



Low Carbon City Planning

Sustainable City · Architecture Planning
for Green House Gas Reduction

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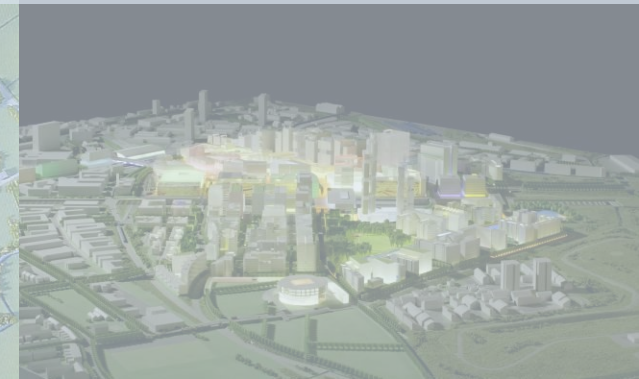
- 1 Synopsis of Go-Duk International City
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1 The Planning Directions of Sustainable City

1. The Fundamental Directions of Sustainable City Planning

2. The Planning Directions by Categories



1. The Fundamental Directions of Sustainable City Planning

The Planning Directions of Sustainable City

Sustainable Land Use

Green Transportation System

Resource Recycling

– Resource Reuse / Water Circulation

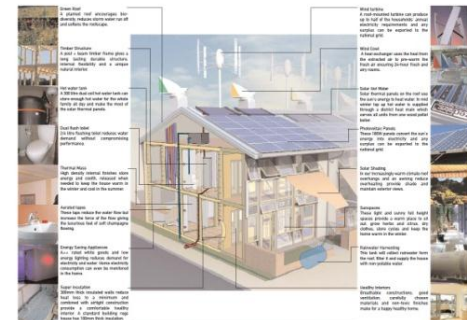
Energy Efficiency

– Renewable Energy Use

– Energy Efficient Building Design

Green Space Plan

– Park, Open Space and Waterfront Design / Wind Corridor



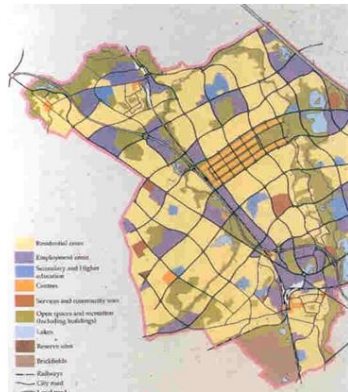
2. The Planning Directions by Categories

Sustainable Land Use

- Establishing Low Carbon Land Use Plan focused on Efficient Land use for the Sustainable City Plan

- Development Directions

- T.O.D Plan and Leveled Density Plan for Efficient Density Management of Central Area
- Efficient Land Use by Multiple Use, Mixed Use, and Mixed Community Development
- Increasing Public Transportation, Infrastructure, and Green Facilities Accessibility



<Milton Keynes
Work-Housing Proximity Plan>

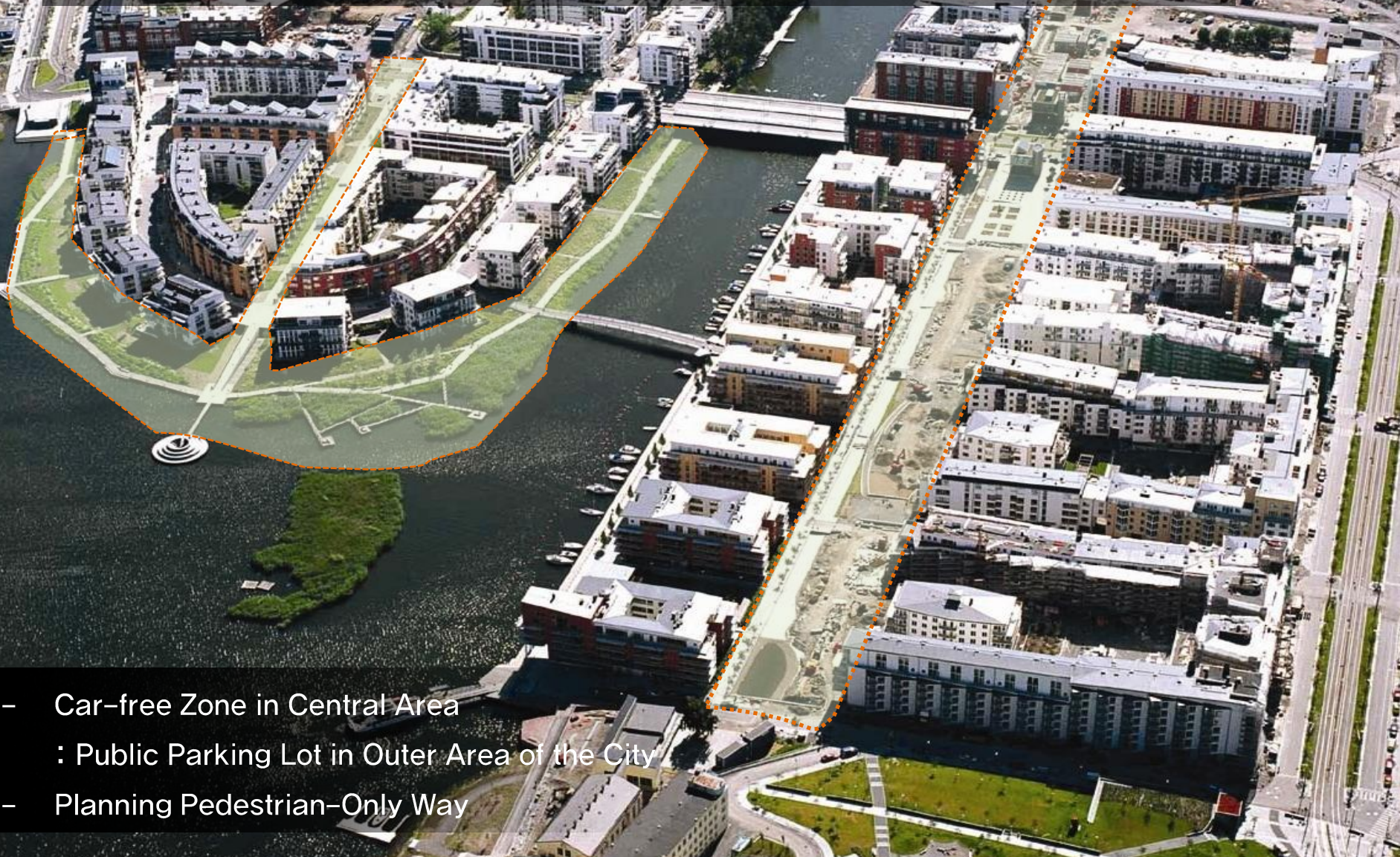


<Yong-San T.O.D. Plan>



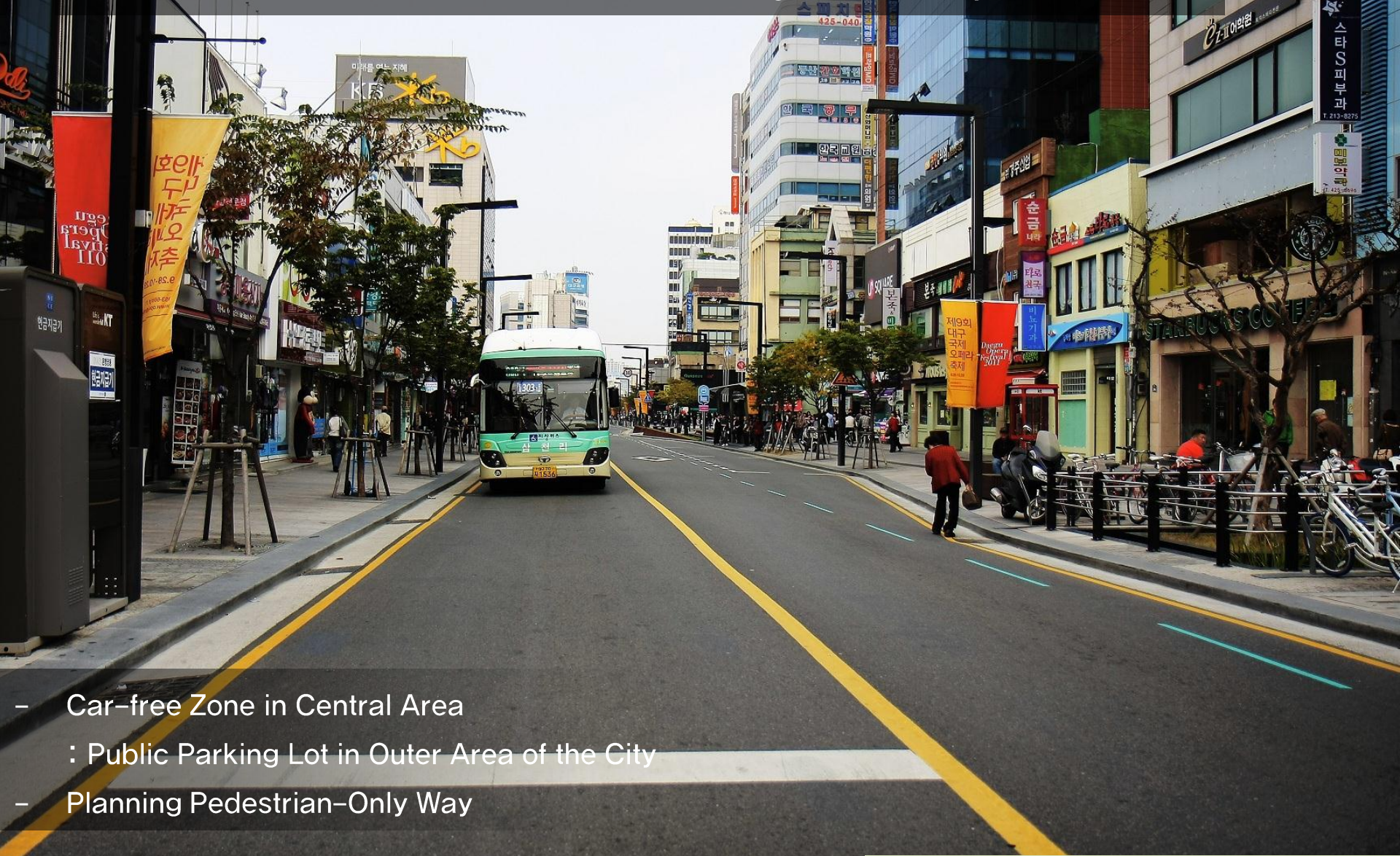
<In-chon Chong-la district Mixed-use Plan>

Land Use: Minimum vehicle Use and Increasing Accessibility of Pedestrian



- Car-free Zone in Central Area
: Public Parking Lot in Outer Area of the City
- Planning Pedestrian-Only Way

Land Use: Minimum vehicle Use and Increasing Accessibility of Pedestrian



- Car-free Zone in Central Area
- : Public Parking Lot in Outer Area of the City
- Planning Pedestrian-Only Way

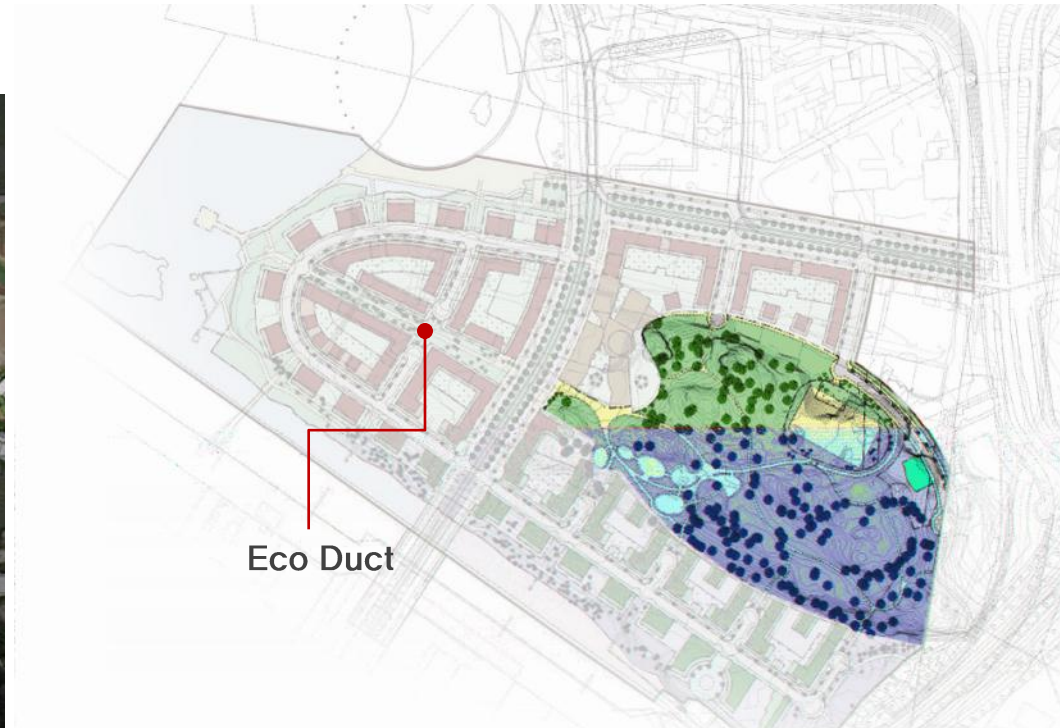
Public Transportation-Only Road, Dae-gu

2. The Planning Directions by Categories

Design for Existed Natural Resources



Yong-In / Shin-gal New Millennium Apartment



Hammarby

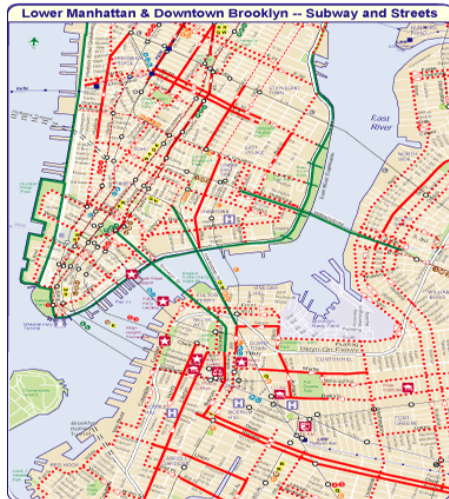
- Landscape-considered Site Plan and Architecture Design

: 보존녹지를 고려한 계획

2. The Planning Directions by Categories

Green Transportation System

- Establishing Green Transportation System for Energy Use Reduction and Decreasing Carbon Emission in Transportation Field
- Development Directions
 - Public Transportation Oriented Development by Green Transportation System
 - Establishing Cycle Road System, Pedestrian-only Pathway System



| PROJECT TITLE | FUNDING | PROJECT TITLE | FUNDING |
|--------------------------------|----------|-------------------------|----------|
| 1. North Street Pier with Dock | CMAG 0.6 | 21. Parkside Park Lane | CMAG 0.4 |
| 2. Hudson River Park | NYC 1.0 | 22. East River Greenway | NYC 1.0 |
| 3. Canal Street Pier | CMAG 0.6 | 23. East River Greenway | NYC 1.0 |
| 4. Hudson River Park | NYC 1.0 | 24. East River Greenway | NYC 1.0 |
| 5. Hudson River Park | NYC 1.0 | 25. East River Greenway | NYC 1.0 |
| 6. Hudson River Park | NYC 1.0 | 26. East River Greenway | NYC 1.0 |
| 7. Hudson River Park | NYC 1.0 | 27. East River Greenway | NYC 1.0 |
| 8. Hudson River Park | NYC 1.0 | 28. East River Greenway | NYC 1.0 |
| 9. Hudson River Park | NYC 1.0 | 29. East River Greenway | NYC 1.0 |
| 10. Hudson River Park | NYC 1.0 | 30. East River Greenway | NYC 1.0 |
| 11. Hudson River Park | NYC 1.0 | 31. East River Greenway | NYC 1.0 |
| 12. Hudson River Park | NYC 1.0 | 32. East River Greenway | NYC 1.0 |
| 13. Hudson River Park | NYC 1.0 | 33. East River Greenway | NYC 1.0 |
| 14. Hudson River Park | NYC 1.0 | 34. East River Greenway | NYC 1.0 |
| 15. Hudson River Park | NYC 1.0 | 35. East River Greenway | NYC 1.0 |
| 16. Hudson River Park | NYC 1.0 | 36. East River Greenway | NYC 1.0 |
| 17. Hudson River Park | NYC 1.0 | 37. East River Greenway | NYC 1.0 |
| 18. Hudson River Park | NYC 1.0 | 38. East River Greenway | NYC 1.0 |
| 19. Hudson River Park | NYC 1.0 | 39. East River Greenway | NYC 1.0 |
| 20. Hudson River Park | NYC 1.0 | 40. East River Greenway | NYC 1.0 |
| 21. Hudson River Park | NYC 1.0 | 41. East River Greenway | NYC 1.0 |
| 22. Hudson River Park | NYC 1.0 | 42. East River Greenway | NYC 1.0 |
| 23. Hudson River Park | NYC 1.0 | 43. East River Greenway | NYC 1.0 |
| 24. Hudson River Park | NYC 1.0 | 44. East River Greenway | NYC 1.0 |
| 25. Hudson River Park | NYC 1.0 | 45. East River Greenway | NYC 1.0 |
| 26. Hudson River Park | NYC 1.0 | 46. East River Greenway | NYC 1.0 |
| 27. Hudson River Park | NYC 1.0 | 47. East River Greenway | NYC 1.0 |
| 28. Hudson River Park | NYC 1.0 | 48. East River Greenway | NYC 1.0 |
| 29. Hudson River Park | NYC 1.0 | 49. East River Greenway | NYC 1.0 |
| 30. Hudson River Park | NYC 1.0 | 50. East River Greenway | NYC 1.0 |

GREENWAY PLAN FOR NEW YORK CITY / NYC Department of City Planning



Left: New York Cycle Road
Up: Public Bicycle
Right: BRT Plan



Transportation : Connection to the Public Pransportation

- Walking Distance from Public Transportation to the House
- High Quality Bicycle-Transfer Parking Lot



Transportation : Multiple Parking System

- LEED-certified Green Parking Lot
- Icon of Green city Transportation

2. The Planning Directions by Categories

Green Space Plan

- Establishment of Green Space for Counter act for Climate Change, Reduction of Carbon Emission, Micro Climate Control, and Water Circulation Management

▪ Development Directions

- Low Carbon Natural Green Space Plan with High Carbon Absorption Ratio
- Decreasing Energy Use with Wind Corridor by Decreasing Heat Island Effect

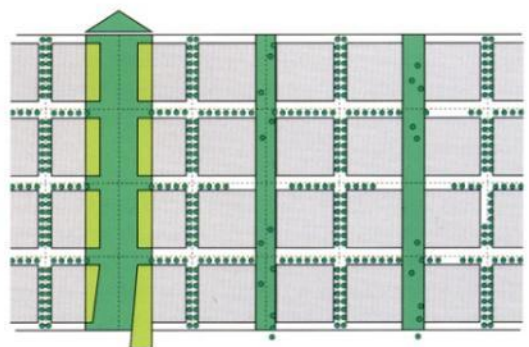
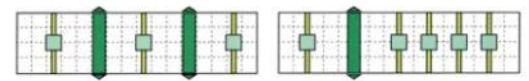
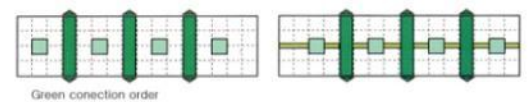
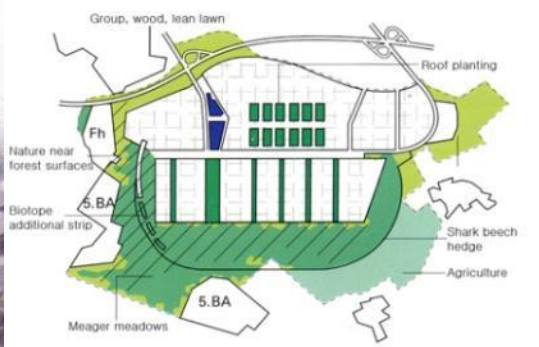


<Wind Corridor=considered Green Area Plan of Riem>



- **Messestadt Riem**
 - Half of the Development Areas are Green Space
 - Green Space and Plantation Plan for Wind Corridor
 - Levelled Green Space Plan

Establishing Eco System: Leveled Eco Corridor Plan



Establishing Eco System: Biotope Plan



- Various Waterfront and Water Space controlling Micro Climate

Waterfront Area Plan



– Artificial Lake with Rainwater

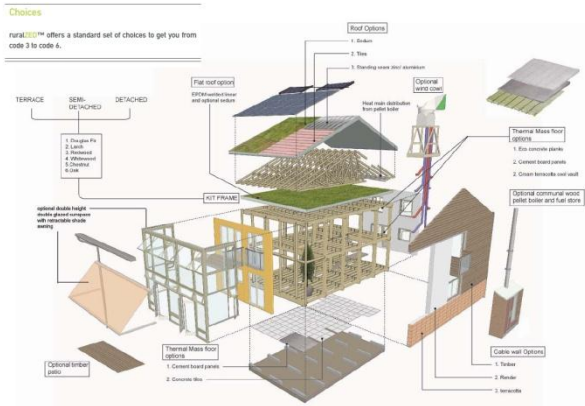
2. The Planning Directions by Categories

Energy Efficiency

- Establishing Architecture Plan which considered Renewable Energy Use and Energy Efficiency

▪ Development Directions

- Strengthening the Use of Renewable Energy for City and Building
- Architecture and Facility Plan for Energy Efficiency



< Rural Zed - Code 6 >



- SOLARA, U.S.A
- Active Use of PV Panel: Installation of PV Panel on top of the building rooftop and Parking Lot

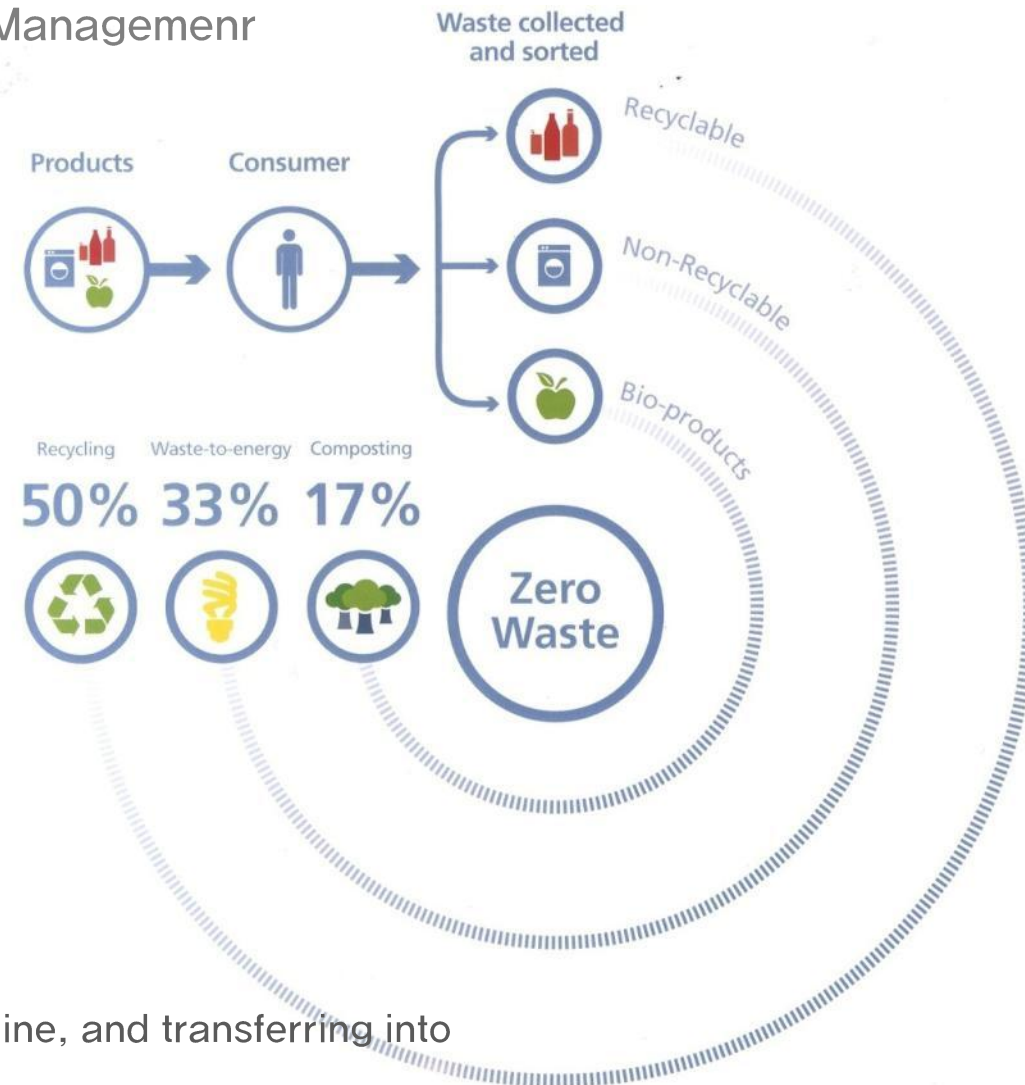
Establishment of the Synthetic Rainwater Management System



- Slope-type Rainwater Channel for Heavy Stormwater

2. The Planning Directions by Categories

Resource Use: Eco-Friendly Waste Management

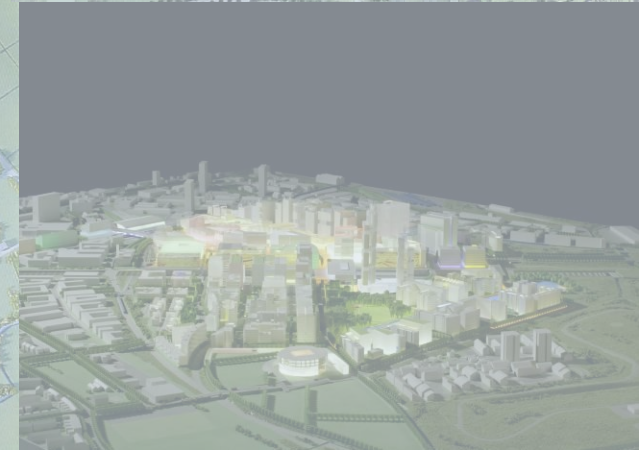
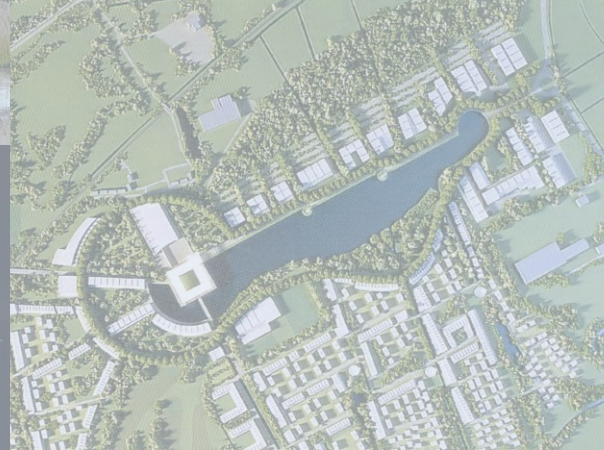


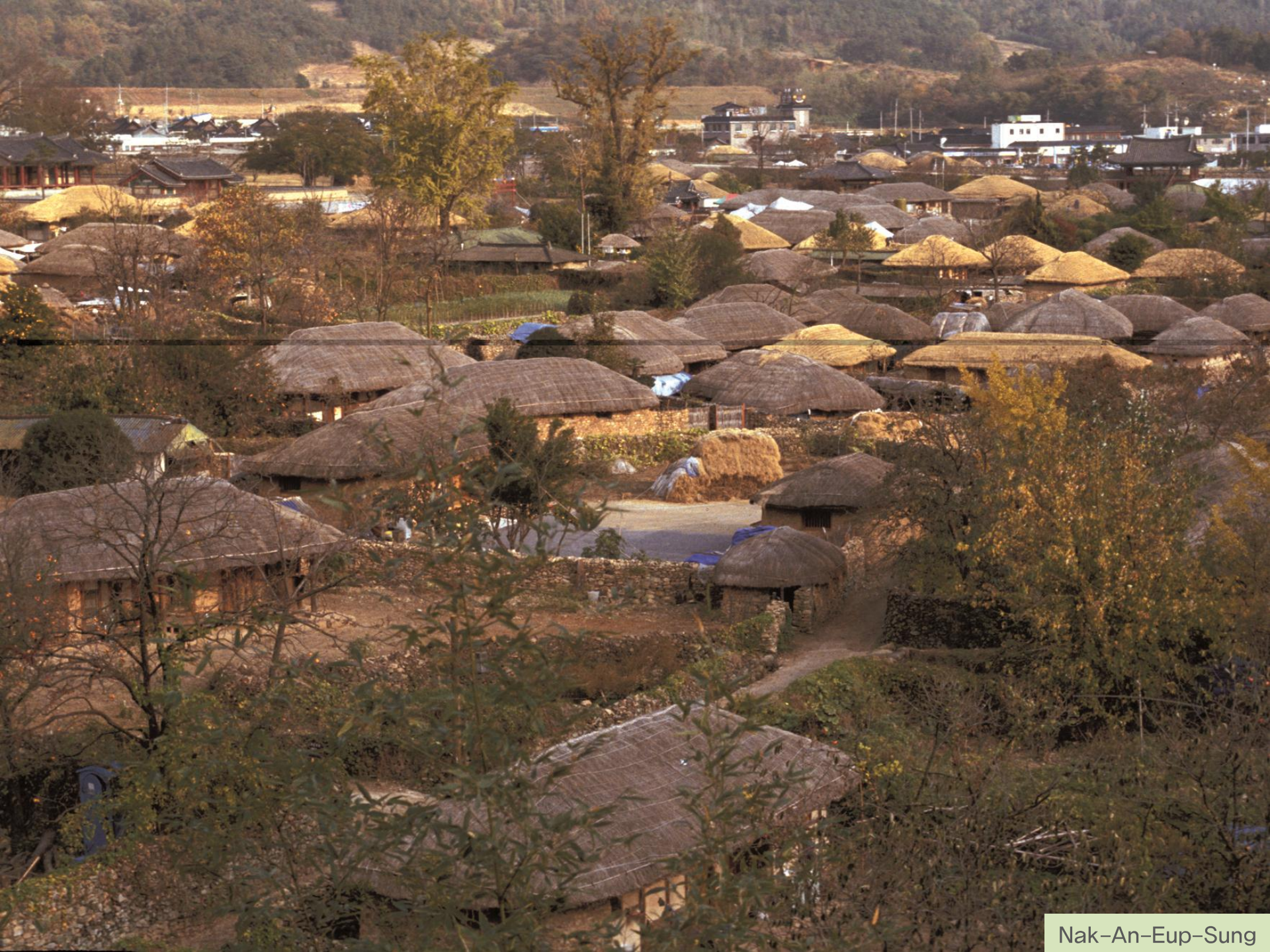
- **Synthetic Waste Control and Recycle**
: Synthetic Food Waste Control by Pipe line, and transferring into Biomass and Reusing facility Plan
- **Separate Waster Collection Area Design**



2

Traditional Korean Settlements Plans





Nak-An-Eup-Sung

1. Elements of sustainable design

| | | |
|-------------------------------|-------------------------------------|---|
| Social Sustainability | Sustainability of History · Culture | Inheriting intangible cultural assets |
| | | Securing symbolism through natural object and artifacts |
| | Integrated socially | Construction of public space |
| | | Community event |
| | | Street system for vitalizing community |
| Visually linked boundary plan | | |
| Economical Sustainability | Self-sufficiency | Food self-sufficiency through farmland and garden |
| | | Development of various sources of income |
| | Disaster prevention | Disaster prevention |
| | Flexible land use | Reservation field for development |
| Environmental Sustainability | Land use | Site selection |
| | | Housing density |
| | | Eco-friendly development |
| | Circulation System | Street system |
| | Green system | Supplement forest, a windbreak forest |
| | | Green space plan |
| | Water system | Water circulation system plan |
| Energy use | Effective energy distribution | |

2. Social Sustainability – Inherit intangible cultural assets

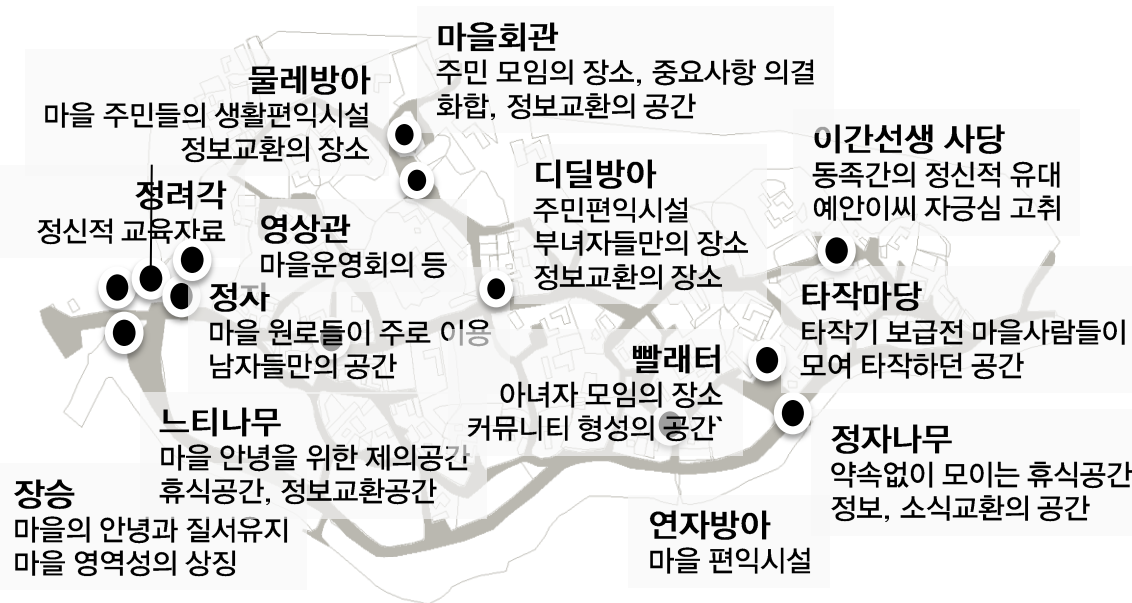


Traditional Virtue Education, Oi-am- Jung-sa
and Kang-dang-sa



Community Festival, Ha-Hoi Mask Play

3. Construct public space

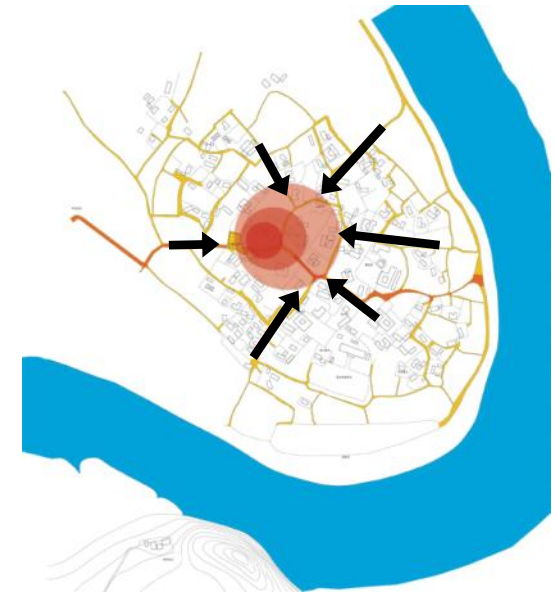


a public laundry

4. Street system for vitalizing community



Crossing point is more than junction in the village.



The roads spread out like the spokes of a wheel, with public square as the hub.

Visually linked Boundary plan



- Visual Communication by Fence plan of appropriate height

5. Social-Mixed



- In traditional community, noble and Commoner housings are mixed to decrease discord between the class, and as times passes, it shows social mix by immigrants

Economical Sustainability
Staple food self-sufficiency through Farmland and garden



Communal garden for joint cultivation in Village

Eoi-am-li Village

5. Development of various sources of income



(e.g) Specialties, Healthy food, forest of usable trees and managing of Experience Village.

Disaster prevention



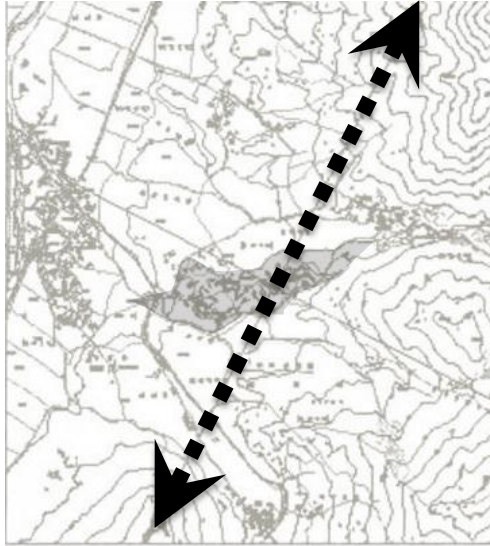
Communal garden for joint cultivation in Village

Environmental Sustainability
- Site selection, Nak-an-eup-sung

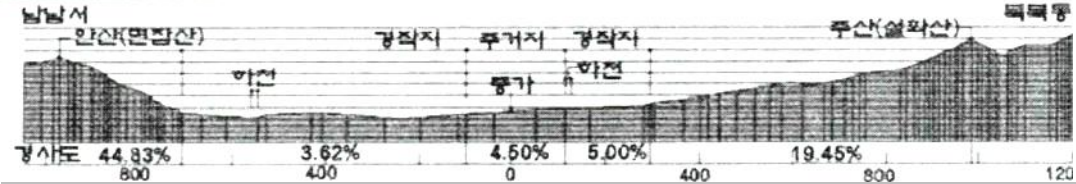


The location is selected based on Pung-su-ji-ri which is the theory of divination based on topography

6. Development adapt to nature



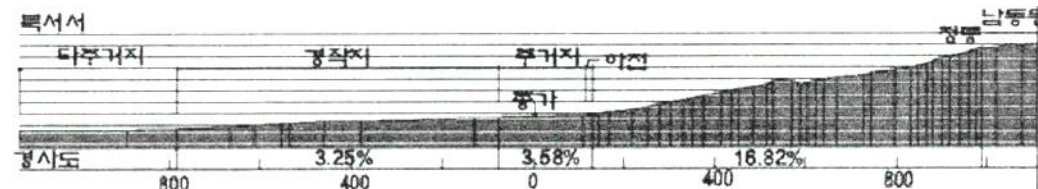
Because the village is surrounded with mountains, The village are less affected by north-west wind in winter



[reference] A Study on the Characteristics of the Locations of Traditional Korean Villages, Shin



Although the average slope as high as 25% in residential site the village has been constructed in the slope site. Accordingly, water from mountain naturally flow into the village so people can use the water for drinking, agriculture and landscaping



[reference] A Study on the Characteristics of the Locations of Traditional Korean Villages, Shin

Street system



Water system + Green system + Street system

Eoi-am-li Village

7. Green system



The green field based on Sulhwa mountain are distributed along the farmland and 1.5m thick stone fence (as point, line, plane.)

Windbreak forest

Man-song-jung

Ha-hoi villae Village



Supplementation forest



Supplementation forest that appear Entrance of Village

Eoi-am-li Village

8. Construct water system

Water circulation system using existing water resource in village



Sewage Purification, Nak-an-eup-sung



Using for personal landscape water

Construct water system



Aquatic Biotop

Eoi-am-li Village

9. Effective position of energy

Low housing density considering direction :

secure amount of sunshine, Controlling microclimate by seasonal wind



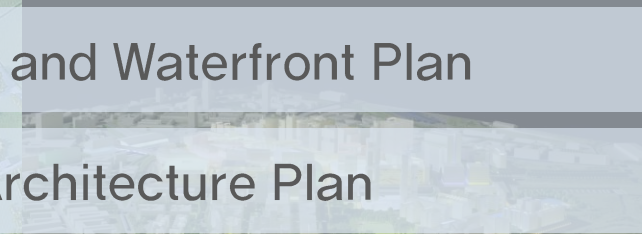
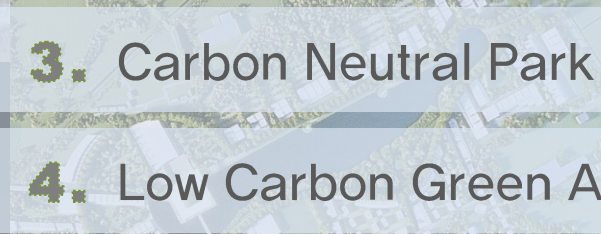
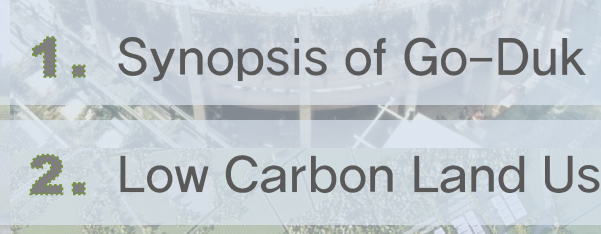
| Housing direction | Rate (All housing) (%) |
|-------------------|------------------------|
| Southwest | 62% |
| south | 25% |
| Southeast | 12% |
| east/west | less than 1% |



3

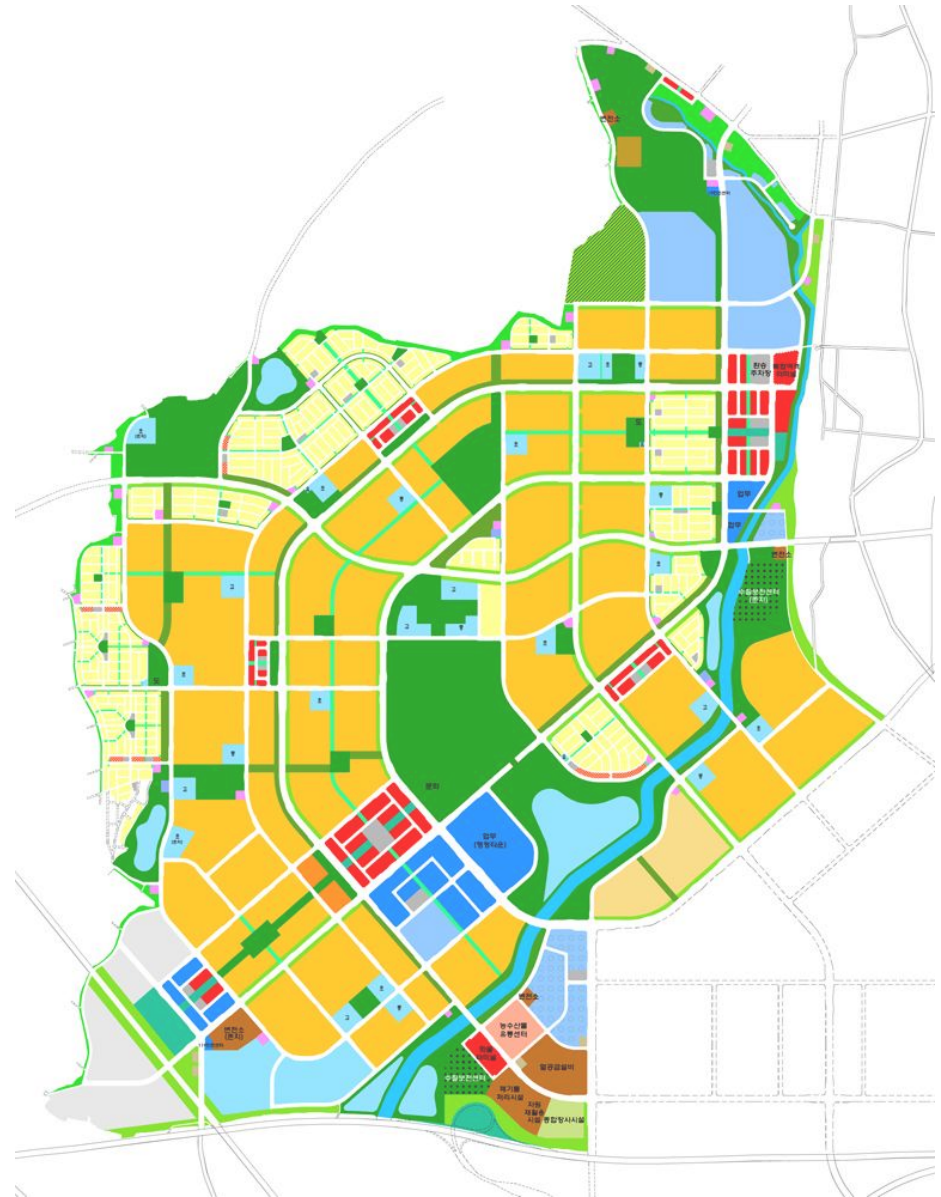
Go-Duk International City Plan

1. Synopsis of Go-Duk International City
2. Low Carbon Land Use and Transportation Plan
3. Carbon Neutral Park and Waterfront Plan
4. Low Carbon Green Architecture Plan



1. Synthesis of Go-Duk International City Plan

- **Development Concept :**
Sustainable Carbon Neutral City
- **Location :**
New City District, Pyeong-Taek,
Kyoung-Ki-do,
- **Area :**
13,500,000m²
- **Planned Population :**
140,000 (54,000 Families)



1. Synthesis of Go-Duk International City Plan

Carbon Neutral City Planning Strategy

Carbon Neutral City Planning Strategies

Carbon Reduction
Strategy 1



Low Carbon
Green Land Use ·
Transportation

Carbon Reduction
Strategy 2



Low Carbon
Green Space

Carbon Reduction
Strategy 3

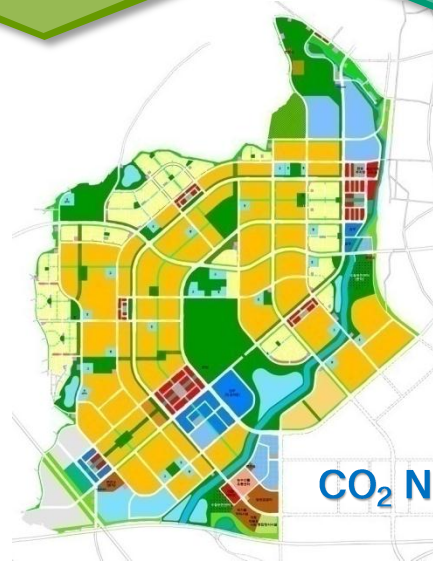


Low Carbon Green
Energy Resource

Carbon Reduction
Strategy 4



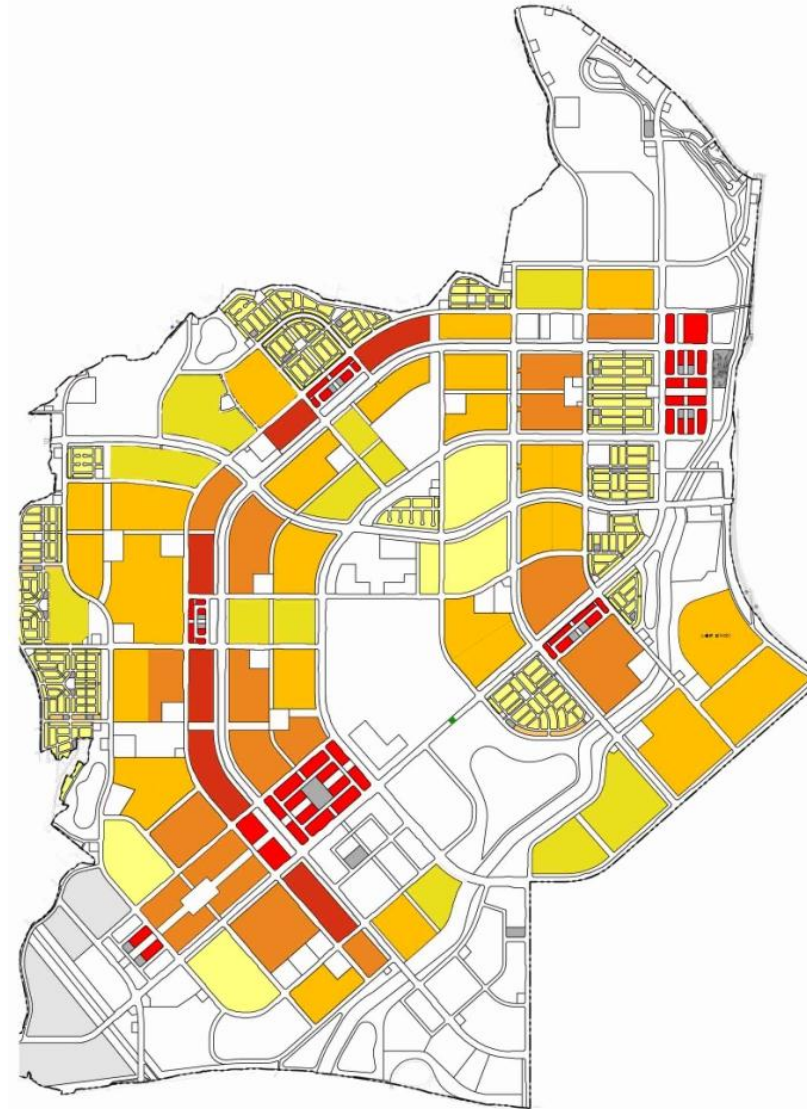
Low Carbon Green
Architecture



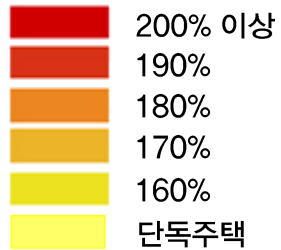
CO₂ Neutral City

2. Low Carbon Green Land Use and Transportation

T.O.D based Land Use Plan

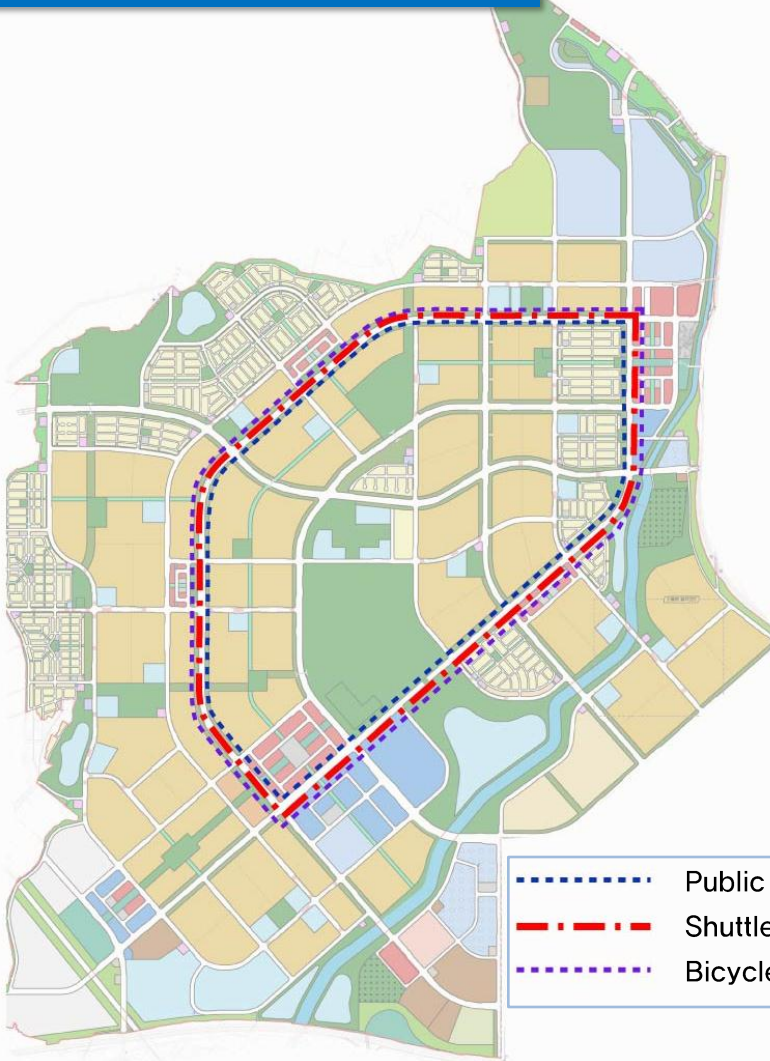


Floor
Area
Ratio



2. Low Carbon Green Land Use and Transportation

Carbon Neutral Road Plan



- Public Transportation
- Shuttle Bus
- Bicycle

Carbon Neutral Road



Low Carbon Shuttle Plan

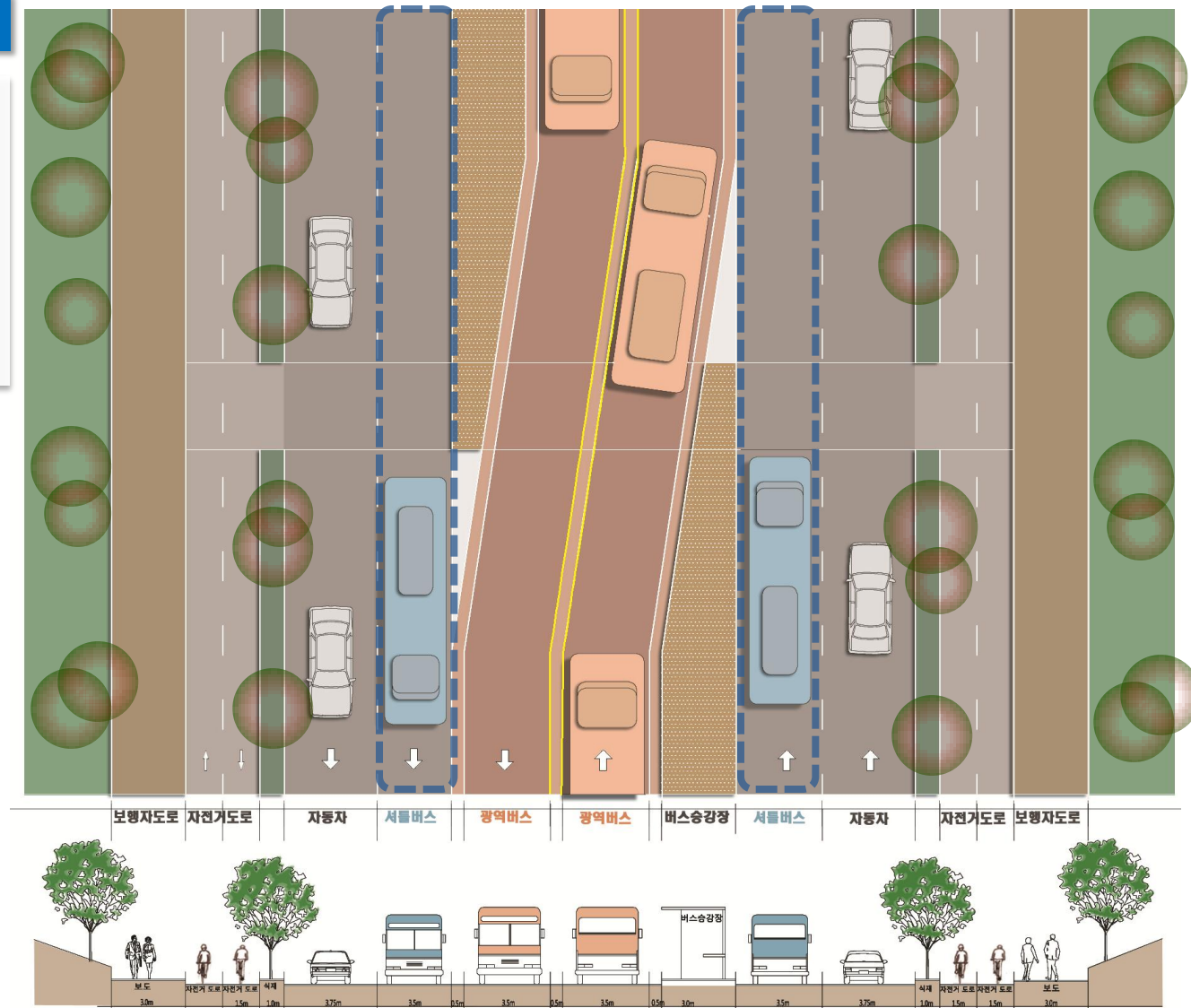


2. Low Carbon Green Land Use and Transportation

Carbon Neutral Road Plan

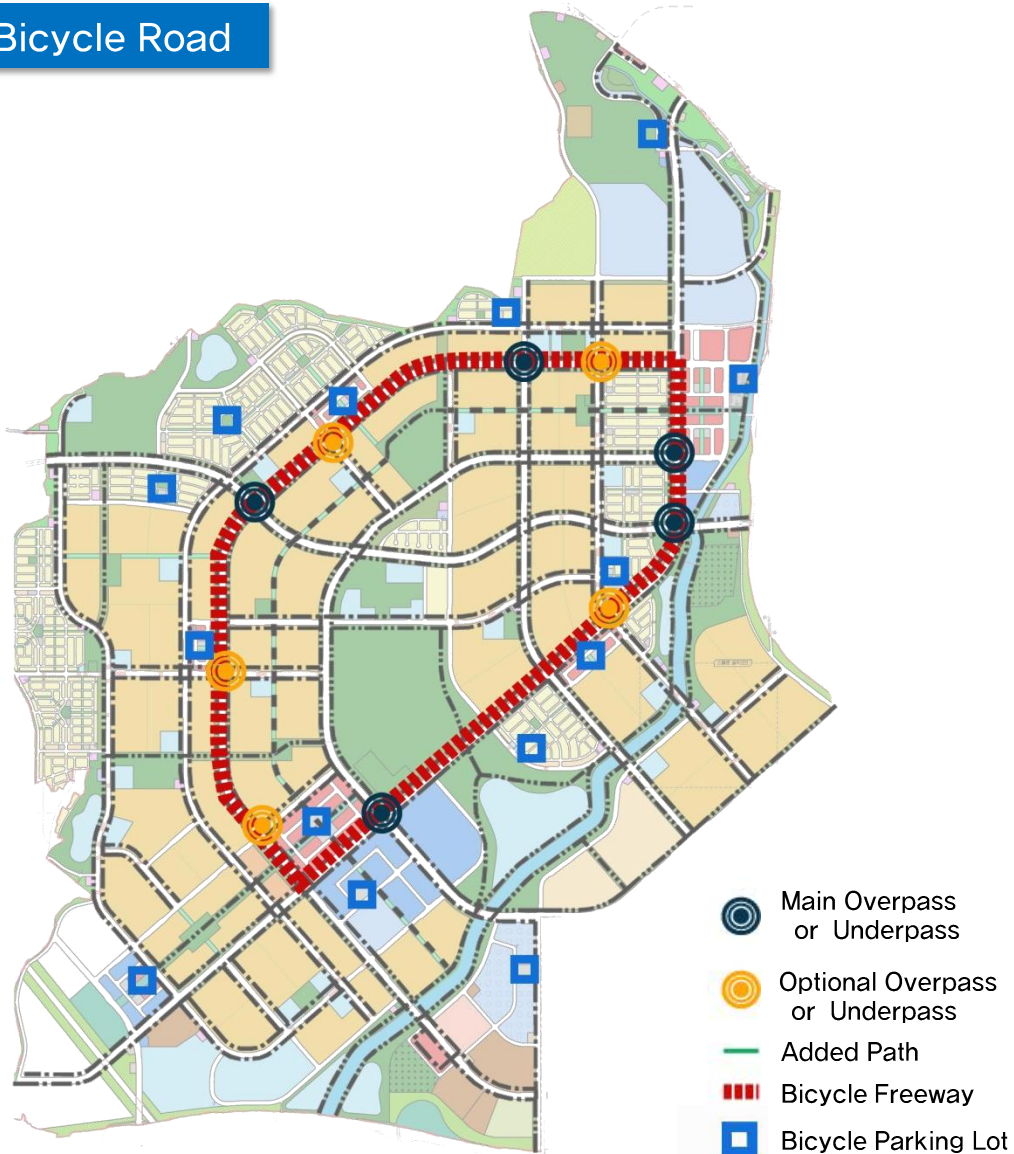
Carbon Reduction Rate

- CNG Bus : CO₂ 17% Reduction
- Hybrid Bus vs Diesel Bus : CO₂ 20% Reduction, Fuel Use 30% Reduction



2. Low Carbon Green Land Use and Transportation

Bicycle Road

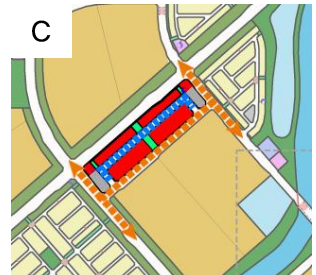
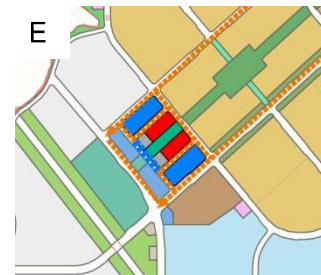
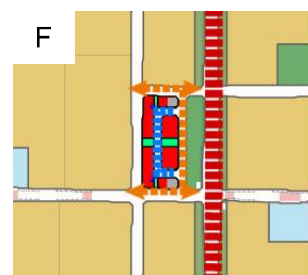
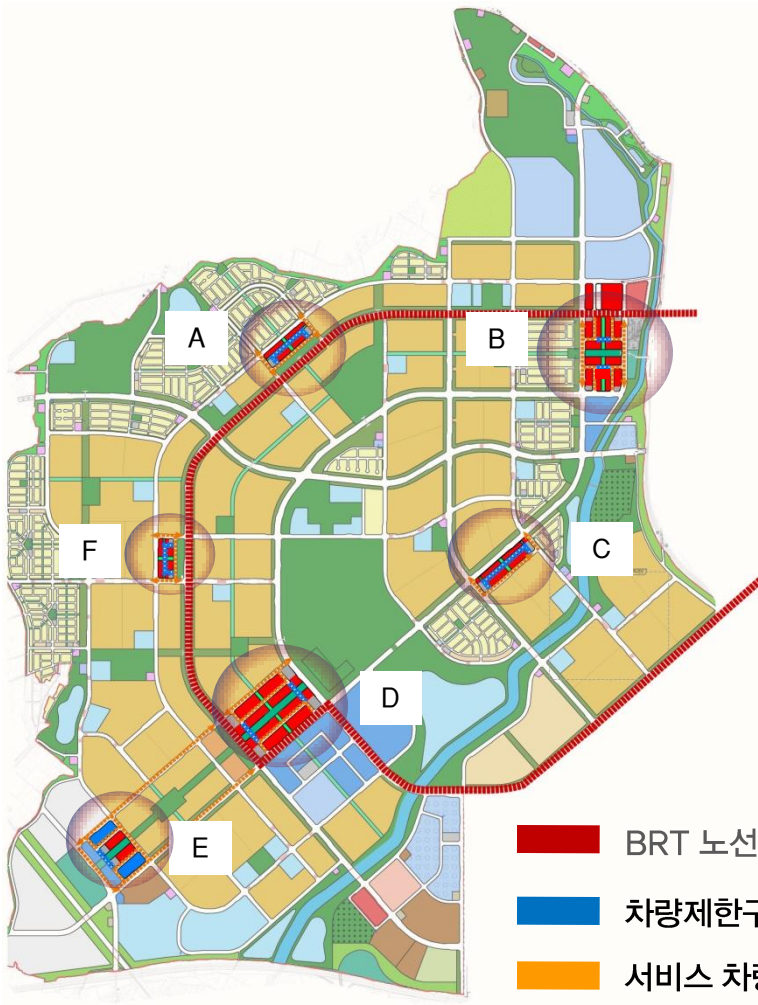


Public Bicycle + Navigation



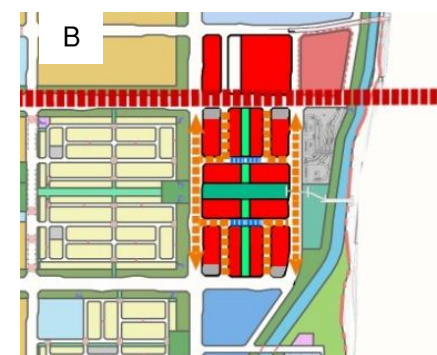
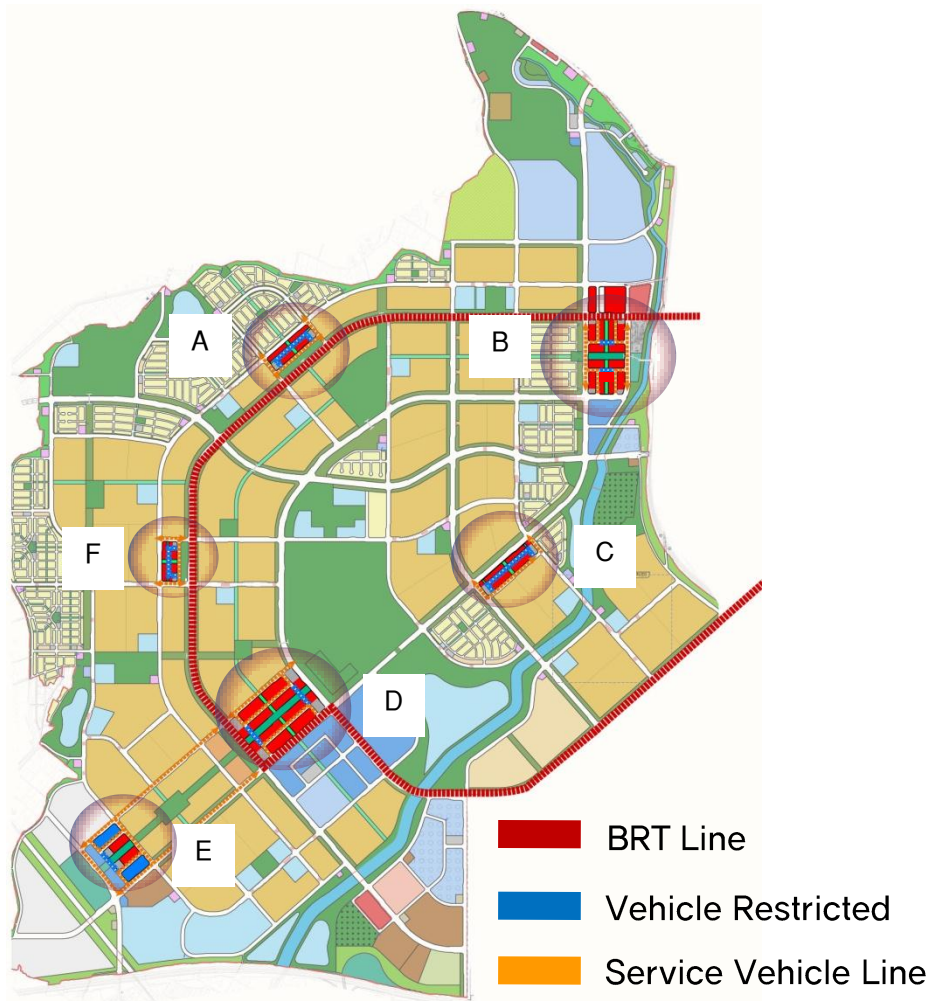
2. Low Carbon Green Land Use and Transportation

Pedestrian-only Pathway



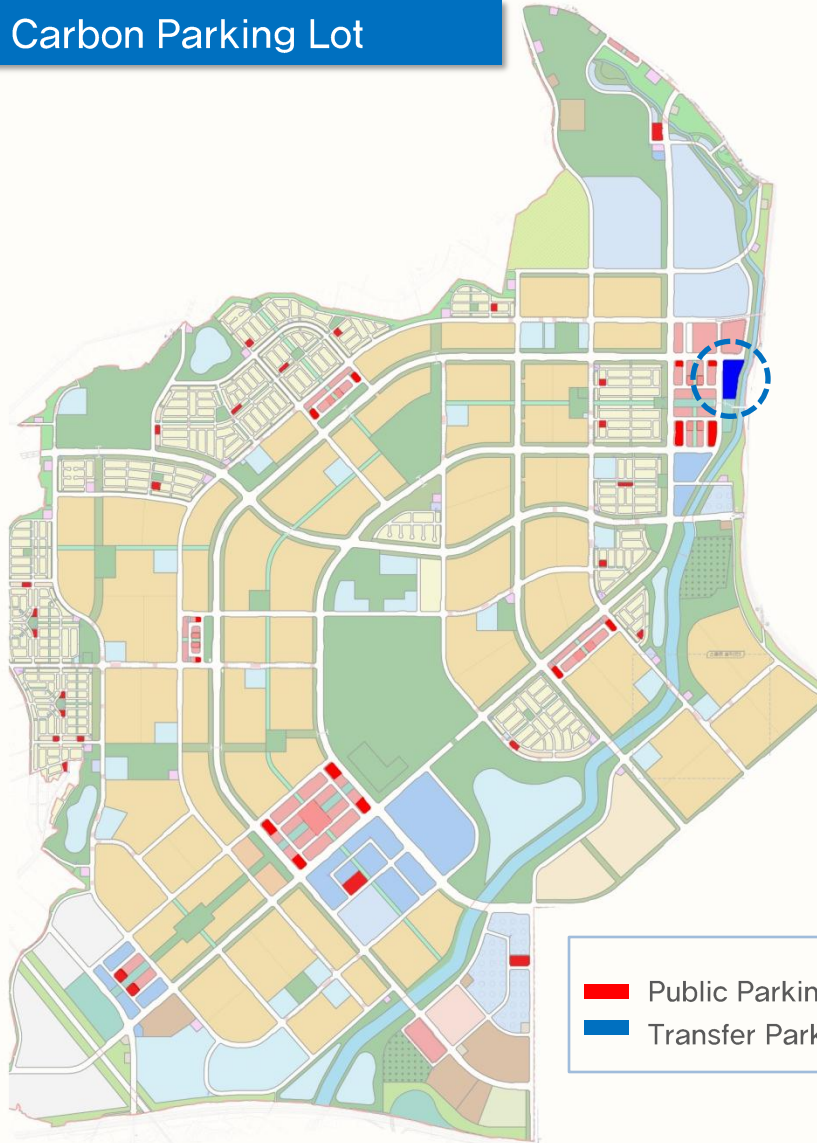
2. Low Carbon Green Land Use and Transportation

Pedestrian-only Pathway



2. Low Carbon Green Land Use and Transportation

Low Carbon Parking Lot



- Public Parking Lot
- Transfer Parking Lot

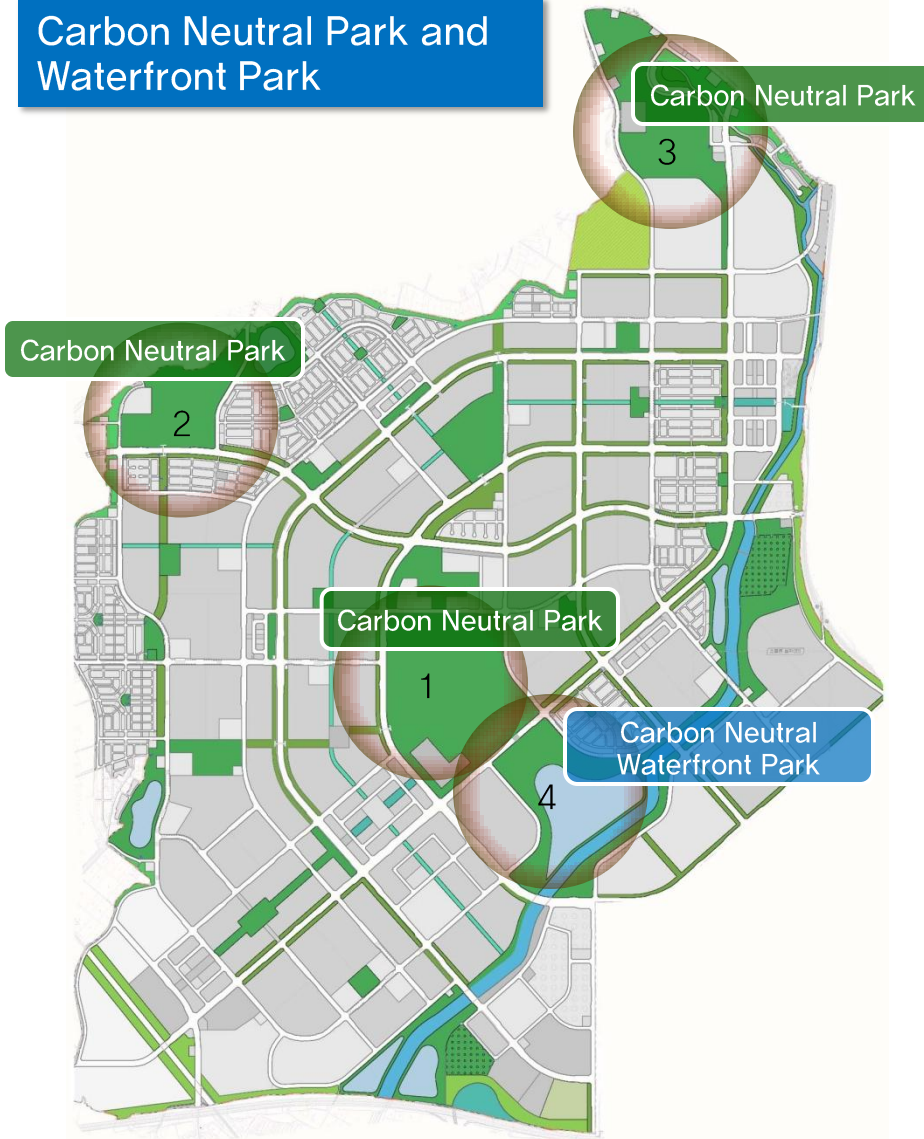
Low Carbon Parking Lot Plan

- Green Paving
- Energy Production in Parking Lot



3. Carbon Neutral Park and Waterfront Park

Carbon Neutral Park and Waterfront Park



Carbon Neutral Park

- Carbon Reduction : $91.92 \times 6.92 = 2,300 \text{ ton}\cdot\text{C}$
- Area 1 : $468,657.48\text{m}^2$
- Area 2 : $175,207.82\text{m}^2$
- Area 3 : $275,414.49\text{m}^2$
- Total : $919,279.80\text{m}^2 (91.92\text{ha})$
- / ha Carbon Absortion : $6.92 \text{ ton}\cdot\text{C}$



Carbon Neutral Waterfront Park

- Carbon Reduction : $104.6272 \times 6.92 = 2,655 \text{ ton}\cdot\text{C}$
- Area 4 : $1,046,272.08\text{m}^2 (104.6272 \text{ ha})$
- / ha Carbon Absortion : $6.92 \text{ ton}\cdot\text{C}$



3. Carbon Neutral Park and Waterfront Park

Carbon Neutral Experience Park

Carbon Neutral Experience Park
Proposed Site



Carbon Neutral Experience Park

- Renewable Energy experience Facilities
- 공원의 Energy Production for Park Maintenance



4. Low Carbon Green Energy and Resources Plan

Renewable Energy System



Renewable Energy System

- LED Street Light along the Seo-Jung-li Stream
- Solar Lily Pad, Solar Park Plan

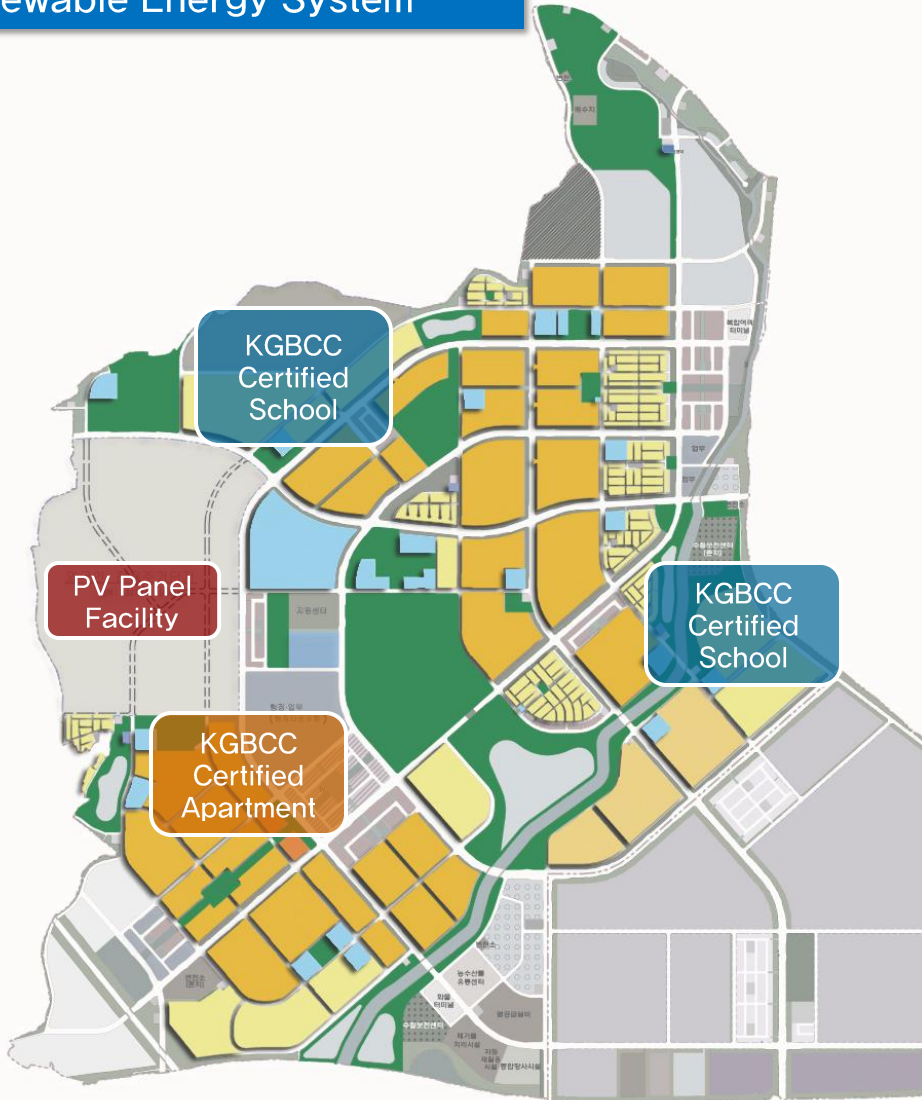


Solar Lily Pad



4. Low Carbon Green Energy and Resources Plan

Renewable Energy System



High Energy Efficiency Apartment



High Energy Efficiency Public Buildings



Thank You !