Build Back Better Plan

In response to the
Kahramanmaraş Feb. 6 Earthquakes

Formulated in February 2024
By Kahramanmaraş Metropolitan Municipality

in partnership with
Ministry of Environment, Urbanization and Climate Change,
Union of Municipalities of Turkey,
and Japan International Cooperation Agency

Kahramanmaraş Büyükşehir Belediyesi

TÜRKİYE CUMHURİYETİ
ÇEVRE, ŞEHİRCİLİK VE
İKLİM DEĞİŞİKLİĞİ BAKANLIĞI

TBB

JICA ジャイカ

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I. Introduction

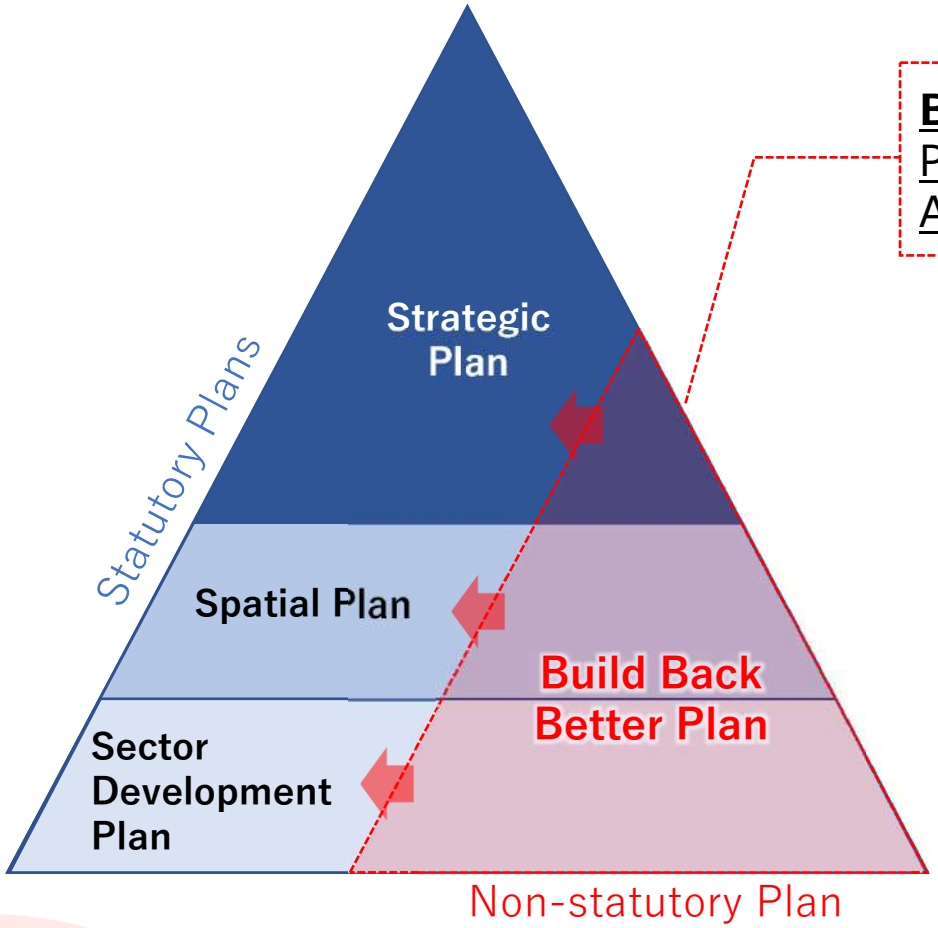
Purpose of the BBB Plan

The February earthquake in Turkey caused extensive damage to several cities, resulting in the loss of many lives. Many houses, stores, and factories were destroyed as well.

This plan was developed in response to the impact and challenges posed by the Kahramanmaraş Feb. 6 Earthquakes and overcoming these challenges in the coming decade. It is drafted with the concept of “Build Back Better”, which is described in the Sendai Framework for Disaster Risk Reduction.

The plan is carefully examined and formulated with the **aim of helping affected citizens rebuild their lives and envisioning the future of the city**. It is formulated following the exchange of views, along with the collection and analysis of information from August 2023 to February 2024.

Concept of the “Build Back Better Plan (BBB Plan)”



BUILD BACK BETTER PLAN
Period: 10 years from the formulation (~2034)
Area: Focus on the disaster affected area in Kahramanmaraş

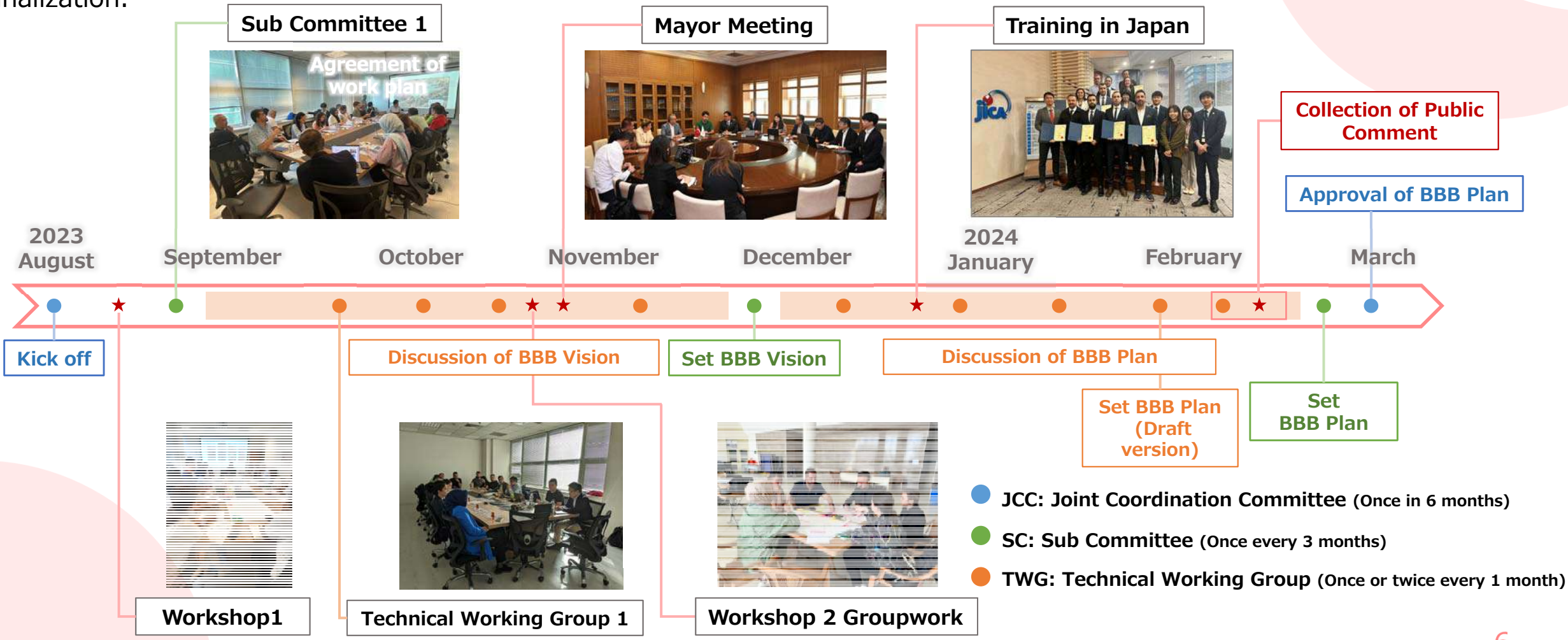
The **Build Back Better Plan** is a comprehensive strategy that leads to a series of projects for the disaster-affected area with the goal of developing or improving the area **beyond the original situation**.

It involves not only physical infrastructure projects but also policies to add values to social and economic environment, considering long-term development and sustainability.

The plans and projects proposed in the BBB Plan will be reflected into the future plans of the respective organizations.

Process of BBB Plan Formulation

The BBB Plan was developed under the leadership of the KMM. Following the earthquake, it was further refined with the assistance of JICA experts, as per the request of the KMM. Opinions were gathered through workshops, technical working groups, and surveys to related organizations and departments. The public comment on the draft was also conducted before finalization.



What's Sendai Framework for Disaster Risk Reduction?

Scope & Purpose

Applies to all scales and types of disasters (whether natural or manmade) and addresses various hazards and risks. It aims to **provide guidance for multi-hazard management of disaster risk during development, at all levels, and across all sectors.**

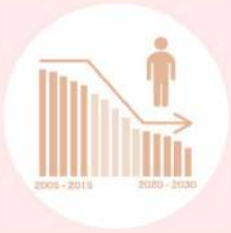
Goal

Prevent new and reduce existing disaster risk by implementing integrated and inclusive measures in **various domains**. Minimize hazard exposure and vulnerability to disasters, enhance preparedness for response and recovery, and ultimately strengthen overall resilience.

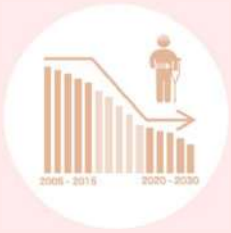
- ✓ Economic
- ✓ Structural
- ✓ Legal
- ✓ Social
- ✓ Health
- ✓ Cultural
- ✓ Educational
- ✓ Environmental
- ✓ Technological
- ✓ Political
- ✓ Institutional

7 Targets

Reduce mortality



Reduce affected population



Reduce economic loss

Reduce social, infrastructural damage

Develop risk reduction strategy

Enhance cooperation

Early warning system

*Adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on March 18, 2015.

BBB in Recovery and Reconstruction (Post-disaster)

Build Back Better to:

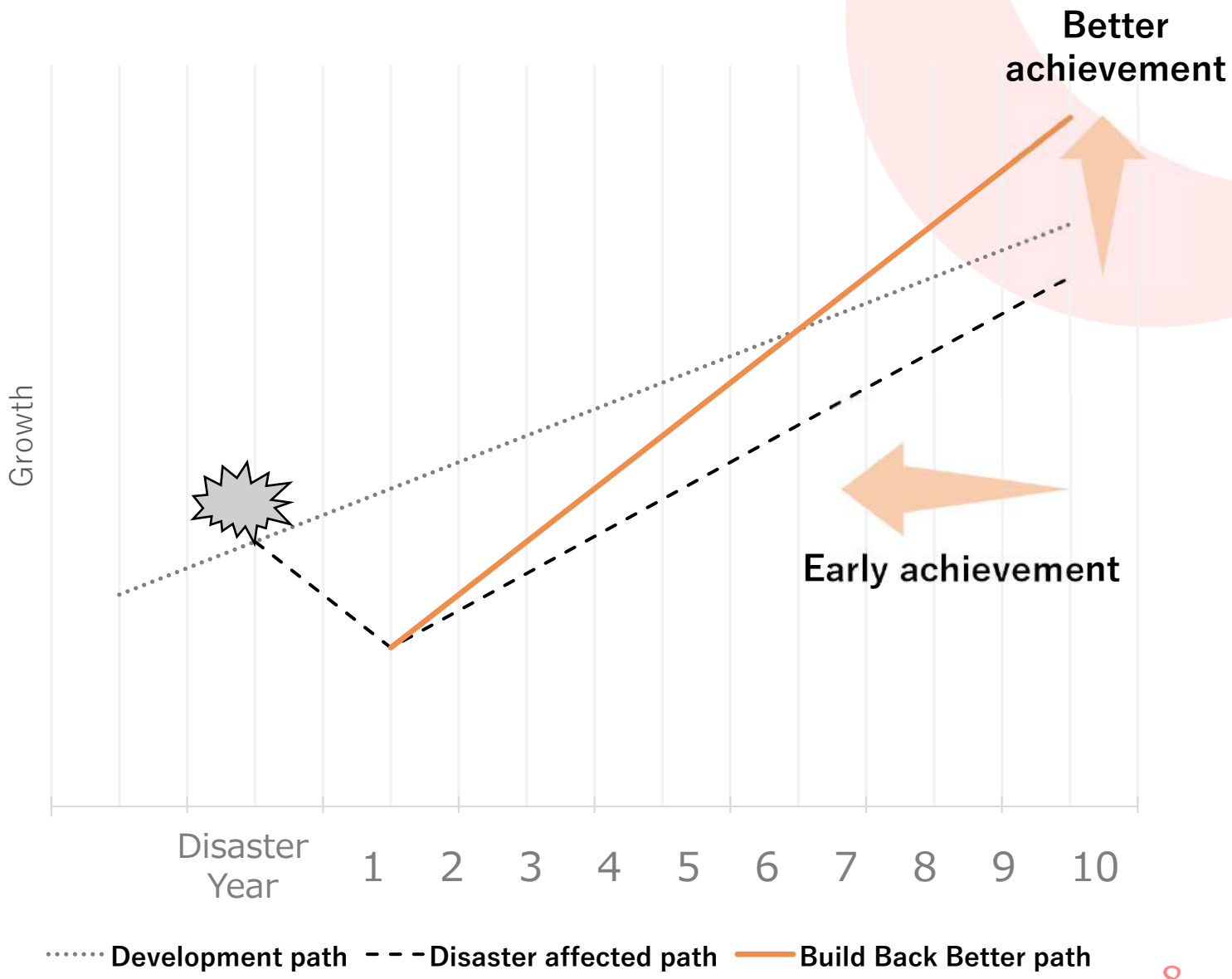
- ✓ Prevent risk creation
- ✓ Reduce existing risk
- ✓ In short, medium and long term

Achieve through:

- ✓ Land-use planning
- ✓ Structural standards improvement
- ✓ Sharing of experience, knowledge, and lessons

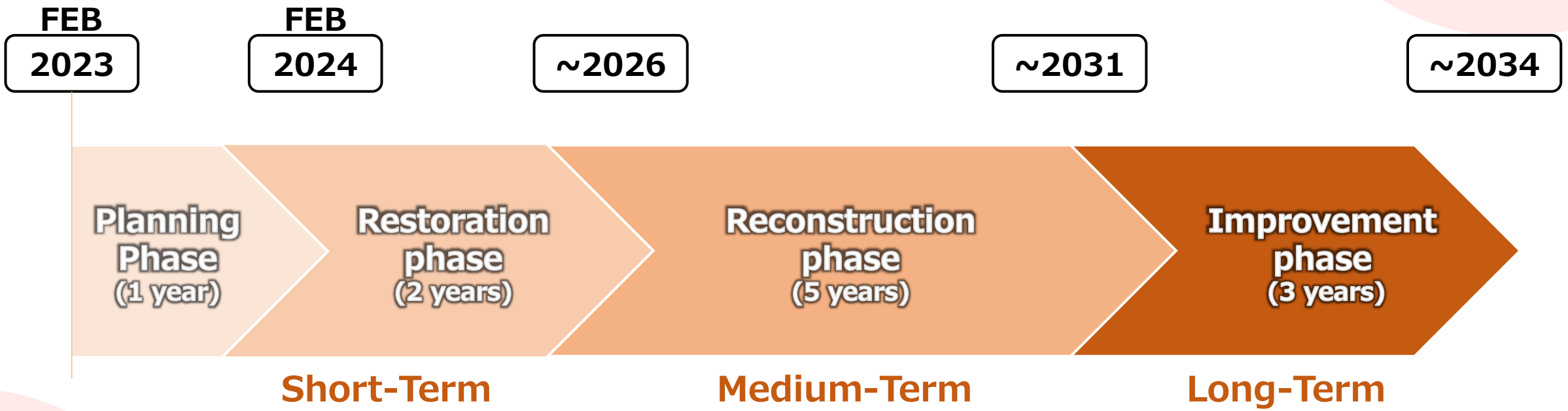
BBB Plan is a chance for:

- ✓ Strengthen economic, social, health and environmental resilience.
- ✓ Integrate post-disaster reconstruction into sustainable development.
- ✓ Address urban challenges and other issues on a large scale.



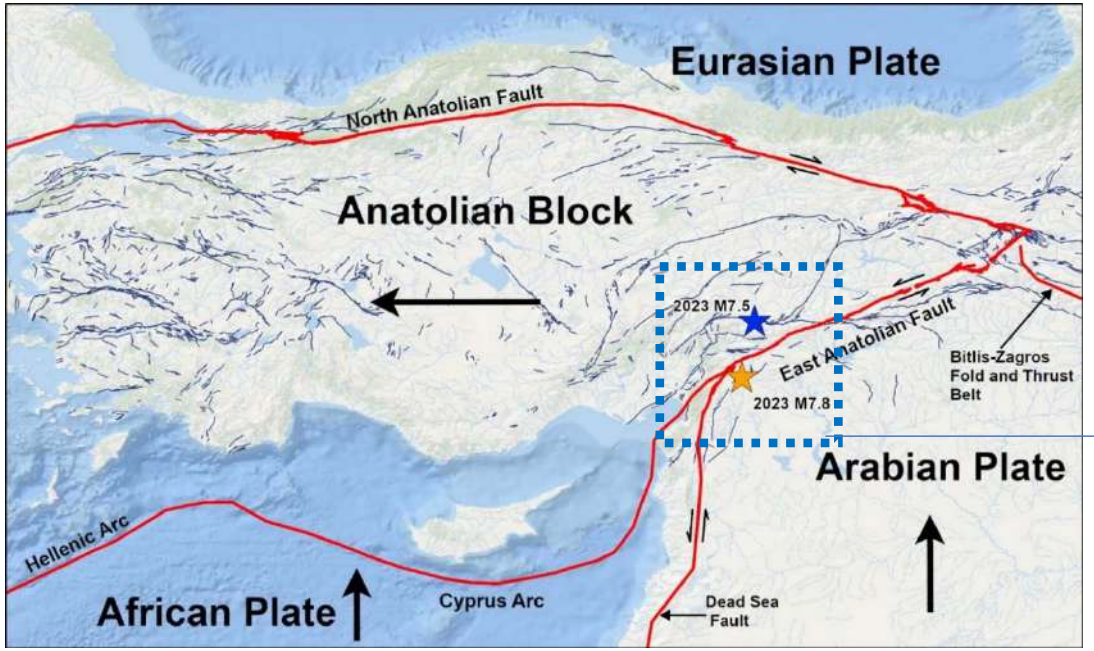
BBB Plan Timeline

The **B**uild **B**ack **B**etter **P**lan will address the medium to long-term vision and projects, which can be achieved within **10 years** after the formulation of this Plan.

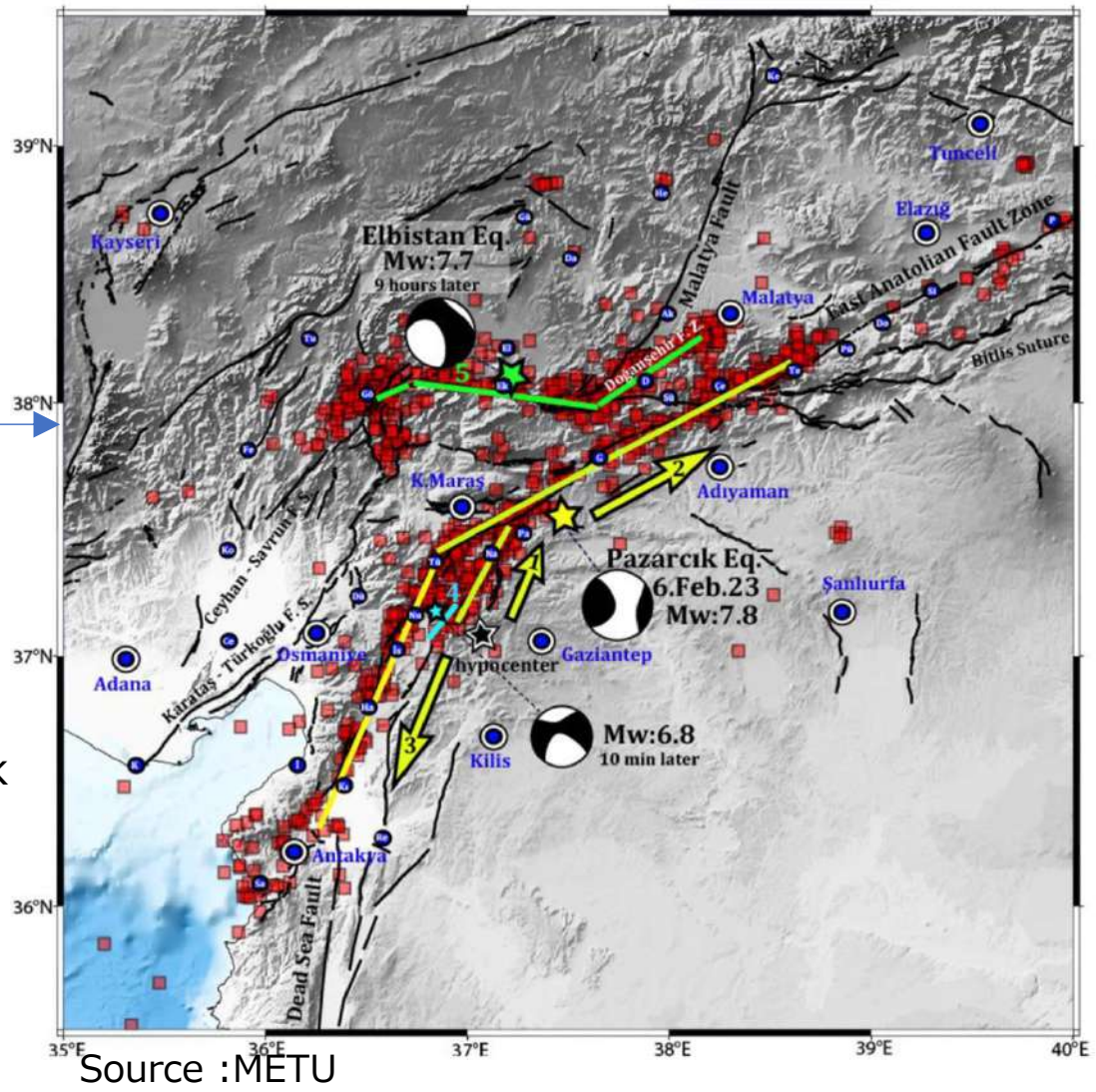


II. Outline of the Earthquake Damages

Outline of the 6th February 2023 Earthquakes



Source :USGS

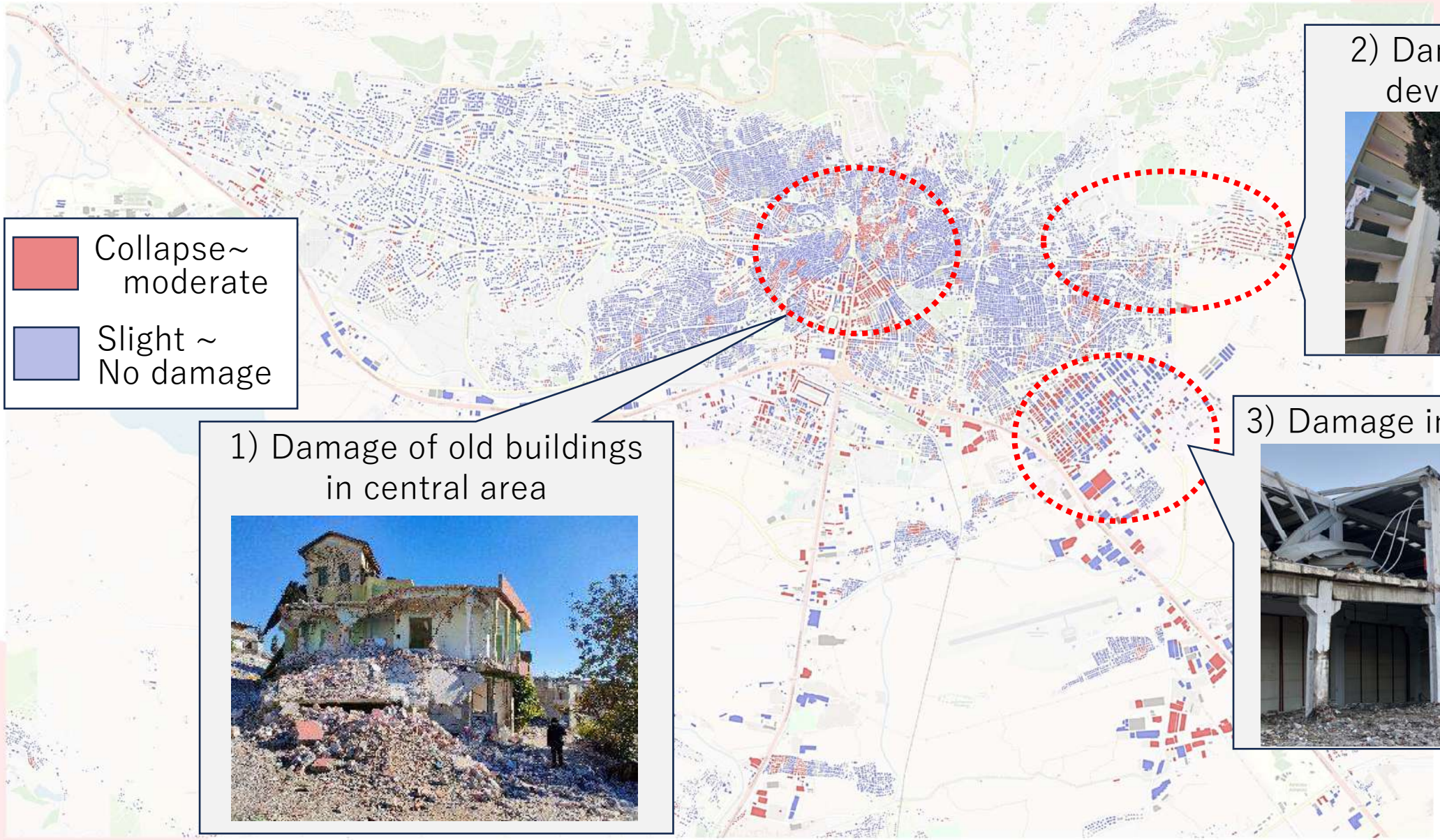


Source :METU

The earthquake affected area is located near the plate boundary between the Arabian Plate and the Anatolian Block (plate) and is one of the most seismically active areas in Turkey.

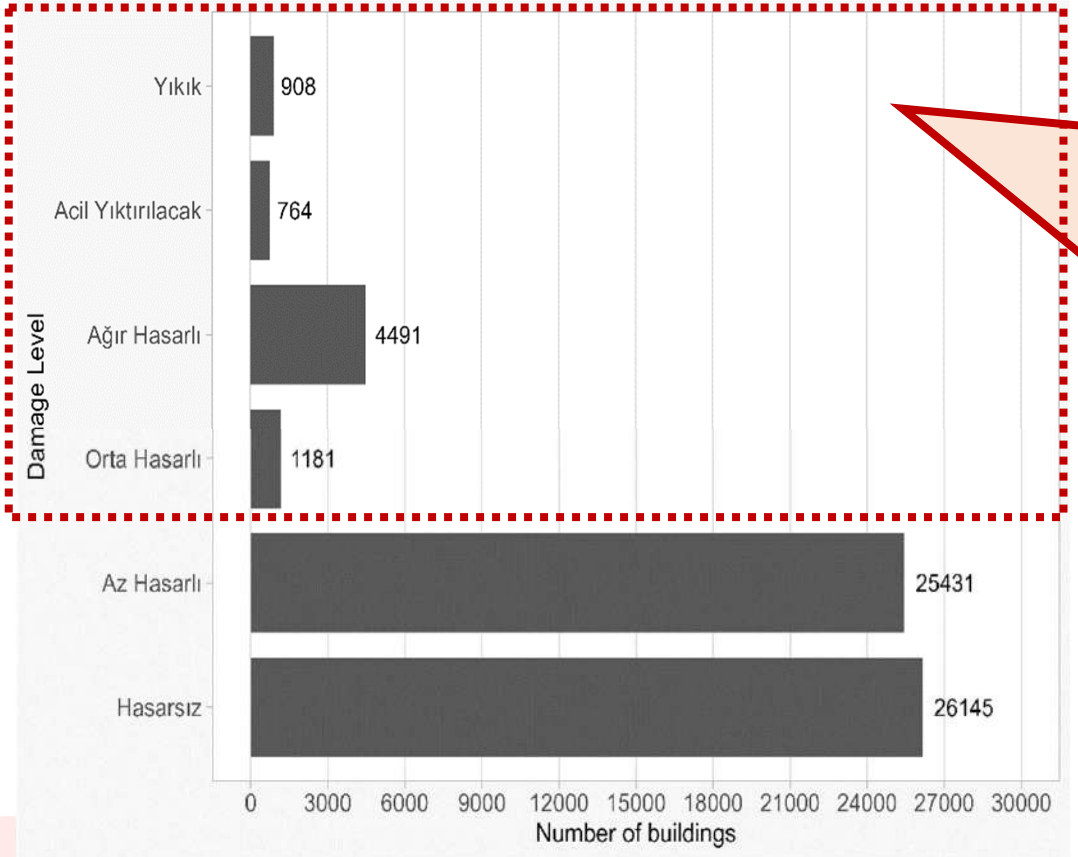
On 6th February, 2023, the epicenter was located near Pazardzhuk, Kahramanmalash, on the East Anatolian Fault, with a moment magnitude (Mw)7.8 (USGS) earthquake occurred at 4:17 (1:17 GMT). Approximately 9 hours later, another earthquake of Mw7.5 occurred. The two earthquakes occurred on different fault segments.

Building Damages in Central Kahramanmaraş

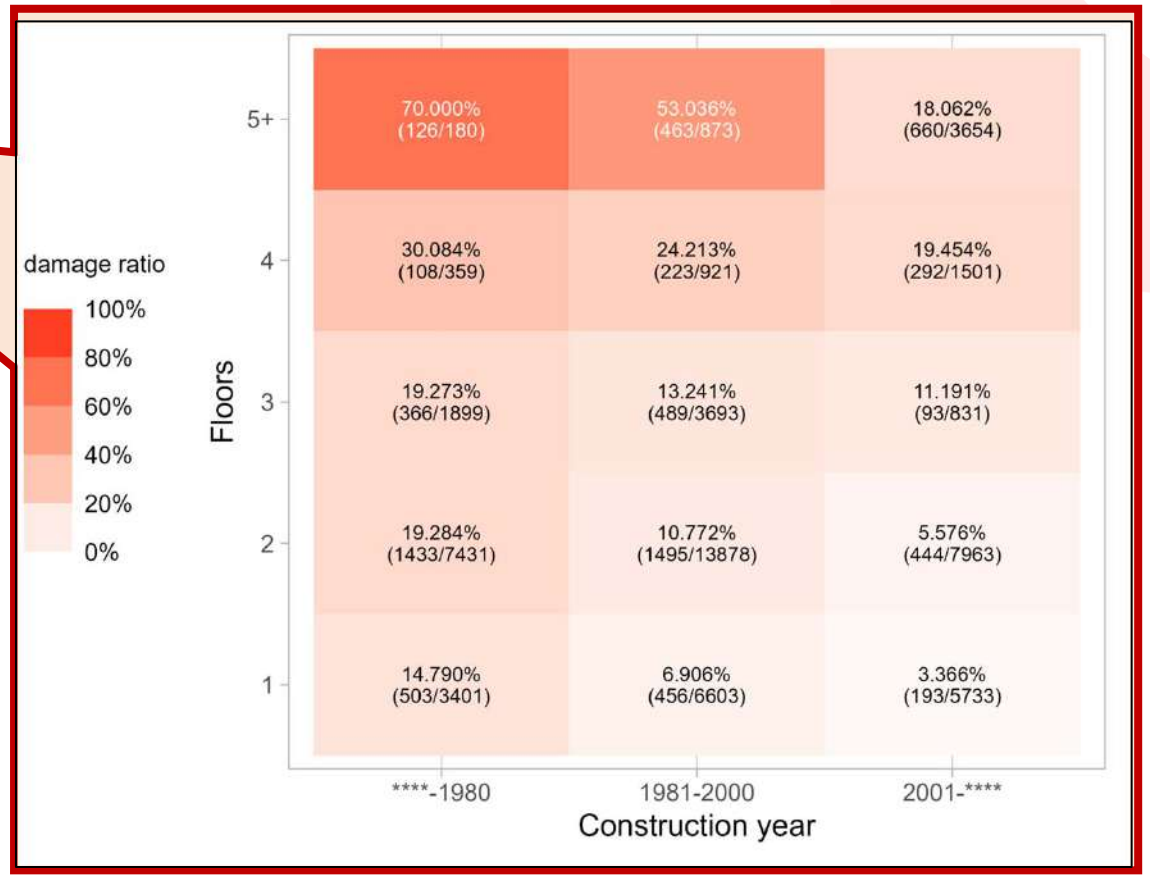


Building Damage in Central Kahramanmaraş

- **Damage Volume in central Kahramanmaraş**



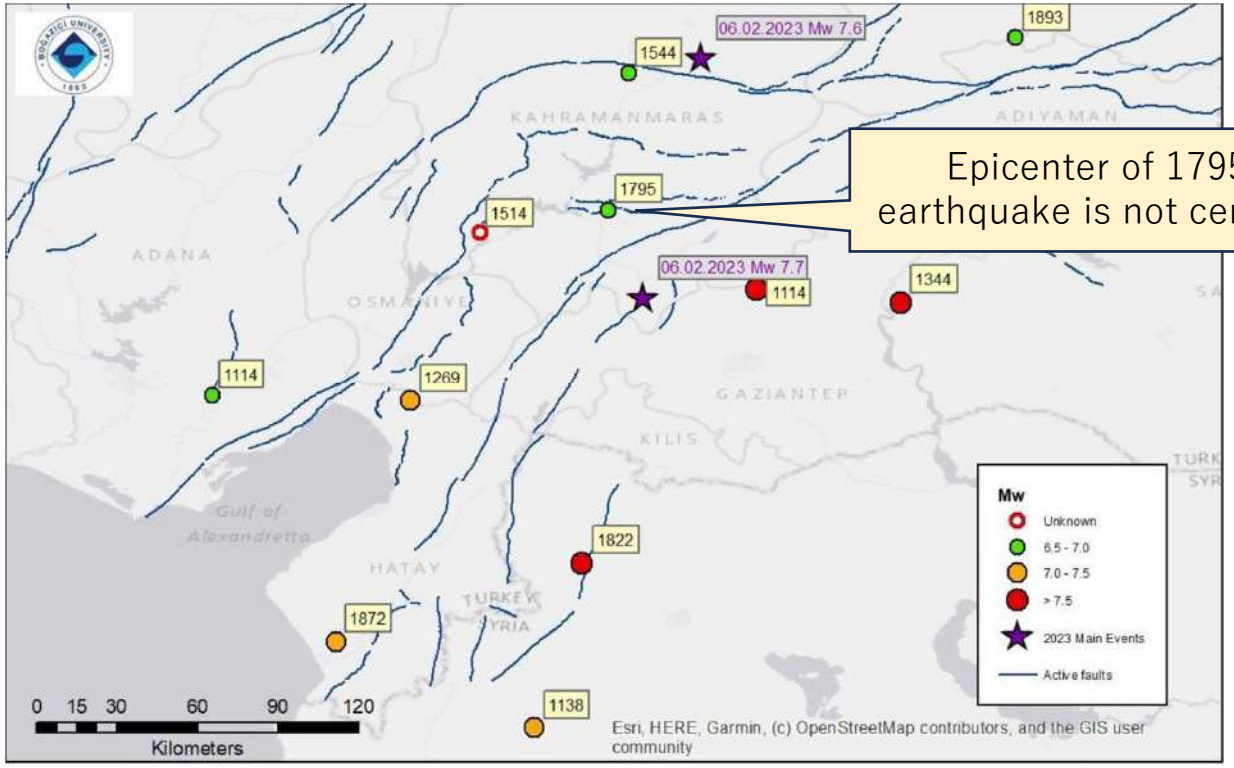
- **Damage Characteristics**



- In the Central Kahramanmaraş, 12% of total buildings got bigger than moderate damage.
- As a damage characteristic, older and higher story buildings got much damage ratio.
- Even newly constructed buildings had damage by earthquake.

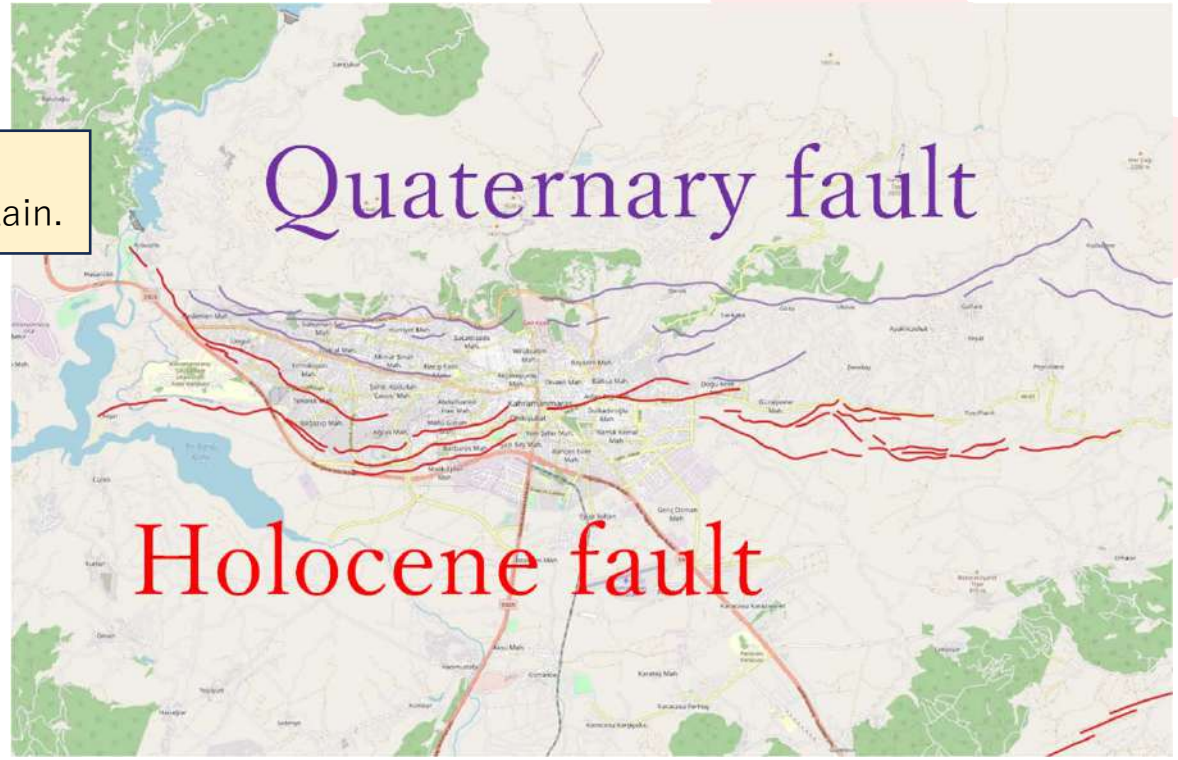
Historical Earthquake and Active Fault around Maraş

Distribution of Historical Earthquakes



Source: K. Sesetyan(2023)

Fault map by MTA



Source: MTA

- Devastating earthquakes hit Kahramanmaraş in 1114, 1514, 1544, and 1795 in the history.
- Activeness of Holocene fault in Kahramanmaraş active fault group is under evaluation.
- In any case, proper measures against earthquake should be taken for earthquakes in the future.

Root Causes of Building Damage and Necessary Measures against future earthquakes

1) Existing old and vulnerable buildings were damaged
>[What to do?] Urban Transformation in systematical way.

2) Even new buildings were damaged
>[What to do?] Promotion to properly comply with building permits

3) Geological data is not well surveyed and properly organized
>[What to do?] Develop a database for geological/geophysical data.

4) Disaster risk management is not organized
>[What to do?] Set up the taskforce to cope with disaster risk management
>[What to do?] Disaster research center & Earthquake Memorial Museum.

III. BBB Vision and Principles

Earthquake Damages and Urban Issues

Buildings

- **Fragile building stocks**: 18% of the remained buildings were built before 1980.
- **Lack of awareness**: Many buildings were built without getting building permit

Infrastructure

- **Damages**: Estimated at 75-80% of water loss ratio after earthquake
- **Vulnerability**: Deterioration of facilities, insufficiency of their capacity for demand

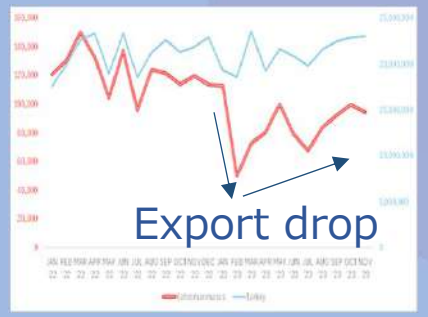
City

- **Single core structure**: urban function (commercial / administrative) are concentrated
- **Lack of monitoring**: urbanization projects are not well coordinated with population demand

Earthquake Damages and Urban Issues

Industry

- **High manufacturing dependency**: 53% of regional economy through Manufacturing
- **Heavy earthquake impacts:** exports (21% down) and employment (10% down) decreased



Culture & Tourism

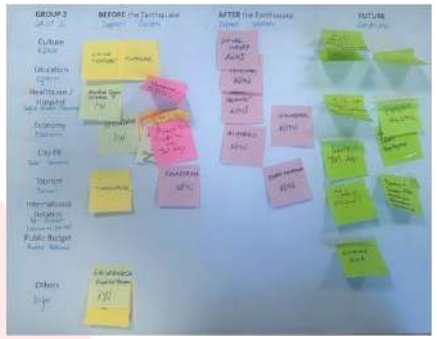
- **Damage to cultural assets**: castle and mosques require attentive restoration
- **Lack of tourist facilities**: lack of accommodation limits tourists to less than 300,000 ppl

Environment & Welfare

- **Debris management**: Appropriate treatment/ recycling of debris are necessary to be applied.
- **Needs for social care**: long-term care is demanded for improving the quality of life

Ideal Image of Kahramanmaraş city

Ideal Images raised in the Workshops
A city with a better **quality** of life.
A **safe, resilient** and **comfortable** city.
City with more **social opportunities**.
An **infrastructure** and **culturally** developed city.
A city that boasts **natural beauty**.
Youth-oriented and **socially interesting**.
A city that values its **cultural heritage**.
A city with strong ties to its **historical heritage**.
A **sustainable** and **smart** city.
A city that everyone can **enjoy**.
A **respectful** city.



Vision

BBB Vision
Resilient, culturally rich, and sustainable city for all
(Uniting safety with prosperity and environmental responsibility)

Principle

SAFE CITY
Safe & Resilient

CITY FULL OF OPPORTUNITY
Economic & Educational

CULTURAL CITY
Social & Cultural

SUSTAINABLE CITY
Green & Environmental

ADVANCED & INCLUSIVE CITY
Smart & Inclusive

Kahramanmaraş's BBB Vision

BBB Vision

Resilient, culturally rich, and sustainable city for all

(Uniting safety with prosperity and environmental responsibility)

The ***vision*** for the build back better plan for earthquake reconstruction envisions creating a resilient, culturally rich, and sustainable city that prioritizes the safety, prosperity, and environmental responsibility of its citizens.

This comprehensive approach aims to rebuild not only the physical infrastructure but also the social and ecological balance of the community. ***Resilience*** is emphasized to withstand future seismic events, ensuring the safety of residents and structures.

Culturally rich elements focus on preserving and celebrating the Kahramanmaraş's cultural heritage and diverse identity, fostering a sense of belonging and pride among the population.

Sustainability is a core principle, with a commitment to environmentally responsible practices that minimize the city's ecological footprint and contribute to long-term environmental health.

By uniting safety with prosperity, the plan seeks to create a city where economic growth and individual well-being are not compromised by the potential risks of earthquakes. This holistic vision aims to establish a model city that embodies the principles of resilience, cultural richness, and sustainability, serving as a beacon for other communities facing similar reconstruction challenges.

Principles

SAFE CITY

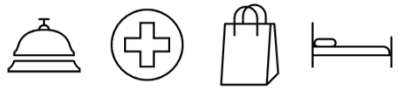
Safe & Resilient

Safety and security, Planning, Housing sector, Road sector

Ensuring immediate safety through robust buildings and infrastructure, while also emphasizing adaptability and recovery after earthquakes.

CULTURAL CITY

Social & Cultural

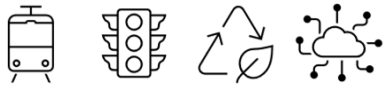


Tourism, Cultural facility, Community enhancement, Health & Well-being

Emphasizes social connections and cultural richness, nurturing a vibrant community that celebrates diversity and heritage.

ADVANCED & INCLUSIVE CITY

Smart & Inclusive



Comfortable transport, Energy management, R&D, Psychologic care

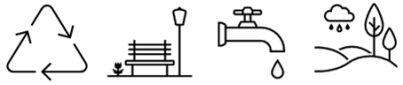
Integrates smart technologies and embraces inclusivity, promoting innovation, accessibility, and equal opportunities for all residents.

Industrial park, New industry, Employment increase, Education & Training

CITY FULL OF OPPORTUNITY

Economic & Educational

Fostering a robust economic and industrial environment, promoting growth, innovation, and prosperity for residents.



Waste management, Open space, Resilient infrastructure, Monitoring

SUSTAINABLE CITY

Green & Environmental

Prioritizes eco-friendly practices, conservation, and responsible resource management for long-term ecological health.

IV. Urban Structure

Urban Structure

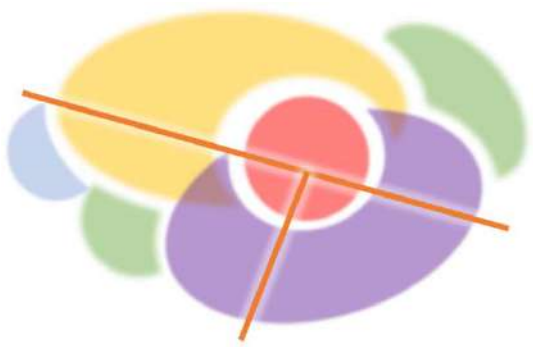
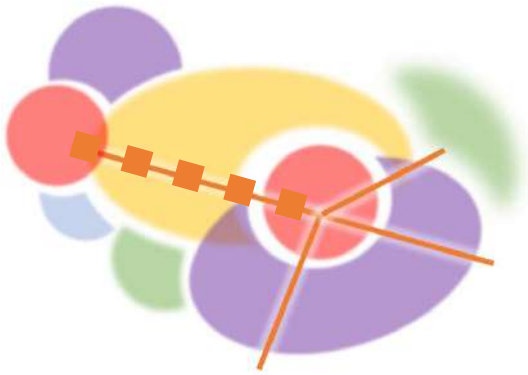
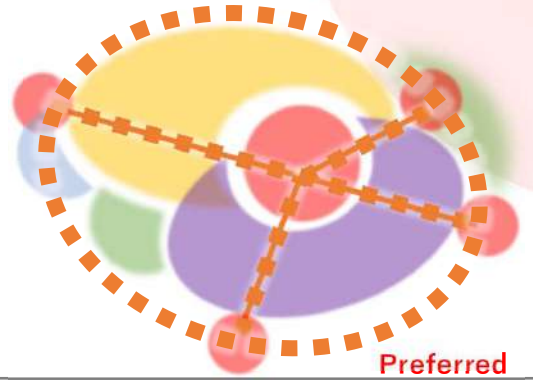
【Condition】

1. Continuous population growth
2. Central area is under renovation after the earthquake damage
3. Floor (height) limitation is implemented (low densification).

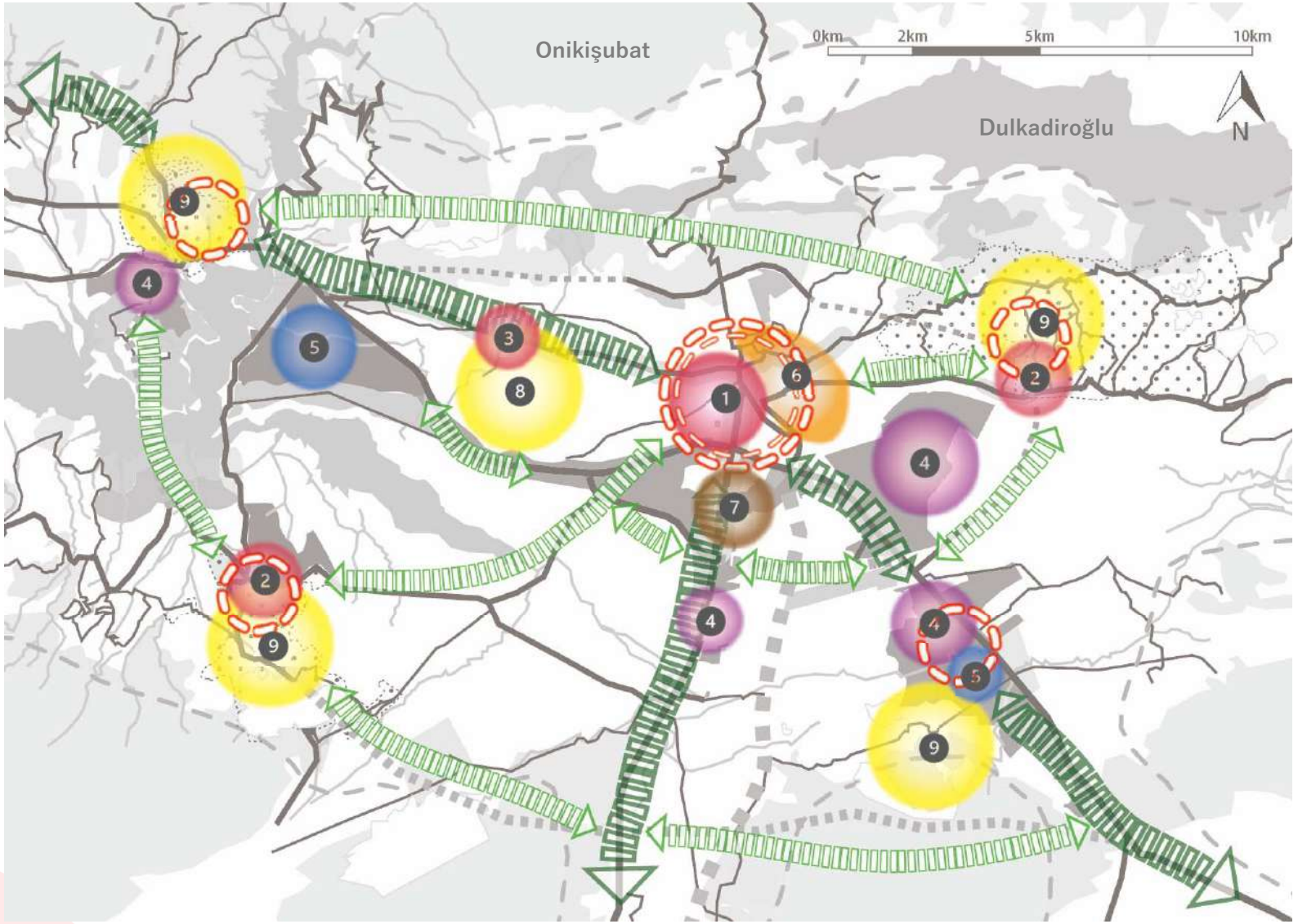
【Concept】

1. **Resiliency**
   - Formulation of resilient new cores: strong buildings with considerations to ground conditions
   - Formulation of resilient infrastructure network: construction/renewal of robust infrastructures
2. **Redundancy**
   - Redundancy of urban functions: urban structural reform from single-core to multi-core
   - Redundancy of road networks: improvement of access (inner and outer circular network) by securing multiple routes connecting cores
3. **Reservation**
   - Well-defined land use: designation of development areas
   - Utilization of local resources: respecting green and cultural assets

Pros and Cons of Urban Structures

	A. Regeneration of Central Core	B. Dual Core	C. Multi Core
			
Pros	• Relatively small investment necessity	• Divides centralization • Axis creation	• Increase accessibility • Redundancy increases safety and resiliency
Cons	• Depends on land right • Congestion increases through centralization • Lack of accessibility	• Further congestion increase in the western part • Limited accessibility	• High infrastructure investment needed • High level of stakeholder collaboration needed

Urban Structure (function)



Legend

1. Central business district
2. New sub centers
3. Commercial axis
4. Industrial sub centers
5. R&D sub center
6. Cultural sub center
7. Logistics and transit area
8. Existing residential area
9. New residential area

- Commercial
- Cultural
- Industrial
- Logistics
- Educational
- Residential
- Center
- Sub center
- Prior road network
- Secondary road network

Revitalize the city center through a comprehensive urban transformation project, incorporating small to mid-sized on-site reconstruction efforts and enhance walkability of the city. Establish new residential areas and multiple sub-centers equipped with essential social services. Enhance the road network to improve overall city accessibility. Strengthen the industrial and education sectors by leveraging the proximity of the diverse land use in sub-centers (shaping industrial knowledge hub).

V. Land Use Direction

Land Use Direction

【Condition】

1. Limited green and public spaces, and green network is not formed.
2. Urban land use direction is not clearly stated, and land use allocation is unbalanced.
3. City center, the limited flat area, received extensive damage.

【Concept】

1. Resiliency

- Formulation of green network: abundant greenery and open space for resiliency
- Formulation of blue network: reduce flood damage by integrating stormwater drainage ditches and rivers (effective use of water surface)

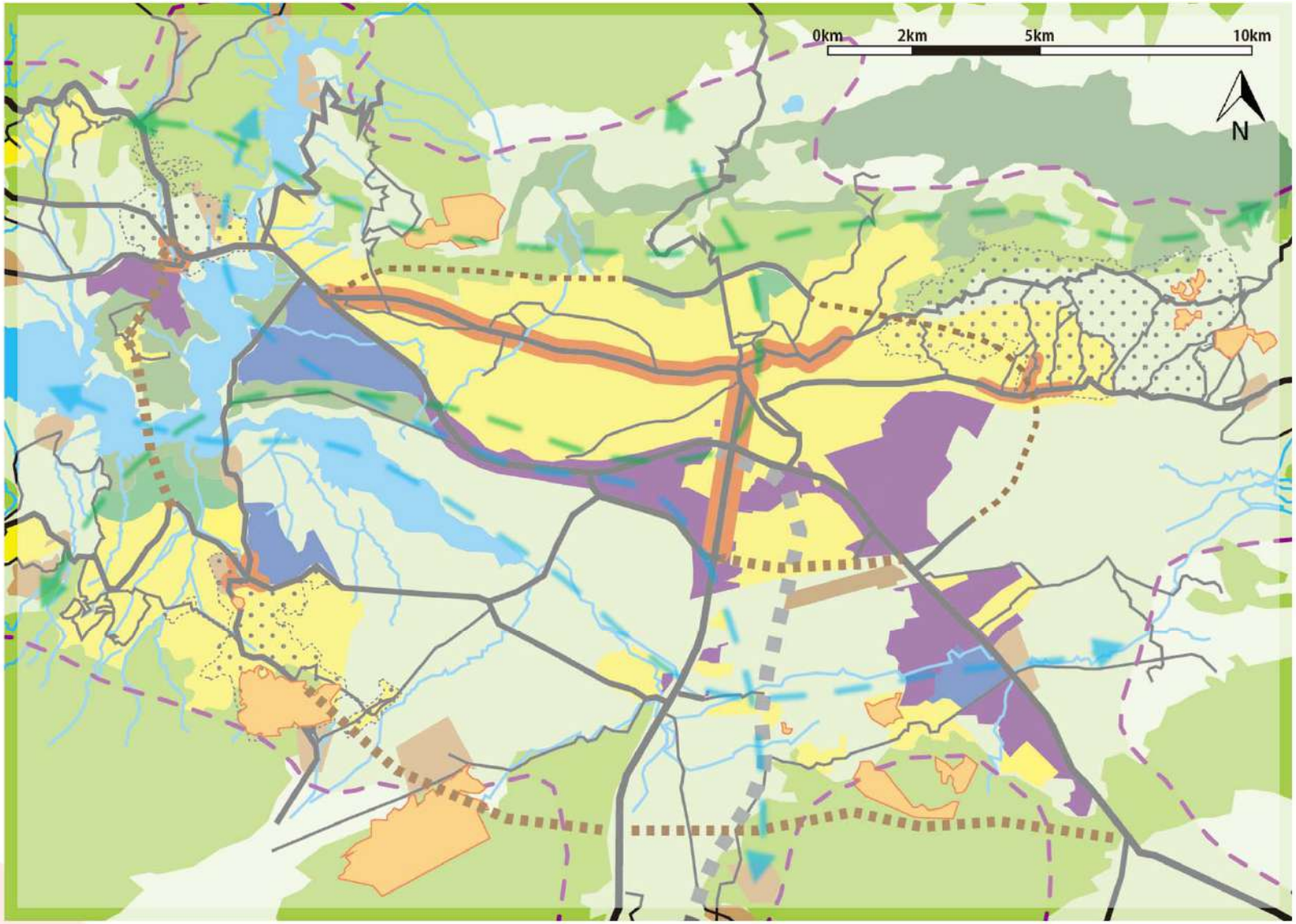
2. Redundancy

- Redundancy of land use: allocate commercial land use among major roads and new development areas (for basic social service infrastructure)
- Redundancy of residential area: allocate new residential areas in less hazardous areas (TOKI, off-site reconstruction)

3. Reconstruction

- Robust commercial and cultural city center: urban transformation project of the central area including small and mid size on-site reconstruction projects
- Construction of new bridge: additional access to the west side of the city to prevent isolation

Urban Land Use Direction



Legend

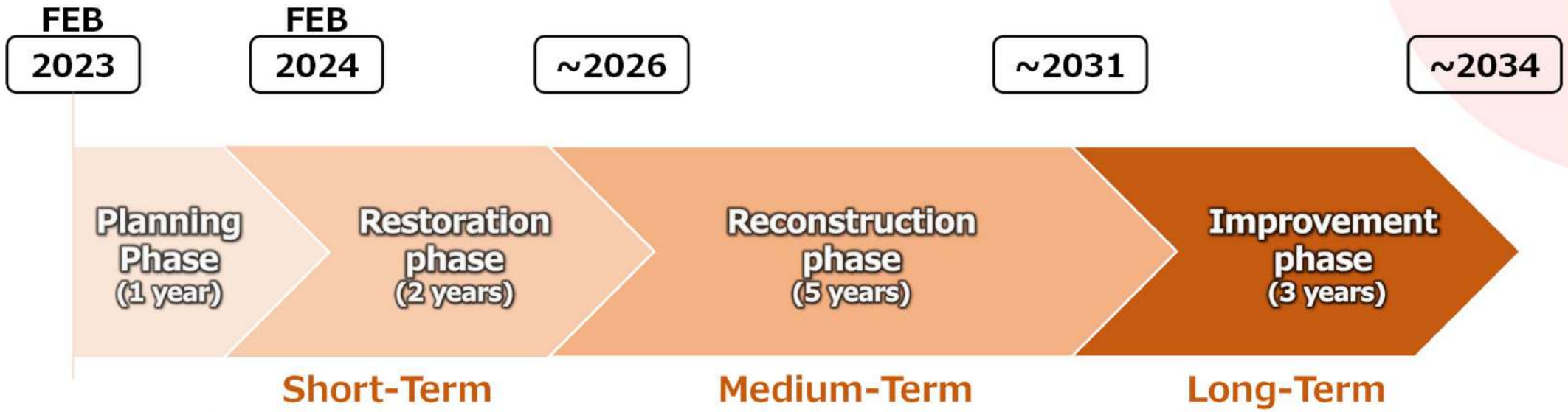
- Commercial/administration use
- Residential use
- New residential dev. (TOKI)
- Summer house use
- Industrial use
- University use
- Arterial road
- Arterial road (planned)
- Sub-arterial road
- Sub-arterial road (planned)
- Railroad
- Airport
- Urban park
- Forest area
- Forestation area
- River basin
- New zoning plan area
- Green and open space network
- Water flow network

Implement redevelopment projects on flatlands and areas with collapsed buildings through the arterial roads and the city center to foster a vibrant atmosphere through mixed-use. Expanding and connecting green areas and public spaces will establish a robust green network, while connecting waterways, rivers, and reservoirs will create a resilient water network, enhancing the overall resilience of the city and the recreation use.

VI. Phasing Development Strategy

BBB Timeline

The **Build Back Better Plan** will address the medium to long-term vision and projects, which can be achieved within **10 years** after the formulation of this Plan.



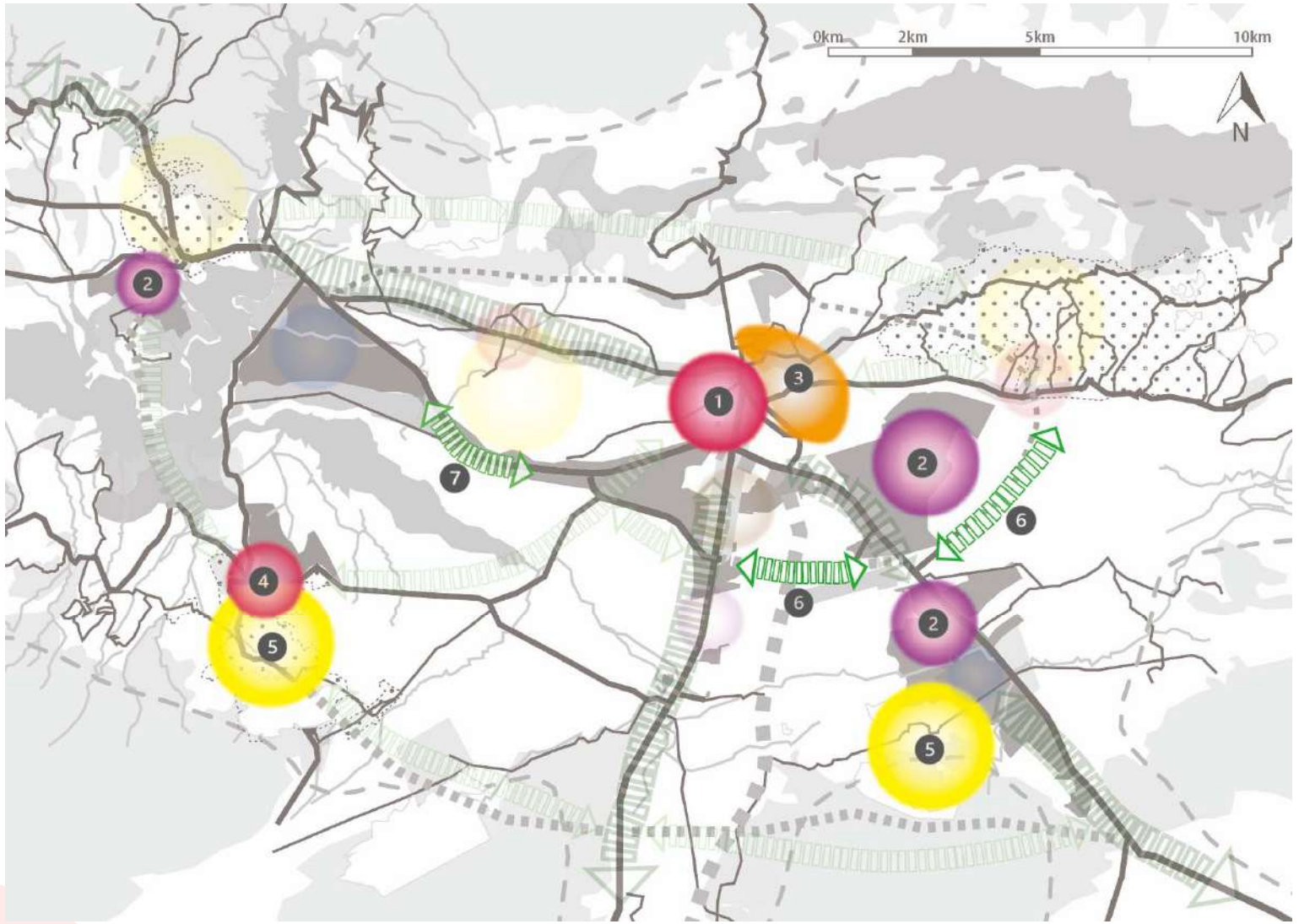
1 **Balanced development based on demand and supply capability**

2 **Synchronize urban area, transportation, and infrastructure development.**

3 **Monitor the entire progress based on the BBB timeline.**

- Focus on on-site development (urban transformation project).
- Continue off-site development (TOKI project) with infrastructure and basic social service development.
- Continuous inner and outer ring road network development with the above projects.

Restoration Phase (2024~2026)



1. Central business district
2. Industrial area
3. Cultural area
4. New sub center
   (basic social service dev.)
5. New residential area
6. Inner ring road network
7. Connection road

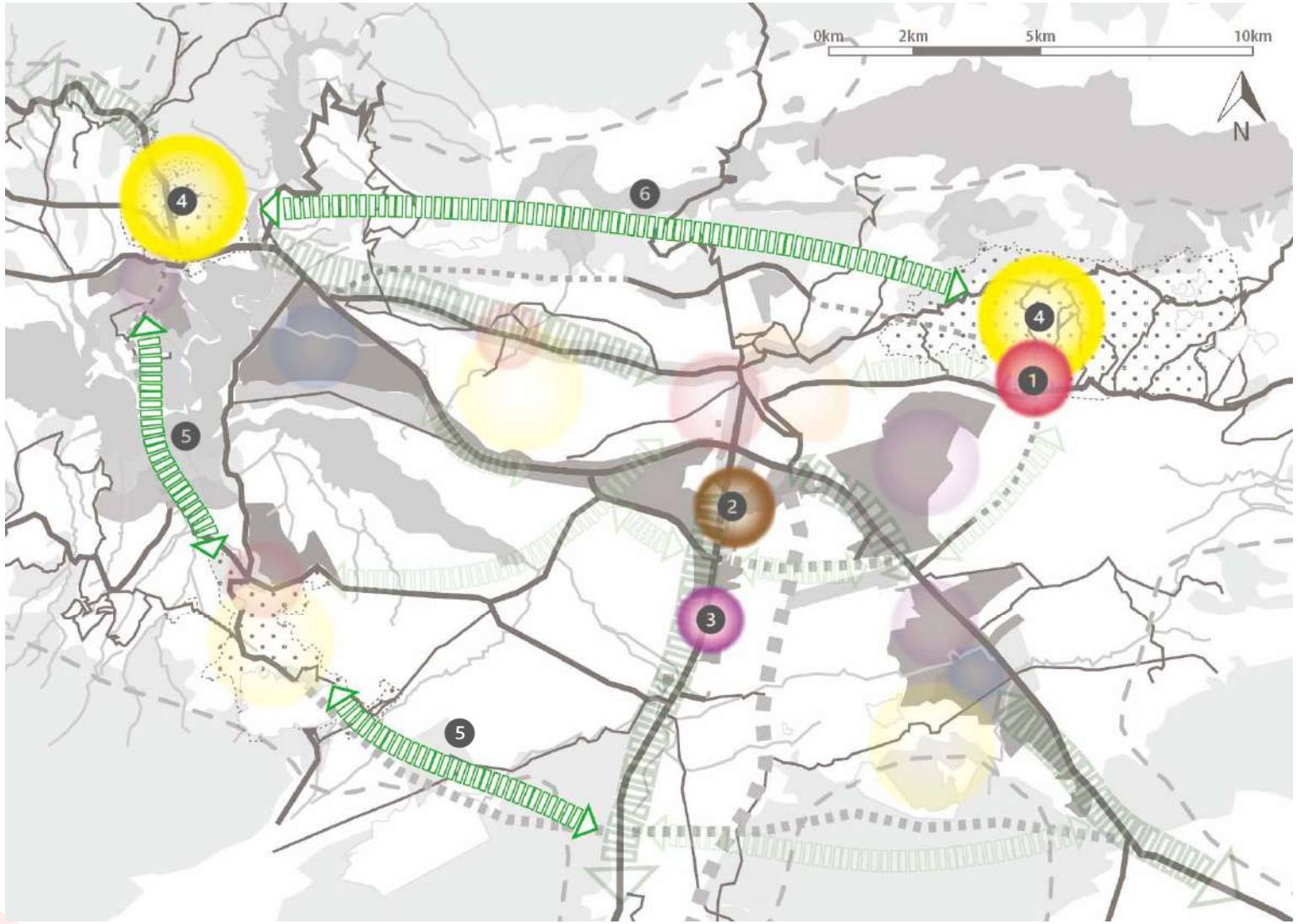
*At the same time:
- Strengthen public transportation of the city
- Bus access to the container settlement area
- Create pedestrian friendly streets

Legend

- Commercial
- Cultural
- Industrial
- Residential
- Secondary road network

The city center will undergo reconstruction to accommodate a diverse range of functions, including commerce, culture, history, housing, and earthquake memorial facilities. Simultaneously, establish a sub-center with essential social service functions, complemented by the construction of housing in the new development area (Önsen, Karacasu). Also, priority is the swift restoration of industrial areas to boost employment. In addition, aim to enhance accessibility by improving the north-south road and developing inner arterial roads.

Reconstruction Phase (2027~2031)



1. New sub center (basic social service dev.)
2. Logistic hub
3. Attract new industry
4. New residential area
5. Southern ring road
6. Northern ring road

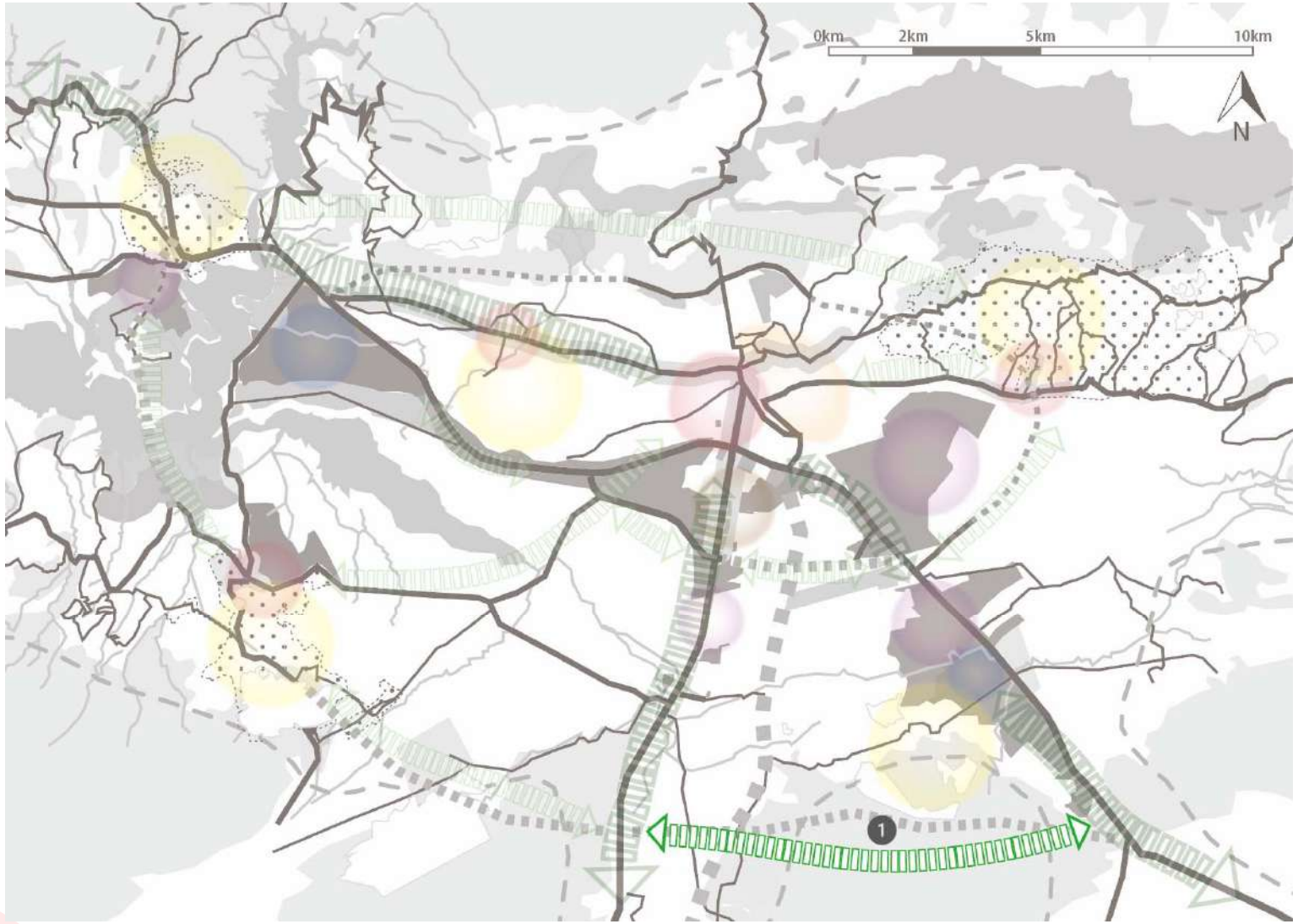
*At the same time:
- Strengthen intercity public transportation
- Create pedestrian friendly streets
- Conduct seismic assessment and reinforcement of the existing buildings.

Legend

- Commercial
- Industrial
- Logistics
- Residential
- Secondary road network

Establish a transportation hub, encompassing a bus terminal alongside the development of an industrial area to attract new industries. In response to housing demand, two new urban areas (Hasancıklı, Dogu Kent) and a sub-center will be created based on the zoning plan revision (Nazım İmar Planı) and geological survey report. Additionally, the completion of the North Ring Road and the initiation of construction for the South Ring Road will enhance connectivity in the Önsen area.

Improvement Phase (2032~2034)



1. Southern ring road extension

Legend

Secondary road network

In the final phase, the South Ring Road will be completed, marking the culmination of urban structural reform from a single-core to a multi-core system. This transformation aims to enhance access by securing multiple routes connecting the various cores.

VII. Policy Measure Directions

Proposal for the Policy Measures

Principles

- SAFE CITY
- CULTURAL CITY
- CITY FULL OF OPPORTUNITY
- SUSTAINABLE CITY
- ADVANCED & INCLUSIVE CITY

Policy measures

6 Pillars

Project lists

Building & Urban Planning	Disaster risk	Housing	Roads & Transportation
Water & Sewage	Waste Management	Medical & Psychological Care	Urban Development
Industry & Logistics	Culture	Earthquake Remains	**<Sector>**

- In order to identify necessary policy measures, **6 pillars** were established based on the principles
- For each pillar, a list of relevant sectoral projects was extracted. The project list includes as below,
  - ✓ being implemented
  - ✓ being planned
  - ✓ be desired to be implemented
  - ✓ be recommended for implementation based on Japanese recovery case studies.
- Projects include those implemented by KMM as well as projects implemented by other organizations related to Kahramanmaraş.
- There is no commitment to implement this measure projects and funding will be coordinated with relevant organizations based on this list.

Build Back Better Story

URBAN CHALLENGES (pre- & post-disaster)	OBJECTIVES	MEASURES
Buildings • Fragile building stocks • Lack of awareness	**Enhance** to safe and strong building stocks	1. Seismic reinforcement 2. Formation of governance structure and enhance awareness
Infrastructure • Vulnerable infrastructure • Lack of redundancy	**Upgrade** to disaster resilient and high-quality infrastructure	1. Install earthquake-resistant and resilient infrastructure 2. Provision of high-quality infrastructure
City • Single core structure • Lack of redundancy	**Create** attractive urban center and new urban cores	1. Redundant urban functions 2. Urban development with open spaces
Industry • Manufacture dependent • High damages on assets	**Innovate** robust and sustainable industrial infrastructure	1. Economic value addition & diversification 2. Renewal of logistics infrastructure
Culture & Tourism • Damage to cultural assets • Lack of tourist facilities	**Pass on** historic assets and memories of disasters to the next generation	1. Rehabilitating cultural & tourism assets 2. Passing on the experience of the disaster
Environment & Welfare • Debris management • Needs for social care	**Improve** sanitation and welfare environment	1. Improved debris & waste management 2. Inclusive community development

Principles	Pillars	Policies
Safe City (Safety & Resiliency) City Full of Opportunity (Economy & Industry) Cultural City (Social & Culture) Sustainable City (Green & Environment) Advanced & Inclusion City (Smart & Inclusive)	Safe and resilient city to prepare for future disaster by developing healthy urban area	**1. Housing** ● 1-1 Strict adherence to building regulation and zoning plan ● 1-2 Promotion for seismic capacity diagnosis on existing houses ● 1-3 Housing repair and reconstruction support ● **1-4 Improvement of geological data reliability and quality★** ● 1-5 Promotion of soil improvement and pile foundation ● 1-6 Construction of disaster reconstruction housing
		2. Urban Planning and Public Facilities ● 2-1 Update to urban planning with disaster risk sensitiveness ● **2-2 Promote Urban Transformation★** ● 2-3 Secure open space and social infrastructure ● 2-4 Seismic Diagnosis and Seismic reinforcement for critical facilities
		3. Disaster risks understanding and Governance ● **3-1 Development of Web-GIS for disaster risk management and dissemination of disaster related information map★** ● 3-2 Promotion of disaster related research and project ● 3-3 Formulation of Disaster Risk Management Department ● 3-4 Establishment of Monitoring Taskforce for BBB plan
	Earthquake-resistant infrastructure and Infrastructure development in line with new development	**4. Roads and Transportation** ● 4-1 Bridge reinforcement and landslides treatment ● **4-2 Development of ring road network (Six sections & major intersections) ★** ● 4-3 Designation of critical road network for emergency response ● 4-4 Control of on-street parking ● 4-5 Earthquake resilient road design ● 4-6 Development of multi-purpose utility tunnel
		5. Water and Sewage ● 5-1 Rehabilitation and development of existing drinking water, sewerage and rainwater drainage facilities ● 5-2 Ensuring efficient water supply through water loss control and water distribution management/monitoring ● **5-3 Development of drinking water, sewerage and rainwater drainage infrastructure facilities ★** ● 5-4 Drinking water supply and transmission from storage systems based on Ceyhan basin for additional drinking water supply. ● 5-5 Development of earthquake-resistant and robust water supply and sewerage systems ● 5-6 Reclamation of stream beds and construction of flood prevention facilities ● 5-7 Promotion of renewable energy, high efficiency equipment and smart technologies ● 5-8 Enhancement of operation & maintenance of water supply and sewer networks
	Attractive city center and development in suburban area	**6. Attractive city center and new development in the suburbs** ● 6-1 Creating Urban structure strategy to ensure strategic urban structure guidance ● 6-2 Creation of a new city center that symbolizes reconstruction and drives livelihood reconstruction ● **6-3 Development of an attractive large-scale suburban new residential area for next generation ★**
	Creating robust and sustainable industrial environment	**7. Industry and Logistics** ● 7-1 Restoration of existing industrial zones ● **7-2 Construction of new industrial zones to induce value addition ★** ● 7-3 Skill up programs for workers and disabled citizens ● 7-4 Vocational trainings including digital/IT Human Resources ● 7-5 Empowering women and youth in labor force through vocational and entrepreneurial trainings
	Inheriting historical culture and disaster memory to the next generation	**8. Culture and Tourism** ● 8-1 Restoration of Castle and old Bazaar and preservation of historical area ● **8-2 Promote urban development utilizing historical and cultural resources such as cultural heritage, food culture ★** ● **8-3 Development of new tourism destinations ★** ● **8-4 Tourist Attraction Map and promotion activity ★** ● 8-5 Training for earthquake memory storyteller
		9. Earthquake Remains and Memorial Hall ● **9-1 Constructing Earthquake Memorial museum ★** ● **9-2 Preservation of damaged structures as earthquake remains ★** ● 9-3 Earthquake Memorial Park ● 9-4 Disaster prevention education to enlighten citizens' awareness
	Disaster waste management and mental and physical health support for citizens	**10 Waste Management** ● **10-1 Promotion of proper treatment, recycling and disposal of Disaster Waste and Construction & Demolition Waste ★** ● 10-2 Developing Disaster Waste management strategies at municipal level ● 10-3 Promotion of Environmental Education and Public Awareness for Zero-waste activities
		11. Medical and psychological care ● 11-1 Rehabilitation center with psychological and physiotherapy care for affected citizens ● 11-2 Health support for citizens ● 11-3 Improvement of local medical system

★: Key Project

Policy Measures of each Pillar

Pillar

Safe and resilient city to prepare for future disaster by developing healthy urban area	Creating of a safe and resilient city: Under the three-pronged strategy of guiding appropriate land use, promoting earthquake resistance of buildings, and developing earthquake-resistant infrastructure, citizens, businesses, and the government will work together to create measures, investments, and systems that will enable disaster prevention, disaster mitigation, and early recovery and reconstruction. In particular, in light of the recent earthquake damage, periodic seismic diagnosis of hospitals, schools, fire stations, city halls, and other facilities used by an unspecified number of citizens and important for disaster prevention, and seismic retrofitting based on such diagnosis, should be steadily implemented. For buildings such as residences, offices, and stores, tighten checks when applying for building permits, and strengthen laws and regulations to promote proper construction.

Projects

1. Housing

- *1-1* Strict adherence to building regulation and zoning plan
- *1-2* Promotion for seismic capacity diagnosis on existing houses
- *1-3* Housing repair and reconstruction support
- ★ ***1-4*** **Improvement of geological data reliability and quality**
- *1-5* Promotion of soil improvement and pile foundation
- *1-6* Construction of disaster reconstruction housing

[Sector Policy] Ensure construction of Houses resilient against the earthquake to prepare for the next disaster

- Construction of disaster recovery housing and support to facilitate relocation from container villages
- Strict adherence of building standards and zoning plan to ensure safety of houses
- Promote seismic diagnosis and seismic reinforcement, soil improvement and pile foundation for houses

2. Urban Planning and Public Facilities

- *2-1* Update to urban planning with disaster risk sensitiveness
- ★ ***2-2*** **Promote Urban Transformation**
- *2-3* Secure open space and social infrastructure
- *2-4* Seismic Diagnosis and Seismic reinforcement for critical facilities

[Sector Policy] Updating the building system and urban planning as the basis for creating a safe city

- Update to urban planning with risk sensitiveness to guide land use and building location appropriately
- Promote urban transformation in order to disaster risk of existing old vulnerable buildings
- Securing open space to support temporary evacuation, first aid, and relief efforts

3. Disaster risk governance and dissemination

- ★ ***3-1*** **Development of Web-GIS for disaster risk management and dissemination of disaster related information map**
- *3-2* Promotion of disaster related research and project
- *3-3* Formulation of Disaster Risk Management Department
- *3-4* Establishment of Monitoring Taskforce for BBB plan

[Sector Policy] Promoting disaster risk management governance and research, and publicizing disaster related information to citizens

- Develop Web-GIS for better disaster risk management and planning
- Produce disaster related information maps to be used to enhance citizens' awareness
- Promote disaster related research and project to study disaster risk and necessary measures in KMM
- Formulate disaster risk management department to organize disaster mitigation measures in KMM
- Establish taskforce or body to monitor projects listed in the BBB plan

★: Key Project

Policy Measures of each Pillar

★: Key Project

Pillar

Earthquake-resistant infrastructure and Infrastructure development in line with new development

Creating safe and resilient infrastructure: In preparing for disasters, important infrastructure that supports post-disaster evacuation, emergency and rescue activities, and supports people's lives and economic activities for recovery and reconstruction include roads, water, sewage, electricity and other energy, and communications. In particular, roads, water, and sewage systems are positioned as the most fundamental infrastructure, requiring effective and efficient infrastructure investment and maintenance management as critical infrastructure that contributes to the creation of sustainable cities that do not repeatedly experience major disasters.

Projects

4. Roads and Transportation

4-1 Bridge reinforcement and landslides treatment
★ ***4-2* Development of ring road network (Six sections & major intersections)**
4-3 Designation of Primary critical network for emergency response
4-4 Control of on-street parking
4-5 Earthquake resilient road design
4-6 Development of multi-purpose utility tunnel

[Sector Policy] Road infrastructure and traffic management to support evacuation, emergency and rescue operations in the event of a major earthquake

- Establish a system to designate and operate roads that are important for disaster prevention as emergency transportation roads and provide priority road investment, maintenance, and parking regulations
- Seismic diagnosis and seismic reinforcement of bridges, tunnels, and other road structures important to the transportation network, including non-emergency transportation roads
- Improvement of connectivity between subcenter and center
- Improvement of joint ditches to improve road disaster prevention and implementation of parking measures for emergency vehicle traffic
- Promote the development of urban ring roads to ensure fail-safe functions

5. Water and Sewage

5-1 Rehabilitation and development of existing drinking water, sewerage and rainwater drainage facilities
5-2 Ensuring efficient water supply through water loss control and water distribution management/monitoring
★ ***5-3* Development of drinking water, sewerage and rainwater drainage infrastructure facilities (Önsen development area, Eastern development area, new industrial zone, 2nd Stage Ayvalı WTP, 2nd Stage Merkez WWTP, Önsen WWTP, etc.).**
5-4 Drinking water supply and transmission from storage systems based on Ceyhan basin for additional drinking water supply.
5-5 Development of earthquake-resistant and robust water supply and sewerage systems (including disaster management plan, business continuity plan, if appropriate)
5-6 Reclamation of stream beds and construction of flood prevention facilities (Temporary rainwater storage facility, “Channel on the northern ring road”)
5-7 Promotion of renewable energy, high efficiency equipment and smart technologies (facility construction, equipment installation, etc.)
5-8 Enhancement of operation & maintenance of water supply and sewer networks

[Sector Policy] Development and quality operation & maintenance of water, sewerage and rainwater drainage infrastructures to support citizens' life, sanitation and safety

- Ensuring sustainable water supply by providing drinking water from dams of storage system to meet population growth and increasing water demand,
- Development of sewerage and rainwater drainage infrastructures to meet population growth and increasing wastewater flow,
- Development of earthquake-resistant drinking water and sewerage infrastructures in order to reduce the risk of disruptions in drinking water networks and environmental pollution caused by wastewater due to the natural disaster-related damages of infrastructure
- Water loss control and water distribution management to promote efficient water use and sustainability
- Strengthening of prevention measures against inland flooding by torrential rains due to climate change
- Promotion of next-generation water supply and sewerage systems, including the use of renewable energy and smart maintenance management

Policy Measures of each Pillar

Pillar

Attractive city center and development in suburban area	Creating attractive city centers and suburban areas: Develop an overall desirable urban structuring plan, revitalize city centers through Urban Transformation, promote new urban areas in suburban areas, and create attractive cities. Promote the layout of urban functions, land use, roads, water, sewage, and other infrastructure to support safe, convenient, and comfortable lifestyles.

Projects

6. Attractive city center and new development in the suburbs

6-1 Creating Urban structure strategy to ensure strategic urban structure guidance

6-2 Creation of a new city center that symbolizes reconstruction and drives livelihood reconstruction

★ *6-3* **Development of an attractive large-scale suburban new residential area for next generation**

[Sector Policy] Promote urban development that embodies " Build Back Better"

- Promote the development of attractive city centers and suburban new towns as desirable reconstruction city plans to be passed on to the next generation.
- Redevelopment of a sustainable city center where people can gather, relax, and enjoy themselves in the central area.
- More open spaces with greeneries to increase safety in times of disasters.
- Pedestrian-friendly road networks and urban planning.
- Large-scale suburban new town development suitable for the new era
- Farmland conservation and harmony between development and suburban agriculture

Source: MoEUCC (2023)

★: Key Project

Policy Measures of each Pillar

Pillar

Creating robust and sustainable industrial Environment	Revitalization of existing industries and promotion of new industries: Develop multifaceted measures to revitalize existing industries and promote new industries. Create a reconstructed industrial park that contributes to the revitalization of the industrial complex, provide recurrent education as a form of human resource development, and offer job matching opportunities, while enhancing the potential of the younger generation, female population, etc., and fostering new industries. In addition, rail and road infrastructure will be used to develop a wide-area logistics hub with in-land depot capabilities to increase the cost and quality competitiveness of existing industries.

Projects

7. Industry / Logistics

- *7-1* Restoration of existing industrial zones
- ★ ***7-2*** **Construction of new industrial zones to induce value addition**
- *7-3* Skill up programs for workers and disabled citizens
- *7-4* Vocational trainings including digital/IT Human Resources
- *7-5* Empowering women and youth in labor force through vocational and entrepreneurial trainings

[Sector Policy] Revitalization of existing industries and promotion of new industries

- Restoration of existing industrial parks and infrastructure development in the plains area
- Construction of new industrial parks (consideration for coordination of new town construction)
- Create a mechanism to develop potential human resources such as young people and women
- Utilize rail infrastructure to develop wide-area logistics hubs while leveraging rail and road networks

★: Key Project

Policy Measures of each Pillar

Pillar

Inheriting historical culture and disaster memory to the next generation	Historical and cultural town planning and passing on disaster lessons: Through restoration of castle ruins, reconstruction of historical districts, and revitalization of old bazaars, traditional history and culture will be passed on to the next generation, while new historical and cultural town planning will be developed. In addition, the company will develop facilities and initiatives to pass on the lessons of the Great East Japan Earthquake to the next generation.

Projects

8. Culture and Tourism

- *8-1* Restoration of Castle and old Bazaar and preservation of historical area
- ★ ***8-2*** **Promote urban development utilizing historical and cultural resources such as cultural heritage, food culture**
- ★ ***8-3*** **Development of new tourism destinations**
- ★ ***8-4*** **Tourist Attraction Map and promotion activity**
- *8-5* Training for earthquake memory storyteller

[Sector Policy] Restoration of cultural heritage and promotion of tourism

- Restoration of cultural heritage, revitalization of historic streets and bazaars
- Tourism promotion utilizing tourism resources such as scenery, photo spots, historical facilities, cultural heritage, food culture, traditional crafts, and traditional events
- Promote tourism through guided tours by earthquake storytellers to disaster-stricken areas, earthquake legacy museums, earthquake memorial museums, memorial parks, and other facilities

9. Earthquake Remains and Memorial Hall

- ★ ***9-1*** **Constructing Earthquake Memorial museum**
- ★ ***9-2*** **Preservation of damaged structures as earthquake remains**
- *9-3* Earthquake Memorial Park
- *9-4* Disaster prevention education to enlighten citizens' awareness

[Sector Policy] Restoration of cultural heritage and promotion of tourism

- Creation of facilities to convey information on major earthquakes (learning facilities such as earthquake-proof experimental facilities using building models, preservation of earthquake remains, earthquake memorial parks, etc.)
- Archives of the Great Earthquake (audio, photos, TV images, submitted images, newspapers, magazines, etc.)

★: Key Project

Policy Measures of each Pillar

Pillar

Disaster Waste management and mental and physical health support for citizens	Disaster Waste Management and Hygiene/Health Management: Disaster Waste generated in the aftermath of earthquake disasters amounts to several years' worth of waste at once. When removing debris and transporting it to existing disposal sites, the volume of waste can put pressure on the remaining capacity of the disposal sites. Additionally, residential Disaster Waste contains various items and household goods, causing potential environmental pollution in the air and water around the disposal sites. This poses hygiene and health concerns for residents and workers in the vicinity. Therefore, proper management of Disaster Waste is crucial. For the vast amount of concrete debris, effective utilization includes short-term applications, such as recycling concrete debris to be utilized for reconstruction projects like roads, water supply systems, parks, etc. Eventually, developing this recycling system of Disaster Waste into a new industry is anticipated.

Projects

10. Waste Management ★*10-1* **Promotion of proper treatment, recycling and disposal of Disaster Waste and Construction & Demolition Waste** *10-3* Developing Disaster Waste management strategies at municipal level *10-4* Promotion of Environmental Education and Public Awareness for Zero-waste activities	**[Sector Policy]** Dissemination of resource circular system through proper Disaster Waste management • Recycling of concrete debris related to earthquake and Construction& Demolition Waste unrelated to earthquake, etc. • Construction of a final disposal site for Disaster Waste which is difficult to reuse/recycle • Developing strategies for management of Disaster Waste beforehand of any disaster • Promote environmental education toward zero waste society
11. Medical and psychological care *11-1* Rehabilitation center with psychological and physiotherapy care for affected citizens *11-2* Health support for citizens *11-3* Improvement of local medical system	**[Sector Policy]** Improvement of mental health care and medical infrastructure for citizens in the disaster area • Establishment of a consultation service and counselor for mental care of citizens, etc. • Expansion of local medical infrastructure, including construction of hospitals

★: Key Project

Build Back Better Story

MEASURES

Building
1. Seismic reinforcement
2. Formation of governance structure and enhance awareness

Infrastructure
1. Install earthquake-resistant and resilient infrastructure
2. Provision of high-quality infrastructure

City
1. Redundant urban functions
2. Urban development with open spaces

Industry
1. Economic value addition & diversification
2. Renewal of logistics infrastructure

Culture & Tourism
1. Rehabilitating cultural & tourism assets
2. Passing on the experience of the disaster

Environment & Welfare
1. Improved debris & waste management
2. Inclusive community development

KEY PROJECTS

No.1 Improvement of geological data reliability and quality

No.2 Promotion of Urban Transformation

No.3 Digital Transformation on Disaster Risk Management and dissemination

No.4 Redundant Emergency Transport Road Network Designation

No.5 Development of drinking water, sewerage and rainwater drainage infrastructure facilities in new development area

No.6 Development of an attractive large-scale suburban new residential area for next generation

No.7 Construction of new industrial zones to induce value addition

No.8 Promoting tourism development through the restoration of cultural heritage, development of new tourist destination and revitalizing historical and cultural districts

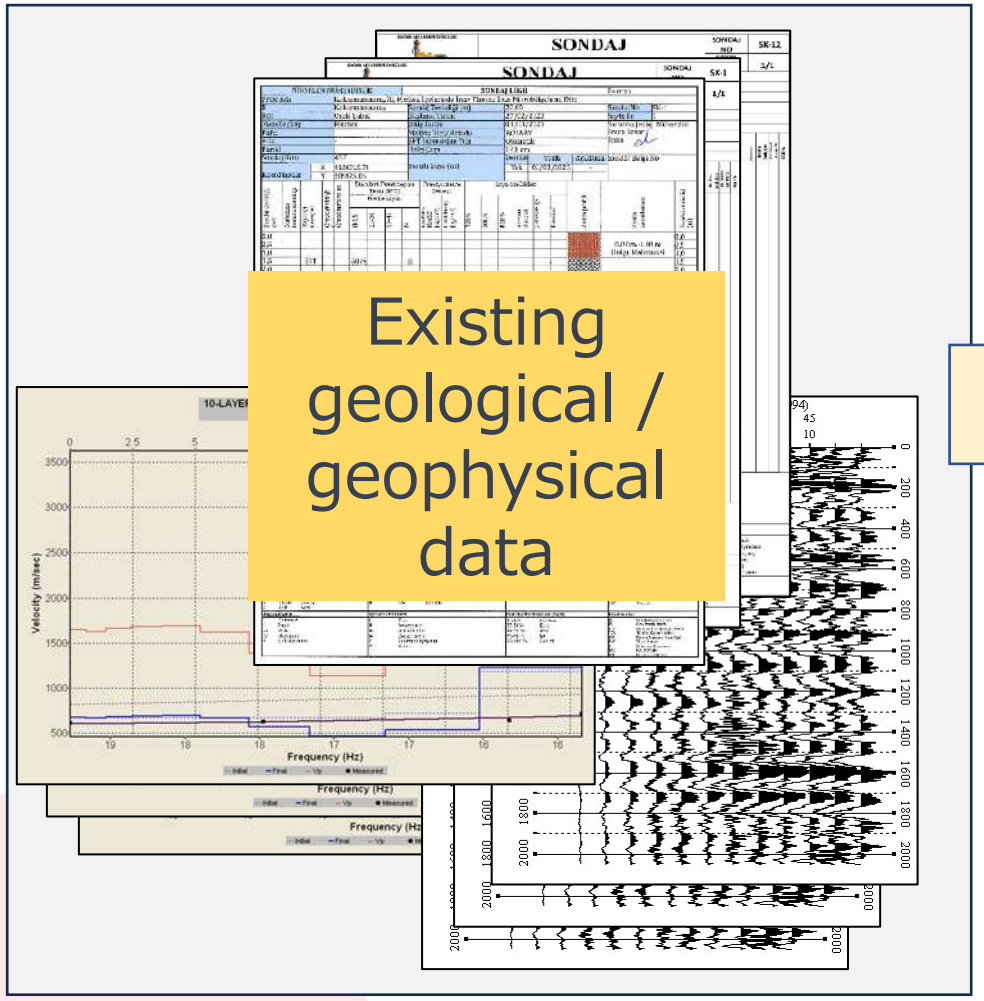
No.9 Earthquake Memorial Museum and Earthquake remains

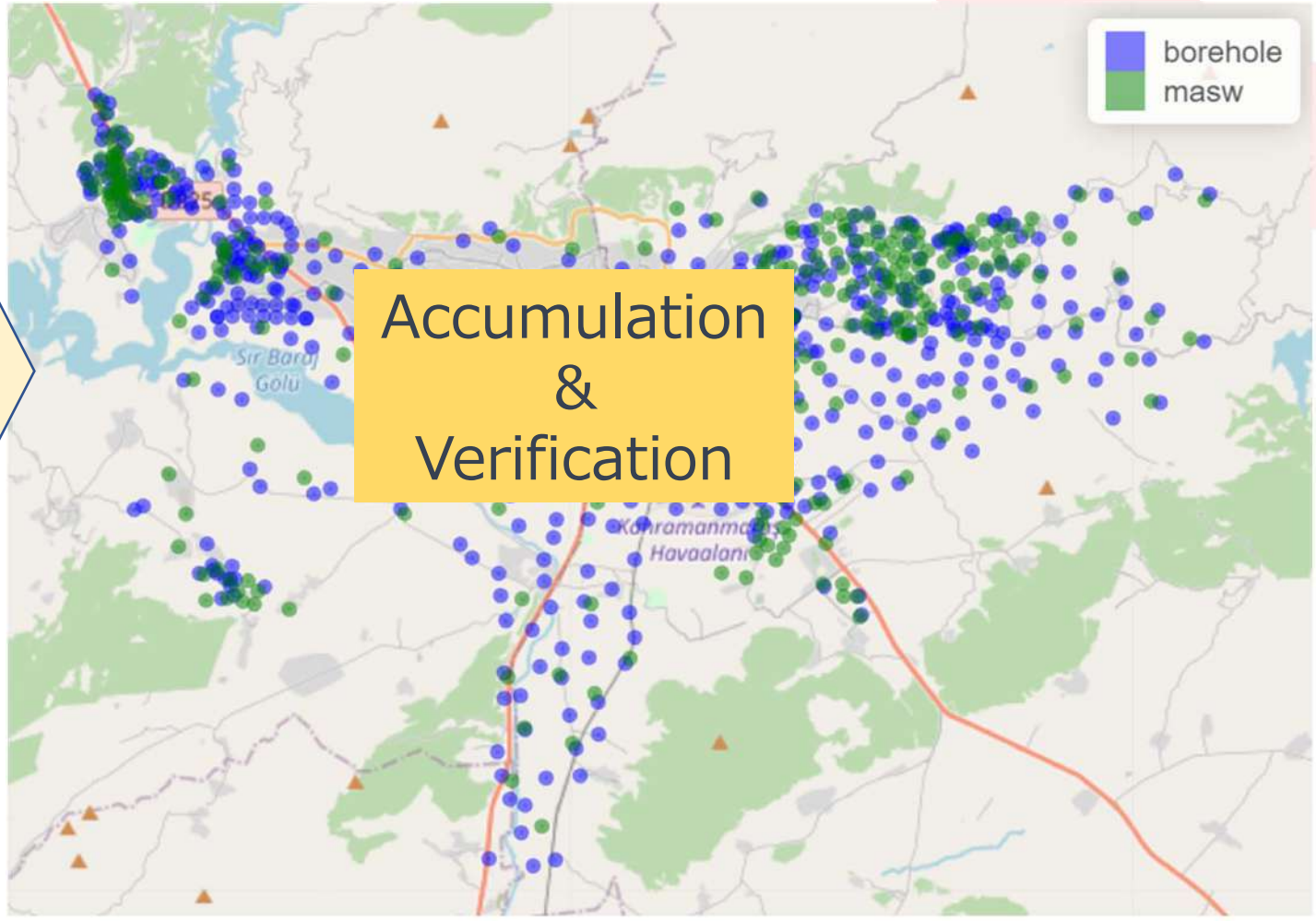
No.10 Promotion of proper treatment, recycling and disposal of Disaster Waste and Construction & Demolition Waste

Key Project No.1 : Improvement of geological data reliability and quality

1-4 Improvement of geological data reliability and quality

Objective: Improve geological data quality and update Vs30 distribution map by accumulating and verifying existing data (additional survey should be required if necessary)



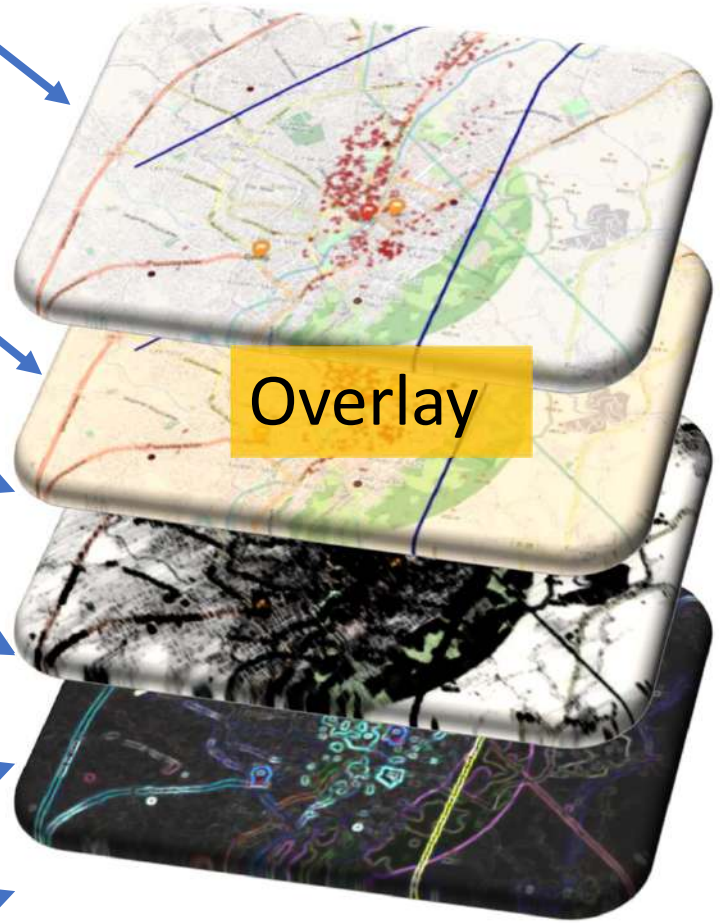


Key Project No.2 : Promotion of Urban Transformation

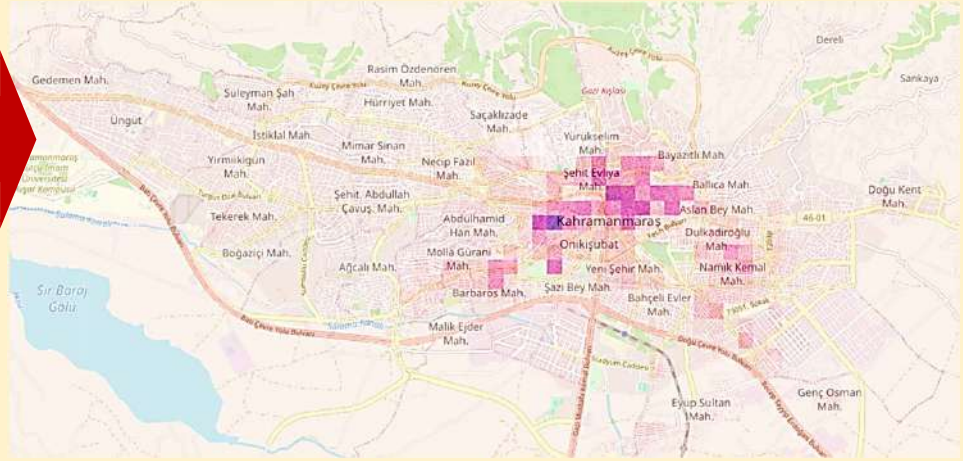
2-2 Promotion of Urban Transformation

Objective: Urban Transformation will be promoted to reduce disaster risk of existing old and vulnerable buildings as well as to increase urban quality of life.

- Ground condition
- Building Density
- Number of Old building (-1980)
- Less Building Permit
- Social Infrastructure (School, hospital)
- Crime Rate
- Unplanned Area



Identify priority area for Urban Transformation

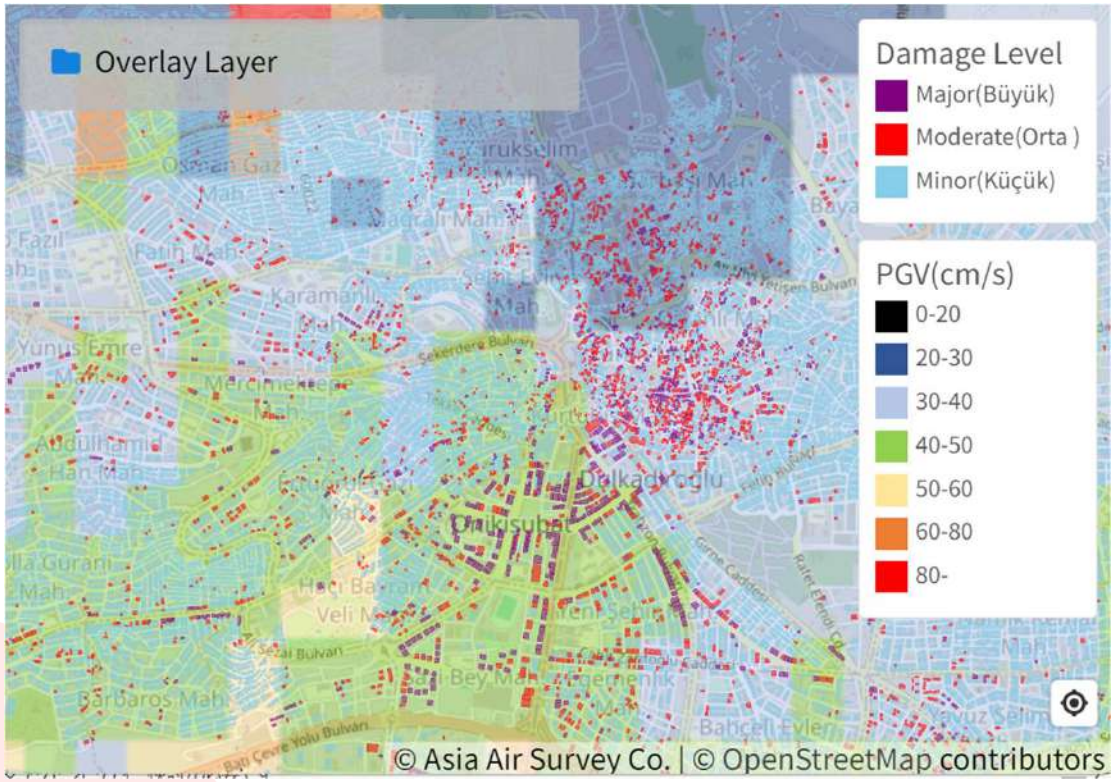


Key Project No. 3 : Digital Transformation on Disaster Risk Management and dissemination

3-1. Development of Web-GIS for disaster risk management and dissemination of disaster related information map

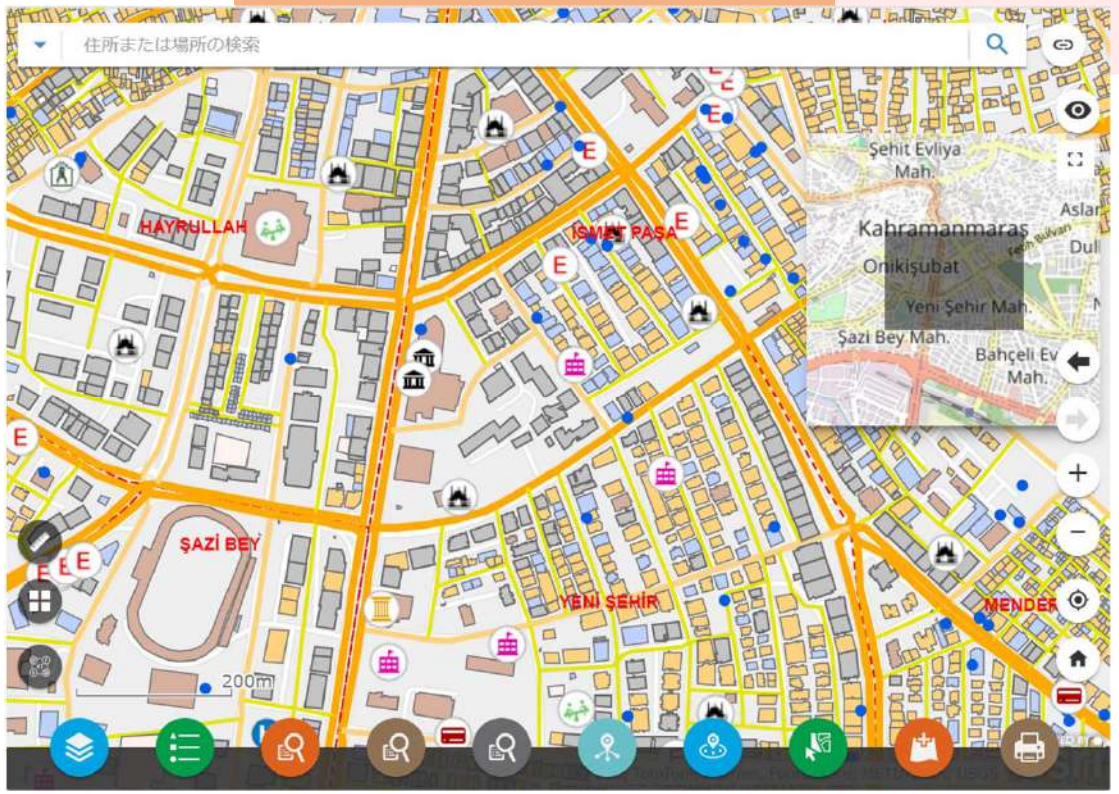
Objective:
- Develop Web-GIS for better disaster risk management and planning
- Disseminate disaster related information to enhance citizen's awareness including ground information(Vs30 map), evacuation point, hospital, fire station, and so on.

Internal data platform inside KMM



Web-GIS for better disaster risk management and planning (Tentative)

Dissemination to citizens



Provide disaster related information by updating "City Guide" on KMM website

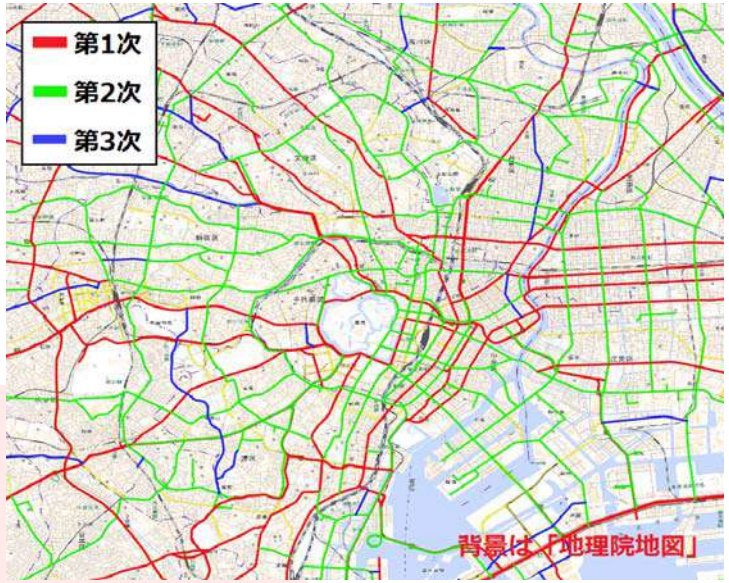
Key Project No.4 : Redundant Emergency Transport Road Network Designation

Main: 4-2. Development of ring road network

Sub: 4-3. Designation of critical road network for emergency response

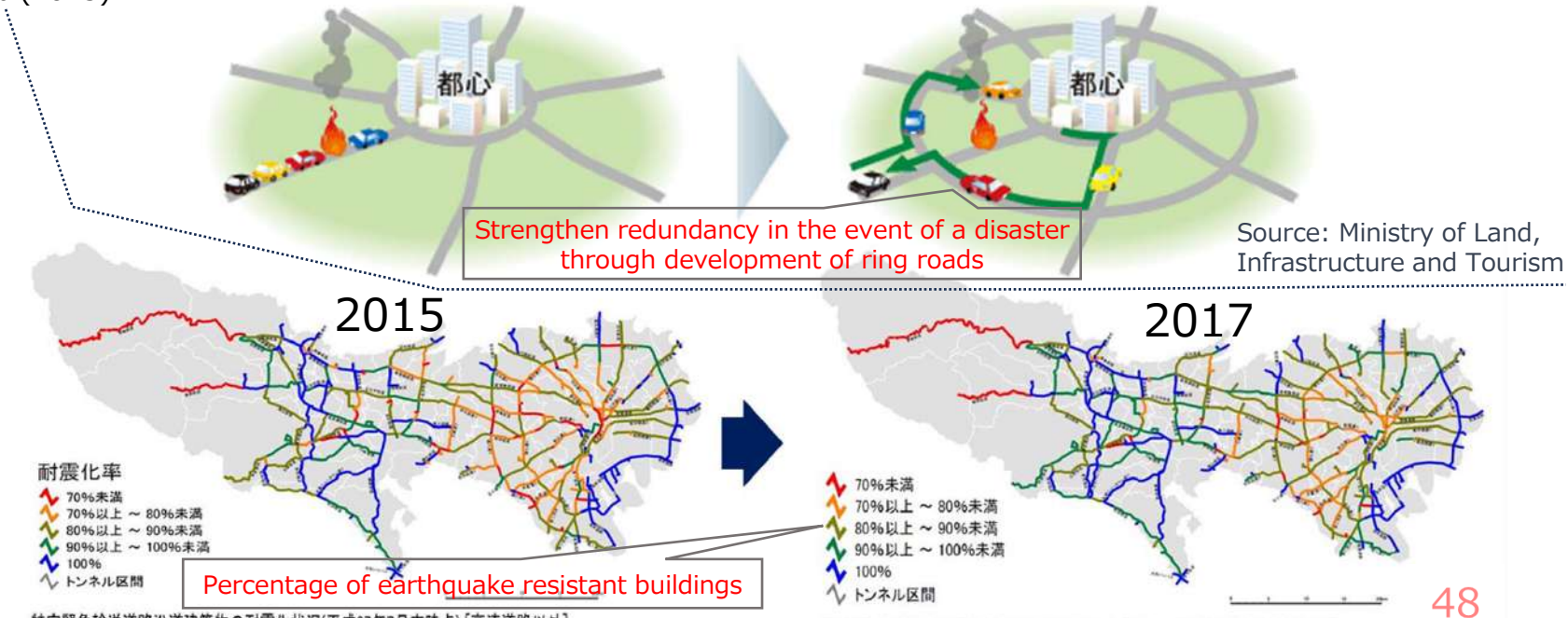
Objective: Planning, constructing, and maintaining redundant and resilient road networks to support the passage of emergency vehicles during relief, emergency, and firefighting activities following a major earthquake. The road development plan with redundant ring and radial network for disaster prevention and resilience is created with the primary goals of improving people's mobility and accessibility, as well as addressing congestion and ensuring traffic safety. In addition, designating emergency roads proves effective in constructing roads.

Reference : Critical roads and classification of roads are designated as Emergency Transport Road Networks in Japan. The emergency roads are used for evacuation, rescue, and supply of goods when an earthquake occurs. Municipality and Governments promotes seismic retrofit of building along critical roads. Tokyo Metropolitan Government is supporting earthquake resistance assessment of buildings. In Tokyo, percentage of earthquake-resistant buildings has reached to 92.6 % (2023).



Source: Ministry of Land, Infrastructure and Tourism

Emergency Road Network in Tokyo of Japan



Source: Ministry of Land, Infrastructure and Tourism

Source: Tokyo Metropolitan Government

Key Project No.5 : Development of drinking water, sewerage and rainwater drainage infrastructure facilities in new development area

Main: 5-3. Development of drinking water, sewerage and rainwater drainage infrastructure facilities

Sub: 5-5. Development of earthquake-resistant and robust water supply and sewerage systems

Objective: Develop drinking water, sewerage and rainwater facilities in new development area and new industrial zone. For distribution mains and network pipeline connecting critical facility such as hospital and fire fighting station, installment of earthquake resistant pipe should be considered to prepare for the future disaster.

Reference : In Tokyo, in order to reduce damage from water outages in the entire region, areas where the water outage rate is expected to be high in the event of an earthquake according to the Tokyo Metropolitan Government's damage assumptions are positioned as priority areas for replacement. In priority area, government installs earthquake-resistant pipe.

Earthquake-resistant Pipeline (Ductile Iron Pipe)

Ordinary Pipe

Earthquake-resistant Pipe

Source: Japan Water Works Associatoin (JWWA)

Source: Japan Ductile Iron Pipe Association

Source: Kubota Corporation

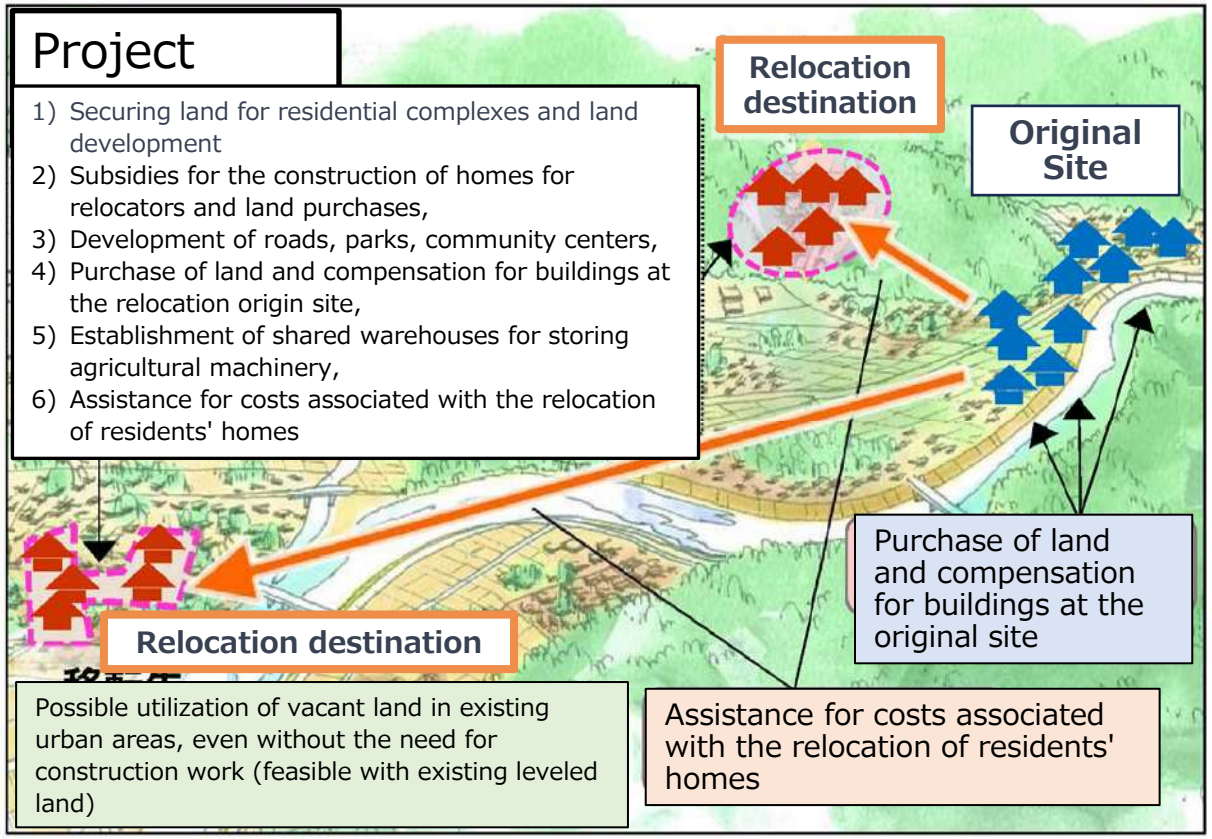
Earthquake Resistant Pipeline (Ductile Iron Pipe)

Key Project No.6 : Development of an attractive large-scale suburban new residential area for next generation

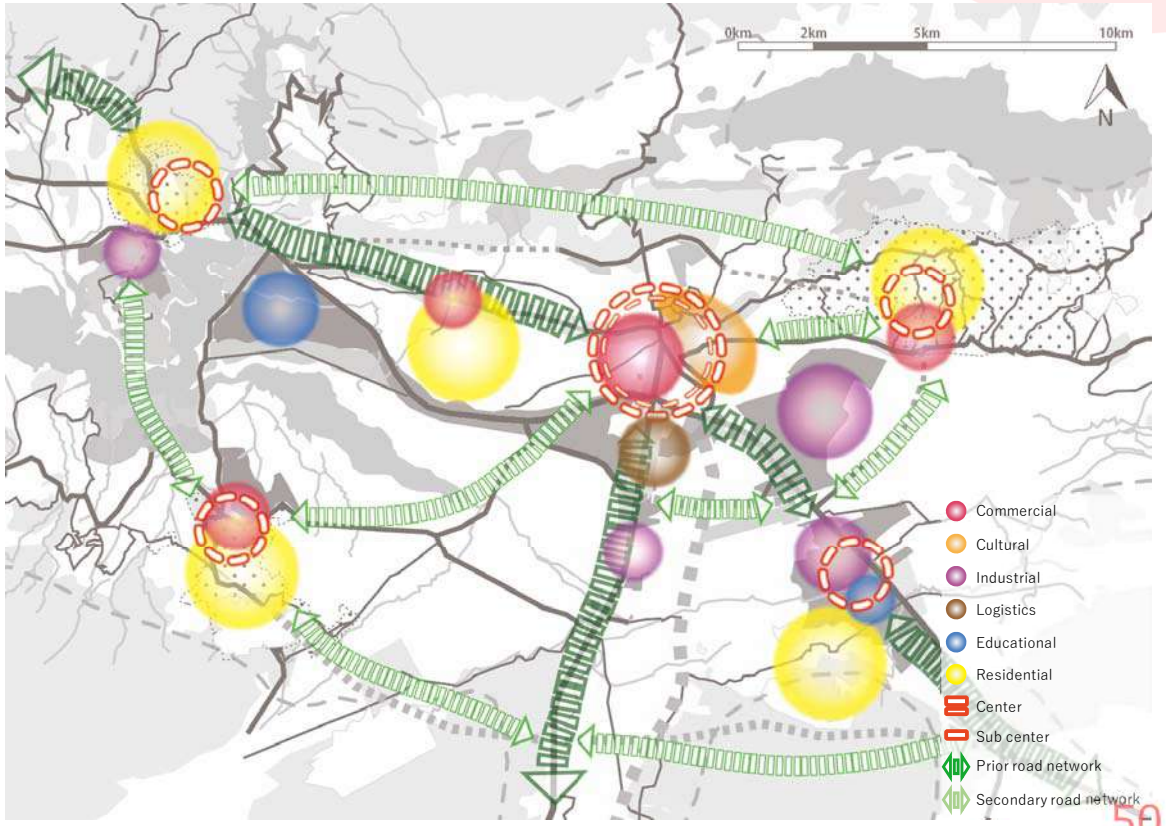
6-3. Development of an attractive large-scale suburban new residential area for next generation

Objective: Promote the development of new towns (Onsen, Havlaki, Kalaki, Alicsekisi) as locations for housing construction for disaster victims. In these areas, create attractive urban development that is earthquake-resistant, safe, and reassuring for the next generation of citizens to grow up in.

Reference: In Japan, after the East Japan Great Earthquake, to prevent the recurrence of tsunami disasters, many communities located along the coast were relocated to nearby higher ground, leading to the construction of numerous new towns. The method of constructing new towns involving group relocation is commonly used in the event of disasters such as earthquakes, tsunamis, and floods.



Disaster Evacuation Group Relocation Project in Japan



New development plan in Kahramanmaraş (BBB Plan)

Key Project No.7 : Construction of new industrial zones to induce value addition

7-2 Construction of new industrial zones to induce value addition

Objective:
By building an organized industrial zone for the high-tech industries such as aviation industry, Create new added value. To achieve sustainable economic growth in Kahramanmaraş, dependency on the textile industry should be reduced and shifted to growing industries. Human resource development in the high-tech and IT industries will also be implemented.

TUSAŞ Parts Production Factory in Kahramanmaraş

Reference:
In Japan, after 2011 Tohoku Great Earthquake, Government implemented "Fukushima Innovation Coast " which is the project aiming to establish new industrial base including 1.Robots and drones, 2. energy, Environment, and Recycling; 3.Agriculture, Forestry, and Fisheries; 4.Medical-related industries; 5.Aerospace.

Fukushima Innovation Coast

Planned Trade and Industry Area in Kahramanmaraş

Key Project No.8 : Promoting tourism development through the restoration of cultural heritage, development of new tourist destination and revitalizing historical and cultural districts

8-2 Promote Urban Development utilizing historical cultural resources such as cultural heritages and food culture
8-3 Development of new tourism destinations
8-4 Tourist Attraction Map and promotion activity

Objective: Through the restoration of castle ruins, the reconstruction of historical districts, and the revitalization of old bazaars, to pass on traditional history and culture to the next generation, develop a new historical and cultural town, and promote tourism resource utilization.

Reference:
In Japan, every time an earthquake occurs, wooden structures of cultural heritage such as castles are damaged. To pass on traditional culture to the next generation, efforts are made to gradually restore these cultural assets, reconstruct historical townscapes, and develop new tourism resources. In the aftermath of the 2016 Kumamoto earthquake, Kumamoto Castle suffered extensive damage. However, a restoration plan was devised, positioning it as an opportunity to pass on traditional construction techniques to the next generation of craftsmen. Additionally, the restoration plan was visualized through computer graphics (CG), attracting the interest of tourists.

Model with digital mapping

Utilize existing remains of castle

Special tour road for visitors

- Castle Restoration Plan
  - ✓ Efficient and strategic restoration through restoration plan
  - ✓ Establishment of a special tour road for visitors during construction
  - ✓ Retrofit the interior of the building with vibration damper
  - ✓ Training of carpenters for restoration during construction, and learning programs for students
- Improvement of exhibition functions
  - ✓ Exhibition of models with projection mapping and AR
  - ✓ Exhibition space utilizing the existing remains of the castle

Key Project No.9 : Earthquake Memorial Museum and Earthquake remains

9-1 Constructing Earthquake Memorial museum

9-2 Preservation of damaged structures as earthquake remains

Objective: Constructing a museum dedicated to the earthquake legacy (tentatively named the Disaster Museum) to provide earthquake education to the children who will carry the responsibility for the next generation.

Reference:
The Hanshin-Awaji Earthquake Museum was constructed in Kobe in 2002 to convey the lessons of the major earthquake that occurred in 1995 to the next generation and to learn what preparations can be made for future major earthquakes. Its goals are to spread the word about a vital phase of local history and ensure that the lessons of the Great Hanshin-Awaji Earthquake are never forgotten. Big-screen footage and soundscapes are used along with recreations of the earthquake using special effects and computer graphics to let visitors experience the terrifying power, while a broad range of materials show how the region has rebuilt their lives. Moreover, we offer games and experiments so that visitors can learn about natural disasters and how to minimize risk and damage in future.

The Great Hanshin-Awaji Earthquake Memorial Museum

Disaster museum to pass on the experiences and lessons of the Great Hanshin-Awaji Earthquake to future generations and to learn how to prepare for the future.

- Earthquake Experience (movie and music)
- Photos, movies and display of items provided from survivors
- Messages from survivor
- Education material for disaster prevention
- Earthquake experiment demonstration

Key Project No.10 : Promotion of proper treatment, recycling and disposal of Disaster Waste and Construction & Demolition Waste

10-1 Promotion of proper treatment, recycling and disposal of Disaster Waste and Construction & Demolition Waste

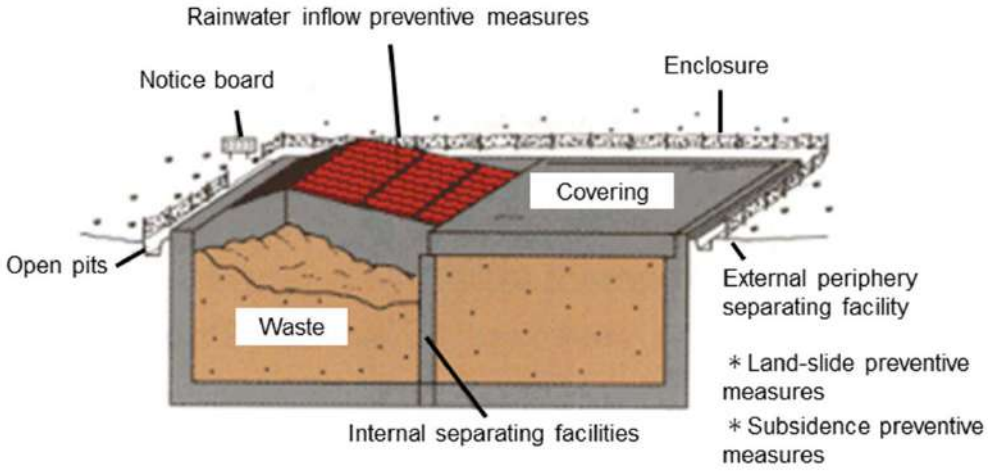
Objective: To establish rigid facilities for the recycling of construction debris. The goal is to foster the recycling industry for Construction & Demolition Waste by properly managing the waste and developing it as a modern and circular industry

Reference:
In Japan, while experiencing massive disaster waste generation due to disasters, on the other hand, the Construction Waste Recycling Law has been enforced in 2000. Through the continuous efforts, Japan's construction waste recycling rate is approximately 90% or more as of 2022.

1. Recycling activities of debris at Temporary Storage Yard (TSS)

2. Mixed industrial waste recycling plant

Recycled for such as public work



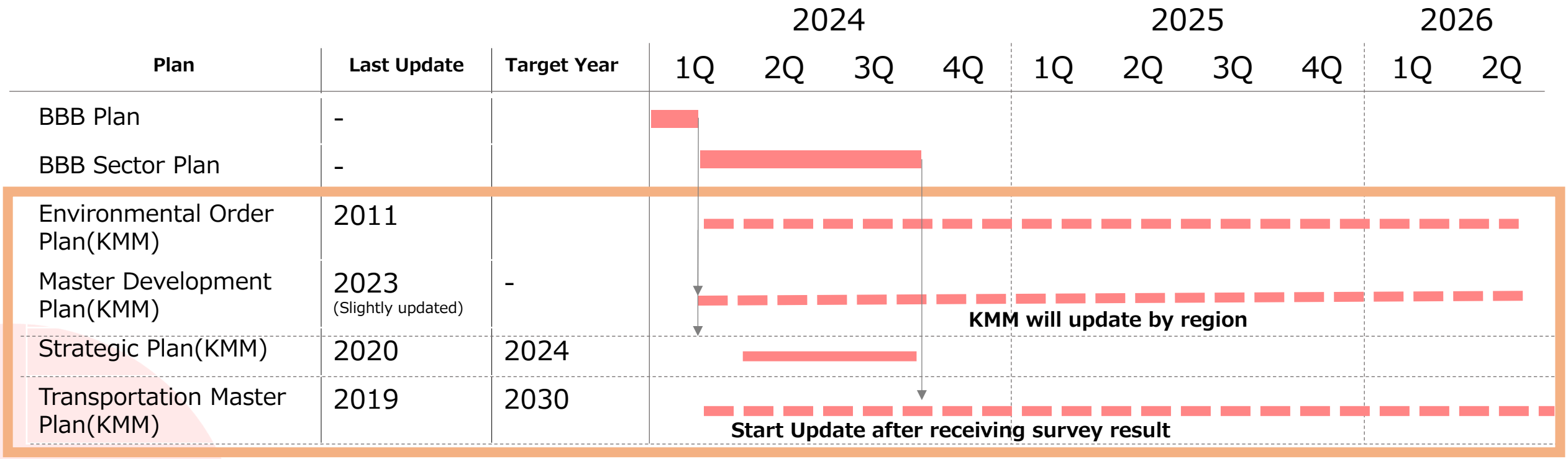
Landfill site for hazardous industrial wastes in Japan (Isolated type)

VIII. Implementation Process

Process for Reflecting BBB Plan to Existing Plans

- KMM will take the leadership for the realization of BBB policies with the coordination with related organizations.
- The BBB Plan is intended to be reflected in the existing and upcoming plans.
- Monitoring of achievement of plan with a Monitoring Committee within the KMM to continuously monitor the progress and performance of the projects listed in the BBB Plan and the reflection of the BBB Plan to the existing plan.

Plan	Last Update	Target Year
BBB Plan	-	
BBB Sector Plan	-	
Environmental Order Plan(KMM)	2011	
Master Development Plan(KMM)	2023 (Slightly updated)	-
Strategic Plan(KMM)	2020	2024
Transportation Master Plan(KMM)	2019	2030



BBB Projects to be applied to Existing Plans

KMM Strategic Plan	KMM / District Spatial Plans		Sector Masterplans			Monitoring other agencies		
1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1
1-2	2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2
1-3	2-3	3-3	4-3	5-3	6-3	7-3	8-3	9-3
1-4	2-4	3-4	4-4	5-4		7-4	8-4	9-4
1-5			4-5	5-5		7-5	8-5	
1-6			4-6	5-6				
				5-7			10-1	11-1
				5-8			10-2	11-2
							10-3	11-3

Remark
It is not a statutory plan that has been accepted by official institutions, however it functions as a suggestion to the relevant stakeholders.