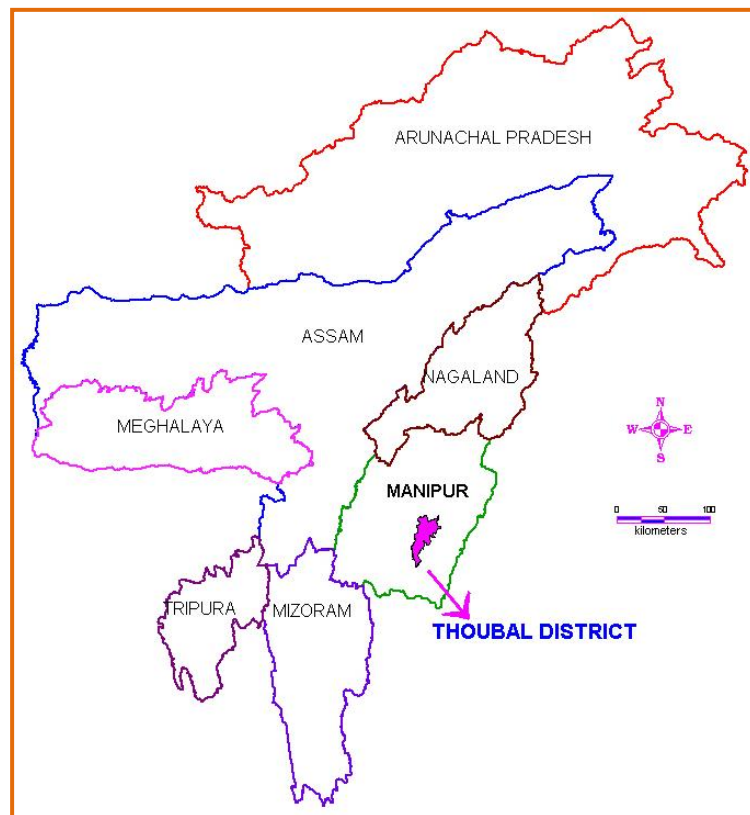




# Ground Water Information Booklet Thoubal District, Manipur



**Central Ground Water Board**  
North Eastern Region  
**Ministry of Water Resources**  
Guwahati  
September 2013



		of Eocene age. Alluvium consisting of sand, gravel, pebble, silt and clay, occur in major portion of the district.
9.	<p><b>HYDROGEOLOGY</b></p> <p>i) Major water Bearing Formations</p> <p>ii) Pre-monsoon Depth to Water Level (existing CGWB data)</p> <p>iii) Post-monsoon Depth to Water(CGWB)</p> <p>iv) Long term Water Level Trend in last 20 yrs in m/yr</p>	<p>Alluvium of Recent age constitutes the major aquifer of moderately thick unconfined to semi-confined multilayered aquifer system up to the depth of 100 m bgl. The yield varies from 10-30 m<sup>3</sup>/hr with drawdown of 10 – 15 m. Depth to water level varies from 1.49 to 5.98 mbgl. Sometimes, artesian conditions also prevail in the area. Ground water is restricted to secondary porosity in weathered, jointed/fractured sandstone, shale and limestone of Disang Group of Eocene age.</p> <p>3 - 4 mbgl</p> <p>1.0 - 2 mbgl</p> <p>No significant rise / fall is observed.</p>
10.	<p>Ground Water Exploration by CGWB as on <b>31.03.2013</b></p> <p>i) No. of wells drilled</p> <p>ii) Depth range in m bgl</p> <p>iii) Discharge in lps</p> <p>iv) Transmissivity (m<sup>2</sup>/day)</p>	<p>No exploration was carried out in the recent years.</p> <p>i) Existing exploratory data of CGWB is 9 in the district (2 EW: abandoned)</p> <p>ii) 45.0 – 103.3</p> <p>iii) 0.3 – 10.19 with Drawdown of 3.42-14.5 m</p> <p>iv) 43.0 – 255.5</p>
11.	<p><b>GROUND WATER QUALITY</b></p> <p>i) Presence of Chemical Constituents more than Permissible Limit (e.g. EC, F, Fe, As)</p> <p>ii) Type of Water</p>	<p>Ground water is generally suitable for all purposes.</p> <p>Good</p>
12.	<p><b>DYNAMIC GROUND WATER RESOURCES ( as on March 2009) in mcm</b></p> <p>i) Annual Replenishable Ground Water Resources</p> <p>ii) Net Annual Ground Water Draft</p> <p>iii) Projected Demand for Domestic and Industrial Use up to 2025</p> <p>iv) Stage of Ground Water Development</p>	<p>i) 112.78</p> <p>ii) 1.01</p> <p>iii) 11.29</p> <p>iv) 1.0%</p>
13.	<p><b>AWARENESS AND TRAINING ACTIVITY</b></p> <p>i) Mass Awareness Programmes Organized</p> <p>ii) Date</p> <p>iv) Place</p> <p>v) No of Participants</p>	<p>Nil</p>

14.	<b>EFFORTS OF ARTIFICIAL RECHARGE AND RAINWATER HARVESTING</b> i)Projects Completed by CGWB (No & amount spent) ii)Projects Under technical Guidance of CGWB (Numbers)	Nil  Nil
15.	<b>GROUND WATER CONTROL AND REGULATION</b> i) Number of OE Blocks ii) Number of Critical Blocks iii) Number of Blocks Notified	Nil
16.	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES</b>	i) Problems related to ground water are negligible in the district.  ii) Flood is a primary natural hazard in the area during monsoon season. Flash flood occurs almost every year during rainy season due to poor drainage condition. The primary causes of flood are heavy runoff and less infiltration in degraded watersheds in the upper reaches of the rivers during rainy seasons in the valley.

## **GROUND WATER INFORMATION BOOKLET THOUBAL DISTRICT, MANIPUR**

### **1.0 Introduction**

Thoubal district which occupies the larger portion of the eastern half of the Manipur valley, takes the shape of an irregular and triangular with its base facing the north. It lies between 23° 45' N and 24°45' N latitudes and 93°45' E and 94°15' E longitudes. It is bounded on the north by Imphal district, on the east by Ukhrul and Chandel districts, on the south by Chandel and Churachandpur districts and on the west by the districts of Imphal and Bishnupur. It has an area of 514 sq. km. as per the Surveyor General of India (Plate-1). Its average elevation is not very much different from the rest of the Manipur valley which is about 790 m on an average above mean sea level (AMSL). Although, the district is a part of the valley, the area of the district is not entirely plain. Many rivers flow through the district and many lakes dot its surface. Most of the lakes in Manipur, with the exception of Loktak, are in this district. The State of Manipur used to supplement its meager resources from the annual lease of the lakes in the past.

Although, little is known about its ancient history, the district has seen in recent past many bloody and disgraceful battles. Through the district runs an international road that leads to Myanmar (Burma) via Moreh and Tammu and this road is, in the days before the independence of India, the route of many military expeditions and counter-expeditions by the forces of Manipur and Burma, and later on, by that of the British Government. It is in this district, at Khongjom, that the last battle of the independence of Manipur was fought in April, 1891 by a few and ill-equipped soldiers of Manipur against the might of the British Empire where the sun does not set, as the saying goes. It is not just an irony of the fate that Major Paona Brajabashi and others would meet their last days in this battle. The battle symbolizes the honourable deed of an extreme sacrifice for his motherland, knowing well that the fight would mean sure defeat.

Among the natural calamities that had occurred in the past, mention may be made of the serious cholera epidemics of 1931 which took a heavy toll of the district population. Although the epidemic is widely spread throughout the Manipur valley it is felt in the district.

The district came into existence in May, 1983 through a notification of the Government of Manipur, (Secretariat: Revenue Department Order No.6/1/73-R (Pt.VII)

dated May 24, 1983) (Manipur Extraordinary Gazette No. 76 of the same date) under the Manipur Land Revenue and Land Reforms Act. 1960. By the said notification, Thoubal sub-division of the erstwhile Manipur Central District (now Imphal district) with all its administrative units was transferred to form a new district under the name of Thoubal with its headquarters at Thoubal. Later, in November, 1983, Thoubal was bifurcated into Thoubal and Kakching sub-divisions comprising of Kakching and Waikhong Tahsils with all their existing villages ( Manipur Gazette Extraordinary No. 343 dated November, 25, 1983 ), the headquarters of Kakching sub-division being Kakching.

The district has two community development blocks one within each sub-division, each block coinciding with its respective sub-divisional areas minus the statutorily notified urban portion. It has 9 main towns. namely, Lilong ( Thoubal ), Thoubal, Yairipok, Shikhong Sekmai, Wangjing, Heirok, Kakching, Kakching Khunou and Sugnu and a part of Samurou whose major portion is in the Imphal District. Thoubal and Kakching are municipalities.

Thoubal is the district headquarters of Thoubal district and also the sub-divisional headquarters of Thoubal sub-division. It is situated at a distance of 22 km. from Imphal. The National Highway No. 39 divides the town almost into halves from North to South length-wise. The Thoubal River flows through the centre of the town from East to West. It is the biggest town in the district and is one of the most important trading centres of the district. The town has all the infrastructures of a fast developing urban area.

## **2.0 Physiography, Drainage and Lakes**

The district is dotted by a few hillocks and hills of low heights namely Khekman range (part only), Mantak, Kwarok and Thongam Mondum-Punam. Of these, Punam hill has an elevation of 1,008.9 m AMSL. Geologically, Khekman range belongs to the Disang Group. Once upon a time, good vegetation covered these hills. But constant deforestation has made them barren and unattractive. As the pressure on land increases with rapid increases in population, there has been a tendency in recent years to use the hills sites for better productive plantation, especially pineapples.

Important rivers that flow through the district are the Imphal and the Thoubal Rivers. The Thoubal River originates in the hill ranges of Ukhrul and is an important tributary of the Imphal River. On its course, it passes through Yairipok and Thoubal before joining the Imphal River at Irong near Mayang Imphal. The Imphal River rises in the hills of Senapati district and flows towards the South. It forms the boundary demarcating line of Thoubal district on its North and the West. During the dry seasons, these rivers are lean and thin but, during the rainy monsoon periods, these rivers are very wild and frequent floods cause widespread damage to the paddy fields, property and life. These rivers were once good means of transport for valuable merchandise. Other rivers in the district are the Wangjing, the Arong and the Sekmai. These rivers originate in the hills of Ukhrul district. The Arong River flows through Khangabok and falls into Kharung Pat. The Wangjing River flows towards West via Heirok and Wangjing before joining the Loushi Pat. With the advent of cheap and faster means of road transport, these rivers no longer serve as routes of transportation of goods. Still, they provide good building materials in the form of sand, pebbles and boulders and a means of livelihood for a large number of people inhabiting along their courses.

The south-western portion of the district is a low-land forming a part of the Loktak Lake region and this area has a number of shallow and rain fed lakes, the important ones being Kharung, Ikop, Pumlun, Lousi and Ngangou. In the northern portion, there is Waithou Lake formed by the drainage waters sandwiched between Waithou hill on the West and the villages and paddy fields on the East. Due to constant siltation and reclamation of vast areas for agricultural purposes, the lakes are gradually shrinking in size and at present, some of them are only in name sake. These lakes drain into the Imphal River. They provided very good fishing ground for a variety of fishes in the recent past.

### **3.0 Rainfall and Climate**

Rainfall is relatively abundant and widespread in the district. The rainy season starts in June with the onset of the south-west monsoon and last up to September. Intermittent rains continue even up to October along with the retreat of the monsoon. As in the rest of the State, the district is also under the effect of the so-called 'vagaries of the monsoon' with the alternating droughts and floods. During the rainy season, the rainwater in the hills quickly flow down to the valley and all the rivers and small streams rises up to

the full brim, frequently flooding its embankments. As the lakes became full, the low lying areas around them are easily amenable to flood. Drainage is slow and takes a long time. The only centre which records authentic meteorological records in the district is the Rice Research Centre, Wangbal. Rainfall recorded there in 1989 is 1306.80 mm as against a mean annual rainfall of 1318.39 mm during 1983-89. For the sake of comparison with its neighboring Imphal district, the corresponding figures recorded in the State Mechanized Farm at Lamphelpat (Imphal) are 1391.20 mm and 1243.50 mm respectively.

On the whole, the district has an equitable and pleasant climate. The summer months are never oppressive with the average maximum temperature fluctuating between 32°C and 35°C during April-June. The mercury seldom goes beyond 37°C. In December-February, with the start of the cold winter months, the average minimum temperature falls to 6°C to 4°C. Sometimes, the temperature falls below 0°C. The cold season lasts from December to February. During the winter months, light rainfall occurs under the influence of the North-East monsoon. March and October are by far, the most pleasant months in the year. April and May are summer season followed by occasional thunder storms. Of late, some changes in the climate calendar in the state are observed which some expert meteorologists attribute the causes mainly due to deforestation in the hills surrounding the valley.

#### **4.0 Geomorphology and Soil Types**

Thoubal district occupies the larger portion of the eastern half of the Manipur Valley. It is virtually a flat alluvium filled valley. The Valley is surrounded in eastern sides by hill ranges of denude-structural hills trending NNE-SSW direction. A number of isolated hillocks of denudational remnants are found within the valley. Imphal River and its major tributaries constitute the main drainage of the valley. These rivers have a nearly NNE-SSW trend concurring with the regional structural trend. This valley portion is a part of Manipur Valley which is made up of alluvium of fluvio-lacustrine origin. These are usually dark grey to black in colour. The principal constituents are sand, gravel, pebbles, boulders, silt and clay. The hillocks inside the valley are basically composed of Disang shale.



Residual and transported types of soils have been observed in this area. The residual types of soils are occurring mainly in the hilly areas. The soils are deficient in nitrogen, in general, it contains fair amount of phosphorous, potassium and other nutrients for plant. The soils of both valley and hill regions are acidic in nature. Sandy and clay loams are found to occur in some parts of the area. Sandy loams are characterized with less water holding capacity and possess excessive internal drainage while the clay loamy soils possess excessive water holding capacity and impede internal drainage.

## 5.0 Geological Set Up

Table 1 Geological Succession of Rocks Occurring in Thoubal District

Recent To Sub-Recent	Recent Alluvium composed of sand, gravel, pebble, silt and clay
Lower & Middle Eocene to Disang Group } Upper Cretaceous	Sandstone, minor buff coloured shale, grit, conglomerate & Limestone Sandstone buff coloured shale & limestone, siliceous Grey shale with minor mudstone, siltstone, siltstone & sandstone

### Alluvium

Alluvium of fluvio lacustrine origin covers major areal extent in the district. These are mainly sand, gravel, pebble, silt and clay, dark grey to black in colour. Average thickness of the granular zones in alluvium to be tapped by tube wells varies from 11 to 30 m within the depth range of 79.3 to 115.9 m bgl.

### Disang Group

The hillocks inside the valley are basically composed of Disang shale of Eocene age. The Disangs are dark grey to black splintery shales. The term Disang was first introduced by Mallet (1876). They are usually thinly laminated, intercalation of siltstone and fine grained sandstone in the form of lensoids and bands. Based on the nature and litho-character, the Disangs are found to be flysch sediments.

## 6.0 Hydrogeomorphological Units

Hydrogeomorphological units (Plate-3) observed in the district area are as follows.

- 1) Alluvial plain
- 2) Denudo-structural hills

- 3) Piedmont zone
- 4) Water Body
- 5) Marshy Land

### **Alluvial Plain**

Alluvial plain covers small areal extent in the valley, consisting of sand, gravel, pebble, silt and clay.

### **Denudo-Structural Hills**

A group of hill ranges surrounding the valley are formed due to different erosion and weathering processes. This zone is characterized by very close space linear strike parallel ridges and intervening narrow valleys, in association with lineaments, fracture, fold patterns, cuestas etc. They trend in NNE-SSW direction and mostly occupy in the eastern parts of the district.

### **Piedmont Zone**

Piedmont zone is a gently sloping area situated in between hills and plains which are found in the eastern portion of the district. This zone consists of sand, gravel, pebbles and boulders.

## **7.0 Ground Water Scenario**

### **7.1 Hydrogeology**

Major part of the area is underlain by alluvium of Recent to Sub-Recent age consisting of sand, gravel, pebble, silt and clay (Plate-2). Ground water occurs under unconfined to semi-confined condition. Depth to water level varies from 3 to 4 m bgl during pre-monsoon period and 1.0 to 2.0 m bgl during post monsoon period. Multilayered aquifers occur up to the depth of 100 m bgl. The yield varies from 10-30 m<sup>3</sup>/hr with drawdown of 10 – 15 m. Sometimes, artesian conditions also prevail in the area. Exploration in the district reveals that the drilling depth of tube well varies from 45.0 – 103.3 m bgl. Transmissivity varies from 43.0 to 255.5 m<sup>2</sup>/day.

National Hydrograph Stations of CGWB in Thoubal district that are regularly monitored prior to 1991. **No monitoring work has been carried out since 1991 due to disturbed law and order situation in the state.**

### **7.2 Ground Water Resources**

Computation of Dynamic Ground Water Resources has been carried out in the district as per GEC '97 as on March 2009. **The Administrative district has been considered as the**

**Assessment Unit due to paucity of block –wise data.** Annual Replenishable Ground Water Resources is 112.78 mcm. Net Annual Ground Water Draft is 1.01 mcm. Projected Demand for Domestic and Industrial Use up to 2025 is 11.29 mcm. Stage of Ground Water Development estimated is 1.0%. All the blocks have been categorized as ‘Safe’.

### **7.3 Ground Water Quality**

Chemical constituents like pH, EC, TDS etc are within the permissible limit. Hence, ground water is suitable for domestic, agriculture and industrial purposes. Here, brine springs are of some significance. These springs are found along the foothills on the eastern part of the valley. Water from these springs is boiled and salt is extracted by the method of evaporation.

Important places where brine springs are found are Waikhong, Sikhong, Chandrakhong, Ningel etc.

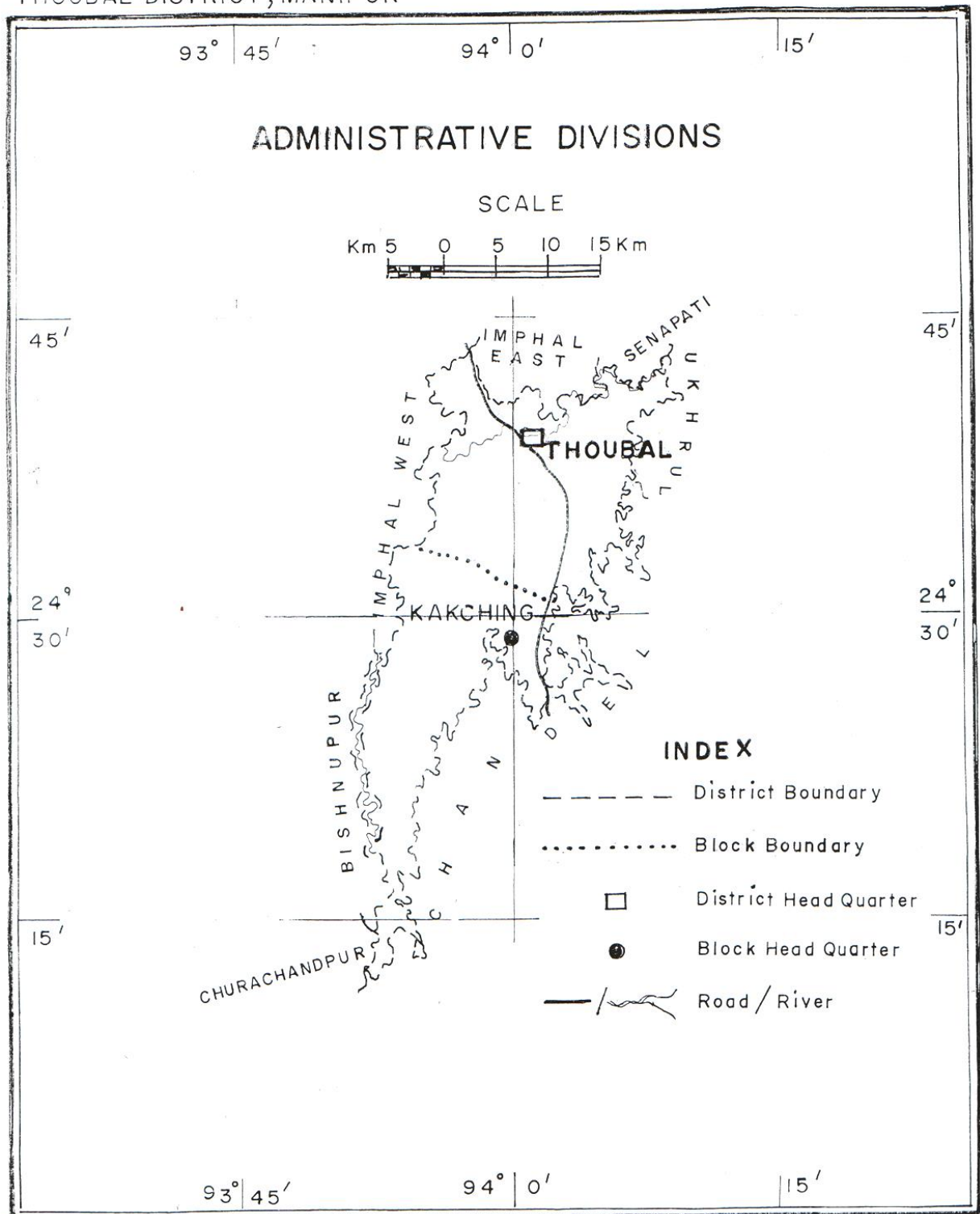
### **8.0 Ground Water Related Issues and Problems**

As such, there is no ground water related issues in the area. Flood is a primary natural hazard in the area during monsoon season damaging the crops and properties of the people. Flash flood occurs almost every year during rainy season due to poor drainage condition. The primary causes of flood particularly in the valley are heavy runoff and less infiltration in degraded watersheds in the upper reaches of the rivers during rainy seasons.

### **9.0 Recommendations**

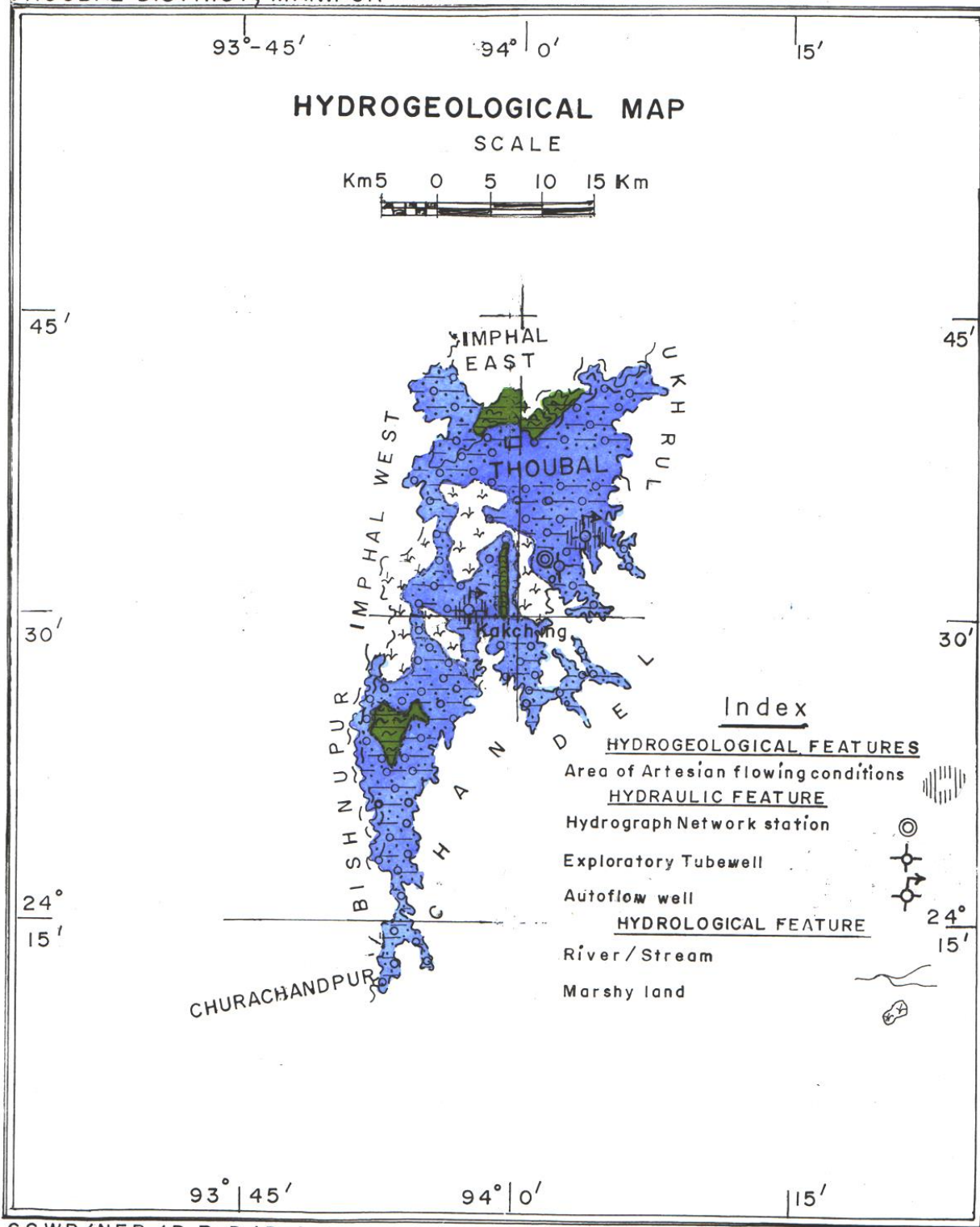
The area occupies the larger portion of the eastern half of the Manipur Valley and is geologically occupied by alluvium and Disang Group of rocks of Eocene age. Based on the local hydrogeological settings, dug well and tube well are best suited ground water abstraction structures. Tube wells may be constructed down to the depth of 100 m bgl tapping 12-30 m thick granular zone.

THOUBAL DISTRICT, MANIPUR



CGWB/NER/B.B.DEVI/D.O.NO-5386/2008





THOUBAL DISTRICT, MANIPUR



CGWB/NER/B.D.D/D.O.NO-5466/2008

THOUBAL DISTRICT, MANIPUR

**LEGEND**

AGE	FORMATION	LITHOLOGY		HYDROGEOLOGICAL CONDITION	GROUND WATER PROSPECTS	
UN-CONSOLIDATED	QUATERNARY	Recent Alluvium	Sand, gravel, pebbles, silt and clay.		Moderately thick unconfined to semi-confined multilayered aquifer system within the drilled depth of 100 m.	Moderate yield prospects of 10-30 m <sup>3</sup> /hr. at 10-15m drawdown 
	EOCENE	Disang	Hard and compact sandstone, shale and limestone.		Ground water restricted to secondary porosity in weathered residuum, joints, fractures and fissures.	Mostly run-off zone Low yield prospects restricted to intermontane valleys. 

THOUBAL DISTRICT, MANIPUR

