

state's pollution board to small scale units. The committee also coordinates and monitors the sanctions of term loans and working capital loans by the state financial corporation and banks.

- (b) The Greater Noida Industrial Development Authority plans to develop a new administration office complex in Surajpur as an industrial secretariat, where various departments and institutions having an impact on investment such as sales tax, labour, financial assistance, etc., will be found under one roof. The plan is to establish an effective single window service coordinating agency for facilitating timely and effective interaction between entrepreneurs and the service departments.

(3) Uttar Pradesh's incentives are as follows.

- (a) fiscal concessions
 - special rebate on electricity usage charges.
 - concessional power tariff.
 - exemption/deferment of sales tax (rates range from 100 - 125 per cent of fixed capital investment up to eight years).
- (b) financial incentives
 - preferential land rates for industrial use in selected areas.
 - investment grants based on fixed capital costs (maximum Rs. 2 million).
 - investment assistance of Rs. 1.5 million for units with investment assistance of more than Rs. 250 million.
 - special grants for industrial units in the hill areas.

8.3.3 Haryana

(1) Organisations and Functions

Haryana's Directorate of Industries (DI) has field offices in each district staffed with a general manager that offers guidance and assistance to entrepreneurs. The DI also plans and arranges for infrastructure, raw materials, training and marketing of finished goods for export.

- (a) The Industrial Assistance Group is a team of specialists from various disciplines to assist Non-Resident Indians and persons of Indian origin. The Chief Secretary to the Government of Haryana is the Chairman of the coordination committee of which the IAG is the executing agency. The

Director of Industries is the chief coordinator of the group. The IAG extends one point contact service and coordinates the activities of various departments, authorities, and corporations regarding the allotment of land, power, and finance. It assumes the responsibility to expedite all clearances.

- (b) The Development Authority is the primary agency for development of industrial estates in the state.
- (c) The Haryana State Electronics Development Corporation Limited primarily operates to promote the establishment of electronics industries in the state. The agency works to promote the creation of needed infrastructure and by setting up commercial projects as joint ventures. The corporation also has established projects in the public sector and collaborated with private enterprises by way of equity participation in joint-assisted sector projects.
- (d) The Haryana Financial Corporation, with branch offices in each of the state's districts, offers financial assistance in the form of term loans to industrial units with aggregate paid-up capital and free reserves below Rs. 5 crore. The corporation also extends loans (that are repayable in 10 years) at rates of 15 per cent to 20 per cent per annum. Soft loans are available in the form of borrower's equity, but are restricted to first-generation entrepreneurs.

(2) Single Window Service

The state government has provided it seems, two single window service agencies. A single window service agency under the Industrial Assistance Group exists to facilitate foreign investment and assists in the identification of projects for entrepreneurs. Also, there are SWS agencies that exist in each district except for Gurgaon. This SWS has seven permanent officers and 10 associate members. The permanent members meet once a month in each district, but can meet more frequently if business situations demand a more expeditious resolution of pending business. The control and supervision of activities will rest with the Additional Deputy Commissioner of the concerned district. The district level SWS agency will function in the office of the general manager, District Industries Centre. The district level agency has the following basic functions to provide assistance for the allotment of land/plots/sheds -- acts as liaison with the Directorate of Industries, Haryana State Industrial Development Corporation, and the Haryana Urban Development Authority, and provides assistance in the following areas.

- financial assistance
- electric connections
- consent/No Objection certificates from the Water Pollution Control Board
- provide raw materials to industrial units
- maintenance of industrial estates
- incentives/assistance in the industries department
- and,
- provides guidance to entrepreneurs.

(3) Haryana provides the following incentives.

(a) Fiscal concessions

- concessional power tariff for a five year period.
- exemption/deferrment of sales tax up to Rs. 60 million for a period of five to nine years (dependent upon location of the unit).
- reservation of plots for export oriented units, units with foreign equity participation.
- single window clearing agencies at state and district levels.

(b) financial incentives

- capital investment grant of Rs. 5 million (for units with investment of Rs. 100 million or more).
- Rs. 1.5 million grant to units with investment of Rs. 500 million and Rs. 1,000 million.
- -additional 50 per cent grant if units are located in certain identified areas.
- capital investment grant to cover up to 25 per cent of fixed capital investments (maximum of Rs. 3 million).
- grant to meet a part of the cost of captive electricity generating sets.

Table 8-14 Industrial Supporting Organisations

Function	Industrial Development Authority	Urban/Rural Infrastructure Development	Industrial Estate Development	Financial Assistance for Medium & Large Scale Industry	Financial Assistance for Small & Medium Scale Industry	Financial Assistance for Special Industry	Marketing Assistance & Export Promotion	Research & Technical Assistance
Karnataka	• Directorate of Industries and Commerce	• District Industries Centres • Karnataka Industrial Areas Development Board	• Karnataka Industrial Areas Development Board	• Karnataka State Industrial Investment & Development Corp.	• Karnataka State Financial Corp. • Karnataka State Small Industries Development Corp.	• Karnataka State Industrial Investment & Development Corp. • Karnataka State Electronics Development Corp.	• Technical Consultancy Services Organisation of Karnataka • Karnataka Small Industries Marketing Corp. • Karnataka Udyog Mitra	• Technical Consultancy Services Organisation of Karnataka
Uttar Pradesh	• Directorate of Industries	• Uttar Pradesh State Financial Corp. • Provisional Industrial Investment Corp. of Uttar Pradesh • Uttar Pradesh State Industrial Development Authority	• Uttar Pradesh State Industrial Development Corp. Greater Noida Industrial Development Authority	• Provisional Industrial Investment Corp. of Uttar Pradesh • Uttar Pradesh State Industrial Development Corp.	• Uttar Pradesh Financial Corp. • Uttar Pradesh Small Industries Corp.	• Uttar Pradesh Electronic Corp. • Uttar Pradesh Minority Finance & Development Corp.	• Uttar Pradesh Export Corp. • Uttar Pradesh Small Industries Corp.	• Uttar Pradesh State Department of Electronics
Haryana	• Directorate of Industries	• Haryana Urban Development Authority • Haryana State Industrial Development Corp. • Haryana State Electronics Development Corp.	• Haryana State Industrial Development Corp. • Haryana Urban Development Authority	• Haryana State Industrial Development Corp.	• Haryana State Industrial Development Corp. • Haryana State Industries & Export Corp. • Haryana Financial Corp.	• Haryana State Industrial Development Corp. • Haryana State Electronics Development Corp. Ltd.	• Industrial Assistance Group • Haryana State Industries & Export Corp. • Haryana State Electronics Development Corp. Ltd.	• Haryana State Electronics Development Corp. Ltd.

Data are summarized from the following publications : "Invest in Karnataka" Directorate of Industries and Commerce Karnataka, 1992. "Doing Business with India" Government of India, 1992. "Doing Business in Uttar Pradesh" Directorate of Industries, Uttar Pradesh 1992. "Haryana : A Leading Edge" Industrial Assistance Group, India, 1992.

Table 8-15 (1) Industrial Promotion Incentives by Selected States

	Land Use Conversion	Special investment subsidies: pioneer and prestige units, large industry	Special thrust for industries in the KVI Sector/artisan-based/tiny rural industries	Seed capital schemes	Special loans	minority entrepreneurs	Non-Resident Indians (incentives for NRIs), persons of Indian origin for foreign investment)	sick industries rehabilitation
Karnataka	Waiver of fees converting from agricultural to industrial use only for tiny and SSI units in Zone III and IV. Waiver is for a maximum of 2 acres.	Investment subsidy: Investment subsidy available to new pioneer investment subsidy. Investment subsidy available in Zones II, III, IV (Investment subsidy of Rs 25 lakhs beyond Rs 25 crores in fixed assets to be set up in Zone III, IV provided at least 500 jobs are created). capital outlays exceeding Rs 100 crore will be evaluated on an individual basis as to state concessions-incentives.	Concessions for thrust sectors/creation of local employment opportunities: All new industrial units in thrust sector are eligible for : Investment subsidies, sales tax, central sales tax and Karnataka sales tax exemptions for periods from 3 - 6 years.	Offered to promote SSI in semi-urban, rural areas. KSFIC offers assistance towards equity on soft term loans, maximum Rs 15 lakhs along with term loan for technically qualified persons.	KSFIC operates five zonal offices for special loan assistance in the SSI sector, interest rates from 11.5% to 20.5%. venture capital schemes in manufacturing, shipping, and other allied fields operated by various financial and state agencies. SSSBs upto Rs 5 lakhs in fixed assets that fall within 27 industries will receive concessions.	Special incentives to Scheduled Caste/Tribes, women, physically handicapped persons, ex-servicemen and the minority community: 5% investment subsidy of the value of fixed assets, maximum Rs 1 lakh.	allowed 100% equity investment with full repatriation of capital invested, for particular sectors, set up manufacturing units, NRIs allowed to import restricted capital equipment and import under Open General License machinery worth Rs 3.5 million.	incentives for rehabilitating sick industries once identified and finalised by the Board for Industrial and Financial Reconstruction-financial institutions, especially designated for tiny/small scale and cooperative sectors.
Uttar Pradesh	Entrepreneurs receive concessional rates for land. State capital subsidy for locating industries to backward areas for fixed capital investment (10-35% for Categories A-C). Bordering Hill district and other Hill district. Development rebates for electricity charges to units located in backward and Hill district areas (rebates are from 20%, 33.5% to 50% for a period of 5 years); Allotments of plots/sheds to NRI industrialists in industrial estates/areas will be prioritised; also housing boards will give priority to residential plot allotments. Special Area Subsidy: Almorah, Chamauti and Unakashi hill districts classified for 35% subsidies to maximum Rs 35 lacs. Five hill districts are eligible for 30% subsidies to a maximum of Rs 30 lacs.	State capital subsidy Special state capital subsidy for units established between 4/90 to 3/31/95 with fixed capital of Rs 25 crores or more can receive Rs 15 lakhs if promoting ancillary industries. Prestige units special state capital subsidy are for Tehsil level units with fixed capital of Rs 5 crores or more and provide Rs 10 lakhs subsidy if promoting ancillary industries. Pioneer units special state capital subsidy are those first 3 units established in any community development block with a fixed capital investment of Rs 30 lakhs or more. These units are provided Rs 5 lakhs subsidy in addition to the general state capital subsidy. scheme of equity participation	Scheme for rural artisans UPSIDC provides for equity assistance for new industries in backward areas to qualified NRIs as a priority. Seed Capital Assistance schemes of Industrial Development Bank of India, open to industrial units (max. Rs 15 lacs). District Industries Centres provides integrated margin money loans schemes at low interest rates for SSI (max. loan is 10% of project cost, or 50% of share capital).	PICUP and the UP Financial Corp. provide Rs 15 lacs as seed capital to qualified NRIs as a priority. Seed Capital Assistance schemes of Industrial Development Bank of India, open to industrial units (max. Rs 15 lacs).	District Industries Centre margin money loan scheme; integrated margin money loan scheme	Scheduled tribes -castes, women, ex-servicemen; special facility incentives for minority community entrepreneurs up to Rs 2 lacs. 5% special capital subsidy up to Rs 1 lac. District Industries Centre margin money loan scheme with Govt. of India assistance to SSI to provide Rs 40,000 - Rs 60,000 for scheduled castes/tribes, entrepreneurs.	Special incentives for NRIs; Udyog Bandhu to function as a model agency for the NRIs which all facilities/incentives are made available. Allotments of plots/sheds to NRI industrialists in industrial estates/areas will be prioritised; also housing boards will give priority to residential plot allotments. UPSIDC extend 15% equity participation of total project cost to technically qualified NRI entrepreneurs.	incentives for rehabilitation of sick units, minimum demand charges for the period of unit closure will not be charged.
Haryana	State will advertise for applicants to obtain plots; zoning plans prepared, cost of development is detailed, and authority is able to deliver possession of plots with all the basic infrastructure within a 6 month period. Capital investment subsidy at 25% in fixed capital assets, max. Rs 2 million for tiny units in rural areas; capital investment subsidies at 15%, max. Rs 1.5 million for locating backward area; granting permission for sale of surplus land to designated new industrial units. Plots reserved for NRIs and Hi-Tech projects can be interchanged on the advice of the Director of Industries.	Integrated margin money loan scheme. capital investment subsidy for pioneer units: Rs 1 million to 5 million, plus location to backward areas eligible for 50% additional subsidy on rates above.	electricity duty, sales tax exemption on par with small scale sector units; marketing assistance; price preference at 10 percent.	NOT MENTIONED	NOT MENTIONED	Exclusive reservation of plots in all industrial estates for allotment to NRIs -POOs - foreign equity participation 100% EOU; built-up houses constructed by HBB & HUDA.	incentives for rehabilitation of sick industrial units; actual reliefs/concessions may include exemptions/deductions of sales/purchase taxes, electricity duty dues and waiver of penalties; minimum demand charges, etc.; exemption from power cuts, preference in power connections and supply, rescheduling of payment and loans, electricity arrears and supply; resolution of labour disputes	

Table 8-15 (2) Industrial Promotion Incentives by Selected States

	modernisation incentives	export oriented industries	electronics, telecommunications, software	agro-based/food processing industries	sales tax exemptions	energy use	pollution control	transportation
Karnataka	Investment subsidy available for expansion, modernisation, and diversification in Zones II (15% value of fixed assets, max./Rs 15 lakhs for all industries). Zone III (20% value of fixed assets, max. to Rs 20 lakhs for all industries). Zone IV (25% of value of fixed assets, max. Rs 25 lakhs for all industries).	100% export oriented units special concessions: Setup in Zone I including Bangalore Urban Agglomeration area and the Mysore City Corp. area are eligible for : investment subsidies, sales tax, central sales tax and Karnataka sales tax exemptions for periods from 3 - 6 years. 5 year corporate tax holiday for first 8 years of operation. Capital investment subsidy of 10% of the value of fixed assets subject to a ceiling of Rs 10 lakhs. Exemption from paying entry tax on all raw materials, etc., procured for processing. EOUs exempted from power cuts.	Special incentives for locating to Mysore and/or Dharwad: investment subsidy as in Zone IV. Also, these units eligible for 100% sales tax (KST & CST) exemption on output for a 6 year period. Informatics, software units/industries set up in Bangalore Urban Agglomeration areas and Mysore City Corp. in the tiny and small scale sectors are eligible for : investment subsidies, sales tax, central sales tax and Karnataka sales tax exemptions for periods from 3 - 6 years.	Classified in thrust areas and to receive establishment of specialised industrial estates, training institutes, testing & development centres. Agro-food processing, agro-based industries are eligible for : investment subsidies, sales tax, central sales tax and Karnataka sales tax exemptions for periods from 3 - 6 years.	Sales tax concessions: stamp duty exemptions - registration charges: All KVI units are exempted from central sales tax and Karnataka sales tax (Zone II, 100% exempt, 3 years max.; Zone III, 100% exempt, 4 years max.; Zone IV, 100% exempt, 5 years max.).	utilizing non-conventional energy sources : 5% investment subsidy on the cost of equipment, maximum Rs 5 lakh for all industrial units.	pollution control: equipment installation incentives -concessions 5% investment subsidy on the cost of equipment, maximum Rs 5 lakh for all industrial units.	NOT MENTIONED
Uttar Pradesh	Schemes for modernisation, productivity, quality improvements of small scale industrial units: Feasibility study grants up to Rs 10,000 each unit; 15% capital subsidy to max. Rs 1 Lakh per unit; interest subsidy for loans to purchase machinery. Exemptions/deductions of sales taxes for expansion -diversification - modernisation are proposed.	Special state capital subsidy to 100% export oriented industrial units, maximum 10% fixed capital investment subject to maximum Rs 1 million. EOUs exempted from power cuts.	NOIDA export processing zone with infrastructure facilities.	NOT MENTIONED	Sales tax exemption -deferral scheme: linked to fixed capital investment: districts divided for this scheme. Rebates are up to 100% of fixed capital investment in Category C; 125% Category B; 150% Category A. An additional 25% rebate given to small industrial units (125%, 150%, 175% respectively).	special incentives for power supply: new units all categories exempt from power cuts for 5 years; exempted from minimum demand charge for 5 years. rebates and minimum charges for rehabilitation of sick units and in backward areas.	special NOIDA committee empowered to grant concessions on behalf of UP Pollution Control Board to small scale units.	Industrial units located in border districts receive additional special transport subsidy of 25%. Transport subsidies of 50% on the cost of transportation of raw materials and finished goods within the Hill areas: Transport subsidies in Hill areas under Govt. of India scheme 75% subsidy for transportation costs of raw materials and finished goods from industrial unit site to railhead and vice versa available in Hill area under scheme of Central government.
Haryana	new industrial units will be exempt from Octroi payments on capital equipment, building materials, and raw materials used for a period of 9 years in Zone A, 7 years in Zone B, and 5 years in Zone C.	NOT MENTIONED	Capital investment subsidy at the rate of 15%, max. Rs 1.5 million; 25%, max. Rs 3 million if located in backward area. Electronics industry tax benefits are uniform for 7 years and up to 500 percent of fixed capital investment.	Capital investment subsidy at 25% of investment in fixed assets - maximum RS 3 million Electronics industry tax benefits are uniform for 7 years and up to 500 percent of fixed capital investment.	sales tax deferral - exemption scheme - electric duty payment exemption for tiny units in rural areas. The state has divided three zones for determining fixed capital investment deferrals of tax exemptions with limited amounts and 5-9 year time limits.	uninterrupted power supply: generating set subsidy at a rate of Rs 1,200/per KVA for small units and Rs 600/per KVA for large and medium scale units or 50 % of the generating set cost (max. Rs 1.5 million); subsidy available for generating sets jointly installed by 2 or more units; designated new industrial units exempt from electricity duty for 5 years. uninterrupted power supply for 19 industrial estates for existing and new units connected load up to 1 MW.	exemption from NOC/Consent from the Water Pollution Control Board for units of a non-polluting nature.	Octroi payment exemption for tiny units in rural areas on finished goods for 5 years; new industrial units exempt from Octroi payments on capital equipment, building materials, and raw materials used for a period of 9 years in Zone A, 7 years in Zone B, and 5 years in Zone C.

"Invest in Karnataka" Directorate of Industries and Commerce Karnataka, 1992. "Doing Business with India" Government of India, 1992. "Doing Business in Uttar Pradesh" Directorate of Industries, Uttar Pradesh 1992. "Haryana : A Leading Edge" Industrial Assistance Group, India, 1992.

8.4 Foreign Collaboration

8.4.1 Investment Characteristics

In an attempt to describe foreign investor activity to India, summary tables are provided that indicate foreign investors' countries of origin and the industry group where venture relationships existed for the years 1988 to 1991.

(1) Bangalore and Vicinity

Major investments by industry classification and country for Bangalore and surrounding areas are presented in Table 8-16 for examination. A cursory review of the table reveals that total foreign investors are 67 companies and the largest number of foreign investors are found in the electrical machinery and electrical parts industry (31.3 per cent), with the machinery and machinery parts industry group garnering about 19.4 per cent and transportation equipment and parts (11.9 per cent) of all foreign investment in the survey area.

The number of companies is 19 Japanese, 10 French, and eight from the United States. Japanese companies comprised the single largest number of investors from one country in the electrical machinery and electrical parts industry. Overall, Japan had the most foreign investors locating to this area for the period surveyed.

(2) Delhi and Vicinity

The number of foreign collaborations by industry for the Delhi area for the period 1988 to 1991 are summarized and presented in Table 8-17. An examination of the data reveals that total foreign investors are 202 companies, the electrical machinery and electrical parts industry comprised the single largest per centage (26.7%) of foreign collaborations to the Delhi area. Of the countries listed, Japan comprised the largest share of this industry group as already noted for the Bangalore area. However, in terms of total investors, Japanese collaborations were slightly more concentrated in the transportation equipment and parts industry.

In comparison to the U.S., Germany, Italy, the U.K, France, Sweden and Switzerland, there is a significantly larger number of Japanese foreign collaborations located in the Delhi area than the other countries surveyed.

Table 8-16 Number of Foreign Collaborations by Industry for the BANGALORE Area: 1988-1991

NIC Code	Industries	USA	JAPAN	UK	SWITZERLAND	GERMANY	ITALY	SWEDEN	FRANCE	OTHER	TOTAL
20-21	Food products		1					1	1		3 (4.5%)
22	Beverages, tobacco, tobacco products										
23	Cotton textiles										
24	Woolen, silk, synthetics		1								1 (1.5%)
25	Jute, hemp, mesta textiles										
26	Hosiery/garments										
27	Wood products										
28	Paper products/printing										
29	Leather products						1			1	2 (3.0%)
30	Rubber/plastic products										
31	Chemical products	1						1		2	4 (6.0%)
32	Non Metallic Industries		1				1		1	1	4 (6.0%)
33	Basic Metal Industries										
34	Metal products	2	1	1						1	5 (7.5%)
35	Machinery/parts	1	1			1	2		4	4	13 (19.4%)
36	Electrical machinery/parts	2	8		3			1	4	3	21 (31.3%)
37	Transportation Equipment/Parts	1	6				1				8 (11.9%)
38	Other Industries	1		2						3	6 (9.0%)
	TOTAL	8	19	3	3	1	5	3	10	15	67 (100 %)

Source: Indian EXIM Bank's Report

Table 8-17 Number of Foreign Collaborations by Industry for the DELHI Area: 1988-1991

NIC Code	Industries	USA	JAPAN	UK	SWITZERLAND	GERMANY	ITALY	SWEDEN	FRANCE	OTHER	TOTAL
20-21	Food products		1		2						3 (1.5%)
22	Beverages, tobacco, tobacco products										
23	Cotton textiles										
24	Woolen, silk, synthetics										
25	Jute, hemp, mesta textiles										
26	Hosiery/garments		2							1	3 (1.5%)
27	Wood products									2	2 (1.0%)
28	Paper products/printing									1	1 (0.5%)
29	Leather products					2				1	3 (1.5%)
30	Rubber/plastic products						1	1			2 (1.0%)
31	Chemical products	1	7	1		2	6	1	2	14	34 (16.8%)
32	Non Metallic Industries	2					3			1	7 (3.5%)
33	Basic Metal Industries	1				3				1	5 (2.5%)
34	Metal products	1	9		1				4	3	18 (8.9%)
35	Machinery/parts	2	6	3	2		5	2		10	30 (14.9%)
36	Electrical machinery/parts	3	10	2	2		2		8	27	54 (26.7%)
37	Transportation Equipment/Parts	1	12				3		1	3	20 (9.9%)
38	Other Industries	1	4	2	3		2		1	7	20 (9.9%)
TOTAL		12	51	8	10	8	22	4	16	71	202 (100 %)

Source: Indian EXIM Bank's Report.

8.4.2 Type of Foreign Collaborations

There are five classifications of foreign collaborations in India. The classifications are defined as: technical, financial, technical and financial, design and drawing, and management services.

Technical and financial collaborations make up about 30 per cent of total foreign investment. However, technical collaborations make up about 70 per cent of total foreign investment. Financial collaborations representing Japanese investors comprised only 20 per cent, less than other foreign investors' average financial collaboration investments. This data portends Japanese investors are relatively passive when it comes to investing in India. Table 8-18 summarises foreign collaborations for Karnataka.

The data indicate that technical collaborations comprise 80 per cent of the total foreign collaborations in Karnataka, significantly higher than for technical and financial collaborations (13.7 per cent).

Table 8-18 Nature and Industry-wise Distribution of F.C. Approvals

Classification	Technical	Financial	Technical & Financial	Design & Drawing	Management Services	Total
Metallurgy	32	4	1	2	0	39
Electrical/ electronics	169	3	21	11	1	205
Telcomm						
Mechanical / Engineering	150	5	28	6	0	189
Chemical /Drugs	21	3	10	0	0	34
Fertilizer						
Others	47	7	14	0	2	70
Total	419	22	74	19	3	537

Source: Technology Profile of Foreign Collaborations State of Karnataka

8.5 Industrial Estates, Export Processing Zones, and Export Oriented Units

8.5.1 Current Situation of Industrial Estates: Bangalore

The Karnataka State government has established two agencies for industrial estate development:

-The Karnataka Industrial Area Development Board (KIADB)

-The Karnataka State Industrial Investment and Development Corporation, Ltd. (KSIIDC)

The KIADB has developed 60 industrial estates and total land area already acquired by the KIADB is about 10,000 ha. Of this, 4,000 ha. has been developed. It should be noted that KIADB also provides infrastructure development as well as industrial estate land development (refer to Table 8-19). Existing Industrial Estates in and around Bangalore are shown in Fig. 8.1. Details of Existing Industrial Estates developed by KSIIDC are shown in Table 8-20. The KSIIDC provides infrastructure requirements to small scale industries and also constructs standard factories, procures raw materials, and gives technical assistance. To date, KSIIDC has established 98 industrial estates with 4,294 working units.

Table 8-19 The KIADB Land Developed and Land Available Statement for the Bangalore District (as of 30.6.1991)

SL No.	Name of the Industrial Area	Taluk in which situated	Extent Developed (Acres and Guntas (A-G))	Approximate extent available for allotments (A-G)
1	Peenya	Bangalore North	1485.00	Nil
2	Doddanekkundi/Dyavasandra	Bangalore South	503.36	1.2
3	a) Kadugodi-Sadarmangala	Hosakote and Bangalore South	243.00	
	b) Kadugodi-Sadarmangala adjoining land allotted to Southern Railways	Hosakote and Bangalore South	75.00	22.0
4	Kumbalgodu	Bangalore south	220.00	12.0
5	Hosakote	Hosakote	406.00	18.0
6	Doddaballapur	Doddaballapur	313.00	Nil
8	Veerasandra	Anekal	108.00	Nil
9	Jigani	Anekal	350.00	13.0
10	Attibele	Anekal	248.00	15.0

Source: A Guide to Entrepreneurs (TECSOK), 1992.

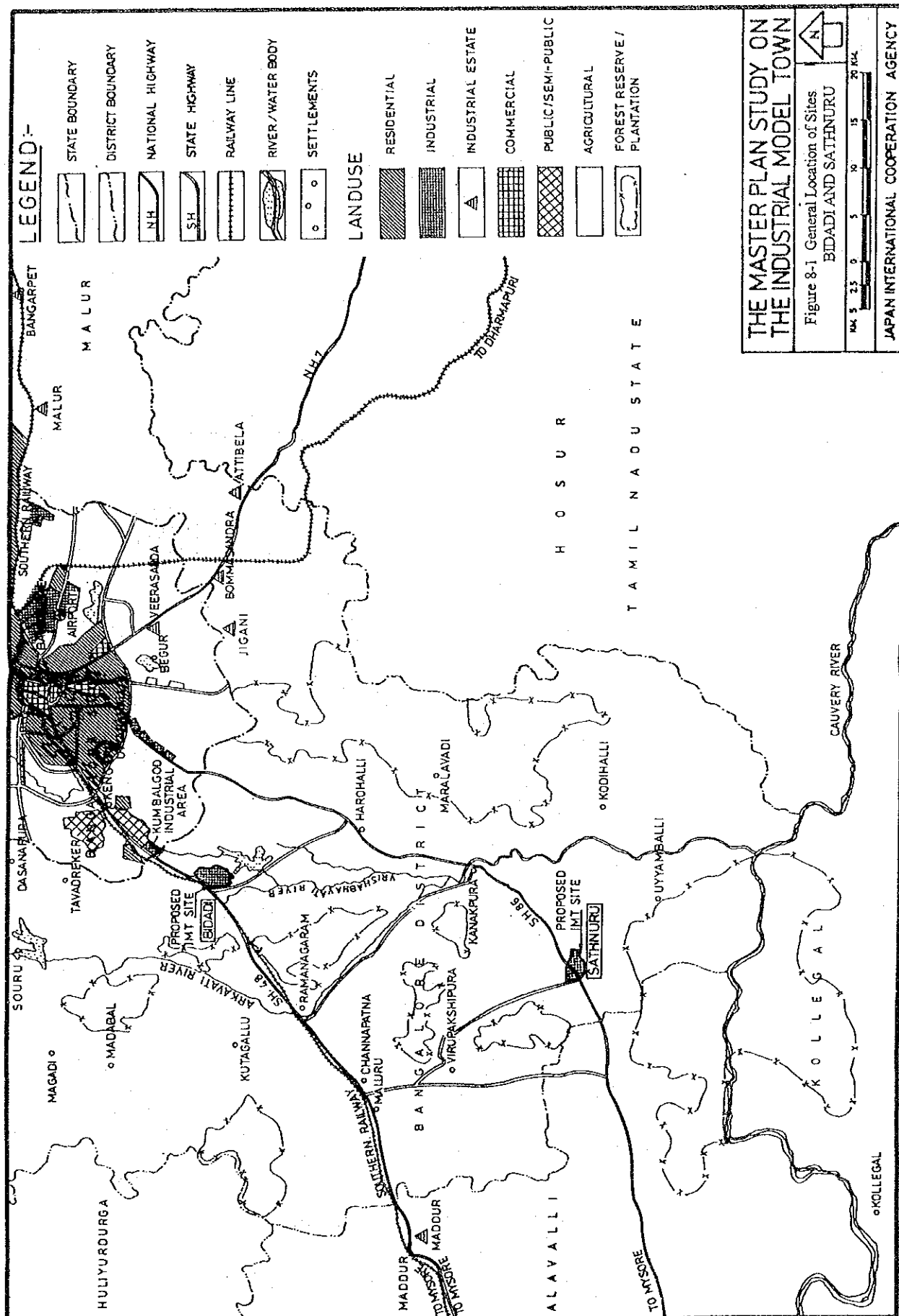
Table 8-20 Details of KSSIDC Industrial Sheds Existing as at 31.3.1992: Bangalore

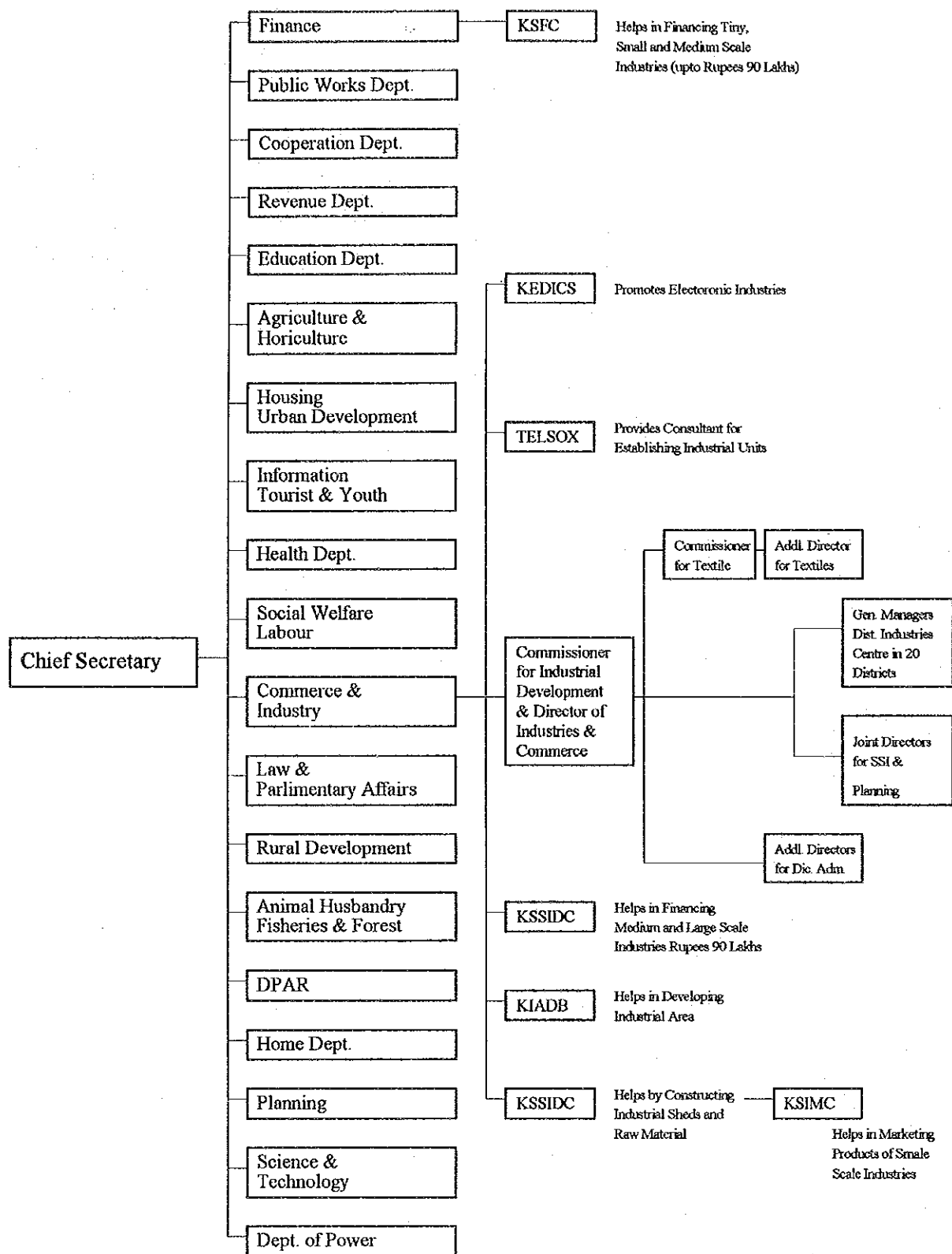
SL NO.	Industrial Estate	District Type and Number of Sheds											
		A	Spl. A	B	Spl. B	C	D	E	F	G	M	SM	Total
1	Bommasandra	19	-	31	-	14	-	-	-	-	-	-	64
2	BEL Ancillary	2	-	18	-	-	-	-	-	-	-	-	20
3	Doddaballapur	-	-	20	-	14	16	-	-	-	-	-	50
4	Dyavasandra	-	-	48	42	26	-	-	-	-	-	-	116
5	HAL	-	-	-	10	-	-	-	-	-	-	-	10
6	Hoskote	-	-	10	-	12	-	-	-	-	-	-	22
7	KEONICS	72	-	36	-	18	-	-	-	-	-	-	126
8	Kanakapura	-	-	5	-	-	-	-	-	-	-	-	126
9	Kumblagodu	-	-	4	-	8	8	-	-	-	-	-	20
10	Magadi	-	-	-	-	-	4	-	-	-	-	4	8
11	NGEF	6	-	6	-	8	2	-	-	-	-	-	22
12	Peenya 1st Stage	84	1	124	50	122	10	-	-	-	20	-	411
13	Peenya 2nd Stage	148	-	168	-	100	18	-	-	-	-	-	434
14	Peenya 3rd Stage	30	-	42	-	36	-	-	-	-	-	8	116
15	Raajinagar	11	8	28	2	26	22	-	16	-	30	-	143
16	Ramanagaram	-	-	-	-	4	4	16	-	-	-	-	24
17	Veerasandra	-	-	36	-	28	30	-	-	-	-	-	94
18	Yelahanka	-	-	13	-	12	10	-	-	-	-	-	35

Source: A Guide to Entrepreneurs (TECSOK), 1992.

Management and Operation/Organisation of Industrial Estates

The organisational flow charts provide a description of industrial estate development, management and those agencies and departments responsible for related operations.





Source: Invest in Karnataka

Figure 8-2 Karnataka State Organisational Flow Chart

Source: Invest in Karnataka. The State of Karnataka.

8.5.2 Current Situation of Industrial Estates: Delhi

(1) Delhi

To provide an economic base to the city, the 1962 [Delhi Master Plan] proposals included development of industrial areas in the form of flatted factories, industrial work centres, light and service industries and extensive industries at various locations in Delhi.

- Industrial areas along Najafgarh Road, developed by the DIT, had extensive types of manufacturing units, DCM Chemicals, and industries such as the Rindustan Breakfast Food Factory.
- Small Scale industrial estate near Okhla developed by the Government of India.
- Remainder of the existing industries were scattered in residential areas across the city.

As per industrial policies, these non-complying industries were required to be relocated in planned industrial areas.

[Master Plan 2001] recommends development of following industrial areas.

- Light Industry - Flatted factory and service industry at five locations Jhandewalan, Birla mills on C.T. Road, in proposed service centres at 19 locations, light industrial estates, (1,533 ha).
- Extensive industrial estates (1,265 ha).
- Industrial areas shall be shown in urban extensions.

Existing industrial estates in and around Delhi are shown in Fig.8-3. Land Use of Existing Industrial Estates in Delhi are shown in Table 8-21.

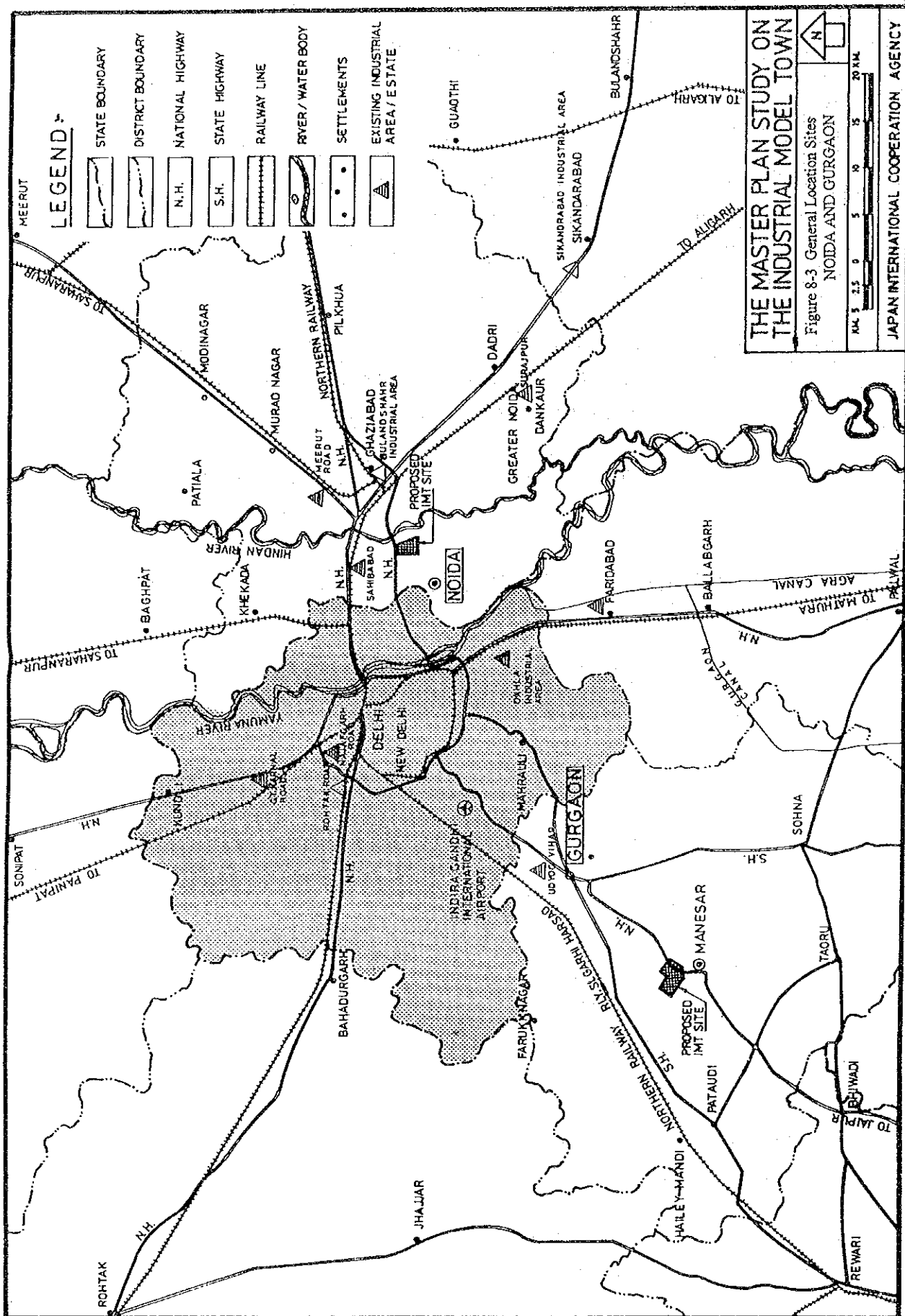


Table 8-21 Land Use of Existing Industrial Estates: Delhi Area - 1

Land Types with Area	Sector XXII Ghaziabad	Sector XXVII Ghaziabad	Meerut Road Site - III	Loni roadside II	Loha Mandi	Sahibabad
Total Land	46.6 ha.	138.3 ha.	142.1 ha.	124.3 ha.	21.2 ha.	585.3 ha.
Area Potted	36.7 ha.	60.9 ha.	111.7 ha.	101.5 ha.	10.0 ha.	455.8 ha.
Road Area	6.8 ha.	16.2 ha.	15.7 ha.	16.2 a.	8.4 ha.	63.4 ha.
Area for Parks	2.4 ha.	61.2 ha.	13.6 ha.	6.6 ha.	1.5 ha.	
Community						
Residential					1.3 ha.	
Electric sub station			1.1 ha.			
Telephone Exchange						
Water Works						
Police						
Green Belt						
Village Ahadi						
Future Use						
Commercial	0.7 ha.					58.7 ha.
Fire Protection						
# of Plots		9	159	16		66

Note: Data are compiled from various state government reports and documents

Table 8-21 Land Use of Existing Industrial Estates: Delhi Area - 2

Land Types with Area	Phase II NOIDA	58 NOIDA (L. VIII)	NOIDA EPZ Extension	Kasna Site I	Kasna Site II	Lon I	Khurja
Total Land	126.2 ha.	68.9 ha.	89.7 ha.	95.1 ha.	225.0 ha.	5.1 ha.	12.6 ha.
Area Potted	81.8 ha.	29.0 ha.	52.3 ha.	61.0 ha.	159.5 ha.	2.2 ha.	10.9 ha.
Road Area	29.4 ha.	11.4 ha.	17.6 ha.	20.0 ha.	37.2 ha.	0.9 ha.	1.1 ha.
Area for Parks		3.3 ha.	5.9 ha.	9.1 ha.	21.4 ha.	0.3 ha.	
Community	7.5 ha.	1.5 ha.	1.7 ha.		1.9 ha.		1.1 ha.
Residential						1.4 ha.	
Electric sub station		0.8 ha.	0.8 ha.				
Telephone Exchange		0.6 ha.					
Water Works		0.2 ha.					
Police		0.8 ha.					
Green Belt	5.0 ha.	1.1 ha.					
Village Ahadi		19.7 ha.					
Future Use			12.0 ha.				
Commercial	3.0 ha.			5.0 ha.	4.6 ha.	0.3 ha.	
Fire Protection		0.6 ha.					
# of Plots		236 ha.	40 ha.	330 ha.	562 ha.	30 ha.	43 ha.

Note: Data are compiled from various state government reports and documents

(2) Uttar Pradesh

There are 87 industrial estates developed by the Uttar Pradesh State Industrial Development Corporation. These industrial estates are located in 13 cities. More than 10 per cent of the sheds and plots are vacant. Table 8-22 shows following.

Table 8-22 Industrial Estates of U.P. State

Name of Zones	No. of Industrial Estates	Available		Allotted	
		Sheds	Plots	Sheds	Plots
1. AGRA	09	200	549	196	537
2. ALLAHABAD	04	30	182	30	164
3. KANPUR	06	125	243	119	213
4. BAREILLY	05	48	239	38	205
5. FAIZABAD	07	48	285	39	254
6. GORAKPUR	07	84	246	83	244
7. GARWAL	04	87	56	34	51
8. KUMAUN	05	45	122	24	116
9. MURADABAD	06	55	221	47	216
10. MEERUT	09	517	407	156	406
11. JHANSI	09	70	291	57	161
12. LUCKNOW	08	83	392	108	345
13. VARANASI	08	123	277	109	145
TOTAL	87	1,155	3,510	1,040	3,057

Source: Doing Business in U.P.(1)

UPSIDC is the industrial estates development and management organisation for Uttar Pradesh. NOIDA is an independent organisation for the development and management with about 1,000 employees of the NOIDA development area (Refer to Fig. 8-4).

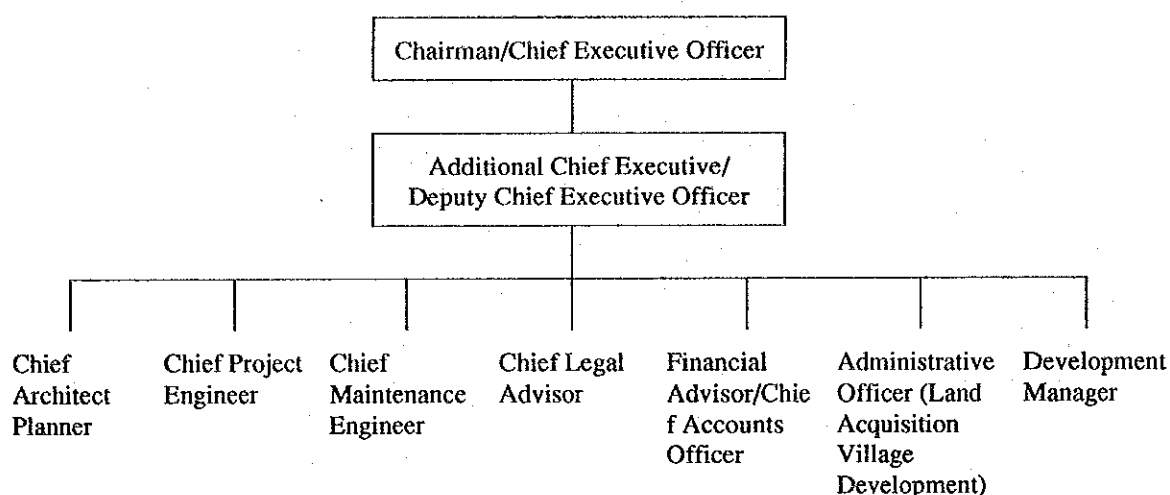


Fig. 8-4 NOIDA Organisation Chart

(3) Haryana

The Haryana State Industrial Development Corporation (HSIDC) and the Haryana Urban Development Authority (HUDA) are responsible for industrial estate development. Currently, there are 63 industrial estates that were developed by HSIDC and HUDA. However, 15-30 per cent of the plots remain vacant.

It should be noted that HUDA is responsible only for developing and the sales of industrial plots. HSIDC develops and sells industrial plots as well as standard factories. The HSIDC organisational flowchart is given in Figure 8-5.

Table 8-23 Industrial Estates of Haryana State

	Ind. Dept.	HSIDC	HUDA	TOTAL
No. of Industrial Estates	25	22	16	63
No. of plots carved out	1314	2623	5897	9834
No. of plots allotted	1304	1895	5009	8208
No. of plots remaining	10	728	888	1626

Source: HARYANA H.I.G.H. 1992

Industrial estates locations developed by HSIDC are as follows:

Udyog Vihar, Gurgaon	Jind
Kundli	Samalkha
Murthai	Panchkula
Ambala	Kalka
Tohana	Roz-Ka-Meo
Yamunanagar	Faridabad

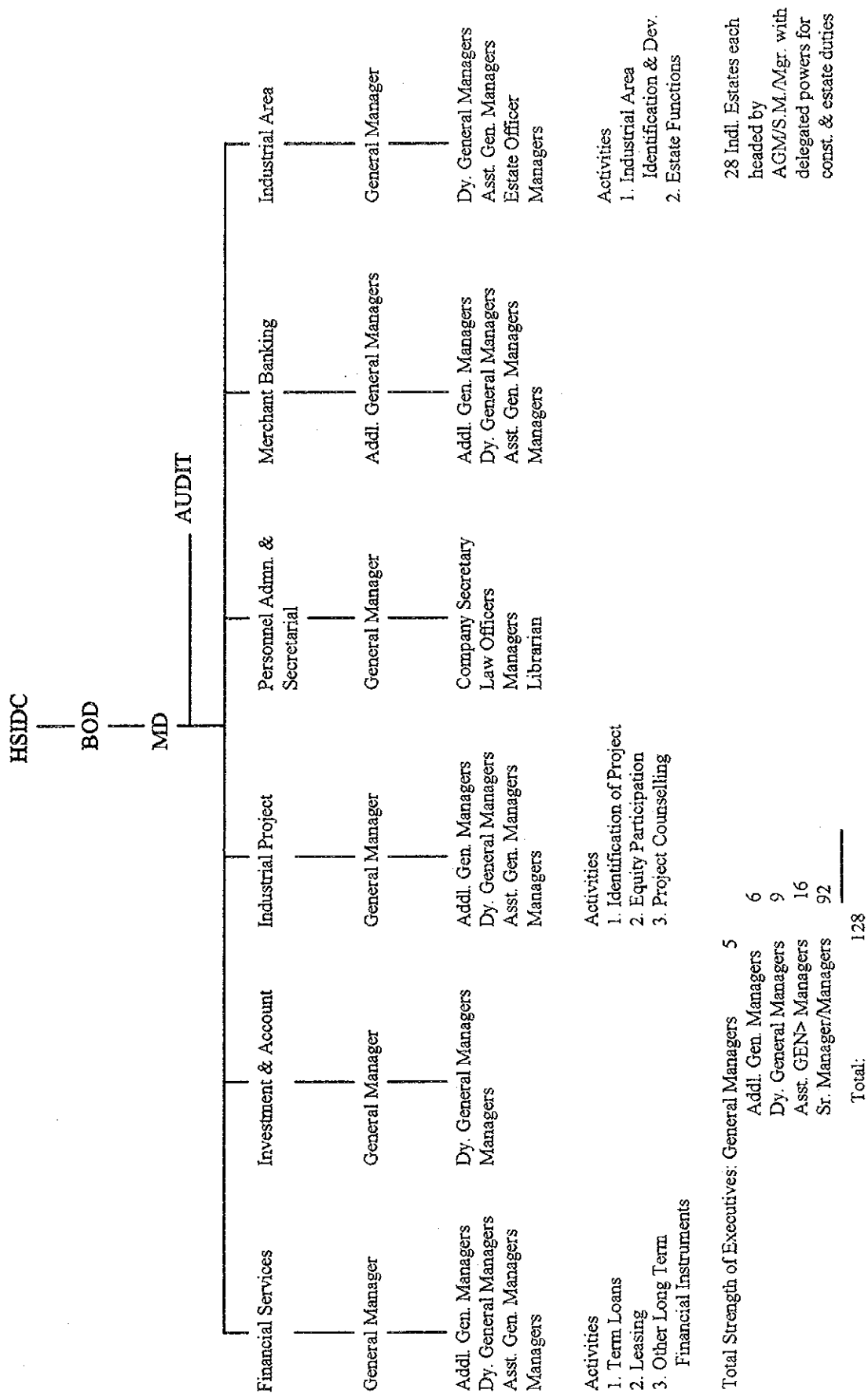


Figure 8-5 The HSIDC Organisational Chart

CHAPTER 9 PHYSICAL CHARACTERISTICS OF CANDIDATE SITES AND SURROUNDING AREA

CHAPTER 9 PHYSICAL CHARACTERISTICS OF CANDIDATE SITES AND SURROUNDING AREA

9.1 The IMT Candidate Site : BIDADI

9.1.1 The Social Environment

Bidadi is a Mandal headquarters and is located in the State of Karnataka within the rural district of Bangalore. The IMT site is located within the Ramanagaram Taluk. The administrative headquarters is located at Ramanagaram Town which is about 10 kilometers from the Bidadi site. The site is located along the Bangalore-Mysore State Highway No.48.

According to the regional and sub-regional plan strategy, Bidadi is within the Metropolitan Area of Bangalore.

The present urban settlement pattern around the IMT candidate site upto a 30 to 50 kms radius is shown in Fig. 8-1. The urban population of Bangalore was 4,086 thousands as per 1991 census figures.

Bangalore is a primate city which contained 27.2 per cent of the total urban population of the state in 1981, and increased to 29.5 per cent as per the 1991 census. But the decadal growth rate of the Bangalore Urban Agglomeration (BUA) has dropped from 75.6 per cent to 39.9 per cent from 1971-81 to 1981-91.

As per the 1991 census, the Bangalore rural district around the Bidadi IMT site, Ramanagaram and Channaptna are the only two class II towns, and Kanakpura is a class III town located nearby. The census class size, population, and decadal growth rate for the urban centre are given below:

Name of the Town	Census Class Size	Population	1981-91 Growth Rate (%)	1971-81 Growth Rate (%)
Bangalore	I	4,086,548	39.87	75.56
Rannagram	II	50,411	14.56	39.96
Channaptna	II	55,210	8.84	55.66
Kanakpura	III	37,837	25.45	48.60

Source: Census of India 1981, 1991

The BUA is growing into a large urban sprawl due to the absence of a statutory regional development plan. The primary is being reduced by placing development emphasis on other major urban centres like Hubli-Dharwar, Mangalore, Mysore, and Belgaum, which are under active consideration by the Government of Karnataka.

(1) Site and Surrounding

The settlement pattern around the IMT site at Bidadi and its surrounding area to a 10 km radius is shown in Fig. 9-1. The village Bidadi is located on the west of State Highway No.8 bordering the IMT site.

The land proposed for the IMT is partly held by private ownership and the remainder is under state government control. The site as demarcated by the Department of Industry measures approximately 1,094 hectare. The site is beyond the jurisdiction of BUDA, but under the Mandal Panchyat.

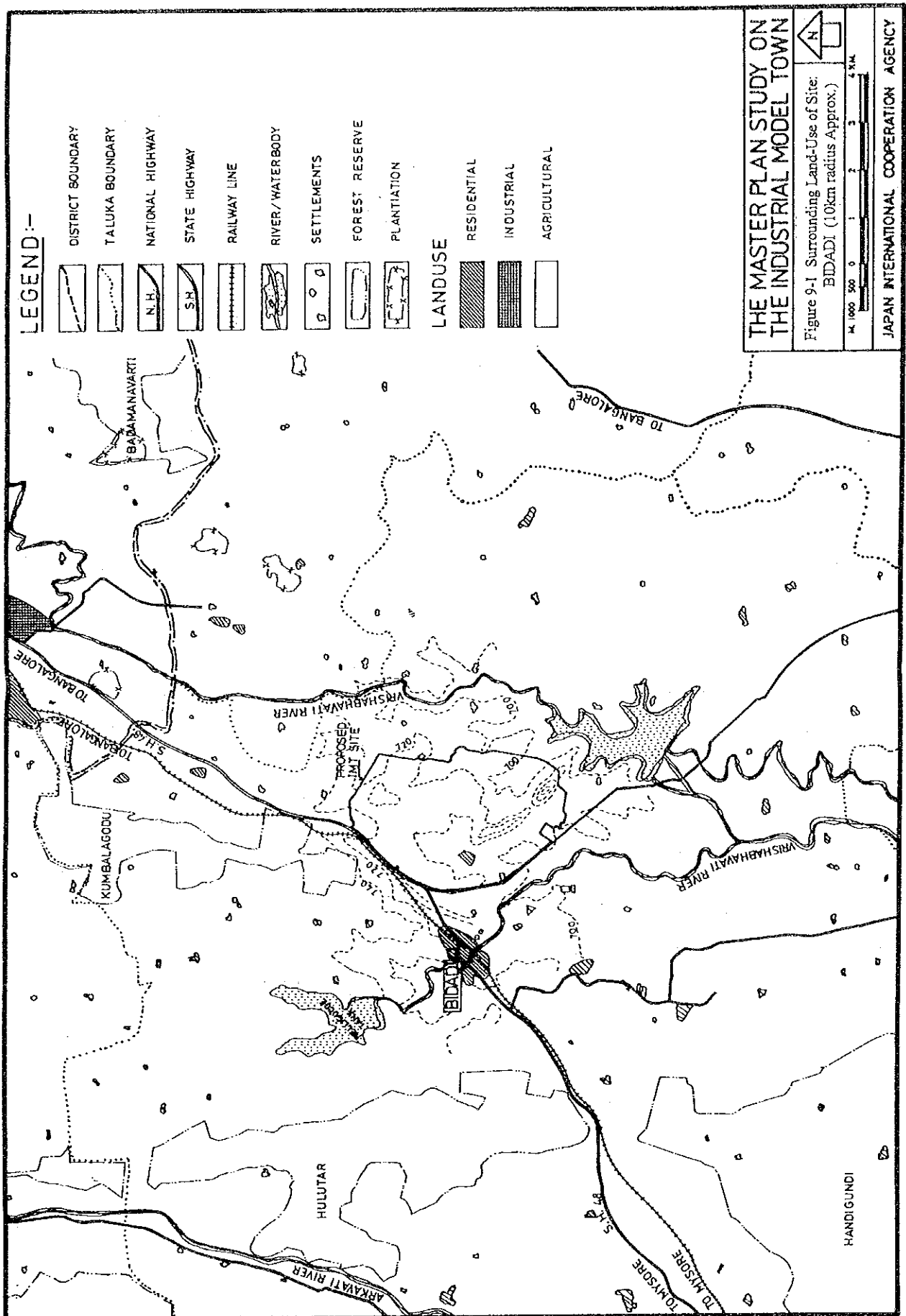
The topography of the site is undulating with few hillocks near the highway. On the whole, the site has a gentle eastern slope as shown in Fig. 9-2.

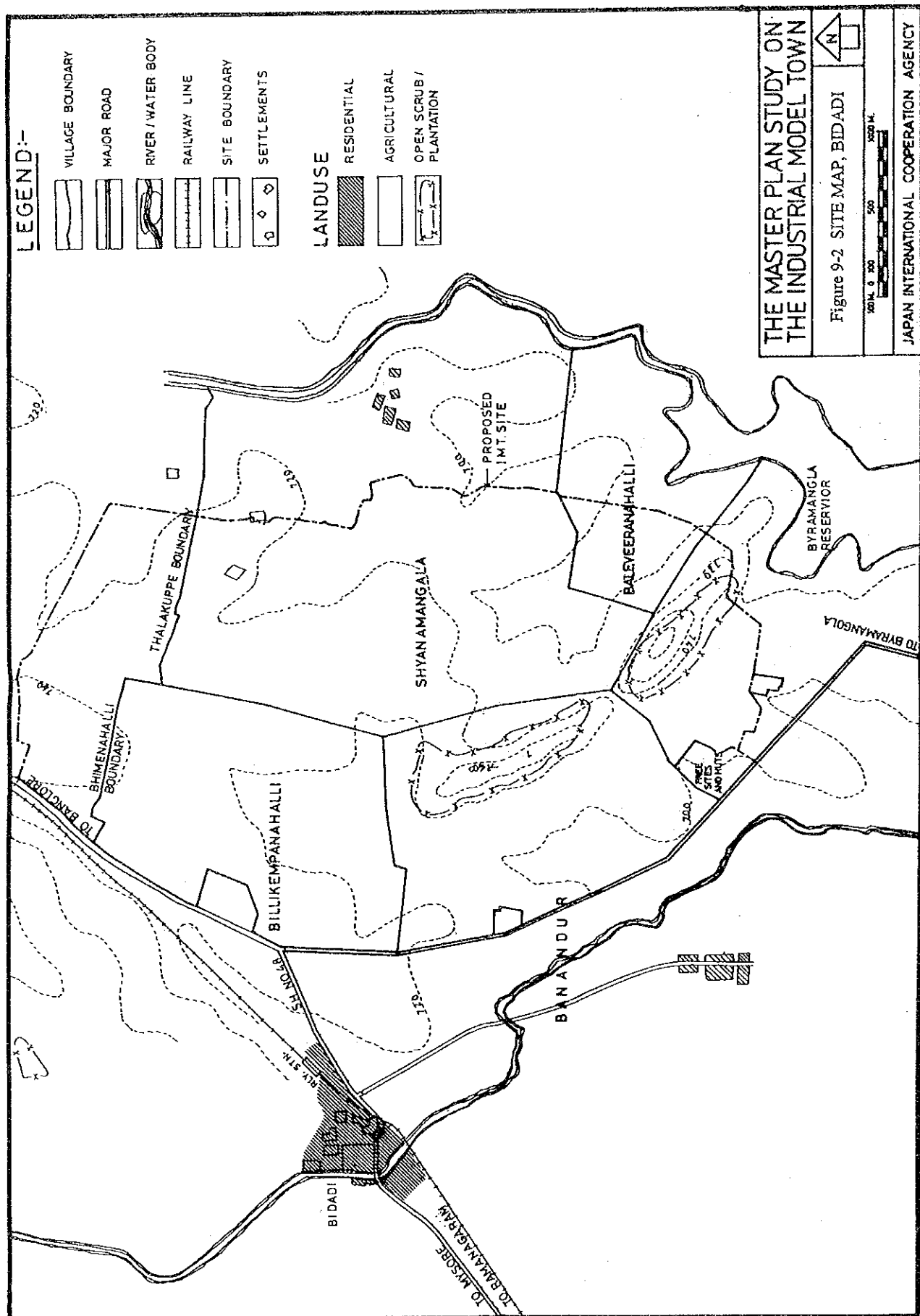
(2) Climate

The climate in the district is salubrious and very agreeable. It is free from extremes. The season from December to February is a period of generally fine cool weather. The hot weather season begins in March. The South-West monsoon season starts from June and lasts until September.

Rainfall: The Bidadi area receives an average annual rainfall of 844 mm. The district receives 51 per cent of the total rainfall during the South-West monsoon period.

April is usually the hottest month with the mean daily temperature of 33.4 degrees Celsius, and the mean daily minimum at 21.2 degrees Celsius. With the onset of monsoon early in June, there is appreciable drop in the daily temperature. December is generally the coolest month with the mean daily maximum temperature at 25.7 degrees, and the mean daily minimum at 15.3 degree Celsius. There is a steep rise in the temperature from about mid January to the beginning of March and a less rapid rise until the end of April.





The meteorological conditions of Bidadi area are as follows:

Height above mean sea level	800 to 1500 metres	
Longitude	77°06 to 77°26	
Latitude	12°35' to 12°52	
Temperature (mean daily)	Max: 33.4°C Min : 21.2°C	
Relative humidity	63.88 (at 8.30 HRS IST)	
Avg. annual rainfall	844 mm	
Wind direction	Summer Winter	South-West North-East
Wind speed	Highest Lowest	11.75 km/hr 7.08 km/hr

(3) Soil Condition of the Site

According to the information received from KSIDC, the soil condition of the site and its surroundings is as follows:

The soil of the Bangalore rural district consists of red loams, red gravel, sand loams, latrito, and gritty soils. Typical alluvial soils are absent in the district and there are some isolated patches of black soils in the district. The soils are generally low in plant nutrients.

(4) Present Landuse in and around the Site

At present the proposed site for the Industrial Model Town (IMT) at Bidadi is under dry agriculture covering most of the site except for a rocky ridge and woods which covers approximately 10 per cent of the site area (Fig. 9-1 & 9-2). According to the latest industrial location policy of the state and the centre, the site is proposed for urban conversion as an industrial growth centre and to develop as a sub-regional centre in the Bangalore Metropolitan Region by 2001.

(5) Existing Urban Facilities

The present IMT candidate site is surrounded by a few small villages with mostly temporary structures. There are few permanent structures in the Bidadi settlement.

The settlement for a 10 kms radius does not offer intermediate or high order urban facilities except within the Bangalore Urban Development Area (Fig. 9-1).

There are a few rich forest and plantations and water bodies with unspoiled scenic beauty. The site would have to depend on Bangalore City for all intermediate and higher level facilities such as an airport, medical, education, and other institutional facilities, as well as national and international wholesale trade offices.

There is a number of inexpensive semi-skilled and skilled labour available in the surrounding area because Bangalore has high-tech training institutions that produce specialised researchers and technicians.

(6) Ramanagaram Taluk

(a) Demographic

Population	0.21 million
Area	631 sq. km.

Town	Villages
------	----------

(b) Residential/housing
Residential Houses

9,134	26,960
-------	--------

(c) Trade and Commercial
Commercial shops

110	300
-----	-----

(d) Public and Semi-public
(Institutions)

(e) Health

i) Hospital

1

ii) Health Centres/Units

9

Total

10

- (f) Education
- | | |
|-------------------------|-----|
| i) Engineering colleges | 1 |
| ii) Other college | 1 |
| iii) High Schools | 19 |
| iv) Primary Schools | 231 |
- (g) Other facilities
- | | |
|-----------------------|-----|
| i) Post Offices | 29 |
| ii) No. of Telephones | 290 |
- (h) Other Social Infrastructure
- | | |
|-----------------------------|----|
| i) Youth Clubs (Boys/Girls) | 38 |
| ii) Sports clubs | 2 |
| iii) Hobby Groups | 5 |
| iv) Bank Branches | 7 |
- (i) Industry

There are four medium and large scale industries in the Taluk, details are as follows:

Name of the unit	Product
Villiappa Textiles Ltd.	: Pure silk and Fabrics
Chamundeshwari Textiles & Silk Mills	: Pure silk Fabrics
Senapathy Whitelays Ltd.	: Electronic Insulation paper and base filth paper
Lakshman Isoda Ltd.	: Mica paper and integrated Mica products

There are a total of 651 units in the tiny and small scale sector, details are as follows:

SL No.	Type of Industries	No. of Units
1.	Silk Reeling	201
2.	Silk Twisting	145
3.	Agriculture Implements and General, Engineering	51
4.	Wood Industries	54
5.	Other servicing units	200
Total		651

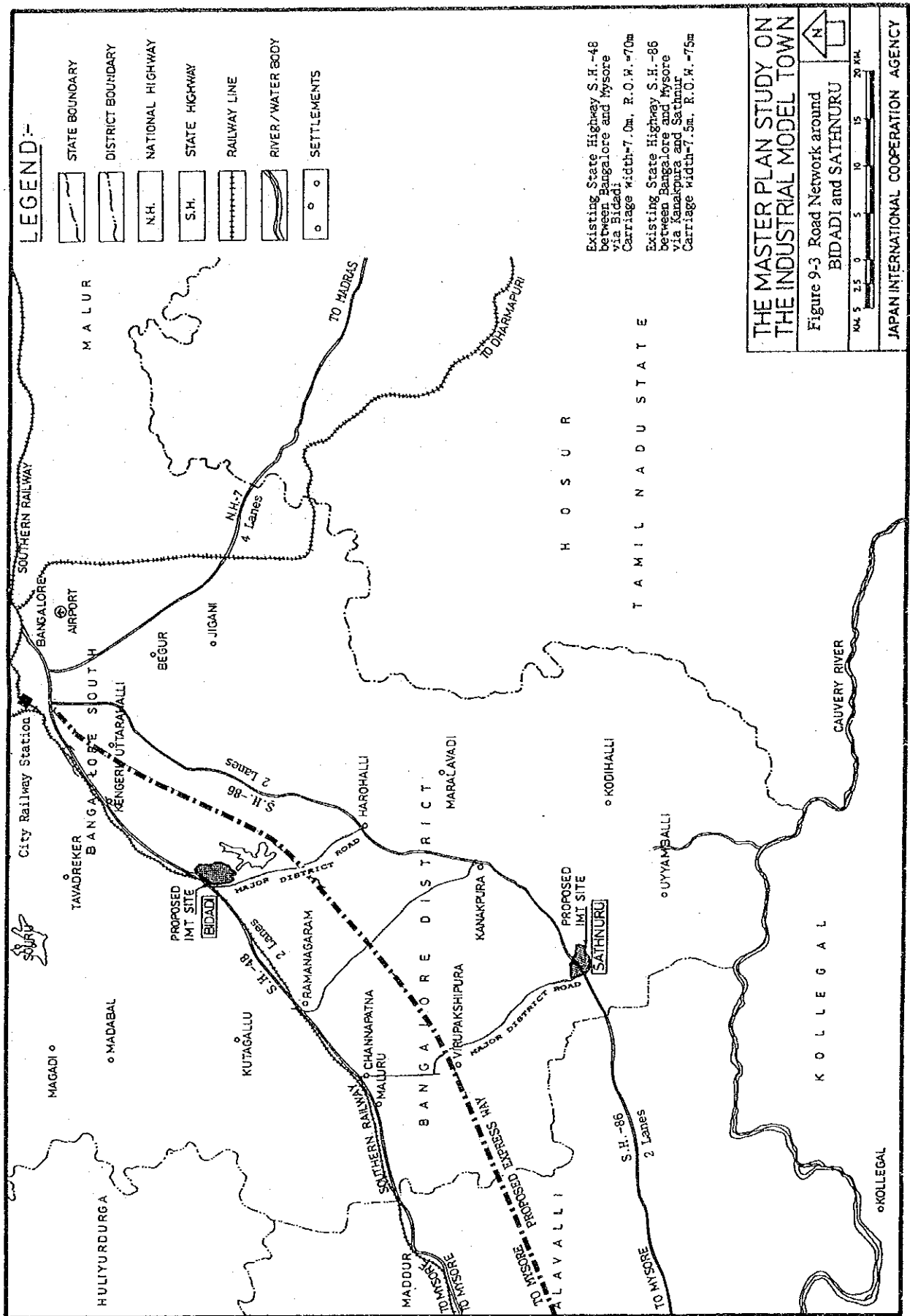
9.1.2 Infrastructure Conditions : Bidadi

(1) Road, Access and Traffic

The proposed IMT site at Bidadi is located at a distance of 35 km. from Bangalore City. The major access to the proposed IMT site at Bidadi is by State Highway No.48 which runs between Bangalore and Mysore via Bidadi. Bidadi-Harohalli major district road connects Bidadi with State Highway No. 86. (Refer to Fig. 9-3)

(2) Water Supply

India is located in the hinterlands of the Himalayas with a territory of 45 million hectares and abounds in ground water resources. Out of this, 7 million ha. of ground water is used for drinking, industrial, and other purposes. The remaining 38 million ha. is for irrigation. It is assessed that the total volume of ground water is 452 km³, and 180 km³ thereof is for use. The rivers in India may be classified into four categories: the Himalayan, Peninsular, Coastal, and the rivers of the Inland Drainage Basin. It is predicted that some 690 m³ of surface water is available, and 360 km³ is in use. According to estimates in 1985, volumes of surface water by principal uses were 470 km³ for irrigation, 17 km³ for domestic use, and 10 km³ for industrial use.



(a) Water Sources

The proposed sites of this project in Bidadi are located in the basin of the Arkavati River. As shown in Fig. 9-4, the Cauvery River flows from east to west, south of the proposed sites. The Arkavati and Vrishabhavati rivers, which are the tributaries of the Cauvery, flow from north to south and divide Bangalore District vertically. Utilisation of river water primarily for irrigation in the State of Karnataka is sourced from the Kamba River.

At present, the Arkavati and Cauvery rivers serve as sources of water supply for the city of Bangalore and the surrounding vicinity. In recent years, however, planned water volumes from the Arkavati River are not secure because of inadequate river water perennially due to the small volume of rainfall in the river valley. The volume of water intake from the Cauvery River is stable throughout the year. Table 9-1 shows the results of water quality tests of the Cauvery River, and Table 9-15 lists Japan's Standards for effluents prescribed by the Law of Prevention of Water Quality Degradation.

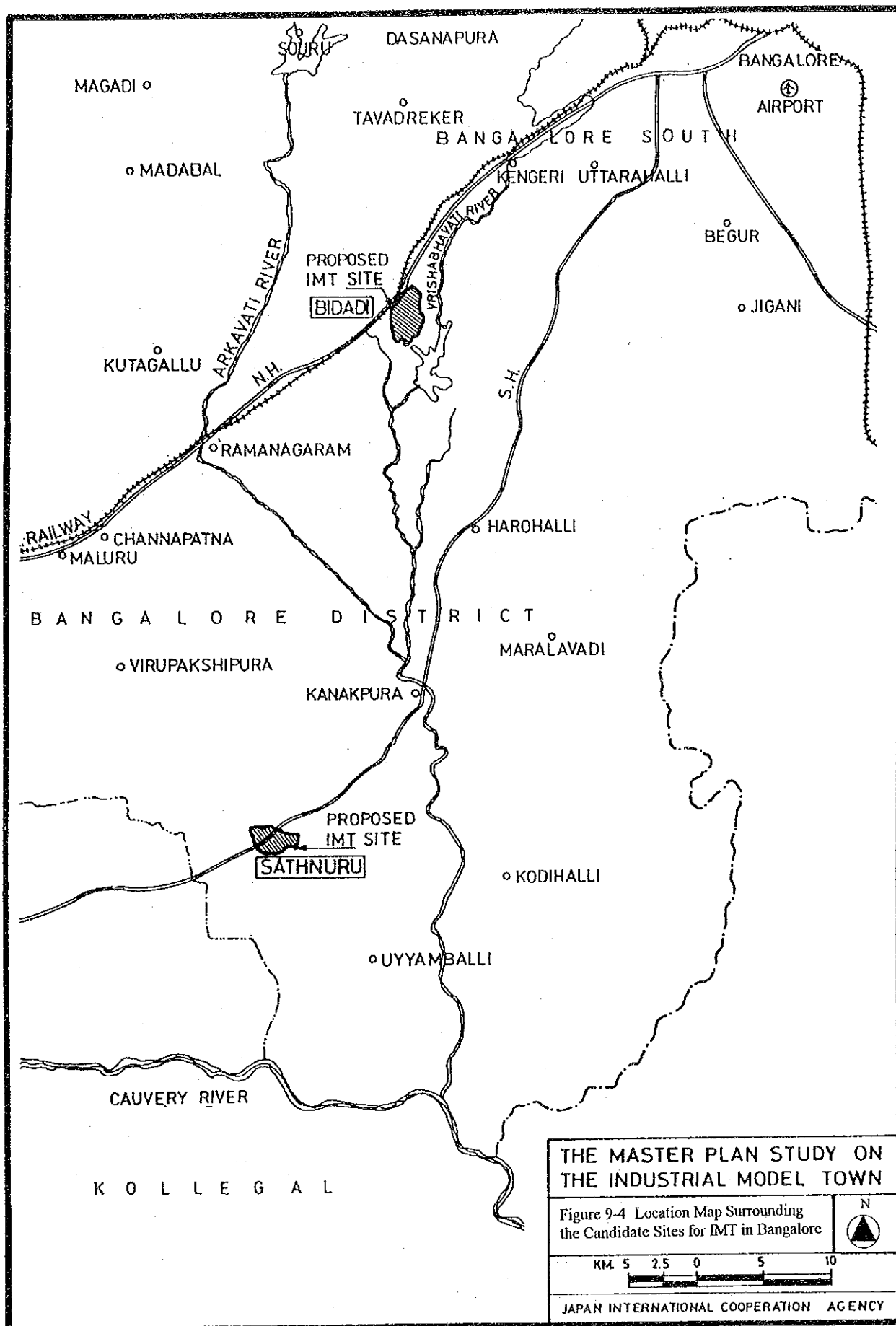


Table 9-1 Water Analysis Report of the Cauvery River

SI No.	Parameters	Result
1.	Temperature, °C	28.0
2.	pH Value	8.0
3.	Turbidity Units, (NTU)	2.0
4.	Dissolved Oxygen, mg/l	7.0
5.	B.O.D., mg/l	1.0
6.	C.O.D., mg/l	14.0
7.	Total Kjeldhal Nitrogens, mg/l	0.42
8.	Nitrogen (NO ₃ +NO ₂), mg/l	0.38
9.	Conductivity, msm ⁻¹	24.0
10.	Hardness, mg/l	106.0
11.	Calcium, mg/l	23.0
12.	Magnesium, mg/l	11.5
13.	Chloride, mg/l	22.0
14.	Sulfate, mg/l	2.4
15.	Sodium, mg/l	31.0
16.	Alkalinity (Total), mg/l	118.0
17.	Phenolphthalein Alkalinity, mg/l	Nil
18.	Fluorides, mg/l	0.1
19.	Iron, mg/l	0.08
20.	Zinc, mg/l	Nil
21.	Total Dissolved Solids, mg/l	156.0
22.	Fixed Dissolved Solids, mg/l	148.0
23.	Total Coliform, MPN/100 ml	21600
24.	Fecal Coliform, MPN/ml	350
25.	Boron, mg/l	Nil
26.	Free Ammonia, mg/l	0.01
27.	Pesticides, mg/l	Nil
28.	Phosphate, mg/l	Nil
29.	Physical Observation	Clear

Note: Cauvery at Srirangapatna Station. Source: KIADB

(b) Present Condition and Water Supply-Demand Balance

The water supply, sewerage, and drainage in the Bangalore District are operated by the Karnataka Urban Water Supply and Drainage Board (KUWSDB) which belongs to the Karnataka Housing and Development Department. The development of infrastructure, including water supply to new industrial estates, is made by the Karnataka Industrial Development Board (KIADB). The water supply system in Bangalore furnishes drinking water primarily. However, as indicated in Table 9-2, the current water supply volume is far below 200 liters a day, the target volume of per capita supply, and is of course unable to cover a population increase.

Table 9-2 Projected Population and Water Supply Demand

Year	Population in Lakhs	Gross demand in MLD	Gross demand in MLD	Shortage in MLD	Per capita supply in liters	
					Standard	Actual supply
1984	35.75	984.25	435.00	549.25	200.00	80.00
1986	40.54	1,082.40	435.00	647.40	200.00	66.00
1991	53.74	1,419.40	705.00	714.40	200.00	90.00
1996	67.93	1,753.53	705.00	1,048.53	200.00	71.00
2001	81.86	2,080.59	705.00	1,375.59	200.00	59.00

Note: Increment of Gross supply is based on the Cauvery Water Supply Scheme Stage III commissioned by 1989-90.

Source: KUWSDB

The water supply for the Bangalore District is developed on the basis of the Cauvery Water Supply Scheme (CWSS). Table 9-3 shows schedules for water supply volume.

Table 9-3 Schedule for Water Supply Volume by the CWSS and Other Projects

Description	Supply Capa.	Water Resource	Remark
—	145 MLD	Arkavathy	Capa. of exist. reservoirs
CWSS Stage I	135 MLD	Cauvery	Completed
CWSS Stage II	135 MLD	Cauvery	Completed
CWSS Stage III	270 MLD	Cauvery	Completed on 1993
Others	20 MLD	Arkavathy	Completed
Total	705 MLD		

Source: Annual Report 1991-92

In the Bangalore District, expansion of existing industrial estates and construction of new estates, is in progress due to rapid industrialization during recent years. As a result, the supply of water to these industrial estates is below demand. In the present situation, not only the supply of industrial water but drinking water, is also threatened. To secure water, therefore, each plant either sinks its own wells or buys water carried by lorries from nearby private wells. Consequently, KIADB plans to develop an independent water supply system for these industrial estates.

(c) Future Projects

After completion of the CWSS Stage III mentioned above, water supply shortages to Bangalore will not improve. Therefore, the CWSS Stage IV was planned. The total cost of this project is estimated to be 100 million Rupees. During the first step of stage IV of the CWSS, 49 million Rupees for construction costs will be invested to supply 270 millions liters per day of water by 1997/98.

In order to alleviate the shortages of water supplies to the existing industrial estates in the vicinity of Bangalore mentioned earlier, the KIADB established a plan for the Bangalore Industrial Water Supply Project, which supplies roughly 100 million liters per day of water to the seven selected industrial estates. As shown in Fig. 9-5, the water main of the project is planned to run about 8 km south of Bidadi and to traverse the proposed candidate site in Sathnur. The project is summarized as follows.

i) Industrial Estates and Requirement of Water Volume

White field (Doddanekundi)	:	18.16
Jigani	:	13.62
Bommasandra	:	13.62
Electronic city (Konappana Agrahara)	:	9.08
Attibele	:	9.08
Sathnur	:	13.62
Industrial growth center (Pandithalli)	:	23.00
<hr/>		
Total volume	:	100.18 MLD

ii) Major facilities

Intake works
 Jackwell
 Water treatment plant
 Pumping station
 Water main
 Reservoir

iii) Design calculations

Quantity of water required per day	:	120 MLD
Losses in treatment plant and transmission over design capacity 10%	:	12 MLD
Capacity of system	:	132 MLD
No. of hours of pumping in a day	:	23 hours
Flow in pipe (132 MLD x 24 Hrs)/23 Hrs	:	137.739 MLD = 137.739 m ³ /day

During the second field survey, however, an investigation and inspection of the water source could not be accomplished. Information gained during the first field survey indicated a lack of consensus between other provinces over the water rights of the Cauvery River. Because these issues remain unresolved at this time, the utility volume of the river water for the project cannot be determined.

(d) Facilities Required for the IMT

There is a plan to supply water to the proposed candidate site for the IMT in Bidadi by the Bangalore Industrial Water Supply Project of the KIADB referred to earlier. Therefore, if this is selected as the final site, impact on the existing industrial estate is unavoidable and the Water Supply Project will have to be reviewed.

Principal facilities required for the IMT include water-supply piping network, reservoirs, overhead tanks, etc., on the premises. If Bidadi is selected, construction of an additional water main will be required for a total length of roughly 8 km.

(e) Water Charge

Water charges are as shown in Table 9-4.

Table 9-4 Water Tariff	
Slab in Liters	Unit: Rs Rate per 1,000 Liters
Domestic	
0 - 25,000	0.5 min. of 12.50
25,001 - 50,000	1.20
50,000 - 75,000	3.00
75,001 - 100,000	4.50
Beyond 100,000	6.00
Bulk domestic consumers high rise or multi-storied buildings	6.00 min. of 60.00
0 - 20,000	
20,001 - 40,000	9.50
40,001 - 60,000	12.00
60,001 - 100,000	12.00
100,001 - 200,000	12.75
Above 200,000	15.00
Industries	
Over 500,000	15.00

(3) Sewerage and Drainage

Sewerage and drainage have important roles in the preservation of water quality in public areas including prevention of urban disasters such as flooding due to heavy rain fall and protection of the environment for quality of life by means of discharge and treatment of waste water. In India, drainage systems are not fully developed, even in the larger cities. As sewage treatment is not fully developed, river pollution and contamination also occur, presenting ecological and sanitary problems. In particular, water treatment facilities and the monitoring system for trade effluents, is not sufficiently developed due to rapid industrialisation in recent years. Large-scale factories are obliged to treat waste water on site. The treatment of waste water for other firms and ordinary industrial estates, is made by (1) public works, or (2) a third sector jointly established by the government, province or municipality and the private sector or some composition of alternatives.

National projects were executed for restoration of the water quality of major rivers such as the Ganges, Indus, Yamuna and Hindon. The IMT project is also required to formulate a sewerage and drainage plan in consideration of future environmental preservation.

(a) Present Conditions

Sewerage and drainage in the city of Bangalore is under the control of the Sanitary Division (Maintenance) of the Bangalore Water Supply and the Sewerage Board (BWSSB), and in other areas under the Karnataka Urban Water Supply and the Drainage Board (KUWSDB). Underground drainage systems were developed for the city. The total length of drainage pipes is 1.67 million meters, with maximum pipe diameter of 300 mm; pottery pipes and between 300 mm and 2,000 mm hume pipes are used.

The primary treatment of sewage is by two plants as given below. A test laboratory is affixed to a plant to test the quality of discharged water and industrial sewage.

i) Vrishabhavathi Plant

Capacity : 123 MLD

Facility

Clarifier : 2 Nos.

Digester : 4 Nos.

Sludge drying bed : 20 Nos.

ii) Koramanagala and Challaghatta Valley Plant

Capacity : 163 MLD

Facility

Clarifier : 3 Nos.

Digester : 4 Nos.

Sludge drying bed : 20 Nos.

(b) Future Projects

In accordance with the Third Stage of the Cauvery Water Supply Scheme which will be completed in 1993, secondary treatment facilities with a treatment capacity of 60 million liter per day are under construction. At the same time, an expansion of the Vrishabhavathi Plant mentioned above is under way to increase capacity to 180 million liters per day. Improvement in the quality of treated waste water from existing facilities is also expected by the completion of the secondary treatment facilities.

Though the design volume of waste water remains unknown, 80 per cent of the water volume supplied is generally regarded as an estimated volume. The volume of water supply per capita, the current status and standards of sewage treatment volume based on this are as shown below.

Table 9-5 Volume of Water Supply and Capacity of Primary Sewage Treatment

PARTICULARS	Million Liters per Day	
	Existing Level	Standard Level
1. Water Supply	376	609
2. Sewage flow @80% of the water supply	301	487
3. Treatment capacity of the primary sewage plant	403	487

Note: Standard level of water supply is estimated @140 LPCD against 1990 population.

Source: Statistical Brochure 1889-90 and 1990-91

(c) Facilities Required for the IMT

Proposed site is not in possession of a sewerage facility or a construction program related to this project. Consequently, if this project is executed, a water treatment plant is required for the IMT.

The treated water thus discharged is used by the Forestry Bureau for irrigation of neighboring farms. As this drain runs dry during the dry season, such a treatment facility will be required that ensures to use discharged water for irrigation purposes without being diluted by rain water. For reference, Table 9-15 shows Japanese environmental standards for agricultural water. In Bidadi, waste water is to be discharged into the adjoining Vrishabhavati River.

(4) Power Supply System

(a) Present Situation

Unlike other State Electricity Boards in the country, the Karnataka Electricity Board (KEB) is vested mainly with the function of transmission and distribution, and the Karnataka Power Corporation Limited (KPC) is vested mainly with the function of power generation. The KPC today has an installed capacity of approximately 3,000 MW. The KEB purchases power generated by the KPC at rates specified, from time to time, by the Government of Karnataka. Another unique feature is that the two power houses on the Thungabhadra River situated in the state are owned and operated by the Thungabhadra Board which is represented by the state governments of Andhra Pradesh, Karnataka and the Government of India, and 20 per cent of the energy generated by these stations

is shared by the KEB. Further, there is central allocation to Karnataka from the NTPC, NLC and MAPP power generation. From this total, Karnataka has a share of 16 per cent.

Electric power for the Bidadi area is distributed through the following substations:

- 66/11 kV, 1 x 5 MVA Master Unit Substation (MUSS) at Honnigahahalli
- 66/11 kV, 1 x 8 MVA MUSS at Kumbalgodu Industrial area

(b) Future Plan

i) Power project

Ongoing and future power projects in Karnataka State are shown on the following table. If these project will be executed timely, the problem of power shortages will be solved.

ii) Substations

The following master unit substations (MUSS) are planned for installation to supply the Bidadi area:

Bidadi MUSS (1 x 5 MVA)

Table 9-6 (1) List of Ongoing & Future Power Projects in Karnataka State

SIN o.	Particular	No. of units and capacity of each	Total installed capacity in Mega Watts (MW)	Annual energy generating capacity in (MU)
A.	EXISTING PROJECTS		3,013	13,665
B.	ONGOING PROJECTS			
1.	VERAHI BASIN			
	1) Mani Dam Power House	2 x 4.5	9	40
2.	KRISHNA BASIN			
	1) Ghataprabha Dam Power House	2 x 16	32	143
	2) Shivapur Scheme on Tungabhadra left Bank Canal (under Execution by Bhorka Ltd.)	2 x 9	18	114
	3) Bhadra Right Bank Canal Power House (Additional Unit)	1 x 6	6	25
	4) Almatti Dam Power House	5x50 + 1x18	268	714
3.	KALINADIBASIN (Stage II)			
	1) Kodalalli Dam Power House	3x40	120	512
	2) Kadra Dam Power House	3x50	150	570
4.	RAICHUR THERMAL POWER STATION			
	StageII Unit 4	1x210	210	1,150
5.	SHARAVATHI BASIN			
	1) Sharavathi Tailrace Project	4x60	240	600
	2) Sharavathi Generating Station Renovation (uprating Existing Units)	7x14.4	100.8	-
6.	DIESEL SETS			
	1) Bidar, Indi, Jamakhandi Kolar (KPC)	4x19.44	77.76	420
	2) Yelahanka (KEB)	6x20	120	720
7.	MINIHYDEL SCHEMES			
	1) Mallapur Scheme	2x4.5	9	51
	2) Sirwar Scheme	1x1	1	5
	3) Ganekal Scheme	1x0.35	0.35	2
	4) Keregodu Scheme	1x0.04	0.04	1
8.	BEDTHI BASIN			
	Bedthi Stage I Underground Power House	1x0.04	210	911
9.	CAUVERY BASIN			
	Brindavan Hydel Scheme	2x6	12	65
	Total		1,566	6,043

Source: KEB

Table 9-6 (2) List of Ongoing & Future Power Projects in Karnataka State

SI No.	Particular	No. of units and capacity of each	Total installed capacity in Mega Watts (MW)	Annual energy generating capacity in (MU)
C.	FUTURE MAJOR PROJECTS			
1.	KALINADI BASIN			
	1) Kalinadi Stage II Dandeli Dam Power House	2x30	60	212
	2) Kalinadi Stage III	2x200	400	1,100
2.	NETHRAVATHI BASIN			
	1) Sarpadi Barrage Power House	3x30	90	215
	2) Nethravathi Barrage Power House	2x30	60	150
	3) Kumaradhara Barrage Power House	3x16	48	236
	4) Gundia High Head Scheme	2x120	240	770
	5) Kumaradhara High Head Scheme	2x50	100	330
3.	AGHANASHINI BASIN			
	1) Aghanashini Project	4x150	600	2,000
	2) Bennehole Scheme	1x50	50	210
4.	MAHADAYI BASIN			
	1) Kotni Dam Power House	2x10	20	
	2) Tailrace Dam Power House	2x12.5	25	828
	3) Krishnapur Underground Power House	2x150	300	
5.	CAUVERY BASIN			
	1) Shivasanudram Seasonal Scheme	2x135	270	1,590
	2) Mekedatu Scheme	2x180	360	722
6.	KRISHNA BASIN			
	1) Tamankal Scheme	4x200	800	2,500
	2) Krishna Barrage PH	3x9	27	96
	3) Bheema River Scheme	2x60	120	293
7.	VARAHI BASIN			
	1) Varahi Irrigation Dam Power House	2x20	40	150
	2) Varahi Stage II	2x115	230	-
8.	BARAPOLE BASIN			
	Barapole Hydel Scheme	3x200	600	1,300
9.	MINI HYDEL SCHEMES	-	200	460
10.	DIVERSION SCHEMES			
	1) Katla, Palna & other Diversion Schemes to Supa Reservoir	-	-	200
	2) Diversion Schemes to Linganamakki Talakalale & Chakra Reservoir	-	-	400

Source: KEB

Table 9-6 (3) List of Ongoing & Future Power Projects in Karnataka State

SI No.	Particular	No. of units and capacity of each	Total installed capacity in Mega Watts (MW)	Annual energy generating capacity in (MU)
11.	THERMAL POWER			
	1) Raichur Thermal Power Station Stage III Unit 5	1x500	500	2,675
	2) Vijayanagar Thermal Plant (Hospet) Stage I & II	3x500	1,500	8,025
	3) Mysore Thermal Plant Stage I & II	3x500	1,500	8,025
12.	NON-CONVENTIONAL ENERGY			
		-	160	320
	Total		8,300	32,807

Source: KEB.

(c) Issues and Constraints

- i) The balance between generated power and power demand indicates there is a likely shortage of power as demand is 57 million units and available power is 47 million units for the Bidadi and Sathnur area. Of course, the state has many ongoing power projects as well as plans for future power projects, however, those projects have to be executed timely otherwise the present situation could not be improved.
- ii) The result of questionnaire surveys indicates that power interruption occurs frequently, i.e., 2 - 5 times per day. Because of this condition, provision of a power generation plant and/or stable power supply from the private sector should be essential for stable power supply to the IMT.

(5) Telecommunication System

(a) Present Situation

As a part of the national telecommunication system, there is an exchange (128 pc DOT Digital Electronic Exchange), which covers the Bidadi area. Working connections are 68 in the Bidadi area and waiting subscribers are 79 for the area.

(b) Future Plan

i) National Telecommunication System

The project for expansion of telecommunication lines is now ongoing and numbers will be increased upto 220 within 6 months. Also another 220 lines are to be completed by the end of 1993. Forecasting subscribers of 150 numbers (100 in Bidadi area and 50 in Sathnur area) for the IMT, in another two years are already taken into consideration total line numbers of 440. Further expansion will be made as per demand.

ii) Private Communication Network

In addition to the above, the The State of Karnataka has plans to provide a communication network for interconnecting various industrial estates in the state. The system consists of providing digital electronic PABX system of necessary line capacity at each township. The exchanges are interconnected using Digital Microwave Radio System and the network including the exchanges work as a single system with common numbering. Local area networks for data transmission are also linked by this radio link. Some part of the system has already been commissioned for ONGC, north eastern region and is working now.

(c) Issues and Constraints

The issue that the number of telephone lines is not enough against actual demand, is a patent fact. However, if the countermeasure mentioned in the previous clause 2) could be executed timely, the present situation would be improved.

9.2 The IMT Candidate Site : SATHNUR

9.2.1 Social Environment

Sathnur is located in the State of Karnataka, within the rural district of Bangalore, about 70 kms from the City of Bangalore. The IMT candidate site falls within the Kanakpura Taluk, whose administrative headquarters is located at Kanakpura town which is about fifteen kilometres from the Sathnur site. Sathnur is one of the 20 Mandals in the Kanakpura Taluk. The site is situated along the Bangalore Mysore State Highway No. 86.

According to the regional plan and sub-regional plan strategy, Sathnur is on the border of the Bangalore Metropolitan Area.

The present urban settlement pattern around the IMT candidate site upto a 30 to 50 kms radius is shown in Fig. 8-1. The urban population of Bangalore (U.A.) was 4,086 thousand as per 1991 census.

The Bangalore rural district comprising 5,815 sq. km, has 16,664,315 population whose urban component is 302,999 people as per 1991 census figures.

Bangalore is a primate city having 27.2 per cent of the total urban population of the state in 1981, which increased to 29.5 per cent as per the 1991 census. But the decadal growth rate of the Bangalore Urban Agglomeration has dropped from 75.6 per cent in 1971-81 to 39.9 per cent in 1981-91.

Ramanagram and Channapatna are the two Class II and III towns nearby, and Kanakpura is a Class III town close to the IMT site.

Name of the Town	Census Class Size	Population	Growth Rates (%)	Growth Rates (%)
			1981-91	1971-81
Bangalore	I	4,086,548	39.87	75.56
Ramanagram	II	50,411	14.56	39.96
Channaptna	II	55,210	8.84	55.66
Kanakpura	III	37,837	25.45	48.60

Source: Census of India 1981, 1991

The BUA is growing into a large urban sprawl due to the absence of a statutory regional development plan. The primacy is being reduced by placing emphasis of development to other major urban centres like Hubli-Dharwar, Mangalore, Mysore, and Belgaum which are under active consideration by the Government of Karnataka.

(1) Site and Surroundings

The settlement pattern around the IMT candidate site at Sathnur and its surrounding area upto 10 kms radius is shown in Fig. 9-6. The village Sathnur is located South-West of State Highway No. 86 bordering the IMT site.

The land proposed for the IMT site is partly under private ownership, with the remainder under the state government. The site as demarcated by the Department of Industry measures approximately 1,400 hectare.

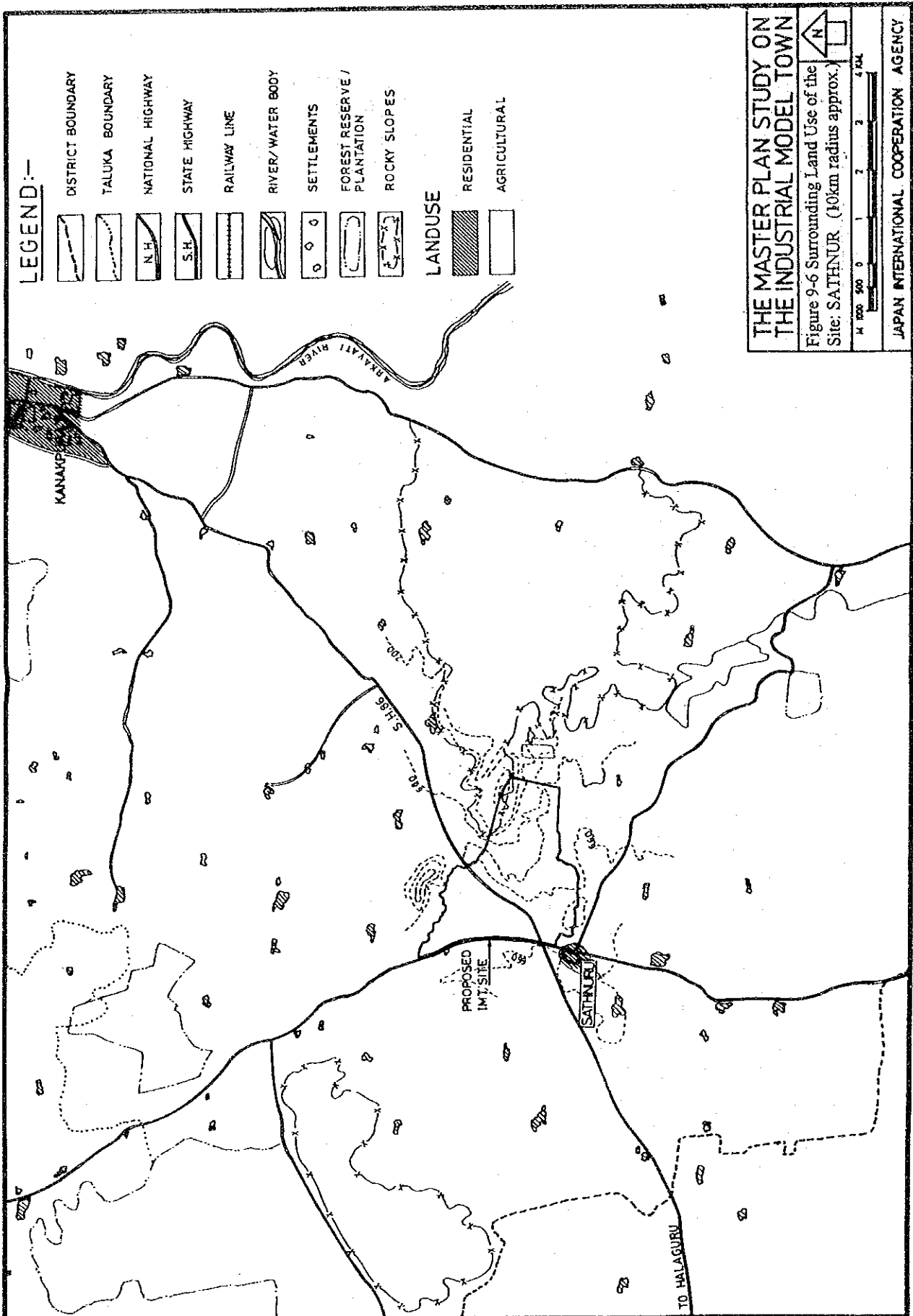
The site is beyond the jurisdiction of BUDA, but under the Mandal Panchyat. The topography of the site is fairly flat and having gentle slope as shown in Fig. 9-7.

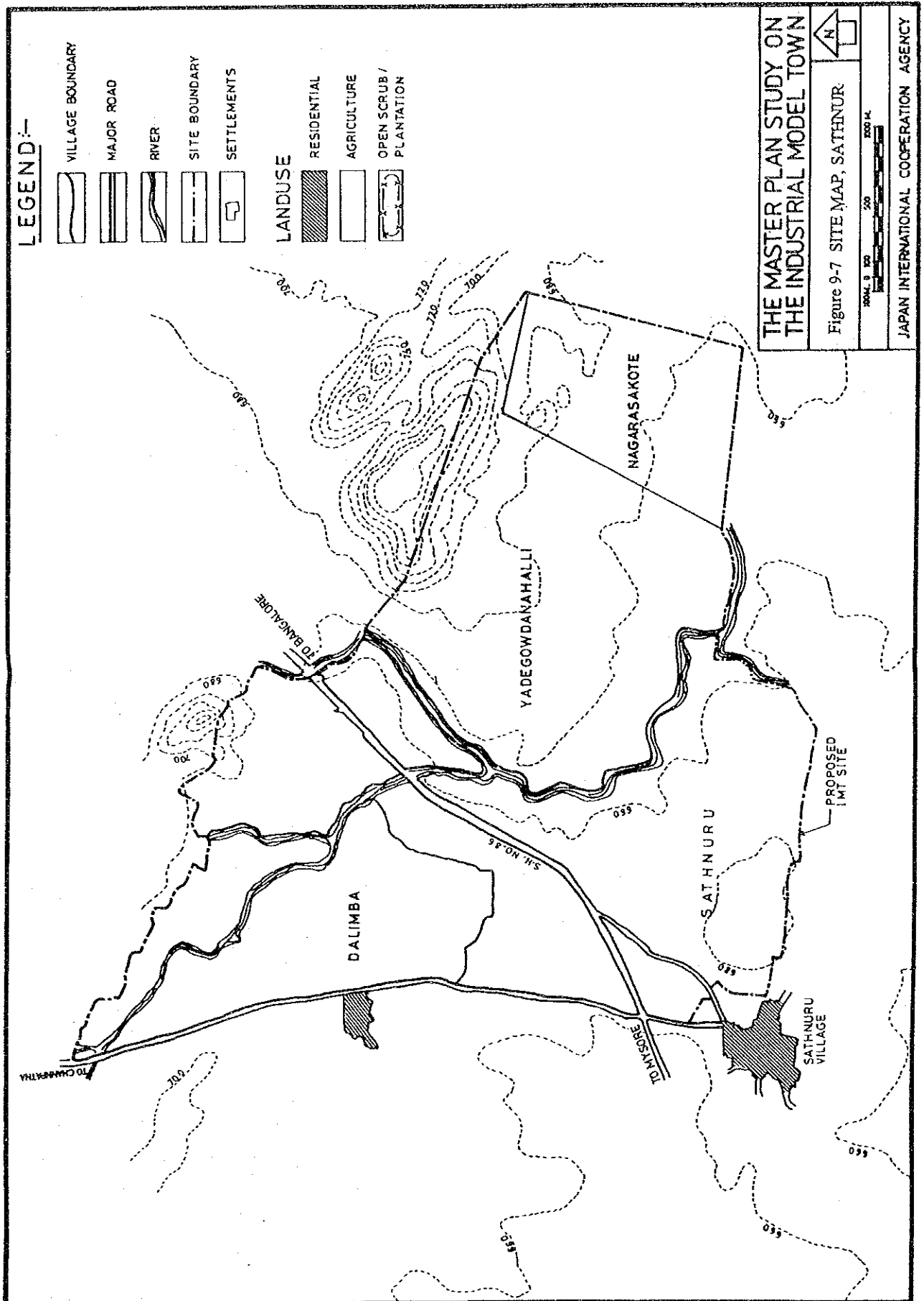
(2) Climate

The climate of the district is salubrious and very agreeable. It is free from extremes. The seasons from December to February is a period of generally fine cool weather. The hot weather season begins in March. The South-West monsoon season starts from June and lasts until September. These are two rainy seasons.

The Sathnur area receives an average annual rainfall of 805 mm. The district receives 51 per cent of the total rainfall during the South-West monsoon period.

April is usually the hottest month with the mean daily temperature of 33.4°C and the mean daily minimum at 21.2°C. With the onset of monsoon early in June, there is appreciable drop in the day's temperature. December is generally the coolest month with the mean daily maximum temperature at 25.7°C, and the mean daily minimum at 15.3°C. There is a steep rise in temperature from about the middle of January to the beginning of March, and a less rapid rise later until the end of April.





The meteorological conditions of Sathnur area are as follows:

Height above mean sea level	800 to 900 metres	
Longitude	77°11 to 77°36	
Latitude	12°13' to 12°48	
Temperature (mean daily)	Max: 33.4°C Min : 15°C	
Relative humidity	63.88 (at 8.30 HRS IST)	
Average annual rainfall	805.2 mm	
Wind direction	Summer Winter	South-West North-East
Wind speed	Highest Lowest	11.75 km/hr 7.08 km/hr

(3) Soil Condition of the Site

The soil condition of Sathnur site is considered the same as the Bidadi site, i.e., the soil consists of red loams, red gravel, sand loams, latrito, and gritty soils. Typical alluvial soil is absent in the district and there are some isolated patches of black soil. The soil is generally low in plant nutrients.

(4) Present Landuse

At present the proposed site for the IMT at Sathnur is under dry agriculture use covering a major part of the site (Fig. 9-6 & 9-7). According to the latest industrial location policy of the state and the central government, the site is proposed for urban conversion as an industrial growth centre, and to develop into a regional centre in the Bangalore Metropolitan Region by 2001 AD.

(5) Existing Urban Facilities

The present IMT site is surrounded by a few small villages with mostly temporary structures. There are few permanent structures in the Sathnur village settlement. The settlement for a 10 kms radius does not offer any intermediate or high order urban facilities of any significance (Fig. 9-6).

There are a few rich forests and plantations, and water bodies with unspoiled scenic beauty. The site is far from Bangalore, but would have to depend on Bangalore City for intermediate and higher level facilities like an airport, medical, education and other institutional facilities, as well as wholesale trade offices of a national and international level.

A number of inexpensive semi-skilled and unskilled labour are available in the surrounding area, but skilled labour would have to be recruited from Mysore or Bangalore.

(6) Kanakpura Taluk

(a) Demography

Population	0.33 million	
Area	1,590 sq. km	
	Town	Villages
(b) Residential/housing		
Residential Houses	3,819	64,500
(c) Trade and Commercial		
Commercial shops	760	400
(d) Public and Semi-public (Institutions)		
(e) Health		
i) Major Hospital	1	
ii) Health Centres/Units	7	
Total	8	
(f) Education		
i) Colleges	3	
ii) High Schools	19	
iii) Primary Schools	365	
(g) Other facilities		
i) Post Offices	58	
ii) No. of Telephones	350	
(h) Other Social Infrastructure		
i) Youth clubs (Boys/Girls)	68	
ii) Sports clubs	3	
iii) Hobby clubs	11	
iv) Bank Branches	20	

(i) Industry

There are two medium and large scale industries in the Taluk as detailed below:

Name of the unit	Product
Govt. Silk Filature	: Raw silk yarn and fabrics
Sona Synthetics	: Polyester synthetic and cotton yarn

There are 624 small scale units in the Taluk as detailed below:

SL No.	Type of Industries	No. of Units
a.	Agrobased	37
b.	Forest based	103
c.	Engineering and allied	39
d.	Chemical	10
e.	Mineral base	2
f.	Food and beverage	6
g.	Leather based	14
h.	Others	413
Total		624

In addition there are 1,383 artisans engaged in various actives as detailed below:

Handloom	145
Powerloom	198
Bamboo craft	432
Mat weaving	321
Pottery	287
Total	1,383

9.2.2 Infrastructure Conditions: Sathnur

(1) Road, Access and Traffic

The proposed IMT site at Sathnur is located at a distance of 70 km. from Bangalore City. The access to the proposed site of Sathnur is by State Highway No. 86 which runs between Bangalore and Mysore parallel to State Highway No.48. Channapatna-Sathnur major district road connects Sathnur with State Highway No. 48.

The road network around Sathnur is shown in Figure 9-3.

Via Bangalore both sites are connected to major cities in India by national highways: For example,

To Bombay by National Highway No.4 via Pune

To Madras by National Highway No. 7 and No. 4

To Hyderabad and further north by National Highway No. 7

To Mangalore by National Highway No. 48.

The profile of existing State Highway No. 48 is carriage width 7.0 m and R.O.W. 70 m. State Highway No.86 is carriage width 7.5 m and R.O.W. 75 m. The profile of the major district road is carriage width 3.75 m and R.O.W. 25 m.

Number of vehicles registered with the Regional Transport Authorities in Bangalore District is 544,957 as of March 1990. A survey of the number of vehicles for the peak hour is yet to be accomplished.

The Bangalore City railway station is the nearest station to the candidate sites of Bidadi and Sathnur; 97 km of railway line passes through the district.

Bangalore has a domestic airport which is located southeast of the city about five km in distance. It has flights to and from Delhi, Bombay, Hyderabad, Madras, Calcutta, Cochin, Mangalore and other cities.

(a) Future Plan

- i) A new expressway has been proposed between Bangalore and Sathnur. This four lane expressway is in a process of planning and is expected to be completed in five years. The alignment is shown in Figure 9-3.
- ii) Major district roads of Bidadi-Harohalli and Channapatna-Sathnur are planned to be widened to 5.5 m of carriage width from the present 3.75 meters.

(b) Issue and Constraints

As the proposed Industrial Model Town will be realized, the existing two lane state highway will not be sufficient to support increased traffic between Bangalore and the IMT. If the proposed expressway would be implemented to connect Bangalore and Mysore, a proper interchange to the IMT site would be required.

(2) Water Supply

In the countryside, tube wells are used to supply ground water. Data in 1988 for Sathnur indicated 2,652 tube wells were in use. The Arkavati and Cauvery rivers serve as sources of water supply for the IMT candidate site; the same as in Bidadi. Bangalore district source water supplies from the Arkavati and Cauvery rivers.

Principal facilities required for the IMT include water-supply piping network, reservoirs, overhead tanks, etc., on the premises. In Sathnur, construction of the water main is not required as it is included in the Bangalore industrial water supply project of KIADB.

(3) Sewerage and Drainage

Outline of the sewerage project in and around Bangalore was previously mentioned.

In Sathnur, treated waste water and rain water is to be discharged from the site through an existing small drain that cuts the proposed site vertically and flows into the Arkavati River. The treated water thus discharged is used by the Forestry Bureau for irrigation of neighboring farms. As this drain runs dry during the dry season, such a treatment facility will be required that ensures that the use of discharged water for

irrigation purposes is diluted by rain water to meet water quality. Consequently, if the IMT project is executed, a sewer water treatment plant is required.

(4) Power Supply

Electric power supply scheme and present conditions are almost the same as Bidadi.

Electric power for the Sathnur area is distributed through the following substations:

-66/11 kV, 2 x 8 MVA MUSS at Kanakapura

-220/66 kV, Substation at T.K. Halli

Additional MUSS (2 x 8 MVA) is to be constructed in accordance with increased demand.

However, under the present conditions, self-generating plant would be required as is the case for Bidadi.

(5) Telecommunications System

As a part of the national telecommunication system, there is an exchange (128 pc DOT Digital Electronic Exchange) which covers the Sathnur area. Working connections are 22 in the Sathnur area, and waiting subscribers are two. Future plans were previously mentioned. If the IMT locates to Sathnur, new expansion would be required because present capacity is much less than demand.

9.3 The IMT Candidate Site : NOIDA

9.3.1 Social Environment

Location: Of the four candidate sites for an IMT in India, the proposed NOIDA (The New Okla Industrial Development Authority) IMT site is located within the Ghaziabad District, and in the Dadri Tehsil of the State of Uttar Pradesh. The site is situated on the North-East corner of NOIDA and on the Delhi-Ghaziabad National Highway (NH) No.24, connecting Eastern India.

According to the Regional Plan and the Uttar Pradesh Sub-Regional Plan Policy of the NCR, NOIDA is a major city within the Delhi Metropolitan Area. NOIDA has developed mature high-tech industries due to its proximity to Delhi. The objective of the regional and sub-regional policy of the National Capital Region (NCR) is to

decentralize and reduce congestion in Delhi by inducing growth away from the Delhi Metropolitan Area (DMA) to the less developed places in the region.

NOIDA is one of the six major cities containing 167,440 people in 1991, and falling within the Delhi Metropolitan Area. The NOIDA development is contiguous to Delhi's developed area. It is the nearest city to the DMA, and is the closest to the central business district of Delhi.

The population growth of the urban settlement in the region along with a decade growth rate and function are listed below.

The site is less than 10 kilometers away from the Ghaziabad Urban Agglomeration which is a major city within the Delhi Metropolitan Area. Hapur is a priority town in the NCR which is located about 50 km away from the IMT site at NOIDA.

Bhagpat, Modinagar, Pikhria, Sikandrabad, and Greater NOIDA (Surajpur-Kasua) are potential settlements in Uttar Pradesh as sub-regional centres under the NCR subregion plan 2001 AD. Greater NOIDA is targeted for a population of 300,000 by the end of this century.

(1) Site and Surrounding

The settlement pattern around the IMT site at NOIDA, and the surrounding area upto a 10 km radius, is shown in Fig. 9-8.

The site contains the existing village of Bazidpur which covers 0.2 hectares, and has approximately 1,500 residents in 1991.

The land that is proposed for the IMT site is privately owned. The site area demarcated by NOIDA would measure approximately 350 hectares. The topography of the site is fairly flat with gentle southward slope (Fig. 9-9).

(2) Climate

NOIDA generally receives an annual rainfall of 714 mm. The temperature of the area varies between 40 degrees Celsius in June to 4 degrees Celsius in January. The prevailing wind direction is from the north west to south east. The mean wind velocity generally varies from 14.4 km/hr to 6.1 km/hr.

**Table 9-7 Functional Classification of Towns Surrounding Proposed IMT Site
During 1971-81-91**

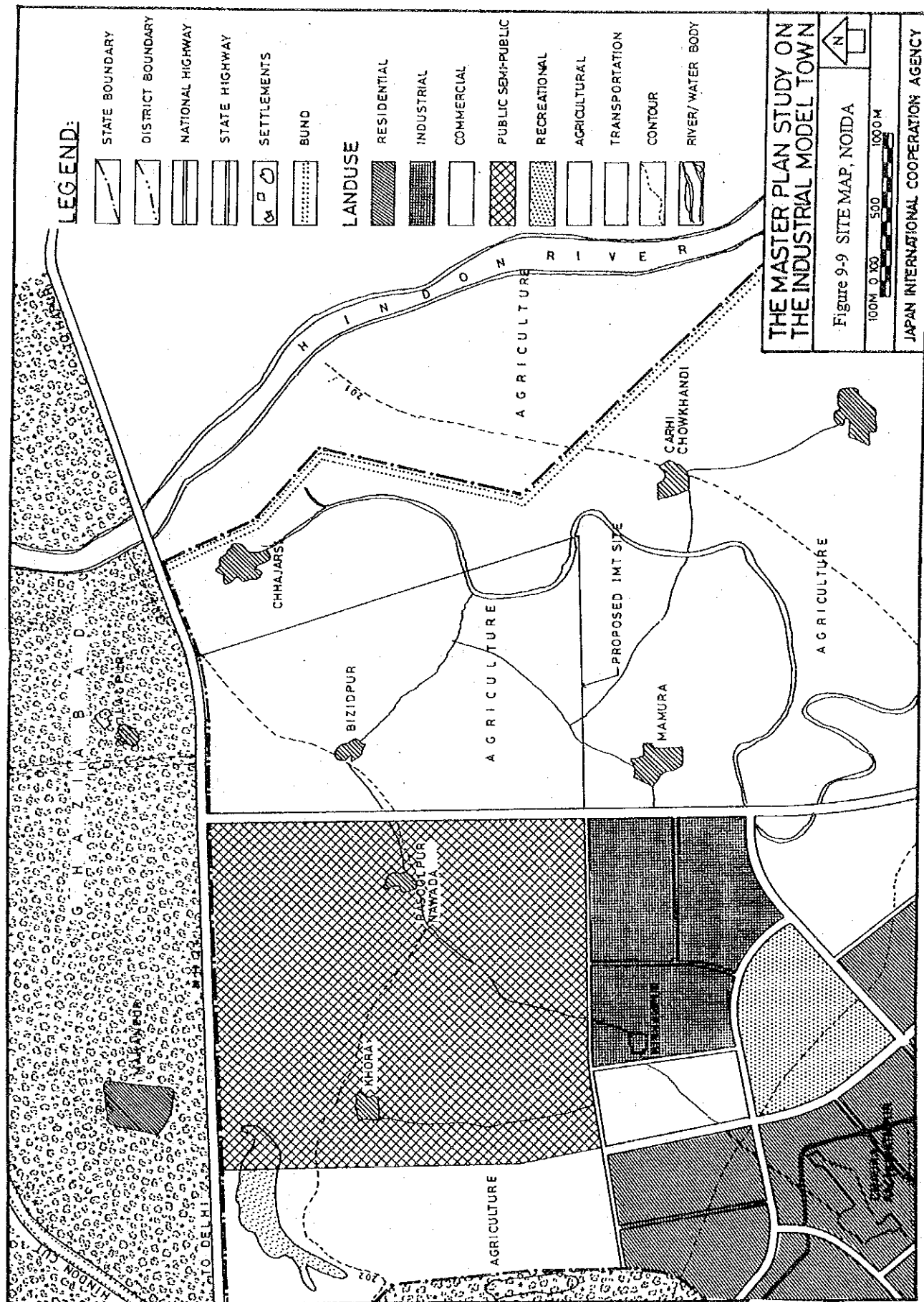
Name of the Town	Census Class Size		Population		Growth Rate		Function In		
	1991	1981	1991	1981	1991-81	1981-71	1991	1981	1971
1. NOIDA	I	III	167,440	42,000	398.66	--	Industry & Others	Primary	--
2. Ghaziabad (UA)	I	I	519,508	287,170	80.91	109.56	--	Others	--
3. Dadri	III	IV	32,946	19,723	67.04	51.01	--	Other	Trade Commerce & Industry
4. Loni	III	IV	36,607	10,259	256.83	*	--	Others	--
5. Murad-Nagar	III	III	44,442	26,047	70.62	86.25	--	Others	Trade Commerce & Industry
6. Of Murad-Nagar	IV	IV	12,812	13,147	(-2.55)	45.66	--	Others	Industry Others
7. Modi Nagar (UA)	I	II	124,197	87,665	41.67	101.67	--	Others	Industry
8. Pilkhwa	II	III	50,218	37,884	32.56	58.24	--	Others	Industry
9. Farid-Nagar	IV	V	10,922	9,116	19.81	20.89	--	Others	Industry - Primary
10. Niwadi	V	V	8,866	7,678	25.26	*	--	Primary	--
11. Patiala	V	V	9,179	7,847	16.97	**	--	Primary	--
12. Khekada	III	III	35,014	24,984	40.15	*	--	Others	--
13. GulAothi	III	III	34,011	24,416	39.30	40.52	--	Others	Trade & Comm.
14. Hapur	I	I	146,591	102,837	42.55	44.30	--	Others	Trade & Comm.
15. Kharkhoda	IV	V	10,549	8,708	21.14	*	--	Primary & Others	Industry & Others
16. Sikandarabad	II	III	61,035	43,135	41.50	34.67	--	Others	Industry-Primary Trade & Commerce
17. Bilaspur	V	V	6,134	4,661	31.60	*	--	Others	--
18. Dankaur	V	V	9,544	7,935	20.28	14.18	--	Others	Other Trade Commerce & Industry
19. Sewalkhas	IV	IV	14,400	10,278	40.11	*	--	Primary	--
20. Baghpat	III	IV	24,918	17,157	45.24	47.07	--	Other Primary	Primary
21. Agarwal Mandi	IV	V	10,802	9,353	15.49	*	--	Primary & Others	--
22. Aminagar Sarai	V	V	8,249	6,837	20.65	21.97	--	Others	Industry Trade & Commerce

* Declassified in 1971

** Newly added town

NA Not available

Source: Regional Plan-2001- National Capital Region



The meteorological conditions of the NOIDA township are as follows:

Height above mean sea level	216 M
Longitude	77° E
Latitude	28° N
Temperature (mean daily)	
Highest monthly mean of daily max. temperature	39.9° C
Lowest monthly mean of daily temp.	23.4° C
Annual mean of daily max. temp.	31.7° C
Annual mean of daily min. temp.	18.8° C
Extreme highest temp. so far attained (1944)	47.2° C
Extreme lowest temp. so far attained (1935)	0.6° C
Humidity	
i) Highest average monthly relative humidity	77 per cent
ii) Lowest average monthly relative humidity	16 per cent
Rainfall	
i) Maximum monthly total rainfall	211.1 mm
ii) Minimum monthly total rainfall	5.2 mm
iii) Average annual rainfall	714.2 mm
iv) Average number of rainy days in one year	37
Wind Speed	
i) Highest monthly mean wind speed	14.4 km/hr
ii) Lowest monthly mean wind speed	6.1 km/hr
Wind Direction	
i) South East (in monsoon)	
ii) North West (in winter)	
Seismic coefficient - Zone IV vide 15-1893-1973	

(3) Soil Condition of the Site

The site is located at the north east corner of NOIDA along National Highway No. 24. The area is flat agriculture land with wheat as the main crop. Site observation and discussions with NOIDA civil engineers revealed that the soil is clay mixed with sand; a thorough soil investigation is yet to be done.

(4) Present Landuse in and around the Site

The land earmarked for the site is at present under agricultural use. (Fig. 9-8). However, according to the statutory NOIDA Development Plan, the proposed IMT site comprises three large sectors (63, 64 & 65) designated mainly for government, semi-government, and supporting residential use. If the IMT site is selected by the Government of India, the conversion of existing designated landuse into an industrial estate would not be difficult.

The proposed IMT site contains the village, Bazidpur, occupying 0.2 hectare of the residential area.

At present the areas around the site are developed according to the statutory development plan of NOIDA and is shown in Fig. 9-9.

The areas under designated land uses at present are as follows:

Table 9-8 Existing Land Use

SL No.	Landuse	Existing 1991	
		Area in Ha	per cent
1.	Industrial	985.0	26.9
2.	Residential	1,106.0	30.2
3.	Commercial	151.0	4.1
4.	Institutional	830.0	22.7
5.	Transportation	300.0	8.2
6.	Organised Open Spaces	290.0	7.9
Total		3,662.0	100.0

Source: Development Place of NOIDA

The ongoing development at the periphery of NOIDA by the UPSIDC under the Greater NOIDA Industrial Authority, is not in conformity with the Regional Plan at present.

(5) Existing Urban Facilities

At present the site at NOIDA Phase II, is surrounded by a small settlement with mostly temporary and few permanent structures (Fig. 9-8). The settlements within a 10 km radius are Gaziabad and NOIDA Phase I, which offer few very high order urban facilities, and most of the required intermediate level facilities.

All higher level infrastructure such as medical, educational and other institutional facilities, as well as commercial establishments, research and development centres, wholesale trade market and international level offices and markets of finished goods, are available within a distance of 12 kms in Delhi. The International and National level airports are 35 kms away from site in Delhi.

(6) NOIDA Phase I

The New Okhla Development Authority was established in early 1980 with a controlled area covering 50 villages and a rural population of 42,000 in 1981. The population density of the town was 2.8 persons per hectare. NOIDA was designated as a DMA town with an urbanisable area of 14,915 ha. Out of this total urbanisable area, 7,790 ha. are targeted for urban development by 2011.

The total land area already developed and under development at present is 3,662 hectare.

The land acquisition proceedings have gone on for decades, but the pace of development has slowed in bordering areas near the Phase II development due to unauthorised encroachment into agricultural areas planned as an urban zone. The village Abadis located close to the arterial roads have transformed into unplanned commercial centres creating major traffic problems.

(a) Demography

Growth of the NOIDA population during the last decade was 398.66 per cent. The population target of 2001 AD adopted is shown below:

	Population (Million)		Target Population in 2001 AD
	1981	1991	2001
NOIDA	0.042	0.167	0.55

If the population target of 0.55 million is achieved by 2001 AD, the Authority would be required to increase capacity sufficiently for implementation of all the required infrastructure and land acquisition.

The density of workers in 1987 as surveyed by the CTCPC of Uttar Pradesh, revealed that the total number of industrial workers in operative units on developed areas of approximately 606 ha. were 41,042, thus indicating a very low density of 68 workers per hectare. But in 1991, as per data supplied by NOIDA, the number of workers increased to 73,000.

Total workers in the tertiary sector in 1986-87 was estimated as 44 per cent by the School of Planning and Architecture (SPA), New Delhi, where the share of trade and commerce was 4.2 per cent of total workers. This indicates that development in NOIDA's tertiary sectors of trade and commerce, medical and health, education, civic, cultural and administrative facilities has not kept pace with industrial growth.

(b) Residential/Housing

About 47 per cent of the total land in the Master Plan is earmarked for residential use. The residential area thus developed is at present only 30 per cent of that area. The average residential gross density at present is 151.4 persons per hectare which is only 43 per cent of the target of 350 persons per hectare.

There is an adequate supply of higher categories housing stock for higher income groups in NOIDA. The residential area developed thus so far is planned to accommodate a population of 300,000. Available residential units at present account for 30,000 and the demand for occupied residential units in 1991 was 5 persons per unit, for a total demand of 33,400 residential units. Thus, a significant gap in quality housing exists.

Squatter and Slum Populations in NOIDA

	Estimated Pop. 1990	Squatter Pop. 1990	J.J. Units @5 persons/ unit	Slum Units Pop. in Slum 1990	Units in Slum	Persons living in JJ & Slums (per cent)
NOIDA	167,000	6,020	1204	—	—	3.60

Source: Functional Plan-DMA, NCR Board, March, 1992

The NEPZ and the Hoisery Complex in the industrial area, Phase II, forms a major employment centre. About 800 ha area adjoining the Hoisery Complex is proposed to provide residential and related social and physical infrastructure as per the norms of NOIDA.

At present, according to the NOIDA Authority, 11,696 residential plots and 23,144 dwelling units have been constructed for various income groups which includes housing developed by government and semi-government organisations.

Table 9-9 Income Wise Distribution of Residential Units

Income Group	No. of Units	per cent
Economically Weaker Section	5,051	21.8
Low Income Group	7,500	32.4
Middle Income Group	5,566	24.1
High Income Group	5,027	21.7
Total	23,144	100.0

Source: NOIDA Authority

(c) Trade and Commerce

The commercial area so far developed accounts for 151 ha., about four per cent of the total developed area. But this includes the city centre and wholesale markets, 25 per cent of which are under construction.

Facilities such as commercial offices, hotels, restaurants, supermarkets, and retail shopping centres are available at present.

(d) Public and Semi-Public (Institution)

NOIDA has attracted prominent national and international level industrial and administrative establishments of public sector undertakings and private corporate bodies. However, the institutional area already developed and under development, accounts for 830 hectare.

(e) Health

There are only two government hospitals with general and specialised categories functioning in the town. One is a 200 bed ESI (Employees State Insurance) hospital and the other is 100 bed government hospital. At sector level, there are few nursing homes and dispensaries.

Town	Hospitals	COLLEGE				SCHOOL			No. of Beds
		Dispen- saries	Health Centre	Primary Health Centre	T.B. Clinic	Family Plg. & Welfare Centre	Nursing Homes	Other	
NOIDA	2	-	-	-	-	-	1	-	300

Source: Functional Plan-DMA, NCR Board, March, 1992

(f) Education

At the town level, universities, technical institutions and degree colleges are planned. At present there is only one degree college functioning in NOIDA.

Town	COLLEGE					SCHOOL			
	Art, Science, Commerce College	Medical	ITI	Poly- technic (women)	Others	Higher Sec./ Inter	Secondary	Junior/ Middle	Primary
NOIDA	1	-	1	1	-	3	3	3	3

Source: Functional Plan-DMA, NCR Board, March 1992

(g) Open Space and Recreational Areas

City level large open spaces such as a regional park, golf course, exhibition ground, cactus garden, and sports complex are available at present. Some larger

parks were developed with fountains, lights and play equipment at sector levels. Present recreational facilities are:

- i) Golf Course at Sector 38
Yamuna River Front Park
- ii) Sports Complex at Sector 21A

(h) Industry

Industry is the key economic activity of the town.

In the region around the proposed IMT the various types of industries that are functioning are mainly medium and light engineering, electrical and electronics, computers, garments products, automobiles, domestic appliances, et cetera.

As a policy, land is allotted for establishing pollution free industrial projects. A special zone for 100 per cent export-oriented units was established by the Ministry of Commerce at NOIDA. Also a film centre was established which has achieved significant progress in a short span of time.

In NOIDA, about 12.6 per cent of the land (985 ha) is planned for industrial use in accordance with NOIDA's master plan. Whereas the developed area for industry is around 70 per cent, i.e., 690 ha., out of the total 6,650 planned units, 5,318 units are allotted, and only 56 per cent (3,735) of the planned units are fully utilized.

Table 9-10 Industrial Breakup of NOIDA

Location	Total area (ha)	No. of plots	No. of plots (allotted)	No. of plots (functional)
Industrial Area Phase I	393.0	NA	4800	3300
IndustrialArea Phase II	127.0	231	NA	80
IndustrialArea Phase III	206.0	400	NA	100
Housing Complex	132.0	449	NA	NA
NOIDA Export Processing Zone	118.0	200	NA	50
Film Centre	9.0	—	NA	—

9.3.2 Infrastructure Conditions : NOIDA

(1) Road; Access and Traffic

(a) Present Situation

The proposed IMT site of the New Okhla Industrial Development Authority (NOIDA) is located at a distance of 12 km. from the central part of New Delhi. National Highway No. 24, which leads to Calcutta, runs along the north boundary of the site. This will be the main access road to the proposed IMT site. Metropolitan Road No. 3 feeds into the proposed site through NOIDA. The Delhi Link road connects No. 24 with the following national highways:

National Highway No. 1 towards Punjab up to Kashmir.

National Highway No. 2 towards east up to Calcutta.

National Highway No.8 to Jaipur, Ahmedabad up to Bombay.

National Highway No.10 towards Haryana up to Rajasthan.

The road network around NOIDA and Gurgaon is shown in Figure 9-10.

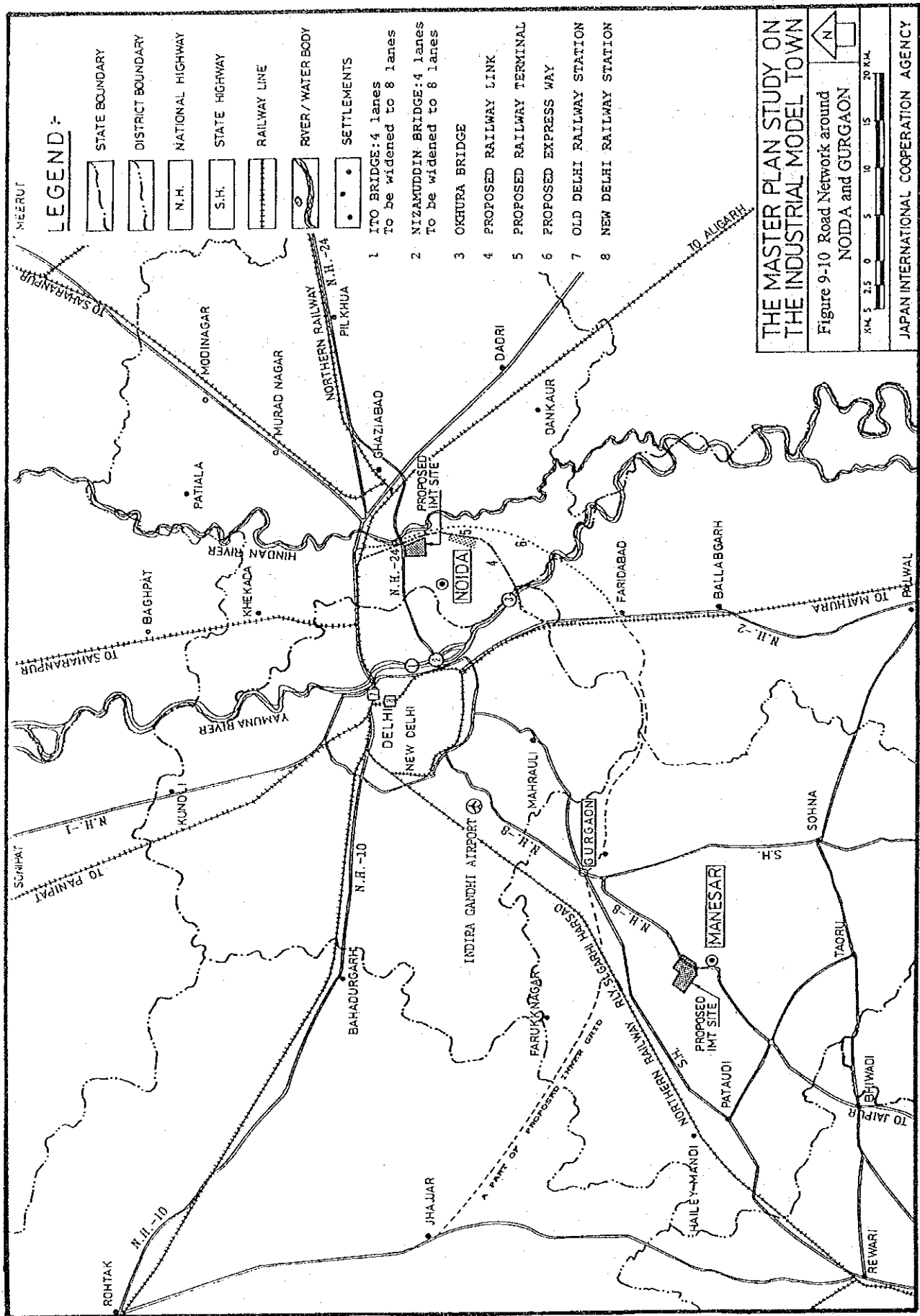
NOIDA is connected with New Delhi by the Ito Bridge, Nizamuddin Bridge, and the Okhla Bridge.

National Highway No.24 is a four lane road with 75 m R.O.W. Currently, a 60 m road is under development at the west boundary of the site. This will serve for the NOIDA institution area, which is located at the west side of the proposed IMT site, and other parts of NOIDA as well as the IMT.

According to NCR traffic surveys, the heaviest traffic congestion takes place on the Ghaziabad-Delhi Section followed by the Delhi-Faridabad and the Delhi-NOIDA sections. The composition of vehicular traffic on the Delhi corridors of five national highways is 67.3 per cent of passenger vehicles, 7.7 per cent of buses, and 25 per cent of commercial vehicles.

Railway linkages are through Delhi. Available stations for the proposed site are:

New Delhi rail way station	20 km from the site.
Old Delhi railway station	25 km from the site.
Nizamuddin railway station	17 km from the site.



The Indira Gandhi International Airport is at a distance of 35 km from the proposed site of NOIDA. This is the primary air gateway of India to other countries. The domestic airport adjacent to the International Airport is the largest in the country. This provides air linkage to all major cities in India. According to information provided by officials of NOIDA, the capacity of the airport is as follows:

- i) Annual passenger handling capacity : 3,350,000 pas/year.
- ii) Cargo handling capacity :
 - Cargo complex Phase I : 200,000 ton/year.
 - Cargo complex Phase II : 300,000 ton/year.

(b) Future Plan

- i) National Highway No. 24 will be widened to eight lanes from the present four lanes. Exact implementation schedule is not fixed as yet.
- ii) The Nizamuddin Bridge is planned to be widened to eight lanes from the present four lanes in conjunction with the improvement plan of National Highway No. 24.
- iii) The Ito Bridge, which is at the north of the Nizamuddin Bridge, is planned to be widened to eight lanes from its present four lanes.
- iv) The Okhla Bridge will be developed as a four lane bridge.
- v) According to "the Regional Plan 2001, National Capital Region" by the National Capital Region Planning Board, along the east and south boundary of NOIDA, a 100 m wide express way is planned which connects Meerut and Faridabad via Ghaziabad.
- vi) A railway link is proposed with a similar alignment to a 100 m expressway connecting the northern railway line. In conjunction with this plan, a large scale railway terminal, which is about 4 km from the site, is planned at the east side of NOIDA. These future development plans are shown in Figure 9-10.

(c) Issues and Constraints

- i) Traffic across the Yamuna River is quite heavy due to the limited capacity of bridges between Delhi and Uttar Pradesh. It is only 12 km from Delhi to NOIDA, it took about 45 minutes to reach the site by detouring along a southern route when the JICA Study Team visited the site. The Nizamuddin Bridge is a bottleneck for National Highway No. 24. Currently, widening of the Nizamuddin Bridge from four lanes to eight lanes is planned, but the exact implementation schedule is not fixed as yet.
- ii) The surface condition of National Highway No. 24 should be improved.
- iii) A 60 m wide access road from National Highway No. 24 is under development. And the National Highway is planned to be widened to eight lanes, but a well-designed proper interchange from the highway is a crucial issue to consider as well for planning purposes.
- iv) Considering the volumes of traffic that will be generated by the proposed IMT, and further development of NOIDA, a traffic study should be conducted to take precautionary planning measures to mitigate foreseeable traffic congestion.
- v) Several transportation projects are proposed in and around the NOIDA site, but actual implementations are yet to be scheduled.

(2) Water Supply

(a) Water Source

As mentioned in Fig. 9-11, the NOIDA area is located between the Hindon River and the Yamuna River. The Hindon River has a length of 300 km, an average width of 200 m, and flows into the Yamuna River. The Yamuna River is one of the largest rivers in India with a total length of 1,000 km and a width of 1,500 m, and the water is used by the provinces in the river valley for irrigation and other purposes. Accordingly, each province has formulated a development plan for the Yamuna River, but a consensus among relevant provinces has not been reached. It should be noted that in India, contamination of rivers is presenting problems because the waste water from many households

and industrial effluent is discharged without treatment. Therefore, pollution prevention programs are being developed at the national level. Appropriate facilities for water treatment will be required as long as river water is used as sources of supply. The volume of flow is 15,000 kilo liters per second for the Hindon River and 110,000 kilo liters per second for the Yamuna River.

(b) Present Condition and Balance of Water Supply-Demand

In the NOIDA area, each sector currently sinks wells to use ground water. The water table is 50 to 60 m underground. As Table 9-11 shows, the utilization of the Ganges water as a resource is scheduled to start from 2001 as water demand increases subsequently to the development of NOIDA.

The water supply and sanitation of NOIDA is operated by the NOIDA Authority, an independent organisation, by dividing the area into 40 water supply zones. At present, 17 zones covering 2,000 ha. are provided with water supply and each zone has a reservoir with 4 to 5 tube wells. Fig. 9-11 shows the present water supply facilities for NOIDA. As ground water is used, no treatment other than chlorination is employed. At present, the daily water supply is for 8 hours. The current compositions of the water supply facilities of NOIDA are as shown below.

Brief Detail of Present State of Water Supply

1) Rate of water supply	:	225 liters per capita per day
2) No. of tube wells	:	75 Nos.
3) No. of overhead tanks	:	18 Nos.
4) Length of water lines	:	500 km approx.
5) No. of sectors benefited		
Residential	:	28
Industrial	:	21
Organised open public and commercial	:	6
6) Water production		
Total supply capacity	:	110,000 KLD
Daily ave. consumption	:	100,000 KLD
Daily max. consumption	:	105,000 KLD
Hourly max. consumption	:	12,500 KLH
7) Water treatment method	:	Chlorination
8) Supply period	:	Morning (6 to 10 a.m.)
	:	Noon (1 to 2 p.m.)
	:	Evening (6 to 9 p.m.)

LEGEND:-

- TUBE WELL
- O.H. TANK
- SEMI SUNK RESERVOIR 5000KL
- ◄ RAINNEY WELL

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Figure 9-11 Existing Water Supply Network in NOIDA

Scale 1:50,000

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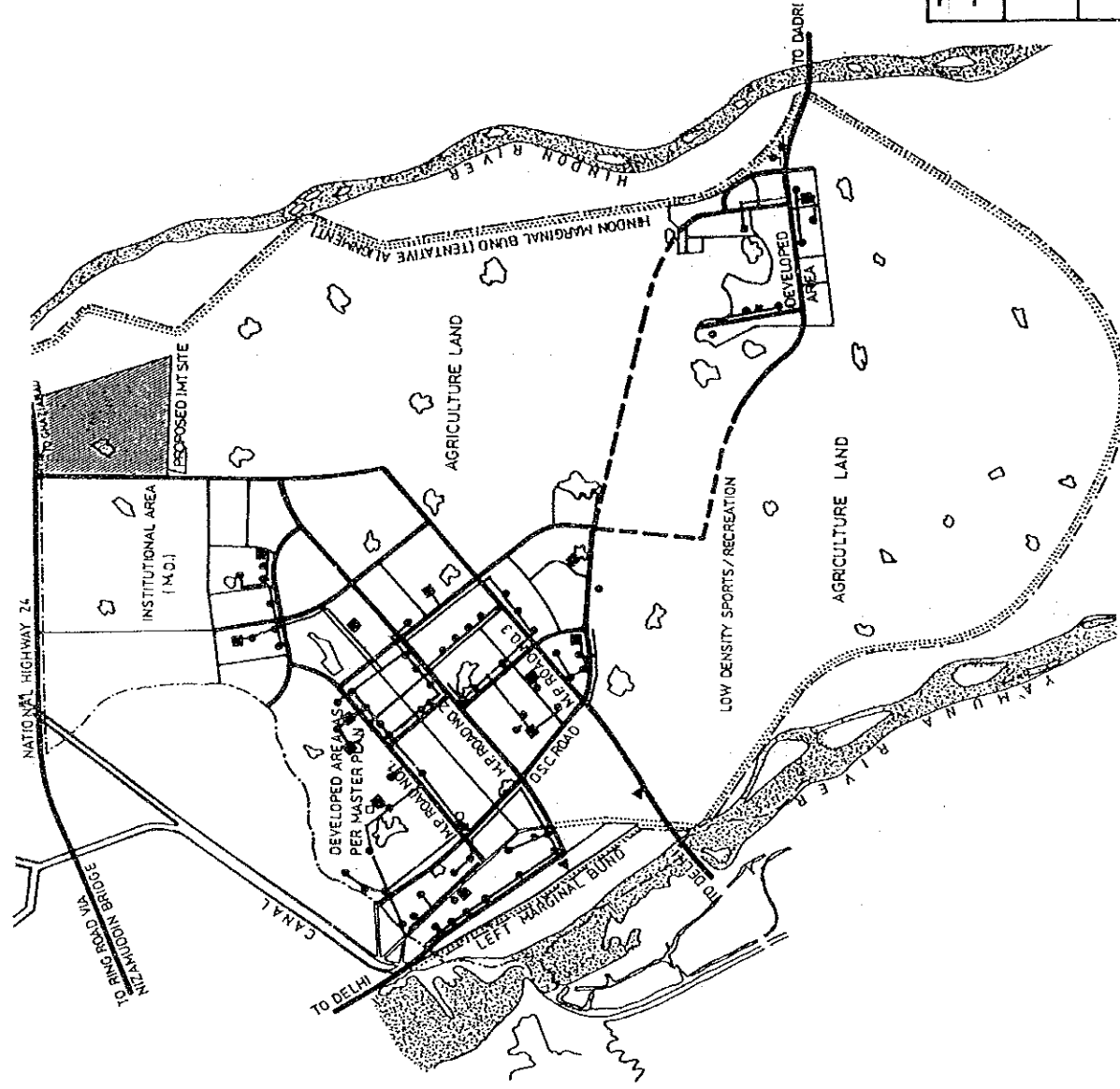


Table 9-11 Water Requirement and Proposed Sources at Various States

		1991	1996	2001	2006	2011
Water Requirement						
Residential						
Population	(1,000)	290	500	740	900	1,150
Demand	(MLD)	65.25	112.5	166.5	202.5	253.75
Per capita	(liter)	225	225	225	225	221
Inland						
Area	(Ha)	600	997	997	997	997
Demand	(MLD)	27.00	44.86	44.86	44.86	44.86
Per Hect.	(1,000 lit)	45	45	45	45	
Other Categories						
Population	(1,000)	40	210	285	285	315
Demand	(MLD)	4.5	56.25	71.07	64.15	71.07
Total Demand	(MLD)	97.00	204.00	267.00	311.00	375.00
Source Requirement Tube						
Wells						
1,500 LPM ¹⁾	(No.)	70	80	80	90	80
2,000 LPM ¹⁾	(No.)	-	80	40	50	50
Ranny Wells		-	4	4	5	6
Ganges Water	(MLD)	-	-	49.4	49.4	123.5
Total Product	(MLD)	100.0	227.0	295.0	329.0	416.0

Note 1) Capacity of tube well

Source: NOIDA Authority

(c) Future Projects

To utilise the riverbed water of the Yamuna River, two radial collector wells are now under construction. Water intake from the Ganges River by 2001 is also planned. Projects under construction and scheduled in the future follow.

Future Projects

- 1) Radial collector well 115,000 KLD : 2 Nos. In completion stage
- 2) Semi sunk reservoir 15,000 KLD : 1 No. 50% progress
5,000 KLD : 2 Nos. Completion in 1996
- 3) Radial collector : 2 Nos. under progress
- 4) Tube well : 40 Nos. - do -
- 5) Overhead tank : 5 Nos. - do -
- 6) Semi sunk reservoir 49,400 KLD : 2 Nos. - do -
- 7) Ganges Water Project 49,400 KLD : Completion by 2001

(d) Facilities Required for an IMT

Institutional Area Phase II is being developed next to the proposed IMT site. This area is scheduled to be water-supplied from the radial collector wells and the construction of the water main is now in progress along the 60 m width road located to the west of the candidate site. The water supply network within the candidate site can be connected to this water main. Although details of water supply facilities are to be finalised when the volume of water required by this project is established, facilities required of an IMT at this point in time are limited alone to the network of water supply on the premises.

(e) Water Charge

Water charges are as listed below:

- 1) Domestic use : Rs. 1.0/KL
- 2) Industrial use : Rs. 2.0/KL
- 3) Minimum charge : Rs. 10.0/month
- 4) Dwelling unit : Rs. 30.0/month

(3) Sewerage and Drainage

(a) Present Condition

As is shown in Fig. 9-12, the discharge water in the NOIDA area is made by two separate systems of sewage lines and drainage lines. In the center of NOIDA, irrigation drain run vertically and some rain water and treated waste water is used for green belts and other irrigation purposes. The remaining water is discharged into the Hindon and Yamuna Rivers.

The embankments have divided the NOIDA area from the Yamuna and the Hindon Rivers. As the maximum monthly rainfall is approximately 200 mm as shown below, it is impossible that the proposed IMT site is submerged.

Rainfall

- 1) Max. monthly total rainfall : 211.1 mm
- 2) Min. monthly total rainfall : 5.2 mm
- 3) Avg. annual rainfall : 714.2 mm
- 4) Avg. number of rainy days in a year : 37

In NOIDA, the maximum volume of waste water is 80,000 kilo liters per day and the hourly maximum volume is 10,000 kilo liters per day. The treatment of waste water is made provisionally in the oxidation ponds and two ponds are now in operation. Treated waste water is discharged into the Yamuna River through Hindon River. In recent years, the pollution of the Yamuna River is presenting a problem and the Yamuna Action Plan was executed to preserve the river's ecological balance. Therefore, as the development of NOIDA progresses, the waste water treatment system requires reinforcement. The current situation of the sewerage network system and the oxidation ponds follows.

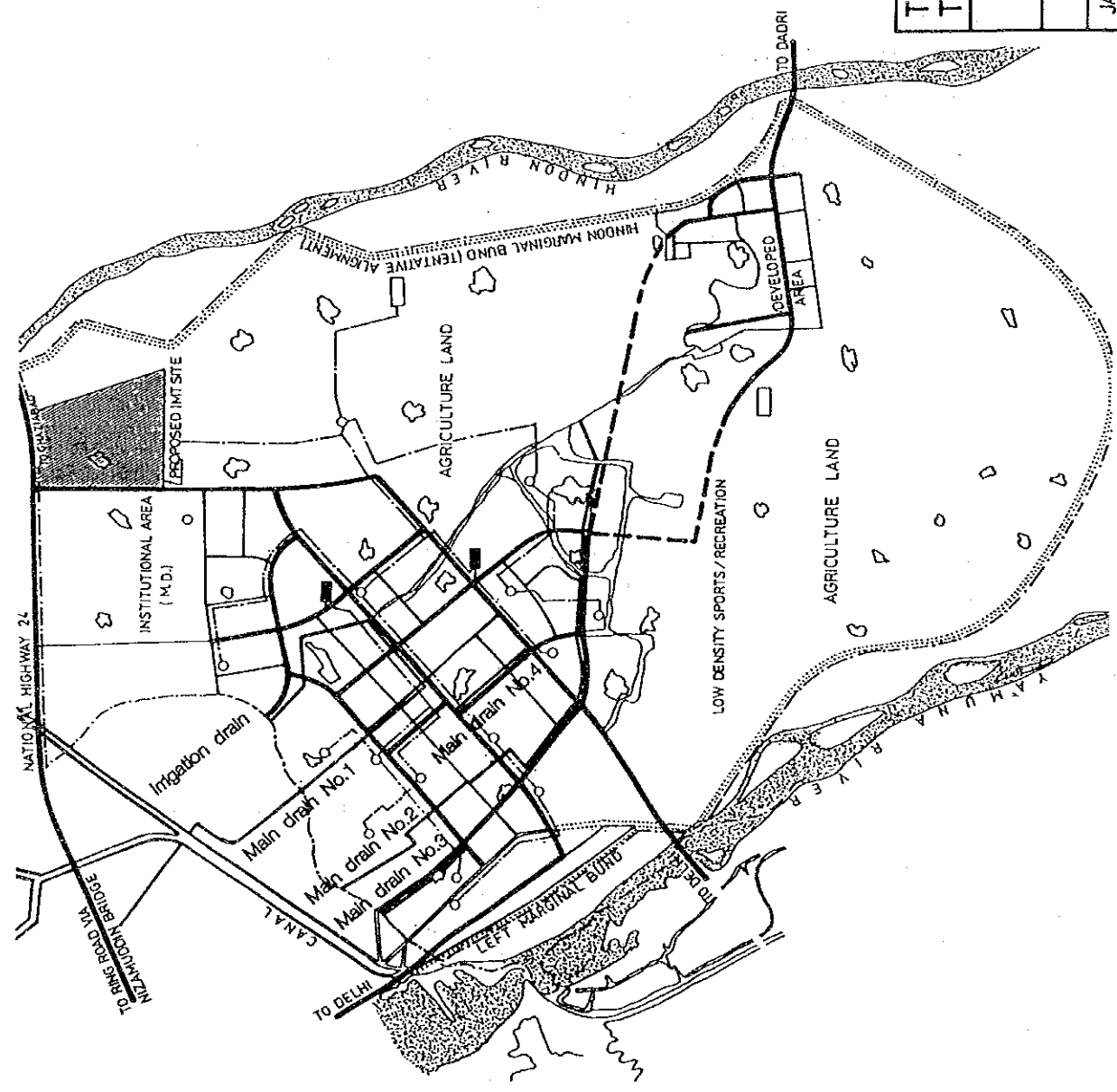
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Figure 9-12 Existing Sewerage and
Drainage Network in NOIDA



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- LEGEND:-**
- Drainage line
 - S.P. station main
 - Gravity main
 - Rising main
 - S.T. plant
 - Oxidation pond



Sewerage Network System

- 1) Sewage pumping station
 - a) Intermediate : 8 Nos.
 - b) Main : 3 Nos.
- 2) Length of sewers : 400 km
- 3) Sector benefited : 46 Nos.
- 4) Villages benefited : 10 Nos.

Waste Water Treatment Facility

- 1) Type of facility : Oxidation pond
- 2) No. of oxidation pond operated : 2 Nos.
- 3) Size of pond : L1000m x /W100m x D1.5 m to 1.7m
- 4) Capacity : 55,000 KLD
- 5) Dwell time : 5 to 6 days
- 6) BOD deduction : Inflow 80 to 100 mg/l
Outflow 20 to 30 mg/l

(b) Future Projects

NOIDA is constructing sewerage and drainage facilities in accordance with the Authority's development plans. At present, the development of the Institution Zone Phase II next to the proposed IMT site is in progress. In connection with a sewage treatment system, there is a future project based on the Yamuna Action Plan, an overall project for developing the Yamuna River, in addition to NOIDA's project. After completion of the new treatment plant based on these projects, the existing oxidation ponds in use will be discarded.

A summary of the future projects is given below.

Future Projects Proposed up the year 2001

- | | |
|---|-----------------|
| 1) Sewage treatment plant
105,000 KLD capacity | : 1 No. |
| 2) Sewage pumping station | : 4 Nos. |
| 3) External sewer gravity mains | : 10 km approx. |
| 4) Rising mains | : 5 km approx. |

Future Projects under Yamuna Action Plan

- | | |
|---|----------|
| 1) Construction of sewage treatment plant
105,000 KLD capacity | : 1 No. |
| 2) Sewage pumping station | : 2 Nos. |
| 3) rising mains | : 5 km |
| 4) Aforestation and landscaping | |
| 5) Public participation and awareness | |
- Uttar Pradesh Jal Nigam has been constructed to complete these works, and are expected to be completed by the year 1994-95.

(c) Facilities Required for the IMT

In parallel with the development of the Institutional Area Phase II adjoining the proposed site, the construction of underground ditches is in progress along the 60 meter width road located to the west of the site, to which the drainage system of the IMT can be connected. As effluent from the IMT will be treated by the treatment plant described in Future Projects now under construction, the IMT's treatment plant will not be required.

As the proposed site features flat configuration, pump stations have to be built wherever necessary for development of a sewerage system within the proposed IMT site.

(d) Standards of Effluent

Table 9-12 through 9-14 show the standards of effluents in India concerning the discharge to public sewer, streams and directly the land. For reference, Table 9-

15 shows Japanese standards of agricultural water and Table 9-16 excerpts from standards of water discharge based on the Water Pollution Control Law.

Table 9-12 Tolerance Limits for Industrial Effluents Discharged into Public Sewer

S.No.	Characteristics	Tolerance Limits
1.	pH	5.5 to 9.0
2.	Temp. °C, Max.	45°
3.	B.O.D. for 5 daysat 20°C mg/l, Max.	300
4.	Suspended solids, mg/l	750
5.	Oil and Grease, mg/l, Max.	20
6.	Lead (as pb), mg/l, Max.	1.0
7.	Copper (as Cu), mg/l, Max.	3.0
8.	Zinc (as Zn), mg/l, Max.	15
9.	Total Chromium (as Cr), mg/l, max.	5
10.	Hexavalent Chromium (as Cr), mg/l, Max.	2
11.	Nickel (as Ni), Max.	2
12.	Phenolic Compounds (as C ₆ H ₅ OH), mg/l, Max.	5
13.	Cyanides (as Cn), mg/l, Max.	2.0
14.	Sulphates (as SO ₄), mg/l, Max.	1,000
15.	Total Dissolved Solids, mg/l, Max.	2,100
16.	Chlorides (as Cl), mg/l, Max.	600
17.	Boron (as B), mg/l, Max.	2.0
18.	Present Sodium Max.	60
19.	Amonical Nitrogen (as N), mg/l, Max.	50
20.	Total Nitrogen (as N), mg/l, Max.	100
21.	Chemical Oxygen demand, mg/l, Max.	750
22.	Alpha Emitters uc/ml, Max.	-7
		10
23.	Beta Emittersuc/ml, Max.	-8
		10
24.	Mercury (as Hg), mg/l, Max.	0.01
25.	Selenium (as Se), mg/l, Max.	0.05

Source: NOIDA.

Table 9-13 Standards for Sewage and Trade Effluent Discharged into Stream

S.No.	Characteristics	Tolerance Limit	Relaxation for Specific Industry
1.	pH	5.5-9.0	-
2.	Total dissolved solids, mg/l, Max.	2,100	-
3.	Sulphates (as SO ₄), mg/l, Max.	1,000	-
4.	Chlorides (as Cl), mg/l, Max.	600	-
5.	Present sodium, Max.	60	-
6.	biochemical Oxygen demand for 5 days at 20°C, mg/l, Max.	200	500 for existing distillery upto 1984 only
7.	Oil and Grease	20	-
8.	boron (as B), mg/l, Max.	2	-
9.	Cyanides (as Cn), mg/l, Max.	0.50	-
10.	Total Chromium (as Cr), mg/l, Max.	2.5	-
11.	Haxavalent Chromium (as Cr), mg/l, Max.	1	-
12.	Zinc (as Zn), mg/l, Max.	10	-
13.	Ammonical Nitrogen (as N), mg/l, Max.	100	-
14.	Copper (as Cu), mg/l, Max.	3.0	-
15.	Nickel (as Ni), mg/l, Max.	3.0	-
16.	total Mercury (as Hg), mg/l, Max.	0.01	-
17.	Selenium (as Se), mg/l, Max.	0.1	-
18.	Lead (as pb), mg/l, Max.	0.5	-
19.	Arsenic (as As), mg/l, Max.	0.5	-
20.	Radio Active Materials Alpha Emitters/uc/mg, Max.	-9 10	-
	Beta Emitters, uc/ml, Max.	-8	-
21.	Cadmium (As Cd), mg/l, Max.	5	-

Table 9-14 Standards for the Effluent to be Discharged on Land

S.No.	Characteristics	General Tolerance Limit	Relaxation for Specific Industries
1.	Total suspended solids, mg/l, Max.	100	-
2.	Particle size of total suspended solids	Shall pass 850 micron I.S. sieve	-
3.	pH	5.5 to 9.0	5.5 to 9.0 for Nitrogenous for tiliser effluent
4.	Temperature	Shall not exceed 40°C in any section of the stream with 15 mtrs. down stream from the effluent outlet	-
5.	BOD for 5 days at 20°C, mg/l, Max.	30	-
6.	Oil & grease, mg/l, Max.	10	-
7.	Pherolic compounds (as C ₆ H ₅ OH), mg/l, Max.	ON	-
8.	Cyanides (as CN), mg/l, Max.	0.2	-
9.	Sulphides (as S), mg/l, Max.	2.0	-
10.	Insecticides	absent	-
11.	Colour and Odour	absent	absent as of as possible for paper industries
12.	Total Residual, Chlorine, mg/l, Max.	1.0	-
13.	Fluoride (as F), mg/l, Max.	2.0	5 for phosphate fertilizer industry
14.	Cadmium (as Cd), mg/l, Max.	2.0	-
15.	Copper (as Cu), mg/l, Max.	3.0	-
16.	Total Chromium as (Cr), mg/l, Max.	0.5	-
17.	Haxavalent Chromium (as Cr), mg/l, Max.	0.1	-
18.	Lead (as Pb), mg/l, Max.	0.1	-
19.	Mercury (as Hg), mg/l, Max.	0.1	-
20.	Nickel (as Ni), mg/l, Max.	3.0	-
21.	Selenium (as Se), mg/l, Max.	0.05	-
22.	Zinc (as Zn), mg/l, Max.	5.0	-
23.	Ammonical Nitrogen (as N), mg/l, Max.	50	100 for nitrogeneus fertilizer effluent
24.	Free Ammonia (as NH ₃), mg/l, Max.	5.0	-
25.	Total Nitrogen (as N), mg/l, Max.	100	150 for nitrogenous fertilizer industry
26.	Chemical Oxygen demand, mg/l, Max.	250	-
27.	Dissolved phosphates (as pH), mg/l, Max.	5.0	-
28.	Chlorides (as Cl), mg/l, Max.	2.0	-
29.	Radio active materials	-7	-
	Alpha emitters uc/ml, Max.	10	-
	Beta emitters uc/ml, Max.	-6	-
		10	-
30.	Arsenic (as As), mg/l, Max.	0.2	1.0 for existing plants of nitrogenous fertilizer effluent

Table 9-15 Environmental Standards of Agricultural Water in Japan

	Rivers	Lakes
pH	Over 6.0, under 8.5	Over 6.5, under 8.5
BOD (biochemical oxygen demand)	Under 8 mg/l	-
COD (chemical oxygen demand)	-	Under 5 mg/l
SS (suspended solids)	Under 100 mg/l	Under 15 mg/l
DO (dissolved oxygen)	Under 2 mg/l	Over 5 mg/l
No. of colon bacillus colonies	-	-

Source: Law concerning prevention of water quality degradation

Table 9-16 Environmental Standards for Water Discharged based on the Water Pollution Control Law

1. Effluent condition polluted by hazardous substance

Characteristic		Tolerance Limits
Cadmium and its compounds	mg/l	0.1
Cyanide	mg/l	1.0
Compounds of Organophosphorus (limited to parathion, methyl parathion, methyldimeton & EPN)	mg/l	1.0
Lead and its compounds	mg/l	1.0
Compound of Hexahydric chromium	mg/l	0.5
Arsenic and its compounds	mg/l	0.5
Mercury Compound, alkyl mercury and other compounds	mg/l	0.005
Alkyl mercury compound		Not to be detected
PCB	mg/l	0.003

2. Other effluent condition

Characteristic		Tolerance Limits
pH		
(Discharged into sea area)		5.0 to 9.0
(Discharged into public water area)		5.9 to 8.6
BOD	mg/l	160 (Daily ave. 120)
COD	mg/l	160 (Daily ave. 120)
SS		
Content of normal hexane extract (Mineral oil)		
(Flora and fauna oil)	mg/l	5
Phenol genus content	mg/l	30
Copper content	mg/l	5
Zinc content	mg/l	3
Soluble iron content		
Soluble manganese		
Chromium content		
Fluorine content		
Coliform bacteria		

Note: 1) Tolerance limits based on the daily average prescribe for the average condition of contamination of the daily volume of water discharged.

2) The standards of water discharge listed in this Table apply to each factory or place of business whose daily average volume of water discharged is 50 m³.

3) The standard of water discharge for BOD applies only to the water discharged into sea area and other public water areas than sea and the standard of water discharge for COD applies only to the water discharged into sea area and any lake.

Source: Water Pollution Control Law.

(4) Power Supply

(a) Present Situation

The Uttar Pradesh State Electricity Board (UPSEB) is vested mainly with the function of power generation, transmission, and distribution, and NOIDA is charged with the responsibility of developing an integrated industrial and residential township and other related infrastructure. The consumption of this township is 2 million units per day, out of which 1.2 million units per day is for the industrial sector, and 0.8 million units for the residential sector.

The existing electric network for the NOIDA area is as follows:

- 1) 132 kV Substation at sector-20, capacity 80 MVA

This Substation is being fed through 132 kV line from Sahidabad.

- 2) The power is distributed by stepdown from 132 kV to 33 KV through the following 7 Nos. 33/11 kV Substations.

- 33/11 kV Substation, Sector-6
- 33/11 kV Substation, Sector-8
- 33/11 kV Substation, Sector-16
- 33/11 kV Substation, Sector-20
- 33/11 kV Substation, Sector-38
- 33/11 kV Substation, Sector-58
- 33/11 kV Substation, Sector-9

- 3) Two Nos. of 33/11 kV Substations at the NEPZ and industrial area, phase II are supplied power from the 132 kV Substation at Suraj Pur.

(b) Future Plans

- 1) Power Project

To ensure a stable and regular power supply, a gas based combined cycle captive power plant is being planned for the township. In the first phase of establishing this plant, there shall be two units of 131 MW and one unit of 160 MW capacity. The gas supply for the plant will be sourced from a pipeline in the NOIDA area by the Gas Authority of India Ltd.

2) Substations

The electric power demand for this township up to 2011 was evaluated as:

Maximum Demand

1990-1991	60 MW
1995-1996	233 MW
2000-2001	427 MW
2001-2011	660 MW

As per load requirement of 233 MW up to 1995-96, the following substations are required:

Table 9-17 (1) List of Substation Projects in NOIDA upto 1995-96

a)	220 kV Substation in Sector-20 is under construction. This will be fed from the existing 220 kV line from Sahibabad to Badar Pur. In addition to this, 2 Nos. following 132 KV Substation is to be installed:
A.	132 kV Substation at Institutional Area, Phase II 1 No.
B.	132 kV Substation at Hosiery Complex 1 No.
b)	8 Nos. 33/11 kV Substation is to be constructed in addition to this existing 9 Nos. Substations:
	- 33/11 kV Substation, Sector-256
	- 33/11 kV Substation, Hosiery Complex
	- 33/11 kV Substation, Sector-34
	- 33/11 kV Substation, Sector-33A
	- 33/11 kV Substation, Institutional Area, Phase II
	- 33/11 kV Substation, Sector-59
	- 33/11 kV Substation, Sector-50
	- 33/11 kV Substation, Industrial Area Phase II
c)	1 No. 132 kV Substation is to be constructed between 1995-96 to 2001 at Sector-57 and 7 Nos. 33/11 kV Substations at following places will be constructed for the supply of electric power upto 2001.
	- 33/11 kV Substation, Institutional Area, Phase II
	- 33/11 kV Substation, Sector-65
	- 33/11 kV Substation, Sector-70
	- 33/11 kV Substation, Sector-35
	- 33/11 kV Substation, Sector-46
	- 33/11 kV Substation, Sector-81
	- 33/11 kV Substation, NEPZ
d)	Upgradation of 220 kV Substation at Sector-57 will be done between 1995-96 and 2001 and 1 No. 132 kV Substation and 8 Nos. 33/11 kV Substations to be constructed to meet the load demand upto 2001 of 427 MW.
e)	1 No. 132 kV Substation and 12 Nos. 33/11 kV Substations will be constructed between 2001 to 2011.
f)	A double circuit 220 kV line is to be constructed between Murad Nagar and proposed Substation site of 132 kV at Sector-57, which will be extended upto 220 kV Substation at Sector-20 after construction of this line supply from two different source will be available.

Table 9-17 (2)

g) Initially, the power requirement of the IMT-1 area will be met from a 132 kV Substation at Institutional Area, Phase II through 33 kV line and 33/11 kV Substations, later on the area will be fed from the proposed 132 kV Substations.								
h) Planned Substations to load requirement are summarized as per the following table.								
PLANNED SUBSTATIONS TO LOAD REQUIREMENT UPTO 2001								
Year	Particulars	Area (Hac)	Load demand (MW)	Total	No. of 220 kV S/S	No. of 132 kV S/S	No. of 33/11 kV S/S	Remarks
1990- 1991	Residential Industrial Other facilities	960 668 251	16.30 39.60 4.10	60	-	2	9	Existing
1995- 1996	Residential Industrial Other facilities	1410 835 598	61.00 144.40 27.60	233	1	3	17	Existing and under future planning
2000- 2001	Residential Industrial Other facilities	2092 985 892	102.00 185.00 140.00	427	2	4	25	
2005- 2006	Residential Industrial Other facilities	2882 985 1512	150.00 185.00 190.00	525	-	5	32	
2010- 2011	Residential Industrial Other facilities	3672 985 2132	198.24 185.00 276.76	660	-	6	44	

Source: NOIDA.

(c) Issues and Constraints

- 1) The balance between generated power and power demand appears not to provide any problems currently according to the data collected. However, load requirements in these areas are increasing rapidly, therefore power supply facilities should be timely and constructed in the future.
- 2) The result of the questionnaire surveys indicates that power interruption occurs frequently, i.e., 3 or 4 times per day, especially during the summer months. Because of this condition, provisions for a power generation plant and/or stable power supply from the private sector should be essential for stable power supplies to the IMT.

(5) Telecommunications System

(a) Present Situation

As a part of the national telecommunication system, the following digital switching facilities are:

- i) Main Exchange at NOIDA of which capacity is 16,000 lines
- ii) Remote Line Unit (RLU) at Sector-39, NOIDA, of which capacity is 2,000 lines
- iii) RLU at the NEPZ, Industrial Area Phase II, NOIDA, of which capacity is 1,000 lines

(b) Future Plan

i) Expansion in the NOIDA Area

The line capacity in the NOIDA area is going to be increased to 60,000 lines by 1997 and 85,000 lines by 2001.

Line capacity of existing facilities will be expanded as follows:

- Main exchange : 16,000 lines to 19,000 lines
- RLU at Sector-39 : 2,000 lines to 4,000 lines
- RLU at NEPZ : 1,000 lines to 2,000 lines

Planned new facilities are as follows:

- New switching station with a capacity of 10,500 lines
- New switching station with a capacity of 10,000 lines
- New RLU in Sector-58

iii) Planned New Links

The following new links are planned:

- Between NOIDA and Greater NOIDA :