

- 34 MB (2+1) Digital Microwave Link
- Between NOIDA and Ghaziabad District :
 - 34 MB (2+1) Digital Microwave Link
- Between NOIDA and Delhi :
 - 34 MB (2+1) Digital Microwave Link
- Between NOIDA and Delhi :
 - 140 MB Optical Fiber Cable System

When completing the above projects, significant improvement of accessibility for long distance calls is predicted.

(c) Issues and Constraints

- i) From the view point of balance between the installed line capacity and demand of subscribers, there aren't any serious issues. Actual load is approximately 76 per cent.
- ii) The result of questionnaire and interview surveys indicates that the probability of a telephone line is inaccessible is quite high. The rate can be as much as 50 per cent, especially for long distance calls. To avoid this problem, the line capacity of the main routes between large metropolitan towns has to be increased.

9.4 The IMT Candidate Site : GURGAON

9.4.1 Social Environment

The IMT site near Gurgaon is located in the State of Haryana, and the Gurgaon District and Tehsil, about 13 kms from the Gurgaon City (refer to Figure 9-2). The site falls within the District and Tehsil administration located in Gurgaon City. The site is situated on the North-West of the Delhi-Jaipur National Highway (NH) No.8, except for a small strip of land falling on the South-West, adjoining the village of Manesar.

The present urban settlement pattern around the site upto a 30 to 50 kms radius is shown in Fig. 8-3. The urban population of towns, size, class, growth rate, and functions are also listed. (Refer to Table 9-18)

Table 9-18 Gurgaon Functional Classification of Towns Surrounding IMT
for 1971, 1981, and 1991

Name of the Town	Census Class Size		Population		Growth Rate		Function In		
	1991	1981	1991	1981	1991-81	1981-71	1991	1981	1971
1. Gurgaon	I	I	134,639	100,877	33.76	76.51	Industry	Others	Others
2.* Jharsa	III	V	28,412	8,412	--	**	--	--	Others
3. Faruk-Nagar	V	V	8,046	6,367	26.37	16.04	Preliminary Trade Commerce Industry	Others	Primary Trade & Industry
4. Pataudi	IV	V	11,257	8,422	33.66	39.32	Others Primary	Others Primary	Primary
5. Hailey Mandi	IV	IV	13,245	10,140	30.62	350.27	Others	Others	Trade & Commerce
6. Taoru	IV	V	12,534	6,912	81.34	--	Others	Others	Trade & Commerce Primary Industry
7. Sohana	IV	IV	16,342	12,667	29.01	44.35	Others	Others	Trade & Commerce Other Industry
8. Nuh	V	V	7,490	5,992	25.00	26.68	Others	Others	Trade & Commerce
9. Jhajjar	III	III	27,674	24,247	14.13	27.97	Others	Others	Primary & Others
10. Bahadur-garh	II	III	57,195	37,488	52.57	45.23	Other Industry	Others	Other Industry
11. Rewari	II	II	75,294	51,562	46.03	17.49	Others	Others	Trade & Commerce & Other Ind
12. Faridabad Complex	I	I	613828	330864	85.52	169.40	Others	Trade & Commerce	Trade & Commerce & Other Ind
13. Palwal	II	III	59,127	47,328	24.93	30.72	Others	Others	Other Trade Commerce & Ind
14. Bawal	V	V	9,013	7,760	16.15	18.85	Other Industry	Others	Primary
15. Bari	IV	IV	14,509	13,490	7.55	9.35	Other Primary	Other Primary	Primary
16. Hathin	V	V	7,863	6,553	19.99	**	--	--	Primary & Others

* Declassified in 1971

** Newly added town

NA Not available. Source: Regional Plan-2001- National Capital Region

Gurgaon is the nearest existing major town falling under the Delhi Metropolitan Area (DMA). It has a population of 135,000 as per the (1991) census. Faridabad is the largest DMA town in Haryana, and has a 1991 population of 613,828. The Rewari-Dharuhera urban complex is also near the site and are NCR priority towns to be developed as a Regional Centre. Sohna and Nuh have future potential to become sub-regional centres, whereas Pataudi, Manesar, and Taoru may become service centers.

(1) Site and Surroundings

The settlement pattern around the IMT site at Manesar and the surrounding area 10 km radius is shown in Fig. 9-13. The Manesar village is situated on the South-East corner of the site and has a population of 5,649 as of 1991.

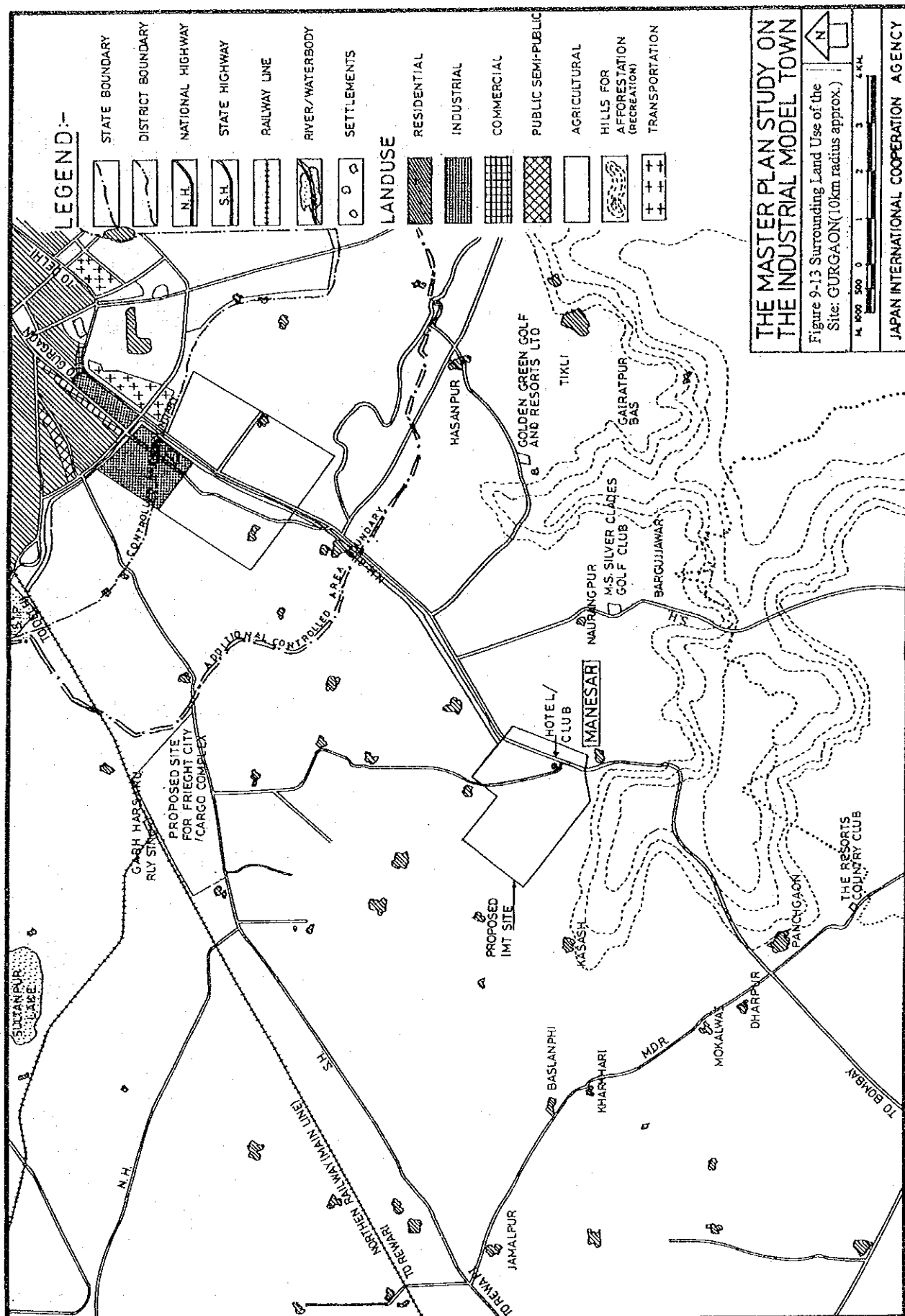
The site map for the proposed IMT site and its immediate surroundings is shown in Fig. 9-14.

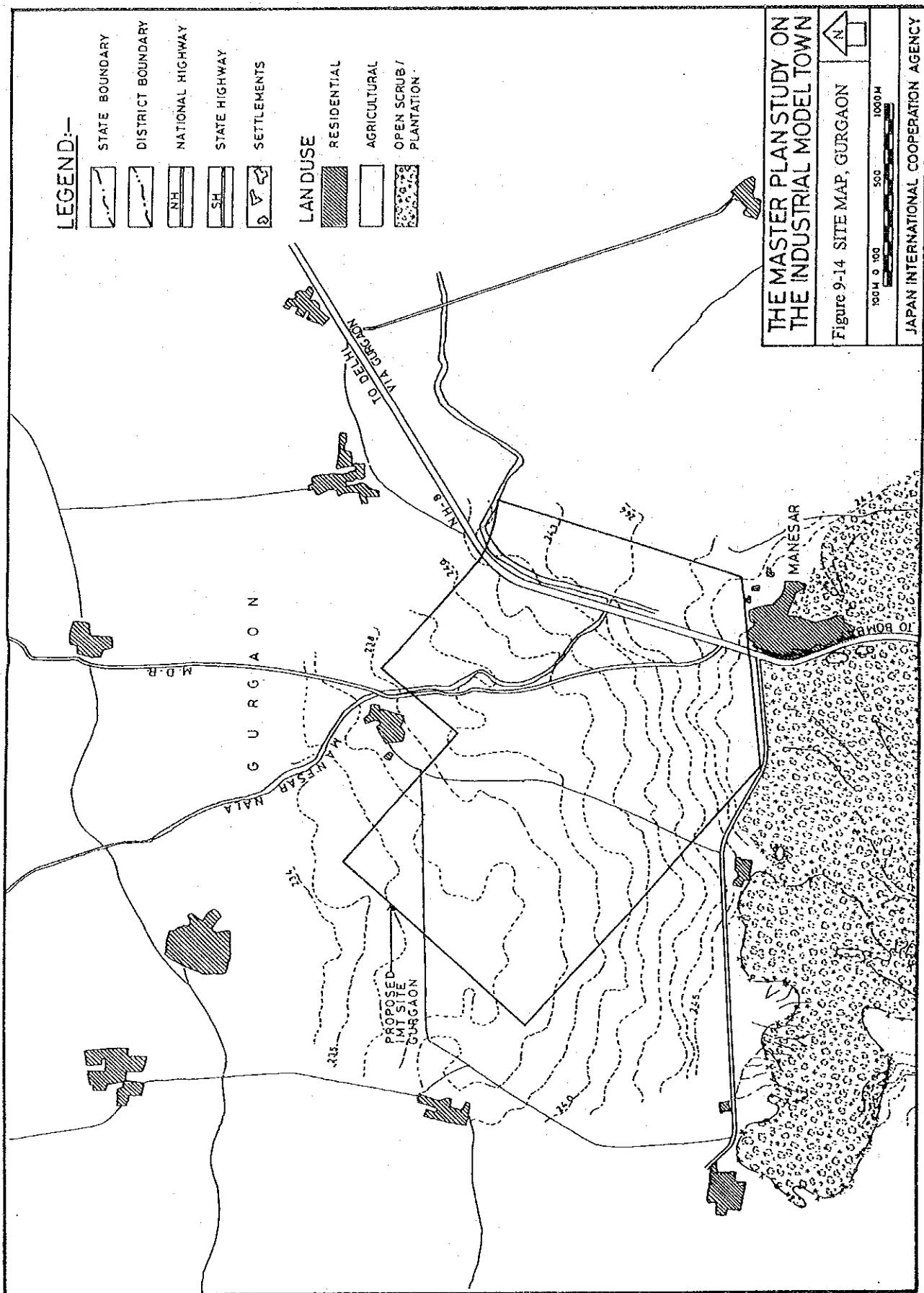
The land proposed for the IMT site is privately owned. The site area, demarcated by the Department of Industry and the Haryana Urban Development Authority, measures approximately 600 hectares.

The topography of the site is fairly flat with a gentle slope in a northward direction.

(2) Climate

The Manesar area receives an annual rainfall of 625 mm. The mean humidity varies from 47 per cent in May to 83 per cent in December. The temperature of the area varies from 15 degree Celsius in January, to 40 degree Celsius in June. The prevailing wind direction of the area is from the north-west to the south-east. The mean wind velocity varies from 2.7 kmph. in December, to 7 kmph. in May.





The meteorological conditions of Gurgaon are as follows:

Height above mean sea level	246 metres
Longitude	76° 56'30" E
Latitude	28° 21'40" N

Temperature:

Highest monthly mean of daily maximum temperature	46.2° celsius
Lowest monthly mean of daily temperature	23.4° celsius
Annual mean of daily maximum temperature	31.7° celsius
Annual mean of daily minimum temperature	18.8° celsius
Extreme highest temperature so far attained	47.2° C (1944)
Extreme lowest temperature so far attained	1.0° C (1935)

Humidity:

Highest average monthly relative humidity	87 per cent
Lowest average monthly relative humidity	16 per cent

Rainfall:

Max. monthly total rainfall	171.0 mm
Minimum monthly total rainfall	4.0 mm
Average annual rainfall	625 mm
Average number of rainy days in a year	41

Wind Direction:

- South-East (in Monsoon)
- North-West (in Winter)

Wind Speed:

Highest monthly mean wind speed	5.3 km/hr
Lowest monthly mean wind speed	1.4 km/hr

Seismic Coefficient - Zone IV vide 15-1893	1973
--	------

(3) Soil Condition of the Site

The site is in the midst of the Aravali Hill series at the town of Manesar along National Highway No.8. The area is flat agricultural land with wheat and mustard as the primary crops.

Based on the site observation hearing and the soil test report from the State of Haryana, the soil condition is as follows:

The sub-soil strata predominantly consists of non-plastic yellowish silt or silty sand of medium compressibility, with traces of Kankar at different levels. The safe bearing capacity at a depth of about 1.0 m is in the range of about 10.00 ton/m².

(4) Present Landuse in an around the Site

The site is utilized for agricultural purposes (Fig. 9-14). However, according to the latest industrial location policy of the state and the central governments, the site is proposed for conversion as an urban industrial growth centre and to be developed as a sub-regional centre in the National Capital Region Plan 2001.

(5) Existing Urban Facilities

The site is surrounded by small settlements with temporary and few permanent structures. The settlement for a 10 kms radius does not offer urban facilities of any significance, but there are existing recreational facility areas. For example, there is one resort and club with a golf course facility, one golf club, a holiday resort with club facilities (without a golf course); another hotel with a club facility is under construction near the site.

The Sultanpur Birds' sanctuary that has an existing resort and picnic spot for tourists, is located within 10 km from the site.

At present, the site would have to depend on Gurgaon City and Delhi for all intermediate and higher level facilities. Infrastructure such as the Indira Ghandi International Airport, medical, educational and other institutional facilities as well as commercial establishments, research and development centres, wholesale trade markets, international markets of finished goods, offices of national and international level, and reputed firms are available within a distance of 30 kilometers. Inexpensive

labour is available in the surrounding villages near the site. The adjoining towns of Gurgaon and New Delhi have polytechnic training institutions. Various skilled workers, specialised researchers, and technicians are available from New Delhi.

(6) Gurgaon City

Gurgaon was a small settlement with a population of less than ten thousand in 1941. In 1981, the town's population density was 41.81 persons per hectare. The literacy rate for 1981 was 65.59 per cent.

Gurgaon City is designated as one of the six Delhi Metropolitan Area (DMA) towns with an area of 266.71 sq.km.

From the total area of 1,535 hectares of land proposed in the Master Plan for Industrial Use by the Department of Urban Estates, the State Government of Haryana is responsible for land acquisition and could acquire 726 ha. of land. The total area developed by HUDA and HSIDC is 367 hectares. HUDA has developed/ allotted/auctioned residential and industrial plots. HSIDC has also developed some industrial areas of Gurgaon.

(7) Demography

The State Government of Haryana initiated large scale acquisition and land development for industrial and residential growth keeping in mind a significant population growth rate during the last three decades. Annual population growth during 1961-81 for Gurgaon was 5.0 per cent. The population of Gurgaon town from 1961 to 1991, and a targeted population for 2001 is given below:

Population (Million)		Target Population in 2001			
	1961	1971	1981	1991	2001
Gurgaon	0.038	0.057	0.101	0.135	0.70

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

The target population of 0.7 million, if achieved by 2001, would place pressure on government agencies to match the implementation of the required infrastructure and land acquisition to meet demands.

(8) Housing/Residential

There is an adequate supply of higher categories of housing stock for higher income groups. A number of newly constructed houses by approved developers are vacant in the colonies. But the population growth rate is higher than the corresponding increase in housing stock for middle and low income groups. There are about 29,150 people living as squatters on the land as of 1991.

Squatter and Slum Population in Gurgaon

	Estimated Pop. 1990	Squatter Pop. 1990	J.J. Units @5 persons/unit	Slum Pop. 1990	Units in Slum	Persons living in JJ & Slums (per cent)
Gurgaon	134,000	29,150	5,830	44,000	8,800	54.48

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

(9) Trade and Commerce

Gurgaon has matured to become a regional center for wholesale trade in iron and steel. It is also becoming a significant commercial node for retail trade and commerce and demonstrates that Gurgaon is self-contained in day-to-day operations for retail trade and commerce.

Table 9-19 Details of Commercial Units Developed by Different Agencies

Agencies	Total Area in the Master Plan (in acres)	Area Acqu- ired (in acres)	Area Deve- loped (in acres)	No. of Plots	No. of Deve- loped Plots	Plots Allotte d	Plots Occupied /Poses- sion	Plots Con- structed	Vacant Plots
		1	2	3	4	5	6	7	(4-7)
HUDA	630	504.04	55.74	779	779	409	138	138	641
Muni- cipal Comm- ittee			10.23	172	172	75	—	—	—

Source: Functional Plan - DMA, NCR Board March 1992

(10) Public and Semi-Public Institutions

Gurgaon has attracted prominent industrial/administrative establishments of the public and private sector enterprises. A number of central government offices of the Ministry of Communication, Agricultural and Cooperation, Commerce, etc., and institutions like the Management Development Institute, are located in Gurgaon.

(a) Health

Gurgaon has a reasonable level of government medical facilities. There is one hospital with 120 beds, one Tuberculosis hospital, a clinic with two beds, one Family Planning Center with 10 beds, and three medical dispensaries.

Town	Hospitals	Dispensaries	Sub-Health Centre	Primary Health Centre	T.B. Clinic	Family Plg. & Welfare Centre	Nursing Homes	Other	No. of Beds
Gurgaon	1	3	9	-	1	1	-	-	164

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

(b) Education

In 1991, Gurgaon had two colleges of arts, science and commerce, four higher secondary schools, 11 secondary schools, 14 middle schools, and 21 primary schools.

Town	COLLEGE					SCHOOL			
	Art, Science, Commerce College	Medical	Architecture planning.	Poly-technic	Others	Higher Sec./ Inter	Secondary	Jr. Sec./ Middle	Primary
Gurgaon	2	-	1	1	-	4	11	14	30

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

(c) Other Facilities

Telephone Exchanges	2
Post Offices	1
Banks	18
Fire Stations	1

(11) Industry

The region around the site is developing many types of industries such as automotive, electric, cotton, textile, engineering, telecommunication, garments, shoe making, food processing, drugs and pharmaceuticals.

In Gurgaon, about 20 per cent of the land planned for industrial use in the Master Plan is developed, and about 40 per cent of the developed plots are in use. Gurgaon's industrial development has grown at a slow pace. Efforts are being made to achieve the expected level of industrial development in Gurgaon by removing bottlenecks, particularly those associated with the availability of power and to some extent water. In the last few years the town has emerged as an industrial centre, especially after the establishment of Maruti Udyog Ltd.

Table 9-20 Industrial Area Breakup for Gurgaon

Use	Total Area in the Master Plan (in acres)	Area Acquired (in acres)	Area Developd (in acres)	No. of Plots	No. of Develop ed Plots	Plots Allotted	Plots Occupy	Plots Constr ucted	Vacant Plots
		1	2	3	4	5	6	7	(4-7)
HUDA	3795	854.57	221.35	85	85	71	67	30	55
H.B.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
PVT.	—	—	—	—	—	—	—	—	—
Any other agency (HSIDC) HUDA LAND			556	1545	1045	1043	1043	660	385

Source: HSIDC

Gurgaon is envisaged to be a services town and also provide industrial activities of a non-polluting nature.

In order to meet the water demand of the predicted population of Gurgaon, a water carrier channel is under construction, and is expected to be commissioned within one year.

(a) Establishment of a Cargo Complex

The Indira Gandhi International Airport was designed for a handling capacity of 6,490 passengers per hour for domestic and international flights, and for the

handling of five lakhs tons annual cargo. Due to the scarcity of land, the capacity of the above cargo complex for the international airport could not be increased, therefore the central government decided to set up a cargo complex in an area of 202.5 ha. adjoining Gurgaon town near the Garhi Harsaru Railway Station.

(b) Broad Gauging of Delhi-Jaipur Meter Gauge Railway Line

The construction of the Delhi-Jaipur Broad Gauge railway line, i.e., conversion of meter gauge into a broad gauge railway line is under progress.

9.4.2 Infrastructural Conditions : Gurgaon

(1) Road, Access and Traffic

(a) Present Situation

The proposed IMT site at Gurgaon is located in Manesar, in Gurgaon District. The site is at a distance of 13 km from Gurgaon, 32 km from the Indira Gandhi International Airport, and 45 km from the central part of New Delhi, Connaught Place.

National Highway No. 8 connects the proposed site with Delhi, Ahmedabad, and Bombay via Jaipur. The Indira Gandhi International Airport is along National Highway No. 8. Maruti and Hero Honda are located on this highway. The area is also connected with neighboring towns by state highways. The road network around the site is shown in Figure 9-15.

The National Highway No. 8 is a four lane road up to Gurgaon, but narrows to two lanes after Gurgaon. The state highway connecting Gurgaon and Rewari is a two lane road. Another state highway connecting Gurgaon with Sohna is also a two lane road.

Based on a traffic survey during June 1992, daily traffic volume (from 6:00 am to 22:00 pm) on National Highway No.8 is between 6,500 and 7,500 for both directions. Maximum peak hour traffic during a week is 971 for down and 686 for up.

The nearest metregauge railway station is Garhi harsaru, which is at a distance of 10 km from the Manesar site. This line runs between Delhi and Jaipur. A junction of broad gauge railway in the DMA is 40 km from the proposed site.

The Indira Gandhi International Airport is at a distance of 32 km from the proposed site, which is connected by National Highway No.8. The domestic airport adjacent to the International Airport is the largest in the country. This provides air linkage to all major cities in India. Handling capacity of the airport is given in the previous section.

(b) Future Plan

- i) National Highway No. 8 from Delhi to Behror via Gurgaon will be widened to six lanes from the present four lanes. This is based on the NCR plan. However, an exact implementation schedule has not been announced.
- ii) A major district road connecting Gurgaon and Alwar via Sohna is planned to be widened to four lanes from the present two lanes. This improvement will begin within three to five years.
- iii) The road connecting Rewari and Palwal via Sohna will be widened 7.2 m from its present 5.5 m. This will begin in about 18 months. This improvement is also in the NCR Plan.
- iv) According to the NCR Plan 2001, there is a plan to connect Jhajjar-Gurgaon-Faridabad as a part of Inner Grid road around the NCR.
- v) The conversion of metregauge railway line into broadgauge from Delhi to Rewari via Gurgaon is proposed and the plan is being approved by the Ministry of Railway.
- vi) Development of an air cargo centre is proposed for handling increased capacity and furthering handling efficiency of air cargo. The location is proposed between the international airport and Gurgaon. The implementation of this project will take at least five years.

(c) Issues and Constraints

- i) At present the traffic between Manesar and Delhi is not very heavy, but if the IMT is developed in Manesar, the present capacity of National Highway No. 8 would be insufficient. Widening and improvement of the highway is essential for the development of the IMT.
- ii) The surface condition of National Highway No. 8 should be improved.
- iii) Several transportation improvement projects around Gurgaon are proposed. The priority of implementing these development projects is flexible.

(2) Water Supply

(a) Water Source

There is not a large river located in the State of Haryana. The Yamuna River, a tributary of the Ganges River that forms the largest basin in India, flows along the border between Haryana and Uttar Pradesh. At present, ground water is utilised as a water source in Gurgaon District and vicinity. However, a sufficient volume of water supply cannot be secured due to rapid population growth, and the progress of industrialisation in recent years. Consequently, construction is now underway to supply river water to industrial estates.

The ground water level in and around the IMT candidate site is 10 to 25 m deep and the water volume is stable. Table 9-21 shows the results of water quality tests of the wells located in the neighborhood of the candidate site. The quality of the above water meets water source requirements for drinking and industrial purposes, but contamination in the future is anticipated as a result of the development of surrounding areas. On the other hand, intake of river water is made from the Najafgarh Drain, a tributary of the Yamuna River. As the quality and volume of water at the place of intake remain unclear, long-term observation will be required. The water quality is however expected to be relatively favorable as the intake is located in the upper stream of the Yamuna River. As for the development of the Yamuna River, agreement with other provinces, including Punjab, is thus far, illusive.

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

In Haryana, the water supply to urban areas is made by the Public Works Division, the Public Health Branch and the Municipal Engineering Department, and to rural areas, by the Haryana Municipality Cooperation. The number of staff members in the Gurgaon District is approximately 200, and the annual budget is 6 million rupees. Construction of large-scale infrastructure facilities is made by the Haryana Urban Development Authority (HUDA).

In Gurgaon and the surrounding vicinity, the supply of drinking water comes from 62 tube wells. These existing wells are capable of supplying 230 to 300 liters per minute and about 65 percent of the area is covered by this water supply network. The volume of total water demand is roughly estimated to 28 million liters, whereas the current supply volume is 15 million liters, far smaller. This is due chiefly to the shortage of industrial water. The water volume of per capita actual supply is 153 liters a day and a supply increase to 200 liters a day is targeted in the future by utilising river water. Underground water through wells does not undergo purification treatment, but is supplied after chlorination.

Table 9-21 Water Analysis Report of Existing Sources in the Villages Around the Proposed IMT Site

Location of Source (Tubewell)	pH	Turbidity (NTU)	Electrical Conductivity (micro-mhos per cm)	Total Alkalinity	total Hardness as CaCO ₃	Chlorines (Cl)	Sulphates (SO ₄)	Fulphates (F)	Nitrates (NO ₃)	Total Dissolved Solids
Manesar	7.7	3.0	1,086	350	230	130	25.5	0.56	19.2	500
Khoh	7.3	0.0	#	#	290	100	traces	0.7	Traces	600
Nakhrola	7.5	9.0	#	#	400	160	Traces	0.8	Traces	700
Naharpur Kasan	7.2	0.0	#	#	300	170	traces	1.0	Traces	700
Sikanderpur (Sihi)	7.2	0.0	#	#	200	100	traces	1.0	Traces	400
Kherki Daula	7.4	1.1	902	#	350	30	Traces	1.0	Traces	600
Kasan	7.5	0.6	800	240	380	35	14	0.5	38	#
Water Quality Desirable Standards Value (ICMR)	7-8.5	2.5	1,500	300	200	200	200	1.0	45	500
Rejection for Drinking (Under Indian Standard) <6.5 or>	9.2	10	2,000	450	600	1,000	400	1.5	45	1,500

Note: 1) # stands for "NOT ANALYSED"

2) All Parameters are in microgram per liter (ppm) except pH, Turbidity & Electrical Conductivity (E.C.)

3) The testing agencies are NBRI (National Environmental Engineering Research Institute) Delhi and Haryana PWD Public Health Engineering Laboratory Amiable Cantt.

(c) Future Projects

To meet an increment of water demand under the above situation, the HUDA is implementing a project (shown in Fig. 9-15) to introduce river water from Najafgarh Drain flowing through the northern part of Gurgaon. The total volume of purified water scheduled under this project is 226.8 million liters a day and, in the first phase, a purification plant having a daily capacity of 7.56 million liters is to be completed in 1993.

Summary of the project is as shown below:

- | | | |
|---|---|---|
| 1) Source of raw water | : | Canal |
| 2) Take off point | : | Kakroi Head Works |
| 3) Length of raw water channel | : | 69.585 km |
| 4) Capacity of the channel | : | 3.8 m ³ /sec |
| 5) Cost of raw Water Channel | : | Rs. 504.3 million |
| 6) Location of the water treatment plant | : | Near Village Basai at 6 km from Gurgaon |
| 7) Ultimate capacity of treatment plant | : | 22.68 MLD |
| 8) Capacity of treatment plant under construction | : | 7.56 MLD |
| (Completion date) | : | Dec. 1993 |
| 9) Estimated Cost | : | Rs. 732.0 million |

(d) Facilities Required for an IMT

The surrounding areas of the proposed IMT site are arable land for mustard and wheat. There are no other facilities other than small irrigation wells. The water supply to the IMT is planned to be sourced from the water main from the treatment plant mentioned above. Consequently, water supply facilities required for the IMT will require a network of water supply pipes, reservoirs, overhead tanks, et cetera.

(e) Water Charge

Public water charges are as listed below:

- 1) Domestic use below 15,000 liters : Rs. 0.6/liter
- 2) over 15,000 liters : Rs. 1.0/liter
- 3) Industrial use : Rs. 2.0/liter

(3) Sewerage and Drainage

(a) Present Conditions

In the city of Gurgaon, sewerage and drainage works are operated by the Public Works Department (PWD), and the Public Health Division. The sewerage system for newly developed residential quarters, industrial estates, etc., in the neighborhood were developed by the Haryana Urban Development Authority (HUDA). About 80 per cent of the city is served by the drainage network and the total pipe length reaches about 38 km. In the area developed by HUDA, only part of the sewerage system has been perfected with a total pipe length of approximately 40 km. There is not an independent drainage system in the city, but the newly developed estates have a two line system for sewerage and drainage.

As Table 9-22 shows, the average volume of effluents from the city is 25 million liters per day in 1992, but the figure is estimated to grow roughly 10 times by 2001. Therefore, treatment of sewage has become an important issue.

Table 9-22 Daily Volume of Sewage Generated

		Unit: MLD	
		1992	2001
1.	Domestic	18	200
2.	Industrial	7	25
3.	Total	25	225

Source: Public Health Branch

The capacity of the existing sewage treatment plant is 68 million liters per day and an activated sludge method is used for treatment. The values of BOD and COD identified by a water quality test and shown in Table 9-23, are extremely large and do not meet Japanese standards for water discharge. Part of the treated water is used for irrigation, but the rest is discharged to the Najafgarh Drain which joins the Yamuna River.

Table 9-23 Test Results of Sewage Water Quality

	Characteristic	Result
1.	pH Value	7.8
2.	Suspended Solids, mg/l	469
3.	Dissolved solids, mg/l	1,376
4.	BOD for 5 days, mg/l	520
5.	COD, mg/l	736
6.	Chlorides as Cl ⁻¹ , mg/l	468
7.	Salphates as SO ₄ , mg/l	319
8.	Sodium	56
9.	Oil & Grease, mg/l	26.4

Source: Haryana State Pollution Board

(b) Future Projects

A treatment plant of sewage discharged from the city of Gurgaon is to be built at the location indicated in Fig. 9-15 in the previous paragraphs by 1995. Summary of the plant is given below.

- 1) Total Capacity : 118 MLD
- 2) Currently under execution : 68 MLD
- 3) Treatment method : Activated sludge process

In addition, the following treatment plant, with a capacity of 50 million liters per day, will be constructed under the Yamuna Action Plan.

The outline of the project is as following.

- 1) Construction of catch pits
- 2) Trunk line
- 3) Sewage treatment plant facility : Screening chamber,
Collection tank pumping
machinery, etc.
Capacity treatment method : 50 MLD
Treatment Method : Activated sludge/trickling
filter
- 4) Effluent channel from treatment plant
to Najafgarh Drain

(c) Facilities Required for the IMT

As the proposed IMT site currently is farm land and is without a sewerage system, construction of an independent treatment plant is required if this project is implemented at this site. After treatment, waste water is planned for discharged through the Maesanara Drain that flows through the site vertically and joins the Yamuna River. As the Manesanara Drain is surrounded by farms, the discharged water is used for irrigation. The same situation as in Sathnur. This drain may also become dry during the dry season and the discharged waste water may be used for irrigation without dilution. Therefore, it is necessary to have standards of waste water treatment comply with agricultural water requirements.

According to monthly rainfall data for the past six years, maximum rainfall is 500 mm and the average monthly rainfall in the rainy season (between July and September) is 160 mm; amounts considered minimal. However, as the proposed site has a gradient of 1/350 on the average from west to north, it would be easy to formulate a rainwater drainage plan.

(4) Power Supply

(a) Present Situation

i) Present source of Supply

The area around Gurgaon is serviced via a 220 kV Substation, Badshahpur, having an installed capacity of 160 MVA. This Substation is presently connected to a 400 kV Substation, Samaypur through a 220 kV D/C Samaypur-Badshahpur line. The 400 kV Samaypur Substation, is one

of the main stations of the NTPC/NPTC Network, which is fed from the Singrauli Super Thermal Power Station, the Rihand Super Thermal Power Station, and the NCR Dadri Gas Station. While a 400 kV side of this station is under the control of the NPTC, the 220 kV bus is controlled by the DBMB.

Prior to the commissioning of the Samaypur-Badahapur circuits, there used to be frequent over-loading on the BBMB feeders resulting in unscheduled power cuts in the command area of the 220 kV Substation, Badshahpur. After commissioning these circuits, over-load problems were resolved.

The main distribution voltage in Gurgaon district is 66 kV. The following major 66 kV Substations service the proper demand of the districts are shown in Table 9-24.

Table 9-24 66 Kv Substation: Gurgaon

66 kV Substation	Trasformer capacity (MVA)	Voltage (kV)
1) Gurgaon (Mchrauli road)	8+12.5/16 6.3/12.5	66/11 33/11
2) Manesar	6+12.5/16	66/11
3) Maruti	1x10+1x16	66/11
4) Bhadas (Nagina)	2x6+1x7.5	66/11
5) Farrukhnagar	12/4/8 +7.5 +4	66/33/11 66/11 33/11
6) Pataudi	7.5+12.5/16	66/11
7) Badshahpur	7.5+12.5/16	66/11
8) Sohna	8 12.5/16	66/33 66/11
9) Taoru	8+10	66/11

Source: HSEB

In addition to the above, there are six 33 kV Substations i.e., Bhadas, Ferozpur-Jhirka, Nuh, Punhana, Rozka-Meo and Pingwan.

ii) Recent Augmentations Made

To strengthen the transmission and distribution network, the following transmission works were recently completed:

- a) 66 kV Substation, Pataudi has been augmented by replacing the existing 7.5 MVA, 66/11 kV transformer with 10/12.5 MVA, 66/11 kV transformer in November, 1991.
- b) 66 kV Single Circuit Hancsar-Pataudi line (15.6 KM) has been commissioned in September, 1991.
- c) 66 kV Substation, Bhadas has been augmented by replacing the existing 6/3/3 MVA, 66/33/11 kV transformers with 7.5 MVA, 66/11 kV transformer in April, 1992.

Considering the importance of industrial activity around Gurgaon, 66 kV ringmain has been planned around Gurgaon Town. The following works are to be executed under this programme:

- a) A new 66 kV Substation is proposed in Sector-10, Gurgaon, with 12.5/16 MVA, 66/11 kV transformer during the next financial year by erecting a double circuit line from Badashahpur Substation.
- b) A new 66 kV Substation is also proposed in Sector-5, with 12/16 MVA capacity, under System Improvement Scheme of the Gurgaon Belt.
- c) Augmentation of the 66 kV Substation, Maruti, is to be accomplished by replacing the 10 MVA transformer with a 12.5/16 MVA.
- d) Augmentation of 66 kV Mehrauli Road Substation is to be accomplished by replacing the 8 MVA transformer with a 12.5/16 MVA.
- e) Augmentation of 66 kV Substation, Farrukhnagar is to be accomplished by replacing the existing 7.5 MVA, 66/11 kV transformer with a 12.5/16 MVA, 66/11 kV unit.
- f) A new 66 kV Substation, at Dundahera, with a capacity of 12.5/16 MVA, 66/11 kV, is under construction, which will be fed from a 220 kV Substation, Badshahpur, through a single circuit 15 KM line.

(b) Future Plan

Considering the importance of the Gurgaon Industrial Complex, arrangements were made to ensure abundant uninterrupted power to this belt. The 400 kV Samaypur Substation, will be connected to the Faridabad Gas-based Thermal Power Station, which is to be constructed by the National Thermal Power Corporation. As a future project, Haryana is to take up a thermal power station at Palwal which is likely to be completed by the turn of the century. With the commissioning of this thermal power station, the power available in this area will further increase.

(c) Issues and Constraints

- i) Balance between generated power and power demand appears to not pose any problems. The situation of Gurgaon is relatively better, as compared with the other candidate sites, so far as the collected data indicate.
- ii) The result of the questionnaire surveys also indicate that power interruption occurs frequently, i.e., 3 or 4 times per day, especially during the summer months. Thus, for the Gurgaon site, stable power supplies should be considered. However, Gurgaon has an advantage compared to the other candidate sites as described below.

Exemption from power outages

Under the new industrial policy notified by the state government, industries located in the industrial estates of the Gurgaon district, and having load upto 1 MW, are exempted from power outages, for a period of 5 years, commencing from 1st April, 1992. Since the control of the 220 kV Substation, Samaypur, is transferred to the HSEB, we are able to give interruption-free supply to the industries in this area.

Augmentation plans are given in Table 9-25.

Table 9-25 Future Augmentation Plan: Gurgaon

Sr. No.	Name of S/S	Present Installed Capacity	Present Max. Demand	Augmentation Plans
(1)	<u>GRID SOURCE</u>			
	400 kV NTPC S/S Samaypur	945 MVA (3x315 MVA)	700 MVA	To be increased to 4x315 MVA
(2)	<u>MAIN SOURCE</u>			
	400 kV NTPC S/S Samaypur	160 MVA (1x100 MVA + 1x60 MVA)	140 MVA	To be increased to 2x100 MVA
(3)	<u>DISTRIBUTION GRID Substations</u>			
	a) 66 kV S/S Badshahpur	1x12.5/16 MVA 66/11 kV 1x7.5 MVA 66/11 kV	10 MVA 7 MVA	None
	b) 66 kV S/S Mehrauli Road	24 MVA (66/11 kV) (1x12.5/16 MVA+1.8 MVA) 16 MVA (33/11 kV) (1x10/12.5 MVA+1x6.3 MVA)	16 MVA	8 MVA T/F to be uprated to 16 MVA during 92-93
	c) 66 kV S/S Maruti	1x10 MVA 66/11 kV	8 MVA	None
	d) 66 kV S/S Manesar	1x12.5/16 MVA -do- MVA 1x6 MVA -do-	10 MVA 6 MVA	None
	e) 66 kV S/S Pataudi	1x12.5/16 MVA -do- 1x10/12.5 MVA -do-	16 MVA 12 MVA	None
	f) 66 kV S/S Farrukhnagar	1x12/4/8 MVA 66/33/11 1x4 MVA 33/11 kV 1x7.5 MVA 66/11 kV	8 MVA 4 MVA 7 MVA	7.5 MVA T/F to be uprated to 12 MVA during 92
	g) 66 kV S/S Sohna	8 MVA (66/33 kV) 16 MVA (66/11 kV)	6 MVA 15 MVA	None
	h) 66 kV S/S Tauru	1x10 MVA 66/11 kV	10 MVA	8 MVA T/F to be uprated to 12.5 MVA during 92
	i) 66 kV S/S Nagina	1x6 MVA 66/33 kV 1x6 MVA -do- 1x7.5 MVA 66/11kV	10 MVA 7.5 MVA	None
	j) 66 kV S/S Udyog Vihar, Phase IV	12.5/16 MVA (Proposed)	7.5 MVA	
	k) 66 kV S/S 10-A (under const.)	12.5/16 MVA (Proposed)		

Source: HSEB.

(5) Telecommunications System

(a) Present Situation

i) Status of Nearest Manesar Exchange

As of this date there is not a telephone exchange in operation at the candidate site. The nearest telephone exchange is the Manesar exchange which is a 128 port CDOT exchange. The second CDOT project of 128 port at Manesar is ongoing and is likely to be commissioned in the near future.

ii) Telecom Facility in Gurgaon District

Gurgaon Main Exchange is of 4,000 lines capacity, and another exchange of 1 k capacity in Sector-18.

iii) Main Links

Gurgaon is connected with Delhi and Bombay by optical fiber system.

(b) Future Plan

i) Status of Nearest Manesar Exchange

A512 line CDOT will be proposed in year 1994 - 1995. A CDOT of 1024 port will be installed in year 1997 - 1998.

ii) Telecom Facility in Gurgaon District

The demand for telephones in Gurgaon is about 16,000 as of this date. The department is planning to install 20 k line digital electronic exchanges in the DRG town during 1993 -1994, and an additional 5,000 lines will be added to capacity of the Gurgaon exchange every year after. Gurgaon exchange may have capacity of 40 k lines by the year 2000.

iii) Communication Network in Candidate Site Area

There are plans to provide a digital microwave system, cellular telephone system, and a radio paging system for this area. Access to the Remote Area Business Message Network (RABMN) and Packet Switching service on the I-NET of the Department of Telecom and Gateway Packet Switching System of the VSNL, can be provided from any location.

(c) Issues and Constraints

It was observed that the number of telephone lines in Gurgaon is not enough to meet actual demand. However, if the countermeasure mentioned in the previous clause are executed timely, the present situation would be resolved.

9.5 Environmental Assessment

9.5.1 The Present Circumstances of the Environmental and Pollution Control at the Candidate Sites

(1) Present Conditions

The present circumstances of the environmental and pollution control plans for the candidate sites are shown in Tables 9-26 to 9-29.

Table 9-26 BIDADI (Karnataka State)

	Item	Present State
1.	Land use of candidate site	<ul style="list-style-type: none">• Agriculture• Resident are about 100
2.	Water source and supply	<ul style="list-style-type: none">• Water sources are wells• Total capacity: 69,500 l/day• Water supply is sufficient
3.	Sewerage and drainage	<ul style="list-style-type: none">• No sewerage system• Industrial waste water and domestic waste water are discharged to natural drain joint with rain water• No flooding experience• A part of drain water is used for sprinklers to wood and plants
4.	Air pollution control	<ul style="list-style-type: none">• Concerned state government guide to institute treatment plant• No treatment plant installed
5.	solid waste disposal	<ul style="list-style-type: none">• Carry to dump site belonging to Bangalore City• Open dumping is used

Table 9-27 SATHNUR (Karnataka State)

	Item	Present State
1.	Land use of candidate site	<ul style="list-style-type: none">• Agriculture• Resident are about 100
2.	Water source and supply	<ul style="list-style-type: none">• Water sources are wells• Total capacity: 423,809 l/day• Water supply is sufficient• Water treatment is by chlorination
3.	Sewerage and drainage	<ul style="list-style-type: none">• No sewerage system• Industrial waste water and domestic waste water are discharged to natural drain joint with rain water• No flooding experience• A part of drain water is used for sprinklers to wood and plants
4.	Air pollution control	<ul style="list-style-type: none">• Concerned state government guide to institute treatment plant• No treatment plant installed
5.	solid waste disposal	<ul style="list-style-type: none">• Carry to dump site belonging to Bangalore City• Open dumping is used

Table 9-28 NOIDA (Uttar Pradesh State)

	Item	Present State
1.	Land use of candidate site	<ul style="list-style-type: none"> • Bush, Meadow, uncultivated, Farmland • No residents • Some small village are near the site
2.	Water source and supply	<ul style="list-style-type: none"> • Water sources are wells • Total capacity: 110,000 l/day • Water supply is sufficient • Water treatment is chlorination
3.	Sewerage and drainage	<ul style="list-style-type: none"> • Separate sewerage system in part of area • Sewage treatment (55,000 kl/day, Oxidation Pond, treated water BOD 20 mg/l) discharge to River Yamuna • Untreated sewage discharge to the Yamuna River • New Sewage treatment plant is planned
4.	Air pollution control	<ul style="list-style-type: none"> • Only non polluting industries (Electrical, Electronics, Textile, Food Industry) are allowed as tenant. • No treatment plant installed
5.	solid waste disposal	<ul style="list-style-type: none"> • Open dump to low grand • Because of open dumping, dumping site is unsanitary condition • Unsanitary conditions: earth cover not accomplished each day

Table 9-29 GURGAON (Haryana State)

	Item	Present State
1.	Land use of candidate site	<ul style="list-style-type: none"> • Agriculture • Resident are about 1,000
2.	Water source and supply	<ul style="list-style-type: none"> • Water sources are wells • Total capacity: 38,250 l/day • Water supply is sufficient • Primarily shallow wells 10-25m water contamination can occur • 2001, water treatment plant (capacity) construction will be completed. The water source is the Nazafgarh Drain 70 km north of the site
3.	Sewerage and drainage	<ul style="list-style-type: none"> • Sewage volume: 15,450 kl/day • Sewerage piping is partially constructed • Sewerage treatment plant (activated sludge system, 68,000 kl/day) discharges to the Yamuna River. • Discharging effluent from industries are treated by the respective companies according to the limits of public sewers standards. Many of the large and medium scale industries have already installed treatment plants. • A part of sewerage supply is used for irrigation without treatment. • Drainage canals are partially finished • Combined sewerage systems are in the old town. A separate sewerage system is in the new town area and the industrial area
4.	Air pollution control	<ul style="list-style-type: none"> • No treatment plant installed
5.	solid waste disposal	<ul style="list-style-type: none"> • Separate collection • Collect after the removal of materials from polluting industries • Compost is practiced by individuals and on an official level • The practice of adequate earth cover on a daily basis does not occur and thus leads to unsanitary conditions.

(2) Counterplan of Environmental and Pollution Control Management

(a) Water and Industrial Water

Drinking water and industrial water for BIDADI and SATHNUR are supplied by wells. Both candidate sites have plans to alter water sources from well water to river water to correspond with increased water demand. However, water quality standards appear not to be an issue. The Cauvery River is planned as the water source and would provide water quality with a BODI mg/l and 350 MPN/100 ml Ecoli. The water quality revealed fecal contamination. Japanese drinking water standards for E. coli number as follow: Non-directive in 50 ml sample. It should be noted that new industries often demand high quality and quantities of water.

Currently, NOIDA uses 100 per cent of water sources from underground wells for drinking and industry. There are plans to source water from the Yamunca River. However, water quality appears not to be as significant an issue as in the State of Karnataka.

(b) Sewage and Industrial Waste Water

Among the four candidate sites, NOIDA and GURGAON have plans for waste water treatment plants. NOIDA is now equipping a separate sewerage system and finished an oxidation pond as the final sewage treatment. The target treated water quality is 20-30 mg/l BOD. Industrial waste water loads change often, thus the oxidation pond is not adequate for industrial waste water due to the 7-days required to change loads.

Field investigation failed to locate in NOIDA's plan a method for the removal of hazardous material from waste water. In the future, NOIDA must provide guidance to industries to establish hazardous material processing/treatment facilities. However, NOIDA has plans to construct a higher level sewage treatment plant.

GURGAON is currently constructing a sewerage system that is a two-way system: combining system, and separate system. The industrial discharge system must be separate from other treatment facilities. The sewage final treatment will utilise the active sludge system.

This treatment system is inadequate for treating waste water and sewage. If capacity is expanded, then the sewage system will be effective.

In GURGAON, concerned government authorities have prepared guidance for industries to remove hazardous material from industrial effluents, and some industries have completed installations.

(c) Air Pollution Countermeasures

As yet, there are not any installed air pollution control plans for the four candidate sites. NOIDA does not allow polluting industries to establish operation within the industrial estate. Specifically, air pollution dispenses over a wide area, and it is very important to provide guidance and guidelines for controlling air pollution.

(d) Countermeasures for Solid Waste Disposal System at BIDADI, SATHNUR

NOIDA and GURGAON have low land dumping sites, not installed treatment facilities. Low landfill sites are not utilising soil coverage every day. Also, ground water contamination is likely as is sanitation problems associated with uncovered fill sites.

The establishment of a landfill system can be difficult to alter in the future. The planning of landfills must consider prevention of contamination of leakage into the water table, and the diligent maintenance of the landfill site to provide necessary soil coverage, et cetera.

GURGAON has began a separate collection of solid wastes, recovery of useful materials, and garbage for compost. Efforts in GURGAON should significantly reduce pollution.

(e) Separation of Residential and Industrial Areas

Presently established industrial estates for the four candidate sites do not practice effective segregation of residential areas from industrial areas. Thus, the planning of an IMT and industrial estates must provide adequate environmental assessments and impact statements regarding waste water demand, air pollution, noise levels and offensive odors.

9.5.2 Environmental Policy

(1) Environmental Policy in the Eighth Five Year Plan

In the Eighth Five Year Plan, the government of India states that environmental protection and pollution control are important, in conjunction with sustainable development that conserves natural resources and the ecosystem.

- (a) Sustained social and economic development
- (b) Emphasis on the protection and conservation of natural resources, especially for soil, water, biomass and forests regarding rural economic development.
- (c) The Plan states the present responsibilities to future generations, and the efforts that must provide environmental protection from irreversible harm.
- (d) Induce innovative approaches to development through inputs of science and technology, but must be responsive to the needs of the people.
- (e) Insist on development programmes being environmentally sustainable through strict adherence to the norms and guidelines of environmental clearance of projects already established, and measures pertaining to resource conservation, pollution control and the upgrading of land and water resource quality.

(2) National and State Organisations for Pollution Control

The Central Government is responsible for environmental protection and pollution control. The Ministry of Environment and Forests is responsible for administration and compliance. The Central Pollution Control Board is responsible for implementation of environmental protection laws and regulations.

The disposition of local environmental problems rests with the appropriate state authority. Investigations and reports are carried out on the state level and notification is made to the appropriate ministry.

Certifications of industrial estates and industries are permitted by the Ministry of Industry (MOI). A service window for certification and requests are located within each state government.

Table 9-30 Responsible Authority for Siting Permission and Pollution Control

Central Government Concerned	State State Authority Concerned
<u>Ministry of Industry</u> Operation Industrial Estates/Areas	Karnataka Karnataka Industrial Area Development Board (KIADB) Karnataka State Small Industries Development Corporation (KSSIDC)
	Haryana Haryana State Industrial Development Corporation (HSIDC)
	Uttar Pradesh U.P. State Industrial Development Corporation (KSPCB)
<u>Ministry of Environment & Forests</u> Operation Environmental Clearance	Karnataka Karnataka State Pollution Control Board (KSPCB)
	Haryana Haryana State Board for Prevention and Control of Water Pollution
	Uttar Pradesh Uttar Pradesh Pollution Control Board (UPPCB)

In addition to the above four states, 26 states have similar functioning authorities.

Process of permission of siting and others for industry are as follows:

Companies must submit a request for establishing an industrial estate and/or industry to the state's concerned authority.

The Ministry of Industry and the concerned authority examine and provide disposition as to whether the request meets appropriate regulations.

Companies must also prepare and submit the "Environmental IMPACT Assessment Report" and the "Pollution Control Plan" to a state's pollution control board. After the environmental impact assessment is studied, the concerned authority can issue permits to companies.

(3) Industrial Pollution Control and Guidelines

(a) Permit Guidelines for Industries

These guidelines are applied to the permitting of industries and industrial estates. In the case of the IMT, the concerned authority will select the IMT site according to established guidelines. Guidelines will show the select conditions of sites with due consideration for the environment, and guide tenants' industries distribution.

(b) Environmental Impact Assessment (EIA)

Polluting Industries with plans to locate within an industrial estate prepare and submit an EIA report to the concerned state government for certification. Industries make counter plans for environmental protection and pollution control according to the EIA report.

(c) Pollution Control Standards

Pollution Control standards are prepared and disseminated by the Central Pollution Control Board. The practice and management of the guidelines are the responsibility of each concerned state government.

The Acts and Rules of Pollution Control Standards are as follows:

- i) The Water (Prevention and Control of Pollution) Act
(Established 1977)
- ii) The Air (Prevention and Control of Pollution) Act, 1981
- iii) Environment (Protection) Act, 1986
- iv) The Hazardous Waste (management and disposal) Rules, 1989

9.5.3 Land Acquisition

(1) The Land Acquisition Act, 1894

A complete summary of the Land Acquisition Act, 1894 is beyond the scope of this report. However, in order to provide some reference as to central and state government land acquisition laws, especially regarding the development of an Industrial Model Town in India, a brief description of salient features of said Act follows.

(a) Addenda

Acquisition, not mala fide

The acquisition of a vast area of land for developing large industrial estates must take into account future needs and cannot be held to be mala fide -- if future foreseeable needs justify bona fide acquisition.

(b) Part VI Temporary Occupation of Land

Temporary Occupation of waste or arable land. Procedure as to when a difference regarding compensation exists. (Refer to S. 35.)

Subject to the provisions of Part VII of this Act, wherever it appears to the (appropriate Government) that the temporary occupation and use of any waste or arable land is needed for any public purpose, or for a Company, the (appropriate Government) may direct the Collector to procure the occupation and use of the same for such a term as it shall think fit, not exceeding three years from the commencement of such occupation. All disputes to be referred to the Court.

- i) the Collector will give notice in writing
- ii) pay compensation (if there is a dispute, decision lies with the Court).
- iii) Karnataka: substitute for "The Collector", the "Deputy Commissioner".
- iv) Karnataka: if Deputy Commissioner believes temporary housing is needed due to some natural catastrophe, in order to provide housing to the population, the Deputy Commissioner may allow residence up to one year; immediately report to the State Government such action; and give notice

in writing to persons interested in said land. Any disputes are referred to the Court for resolution.

(c) Part VII Acquisition of Land for Companies

Company may be authorised to enter and survey. Rep. by the Land Acquisition (Amendment) Act, 1894 (Refer to S. 38).

Industrial concern to be deemed company for certain purposes: an industrial concern ordinarily employing not less than 100 workers owned by an individual or an association of individuals and not being a Company, desiring to acquire land for building worker dwellings, shall be deemed a Company for the said beneficial purposes. (Refer to S. 38A.)

Previous consent of appropriate Government and execution of agreement necessary. (Refer to S. 39.)

Note: The provisions of (sections 6-16 both inclusive and sections 18-37, both inclusive) shall not be put in order to acquire land for any company, under this Part, unless with the previous consent of the appropriate Government, nor unless the Company shall have executed the agreement hereinafter mentioned.

Previous enquiry. (Refer to S. 40.)

Note: Such consent shall not be given unless the appropriate Government be satisfied that the purpose of the acquisition is to erect worker dwellings or amenities directly connected therewith; construction of some building or work for a Company; that acquisition is needed for the construction of some work likely to prove useful to the public.

Notes: the question of consent for the acquisition of land for a company under one clause of section 40(1) has to be decided on the basis of the agreement and the notification under section 6. It is open to the appropriate Government to give consent on being satisfied as to one of the three clauses only or as to more than one clause.

Agreement with appropriate Government (Refer to S. 41.)

If the appropriate Government is satisfied with the report, if any, of the Collector, the following matters are required of a Company for entering into a land acquisition agreement:

- i) payment to the appropriate Government of cost of the acquisition;
- ii) transfer upon payment of land to the Company;
- iii) terms by which the land is held by the Company;
- iv) where the acquisition is for construction dwellings or amenities, the time schedule, conditions and manner in which the dwellings or amenities shall be erected or provided;
- v) time schedule and conditions for construction of buildings if Company is engaged in work for the public good; and
- vi) where the acquisition is for construction of any other work, the time schedule and conditions which the work shall be executed and maintained and the terms on which the public shall be entitled to use the work.

Publication of an agreement shall be as soon as executed in an official Gazette.
(Refer to S. 42.)

Note: Rule 4(1) of the Land Acquisition (Companies) Rules, 1963 made by the Central Government by virtue of the power conferred under section 55 of the Act requires the appropriate Government to which an application is made by a company for acquisition of land to direct a report on six matters set out therein. The Collector shall hold an inquiry in respect of those six matters and shall consult the Senior Agricultural Officer of the District in case the land is agricultural land; determine compensation to be paid; ascertain whether the Company offered reasonable compensation.

When a locality/village/group of villages are notified of an acquisition, any person can lodge an objection under section 5A where lands in any locality are notified under section 4(1). Further, landowners are entitled to a hearing under

Rule 4 of the Land Acquisition (Companies) Rules, 1963, over and above an opportunity of hearing in an objection under section 5A of the Act. When no such opportunity was given, the acquisition is vitiated. (Refer to S.5A.)¹

¹Source: Land Acquisition Act, 1894. M.R. Mallick, M.A. LL.B., Judge, Calcutta High Court. K.K. Lodha Publishers, 1990

CHAPTER 10 COMPARISON OF CANDIDATE SITES

CHAPTER 10 COMPARISON OF CANDIDATE SITES

10.1 Basic Strategy of Comparisons

The study results for the four candidate sites comprised of state-level and site conditions which were short-listed in the Scope of Work, are described in Chapters 8 and 9. An IMT development concept was derived in Chapter 6 based on background information and characteristics. The purpose of this model study was to select an appropriate site without any constraints, as the selected site will proceed to determine the Conceptual Plan's formulation as the initial operation of the IMT in India.

The study framework for the IMT is illustrated in Figure 10-1.

(1) Necessity of the IMT Formulation

According to "Chapter 6: IMT Concept", the introduction of foreign investments including technology transfers, is practical and effective measures for improvement and expansion of India's domestic industry. For promotion of this objective, an investment climate consisting of both "soft factors" and "hard factors", should be well established. Realisation of these measures will formulate the IMT, therefore, the following should be seriously considered for successful implementation of the IMT.

- (a) The investment climate of neighboring countries should be considered when attempting to provide an investment climate.
- (b) The IMT is an accumulated production base that receives foreign investors, thus the IMT is required to establish incentives and infrastructures with international standards.
- (c) Additional IMTs should be planned in the future based upon this model study.

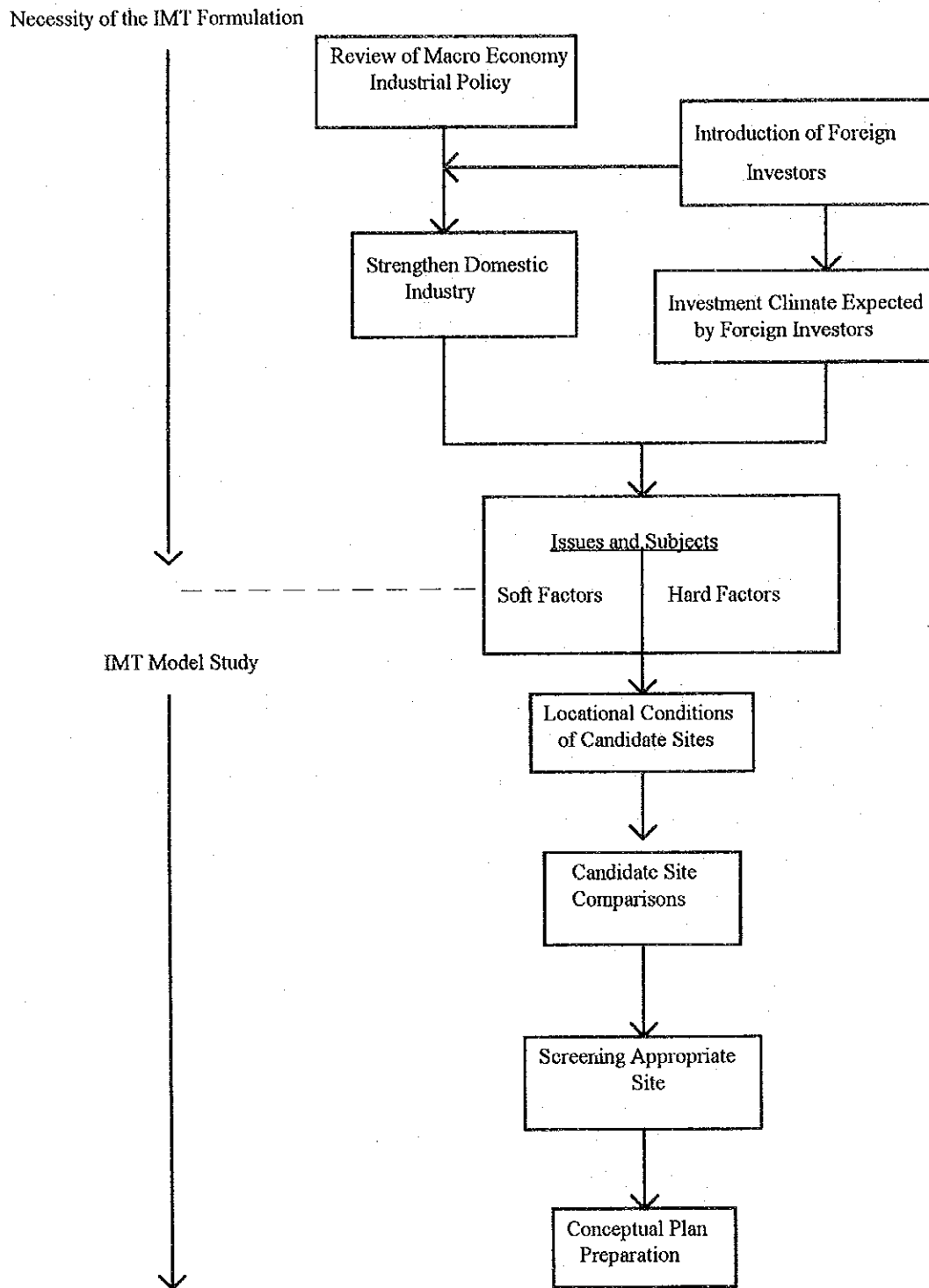


Figure 10-1 Framework of the Study for the IMT

(2) Appropriate Site Screening

The objective of preparing the Master Plan is to study what is an appropriate ideal model for the IMT that has the most functional and effective climate for the promotion of investment (including foreign investors). Therefore, selection of an appropriate site for the model study will be accomplished by screening the four sites. Comparisons of the candidate sites will be accomplished in the following manner.

(a) Primary Evaluation

Adjustment and appropriation between the objectives of the Master Plan Study and the candidate sites.

(b) Secondary Evaluation

Quantitative evaluation for relative advantages and disadvantages among the candidate sites.

10.2 Primary Evaluation

The objectives of the study are to formulate a Master Plan for an Industrial Model Town provided with the proper incentives, infrastructure, and other necessary facilities attractive to the investment requirements of foreign investors. Therefore, prior to complete formulation of the master plan, to ascertain whether the objectives of the study can be obtained, each candidate site must be evaluated.

(1) NOIDA Candidate Site

From the objectives of the study, the following conditions of NOIDA were evaluated and observed to differ from the other candidate sites.

- (a) NOIDA is adjacent to Delhi, a major town in the Delhi Metropolitan Area, and has well-organised urban facilities (such as housing, commercial, industrial, etc.) that were developed during the early 1980s based on NOIDA's master plan.**

The NOIDA area is about 50 per cent developed. The IMT candidate site is proposed to be established in a part of the industrial area based on NOIDA's Master Plan. However, from the viewpoint of total urban planning, adjustments to existing facilities and new urban functions within the industrial area would be required if the IMT is established in this area.

Therefore, for NOIDA, only an industrial estate should be established in the candidate site, and urban functions could then commonly depend upon NOIDA's present facilities. If not, reshaping the IMT concept to more resemble an industrial estate would be necessary. This is not in accordance with the objectives of the Master Plan Study for ascertaining all the IMT's functions.

- (b) Existing enterprises in NOIDA are given several incentives. However, several incentives given to existing enterprises will have expired because development started in the early 1980s. Therefore it is assumed, that some difficulty would occur during adjustments between existing enterprises already given incentives and newly established enterprises located in the same area. Furthermore, it appears that preferable incentives are difficult to be awarded to the IMT, and this is also another difficulty related to achieving the objectives of formulating an ideal master plan in NOIDA.

Given the conditions mentioned above, it was judged as difficult to proceed with preparation of the Master Plan Study in accordance with the objectives of the IMT development concepts.

(2) Bidadi Candidate Site

The Bidadi candidate site is planned as a proposed site by the state government. There are no constraints, and no structures to be removed in and around the candidate site. It appears that there are no barriers to the incentives established by the state government as one of the objectives of formulating the IMT Master Plan.

(3) Sathnur Candidate Site

Sathnur is the same as Bidadi, and it appears that there are no barriers to the incentives and location conditions of the candidate site for the objectives of formulating the IMT Master Plan.

(4) Gurgaon Candidate Site

There are no special constraints regarding incentives and location conditions of this site for the formulation of the objectives of the IMT Master Plan.

(5) Primary Evaluation Conclusion

From the descriptions above, the NOIDA candidate site becomes an exception to the IMT's formulations compared to the other candidate sites. Therefore the secondary evaluation will proceed for the three candidate sites of Bidadi, Sathnur, and Gurgaon.

10.3 Secondary Evaluation

10.3.1 Comparison Parameters

(1) Objective of Evaluation

An evaluation of the IMT candidate sites should consider the needs and limitations of the central government, state government, district-level government bodies, and foreign investors. The forthcoming comparative analyses employed such a working concept.

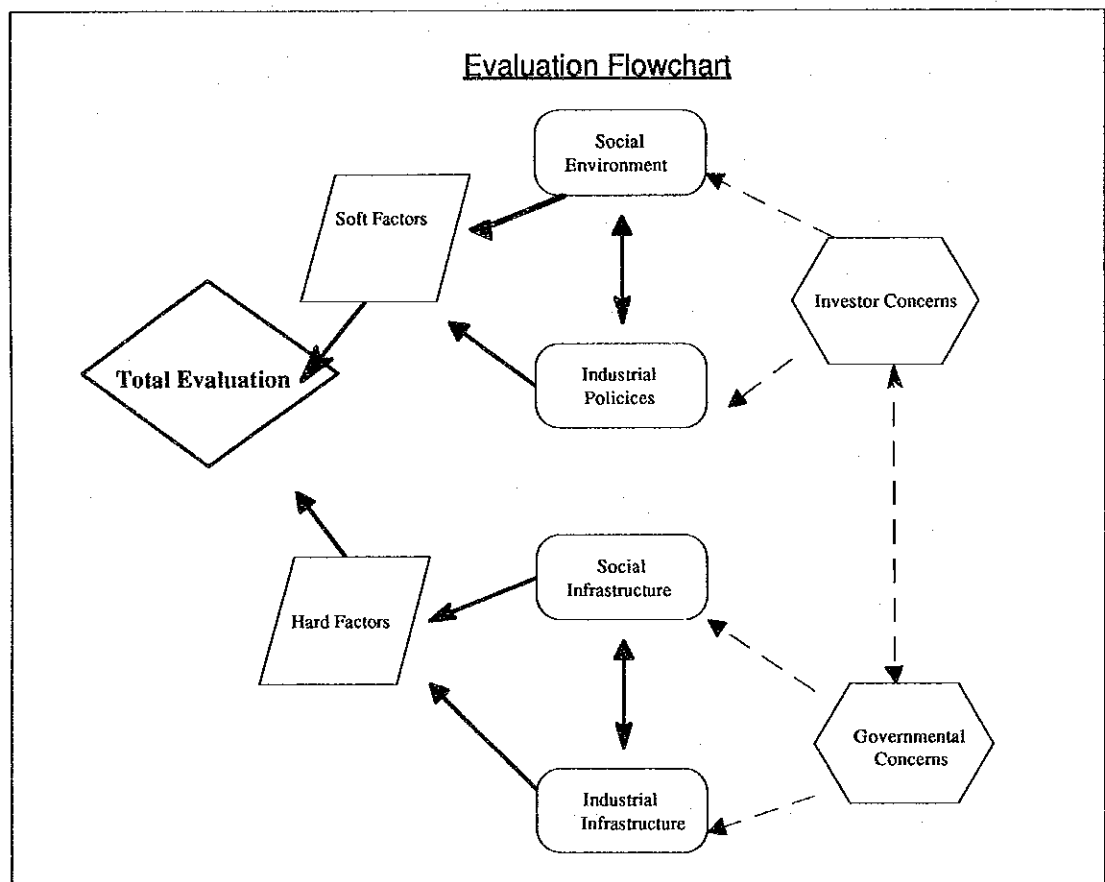
(2) Grouping of Parameters

Grouped factors consist of the following categories:

- (a) Regional Maturity/Social Environment: a measure of the state's industrial production base and the social environment as perceived and evaluated by foreign investors.

- (b) Industrial Policies: state government policies and systems for providing industrial development promotion and incentives.
- (c) Social Infrastructure: operationally defined as the necessity of basic infrastructure improvements for the areas and regions in and around the candidate site locations.
- (d) Industrial Infrastructure: comprises those variables that demonstrate the "ease" of industrial infrastructure development for production and quality of life activities.

The use of a flowchart presentation was selected as the most concise method of explaining direct and indirect relationships regarding the classifying and prioritizing of the IMT candidate site locations.



Factors, Parameters, and Additional Variables

Factors	Parameters	Additional Variables
Social Environment	Meteorological Conditions	Climate/temperature/humidity
	Quality of Life	Availability of Housing
		Urban System Adequacy
		Adequacy of Amenities facilities
	Industry's Level of Development	Industry Integration
		No. Foreign Investors
		No. laboratories/R&D facilities
	Labour Force	No. Workers (within 30 km)
		Skill Levels/Educational Facilities, Wage Levels
	Environmental Impact	Ecological Impact
		Impact on Transportation
		Impact on Housing
	Transportation Characteristics	Air Terminal Access
Traffic Conditions		
Railway Access		
Industrial Policies	Level of Incentives	Taxes
		Financial Assistance/Others
	Organisations for Industrial Estates development	Agencies for Developing Industrial Estates
		Administrative Support
	Support Agencies	Single Window Shops
	Legal Concerns	Land Use Laws
		Environmental Pollution Control Laws
Social Infrastructure	Transportation Infrastructure	Arterial Roads
		Access Roads/Railway Lines
	Commercial Facility	Shopping Centres, Hotels, etc.
	Educational Facilities	College, Polytechnic, etc.
	Social Welfare Facilities	Hospitals, Clinics
	Public Service Facilities	Post Offices, Police Stations, etc.
	Amenities Facilities	Theaters, Museums, etc.
	Housing	Residential Zoning
Industrial Infrastructure	Land Development	Land Acquisition
		Resident Opposition
		Compensation for Relocation
	Geographical Conditions	Topography & Geology
	Water Supply	Resources
		Quality/Quantity
		Adequacy of Facilities
	Drainage & Sewerage	Adequacy of Facilities
		Condition of Effluent
	Electric Power Supply	Available Power Supply
		Stability of Sources
	Telecommunications	No. Domestic Telephone Lines
		No. International Lines

10.3.2 Evaluation Methodology

(1) Primary Analyses

The evaluation of the parameters consisted of collecting data and observations for the variables previously described for each of the candidate sites. The study hypothesis states that a comparison of the relevant variables will reveal the relative advantages and disadvantages between candidate sites and states for the development of an IMT in India.

The four major factors and additional characteristics (variables) follow.

i) Social Environment	living conditions and the kinds of enterprises to be established after the IMT becomes operational.
ii) Industrial Policies	establishment of state governments policy to foreign investors needs and requirements.
iii) Social Infrastructure	comparisons of costs associated with improving infrastructure around the IMT candidate sites (e.g., transportation networks) for improved quality of life.
iv) Industrial Infrastructure	comparisons of costs associated with industrial infrastructure requirements for the IMT candidate sites.

(2) Secondary Analyses

In addition to the primary analyses, secondary analyses were accomplished for subsets of variables for each factor. The weighted scores estimates are products of value rankings based on the findings of foreign investor receptivity to the development of industrial estates considering India's characteristics, and the findings of the *Japan Industrial Policy Research Institute* for inland industrial estates in Japan in order to avoid arbitrary evaluations. Variables and weighted scores are given as shown in Table 10-2.

Table 10-1 Factors, Variables and Weighted Scores

Factors	Variables/Parameters	Weighted Scores
Social Environment	1. Meteorological conditions	0.6
	2. Quality of Life	1.0
	3. Level Industrial Development	1.0
	4. Labour Force	0.8
	5. Environmental Impact	0.6
	6. Transportation Characteristics	1.0
Industrial Policies	1. Level of Incentives	1.5
	2. Organisations for Industrial Estates	1.0
	3. Support Agencies	1.5
	4. Legal Concerns	1.0
Social Infrastructure	1. Transportation Infrastructure	1.0
	2. Commercial Facility	0.7
	3. Education Facility	0.6
	4. Social Welfare Facility	0.6
	5. Public Service Facility	0.7
	6. Amenities Facility	0.7
	7. Housing	0.7
Industrial Infrastructure	1. Real Estate Concerns	1.2
	2. Geography	0.5
	3. Water Supply	0.9
	4. Drainage and Sewerage	0.7
	5. Electric Power Supply	1.0
	6. Telecommunication Systems	0.7

Note: Weighted scores are for variables and associated factors, values are not applicable across factors.

(3) Tertiary Analysis

The tertiary analysis attempts to discover the relative importance and strength of each factor category for comparisons between the candidate sites based on the results of the secondary analyses.

10.4 Comparison of the Three Candidate Sites

Comparisons of the three candidate sites, Bidadi, Sathnur, and Gurgaon, follow.

10.4.1 Social Environment: Comparison

The variables that best estimate the characteristics of the social environment factor were derived from quantitative and qualitative data and are presented as weighted scores for each of the candidate sites for comparison purposes.

Previous sections discussed the IMT development concepts, study methodology and the operational definitions for the study parameters (sections 10.3.2). Variables and relationships identified for analysis purposes are described in section 10.3.2, and the following descriptive findings are derived from the previous data analyses. The relative future potential of each site developing a successful industrial model town is described, and relative rankings of the best possible candidate site are based on between site comparisons.

(1) Bidadi : The parameter and factor evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Environment 1	Meteorological Conditions	8
Social Environment 2	Quality of Life	7
Social Environment 3	Level of Industrial Development	6
Social Environment 4	Labour Force	7
Social Environment 5	Environmental Impact	7
Social Environment 6	Transportation Characteristics	7

Observations and Future Potentials

- (a) Bidadi has a relative advantage regarding meteorological conditions compared to the Delhi area candidate sites.
- (b) The site is within commuting distance of Bangalore, therefore housing, urban facilities, and amenity facilities would be accessible.
- (c) There are a number of enterprises and foreign collaborations in and around the Bangalore area. This is an advantage for those companies locating to an IMT desiring to establish supplier/support services linkages. There are not any constraints to secure a labour force.
- (d) There is not a problem if normal environmental protection measures are taken.
- (e) The site is about 40 km. from Bangalore airport and requires 30 minutes commuting by automobile. The Bangalore Air terminal services only domestic flights and is linked to major cities in India. There are international air cargo service connections via the Madras Air terminal through KLM Airlines. There are also plans for expanding the Bangalore airport to an international service terminal, however, details as to when this might occur are not available.
- (f) There is heavy traffic congestion for service from Bangalore to Bidadi along State Highway No. 48. However, there are plans to widen the state highway from the present two lanes to a six lane carriage road. This would significantly reduce existing and anticipated traffic congestion.
- (g) The Southern Railway Line passes from Bangalore to Mysore and runs near State Highway No. 48. The nearest railway station is 1 km. from the candidate site.

(2) Sathnur

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Environment 1	Meteorological Conditions	8
Social Environment 2	Quality of Life	7
Social Environment 3	Level of Industrial Development	6
Social Environment 4	Labour Force	6
Social Environment 5	Environmental Impact	7
Social Environment 6	Transportation Characteristics	5

Observations and Future Potential

- (a) Meteorological conditions are relatively better than the Delhi area candidate sites.
- (b) The Sathnur candidate site is not within commuting distance of Bangalore, and therefore requires constructing adequate housing, public facilities, and commercial facilities within and around the site. If the facilities were constructed, met international standards of acceptance, and were operational, an appropriate urban support services environment would be obtained.
- (c) The availability of recruiting an adequate labour force from the neighboring cities poses difficulties as to the size of these urban areas. However, if New Towns are established in the future, worker recruitment would be enhanced.
- (d) There are no large-scale industries near the candidate site, but enterprises locating to the IMT could form linkages with support industries in the Bangalore region.
- (e) There is not a problem if normal environmental protection measures are taken.

- (f) The distance from the candidate site to the Bangalore Air terminal is about 75 km., and requires 90 minutes travel time by automobile.
- (g) At present, State Highway No. 86 has two lanes, but if expanded would meet future traffic demand needs, thus reducing commuting time from Bangalore.
- (h) The Southern Railway Line is the nearest railway service to the candidate site. However, distances from the candidate site to the closest railway station are disadvantageous for business and personal use.

(3) Gurgaon

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Environment 1	Meteorological Conditions	6
Social Environment 2	Quality of Life	8
Social Environment 3	Level of Industrial Development	8
Social Environment 4	Labour Force	8
Social Environment 5	Environmental Impact	7
Social Environment 6	Transportation Characteristics	8

Observations and Future Potential

- (a) Meteorological conditions are not as favorable as the Bangalore area sites.
- (b) The quality of life measurement reveals that housing stocks and other urban facilities would depend on housing units available in Delhi. Residential housing planned in sector 29 is constructed, housing demand would be met and that urban facilities' requirements would be met, the New Town is developed as currently planned.

- (c) Gurgaon is an industrial city with other major industrial cities within the vicinity of the candidate site (including the Delhi Metropolitan Area).
- (d) Recruitment of an adequate labour force is possible in Gurgaon and Delhi. (Commuting distances would not pose any significant problems for workers.)
- (e) There is not a problem if normal environmental protection measures are taken.
- (f) The Indira Gandhi International Airport is about 35 km. from the candidate site and requires about 30 minutes travel time by passenger automobile. Commuting time is significantly less.
- (g) State Highway No. 8 passes through the candidate site and requires 30 minutes commuting time to the Delhi Metropolitan Area. If the highway is expanded as is currently planned, traffic conditions would be adequate to meet present and future demand.
- (h) The Northern Railway Line that passes from Delhi to Rewari is located about 5 km. north of the candidate site. A cargo terminal complex is planned near the candidate site and an extension railway line.

10.4.2 Industrial Policies: Comparison

Comparative advantages were studied based on documented industrial policies and documentation regarding industrial supporting organisations as described in Chapter 8.

(1) Bidadi

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Policies 1	Levels of Incentives	7
Industrial Policies 2	Organisations for Industrial Estates	7
Industrial Policies 3	Support Agencies	6
Industrial Policies 4	Legal Concerns	7

Observations and Future Potential

- (a) The site falls under the jurisdiction of the State of Karnataka, and provides the same incentives available for Sathnur. State-sponsored incentives were provided in Chapter 8, Table 8-15.
- (b) The KIADB is responsible for land acquisition, infrastructure development, and the management operations of industrial estates after development. A specialised and autonomous management organisation would be required for the IMT.
- (c) The support services for enterprises are fragmented and are the responsibility of several official organisations. An integrated single shop service would more effectively meet the needs of newly locating industries to the IMT.
- (d) The candidate site should be developed in accordance with landuse and environmental protection laws and regulations.

(2) Sathnur

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Policies 1	Levels of Incentives	7
Industrial Policies 2	Organisations for Industrial Estates	7
Industrial Policies 3	Support Agencies	6
Industrial Policies 4	Legal Concerns	7

Observations and Future Potential

The results mirror the findings of Bidadi and are not duplicated here.

(3) Gurgaon

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Policies 1	Levels of Incentives	7
Industrial Policies 2	Organisations for Industrial Estates	7
Industrial Policies 3	Support Agencies	7
Industrial Policies 4	Legal Concerns	7

Observations and Future Potential

- (a) Incentives given are similar to other candidate sites. State-wide incentives are found in Chapter 8, Table 8-15.
- (b) The HUDA and HSIDC are responsible for industrial estate development. The HUDA is responsible for land acquisition and the HSIDC is responsible for infrastructure development. The development and management of the IMT would be the responsibility of the HSIDC, but an independent organisation such as is found in NOIDA would be needed.

- (c) Support service systems for arriving enterprises would be the responsibility of various authorities and appears fragmented. Investment promotion activity is the responsibility of the state industrial assistance group headquarters in New Delhi. For the development and management the IMT, a single window shop should be established to meet the needs of newly locating enterprises.
- (d) A portion of the candidate site falls under the Delhi National Capital Region Plan, but is approved for industrial estate development.

10.4.3 Social Infrastructure: Comparison

A comparative analysis was employed for each candidate site to discover the relationships effecting the social infrastructure factor variables. A complete description of variables, weighted scores, and methodology are given in Chapter 9, sections 9.1 to 9.4.

(1) Bidadi

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Infrastructure 1	Transportation Infrastructure	6
Social Infrastructure 2	Commercial Facilities	7
Social Infrastructure 3	Educational Facilities	6
Social Infrastructure 4	Social Welfare Facilities	6
Social Infrastructure 5	Public Service Facility	6
Social Infrastructure 6	Amenity Facilities	6
Social Infrastructure 7	Housing	6

Observations and Future Potential

- (a) State Highway No. 48 is a two-lane highway and requires extending about 35 km. to Bangalore.
- (b) If a four-lane highway for Bangalore to Mysore is constructed, access roads from the candidate site would require constructing and extending for a 12 km. distance.

- (c) To utilize the railway, a railway line extension and station must be constructed.
- (d) Commercial, educational, public service, amenity, health care, and housing facilities are available from Bangalore and the surrounding vicinity. However, the minimum facilities for production activities should be constructed at the candidate site.

(2) Sathnur

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Infrastructure 1	Transportation Infrastructure	5
Social Infrastructure 2	Commercial Facilities	5
Social Infrastructure 3	Educational Facilities	5
Social Infrastructure 4	Social Welfare Facilities	5
Social Infrastructure 5	Public Service Facility	5
Social Infrastructure 6	Amenity Facilities	5
Social Infrastructure 7	Housing	5

Observations and Future Potential

- (a) State Highway No. 86 is a two-lane gauge road and needs expanding 70 km. to Bangalore.
- (b) A four-lane highway from Bangalore to Mysore would require access roads from the site be constructed for 30 km distance.
- (c) The existing railway line is located at an inconvenient distance from the candidate site and would require constructing an extension line, or new roads to the nearest railway station. Investment costs associated with the transportation network are comparatively higher than in Bidadi.

- (d) Investment costs for commercial, educational, public service, public welfare, and housing facilities would have to be newly established and constructed for the candidate site and the surrounding vicinity.

(3) Gurgaon

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Social Infrastructure 1	Transportation Infrastructure	8
Social Infrastructure 2	Commercial Facilities	7
Social Infrastructure 3	Educational Facilities	8
Social Infrastructure 4	Social Welfare Facilities	7
Social Infrastructure 5	Public Service Facility	7
Social Infrastructure 6	Amenity Facilities	7
Social Infrastructure 7	Housing	7

Observations and Future Potential

- (a) National Highway No. 8 will be widened from four-lanes to six-lanes. This plan does not require large investment costs as there are no large structures between Delhi and the candidate site. Improvement costs are substantially reduced.
- (b) Construction of access roads would not pose cost-related problems for two specific reasons: National Highway No. 8 passes through the candidate site, and the topography of the land is suitable for such construction efforts.
- (c) The railway line passes about 5 km. north of the candidate site. Costs associated with providing a railway extension link would be relatively less.
- (d) Commercial, educational, public welfare, public service, amenity and housing facilities are available from Delhi. Also, the New Town development plan calls for a large-scale shopping centre with supporting enterprises. Costs for this development plan are substantial.

10.4.4 Industrial Infrastructure: Comparison

A comparative analysis was employed utilizing the variables associated with the industrial infrastructure factor and present conditions as discussed and explained in Chapter 9, section 9.1 to 9.4.

(1) Bidadi

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Infrastructure 1	Real Estate Concerns	5
Industrial Infrastructure 2	Geology/topography	7
Industrial Infrastructure 3	Water Supply	7
Industrial Infrastructure 4	Drainage & Sewerage	7
Industrial Infrastructure 5	Electric Power Supply	6
Industrial Infrastructure 6	Telecommunications	6

Observations and Future Potential

- (a) The state government is in possession of 40 ha. (3 per cent), of a total area of 1,200 hectares. Land value prices are relatively more expensive than in Sathnur, but significantly less than the Delhi area candidate sites.
- (b) As yet, there appears that there have not been consultations with regional residents regarding an IMT in this area. Also, compensation costs for relocation efforts are not defined.
- (c) Geological and topographical evaluations indicate the site has two small hills of 740 m. and 760 m. in height. Development of this site would be effected by the topography. However, geological resistance demonstrates there are not any restrictions for the construction of industrial facilities.
- (d) Water supply resources are expected from the Cauvery River's main pipe source via pipeline (water rights of the Cauvery River are as yet

unsettled). Construction of this supply network would require 8 km. pipeline and an elevated water tank.

- (e) Discharged water is planned for agricultural and green belt irrigation use. Adequate sewerage treatment facilities are required to meet water effluent health and quality standards.
- (f) Electricity demand and current supply programs planned by the State of Karnataka indicate that power shortages amounting to 20 per cent of demand are expected in 1995. Power shortages can be avoided if an independent power generating plant is installed at the IMT site.
- (g) Currently, there are a limited number of telecommunications lines. The telecommunications network system should be improved to meet practical residential and business demands.

(2) Sathnur

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Infrastructure 1	Real Estate Concerns	5
Industrial Infrastructure 2	Geology/topography	7
Industrial Infrastructure 3	Water Supply	7
Industrial Infrastructure 4	Drainage & Sewerage	7
Industrial Infrastructure 5	Electric Power Supply	6
Industrial Infrastructure 6	Telecommunications	6

Observations and Future Potential

- (a) About 400 ha., or 30 per cent of the total development area (1,300 ha.) is held by the state authority. Land acquisition costs are less compared to other candidate sites.
- (b) As yet, there appears that there have not been any consultations with regional residents regarding an IMT in this area. Also, compensation costs for relocation efforts are not defined.

- (c) Geologic and topographical conditions indicate for 20 meters variation radius gentle sloping hills at a maximum elevation of 760 meters. There are no geologic restrictions for industrial development.
- (d) Water supply systems, sewerage treatment facilities, telecommunications lines and accessibility, and electric power supplies mirror the conditions observed for Bidadi. Extension of the main water supply would be relatively inexpensive compared to Bidadi, as the main water pipe passes through the candidate site.

(3) Gurgaon

The parameters and factors evaluation results are as follows:

Factor Variables	Variable Definition	Weighted Ranking
Industrial Infrastructure 1	Real Estate Concerns	8
Industrial Infrastructure 2	Geology/topography	8
Industrial Infrastructure 3	Water Supply	8
Industrial Infrastructure 4	Drainage & Sewerage	7
Industrial Infrastructure 5	Electric Power Supply	7
Industrial Infrastructure 6	Telecommunications	7

Observations and Future Potential

- (a) The site has a potential development area from 500 to 1,000 ha., according to the pilot project requirements per reports by Haryana State officials. Consultations with residents have occurred, and a consensus appears to be in favor of the IMT project. However, compensation and relocation expenses have not been formally discussed, and land acquisition was not implemented at the time of this report.
- (b) The site is at an elevation of 240 m., and the land is generally flat with a 10 meter variation. There are no geologic restrictions that would hamper industrial development.
- (c) Water supplies are sourced from a Yamuna River tributary; canal works and a water reservoir is currently under construction. Water

supplies would be sourced from the water reservoir for the candidate site for a 13 km. distance. Also, an elevated water tank would be required at the IMT site.

- (d) Discharged effluent would be used for agricultural irrigation purposes and thus requires construction of a sewerage treatment plant as well as a discharge pumping station to compensate for the site topography.
- (e) Gurgaon is designated as a uninterrupted power service area by the Haryana State government. According to an electricity supply and demand program survey prepared by the state government, in 1995 demand will be 07 per cent greater than available supplies. An independent generating power plant is necessary for the IMT project.
- (f) Telecommunications facilities and lines have a relative advantage compared to the candidate sites in Bangalore. However, present numbers are insufficient and would require expansion of service lines and long distance access to meet the demands of the IMT project development.

10.4.5 Analysis Results by Parameters

Overall evaluations are based on scores derived from the comparative evaluations of the parameters and factors for each of the candidate sites.

The formula for ascertaining an overall evaluation by candidate site is as follows:

$$K_1 \sum_{l=1}^6 \frac{P_l}{5} \times \frac{G_l}{10} + K_2 \sum_{m=1}^4 \frac{P_m}{5} \times \frac{G_m}{10} + K_3 \sum_{n=1}^7 \frac{P_n}{5} \times \frac{G_n}{10} + K_4 \sum_{o=1}^6 \frac{P_o}{5} \times \frac{G_o}{10}$$

where:

K = weighted scores by parameter group K1 (= 25) + K2 (= 25) + K3 (= 25) + K4 (=25) = 100

P = weight by each parameter (P1 +Pn = 5.0)

G = Evaluated score by parameter (1 ~ 10 score)

l, m, n, o = Each parameter from K1 to K4.

The overall evaluation scores are as follows and illustrated in the radar charts.

Table 10-2 Overall Evaluation Results

Candidate Site	Score	Ranking	Illustration
Bidadi	64.9	2	Refer Fig. 10-2
Sathnur	60.6	3	Refer Fig. 10-3
Gurgaon	73.7	1	Refer Fig. 10-4

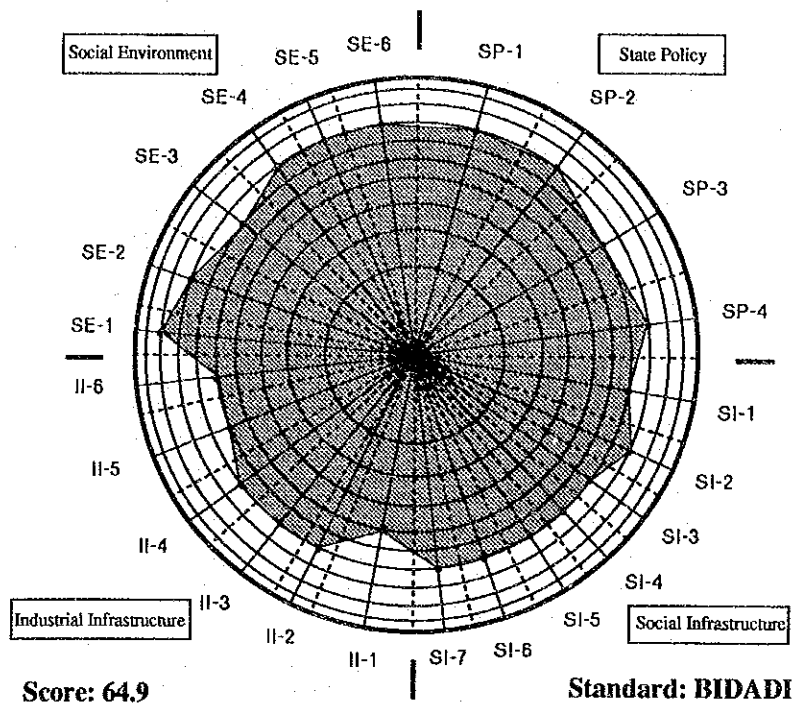


Figure 10-2 BIDADI: Evaluation Chart (Standard)

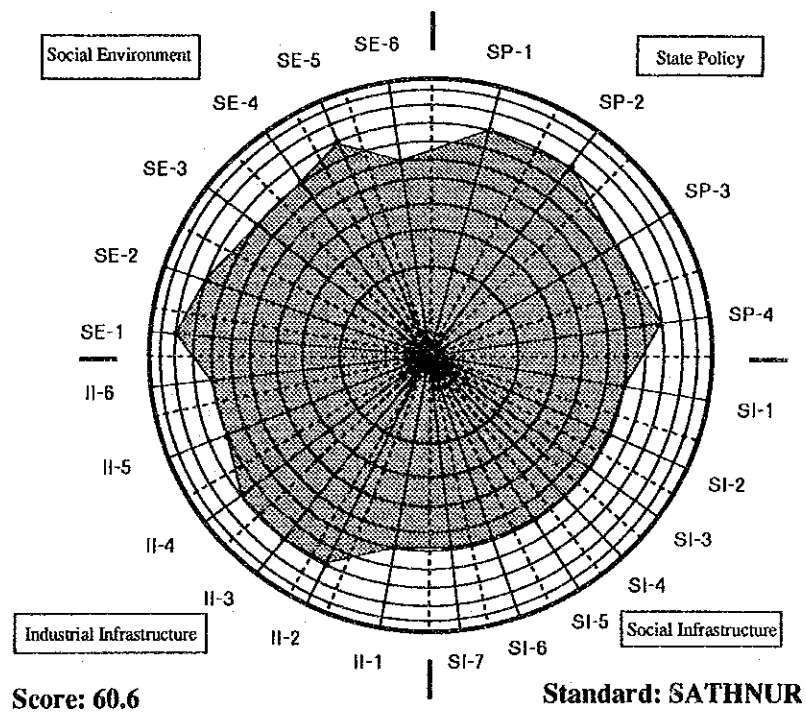


Figure 10-3 SATHNUR: Evaluation Chart (Standard)

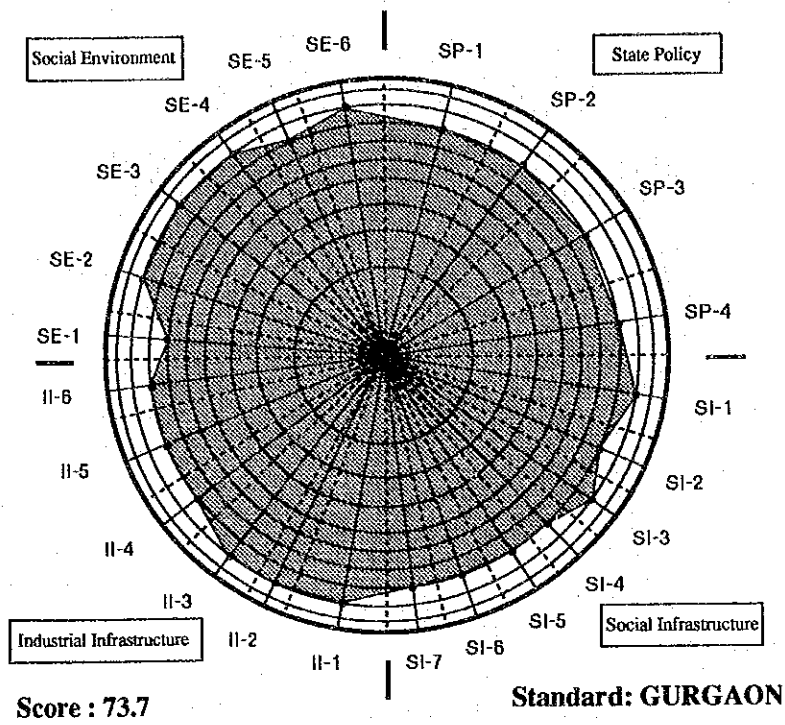


Figure 10-4 GURGAON: Evaluation Chart (Standard)

10.4.6 Variation Analysis

Baseline analyses were described in the previous section, and it was shown that weighted scores for the four group factors were treated as equal (K1 ~ K4).

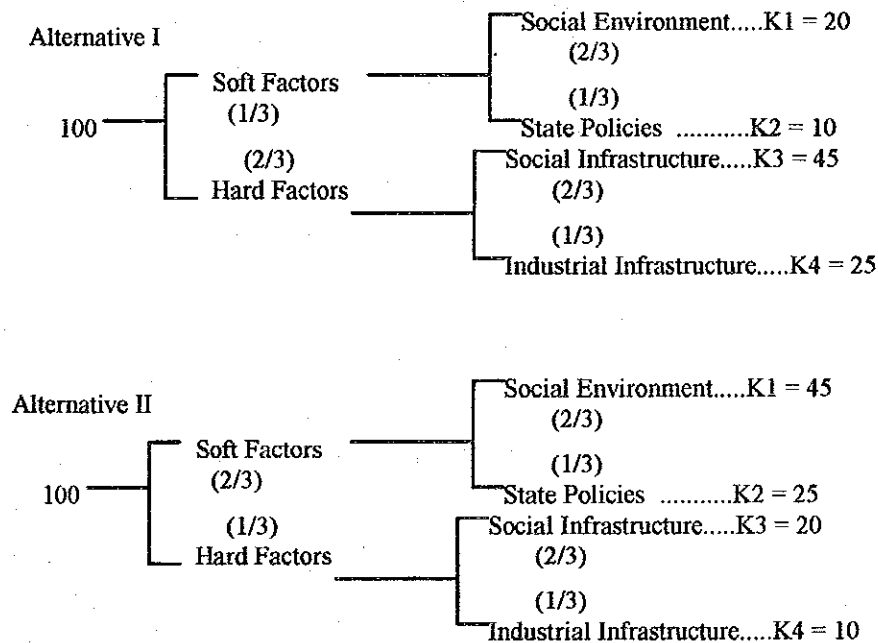
The following section will utilise two alternative analyses to validate the findings of the baseline analysis regarding the variance of weighted scores for the group factors.

Alternative I : Difference in weighted scores for the four group factors are due to central and state government expenditure levels for infrastructure requirement costs.

Alternative II : Differences in weighted scores are due to investors' requirements and perceptions regarding the social environment and state policies.

Differences in weighted scores for the Soft Factors (two group factors) and the Hard Factors (Remaining two group factors) are divided in 3 : 7. The distribution ratio of

K1 ~ K4 is as follows:



The results of the Alternative I and Alternative II analyses are presented below for the three candidate sites.

Table 10-3 Results of Alternative Analysis

Candidate Site	Alternative I	Alternative II
Bidadi	63.6	66.4
Sathnur	57.4	61.6
Gurgaon	74.0	74.0

- (1) For the Alternative I analysis, the scores for Bidadi and Sathnur are less than the scores for the baseline analysis. Development priority for both candidate sites appear to be low if expenditure levels for infrastructure requirement costs are considered.
- (2) For the Alternative II analysis, the scores for Bidadi and Sathnur are higher than the baseline analysis scores. Development priority for the candidate sites appears to be higher if investors' requirements and perceptions are considered.
- (3) For Gurgaon, the scores were consistently higher and demonstrated no differences between the two alternative analyses.

10.5 Site Selection Recommendations

The evaluation for the three candidate sites for an industrial model town is illustrated in the evaluation charts from the perspective of social environment, state policy, social infrastructure, and industrial infrastructure. The evaluation results based on the study parameters and comparison table findings which indicated the rankings of each candidate site, allowed for recommendations regarding site selection priority and comprise the overall guiding concepts of the successful implementation of an industrial model town in India.

- (1) Gurgaon (Ranked First in the Secondary Evaluation)

Regional maturity, adequate access to the site and surrounding areas, free of planned development designs, and ranked first in the Secondary evaluation analysis, were deciding factors in the selection of Gurgaon as the first priority site for development of an IMT in India.

(2) Bidadi (Ranked Second in the Secondary Evaluation)

Although Bidadi has not developed regional maturity, the eagerness of the state government to promote development and provide investor incentives, accessibility to Bangalore and the geologic record findings, are the rationale for selecting Bidadi as the second priority site for the development of an IMT in India.

(3) Sathnur (Ranked Third in the Secondary Evaluation)

The present evaluation of Sathnur considered the level of infrastructure because the first site development must seriously consider time factors and infrastructure development costs (Note: according to the results of the investment demand survey, there are indications that there will not be enough investors to completely occupy the three candidate sites). Although regional maturity and the general conditions of the Sathnur site are not at levels that can be recommended as a priority site selection, overall indications suggest that long term potential for this area's development is a possibility after establishment of general concepts in the region.

(4) NOIDA (Primary Evaluation Exception)

NOIDA should develop according to the NOIDA Master Plan which is well-planned and based on clear concepts. And recommend that foreign investors be introduced to refer to this Master Plan study's findings.

CHAPTER 11 INDUSTRIAL MODEL TOWN CONCEPTUAL DESIGN

CHAPTER 11 INDUSTRIAL MODEL TOWN CONCEPTUAL DESIGN

11.1 IMT Development Premise

(1) Basic Development Strategy

A general flow diagram of the IMT development premise is depicted in Figure 11-1 below.

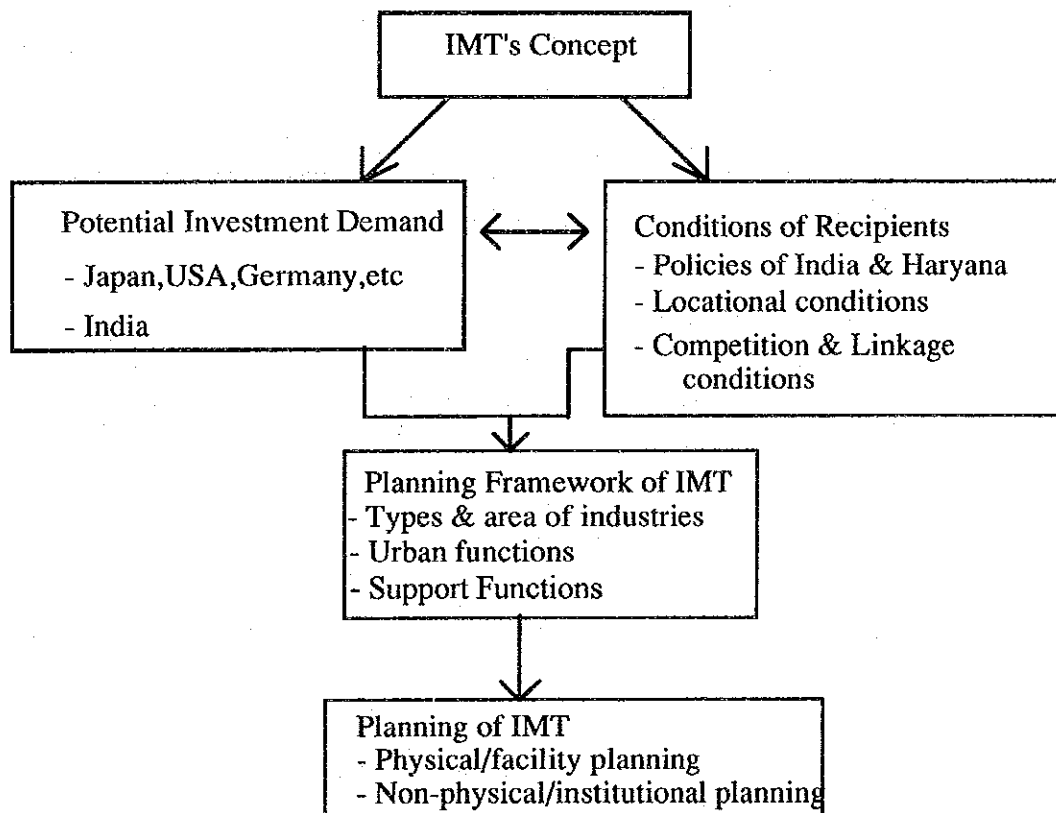


Figure 11-1 Flow Diagram of IMT Conceptual Design

- (a) To improve Indian technology through technology transfers based on the introduction of foreign investment and develop more local support industries.
- (i) To improve investment climate through development of soft factors (institutional) and hard factors (physical conditions) in relation to industrial production and social environment aspects for promotion of foreign investment.

- (ii) To strengthen industrial linkage between IMT industries and local enterprises, the IMT should not become an isolated industrial zone (which export processing zones tend toward).
 - (iii) To strengthen linkages with domestic enterprises, industries with strong associations with other industries should have highest priority.
 - (iv) Technical support functions should be established to strengthen industrial linkages.
 - (v) Industries locating to the IMT should be correlated with existing industries and local available technologies.
 - (vi) Foreign and domestic industries should locate in the IMT as a multinational complex to enhance industrial linkages.
- (b) Domestic market-oriented and import substitution industry
- (i) Priority should be given to develop industries with greater prospective domestic market demand.
 - (ii) Priority should be given to import substitute industry.
 - (iii) The IMT should not become an export-oriented industrial zone such as EPZs or EOUs.
- (c) To establish a base for future export promotion as there is not any immediate plan for export orientation.
- (d) Industrial pollution-free, environmental conservation model
- (i) Polluting industries can be located with adequate prevention measures.
 - (ii) Promotion of production for pollution control and environmental protection equipment and the development of conservation technology.

(2) Gurgaon Development Conceptions

Future development conceptions regarding Gurgaon and the future IMT site are referred to in the "National Capital Region Plan, 2001", which describes Gurgaon as an independently developing city. However, the IMT project site is located at the foothills about 20 kilometers from the centre of Gurgaon City, and is used for agriculture. A development plan should consider the location conditions and the NCR Plan. The NCR Plan and the future plan of Gurgaon City, is shown in Fig. 11-2 and 11-3.

