6.4 Land Use Plan for GKS 2030

6.4.1 Methodology

A long-term land use plan was formulated for the GKS Zone for 2030 based on an evaluation of development potentials and constraints in the GKS (section 6.1), development suitability (section 6.2), and urbanization and land demand (section 6.3),

1) Proposed Land Use Zoning Categories

Indonesia's National Survey and Mapping Coordination Agency (BAKOSURTANAL) prepared a detailed land use map using a color-coding system for spatial planning. However, such detailed breakdown of land use categories is not relevant to the spatial plan prepared in this JICA study for two reasons, namely: (1) the mapping scale of the latter, i.e., GKS spatial plan, is 1:250,000, and (2) the GKS spatial plan aims to provides general guidelines at the macro level only and should be useful when spatial plans are prepared at the regency level. Therefore, the JICA Study Team proposed 10 categories of land uses, as shown in Table 6.4.1 .

BAKOSURTANAL's land use categories that fall under each of these 10 land uses are attached to this table.

2) Basic Directions in Land Use Planning

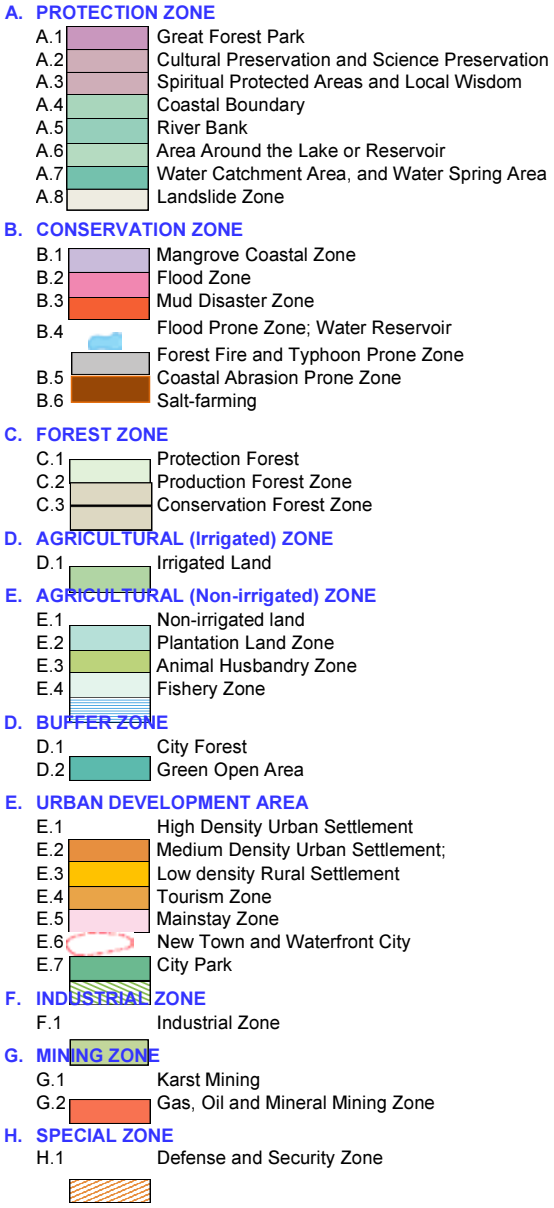
A number of directions have been considered in preparing the land use plan for the GKS Zone. The following seven are the major considerations:

- **Legally Protected Forests** should be strictly protected and laws enforced;
- **Environmentally Sensitive Areas** (ESAs) should be identified and managed under a special policy;
- **Conservation Areas**, including swampy, flood-prone, coastal areas and salt farms, as well as the Lapindo mud flow areas, should be controlled against urban development;
- **Conversion of Irrigated Areas** to urban uses should be minimized despite strong urbanization pressure;
- **Agricultural Land**, especially in Bangkalan and Mojokerto, should be utilized for more diversified and versatile activities, including animal husbandry especially dairy farming;
- **Urbanization with Green Networks** should be pursued in urban areas; and
- **Water-saving and Pollution-free Industries** should be promoted to locate in high-development potential areas and disallowed in ESAs**.**

Table 6.4.1 Land Use Categories for the Proposed GKS Spatial Plan 2030

Land Use Category		Objective/Attribute	Note
1	Protection Zone	• To legally protect natural resources and critical ecosystems from disorderly development and illegal land conversion. • To mitigate disasters, keeping the existing natural conditions and pattern protected	Refer to the environmentally sensitive area (ESA) map
2	Conservation Zone	• To conserve natural resources and ecological assets through institutional measures on development control and land use management, taking account of environmental considerations.	Including mud flow area and salt farms
3	Forest Zone	• To manage forest areas with the legal framework of three (3) categorized forests: protection forest, conservation forest, and production forest.	Should comply with laws and regulations
4	Irrigated Agricultural Zone	• To promote agricultural activities with a well-managed water use system	
5	Non-irrigated Agricultural Zone	• To encourage more diversified agricultural activities, including animal husbandry and agro-processing. • Fishpond and salt-farming pond	
6	Buffer Zone	• To reserve open space and environmental resources to serve as green networks for a more livable metropolis.	Including areas reserved for urbanization beyond 2030.
7	Human Settlement & Urban Development Zone	• To facilitate the development of areas for housing and urban services under three types based on population density: high density, medium density, and low density. • To develop rural villages as human settlement areas.	Including all public services such as parks, schools, health and government facilities.
8	Industrial Zone	• To encourage and facilitate industrial development in the form of industrial estates/parks or special industrial zones.	Sewerage and drainage systems to be provided.
9	Mining Zone	• To promote proper environmental management for gas and oil exploitation as well as mineral mining and quarrying.	No specific areas exist in the GKS Zone.
10	Special Zone	• Including military use and cemeteries.	

Source: JICA Study Team



6.4.2 Proposed GKS Land Use Plan 2030

1) Overall Land Use and Spatial Patterns for 2030

A long-term land use plan for the GKS Zone targeting 2030 was prepared by the JICA Study Team, as shown in table 6.4.1.

The areas covered by these land uses by 2030 are tabulated in Table 6.4.2. From this table, the followings points have been noted:

- Protection Zone, Conservation Zone and Forest Zone will share 10.1%, 2.4%, and 10.3% respectively, of the total land area. Thus, about 22.8% of the entire GKS Zone will become protected;
- Irrigated Agricultural Zone will account for 20%, and Non-irrigated Agricultural Zone, 30.5%. This means that agricultural land will cover half (50.5%) of the GKS Zone, making agriculture the most significant land use;
- Human Settlement & Urban Development Zone will account for 74,944 ha, sharing 11.8% of the GKS total, while the land for rural villages will account for 58,540 ha, or 9.2%. Hence, a total of 21% of the land will be used for human settlements and urban activities.
- Industrial Zone will have a total 13,328 ha by 2030, or a 2.1% share of the entire GKS Zone.

In general, it was assessed that the proposed land use plan strikes a balance in terms of environmental conservation and urban development.

Table 6.4.2 GKS Land Use Zones by 2030

Land Use Category		Area (ha)	Share (%)
1	Protection Zone	63,948	**10.1**
2	Conservation Zone	15,472	2.4
3	Forest Zone	65,132	**10.3**
	Protection Forest	*(1,292.0)*	*(0.2)*
	Conservation Forest	*(11,108.0)*	*(1.7)*
	Production Forest	*(52,732.0)*	*(8.3)*
4	Agricultural (Irrigated) Zone	126,880	**20.0**
5	Agricultural (Non-irrigated) Zone	193,448	**30.5**
6	Buffer Zone	21,660	3.4
7	Human Settlement & Urban Development Zone	74,944	**11.8**
	High Density	*(11,068.0)*	*(1.7)*
	Middle Density	*(38,936.0)*	*(6.1)*
	Low Density	*(24,940.0)*	*(3.9)*
	Rural Villages	58,540	9.2
8	Industrial Zone	13,328	**2.1**
9	Mining Zone	0	0.0
10	Special Zone	1,548	0.2
Total		**634,900**	**100.0**

Source: JICA Study Team

2) Changes in Land Use Patterns between 2009 and 2030

An analysis of land conversion from the existing conditions in 2009 to the target year 2030 was made, and a matrix of land use changes was prepared, as shown in Table 6.4.4. This matrix indicates what uses an existing land can shift to by 2030.

From this analysis, changes in the existing irrigated agricultural areas have been noted, as shown in Table 6.4.3. As mentioned earlier, one of the most important land use planning strategies is minimizing the decrease in areas for irrigated agricultural lands due to urbanization pressures. As mentioned earlier, the Law No.41/2009 places restriction on land use conversion of the agricultural land to residential and industrial uses.

As seen in the table, the existing irrigated land accounts for ***168,104 ha*** in total, out of which **126,536 ha (75.3%)** should remain as irrigated lands and 14,680 ha (8.7%) could be converted to environment-oriented land, such as protection and conservation areas. While ***12,768 ha*** (7.6%) could be converted to urban development areas, ***2,520 ha*** (1.5%) could be shifted to industrial uses. More or less 9% of the existing irrigated land could be converted to urban and industrial land. Such changes are considered reasonable and relevant, taking into account the strong urbanization pressure which is anticipated in the coming decades.

Table 6.4.3 Changes in Irrigated Agricultural Land Areas from 2009 to 2030

		Existing 2009		
Land Use Category		**Irrigated Agricultural Area 2009 (ha)**		**Composition (%)**
Land Uses by 2030	Protected area	10,144	14,680	8.7%
	Conservation area	736		
	Production forest	3,800		
	Agriculture (Irrigated)	**126,536**		**75.3%**
	Agriculture area	2,376		1.4%
	Buffer	9,224		5.5%
	Urban Dev't Area (High Density)	464	12,768	7.6%
	Urban Dev't Area (Middle Density)	5,080		
	Urban Dev't Area (Low Density)	7,224		
	Industrial area	2,520		1.5%
Total		**168,104**		**100.0%**

Source: JICA Study Team

3) Forest Areas in 2009 and 2030

The forest areas as of 2009 covers 19, 736 ha in total over the GKS, which shares only 3.1% of the entire territory of the GKS Zone (634,900 ha). Whilst, in the land use plan in 2030, the forest areas will account for a total of 65,132 ha, out of which 1,292 ha is for protection forest; 52,732 ha for production forest and 11,108 ha for conservation forest. The total forest area shares 10.3% in the GKS Zone. The increase of forest areas will be realized by proactive reforestation and conservation actions that are expected to be initiated by authorities concerned.

The coverage ratio with forest in 2030, however, does not reach 30% of the entire GKS Zone, although the ratio of 30% is guided by the Law No.41/1999, as mentioned earlier. It is noted that the GKS Zone does not cover the entire river basins of the major watershed. Given the expanding GKS zone including the whole watersheds, the designated forest ratio of 30% may be complied. However, the most important issue is to facilitate a reforestation and forest-restoration program, having the existing forest resource conserved.

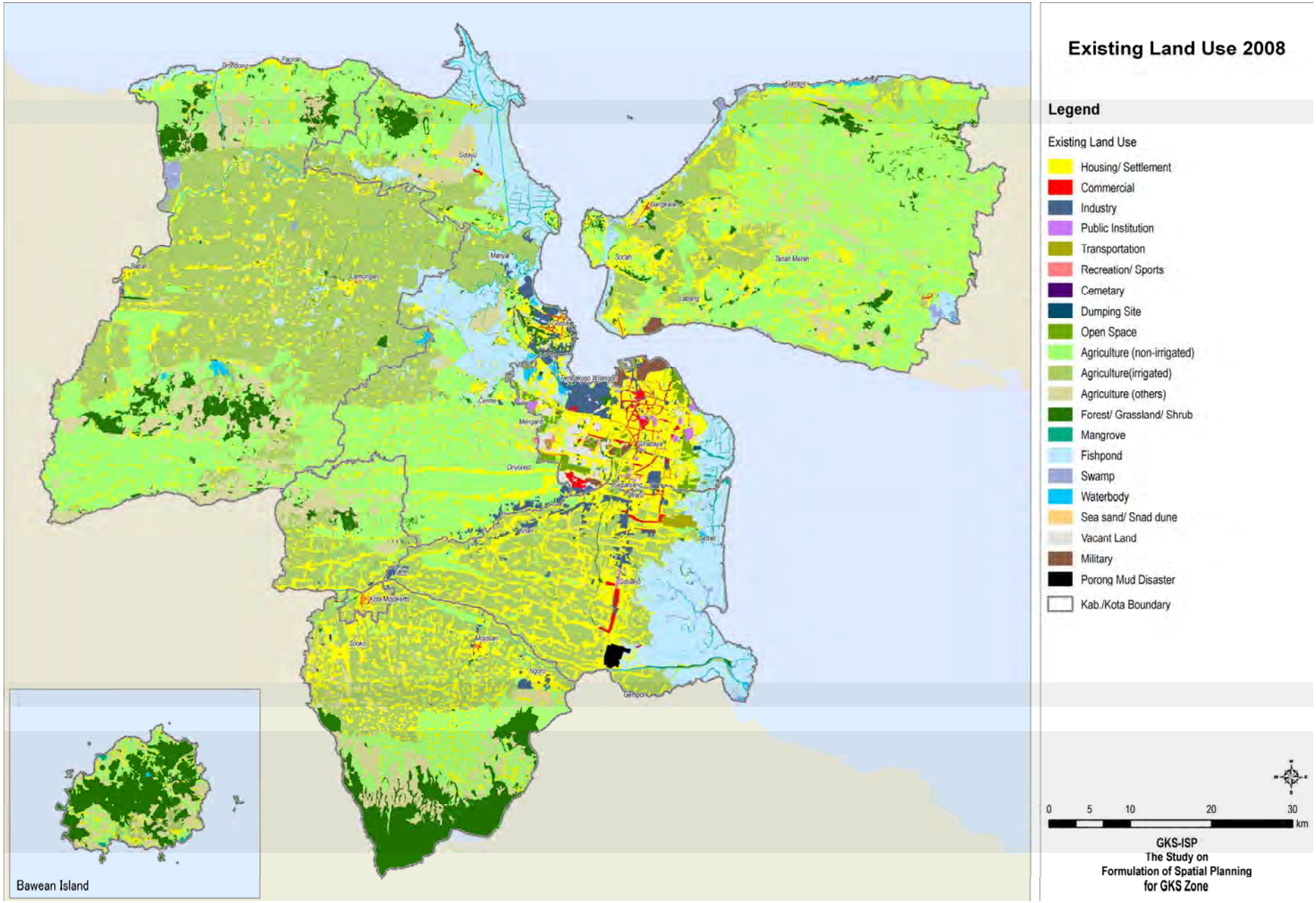


Figure 6.4.1 Land Use Plan 2030 for GKS Zone

Table 6.4.4 Changes in Land Use Areas in GKS Zone from 2009 to 2030

(Unit: ha)

	Land Use	Existing Land Use (2009)																			
		Agriculture	Agriculture (non-irrigated)	Agriculture(irrigated)	Cemetery	Commercial	Dumping Site	Fishpond	Forest/ Grassland/ Shrub	Housing/ Settlement	Industry	Mangrove	Military	Open Space	Porong Mud Disaster	Public Institution	Recreation / Sports	Sea sand/ Sand	Swamp	Transportation	Vacant Land	Water body
Land Use Plan (2030)	Protected area	8,044	35,700	9,964	0	20	0	168	8,288	732	56	0	0	0	0	0	0	88	616	0	8	264
	Conservation area	88	312	696	0	8	0	10,800	384	28	8	1,624	0	0	580	0	0	8	732	0	0	204
	Agriculture area (irrigated)	0	4	126,860	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
	Buffer area	1,912	3,684	9,092	0	72	32	812	4,892	340	260	12	0	80	0	48	8	12	60	136	20	256
	Agriculture area	22,924	117,608	16	24	132	4	36,264	6,072	3,788	380	996	0	76	20	8	36	72	1,128	172	44	3,684
	Industrial area	68	3,160	2,716	0	100	0	2,364	444	1,324	2,780	140	0	0	0	24	0	0	232	0	132	264
	Special zone (military)	0	0	0	0	0	0	0	340	28	0	0	1,184	0	0	0	0	0	0	0	0	0
	Kampung	0	12	28	0	12	0	120	0	58,240	12	0	0	0	0	0	0	0	0	0	0	116
	Protected forest	60	64	0	0	0	0	0	1,168	0	0	0	0	0	0	0	0	0	0	0	0	0
	Production forest	18,040	19,044	3,720	0	0	0	428	11,052	184	4	0	0	0	0	0	0	0	140	0	4	116
	Conservation forest	1,860	172	0	0	0	0	0	9,076	0	0	0	0	0	0	0	0	0	0	0	0	0
	Urban development area (High)	80	96	384	0	912	0	36	412	6,996	768	0	0	372	0	400	56	0	4	52	344	152
	Urban development area (Mid)	1,740	4,768	4,792	0	1,080	0	324	1,412	15,728	2,980	4	0	1,792	0	700	104	8	68	216	2,288	476
	Urban development area (Low)	1,284	5,540	7,052	0	156	40	776	540	7,456	800	0	0	368	0	32	48	8	88	176	116	428

Source: JICA Study Team

6.5 Comprehensive Spatial Plan for GKS Zone

6.5.1 Strategic Development Zones for Equitable Economic Growth

1) Definition and Projects in the Strategic Development Zones

The Spatial Planning Law articulates that strategic development zones should be identified to realize visions and missions envisioned in the beginning of the spatial planning process. Based on such a direction, strategic development zones (SDZs) and their respective major projects were defined, as follows:

- **Anchor projects** to realize the identified development visions;
- **Key projects** to boost the regional economy of the GKS and East Java;
- **Large/medium-scale projects** which require massive public and/or private investments; and
- **Priority projects** for immediate commencement and supported by special policies.

Thus, the major projects in the SDZ are assumed to include the following:

- Industrial estates/zones;
- Transportation nodes and traffic generators such as ports, airports, railway stations, bus terminals, cargo distribution terminals, and so on;
- Commercial and business centers;
- Tourism destinations to attract both international and domestic tourists;
- New towns, urban sub-centers, and/or new settlement centers;
- Major utility infrastructure such as reservoirs, water intakes, sewerage and drainage systems;
- Facilities for solid waste management (final disposal sites, intermediate transfer facilities, recycling centers, composting plants, etc.); and
- Other facilities and services indispensable to the achievement of the visions.

2) Assessment of Proposed Strategic Projects

Each kabupaten and kota spatial plan proposed a number of strategic projects with medium and large scales. These major projects are tabulated in Table 6.5.1. They were reviewed and prioritized by the JICA Study Team using the evaluation process shown in Figure 6.5.2. The criteria were (1) relevance to vision and objectives of GKS development as a whole; (2) expected impacts, effectiveness, and implicit feasibility; and (3) urgency of implementation.

All regencies expect to develop massive industrial estates. However, the incremental demand for industrial land area is computed at about 8,680 ha until 2030. Thus, prioritization is important in order to avoid overinvestment and overdevelopment of land. Once agricultural lands are converted to industrial areas they will never revert to agricultural lands again, because the process is not reversible.

Moreover, projects planned in the "Protection Zone" were either omitted, partially cut, or relocated due to crucial environmental considerations.

3) Proposed Strategic Development Zones in the GKS toward 2030

After reviewing and prioritizing the strategic projects proposed by the kota/kabupaten spatial plans, the locations of these priority projects were recognized as SDZs for the target year 2030. In addition to these projects, a number of other strategic projects in the transportation and infrastructure sectors were included in the GKS spatial plan. Their locations were also regarded as SDZs.

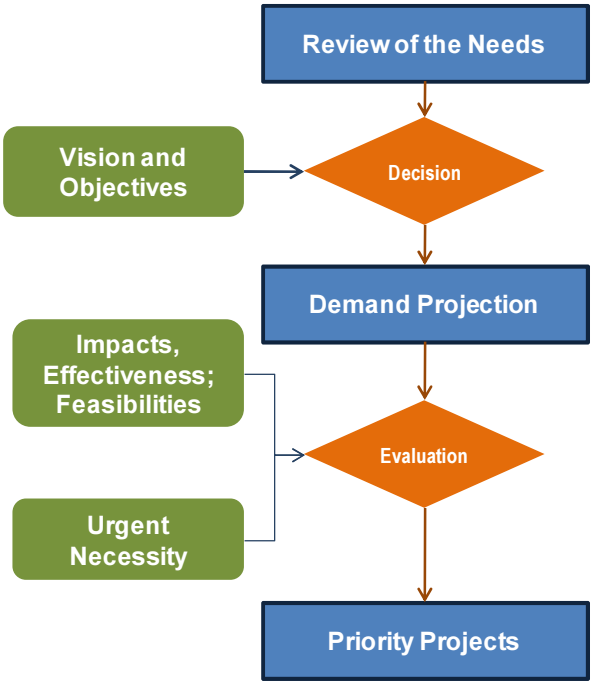


Figure 6.5.1 Prioritization Procedure of Strategic Zones/Projects Proposed by Kota/Kabupaten

Figure 6.5.4 shows the proposed GKS strategic development zones to be developed up to 2030, which include:

- ***Central Commercial and Business Development Zone***, where intensive urban redevelopment be promoted to encourage pivotal commercial and business functions as the second largest city in the Nation.
- ***Green Development Zone***, whose environmental resources be conserved and/or newly created for people's recreation and tourism activities.
- ***Public Facilities Development Zone;*** where a large-scale and high-functional public service facilities such as goods distribution and transportation, higher educational institutes, hospitals, tourism facilities and intermodal centers, etc.
- ***Industrial Development Zone***; where sizable industrial estates/parks, industrial incubation facilities and/or R&D technology centers be strategically constructed under Government Regulation No.24/2009 (Industrial Zone).
- ***Military Zone***; where includes the designated areas for national security and defense (further discussion in the following section)
- ***Other Strategic Project Locations***; where a number of infrastructure development projects are strategically proposed to achieve the development goals and visions for GKS.

4) Special Zones for Security and Defense

Special zones for security and defense are categorized as one of strategic zone in the GKS spatial plan. Significant zones are located in the northern coast in Surabaya and the southern coast in Kabupaten Bangkalan, and these are designated as military zone.

As mandated by the Act No. 3/2002 on National Defense, one of the basic principles of preparation of the defense is to take into account the geography of Indonesia as an archipelago.

The archipelago is formed with very diverse society, and rich natural resources. These are all factors which greatly affect the dynamics of the unitary Republic of Indonesia. Among the important aspects that influenced the geography of Indonesia, three key views are recognized to explain the geo-strategy of the national defense policy, namely, views of ***geo-political***, ***geo-economic*** and ***geo-socio-cultural***.

To face *threats of economic dimension,* the national defense effort to be taken is to build resilience in the economy through healthy and sustainable growth. Economic development with a sound economic growth is vital to realize economic stability, and to uplift people's welfare, thereby being a winner in the globalization era. To deal with the economic dimension of the internal threat, policy priorities can be a labor-intensive employment creation as a solution to eradicate poverty, infrastructure development, creation of a conductive business climate, and the selection of appropriate technology as a solution to equal opportunity employment.

Threats of socio-cultural dimension can be explained by the inner threat and outer threat. The inner threat is driven by issues of poverty, ignorance, backwardness, and inequality. These issues became a starting point of all social problems, such as separatism, terrorism, and violence inherent entrenched, as a result of human-made disasters. On the other hand, threats from outside are related to the penetration of overseas cultural values, which affects social values of the regional to local level. This is difficult to be avoided under the era of information technology leading to the world into a global village.

As far as these considerations are often envisaged for policy issues on national and regional security and defense, the military land must be an practical strategic space to secure development for peoples' safe and sustainable livelihood.

Table 6.5.1 Proposed Strategic Development Projects by Area and Their Prioritization

Kota/Kab	Ref. # [1]	PROJECT NAME	PROJECT SECTOR	LOCATION	AREA (Ha)	STATUS	SCALE	PRIORITY [2]
GRESIK	1	Ujung Pangkah Industry	Industry	Ujung Pangkah	4,984.38	Planned up to 2028	Large	H
	3	Manyar Industry	Industry	Manyar	1,489.00	Planned up to 2028	Large	M/L
	2	Sidayu Industry	Industry	Sidayu	1,000.00	Planned up to 2028	Large	M/L
	15	ERP (Environment Recycling Park)	Solid Waste	Kedamean	120.00	Feasibility Study 2010	Medium	H
	4	Housing & Settlement	Human Settlement	Driyorejo, Kedamean, Menganti, Cerme	4,000 of total 29,207.00	Planned up to 2028	Large	M/L
	25	Sembayat Barrage (water reservoir)	Natural Resource	Bungah	64.00	Start 2011	Medium	H
	16	TOL road Legundi-Manyar	Transportation		172.50		Medium	M/L
BANGKALAN	12	Suramadu Bridge Foot	Tourism, Service	Labang	600.00	Start 2011	Medium	H
	5	Tanjung Bulupandan Port Hub	Transportation	Klampis	1,000.00	May be start in 2012	Large	H
	13	Blega Reservoir	Natural Resource	Galis	966.30	Water supply Capacity: 0.39 m3/sec; Catchment Area: 122 Km2.	Medium	H
	14	MISI Port	Transportation	Socah	?	Planned up to 2028	Medium	M
MOJOKERTO	6	Ngoro Industrial Park	Industry	Ngoro	440.00	Operate since	Medium	H
	6	Mojoanyar Industrial Estate	Industry	Mojanyar	1,555.00	Planned up to 2028	Large	M
	6	Jetis Industrial Estate	Industry	Jetis		Planned up to 2028		M
	7	Housing & Settlement	Human Settlement	Sooko, Gedek, Mojosari, Pacet	18,807 of total 31,058.1	Planned up to 2028	Large	M/L
	17	TOL road SUMO	Transportation	Waru-Driyorejo-Krian-Mojokerto	311.20	Start in 2009	Medium	M
SIDOARJO	21	Regional Main Market for Agrobussiness (PIA)	Industry	Jemundo	50.00	Construction started in 2010	Medium	H
	20	JUANDA Airport II (Expansion)	Transportation	Sedati	10.00	Plan to be developed in 2012	Medium	H
	8	Siborian Industrial Estate&Zone	Industry	Sidoarjo-Jabon-Krian	2,450.00	Plan to be developed	Large	L
	9	New Town Development	Human Settlement	Sukodono	1,716.80	Plan to be developed	Large	M
	18	Waterfront City	Human Settlement	Sedati	N/A	Plan to be developed	Medium	M/L
	22	Tarik Riverside City	Human Settlement	Tarik	N/A	Plan to be developed	Medium	M
	19	Gemopolis (Gem Industry)	Industry	Sedati	300.00	Plan to be developed	Medium	M
LAMONGAN	26	Lamongan Integrated Shore-base	Industry	Paciran	100.00	Operating in 2010	Medium	H
	25	Sembayat Barrage (water reservoir)	Natural Resource	Laren	10.00	Start 2011 (a part of Gresik location)	Medium	H
	27	TOL road Gresik-Lamongan-Tuban	Transportation		375.00	Planned up to 2028		M/L
		Air Port Alternative for Juanda extension	Transportation			Discourse	Medium	L
KOTA MOJOKERTO		-	-	-	-	-		
KOTA SURABAYA	12	Suramadu Bridge Foot	Commercial	Tambak Wedi	600.00	Start 2011	Medium	H
	11	Lamong Bay Port for Container	Transportation	Lamong Bay	55.50	Start 2011	Medium	M
	12	Waterfront Residential Settlement	Human Settlement	Lamong Bay, Suramadu Bridge Foot, East Coast	400.00	Planned up to 2028	Medium	M/L
	23	TOL road	Transportation	Eastern Ring Road	320.50	Planned up to 2028	Medium	H
	10	Suramadu Bridge	Transportation	Tambak Wedi	5.40 Km	Finish and Operate since 2009	Large	Completed

Source: Kabupaten and kota spatial plans.
Notes: 1) Refers to the numbers indicated in Figure 6.5.2.
2) Prioritization done by the JICA Study Team: H=High, M=Medium, and L=Low.

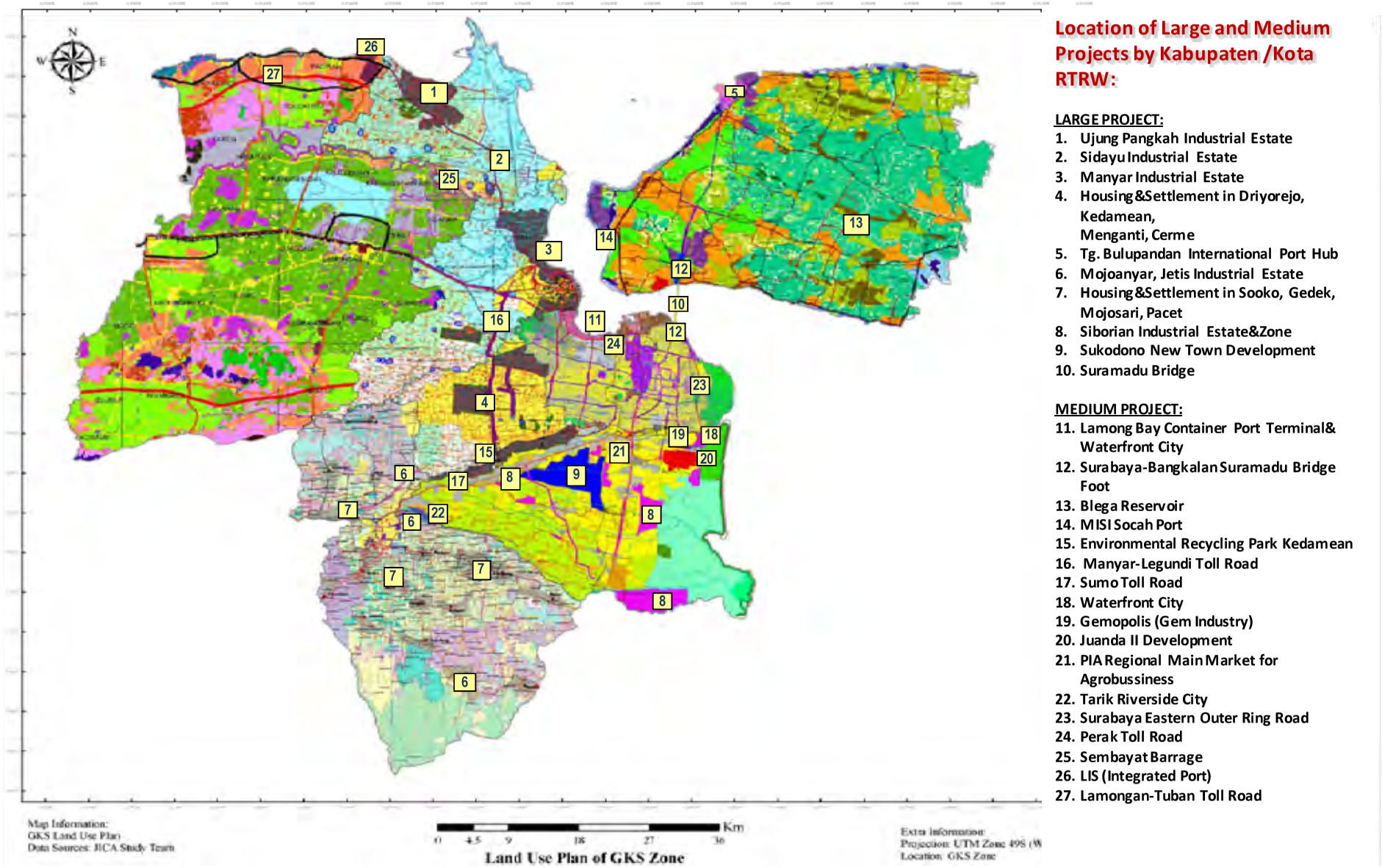


Figure 6.5.2 Large- and Medium-scale Strategic Projects Proposed by Regency Spatial Plans

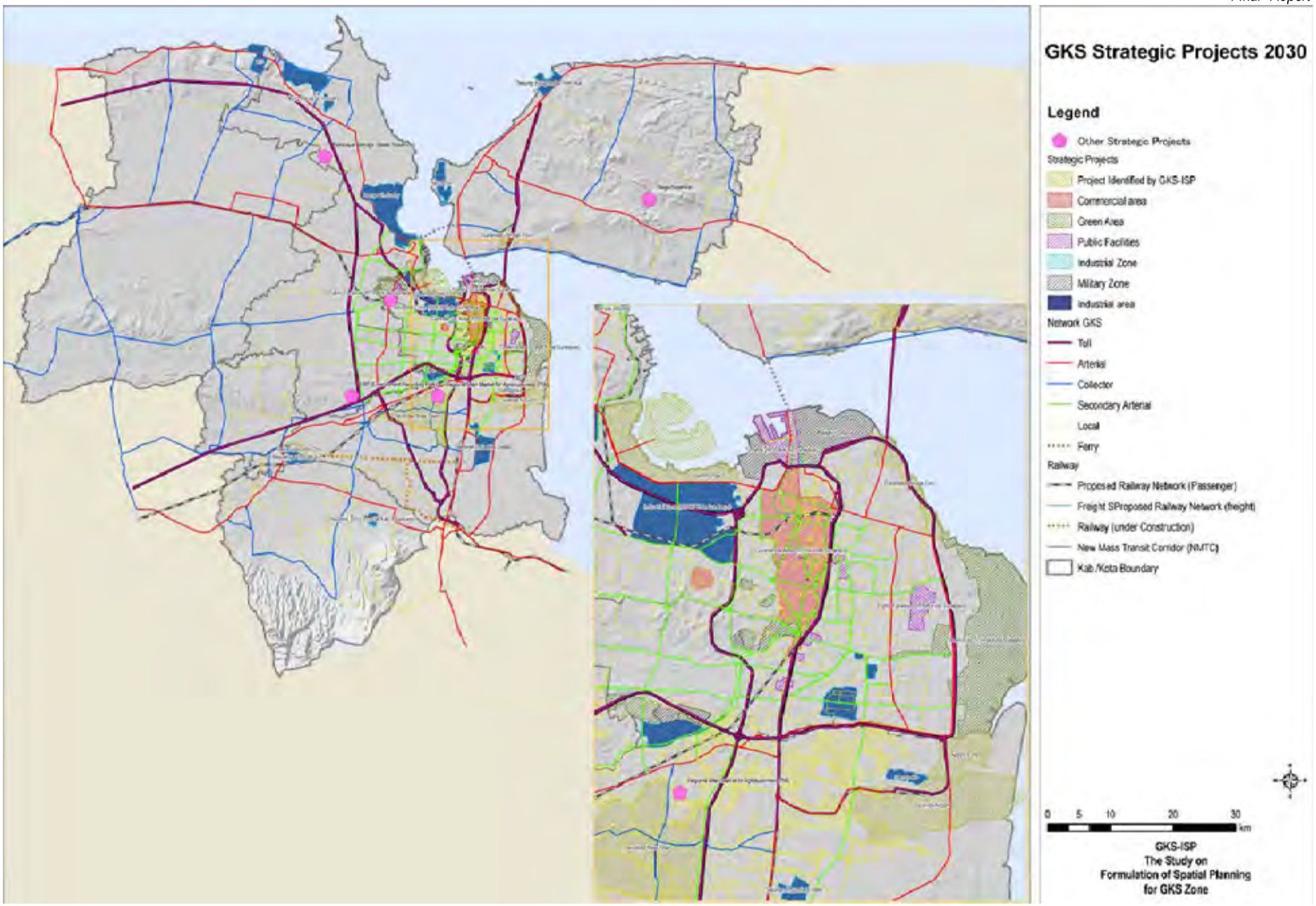


Figure 6.5.3 Proposed Strategic Development Zones in GKS toward 2030

6.5.2 GKS Spatial Plan 2030

The preceding sections delineated and fleshed out the spatial plan for the GKS Zone leading to 2030, as follows (refer to Figure 6.5.5):

- Visions, policies, and strategies;
- SWOT of the GKS;
- Socio-economic framework in 2030;
- Urban center hierarchical system;
- Transportation network;
- Infrastructure network;
- Land potentials and constraints;
- Environmental management system;
- Land use demand projection for 2030;
- Land use plan; and
- Strategic development zones.

Based on the above, the JICA Study Team proposes the **GKS Spatial Plan 2030**, as shown in Figure 6.5.5.

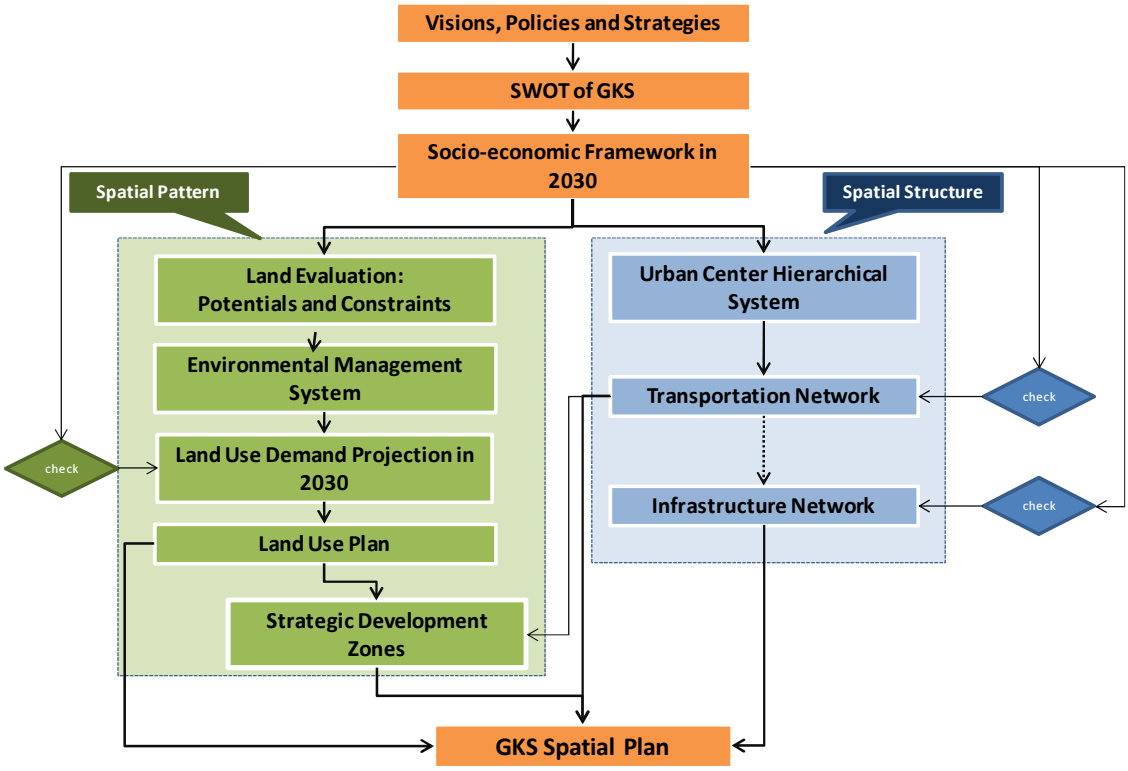


Figure 6.5.4 Planning Process to Formulate GKS Spatial Plan

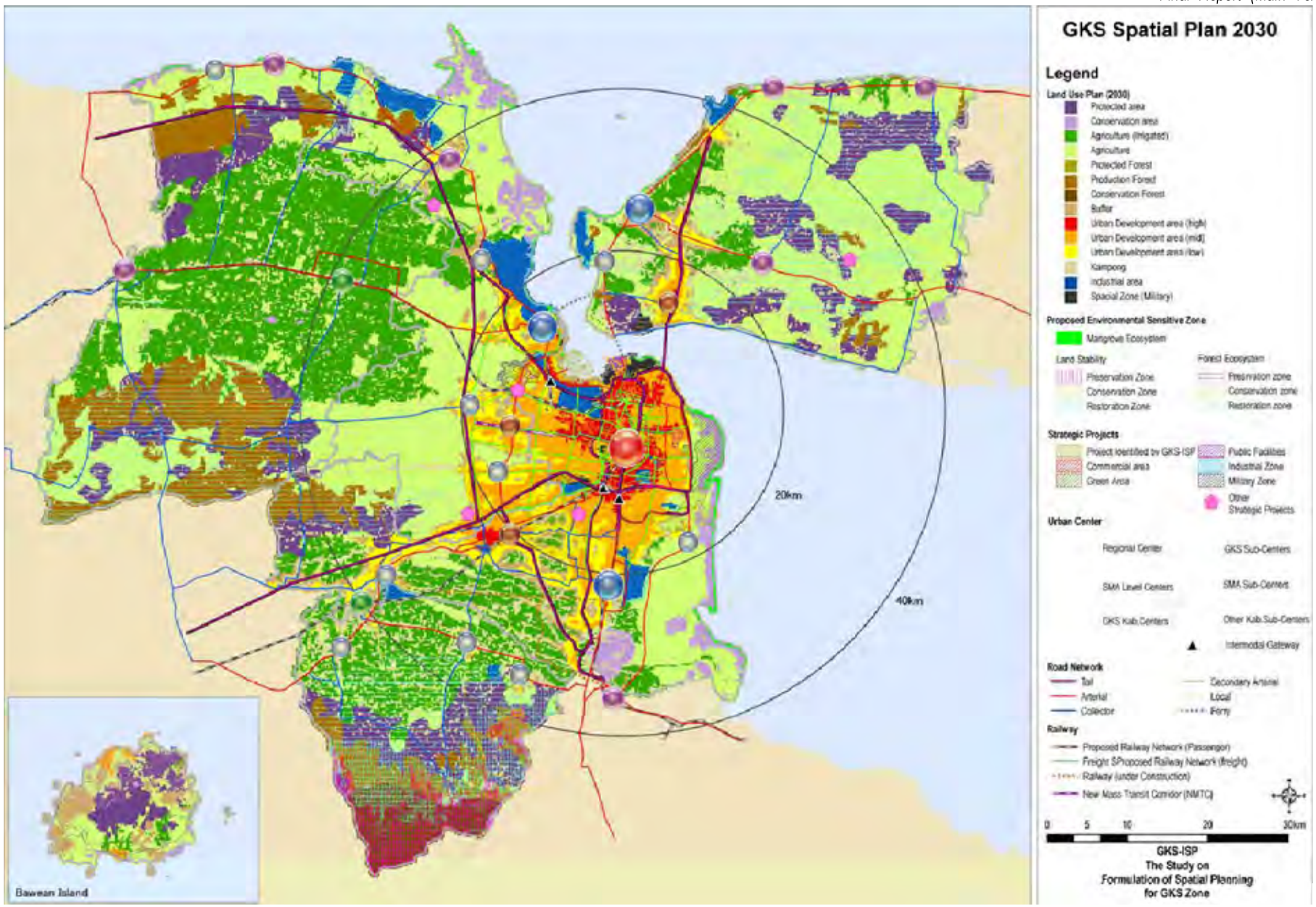


Figure 6.5.5 Proposed GKS Spatial Plan 2030

6.6 Environmental Management System

6.6.1 Existing Environmental Problems in GKS Zone

The environmental problems in the GKS Zone were identified through the conduct of various activities, which included the collection of secondary data, interviews, field surveys, and a workshop on environmental problems analysis. These activities were conducted in coordination with the Department of Environment and the Spatial Planning Department of East Java province. These data were analyzed and the results are discussed in this section.

1) Types of Environmental Problems

The major environmental problems in the GKS Zone are caused mostly by human activities, namely:

- Inappropriate land conversion
- Damage of forest and mangrove
- Pollution
- Traffic
- Solid waste

(1) Inappropriate Land Conversion

Inappropriate land conversion was of two different types, namely, forests converted into agricultural lands and agricultural lands converted to residential and industrial areas. The first type is forest land conversion which was observed in Pacet in Kabupaten Mojokerto, where forest lands have been cultivated by poachers. These areas can easily erode due to their steep slopes.

The second type is agricultural land conversion. Land conversion in the GKS Zone is covered by Law No. 20, 2003. Land management is also controlled by the Department of Agriculture, whereby a farmer has to ask permission if he intends to sell his agricultural land. This policy is implemented to safeguard food security and to sustain the department's food security targets. However, based on the results of the survey done in this study, approximately 19% of agricultural land is decreasing every year. In East Java province, 72% of agricultural land is less than 1 ha in size. According to the Department of Agriculture, some farmers, with small sized lands, are selling their agricultural land for development purposes.

(2) Damage to Forests and Mangroves

The forest cover in East Java decreased approximately 1,000 ha/year due to illegal logging and forest fires started by human activities, such as camping and embers from smoked tobacco. From January to October 2009 in Pacet, Kabupaten Mojokerto alone, there were five cases of arrests of illegal loggers.

During the Workshop on Environmental Problems Analysis with the Department of Environment and the Department of Spatial Planning in East Java province, participants identified the increasing trend in mangrove forest damage as a serious concern across

the GKS. Although very limited data were available, such observation is highly telling as to the environmental state of the region..

(3) Pollution

The GKS Zone experiences two types of pollution, i.e., water and air pollution. Most of the rivers and drainages are polluted by industrial effluent, sewage, agricultural chemicals, and solid waste. To date, there are two existing pumping stations for downstream water supply. According to the Department of Environment, these pumping stations have poor water quality levels for drinking because they are affected by pollution from nearby factories, most of which have not followed effluent standards. Another factor is the dumping of garbage into drainage systems, a practice which has been more observable in the rural areas. The garbage disposal system not only results in water pollution but also generates foul odor, thereby contributing to the poor sanitary conditions in most areas. Dumped garbage also clogs the flow of water, causing flooding especially during the rainy season.

On the other hand, air pollution is mainly caused by vehicles and factories. Heavy traffic congestion is prominent in urban areas which generate more air pollution. Poorly maintained vehicles and high numbers of two-stroke motorbikes generate suspended particulate matters.

An increasing number of vehicles also generate air pollutants including greenhouse gases not to mention that they contribute to the increasing number of car-related accidents.

(4) Traffic

Traffic volume is rapidly increasing in Kota Surabaya .In fact, one of the key issues in urban transportation in Surabaya is how to manage traffic demand in the CBD, especially during peak hours. There are several roads in the west direction to the CBD but these roads are relatively small and are mostly two lanes. There is actually only one road which comes from the south and directly leads to the CBD (i.e., Jl. Achmad Yani), but the traffic is very high in this road.

(5) Solid Waste

Based on the results of the recently conducted Workshop on Environmental Problems Analysis, the problem on solid waste is a major concern in the GKS Zone. People throw garbage into rivers and drainage which results in water pollution, floods, and foul odor, among others.

Inappropriate Land Conversion

Land conversion to agricultural land from forest

Damages to Forests and Mangroves

Mangrove forest converted to fishpond

Agriculture area intrudes into forest area

Scattered Garbage

Scattered garbage in a vacant area

Garbage in coastal areas

Disposal of garbage into drainage

Throwing garbage at road side

Pollution

River water pollution from garbage

Untreated sewage

Traffic

Source: JICA Study Team

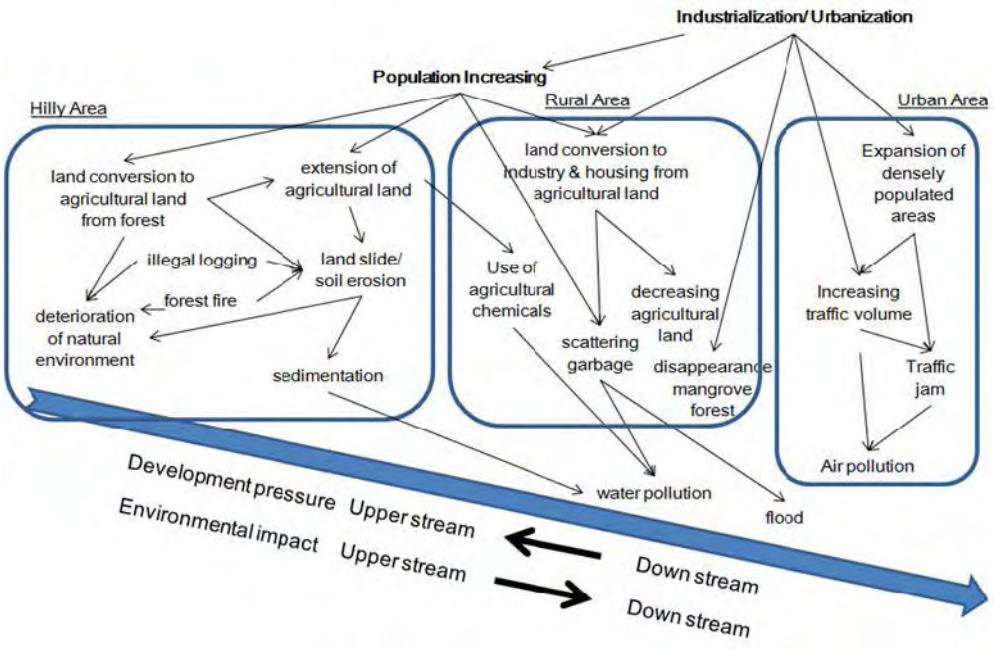
Figure 6.6.1 Environmental Problems in GKS Zone

2) Environmental Problem Structure

The interrelationship of the major environmental problems in the GKS Zone is shown in Figure 6.6.2. As illustrated in the figure, environmental problems are related mainly to the interplay of topographic conditions and land use. These are distinctively characterized by the problem in hilly areas, as well as rural and urban areas. For example, in the hilly areas, the problems are related to forest and soil conservation, particularly in Kabupaten Mojokerto. In the urban areas, the problems are related to population growth. These problems are collectively caused by industrialization, urbanization, and increasing population.

It has been observed that most of the development pressure in the GKS Zone comes from downstream then to the upstream. Manifestations include the decreasing agricultural land in favor of more industries, settlements, and housing expansion. The forest cover in hilly areas, on the other hand, has been observed to be decreasing due to illegal conversion of forest areas into agricultural lands.

The flow of environmental impacts due to development pressure and the influence from this pressure have been noted to come from upstream to downstream. For example, soil erosion caused by land conversion in hilly areas causes sedimentation in the rivers, and agricultural chemicals in rural areas and effluents from industrial wastes negatively influence the water quality of the surrounding water bodies. Moreover, many of the dumped garbage flow into the coastal areas.



Source: JICA Study Team

Figure 6.6.2 Environmental Problem Structure in GKS Zone

6.6.2 Environmental Policy Framework for Spatial Planning in GKS Zone

1) Objectives of Environmental Management in Spatial Planning for the GKS Zone

The purposes of incorporating environmental management in spatial planning for the GKS are as follows:

- To strengthen the environmental sustainability of the GKS Zone by ensuring the balance between environmental conservation and development demand, and.
- To maintain and maximize environmental quality, including that of the natural and manmade environments, for succeeding generations.

2) Environmental Policy Issues

The economy of the GKS Zone has developed in recent years. At present, such economic growth has given rise to environmental problems due to industrialization and urbanization. The assumption is that in the future the environmental conditions will further deteriorate if the government will not improve its environmental management system.

This poses a challenge for the GKS Zone in its desire to become a model of sustainable area development in Indonesia. Hence, in order to strengthen the GKS position, as well as sustain and maintain its development efforts, the GKS Zone should promote sustainable area development along essential elements that will balance economic growth and environmental conservation. In order to achieve this goal, the following environmental policy issues should be made integral in the planning process:

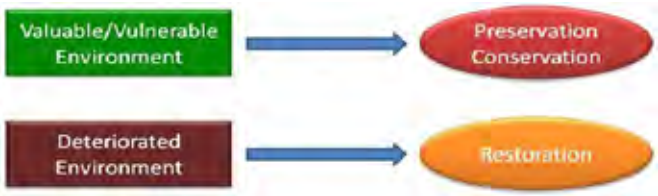
- Strengthen the symbiosis between environmental conservation and development for sustainable prosperity;
- Ensure the sustainability of valuable and vulnerable environments and restore the damaged environment; andContribute to the solution of global issues especially climate change

(1) Strengthening of the symbiosis between environmental conservation and development for sustainable prosperity

In order to achieve healthy and comfortable environment for the people in the GKS Zone, environmental loads should be minimized where benefits are obtained from the environment. Pursuing symbiosis with the natural environment through minimizing environmental loads is indispensable in developing a sustainable GKS zone.

(2) Protection of valuable and vulnerable environments and restoration of damaged environment

The JICA Study Team findings show that the GKS has many valuable and vulnerable natural environments that need to be preserved and protected for its next generations. At the same time, the deteriorated environment caused by development activities should be restored and rehabilitated. Hence, a comprehensive and integrated action should be undertaken. Figure 6.6.3 shows the relationship of the process:



Source: JICA Study Team

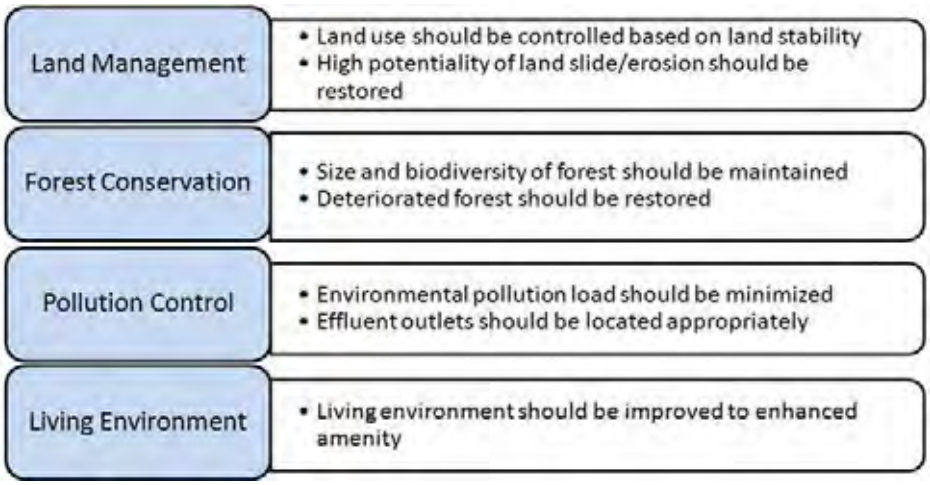
Figure 6.6.3 Integrated Process of Environmental Preservation

(3) Contributions to the solution of global issues especially climate change

Environmental conditions in the GKS Zone are numerous and they cover a huge area. It is therefore necessary to approach these issues from multiple directions and levels at the same time. During the 15th session of the Conference of Parties (COP 15)to the United Nations Framework Convention on Climate Change in Copenhagen in December 2009, Indonesian President Susilo Bambang Yudhono declared that Indonesia will reduce 26% of its CO2 emissions by 2020. As the second largest city in Indonesia, Surabaya is expected to contribute significantly in this COP 15 commitment. In the same line, the spatial plan for the GKS Zone should contribute in the reduction of CO2 emissions, as well.

3) Environmental Considerations in Spatial Planning in the GKS Zone

The environmental planning issues are shown in Figure 6.6.4. These issues are based on the path of environmental problems shown in Figure 6.6.2. The environment in the GKS Zone is in a critical condition due to the adverse effects of rapid economic growth and population increase which went on without a comprehensive environmental management plan and adequate infrastructure to cater to the basic needs of a growing population. If this condition continues, further environmental deterioration will ensue, leading to even more serious deterioration of the people's quality of life.



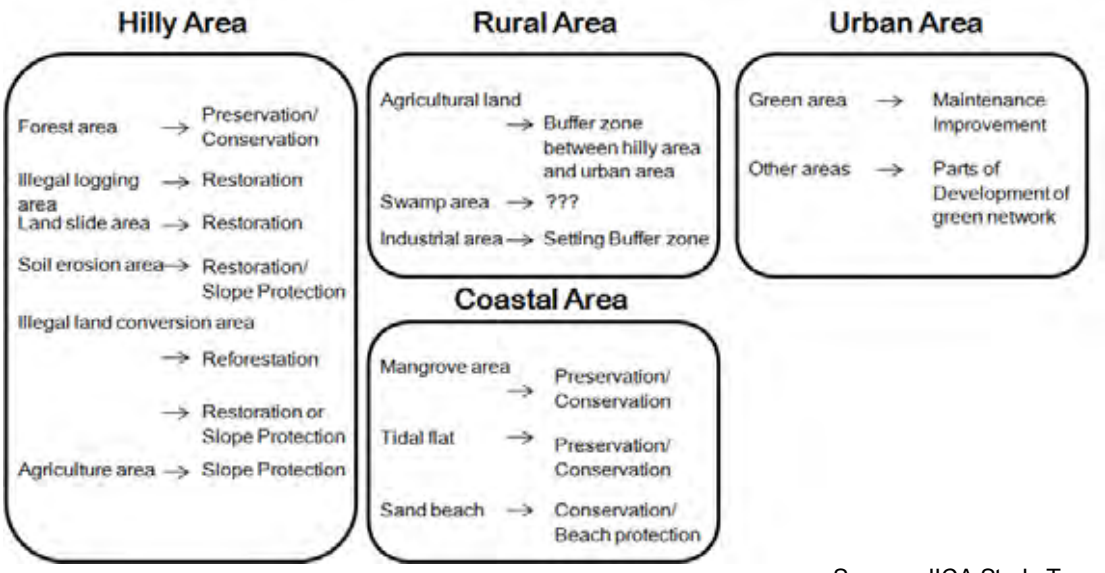
Source: JICA Study Team

Figure 6.6.4 Environmental Planning Issues

Management issues were identified based on environmental sensitivity and vulnerability.

In order to achieve sustainability, hilly areas, as well as rural and urban areas should have different spatial policies.

Spatial policies for environmental consideration in the GKS Zone are shown in Figure 6.6.5. The figure reflects the necessity in taking different environmental actions for different areas due to land vulnerability. For example, agricultural land in rural areas should function as buffer zones between urban and hilly areas. In the existing agricultural land in hilly areas, slope protection should be considered.



Source: JICA Study Team

Figure 6.6.5 Spatial Policies on Environment for GKS Zone

6.6.3 Environmentally Sensitive Zoning

1) Need for Designating Environmentally Sensitive Zones

The economy of the GKS Zone is rapidly growing and the lack, or absence, of a comprehensive environmental management plan will aggravate the adverse environmental impacts of this growth. As cases in point, housing and industrial developments are constructed and developed in agricultural land and swamp areas. At the same time, agricultural activities have vastly encroached on hilly and forested areas. This disorderly development will cause environmental damage and disrupt the natural balance of valuable and vulnerable environments.

In terms of spatial use, land use categories have been developed for various purposes such as industrial development, housing development, commercial, solid waste disposal sites, in-take of water supply, protected areas, etc. The land potentiality and vulnerability analysis conducted by the JICA Study Team showed that the different resource uses have become intertwined and overlapping, resulting in conflicts of uses.

Besides user conflicts, this situation can cause geographical, ecological, and social conflicts. Coordination is necessary between and among spatial users in order to minimize the potential conflicts which will arise from resource utilization. It is also important to note

that the use of areas should be reasonable and integrated within the use of neighboring areas, taking into account geographical and ecological conditions.

Due to development pressure and the associated loss and fragmentation of natural areas throughout the GKS Zone, it has become increasingly important to preserve the remaining natural assets. Also important is the designation of areas for protection and conservation to ensure ecological balancesustainable production. It is also critical that a precise assessment and research on the zone's natural environment and ecosystem be undertaken. An environmentally sensitive zoning map should indicate the areas that should be preserved, conserved, and restored. This information is important and valuable for effective and appropriate environmental management in the GKS Zone.

2) Concept of Environmentally Sensitive Zoning

The introduction of an environmental sensitive zone (ESZ) management is a strategic approach for sustainable area development in the GKS Zone. Below is a description of environmentally sensitive zoning:

(1) What is environmentally sensitive zoning?

Environmentally sensitive zoning is a system, or type, of designation for an area which needs special protection due to its value and/or vulnerable landscape and/or ecosystem from the viewpoint of environmental conservation. An ESZ map is one of the most effective tools in environmental spatial management. It is practiced by designating permitted uses of land on mapped zones, separating one set of land uses from another. It also shows the areas which should be preserved, conserved, and restored from the viewpoint of natural environmental conservation and ecosystem protection.

(2) What are the objectives of environmentally sensitive zoning?

In general, environmentally sensitive zoning aims to minimize the conflicts between spatial and resource utilization and environmental conservation in responding to economic and social demands.

Specifically, environmentally sensitive zoning has the following objectives:

- To preserve environmentally important and critical areas, and their unique features;
- To protect critical habitats, ecosystems, and ecological processes;
- To separate conflicts of human activities; and
- To minimize the effects of human activities in inland and coastal areas.

(3) How to use an Environmentally Sensitive Zoning map?

It is important to ensure the balance among development demand, socioeconomic

situation, and environmental conservation. As mentioned earlier, an ESZ map shows the areas which should be preserved, conserved, and restored for environmental conservation. Therefore, ESZ maps are used as the basis for land use planning and infrastructure development in order to achieve sustainable area development (see Figure 6.6.6). It can be used in setting guidelines for spatial planning, infrastructure development, and environmental impact assessment (EIA) studies.

Source: JICA Study Team

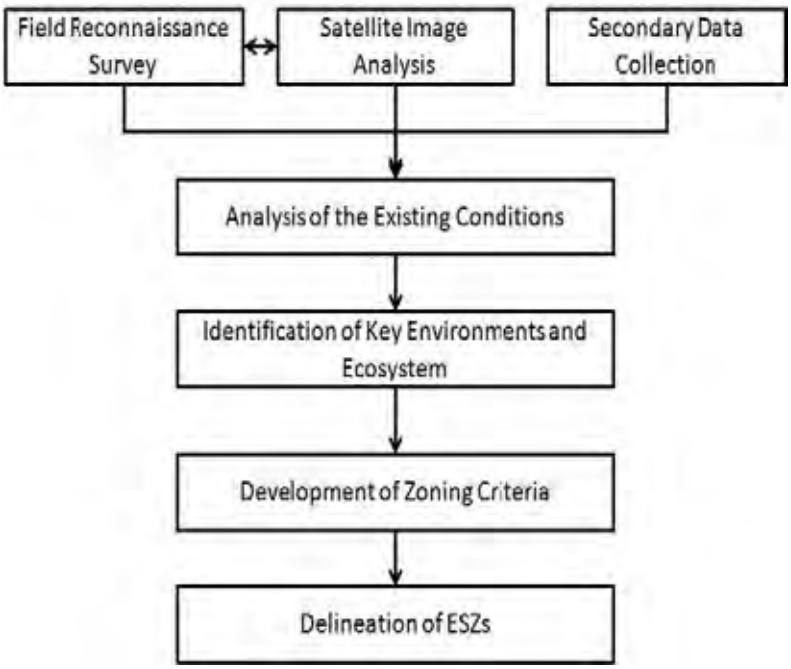
Figure 6.6.6 Integrated Zoning and Land Use Planning

3) Methodology of Environmentally Sensitive Zoning

(1) Process of Environmentally Sensitive Zoning

The zoning process is shown in Figure 6.6.7. The existing environmental conditions were analyzed based on the results of field surveys and secondary data collected. Based on the analysis, key environments and ecosystems were identified, namely:

- Environmentally important and critical areas and their unique features, and
- Critical habitats, ecosystems, and ecological processes.



Source: JICA Study Team

Figure 6.6.7 Process of Environmentally Sensitive Zoning

After the identification of key environments and ecosystems, environmentally sensitive zones were delineated.

(2) Definition of Environmentally Sensitive Zones

The ESZs are classified into preservation zone, conservation zone, and restoration zone based on the following definitions:

i) Preservation Zone

Preservation zones are areas where utmost preservation efforts are exerted to protect the target environment. Some of these areas are established as core zones. Areas included in this category are the following:

- Areas rich in natural environment;
- Areas with high ecological values, including scientific value; and
- Areas ecologically sensitive to human activities.

ii) Conservation Zone

Conservation zones are areas which protect the conditions and ensure sustainable use of the natural environment and resources with due consideration to the areas' environmental capacity. They serve as buffers to reduce the impacts of human activities and restore the natural environment and expanding wildlife habitats.

iii) Restoration Zone

Restoration zones are areas damaged by natural causes and human activities and which require restorationfrom the view points of ecosystem and natural landscape. These areas are the following:

- Areas where deterioration of the environment is feared,, and
- Areas that influence or affect other environments.

4) Key Environment and Ecosystem in Environmentally Sensitive Zoning

Key environments and ecosystems refer to environmentally important and critical areas and other unique features, as well as critical habitats, ecosystems, and ecological processes. Based on an analysis of the existing environmental conditions, the key environments and ecosystems of the GKS Zone were identified as follows:

(1) Land Stability

The major issues on land stability in the GKS are reflected mostly in areas where substantive increases in agricultural activities are done in hilly and forested areas that cause landslides and soil erosion. Based a map that shows the potential areas for landslides and soil erosion from the Department of Energy and Mineral Resources, East Java province, the landslide- and erosion-prone areas in the GKS Zone are expanding. In order to maintain land stability and restore land resource value, land uses should be managed against the increasing risk of landslide and soil erosion.

Source: JICA Study Team

Figure 6.6.8 Key Environment and Ecosystem in GKS Zone

(2) Forest Ecosystem

The forest serves to maintain biodiversity through the provision of habitat and food to endemic flora and fauna, facilitate the stability of the land, as well as support in the absorption of CO_2 gas. In the context of the GKS Zone, its forest areas are a key environment and ecosystem.

(3) Mangrove Ecosystem

Mangrove areas provide high biodiversity in the coastal zone, serve as a habitat for migrant birds, and protect the beaches against waves and current. Mangrove areas are mostly found in the shoreline of Sidoarjo, accounting for approximately 3,107 ha. Planted mangroves are also located in canals.

5) Guidelines for Environmentally Sensitive Zone Management

(1) Objectives and Parameters of the ESZs

As mentioned in the previous section, the key environments and ecosystem in the GKS Zone consist of land stability, forest ecosystem and mangrove ecosystem. The delineation of each zone is based on environmental and ecological features using different criteria and guidelines because different environments and ecosystems have varying levels of vulnerability against the impact of human activities. For example, for terrestrial forests which are mostly located in hilly areas and mangrove forests which can be seen along the coastline and mud bottom, where saline water is one of the factors that restrict their growth. Furthermore, the growth rate of terrestrial trees and mangrove trees are different. This is one of the reasons ESZs should be delineated based on environmental and ecological features. Different environments and ecosystems require different management approaches and techniques.

The objectives and parameters of ESZs for each key environment and ecosystem are detailed in Table 6.6.1.

Table 6.6.1 Objectives, Targets, and Parameters of Environmentally Sensitive Zones

Component		Objective of Zoning	Zoning Target	Zoning Parameter
Terrestrial Environment	Land Stability	• To protect land against natural disasters.	☐ Land prone to landslides and soil erosion.	✓ Slope and elevation ✓ Landslide and erosion potential (Dept. of Energy and Minerals, East Java Province)
	Forest Ecosystem	• To protect forest ecosystems and terrestrial environments. • To conserve water and land resources.	☐ Protection, conservation, and production forests	✓ Forest areas ✓ Elevation
Coastal Environment	Mangrove Ecosystem	• To protect mangrove forests to ensure biodiversity, biomass and coastal protection.	☐ Mangrove areas	✓ Location of mangrove areas.

Source: JICA Study Team

(2) Land Stability

i) Criteria in Delineating Zones

The ESZ criteria on land, or slope, stability are shown in Table 6.6.2. Figure 6.6.9 shows the land suitability map. It is important to note that there are two factors regarding land stability, namely slope and elevation. According to studies, land starts to erode approximately above 8% slope and landslides occur approximately above 18% slope. The environmental impact caused by unstable land is dependent on its elevation. The higher the elevation the more it needs land stability.

Most forest areas in the GKS Zone are located more than 200 m above the sea level. To stabilize the land, the slope data mentioned above can be used in determining their zoning classification. It is important to consider that forest areas should be preserved and conserved, particularly areas with steep slopes.

Table 6.6.2 Criteria for Environmentally Sensitive Zone for Land Stability

Type of Area	Elevation (m)	Slope		
		8–17%	18–29%	Above 30%
Forest area	200–499	Conservation Zone	Preservation Zone	Preservation Zone
	500–999	Conservation Zone	Preservation Zone	Preservation Zone
	above 1000	Preservation Zone	Preservation Zone	Preservation Zone
Non-forest area	above 200	-	Restoration Zone	Restoration Zone
Landslide- and Erosion-prone	high/medium/low	Restoration Zone		

Source: JICA Study Team

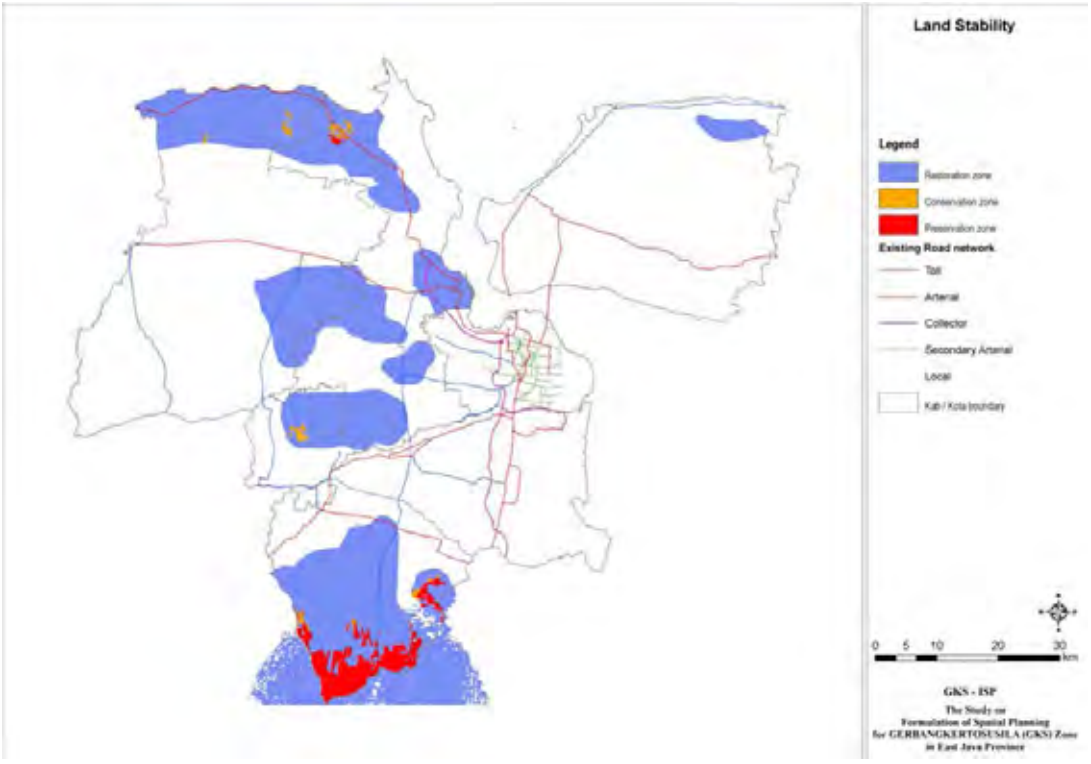


Figure 6.6.9 Environmentally Sensitive Zones for Land Stability

ii) Activity Guidelines for ESZs

The delineation of zones for land stability aims to preserve soil and conserve watershed in the uplands against soil erosion and landslides. Areas with over 18% of slope can easily erode so that any development should be prohibited in these preservation zones. However, it is possible that infrastructure and small buildings can be built here but with slope protection measures, while wide spatial developments, such as those for agriculture and industries, are prohibited in these areas, because of their high potential for adverse environmental impacts.

The delineation of restoration zones for slope stability aims to restore eroded areas and those where landslides occurred. This zone easily erodes without forest cover. Severely unstable areas without forest cover should be prioritized for restoration. The following restoration measures, alone or in combination, are recommended:

- Reforestation;
- Slope stability measures including bamboo fencing, grass planting, and others; and
- Soil erosion control measures including the use of wire net gabion boxes, masonry walls, etc.

Table 6.6.3 Activity Guidelines for ESZ of Land Stability

Preservation Zone	Conservation Zone	Restoration Zone
• Any spatial development is prohibited. • Any construction of road for vehicles is prohibited. • Construction of structure is prohibited.	• Any spatial development is prohibited. • Construction of roads and other infrastructure without slope protection and environmental permission are prohibited. • Construction of individual houses and small size buildings are prohibited without environmental permission.	The following restoration works are required: • Reforestation • Slope protection • Soil erosion control work

Source: JICA Study Team

(3) Forest Ecosystem

i) Criteria in Delineating Zones

The ESZ criteria on forest ecosystems are shown in Table 6.6.4, and Figure 6.6.10 shows the forest ecosystem map. The land use map of the 1990s and the SPOT (*systeme provatoire observation de la terre*) image analysis were the bases in identifying forest distribution in the GKS. Since there was no ground-truth survey conducted, the density of the forest could not be identified at this point. Hence, the ESZs on forest ecosystem show only the outline of forest sensitivity. It might be necessary to re-delineate the ESZs based on a detailed map of forest distribution.

Table 6.6.4 Criteria for Environmentally Sensitive Zone for Forest Ecosystem

Elevation (m)	Forest Area	No-forest
50–199m	Conservation Zone	Restoration Zone
Above 200 m	Preservation Zone	Restoration Zone
Surrounding Preservation Zone	-	Restoration Zone
Surrounding Conservation Zone	-	Restoration Zone

Source: JICA Study Team

The delineation of zones on forest ecosystem aims to preserve and conserve forests as well as forest ecosystems. The forest areas in the GKS Zone are located in higher elevations with many endemic forest trees although their species are very limited.

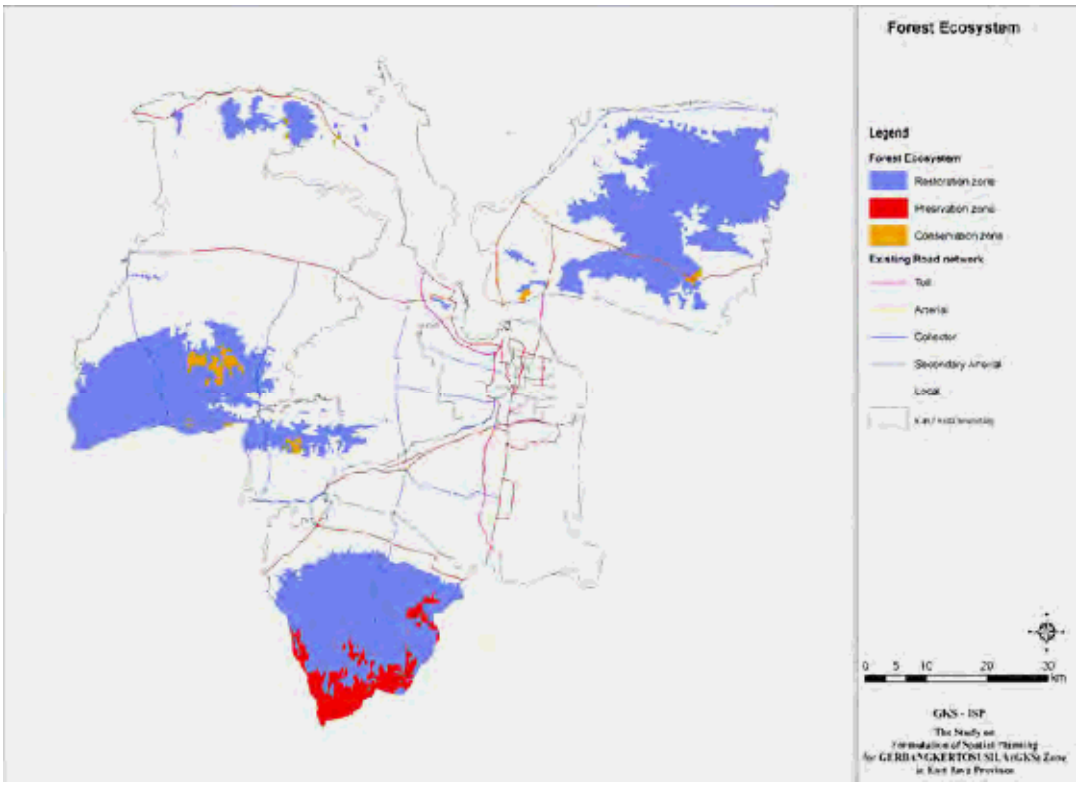
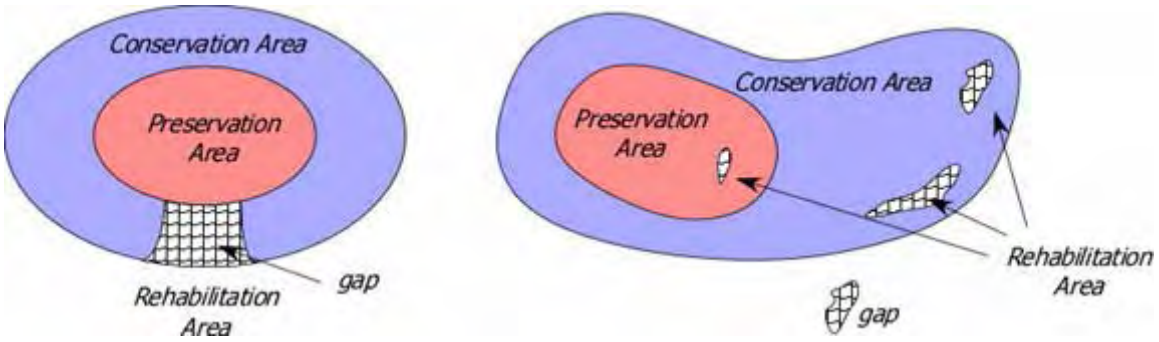


Figure 6.6.10 Environmental Sensitive Zones for Forest Ecosystem

The establishment of restoration zones strengthens the functions of preservation and conservation zones, as the former will ensure the continuity and area of the ecosystem, as well as fill the gaps in between preservation and conservation zones (see Figure 6.6.11). In addition, the conservation of forests and wildlife habitat will remain in the higher areas and upland forests. It is important that upland forests are conserved, and denuded areas restored. However, in large upland areas, where agricultural development already has taken place, it might be difficult to restore these areas through reforestation.



Source: JICA Study Team

Figure 6.6.11 Concept in the Delineation of Restoration Zones

ii) Activity Guidelines for ESZss

Preservation zones are areas where strict management of a limited number of trees and severe revitalization of forests are to be carried out. Any activity and structure which can decrease the size of the forest areas are prohibited except for scientific purposes.

As in preservation zones, human activities are prohibited in conservation zones, although small facilities for environmental education, such as recreation and tourism will be allowed with permission from the Department of Environment. An EIA may be necessary to obtain permission to use these zones.

On restoration work, a forest survey should be conducted to select suitable species that are compatible with the surrounding indigenous trees.

The guidelines for forest ecosystems should be prioritized in areas where forest ecosystems and land stability overlap.

Table 6.6.5 Activity Guidelines for ESZ of Forest Ecosystem

Preservation Zone	Conservation Zone	Restoration Zone
• Any activity which causes the decrease in forest areas is prohibited. • Small-scale facilities for scientific research are allowed with environmental permission.	• Logging, agriculture, and other activities which cause the decrease in forest areas are prohibited. • Small-scale facilities for tourism, environmental, and education purposes with government permits from the Department of Environment are allowed. • Recreation and ecotourism are allowed. • Cutting of trees for significant culture, religious, anthropological purposes, and ceremonies are allowed with permission from the Department of Environment.	A variety of indigenous tree species is planted.

Source: JICA Study Team

(4) Mangrove Ecosystem

i) Criteria in Delineating Zones

The target of this zoning is the shoreline mangroves. There are two types of mangroves in the GKS Zone. These are shoreline mangroves and inland mangroves. The ESZ target is shoreline mangrove because the inland mangroves are fragmented and distributed mostly in canals. Also, the biodiversity of inland mangroves is not high because mangrove trees were planted by people, not natural process.

The ESZ criteria for mangrove ecosystems are shown in Table 6.6.6, while Figures 6.6.12 through 6.6.15 show the mangrove ecosystem maps. The data source for mangrove distribution is not identified since the density of the mangroves could not be determined at this point; hence only the conservation zones were delineated.

Table 6.6.6 Criteria for Environmentally Sensitive Zone for Mangrove Ecosystem

Location	Mangrove Area	Non-mangrove Area
Coast line	Conservation Zone	-
Surrounding Preservation and Conservation Zones	-	Restoration Zone

Source: JICA Study Team

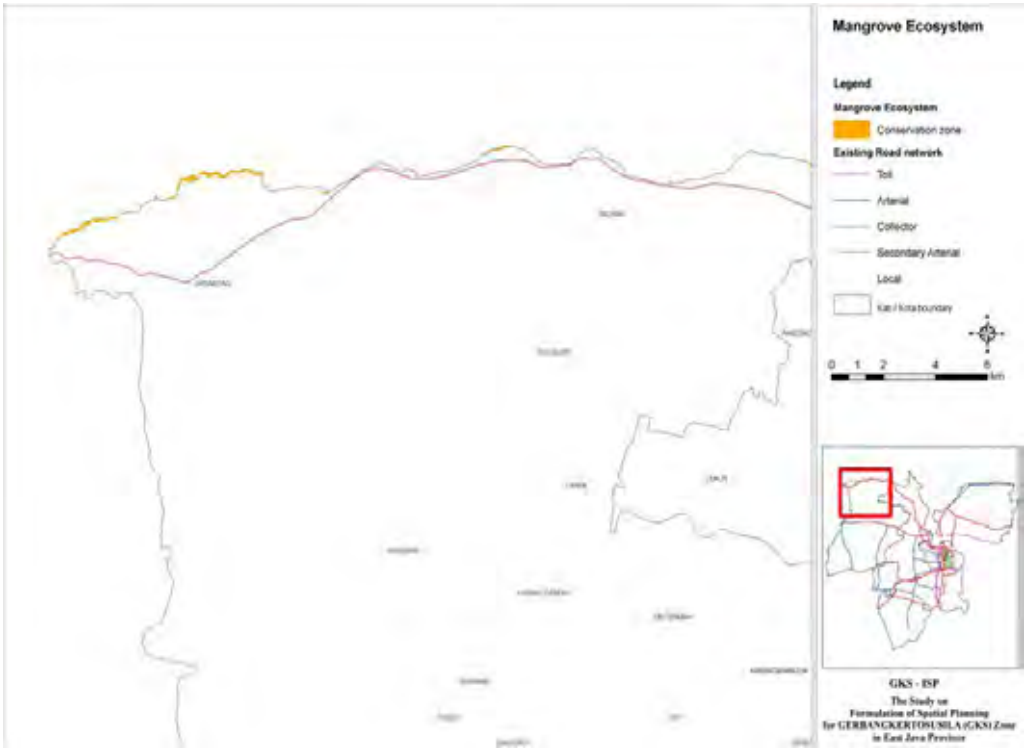


Figure 6.6.12 Environmentally Sensitive Zones for Mangrove Ecosystems in Northwestern GSK

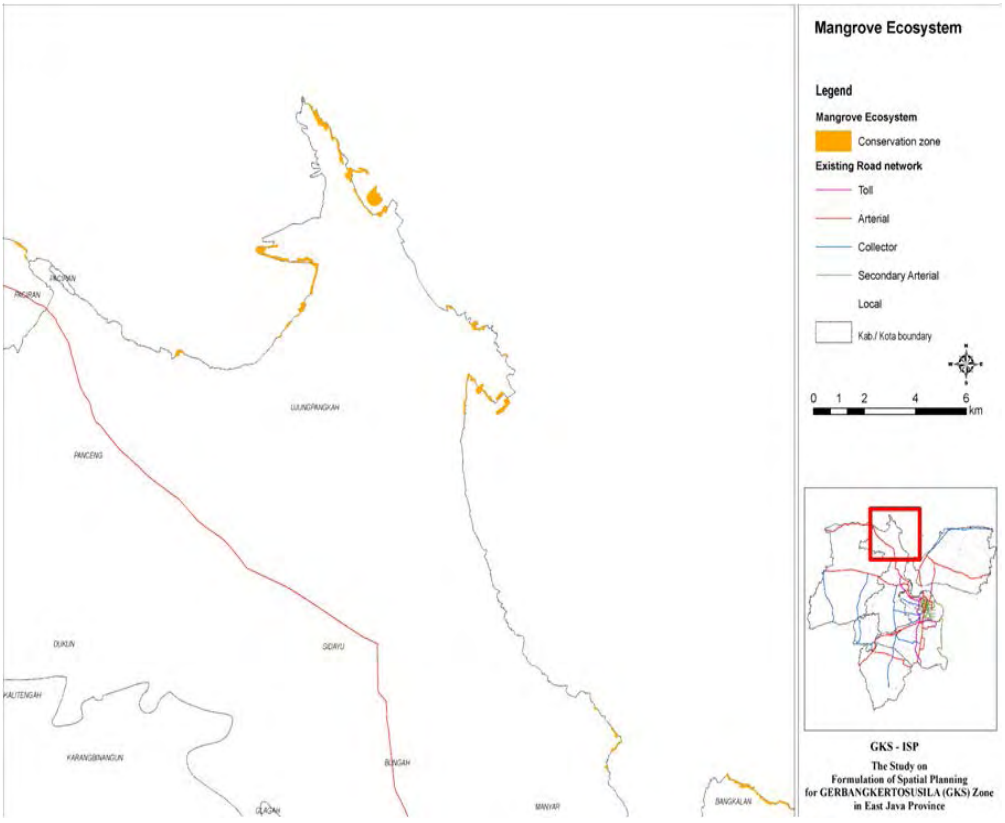


Figure 6.6.13 Environmentally Sensitive Zones for Mangrove Ecosystems in Northern GSK

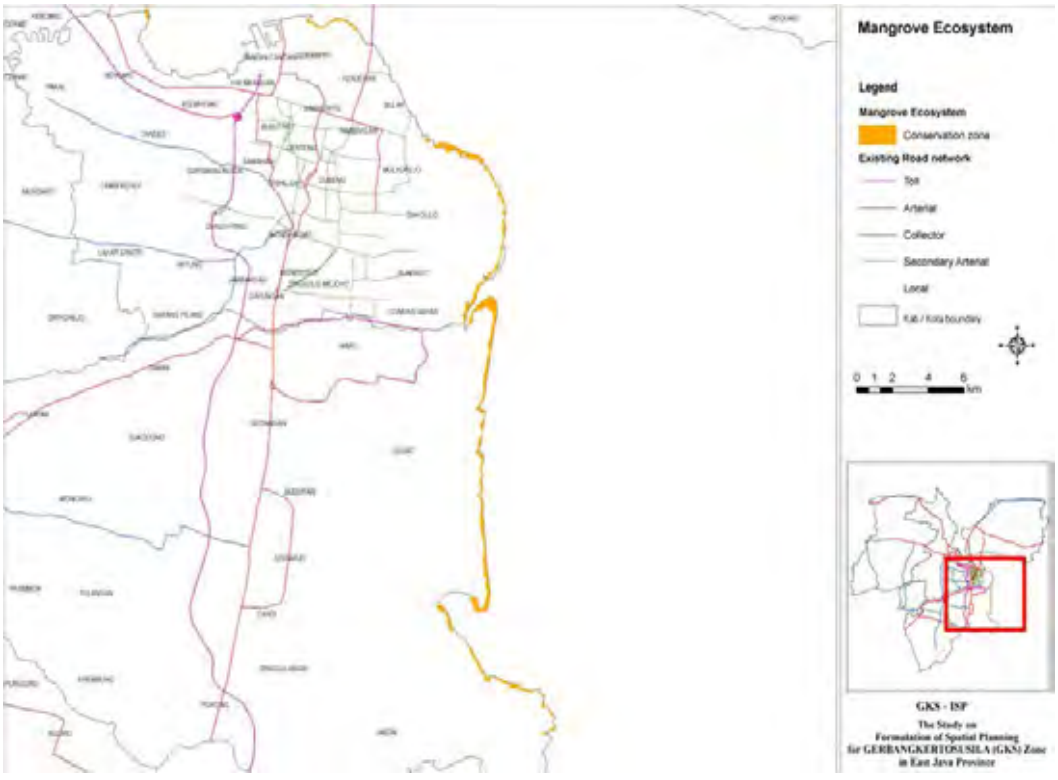


Figure 6.6.14 Environmentally Sensitive Zones for Mangrove Ecosystems in Eastern GSK

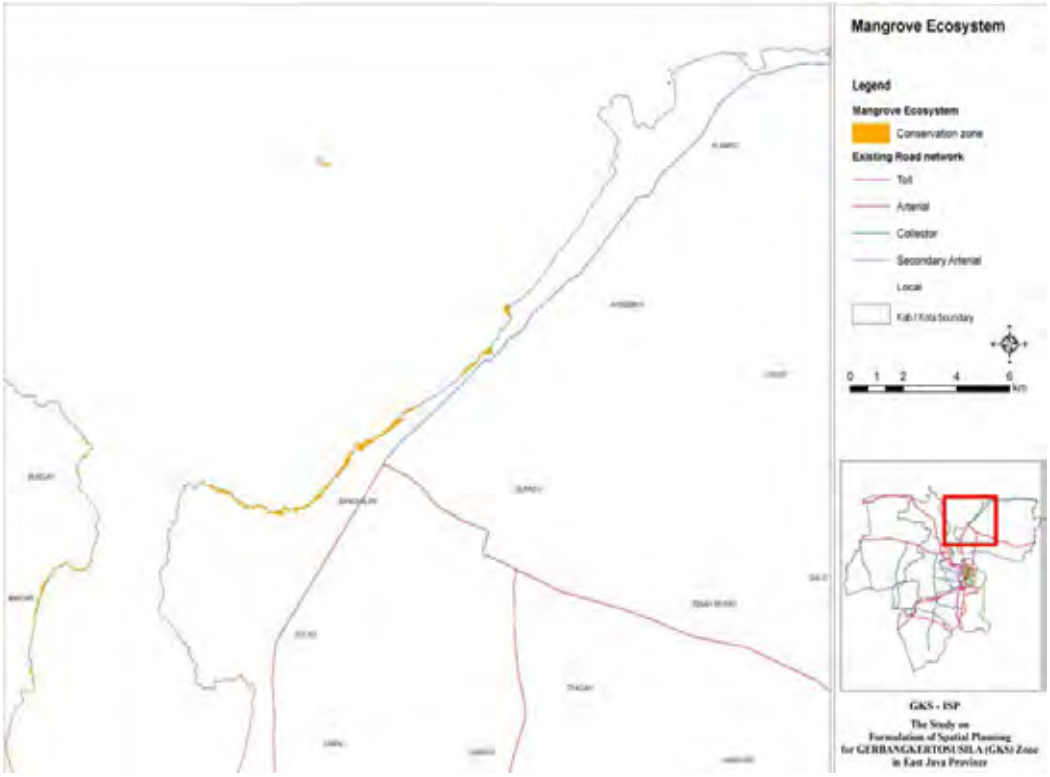


Figure 6.6.15 Environmentally Sensitive Zones for Mangrove Ecosystems in Northeastern GSK

ii) Activity Guidelines for ESZs

The ESZ guidelines for mangrove ecosystems are shown in Table 6.6.7. In order to conserve and improve the functions of mangrove areas, activities that lead to the overuse, or those that reduce, the mangrove areas are not allowed. Therefore, any spatial development is not allowed in the conservation and restoration zones. Activities, like fishing and crab trapping, which do not directly damage mangroves, can be allowed in the conservation zone.

In the restoration zone, mangrove areas are restored in order to sustain the continuity of forests in the preservation and conservation zones, as well as to help establish buffer areas for preservation zones.

Table 6.6.7 Activity Guidelines for ESZ of Mangrove Ecosystem

Conservation Zone	Restoration Zone
• Construction of ports is prohibited. • Construction of dike retaining walls, piers, jetties, and causeways are prohibited. • Dredging of channel is prohibited. • Reclamation is prohibited. • Solid waste disposal is prohibited. • Liquid waste disposal is prohibited. • Fishing activities excluding decreasing mangrove trees are allowed.	• Fishing activities are allowed. • Restoration work is promoted.

Source: JICA Study Team

6.6.4 Integration of Environmentally Sensitive Zones into Spatial Planning

With the ESZ map as the basis for land use planning (see Figure 6.6.6), ESZs were integrated into the GKS land use plan, as shown in Figure 6.6.16.

Conservation and restoration zones for land stability can be categorized as conservation areas in the GKS land use plan. They are necessary measures to achieve land stability. Conservation zones can also be used as buffers, if land stability will not decrease.

In principle, the ESZs on forest and mangrove ecosystems should be categorized as protection areas in the GKS land use plan.

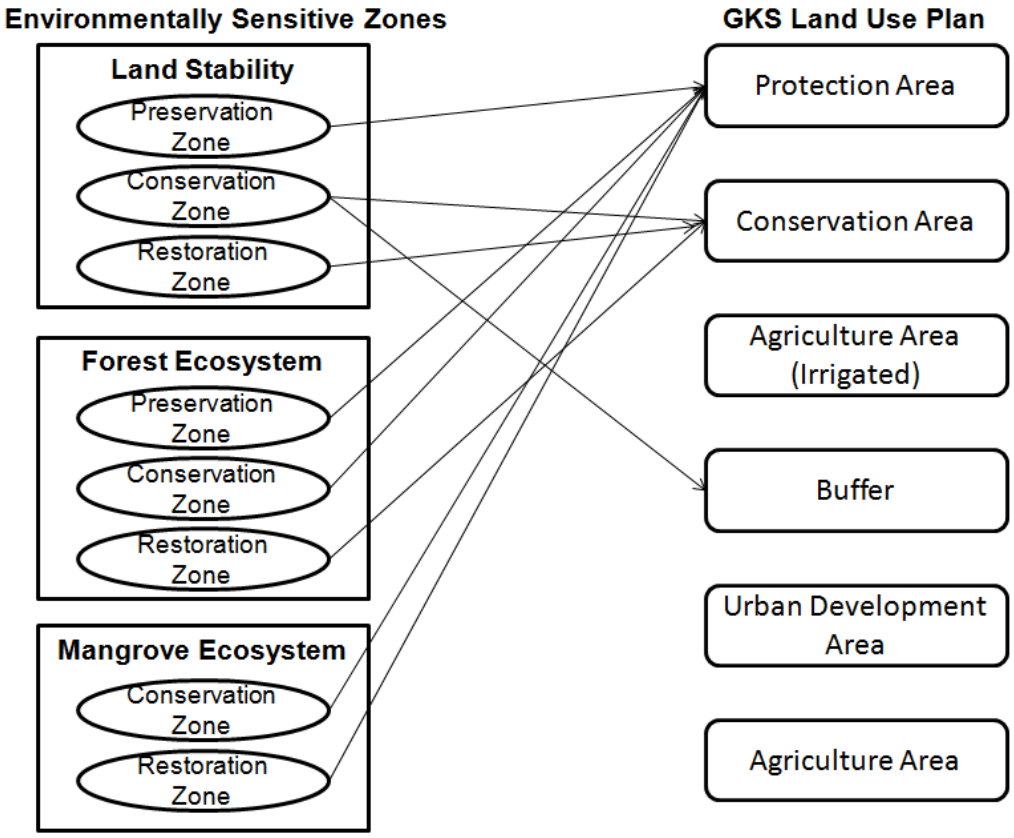


Figure 6.6.16 Integration of Environmentally Sensitive Zones into GKS Land Use Plan

6.7 Natural Disaster

6.7.1 General

Flood, which is caused by Brantas River and Solo River, is the major natural disaster in the GKS zone. In addition to flood, according to the East Java Spatial Plan, natural disasters which suffer the GKS zone are tidal wave, earthquake and volcanic eruption. In the GKS zone, there are no high to middle potential land slide areas. The GKS zone is categorized in earthquake intensity from IV to VI in the Modified Mercalli Intensity (MMI) Scale. Kabupaten Mojekerto is listed in the volcanic eruption prone area of Mt. Arjuno-Welirang in Pasuruan. This section that follows describes these disasters and strategies to be taken.

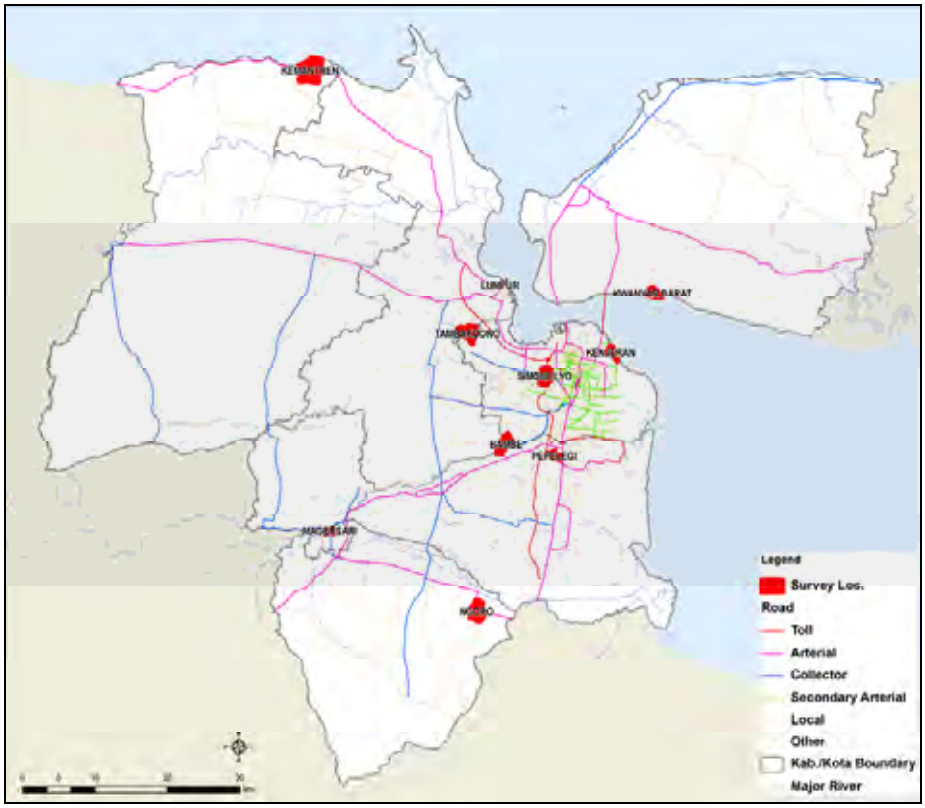
6.7.2 Communities' Perception on Natural Disasters

The Study Team conducted a community survey at ten communities to recognize current planning issues and problems on urban infrastructure, natural disaster and living environment, development issues, and their ideas about development. The ten communities surveyed are as shown in Table 6.7.1. Around 50 people were assembled at each community for the survey.

Table 6.7.1 Communities for Community Survey

Kota / Kabupaten	District	Village / Sub district	Location Target
Kab. Gresik	Gresik	Lumpur	Rural Area
	Driyorejo	Bambe	Rural Area
Kab. Bangkalan	Kwanyar	Kwanyar Barat	Rural Area
Kab. Mojokerto	Ngoro	Ngoro	Dusun (Rw) In Ngoro
Kota Mojokerto	Magersari	Magersari	Rural Area
Kota Surabaya	Sukomanunggal	Simomulyo	Rw Xvi
	Bulak	Kenjeran	RW I, II, III, IV
	Pakal	Tambakdono	RW II
Kab. Sidoarjo	Waru	Pepelegi	Rural Area
Kab. Lamongan	Paciran	Kemantren	Rural Area

Source: JICA Study Team



Source:JICA Study Team

Figure 6.7.1. Location of Communities Surveyed

Results of the community survey about natural disaster are summarized below. Major responses from the communities are:

1) Community people do not know about the mitigation and counter-measures against natural disasters, in particular, flood;

2) The local government do not sufficiently provide community people with proper information about disaster mitigation and counter-measures, and disaster mitigation plan and

3) Even though they know they live on disaster prone area, in particular flood and tidal wave, most people are unwilling to move out of where they live presently to avoid damage caused by disaster.

The following table summarizes the responses of community people on natural disaster.

Table 6.7.2 Responses of Community People on Natural Disaster

Kota / Kabupaten	Village / Sub-district	Type of Natural Disaster	Perception
Kab. Gresik	Lumpur	- Flood - Tidal Wave	- Half of the respondents have been troubled by natural disaster. Natural disaster types in this area are flood and sea water high tide. About 36% of them experienced natural disasters about 1 year ago.

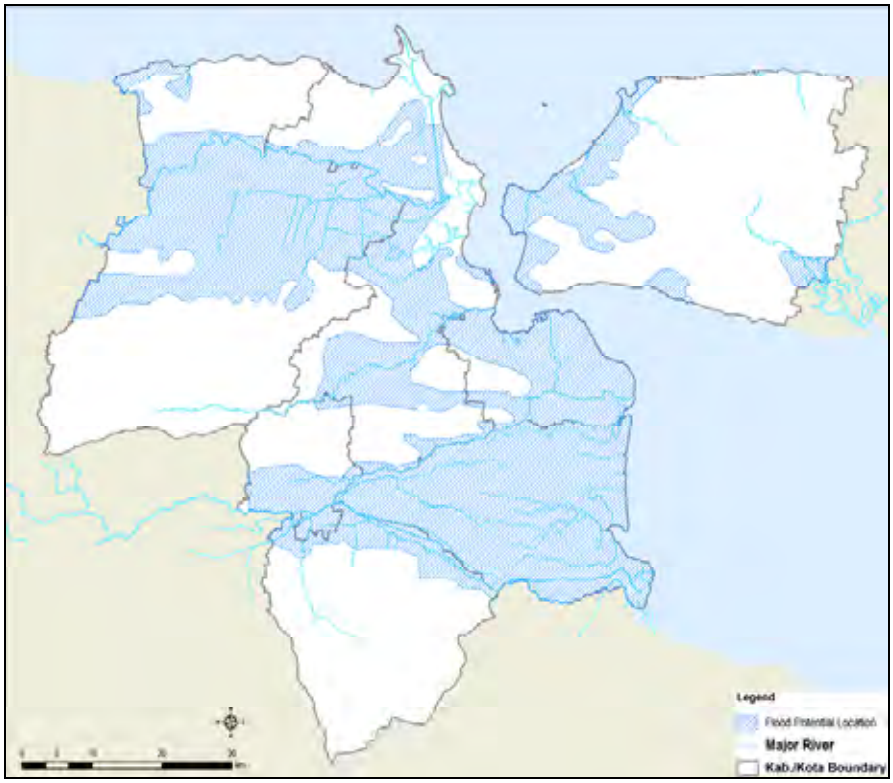
Kota / Kabupaten	Village / Sub-district	Type of Natural Disaster	Perception
			- 80% respondents are unwilling to move to other safer place due to the disaster - 82% of respondents were never informed of disaster mitigation and countermeasure from the local government. The community suggests a mitigation measure to heighten houses and dredge the river sediment.
	Bambe	- Flood	- 82% respondents suffered financial loss from natural disaster, especxially flood. Most of the respondents state that flood occurred about six months ago. - Most respondents are unwiling to move out to other safer place due to the disaster. - The community did not know about disaster mitigation plan and its implementation in their area by the government or other organizations.
Kab. Bangkalan	Kwanyar Barat	- Tidal Wave	- Sea water wave and thunder often occur in the coastal settlement. About 34% respondents are suffered from material loss and boat damage. - The community was never informed of countermeasures against the disaster by the government for their area.
Kab. Mojokerto	Ngoro	- Flood	- 52% respondents answered that they would be suffered by natural disaster from flood and pollution. - 23% of the respondents state it occurred about 3 years ago. - Community were never informed of disaster mitigation and countermeasures from the local government or other institutions
Kota Mojokerto	Magersari	- Flood	- Until now, most of community has never suffered by natural disaster. But they afraid of potential flood that will be occur if Jasa Tirta not protect Brantas River. - Only about 20% respondents assess suffered by natural disaster, as flood, landslide, wind and fire - Respondents were never informed of disaster mitigation and countermeasure, whether from local government or others.
Kota Surabaya	Simomulyo	- Flood	- Most respondents consider flood is teh natural disaster that happen at their community. About 84% respondents assess suffering financial loss caused by that disaster. - Even though most respondents assess flood occur every year, they are unwilling to move from there - Respondents were never informed of disaster mitigation and countermeasures by the local government or others
	Kenjeran	- Flood - Tidal Wave	- 46% respondents were suffered from flood and sea water high tide. 54% of the respondents usually experience the natural disaster - These natural disasters occur every year. Even though the community bet accustomed to it, they still afraid of it. - The respondents were never informed of disaster mitigation and countermeasure from local government but they have own way to notify each other
	Tambakdono	- Flood - Tidal Wave	- 88% respondents suffered by natural disaster from flood, but 80% respondents don't want to move due to disaster. - None of respondents were infromed about disaster mitigation and countermeasures by the local government. - The community suggest that the government should dredge the river sediment.
Kab. Sidoarjo	Pepelegi	- Flood - Tidal Wave	- Flood is the major disaster to most respondents. - 12% of the respondents assess that flood occurs every

Kota / Kabupaten	Village / Sub-district	Type of Natural Disaster	Perception
			year whie 64% of the respondents don't think so. - Most of the respondents assess that there's flood countermeasure in their community.
Kab. Lamongan	Kemantren	- Flood - Tidal Wave	- 64% of the respondents are suffered from flood, sea water high tide, and abrasion. - The community gets accustomed to experience the natural disasters. - 84% of the respondents are unwilling to move to safer place due to the disaster. - 88% of the respondents were never informed of disaster mitigation and countermeasures from the local government. The community suggests that a break water be built to protect houses in the coastal zone and the boat harbour.

Source: Community Survey conducted by JICA Study Team

6.7.3 Flood

Flood is often caused by Solo River and Brantas River in the GKS zone. Figure 6.7.2 shows flood prone area in the GKS zone. As shown in the Figure, most of the GKS area is vulnerable to flood. These areas have been expanding from east to west, particularly widely spreading in the lowland areas.



Source: Department of Energy and Minerals, East Java Province

Figure 6.7.2 Flood-Prone Area in GKS

Flood prone area of High Potential of flood which is listed in the East Java Spatial Plan is Kecamatan Gresik in Kabupaten Gresik; and those of Middle Potential of Flood are Kecamatans of Jatiroto, Mojokerto, Bangsal, Mojosari, and Pugging in Kabupaten

Mojeokerto, Part of Surabaya, and Kecamatan Bangkalan in Kabupaten Bangkalan.

Flood damages extensively not only people's lives but production activities such as agriculture and other businesses.

In order to protect people and their assets and activities against flood, flood mitigation efforts can generally be divided into: (1) flood mitigation through spatial planning, (2) non-structural mitigation, (3) structural, and (4) public participation.

As described in the previous section, as a result of the community survey, people who have experience natural disasters such as flood rarely know mitigation measures and countermeasures against the natural disaster and furthermore they are not given information about these measures from the local government. In addition, even though they know they live on disaster prone area, many of them are not willing to move out to avoid the natural disaster. These aspects should be taken into account in measures.

The East Java Spatial Plan addresses the various measures, and this Study follows them. The measures are as follows:

1. Flood Disaster Mitigation Efforts through Spatial Planning

- To direct development to avoid flood prone areas based on a flood-prone area or flood hazard map with land-use controls;
- To diversify agricultural products such as food crops resistant to flooding or to adjust the cropping season;
- To reforest the upper stream of the watersheds, and
- To formulate a flood evacuation plan including evacuation routes

2. Non Structural Mitigation

- To determine clear roles and functions of relevant agencies in order to mitigate flood damage, which roles and functions include inspection, observation and tracking of infrastructure and existing flood control facilities and measures;
- To improve flood control infrastructure and maintain them function properly;
- To monitor and evaluate data of rainfall, flooding, inundation areas and other information necessary to predict flood events and identify flood-affected areas and flood-prone areas;
- To prepare maps of flood prone areas equipped with "plotting" evacuation routes, temporary refugee camps, POSKO location, and location of the observer post, discharge flood / flood water level in rivers caused flooding.
- To check facilities of existing early warning systems or establish a simple warning system if there is not any;
- To formulate a logistics plan for funds, equipment and materials necessary for the operation and emergency response in the event of flood;
- To plan and prepare Standard Operation Procedures of all the relevant agencies and

the community for response in the events of flood;

- To establish a Flood Information System for a direct dissemination to the public, press releases and the dissemination of information about flooding through mass media.
- To implement evacuation training to check the readiness of the community, SATLAK and evacuation equipment, and readiness of temporary shelter and equipment.
- To establish cross-agency networks and NGOs engaged in awareness of the disaster and the mass media both print and electronic (TV and radio stations) to rally regardless of the disaster to the community including the distribution of information about flooding.
- To carry out public education on flood hazard maps, flood risks and building materials that are waterproof.

3. Structural Mitigation

- Construction of retaining walls and embankments along the rivers, the sea wall along the coast are prone to storms or tsunamis will greatly help to reduce flooding on the planned level of flood discharge.
- The speed and flow, surface water discharge from upstream areas is very helpful to reduce the occurrence of flood disasters. Some effort needs to be done to regulate the water velocity and flow of water into the drainage system is to include reforestation and construction of infiltration systems and the construction of dams / reservoirs.
- Dredging of the river, making river shunt either open or closed channels or tunnels can help reduce the occurrence of floods.

4. Public Participation and Awareness Raising

Both individuals and society as a whole can have a significant role in flood disaster management that aims to mitigate the impact of flooding. Roles and responsibilities of the community can be categorized into the following two aspects:

- Human-induced causes of flood should be managed to reduce the magnitude of the flood disaster. These human-related measures to be taken are:
  - No disposal of garbage / solid waste into rivers, canals and drainage system;
  - No construction of bridges and/or buildings that block or narrow the trench of the river flow;
  - No living in the flood plain of the river;
  - No use of flood retention plains for settlement or other unplanned things;
  - Cease of deforestation in catchment areas,
  - No illegal land conversion in agriculture and land use are contrary to the rules of water and soil conservation; and
  - Control of development and urbanization.
- Community disaster management would reduce the impact of flood disasters, which include the following:

- Community mitigation activities against flood such as a campaign, the flood preparedness, evacuation drill, flood early warning exercise and so forth;
- Program and design & construction of flood resistant housing, among others, at household level, the use of waterproof material and water scour;
- Public education efforts related to flood mitigation;
- Public consultation for the development of flood control and flood mitigation;
- Adaption of the pattern and timing of planting to reduce losses of business and agricultural land from flooding; and
- Cleaning existing drainage channels.

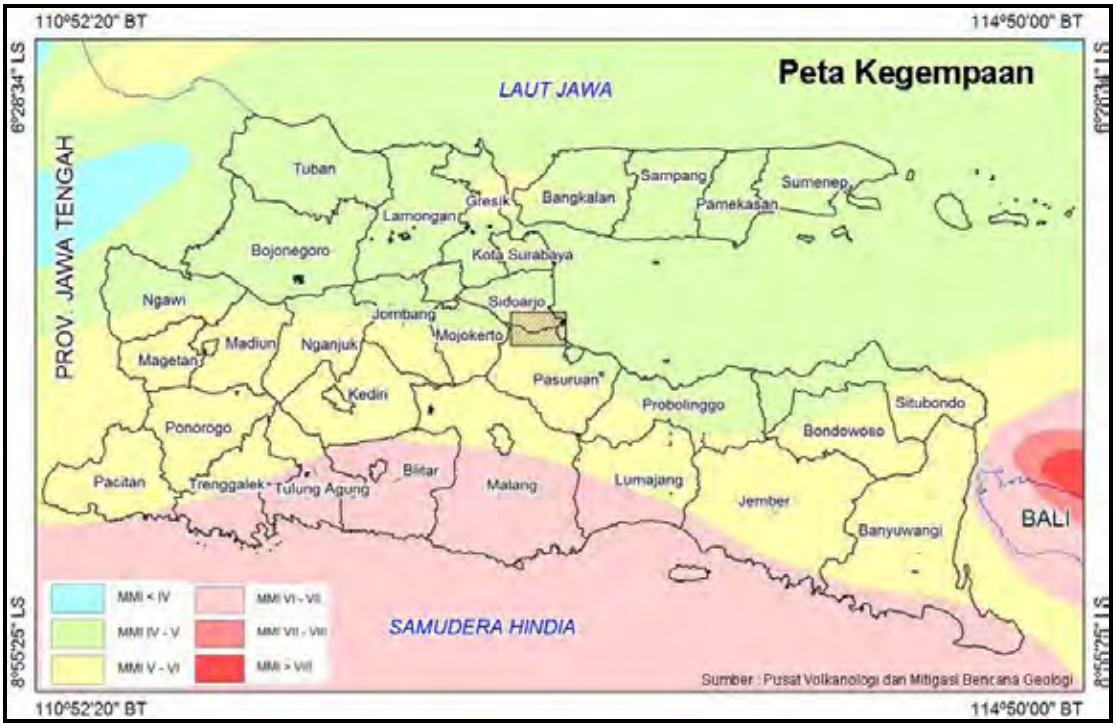
6.7.4 Tidal Wave

Tidal wave prone areas in the GKS are located along the coastal area of Bangkalan, Lamongan, Gresik, Surabaya and Sidoarjo. As mentioned in the summary of the community survey, people are seldom informed of mitigation and countermeasures against tidal wave by the government; and also they tend not to move out to a safer place. Mitigation strategies and tidal wave disaster reduction include the following:

- Coastal reclamation;
- Construction of breakwater (water break);
- Arrangement of buildings around the beach;
- Development of mangrove forest; and
- Construction of the retaining wall of waves.

6.7.5 Earthquake

An earthquake prone area, according to Regulation No. 26 Year 2008 about the National Spatial Plan, is an area that has a potential of, and/or that has experienced an earthquake at a scale of VII to XII in Mercalli Modified Intensity (MMI) Scale. As shown in Figure 6.7.3., the GKS zone has potential earthquake intensity from IV to VI in MMI; accordingly the GKS is not categorized as an earthquake prone area.



Source: East Jawa Spatial Plan

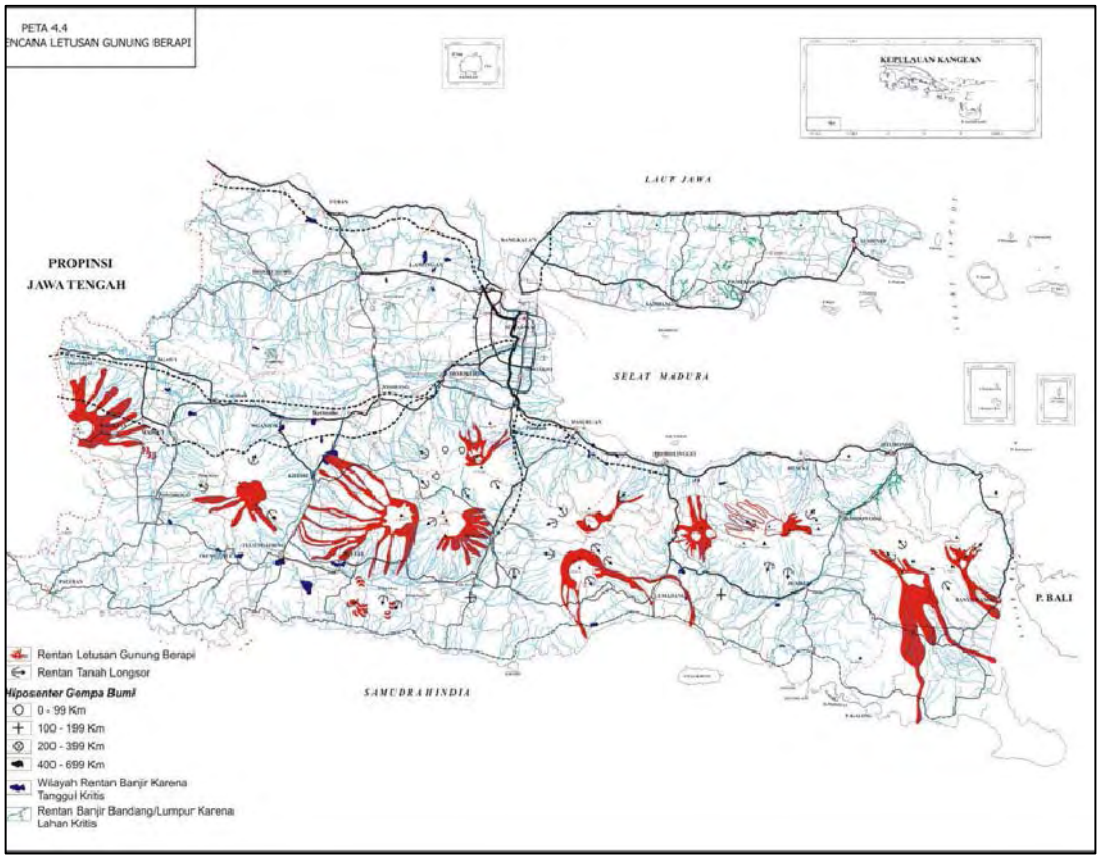
Figure 6.7.3 Distribution of Earthquake Intensity by MMI

6.7.6 Volcanic Eruption

There is Mt. Arjuno-Wellirang in the southern part of Mojokerto which has a potential of volcanic eruption. Figure 6.7.4 shows the volcano eruption dangerous zone in East Java Province; and Mojokerto has such a potential in the GKS zone. The prone areas may be influenced by lava, toxic fumes and dust.

The following are mitigation strategies to reduce damage caused by volcanic eruption.

- Avoidance of areas close to the slopes of Mt. Arjuno-Wellirang and lava flow channels for development and activities as much as possible;
- Introduction of fire resistant buildings and engineering buildings to withstand the additional burden of ash deposits;
- Identification of dangerous areas, which can be viewed on Data Base Indonesian Volcano or Volcano Disaster Prone Area Map, and notify the dwellers in the prone area about it;
- Preparation of emergency facilities and equipment including fire fighting, and evacuation plan including evacuation route and places with safe shelters
- Introduction of a community disaster management system including education about volcanic activities, how to observe volcanic activities with the necessary apparatus/devices, and the early warning.



Source: RTRW (2009 – 2029) of East Java Province

Figure 6.7.4 Volcano Eruption Dangerous Zone in East Java Province

7. PROGRAMS AND PROJECTS ON SPATIAL UTILIZATION

7.1 Programming Concepts

Based on the development concepts and strategies in the GKS spatial plan, projects and action plans were programmed to achieve the plan's visions by 2030, as shown in Table 7.1.1. The projects and action plans for the GKS and to be carried out in the long term are grouped into the following major sectors:

- Economic development;
- Transportation development;
- Infrastructure and utilities (water and sanitation, drainage and wastewater, electricity, telecommunications) development;
- Solid waste management;
- Housing supply;
- Environmental management; and
- Social services and urban facilities provision.

To promote the smooth implementation of the projects and action plans, the following aspects were addressed in Chapter 10.

- Institutional and legal environment, and
- Development financing.

Table 7.1.1 Projects and Action Plans for GKS Zone for 2010–2030 by Sector

1) Economic Development

No.	Project/Action Plan	Description
1	Strengthening of Inter-industrial Linkages	• For better industrial development of the GKS Zone, industries with more supporting linkages will be promoted. • Agro-industrialization will contribute significantly to the growth of the rural economy.
2	Strategic Industrial Estate Development	• Land and infrastructure provision: The government should prepare land and infrastructure such as power, water, wastewater treatment, road network, and others. • Eco-oriented operation: Industrial estates should be environment-friendly, creating no any adverse impacts on neighboring areas. • Incentives preparation: Such as tax exemptions and preferential treatment.
3	Promotion of Small and Medium-sized Enterprises (SMEs)	• Rationale of project is that industrial estates are generally for large enterprises focused on production rather than employment and that the GKS has fewer employment opportunities and most businesses are micro, small to medium in scale. • To improve the employment situation in the GKS, SMEs should be promoted. Provision of institutional financial support by the public sector is a must together with favorable loan conditions.
4	Facilitation of Investment into GKS	• To promote industrial development in the GKS and infuse investments, incentives are needed. These incentives are not limited to tax holidays, but include other government support and the creation of reliable infrastructure as add-on incentives for investors. • Promotional activities of the GKS are strongly needed to attract investments, including one-window investment services. This will be carried out by the Investment Board of East Java, Department of Industry and Trade, East Java Province, and the Chamber of Commerce and Industry, East Java Province and the like in cooperation with each kabupaten and kota in the GKS.
5	Promotion of R&D for Local Enterprises	• Investment incentives are not limited to the provision of tax incentives; but should include other government support and reliable infrastructure. In addition, promotional activities of the GKS are strongly needed to attract investments.
6	Improvement of Agricultural Productivity	• Provision of infrastructure (including irrigation, if necessary), technical assistance, and market information.
7	Promotion of Non-farm Business	• In order to create employment opportunities, not only in the agriculture and fishery sectors, non-farm businesses should be enhanced to alleviate rural unemployment and poverty.
8	Diversification and Promotion of Market oriented produce	• At this moment, the GKS is dominated by rice production. Diversification should be pursued to add value to agriculture. Diversification strategy involves crop diversification, development of alternative farming systems, and market development. • Crop diversification should be pursued based on the products' competitiveness and their international and national market potentials. • Such competitive products can be promoted through the "one-village one-product" method to market local goods.
9	Promotion of Efficient Post-harvest Activities	• Cooperatives are self-help organizations and can be viable options for maintaining economies of scale in a sense, because individual farmers or fishermen are usually weak in marketing.

No.	Project/Action Plan	Description
		• The establishment of an organization of farmers/fishermen like cooperatives will give them more power to market their products and give them stronger bargaining power in seeking better transportation and storage means, better credit, more market information, better production technologies, etc. • Cooperatives should have management skills and financial means. Accordingly, cooperatives should be enhanced in such aspects.
10	Promotion package of the Tourism Business	• Various components should be introduced to promote tourism, such as: - Formulation of touring circuits; - Introduction of eco-tourism; - Integration and agglomeration of tourism development; and - Support for local participation in tourism promotion activities.
11	Promotion of Local Production and Local Consumption	• In order to vitalize the rural economy through the agropolitan concept, rural self-ownership of the economic mechanism is needed. To enhance the rural economy, the following measures should be undertaken: - Marketing of competitive products and their processing; - Market information; - Physical distribution facility including post harvest transportation; - Provision of necessary Infrastructure, including road network and other utilities, physical distribution facility, public-run marketplaces; and - Linking of producers and consumers of specific commodities.
12	Facilitation of Private Sector Participation	• In order to respond to the huge amount of financial and managerial demand for public services and infrastructure expected in the future, the private sector's proactive involvement is key. • Several useful and effective models of PPP (public-private partnership) scheme are being tested all over the world in both developing and developed countries. • Indonesia also has PPP experiences from some of its infrastructure projects such as the Suramadu Bridge. • The government needs to prepare new institutional setup and/or facilitate institutional reform to pursue a more suitable mechanism for this purpose.

2) Transportation Development

(1) Road Development

No.	Projects/Action Plans	Project Description
1	Toll Road Development In Surabaya	• In Surabaya, the Suramadu Bridge needs to be connected to the existing toll roads (Manyar–Gempol with Tg. Perak at 62.1 km and Waru–Juanda at 13.6 km) to form a continuous toll road network. For this, at least one of the following toll roads needs to be constructed: - East Toll Ring Road (Suramadu Bridge–Juanda Airport); - Extension of existing toll road (Tg. Perak–Suramadu Bridge); and - Middle East Toll Ring Road.

No.	Projects/Action Plans	Project Description
2	Surabaya Middle Toll Road Development	• The plan for the Surabaya Middle Toll Road along Jl. Achmad Yani needs to be further reviewed, because this area is well developed and the toll road needs to be elevated which will cost more. • A large amount of land acquisition on Jl. Achmad Yani will also be required.
3	Development of Toll Road outside Surabaya	• Other prospective toll road projects within and beyond GKS are listed below. - Gresik–Krian Toll Road; - Krian–Gempol Toll Road; and - Gempol–Malang Toll Road. • The first two toll roads will form part of the SMA Semi-ring Corridor. The viability of these toll road projects should be well examined in light of future development plans of the GKS and East Java province to cope with interregional traffic. • As for the Krian–Gempol toll road, it may be given priority as an alternative route for the current Surabaya–Gempol toll road, which is disconnected in Porong due to the mud flows in Sidoarjo. Reconstruction of the toll road to detour around the mud flows is still pending due to the uncertainty of the mud flows.
4	Arterial Road Development in SMA: Primary Arterial Road (N-S direction)	• The Middle East Ring Road (MERR) will be fully completed in 2010. Other north–south trunk roads that need to be constructed soon are: - Middle West Ring Road (MWRR); - West Ring Road (WRR); and - East Ring Road (ERR). • With respect to the MWRR and WRR, a feasibility study (FS) has been completed, and some existing roads could be utilized for their development. The ERR may have o be constructed if a toll road (i.e., East Toll Ring Road) is not built.
5	Arterial Road Development in SMA: Secondary Arterial Road (E-W direction)	• As listed in the ARSDS-GKS master plan (1997), secondary arterial roads in the SMA should be developed mainly in the east–west direction to connect primary arterial roads to form an efficient arterial road network in the SMA. • Existing roads are composed of secondary arterial roads for the most part. Some road sections need to be widened and upgraded and some missing links or flyovers/underpasses need to be constructed.
6	Arterial Road Development in GKS	• Following the road planning of each kabupaten/kota, the roads that were listed in the ARSDS-GKS master plan (1997) but have not been developed yet are good candidates for prioritization to strengthen the arterial road network in the GKS.
7	Flyover and Underpass in SMA	• Many flyover and underpass projects are planned by the central and local governments. These candidate projects should be reviewed based on the survey results and analyses in this JICA study. • Priority of implementation should be considered. • Both land acquisition and environmental issues should be settled before actual implementation starts.

No.	Projects/Action Plans	Project Description
8	Traffic Control and Management	• In terms of traffic control and management, the following action plans and projects should be given priority: - An efficient and inexpensive way of identifying traffic bottlenecks using intelligent transportation systems (ITSs) and dispersing traffic by guiding and regulating them through traffic signal controls and the provision of traffic information; - Extension of the bus- and motorcycle-only lanes where motorcycles and public transportation are separated from other transportation modes; - Traffic demand management such as road pricing, enforcing parking regulation, and raising parking fees in the CBD; - Construction/Rehabilitation of pedestrian facilities such as pedestrian overpasses and sidewalks; and - Traffic safety education program for drivers, students, and the public.

(2) Public Transportation Development

No.	Projects/Action Plans	Project Description
1	Bus Transportation Improvement	• Categorization of bus route structures into line-haul bus services, CBD circulator bus services, and suburban feeder bus services, in light of the existing and future passenger demand patterns. • Extension/Addition of bus- and motorcycle-only lanes and the provision of dedicated bus lanes and new transit malls, where applicable.
2	Improvement of Existing PT. KA Railway	• Improvement in the existing PT. KA railway system, including key improvements on frequency, compatibility, comfort, accessibility to stations, and intermodality with bus and private transportation modes. • Major improvement plans and projects for central stations and railway tracks in Surabaya, as follows: - Connection of Pasar Turi and Gubeng stations for continuous commuter train operation between the north and south railway lines; - Development of the new elevated Surabaya Kota station between Pasar Turi and Gubeng stations; - Development of the Pasar Turi commuter station as recommended in the Surabaya Regional Rail Transportation System (SRRTS) study; and - Development of the Sidotopo station to serve not only current freight operations and locomotive maintenance of the trains on the south trunk line and Malang line, but also passenger train services. • As for improvements of the railway in the SMA and GKS, the following action plans and projects can be prepared: - Elevation of most of the existing railway sections in the SMA to avoid grade crossings; - Double-tracking the existing railway between Lamongan and Sidoarjo/ Mojokerto; - Revitalization of the railway from Kandangan and Gresik (Indro), which is now operated for freight transportation only (up to Indro), and provision of commuter train services; - Improvement/Development of station plazas and approach roads to provide easier access to stations for all modes of transportation; and - Provision of a new commuter railway station where the distance between

No.	Projects/Action Plans	Project Description
		the existing stations is more than 2 km in the central area and more than 4 km in the suburbs.
3	Development of a New Rail Mass Transit System	• A new rail mass transit system may be recommended in the following new corridors to supplement the existing PT. KA railway system: - North—south corridor running through the CBD; - East–west corridor connecting Surabaya and southern Kabupaten Gresik; and - Branch line connecting Waru (on the existing railway line) and Juanda Airport. • However, whether to develop the new mass transit system as rail-based or bus-based, such as BRT, will depend on the demand forecast and the service distance on the corresponding transportation corridor(s).
4	Integration of Rail and Bus Transportation	• In order to cover travel demands by public transportation in the SMA, bus transportation is expected to supplement and coordinate with the rail-based transportation system especially in areas outside walking distances from the stations. Hence, the following action plans and projects are necessary for the integration of rail and bus transportation: - Reorganization of bus routes to provide feeder bus services for the convenience of potential railway users who live beyond walking distances from stations, and - Introduction of a common fare system that allows free or discounted transfers between different modes of public transportation.
5	Integration of Public Transportation and Land Use	• It is of great importance to make the urban structure convenient for public transportation users through appropriate land use plans. In order to enhance the integration between public transportation and land use under the concept of a transit-oriented development (TOD), the following action plans and projects are suggested: - Provision of high floor area ratios and development of business and commercial centers in the vicinities of railway stations and major intermodal stations, and - Housing development in areas along the railway corridor.

(3) Port and Harbor Development

No.	Projects/Action Plans	Project Description
1	Feasibility Study on Regional Strategic Port Development	• "The Study for the Development of the Greater Surabaya Metropolitan Ports in the Republic of Indonesia" was conducted by JICA in 2007. A comparative study of the following six (6) candidate ports was undertaken: (i) Lamong Bay in Surabaya City, (ii) Gresik South and (iii) Gresik North in Gresik, and (iv) Socah, (v) Tanjung Bulupandan, and (vi) Tanjung Bumi in Bangkalan. The study selected Tanjung Bulupandan as the highest priority port for development. • After the completion of the study, the Suramadu Bridge was opened on 10 June 2009, and socio-economic conditions have correspondingly changed. Regional port development is one of the biggest issues to boost the region's economy with the support of Suramadu Bridge. • A feasibility study should be conducted to determine a port development site in the GKS Zone.

3) Infrastructure and Utilities Development

(1) Water and Sanitation

No.	Projects/Action Plans	Project Description
1	Proper Raw Water Allocation Plan	• Proper raw water allocation will be possible through the formulation of an water allocation plan consistent with the future land-use plan in the GKS: Consistency shall be met through the following relevant plans: - Land-use plan (urban, industrial and housing); - Brantas River Basin Master Plan (flood control and water use); - Solo River Basin Master Plan (flood control and water use); - Groundwater and spring water management plan; - PJT1 corporate plan; - PDAM corporate plan; and - PDAB corporate plan. • This project will be conducted by provincial, kota, and kabupaten authorities, as well as PJT1, PDAB, and PDAM.
2	Interregency Water Export-Import Project in East Java Province	• Water supply is critical in the development of the GKS because of uneven distributed water resources. Consequently, within the GKS Zone, water, sometimes, will be supplied beyond the local administrative territory. Such water export-import project will be conducted to balance growth in the GKS Zone. • The following are highly related to this water export-import project: - Groundwater and spring water management plan; - Feasibility study for interregency water export-import project in East Java; - PDAM corporate plan; and - PDAB corporate plan. • This project will be implemented by: provincial, kota, and kabupaten authorities, as well as PJT1, PDAB, and PDAM
3	Water Supply Facility Expansion Project in Each PDAM	• Water supply will be planned based on the raw water allocation plan which should be consistent with the water demand required by the land-use plan. This project will include the following: - Feasibility study for water supply facility expansion project, and - PDAM corporate plan. • This project will be implemented by provincial, kota, and kabupaten authorities, as well as PDAM.
4	Non-Revenue Water Reduction Project	• Non-revenue water (NRW) covers water leakage from the network and water whose tariff is not collected properly. To reduce non-revenue water, the following will be conducted: - Feasibility study for NRW reduction in each PDAM, and - PDAM corporate plan. • This project will be implemented by kota and kabupaten authorities, as well as PDAM.
5	Groundwater Management Plan	• Since groundwater is important in the GKS, it must be managed appropriately. This project will formulate groundwater management through the following: - Study of hydro-geological conditions in East Java, and - Preparation of groundwater use and conservation plan. • This project will be implemented by provincial, kota, and kabupaten authorities, as well as PDAB and PDAM.
6	PI (Performance	• Water industries' performance should be appropriately monitored and

No.	Projects/Action Plans	Project Description
	Indicator) System Implementation Program for Water Industries	evaluated. However, such system has yet to be conducted in the GKS; thus, this project will be conducted with the following objectives: - To establish the performance indicator system to audit the accountabilities of PDAM and other water entities, and - To prepare legal document to effectuate the PI system. • This project will be implemented by provincial, kota, and kabupaten authorities.
7	Water Saving Program in Each Kabb./Kota	• Water should be supplied to meet demand; hence, besides the supply side of water, demand side management should also be taken to conserve and save the limited water resource. The following components will be included: - Public awareness campaign on water saving; - Educational campaign on the scarcity of water; and - Award system to water savers and recyclers. • This project will be implemented by kabupaten and kota authorities as well as PJT1 and PDAM.
8	River Water Conservation Program on Monitoring, Regulatory Provision and Punitive Action	• River water is very important to meet water demand in the GKS. Thus, a conservation action plan will be formulated. The following are relevant components of the conservation plan: - Brantas River Basin Master Plan (flood control and water use); - Solo River Basin Master Plan (flood control and water use); - Industrial development plan; - Housing development plan; and - PJT1 corporate plan. • The implementing agencies are provincial, kota, and kabupaten authorities, as well as PJT1.
9	Urban Drainage and Wastewater Disposal Master Plan in Designated Urban Areas in the GKS Zone	• In order to ensure that the urban areas are clean from stormwater and wastewater, a proper urban drainage and wastewater disposal system will be established. For this purpose, a master plan for urban drainage and wastewater disposal s will be drafted while maintaining consistency with the following plans: - Land-use plan; - Urban development plan; - Urban drainage plan; - Industrial development plan; - Housing development plan; - PDAM corporate plan; and - PDAB corporate plan. • Based on these plans, the projects' materialization will be formulated. The implementing agencies will be kota and kabupaten authorities.

(2) Wastewater and Drainage

No.	Projects/Action Plans	Project Description
1	River Water Conservation Program on Monitoring,	• Conservation of river water is critical in the GKS Zone, because the zone strongly depends on two major rivers, the Brantas River and the Bengawan Solo. This project aims to conserve river water based on the following plans:

	Regulatory Provision and Punitive Action	- Brantas River Basin Master Plan (flood control and water use); - Solo River Basin Master Plan (flood control and water use); - Industrial development plan; - Housing development plan; and - PJT1 corporate plan. • This project will be implemented by provincial, kota, and kabupaten authorities, as well as PJT1.
2	Urban Drainage and Wastewater Disposal Master Plan in Designated Urban Area in the GKS Zone	• Urban drainage and wastewater disposal is one of the critical issues in specific urban areas in the GKS Zone; thus, countermeasures will be planned based on future conditions of the urban settlements and they will be designed consistent with the following plans: - Land-use plan - Urban development plan - Urban drainage plan - Industrial development plan - Housing development plan • This project will be implemented by: Province, Kota, Kabupaten and PJT1
3	Human Resources Development for Drainage Administration	• Plans cannot be properly pursued without a competent staff; thus, human resource development for drainage administration is quite important. This human resource development project will include the following components: - Information network; - Standard operation and maintenance manual; and - Public announcement system. • This project will be implemented by kota and kabupaten authorities.

(3) Power Development

No.	Projects/Action Plans	Project Description
1	Improvement and Reinforcement of Network	• In order to solve the above-mentioned problems and to meet increasing electricity demand, the existing transmission and distribution network should be improved and reinforced considering the following points: - Extend transmission/distribution lines; - Increase the number of substations or install additional transformers; and - Reduce distribution loss (technical loss) by replacing with larger conductors or high-efficiency transformers, or inserting capacitors.
2	Demand Side Management	• In order to overcome power supply shortages, demand side management (DSM) should also be considered to reduce overloads on the network through the following measures: - Socialization of and campaign on the use of lights and energy-saving equipment; - Load shifting from nighttime peak to low-consumption time in the morning/afternoon with incentives to customers; and - Tightening control on non-technical losses (irregular/illegal connections, revamping kWh meters, etc.).
3	Stabilization of Power Supply In Surabaya	• A stable power supply is necessary for the smooth development of the GKS Zone, especially for the largest urban area, Surabaya. • The first priority is to complete a 150-kV transmission line between the edge of the existing line in Ujung Substation and Perak Substation, forming a loop, so that the supply system for Surabaya City will be more reliable.
4	Provision of Reliable	• Participation of power plants owned by private electricity providers to ensure

	Backup Power Supply	backup supply in case of a PLN power shortage, or to supply power to rural or remote areas in addition to the PLN's national grid.
5	Diversification of Renewable Energy Source	• Because of energy issues and global warming, the diversification of energy sources should be considered. • Renewable energy sources, such as photovoltaic (solar), wind, biomass, and conversion of garbage to energy especially for Surabaya, are considered by PLN and other international/domestic organizations.

(4) Telecommunications

No.	Projects/Action Plans	Project Description
1	Coordination with Private Operators	• Telecommunications sector is privatized and highly competitive, which leads to the nondisclosure of development plans of the operators, thereby lessening coordination or collaboration in the supply services to customers. For the development of the telecommunication system from the regional development viewpoint, private operators should be involved and coordinated.
2	Provision of Affordable Telecommunications Services	• In order to meet the telecoms needs of communities and their desire to utilize telecommunications facilities, the government through the Department of Communication and Information (DOCI) should institute affordable and accessible telecommunications services. • This program is an implementation of the policy of Telecommunications Universal Service (Universal Service Obligation/USO) in Indonesia in implementing the ITU Information Society Declaration. The program is implemented in the villages by allocating telecommunications universal service areas (WPUT).

4) Solid Waste Management

No.	Projects/Action Plans	Project Description
1	Renovation of Existing Landfill for Creating a Sanitary Environment	• The lifespan of landfills should go beyond their prescribed end-points. Thus, the improvement of their operation and conditions is required. The action plans thus include infrastructure rehabilitation and reduction of negative environmental impact. In addition, securing landfill sites will be necessary.
2	Improvement of 3Rs Activity	• The function of landfills will be reduced and the 3Rs practice (reduction, reuse, and recycling) should increase. It is necessary to establish the relative regulations and appropriate provision of equipment. Actions for 3Rs should include: <u>For Reduction:</u> - Improvement of retribution system; - Adoption of an award and monitoring systems; and - Other activities to promote waste reduction. <u>For Reuse:</u> - Stimulus measures for home composting; - Service coverage promotion; - Establishment of business model for compost products; and - Other activities to promote waste reuse. <u>For Recycling:</u> - Preparation of a source separation plan;

No.	Projects/Action Plans	Project Description
		- Establishment of a recycling society; - Public awareness-raising program on recycling; - Introduction and compliance of "Extended Producer Responsibility (EPR)" and - Other activities to promote waste recycling. • Furthermore, the following are also taken: - Infrastructure arrangement: regulation, institutional capacity, hardware, etc. - Model project for recycling, etc
3	Service Quality Improvement	• Garbage generation is estimated to increase from 3 million tons/year in 2007 to 5.4 million tons/year by 2030, or 1.8 times. At present, only Kota Surabaya and Mojokerto have a 100% garbage collection rate, and Surabaya is faced with problems regarding the final dumping site. • Garbage collection, transportation, and final disposal site should be improved.
4	Formulation of Integrated Solid Waste Management & Regionalization Program	• This aims to develop interregional partnership on SWM. Interregional cooperation will be highlighted because of limited capacities of municipalities and avoidance of stakeholder friction. Regarding SWM, landfill site acquisition will become difficult to achieve, thus partnerships will be required. • This strategy will include the following plan components: - Recycle center and landfill site selection; - Multiregional disposal system; and - Education, enlightenment, and implementation.

5) Environmental Management

No.	Projects/Action Plans	Project Description
1	Capability Building and Strengthening of the Environment Department in the GKS Zone	• This project is to enhance the ability of the Environment Department to evaluate environmental impacts of various development projects in the GKS Zone. It hopes to develop the department's technical and analytical skills, knowledge, and orientation which will support the implementation of environmental programs and projects. • The project has two phases: Phase 1 involves an analysis of the training needs, program design, curriculum development, and pre-test of training programs. Phase 2 includes local GKS training, as well as national and international networking, post-training documentation, implementation, and evaluation.
2	Development and Strengthening of the Environmental Awareness Program for Each Kabupaten in the GKS Zone	• This project will promote environmental awareness and action plans on environmental conservation and sustainable development in a holistic manner.
3	Establishment of a GKS Council for Environment	• This project aims to promote and facilitate, as well as forge, linkages with the private sector, government, and the community in the GKS Zone. It hopes to: - Enable sharing of expertise and resources; - Provide a channel for exchanges of ideas; - Establish links among various environment-related stakeholders; and - Conduct and coordinate programs and projects on environmental protection.

No.	Projects/Action Plans	Project Description
4	Establishment of an Environmental Policy for the GKS Zone	• This project aims to provide direction on environmental protection and management in the GKS Zone. It will include a program seeking a genuine commitment of related agencies and the society. It hopes to provide some measurable indicators of sustainability and environmental quality that could be used over time to assess the progress in achieving environmental goals.
5	Study on the Conservation Status of Biodiversity in the GKS Zone	• This is a research project which aims to conduct a comprehensive documentation of all the conservation status of fauna and flora across the GKS Zone. This documentation is important to understand the diversity in the area and provide policy makers needed information for any relevant conservation effort.
6	Establishment of a GKS Protected Area and Management Plan	• This project aims to respond to the concerns regarding the preservation and conservation of environmentally valuable and sensitive areas in the GKS Zone. • This project involves the designation of parks, nature reserves, wildlife sanctuaries, and other areas especially dedicated to the protection and maintenance of biological diversity, as well as of natural and associated cultural resources within the GKS Zone. • An integral part of this project is the development of management plans for each protected area. As a dynamic instrument, the management plan will provide general guidelines on conservation and zoning uses of the natural space. It hopes to achieve the following objectives: - Ensure protected areas are managed to achieve the objectives of conservation management; - Ensure public involvement in protected area management; - Develop a shared understanding and vision of protected areas; and - Promote public accountability.

6) Housing Supply

No.	Projects/Action Plans	Project Description
1	Implementation of a Comprehensive KIP Program	• C-KIP is being replicated in other slum areas in the GKS with learning from the Surabaya experience to relieve each local government's budget woes, alleviate poverty, and improve basic infrastructure through sustainable, community-based development programs as part of an incentives program from provincial and local governments.
2	Promotion of Housing Development for Lower Income Families	• This project aims to motivate local governments to provide lower land prices and land-banking schemes to developers and low-income families for the long term, as well as to encourage both actors to provide multistory housing rather than one-story houses. • It aims to assist local governments to improve research and applied technology for environmentally friendly, low-cost housing construction.
3	Improvement of Living Environment (residential areas)	• A national standard for housing and environmental quality should be introduced and implemented using more technical and local resources through technical assistance directly for developers and community groups. • Encourage local government to involve developers and communities in infrastructure planning and implementation and minimize disaster impact.
4	Establishment of Local Institution for	• Each local housing planning and development guideline (RP4D) is targeted to be finished in a couple of years. This is followed by the establishment of a Housing Development and Management Institution in each Kabb./Kota and

No.	Projects/Action Plans	Project Description
	Housing Development and Management	municipality. This institution's availability is also very important to enable the National Housing Agency to distribute housing program incentives and subsidies for low income group to overcome the problem of substandard housing and housing backlog. • This institution is expected to control the use of land for housing development and to guarantee abundant supply of land and housing stock and to facilitate the revitalization of the housing program, land consolidation, settlements renewal, and relocation due to disaster impact.
5	Improvement of Funding Alternatives and Mechanisms	• This aims to identify funding alternatives for the low income group and provide them access to funding through formal funding institutions (banks) or/and the creation of community self-help groups which will provide equal opportunity to all in the GKS Zone.
6	Encouragement of Community Groups to Establish Their Own Housing System through Self-help and "*Tridaya*" Concept	• Motivating each local government and provincial government to provide incentives to low income community groups to encourage self-help housing by developing basic infrastructure (streets, drainage, water connection, sanitation, and electricity) and providing technical assistance to enhance their skills and build capacity, increase their income, and improve their environment.

7) Social Services and Urban Facilities Provision

No.	Projects/Action Plans	Project Description
1	Development of Urban Facilities based on Residential Neighborhood Units	• Urban facilities, such as schools, hospitals, and worship facilities, are planned based on the standards for improving urban public facilities in the RTRWs of the GKS kabupaten/kota. The planning standard will revolve around the concept of residential neighborhood units, which is popularly used in developed countries to plan and develop urban facilities.
2	Development of a Hierarchical Park System and Green Network	• Parks should be planned in a hierarchical manner, according to the sizes of service areas: <u>City Level:</u> - City parks: Recreation for citizens; - Special parks: Parks with special purposes (zoos, botanical gardens, historical parks, etc.); and - Sports parks: Sports activities for citizens. <u>District and Community Level</u> - District parks: Residents of the same residential area (approx. 4 ha); - Neighborhood parks: Neighboring community (approx. 2 ha); and - Community parks (approx. 1 ha).

No.	Projects/Action Plans	Project Description
3	Introduction of Housing Development Guidelines	• The development guidelines will provide certain design standards to create good, healthy living environments with a well-planned land use and orderly formation of urbanized areas in cooperation with developers. • In the development of public facilities, responsibilities and roles among the government, the developer, and the land owners based on the design standard stipulated in the guideline should be deterimined. • To this end, in addition to the design standards, development finance is also needed, which is called “development financial cooperation” from the developers. It is meant for the development of infrastructure and public facilities like roads, parks, water, power, heating, etc. • In financing the development of infrastructure and public facilities, the responsibilities and roles among the government, developer, and land owners should be demarcated clearly. • Developers and land owners will bear the financial burden, sourcing it from the increased value of their property as a result of the development.
4	Human Resource Development Project	• Regardless of whether it is the urban or rural area, the capacity of human resources has an effect on employment. Education level, skills level, and health are all strongly related to employment. • Highly educated and skilled people have more chances in landing formal jobs in the urban areas, while those with less education and skills are likely to settle for informal jobs which will have lower wages, or remain/become unemployed.

Source: JICA Study Team

7.2 Key Development Projects for GKS Zone for 2010–2030

Based on the list of projects and action plans discussed in the preceding section, a number of key projects included in the GKS Spatial Plan 2030 are listed and shown in Table 7.2.1. This list includes the selected projects/programs proposed by each kabupaten/kota spatial plan (2008–2030) and those proposed in the GKS spatial plan. This list is still indicative and therefore is subject to further clarification and coordination among relevant authorities.

Table 7.2.1 Indicative Key Infrastructure Development Projects for GKS Zone for 2010–2030

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
I	**Transportation Development (Road Network)**	Project No. R1 ; Component(s):PA-04	Gresik–Paciran–Tuban	74.19	2010–2015	Government	Central Government	X
		Project No. R1b ; Component(s):PA-06 PA-07 PA-14	Kenjeran–Rajawali–Gresik	9.27	2010–2015	Government	Central Government	X
		Project No. R1t ; Component(s):TR-02 TR-06	Gresik–Paciran–Tuban (Toll)	80.58	2010–2015	Government-Private Sector	Central & Provincial Government, Private Sector	X
		Project No. R2 ; Component(s):PA-05 PA-16	Gresik–Lamongan–Babat	22.72	2010–2015	Government	Central Government	X
		Project No. R3a ; Component(s):SA-03 SA-15	Rungkut–HR, Mohammad–Lakarsantri	24.21	2010–2015	Government	Kota Surabaya & Kabupaten Gresik	X
		Project No. R4a ; Component(s):PA-10 PA-19	Krian–Mojokerto	28.00	2010–2015	Government	Central Government	X
		Project No. R4b ; Component(s):PC-04 SA-08 SA-18	Gunung Sari–Mastrip–Mojokerto	42.58	2010–2015	Government	Provincial Government & Kota Surabaya & Gresik	X
		Project No. R4t ; Component(s):TR-03	Surabaya–Mojokerto (Toll)	40.98	2010–2015	Government-Private Sector	Central & Provincial Government, Private Sector	X
		Project No. R5c ; Component(s):PA-11 PA-15 SA-20 SA-22 SA-23 SA-25SA-26	Indrapura–A Yani–Porong	28.25	2010–2015	Government	Central Government & Kota Surabaya	X
		Project No. R5d ; Component(s):PA-09 SA-01 SA-13	MERR–Sawotratap–Sidoarjo	19.51	2010–2015	Government	Central Government & Kota Surabaya & Kab. Sidoarjo	X
		Project No. R5t ; Component(s):TR-01 TR-10	Surabaya–Gempol (Toll)	29.39	2010–2015	Government-Private Sector	Central & Provincial Government, Private Sector	X
		Project No. R8 ; Component(s):PA-03 PA-08 PA-18	SERR–Purabaya	22.35	2010–2015	Government	Central Government	X
		Project No. R10b ; Component(s):PA-12	Mojokerto–Gempol	28.10	2010–2015	Government	Central Government	X
		Project No. R14 ; Component(s):PA-13	Romo Kalisari–Benowo–Wringinanom	22.31	2010–2015	Government	Central Government	X
		Project No. R15 ; Component(s):SA-02 SA-17 SA-19 SA-21	Benowo–Banyu Urip–ITS	30.38	2010–2015	Government	Kota Surabaya & Kabupaten Gresik	X
		Project No. R16 ; Component(s):SA-04	Margorejo–Wiyung–Menganti	22.22	2010–2015	Government	Kota Surabaya & Kabupaten Gresik	X
		Project No. RB2 ; Component(s):PC-03 PC-12	Bangkalan–Trunojoyo	15.65	2010–2015	Government	Provincial Government	X
		Project No. R1a ; Component(s):SA-24	Ngaglik–Kapas Karampung	1.16	2015–2020	Government	Kota Surabaya	
		Project No. R3 ; Component(s):PC-02 PC-17	Benjeng–Mantup–Ngimbang	63.12	2015–2020	Government	Provincial Government	-

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
I	**Transportation Development (Road Network)**	Project No. R5a ; Component(s):SA-07 SA-16	Simogunung–Sidoarjo	20.38	2015–2020	Government	Kota Surabaya & Kabupaten Sidoarjo	-
		Project No. R6a ; Component(s):PA-17 SA-12	Ngagel Jaya–Putro Agung Wetan–Kedung Cowek	18.14	2015–2020	Government	Central Government & Kota Surabaya	-
		Project No. R6at ; Component(s):TR-11	Labang–Burneh–Arosbaya	26.08	2015–2020	Government-Private Sector	Central Government, Provincial Government, Private Investor	-
		Project No. R7 ; Component(s):PA-01 PC-01	Kamal–Modung–Blega	90.04	2015–2020	Government	Central Government & Provincial Government	-
		Project No. R8st ; Component(s):TR-04	Perak–Suramadu (Toll)	7.94	2015–2020	Government-Private Sector	Central Government, Provincial Government, Private Investor	-
		Project No. R9 ; Component(s):SA-09	Gresik–Krian	27.03	2015–2020	Government	Kabupaten Gresik & Kabupaten Sidoarjo	-
		Project No. R11 ; Component(s):PC-08 PC-11 PC-18	Mojokerto–Babat–Paciran	102.16	2015–2020	Government	Provincial Government	-
		Project No. R12 ; Component(s):PC-14 SA-11	Margomulyo–Taman–Sidoarjo	21.90	2015–2020	Government	Provincial Government & Kota Surabaya & Kabupaten Sidoarjo	-
		Project No. R13 ; Component(s):SA-10	Lamong Bay–Lakarsantri–Driyorejo	18.10	2015–2020	Government	Kota Surabaya & Kabupaten Gresik & Kabupaten Sidoarjo	-
		Project No. R17 ; Component(s):SA-05 SA-06	Rungkut–Sumur Welut–Menganti	24.77	2015–2020	Government	Kota Surabaya & Kabupaten Gresik	-
		Project No. RG2 ; Component(s):SA-14	Gresik Ring Road	20.48	2015–2020	Government	Kabupaten Gresik	-
		Project No. R6 ; Component(s):PA-02	Kamal–Bangkalan–Tg.Bumi	59.36	2020-2030	Government	Central Government	-
		Project No. R8at ; Component(s):TR-05	SERR	16.49	2020–2030	Government-Private Sector	Central & Provincial Government, Private Sector	-
		Project No. R8t ; Component(s):TR-12	Juanda Toll Road–Waru	8.28	2020–2030	Government-Private Sector	Central & Provincial Government, Private Sector	-
		Project No. R9t ; Component(s):TR-07 TR-09	Driyorejo–Krian–Porong	56.99	2020–2030	Government-Private Sector	Central & Provincial Government, Private Sector	-
		Project No. R10a ; Component(s):PC-07 PC-10	Sidayu–Lamongan–Mojokerto	64.96	2020–2030	Government	Provincial Government	-
		Project No. RB1 ; Component(s):PC-05 PC-06	Tanah Merah–Sepulu Tg.Bumi–Blega	53.08	2020–2030	Government	Provincial Government	-
		Project No. RG1 ; Component(s):PC-21 PC-22	Sidayu–Ujung Pangkah-Panceng	26.95	2020–2030	Government	Provincial Government	-

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
I	**Transportation Development (Road Network) Transportation Development (Port & Harbor)**	Project No. RL1 ; Component(s):PC-19 PC-20	Pucuk–Paciran	42.61	2020–2030	Government	Provincial Government	-
		Project No. RM1 ; Component(s):PC-09 PC-23	Mojosari–Trawas–Sooko	47.24	2020–2030	Government	Provincial Government	-
		Project No. RS2 ; Component(s):PC-15 PC-16	Krian–Wonoayu–Cemeng Kalang	18.49	2020–2030	Government	Provincial Government	-
		Tanjung Bulupandan International Port Hub Development	Klampis + surroundings, Bangkalan	1,000.00	2012–2015	Government & Private	BPWS	**X**
		Lamong Bay Container Terminal Development	Lamong Bay, Surabaya	55.50	2010–2012	Government	Government Enterprise	**X**
		Socah Industry Port Development	Socah, Bangkalan	?	2012–2015	Private Sector	Bangkalan Government, Private Sector	**X**
	(Airport)	Expansion of Juanda II International Airport Development	Sedati, Sidoarjo	10.00	2011–2015	Government	Province Government	**X**
	Transportation Development (Railway System)	Feasibility Study for Commuter Train Operator for Surabaya-Mojokerto and Surabaya-Krian Sections	GKS		2012	Central Government	Ministry of Transportation	**X**
		Railway and Commuter Train Planning and Development connecting Waru to Juanda	Sawotratap–Juanda		2012–2014	Central Government	Ministry of Transportation	**X**
		Juanda-Waru-Wonokromo-Gubeng Commuter Train Connection Planning and Implementation	Waru–Wonokromo–Gubeng		2015–2017	Central Government	Ministry of Transportation	-
	Transportation Development (Intermodal System)	Intermodal Gateway Center Connecting Sidoarjo-Surabaya	Waru, Surabaya		2015–2016	Central Government	Ministry of Transportation	-
		Intermodal Gateway Center Connecting Lamongan-Surabaya	Benowo, Surabaya		2017–2018	Central Government	Ministry of Transportation	-
		Intermodal Gateway Center Connecting Mojokerto-Surabaya	Sepanjang, Sidoarjo		2019–2020	Central Government	Ministry of Transportation	-
		Intermodal Gateway Center Connecting Gresik-Surabaya	Tambak Oso Wilangun, Surabaya		2021–2022	Central Government	Ministry of Transportation	-
II	**Water-related Infrastructure Development**	Sembayat Barrage Development	Bungah, Gresik	64.00	2010–2012	Central, Provincial Governments	Ministry of Public Work, Province & Kabb./Kota Gover't	**X**
			Laren, Lamongan	10.00	2010–2012	Central, Provincial Governments	Ministry of Public Work, Province & Kabb./Kota Gover't	**X**
		Blega Reservoir Development	Galis, Bangkalan	966.30	2012–2015	Central and Local Governments	Ministry of Public Work, Kabb./Kota Government	**X**
		Inter-province Water Diversion Project (Umbulan Water Transfer Project & Solo River Water Transfer Project))	Gresik, Sidoarjo, Surabaya, Bankalan, Lamongan, Pasuruan	-	2012-2015	Government-Private Sector	Ministry of Public Work, Province & Kabb./Kota Gover't	**X**

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
		Water Supply Facility Expansion and Non-revenue Water (NRW) Reduction Project	Each PDAM	-	2015-2020	Government-Private Sector	Provincial, Kabb./Kota Governments, PDAM	-
		Water Saving Promotion Program	All GKS Zone	-	2012-2015	Provincial and local governments	Provincial, Kabb./Kota Governments, PDAM	**X**
III	**Waste Water Treatment and Urban Drainage Development**	Urban Drainage and Waste Water Disposal Master Plan (Including Capacity Development Program)	Selected urban areas in GKS Zone		2012-2015	Central & Provincial Government	Ministry of Public Work, Provincial and Kabb./Kota Governments, PJT1	**X**
IV	**Solid Waste Infrastructure Development**	ERP (Ecological Recycling Park) Development for Gresik-Sidoarjo-Surabaya	Kedamean, Gresik	120.00	2011–2015	Government-Private Sector	Province and Local Public Work Agency, Private Sector	**X**
		Improvement and Expansion of Existing SWM Facilities (Including closure project of landfill sites)	GKS	-	2011-2015	Government-Private Sector	Province and Local Public Work Agency, Private Sector	**X**
		Disposal Capacity Development Program (including 3Rs facilities, Intermediate Transfer System, Technology Innovation for SWM, etc)	GKS	-	2012-2015	Government-Private Sector	Province and Local Public Work Agency, and Private Sector	**X**
V	**Power**	Power Supply Enhancement Program towards 2020 (including: Capacity enhancement of Peak Load, Distribution Network and Transformers)	GKS and Other Parts of East Java	-	2010-2020	PLN East Java	PLN East Java	-
		Alternative and Renewable Energy System Development Program	East Java and over the Nation	-	2010-2030	PLN, Private Sector, International Organizations	Central Government, PLN, Private Sector	**X**
VI	**Controlled Industrial Zone Development**	Agro-industry Zone Developments	Ujung Pangkah, Gresik	4,984	2010–2015	Government-Private Sector	Local Government-Private Sector	**X**
		Industrial Zone Development	Manyar, Gresik	1,489	2015–2020	Public and Private Enterprise	Public and Private Enterprise	-
		Sidayu Industrial Park	Sidayu, Gresik	1,000	2020-2030	Public and Private Enterprise	Public and Private Enterprise	-
		Ngoro Industrial Park	Ngoro, Mojokerto	440	2010-2015	Private Sector	Private Sector	**X**
		Puspa Agro Regional Market Development	Jemundo, Sidoarjo	50	2010–2015	Government-Private Sector	Public and Private Enterprise	**X**
		Siborian Industrial Estate and Zone Development	Sidoarjo–Krian	1,500	2012–2025	Government-Private Sector	Public and Private Enterprise	**X**
		Pengembangan Industri Gemopolis	Sedati, Sidoarjo	300	2015–2017	Government-Private Sector	Public and Private Enterprise	-
		Lamongan Integrated Shore-base	Paciran, Lamongan	100	2010–2012	Private Sector	Private Sector	**X**

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
		Mojoanyar Industrial Estate	Mojanyar, Mojokerto	555	2015–2020	Private Sector	Private Sector	-
		R&D Center for Agro-processing and Fishery Products and Market Development	Mojokerto, Sidoarjo	Each 50	2012-2015	Government-Private Sector	Public and Private Enterprise	**X**
VII	**Tourism**	GKS Tourism Circuits Development, networking historical and natural assets (including: tourism spots, information centers, eco-tourism site development)	Surabaya, Mojokerto, Sidoarjo, Gresik	-	2012-2015	Government-Private Sector	Public and Private Enterprise	**X**
		New Tourism Area Development in Suramadu Bridge Foot Area Project	Surabaya, Bangkalan	-	2015-200	Government-Private Sector	BPWS, Provincial and Kab//Kota Governments	-
VIII	**Large-scale Settlements Development**	Tarik Riverside City	Tarik, Sidoarjo	300	2015-	Private Sector	Kab./Kota Government, Private Sector	-
		Waterfront Residential Settlement Development	Teluk Lamong, Pantai Timur, Surabaya	400	2015-	Private Sector	Kab./Kota Government, Private Sector	-
		New Housing Complex Development	Driyorejo, Kedamean, Menganti, Cerme	4,000	2020-	Private Sector	Kab./Kota Government, Private Sector	-
IX	**Suramadu Bridge Foot Zone Development**	Suramadu Bridge Foot for Bangkalan Zone Development	Labang, Bangkalan	600	2011–2030	BPWS-Private Sector	BPWS, Provincial and Kab//Kota Governments	**X**
		Suramadu Bridge Foot for Surabaya Zone Development	Tambak Wedi, Surabaya	600	2011–2030	BPWS-Private Sector	BPWS, Provincial and Kab//Kota Governments	**X**
X	**Environmental Management**	Comprehensive Program for Capability Building and Strengthening of the Environmental Management in the GKS Zone, including:1) Establishment of a GKS Council for Environment; 2) Environmental Policy Building; 3) Research of biodiversity status; 4) Establishment of a GKS Protected Area and Management Plan.	GKS		2011-2020	Central and Local Governments	Provincial and Kab//Kota Governments	**X**
XI	**Housing and Social Services**	Expanding Implementation of the Comprehensive KIP Program	Selected Kab/Kota other than Surabaya		2012-2020	Governments-Private Sector	Provincial and Kab//Kota Governments	**X**
		Establishment of Local Institution and Funding Mechasnism for Housing Development and Management, including community-driven self-help activities based on a "*Tridaya*" concept.	GKS, East Java		2012-2015	Central and Provincial Government-Private Sector	Provincial and Kab//Kota Governments, Private Sector	**X**
		Development of a Hierarchical Park System and Green Network	Each Kab/Kota		2015-2030	Provincial and Kab/Kota Governments, Private Sector	Provincial and Kab/Kota Governments	-

No	Main Program	Project	Location	Area (Ha) / Length (Km)	Time Frame	Fund Source	Implementing Agency	Priority (Short-tem Projects)
XII	**Institutional Development**	Establishment of "the GKS Development Cooperation Board" for inter-regency coordination of development	GKS		2011–2012	BKSP GKS	BKSP GKS, Province Government	**X**
		Training of Spatial Planning and Development of GKS Zone Management	GKS		2011–2015	BKSP GKS	BKSP GKS, Province Government, University	**X**
		Training for Human Resource Capacity Building of GKS Institution Management to Improve Carrier Ladder	GKS		2011–2030	BKSP GKS	BKSP GKS, Perguruan Tinggi, Pemprov Jatim	
		Training for Cooperation Development Capacity (every two years)	GKS		2011–2030	BKSP GKS	BKSP GKS	**X**
XIII	**Community-based Economic, Social & Cultural Development**	Socio-cultural Rehabilitation for Community impacted by Project	Each location impacted by project		2011–2030	Government-Private Sector	BKSP GKS; Central, Province and Kab/Kota Governments	**X**
		Economic Rehabilitation for Community impacted by Project	Each location impacted by project		2011–2030	Government-Private Sector	BKSP GKS; Central, Province and Kab/Kota Governments	**X**
XIV	**Capacity Development of the Governance**	Economic Capacity Improvement for Local Government through Cooperation	Each Kabb./Kota		2011–2030	Government-Private Sector	Government-Private Sector	**X**
		Development Activity Monitoring, Evaluation and Control	Each project		2011–2030	BKSP GKS	Inspector, Public	**X**

Source: JICA Study Team and Spatial Planning Document of each Kabupaten/Kota in GKS Zone (2008–2030) and The Study of Spatial Planning for GKS Zone 2010–2030

8. DIRECTION OF SPATIAL UTILIZATION CONTROL

8.1 Zoning Regulations on Spatial Utilization

According to Law No.26, 2007 on spatial planning, zoning regulations serve guidelines used to enforce spatial utilization control. The law also stipulates that regulatory policies should be based on the detailed plans of each spatial utilization zone. Zoning regulatory directions for the GKS Zone should comply with those of East Java's zoning policies. The province's zoning regulations include those for spatial structure, spatial pattern, as well as strategic sectors and zones which consist of the following:

- Urban system;
- Transportation network;
- Energy network;
- Telecommunications network;
- Water system;
- Protection zone;
- Cultivation zone; and,
- Strategic zone.

From these sectors, two were reviewed in this Study: (1) urban system and 2) transportation network. Since all the aspects and sectors were assessed to be relevant to the GKS Zone, they.were included in the GKS spatial plan.

1) Urban System Regulations

The considerations that are considered in formulating zoning regulations for urban systems are indicated below.

(1) National Activity Centers (PKN)

- Spatial utilization should be on the international and national scale, and urban economic activities should be supported by appropriate facilities and urban infrastructure, and
- The development of urban areas into settlements should have medium to high intensity space use with vertical development.

(2) Area Activity Centers (PKW)

- Spatial utilization of the provincial-scale urban economic activities, supported by appropriate urban infrastructure and facilities, and
- Development of urban areas as settlement centers, with medium spatial utilization, and with controlled horizontal development.

(3) Local Activity Centers (PKL)

- Spatial utilization for regency/municipal-scale economic activities, supported by appropriate urban facilities and infrastructure.

2) Transportation Network

The considerations that are considered in formulating zoning regulations for urban systems are indicated below and on succeeding pages.

(1) Road Networks

- Restriction on medium to high spatial utilization of areas along the roads;
- Prohibition of the conversion of roadside areas, especially those with protection function;
- Determination of building setbacks along roadsides to meet road control space;
- Permission on complementary road infrastructure development in accordance with the road class; and
- Prohibition of utilization of designated road space (Right of Way).

(2) Railway Networks

- Spatial utilization of medium to high intensity along railway networks and limitation on areas being developed;
- Restriction on land uses around railway networks that could interfere with railway operation and safety;
- Control of spatial utilization along railway lines which can create adverse environmental impacts on railway traffic;
- Limitation on the number of grade crossings between railway lines and roads; and,
- Determination of building setbacks from railway lines based on environmental impacts and the development needs of the railway network.

(3) Inland Waterway and Maritime Transportation

- Safety and security of shipping;
- Prohibition on air space activities that would impact on existing navigation channels for river, lake, and maritime transportation;
- Prohibition on underwater activities with adverse impacts on river, lake, and maritime transportation; and,
- Limitation on water use which impacts on navigation channels for river, lake, and maritime transportation.

(4) Public Ports

- Spatial utilization for the operational needs and development of port areas;
- Ban on developments in water bodies that obstruct marine transportation routes; and,
- Restriction on spatial utilization of port areas and their surroundings and the issuance of permits for such use in accordance with existing laws and regulations.

(5) Public Airports

- Need to use the space for airport operations;
- Spatial utilization around airports in accordance with airport development needs under current laws and policies;
- Identification of safety zones for flight operations and noise zones; and
- Adoption of international air space standards to ensure safe flight operations.

3) Protection Zones

The considerations for formulating regulations for various protection zones include the following:

(1) Forest Protection Zones

- Utilization for nature tourism with the condition that it will not change the landscape;
- Utilization for educational and research activities with the condition that they will not change the landscape;
- Prohibition on activities that will reduce forest areas;
- Prohibition on activities that will disturb the following: landscape, soil fertility, durability, hydrologic functions, preservation of flora and fauna, and environmental sustainability;
- Prohibition on activities that will change or destroy the area, its ecosystem, or engender forest encroachment, land clearing, logging, and poaching of protected animals;
- Strict supervision of cultivation of fixed areas by indigenous peoples and preservation of the function of protected areas;
- Utilization for very low-intensity building and forest protection and its related activities; and
- Strict supervision by relevant provincial institutions of space for cultivation.

(2) Water Infiltration Zones

- Prohibition on all types of activities that disrupt water absorption;
- Utilization for community forest activities;
- Limitation on permits for cultivation activities in non-built-up areas and which have strong ability to hold rainwater runoffs;
- Utilization for nature tourism with the condition that it will not change the landscape.
- Utilization for educational and research activities with the condition they will not change the existing landscape;
- Utilization to provide absorption wells and/or construct reservoirs on existing lands; and
- Application of the Zero Delta Q Policy on proposed permits for cultivation activities in built-up areas.

(3) Karst Zones

- Utilization for land reforestation activities, and
- Restriction on activities in absolute protection zones of karst resources.

(4) Coastal Areas

- Prohibition within a 100-meter distance from the high water line on all activities that will reduce coastal quality;
- Prohibition on all activities that will damage coastal ecosystems, mangroves, coral reefs, sea grass beds, and estuaries;
- Prohibition on activities that will lead to the reduction of the areas' ecological value and zone aesthetics;
- Prohibition on activities that will disturb the landscape, coastal preservation functions, and/or access to shoreline areas;
- Utilization for mangrove plantation and other conservation activities.
- Utilization for construction of wharf infrastructure;
- Utilization for visitor safety guard tower infrastructure;
- Utilization for the development of natural and/or built-up structures to prevent abrasion;
- Utilization for the provision of green open spaces; and
- Prohibition on new-building construction except for those supporting coastal recreational activities.

(5) River Boundaries

- Prohibition on all activities and building construction on river boundaries;
- Prohibition on all activities and buildings that damage and degrade river quality;
- Utilization for adventure tourism that they will not degrade river water quality;
- Permission for tourism activities with the condition that the safety of tour users is ensured;
- Utilization for the provision of green open spaces;
- Prohibition on new buildings except for those with water resource management purposes;
- Restriction on building construction except those to support recreation parks; and
- Determination of river boundaries in accordance with existing laws.

(6) Water Springs

- Prohibition on all types of activities that degrade water quality, the physical condition of the area, and catchments;
- Prohibition on all activities that disturb the landscape, soil fertility, durability, hydrology, preservation of flora and fauna, and environmental functions;
- Prohibition on the use of non-irrigated rice fields;

- Utilization for tourism and other cultivation activities with the condition that they do not damage water quality; and
- Utilization for preservation and conservation activities such as land reforestation.

(7) Reservoirs and Lakes

- Prohibition on all types of activities that endanger protected areas and degrade water quality;
- Utilization for tourism and cultivation activities with the condition that they do not cause water degradation;
- Utilization for preservation and conservation activities such as land reforestation;
- Utilization for low-density building and those related to protection purposes; and
- Utilization for infrastructure to conserve reservoirs.

(8) Urban Green Open Spaces

- Prohibition on land-use conversion of all green open space;
- Utilization for expanding the areas for green open space exceeding 30% of urban land use;
- Utilization on spatial utilization for recreation activities.
- Restriction on building construction except for recreation facilities and other public facilities.
- Prohibition on permanent building construction, except for recreation and other public facilities.
- Strict government control related to cultivation activities that affect green open space functions and conversion.

(9) River Boundaries

- Prohibition on all cultivation activities within a 15-meter distance from river boundaries;
- Utilization for land reforestation activities; and
- Prohibition on all activities causing land-use conversion of protected areas and degradation of water quality.

(10) Mangroves and Forested Coastal Zones

- Utilization for land reforestation;
- Utilization for research, education, and natural attractions;
- Prohibition on the harvest and use of mangrove wood;
- Prohibition on activities that reduce or contaminate the mangrove ecosystem; and
- Prohibition on activities that disturb mangrove landscape and ecosystems, fauna and flora, and biodiversity.

(11) Forest Parks

- Utilization for educational and research activities, and ecotourism;
- Prohibition on activities that destroy or disrupt flora and fauna;
- Prohibition on activities that disturb the landscape, ecosystems, fauna and flora, and biodiversity;
- Restriction on building construction except for educational, research, and ecotourism purposes; and
- Prohibition on other building construction.

(12) Nature and Marine Parks

- Utilization of space for ecotourism that will not change the landscape;
- Prohibition on other activities except ecotourism;
- Conditional permission for building construction that support ecotourism;
- Prohibition on building construction except for the above;
- Prohibition on activities not suitable with the zone's function and that of ecotourism parks; and
- Prohibition on activities that change the landscape and ecosystem, as well as those not in accordance with the zone's function and that of other natural attractions.

(13) Cultural Heritage and Science Zones

- Utilization for educational activities, research, and tourism;
- Conditional permission for building construction that support education, research, and tourism;
- Prohibition on activities that disturb cultural properties;
- Prohibition on activities that change specific geological formations beneficial to science and research;
- Prohibition on activities that disturb the environment of historical and archaeological sites/buildings, national monuments, and specific geology of certain zones; and
- Prohibition on activities that disrupt the preservation of local cultures.

(14) Landslide- and Tidal-wave-prone Zones

- Utilization of space based on zonal characteristic, type, and disaster vulnerability;
- Determination of location and evacuation routes from the residential areas; and
- Limitation on new buildings, except for those that monitor disasters and promote public interest.

(15) Flood-prone Zones

- Determination of flood-plain boundaries;
- Utilization of flood plains as green open spaces and construction of low-density

public facilities; and

- Prohibition on the use of the areas as sites for settlements and public facilities.

(16) Natural-disaster-prone and Geological Protection Zones

- Prohibition on the use of the areas as sites for settlements and major infrastructure;
- Utilization for cultivation using high technology in accordance with the area's characteristics except in absolute protection zones; and
- Implementation of soil drainage, rock netting, shotcrete, block pitching, stone pitching, retaining wall, gabion wall, installation of geotextile, terracing, retaining embankments, mitigation / evacuation route, disaster information systems, early warning systems, and disaster procedure operation standards.

4) Cultivation Zones

The following are the considerations in formulating regulations for cultivation zones:

(1) Community and Production Forests

- Utilization for sustainable forest development activities;
- Prohibition on cultivation development activities that reduce the forest area;
- Utilization for reforestation and forest rehabilitation;
- Limitation on forest products utilization permits to maintain balance in forestry resources;
- Limitation on new building permits to support the utilization of forest products; and.
- Prohibition on building construction.

(2) Agriculture Zones

- Prohibition on cultivation activities that reduce irrigated areas;
- Prohibition on cultivation that reduce or destroy the function of the land and soil quality;
- Utilization for agricultural support activities;
- Prohibition on building construction in the affected irrigation channels of the paddy fields;
- Utilization for the construction of farmer settlements with the condition that they do not interfere with agricultural functions and have low density;
- Utilization for the implementation of agro-processing facilities and technical training halls for farmers;
- Utilization for facilities and infrastructure for agricultural product development;
- Utilization for the development of irrigation channels;
- Utilization for the development of reservoirs and ponds;
- Utilization for the development of modern village barns; and
- Prohibition on the merging of irrigation and drainage canals..

(3) Plantation Zones

- Utilization for house construction on the condition that they do not interfere with the land use;
- Prohibition on farming activities that reduce, or destroy, the function of land and the soil quality of the plantations; and
- Utilization for plantation support activities, such as organizing seeding activities.

(4) Fishery and Animal Husbandry Zones

- Utilization as farmers' and/or fishermen's settlements with low density;
- Utilization as spawning ground and/or green belts;
- Utilization of sustainable resources;
- Prohibition on all farming activities that interfere with the quality of rivers/reservoirs and the water for aquaculture;
- Utilization for activities that support animal husbandry and fishery; and
- Utilization for the operation of fish processing buildings, fishermen's training centers, development facilities, and fisheries product development infrastructure, and breeding centers.

(5) Mining Zones

- Utilization for the development of agriculture or forestry, especially for post-mining;
- Utilization for residential development outside the core mining zones;
- Utilization for industrial development related to mining processing outside the core zones for mining;
- Utilization for low-density building;
- Utilization for port development;
- Setting mining areas with due consideration given to cost–benefit and risk–benefit balance; and
- Setting of other building arrangements around mining installations and equipment locations that will potentially cause disasters, by taking into account local concerns.

(6) Industrial Zones

- Utilization for the development of industrial support activities;
- Utilization of areas outside the buffer zones designated with medium-density building for the development of small-scale residential stock ;
- Utilization of areas outside the industrial buffer zone for cultivation activities.
- Implementation of local scale workers/employees housing, social and public facilities to support industrial activities;
- Utilization for the operation of wastewater treatment plants (WWTP);
- Provision of government incentives for the industrial zones' increased integration

with other productive cultivation zones without affecting the main function of each zone;

- Utilization for industrial activities using appropriate technologies and are related to natural resources and local human resources; and
- Limitation on new housing development around industrial zones.

(7) Tourism Zones

- Utilization for the development of commercial activities in accordance with the scale of tourism attractions;
- Utilization for limited housing and settlement developments outside the main tourism zones with the condition that they will not disturb the landscape;
- Prohibition on large-scale industrial and mining activities that will disrupt the land use;
- Utilization of space by tailoring the building site coverage ratio (BCR) and floor area ratio (FAR) to the type and characteristics of the tourist attraction;
- Development of tourism information service systems;
- Establishment of souvenir shops, cafeterias, restaurants, other commercial places, etc. according to the scale of the tourist attraction;
- Utilization of natural and cultural potentials based on environmental carrying capacities;
- Protection of cultural heritage sites; and
- Limitation on new buildings only to support tourism development.
- Prohibition on new buildings other than those supporting tourism in the tourism core zones.

(8) Urban Settlement Zones

- Utilization for single houses, apartments, and/or cluster housing development;
- Utilization for low-, medium- to high-density buildings;
- Medium-density residential zones should be served by at least one public mass transit, and a minimum of two public mass transit modes in high-density zones;
- Utilization for the development of trade and service areas in accordance with the housing scale;
- Utilization for public and social facilities development according to the appropriate scale;
- Prohibition on cultivation;
- Determination of the building conditions in terms of the building coverage ratio; floor area ratio; and set-back from the limit of frontage road.
- Determination of the architectural themes; and
- Determination of the type and terms of permitted building use.

(9) Rural Settlement Zones

- Utilization for single housing, cluster housing, and flat development;
- Intensification from low- to medium-density buildings;
- Allowing the development of trade and services in accordance with the settlement scale.
- Utilization for the development of appropriate social and public facilities in accordance with the settlement scale;
- Prohibition on cultivation;
- Determination of the building envelope;
- Determination of the architectural themes;
- Determination of housing completeness and its environment; and
- Determination of the type and terms of permitted building use.

5) Strategic Zones

The following are the considerations in formulating regulations for strategic zones.

(1) Economic Zones

- Development of large-scale economic support zones in urban development zones, especially those with functions for: housing, commerce, business services, industry, and transport, that support economic development;
- Minimization of spatial function changes for built-up areas through compact vertical development in accordance with each zonal conditions;
- Completion of green open spaces to provide freshness in the middle of high-intensity activities, and preservation of these spaces;
- Allowing for spatial changes in non-core zones (for trade, services, and industrial), but continuing to support the zone's main functions as an economic driver which can be done without changing the main function of a predetermined zone;
- Change in or addition of specific spatial functions of open spaces provided these are within the carrying capacity of the open spaces (but not allowed for urban green space);
- Development of high-tech industrial parks through high-tech industries and research, technology transfer center, and patents development center with developed industry types such as biotechnology, pharmaceutical industry, information technology, etc., supported by transportation and communication infrastructure and green open spaces;
- Development of eco-estates with ecotourism and gift centers;
- Development of trade/commercial zones with commercial centers, office buildings, convention centers, and other services such as banking and finance, with high-density and compact buildings; and
- Development of free trade zones with industrial, warehousing, and port activities, as well as container and distribution terminals, lots for lease, public service facilities, national training centers, hospitals, schools, and industrial areas; along with access to highways, primary arteries, and airport/port, international standard

facilities, flood prevention system, green open spaces, high-tech communication systems, and an EDI system.

(2) Defense and Security Zones

- Securing of defense and security zones and ensuring that they will not attract community activities, especially high-intensity activities;
- Development of adequate environmental infrastructure and facilities to boost defense and security;
- Support for direct or indirect activities with the condition that they do not disrupt the land use; and
- Prohibition on activities undermining defense and security functions, i.e., development of industries that require huge amounts of labor and those that could potentially interfere with the mobilization of defense and security; and
- Development of a core zone, enclave, or a closed space with buffer zones between respective zones and the surrounding areas.

(3) Environmental Preservation Zones

- Guarantee of protection functions of core zones;
- When both core and supporting zones are damaged, these should be returned to their initial condition to protect rare and endangered species;
- Support for the preservation of zones and prevention of damage in the long term and acceleration of land rehabilitation;
- Utilization for ecotourism activities;
- Utilization for the construction of infiltration wells for zones with water infiltration capacity;
- Restriction on land use conversion that interferes with the zone's protection function, especially if there are rare wildlife; and,
- Restriction on further development of core and supporting zones through cultivation, especially in tandem with the development of settlements and the cultivation of seasonal crops, or provision of gradual conversion of the zone to a protected zone.

(4) High Control Zones

- Requirement for an impact assessment of cultivation in high control zones to determine the allowable scale of activity;
- Strict control on cultivation that interferes with the zone's primary function; and
- Utilization for allowed activities should comply with the zoning division.

8.2 Administrative Measures on Spatial Control

8.2.1 Basic Concepts

Law No.26, 2007 mandates the streamlining of all zoning regulations, stipulating them to be based on the detailed plan of each spatial zone. Although, the zoning regulations in the GKS Zone is coherent with those of East Java's, the need for a unique regulatory framework is still present, taking into account the following requirements expected of the GKS Zone:

- Enhancement of a guided urban growth toward the development of a **compact city**;
- Enforcement of **regulations on land-use zoning** for urbanized or urbanizing areas, stipulating the guidelines on land use, land development, and physical conditions of buildings and facilities to be newly constructed; and
- Preparation of **physical regulations** for building construction in accordance with building standards codes such as height, FAR, BCR, and setback.

As discussed in Chapter 6, a land-use zoning system has been proposed for the GKS Zone spatial plan. In the zoning system, 10 categories of land uses were indicated, and the most crucial is the effective management of environmentally sensitive areas against disorderly development and land conversion. For this purpose, the following actions are particularly essential:

(1) Establishment of a legal enforcement system for protecting "protection zones" and to strictly control inappropriate actions in these zones;

(2) Provision of a detailed management mechanism for "forest areas," wherever they have been designated by law, in terms of permissible social, commercial, and industrial activities in forest conservation and production;

(3) Establishment of guidelines for permissible and impermissible conversion of irrigated agricultural land, taking into account existing relevant laws/regulations;

(4) Provision of housing development guidelines which should be complied with in "urban development zones" (in terms of building and design standards, utilities, and other facilities to be provided) and official engineering inspections; and

(5) Provision of industrial development guidelines for factories to be located in "industrial zones," including environmental quality standards for emissions, wastewater discharges, drainage system, truck access, vibration and noise generation, as well as greenery within the zones' territories.

8.2.2 Administrative Framework for Spatial Management

A basic framework for the tools for land development and spatial control should be prepared together with the spatial plan. The effective administrative tool should be double-edged, say, promotion and restriction; incentive and disincentive; favor and fear; reward and punishment; or carrot and stick. Using this tool, three aspects are addressed in terms of (1) permission issuance, (2) provision of incentives and disincentives, and (3) imposition of sanctions on land use, land development, and use of spatial resources that result in financial loss or environmental degradation.

1) Issuance of Permits

Utilization permits are regulated by the provincial and local governments in compliance with related laws. All development activities should obtain such permits in accordance with the detailed spatial plan and zoning permits given by the respective local governments.

2) Provision of Incentives and Disincentives

Incentives and disincentives should be provided in accordance with the laws and regulations on spatial use and spatial plan.

Incentives or disincentives can be given by:

- Central government to local government;
- Government to private/community group;
- Local government to local government; and
- Local government to private/community group.

Tax holidays, subsidies, and prestigious usage of public services are typical incentives, while taxes and surcharges on activities and physical restrictions on buildings and development activities are forms of disincentives.

3) Imposition of Sanctions

Sanctions are determined by the central government and the respective local governments based on their authority and are dependent on the amount of loss caused by the activity. Sanctions are imposed on activities which intentionally violate the approved spatial structure plan and spatial pattern plan for the GKS Zone.

Table 8.2.1 Administrative General Framework for Spatial Management

Permit Direction	Incentive and Disincentive Direction	Sanction Direction
All spatial utilization should obtain the Spatial Utilization Permit in accordance with Detail of Spatial Plan and Zoning Permit in respective Local Government. Spatial Utilization Permit is regulated by Government and Local Government in accordance with each government authority as stipulated in related Law.	Incentives and disincentives can be applied in accordance with the stipulation of laws and regulations for the utilization of spatial activities in line with spatial planning. Incentive and disincentive can be given by: • Central Government to Local Government; • Government to Private/Community Group; • Local government to Local Government; and • Local Government to Private/Community Gr.oup .	Sanction direction is determined by Government and respective Local Government based on their authority and depend on the financial loss value suffered by the activity. Sanction is applied for the spatial utilization activity violate Spatial Structure Plan and Spatial Pattern Plan of GKS Zone.

Source: JICA Study Team