.7. Underground plaza

The efficiency of the underground plaza

- *Passage facility*
- *Symbolic landscape of the ground level*

3) The waiting space for foreign tourists

4) The fugitive space for people in disaster

5) The connection of underground and ground level

EXHIBITION for Disaster prevention training

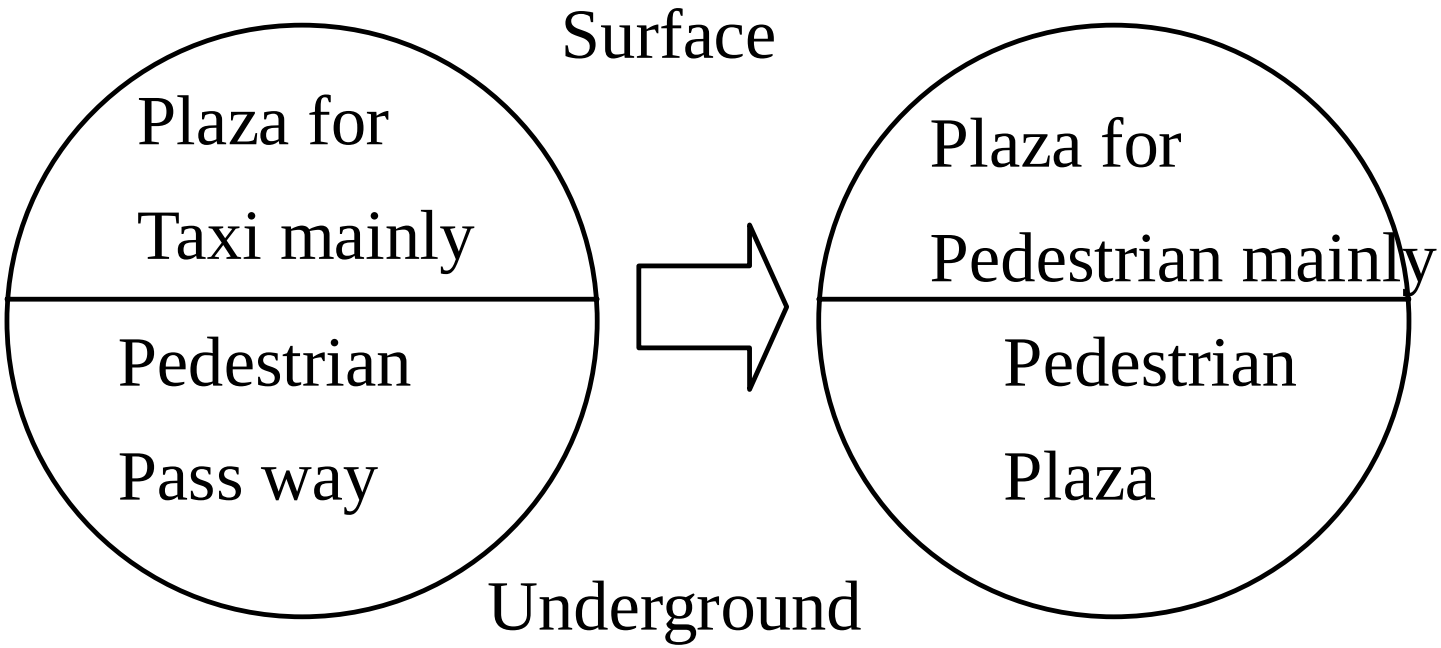


Fig. 2.1. Use of the space

2,5 The efficiency of the underground plaza

The efficiency of the plaza is the multiple uses for people including passage use.

- Passage facility
- Symbolic landscape of the ground level
- The waiting space for foreign tourists
- The fugitive space for people in disaster
- The connection of underground and ground level

3. THE CASE STUDY OF MADRID M-30 AND THE RIVER MANZANARES

3.1 The situation of Madrid

In Madrid there is so called M-30 highway loop surrounding the center of Madrid.

The main highways to the other districts link to M-30 by various junctions.

The traffic system has been redeveloped during 2004-2007 to settle the traffic jam, heavy noise and air pollution caused by a huge volume of transportation.

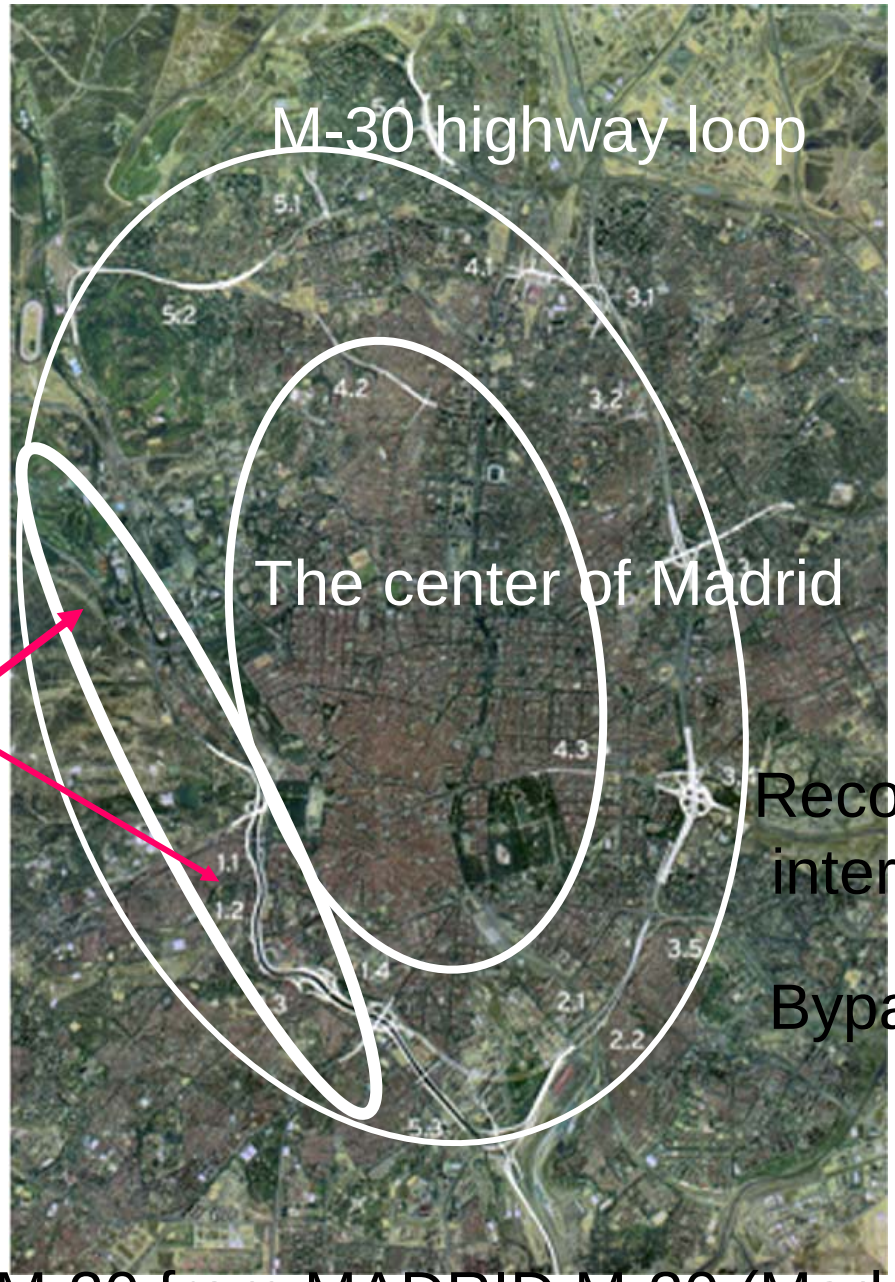


Fig. 3.1. Madrid M-30 from MADRID M-30 (Madrid: Turner, 2007)

scale: 5km

The river Manzanares

3.2 Project of M-30

The project is composed of the reconstruction of interchanges, riverside roads, inner-city roads and bypass system for smooth circulation.

Especially the reorganization of riverside space is useful not only for the underground network but also for the activation of ground level with parks and green belt.

The Manzanares was lined with roadways on both sides and it stood in the way of effective use of riverside space.

Calle 30 removed the roadways to the underground and the both banks of Manzanares changed to parks and public open space for residents, who can enjoy walking and jogging.

the riverside park under construction

The Manzanares river

Fig. 3.3. Plan of the riverside park
from MDRID M-30(Madrid:Turner,2007)

the riverside park under construction

Fig. 3.4. Section of the riverside park from MDRID M-30 (Madrid: Turner, 2007)

Fig. 3.5.
The situation of the river

3.3Constraction system

The main organization for this project is Calle 30, which performs key role for planning and reconstruction of M30.

Calle 30 receives investment money form both public sector and private construction firm.
It is so called public and private partnership.

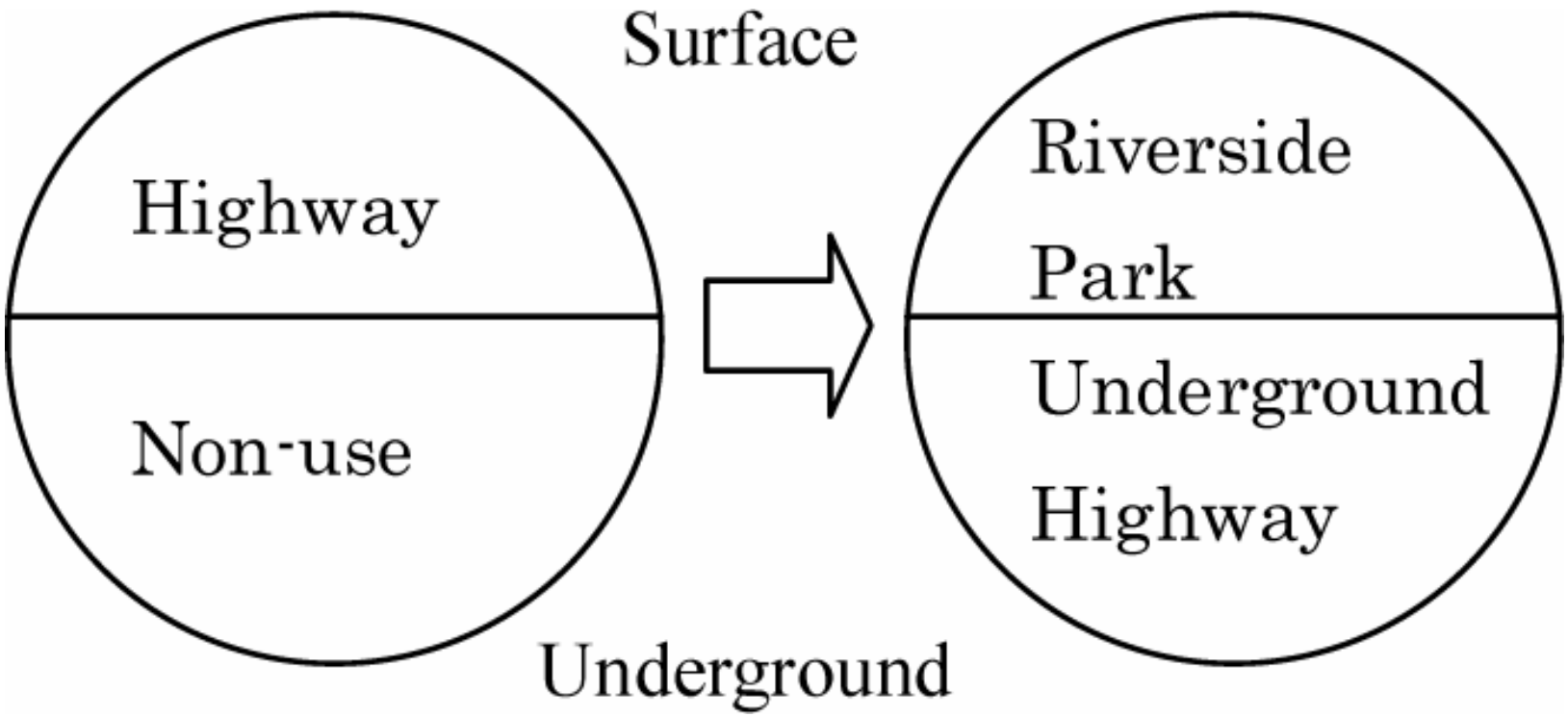


Fig. 3.2. Use of the space

3.5 Efficiency

- To increase the capacity of M-30.

2) Recovery of the environmental area surrounding the old section of M30.

3) Regeneration and cleanup of Manzanares River

4) Improvement of the radial connections with surrounding secondary roads.

4. THE CASE STUDY OF AMETZOLA STATION AREA IN BILBAO

Industrial city in 1970` s

かつては鉄鋼と造船の重工業都市　産業の衰退で1970年代に失業率25%なる。

Ria2000 Projects

4.1 The situation of Bilbao

•Twenty years ago, Bilbao was completely abandoned because the steel and shipbuilding industry were steadily declining.

•In order to reshape and reactivate the city of Bilbao, the Basque Country (autonomous community)
took the leadership and planned various projects.

•Those are Abandoibarra project, Ametzola project, reform of traffic system, construction of parking, including outskirts of the town.

•They intended to cover not only some area but also the entire city by the projects.

4.2 The project of Ametzola

•The Ametzola station is located at the southern part of Bilbao.

•This area was suffering from the gap of uneven land, separated by the railways.

•A public organization Ría 2000 realized a large-scale project during 1994-2007 to cover over the railways and to develop a level ground for parks, housing lots and roads.

•Amezola project is the most important project for Ría 2000 based on the area redevelopment strategy.

Fig. 4.2 The centre of Bilbao

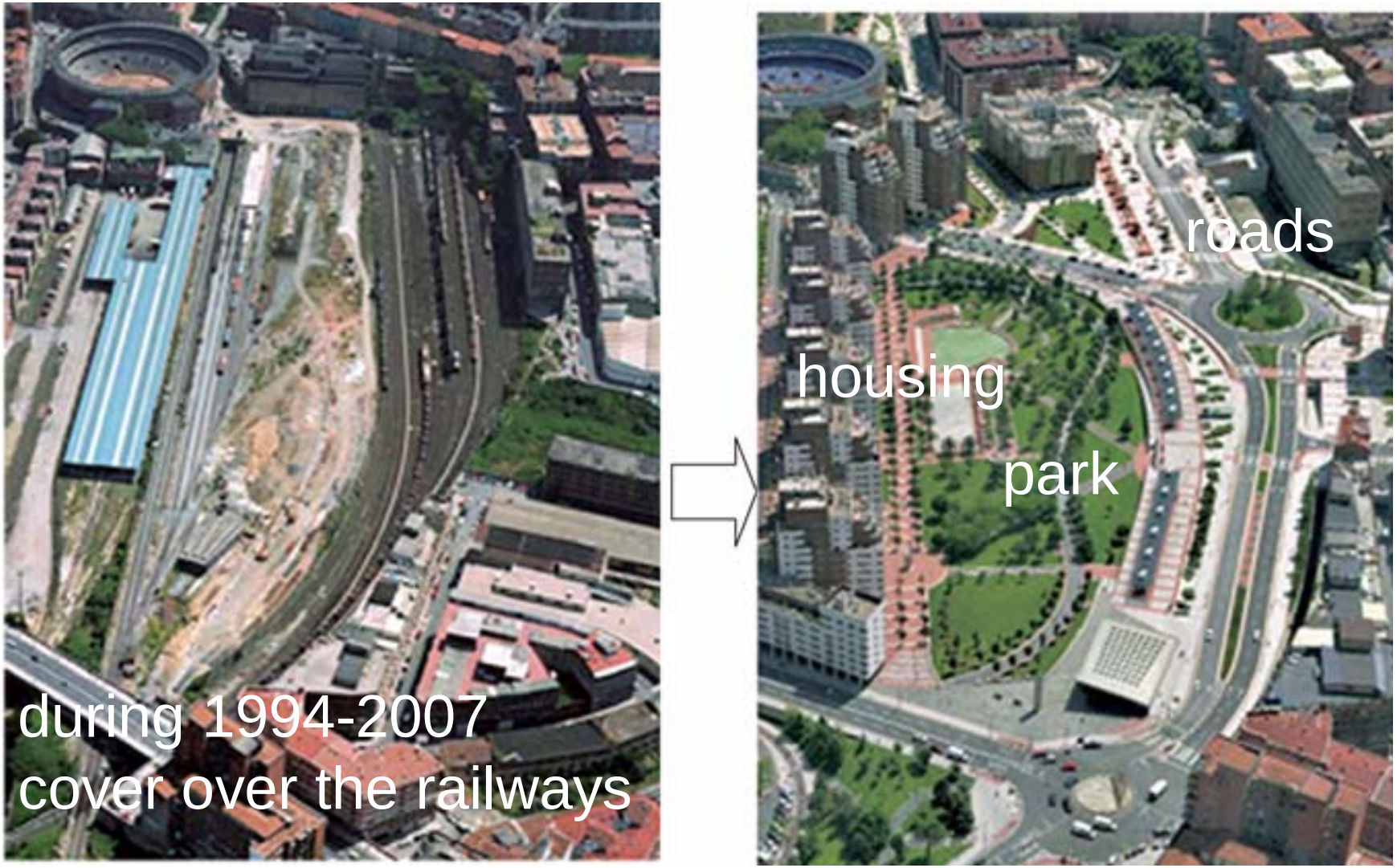


Fig. 4.3 Project of Ametzola from Bilbao Ría 2000(Bilbao:Bilbao Ría 2000,2007)

The process of The Ametzola poject

The Ametzola station
Park and Housing

Park

The Ametzola station

Housing

Park and Housing

The Ametzola station entrance

Under Ground The Ametzola station

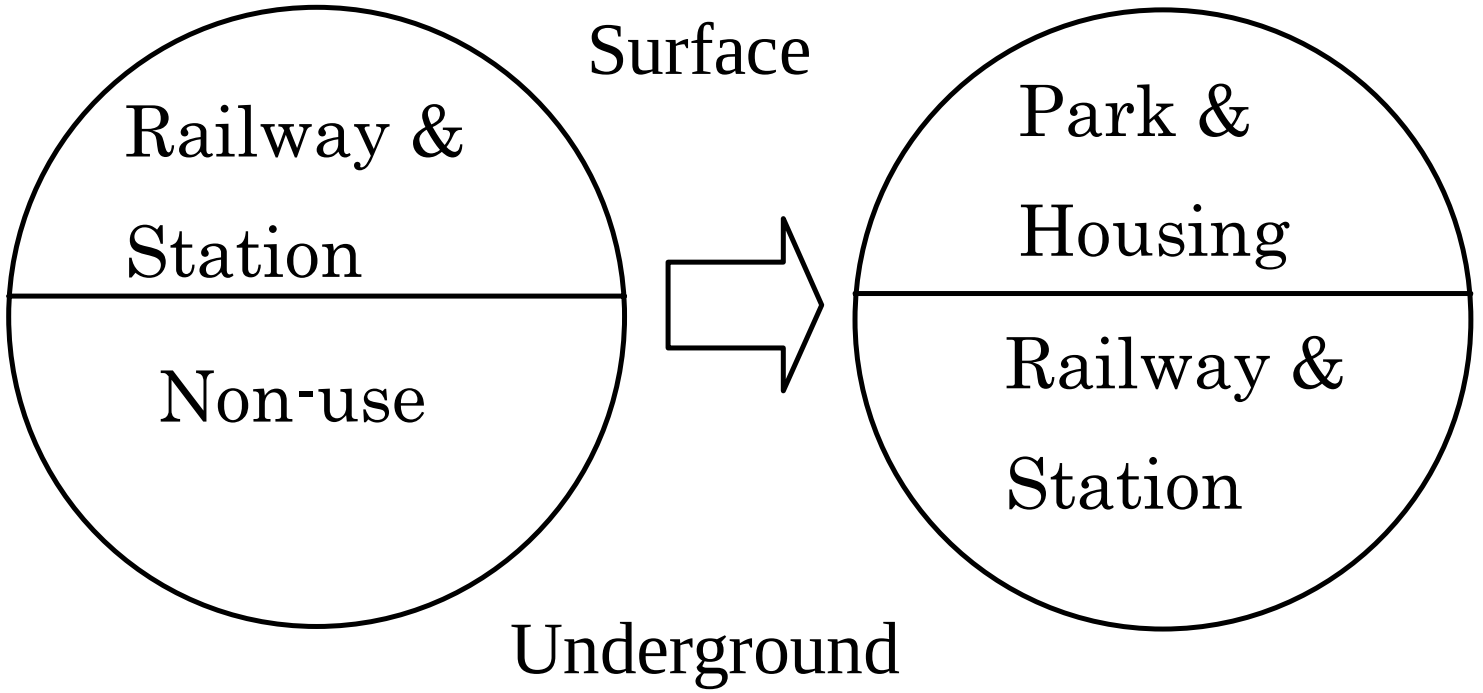


Fig. 4.1 Use of the space

The main subjects of the project

- To combine two areas.
- To change the railway space to parks.
- To cover over the railway space and use the space to roads.
- To develop housing project

4.3 Organization

- Two main organizations lead the city redevelopment.

- Ría 2000, a public organization for city planning with infrastructures, buildings and long-range program.

- Metropoli 30, a joint venture with the public and private sector to make concepts of the projects.

- In addition to them, private companies invest in other projects such as Guggenheim Museum.

4.3 Efficiency

- *Good and clean environment and landscape for people*
- *City life in a natural environment, parks and pedestrian deck*
- *Houses in front of the station*
- *Symbolic project from a heavy industrial city to business city with high-tech industry*

5. CONSIDERATION

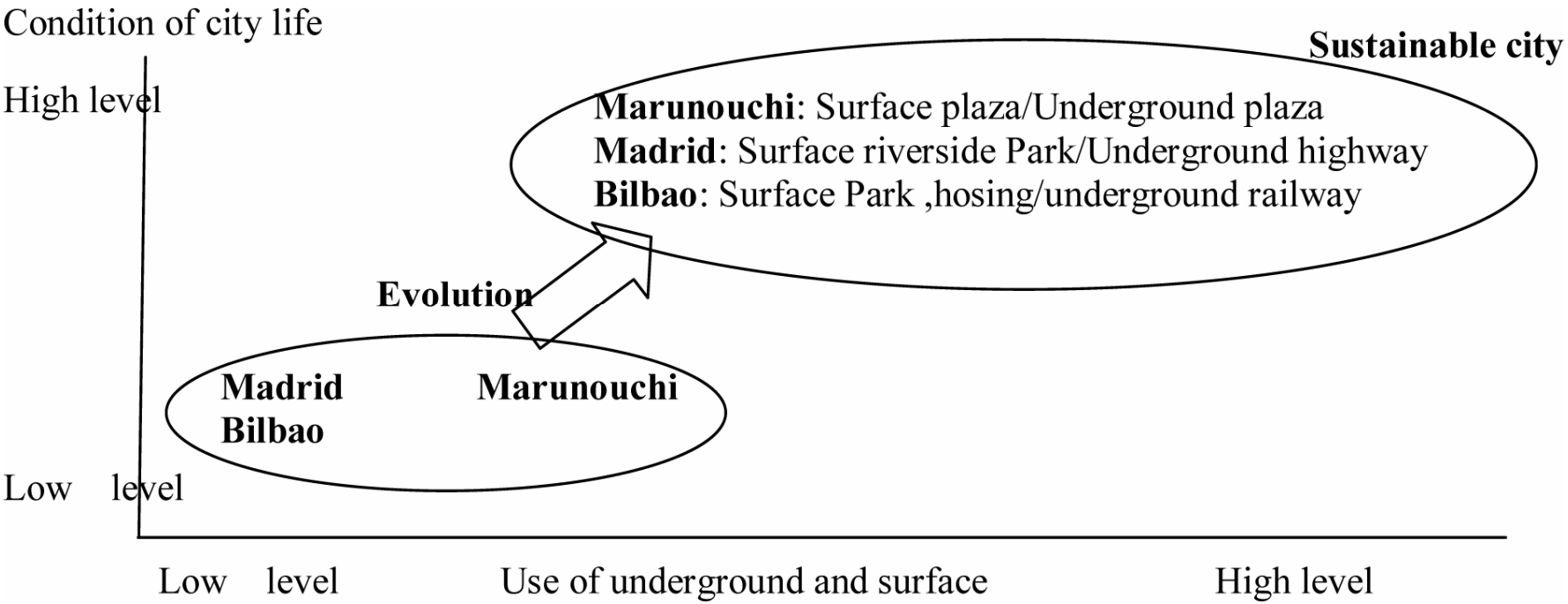
The principle for sustainable city

5.1. Sustainable city

To change an old urban system to a new one is a pressing need to deal with internationalization, diminution of population, global environment problem. It is possible to evolve the function,
environment and landscape of the city by using underground space and ground level efficiently.

5.2 The public and private partnership

To guide every project to success, a joint venture or a close partnership
between public and private sector is a prerequisite.
So it is necessary to have the future vision of the city.



The development of underground will open a new way to improve the landscape,the city life and new business with high-tech industry.

Fig.5.1 The efficiency of three projects

6. CONCLUSION

- The common component is an effective utilization of underground space to maintain the natural environment, history and the present circumstances on the ground level.

- The development of underground will open a new way to improve the landscape, the city life and new business with high-tech industry.

- A further study of how underground space is useful for urban redevelopment and the present tendency of development in other big cities should be conducted.

Acknowledgments

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Thank you very much for your kind attention.