

SULEJA NEW TOWN MASTER PLAN IN NIGER STATE



Suleja Smart City in Niger States, Nigeria

Bird eye view of Phase 1 area



➤ Residential area



➤ High-tech industrial area



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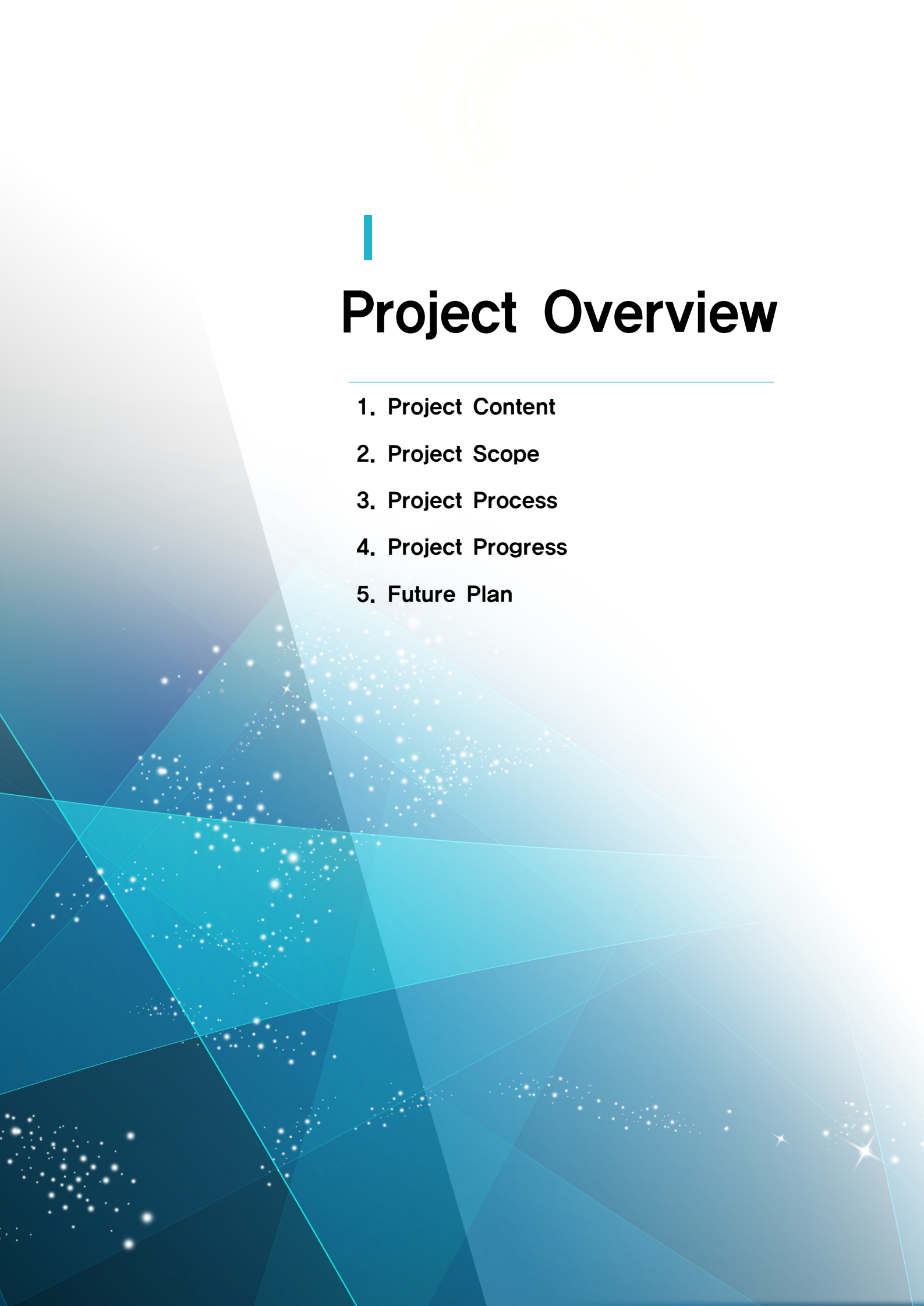
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Project Overview

1. Project Content
2. Project Scope
3. Project Process
4. Project Progress
5. Future Plan



I. Project Overview

i. Project Content

1) Background and Goals

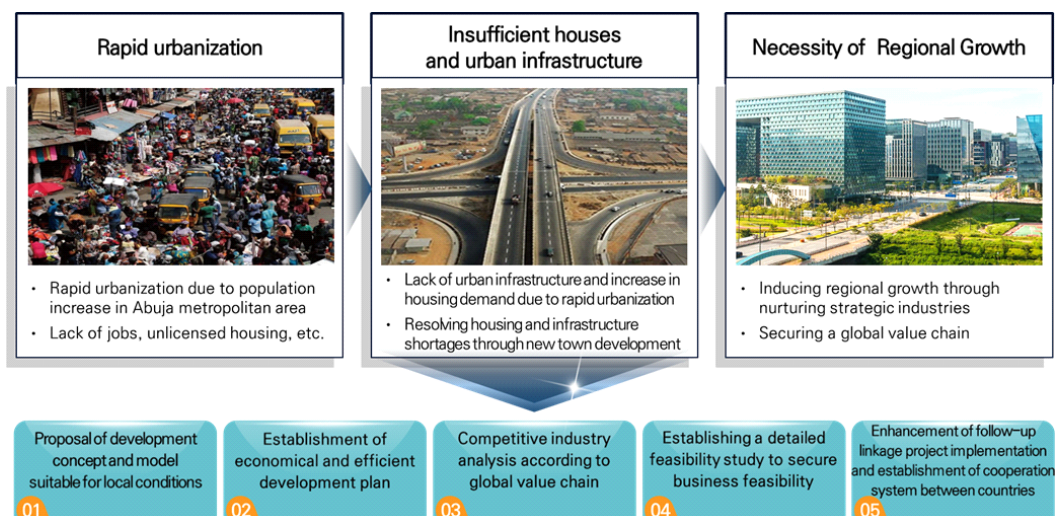
■ Background

- The rapid urbanization of Suleja in Niger State near Abuja, the administrative capital of Nigeria, is driving up the housing demand, but its infrastructure is lacking. The master plan for a new town will contribute to providing housing and infrastructure, building a framework for fostering strategic industries, as well as creating job and greater income opportunities for locals.

■ Goals

- The master plan will lay out the visions for new growth engines for the Suleja area and foster strategic industries to promote regionally balanced development and to secure the global value chain. It also aims to provide Korean businesses opportunities to involve in building and managing the overall city infrastructure, including new town and metropolitan infrastructure, housing construction, and new town shaping and management.

[Figure 1-1] Background and goals



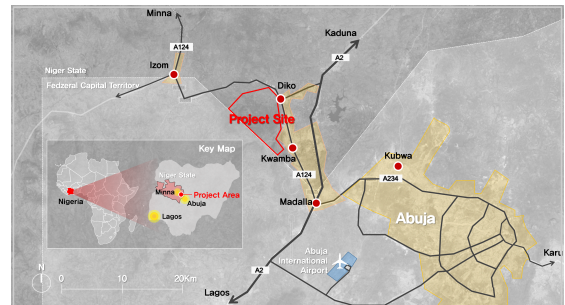
ii. Project Scope

1) Spatial and Temporal Scope

■ Location & Duration

- Location: Suleja, Niger State, 40km northwest from center of Abuja
- Duration: June 15, 2020 to November 22, 2021

[Figure 1-2] Location map



2) Content Scope

■ Project Scope

[Table 1-1] Project scope

Category		Details
1	Analyzing the Development Condition	Surveying the current condition; analyzing the Niger State Urban Support Program (NSUSP); analyzing superordinate and relevant plans; and comprehensively analyzing the current condition
2	Setting Development Directions and Developing Spatial Structure Design	Setting development goals and directions; formulating development concepts; developing spatial structure design; and preparing for alternatives
3	Prioritizing and Selecting the Pilot Site	Assessing candidate sites and finalizing the site selection; defining district boundaries and setting detailed directions; formulating planning criteria; devising land use plans; establishing a development plan for each sector; and setting building arrangement plans
4	Assessing Project Feasibility and Setting the Action Plan	Estimating project costs, construction costs, and housing sale prices; assessing project feasibility, project implementation strategies, project financing channels, and project action plans; and creating capability strengthening programs
5	Exploring Follow-up Projects	Exploring ways to connect the project to various funds and Korean ODA



iii. Project Process

■ Process of the Suleja New Town Master Plan

[Table 1-2] Process of the project

Phases	Process						
Phase 1 Condition and Market Analysis	Site investigation		Natural, social, and economic environment analysis		Analysis of upper plans and law statutes		
					Analysis of facility and infrastructure status		
					Consultations with related organizations and interested parties		
	Remote conference with interested parties (Niger State, UN-Habitat, Smart City Company)						
Phase 2 Development Strategies and Basic Design	Setting goals and establishing tasks						
	Prioritizing and selecting the project district						
	Candidate sites assessment			Final site selection			
	Devising development strategies, concepts, and functions; and formulating planning criteria						
	Devising land use plans						
	Land use plan	Population and housing plan	Transportation and traffic plan	Park and green space plan	Supply and treatment facility plan	Building arrangement plan	
	Presenting an interim report and conducting an (online) invitational seminar						
	Estimating construction costs						
	Phase 3 Project Validity Analysis	Financial feasibility analysis					
		Project cost estimation		Developing project delivery methods		Project execution strategies	
				Economic and financial analysis			
Building a financial model							
Financial model		Financing channels		Implementation plan			
				Study the credibility of investors			
Phase 4 Exploring Follow-up Projects	Project risk analysis						
	Risk management measures			Risk sensitivity analysis			
	Exploring follow-up projects						
Phase 4 Exploring Follow-up Projects	Opportunities with international development organizations		Opportunities with Korea's ODA finances		Opportunities with public-private partnerships (PPP)		
	Exploring feasible projects						
	Metropolitan infrastructure project		Building industrial clusters		Project management consulting (PMC) and unit projects by work type		
				Smart solution projects			

iv. Project Progress

■ Project Progress Status

[Table 1-3] Project progress

2018	Prior consultations with the Niger State government and request for establishing the new town development plan
▼	
2019	Pre-feasibility study on the Suleja New Town
▼	
Jun, 2020	Contract signed and began project: Suleja New Town Master Plan in Niger State
▼	
Dec, 2020	Workshop on selection of pilot site
▼	
Jul, 2021	Field investigation and project consultations with the Niger State government
▼	
Oct, 2021	Online capacity building program for Niger State government officials

v. Future Plan

■ Basic Directions

- Based on the establishment of the Master Plan, find business opportunities feasible for Korean enterprises.
- Exploring ways to follow up with working design and engage in supervision tasks for sustainable project development after the Master Plan.

■ Future Plan (Draft)

[Table 1-4] Future plan

Year	Progress and Plan
2021	• Complete the service of establishing the Suleja New Town Master Plan in Niger State of Nigeria
2022	• Hold Korea-Nigeria consultations to discuss project directions and place an order for project design
2022 - 2023	• Select operators for basic design and working design or unit project for the pilot site
2023 - 2024	• Provide indirect compensation
2023 - 2027	• Begin and complete the constructions in Phase 1
2028 - 2042	• Begin and complete the constructions in Phases 2, 3, and 4



II Development Condition Analysis

1. General Overview
2. Overview of Suleja
3. Superordinate and Related Plans
4. Nigerian Law and Policies
5. Comprehensive Condition Analysis



II. Development Condition Analysis

i. General Overview

■ Overview of Nigeria

- Area: 923,768km² (nine times greater than South Korea) / Major Cities: Abuja (capital), Lagos, Ibadan
- Population: 190 million (urbanization rate: 50.3%)
- Major Industry: petroleum (90% of total exports)

■ Overview of Niger State

- Area: 76,363km² / Major Cities: Minna (state capital), Suleja, Bida
- Population: 5.55 million (urbanization rate: 48.6%)
- Major Industries: agriculture, mining, metal processing

[Figure 2-1] Location of Nigeria and Niger State



ii. Overview of Suleja

1) Overview of Suleja

■ Basic Overview

- Area¹⁾: 115 km²
- Population²⁾: 302,200 (2016)
- Annual Temperature Range³⁾: 15.6°C ~ 33.9°C
- Average Annual Precipitation⁴⁾: 1,640mm

2) Population Overview

■ Population and Population Density

- The population of the Federal Capital Territory Abuja (FCT Abuja) is approximately 3.56 million and the population of Minna, the capital of Niger State, is about 450,000. Suleja is home to about 300,000 people.

[Table 2-1] Population of Suleja

Area	Population (people)			Population Density (people/km ²)	Change Rate (%)
	1991	2006	2016		
Nigeria	88,992,220	140,431,790	193,392,500	209	117.31
Niger State	2,421,581	3,954,772	5,556,200	73	129.45
Suleja	151,300	215,075	302,200	2,638	99.74

Source: CityPopulation (2020.09.21) <https://www.citypopulation.de/php/nigeria-admin.php?adm1id=NGA027>

- The population of the Suleja region nearly doubled from 1991 (150,000) to 2016 (300,000).
- The average population density of Niger State was 364 people/km², while that of Suleja was 2,638 people/km², the second highest in population density among the cities in Niger State.

[Figure 2-2] Site location



1) CityPopulation(2020.09.21) <https://www.citypopulation.de>

2) CityPopulation(2020.09.21) <https://www.citypopulation.de>

3) Weather Spark (20200824) <https://weatherspark.com/y/55092/Average-Weather-in-Suleja-Nigeria-Year-Round>

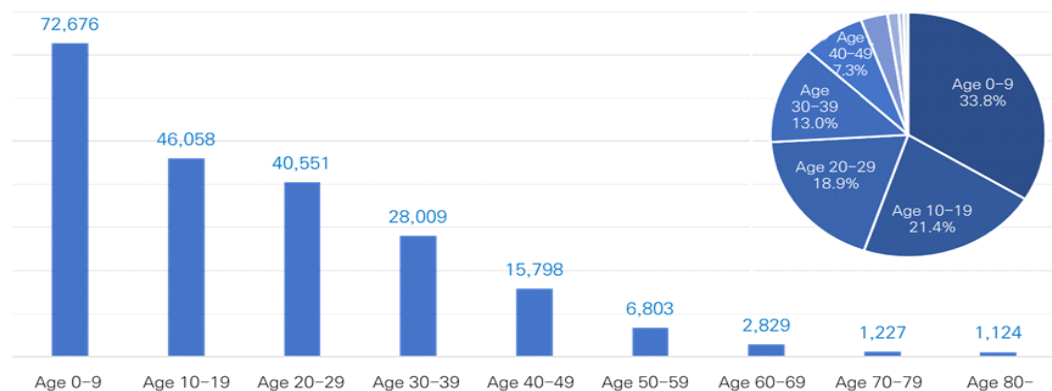
4) MasLockGroup Nigeria Limited (1988) Suleja Master Plan 1987-2006



■ Population by Age and Sex

- According to the population distribution by age, the 0-9 age group numbered 72,676, accounting for 33.8% of the total population and the 60 or above age group comprised 2.4% (5,180 people), which is relatively low.

[Figure 2-3] Population of Suleja region (2006)



Source: Projected from priority table 2006 census

- The population by sex in 2006 showed that the sex ratio was fairly balanced with the male population being 112,030 (52.1%) and the female population being 103,045 (47.9%). There were about 10,000 more males than females.

3) Economic Overview

■ Economically Active Population

- The economically active population of Suleja increased about 18% from 149,300 in 2014 to 176,552 in 2019. It was more than twice that of nearby areas such as Gurara and Tafa.

[Table 2-2] Suleja's economically active population trend

Area	2014	2015	2016	2017	2018	2019
Suleja	149,300	154,391	159,656	165,100	170,730	176,552
Its Nearby Areas						
Gurara	59,556	61,586	63,686	65,868	68,104	70,426
Tafa	55,476	57,370	59,326	61,349	63,441	65,605

Source: Projected from priority table 2006 census

■ Income Per Household

- It showed that more than half of the households in Suleja had unsteady income and most of them had a monthly income of 60,000NGN or less (1NGN $\cong$ KRW 2.8, 60,000NGN = approx. KRW 168,000).

■ Major Industries

- Niger State's industry composition showed that the shares of retail trade (55.0%) and agriculture (18.4%) were high. The share of agriculture in Niger State was not only greater than that of agriculture (12.7%) in the capital of Abuja but also that of agriculture (14.7%) in Nigeria as a whole country.

[Table 2-3] Industry shares in Niger State and others (%)

Area	Agriculture	Retail Trade	Wholesale Trade	Other Services	Food and Beverage	Shipping	Clothing Manufacturing	Food Manufacturing
Niger State	18.4	55.0	0	11.5	1.2	13.3	0	0.6
Abuja	12.7	49.7	0	2.8	12.3	9.2	8.6	1.6
Nigeria	14.7	47.5	2.3	9.7	8.5	6.8	4.5	3.5

Source: National Bureau of Statistics (NBS), 2020

- According to a survey of about 1,200 Suleja residents, workers in agriculture accounted for the largest share of 38.15%, followed by those in trade and those in the public sector.

[Table 2-4] Workers by industry in Suleja

Type	Respondents (people)	Distribution (%)
Agriculture	483	38.15
Trade	224	17.69
Public Sector	198	15.64
Private Sector	73	5.77
Others	101	7.98
Retirees and Pensioners	66	5.21
Unemployed	121	9.56

Source: Field Survey(2020)

- Major crops produced include yams, maize, and groundnuts. There are five large-scale farms whose total area adds up to 415 ha.



4) Natural Environment

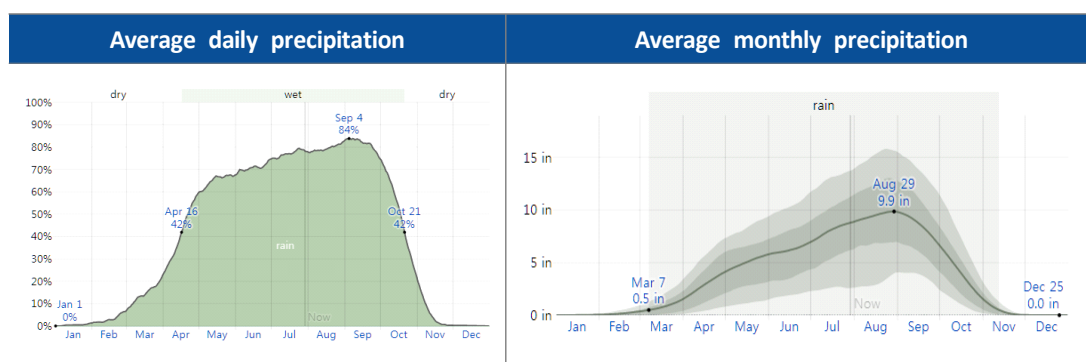
■ Geography⁵⁾

- Suleja belongs to Niger State and is located in between Niger State and the Federal Capital Territory. To its west lies Bida and to its north lies Minna.
- Suleja is next to the A124 highway and A2 highway. The A2 highway is one of the most important federal arteries. It connects Kaduna to the north and Lokoja to the south.

■ Climate and Temperature

- Suleja is wooded and has a savanna climate. The year is divided into a rainy season when it's humid and cloudy and a hot, dry season. Its temperature usually ranges between 15°C and 33°C.
- Suleja's annual temperature change indicates that a heat wave with temperatures above 32°C stays for about two and a half months from late January to the middle of March. From late June to September, it enjoys cool weather, staying below 28°C.
- Suleja's precipitation and precipitation probability are sporadic throughout the year. Its rainy season lasts for more than seven months from April to October and the highest daily precipitation in August is about 251.46 mm.

[Figure 2-4] Average precipitation of Suleja region



Source: Weather Spark (2020.08.24.) <https://weathersparkcom/y/55092/Average-Weather-in-Suleja-Nigeria-Year-Round>

5) MasLockGroup Nigeria Limited (1988) Suleja Master Plan 1987-2006

■ Topographic and Slope Characteristics⁶⁾

- Suleja lies on the central highland and has dramatic terrain variations (altitudinal variations of approximately 500 meters).
- Suleja is largely located in the hill station and most of the area is covered with wild plants and rocks.
- The ground in Suleja is composed of crystalline solids such as gneiss and migmatite. The project site maintains a solid ground with hilly areas, which means it has substantially low water content.
- In the west, a long line of mountain ridges and hills bounds the city and since 30% of the area are on a slope, steep erosions and ditches are frequently found.
- There are six rivers in Suleja. The Gurara River, the most important one, starts from Jos Plateau and cuts through Izom, 20 km west of Suleja.
- The Iku River is the main supplier of drinking water and the main drain for the city. It bisects the Suleja area, including the project site, into east and west halves. To the east, there are the Getaure River, the Rafin Sayin area, and the Laydua River.
- The area within a 3.21 km radius from the center of Suleja consists of farmland (40%), shrubs (29%), trees (16%), and grassland (12%). Over 40% of the area within a 16 km radius are also farmland.

5) Urbanization Status

■ Land Use Status

- The urbanization rate of the area, including the project site, between 1980 and 2015 and its expected urbanization rate by 2035 showed that its urbanization rate is about 13%.
- Urbanization largely occurs around the A124 highway and Suleja-Bakin Iku road.

6) MasLockGroup Nigeria Limited (1988) Suleja Master Plan 1987-2006, Weather Spark (2020.08.24)
<https://weatherspark.com/y/55092/Average-Weather-in-Suleja-Nigeria-Year-Round>



■ Area by Land Use and Its Distribution

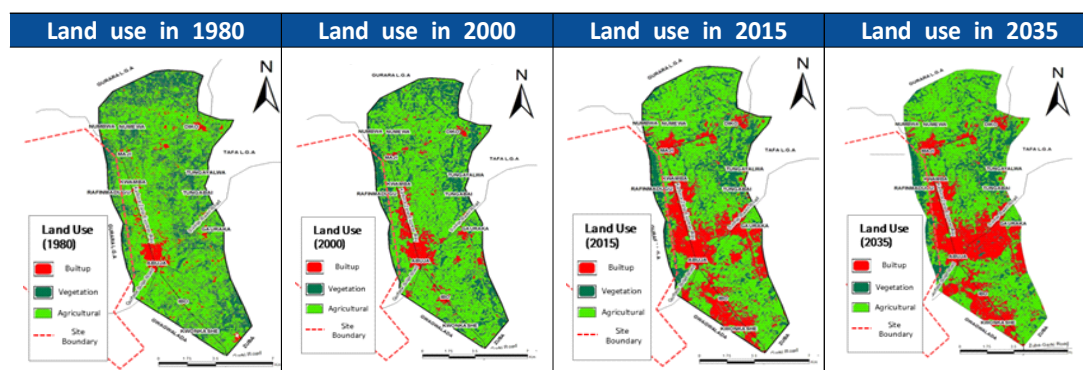
- The total size of Suleja's central part, near the project site, is 118.9km². As a population concentrated zone neighboring Abuja, the proportion of its residential area is rapidly expanding.
 - The proportion of the residential area, which was 10% (about 11.75 km²) in 2000, increased 2.5 times to 26% (about 30.6 km²) in 2015.
- The expected proportion of the residential area in 2035 is close to 39% (46.37km²), which is 1.5 times greater than that in 2015.
 - Meanwhile, the expected proportion of farmland in 2035 will see about an 11% decrease from 2015.

[Table 2-5] Area and proportion by land use in Suleja (1980-2035)

Type	1980		2000	
	Area (km ²)	Proportion (%)	Area (km ²)	Proportion (%)
Built-up	6.50	5.5	11.75	9.9
Agricultural Land	85.33	71.8	82.40	69.3
Vegetation	27.07	22.8	24.76	20.8
Type	2015		2035 (estimate)	
	Area (km ²)	Proportion (%)	Area (km ²)	Proportion (%)
Built-up	30.61	25.8	46.37	39.0
Agricultural Land	71.23	59.9	58.27	49.0
Vegetation	17.01	14.3	14.27	12.0

Source: Urban Growth and Land use Cover Change in Nigeria using GIS and Remote Sensing Applications. Case Study of Suleja L.G.A., Niger State

[Figure 2-5] Land use status of Suleja region(1980-2015)



Source: Buba etc (2016) Urban Growth and Landuse Cover Change in Nigeria)

6) Infrastructure Status

■ Water Supply Facilities

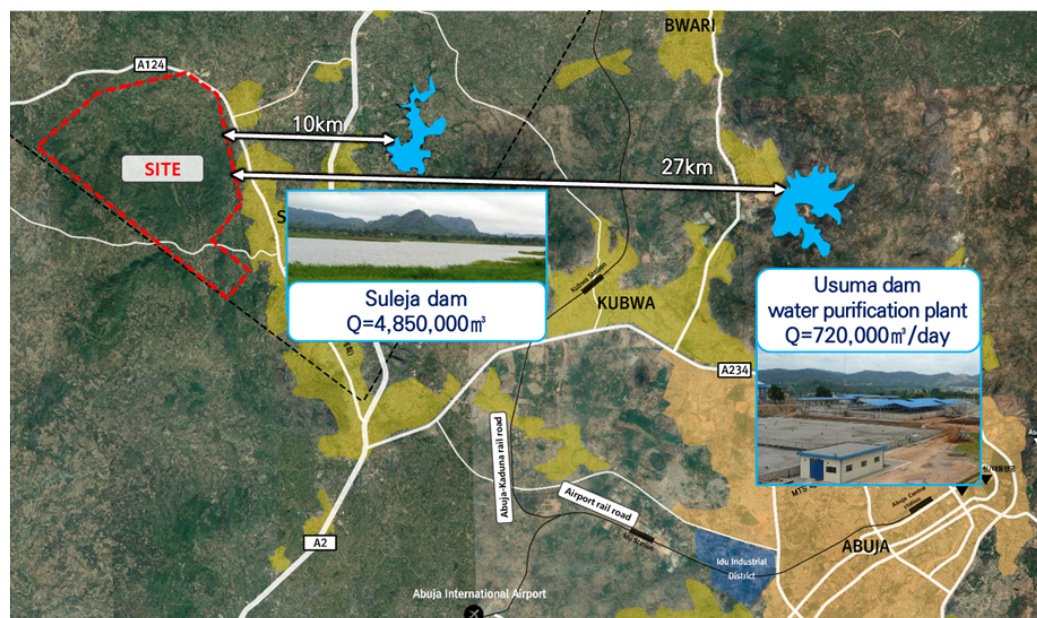
- The Suleja Dam whose total storage volume is 5,200,000 m³ is 10 km away in a straight line from the project site, but no water supply facility (such as a water purification plant) is installed.
 - The Suleja Dam has a length of 512 m and a width of 10 m. It is an earthfill dam whose source of water is the Iku River.
- The water purification plant (720,000 m³ per day) at the Usuma Dam supplies water to nearby areas (Abuja and Suleja), which makes it possible to consider utilizing the existing water pipes for the project site's water supply plan.

[Table 2-6] Water consumption per capita (2016)

Type	Population	Per Capita Consumption (L/person/day)
Towns	Over 20,000	120
Villages	5,000 - 20,000	60
Rural Areas	Fewer than 5,000	30

Source: Nigeria National Water Policy, 2016

[Figure 2-6] Water supply status in Suleja region





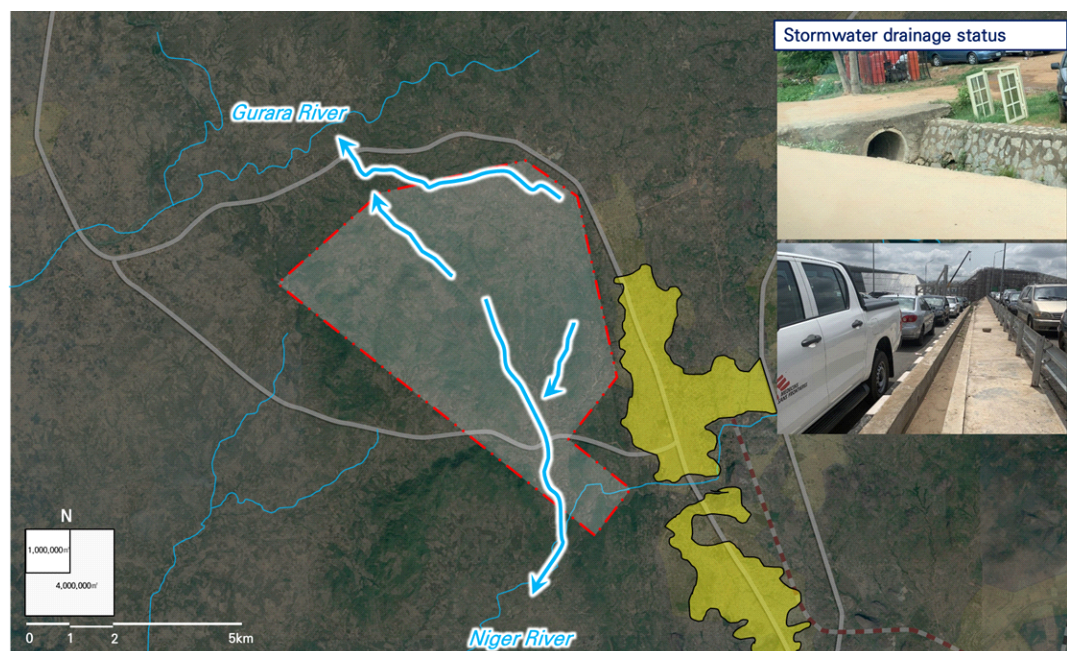
■ Wastewater Treatment Infrastructure

- More than 80% of the local residents live without water closets or use pits instead and this is causing serious environmental contamination and threatening the people's health.
- The absence of wastewater treatment infrastructure makes it necessary when devising a wastewater treatment plan to consider the implementation of a decentralized wastewater treatment system that utilizes integrated septic tanks. The decentralized system is needed to provide integrated treatment for each household. Consultations with the sewer office are also required.

■ Stormwater Drainage Status

- The typical stormwater drainage method used in the Suleja area releases stormwater to rivers through roadside trenches without treatment.
- The annual average precipitation is 1,220 mm and the Gurara River has its branches in the north and south of the project site. Draining stormwater through these branches needs to be considered.

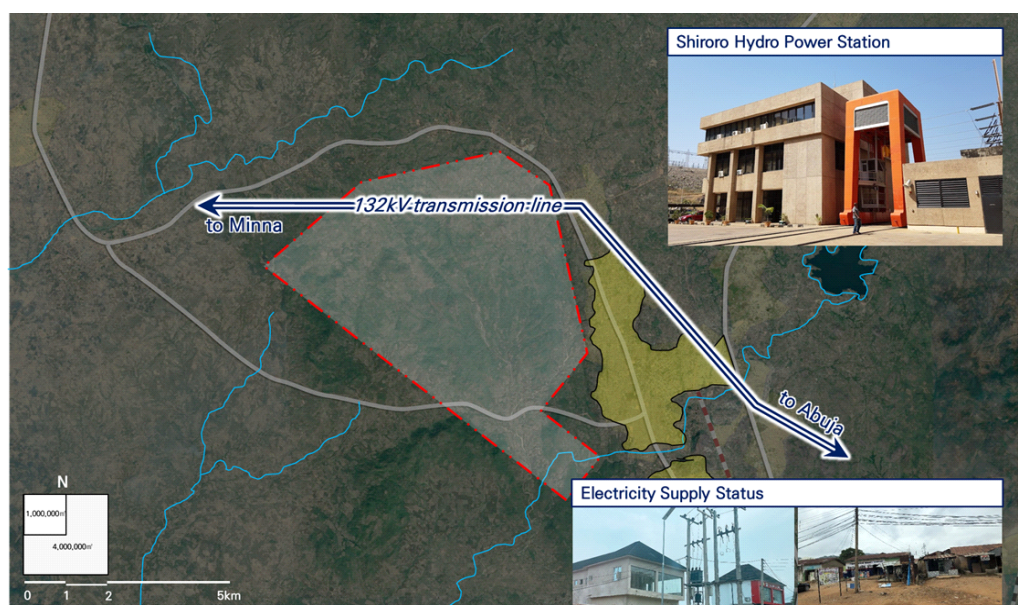
[Figure 2-7] Stormwater drainage status in Suleja region



■ Power Supply Infrastructure Status

- The 600 MW Shiroro Hydroelectric Power Plant supplies electricity of 132 kV to Minna, Suleja, and Abuja through transmission lines.⁷⁾
 - The current power distribution system is inefficient as more than 50% of electricity is lost during the transmission process. This calls for installation of new additional power facilities.
- The cooperative development project on electricity undertaken with the Japan International Cooperation Agency is making adjustments to the power supply plan. Taking this into account, consultations with the local electricity office need to check the possibility of utilizing existing transmission lines when drawing up a power supply plan for the project site.
- The current power lines are all on the ground, which undermines the city's appearance and may cause safety issues. The power lines therefore need to be buried into the ground.
 - Burying the lines into the ground is beneficial for supplying power to the heart of the city because more lines can be installed underground compared to overground. Buried lines are safer than overhead lines and will enhance the cityscape, providing a more pleasant, convenient urban environment.

[Figure 2-8] Power supply status in Suleja region



7) National Power System Development, 2019



7) Property Market Status

■ Scope of and Criteria for Market Research

- A housing market research was conducted on the project site and areas within a 50 km radius from it to analyze market conditions in Nigeria and Niger State.
 - Located in North Central, one of Nigeria's six zones, Abuja has a high population density and mobility as well as many undeveloped areas. This impedes collecting data needed for the market research.
 - For cases where collecting data on the areas within a 50 km radius was not feasible, estimates were made based on the housing market of the whole country.
- The subject of analysis was Nigeria's overall property market and Niger State's houses as well as retail, office, and industrial facilities.

■ Housing Market Conditions in Nigeria and Niger State

- Suleja in FCT Abuja has a population density higher than those of other communities and cities.
 - Considering Suleja's population density, the number of houses is significantly low. Insufficient public security is increasing preference for highly populated areas where population mobility is high.
 - For office and retail facilities, demand is rapidly growing for small and low price facilities while demand is continuously decreasing for large and high price facilities.

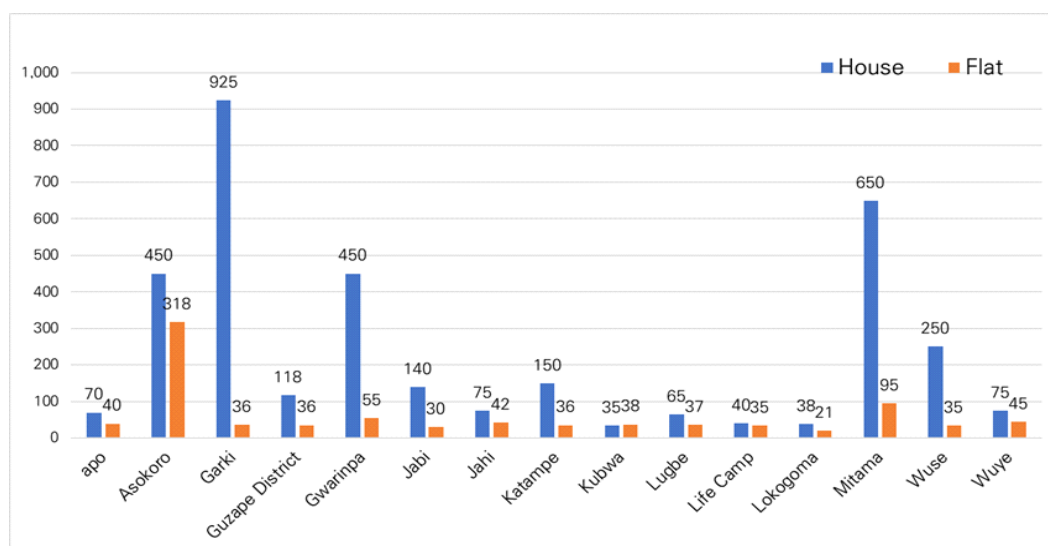
■ Residential Housing Market

- There are three types of residence in Nigeria: houses, flats, and affordable housing. Houses refer to single story houses, flats are in three or higher story buildings, and affordable housing means public housing. Demand for residential housing is continuously increasing.
- Market Analysis on Houses Around the Project Site
 - The average price of the houses around the project site is about 180 million ₦/m². The closer it is to Abuja CBD, the higher the price. In particular, houses in Guzape and Asokoro that sit southeast of Abuja CBD tend to be sold at higher prices. Meanwhile, houses in the central part of the city are generally at lower prices because most of them are old.

○ Market Analysis on Flats Around the Project Site

- Flat prices in Asokoro, a high-end residential area, are relatively high. Flats in other areas, on the other hand, cost around 41 million ₦/m².

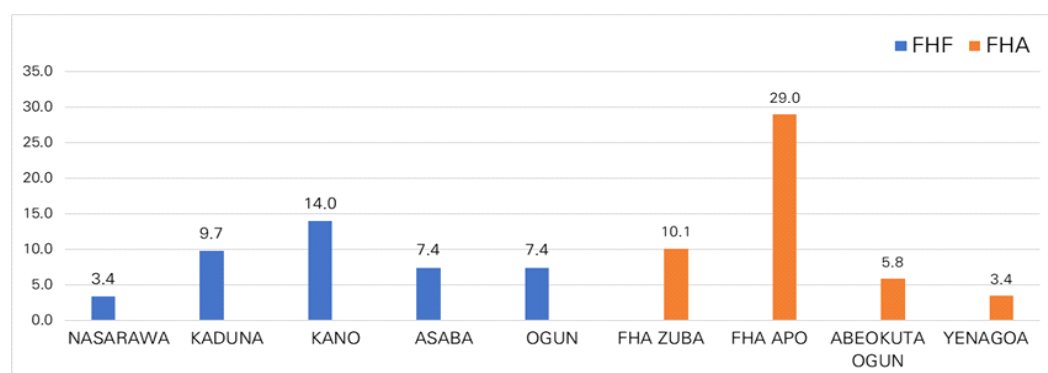
[Figure 2-9] House and flat prices around the project site (million ₦/m²)



○ Market Analysis on Affordable Housing Around the Project Site

- Affordable housing for low-income households in Abuja can be divided into two types based on its providers: Family Homes Funds (FHF)⁸⁾ and Family Housing Authority (FHA)⁹⁾.
- These homes cost around 10 million ₦/m², which is about half the price of a flat.

[Figure 2-10] Affordable home prices around the project site (million ₦/m²)



8) The private-led FHF's Affordable Housing Fund is a financial product that aims to support the development of up to 500,000 homes for low income people. Refer to Appendix.

9) The public-led FHA is Nigeria's housing authority completely financed by the Nigerian federal government. It has functions similar to those of the Korea Land and Housing Corporation (LH) in Korea. Refer to Appendix.



■ Market Conditions for Retail and Office Properties

○ Overview

- Unregistered businesses account for 92% of the total number of companies. They are reducing office areas to cut down on costs. Meanwhile, the shared office market's growth since 2018 has led to more construction of new business facilities.

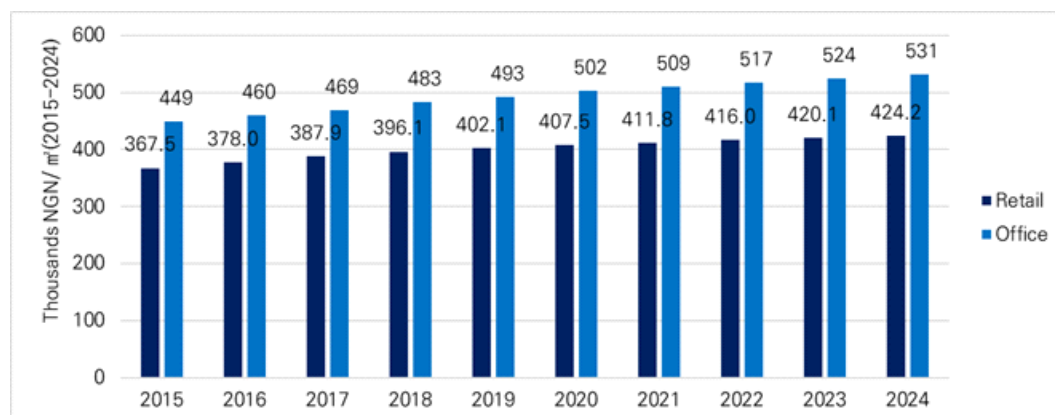
○ Retail Property Market

- The average construction cost of retail property recorded a 2.28% CAGR from 2015 to 2019, indicating a steady growth. The average construction cost of retail property is NGN 411,767₦ per 1m² in 2021 and it is expected to record a 1.01% CAGR between 2020 and 2024, hitting NGN 424,235₦ per 1m² by 2024.
- Most retail facilities are in a paradigm shift of moving from offline to online, which is lowering the demand for large-scale retail and multifunctional facilities. On the other hand, the demand for dark kitchens (online restaurants that only provide delivery service) is rising.

○ Office Property Market

- The average construction cost of business property (offices) recorded a 2.32% CAGR between 2015 and 2019, showing a steady upward trend. The average construction cost of office property is NGN 590,494₦ per 1m² in 2021, and it is forecast to see a 1.4% CAGR between 2020 and 2024, reaching NGN 530,940₦ per 1m² by 2024.
- Due to the pandemic, full reinvestment on internal equipment such as heating, ventilating, and air-conditioning systems is being reviewed. Since new buildings require such equipment, investment on construction is continuously growing.

[Figure 2-11] Average annual construction cost of per 1m² of retail and office property (1,000₦)

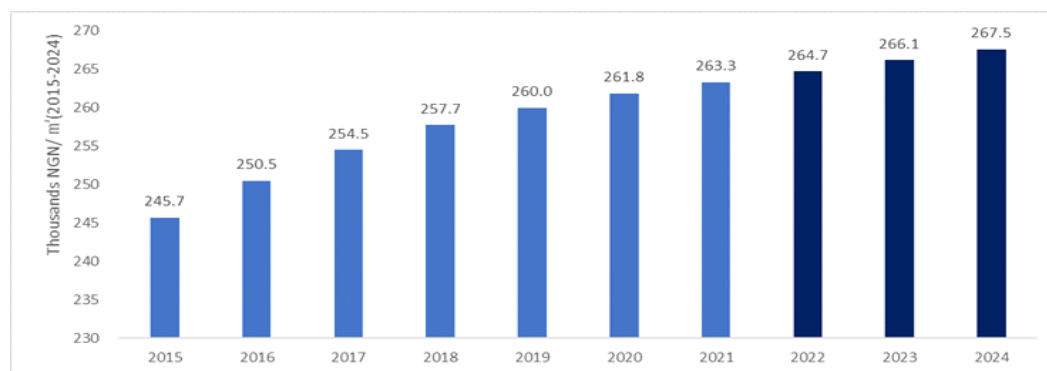


■ Market Conditions for Industrial Properties

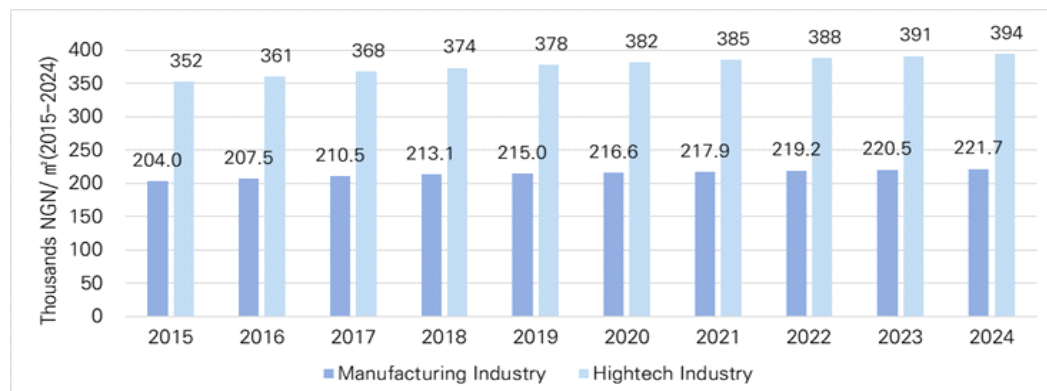
○ Overview

- The average construction cost of industrial property recorded a 1.42% CAGR from 2015 to 2019, showing a steady growth. In 2021, the average cost is at NGN 263,300₦ per 1m² and it is expected to see a 0.54% CAGR between 2020 and 2024, reaching NGN 267,549₦ per 1m² by 2024.
- The average construction cost of manufacturing facilities saw a 1.32% CAGR from 2015 to 2019, observing a steady increase. In 2021, its average cost is at NGN 217,915₦ per 1m² and it is expected to see a 0.59% CAGR between 2020 and 2024, hitting NGN 221,745₦ per 1m² by 2024.
- The average construction cost of high-tech industrial facilities recorded a 1.78% CAGR from 2015 to 2019, showing a steady growth. In 2021, the average cost is at NGN 385,278₦ per 1m² and it is expected to see a 0.79% CAGR between 2020 and 2024, reaching NGN 394,417₦ per 1m² by 2024.

[Figure 2-12] Average annual construction cost of per 1m² of industrial property (1,000₦)



[Figure 2-13] Average annual construction cost of per 1m² of manufacturing and high-tech industrial facilities (1,000₦)

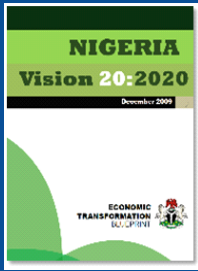
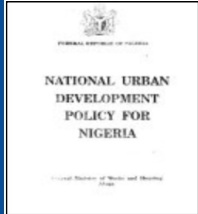




iii. Superordinate and Related Plans

1) Overview

- Nigeria's national plans were reviewed, including Nigeria Vision 2020, as well as Niger State's plans and policies.

 Nigeria Vision 2020	• Aims to become one of the world's top 20 economies by 2020 • Aims to generate a GDP of \$900 billion (\$4,000 per capita) • Three major goals are 1) to secure the people's safety and productivity, 2) to optimize key sources for economic growth, and 3) to foster sustainable socioeconomic development. • Key suggestions are as follows: - Strengthen the capabilities of manufacturing and high-value adding industries - Develop urban infrastructure for sustainable economic growth - Provide public housing to low-income households - Foster new industries that pursue oil independency
 National Urban Development Policy	• Drawn up in 2012, the national policy aims to "promote sustainable growth, encourage efficient and balanced urban development, and establish institutions that secure inclusive environments and improved quality of life. • However, political will, institutional capacity, and resources are insufficient to achieve proper policy implementation.
 Niger State Vision 2020	• Sets out to make Niger State one of three major economies in the country by 2020 • Looks to establish agricultural-based industrial strategies and provide a peaceful environment by creating quality jobs and wealth • Suggests specific strategies in areas such as agriculture, tourism, mining, traffic, energy, public health, education, water supply and wastewater management, information and communications technology, urban-rural development, and technological innovation • Major projects include building additional infrastructure for electricity, transportation, and others; improving business environment; and creating an Abuja-Minna economic corridor.
 Niger State Urban Policy 2020	• A policy developed by the Niger State Urban Support Program (NSUSP), the collaboration between Niger State and UN-Habitat prioritizes eleven policies. • Among the eleven policies, three policies can be applied to the Suleja New Town development. They are the first (balanced and integrated land development), the ninth (urban sustainability and responses to climate change including migration), and the tenth (smart city strategies) policies.

Source: Nigeria Vision 2020, Niger State Vision 2020, Niger State Urban Policy 2020

2) The Master Plan for Abuja the New Federal Capital of Nigeria (1979)

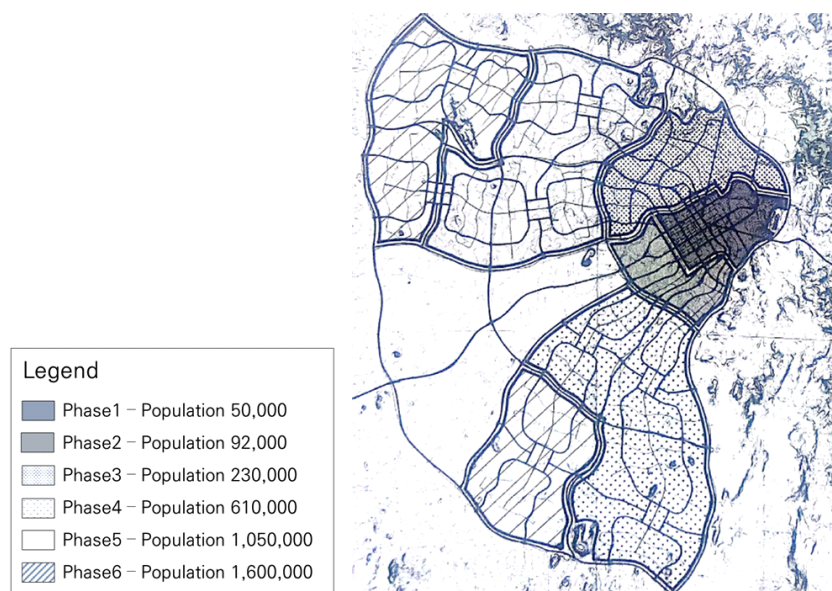
■ Overview

- In 1976, the complexity and expansion of Lagos, the former capital, led to the promulgation of decree number 6 where FCT Abuja was announced.
- In 1977, the federal government entrusted the International Planning Associates (IPA) with the planning rights to the Master Plan for Abuja. After the Master Plan was announced in 1979, Abuja was officially designated as the capital in 1991.

■ Development Strategies and Phased Plan

- A crescent-shaped spatial structure was designed based on two axes.
- With a goal of achieving a population density of 200 people/ha, the plan suggested to gradually implement phases 1 through 6 in a total area of 25,000ha. Phase 1 is a population of 50,000 and Phase 6 is a population of 1.6 million.
- In 2016, the population of Abuja was about 2 million and in 2019, it was estimated at 3.28 million.

[Figure 2-14] Phase plan of the master plan for Abuja FCT



Source: FCDA (1979) The Master Plan for Abuja the New Federal Capital of Nigeria



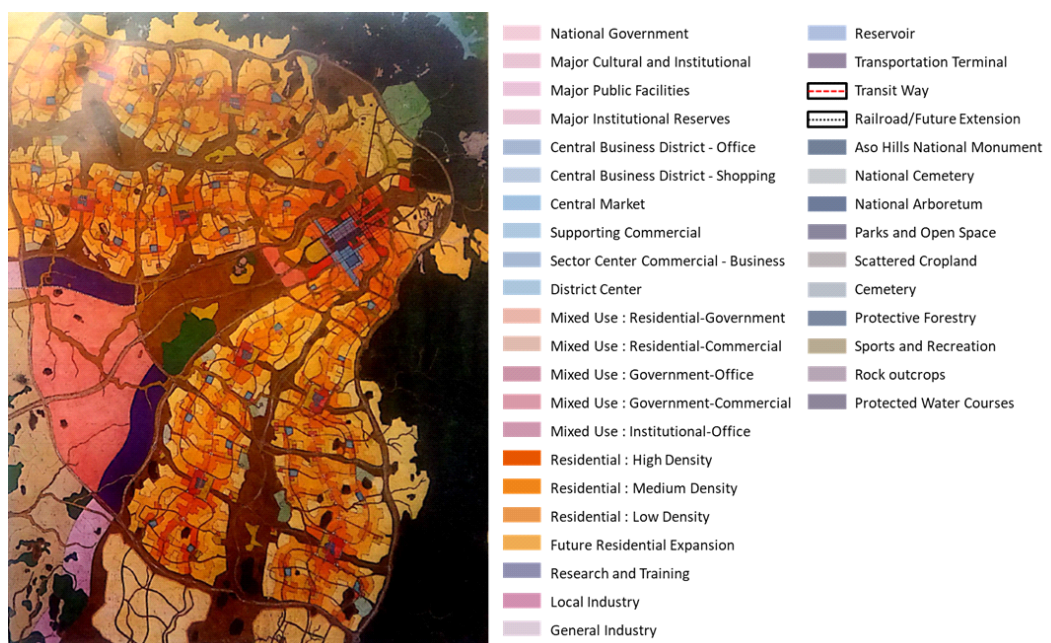
■ Urban Spatial Design

- Considering traditional Nigerian cities, the 1979 Master Plan suggested a new city design whose population density is about 200 people/ha.
 - Traditional Nigerian cities: A population density of 2,000 households per hectare and a neighborhood unit of about 3,000 to 5,000 people.
 - Detailed standards for Abuja: The living floor area of a detached house is 120 to 160 m² per household (land area of 1,000 to 1,500 m²), the living floor area of a low-income family is 30-60 m² per household (land area of 75 to 100 m²), the living floor area of an apartment is 100 m² per household (land area of 80 m²), and the living floor area of a single-person household is 13m² per household.
- Aso Hills is the city center's viewpoint, strengthening the capital's political symbolism.

■ Land Use Plan

- According to the land use plan of the Abuja New City, residential areas account for 49%, commercial areas 2%, industrial areas 4%, and parks and open spaces 33%.

[Figure 2-15] The master plan for Abuja FCT

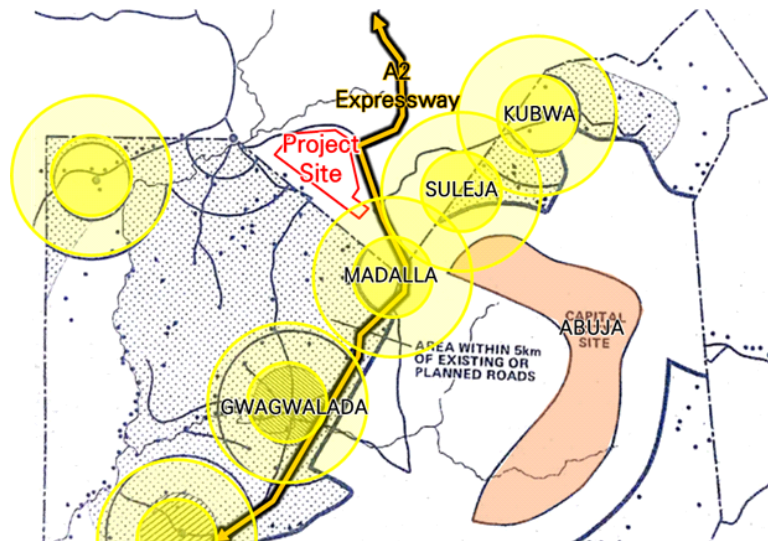


Source: FCDA (1979) The Master Plan for Abuja the New Federal Capital of Nigeria

■ Design for Abuja Metropolitan Area and Nearby Satellite Cities

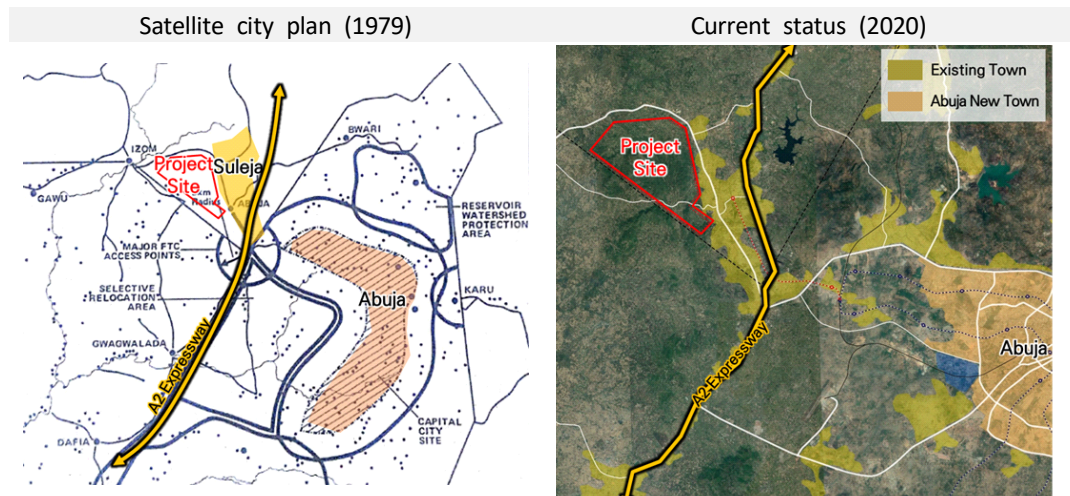
- With the A2 highway being the core traffic network that connects Abuja New City to all parts of the country, the plan is to develop cities along the A2 highway as planned satellite cities.
- The development of Abuja's rural areas is to be restricted in order to prevent urban sprawl. Instead, existing cities such as Suleja, Madalla, and Gwagwalada are to be developed as satellite cities. However, urban sprawl is a more serious issue than satellite city development.

[Figure 2-16] Abuja metropolitan spatial structure



Source: FCDA (1979) The Master Plan for Abuja the New Federal Capital of Nigeria

[Figure 2-17] Satellite city plan for Abuja FCT and current status



Source: FCDA (1979) The Master Plan for Abuja the New Federal Capital of Nigeria



3) Suleja Master Plan (1987)

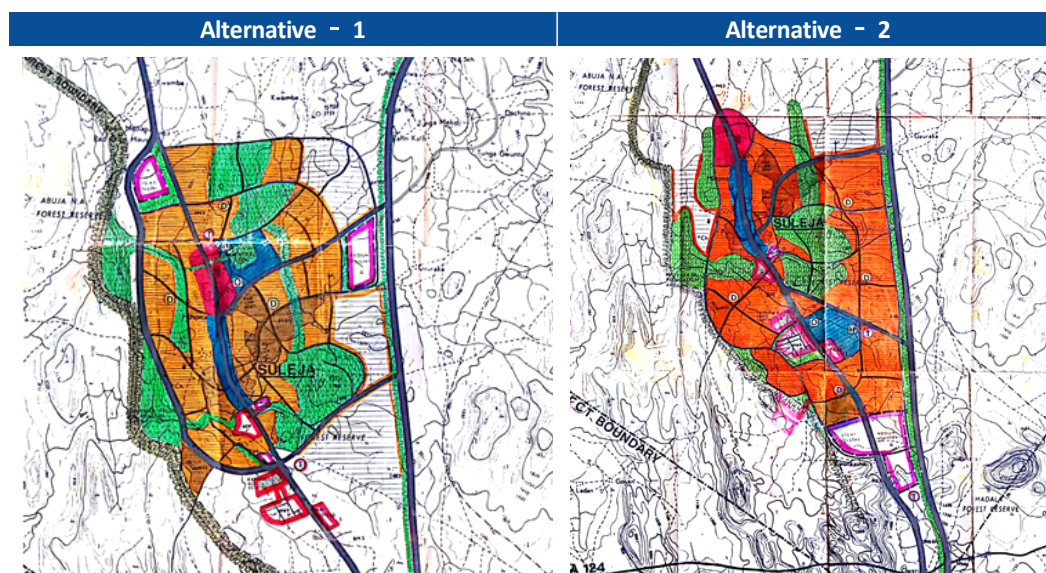
■ Overview

- A satellite city to the capital Abuja, Suleja is a place to which numerous workers commute. In 1987, 61.7% of the Suleja population had their birthplaces other than Suleja, which indicates that the presence of the Abuja New City sparked a rapid inflow of people from other places.
- Suleja has its role highlighted as a neighboring city of Abuja and it therefore needs greater infrastructure that could underpin urban development in the future such as a transportation system (e.g. a ring road in Suleja), water supply and wastewater management, electricity, telecommunication, and drainage facilities.

■ Content of the 1987 Master Plan

- A residential plan with an average population density of 60 people/ha was devised, and large-scale commercial facilities as well as a heavy industrial complex were planned near the A2 highway.
- A progressive development plan was proposed that spanned from 1987 to 2006. The development was arranged to take place in areas near traditional cities first, gradually followed by the southern area near Abuja and those along the A2 highway.

[Figure 2-18] Land use plan of Suleja master plan



Source: Suleja Master Plan (1987)

4) Suleja New City Master Plan (1989)

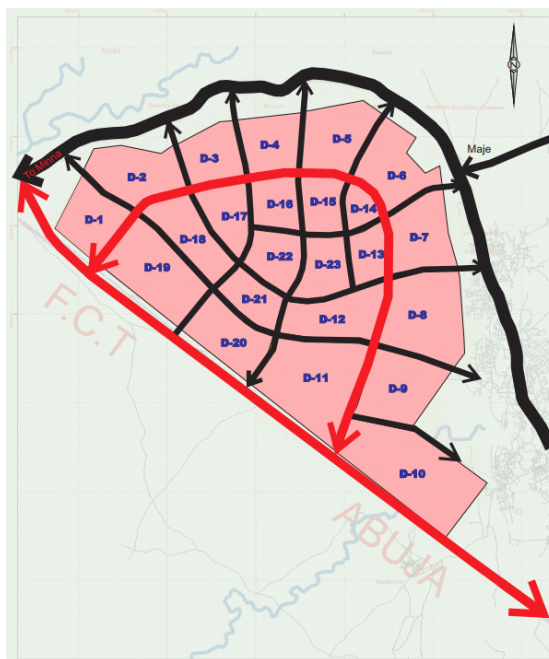
■ Suleja Development Goals

- Improve economic connections between Suleja and Abuja
- Ensure its role as a residential area for workers commuting to Abuja
- Bolster its function as a commercial and industrial center along the A2 highway

■ Content of the 1989 Master Plan

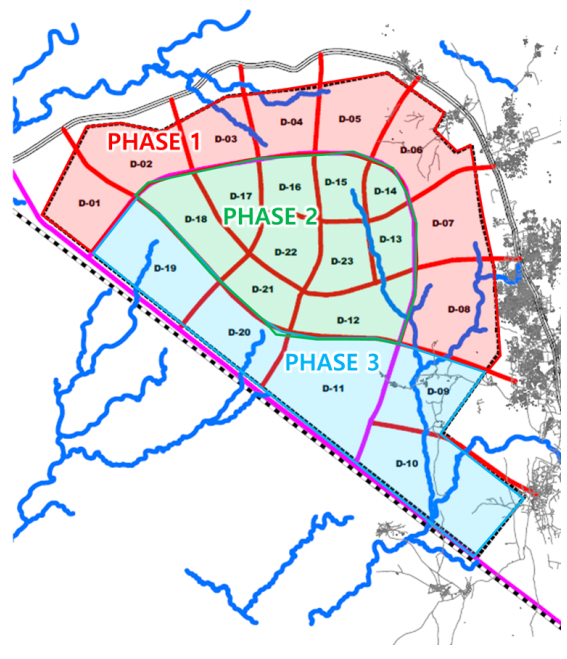
- Boost the connection between Abuja and Suleja with the A2 highway
- Expand the south-west growth axis for new urbanization
- Absorb youth and adult population and develop satellite cities based on the southern growth axis
- Secure budget for services as well as for amenity and infrastructure constructions
- Develop infrastructure such as water supply and wastewater management facilities, power transmission lines, and drainage systems to underpin the expansion of the north-south axis

[Figure 2-19] Structure of Suleja New City



Source: Suleja New City Master Plan(1989)

[Figure 2-20] Phase plan of Suleja New City



Source: Suleja New City Master Plan(1989)



Land Use Plan

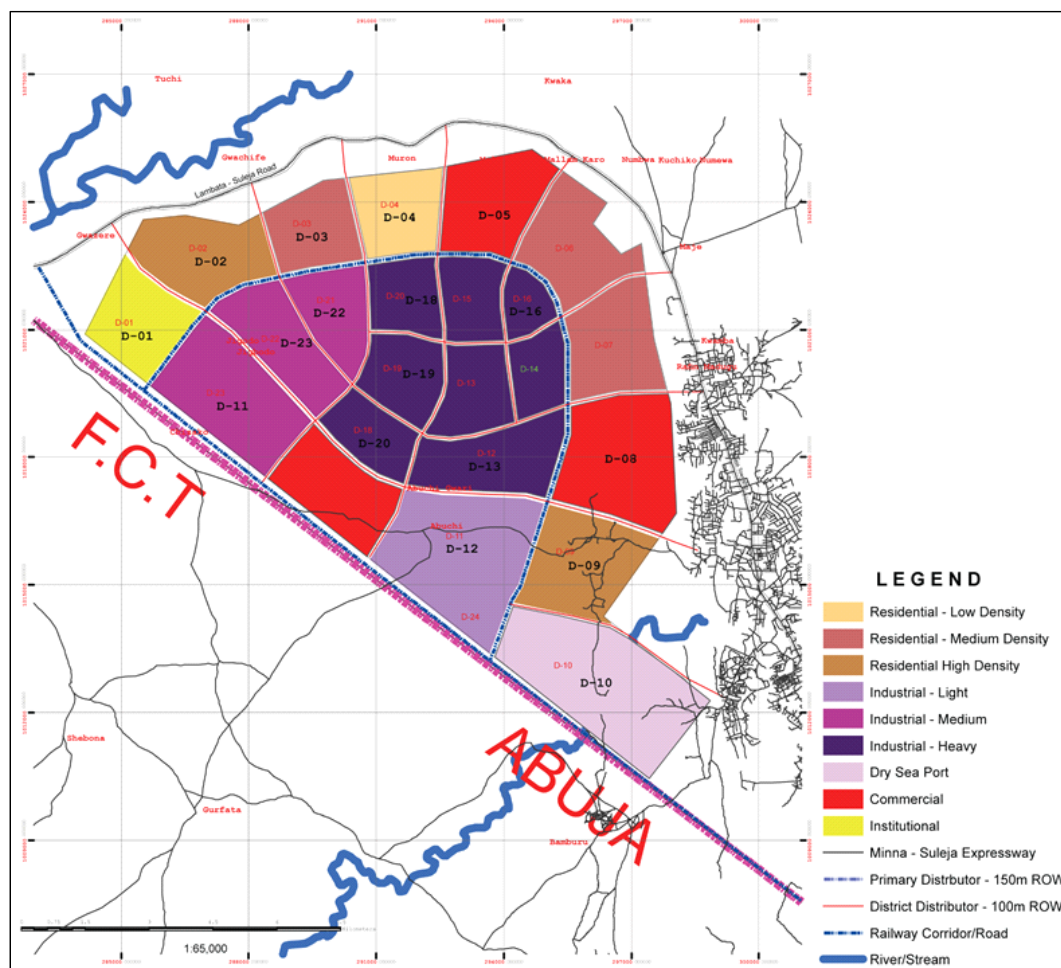
- The land use plan of Suleja was prepared as follows: residential areas (30-40%), open spaces (12-18%), commercial and public areas (6-10%), industrial areas (8-10%), education and health (10-12%), and roads (20-25%).

[Table 2-7] Land use plan of Suleja New City

Land Use Type	Area (ha)	Distribution (%)
Residential Area	1,370.5	60
High-density	342.6	15
Medium-density	685.3	30
Low-density	342.6	15
Public Area	228.4	10
Commerical Area	68.5	3
Leisure and Open Space	159.9	7
Ring Road	456.8	20
Total	2,284.2	100

Source: Suleja New City Master Plan (1989)

[Figure 2-21] Land use plan of Suleja New City



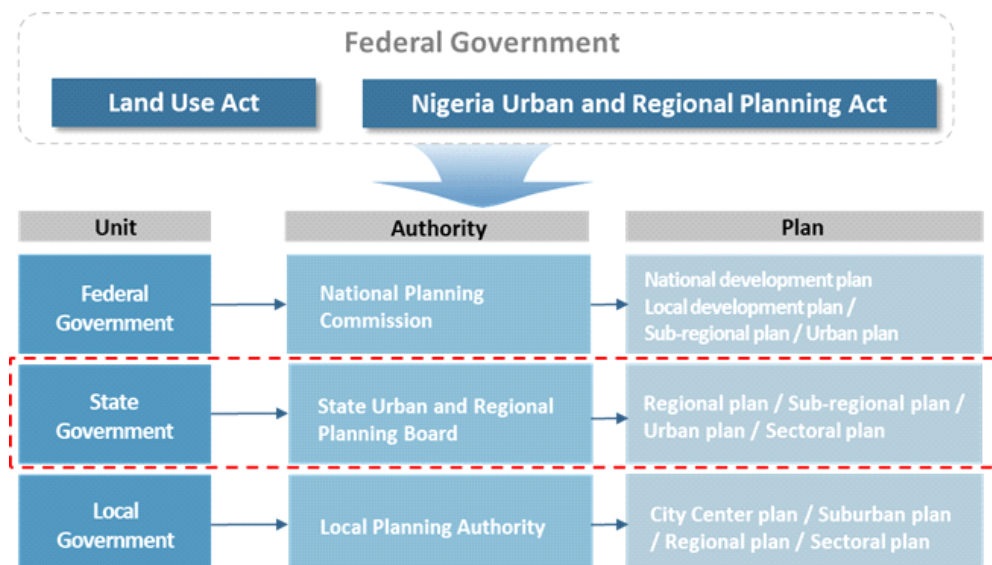
iv. Nigerian Law and Policies

1) Key Statutes Related to Urban Development

■ Overview

- In regards to urban planning in Nigeria, the Land Use Act (1978) and the Nigeria Urban and Regional Planning Act (1992) are the most important.
 - The Land Use Act is about land possession and land management. The Nigeria Urban and Regional Planning Act deals with planning procedures and administrative institutions.
 - Other than the two aforementioned Acts, there are regional control manuals and state policies.
- According to the key statutes, federal, state, and local governments have to control urban planning in their respective jurisdictions and establish institutions such as a State Urban and Regional Planning Board and a Local Planning Authority.
 - However, due to inadequate administrative capacity and other reasons, no state has its board established except for Lagos as of 2015.
 - This impedes state and local governments from managing details and specifics of urban planning.

[Figure 2-22] Planning system in Nigeria





2) Nigerian Urban and Regional Planning Act (1992)

■ Overall Significance

- The Nigerian Urban and Regional Planning Act deals with development plan drafting, its action plan procedures, development control, land acquisition, compensation, and others. Legislated in December 1992, it consists of six chapters and 92 sections.

■ Urban Planning Types

- Nigeria is creating urban plans according to government levels as follows:

[Table 2-8] Nigerian urban planning system

Level	Urban Planning System
Federal	national development planning > regional planning > sub-regional planning > urban planning > sectoral planning
State	regional planning > sub-regional planning > urban planning > sectoral planning
Local	town planning > rural area planning > regional planning > sectoral planning

Source: Nigerian Urban and Regional Planning Act (1992)

■ Establishment of Development Plan

- A developer, may it be private or public, has to submit a plan, design, project drawings, and other information to apply for a development permit. An approval from the development management department is required to begin development.
- A development plan must be written by registered (licensed) architects, town planners, and engineers. Environmental impact documents have to be attached when a plan involves the following:
 - A residential area greater than 2 ha; a four or higher story building or a total ground area of 5,000 m² or more in business and industrial areas; and major amenities

■ Development Plan Approval

- Development control departments (DCDs) respective to federal, state, and local governments have to make a decision on approval or disapproval within three months from the submission of a plan and the decision has to be notified by paper.

- DCDs may disapprove an application if:
 - it does not comply with previously approved plans.
 - it is considered that there is a facility not included in the physical plan but expected to exert a large impact on local community environment, facilities, and residents.
 - it is considered that the plan includes a facility harmful to local residents.
- DCDs may postpone an application if:
 - it is considered that there is a need for a supply of public infrastructure.
 - it is considered that there is a need for commercial facilities.
 - it is considered that there is a need for social facilities and leisure and community facilities.
 - it is considered that payment has to be made to supply the above facilities.
- A development permit is valid only for two years after the approval notification, and if development could not begin within two years, reapproval from DCDs is required.

■ Establishment and Roles of the Urban Planning Council

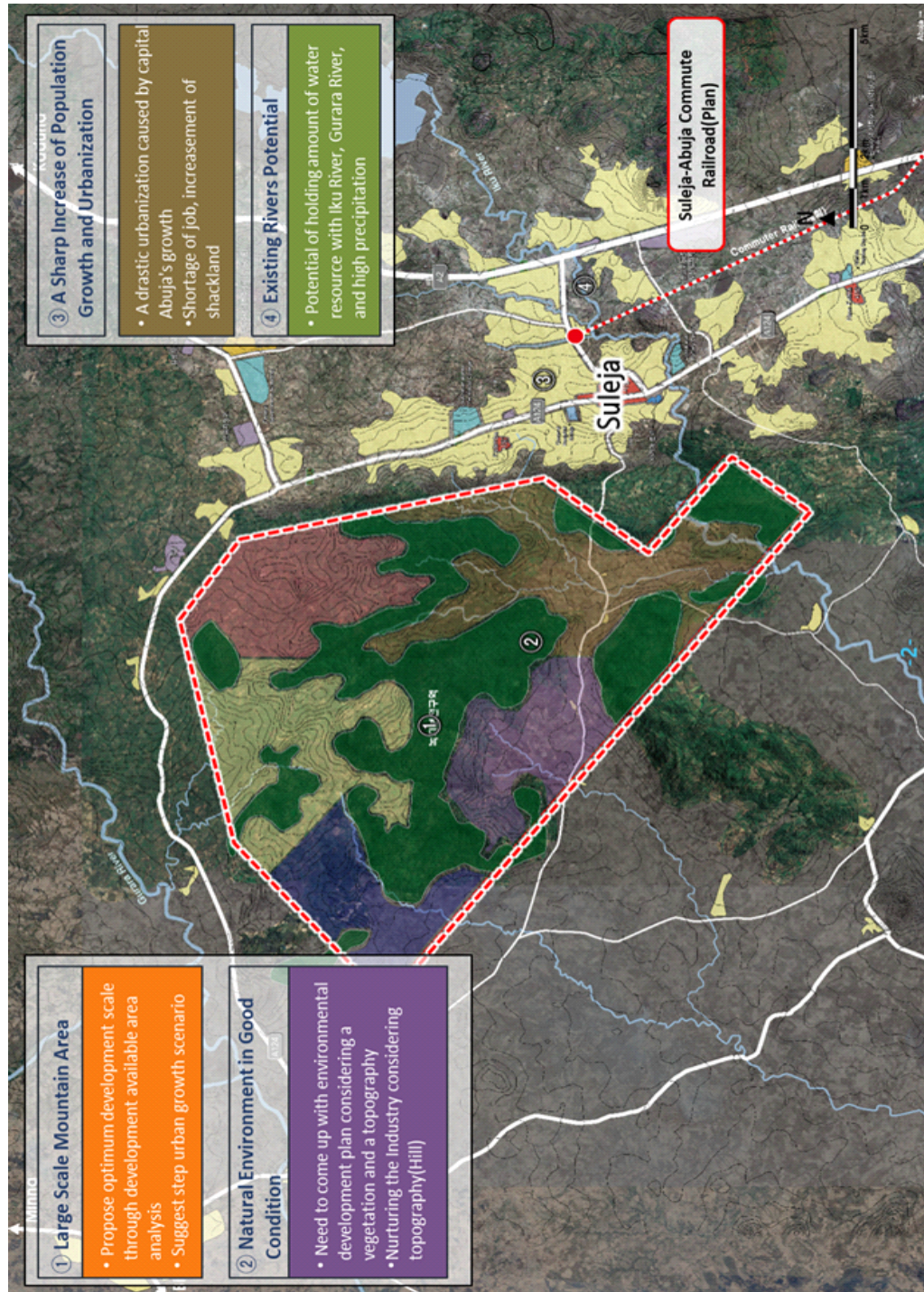
- The urban planning council is composed of a chairman, experts (one from each field and ministry), and ten representatives of the federal capital Abuja.
 - One expert from each field: urban planning, architecture, civil engineering, land investigation, law, real estate investigation, etc.
 - One representative from each ministry: Labour and Employment; Works and Housing; Agriculture and Rural Development; Finance; Budget and National Planning; Industry, Trade and Investment; Information and Culture; Mines and Steel Development; Environment; Transportation; Communication; Power; etc.
- The council performs the roles listed below:
 - Establish national policies for urban and regional plans.
 - Establish and execute national physical development plans, regional plans, sectoral plans, etc.
 - Establish and manage urban and regional plans and conduct relevant studies.
 - Supervise and monitor national physical development plans, exercise control over development, and promote technical and economic cooperation, etc.



v. Comprehensive Condition Analysis

1) Map of Comprehensive Condition Analysis

[Figure 2-23] Map of comprehensive analysis for the Suleja New Town



2) Comprehensive Condition Analysis

[Table 2-9] Table of comprehensive status analysis

Category	Key Points
Population	- Suleja's total population was about 300,000 in 2016 and over the last 20 years, the population has almost doubled. - Its population density is 2,638 people/km², which is about seven times as many as the average density of Niger State (364 people/km²). - After its designation as a capital, Abuja is seeing a rapid growth in population due to workers commuting to Abuja. - The population by age group shows that the 60 or above age group accounts for 2.4% and the 0-19 age group is responsible for 55.2%.
Nature	- Suleja has a savanna climate with a wooded environment. The year is divided into rainy and dry seasons. During the rainy season, the highest daily average precipitation is about 251mm, indicating potential flood risks. - Overall, it's located on the hills and they are used as agricultural land and pasture. - It has dramatic terrain variations and since 30% of the area is on a slope, steep erosions and ditches are frequently found.
Urban Development	- The central part of Suleja has a total area of 118.9km² and the proportion of its residential area is rapidly growing as a neighboring city to Abuja. - Most of the land is currently being used as farmland or pasture and the residential area accounts for about 26%, but its proportion is expected to reach 39% by 2035, which is 1.5 times greater compared to 2015.
Socio-economic Status	- Suleja's economically active population is about 180,000, higher than most of nearby areas, but more than half of its households have irregular income. - Most of them earn a monthly income of 60,000NGN (approx. KRW 168,000) or less. - Major industries in Niger State in order of proportion were retail trade (55%), agriculture (18%), and other services (12%). A survey of Suleja residents showed that the agriculture industry employed the largest number of workers.
Traffic and Infrastructure	- Suleja is located around the A2 highway and A124 highway. - Insufficient wastewater and stormwater treatment facilities call for additional infrastructure. It is necessary to check with relevant organizations through consultations the possibility of utilizing the existing infrastructure when developing the new town.



Setting Development Directions

-
1. Development Goals and Directions
 2. Formulating Development Concepts
 3. Designing Spatial Structures



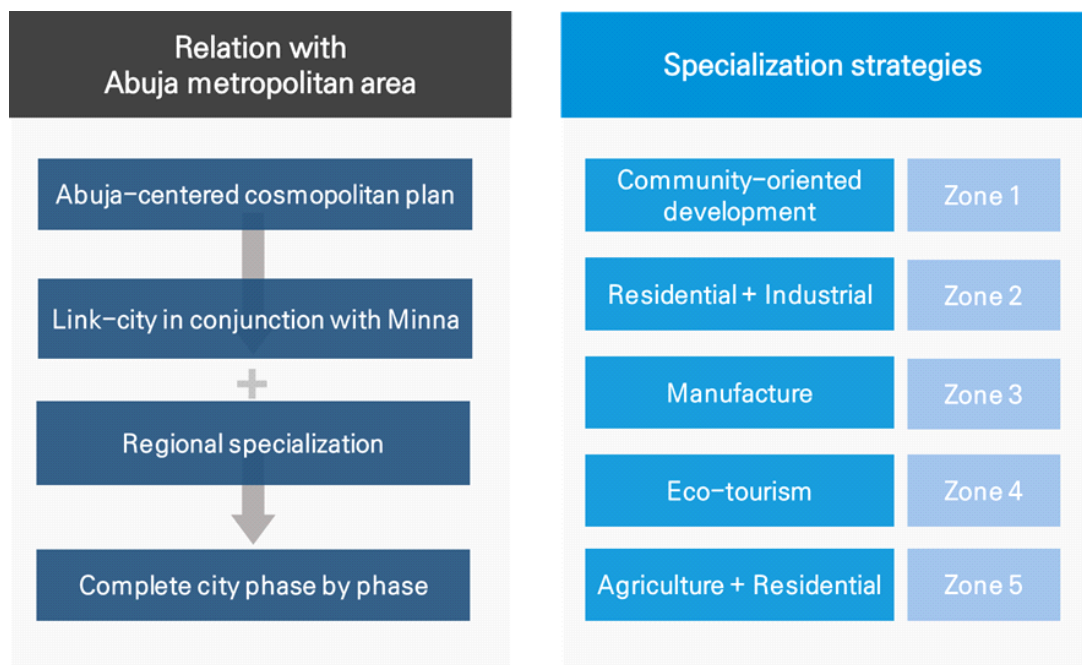
III. Setting Development Directions

i Development Goals and Directions

1) Basic Directions

- In addition to the Abuja-centered metropolitan plan, we plan to construct five urban zones in the Suleja New Town and promote urban development towards a complete city phase by phase connecting to Minna.
- Spatial structures for Suleja and Minna will be designed with the Abuja metropolitan area being the center. A shared growth model that divides functions between districts is suggested to encourage balanced regional development.
- Strategies that involve the development of the Suleja New Town are devised to achieve balanced regional growth and regional specialization.

[Figure 3-1] Basic directions for Suleja New Town development





2) Development Goals

■ Residential Multifunctional City

- Develop a self-sufficient, multifunctional city
 - Develop an independent new town that goes beyond its function as Abuja's bed town and offers a plethora of activities
 - Build a comfortable living environment for users and residents that offers accommodation, education, businesses, shopping experiences, etc.
 - Contribute to the unity of residents by promoting balanced regional development as well as shared development between existing and new cities

■ Environment-Friendly Ecological City

- Build an eco-friendly environment where humans and nature harmonize
 - Create open spaces such as parks and green spaces to offer a pleasant environment
 - Preserve the existing natural landscape as much as possible to build a sustainable ecological city

■ Futuristic Smart City

- Build a futuristic smart city which offers residents a safe and convenient lifestyle
 - Apply smart technologies to address issues such as energy, safety, and waste to provide a convenient living environment
 - Expand transportation infrastructure to enhance connectivity with Abuja and Niger State and utilize competent ICT to provide convergent service

■ Sustainable Industrial City

- Specialize traditional industries and foster new industries to create future opportunities
 - Utilize and specialize traditional industries to discover new industries
 - Attract educational institutions such as science and technology intensive colleges to create a knowledge-based urban environment



ii Formulating Development Concepts

1) Survey of Relevant Departments in Niger State

■ Overview

- Survey Dates : Nov. 10, 2020 – Nov. 30, 2020 (about 3 weeks)
- Survey Method : Online survey via SurveyMonkey
- Survey Subjects : Niger State and local government officials
- Respondents: 50 people
- Process
 - Nov. 8, 2020: Distributed online survey questionnaires
(<https://ko.surveymonkey.com/r/NewtownNigerState>)
 - Nov. 10, 2020 – Nov. 30, 2020: Conducted the survey
 - Dec. 08, 2020 : Analyzed the result of the survey and determined development directions

Online Survey for Newtown Master Plan in Niger State, Nigeria

2020년 12월 7일 월요일

Powered by SurveyMonkey

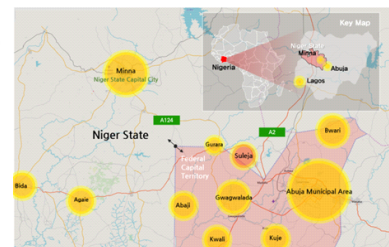
Online Survey for Newtown Master Plan in Niger State, Nigeria

Purpose of Survey

Niger State, which are adjacent to FCT region, is growing in demand for housing due to rapid urbanization, but still lack of housing units and urban infrastructure. Therefore, the government of Niger State is seeking to provide housing and urban infrastructure, foster strategic industries, and create job opportunities for local residents by creating a new city where is within the Niger State nearby FCT region.

The objective of this On-line survey is to establish development concept & direction of Newtown in Niger State and to meet the demand in relation to the [Preparation of Newtown Master Plan in Niger State Project] executed by Korean government as an Official Development Assistance (ODA) project.

We would like to hear your opinions through this Online survey and use them as baseline data to establish a development concept of Newtown. It would be very grateful if you respond with sincerity. In addition, we promise that this survey is used only for statistical purposes, so that matters belonging to personal confidentiality are strictly protected and will not be used for any other purpose. Thank you.

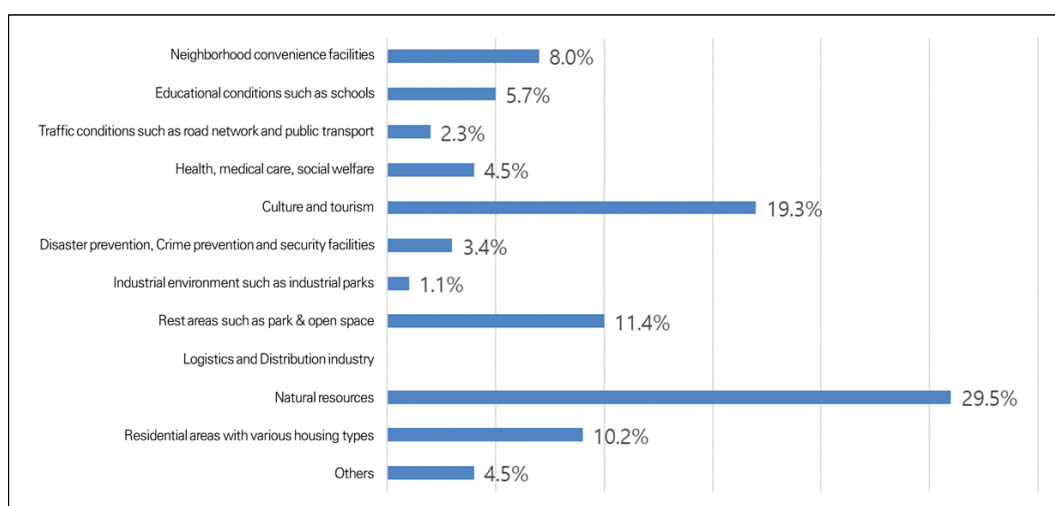




■ Key Responses

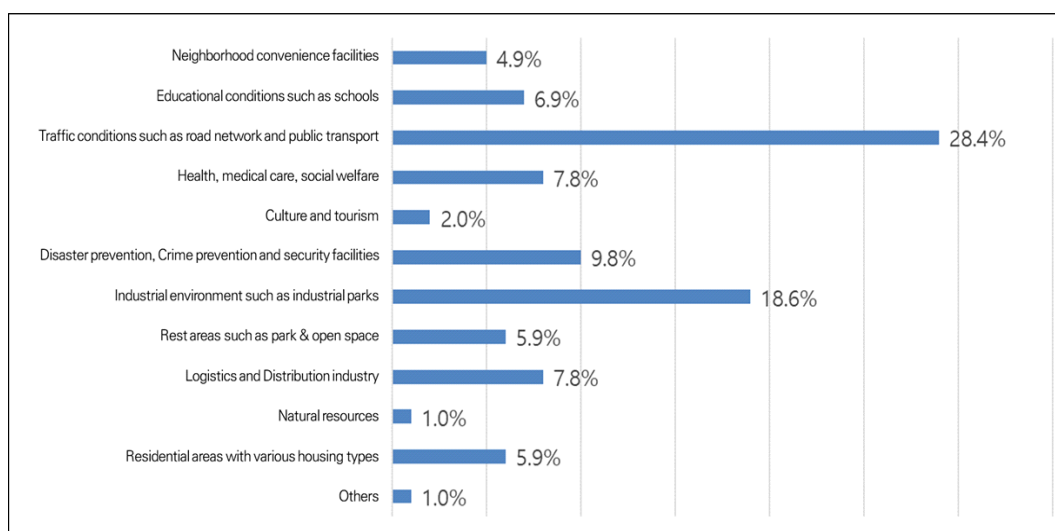
○ What are the strengths about Niger State compared to other states?

- Natural resources (29.5%)
- Culture and tourism (19.3%)



○ What are the weaknesses of Niger State compared to other states?

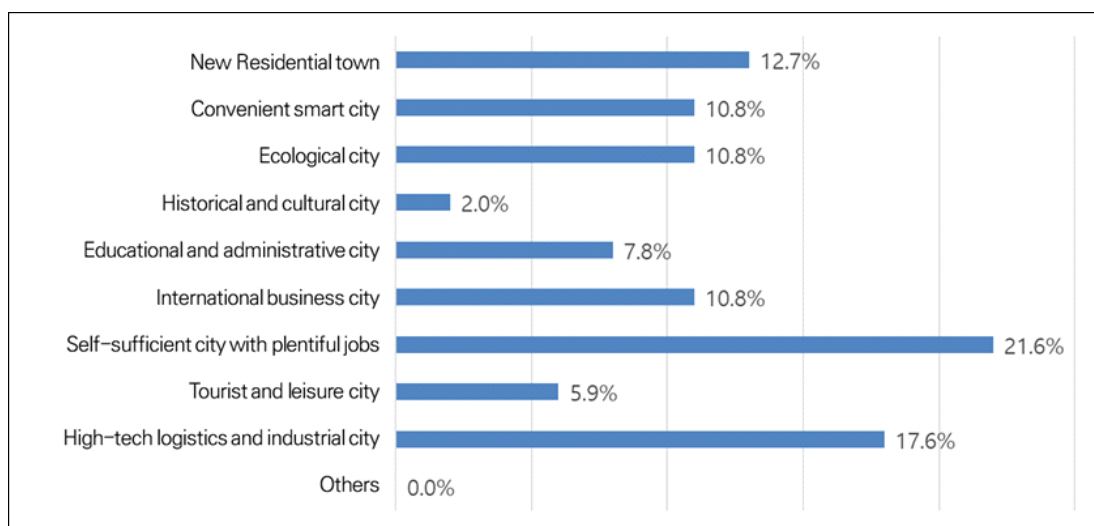
- Traffic conditions such as road network and public transport (28.4%)
- Industrial environment such as industrial parks (18.6%)





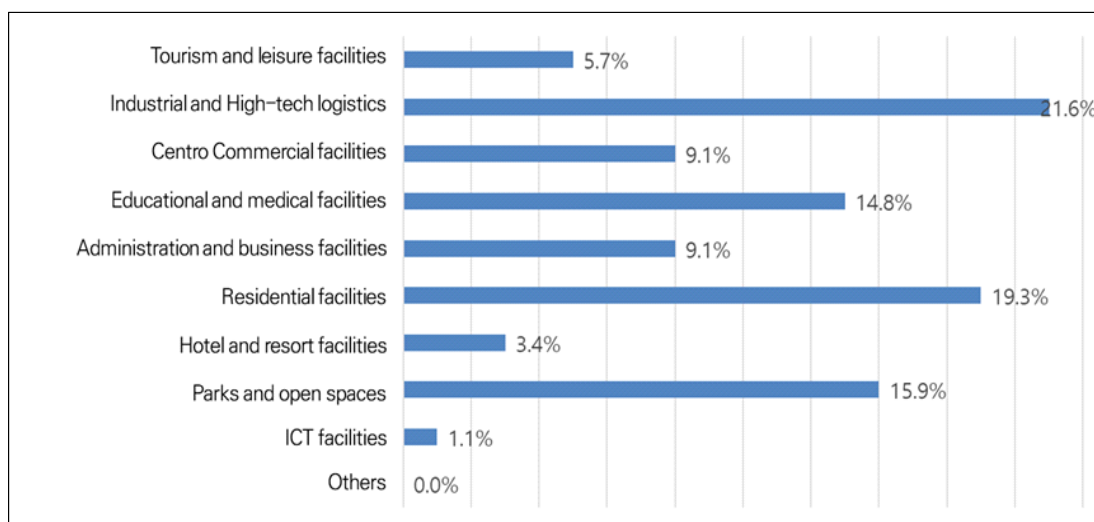
○ In what direction should Niger State's new town be developed?

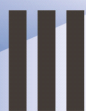
- Self-sufficient city with plentiful jobs (21.6%)
- High-tech logistics and industrial city (17.6%)



○ Which facilities would you like to install in Niger State's new town?

- Industrial and high-tech logistics (21.6%)
- Residential facilities (19.3%)
- Parks and open spaces (15.9%)

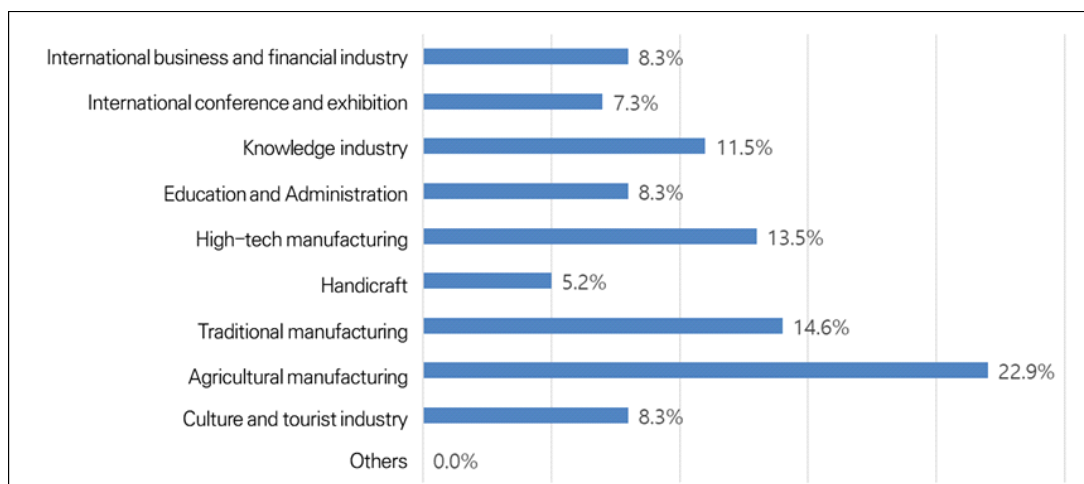




Setting Development Directions

○ Which industries should Niger State be fostering?

- Agricultural manufacturing (22.9%)
- Traditional manufacturing (14.6%)
- High-tech manufacturing (13.5%)



■ Drawing Survey Conclusions

- The strengths of Niger State include bountiful natural resources and the potential of cultural and tourism industries related to them. Among its weaknesses were transportation and industrial conditions.
- For transportation, low public transport accessibility was the biggest concern and the enhancement of the road system was also proposed.
- Respondents said that job creation is important to urban economy vitalization and that it is important to build industrial complexes by establishing regionally specialized industries and attracting strategic industries.
- In regard to planning directions, a self-sufficient town with plentiful jobs and an industrial town with high-tech logistics capabilities were thought to be the most appropriate. It showed that logistics and industrial facilities, residential facilities, and parks and open spaces need to be established.
- Concerning the attraction of industries, agricultural product processing that utilizes traditional agriculture was deemed suitable, as well as high-tech and traditional manufacturing.



2) Development Concepts

■ Gateway City to the West of Abuja, the Capital of Nigeria

- Building the foundation for regional growth by linking the Abuja metropolitan area to the Minna economy

[Figure 3-2] Development concept



3) Development Strategies

■ Connecting Suleja and the Abuja metropolitan area

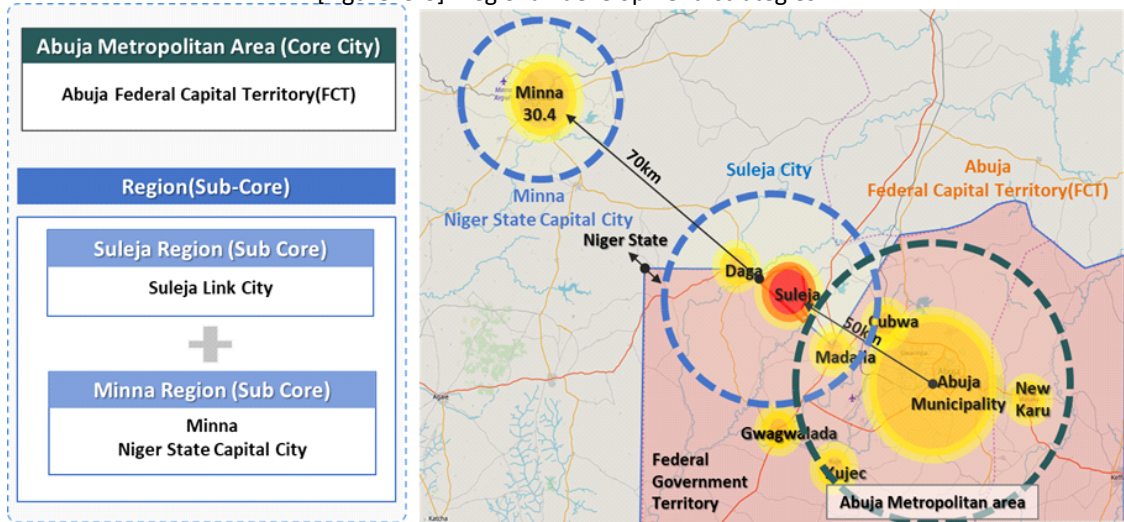
- Absorb housing demand from Abuja
- Build a public transport system between Abuja and Suleja to enhance accessibility and reduce traffic
- Support Abuja's administrative work and education research as well as attract strategic industries for the region

■ Connecting Suleja and Minna

- Build metropolitan transportation infrastructure between Minna and Suleja to improve accessibility

- Develop industrial complexes for new renewable energy and manufacturing to discover new growth engines

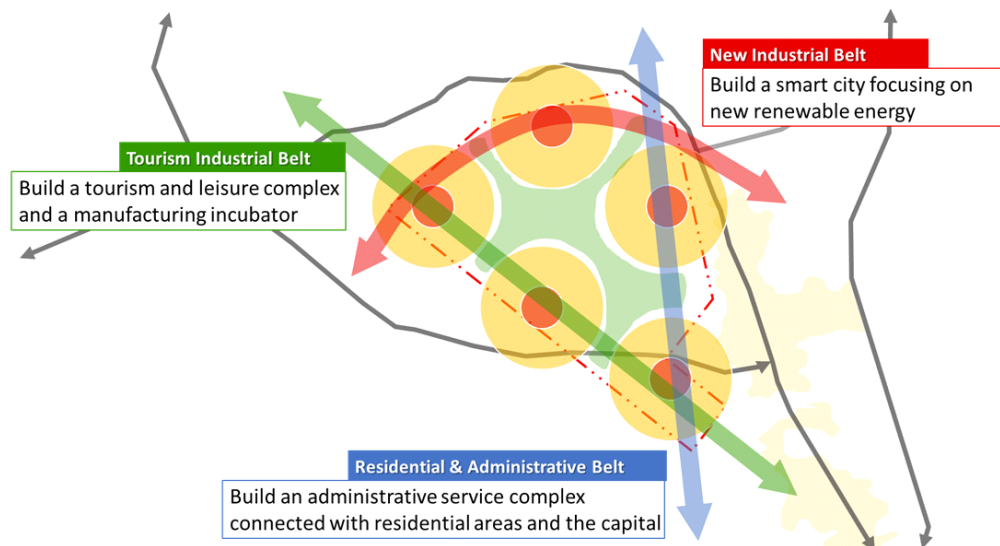
[Figure 3-3] Regional development strategies



■ Plan for Economic Development Belts

- New Industrial Belt: Build a smart city focusing on new renewable energy
- Tourism Industrial Belt: Build a tourism and leisure complex and a manufacturing incubator
- Residential and Administrative Belt: Build an administrative service complex connected with residential areas and the capital

[Figure 3-4] Plan for economic development belts in the Suleja region





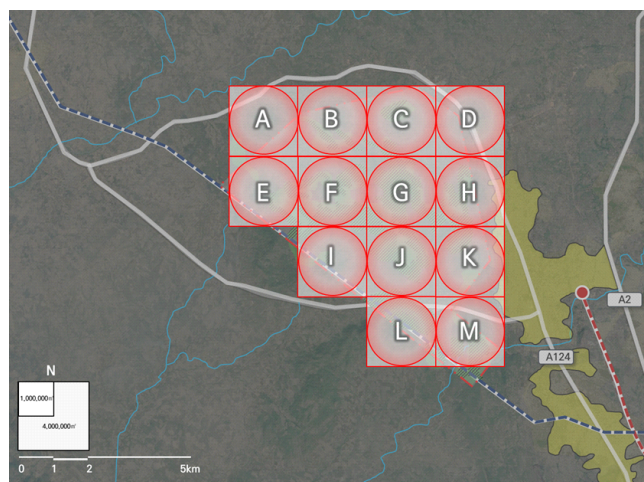
iii Designing Spatial Structures

1) Assessing Development Conditions

■ Determining Regional Districts

- Areas near Suleja and Gurara were subject to regional districts
- The area within a 5km radius from the project site's center was designated as the metropolitan development zone and the area within a 1km radius from the center was set as an urban impact zone considering its transportation and environmental impact.

[Figure 3-5] Determined regional districts



- 13 districts of 2km by 2km squares in the urban impact area, which is within a 1km radius from the center, were established in order to make the analysis more manageable.

■ Setting Assessment Criteria

- Among the assessment criteria for selecting the project site, balanced development, development feasibility, and environment were prioritized.
 - Balanced development was assessed based on the distance to the development growth axis and the distance to Abuja.
 - Development feasibility was assessed based on land use and transportation accessibility.
 - Environment was assessed based on the location of obstructions.

■ Comprehensive Assessment

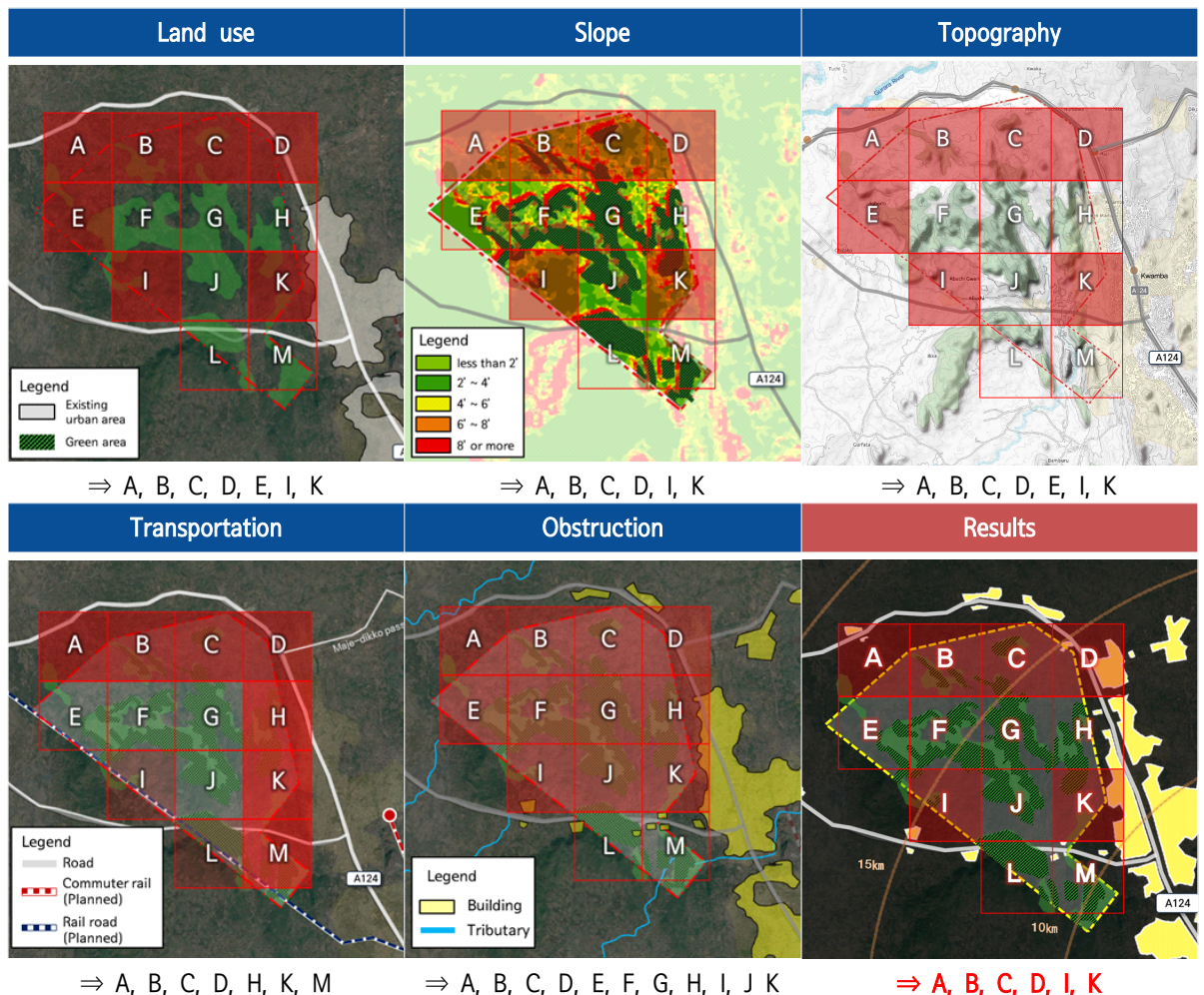
- Areas were selected within the entire subject location if they were in compliance with the project's goals and if their topographic conditions were satisfactory.



Setting Development Directions

- Areas were chosen if large-scale development was feasible, considering already developed areas and protected areas.
 - Areas were chosen if they were geographically central and symbolic within the metropolitan area.
 - Areas were chosen if they had decent accessibility to traditional built-up areas and nearby areas as well as infrastructure development feasibility.
- Areas were selected if they had appropriate land conditions with potential expandability. Preferred areas were where there were not many obstructions and where migration planning was viable.
- As a result, it was concluded that Districts A, B, C, D, I, and K are feasible.

[Figure 3-6] Comprehensive analysis





2) Designing Spatial Structures

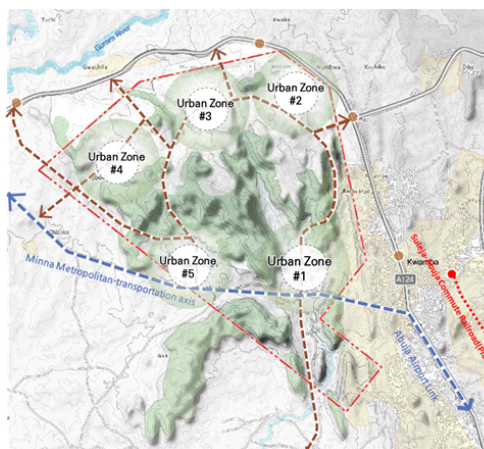
■ Basic Directions

- Introduce five urban zones within the feasible areas (Districts A, B, C, D, I, and K)
- Build a network of radial ring roads or radial roads which are modeled after the Korean road network
- Introduce various urban functions, considering the characteristics of each urban zone

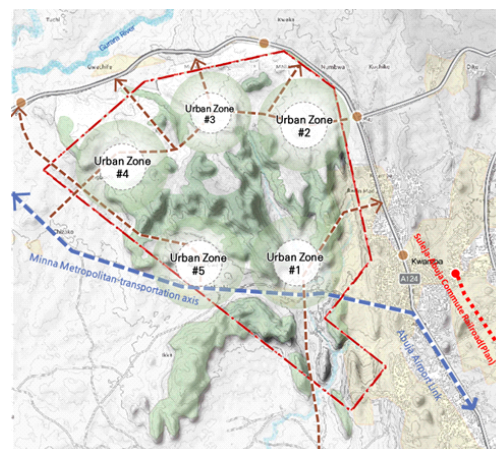
■ Spatial Structure Design (Drafts)

- Draft 1: Building a network of radial ring roads to enhance connectivity between urban zones
 - The existing mountainous terrain in the center will be preserved in pursuit of environment-friendly development.
 - Building a public transportation system that includes bus rapid transit (BRT) and light rail transit (LRT) along the loop roads is viable.
- Draft 2: Building a network of radial roads to improve accessibility to external arterial roads
 - Development that respects natural topography and needs a minimal number of structures can be environment-friendly and reduce construction costs but may undermine connectivity between urban zones.

[Figure 3-7] Spatial structure (Draft 1)



[Figure 3-8] Spatial structure (Draft 2)

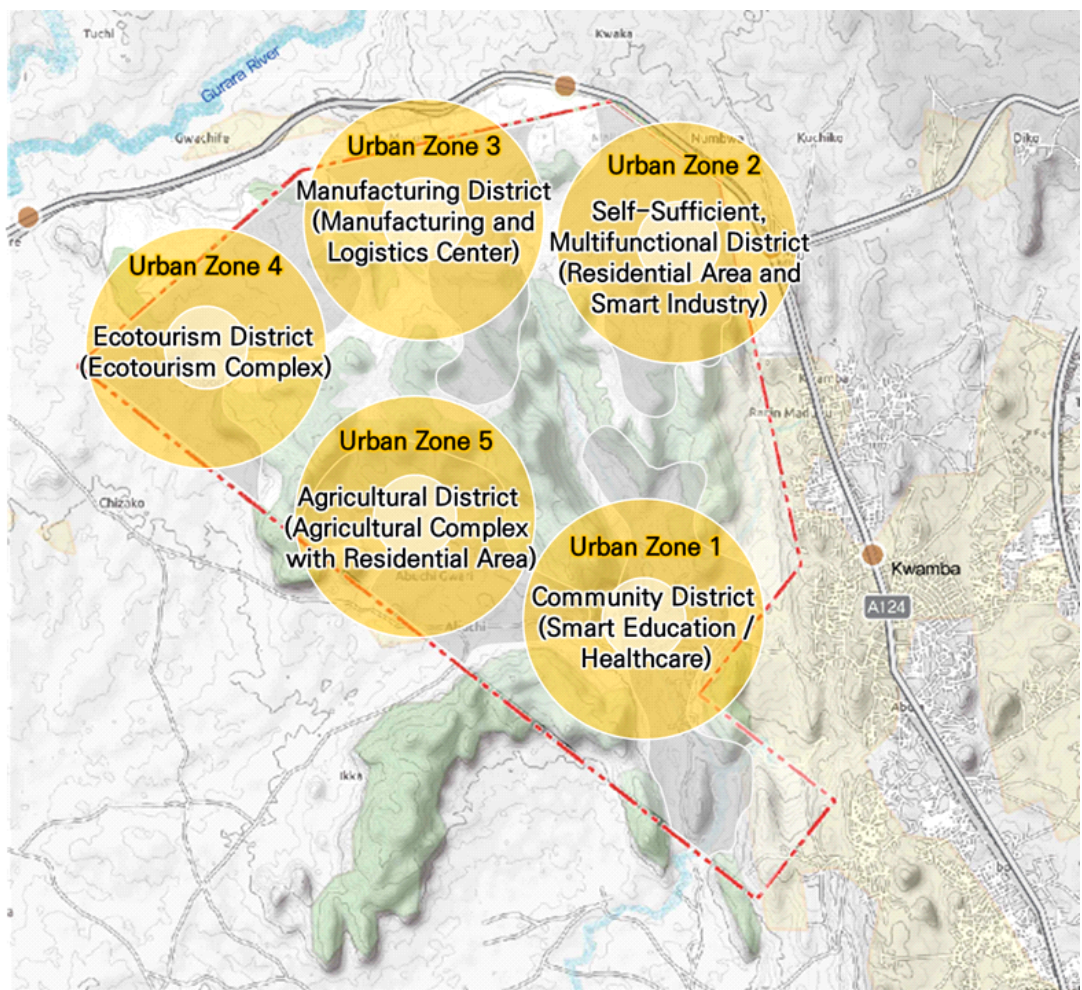


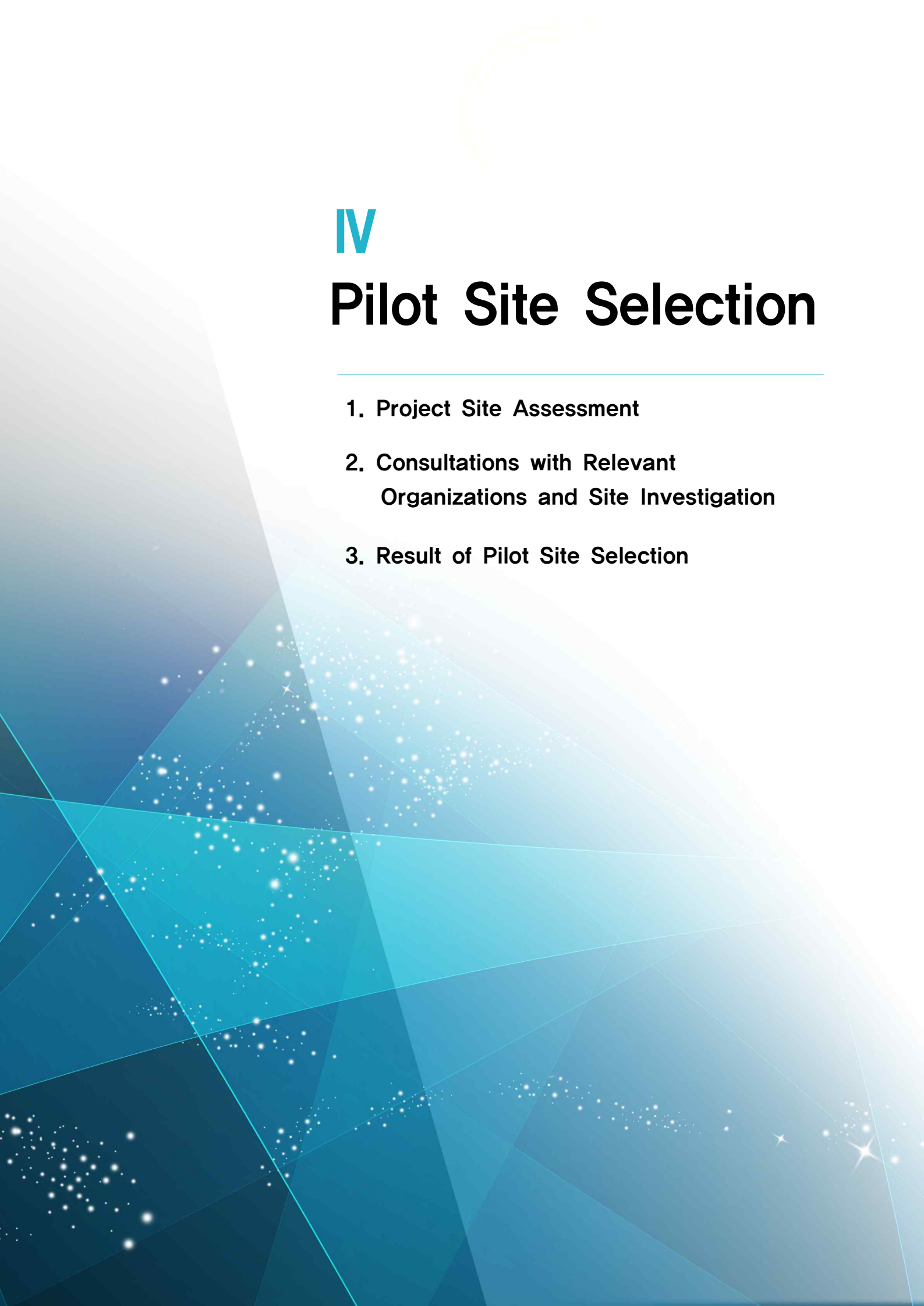


3) Urban Zone Plan (Draft)

- Formulate specialized urban strategies reflecting each zone's characteristics
 - Urban Zone 1: Community District (Smart Education and Healthcare Facilities)
 - Urban Zone 2: Self-Sufficient, Multi-functional District (Residential Area and Smart Industry)
 - Urban Zone 3: Manufacturing District (Manufacturing and Logistics Center)
 - Urban Zone 4: Ecotourism District (Ecotourism Complex)
 - Urban Zone 5: Agricultural District (Agricultural Complex with Residential Area)

[Figure 3-9] Concept for each urban zone





IV

Pilot Site Selection

1. Project Site Assessment
2. Consultations with Relevant Organizations and Site Investigation
3. Result of Pilot Site Selection



IV. Pilot Site Selection

i. Project Site Assessment

1) Assessment Overview

- Areas were proposed after being assessed that they can deliver functions as a new town in a way that they can contribute to population distribution of Abuja and Suleja as well as to balanced development of Niger State.
- Areas were proposed after being assessed that they can allow physical development of a certain size or greater and implementation of concepts such as green city and transit-oriented development (TOD).
- Feasible areas (urban zones) that had been chosen from the development feasibility analysis were assessed for their locational and natural factors to finalize the selection of a pilot site.

[Table 4-1] Site assessment process

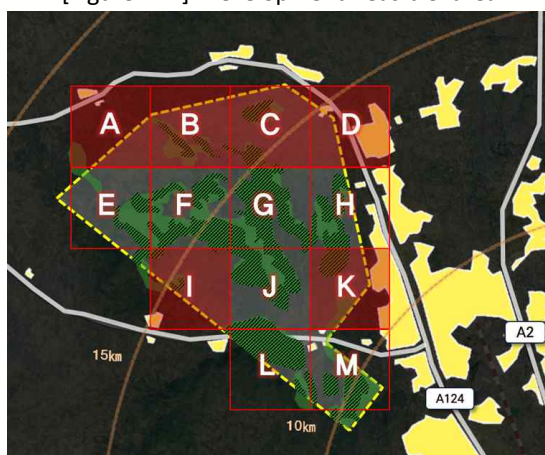
Determining the Area Scope	Limited the scope to areas near built-up areas of Suleja
▼	
Setting Assessment Criteria	Created criteria with categories such as physical, social, environmental, technical, and economic conditions
▼	
Assessing Feasible Areas	Made an assessment of areas based on 13 districts, and their urban, transportation, and environmental conditions
▼	
Proposing Feasible Areas	Proposed areas where they can perform functions of a new town and allow development of a certain size or greater
▼	
Determining Candidate Sites	Determined candidate sites (urban zones) within feasible areas
▼	
Assessing Locational and Natural Factors	Analyzed the development growth axis, adjacency to central area, transportation accessibility, terrain, and the water system
▼	
Site Investigation	Consulted with relevant organizations in Niger State and Suleja and conducted site investigation
▼	
Proposing a pilot site	Proposed a pilot site where future development and project realization is highly feasible

2) Candidate Site Assessment

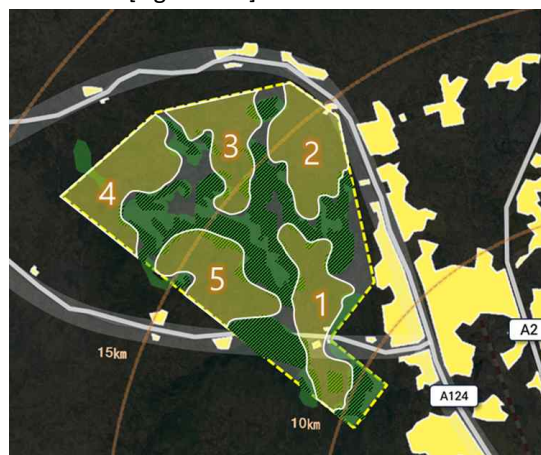
■ Selecting Candidate Sites

- The above assessment process led to the selection of five urban zones near Districts A, B, C, D, I, and K.

[Figure 4-1] Development feasible area



[Figure 4-2] Candidate sites



■ Assessing Candidate Sites (Urban Zones)

- The selection was finalized after assessing location factors such as the development growth axis, adjacency to central area, and transportation accessibility as well as analyzing terrain and the stream system.

[Table 4-2] Assessment criteria for candidate sites

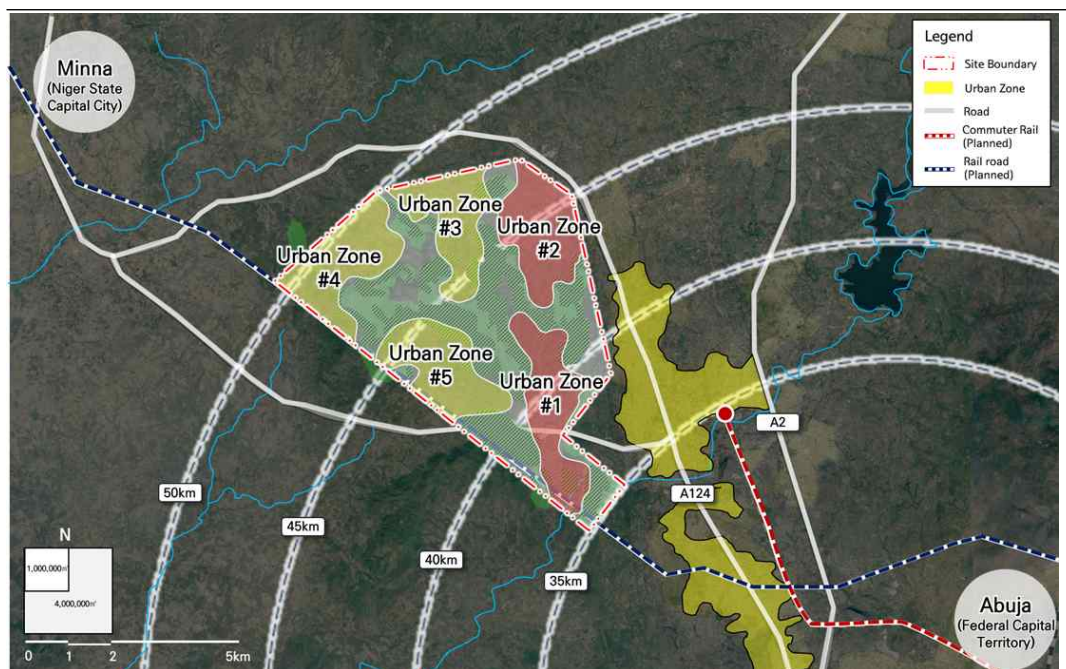
Category	Details
Development Growth Axis	• Areas where future development and expansion are feasible in connection with nearby areas
Adjacency to Central Area	• Areas where they can be connected to Abuja, Suleja, and nearby industrial complexes
Transportation Accessibility	• Areas where they can be readily connected to airport, railroads, and roads and where public transport is satisfactory
Topographical Analysis	• Areas where their physical factors such as altitude, slope, and soil quality are friendly to development
Stream System	• Areas where their land usability is high, considering the need for stormwater drainage, streams, and embankment



3) Assessment Result

- The assessment of the five candidate sites took locational and natural factors into account comprehensively. The result showed that Urban Zones 1 and 2 are close to existing built-up areas and have great development potential, transportation accessibility, and land usability. They are also feasible for foundational earthwork required to build a new town.

[Table 4-3] Comprehensive assessment of candidate sites



Assessment Criteria (Out of 5 points)		Urban Zone 1	Urban Zone 2	Urban Zone 3	Urban Zone 4	Urban Zone 5
Location al Factors	Development Growth Axis	5	4	2	1	3
	Adjacency to Central Area	5	4	2	1	3
	Transportation Accessibility	5	4	3	2	1
Natural Factors	Terrain Analysis	3	5	5	1	5
	Stream System Analysis	1	5	1	3	5
Total (Average)		3.8	4.4	2.6	1.6	3.4

*Scores were given out of five for each category, which were then used to calculate the average.

ii. Consultations with Relevant Organizations and Field Investigation

1) Consultations with Relevant Organizations

■ Visit to the Niger State Government

- Date and Time: July 7, 2021 (Wed.), 11:00 – 12:00
- Place: Secretary Office of Niger State
- Participants : Abubakar Sani Bello Niger State Governor, 22 assembly members, and department members
- Summary of the Meeting
 - The development has to consider connecting the site with the existing cities.
 - In regards to smart city concepts, it is hoped that smart infrastructure planning is also taken into consideration.
 - It is hoped that friendly partnership continues and that the project proceeds to follow-up plans after feasibility studies as it draws attention not only from Niger State but also from the whole country.

[Figure 4-3] Visit to Niger State Government

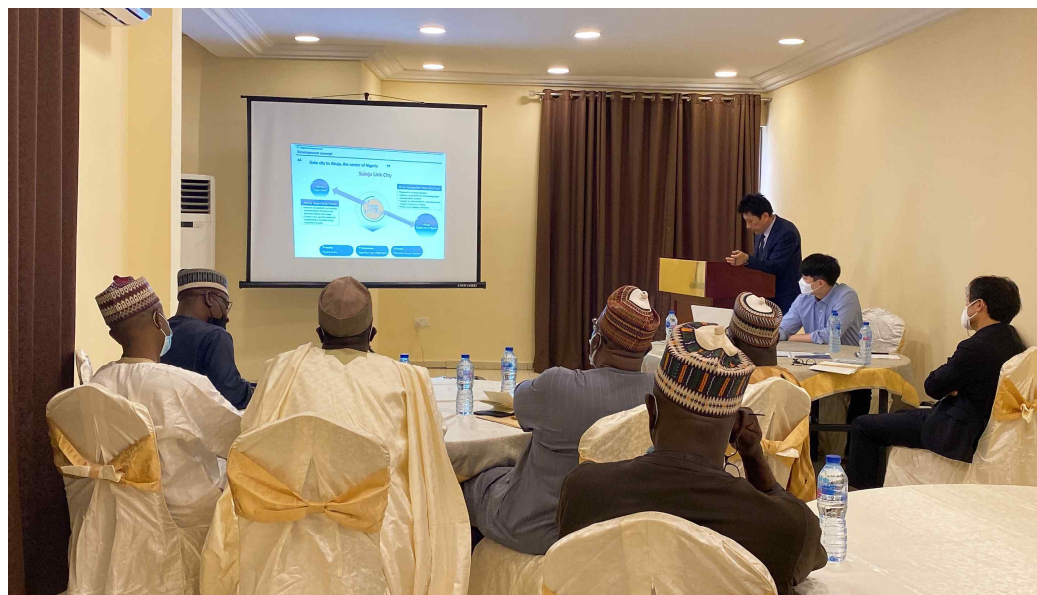




■ Meeting with Board Members of Suleja Smart City Company

- Date and Time: July 6, 2021 (Tues.), 11:00 – 13:00
- Place: Amazon Hall, The Palm Hotel
- Participants : Suleja Smart City Company Chairman M. S. Alhassan and eight board members, including Permanent Secretary of Niger State Ministry of Transport, Permanent Secretary of Niger State Environment Protection Agency, and Permanent Secretary of Ministry of Niger Delta Affairs
- Summary of the Meeting
 - It was requested that the Suleja Master Plan be additionally reviewed and reflected in the project site's functions and sectoral plans.
 - The Nigerian authority wants to name the Suleja New Town as “Suleja Smart City,” introducing smart city elements. It therefore wants to see smart city factors being added to the project.
 - Formulating a phased plan would be suitable for advancing the feasibility of Suleja New Town development.
 - It was requested that the additional plan for the commuter rail between Abuja and Suleja be considered when devising plans for connecting the site with nearby areas.

[Figure 4-4] Meeting with Suleja Smart City Company board members



■ Visit to the Ministry of Land and Housing

- Date and Time: July 7, 2021 (Wed.), 14:00 – 15:00
- Place: Niger State SSG Office
- Summary of the Meeting
 - Even though roads in Abuja are mostly in a radial pattern, using land in a grid pattern was recommended as it is a recent popular trend.
 - It was agreed that natural factors and nearby infrastructure conditions make Zone 2 the pilot site.
 - There are urban development experts, district planning experts, and housing planning experts in the Niger State Ministry of Land and Housing. Upon specific request for data that needs to be provided from Niger State, experts from each field will cooperate to the best of their ability.

[Figure 4-5] Meeting with Niger State government officials





■ Consultation with the Ministry of Water Resources and Dams Development

- Date and Time: July 8, 2021 (Thurs.), 11:00 – 13:00
- Place: External Meeting Room
- Participants: Permanent Secretary of the Ministry of Water Resources and Dams Development Abubakar Sadiq Idris and Niger State Water and Sewage Corporation Managing Director Eng. Hassan M. Chado
- Summary of the Meeting
 - Most areas, including central urban areas, in Niger State and Suleja have an insufficient water supply structure. Due to unstable electricity supply and inadequate financing, supply facilities such as water purification plants are not at full operation.
 - This suggests that the water supply plan will depend on the electricity supply plan.
 - There is currently no wastewater treatment process or facility near the project site, and most of the wastewater is drained into pits and rivers without treatment. Since there is an integrated septic tank system that was studied in a previous plan, the related data will be shared when it comes to wastewater treatment.
 - Most of the water supply and wastewater treatment infrastructure was built with subsidies provided by advanced countries such as the U.S. and Japan. It is desired that the Water and Sewage Corporation undertake the project for the wastewater treatment plant in public-private partnership (PPP) with foreign investment.
 - Data on financial resources and plans related to water supply are to be shared.

[Figure 4-6] Meeting with Ministry of Water Resources and Dams Development and NSWSC



■ Consultation with Smart City Company

- Date and Time: July 9, 2021 (Fri.), 10:00 – 12:00
- Place: Fraser Suites Abuja
- Participants: Saidu Takuma (Managing Director, CEO), Nasiru Suleiman (Head of Operation)
- Summary of the Meeting
 - The plan is to build the Suleja New Town in such a way that it functions as a self-sufficient town unlike other satellite cities on the outskirts of Abuja.
 - The major industry being reviewed to be attracted belongs to the senary industry (agro-park) which utilizes the primary industry (agriculture).
 - The Suleja New Town plan wants various income groups (business people, professors, government officials, industrial workers, etc.) to have their workplaces close to their homes. It is therefore proposed that the densities of residential areas be diversified. The proposed appropriate ratio of high to medium to low densities is 3:4:3.
 - Most low income families are living in high density residential areas while middle income households tend to dwell in housing complexes. High income families generally prefer high-end detached houses with gardens, but the demand for flats is also growing lately as they have fine security systems with cleaning services.
 - Due to insufficient architectural infrastructure technology, Nigeria has so far had issues such as inadequate power supply to mid-rise and high-rise buildings and water and sewage problems. A plan is therefore being reviewed where high rises account for 25% or more of the total number of buildings in the Suleja New Town under the assumption that advanced architectural technology will be implemented.

[Figure 4-7] Meeting with CEO of Suleja Smart City Company





■ Visit to the Suleja Council

- Date and Time: July 10, 2021. (Sat.), 10:00 – 11:00
- Place: Suleja Council Chairman's Office
- Participants: The Emir of Suleja, Suleja Council Chairman, and five council members
- Summary of the Meeting
 - The Suleja area is in between Niger State and Abuja, which makes it a geographical hub.
 - Since communities are already formed in some areas, project boundaries have to be carefully drawn in order that the plan is not deemed a threat to them.

[Figure 4-8] Courtesy call for Emir of Suleja



2) Project Site Investigation

■ Overview

- Date and Time: July 10, 2021. (Sat.)
- Place: Areas around Abuja and Suleja
- Participants: Suleja Council Chairman, five council members, two representatives from Smart City Company, and four representatives from Dohwa Engineering

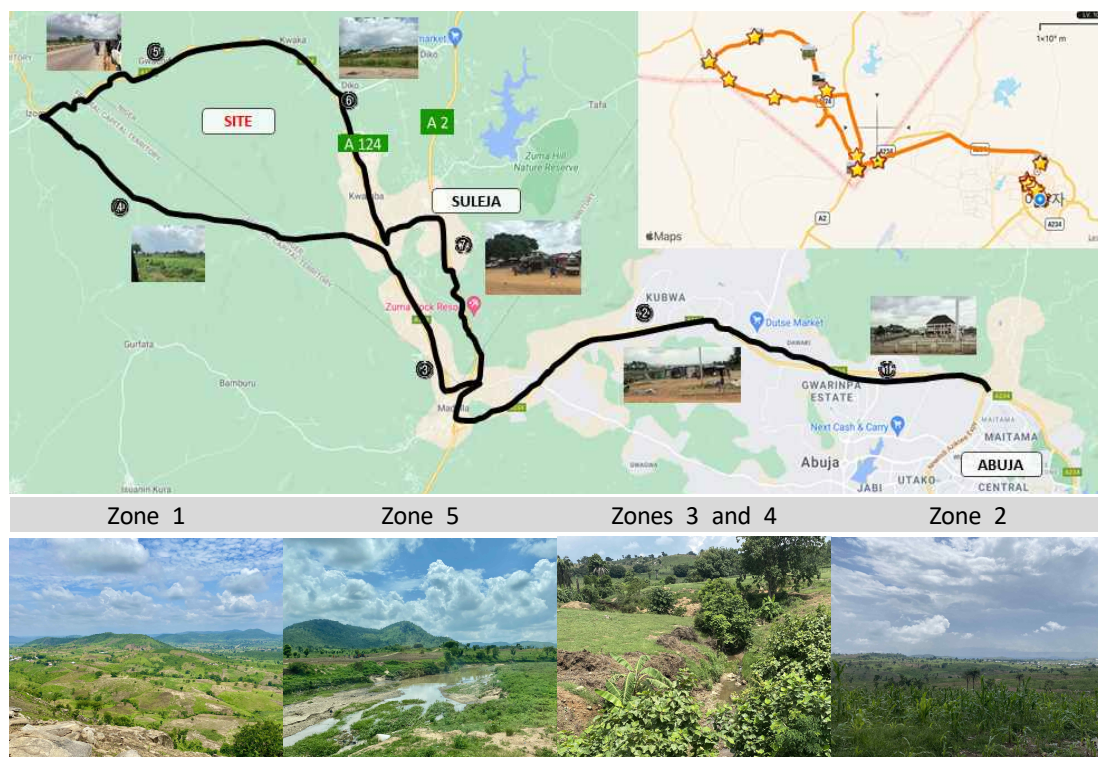
[Figure 4-9] Field investigation



■ Field Investigation Route

- Departed Abuja → Moved to Suleja via Madalla
- Stopped by at Tudun Wada where it gives a commanding view of the entire project area, then moved to built-up areas in Izom via Hassan Dallatu road
- Moved to built-up areas in Maje via the A124 highway

[Figure 4-10] Field investigation route



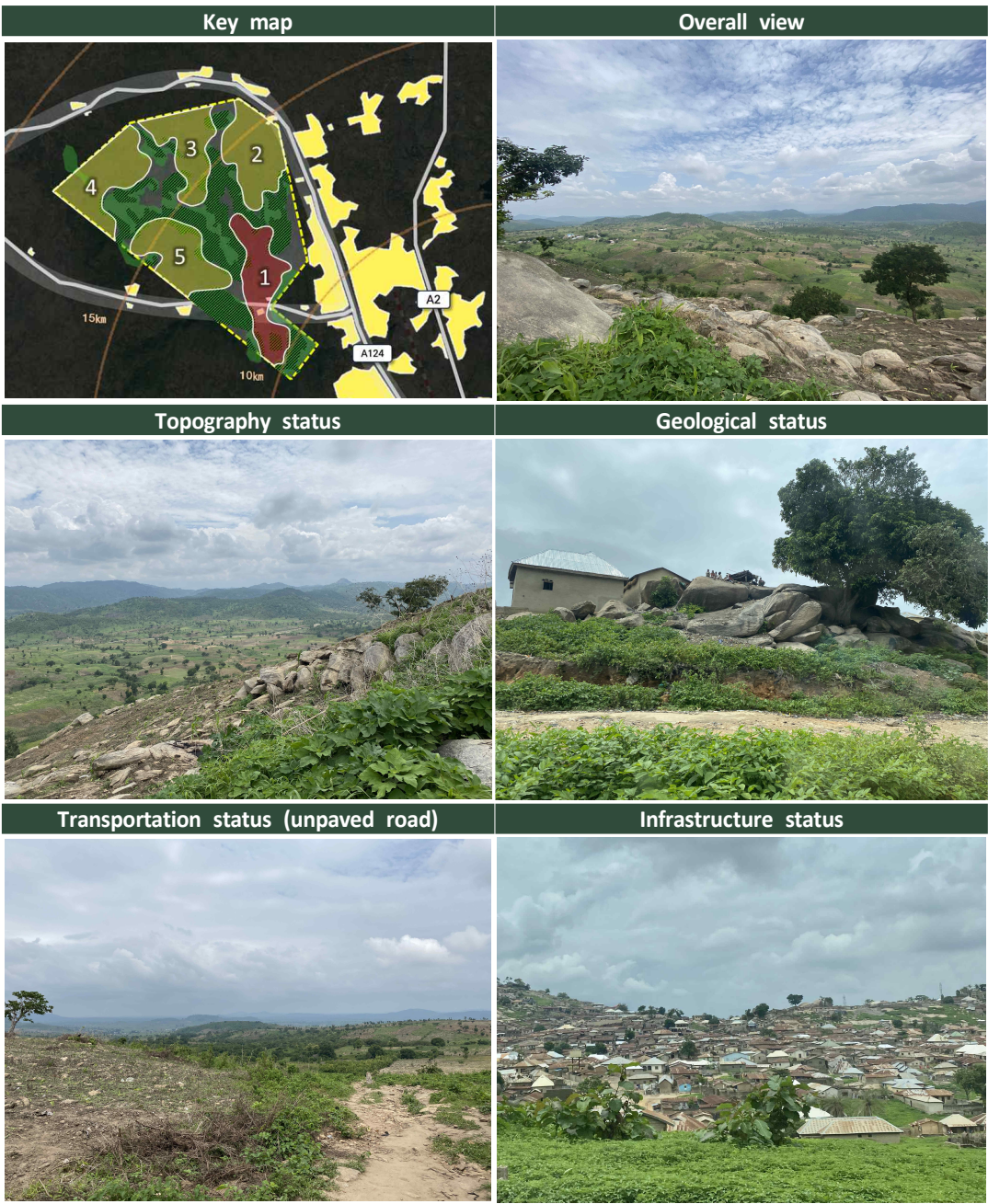


■ Field Investigation Summary

○ Zone 1

- Zone 1 is close to existing built-up areas, but unpaved roads somewhat undermine accessibility. Its dramatic terrain variations would lead to high costs for foundational earthwork. On top of that, rocky soil can be a hindrance to developing water supply and drainage infrastructure.

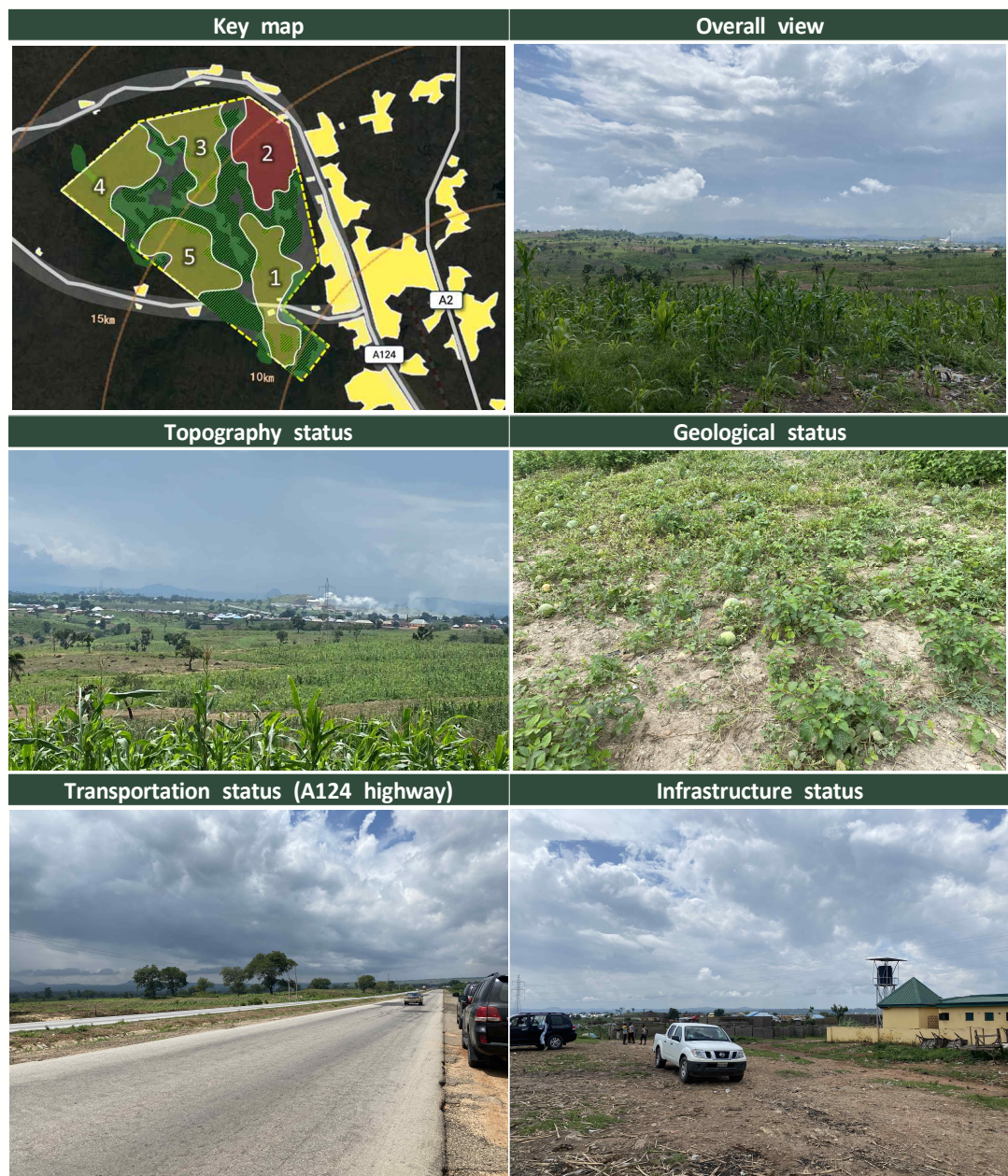
[Figure 4-11] Site investigation of Zone 1



○ Zone 2

- Zone 2 is accessible by the A124 highway and the Maje-Dikko bypass. Its adjacency to traditional built-up areas in Suleja makes its connection with existing supply infrastructure more feasible.
- The terrain is relatively flat and at a higher altitude. The fairly gentle terrain variation would contribute to lower costs for foundational earthwork and the higher altitude would protect the area from flood damage.

[Figure 4-12] Site investigation of Zone 2

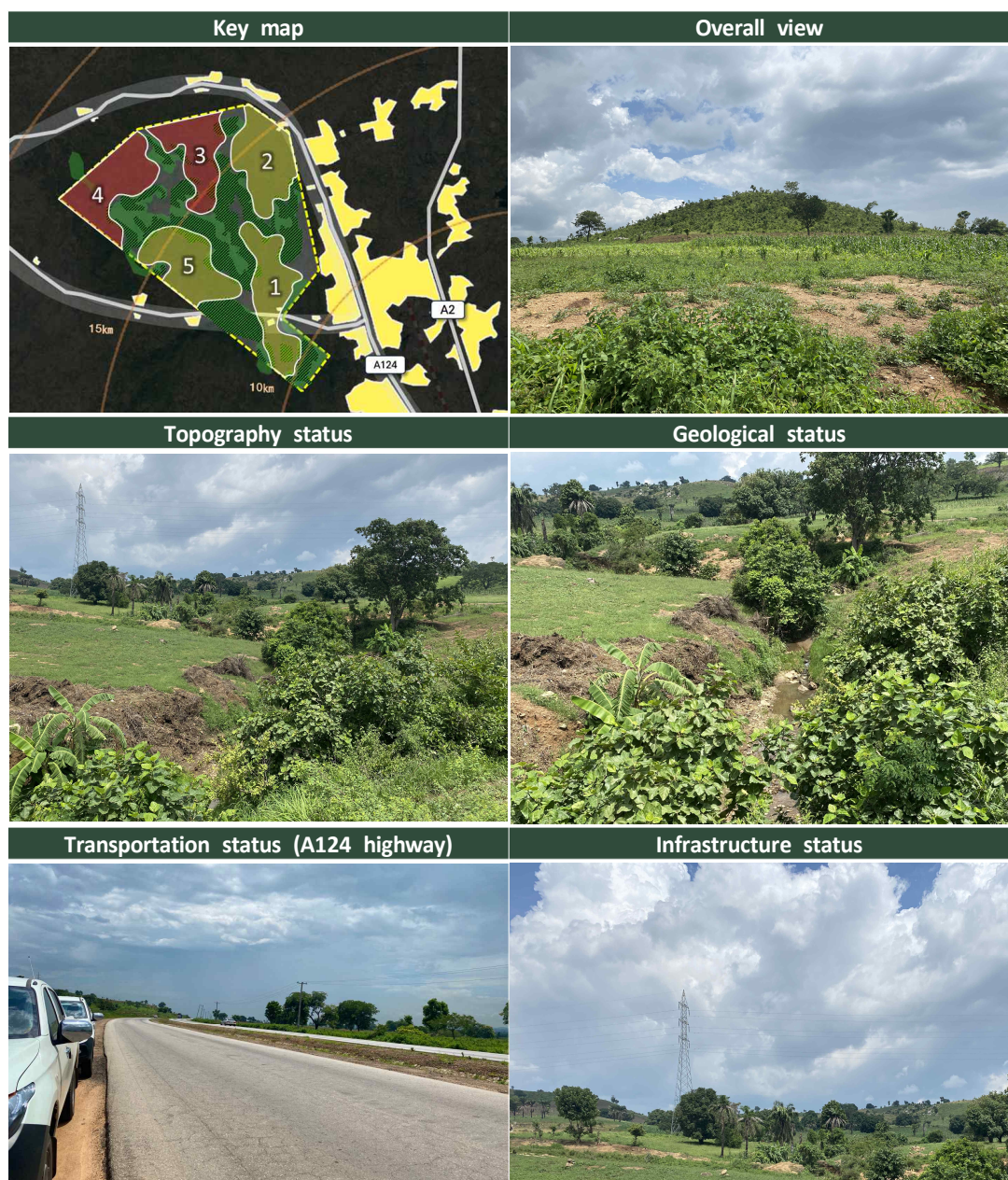




○ Zones 3 and 4

- Zones 3 and 4 are easily accessible as they are in the vicinity of existing built-up areas and connected to highways. Meanwhile, they are not more accessible than Zone 2 is.
- There is a certain amount of terrain variation which would require a fair amount of construction costs. In addition, the Gurara River runs in the North.

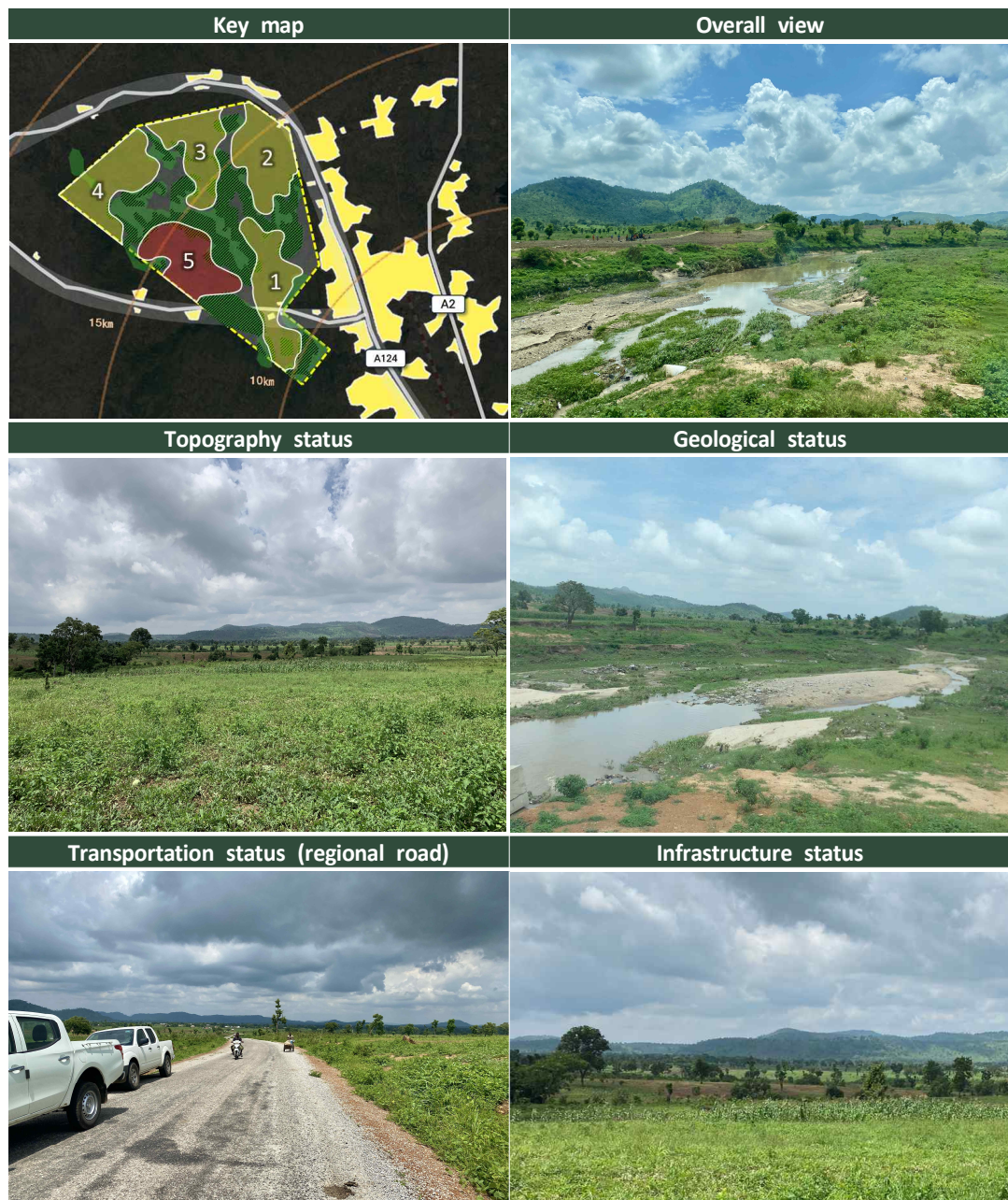
[Figure 4-13] Site investigation of Zones 3 and 4



○ Zone 5

- Zone 5 has low connectivity with highways and roads and is only accessible by the 4 m wide Hassan Dallatu road.
- Located at a lower altitude, Zone 5 seems vulnerable to flood damage.

[Figure 4-14] Site investigation of Zone 5

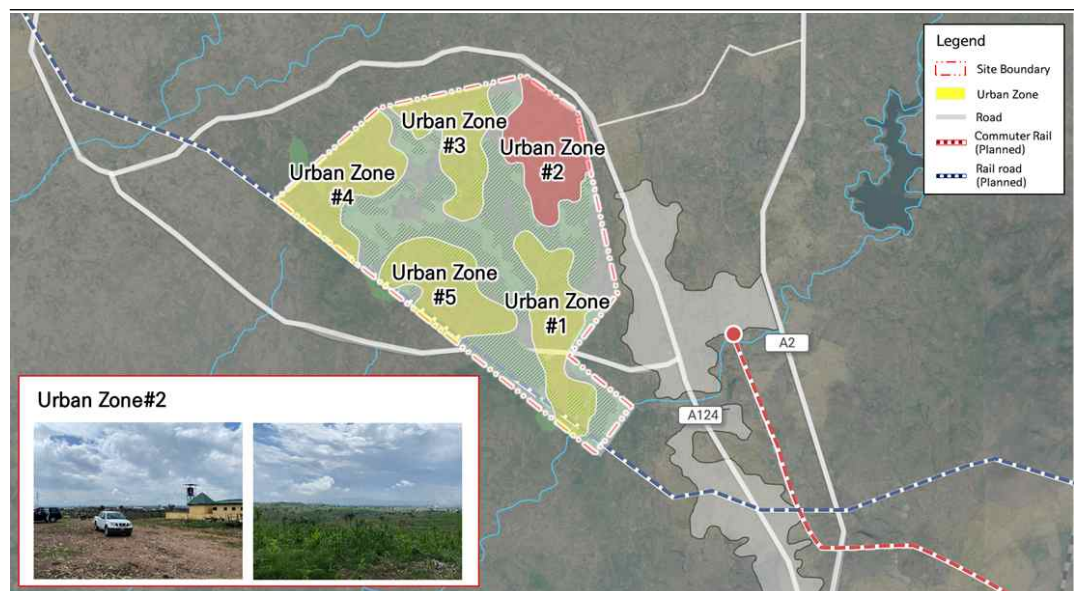




iii. Result of Pilot Site Selection

- According to the candidate site assessment based on Niger State's status report and map data, the field investigation result, and the opinions gathered from relevant departments, Zone 2 was selected as the pilot site.

[Table 4-4] Selection of the pilot site



Assessment Criteria			Urban Zone 1	Urban Zone 2	Urban Zone 3	Urban Zone 4	Urban Zone 5
Assessment Results of Candidate Sites	Locational Factors	Development Growth Axis	5	4	2	1	3
		Adjacency to Central Area	5	4	2	1	3
		Transportation Accessibility	5	4	3	2	1
	Natural Factors	Terrain Analysis	3	5	5	1	5
		Stream System Analysis	1	5	1	3	5
Field Investigation Results	Topographic and Slope Condition		1	5	3	3	5
	Terrain Condition		1	5	3	3	1
	Transportation Accessibility		4	5	3	3	1
	Adjacency to existing built-up areas		5	5	1	3	1
	Nearby Infrastructure Condition		3	5	3	4	1
Total (Out of 50 points)			33	47	26	24	26

*Scores were given out of five for each of the ten categories, which were then added to obtain the final scores.



V

Pilot Site Development Plan

1. Development Directions
2. Sectoral Development Plan
3. Building Arrangement Plan
4. Smart City Service Plan



V. Pilot Site Development Plan

i. Development Directions

1) Development Goals and Strategies



2) Designing Spatial Structures

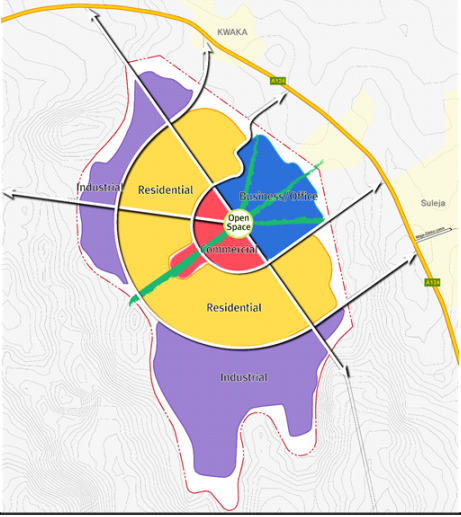
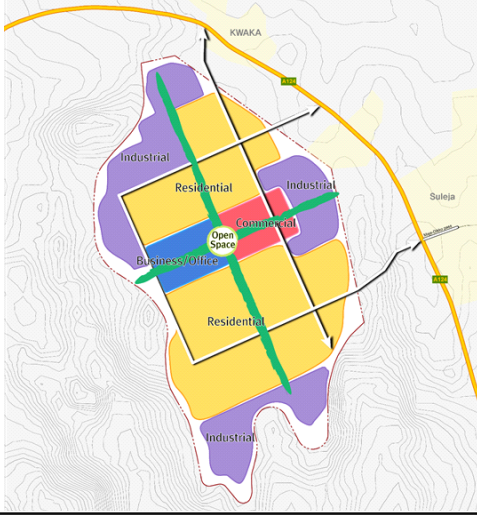
■ Basic Directions

- Differentiated the pilot site from Abuja and position it as a newtown of Niger State
- Designed to build a self-sufficient town that combines industrial clusters with business districts
- Proposed balanced spatial structures with a focus on interconnectivity between various functions

■ Draft Assessment and Final Selection

- Selected a draft that complies with locational and natural conditions and that maximizes land use efficiency
- During our business trip to Nigeria, the assessment and comparison of two drafts were conducted together with relevant Niger State departments and Suleja Smart City Company. As a result, **Draft 2 was selected as the final draft.**

[Table 5-1] Comparison of spatial structure designs

Categories	Draft 1	Draft 2
Design Map		
Spatial Structure	• Radial pattern / Residential areas and industries neighboring the central commercial district	• Grid pattern / Residential, commercial, and industrial facilities appropriately distributed considering the phase
Transportation System	• Ring road network • Various junctions with existing roads	• Simple system that enhances mobility • Connects to neighboring areas
Green Space System	• Distribute green space around the central green space axis	• Make use of the protected area and put emphasis on the green space axis



3) Determining Facility Functions

■ Examples of facility functions

- Functions of each facility type are shown below.

[Figure 5-1] Functions of each facility type



ii. Sectoral Development Plan

1) Land Use Plan

■ Basic Directions

- Obtain transferable land, except for public land, in light of profitability but also obtain as much green space as possible to provide a pleasant environment
- Provide low, medium, and high density residential areas to satisfy various needs
- Build industrial, commercial, and public facilities of sufficient size to perform functions of a self-sufficient town

■ Land Use Plan Table

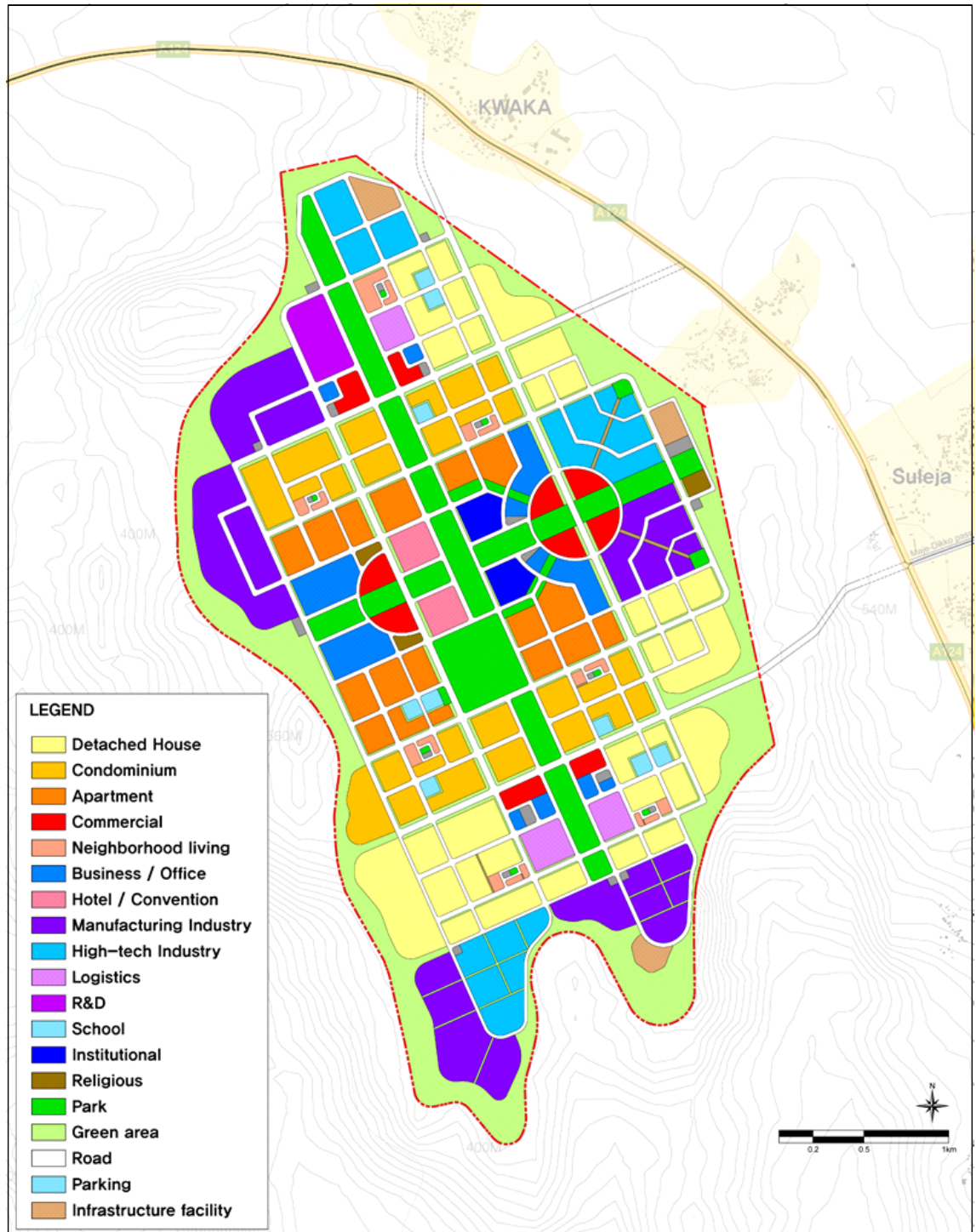
[Table 5-2] Land use plan table

Type	Area (㎡)	Ratio (%)	Note
Total	12,196,576	100.0	
Residential Area	3,143,175	25.8	
Detached House	1,546,955	12.7	Bungalow
Condominium	936,390	7.7	2 to 3 stories
Apartment	659,830	5.4	4 to 5 stories
Commercial and Office Area	879,143	7.1	
Commercial Facility	287,029	2.3	
Business and Office Facility	371,538	3.0	
Neighborhood Commercial Facility	112,669	0.9	
Hotel and Convention Center	107,907	0.9	
Industrial Area	2,156,353	17.7	
Manufacturing Facility	1,297,099	10.6	
Logistics Facility	152,856	1.3	
High-Tech Facility	587,465	4.8	
R&D Facility	118,933	1.0	
Public Area	238,988	2.0	
School	94,736	0.8	
Institutional Facility	104,444	0.9	
Religious Facility	39,808	0.3	
Park and Green Space	3,491,242	28.6	
Park	1,088,709	8.9	
Green Space	2,402,533	19.7	Including green buffer zone
Infrastructure	2,287,676	18.8	
Road	2,098,088	17.2	Including pedestrian roads
Parking Lot	76,221	0.6	
Infrastructure Facility	113,367	1.0	Substation, wastewater treatment plant, etc.



■ Map of Land Use Plan

[Figure 5-2] Map of land use plan for the Suleja pilot site



2) Population and Housing Plan

■ Population and Housing Supply Plan

- We proposed housing capacities and floor areas that comply with the new town's goals and that provide a pleasant residential environment.
- Proportions of detached houses and apartments were determined in view of the local housing demand.
- The number of family members per household was set at 5.66, determined based on its average number in Niger State.
- Complying with the Niger State government's request, about 23% of the residential area will be provided by social housing.

[Table 5-3] Population and housing plan for the Suleja pilot site

Type		Area (㎡)	Distribution (%)		Household (Units)	Capacity (People)	Note (People /ha)
			Total	Type			
Total		3,143,175	100.0	-	37,248	210,824	172.9
Detached House	Subtotal	1,546,955	49.2	100	7,734	43,775	
	Bungalow	1,546,955	49.3	100	7,734	43,775	
Condo minium and Apartm ent	Subtotal	1,596,220	50.8	100	29,514	167,049	
	52.05㎡	731,299	23.3	45.8	15,643	88,539	social housing
	67.60㎡	84,433	2.7	5.3	1,309	7,409	
	79.57㎡	90,901	2.9	5.7	2,398	13,573	
	91.53㎡	689,587	22.0	43.2	10,164	57,528	

■ Estimating Population Density and Residential Area

- The area of the pilot site is about 1,220 ha and the total population density was estimated to be 172.9 people/ha. This results in a planned population capacity of 210,824.

[Table 5-4] Assessment result of residential area in the Suleja pilot site

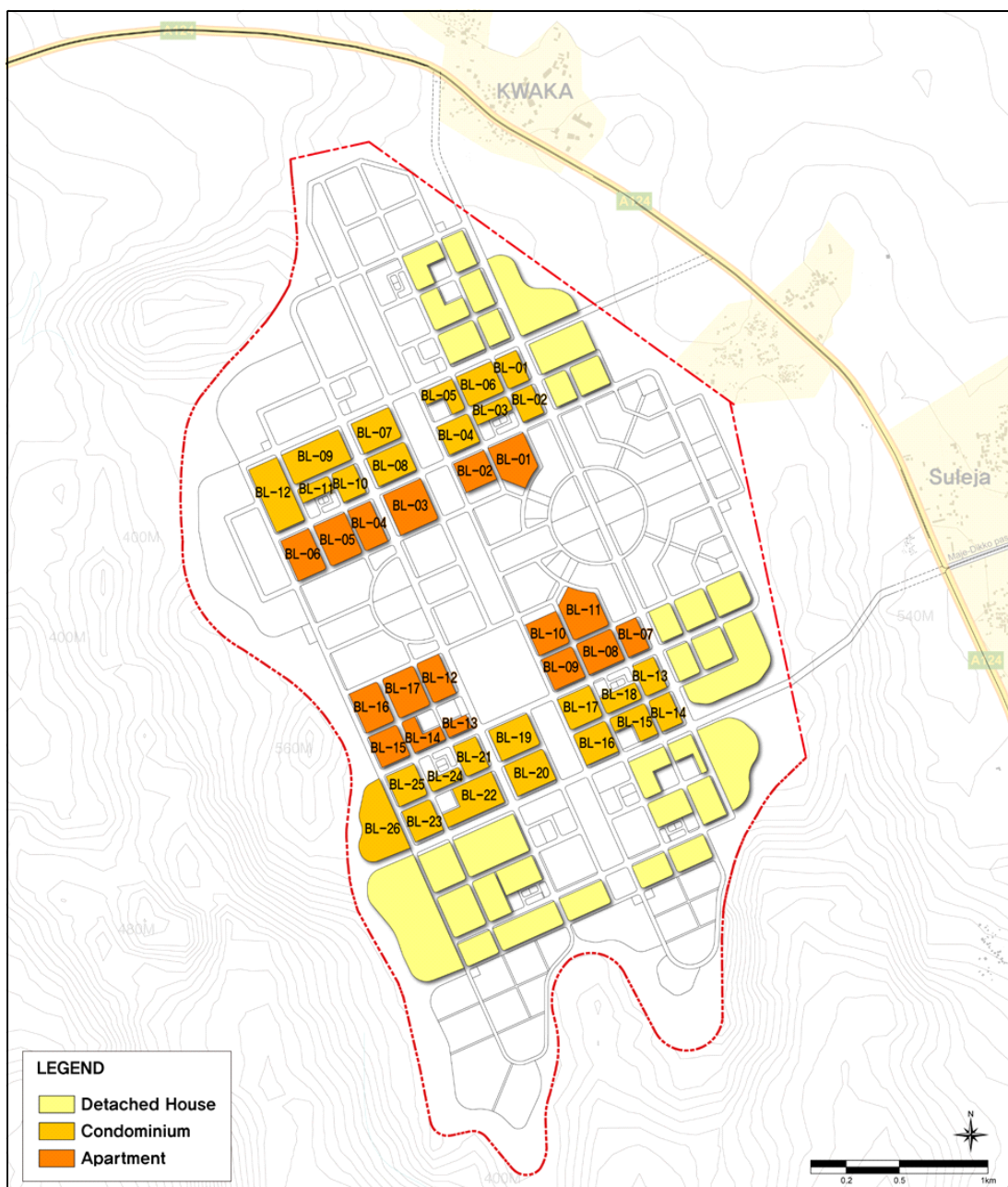
Type	Pilot Site Area (㎡)	Residential Area (㎡)	Population (people)	Density (people/ha)
Total	12,196,576 (≒1,220ha)	3,143,175 (≒314ha)	210,824	172.9



■ Housing Plan Map

- Five story apartments were laid out near the commercial and office districts in the central area of the pilot site. Two to three story condominiums and detached houses were planned in such a way that building heights step down towards the suburbs in light of the skyline.

[Figure 5-3] Housing plan map of the Suleja pilot site



3) Transportation and Traffic Flow Planning

■ Basic Directions

- The metropolitan transportation system connected to the A124 highway will enhance connectivity among Abuja, Suleja, and Niger; improve the development efficiency of the pilot site; and provide benefits to its users.
- Roads will be installed in a hierarchical structure according to their functions and characteristics.
- The future implementation of an eco-friendly green transportation system requires bicycle roads and a pedestrian network system to be implemented at key facilities and major nodes.

■ Metropolitan Transportation System Design

- Three access roads connected to the A124 highway will allow entrance to the pilot site's internal transportation system.
- Entry and exit from the north and east sides of the pilot site are planned to smooth connection with nearby areas. A road network is planned around the traffic flow axis that connects main and secondary entrances.

■ Internal Transportation System Design

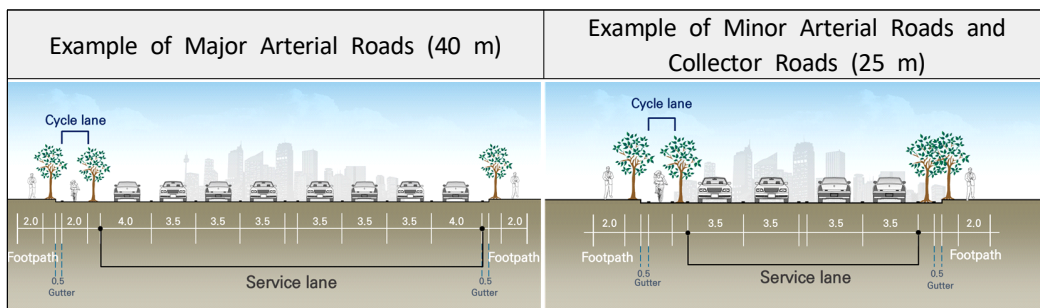
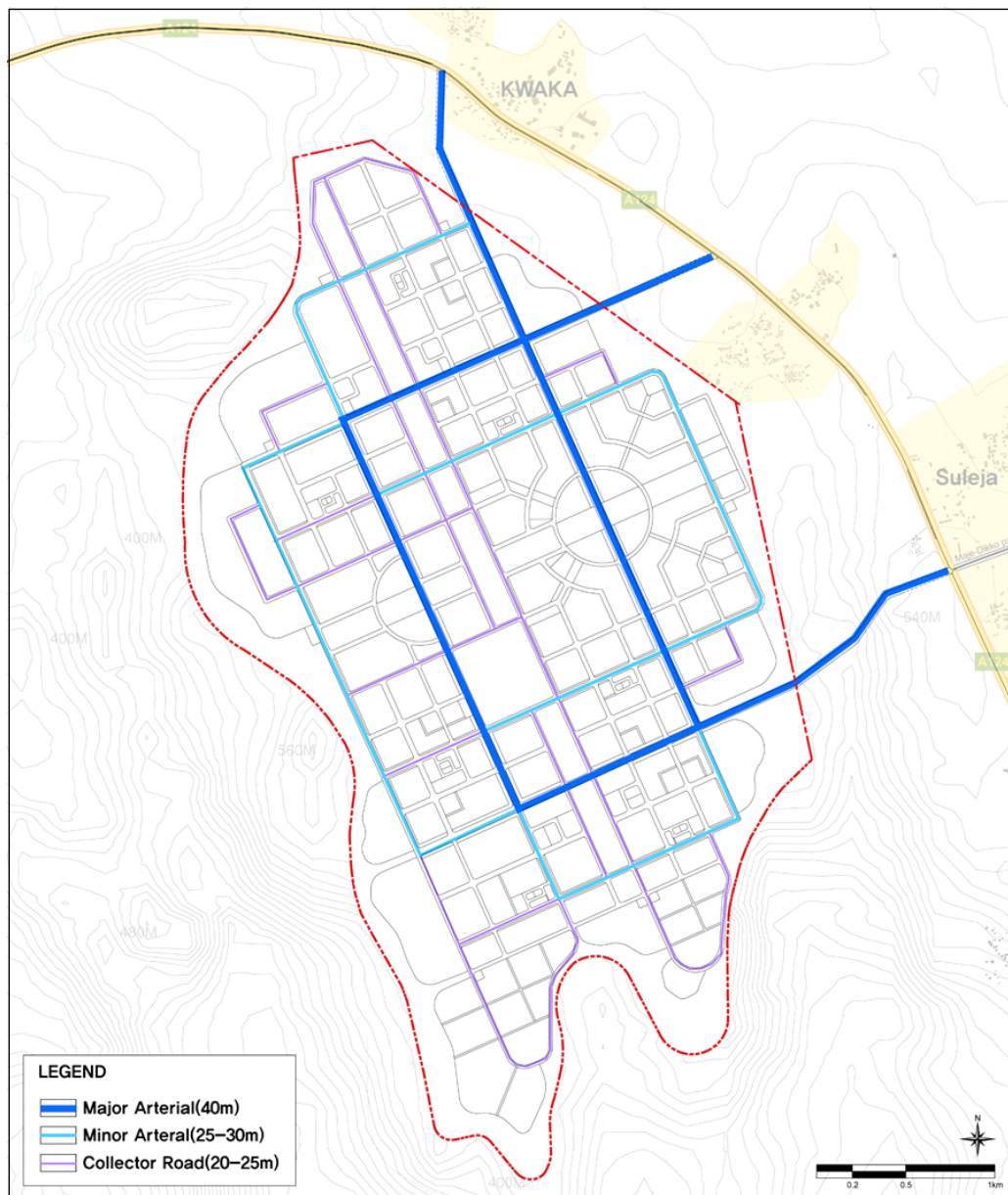
[Table 5-5] Internal transportation plan

Type	Functions	Planned Width	Note
Major Arterial Road	It accommodates heavy traffic and functions as through roads.	40 m	Connected to A124
Minor Arterial Road	It forms the structural framework for neighborhood living and connects major arterial roads with collector roads.	25 to 30 m	
Collector Road	It functions as entrances to the town.	20 to 25 m	



■ Transportation Plan Map

[Figure 5-4] Transportation plan map of the Suleja project site



4) Commercial and Office Facility Plan

■ Basic Directions

- Connect the central green space axis with the industrial district axis to create a major space for activities in the Suleja New Town
 - Create a major commercial district along the giant green network and the square to highlight its centrality
 - Locate office properties near commercial facilities to advance convenience and add dynamism
- Seek to place commercial and office facilities along the major arterial roads and neighborhood commercial facilities along the minor arterial roads, bearing in mind of the town's spatial structure
 - The traffic flow of residents and users will be taken into account when arranging parks and commercial facilities that offer many different places to relax.
 - Neighborhood commercial facilities along the minor arterial roads will be in the center of living space.
- Commercial and office properties (commercial facilities, neighborhood commercial facilities, business and office facilities, and hotels and convention centers) account for 7.1% of the total area.

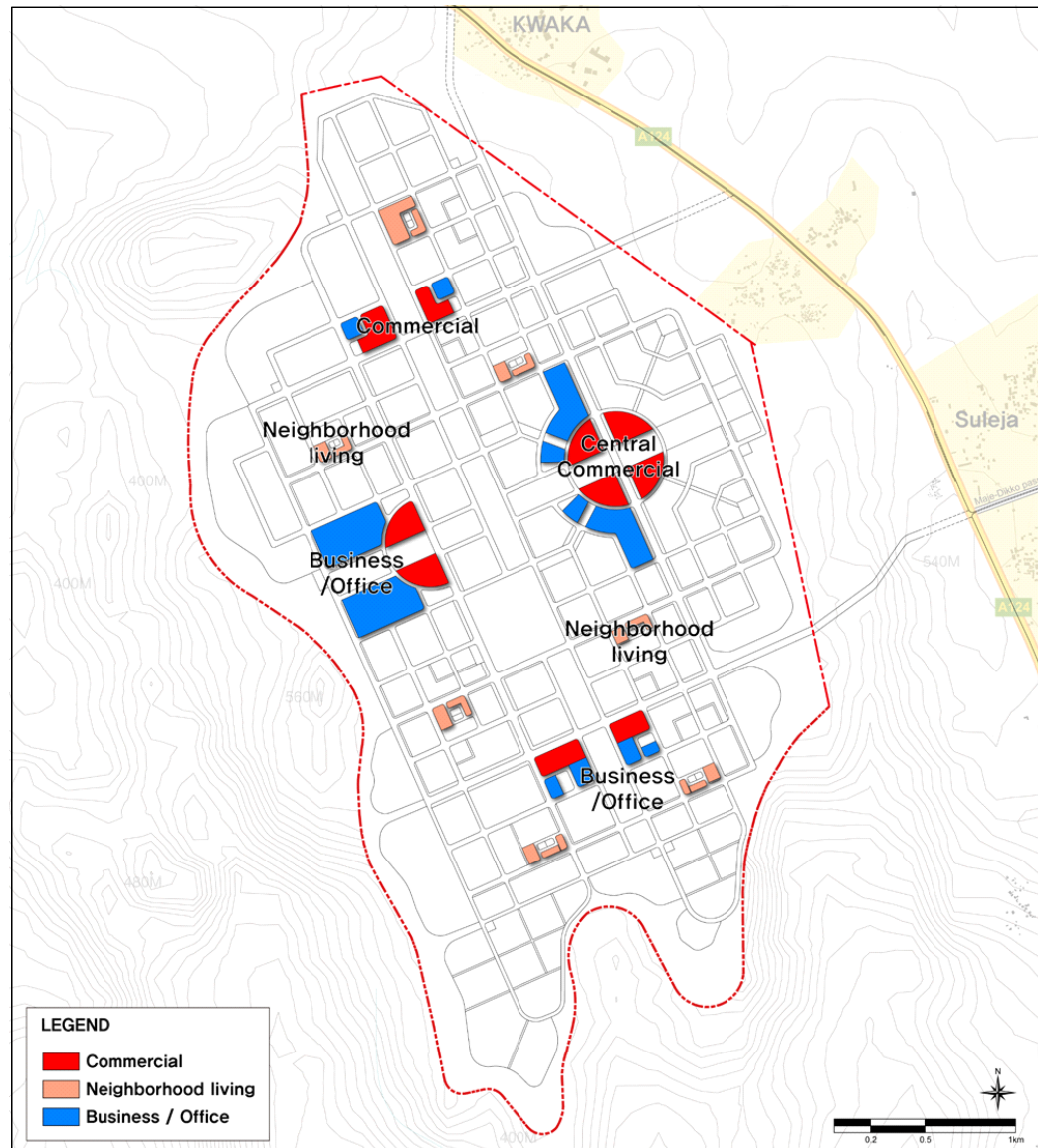
[Table 5-6] Table for commercial and office facility plan

Type		Area (㎡)	Proportion (%)	Note
Commercial and Office Property	Commercial Facility	287,029	2.3	
	Neighborhood Commercial Facility	112,669	0.9	
	Business and Office Facility	371,538	3.0	
	Hotel and Convention Center	107,907	0.9	
Total		879,143	7.1	



Commercial and Office Facility Planning Map

[Figure 5-5] Commercial and office facility planning map of the Suleja pilot site

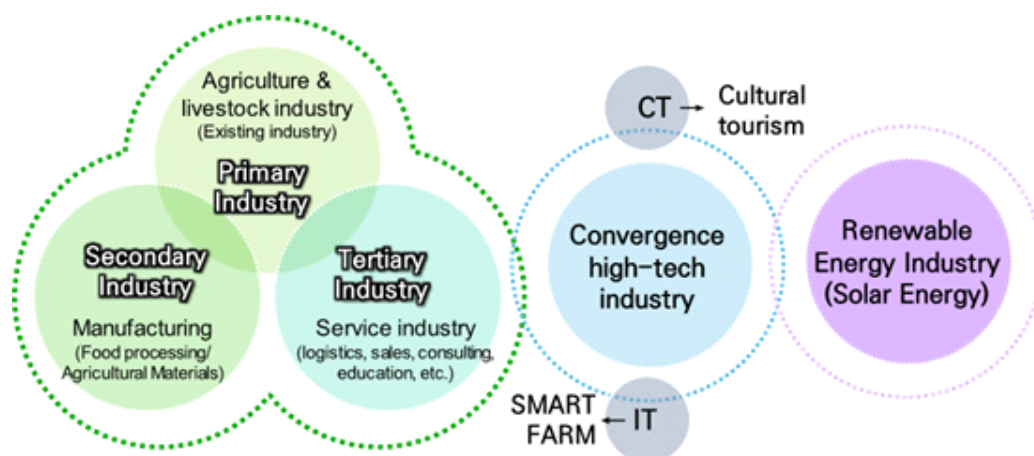


5) Industrial Facility Plan

■ Basic Directions

- Foster high-tech industries based on the key industries of Suleja, namely agriculture and traditional manufacturing
- Develop new renewable energy-related industries to respond to the growing energy demand in Nigeria and Niger State
- Build industrial clusters within short commuting distances and provide quality job opportunities
- Provide an industrial environment where universities, research centers, businesses, and local governments cooperate to yield synergistic benefits

[Figure 5-6] Industrial facility development directions in the Suleja pilot site



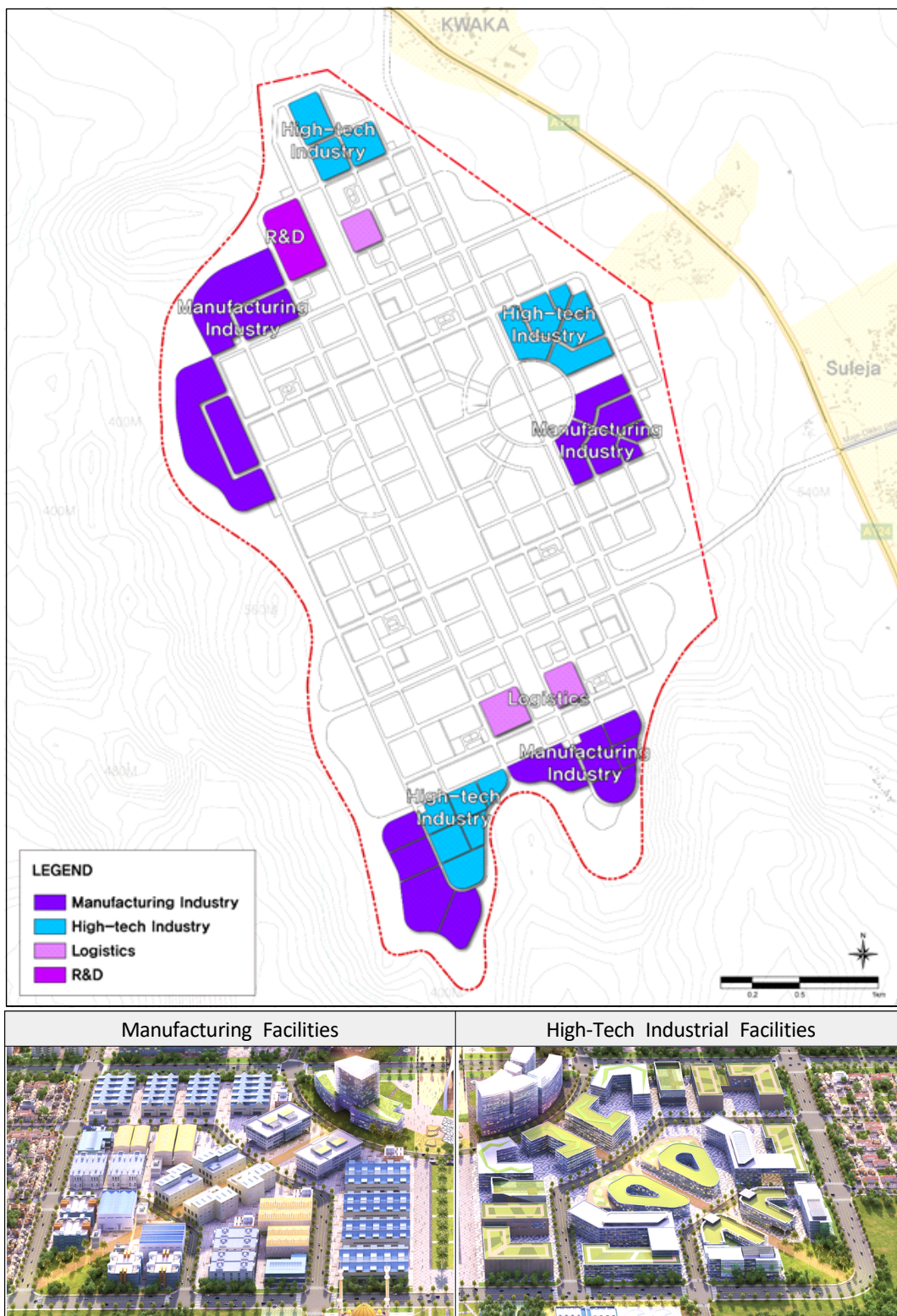
[Table 5-7] Table for industrial facility plan of the Suleja pilot site

Type		Area (㎡)	Proportion (%)	Note
Industrial Property	Manufacturing Facility	1,297,099	10.6	
	High-tech Industrial Facility	587,465	4.8	
	Logistics Facility	152,856	1.3	
	R&D Facility	118,933	1.0	
Total		2,156,353	17.7	



■ Industrial Facility Planning Map

[Figure 5-7] Industrial facility planning map of the Suleja pilot site



6) Park and Green Space Plan

■ Basic Directions

- Connect green spaces and parks in and around the pilot site to build a large-scale green space network
 - The green space accounts for 28.6% of the total pilot site and its green space per capita is 16.4m², which is greater than the WHO standard of 9m².

[Table 5-8] Table for park and green space plan of the Suleja pilot site

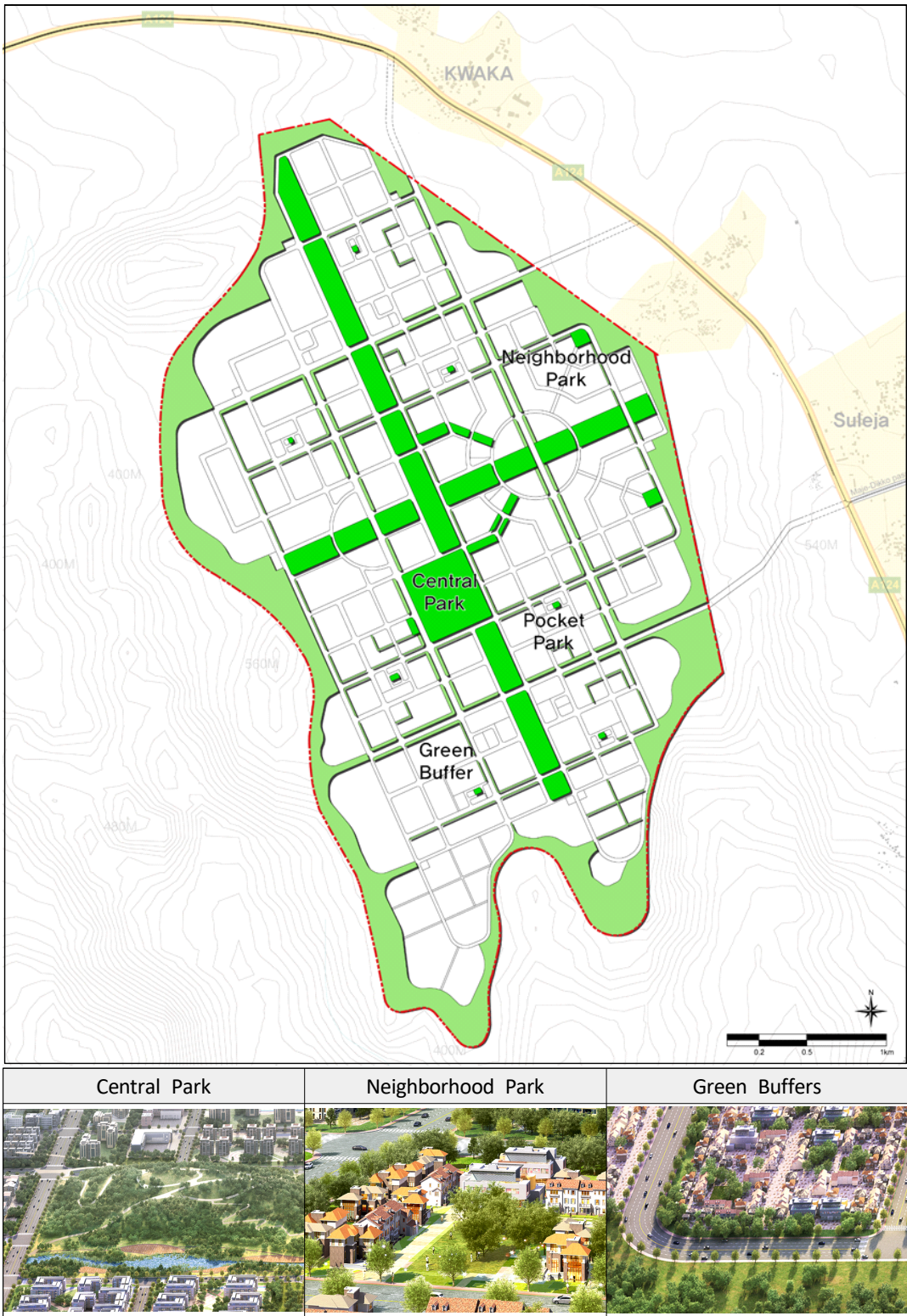
Type		Area (m ²)	Proportion (%)	Note
Park and Green Space	Park	1,088,709	8.9	
	Green Space	2,402,533	19.7	Including green buffers
Total		3,491,242	28.6	

- Develop parks and green spaces considering the existing terrain of Suleja and its future phased development
 - Build scenic green spaces where their terrain is steep and needs environmental protection and landscape maintenance
 - Maintain and preserve areas on a steep slope in the center of the pilot site to create a central park
 - Build a large-scale green space axis between living spaces to let it function as the reservation area for the phased development
- Develop parks and green spaces ecologically and environmentally to build eco-friendly ecological districts
 - Locate a neighborhood park in the center of a neighborhood living facility to help the residents relax and form communities
- Construct green buffers along the major and minor arterial roads to sustain pleasantness throughout the properties
 - Green buffers will reduce noise and function as green spaces for residential areas



■ Park and Green Space Planning Map

[Figure 5-8] Park and green space planning map of the Suleja pilot site



7) Public Facility Plan

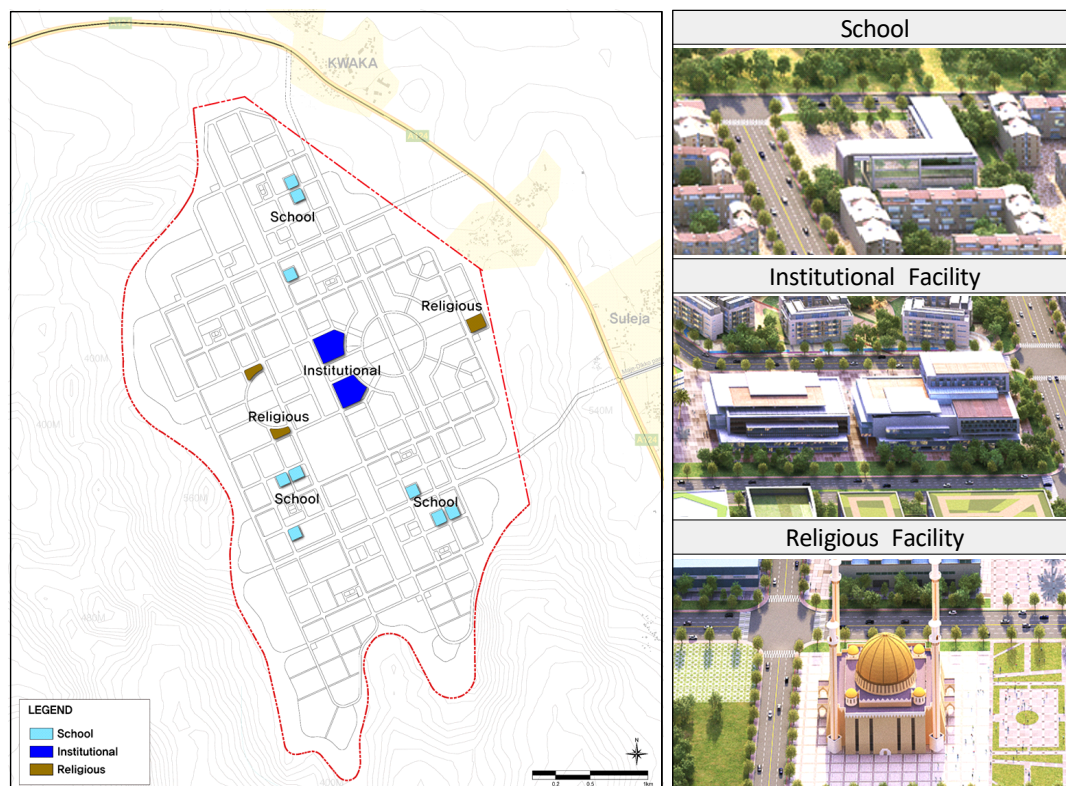
■ Basic Directions

- Build institutional offices, schools, and religious facilities to allow convenient use of public facilities
- Connect schools with neighborhood parks, residential areas, and commercial facilities to contribute to building local communities
- Introduce institutional facilities including an administrative complex, medical facilities, and fire departments to support the welfare of residents

[Table 5-9] Table for public facility plan

Type		Area (㎡)	Proportion (%)	Note
Public Facility Property	School	94,736	0.8	
	Institutional	104,444	0.9	
	Religious	39,808	0.3	
Total		238,988	2.0	

[Figure 5-9] Public facility planning map





8) Site Construction Plan

■ Basic Considerations for Site Construction

- Deciding on site construction requires consideration for terrain conditions of the site and its connectivity with nearby areas
 - A significant difference between the altitude of the pilot site and that of a neighboring area requires installation of structures such as retaining walls, bridges, and soundproofed walls. In severe cases, such installation may lead to significant additional costs.
- Major infrastructure components include town streets, stormwater pipes, sewer pipes (for treating wastewater discharged from each household), and water supply pipe networks, all of which need to be buried underground. It is therefore necessary to take these components into account when determining the final height of the site.
- Particularly, the construction costs of stormwater pipes and sewer pipes with gravitational flow can vary significantly depending on how the site construction plan is established.

■ Terrain and Streams System of the Pilot Site

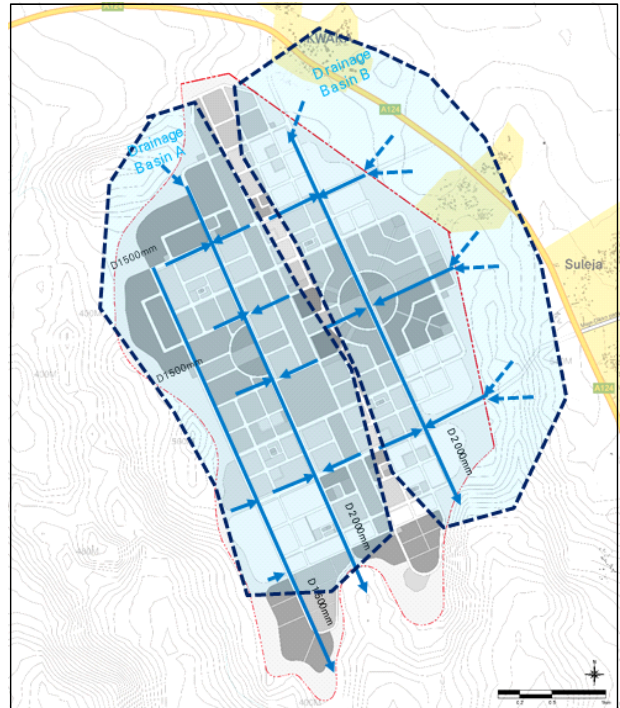
- The pilot site is 450m above sea level and composed of about 1,219ha of grassland. Meanwhile, stream systems are adjacent to the project boundary, therefore it is a topographical condition that enables suitable planning for rain and sewage treatment in the project area.
- The establishment of infrastructure requires consideration for the traditional built-up area in Suleja, located in the east of the pilot site.
 - The built-up area in Suleja is 500m above sea level, which is about 40 to 50m higher than the pilot site.
 - Once the pilot site is developed, the difference in the heights of the two areas can cause wastewater in sewer pipes to flow from the traditional built-up area to the new town.
- The slope of the pilot site overall runs gradually from east (490m above sea level) to west (420m above sea level) at a hydraulic gradient of approximately 1.17%.
- A stream, located 2.5km to 3.0km away to the west of the pilot site, is highly suitable for treating stormwater and wastewater discharged from the pilot site.

9) Stormwater Treatment Plan

■ Formulating Stormwater Treatment Plan

- Formulated the stormwater treatment plan using a gravitational flowing from northeast to southwest incorporating the pilot site's terrain characteristics

[Figure 5-10] Stormwater treatment planning map of the Suleja pilot site



- Since the gravitational flow has to be equally applied to the wastewater treatment plan, the determination process of the final height of the site has to take into account the final height that can accommodate the necessary infrastructure as well as the soil cutting and embankment plan that can optimize the construction costs.

- The abnormal climate change due to global warming is leading to frequent, dramatic raising or lowering of climate normals such as temperature and precipitation.

- Responding to the climate change requires implementation of green infrastructure plans

- As part of the green infrastructure plan, a method was proposed to save a certain amount of rainwater for recycle before draining it.

- Collecting rainwater can be applied to many different areas such as building urban artificial ponds, creating lowlands and wetlands in nature, and installing retention basins for supplying road cleaning water.
- Yet, this approach entails additional construction costs, requiring strong agreement with the project operators during the planning phase.

- The stormwater drainage planning was only roughly carried out at this stage. A

green infrastructure plan was not incorporated as the plan was explored at the level of observation.

[Table 5-10] Estimates of drainage basins in the Suleja pilot site

Type	Area	Note
Drainage Basin A	572ha	external water inflow considered
Drainage Basin B	776ha	external water inflow considered

10) Wastewater Treatment Plan

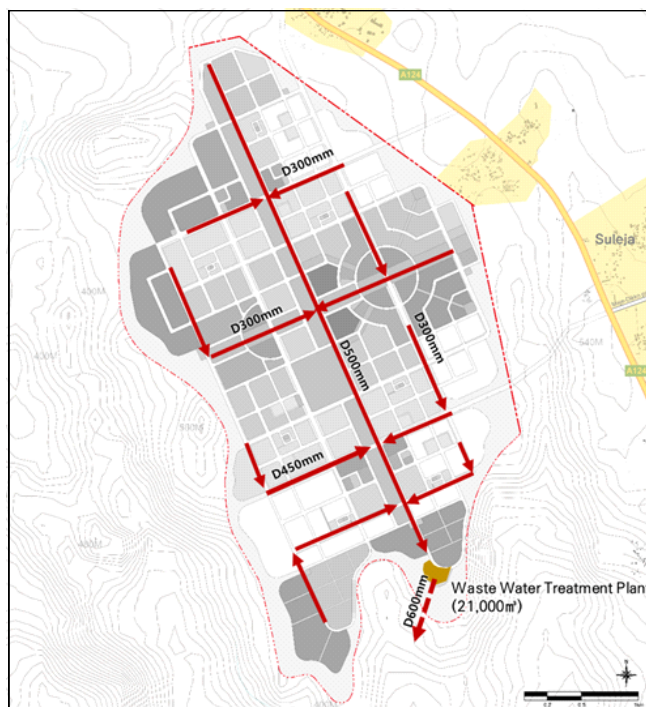
■ Geographical Analysis

- The pilot site is right next to the Gurara River, a branch of the Niger River, which is one of the longest rivers in West Africa. This means that all treated water released from the pilot site will flow into the Gurara River, which will then join the Niger River.

- Running about 4,000km before joining the Pacific Ocean, the Niger River plays a critical role as a source of Nigeria's agricultural water supply. Therefore, the treatment plan of the pilot site's household and industrial it is not only essential for pro the water supply source.

- Wastewater discharged from the pilot site will first be collected and treated at the wastewater treatment facilities.
 - The treated water will be released through nearby sewage pipes to outside of the pilot site, and if the Nigerian government requests, household wastewater could go

[Figure 5-11] Wastewater treatment planning map of the Suleja pilot site



through advanced treatment processes to be used as recycled water.

- Advanced wastewater treatment is directly related to facility costs.
- The wastewater treatment facility plan has to be designed by phase as the pilot site development plan did.
 - One approach is to treat all of the wastewater from the pilot site in one facility and expand the facility's size phase by phase. Another approach is to build individual facilities according to the requirement of each phase from the beginning.
 - The pros and cons as well as cost effectiveness of the two approaches have to be assessed separately as two different projects.

■ Assessment of Wastewater Treatment Plan

- Wastewater treatment can be done in a single facility or multiple facilities. In the latter case, each district would have one facility according to a development plan by phase. Meanwhile, this paper deals with the former approach.
- Location conditions for the wastewater treatment facility are as follows.
 - 1) It has to be in the lowest area within the entire pilot site.
 - 2) It cannot be near residential or business and office areas.
 - 3) It has to have an environment nearby to which it can release the water.

[Table 5-11] Planned wastewater volume for the Suleja pilot site

Type	Area (ha)	Population	Unit of Water Supply Amount	Planned Water Supply Volume	Wastewater Ratio	Planned Wastewater Volume
Residential Facility	314.3	210,824	120 L/person	25,300 tons	0.8	21,000 tons
Commercial Facility	87.9					
Industrial Facility	215.6					
Public and Park	373.0					
Total	1,219.7					



11) Water Supply Plan

■ Basic Directions

- The water supply of Abuja and its nearby areas is managed by the Federal Capital Territory Water Board (FCTWB), which was founded in 2017. The water supply plan of the pilot site has to be established according to the upper water supply network plan prepared by the FCTWB.
- The water supply source to Abuja is the Usuma Dam and the Lower Usuma Dam Water Treatment Plant (LUDWTP) completed its third and fourth expansion between 2011 and 2013.
- The LUDWTP can produce 720,000 tons of water per day, which is equal to the amount 5 to 10 million people can use based on the water consumption per capita of Nigeria.
 - The expected amount of water supply to the pilot site is 30,600m³ per day.

[Figure 5-12] Usuma Dam and power plant

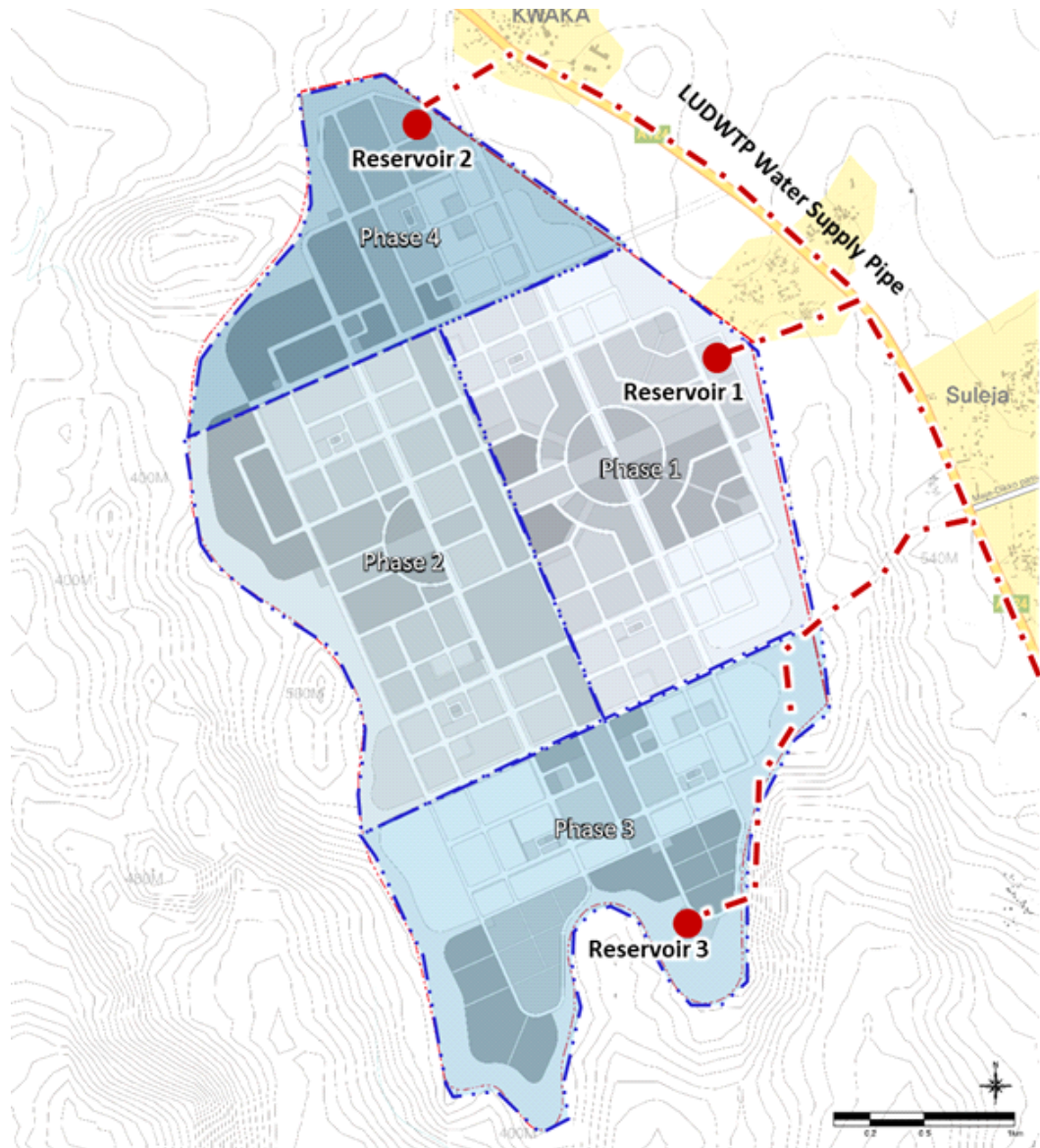


Source: FCTW website

- The water supply from the Usuma Dam has to be first stored at a reservoir before distributing to households or offices.
- The reservoir can either be constructed underground or on the ground, which is to be decided in light of facility costs and usability as well as the economic feasibility and convenience of operations and management.
 - The reservoir development plan can take a similar approach to that was explained for the wastewater treatment facility plan above.
- Considering the pilot site to be developed by phase, building the reservoir by phase is advantageous in terms of operations and maintenance, and its plan can be described as below, assuming it goes through four phases.

■ Water Supply Planning Map

[Figure 5-13] Water supply planning map of the Suleja pilot site



Lower Usuma Dam Water Treatment Plant (LUDWTP)





12) Electricity Supply Plan

■ Basic Directions

- Some of the electricity in the central Nigeria are generated at the 600MW Shiroro hydroelectric power plant, located 120km away from Abuja in a straight line. Electricity generated at the Shiroro plant is being supplied to areas such as Abuja, Suleja, and Minna.
- Electricity in Nigeria is controlled by the Nigerian Electricity Regulatory Commission (NERC), and the power supply network of the Abuja region is managed by Abuja Electricity Distribution Company PLC. (AEDC). Consultations regarding the power supply for the Suleja New Town have to be made with the AEDC.
- Stable power supply to the pilot site requires the installation of service lines to existing transmission lines and it is best practice to build an electrical substation near the pilot site. Currently, there are 132kV transmission lines along the A124 highway, which is close to the pilot site.
- Burying power supply lines underground will be beneficial for the pilot site in terms of the urban landscape and operations and maintenance.

■ Electricity Supply Plan

[Figure 5-14] Electricity supply planning map of the Suleja pilot site



iii. Building Arrangement Plan

1) Basic Directions

- The arrangement plan was established in such a way that the entire pilot site is divided into four project areas for four phases.
- The project site for the first phase is located east of the 140 m wide north-south green space axis. It will be connected to the A124 highway with two major arterial roads which will function as the entrances to the site.
- Near the east-west green space axis that connects the first and the second phases, commercial areas are planned. They are also around 40 m wide major arterial roads that are linked to Kwaka. Residential areas will be built within a 1,000 m radius from central commercial areas and manufacturing and high-tech industrial facilities. This will create a town of short commuting distances where residential and industrial areas coexist.

[Figure 5-15] Aerial view of arrangement plan by property type for the first phase-1





2) Residential Facilities

- Residential properties are divided into three types depending on the density: detached housing properties, medium density housing properties, and high density housing properties.
- Four to five story buildings of high density housing will be constructed next to commercial properties while detached houses will be built near the suburbs and industrial properties.
- High density residential properties near commercial properties will have 50 to 70 m wide green spaces in between, which will act as buffer zones and create a stable residential environment.
- Along a 35 m wide major arterial road will run a 10 to 20 m wide green space axis, which will protect the residential environment from traffic noise and function as a pedestrian road leading to local communities.

[Figure 5-16] Overall aerial view of residential properties



■ Arrangement Plan for Detached Houses

- Detached houses will be two stories with a building coverage ratio of 40% or less and a floor area ratio of 60% or less. A total of 7,734 units will be supplied. The plan was devised based on five to six people per household.
- In view of local preferences, bungalows with slanted roofs and traditional dome-shaped Nigerian houses are planned by district.

[Figure 5-17] Overall aerial view of detached houses



[Figure 5-18] Detailed aerial view of detached houses





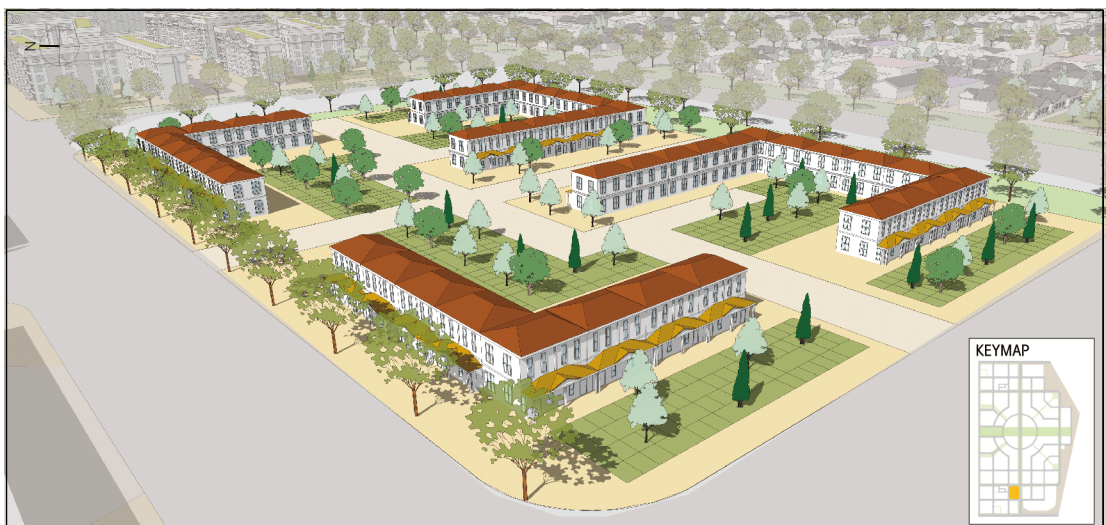
■ Arrangement Plan for Medium Density Housing Facilities

- Medium density housing properties will be built with a building coverage ratio of 40 to 50% and a floor area ratio of 80 to 150%. In light of the urban landscape, those close to high density housing properties will be three story condominiums while others will be two stories high.
- Two to three story condominiums will be duplexes.

[Figure 5-19] Overall aerial view of medium density housing properties



[Figure 5-20] Detailed aerial view of medium density housing properties



■ Arrangement Plan for High Density Housing Facilities

- High density housing properties will be built with a building coverage ratio of 60% or less and a floor area ratio of 240 to 300%. They will be constructed close to central commercial and business areas.
- Four to five story buildings in the high density housing areas will be divided into two types: the flat type and the terrace type.

[Figure 5-21] Overall aerial view of high density housing properties



[Figure 5-22] Detailed aerial view of high density housing properties





3) Commercial and Business Facilities

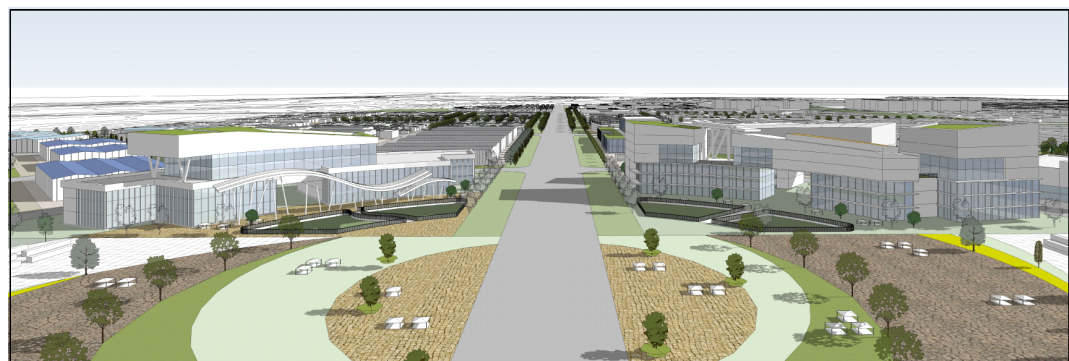
■ Commercial Facility Arrangement Plan

- The place where the 140 m wide north-south green space axis meets with the east-west green space axis that connects the first and second phases will be the town's central activity area. A community network square will be introduced there, which will be surrounded by commercial facilities to provide a cultural and commercial space.
- The arrangement of curved buildings in four fan-shaped pieces of land, excluding the green space in the center of the commercial area, will form a community ring in the central square, which will enhance accessibility and usability.
- The lower floors of these buildings will have food and beverage outlets to let visitors interact with the square and freely move between inside and outside. They will also have community corridors to hold various events and add vitality to town.

[Figure 5-23] Overall aerial view of commercial properties



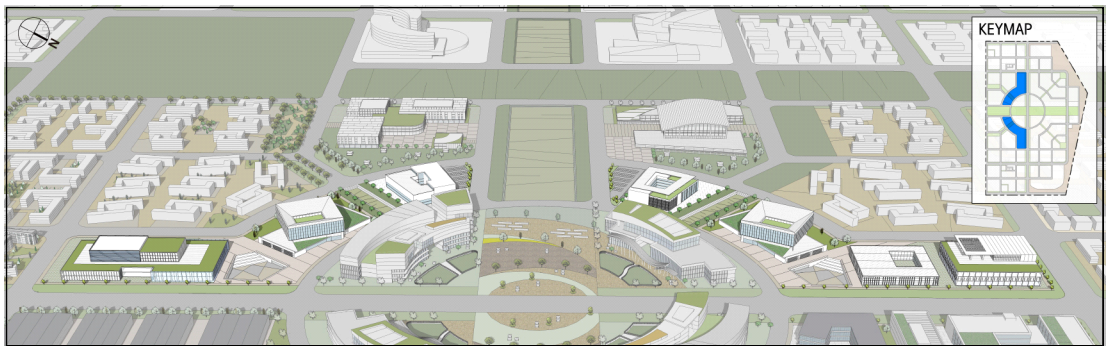
[Figure 5-24] Detailed aerial view of commercial properties



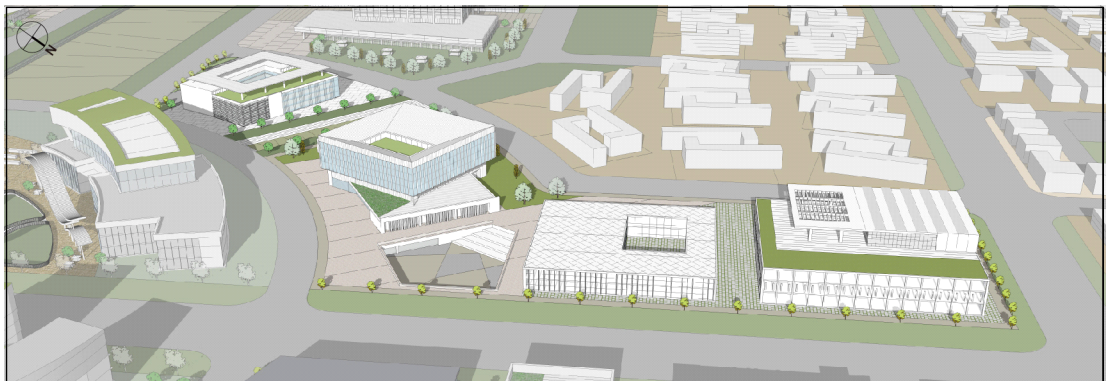
■ Business Facility Arrangement Plan

- Business facilities will be located close to commercial areas and high density housing properties, securing the centrality of the Suleja region.
- A 20 m wide green space axis will function as a buffer zone from major arterial roads. A 50 m wide green space axis for pedestrians that connects with high density housing properties and commercial areas will be created to improve the business area's connectivity.

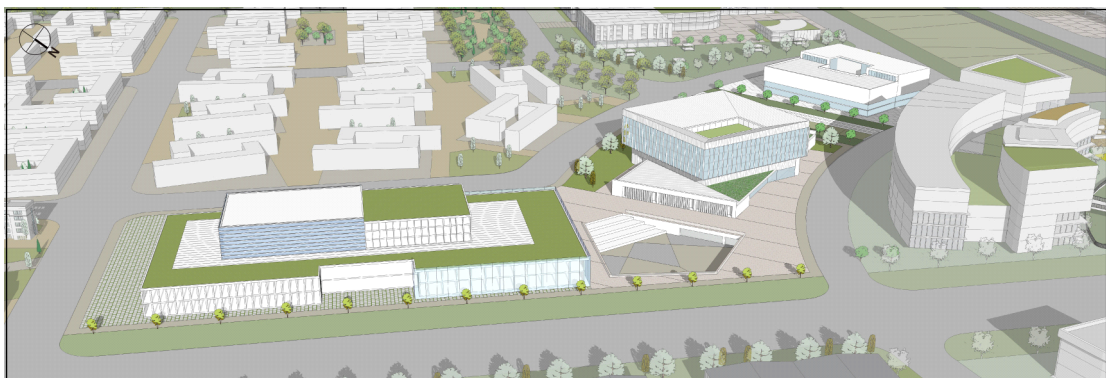
[Figure 5-25] Overall aerial view of business properties



[Figure 5-26] Detailed aerial view of business properties-1



[Figure 5-27] Detailed aerial view of business properties-2



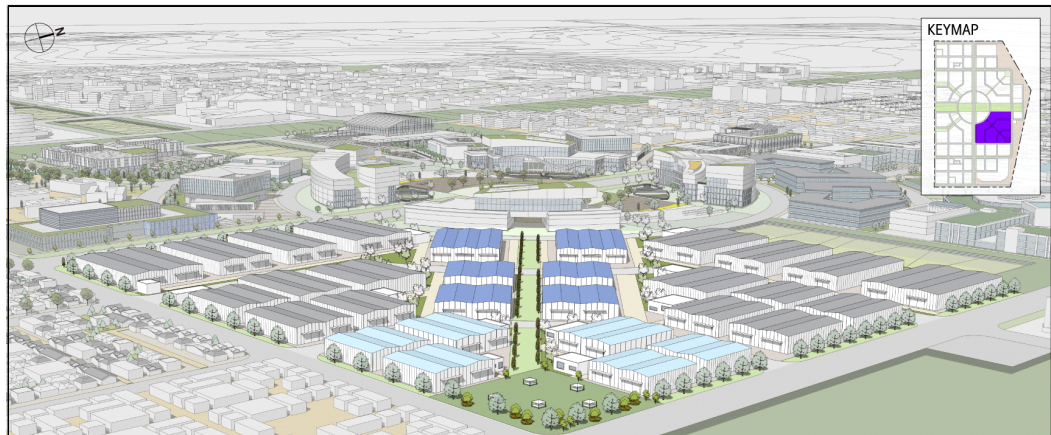


4) Industrial Facility Properties

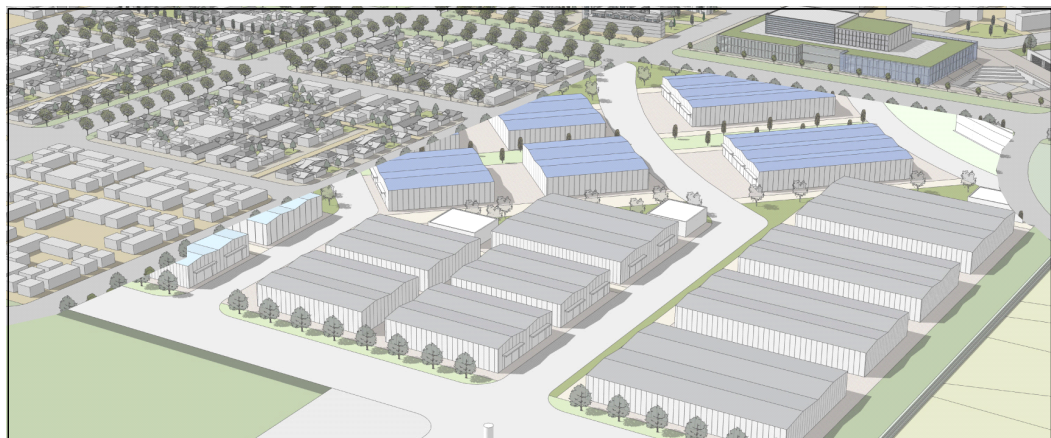
■ Manufacturing Facility Arrangement Plan

- Manufacturing facility properties are designed in an industrial environment that is based on agriculture of the primary industry, manufacturing of the secondary industry, and logistics and sales consulting of the tertiary industry.
- Long span steel structures and insulation panels will be used to build a large-scale district, and solar equipment will be installed on their roofs to provide to be energy self-sufficient with eco-friendly energy.
- A 20 m wide pedestrian road starts from commercial facility properties and passes through industrial facility properties to reach a neighborhood park, bolstering the industrial cluster's accessibility to other places.

[Figure 5-28] Overall aerial view of manufacturing facilities



[Figure 5-29] Detailed aerial view of manufacturing facilities



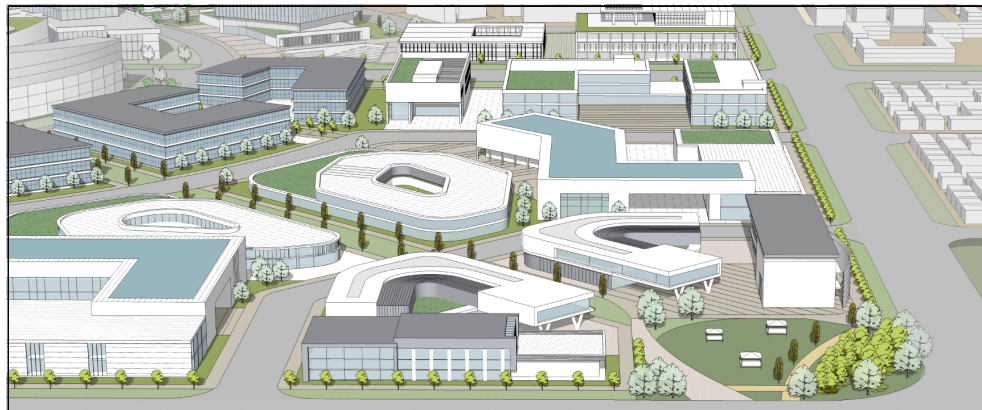
■ High-Tech Facility Arrangement Plan

- High-tech facility properties are meant to be an industrial complex that converge renewable energy, information technology (IT), and culture technology (CT). They will be home to new renewable energy-related companies, high-tech research centers, and talent development and support facilities.
- A multi-purpose building will be created to house an industrial-academia cluster whose platform pursues research, development, and commercialization for technological innovation.
- High-tech facilities will be located close to commercial properties. Each industrial property will have a neighborhood park to let workers at the cluster enjoy rest spaces and communicate with each other.

[Figure 5-30] Overall aerial view of high-tech industrial facilities



[Figure 5-31] Detailed aerial view of high-tech industrial facilities

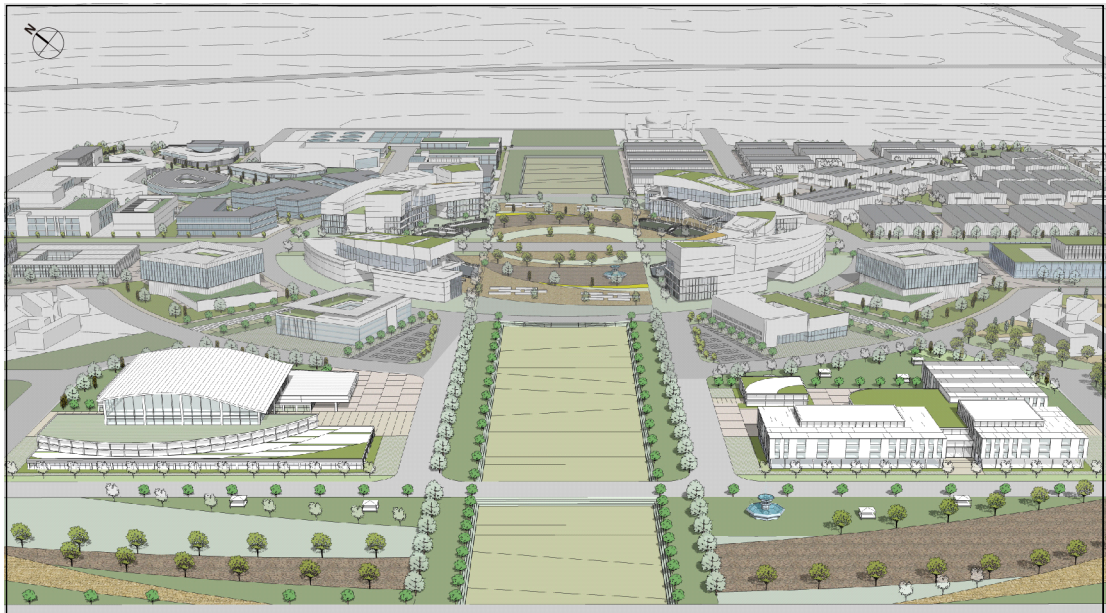




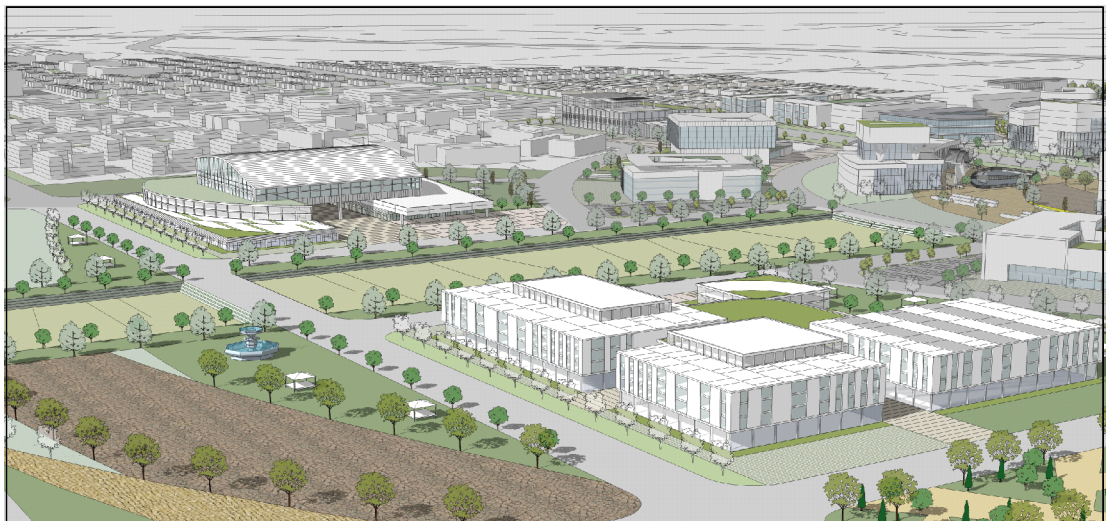
■ Institutional Facility Arrangement Plan

- Institutional facilities will be located at the intersection of the green space axes. They will rise no more than five stories high and will provide administrative and educational support to the citizens.
- Their lower floors that overlook nearby parks will house spaces such as a library and a Nigerian history museum to enable the citizens to have access to leisure and cultural activities.

[Figure 5-32] Overall aerial view of institutional facilities



[Figure 5-33] Detailed aerial view of institutional facilities



iv. Smart City Service Plan

1) Basic Directions

- Determine smart city services applicable to the entire Suleja New Town
- Propose an operation plan of the information and communications network and the integrated control tower based on smart city technology
- Propose methods to introduce mutual links among information systems
- Propose ways to foster and develop regional industries by applying smart city technology
- Provide services related to production, collection, processing, and utilization of smart city information

2) Selecting Smart City Services

■ Process of Determining Smart City Services

- Conduct a five-step analysis to determine services and establish their development plans for each field

[Table 5-12] Service determining process

Type	Installation Standards in Korea
Analyzing Regional Environment	• Analyze upper and related plans and assess service applicability considering the current condition • Conduct a survey of relevant departments to analyze their needs
Selecting Service Fields	• Review Niger State's key requests to select service fields Examples: transportation, energy, industry, waste, etc.
Determining a List of Services	• Determine a list of items appropriate to the Suleja New Town among specific services in each field Examples: smart parking management in transportation, smart grids in energy, etc.
Selecting Services	• Select a detailed list of services based on criteria that include applicability, feasibility, etc.
Establishing Service Implementation Plan	• Establish a specific service implementation plan for each field that takes into account matters such as service necessity, service functions, service definitions, service installation scope, service beneficiaries, service profit structures, and others



■ Determining a List of Services

- A total of 28 services in seven fields that reflect regional characteristics were determined after reviewing urban and environmental issues of Niger State, conducting a survey of relevant departments, and collecting opinions from Smart City Company.

[Table 5-13] List of smart city services in the Suleja New Town

Type	Service	Type	Service
Smart Living	IoT Gardening Service	Smart Safety	Smart Street Light
	Smart Insulation Service		Hazardous Gas and Explosives Management
	Automated Healthcare Service		Forest Fire Detection Service
	Smart Ventilation Service		Smart CCTV Service
Smart Industry	Smart Farm	Smart Environment	Air Quality Control Service
	Specialized Software Solution		AI Waste Management
	Remote Vocational Education Service		Water Quality Monitoring Service
	Business Incubating Center		Smart Wastewater Treatment Service
Smart Energy	Smart Grid	Smart City	Smart Kiosks
	Smart Meter		Public Wi-Fi Service
	Renewable Energy (Solar)		Smart Administration Service
	Smart Mineral Detection Service		Data Centers
Smart Mobility	Smart Parking Management Service		
	Intelligent Traffic Management System		
	Highway Toll Service		
	Integrated Control Center		

■ Selecting Smart Services

- Among the 28 services outlined above, services that need prioritized implementation were selected using the Delphi method. In the feasibility aspect, economic feasibility, stability, and urgency were considered. In the aspect of expected effectiveness, convenience, importance, and public interest were weighed.

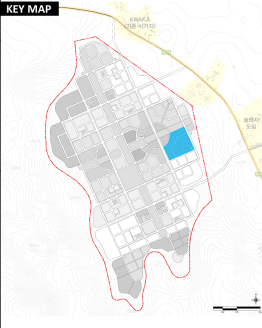
[Figure 5-34] Smart services selected for the Suleja New Town

Smart Industry	Smart Energy	Smart Mobility	Smart Safety
Smart Farm	Smart Grid	Smart Parking Management Service	Smart Street Light
Specialized Software Solution	Smart Meter	Intelligent Traffic Management System	Hazardous Gas & Explosives Management
Remote Vocational Education Services	Renewable Energy	Highway Toll Service	Forest Fire Detection Service
Business Incubating Center	Smart mineral detection service	Integrated Control Center	Smart CCTV Service

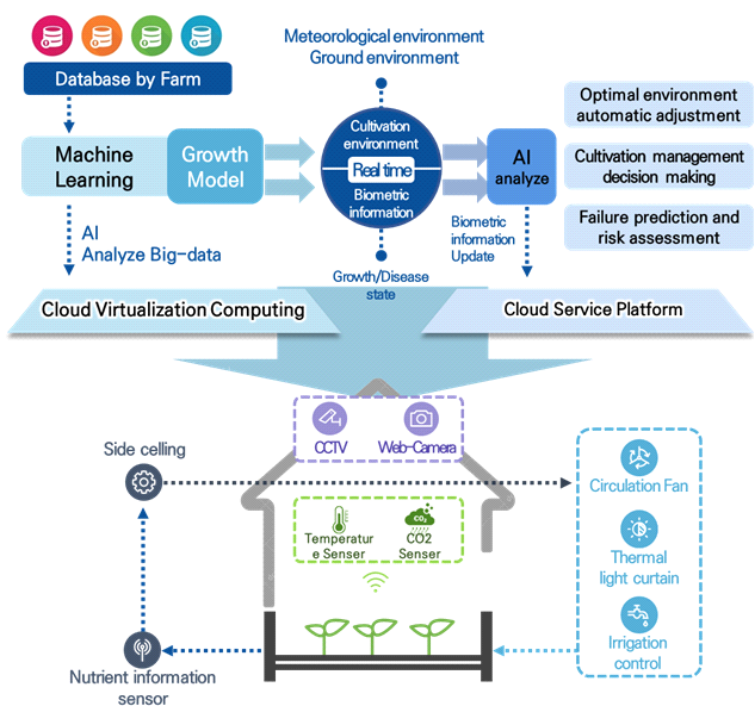
3) Smart Services Implementation Plan

■ Smart Farms

[Table 5-14] Implementation plan for smart farms

Aspect	Content	
Definition	Applying ICT to remotely and automatically observe growing conditions for crops and manage them to be optimal	
Functions	- Build a system to remotely manage growing conditions and automate it - Introduce vertical farming to increase production - Create a cultivation support system to provide an optimal cultivating environment	
Technology	- LED lighting system and cultivation beds - Nutrient solution irrigation system - Integrated environment control system	Location (example) 
Infrastructure and Considerations	One system of hardware and software as well as on site equipment such as LED lights, cultivators, circulators, cold storage, paddy fields, sprays, and distribution boards	
Overview of Service	- Spatial scope: Suleja New Town - Service users: agricultural workers - Operator: Business entities designated by the Niger State Ministry of Work & Infrastructure Development	
Expected Outcomes	- Convenient management with ICT-based smart farm technology - Growth period reduction and increased production - Stable production base for agriculture	

Concept Map





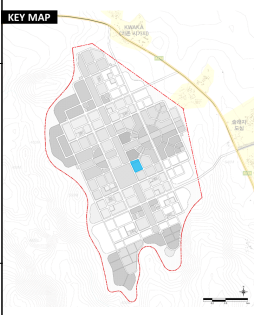
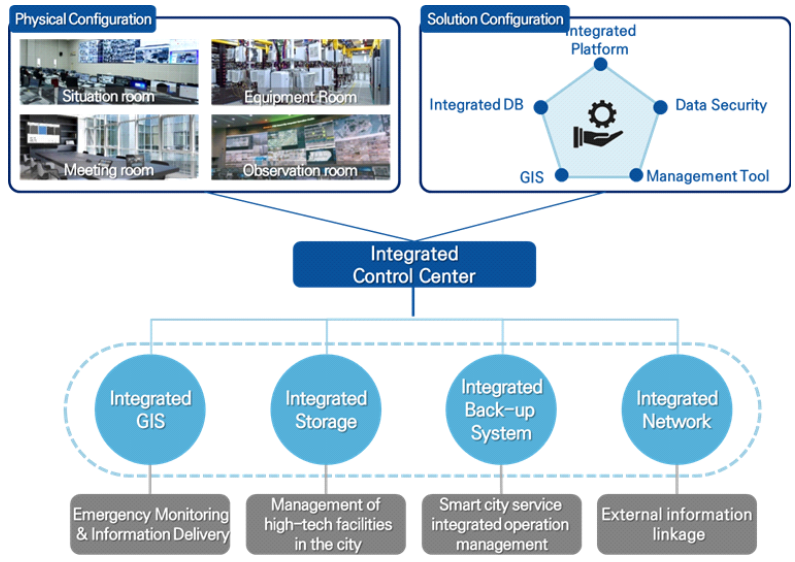
Renewable Energy System

[Table 5-15] Implementation plan for renewable energy system

Aspect	Content
Definition	New town renewable energy infrastructure that utilizes eco-friendly new energy systems in separate or hybrid manners
Functions	- Use smart grids to enable integrated management of electric and non-electric power data as well as electric and non-electric power equipment information - Integrated management of urban energy using a 2D/3D GIS-based energy map - Provide optimal plans for urban energy supply
Technology	- Data collection, storage, and analysis - Eco-friendly energy technology including EMS, BEAM, and solar power generation
Infrastructure and Considerations	- One center system of hardware and software as well as on site equipment such as solar panels, DCUs, repeaters, smart meters, and wireless modems - Need cooperation between urban energy suppliers and consumers as well as consideration for management systems and authorities
Overview of Service	- Spatial Scope: entire Suleja New Town - Service Users: residents and workers - Operators: energy supply management organizations
Expected Outcomes	- Contribute to stable power supply and greenhouse gas reduction - Make the people's lives easier through efficient power consumption and peak electricity management - Raise public awareness of renewable energy - Assist in creating new quality jobs on the back of expanding renewable energy businesses
Concept Map	

■ Integrated Control Center

[Table 5-16] Implementation plan for integrated control center

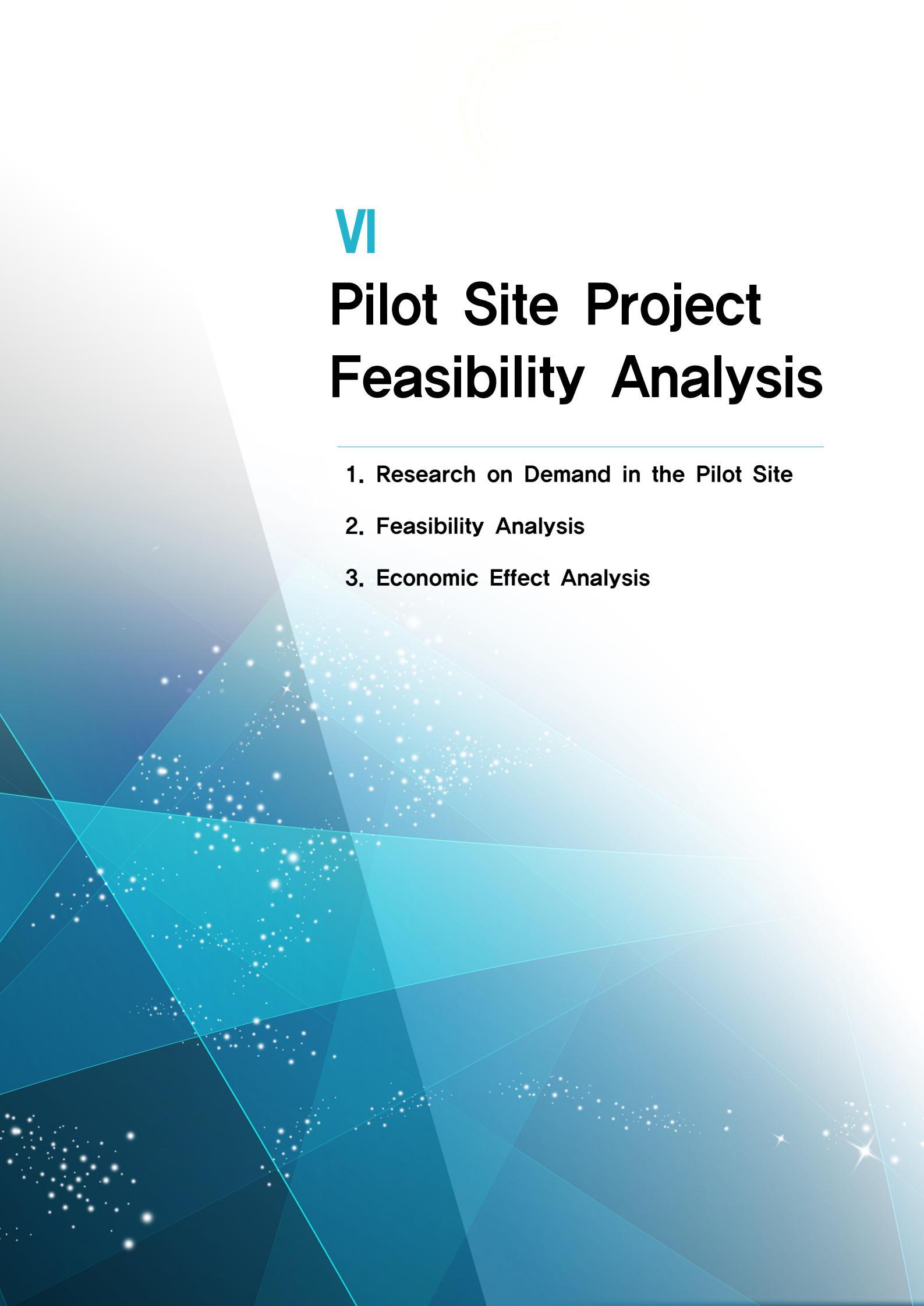
Aspect	Content	
Definition	Integrate the town's data on electricity, water, gas, waste, networks, traffic, crime prevention, etc. for a control system	
Functions	- Integrated control monitoring system synced with a GIS map - Collect real-time videos with multi-purpose CCTV cameras and livestream them to video control servers - Share key data with digital signage installed in the town	
Technology	- Control equipment with LED DLP Cube display - Wall Controller-based system operation - Integrated and real-time monitoring system - Video security technology in CCTV cameras	Location (Example) 
Infrastructure and Considerations	- Need high availability of power supply for computer equipment using static transfer switches (STCs) in case of emergency - Need cooperation and fire fighting equipment to maintain optimal temperature and humidity	
Overview of Service	- Spatial scope: entire Suleja New Town - Service users: residents and workers - Operator: Niger State government	
Expected Outcomes	- Can run a system 24/7 all year round and prevent crimes - Can improve the public's safety and convenience - Can respond rapidly to crimes and disasters as well as build an efficient cooperation system with relevant organizations	
Concept Map		



■ Smart CCTV System

[Table 5-17] Implementation plan for smart CCTV system

Aspect	Content
Definition	Service that helps prevent crimes and enables rapid responses to them with a high-resolution CCTV system installed in main urban areas for day and night monitoring
Functions	- Day and night video monitoring 360° rotation with preset capability - Alarm bells, warning lights, warning broadcasting - Fast search by intelligent video analyses
Technology	- Camera technology - Intelligent video analysis technology - GIS technology - Wired and wireless communications technology
Infrastructure and Considerations	- Infrastructure: a center system, CCTV cameras, a wired and wireless communications network - Need to select a system that can integrate and connect with the existing CCTV system
Overview of Service	- Spatial scope: entire Suleja New Town - Service users: residents and workers - Operators: Niger State's local governments and security centers
Expected Outcomes	- Can be used to prevent crimes in dangerous or vulnerable areas - Video evidence can lead to a faster capture of criminals and can minimize second crimes - Rapid responses to violent crimes and medical emergencies can secure the public's safety
Concept Map	The Concept Map illustrates the Smart CCTV System architecture. On the left, a box labeled 'CCTV installation area' lists four locations: Pedestrian Road, Residential Area, Central Commercial Area, and Park. In the center, a 'Security CCTV' camera icon is connected to a 'City Integrated Control Center Data Center' (represented by a cloud icon) via a 'CCTV Network' (represented by a radio tower icon). Above the camera is a 'Citizen Report' icon (megaphone), and below it is an 'Emergency Bell' icon (bell). On the right, a box labeled 'Service Target' lists five groups: Senior citizen, Children, Disabled, and Legal Guardian. Below the 'CCTV Network' icon, three service locations are listed: Police office, Hospital, and Fire station. Arrows indicate the flow of data and service from the installation areas through the network to the control center and then to the service targets.



VI

Pilot Site Project Feasibility Analysis

1. Research on Demand in the Pilot Site
2. Feasibility Analysis
3. Economic Effect Analysis



VI. Pilot Site Project Feasibility Analysis

i. Research on Demand in the Project Site

■ Demand Forecasting Methods

- The increased amount of the demanded area by property type in Gurara, Suleja, Tafa, and Gwagwalada was compared to the amount of the planned area to analyze if the planned area could meet the residential and industrial property demand.
- Methods to Forecast the Residential Property Demand
 - The population growth in the administrative district near the project site was predicted to estimate the population at the time of residential property supply. The average number of household members was used to calculate the demand.
 - The residential property supply schedule was considered to calculate the proportion of residential facilities to respond to a population increase for each year.
- Methods to Forecast the Industrial Property Demand
 - The state and city levels were used to define industry types and estimate the demand of industries by type. To predict the demand for industrial properties, the following were taken into account: the average number of new jobs created annually, GDP shares of industries by type in Niger State, and areas required to accommodate new jobs for the selected industries.
- The Amount of Area by Property Type to be Supplied in the Project Site
 - The construction plan for the new city whose area is to be 106km² in Suleja consists of four phases, with each phase lasting five years. Starting in 2022, the 20-year plan will supply housing for 37,249 households as well as residential, retail, business, and industrial properties.

[Table 6-1] Area supply plan by phase for the project site (m²)

	Phase 1		Phase 2		Phase 3		Phase 4	
Residential	1,009,114	32%	976,180	31%	865,306	28%	292,575	9%
(Household)	14,573 households		16,886 households		4,327 households		1,463 households	
Retail	279,839	32%	373,436	42%	118,958	14%	106,911	12%
Industrial	443,934	21%	310,968	14%	826,229	38%	575,221	27%
Others	1,743,330	29%	1,790,211	30%	1,442,467	24%	1,041,897	17%
Total	3,476,217	29%	3,450,795	28%	3,252,960	27%	2,016,604	17%

Source: National Bureau of Statistics, Nigeria

■ Estimating the Demand for Residential Properties

○ Overview and Status of Areas Near the Project Site

- The project site is near Abuja, located in North Central, one of Nigeria's six zones, and is also close to the highly populated Local Government Area (LGA). The population was about 300,000 in 2016, the highest among all areas in the vicinity. Creating additional urban space requires its population density to be taken into account.

○ Calculating the Estimates of Annual Average Population Growth

- The past population statistics of Suleja and its nearby areas were used to calculate annual average population growth rates, from which population estimates for the expected duration of the project were made. The results showed that Gurara, Suleja, and Tafa will see an annual average growth rate of 3.46% and Gwagwalada will see that of 9.75%.

○ Population Forecast for the Project Site and Its Nearby Areas

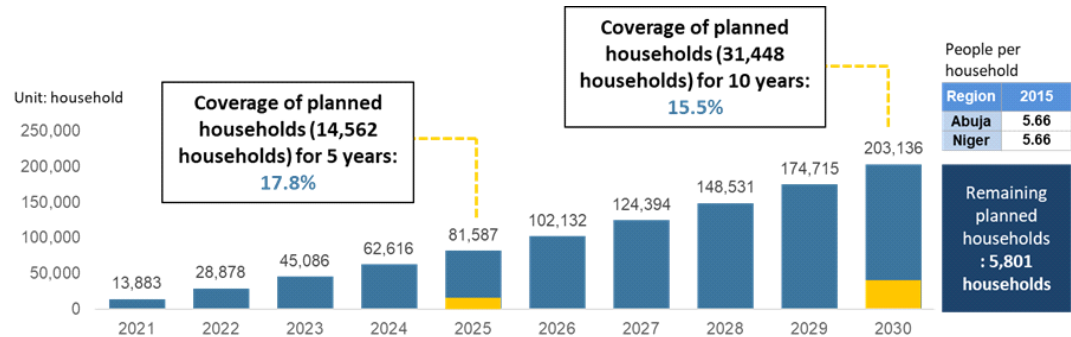
- Considering annual average population growth rates since 2016, the population of the project site and its nearby areas in 2020 is estimated at 1,210,763. By 2030, the population will experience an increase of 1.5 million.

○ Planned Housing Units to Accommodate the Population Increase

- Assuming that the number of members per household is 5.66, population estimates for the next decade were used to predict that the demand for housing units until 2030 is 203,136. The project will create 31,448 housing units, which will meet 15.5% of the demand.



[Figure 6-1] Annual increases in number of households compared to planned number of households



Source: National Bureau of Statistics, Nigeria

■ Estimating the Demand for Industrial Properties

○ Using a Two-Step Process to Estimate the Demand for Industrial Properties

- The first step was to select key industries at the state level and the city level, and the second step was to calculate the number of jobs created by these industries and determine the industrial area required per worker.

○ Selecting Six Key Industries to Estimate the Demand for Industrial Properties

- At the state level, key industries appropriate for Niger State were chosen from the 26 industries outlined in Niger State Vision 2020.
- The six chosen industries at the state level are food, beverages and tobacco; textile, apparel and footwear; non-metal products; basic metals, iron and steel; electricity, gas, steam and air conditioning supply; and information and communications technology (ICT).
- Among the six state-level industries, secondary industries were reviewed to narrow them down to city-level industries. They were usually light industries that are labor-intensive and suitable to be introduced at an early stage of industrialization.
- The four city-level industries were joined by two more city-specific industries to form the final six industries: food, beverages and tobacco; textile, apparel and footwear; electricity, gas steam and air conditioning supply; ICT; shipping services; and professional scientific and technical services.
- In sum, the final six city-level industries were decided by choosing two from the four secondary industries and two from the two third industries as well as by adding two agricultural and related industries.

[Table 6-2] Finalized city-level industries

	Industry	Type	Results
2 nd Industries	Food, Beverages and Tobacco	Light	○
	Textile, Apparel and Footwear	Light	○
	Non-Metallic Products	Heavy	X
	Basic Metals, Iron and Steel	Heavy	X
3 rd Industries	Electricity, Gas, Steam and Air Conditioning Supply	Green	○
	ICT	Smart	○
Additional Industries	Shipping Services	Niger-State Based	○
	Professional Scientific and Technical Services		○

- The estimation showed that annually expected demand for industrial properties is about 2,989,818m².
- A: Nigeria aims to create 3.75 million new jobs per year in average. Niger State accounts for 2.3% of the country's GDP, which means it needs to create an annual average of 85,940 jobs.
 - B: The six city-level industries make up for 25.7% of Niger State's total GDP. These industries in Niger State create an annual average of 22,094 new jobs.
 - C: The industrial area per worker is from 32.3m² to 344m².

[Table 6-3] Estimates for industrial demand

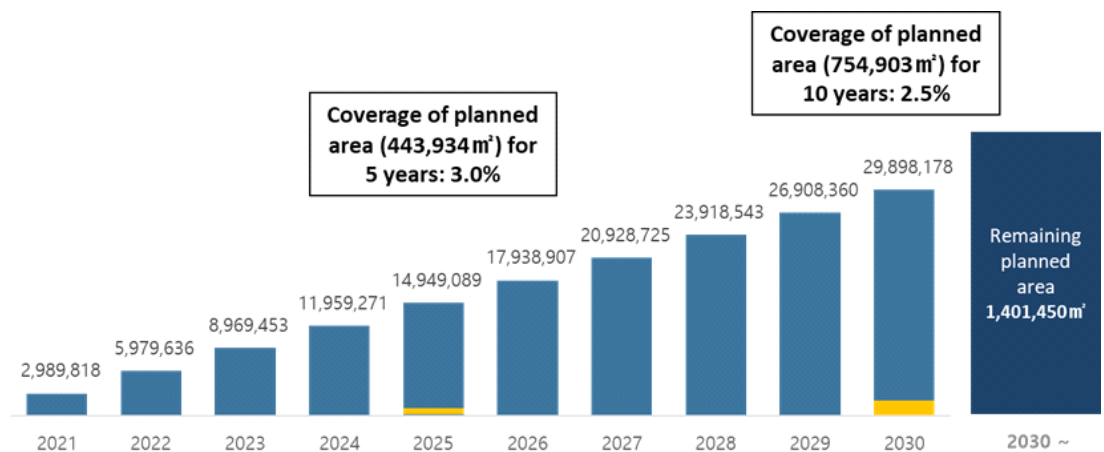
	A Number of New Jobs Created Per Year in Niger State	B(%) Proportion of GDP by Industry in Niger State	C(m ²) Industrial Area Per Worker	A*B*C(m ²) Annual Average Area Required by Industry
Food, Beverages, and Tobacco	85,940	4.9%	253.5m ²	1,060,913m ²
Textile, Apparel, and Shoes		2.8%	82.5m ²	199,812m ²
Electricity, Gas, Steam, and Air Conditioning Supply		2.0%	292.7m ²	488,178m ²
Shipping Services		0.6%	183.9m ²	96,205m ²
ICT		12.8%	32.3m ²	355,300m ²
Professional Scientific and Technical Services, etc.		2.7%	344.0m ²	789,409m ²
		Total: 25.7%	Average: 198.0m ²	Total: 2,989,818m ²

Source: ERGP (2017), Nigerian National Bureau of Statistics, KISCON



- Using the Number of Jobs to be Created by Selected Industries to Calculate the Annually Required Area for Industries
 - It is possible to calculate the number of new jobs needed to meet the industrial demand based on the number of new jobs created annually in Niger State and GDP proportion by industry. A required area per worker by industry allows us to calculate that the annually required area for industries is 2,989,818m².
- The coverage of planned area of industrial area is expected to account for 3.0% for 5 years and 2.5% for 10 years of industrial area required by Niger State.
 - The planned area of this industrial area for five years is 443,934m², 754,903m² for 10 years, and 2,156,353m² for 20 years.
 - The proportion of the industrial land area of this project site to the total required area of the selected industries is expected to account for 3.5% for 5 years and 3.0% for 10 years.

[Figure 6-2] Annual increases in demand for industrial area compared to planned industrial area



ii. Feasibility Analysis

1) Basic Assumptions

■ Time Period Assumption

○ Time Period Assumption by Phase

- The time period assumption made by phase to analysis the pilot site project's financial feasibility is the following.

[Table 6-4] Time period assumption for financial feasibility analysis

Time Period	Phase 1	Phase 2	Phase 3	Phase 4
Analysis Start Date (Project Start Date)	2022-01-01			
Land Compensation Begins	2022-01-01	2022-01-01	2022-01-01	2022-01-01
Compensation Period	12 months	12 months	12 months	12 months
Land Compensation Ends	2022-12-31	2022-12-31	2022-12-31	2022-12-31
Construction Begins (Groundbreaking)	2023-01-01	2028-01-01	2033-01-01	2038-01-01
Construction Period	60 months	60 months	60 months	60 months
Construction Ends (Completion)	2027-12-31	2032-12-31	2037-12-31	2042-12-31
Sales Begin	2023-01-01	2028-01-01	2033-01-01	2038-01-01
Sales End	2033-12-31	2038-12-31	2043-12-31	2043-12-31
Project End Date	2043-12-31			

■ Area Assumption

○ Land Development Plan of the Project

- According to the land use plan, profitable land (residential, commercial, and industrial land) accounts for 51% and non-profitable land accounts for 49%.
- For profitable land types, residential land accounts for 26% (314ha) of the total area, commercial 7% (88ha), and industrial 18% (216ha).



2) Project Cost Assumption

■ Overview of Project Cost Assumption

○ Total Investment Cost

- The investment cost is calculated under the assumption that the project uses Niger State's state-owned land.
- The total investment cost that reflects basic cost, inflation, special purpose company operation cost, financial cost, and others is shown below.

[Table 6-5] Overview of investment cost

Cost Type	Cost (USD 1,000)	Proportion	Note
Land Cost	-	-	
Construction Cost	842,232	71.14%	Excludes infrastructure construction cost
Inflation	197,005	16.64%	Based on average CPI estimates in USD for the next 4 years
SPC Operation Cost	111,810	9.44%	Refer to local SPC's data
Financial Cost	32,885	2.78%	Interest costs and financial fees
Total	1,183,933	100.00%	

3) Revenue Estimates

■ Sales Price Per Square Meter

○ Sales Price Per Square Meter by Land Use

- Sales prices per square meter by land use were estimated by analyzing local land trading cases in Nigeria and construction cost. Seasonal escalation effects were reflected.

[Table 6-6] Sales price per square meter

Land Type		Sales Price Per Square Meter (1,000 USD/m ²)	Price Increase Rate (Annual)
Residential	Sale	296-608	2.08%
	Rental	132-270	
Commercial/Office		224-278	
Industrial		143-210	

■ Sales Schedule and Ratio of Sold Units

○ Sales Schedule by Land Use

[Table 6-7] Sales schedule for residential land

Residential	Phase 1	Phase 2	Phase 3	Phase 4
Sales Begin	2023-01-01	2028-01-01	2033-01-01	2038-01-01
Sales Period	10 years	10 years	10 years	5 years
Sales End	2032-12-31	2037-12-31	2042-12-31	2042-12-31

[Table 6-8] Sales schedule for commercial land

Commercial	Phase 1	Phase 2	Phase 3	Phase 4
Sales Begin	2027-01-01	2032-01-01	2037-01-01	2042-01-01
Sales Period	5 years	5 years	5 years	2 years
Sales End	2031-12-31	2036-12-31	2041-12-31	2043-12-31

[Table 6-9] Sales schedule for industrial land

Industrial	Phase 1	Phase 2	Phase 3	Phase 4
Sales Begin	2024-01-01	2029-01-01	2034-01-01	2039-01-01
Sales Period	10 years	10 years	10 years	5 years
Sales End	2033-12-31	2038-12-31	2043-12-31	2043-12-31

○ Ratio of Sold Units

- The assumption was made that sales of residential land will begin first followed by those of commercial land and industrial land, considering the urban construction period.
- Until construction ends by phase, it is assumed that the ratio of sold residential land will reach 60%, commercial land 20%, and industrial 40%. It is considered that residential districts will be built before commercial districts.
- The planned ratio of sold units is the same for every phase, and phase 4 is planned based on a sales period of six years.

■ Schedule for Collecting Payments

○ Payment Collection Guidelines

- A 20% down payment on the land has to be made on the contract date. After the contract, a 20% intermediate payment has to be made every time it is due. The remainder has to be paid on the construction completion date. The remainder is set at 20% of the sales price; however, if there are any outstanding intermediate payments, they need to be made in order for the remainder to be paid in full.



4) Financing Assumption

■ Overview of Financing Plan

- It is assumed that the total investment cost will add up to \$11.84 billion. Financing will first be backed by cash inflows (sales revenue) from the project, and then by external sources.
- External sources will consist of 45% equity capital and 55% debt capital.
- Loans will follow the milestone method in which they will be requested each time a necessary construction cost is incurred. Repayments will follow the sculpted method in which they will not be fixed and will be made each time a surplus is generated.

[Table 6-10] Financing plan (in USD 1,000)

Type	Proportion	Total	Phase 1						Phase 2 and afterwards
			Sub-total	'23	'24	'25	'26	'27	'28 and afterwards
Project Cost		1,183,933	311,047	50,888	61,555	66,032	73,787	58,784	872,886
Sales Revenue	85.6%	1,014,154	141,268	7,384	23,224	30,417	37,770	42,473	872,886
Equity	6.5%	76,400	76,400	43,504	32,896	-	-	-	-
Debt	7.9%	93,378	93,378	-	5,435	35,615	36,018	16,311	-
Total	100%	1,183,933	311,047	50,888	61,555	66,032	73,787	58,784	872,886

5) Financial Feasibility Analysis Result

■ Financial Feasibility Analysis Result

[Table 6-11] Summary of profitability analysis result

Items	Project Level		Equity Level	
	Pre-tax	Post-tax	Attributable to Shareholders	Dividends
Internal Rate of Return (IRR)	24.91%	20.75%	20.44%	16.21%
Payback Period	6.75 Years	8.25 Years	9.5 Years	9.75 Years
Minimum Cumulative Debt Service Coverage Ratio	1.47			

[Table 6-12] Detailed annual projection of costs and revenue (in USD 1,000)

Type	Total	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
Sales Revenue	2,005,056	12,762	24,450	32,047	39,950	143,277	68,442	82,192	91,204	100,554	198,412
Construction Cost	-1,039,237	-45,188	-56,700	-57,879	-59,083	-38,140	-51,103	-62,148	-63,440	-64,760	-41,230
SPC Operation Cost	-111,810	-4,300	-4,390	-4,481	-4,574	-4,669	-4,766	-4,866	-4,967	-5,070	-5,176
Financial Cost	-32,885	-1,400	-466	-3,672	-10,130	-15,975	-1,242	-	-	-	-
Corporate Tax	-246,337	-379	-1,226	-1,630	-2,180	-2,600	-6,561	-8,268	-8,712	-10,226	-9,921
Cash Flow	574,786	-38,504	-38,331	-35,615	-36,018	81,893	4,769	6,911	14,085	20,499	142,086
Cumulative Cash Flow		-38,504	-76,836	-112,450	-148,468	-66,575	-61,806	-54,895	-40,810	-20,311	121,775
Type	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43
Sales Revenue	85,253	90,224	101,077	112,343	205,691	71,769	79,620	89,213	99,171	208,648	68,755
Construction Cost	-45,364	-66,028	-67,401	-68,803	-48,317	-28,534	-44,641	-45,570	-46,518	-38,391	-
SPC Operation Cost	-5,283	-5,393	-5,505	-5,620	-5,737	-5,856	-5,978	-6,102	-6,229	-6,359	-6,491
Financial Cost	-	-	-	-	-	-	-	-	-	-	-
Corporate Tax	-14,341	-17,952	-18,179	-20,176	-16,965	-16,448	-21,370	-19,941	-21,204	-21,783	-6,274
Cash Flow	20,265	851	9,992	17,744	134,673	20,931	7,631	17,600	25,220	142,115	55,990
Cumulative Cash Flow	142,040	142,891	152,882	170,626	305,299	326,230	333,861	351,461	376,681	518,796	574,786



6) Sensitivity Analysis

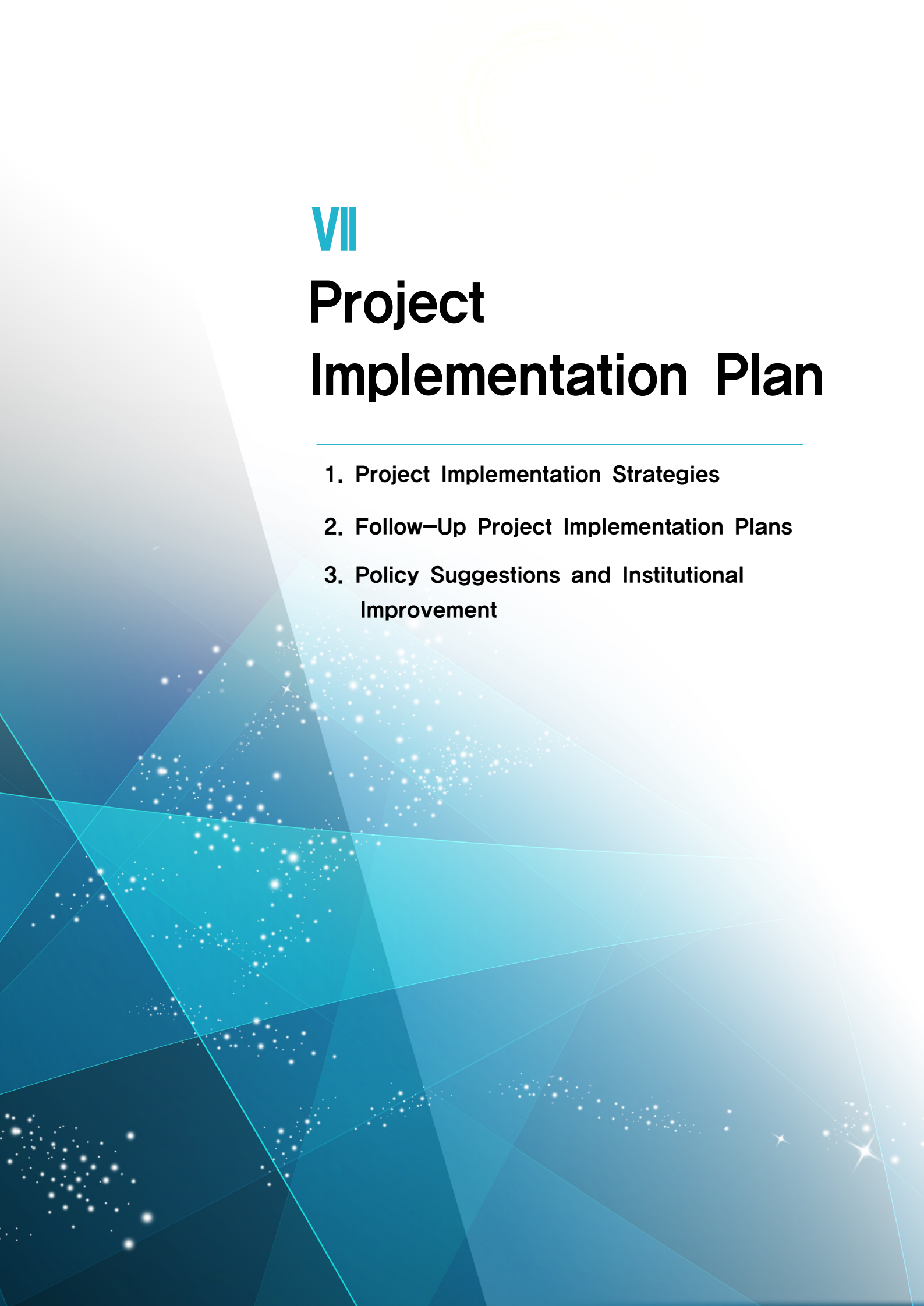
■ Selection of Key Variables and Summary of Sensitivity Analysis Result

- Construction costs and sales prices per square meter were selected as key variables that affect the project feasibility.
- Construction costs and sales prices per square meter are assumed to vary between -10% and +10%.
- The condition (an E-IRR of 15% or higher) where the project development can be implemented was assessed by the sensitivity analysis of construction costs and sales prices per square meter. At the moment, more than 10% increase in construction costs (more than 10% decrease in sales prices per square meter) results in an E-IRR of less than 15%, meaning that the project feasibility needs to be improved.
- Construction costs showed a P-IRR of 20.45% to 30.24% and an E-IRR of 16.01% to 25.89%. Sales prices per square meter showed a P-IRR of 20.00% to 29.72% and an E-IRR 15.55% to 25.34%.

iii. Risk Management Plan

[Table 6-13] Risk management plan

Risk Type	Risks and Management Plan	
	Potential Risks	Management Plan
Risk of Unsold Units	Sluggish sales of units may lead to increases in equity capital and debt capital, which then could hinder repayments for debt capital.	Continuous monitoring of circumstances such as project-related infrastructure development and the Nigerian government and Niger State's will towards the project is necessary.
Financing and Project Implementation	Not many previous developing country projects picked up on existing local plans. This may lead to some uncertainty in financing during the actual process.	Financing requires additional agreements such as the intervention of the Nigerian government or guarantees from guarantee institutions.
	Considering the current progress, there are many issues (state-owned land use, the government's support for urban infrastructure, etc.) to resolve before actually undertaking the project.	Efforts such as close consultations with local interested parties should be made to establish a structure that can minimize risks.
Exchange Rate and Inflation Risk	As a long term project, it will be continuously exposed to exchange rate and inflation volatilities.	To hedge exchange rate risks, short term forward contracts or currency swaps can be used.
	Depending on the currency supply and demand in Nigeria, high hedging costs may be incurred.	It should be better to fix the costs of key items such as construction costs and financial costs so that they are not coupled with inflation.
	At the time of financing, inflation rates can be higher than expected rates.	Sufficient financing may be considered as an option.
Exceeding Construction Costs	Costs of raw materials, labor, subcontract, and others may exceed expectations.	Contracts for raw materials, labor, subcontract, and other construction-related matters may be signed at fixed prices. Arranging sufficient finances for reserve is also considerable.
Other Sociopolitical Risk	Sociopolitical risks include revisions on project-related laws or statutes, restrictions on capital outflow, project acceptance or termination, strikes or protests, war, terrors, natural disasters, and other uncontrollable forces.	Preemptive measures include adding conditions that can mitigate risks to agreements with the governments during prior consultations and purchasing insurances that cover the costs lost by risks.



VII

Project Implementation Plan

1. Project Implementation Strategies
2. Follow-Up Project Implementation Plans
3. Policy Suggestions and Institutional Improvement



VII. Project Implementation Plan

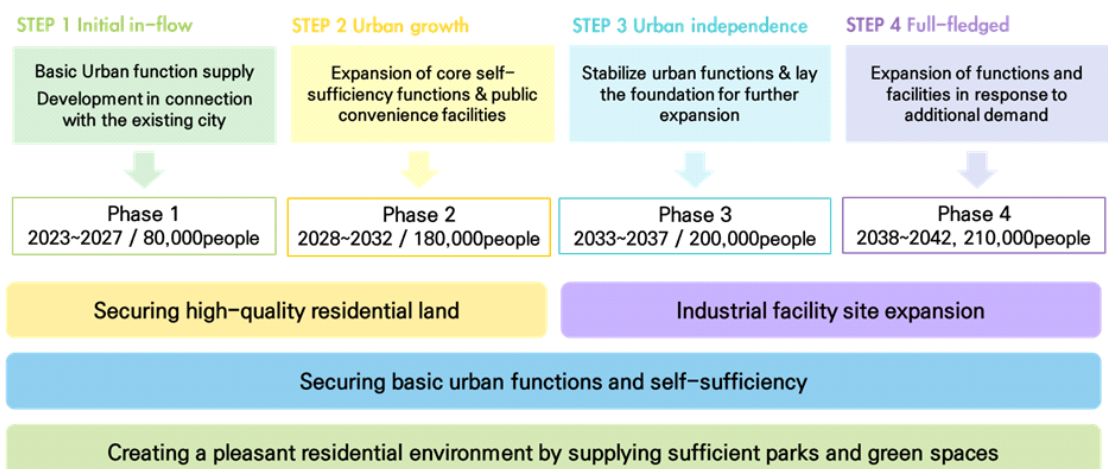
i. Project Implementation Strategies

1) Phased Project Implementation Plan

■ Basic Directions

- The development scope was determined and a phased implementation plan was devised in light of implementation periods according to the new town's functions.
- The new town's functions were categorized into several topics including providing residential areas; enabling self-sufficiency in terms of commerce, industry, and business; offering ecological and cultural environments; securing the public's health; and promoting the public welfare to create a multi-phase plan in view of implementation periods according to its functions.
- Niger State is taking the initiative for the pilot project of a new town near Abuja to be a success model.
- In Phase 1, a pilot site was designated to utilize the traditional infrastructure connected to nearby areas. Specialized functions were added to promote development.

[Figure 7-1] Phased project implementation plan



■ Phase 1: Initial In-Flow Phase

- A pilot site of a feasible size where existing infrastructure can be connected and utilized was selected to make the project more achievable and successful.
 - Construction costs were reduced by selecting a site that can utilize the traditional infrastructure by connecting to the existing build-ups in Suleja.
- Residential, commercial, industrial, and public facilities will be supplied for the initial inflow of population.

■ Phase 2: Urban Growth Phase

- Residential facilities will be expanded to accommodate the vitalized inflow of additional population.
- Industrial, commercial, and business facilities will be introduced to achieve key self-sufficient functions, and adequate public facilities and urban infrastructure will be established to boost the town's early settlement and stimulate its growth.

■ Phase 3: Urban Settlement Phase

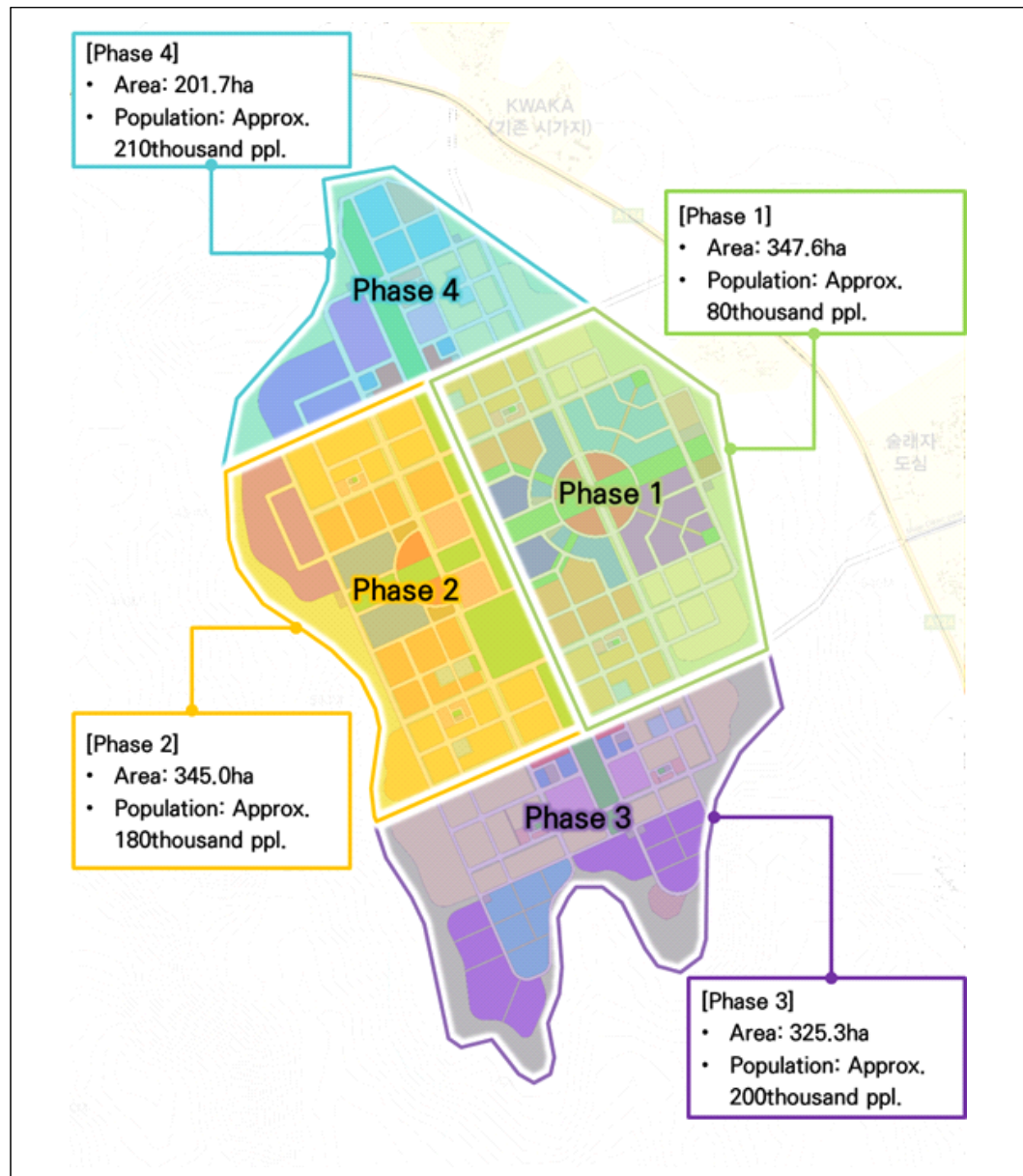
- This is a phase where the urban functions and infrastructure introduced in Phase 1 are maturing and where Phase 2 will have been completed. At this phase, the overall backbone of the town will be on the way to complete development.
- The plan in this phase will expand intellectual industrial spaces and develop quality housing in neighboring areas to continuously attract population and improve the town's self-sufficiency.

■ Phase 4: Full-Fledged Phase

- The completed new town will develop self-sufficient facilities for newly settled population and companies.
- Various public convenience facilities and urban infrastructure will be supplied to improve quality of life.



[Figure 7-2] Phase plan map



[Table 7-1] Area and planned population by phase

Type	Total	Phase 1	Phase 2	Phase 3	Phase 4
Area (㎡)	12,196,576	3,476,217	3,450,795	3,252,960	2,016,604
Proportion (%)	100.0	28.5	28.3	26.7	16.5
Planned Population (ppl)	210,828	82,485	178,060	202,548	210,828

[Table 7-2] Components of plan by phase

Component		Area (m ²)	Proportion (%)	Number of Households	Period (Years)
Phase 1	Total Area	3,476,217	100.0	14,573	2023 - 2027
	Detached House	389,074	11.2	1,945	
	Condominium	338,679	9.7	4,908	
	Apartment	281,361	8.1	7,720	
	Commercial/Office Facility	279,839	8.1		
	Industrial Facility	443,934	12.8		
	Public Facility	141,793	4.1		
	Park and Green Space	769,176	22.1		
	Infrastructure	832,362	23.9		
Phase 2	Total Area	3,450,795	100.0	16,886	2028 - 2032
	Detached House	-	-	-	
	Condominium	597,710	17.3	7,908	
	Apartment	378,470	11.0	8,978	
	Commercial/Office Facility	373,436	10.8		
	Industrial Facility	310,968	9.0		
	Public Facility	53,813	1.6		
	Park and Green Space	1,075,053	31.2		
	Infrastructure	-	0		
Phase 3	Total Area	3,252,960	100.0	4,327	2033 - 2037
	Detached House	865,306	26.6	4,327	
	Condominium	-	-	-	
	Apartment	-	-	-	
	Commercial/Office Facility	118,958	3.7		
	Industrial Facility	826,229	25.4		
	Public Facility	23,478	0.7		
	Park and Green Space	1,014,312	31.2		
	Infrastructure	404,677	12.4		
Phase 4	Total Area	2,016,604	100.0	1,463	2038 - 2042
	Detached House	292,575	14.5	1,463	
	Condominium	-	-	-	
	Apartment	-	-	-	
	Commercial/Office Facility	106,911	5.3		
	Industrial Facility	575,221	28.5		
	Public Facility	19,903	1.0		
	Park and Green Space	632,701	31.4		
	Infrastructure	389,292	19.3		
Total Area		12,196,576			



2) Project Structure Assessment and Suggestions

■ Project Implementation Structure

- This project is to build a new town in Niger State, which will be proceeded by establishing a special purpose company (SPC). The total investment cost is estimated to be \$1.184 billion.
 - Participants are not yet decided, but financing plan will be devised by considering local development financing cases and recent trends.
 - It is assumed that financing will first be backed by land sale revenue to minimize financing costs. The total investment cost is expected to be \$1.184 billion with the ratio of equity capital to debt capital being 45 to 55.
- The role of each participant in the project is as follows.
 - Niger State, a public entity, will be responsible for land supply as well as project authorization and permission. Equity investors are yet to be decided but a construction investor that can simultaneously proceed engineering, procurement, and construction (EPC) is likely to be involved.
 - For debt capital, project financing is expected to be utilized with a local commercial bank being the primary option. Meanwhile, diversifying financing channels to reduce costs is considerable.

■ Financing Plan

- Rapid urbanization and population growth drove up the demand for infrastructure, but African countries are financially insufficient to independently supply development finances, which explains why private investment efforts are increasing.
- Meanwhile, African countries' high national risks and low sovereign credit ratings make them difficult to obtain financing from both the international market and the local financial market.
- Large-scale, long-term projects like these have high risks and it is therefore important to improve their capital structure and reduce risks by injecting public funds from institutions such as multilateral development banks. Such efforts should be followed by investment from private capital.

- Co-financing¹⁾ by MDBs, the export credit agencies (ECAs), and development financial institutions (DFIs) as well as financing by local public-private partnership in Nigeria that involves private investment are encouraged.

[Table 7-3] Characteristics of financial institutions for financing

	Characteristics	Institutions
Multilateral Development Bank (MDB)	• Focus on support for economic development • Provide loans and guarantees • Small, long term, low interest loans • Look for procedural transparency	• African Development Bank • African Development Fund • Nigeria Trust Fund
Export Credit Agency (ECA)	• Support exports of and investment for domestic companies • Provide loans, guarantees, and insurances • Consider national interest and economic cooperation	• Export-Import Bank • Trade Insurance Corporation
Development Financial Institution (DFI)	• Support private projects with high development effectiveness and commercial viability • Focus on infrastructure support	• CDC (UK), Properco (France), DEG (Germany), etc.

[Table 7-4] Process for public-private partnership projects

Phase I: Project Development	• Define the necessity of a project and provide appropriate solutions • Prepare economic, social, environmental cost-benefit analysis and, if necessary, provide environmental impact assessment and economic feasibility analysis of various financing channels • Preliminary and comprehensive feasibility study and approval
Phase II: Project Procurement	• Organize project teams, establish management structures, and write an information memorandum and bidding documents • Select a preferred bidder through competitive bidding • Project approval (Approval by the federal executive council is required to sign a contract) • The preferred bidder wins the contract

1) Co-financing is a way to jointly supply finances from different financial institutions for the same project.



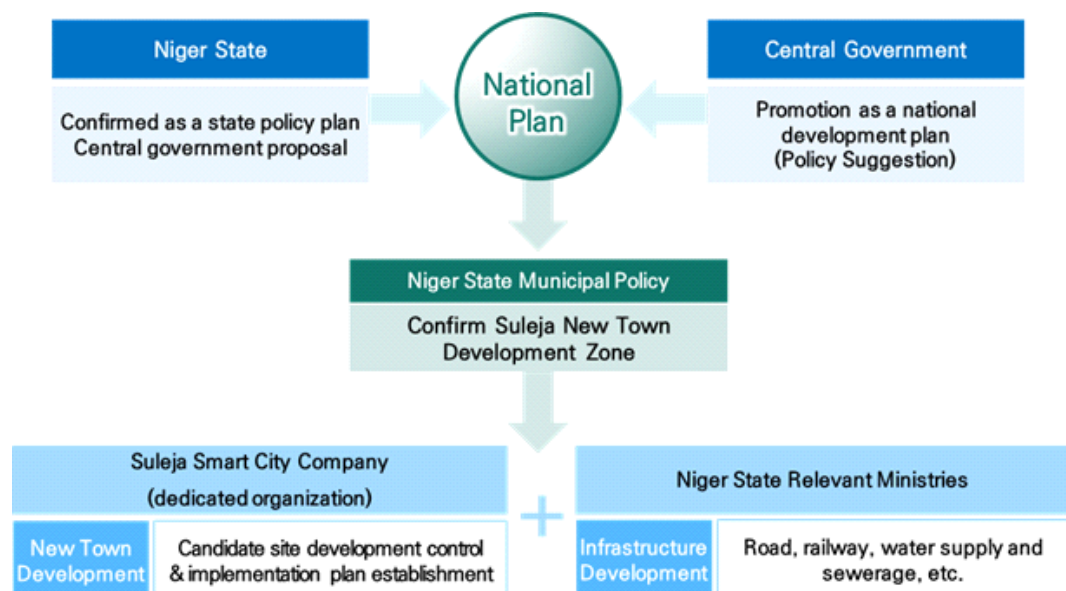
ii. Follow-Up Project Implementation Plan

1) Basic Directions

■ Reflect Niger State's Superordinate Plans and Proceed with a Dualized Project

- Niger State's policy plan (Vision Plan) was reflected to promote the project.
- The superordinate plans of urban policies and Suleja Smart City guidelines were reflected in the new town development project plan.
 - Regionally specialized plans were created according to the Suleja New Town's regional growth vision and policy.
 - Policy directions were proposed in order that they can be incorporated into the urban guidelines that are currently being revised.
- It was proposed that the development of the new town and the infrastructure be separated in light of large-scale development.
 - The new town development project will be conducted by Suleja Smart City Company dedicated to the new town, and the infrastructure development will be undertaken by the transportation ministry and the infrastructure ministry of the federal government. This will allow the project to divide into two.

[Figure 7-3] Basic directions for follow-up project plan

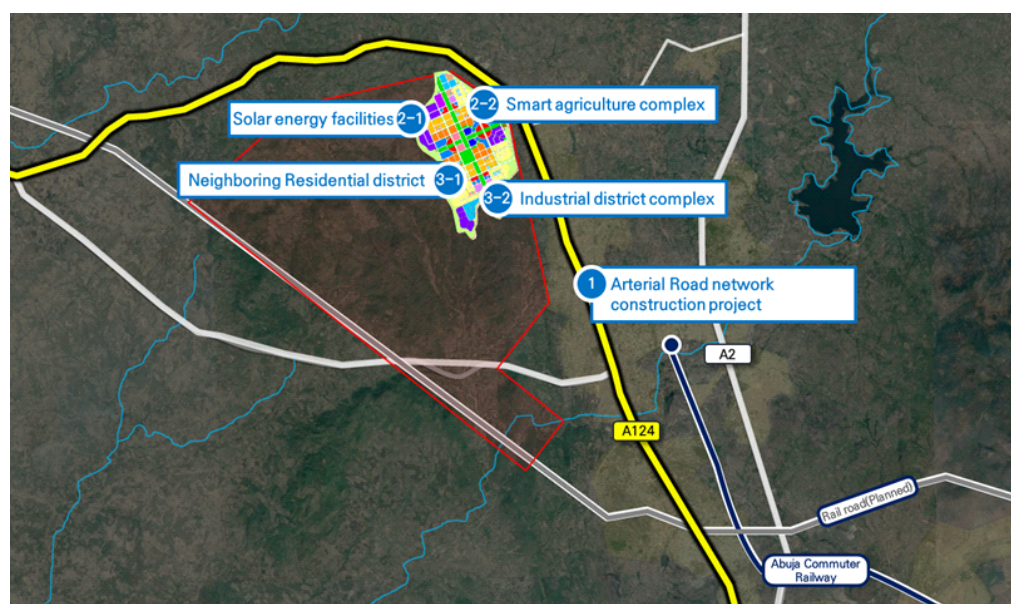


2) Follow-Up Project Implementation Plan

■ Basic Directions

- A phase was determined in light of building metropolitan and district infrastructure.
 - Building the metropolitan infrastructure was chosen as Phase 1 considering its ripple effect. The project will be undertaken together with neighboring infrastructure facilities connected to the new town. They include metropolitan and public transportation as well as supply treatment facilities.
- Development projects with large ripple effects were selected for each phase.
 - Development projects with large ripple effects were selected for each phase in view of availability and expandability.

[Table 7-5] Follow-up project by phase



Phase 1	Arterial road network construction	Build a key metropolitan transportation network to boost the Niger region
Phase 2	Solar energy facilities Smart agriculture district	Respond to the additional energy demand in Nigeria and Niger State Connect the smart agricultural district for balanced regional development and new industry growth
Phase 3	Neighboring residential district Industrial district complex	Improve the settlement environment to enhance the quality of the worker's life Build an industrial complex to foster a new economic center in northern Nigeria



■ Phase 1: Metropolitan Infrastructure Development

- A plan was designed for an arterial road network and a wastewater and waste treatment system to be ready by the time the first phase of the new town is completed.

[Table 7-6] Phase 1: Arterial road network construction

① Arterial Road Network Construction Project	
Purpose	• Connect to the transportation system in northern Nigeria and ease traffic around the capital
Period	• 2022-2032
Financing	• MDB / EDCF
Key Points	• Create a plan for a metropolitan transportation network between Niger State and Abuja • Prepare investment plans and financing • Analyze economic and financial feasibility

■ Phase 2: Smart Facility Implementation

- A plan of building solar energy facilities and a smart agricultural district can specialize the Suleja pilot site.

[Table 7-7] Phase 2: Solar energy facility construction project

② Solar Energy Facility Construction Plan	
Purpose	• Build solar energy facilities to meet the increasing electricity demand followed by the growth of Niger State
Period	• 2025-2030
Financing	• KOICA / KSP
Key Points	• Estimate the energy capacity of Niger State and Suleja • Build an energy transmission system • Connect them with Abuja and nearby satellite cities such as Kubwa

[Table 7-8] Phase 2: Smart agriculture district project

③ Smart Agriculture District	
Purpose	• Establish a sustainable agricultural district in Nigeria for balanced regional development
Period	• 2027-2032
Financing	• MDB / EDCF
Key Points	• Establish a strategy by studying how to develop a smart agricultural district in Niger State • Incorporate Korean smart city solutions or smart farm technology into Nigeria

■ Phase 3: Building a Neighboring City

- An implementation plan of comprehensive development was established according to the feasibility analysis of the pilot site that was proposed in the Suleja New Town Master Plan.

[Table 7-9] Phase 3: Neighboring residential district construction project

③ Neighboring Residential District Construction	
Purpose	• Improve the settlement environment to enhance the quality of the worker's life
Period	• 2025-2035
Financing	• EDCF / PPP
Key Points	• Analyze the housing demand in Niger State and Suleja • Determine development directions and the construction area for the neighboring residential district • Establish plans for population and housing

[Table 7-10] Phase 3: Industrial complex district construction project

④ Industrial Complex District	
Purpose	• Support Korean solar energy companies in Nigeria and promote its expansion
Period	• 2025-2030
Financing	• EDCF / PPP
Key Points	• Analyze national industrial complex development in Nigeria • Determine development directions and the construction area for Niger State's industrial complex district • Devise a plan to develop an industrial complex of Korea-Nigeria cooperation and ways to specialize it • Assess demand and industry types to attract

■ Follow-Up Projects Cases

- Considerations for Korean businesses entering Nigeria
 - Due to the sovereign credit rating, infrastructure, public safety, and political risks, the number of Korea businesses advancing to Nigeria is small.
- Follow-up projects need investors and companies that participated in various development projects overseas.
 - Public companies also need to participate as they can provide support regarding insufficient institutional aspects for follow-up projects such as solar energy and rental housing. Seeking consultations with institutions traditionally known to finance African



projects in Europe and in advanced countries is encouraged to promote Korean businesses advancing overseas. With ECAs taking the lead, cooperative financing with foreign financial institutions is encouraged to mitigate risks and attract private investors.

[Table 7-11] Follow-up project cases

Project	Contents
Arterial Transportation Network Construction (Lekki-Epe Expressway)	- The construction project was Nigeria's first PPP project whose goal was to expand the existing four lane road to a six lane highway and add a 20 km long highway. - The special purpose vehicle had faced refinancing uncertainty and high fixed interest rates in an immature local financial environment, but US dollar loans and currency hedging led to successful financing.
The 20MW Solar Power Plant in Chile (La Acacia and Talca)	- This project was to construct two small solar power plants with a capacity of 19.9 MW at \$25 million and sell the generated electricity to the Chilean power exchange. - Global Infrastructure Fund No. 3 where Korea Development Bank, Woori Bank, and public companies under the MOLIT participated as investors financed a bridge loan of KRW 6.7 billion and Korea-based S-Energy took part in the project. - The project constructed and operated one plant in Acacia and another in Talca. Financing method was different for each region: Talca was financed with bonds and Acacia with revenue securities.
Industrial District Development Plan in Hung Yen, Vietnam (LH)	- In the past, most of the 9,000 Korean companies that entered into the Vietnamese market independently searched for industrial land and faced difficulties in obtaining permission and authorization as well as in financing. For such companies, a Korean industrial district is to be built in Hung Yen to provide one-stop service for consulting, financing, administrative work, and permission and authorization. - A joint venture of Korean and Vietnamese companies will operate the project, and the district will house a total of 60 Korean companies.
Residential District (Rental Housing) Development Plan in Solongo, Mongolia	- Ulaanbaatar's 2020 Master Plan, devised for year 2030, aims to reshape Ulaanbaatar according to a multi nuclei model through an eco-friendly development in the ger districts and build a secondary city near the international airport. - Most of the project cost is financed by loans from the Economic Development Cooperation Fund (EDCF) and the taxes incurred are paid by the Mongolian government. - Mongolia's inadequate experience and performance in public housing construction projects requires capability enhancement in continuous supply, operation, and management of public housing. Korea's policies and experiences will be shared to support enhancing capabilities of human resources.

■ Follow-Up Project Implementation Plan

- With ECAs taking the lead, cooperative financing with foreign financial institutions is encouraged to mitigate risks and attract private investors.
 - ECAs or development financial institutions such as MDBs allow to gain the same status in seniority, which can reduce the risks of projects in the recipient country. In addition, debt guarantees and insurances can mitigate political risks of commercial financing.
- Seeking consultations with European and other advanced countries' institutions traditionally well-known to finance African projects is encouraged to promote Korean businesses advancing overseas.
 - Consultations with not only Korean financial institutions but also with European equivalents that have advanced consulting capabilities regarding Africa are recommended when devising means to work out financing methods and reduce risks.
 - Financial consulting institutions are expected to provide consulting services and project feasibility studies for Korean companies entering Nigeria. The consultants' role will range from finding ways to mitigate potential and obvious risks at the planning stage of the project and measuring financial accessibility to supporting the establishment of financing plans.
- Public companies also need to participate as they can provide support regarding insufficient institutional aspects for follow-up projects such as solar energy and rental housing.
 - In order to address institutional shortcomings in Nigeria in regard to solar energy and rental housing projects, it is necessary for relevant Korean companies to participate in enhancing the recipient country's project implementation capabilities.
 - Continuous capability enhancement programs are necessary to extend the project timeline, improve the effectiveness of ODA grants, and boost Nigeria's capabilities for the sustainable implementation of follow-up projects.
 - Nigeria's high ranking government officials, project managers, and working level staff will be invited to visit relevant public organizations in Korea to share development and growth experiences as an effort to support human resource empowerment and institutional development capability advancement in Nigeria.



iii. Policy Suggestions and Institutional Improvement

1) Policy Suggestions and Institutional Improvement

■ Participation of Public Institutions and Strengthening Their Roles

○ Administrative Support for Planned Development

- A smooth and stable implementation of the project requires support for urban sprawl control and land price stabilization from Niger State and other local governments.
- In other words, it is necessary to establish laws and regulations to prevent a potential significant increase in land prices followed by the development project implementation and thereby minimize strains on the project at an early stage.

○ Basic conditions for private investment inducement can be categorized into land, permission and authorization, and public support. The details are the following.

- Land: A high proportion of public land and a public institution's support as a purchase agent are expected. Reasonable land prices are a must.
- Permission and Authorization: Swift facility investment has to be possible once a decision is made and this implies strong support from local governments.
- Public Support: It is necessary to support infrastructure outside the project area and mediate and resolve claims from local residents and environment groups.

[Table 7-12] Participation of public institutions and their roles

Category		Content
Land	Securing land and stabilizing land prices	Provide support such as land price stabilization for securing land and encouraging the active participation of landowners to achieve a smooth and stable implementation of the project
	Thoroughness	Allow swift facility investment once a decision is made
Permission and Authorization	Support	Provide administrative and financial support regarding permission and authorization
	Support district infrastructure	Provide support for entrance roads, a water supply and wastewater management system, wastewater treatment facilities, suburban facilities, etc.
Public Support	Resolving claims	Resolve claims from landowners and local residents, highlight development necessity, and formulate sustainable development principles

2) Institutional Improvement

■ Establish Laws for New Town Development

- It is recommended that laws and regulations suitable to Nigeria be established by reviewing and comparing acts related to new town development in other countries. Such an effort will resolve the issues of the current urban development system and lay the institutional groundwork for driving the new town development policy.

[Table 7-13] Acts related to new city development by country

Category	UK	U.S.	South Korea
Purpose	Garden city development	Residential city development (Private-led)	New city development
Acts	New Towns Act (1946)	Housing and Urban Development Act (1965)	Industrial Sites and Development Act (1960) Housing Site Development Promotion Act (1980) Urban Development Act (2000)
Operator	New town development corporation	Private developers, large enterprises (coordinated by the Housing and Urban Development Department)	Government or public companies (LH)
Characteristics	• New town development led by the central government • The act stipulates the developer's foundation, rights, and responsibilities. • The act allows a long term low rate loan from the government.	• Before the 1960s, private developers were responsible for new city development. • The establishment of the act strengthened the federal government's financial assistance on new city development.	• Central government-driven new city development • Acts established to meet social changes • Industrial, residential, multifunctional cities • Land acquisition by batch purchase



■ Suggestion for New Town Development Act

- Suggestion for a new town development act is proposed after review.

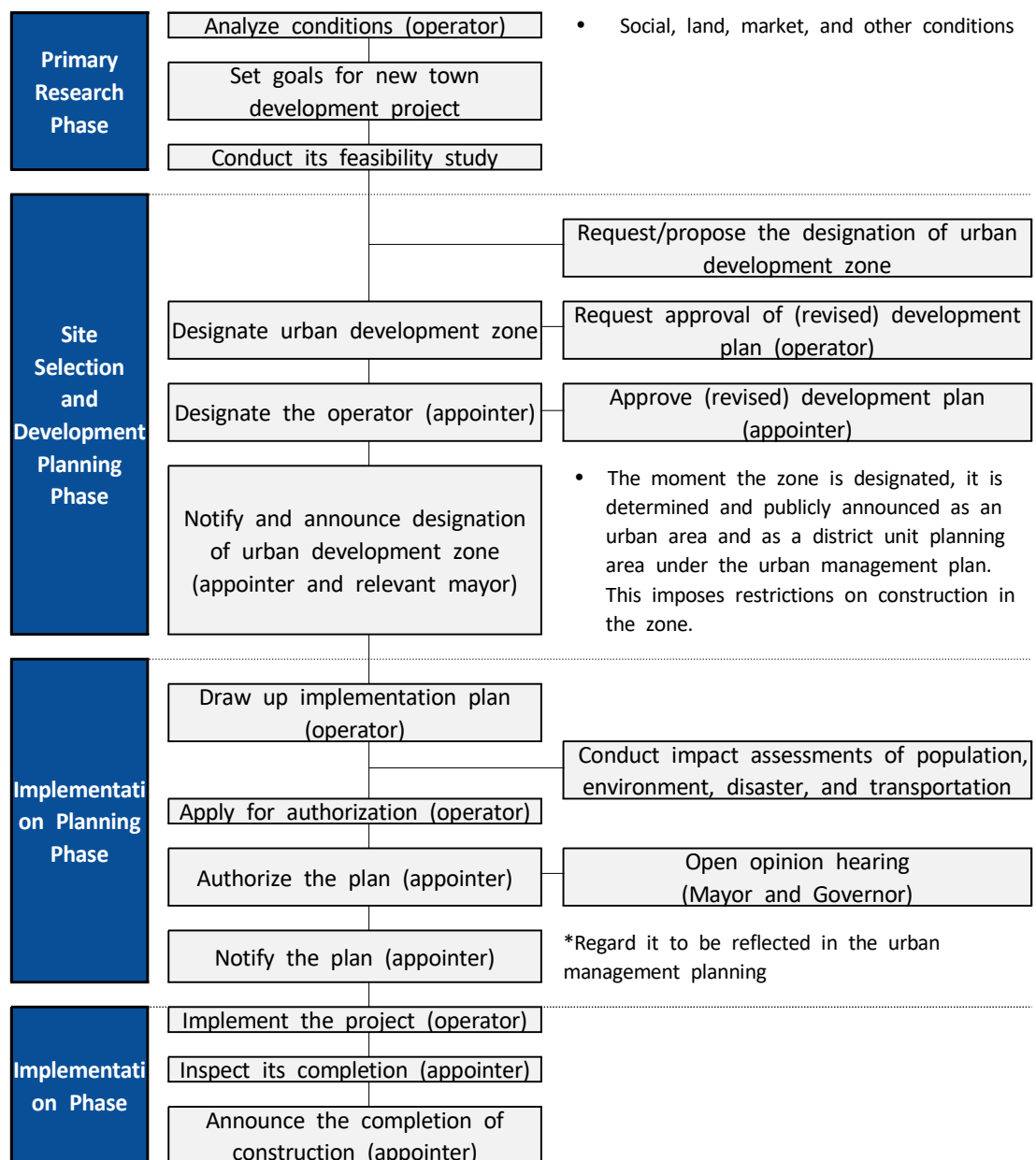
[Table 7-14] Suggestion for new town development act

Category	Key Points
Area Designation for New Town Development	The area of new town development is to be in principle designated by a mayor and a governor or the request from a mayor. In the case of a state-driven project, it is to be designated by a permanent secretary.
New Town Development Project Operator	- A new town development project is to be operated by a public enterprise or corporation. - A private company is to be an operator only as a public-private entity.
Implementation Process	The implementation process is to be freely chosen among an expropriation or land usage approach, replotting approach, or a combination of both. This will grant the operator flexibility when implementing the project.
Granting land expropriation rights to operator	Land expropriation rights are to be granted to an operator only if it purchased two-thirds or more of the area of the project site and obtained consent from two-thirds or more of the total number of landowners in order that potential violation of landowners' property rights can be minimized when the operator is exercising land expropriation rights.
Revision of Urban Management Plan and Establishment of District Unit Plan	- Once a new town development zone is designated, the zone is deemed designated as an area of a district unit plan under an urban management plan according to which the new town development zone will be managed. - A new town project implementation plan must include a revision of a urban management plan (including a district unit plan) in order that it outlines details such as the usage of land and buildings.
Others	- It should include methods to securing financial resources and retrieving revenue. - It should stipulate the establishment of a new town development corporation.

■ Implementation Process of New Town Plan

- The proposed new town plan is divided into a primary research phase, a site selection and development planning phase, an implementation planning phase, and an implementation phase.
- The project implementation process is to be streamlined. The federal government's collective project approval and the streamlined process will accelerate the implementation.

[Table 7-15] Implementation process of new town development project



SULEJA NEW TOWN MASTER PLAN IN NIGER STATE



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