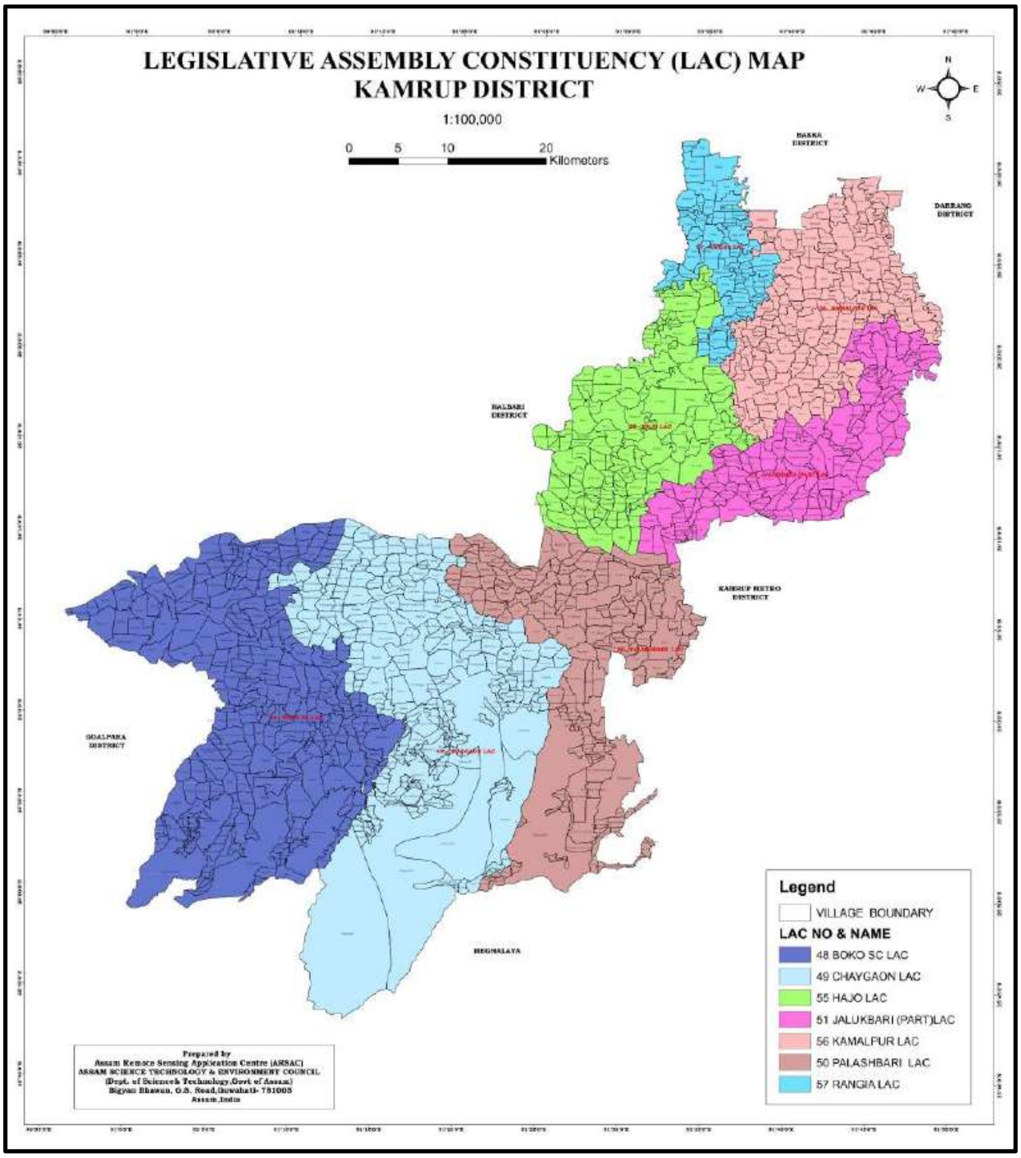
DISTRICT SURVEY REPORT(Draft)

KAMRUP DISTRICT, ASSAM



Prepared by:

OFFCE OF THE DISTRICT COMMISSIONER

KAMRUP DISTRICT

GOVERNMENT OF ASSAM

C O N T E N T

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Acknowledgements:

1) Ground Water Information Booklet Kakrup and Kamrup Metro District, Assam, CGWB, N-E Region, Ministry of Water Resources, Guwahati, 2013

2) Acharya, S.K. and Ghosh, S.K. (1968): Geology and Coal resources of Siju Coalfield (eastern part) Garo Hills District, Assam. Rep. F.S. 1967 - 68.

4) De, A. K and Boral, M. C. (1978): A note on the Singsimani (Hallidagganj) area, Garo Hills, Meghalaya, Geol. Surv. Rep.

5) Fox, C.S. (1934): The Lower Gondwana Coalfields of India. Mem. Geol. Surv. Ind. Vol. 59, pp. 1 - 386.

6) Mathur, L. P. and Evan, P (1964): Oil in India, Int. Geol. Cong, 22nd Session India, 1964

7) Satellite Imagery Studies on Secondary Data

8) Sustainable Sand Mining Management Guidelines, 2016

9) Enforcement & Monitoring Guidelines for Sand Mining, 20

1.0 Introduction

According to MoEF&CC Notification No.125 (Extraordinary, Part II Section 3, Sub-section (ii),S.O.141(E) dated 15thJanuary 2016, it is mandatory to have District Survey Report (DSR) for Mining of Minor Minerals. This will ensure environmentally sustainable mining for minor minerals under close supervision of district authorities. A detailed procedure and format for preparation of District Survey Report (DSR) has been discretely discussed under Para 7(iii)(a) and Annexure (x) of the Notification issued by Ministry of Environment, Forest and Climate Change, Government of India on 15th January 2016.

As per MoEF&CC Notificatioin dated 25th July 2018, preparation of DSR requires both primary and secondary data generation. District Survey Report will cover General information of the district, Demography, Geomorphology, Topography, Forest and Agricultural information, Climate and Rainfall conditions, Land Use pattern, calculation of total amount of replenishment, details of Royalty and revenue received in last three years etc. etc.

Mineral wise District Survey Report must be prepared in every district for Sand mining / River bed mining and other minor minerals mining in order to obtain Environment Clearance.

The main purpose of preparing the district survey report. Identification of areas of aggradations or deposition where mining can be allowed and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area".

The District Survey Report (DSR) will contain mainly data published and endorsed by various departments and websites about Geology of the area, Mineral wealth details of rivers, Details of Lease and Mining activity in the district along with Sand mining and revenue of minerals.

1.1 The process involved in the preparation of DSR

A. Collection of Baseline Data from the Districts.

B. Development of related maps from satellite and secondary sources

C. Understanding river flows and sedimentation vis-a vis sand mining

D. Tabulation and mapping of existing sand / gravel mining locations and yield

E. Correlation with satellite data for pre and post monsoon sand MM yield

F. Suggesting new locations for sand and other MM approval

G. To design and prepare DSR as per MoEF guidelines

H. Interaction with line department for data / document ownership

G. Draft DSR in to be kept in public domain for 21 days including public consultation.

1.1a Objective of DSR

1) Identification of areas of aggradations or deposition where mining can be allowed.
2) Identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited.
3) Calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.
4) To balance development and environment.

1.2 Methodology of DSR preparation |

Step 1 : Identification of Date Source ….

DSR has been prepared on the basis of Primary data base and Secondary data base collected from various sources. This is a critical process in order to identify the authentic data sources prior to collation of data set. Sources of secondary data used in this DSR are mostly data published by the State government and district census in 2011. Mining lease and revenue generated from minor minerals have been prepared on the basis of available data from the DFO office of the district.

Step 2 : Data analysis and Preparation of Maps……

DSR involves the analytical implication of dataset captured during the preparation of report. The principal steps in map preparation involves determination of appropriate classification system through Visual Image Interpretation, selection of samples, Satellite Image pre-processing and accuracy assessment. ISRO RESOURCE has been adapted for supervised classification.

Step 3. Primary Data Collection :

During the preparation of DSR, primary or field data has been collected from the district which involves assessment of the mineral resources in the district by means of pitting and trenching in pre-determined interval. This gave a clear picture about characterization of minerals and their distribution.

Step 4 : Replenishment Study :

Replenishment study is very important in the sense that in case more sediment is removed than the system can replenish, then there will be adverse and severe impact on environment. Physical survey has been carried out in order to define the topography, contours and offsets of the riverbed. Annual replenishment of the riverbed has been calculated using field survey, satellite imagery and empirical formula. The study was carried out on existing mine leases and an approach of direct measurement methodology was adapted. The depth and area of mining leases are measured through GPS/ Total Station just before the closure of the mines during pre-monsoon period and the same area was resurveyed in the post-monsoon period.

Step 5 : Preparation of Report :

The DSR clearly elaborates the general profile, geomorphology, land use pattern and geology of the district. This report describes the availability and distribution of riverbed sands and other minor minerals in the district and at the same time, includes inventorization of the minerals, recent trends of production of minor minerals and revenue generated from them. Moreover, potential environmental impacts due to mining of such materials, required mitigation measures to be adapted along with risk assessment and hazard management have also been indicated.

2.0 About Kamrup Rural District

Kamrup Rural district or simply Kamrup district is an administrative district in the State of Assam. It was formed by dividing the old Kamrup district into two in the year 2003, other being Kamrup Metropolitan District, named after the region it constitutes. The present district with its headquarter at Amingaon has proved to be an exemplary and model civil district

The area the district covers is about 2740 sq. km. The population of the district, as per the census report of 2011 is also stated to be 1,517,542 with the literacy rate of 75.55%. Kamrup district has 1027 villages, administered under twelve revenue circles.

Historicity of the district is quite significant from time immemorial. The Amingaon area, wherein the present district head quarter stands, was a battlefield wherein the Ahom soldiers resisted Mughal invasions several times. The Ahoms under Lachit Borphukan won Guwahati back from Mughals in September-October 1667. Aurangzeb then appointed Ram Singh of Amber on 13 Rajab/ 19th December 1667 to invade Assam. Ram Singh started his expedition on 27th December, 1667. He travelled through Kuntaghat and reached Sualkuchi in April, 1669. The brave Assamese soldiers under General Lachit Borphukan stood in the way of his plans. Skirmishes between the two sides ensued. On 20 Sravan, Thrusday, Saka 1591 (about 5th August,1669) both sides clashed at Alaboi near present day Dadara, Village-Pacharia in Kamrup District. The Assamese fighting for their motherland inflicted huge losses on the Mughal Army. In the ensuing battle, 10,000 Assamese soldiers sacrificed their lives at the altar of the nation. The sacrifice of the brave Assamese did not go in vain and the Mughal advance was stopped. Further, it inspired the Assamese soldiers, who two years later in 1671 in the Battle of Saraighat delivered a crushing and humiliating defeat on the Mughals.

Kamrup district is important for many historic places like Hajo, Sualkuchi, Chhaygaon, Chamaria, Rangia, Palashbari, Boko and North Guwahati. Hajo is known for many religious shrines like Hayagriba Madhaba Temple, Poa-Macca, Kedar temple, Kameswar temple, Ganesh temple and Kamaleswar temple. Hajo is also known for Dhoparguri Satra, a great vaishnavite shrine established by Madhabdeva. Sualkuchi is known as the Machester of Assam.

Geography and Environment of Kamrup District

Hydrography

In the immediate neighborhood of the Brahmaputra, the land is low and exposed to annual inundation. In this marshy tract reeds and canes flourish luxuriantly, and the only cultivation is that of rice. At a comparatively short distance from the river banks the ground begins to rise in undulating knolls towards the mountains of Bhutan on the north, and towards the Khasi hills on the south. The hills south of the Brahmaputra in some parts reach the height of 800 feet (240 m). The Brahmaputra, which divides the district into two nearly equal portions, is navigable by river steamers throughout the year, and receives several tributaries navigable by large native boats in the rainy season. The chief of these are the Manas, Chaul Khoya and Barnadi on the north, and the Kulsi and Dibru on the south bank.

Flora and fauna

In 1989 Kamrup district became home to the Dipor Bil Wildlife Sanctuary, which has an area of 4.1 km^2 (1.6 sq mi). There is also a plantation where seedlings of teak, sal, sissu, sum, and nahor are reared, and experiments are being made with the caoutchouc tree.

Kamrup is home to one of the few large colonies of greater adjutant storks still in existence. The villagers previously regarded the birds as pests, but outreach efforts including cultural and religious programming, especially aimed at local women, have rallied Kamrup residents to be proud of and protect the storks.

According to the 2011 census Kamrup district has a population of 1,517,542, roughly equal to the West African country of Gabon or the US state of Hawaii. This gives it a ranking of 327th in India (out of a total of 640). The district has a population density of 436 inhabitants per square kilometre (1,130/sq mi). Its population growth rate over the decade 2001-2011 was 15.67%. Kamrup has a sex ratio of 946 females for every 1000 males, and a literacy rate of 72.81%. Scheduled Castes and Scheduled Tribes made up 7.11% and 12.00% of the population respectively.

Religion

Coordinates (Amingaon): 26°20'N 91°15''E	
Division	Lower Assam
Headquarters	Amingaon
Government • **Lok Sabha constituencies** • **Vidhan Sabha constituencies**	Gauhati, Darrang Udalguri Boko,Chaygaon, Palasbari, Hajo, Kamalpur, Rangiya
Area • **Total**	3,105 km^2 (1,199 sq mi)

Population (2011) • **Total** • **Density** • **Urban**	 1,517,542 490/km^2 (1,300/ sq mi) 142,394
Demographics • **Literacy** • **Sex ratio**	 70.95% 914
Time zone	UTC+05:30 (IST)
Major highways	National Highway31, National Highway 37, National Highway127D, National Highway 15
Average annual precipitation	1,400mm
Website	kamrup.assam.gov.in(https://kamrup.assam.gov.in)

The religious composition of the district includes Hinduism (877,495) 57.82% majority, second most popular is Islam numbering (601,784) constituting 39.66% of the region andrest 2.52% include others religions like Sikhism, Christianity, Buddhism, Jainism and indigenous tribal religions according to census 2011 report. The district has people belonging to various indigenous Assamese communities like Keots/Kaibarta, Bodo, Rabha, Tiwa/Lalung, Amri Karbi, Dom/Nadiyal, Koch-Rajbongshi etc.

Religion in Kamrup district (2011)	
Religion	Percent
Hinduism	57.82%
Islam	39.66%
Christianity	2.19%
Other or not stated	0.33%

Religious important places

The district has followers of Hinduism, Islam, Christianity, Buddhism and Animism. The ancient temples of Kamakhya and Hajo attracts many pilgrims from all quarters.[5] The people of Kamrup also donated a sacred Arya Avalokiteśvara statue to Stakna Monastery in Ladakh.

Language

According to the 2011 census, 74.43% of the population spoke Assamese, 19.90% Bengali, 1.86% Garo, 1.41% Boro and 1.17% Hindi as their first language.

Economy

The staple crop of the district is rice, of which there are three crops. The indigenous manufactures are confined to the weaving of silk and cotton cloths for home use, and to the making of brass cups and plates. The chief exports are rice, oilseeds, timber, and cotton; the imports are fine rice, salt, piece goods, sugar, betel nuts, coconuts, and hardware. A section of the Assam-Bengal railway starts from Guwahati and a branch of the Eastern Bengal railway has recently been opened to the opposite bank of the river. A metalled road runs due south from Guwahati to Shillong.

Villages

- Amranga
- Hahara
- Hatipara

3.0 Geology of Kamrup (Rural) district

The Kamrup (Rural) district, situated in the west central part of Assam, has a diverse geology due to its location within the northeastern part of the Indian subcontinent. It lies on the northern edge of the Shillong Plateau and is bordered by the Brahmaputra River to the north. It covers an area of 2740 sq km falling under Survey of India degreesheet no. 78N and 78O with latitude 25°46'N−26°49' N and longitude 91°15'E−91°42'E. It is bordered by Tamulpur District in the north, Goalpara, Nalbari and Barpeta districts in the west and Kamrup Metropolitan and Darrang districts in the east. It shares inter-state boundary with Meghalaya in the south.

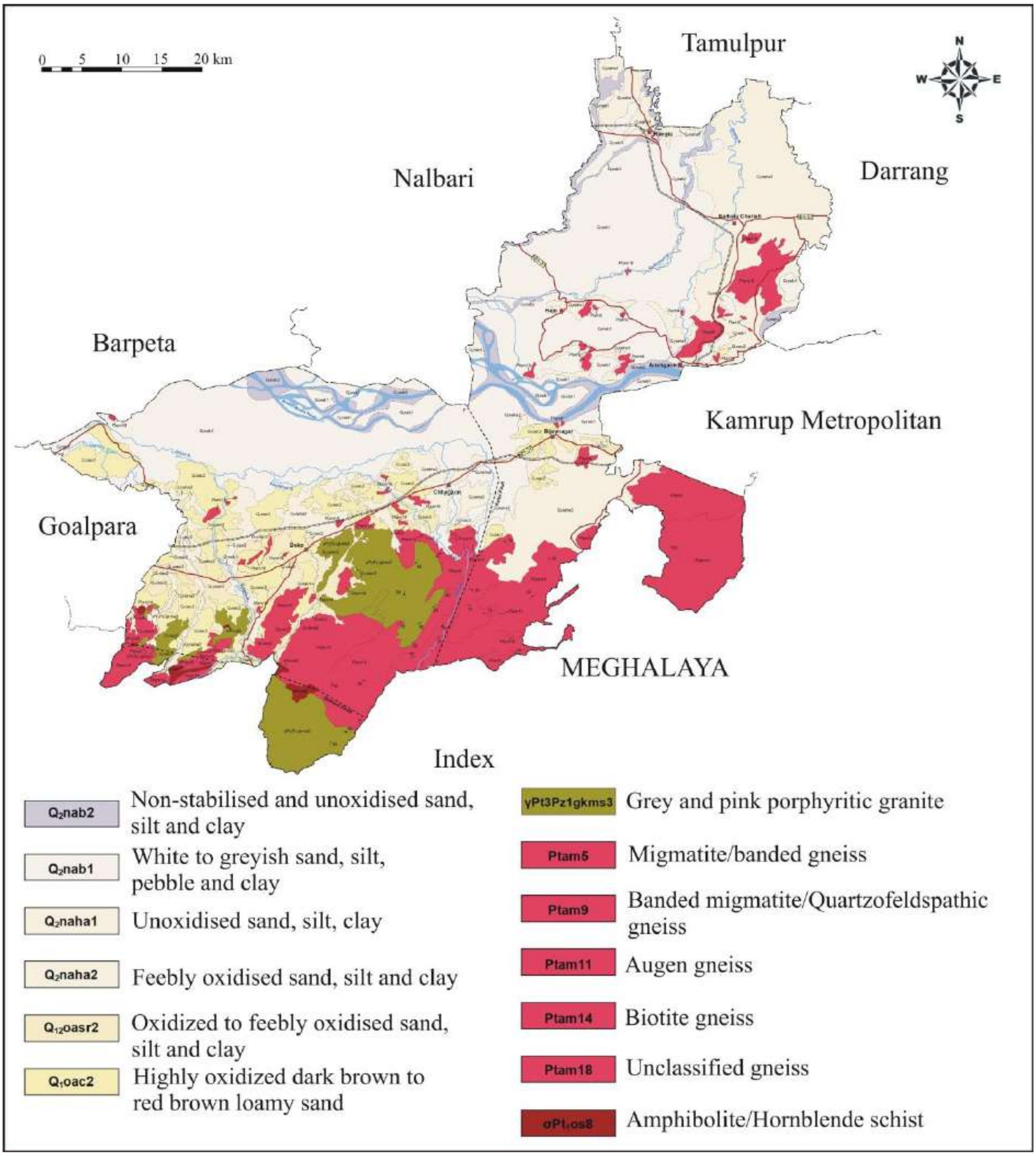

Figure: Geological map of Kamrup Rural district (Source: District resource map published by Geological Survey India, Kolkata, 2024)

Physiographically, the district can be divided into three units; i.e. the hilly region in the south, the alluvial plain in the central and western part and the swampy areas along Brahmaputra plains. The distinguishable geomorphic units are (i) flood plain of river Brahmaputra and its tributaries, (ii) younger alluvial plain which occupies major part of the area, having slightly higher elevation than flood plain, (iii) older alluvium/valley fill, gently sloping plain, having higher elevation than the younger alluvial plain, (iv) piedmont, gently sloping plain along the foothills, (v) inselberg occurs as very small isolated hills, (vi) denudational hills considering of granite, gneissic rocks. Denudational hills cover 16% of the district, including the extension of the Shillong plateau foothills. These denudational hills lie between the rugged terrain hills and the valleys distributed unevenly in the foothill belt in the southern part of the district. The district occupies part of the basin formed by the mighty river Brahmaputra flowing from east to west in the central part of the district. The perennial tributaries like Puthimari, Digaru, Kulsi, Singra, Sessa etc. drain the district and join the River Brahmaputra. Fluvial landforms cover 40% of the district comprising flood plains, alluvial plains, abandoned channels, natural levee etc. Pediment pediplain complex and piedmont alluvial plain covers 14% of the district and the remaining part is covered by rivers and water body.

Geologically, the district consists of lithounits of Archean to Recent age.

The stratigraphic succession of the area as follows:

Age	Group	Formation	Lithology
Recent	Newer Alluvium	Barpeta-II	Non-stabilised and unoxidised sand, silt and clay
		Barpeta-I	White to greyish sand, silt, pebble and clay
Holocene		Hauli	Unoxidised to feebly oxidised sand, silt and clay
Pleistocene to Holocene	Older Alluvium	Sorbhog	Oxidized to feebly oxidised sand, silt and clay
Middle to Late Pleistocene		Chaper	Highly oxidized dark brown to red brown loamy sand
Neoproterozoic to Early Palaeozoic	Granite Plutons		Grey and pink porphyritic granite
---Intrusive contact--			
Archean to Neoproterozoic	Assam-Meghalaya Gneissic complex		Amphibolite, Hornblende biotite schist, Biotite gneiss, Augen gneiss, Banded migmatite, Quartzofeldspathic Gneiss, basic granulite, cordierite sillimanite gneiss, basic (gabbro) dyke, pegmatite.

The Older rocks comprising of hornblende schist represents the oldest lithounit of the district, occur as enclaves within AMGC. Assam Meghalaya Gneissic Complex (AMGC) constitutes the major geological entity in the southern part of the district which are highly metamorphosed and intruded by granites. It comprises of augen gneiss, migmatitic granitoid, biotite gneiss and some unclassified gneiss. Basement rocks of AMGC have been intruded by Neoproterozoic to Early Palaeozoic porphyritic to non-porphyritic granitic plutons. The structural features of the different litho-units observed in the area are foliation, joints and folds. The general trend of the foliation plane in the gneissic rocks is NE-SW with an average dip towards NW as well as SE.

The central and northern parts of the district are covered by quaternary sediments, which have been classified into Older Alluvium and Newer Alluvium groups. Older Alluvium sediments are present in the high-level terraces whereas the Newer Alluvium forms as low-level terraces within the flood plain areas. Older Alluvium Group is composed of highly oxidized loamy sand, in the valley fill deposits and oxidized to feebly oxidized sand, silt and clay exposed in the southern part of the district in the vicinity of the AMGC rocks in the foothills. Feebly oxidized sand, silt and clay deposits of Newer Alluvium Group along with non-stabilised and unoxidized sand, silt, clay and pebble in the active river channel deposits are formed. The N-S trending active Kulsi Fault passing from south to north in the district and controls the course of the Kulsi River. The E-W trending concealed Oldham Fault passes through the district dipping towards south towards the southern boundary of the district.

Groundwater in the district occurs in the Palaeoproterozoic rocks mainly within the shallow weathered zone and the joints and fractures are potential water-bearing zones. In the alluvial plains, groundwater occurs down to the depth of 305m. Geotechnically, Kamrup (Rural) district has been divided into two morphotectonic units namely alluvial fill in intracratonic linear depression and basement crystalline rocks. Alluvial fill intracratonic linear depression comprising unconsolidated sand silt boulders has very high permeability with low to medium comprehensive strength. However, basement crystalline granitic rocks are low in permeability with medium to high bearing capacity and have good foundation characteristics. Rainfall-triggered landslides are a common feature in hazard studies in the hilly areas of the district. Earthquake epicentrs are also reported in the district.

The exposures of granite gneiss and hard rocks from the hilly regions are used as construction materials. In the area of Hahim and Ukium along the Assam-Meghalaya border, occurrences of weathered bands of magnetite-hematite-quartzite bands in gneissic hills have been reported. River borne pebbles and boulders are also used for construction material by the locals.

4.0. Drainage System :

The district occupies part of the basin formed by mighty river Brahmaputra passing through the central part with a westerly course. The perennial tributaries like Puthimari, Digaru, Kulsi, Singra etc. drain the district and join the River Brahmaputra. The irrigation facilities have mostly been confined to a few lift and flow irrigation schemes. Moreover, farmers are accustomed with single rainfed irrigation. Single paddy crop has now switched over to multiple cropping practices by utilizing ground water through shallow tube wells.

5.0. Rainfall and Climate :

The climate of the area has been classified as sub-tropical humid climate with heavy rainfall, hot summer and high humidity. Average temperature ranges from 12 to 38°C during the year. In winter, temperature ranges from 15 to 25°C during day and 8 to 15°C during night. The summer temperature ranges from 25 to 38°C during day and 15 to 25°C during night. Average annual rainfall of the district is 1752 mm and co-efficient of variation is 15.3%. The annual normal rainfall of the district as compiled from IMD data is 2125.4 mm with 96.5 rainy days

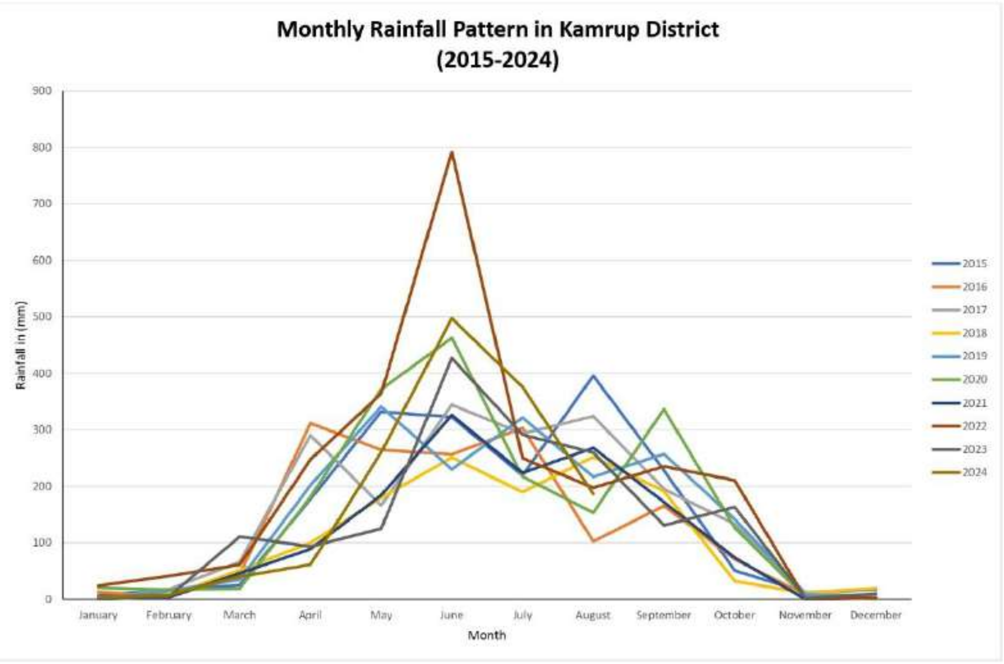

Figure: 1

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	17.5	19.5	23.3	26	26.8	28.1	28.9	29	28.6	26.2	22.5	18.7
Min. Temperature (°C)	11	12.8	16.6	20.4	22.7	24.7	25.8	25.8	25.2	22	17.3	12.5
Max. Temperature (°C)	24	26.3	30.1	31.6	31	31.5	32.1	32.2	32	30.5	27.8	24.9
Avg. Temperature (°F)	63.5	67.1	73.9	78.8	80.2	82.6	84.0	84.2	83.5	79.2	72.5	65.7
Min. Temperature (°F)	51.8	55.0	61.9	68.7	72.9	76.5	78.4	78.4	77.4	71.6	63.1	54.5
Max. Temperature (°F)	75.2	79.3	86.2	88.9	87.8	88.7	89.8	90.0	89.6	86.9	82.0	76.8
Precipitation / Rainfall (mm)	12	16	60	141	278	315	313	261	181	100	15	6

Figure 2: Climate Table/ Historical Weather Data of Kamrup District

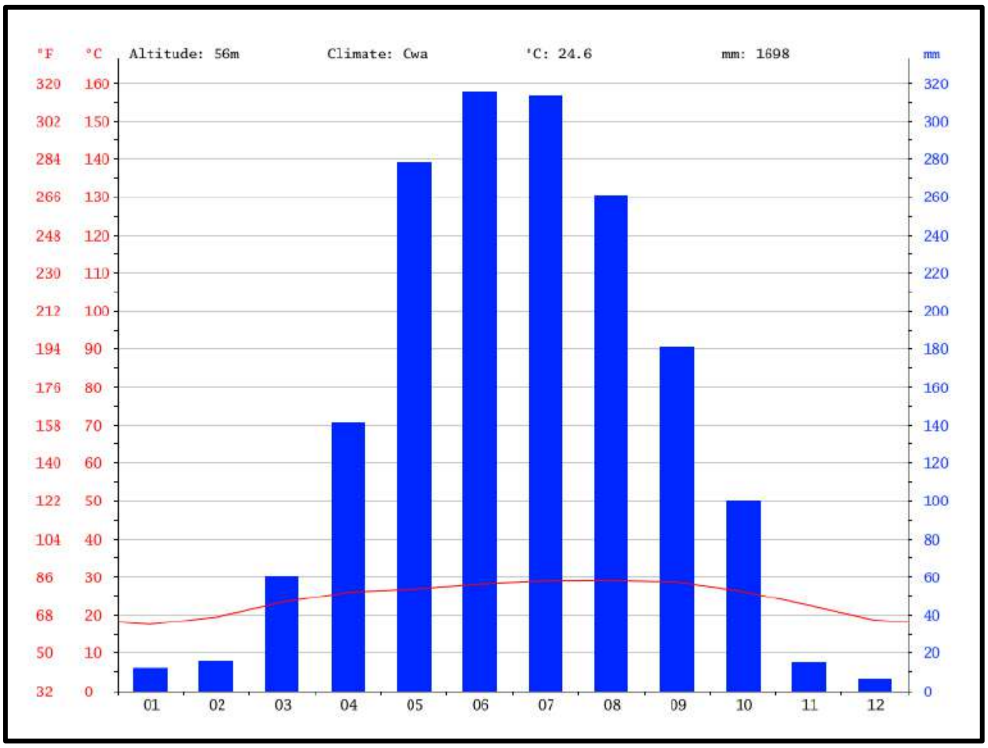

Figure 3: Climate Graph of Kamrup District.

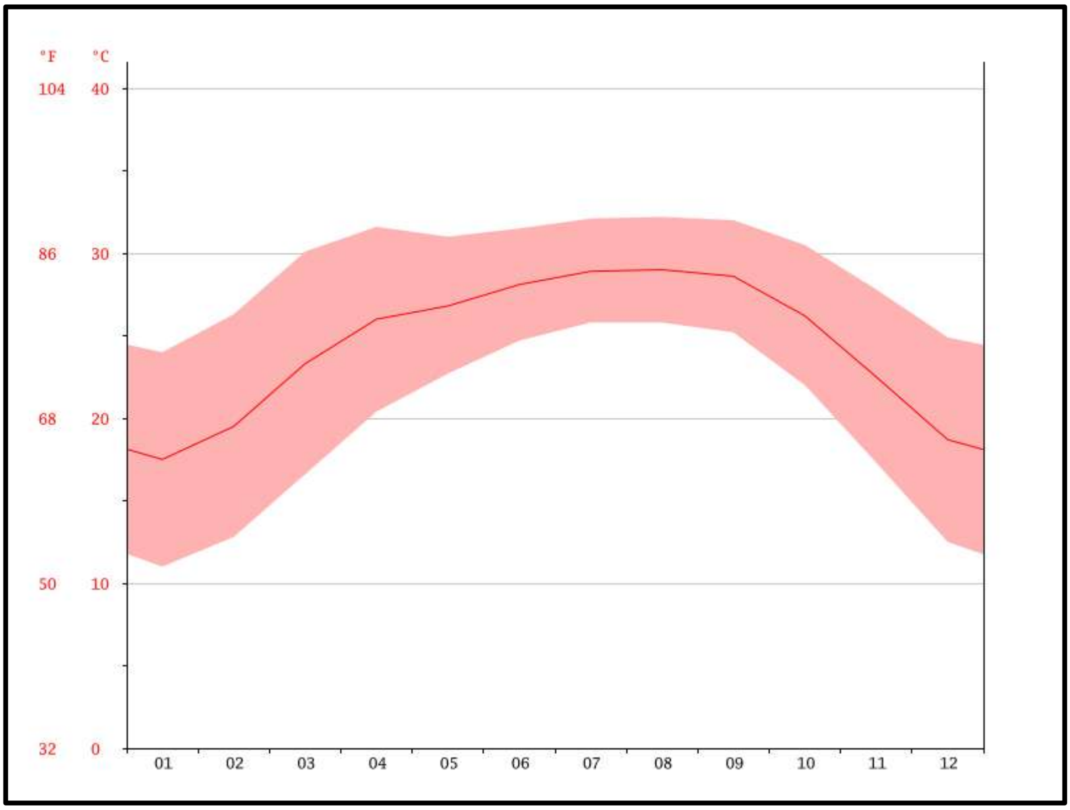

Figure 4: Temperature Graph of Kamrup District.

6. Geology of Assam:

Introduction

Assam, located in the north eastern part of India, is geologically diverse, encompassing a range of geological formations that reflect its complex tectonic history. Assam geological province is an onshore province covering approximately 78,438 km2. The geological province is bounded to the north by the Brahmaputra valley bordering Arunachal Pradesh, to the west by the West Bengal and Bangladesh plains, and to the south and east by the Indo-Burma Ranges and the Central Burma Basin. Major features within the Assam geological province include the Assam Shelf, Brahmaputra River valley, the Barak Valley, parts of the Shillong Plateau, Mikir Hills, and a foreland portion of the Indian Shield. The Assam Shelf consists of a portion of the Paleocene to Eocene continental shelf of the Indian plate which became emergent and which is being overthrust by the Himalayas to the northwest and by the Burma micro-plate to the southeast.

Geotectonic evolution of Assam

Geological province of Assam has passed through five important phases during its geological history. The first of these relates to when it was a part of the Gondwana Supercontinent. The second phase came in the Permo- Carboniferous, when its adjoining areas were rifted and the coal-bearing Gondwana was deposited. This phase seems to have been accompanied locally by some volcanic activity and the area was still a part of the Gondwanaland. The third phase came in Late Triassic/Early Jurassic when, with the drifting away of Southern Tibet, the northern fringe of India including the part that is now Assam became open to marine Sedimentation. The Sung Valley Carbonatite intrusion took place during this period. The fourth phase started when the eastern boundary also broke apart in Late Jurassic-Early Cretaceous and the southern and eastern shores of Assam became open to marine sedimentation. This phase also saw the beginning of some igneous activity with the outpouring of Garo Hills, Sylhet, and Mikir Hills Traps (basalts), and the formation of a number of basic and ultrabasic intrusives.

The fifth phase started with its collision with Myanmar to the east and Tibet to the north around Early Eocene and continued with all the stages of collision tectonics thereafter.

During this phase, the entire land was caught up, as in a vice, between the two collision zones. The Mishmi Hills added a third compressional force from the northeast and subsequently a major uplift of the Shillong Plateau-Mikir Hills also contributed.

Stratigraphy

The lithology of Assam comprises (a) Proterozoic Gneissic Complex, (b) Palaeo-Mesoproterozoic Shillong Group of rocks, (c) Granite Plutons of Neo-Proterozoic−Lower Palaeozoic age, (d) Lower Gondwana sedimentary rocks of Permo-carboniferous age, (e) Alkali Complexes of Samchampi and volcanic rocks represented by Sylhet Trap of Cretaceous age, (f) Lower Tertiary (Paleocene-Eocene) shelf sediments of the Jaintia Group extending along the southern and eastern flanks of Mikir Hills and geosynclinals sediments of Disang Group in parts of the North Cachar Hills, (g) Upper Tertiary (Oligocene to Pliocene) shelf and General Geology and Stratigraphy geosynclinal sediments covering the southern flanks of Mikir Hills, the North Cachar Hills and the hills of the Cachar district in the Surma valley area. These rocks are also exposed along the northern foothills of Naga-Patkai range. Along the southern foothills of Eastern Himalaya facing the northern border of Assam a narrow strip of Siwalik rocks are exposed, (h) the Quaternary deposits comprising of Older and Newer Alluvium occur in flood plains and terraces of the Brahmaputra valley, Surma valley and other river basins of Assam.

The stratigraphic set-up of Assam geological province is as follows:

Age	Group Name	Formation (Thickness)	Lithology
Holocene	Unclassified	Newer or Low Level Alluvium	Sand, silt and clay
Middle to Upper Pleistocene	Unclassified	Older Alluvium	boulder deposit
---Unconformity/Tectonic------------------------------------			

Age	Group Name	Formation (Thickness)	Lithology
Pliocene-Pleistocene	Siwalik Group	Kimin Formation	Sandstone with clay stone
		Subansiri	Micaceous sandstone
Pliocene	Dihing Group	Dihing Formation (900m)	Pebble beds, soft sandy clay,
--Unconformity---			
Mio-Pliocene	Dupitila Group	Dupitila Formation (Surma Valley: 3300 m)	Sandstone, mottled clay, grit and conglomerate; locally with beds of coal, conglomerate and poorly consolidated sandstone with layers and pockets of pebbles
		Namsang Formation	Coarse, gritty, poorly consolidated sandstone and conglomerate of coal pebbles
--Unconformity---			
Mio-Pliocene	Tipam Group	Girujan Clay Formation (1800 m)	Mottled clays, sandy shale and subordinate mottled, coarse to gritty sandstone
		Tipam Sandstone Formation (2300 m)	Bluish grey to greenish, coarse to gritty, false bedded, ferruginous sandstone, clays, shales and conglomerates

Age	Group Name	Formation (Thickness)	Lithology
---Unconformity---			
Miocene	Surma Group	Bokabil Formation (900 to 1800 m)	shale, sandy Shale, siltstone, mudstone and lenticular, coarse ferruginous sandstone
		Bhuban Formation (1400 to 2400 m)	Alternations of sandstone and sandy shale and thin conglomerate, argillaceous in middle part
---Unconformity---			
Eocene-Oligocene	Barail Group	Renji Formation (600 to 1000 m)	Massive bedded sandstone; its equivalent - the Tikak Parbat Formation in the Upper Assam is marked by thick coal seam in basal part
		Jenam Formation (1000 to 3300 m)	Shale, sandy shale, and carbonaceous shales with interbedded hard sandstone; its equivalent the Bargolai Formation in Upper Assam is marked by thin coal seams
		Laisong Formation (2000 to 2500 m)	Well bedded compact flaggy sandstone and subordinate shale; its

Age	Group Name	Formation (Thickness)	Lithology
			equivalent- the Nagaon Formation in Upper Assam is marked by thin bedded, hard sandstone and interbedded shale.
	Disang Group		Splintery dark grey shale and thin sandstone
Palaeocene -Eocene	Jaintia Group	Kopili Formation	Shale, sandstone and marl.
		Shella Formation	Sylhet Limestone (Fossiliferous Limestone) Sylhet sandstone Sandstone, clay and thin coal seam
		Langpar Formation	Calcareous shale, sandstone-Limestone
--- Unconformity --			
Cretaceous	Alkali Complex of Samchampi		Pyroxenite – Serpentinite with abundant development of melilite pyroxene rock, ijolite, syenite and carbonatite
--- Unconformity --			
Cretaceous		Sylhet Trap (exposed in Meghalaya) (600m)	Basalt, alkali basalt, rhyolite, acid tuff

Age	Group Name	Formation (Thickness)	Lithology
--- Unconformity --			
Permo-carboniferous	Lower Gondwana	Kaharbari Formation	Very coarse to coarse grained sandstone with conglomerate lense, shale, carbonaceous shale and coal
		Talchir Formation	Basal tillite, conglomerate with sandstone bands, siltstone and shale
--- Unconformity --			
Neo-Proterozoic - Early Palaeozoic	Granite Plutons		Porphyritic coarse granite, pegmatite, aplite, quartz vein traversed by epidiorite, dolerite
--- Intrusive contact ---			
Palaeo-Meso Proterozoic	Shillong Group		Quartzite, phyllite, quartz – sericite schist, conglomerate
--- Unconformity --			
Archaean (?)Proterozoic	Gneissic Complex		Complex metamorphic group comprising ortho and para gneisses and schists, migmatites granulites etc.

Age	Group Name	Formation (Thickness)	Lithology
			Later intruded acidic and basic intrusives.

PRECAMBRIAN ROCKS

A. Gneissic Complex:

The crustal material of the Precambrian outcrops in Assam exposed in the Mikir Hills, at the fringes of the Shillong Plateau adjoining Meghalaya State. It also forms isolated inselbergs jutting out of the Quaternary plains, straddling both sides of the Brahmaputra river Valley. Elsewhere, the surface of this Precambrian landmass slopes down into basinal depressions and constitutes the basement for their sedimentary cover. Some of these are very minor and are filled with recent alluvium; the others are major features covered by sediments ranging in age from the Cretaceous to the present day Alluvium.

The Gneissic Complex comprises of gneiss, schist, migmatitic rocks intruded by younger acidic (granite, aplite, pegmatite) and basic (metadolerite, epidiorite, amphibolite) rocks. The rocks of the Gneissic Complex exposed in parts of Goalpara, Kamrup districts and in northern part of North Cachar Hills and Nagaon districts including the isolated inselbergs in the Brahmaputra Basin, mainly consist of biotite, and biotite-hornblende gneisses with bands of granulites and bosses of intrusive granites, pegmatites, quartz veins and minor basic bands.

In the Mikir Hills, the rock types vary from coarse grained, porphyritic granite to foliated biotite-granites and seem to be associated with fine grained banded foliated gneisses, schists and granulites with intrusive pegmatite, quartz veins and basic sills and dykes. The structural framework of the gneissic complex and its history of evolution combined with associated intrusives are complex issues. Effects of polyphase deformation and intrusion are indicated from several places. These rocks have undergone regional metamorphism of amphibolite-granulite facies from place to place and have given rise to gneisses, schists and some granulites.

B. Shillong Group :

The Gneissic Complex is unconformably overlain by the Shillong Group of rocks of Palaeo-Mesoproterozoic age. These rocks mainly comprise of conglomerate and metasedimentaries like quartzite, phyllite, schist association. In Assam, the rocks of Shillong Group are exposed along the western and northern part of the Mikir Hills across the Kopili valley. These rocks are metamorphosed to greenschist facies condition. Intrusion by granite plutons in Shillong Group exhibits contact metamorphism. The continuity of the Gneissic Complex and the Shillong Group across the Kopili valley in a roughly collinear trend suggests the continuity of the rocks from the Shillong Plateau is possibly separated by the Kopili lineament.

C. Granite Pluton:

A number of granite bodies transect both Gneissic Complex and Shillong Group. In Mikir Hills area, two types of granite occur, a) nonporphyritic foliated medium to coarse grained pink granite, occurring in the central part and b) porphyritic granite encircling the non-porphyritic granite. It is seen that these two granites evolved in separate phases of intrusions which is less studied. Also, these granite bodies have been exposed in the central and western part of the Assam covering the northern fringe of the Shillong plateau and few isolated inselbergs jutting out of the Quaternary plains which are straddling both sides of the Brahmaputra basins.

PALEOZOIC-MESOZOIC ROCKS

D. Lower Gondwana Group:

The occurrence of Lower Gondwana rocks are exposed in Singrimari area along the Meghalaya border in the extreme western corner of Assam. Fox (1934) reported plant fossils and coal from these beds, based on which he concluded Gondwana affinity. Acharyya and Ghosh (1968) grouped the entire sequence into Karharbari Formation (Permian). De and Boral (1978) further differentiated these sediments lithostratigraphically into the Talchir and Karharbari Formations.

E. Alkali Complex of Samchampi:

Alkaline mafic-ultramafic-carbonatite complex at Samchampi is emplaced within granitic host rock. The rock types include mainly a variety of syenites which cover large part of the area, mafic rocks which include alkaline pyroxenite, shonkinite, biotite pyroxenite, ultramafics (ijolite, melteigite), apatite-hematite-magnetite rock, carbonatite and cherty rocks. Carbonatite occurs mainly in the northern and eastern peripheral parts of the complex as dykes. At places, they laterally grade into mafics and ultramafic rocks and occasionally contain partly digested xenoliths of syenites and mafic-ultramafic rocks. Carbonatite bodies with associated rhyolite flows have been found along Brik nala, south of Matikhola Parbat in Mikir Hills. This occurrence resembles the carbonatite complex of Sung valley in Meghalaya.

F. Sylhet Trap:

Direct evidence of Cretaceous basaltic lava flows and intrusive from Assam is limited to the Mikir Hills area. Sylhet traps are well exposed in the Um Sohringknew and a no. of places of Shillong Plateau. Patchy occurrences of basaltic lava flows presumably belonging to Sylhet suite of Meghalaya have been reported from vicinity of Koilajan and its neighborhood, and in the Puja Nala in Mikir Hills of Assam. The outcrop shows highly weathered and altered chert/olive green trap rocks overlying the gneisses. About 67m of lava flows, with thin intertrappean bed has also been encountered in the Barapathar oil well drilled by Oil and Natural Gas Corporation (ONGC). Palynofossils obtained from the section suggests an early Cretaceous age.

TERTIARY ROCKS

The Tertiary rocks, rest over the weathered platforms of Precambrian rocks, these comprise of both shelf and geosynclinal facies sediments of Palaeocene-Eocene age represented by the Jaintia and Disang Groups respectively. The overlying Barail (Eocene-Oligocene), Surma (Lower Miocene), Tipam (Mio-Pliocene), Dupitila (Mio-Pliocene) and Dihing (Pliocene) Groups also represent both shelf and geosynclinal facies. The Tertiary sedimentary history of Assam is an integral part of the tectonosedimentary setting of the Tertiary sediments of the North East India and is influenced by the prominent ‘Brahmaputra Arch’ running parallel to Brahmaputra River. The thickness of Tertiary rocks is seen to increase towards southeast whereas the thickness of Quaternary sediments of Brahmaputra Basin increases towards north and northwest.

In the Early Tertiary sediments there is a sharp distinction between a geosynclinal facies and a shelf facies. In the Late-Tertiary sediments, there are minor differences in lithology, except that the shelf sediments are much thinner. The geosynclinal sediments are very thick where deposition took place in a sinking basin.

G. Jaintia Group:

The Jaintia Group (shelf facies sediments) of Eocene age is calcareous and abundantly fossiliferous. They differ markedly from the Eocene shales of the geosyncline (Disang Group) facies. Jaintia Group comprising Shella and overlying Kopili Formations is seen around Garampani area of the North Cachar Hills. It also extends north-easterly along the southern and eastern slopes of the Mikir Hills. These rocks are exposed from the vicinity of Selvetta in west through Dilai Parbat in the east and then through Doigrung further north-east. Workable seams of coal are present in the Sylhet Sandstone Member at Selvetta, Koilajan and Sylhet Limestone Member in Selvetta, Jarapgaon, Koilajan and Nambar areas.

The Shella Formation is well developed with three limestone bands alternating with three interbedded clastic sandstone units. The underlying unit, Lower Sylhet Sandstone Member in Assam exposed in Garampani area rests unconformably over the Precambrian basement. It is about 60 m thick and includes thick beds of sandstone with interstratified shale, carbonaceous shale and thin (0.3 m) coal seam, which overlies 2 to 3 meters thick basal conglomerate bed. The Shella Formation is conformably overlain by Kopili Formation, consisting mainly of greyish, usually ferruginous, splintery shales with interbedded sandstone and calcareous marl of variable thickness. Northeast of Lumding, Kopili Formation is overlapped by beds of Surma Group.

H. Disang Group:

Disang Group in Assam is represented by monotonous sequence of dark grey, splintery, shale with thin sandstone interbands. The shale is usually limonite coated. The Disang are predominantly arenaceous in the upper part and exhibit vertical as well as lateral facies change to its overlying Barail Group of rocks. In Assam, Disang Group is exposed along a narrow strip southwest of Haflong-Disang thrust in the central part of North Cachar Hills. This sequence is exposed from Jatinga valley eastward upto the headwaters of Dhansiri. In Upper Assam, Disang Group comprises of a thick sequence of alternating splintery shale with thin partings of hard greyish flaggy sandstone and sandy shales.

I. Barail Group :

Barail Group represents a sequence of lithology belonging to the geosynclinal facies. Rocks of this group are exposed along two different strips, in the south-eastern part of North Cachar Hills, i.e. to the South of Haflong-Disang Thrust and secondly in parts North of the Cachar and Mikir Hills i.e. to the north of Haflong-Disang Thrust in Upper Assam.

The unclassified shelf facies rocks of Barail Group which overlie the Kopili Formation cover a large area with a gross thickness of about 1000 m. Lithologically, they consist of fairly coarse sandstone, shale and carbonaceous shale with streaks of minor seams of coal. Outcrops of Barail Group in this part of the area are seen near Mupa, Langling, Latikhali, Chota Langher along the exposure of Lumding- Badarpur railway cuttings as well as along road section between Haflong and Garampani-Kopili. The geosynclinal facies of Barail Group in Surma valley and North Cachar Hills are subdivided into Laisong, Jenam and Renji Formations. But in upper Assam, the equivalent formations have been classified as Nagaon Formation, Bargolai Formation and Tikak Parbat Formation, respectively.

Laisong Formation consists of thin bedded greyish sandstone with interbedded thin sandy shale, rare massive sandstone, carbonaceous shales and streaks of coal. Laisong Formation gradationally passes into argillaceous Jenam Formation comprising mainly of shale, sandy shale, carbonaceous shale with streaks of coal and interbedded hard sandstone.

Renji Formation comprises of hard massive sandstone with rare beds of shale and sandy shale. The Renji Formation is distinguished from the former two by the increased frequency of microfauna and palyno-fossil. The thickness of Barail Group in southeastern part of Upper Assam Valley decreases in a north-westerly direction.

J. Surma Group:

Barail Group is unconformably overlain by Lower Miocene Surma Group, which covers a large area in Surma valley and North Cachar Hills. This group is divided into a lower arenaceous facies (Bhuban Formation) and an upper argillaceous facies (Bokabil Formation). Bhuban Formation consists of sandstones, sandy shales and conglomerate intervened by shale, sandy shale and lenticular sandstone. Bokabil

Formation is represented by shale, sandy shale, siltstone, mudstone and fairly thick lenticular, coarse grained, ferruginous sandstone. Surma Group as a whole is well exposed as inliers in the southern part of the Surma valley and also occupies a strip in the northern part of the valley. In the North Cachar Hills, the rocks of Surma Group occupy a large tract in the vicinity of Maibong and further northeastward upto Lumding. These rocks further continue northwards and are exposed in the south-eastern part of the Mikir Hills, as a narrow strip over the eastern base of the Mikir Hills. Surma Group in Upper Assam is represented by about 30 to 60 m thick estuarine sandstone, shale and conglomerate unconformably overlying the Barails.

K. Tipam Group:

Tipam Group comprises a lower arenaceous facies Tipam Sandstone Formation and an upper argillaceous facies Girujan Clay Formation. Tipam Sandstone consists of fairly coarse to gritty false-bedded, ferruginous sandstone interbedded with shale, sandy shale, clay and conglomerate. Whereas The Girujan Clay Formation consists of lacustrine mottled clay, sandy mottled clay, sandy shale and subordinate mottled, coarse to gritty, ferruginous sandstone. Tipam Group has a general strike of ENE–WSW with a northerly dip varying from 50º-70º.

The rocks of Tipam Group are exposed in many areas in the Surma valley. Upper part of the Tipam sequence at many places is found to be eroded away, prior to the deposition of overlying Dupitila Group. However, Girujan Clay is exposed in the hills between Chargola and Longai valleys and the low hills to the east of Jatinga and Cachar district. Rocks of this group are present also in the Labak-Diksha and Darby-Dwarband areas. In Assam valley, Tipam Group occupies a 300 km long strip from Langting to Digboi interrupted by small patches of alluvium cover. Tipam Group also includes several oil-sand horizons in Upper Assam.

L. Dupitila Group:

Tipam Group is unconformably overlain by the Mio-Pliocene Dupitila Group consisting of coarse, loose and ferruginous sand, clay, mottled clay, mottled sandstone and poorly consolidated sand with layers and pockets of pebbles. These beds are well exposed at intervals, as patches over Tipam Group in Cachar and Karimganj districts, forming low mounds in valley areas.

The rock of Dupitila Group is exposed in Surma valley attaining a thickness of 3300 m and is named as Dupitila Formation. It comprises of sandstone, mottled clay, grit and conglomerate, locally with beds of coal, conglomerate and poorly consolidated sand with layers and pockets of pebbles. In Upper Assam, Dupitila Group is represented by fluviatile Namsang Formation, which consists of coarse, gritty, poorly consolidated sandstone, mottled clay and conglomerate, which at places, is almost entirely composed of pebbles of coal derived from Barail Group. Namsang Formation overlies Girujan Clay Formation with an unconformable contact at places and is well exposed in Dihing river section near Jaipur.

M. Dihing Group:

Lithology of Dupitila Group are unconformably succeeded by fluvial Pliocene Dihing Group consisting of thick pebble beds alternating with coarse, soft sandstone, clay, grit and conglomerate containing half decomposed plant remains. The unconformable relationship between Dihing and underlying Namsang Formation is well exposed along Dihing river section near Jaipur in Upper Assam. In Makum coalfields, this group comprises alternating pebble beds, sandstone and clays. The sandstones are gritty to coarse grained, loose ferruginous and generally greyish in colour. Along Margherita thrust, Tipam Sandstone is seen in juxtaposition with the Dihing beds. In Surma valley, Dupitila Formation is conformably overlain by a sequence of conglomerate, grit, sandstone and clay corresponding possibly to Dihing Group of Upper Assam. These beds, with steep dip are seen near Bishramkandi and Nagar Tea Garden. Dihing Group is correlated with the Kimi Formation of Siwalik Group exposed in the foothill of Arunachal Himalayas.

N. Siwalik Group:

Middle and Upper Siwalik rocks designated as Subansiri and Kimin formations are exposed in Sonitpur district of Assam, along the foot hills of Arunachal Himalaya. The Subansiri Formation is represented in the area by micaceous massive fine to medium grained pale brown sandstone while the Kimin Formation in the area comprises soft, grey sandstone with bands of claystone.

Quaternary Period

O. Alluvium:

The tectonic movements that took place after the deposition of the Kimins and the Dihings were the last major folding events in the Assam Valley region. Thereafter, all movements have been primarily concerned with the further uplift of already raised mountain masses. In the process, these have helped raise and give minor tilts to erosional surfaces, earlier flood plains and river built terraces. There have also been minor movements along earlier joints, faults and thrust planes.

Dihing Group is unconformably overlain by Quaternary sequence which has been described variously in the Upper Assam like “Terrace Deposits” or “Older or High Level Alluvium” etc.. It consists of indurated, yellow, brown or red clay with sand, gravel and boulder deposits. These deposits do not belong to the typical fluvial Quaternary deposits of the Brahmaputra Basin and are possibly weathered derivatives of the underlying older rocks. On the other hand, a major part of the area flanking the Brahmaputra River in Lower and Upper Assam is covered by thick Quaternary fluvial sequence.

Regional structure and tectonics

The Gneissic Complex of Assam, in continuity with Meghalaya’s geological framework, consists of Peninsular crystalline rocks that exhibit evidence of deformation, characterized by intricate folding and deep-seated fracture lineaments trending E-W and NE-SW. These fractures are possibly connected to sub-crustal movements, which have divided the region into several blocks. The present-day configuration of the Brahmaputra Valley is a result of the uplift and subsidence of different blocks of Precambrian crystalline autochthon, remnants of which are now seen in the Mikir Hills and the Shillong Plateau. This mass forms a "foreland spur" (Mathur and Evans, 1964), which has been overthrust from the northwest by the Eastern Himalayas, from the northeast by the Mishmi Hills, and from the southeast by the Naga-Patkai range during the Tertiary geotectonic cycle.

In Northeast India, four distinct geotectonic provinces have been identified:

1 The comparatively stable shield area of the Shillong Plateau and Mikir Hills.
2 The platform area peripheral to the shield, now covering the Brahmaputra Valley, North Cachar Hills, and Bangladesh plains.
3 The Naga-Patkai and Eastern Himalayan mobile geosyncline belt.
4 Transitional zones between the platform and the geosyncline, likely with narrow pericratonic downwraps marginal to the shield.

These geologic provinces are bounded by major tectonic lineaments that have been active throughout various tectonic cycles, influencing the area since the cratonization of the Gneissic Complex. This was followed by the deposition of the Shillong Group of rocks in intracratonic basins and sedimentation continuing up to Pleistocene times. The major lineaments include the E-W Dauki Fault along the southern margin of the Shillong Plateau, a suspected E-W fault along the Brahmaputra Valley, and the NW-SE Mishmi Thrust along the Lohit foothills.

The Upper Assam oil fields' subsurface geology reveals that the Tertiary sediments overlying the basement are folded into domes and anticlines, with faults trending NE-SW, NNE-SSW, NW-SE, and E-W. Fields like Naharkatiya, Moran, Rudrasagar, and Lakwa display complex fault patterns, some of which involve tensional faults and reverse faults. Faulting, which occurred intermittently from the Eocene to the Pleistocene, played a significant role in basin subsidence and sedimentation. The intricate fault patterns likely originated during Precambrian intrusive movements, with later tectonic reactivations affecting the overlying sediments.

The Schuppen belt, located over the northern part of the Naga-Patkai range, exhibits a series of imbricate thrusts with the Naga Thrust marking the boundary of the Quaternary valley fill of Assam. This belt consists of six thrusts, with the Disang Thrust being a prominent feature. The Cenozoic rocks in the Schuppen belt show a greater thickness of sediments compared to the Assam shelf, indicating a different depositional environment. The Surma Group, for instance, is thin and discontinuous in Upper Assam but well-exposed in the Schuppen belt. Similarly, the Barail coal seams are thicker and more persistent in the Schuppen belt.

The NW-SE Mishmi Thrust, which marks the youngest tectonic feature in the region, causes the metamorphic rocks of the Mishmi Hills to override younger Tertiary and

Quaternary deposits in the frontal Himalayan thrust belt and the Naga-Patkai belt. The Surma Valley, partly extending into the Cachar district of Assam, displays N-S to NE-SW asymmetrical folding, with broad synclines intervening faulted anticlines. Unlike the Schuppen belt, this region does not show overthrusting.

The tectonic evolution of Assam has been a complex interplay of uplift, subsidence, and faulting, with ongoing tectonic movements shaping the Brahmaputra basin and adjacent regions throughout geological history.

Mineral Resources

Assam is rich in a variety of mineral resources, some of which play a significant role in the state's economy. The state is part of the larger Assam-Arakan Basin, which stretches across northeastern India and into parts of Myanmar, making it one of the major oil and gas-bearing regions in India. Petroleum and natural gas being the most significant natural resources of Assam, especially in the Assam-Arakan Basin, where fields like Digboi, Duliajan, and Naharkatiya have driven India's oil industry since the late 19th century. These fields are part of the Assam Shelf, a rich oil-bearing region. Natural gas is another key resource in Assam, often found alongside oil in the Assam-Arakan Basin. The production of natural gas has grown considerably, especially in fields like Lakwa, Duliajan, and Tengakhat. The coal occurrences in Assam are reported from two geological horizons viz., Gondwana and Tertiary of which Tertiary coal deposits of Makum, Mikir Hills and Dilli-Jeypore are the most important coalfields. The Gondwana coal deposits in the westernmost part of Garo Hills of Meghalaya are extending into the Hallidayganj area of western Assam known as the Singrimari Coal deposits. Assam's coal is known for its high sulfur content but has a low ash content whch supports local industries such as tea processing and brick manufacturing. Limestone deposits are found mainly in the Karbi Anglong district and in parts of the North Cachar Hills, is crucial for cement production. Assam has deposits of various types of clay, including china clay and fire clay used in pottery and ceramics. These are found in districts like Nagaon, Kamrup, and Goalpara. In the Namdang-Ledo area, the fire clay bands occur below the coal seams. Also, in karbi-Anglong district, fire clay bands of 3-5 m thickness in association with coal occur at Koilajan Colliery. Other minerals include silica sand (for glass manufacturing), and smaller deposits of iron ore, granite, gypsum, base metal, beryl, building stone,clay, sillimanite, salt and radioactive minerals which contribute to local construction and industrial activities.

7.0. Geomorphology and Soil type of Kamrup District

Physiographically, the district can be divided into three units i.e. the hilly region in the south, the alluvial plain in the central and western part and the swampy areas along Brahmaputra plains. The distinguishable geomorphic units are as follows :

a) Flood plain of river Brahmaputra and its tributaries
b) Younger alluvial plain which occupies major part of the area, having slightly higher elevation than flood plain.
c) Older alluvium/ valley fill, gently sloping plain, having higher elevation than the younger alluvial plain
d) Piedmont, gently sloping plain along the foothills
e) Inselberg occurs as very small isolated hills
f) Denudational hills consisting of granite, gneissic rocks

The different rock formation occurring in the district has been subjected to various soil formation processes though agents of weathering and transportation, during different geological ages. Soils comprising various proportions of sand, silt, clay and organic material in the district are grouped into three broad categories i.e. a) newer alluvial soil, b) valley fill / older alluvial soil and c) soils over forest hilly terrain

8.0. Groundwater Scenario:

In the alluvial plain, groundwater occurs in regionally extensive aquifers down to the depth of 305 m. It has a very good yield prospect. The aquifers are consisting of sands of various grades with gravel and are suitable for construction of both shallow and deep tube wells. Groundwater occurs under unconfined to semi-confined condition occupying an area of about 200 sq. km. in and around Haihata-Dumunichowki which is under artesian condition. In other parts also, the water level rests at the shallow depth and in major part, it rests between 2-5m bgl during pre-monsoon period. The study of long-term water level trend shows no significant change in rise/fall in water level in the last 10 years.

The shallow tube wells tapping aquifers within 50 m depth are capable of yielding about 10 lps in major places, deep tube wells constructed within 95 m depth tapping about 30 m granular zones are yielding 10-20lpm. The transmissivity of the aquifer ranges from 41 to 6162 m^2/day and the permeability varies from 10 to 59 m/day. In hard rock, the yield of bore well-constructed in greater Guwahati area ranges from 4 to 300 lmp. The dispositions of aquifers in Kamrup district, Assam are shown in (Plate-IIIa-IIIc). The summarized results of the exploration conducted by C.G.W.B. in the district are given in Table 1.

8.1 Ground Water Resources

Dynamic ground water resources of Kamrup district are estimated based on the methodology adopted as per GEC 1997, following water level fluctuation and rainfall infiltration factor methodology.

The annual dynamic ground water resources as on2009 are estimated to be 1847.29 MCM while the net annual ground water draft is 715.97 MCM. The stage of ground water development is 43 %. The projected demand for domestic and industrial uses up to 2025 is estimated to be about 105.16 MCM. The district is still under 'Safe' category and sufficient resources are still available for future development.

8.2 Ground Water Quality

The water samples collected from the monitoring stations and the exploratory wells drilled in different parts of the district were analyzed in the Chemical Laboratory of C.G.W.B., NER Guwahati. The results of the chemical analysis of ground water samples reveal that ground water is fresh, potable and suitable for both domestic and irrigation purposes. However, due to slightly higher content of iron in some sporadic patches of the area and fluoride content exceeding permissible limit in some pockets in and around Guwahati City, water needs to be treated before being used for drinking purpose.

8.3 Status of Ground Water Development

Ground water development is at low key at present and estimated to be 644 MCM only against the vast annual dynamic resources of 1482 MCM. After allocation for domestic and industrial requirement of 105MCM for a population estimated in 2025, the net annual dynamic resources of 790 MCM are still available for development.

At present, ground water draft is mainly for domestic and irrigation purposes and a negligible amount is for industry. The water supply scheme for drinking purpose are executed by Assam Public Health Engineering Department through groundwater structures like dug well, hand pump and deep tube well. The groundwater draft for irrigation is mainly from shallow tube well implemented by Agriculture Department through the farmers. The existing draft for irrigation is estimated to be 586 MCM.

8.4 Water Laws

The Guwahati Water Bodies (Preservation and Conservation) Act 2008 (Assam Act No. XX of 2008) of the Assam Legislative Assembly received the assent of the Governor on 05.08.2008 and its notification came on effect on 07.08.2008 to provide for preservation, protection, conservation, regulation and maintenance of water bodies into natural water reservoir and convert into eco-tourism recreation centre to suit the ecological balance within the jurisdiction of Guwahati Metropolitan Development Authority and to protect the water bodies from the encroaches and damages and the matters connected therewith or incidental thereto. The area of land specified in the Schedules I, II, III and IV of this Act are declared as Water Bodies namely Sarusala Beel, Borsola Beel, Silsako Beel and Deepor Beel which are shown in Plate-IV.

8.5 Ground Water Management Strategy

Thick and extensive alluvial deposit with rich aquifers system covering major part of the district is suitable for ground water development through open walls, shallow tube wells and deep tube wells. To meet the drinking and other requirements of limited quantities of individual households, open wells and filter point wells are feasible almost in all parts of the district, except the areas occupied by hills. Ring wells of 0.80 to 1.20 m diameter to depth of 5 to 10 m bgl are likely to hold sufficient quantity of water to meet the requirement. Filter point wells to the depth of about 20 to 25 m bgl by providing galvanizing iron/PVC pipes with slotted pipes against the granular zones are suitable for extraction of groundwater for domestic use.

For agricultural purpose, shallow tube wells can be constructed in areas occupied by flood plain and younger alluvial formation. A number of shallow tube wells constructed by State Agricultural Department and the performance of the tube wells shows that tube wells constructed within 30m depth, tapping over about 9 m granular zone giving discharge of about 600 lmp. As such, based on the nature of sub-surface geology, a shallow tube well of 30 to 50 m^3/hr in alluvial area. A well assembly of 100 mm diameter GI or PVC pipe can be lowered in a 150 mm diameter borehole. Considering the shallow water level, a centrifugal pump can be used to irrigated about 3 ha of land with an average annual draft of 0.03 MCM.

8.6 Recommendations

Detailed hydrogeological surveys aided by exploratory drilling carried out by Central Ground Water Board have revealed the existence of rich aquifers system down to the depth of 300 m. The geological formation constituting the district comprises of Recent to Sub-recent unconsolidated alluvial formation and Pre-Cambrian consolidated rocks in the form of hills and inselberg.

The hydrogeological set up and availability of huge dynamic ground water resources indicates that there is much scope for the development of groundwater through construction of different ground water abstraction structures in a planned way. Keeping in view of the copious rainfall received in the district, rainwater harvesting through various means should be popularized in the district. In sloping terrain, rainwater may be harvested in the ponds coated with impervious polythene sheets etc. for utilizing the water for various purposes.

<u>Summarized results of the exploration conducted by C.G.W.B. in Kamrup district</u>

Sl. No.	Location	Depth(m)		Zones Encountered (m)	Zones Tapped (m)	SWL (mbgl)	Yield (lpm)	DD (m)	T (m^2/d)	P (m/d)	S	Remarks
		Drilled	Const									

1	Sakhati E.W. 25°57'15" 91°04'00"	181.5	143.0	19-21 44-48 57-59 69-77 80-88 108-116 119-127 132-181.50	30m	5.92	120	2.76	41	0.54	-	
2	Jogipara E.W 26°02'00" 91°05'15"	189.1	93.0	6-9 27-40 43-52 67-92 183-189	27m	4.15	749	2	21	46	$8.6X10^{-4}$	Do
3	Rani E.W. 26°02'42" 91°34'30"	200.25	200.0	13-90 93-98 148-160 170-187 194-200	39m	4.75						
4	Garigaon E.W. 26°09'00" 91°39'30"	201.3	192.0	25-35 45-49 60-66 83-86 119-123 174-179 186-189	31m	5.15	435	2.01	564	16		
5	Khetri E.W. 26°07'30" 92°07'00"	93.5	82.0	0-6 44-52 58-63 68-81	18m	1.95	1336	16.39	89.31	3.44		Bed rock encountered

7	Rangamati E.W. 26°05'08" 91°31'04"	180.45	98.0	39-51 69-97 143-146	28m	4.33	197	0.34	2023	51	1.8X10^{-4}	
8	Sualkuchi E.W. 26°09'55" 91°34'10"	62.50	62.0	50-62.50	6m		25					
9	Rangia E.W. 26°27'45" 91°36'45"	306.39	156.0	6-44 52-58 63-96 101-130 133-154 158-198 207-216 230-240 256-298	54m	0.92	1876	4.28	4947	59	41	
10	Circuit House Guwahati E.W. 26°11'31" 91°45'06"	68.75	57.0	21-27 30-47 50-56	22m	10.06	674	1.66	1637	44		
11	Goreswar E.W. 26°31'00" 91°43'00"	159.90	-		-	-	-	-	-	-	-	S.H.
12	Changsari E.W.	192.98	187.0	-	36m	0.54	40	18.33	4.20		-	Abandoned

	26°19'45" 91°40'09"											
13	Science Museum Khanapara	55.55	54.50	12.70-28 31-34 46-55	12m	3.38	143	11.32	16.24	0.67		Do
14	Jambari (OW)	64.60	62.0	-	39-43 59-61	1.60	492	-	-	-	-	
15	Bamunigaon (OW)	80.50	77.0	-	38-42 54-55.5 74-75.5	-	-	-	-	-	-	
16	Dhupguri (OW)	88.40	86.0	-	47-48 70-74	-	-	-	-	-	-	
17	Gohalkona (OW)	51.66	50.0	-	35-38 45-48	2.0	492					
18	Sakhadari (EW)	92.35	81.0	-	33-37 52-58 72-78	12	143					

9.0 Flood Management

As a practice, three phases of flood management actions are envisaged i.e. pre-flood, during flood and post-flood. The pre-flood activities include preparatory measures involving assessment of vulnerability, development of personnel and organizational database, to chalk-out emergency action plan such as deployment of early warning procedure and training of personnel for evacuation and rescue. Arrangement of commodities and relief materials also to be done along with verification updating of existing search and rescue operations. It is desired that a District Disaster Management Committee is formed well before the onset of the monsoon to guarantee adequate preparedness. It is also welcome that various Non-government Organizations come forward and properly get involved in this venture. All the information relating to disaster management must be well documented in order to accomplish future management plans. It is important to note that The National Commission for Integrated Water Resources Develoopment,1999 recommended management approach rather than control, emphasizing failure to provide complete protection. Such strategies include flood-plain zoning, flood proofing, forecasting, disaster preparedness, response planning and insurance. Regarding flood-plain zoning, the National Commission already proposed a legislation to classify flood prone zones according to occurrence and intensity. Now-a-days, flood forecasting has become easier with advancement of satellite and remote-sensing technology.

Flood-Plain

Flood –plain is said to be an area of land which is adjacent to a stream or river which stretches from the banks of its channel to the base of the enclosing valley walls, and which experiences flooding during periods of high-discharge. The soils usually consist of sands, silts and clays. Flood-plains are formed during erosion of a meander sideways as it travels downstream. At a time when a river breaks its banks, it leaves behind layers of silts (alluvium). These layers gradually build up to create the floor of the plain which generally contain unconsolidated sediments, very often extending below the bed of the stream. Flood-plains are accumulation of sand, gravel, loam, silt, clay and often serve as important aquifers.

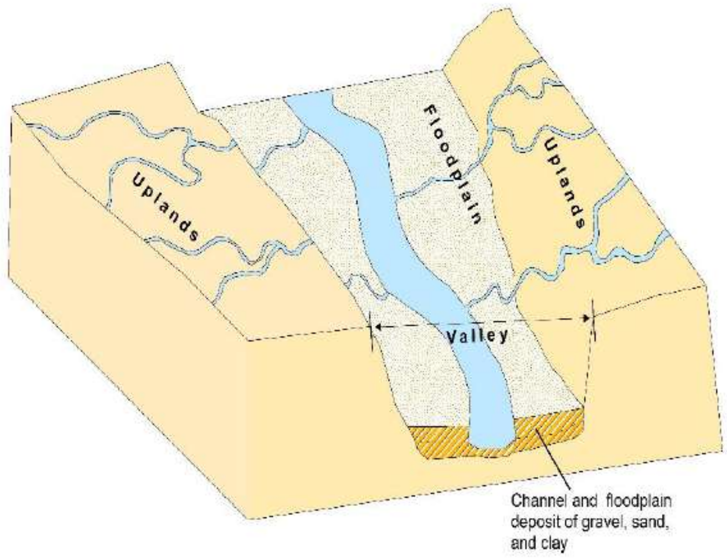

Figure 5

10. Replenishment of Sand and its Assessment

Based on the fundamentals of hydraulic, river flow has the ability to transport the debris as the resisting force is exerted on the water. The downstream of the river is based on the gravitational force acting as an inducing force while the friction resistance helps in the degrading process of the channel. The deposition on river bed is very pronounced during rainy season although the quantum of deposition varies from stream to stream depending on several factors like catchment, lithology, discharge, profile of river and geomorphology of the river course. In order to calculate the mineral deposits in the stream beds, the mineral constituents have been categorized as sand, gravel, silt and clay. Further, the Survey of India Topo-sheets should be used as base map to know the practical extent of river course. The sediment transportation is largely influenced by the grain size as the movement is influenced by the turbulence at the bed of the channel. The evaluation of sediment transport is important for appropriate management and policy implementation. The replenishment volume is determined by a 5-month dry period and as per River Sand Management Guidelines (2009).

10.1. Procedure for assessment of sediment replenishment :

The main objective of this study to assess the replenishment volume in order to calculate the optimum volume of sand to be extracted, supported by specific objectives in identifying the particle size in the river and determination of sediment transport during the low flow season. Regular replenishment study is mandatory and required to be carried out in order to keep a balance between deposition and extracted quantities.

Sediment load deposition in a river depends on catchment area, weathering index of the various minerals of that area, land-use pattern, rainfall data and grain-size distribution of the sediments.

Catchment Yield can be calculated using the following formula :

Catchment Yield (m^3) = Catchment Area (m^2) x Run-off Coefficient (%) x Rainfall (m)

Procedure :

Step no. 1 : Sampling stations to be identified as monitoring points within the study area. Sampling stations to be selected on the basis of active sand mining activity, the past sand mining area and the control stations. Control stations are to be used to represent the river reaches with no sand mining activity, so as to reflect the natural morphological characteristics without any human-made alterations. Such stations will represent the undisturbed condition for comparison with disturbed ones.

Step no. 2 : Following physical parameters are to be ascertained.

a) Channel width in meter (W)
b) Total cross-sectional area in m^2 (A)
c) Minimum and maximum velocity in m/s (V)
d) Water discharge in m/s (Q)
e) Total Dissolved Solid (TDS)

It may also be necessary to determine the channel slope and hydraulic radius, depending on the method of calculation followed.

All the above parameters are to be measured in-situ based on one water cycle (low-flow and high-flow). High-flow sampling period is preferred to be within November to January and low-flow sampling period may be during May-June.

Step no. 3 : It is desired that three samples are taken from each station from the upstream to the downstream. The samples are to be left to dry for 24 hours prior to obtaining bed material classification. Preferable sieve diameters are 2 mm, 1 mm, 0.5 mm, 0.25 mm,0.125 mm, 0.063 mm and 0.01 mm.

The changes in grain-size distribution determine the transport of sediment and sedimentation the river towards downstream. The result shall be represented as a cumulative distribution curve.

Step no. 4 : The total bed load can be calculated using the following equation :

$$T_j = \sum_{1}^{n} G_b \quad \text{where } G_b = \frac{W_i}{(T \times h_s)} \cdot \times b$$

Here, T_j is rate of bed load for the pre-defined cross-section in kilogram per second and G_b is rate of bed load for each section within the pre-defined cross-section in kilogram per second, W_i is weight of bed load sample in kg, T is duration of sampling in second, h_s nozzle width in meter, b = ratio between width of channel and number of se3ction within cross-section.

Other equations can also be used for calculation as shown below :

1) **<u>Manning's Equation</u>**

$Q = V. A. = (1.00 / n) .A. R^{2/3} .\sqrt{S}$ where
Q = Flow rate (m^3 /s) ; V = Velocity (m/s) ; A = Flow area (m^2) ;
R = Hydraulic Radius (m) : S = Channel Slope (m / m);
n = Manning's Roughness Co-efficient = $0.39\ S^{0.38}\ R^{-0.15}$

2) **<u>Yang Equation (1972)</u>**

$\log C_T = \{5.435 - 0.286 \log \log (W_s\, d_{50})\} / U - 0.475 \log U / W_S$ where

C_T = Total sand concentration in ppm
W_S = Terminal fall velocity (m / s)
d_{50} = Average particle diameter of granular material in mm
U = Shear Velocity in m / s = $(gRS_O)^{1/2}$
$R_e = U.\ d_{50} / v$; If $R_e < 70$, then $V_c / W_s = [2.5 / (\log \frac{U\ d_{50}}{v} - 0.06)] + 0.66$
If $R_e > 70$, then $V_c / W_s = 2.05$

3) **Dandy – Bolton Equation** :

Y = X . EK. CVF. PE. SL. ROKF

where Y - Sediment yield in tons per hectare
EK - Soil erodibility factor
CVF - Crop management factor considers prevention of soil loss

PE – Erosion control practice factor
SL - Slope length and steepness factor
ROKF – Coarse fragment factor
X is energy factor and equal to $1.586 \times (Q \times q)^{0.56} \times WSA^{0.12}$ where
Q =Runoff volume in mm, estimated using the SCS curve number method. ; q_p = Peak runoff rate in mm / hour ;
WSA = Watershed area in hectares ;
Peak flow q is calculated as per equation q = C x i x A where
C – runoff coefficient representing watershed characteristics
i - rainfall intensity for the watershed's time of concentration

4) Peak Flood Discharge calculation can be carried out using **Dicken's Formula**

$Q = CA^{3/4}$ where Q = Maximum flood discharge in a river (m^3/ hr)
A = Area of catchment in km^2

.   C = a constant varying widely between 2.8 to 5.6 for

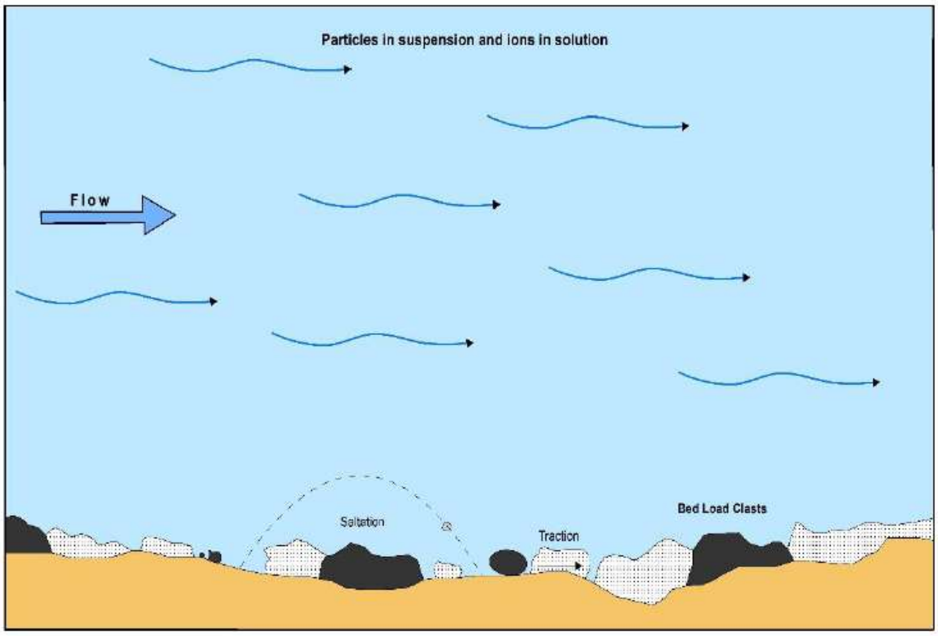

Figure 6

catchments in plains and 14 to 28 for catchments in hills.

OR Jarvis Formula : $Q = CA^{1/2}$ where C = a constant varying between 1.77 as minimum to 177 as maximum. Flood of 100% chance is when C =177.

OR Rational Formula : Q = C.I.A where C is Run-off coefficient depending on the characteristics of the catchment area, being a ratio of Runoff : Rainfall

I = Intensity of Rainfall m/sec ;

Bed Load Transport calculation is very difficult considering the fact three modes of transport may occur simultaneously i.e. rolling, sliding and saltation. There are a few

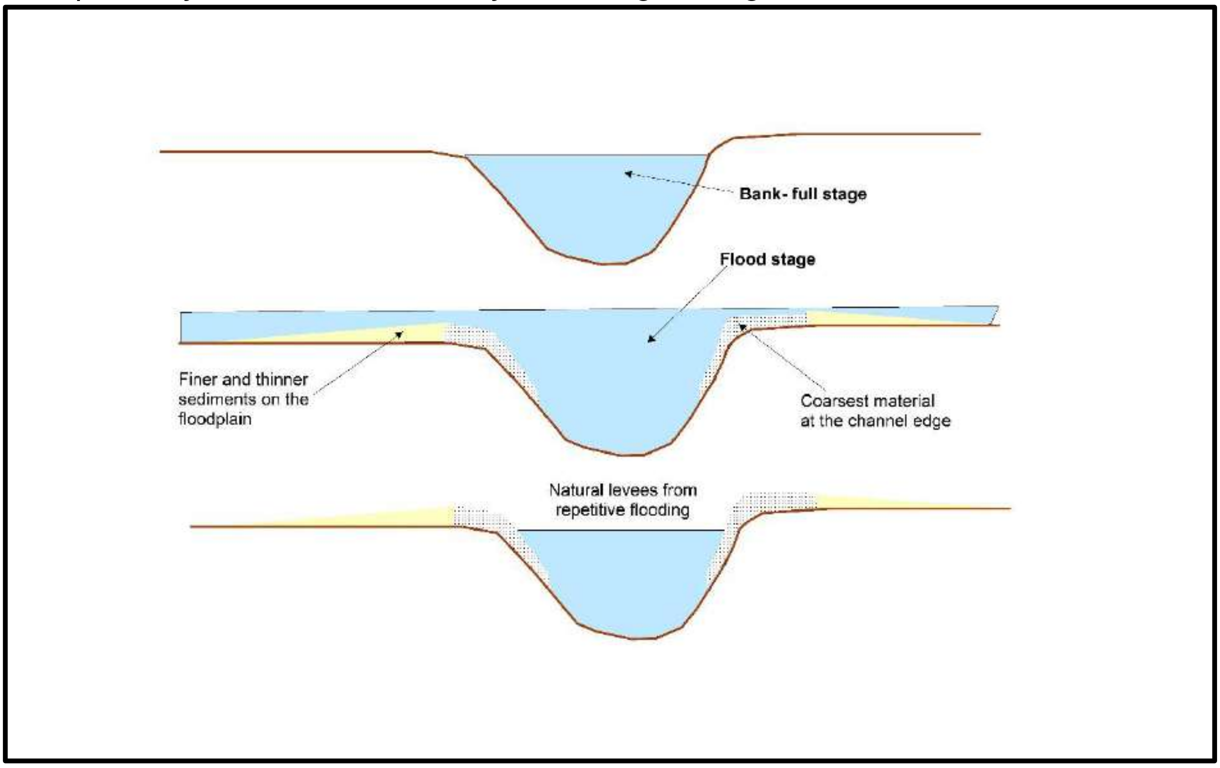

Figure 7

equations in order to compute the total sediment load,most of which have both theoretical and empirical basis.

1) **Ackers and White equation (1973) :**

$C_t = C_s G_s (d_{50} / h) (v / U_*)^{n'} [F_{gr} – A_1) -1]^m$ where $F_{gr} = U n' / (G_s -1) g.d_{50} \times (V / \{ 5.66 \log(10h/ d_{50})\}^{1-n'}$

A_1 = Critical particle mobility factor
C_s = Concentration coefficient in the sediment transport function
C_t = Total sediment concentration
d_{50} = Medium grain size
d_{gr} = Dimensionless particle diameter = $d_{50} [g(G_s -1) /v^2]^{1/3}$

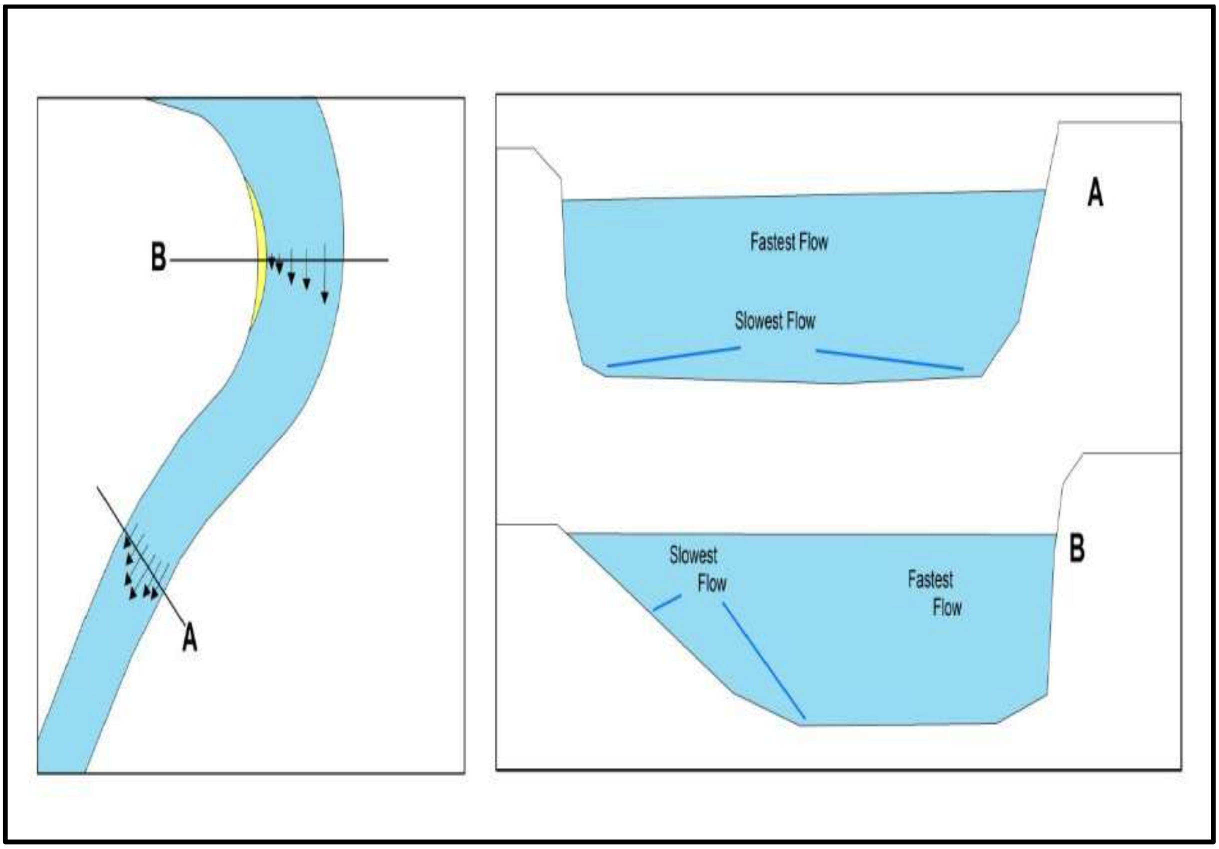

Figure 8

10.2. Deposition Process of Sediments in the River

Sediment is naturally occurring material, broken down by process of weathering and erosion and subsequently carried out or transported by the action of wind, tides, water and force of gravity acting upon the particles. Among these, water is the strongest agent for transportation of sediments and the degree of transportation depends on the strength and velocity of flow.

In general, there are three categories of river.

1) Youthful River
2) Mature River
3) Old Age River

A few characteristics of each of these are described below.

Youthful River

This river is the most dynamic of all the rivers. Such rivers are found at higher elevations, mainly in mountain areas where the slope of the land is steeper. Water moves very fast over such a landscape. These rivers can also be a tributary of a older and larger river, very far away. They also may be close to the beginning of the larger river.

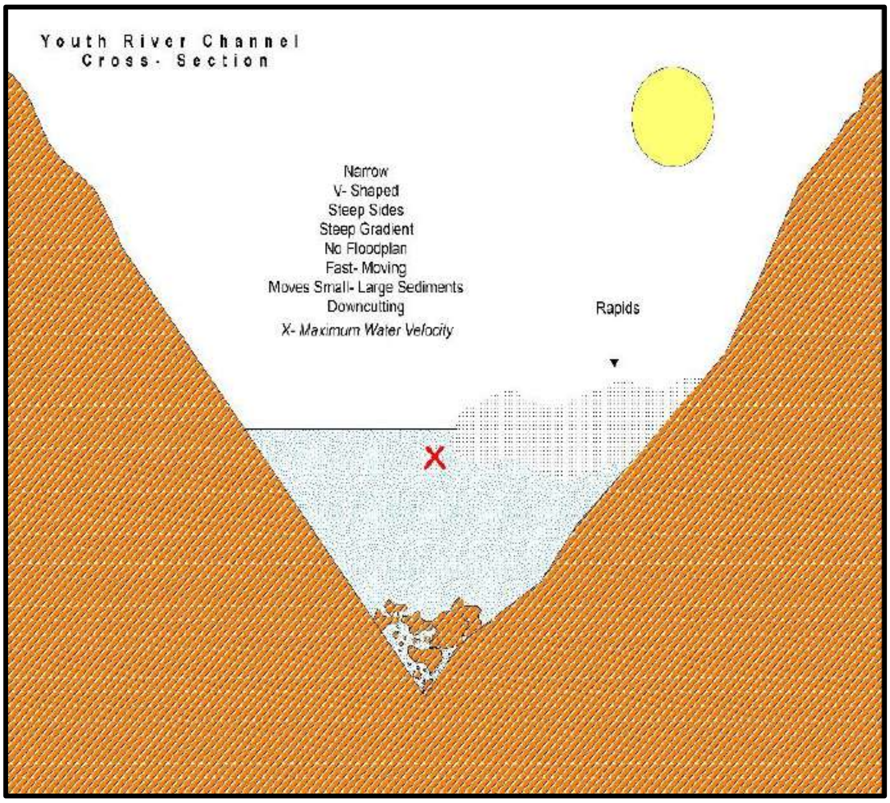

Figure 9

Mature River

Such Rivers down cuts to a much lesser degree than the Youthful Rivers does. They erode laterally but not as extensively as compared to Old Age River. They pass over enough steep landscape that slope of the river creates a velocity capable of moving not only the finer sedilen5ts but also larger pebbles and cobbles by way of rolling, bouncing and saltation along the river bed. They may flow through mountainous areas but not as high areas as in case of the Youthful River. The channel of a Mature River is U-shaped, more deep but less wide than Old Age River.

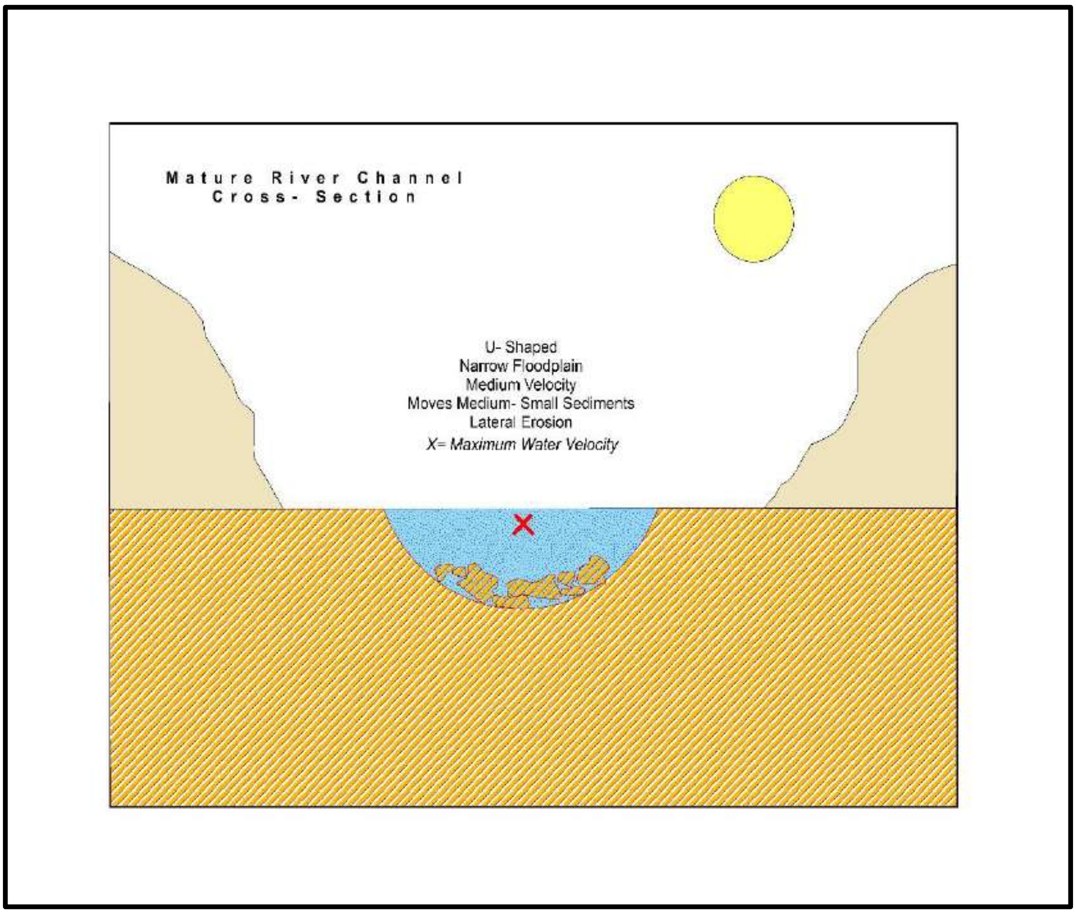

Figure 10

Old Age River :

An Old Age River rests in almost flat valley due to many years of erosion that took place over the years. Their course is not straight with widened flood plains. They are the slowest river with a high degree of sediments

.

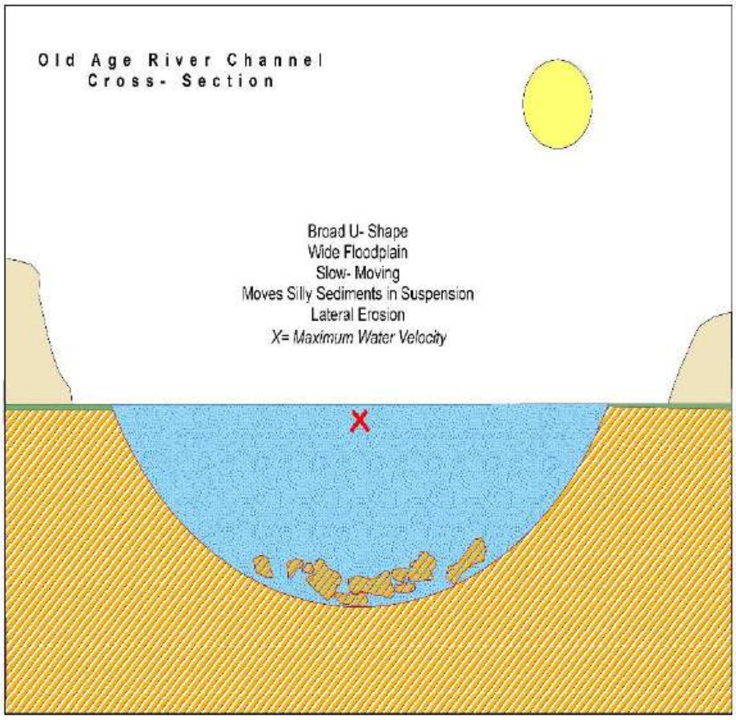

Figure 11

11. Stream Erosion and Deposition

Water flow in a stream largely depends on its gradient and also governed by the geometry of the stream channel. Velocity of water flow decreases with increase in friction along the stream bed. As a result, it is slowest at the bottom and edges and fastest near the surface and in the middle portion. On a curved section of a stream, flow velocity is highest on the extremes and slowest in the middle. An important factor that determine velocity of stream water is the size of sediments on the stream bed because large particles tend to slow down the flow more than the small particles. During a flood as the water level rises, there is more cross0-sectionalmarea available for the water to flow. But as long as the river remains confined, the velocity of water flow naturally increases. Small dimensional particles rest at the bottom for a (Figure -12) while where they are moved by saltation and traction. These particles can also be held in suspension in the flowing water, at a time when the velocity is high. As we are aware of, stream water can also have dissolved load which may represent about 15% of the mass transported and consists of minerals like calcium (Ca^{2+}) and Chloride (Cl^{-}) in dissolved condition.

Typical Particle-size (mm) Distribution Curve:

A stream typically reaches the highest velocity as and when it is close to flooding over its banks (Bank-full Stage). As soon as the flooding stream flows over its banks and occupies the wide area in the flood plain, larger area becomes available and consequently the velocity comes down. At this juncture, sediment that was earlier being carried by high velocity of water gets deposited near the edge of the channel forming a natural bank or levee.

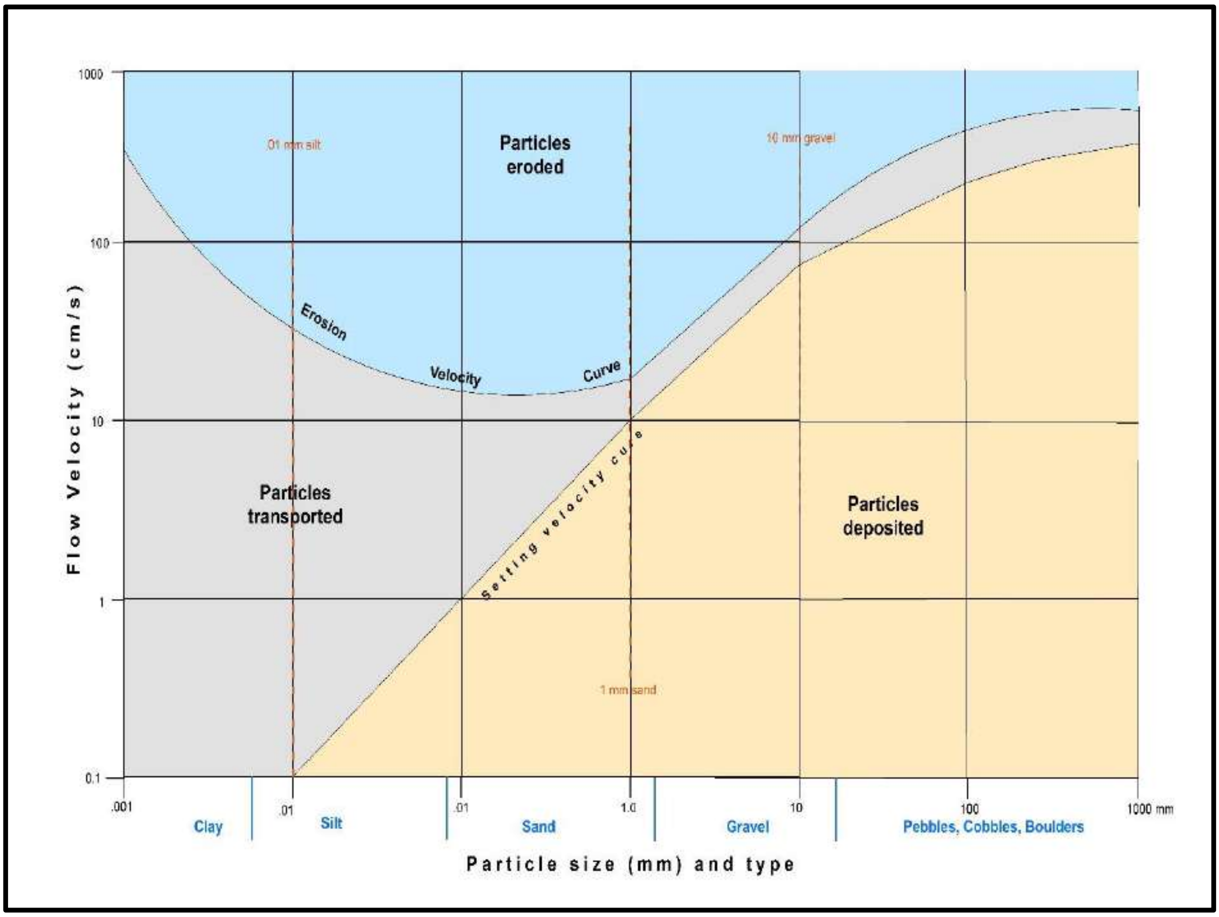

Figure 12

12. SAND MINING GUIDELINES

(Based on Sustainable Sand Management Guidelines, MoEF&CC, 2016)

In order to ensure sustainable and systematic sand mining with monitored protection of environment, the guidelines laid down in following documents are followed :

1) Sustainable Sand Mining Management Guidelines 2016 by MoEF&CC

2) Enforcement & Monitoring Guidelines for Sand Mining 2020 by MoEF&CC

3) Assam Minor Mineral Concession Rules, 2013

The above documents have been strictly adhered to during Preparation of Mining Plan and Progressive Mine Closure Plan under the guidance of a registered RQP. This will facilitate grant of any mineral concessions like "Mining Lease", "Mining Contract" or "Mining Permit" in respect of minor minerals for systematic, scientific and progressive development of all mines, quarries as well as river bed mining. As per guidelines prescribed in above said documents, special attention has been given on the following aspects :

1) The permanent boundary pillars need to be erected after identification of an area of aggradation and deposition outside the bank of the river at a safe location for future surveying. The distance between boundary pillars on both sides of the bank shall not be more than 100 meters.

2) Proper channelization of river is to be carried out so as to avoid the possibility of flooding and to maintain the flow of rivers.

3) The mining plan should include original ground level (OGL), available from District Survey Report (DSR) and to be recorded at an interval not more than 10 m x 10 m along and across the length of the river. Area of aggradation /deposition needs to be ascertained by comparing the level difference between the OGL and water level.

4) Riverbed sand mining shall be restricted within the central 3/4th width of the river/ rivulet or 7.5 meters(inward) from river banks but up to 10% of width of the river. Central 3/4th part of the river needs to be identified on a map, out of which the area of deposition / aggradation needs to be identified. Remaining 1/4th area needs to be marked as 'no mining zone'.

5) The sediment sampling should include the bed material and bed material load before, using and after the extraction period. The above exercise by DSR require four surveys i.e. 1st survey in the month of April, 2nd survey at the time of closing of mines for monsoon, 3rd survey needs to be carried out after monsoon to know the quantum of material deposited/replenished and the 4th survey to be carried out at the end of March to know the Quantum of material excavated. The above information will be available in District Survey Report (DSR).

6) The particle size distribution and bulk density of deposited material are required to be assessed by a NABL recognised laboratory.

7) Depth of mining should be restricted to 3 meters and distance from the bank should be 1/4th of the river width and should not be less than 7.5 meters. Alternatively, distance from the bank should be 3 meters or 10% of the river width, whichever is less.

8) Demarcation of mining area with pillars and geo-referencing should be done prior to of mining operation.

9) A buffer distance/ un-mined block of 50 meters after every block of 1000 meters over which mining is undertaken, shall be maintained.

10) Sand and gravel may be extracted across the entire active channel during the dry season only. No sand mining during monsoon session, as defined in DSR or IMD for each state.

11) Sand and gravel shall not be extracted up to a distance of 1 km from major bridges and highways on both sides, or five (5) times span of a bridge/public civil structure (including water intake points) on up-stream side and ten(10) times the span of such bridge on down- stream side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.

12) Sand and gravel shall not be allowed to be extracted where erosion may occur, such as, at the concave bank.

13) River mining from outside should not affect rivers. No mining shall be permitted in an area up to a width of 100 meters from the active edge of the embankments or distance prescribed by irrigation department. The mining from area outside river bed

shall be permitted subject to a condition that a safety margin of two (2) meters shall be maintained above the groundwater level while undertaking mining operation.

14) Sand and gravel shall not be extracted within 200 to 500 meters from any crucial hydraulic structure such as pumping station, water intakes.

15) All sand carrying vehicle (from source to destination) to be tracked through GPS or RFID. There should be one entry and exit point for trucks / dumpers. Project Proponent should carry out effective monitoring of the same. In case of vehicle break-down, the validity of transport permit can be extended by State Authority, if so required.

13. List of PP land Mining in Kamrup District under North Kamrup Division, Rangia.

Sl no.	Name of District	Name of Range	Name of PP land Permit area	GPS coordinates		Remarks
				Latitude N.	Longitude E.	
1	Kamrup	Sila Range	Bargaon PP land ordinary Earth MPA	26^{0} $13^{/}$ $41.17^{//}$	91^{0} $39^{/}$ $51.7^{//}$	
				26^{0} $13^{/}$ $41.04^{//}$	91^{0} $39^{/}$ $52.7^{//}$	
2	Kamrup	Sila Range	Sila PP land Earth MPA	26^{0} $14^{/}$ $37.7^{//}$	91^{0} $41^{/}$ $31.0^{//}$	
				26^{0} $14^{/}$ $44.2^{//}$	91^{0} $41^{/}$ $23.5^{//}$	
3	Kamrup	Sila Range	Patta Land Ordinary Earth MPA at Sila Village	26^{0} $14^{/}$ $43.4^{//}$	91^{0} $41^{/}$ $22.9^{//}$	
				26^{0} $14^{/}$ $44.4^{//}$	91^{0} $41^{/}$ $23.4^{//}$	
				26^{0} $14^{/}$ $44.4^{//}$	91^{0} $41^{/}$ $36.0^{//}$	
				26^{0} $14^{/}$ $45.3^{//}$	91^{0} $41^{/}$ $36.0^{//}$	
4		NR, Hajo	1 no. Singimari PP Land Ordinary Clay MPA	26^{0} $12^{/}$ $53.7^{//}$	91^{0} $37^{/}$ $14.4^{//}$	
				26^{0} $12^{/}$ $55.7^{//}$	91^{0} $37^{/}$ $13.0^{//}$	
5	Kamrup	Sila Range	Satgaon Grant PP land MPA	26^{0} $18^{/}$ $05.6^{//}$	91^{0} $46^{/}$ $38.3^{//}$	
				26^{0} $18^{/}$ $03.8^{//}$	91^{0} $46^{/}$ $32.2^{//}$	
6		Sadar Beat	Ajara PP Land Ordinary Clay/Earth MPA	26^{0} $21^{/}$ $17.6^{//}$	91^{0} $38^{/}$ $46.8^{//}$	
				26^{0} $21^{/}$ $21.7^{//}$	91^{0} $38^{/}$ $46.0^{//}$	
7	Kamrup			26^{0} $24^{/}$ $56.6^{//}$	91^{0} $39^{/}$ $27.8^{//}$	

		Sadar Beat	Madhukuchi PP land Ordinary Earth MPA	26^{0} 24$^{/}$ 56.6$^{//}$	91^{0} 39$^{/}$ 27.1$^{//}$	
8	Kamrup	Sila Range	Koroibari Stone Permit area	26^{0} 13$^{/}$ 38.2$^{//}$	91^{0} 41$^{/}$ 43.9$^{//}$	
				26^{0} 13$^{/}$ 38.9$^{//}$	91^{0} 41$^{/}$ 44.5$^{//}$	
9	Kamrup	NR, Hajo	Bamundi Mining Contract Area	26^{0} 10$^{/}$ 33.00$^{//}$	91^{0} 27$^{/}$ 55.40$^{//}$	
				26^{0} 10$^{/}$ 33.20$^{//}$	91^{0} 28$^{/}$ 05.70$^{//}$	
				26^{0} 10$^{/}$ 35.30$^{//}$	91^{0} 28$^{/}$ 11.0$^{//}$	
				26^{0} 10$^{/}$ 35.21$^{//}$	91^{0} 27$^{/}$ 59.3$^{//}$	
10	Kamrup	Sila Range	Dakhin Phulung Ordinary Earth MPA	26^{0} 13$^{/}$ 14.0$^{//}$	91^{0} 44$^{/}$ 45.0$^{//}$	
				26^{0} 13$^{/}$ 12.3$^{//}$	91^{0} 44$^{/}$ 45.6$^{//}$	
11	Kamrup	Sila Range	Sila PP Land Earth MPA	26^{0} 14$^{/}$ 28.9$^{//}$	91^{0} 41$^{/}$ 32.2$^{//}$	
				26^{0} 14$^{/}$ 29.4$^{//}$	91^{0} 41$^{/}$ 32.2$^{//}$	
12	Kamrup	Sila Range	Pacharia Ordinary Earth MPA	26^{0} 14$^{/}$ 21.7$^{//}$	91^{0} 39$^{/}$ 04.2$^{//}$	
				26^{0} 14$^{/}$ 19.4$^{//}$	91^{0} 39$^{/}$ 05.4$^{//}$	
13	Kamrup	Sila Range	Dakhin Fulung Ordinary Earth MPA	26^{0} 12/56.2$^{//}$	91^{0} 44/43.7/$^{/}$	
				26^{0} 12/50.5$^{//}$	91^{0} 44$^{/}$ 32.5$^{//}$	
14	Kamrup	Sadar Beat	Maukuchi PP land Ordinary Clay MPA	26^{0} 22$^{/}$ 35.07$^{//}$	91^{0} 39$^{/}$ 36.07$^{//}$	
				26^{0} 23$^{/}$ 47.02$^{//}$	91^{0} 39$^{/}$ 35.00$^{//}$	
15	Kamrup	Sila Range	Pacharia Ordinary Earth / Clay MPA	26^{0} 13$^{/}$ 54.20$^{//}$	91^{0} 38$^{/}$ 31.70$^{//}$	
				26^{0} 13$^{/}$ 55.24$^{//}$	91^{0} 38$^{/}$ 30.19$^{//}$	
16	Kamrup	Sila Range	Sila PP land Earth MPA	26^{0} 14$^{/}$ 37.7$^{//}$	91^{0} 41$^{/}$ 31.0$^{//}$	
				26^{0} 14$^{/}$ 43.5$^{//}$	91^{0} 41$^{/}$ 22.9$^{//}$	
17	Kamrup	Sila Range	Sila PP Land Earth MPA	26^{0} 14$^{/}$ 49.7$^{//}$	91^{0} 41$^{/}$ 39.5$^{//}$	
				26^{0} 14$^{/}$ 52.4$^{//}$	91^{0} 41$^{/}$ 36.0$^{//}$	
18	Kamrup	Sila Range	Athgaon Ordinary Earth MPA	26^{0} 17$^{/}$ 47.0$^{//}$	91^{0} 37$^{/}$ 27.9$^{//}$	
				26^{0} 17$^{/}$ 54.2$^{//}$	91^{0} 37$^{/}$ 27.7$^{//}$	
19	Kamrup	Sila Range	Gopeswar Ordinary Earth MPA	26^{0} 19$^{/}$ 03.3$^{//}$	91^{0} 44$^{/}$ 05.4$^{//}$	
				26^{0} 19$^{/}$ 01.3$^{//}$	91^{0} 44$^{/}$ 10.2$^{//}$	
20	Kamrup	Sila Range		26^{0} 14$^{/}$ 43.4$^{//}$	91^{0} 41$^{/}$ 22.9$^{//}$	
				26^{0} 14$^{/}$ 44.4$^{//}$	91^{0} 41$^{/}$ 23.4$^{//}$	

			Patta land Ordinary Earth MPA at Sila Village	26^{0} $14^{/}$ $44.4^{//}$	91^{0} $41^{/}$ $36.0^{//}$	
				26^{0} $14^{/}$ $45.3^{//}$	91^{0} $41^{/}$ $36.0^{//}$	
21	Kamrup	Sila Range	Sila Sindurighopa Mouza PP land MPA	26^{0} $15^{/}$ $06.2^{//}$	91^{0} $41^{/}$ $39.3^{//}$	
				26^{0} $15^{/}$ $05.6^{//}$	91^{0} $41^{/}$ $36.3^{//}$	
22	Kamrup	Sila Range	Athgaon Ordinary Earth MPA	26^{0} $17^{/}$ $50.5^{//}$	91^{0} $37^{/}$ $48.7^{//}$	
				26^{0} $17^{/}$ $52.1^{//}$	91^{0} $37^{/}$ $48.6^{//}$	
23	Kamrup	Sila Range	Majgaon WTP area PP land orindary clay MPA	26^{0} $11^{/}$ $20.7^{//}$	91^{0} $43^{/}$ $11.9^{//}$	
				26^{0} $11^{/}$ $19.6^{//}$	91^{0} $43^{/}$ $14.6^{//}$	
24	Kamrup	Sila Range	Sila Sindurighopa Mouza PP land MPA	26^{0} $14^{/}$ $09.7^{//}$	91^{0} $41^{/}$ $37.8^{//}$	
				26^{0} $14^{/}$ $13.0^{//}$	91^{0} $41^{/}$ $37.9^{//}$	
25	Kamrup	Sila Range	Pacharia Dalar Pathar Ordinary Earth MPA	26^{0} $14^{/}$ $13.1^{//}$	91^{0} $39^{/}$ $08.4^{//}$	
				26^{0} $14^{/}$ $15.1^{//}$	91^{0} $39^{/}$ $11.6^{//}$	
				26^{0} $14^{/}$ $14.2^{//}$	91^{0} $39^{/}$ $05.7^{//}$	
				26^{0} $14^{/}$ $16.5^{//}$	91^{0} $39^{/}$ $09.6^{//}$	
26	Kamrup	Sadar Beat	Ajara PP Land Ordinary Clay MPA	26^{0} $21^{/}$ $19.3^{//}$	91^{0} $38^{/}$ $45.0^{//}$	
				26^{0} $21^{/}$ $21.3^{//}$	91^{0} $38^{/}$ $45.5^{//}$	
27	Kamrup	Sila Range	Sila Sindurighopa PP land Earth MPA	26^{0} $14^{/}$ $23.59^{//}$	91^{0} $41^{/}$ $32.28^{//}$	
				26^{0} $14^{/}$ $22.27^{//}$	91^{0} $41^{/}$ $37.42^{//}$	
28	Kamrup	Sadar Beat, Rangia	Soneswar PP land Ordinary Earth MPA	26^{0} $20^{/}$ $27.2^{//}$	91^{0} $38^{/}$ $47.8^{//}$	
				26^{0} $20^{/}$ $23.8^{//}$	91^{0} $38^{/}$ $50.1^{//}$	
29	Kamrup		Dirgheswari Ordinary Earth MPA	26^{0} $16^{/}$ $49.2^{//}$	91^{0} $44^{/}$ $48.3^{//}$	
				26^{0} $16^{/}$ $50.1^{//}$	91^{0} $46^{/}$ $52.8^{//}$	
30	Kamrup	Sila Range	Satgaon PP land Ordinary Earth MPA	26^{0} $17^{/}$ $44.30^{//}$	91^{0} $46^{/}$ $13.90^{//}$	
				26^{0} $17^{/}$ $57.98^{//}$	91^{0} $46^{/}$ $10.98^{//}$	
31	Kamrup	Sadar Beat, Rangia	Moukuchi Ordinary Clay MPA	26^{0} $22^{/}$ $52.20^{//}$	91^{0} $39^{/}$ $40.10^{//}$	
				26^{0} $22^{/}$ $51.30^{//}$	91^{0} $39^{/}$ $38.30^{//}$	
32	Kamrup	Sila Range	Sila ordinary Earth MPA	26^{0} $14^{/}$ $55.58^{//}$	91^{0} $41^{/}$ $38.15^{//}$	
				26^{0} $14^{/}$ $54.80^{//}$	91^{0} $41^{/}$ $37.01^{//}$	

				$26^{0}\ 14^{/}\ 55.55^{//}$	$91^{0}\ 41^{/}\ 36.73^{//}$	
				$26^{0}\ 14^{/}\ 55.98^{//}$	$91^{0}\ 41^{/}\ 37.69^{//}$	
33	Kamrup	Sila Range	Sila Village Patta Land Ordinary Earth MPA	$26^{0}\ 14^{/}\ 23.38^{//}$	$91^{0}\ 41^{/}\ 54.82^{//}$	
				$26^{0}\ 14^{/}\ 24.88^{//}$	$91^{0}\ 41^{/}\ 53.24^{//}$	
				$26^{0}\ 14^{/}\ 23.74^{//}$	$91^{0}\ 41^{/}\ 52.03^{//}$	
				$26^{0}\ 14^{/}\ 22.41^{//}$	$91^{0}\ 41^{/}\ 53.38^{//}$	
34	Kamrup	Sila Range	Sila PP Land Earth MPA	$26^{0}\ 14^{/}\ 48.6^{//}$	$91^{0}\ 41^{/}\ 37.3^{//}$	
				$26^{0}\ 14^{/}\ 48.53^{//}$	$91^{0}\ 41^{/}\ 36.39^{//}$	
				$26^{0}\ 14^{/}\ 49.56^{//}$	$91^{0}\ 41^{/}\ 36.23^{//}$	
				$26^{0}\ 14^{/}\ 49.63^{//}$	$91^{0}\ 41^{/}\ 37.37^{//}$	
35	Kamrup	Sila Range	Rangmahal P.P. Land Ordinary Earth MPA	$26^{0}\ 13^{/}\ 24.3^{//}$	$91^{0}\ 43^{/}\ 37.3^{//}$	
				$26^{0}\ 13^{/}\ 22.6^{//}$	$91^{0}\ 43^{/}\ 39.1^{//}$	
				$26^{0}\ 13^{/}\ 20.7^{//}$	$91^{0}\ 43^{/}\ 38.0^{//}$	
				$26^{0}\ 13^{/}\ 21.6^{//}$	$91^{0}\ 43^{/}\ 37.1^{//}$	
				$26^{0}\ 13^{/}\ 22.2^{//}$	$91^{0}\ 43^{/}\ 37.8^{//}$	
				$26^{0}\ 13^{/}\ 23.5^{//}$	$91^{0}\ 43^{/}\ 36.9^{//}$	
36	Kamrup	Sila Range	Kalipahar Ordinary Earth MPA	$26^{0}\ 12^{/}\ 34.0^{//}$	$91^{0}\ 41^{/}\ 15.7^{//}$	
				$26^{0}\ 12^{/}\ 33.5^{//}$	$91^{0}\ 41^{/}\ 14.3^{//}$	
				$26^{0}\ 12^{/}\ 34.1^{//}$	$91^{0}\ 41^{/}\ 14.1^{//}$	
				$26^{0}\ 12^{/}\ 34.7^{//}$	$91^{0}\ 41^{/}\ 15.0^{//}$	
37	Kamrup	Sila Range	Extraction Stone from Patta Land at Sila Village	$26^{0}\ 14^{/}\ 20.09^{//}$	$91^{0}\ 42^{/}\ 00.00^{//}$	
				$26^{0}\ 14^{/}\ 20.06^{//}$	$91^{0}\ 42^{/}\ 01.04^{//}$	
				$26^{0}\ 14^{/}\ 22.02^{//}$	$91^{0}\ 42^{/}\ 01.08^{//}$	
				$26^{0}\ 14^{/}\ 22.05^{//}$	$91^{0}\ 42^{/}\ 00.08^{//}$	
38	Kamrup	Sila Range	Patta Land Ordinary Earth MPA at Sila Village	$26^{0}\ 14^{/}\ 37.58^{//}$	$91^{0}\ 41^{/}\ 59.65^{//}$	
				$26^{0}\ 14^{/}\ 40.46^{//}$	$91^{0}\ 41^{/}\ 50.61^{//}$	
				$26^{0}\ 14^{/}\ 42.25^{//}$	$91^{0}\ 41^{/}\ 51.57^{//}$	
				$26^{0}\ 14^{/}\ 39.13^{//}$	$91^{0}\ 42^{/}\ 0.27^{//}$	
39	Kamrup			$26^{0}\ 12^{/}\ 44.1^{//}$	$91^{0}\ 44^{/}\ 32.5^{//}$	

		Sila Range	Dakhin Fulung Ordinary Earth MPA	$26^0\ 12^/\ 42.5^{//}$	$91^0\ 44^/\ 33.2^{//}$	
				$26^0\ 12^/\ 45.3^{//}$	$91^0\ 44^/\ 38.5^{//}$	
				$26^0\ 12^/\ 43.6^{//}$	$91^0\ 44^/\ 39.1^{//}$	
				$26^0\ 12^/\ 40.6^{//}$	$91^0\ 44^/\ 34.3^{//}$	
				$26^0\ 12^/\ 38.1^{//}$	$91^0\ 44^/\ 39.6^{//}$	
				$26^0\ 12^/\ 40.6^{//}$	$91^0\ 44^/\ 39.0^{//}$	
40	Kamrup	Sila Range	Pacharia Ordinary Earth MPA	$26^0\ 14/17.01^{//}$	$91^0\ 39/12.27^{/}/$	
				$26^0\ 14/19.63^{//}$	$91^0\ 39^/\ 14.54^{//}$	
				$26^0\ 14^/\ 21.00^{//}$	$91^0\ 39^/\ 12.08^{//}$	
				$26^0\ 14^/\ 18.31^{//}$	$91^0\ 39^/\ 07.75^{//}$	
41	Kamrup	Sila Range	Uttar Fulung Ordinary Clay MPA	$26^0\ 13^/\ 44.19^{//}$	$91^0\ 45^/\ 13.38^{//}$	
				$26^0\ 13^/\ 31.54^{//}$	$91^0\ 45^/\ 3.25^{//}$	
				$26^0\ 13^/\ 30.70^{//}$	$91^0\ 45^/\ 4.34^{//}$	
				$26^0\ 13^/\ 43.45^{//}$	$91^0\ 45^/\ 14.81^{//}$	
42	Kamrup	Sila Range	Katamur(Sila Sindurighopa) Stone & Earth Permit Area	$26^0\ 14^/\ 09.5^{//}$	$91^0\ 41^/\ 33.8^{//}$	
				$26^0\ 14^/\ 09.8^{//}$	$91^0\ 41^/\ 32.2^{//}$	
				$26^0\ 14^/\ 13.1^{//}$	$91^0\ 41^/\ 32.5^{//}$	
				$26^0\ 14^/\ 12.9^{//}$	$91^0\ 41^/\ 33.7^{//}$	
43	Kamrup	Sila Range	Rudreswar P.P. Land Ordinary Earth MPA	$26^0\ 13^/\ 8.2^{//}$	$91^0\ 43^/\ 33.8^{//}$	
				$26^0\ 13^/\ 8.2^{//}$	$91^0\ 43^/\ 34.7^{//}$	
				$26^0\ 13^/\ 9.7^{//}$	$91^0\ 43^/\ 34.4^{//}$	
				$26^0\ 13^/\ 9.59^{//}$	$91^0\ 43^/\ 33.45^{//}$	
			Moukuchi P.P. Land Ordinary Clay MPA	$26^0\ 22^/\ 49.00^{//}$	$91^0\ 39^/\ 34.00^{//}$	
				$26^0\ 22^/\ 48.90^{//}$	$91^0\ 39^/\ 35.30^{//}$	
				$26^0\ 22^/\ 48.20^{//}$	$91^0\ 39^/\ 35.30^{//}$	
				$26^0\ 22^/\ 48.50^{//}$	$91^0\ 39^/\ 34.70^{//}$	
				$26^0\ 22^/\ 51.40^{//}$	$91^0\ 39^/\ 37.30^{//}$	
				$26^0\ 22^/\ 52.20^{//}$	$91^0\ 39^/\ 37.40^{//}$	
				$26^0\ 22^/\ 52.80^{//}$	$91^0\ 39^/\ 40.40^{//}$	

44	Kamrup	Sadar Beat		$26^{0}\ 22^{/}\ 52.40^{//}$	$91^{0}\ 39^{/}\ 40.40^{//}$	
				$26^{0}\ 22^{/}\ 52.30^{//}$	$91^{0}\ 39^{/}\ 39.30^{//}$	
				$26^{0}\ 22^{/}\ 51.50^{//}$	$91^{0}\ 39^{/}\ 39.30^{//}$	
				$26^{0}\ 22^{/}\ 57.20^{//}$	$91^{0}\ 39^{/}\ 38.70^{//}$	
				$26^{0}\ 22^{/}\ 56.10^{//}$	$91^{0}\ 39^{/}\ 38.30^{//}$	
				$26^{0}\ 22^{/}\ 55.70^{//}$	$91^{0}\ 39^{/}\ 33.70^{//}$	
				$26^{0}\ 22^{/}\ 57.00^{//}$	$91^{0}\ 39^{/}\ 33.80^{//}$	
				$26^{0}\ 22^{/}\ 59.10^{//}$	$91^{0}\ 39^{/}\ 30.30^{//}$	
				$26^{0}\ 23^{/}\ 1.80^{//}$	$91^{0}\ 39^{/}\ 33.30^{//}$	
				$26^{0}\ 23^{/}\ 2.40^{//}$	$91^{0}\ 39^{/}\ 30.80^{//}$	
				$26^{0}\ 23^{/}\ 0.70^{//}$	$91^{0}\ 39^{/}\ 28.30^{//}$	
45	Kamrup	Sila Range	Agyathuri Ordinary Clay MPA	$26^{0}11^{/}12.776^{//}$	$91^{0}38^{/}39.854^{//}$	
				$26^{0}11^{/}7.920^{//}$	$91^{0}38^{/}38.120^{//}$	
				$26^{0}11^{/}10.340^{//}$	$91^{0}38^{/}26.670^{//}$	
				$26^{0}11^{/}15.016^{//}$	$91^{0}38^{/}29.077^{//}$	
46	Kamrup	NR Hajo	Bamun Sualkuchi Ordinary Earth MPA	$26^{0}\ 10^{/}\ 43.78^{//}$	$91^{0}\ 34^{/}\ 46.59^{//}$	
				$26^{0}\ 10^{/}\ 40.20^{//}$	$91^{0}\ 34^{/}\ 36.56^{//}$	
				$26^{0}\ 10^{/}\ 34.50^{//}$	$91^{0}\ 34^{/}\ 38.60^{//}$	
				$26^{0}\ 10^{/}\ 38.08^{//}$	$91^{0}\ 34^{/}\ 46.83^{//}$	
47	Kamrup	Sila Range	Satgaon FC Grant PP Land Ordinary Earth MPA	$26^{0}\ 18^{/}\ 4.40^{//}$	$91^{0}\ 46^{/}\ 31.20^{//}$	
				$26^{0}\ 18^{/}\ 3.40^{//}$	$91^{0}\ 46^{/}\ 32.40^{//}$	
				$26^{0}\ 18^{/}\ 3.90^{//}$	$91^{0}\ 46^{/}\ 30.20^{//}$	
				$26^{0}\ 18^{/}\ 5.00^{//}$	$91^{0}\ 46^{/}\ 29.80^{//}$	
48	Kamrup	Sila Range	Sila PP Land Ordinary Earth & Stone MPA`	$26^{0}\ 14^{/}\ 9.60^{//}$	$91^{0}\ 41^{/}\ 32.40^{//}$	
				$26^{0}\ 14^{/}\ 9.49^{//}$	$91^{0}\ 41^{/}\ 30.21^{//}$	
				$26^{0}\ 14^{/}\ 12.39^{//}$	$91^{0}\ 41^{/}\ 29.72^{//}$	
				$26^{0}\ 14^{/}\ 12.46^{//}$	$91^{0}\ 41^{/}\ 31.92^{//}$	
49	Kamrup	Sila Range	Satgaon PP Land Ordinary Earth MPA	$26^{0}\ 17^{/}\ 44.30^{//}$	$91^{0}\ 46^{/}\ 13.90^{//}$	
				$26^{0}\ 17^{/}\ 43.20^{//}$	$91^{0}\ 46^{/}\ 12.30^{//}$	

				26^0 $17^/$ $55.54^{//}$	91^0 $45^/$ $58.50^{//}$	
				26^0 $17^/$ $57.98^{//}$	91^0 $46^/$ $10.98^{//}$	
50	Kamrup	Sila Range	Uttar Fulung Government Land Ordinary Clay MPA	26^0 $14^/$ $5.16^{//}$	91^0 $45^/$ $24.83^{//}$	
				26^0 $14^/$ $4.42^{//}$	91^0 $45^/$ $26.22^{//}$	
				26^0 $14^/$ $16.88^{//}$	91^0 $45^/$ $37.83^{//}$	
				26^0 $14^/$ $17.78^{//}$	91^0 $45^/$ $36.75^{//}$	
51	Kamrup	Sila Range	Dirgheswari Ordinary Earth MPA	26^0 $17^/$ $7.10^{//}$	91^0 $45^/$ $1.69^{//}$	
				26^0 $17^/$ $11.26^{//}$	91^0 $45^/$ $2.11^{//}$	
				26^0 $17^/$ $8.65^{//}$	91^0 $45^/$ $7.15^{//}$	
				26^0 $17^/$ $6.50^{//}$	91^0 $45^/$ $6.40^{//}$	
52	Kamrup	Sila Range	Satgaon PP Land Stone MPA	26^0 $17^/$ $44.30^{//}$	91^0 $46^/$ $13.90^{//}$	
				26^0 $17^/$ $43.20^{//}$	91^0 $46^/$ $12.30^{//}$	
				26^0 $17^/$ $50.93^{//}$	91^0 $46^/$ $3.58^{//}$	
				26^0 $17^/$ $53.07^{//}$	91^0 $46^/$ $6.22^{//}$	
53	Kamrup	Sila Range	Baralabari(Jalah) Stone & Earth MPA	26^0 $13^/$ $58.5^{//}$	91^0 $43^/$ $08.2^{//}$	
				26^0 $13^/$ $57.8^{//}$	91^0 $43^/$ $08.2^{//}$	
				26^0 $13^/$ $58.12^{//}$	91^0 $43^/$ $9.85^{//}$	
				26^0 $13^/$ $58.91^{//}$	91^0 $43^/$ $9.72^{//}$	
54	Kamrup	Sila Range	Sila Ordinary Earth MPA	26^0 $14^/$ $45.87^{//}$	91^0 $41^/$ $42.56^{//}$	
				26^0 $14^/$ $46.32^{//}$	91^0 $41^/$ $42.30^{//}$	
				26^0 $14^/$ $47.18^{//}$	91^0 $41^/$ $40.42^{//}$	
				26^0 $14^/$ $46.32^{//}$	91^0 $41^/$ $39.86^{//}$	
55	Kamrup	Sila Range	Sila PP Land Earth MPA	26^0 $14^/$ $23.7^{//}$	91^0 $41^/$ $57.8^{//}$	
				26^0 $14^/$ $33.65^{//}$	91^0 $41^/$ $58.78^{//}$	
				26^0 $14^/$ $35.06^{//}$	91^0 $41^/$ $58.24^{//}$	
				26^0 $14^/$ $34.05^{//}$	91^0 $41^/$ $56.88^{//}$	
56	Kamrup	Sila Range	Bor-Nizara PP Land Ordinary Earth MPA	26^0 $17^/$ $35.3^{//}$	91^0 $46^/$ $11.5^{//}$	
				26^0 $17^/$ $36.5^{//}$	91^0 $46^/$ $12.9^{//}$	
				26^0 $17^/$ $37.5^{//}$	91^0 $46^/$ $13.9^{//}$	

				$26^{0} 17^{/} 39.2^{//}$	$91^{0} 46^{/} 12.6^{//}$	
				$26^{0} 17^{/} 39.2^{//}$	$91^{0} 46^{/} 11.4^{//}$	
57	Kamrup	Sila Range	Changsari Ordinary Earth MPA	$26^{0} 14^{/} 44.03^{//}$	$91^{0} 41^{/} 22.90^{//}$	
				$26^{0} 14^{/} 43.79^{//}$	$91^{0} 41^{/} 24.13^{//}$	
				$26^{0} 14^{/} 45.52^{//}$	$91^{0} 41^{/} 25.01^{//}$	
				$26^{0} 14^{/} 46.10^{//}$	$91^{0} 41^{/} 23.30^{//}$	
58	Kamrup	Sila Range	Chowkigate Ordinary Earth MPA	$26^{0} 14^{/} 8.84^{//}$	$91^{0} 41^{/} 25.56^{//}$	
				$26^{0} 14^{/} 10.76^{//}$	$91^{0} 41^{/} 28.11^{//}$	
				$26^{0} 14^{/} 11.03^{//}$	$91^{0} 41^{/} 24.19^{//}$	
				$26^{0} 14^{/} 13.25^{//}$	$91^{0} 41^{/} 26.79^{//}$	
59	Kamrup	Sila Range	Sila PP Land Earth & Stone MPA	$26^{0} 14^{/} 44.33^{//}$	$91^{0} 42^{/} 0.88^{//}$	
				$26^{0} 14^{/} 43.70^{//}$	$91^{0} 42^{/} 1.45^{//}$	
				$26^{0} 14^{/} 42.75^{//}$	$91^{0} 42^{/} 0.56^{//}$	
				$26^{0} 14^{/} 43.29^{//}$	$91^{0} 41^{/} 59.90^{//}$	
60	Kamrup	Sila Range	Sila PP Land Earth & Stone MPA	$26^{0}14^{/}37.515^{//}$	$91^{0}41^{/}58.822^{//}$	
				$26^{0}14^{/}36.745^{//}$	$91^{0}41^{/}58.812^{//}$	
				$26^{0}14^{/}36.355^{//}$	$91^{0}41^{/}59.872^{//}$	
				$26^{0}14^{/}37.205^{//}$	$91^{0}41^{/}59.802^{//}$	
61	Kamrup	Sila Range	Uttar Fulung Ordinary Earth MPA	$26^{0} 14^{/} 37.6^{//}$	$91^{0} 45^{/} 29.7^{//}$	
				$26^{0} 14^{/} 35.87^{//}$	$91^{0} 45^{/} 30.20^{//}$	
				$26^{0} 14^{/} 36.89^{//}$	$91^{0} 45^{/} 33.82^{//}$	
				$26^{0} 14^{/} 38.75^{//}$	$91^{0} 45^{/} 33.30^{//}$	
62	Kamrup	Sila Range	Sila Ordinary Earth MPA	$26^{0} 14^{/} 35.11^{//}$	$91^{0} 41^{/} 59.63^{//}$	
				$26^{0} 14^{/} 36.34^{//}$	$91^{0} 41^{/} 59.69^{//}$	
				$26^{0} 14^{/} 36.85^{//}$	$91^{0} 41^{/} 57.69^{//}$	
				$26^{0} 14^{/} 35.43^{//}$	$91^{0} 41^{/} 57.67^{//}$	
63	Kamrup	Sila Range	Sila Sindurighopa PP Land Stone & Ordinary Earth Permit Area	$26^{0} 14^{/} 15.30^{//}$	$91^{0} 41^{/} 56.10^{//}$	
				$26^{0} 14^{/} 16.80^{//}$	$91^{0} 41^{/} 56.30^{//}$	
				$26^{0} 14^{/} 16.62^{//}$	$91^{0} 42^{/} 0.14^{//}$	

				$26^{0}\ 14^{/}\ 14.94^{//}$	$91^{0}\ 41^{/}\ 59.80^{//}$	
64	Kamrup	Sila Range	Sila PP Land Earth MPA	$26^{0}\ 14^{/}\ 13.40^{//}$	$91^{0}\ 41^{/}\ 39.70^{//}$	
				$26^{0}\ 14^{/}\ 12.90^{//}$	$91^{0}\ 41^{/}\ 42.10^{//}$	
				$26^{0}\ 14^{/}\ 14.70^{//}$	$91^{0}\ 41^{/}\ 42.74^{//}$	
				$26^{0}\ 14^{/}\ 15.14^{//}$	$91^{0}\ 41^{/}\ 40.25^{//}$	
65	Kamrup	Sila Range	Mandakata FC Grant PP Land Earth MPA	$26^{0}17^{/}26.700^{//}$	$91^{0}45^{/}42.400^{//}$	
				$26^{0}17^{/}27.100^{//}$	$91^{0}45^{/}47.600^{//}$	
				$26^{0}17^{/}30.300^{//}$	$91^{0}45^{/}48.200^{//}$	
				$26^{0}17^{/}29.800^{//}$	$91^{0}45^{/}42.200^{//}$	
66	Kamrup	Sila Range	Sila PP Land Erath & Stone MPA	$26^{0}\ 14^{/}\ 45.58^{//}$	$91^{0}\ 41^{/}\ 41.99^{//}$	
				$26^{0}\ 14^{/}\ 46.12^{//}$	$91^{0}\ 41^{/}\ 44.14^{//}$	
				$26^{0}\ 14^{/}\ 42.82^{//}$	$91^{0}\ 41^{/}\ 44.40^{//}$	
				$26^{0}\ 14^{/}\ 42.28^{//}$	$91^{0}\ 41^{/}\ 41.95^{//}$	
67	Kamrup	NR Hajo	Pacharia Dalar Pathar Ordinary Earth MPA	$26^{0}\ 14^{/}\ 22.02^{//}$	$91^{0}\ 39^{/}\ 9.00^{//}$	
				$26^{0}\ 14^{/}\ 22.20^{//}$	$91^{0}\ 39^{/}\ 7.14^{//}$	
				$26^{0}\ 14^{/}\ 21.35^{//}$	$91^{0}\ 39^{/}\ 6.99^{//}$	
				$26^{0}\ 14^{/}\ 21.23^{//}$	$91^{0}\ 39^{/}\ 9.00^{//}$	
68	Kamrup	NR Hajo	Soneswar PP Land Ordinary Clay MPA	$26^{0}20^{/}\ 29.9^{//}$	$91^{0}\ 38^{/}\ 47.8^{//}$	
				$26^{0}20^{/}\ 34.4^{//}$	$91^{0}\ 38^{/}\ 49.2^{//}$	
				$26^{0}20^{/}\ 18.4^{//}$	$91^{0}\ 38^{/}\ 52.2^{//}$	
				$26^{0}20^{/}\ 19.4^{//}$	$91^{0}\ 38^{/}\ 53.5^{//}$	
69	Kamrup	NR Hajo	Bagta PP Land Ordinary Earth MPA	$26^{0}\ 16^{/}30.6^{//}$	$91^{0}\ 33^{/}\ 28.5^{//}$	
				$26^{0}\ 16^{/}30.4^{//}$	$91^{0}\ 33^{/}\ 26.8^{//}$	
				$26^{0}\ 16^{/}36.7^{//}$	$91^{0}\ 33^{/}\ 25.4^{//}$	
				$26^{0}\ 16^{/}36.7^{//}$	$91^{0}\ 33^{/}\ 27.4^{//}$	
				$26^{0}\ 16^{/}30.1^{//}$	$91^{0}\ 33^{/}\ 28.9^{//}$	
				$26^{0}\ 16^{/}29.5^{//}$	$91^{0}\ 33^{/}\ 27.0^{//}$	
				$26^{0}\ 16^{/}27.5^{//}$	$91^{0}\ 33^{/}\ 28.6^{//}$	
				$26^{0}\ 16^{/}26.9^{//}$	$91^{0}\ 33^{/}\ 27.6^{//}$	

70	Kamrup	NR Hajo	Sanpara Parbat Ordinary Earth MPA	$26^{0}\ 12^{/}04.2^{//}$	$91^{0}\ 32^{/}\ 40.9^{//}$	
				$26^{0}\ 12^{/}02.5^{//}$	$91^{0}\ 32^{/}\ 40.8^{//}$	
				$26^{0}\ 11^{/}59.5^{//}$	$91^{0}\ 32^{/}\ 40.3^{//}$	
				$26^{0}\ 11^{/}59.1^{//}$	$91^{0}\ 32^{/}\ 43.9^{//}$	
				$26^{0}\ 12^{/}01.3^{//}$	$91^{0}\ 32^{/}\ 46.7^{//}$	
				$26^{0}\ 12^{/}05.7^{//}$	$91^{0}\ 32^{/}\ 46.2^{//}$	
				$26^{0}\ 12^{/}06.4^{//}$	$91^{0}\ 32^{/}\ 42.6^{//}$	
71	Kamrup	Sadar Beat, Rangia	Madhukuchi & Gusai Solmari Ordinary Earth/Clay MPA (Madhukuchi)	$26^{0}\ 24^{/}58.2^{//}$	$91^{0}\ 39^{/}27.9^{//}$	
				$26^{0}\ 24^{/}59.8^{//}$	$91^{0}\ 39^{/}\ 28.0^{//}$	
				$26^{0}\ 24^{/}59.9^{//}$	$91^{0}\ 39^{/}\ 29.0^{//}$	
				$26^{0}\ 24^{/}58.2^{//}$	$91^{0}\ 39^{/}\ 29.3^{//}$	
				$26^{0}\ 24^{/}59.8^{//}$	$91^{0}\ 39^{/}\ 30.4^{//}$	
				$26^{0}\ 24^{/}59.8^{//}$	$91^{0}\ 39^{/}\ 31.5^{//}$	
				$26^{0}\ 24^{/}58.3^{//}$	$91^{0}\ 39^{/}\ 31.6^{//}$	
				$26^{0}\ 24^{/}58.1^{//}$	$91^{0}\ 39^{/}\ 30.5^{//}$	
72	Kamrup	Sadar Beat, Rangia	Madhukuchi & Gusai Solmari Ordinary Earth/Clay MPA (Gusai Solmari)	$26^{0}\ 25^{/}02.8^{//}$	$91^{0}\ 39^{/}\ 33.2^{//}$	
				$26^{0}\ 25^{/}01.5^{//}$	$91^{0}\ 39^{/}\ 33.4^{//}$	
				$26^{0}\ 25^{/}02.0^{//}$	$91^{0}\ 39^{/}\ 38.3^{//}$	
				$26^{0}\ 25^{/}03.9^{//}$	$91^{0}\ 39^{/}\ 38.2^{//}$	
73	Kamrup	Sadar Beat, Rangia	Haberikura PP Land Ordinary Earth MPA	$26^{0}\ 21^{/}30.9^{//}$	$91^{0}\ 39^{/}\ 6.7^{//}$	
				$26^{0}\ 21^{/}32.3^{//}$	$91^{0}\ 39^{/}\ 6.6^{//}$	
				$26^{0}\ 21^{/}32.1^{//}$	$91^{0}\ 39^{/}\ 4.3^{//}$	
				$26^{0}\ 21^{/}30.7^{//}$	$91^{0}\ 39^{/}\ 4.3^{//}$	
74	Kamrup	Sadar Beat, Rangia	Kendukona Ordinary Earth / Clay MPA	$26^{0}\ 22^{/}20.4^{//}$	$91^{0}\ 39^{/}\ 14.4^{//}$	
				$26^{0}\ 22^{/}19.3^{//}$	$91^{0}\ 39^{/}\ 14.0^{//}$	
				$26^{0}\ 22^{/}18.2^{//}$	$91^{0}\ 39^{/}\ 16.8^{//}$	
				$26^{0}\ 22^{/}\ 20.1^{//}$	$91^{0}\ 39^{/}\ 18.8^{//}$	
				$26^{0}\ 22^{/}20.9^{//}$	$91^{0}\ 39^{/}\ 16.5^{//}$	
75	Kamrup			$26^{0}\ 21^{/}17.30^{//}$	$91^{0}\ 38^{/}\ 46.40^{//}$	

		Sadar Beat, Rangia	Azara PP Land Ordinary Clay MPA	$26^{0}\ 21^{/}17.20^{//}$	$91^{0}\ 38^{/}\ 44.40^{//}$	
				$26^{0}\ 21^{/}12.50^{//}$	$91^{0}\ 38^{/}\ 43.20^{//}$	
				$26^{0}\ 21^{/}12.60^{//}$	$91^{0}\ 38^{/}\ 45.30^{//}$	
76	Kamrup	Sadar Beat, Rangia	Maukuchi PP Land Ordinary Clay MPA **Plot-1**	$26^{0}\ 22^{/}53.6^{//}$	$91^{0}\ 39^{/}\ 40.9^{//}$	
				$26^{0}\ 22^{/}54.5^{//}$	$91^{0}\ 39^{/}\ 40.9^{//}$	
				$26^{0}\ 22^{/}53.7^{//}$	$91^{0}\ 39^{/}\ 36.1^{//}$	
				$26^{0}\ 22^{/}54.5^{//}$	$91^{0}\ 39^{/}\ 36.7^{//}$	
77	Kamrup	Sadar Beat, Rangia	Maukuchi PP Land Ordinary Clay MPA **Plot-2**	$26^{0}\ 22^{/}55.4^{//}$	$91^{0}\ 39^{/}\ 37.2^{//}$	
				$26^{0}\ 22^{/}56.6^{//}$	$91^{0}\ 39^{/}\ 37.4^{//}$	
				$26^{0}\ 22^{/}56.7^{//}$	$91^{0}\ 39^{/}\ 40.6^{//}$	
				$26^{0}\ 22^{/}55.4^{//}$	$91^{0}\ 39^{/}\ 41.0^{//}$	
78	Kamrup	Sadar Beat, Rangia	Maukuchi PP Land Ordinary Clay MPA **Plot-3**	$26^{0}\ 22^{/}48.9^{//}$	$91^{0}\ 39^{/}\ 35.7^{//}$	
				$26^{0}\ 22^{/}48.1^{//}$	$91^{0}\ 39^{/}\ 35.8^{//}$	
				$26^{0}\ 22^{/}48.1^{//}$	$91^{0}\ 39^{/}\ 35.0^{//}$	
				$26^{0}\ 22^{/}47.0^{//}$	$91^{0}\ 39^{/}\ 34.6^{//}$	
				$26^{0}\ 22^{/}47.0^{//}$	$91^{0}\ 39^{/}\ 31.4^{//}$	
				$26^{0}\ 22^{/}48.3^{//}$	$91^{0}\ 39^{/}\ 31.5^{//}$	
				$26^{0}\ 22^{/}48.3^{//}$	$91^{0}\ 39^{/}\ 32.6^{//}$	
				$26^{0}\ 22^{/}49.3^{//}$	$91^{0}\ 39^{/}\ 33.1^{//}$	
79	Kamrup	Sadar Beat, Rangia	Ajara PP Land Ordinary Clay/Earth MPA **Plot-1**	$26^{0}\ 21^{/}17.6^{//}$	$91^{0}\ 38^{/}\ 46.8^{//}$	
				$26^{0}\ 21^{/}17.9^{//}$	$91^{0}\ 38^{/}\ 43.9^{//}$	
				$26^{0}\ 21^{/}21.2^{//}$	$91^{0}\ 38^{/}\ 47.0^{//}$	
				$26^{0}\ 21^{/}21.7^{//}$	$91^{0}\ 38^{/}\ 46.0^{//}$	
80		Sadar Beat, Rangia	Ajara PP Land Ordinary Clay/Earth MPA **Plot-2**	$26^{0}\ 21^{/}15.9^{//}$	$91^{0}\ 38^{/}\ 43.7^{//}$	
				$26^{0}\ 21^{/}16.1^{//}$	$91^{0}\ 38^{/}\ 42.9^{//}$	
				$26^{0}\ 21^{/}11.3^{//}$	$91^{0}\ 38^{/}\ 42.3^{//}$	
				$26^{0}\ 21^{/}11.4^{//}$	$91^{0}\ 38^{/}\ 41.1^{//}$	
81	Kamrup		Kendukona Ordinary Earth MPA	$26^{0}\ 22^{/}15.2^{//}$	$91^{0}\ 39^{/}\ 14.1^{//}$	
				$26^{0}\ 22^{/}16.4^{//}$	$91^{0}\ 39^{/}\ 10.1^{//}$	

		Sadar Beat, Rangia		$26^{0} 22^{/}19.2^{//}$	$91^{0} 39^{/} 15.5^{//}$	
				$26^{0} 22^{/}20.9^{//}$	$91^{0} 39^{/} 14.5^{//}$	
82	Kamrup	Sadar Beat, Rangia	Kekohati Village Patta Land Ordinary Earth MPA	$26^{0} 27^{/}11.9^{//}$	$91^{0} 34^{/} 08.1^{//}$	
				$26^{0} 27^{/}11.5^{//}$	$91^{0} 34^{/} 07.9^{//}$	
				$26^{0} 27^{/}11.8^{//}$	$91^{0} 34^{/} 03.4^{//}$	
				$26^{0} 27^{/}11.1^{//}$	$91^{0} 34^{/} 04.4^{//}$	
83	Kamrup	Sadar Beat, Rangia	Kekenikuchi PP Land Ordinary Earth MPA	$26^{0} 24^{/}25.58^{//}$	$91^{0} 39^{/} 11.5^{//}$	
				$26^{0} 24^{/}26.7^{//}$	$91^{0} 39^{/} 11.5^{//}$	
				$26^{0} 24^{/}26.9^{//}$	$91^{0} 39^{/} 12.9^{//}$	
				$26^{0} 24^{/}26.5^{//}$	$91^{0} 39^{/} 13.7^{//}$	
				$26^{0} 24^{/}24.8^{//}$	$91^{0} 39^{/} 13.3^{//}$	
				$26^{0} 24^{/}24.9^{//}$	$91^{0} 39^{/} 15.8^{//}$	
				$26^{0} 24^{/}25.1^{//}$	$91^{0} 39^{/} 16.8^{//}$	
				$26^{0} 24^{/}26.1^{//}$	$91^{0} 39^{/} 15.6^{//}$	
				$26^{0} 24^{/}26.4^{//}$	$91^{0} 39^{/} 17.3^{//}$	
84	Kamrup	NR Hajo	Bamundi Mining Contract Area	$26^{0} 10^{/}33.00^{//}$	$91^{0} 27^{/} 55.40^{//}$	
				$26^{0} 10^{/}33.20^{//}$	$91^{0} 28^{/} 05.70^{//}$	
				$26^{0} 10^{/}35.30^{//}$	$91^{0} 28^{/} 11.00^{//}$	
				$26^{0} 10^{/}35.21^{//}$	$91^{0} 27^{/} 59.13^{//}$	
85	Kamrup	Sadar Beat, Rangia	Madhukuchi Ordinary Earth / Clay MPA	$26^{0} 24^{/}27.6^{//}$	$91^{0} 39^{/} 23.0^{//}$	
				$26^{0} 24^{/}30.1^{//}$	$91^{0} 39^{/} 22.5^{//}$	
				$26^{0} 24^{/}29.0^{//}$	$91^{0} 39^{/} 25.7^{//}$	
				$26^{0} 24^{/}31.5^{//}$	$91^{0} 39^{/} 25.5^{//}$	
86	Kamrup	Sadar Beat, Rangia	Moukuchi PP Land Ordinary Clay MPA	$26^{0} 22^{/}49.00^{//}$	$91^{0} 39^{/} 34.00^{//}$	
				$26^{0} 22^{/}48.90^{//}$	$91^{0} 39^{/} 35.30^{//}$	
				$26^{0} 22^{/}48.20^{//}$	$91^{0} 39^{/} 35.30^{//}$	
				$26^{0} 22^{/}48.50^{//}$	$91^{0} 39^{/} 34.70^{//}$	
				$26^{0} 22^{/}51.40^{//}$	$91^{0} 39^{/} 37.30^{//}$	
				$26^{0} 22^{/}52.20^{//}$	$91^{0} 39^{/} 37.40^{//}$	

				$26^{0} 22^{/}52.80^{//}$	$91^{0} 39^{/} 40.40^{//}$	
				$26^{0} 22^{/}52.40^{//}$	$91^{0} 39^{/} 40.40^{//}$	
				$26^{0} 22^{/}52.30^{//}$	$91^{0} 39^{/} 39.30^{//}$	
				$26^{0} 22^{/}51.50^{//}$	$91^{0} 39^{/} 39.30^{//}$	
				$26^{0} 22^{/}57.20^{//}$	$91^{0} 39^{/} 38.70^{//}$	
				$26^{0} 22^{/}56.10^{//}$	$91^{0} 39^{/} 38.30^{//}$	
				$26^{0} 22^{/}55.70^{//}$	$91^{0} 39^{/} 33.70^{//}$	
				$26^{0} 22^{/}57.00^{//}$	$91^{0} 39^{/} 33.80^{//}$	
				$26^{0} 22^{/}59.10^{//}$	$91^{0} 39^{/} 30.30^{//}$	
				$26^{0} 23^{/}1.80^{//}$	$91^{0} 39^{/} 33.30^{//}$	
				$26^{0} 23^{/}2.40^{//}$	$91^{0} 39^{/} 30.80^{//}$	
				$26^{0} 23^{/}0.70^{//}$	$91^{0} 39^{/} 28.30^{//}$	
87	Kamrup	Sadar Beat, Rangia	Moukuchi PP Land Ordinary Earth MPA	$26^{0} 22^{/}49.0^{//}$	$91^{0} 39^{/} 34.0^{//}$	
				$26^{0} 22^{/}48.9^{//}$	$91^{0} 39^{/} 35.3^{//}$	
				$26^{0} 22^{/}48.2^{//}$	$91^{0} 39^{/} 35.3^{//}$	
88	Kamrup	Sada Sadar Beat, Rangia	Moukuchi PP Land Ordinary Earth MPA	$26^{0} 22^{/}48.5^{//}$	$91^{0} 39^{/} 34.7^{//}$	
				$26^{0} 22^{/}51.4^{//}$	$91^{0} 39^{/} 37.3^{//}$	
				$26^{0} 22^{/}52.2^{//}$	$91^{0} 39^{/} 37.4^{//}$	
				$26^{0} 22^{/} 52.8^{//}$	$91^{0} 39^{/} 40.4^{//}$	
				$26^{0} 22^{/}52.4^{//}$	$91^{0} 39^{/} 40.4^{//}$	
				$26^{0} 22^{/}52.3^{//}$	$91^{0} 39^{/} 39.3^{//}$	
				$26^{0} 22^{/} 51.5^{//}$	$91^{0} 39^{/} 39.3^{//}$	
				$26^{0} 22^{/}57.2^{//}$	$91^{0} 39^{/} 38.7^{//}$	
				$26^{0} 22^{/}56.1^{//}$	$91^{0} 39^{/} 38.3^{//}$	
				$26^{0} 22^{/}55.7^{//}$	$91^{0} 39^{/} 33.7^{//}$	
				$26^{0} 22^{/}57.0^{//}$	$91^{0} 39^{/} 33.8^{//}$	
				$26^{0} 22^{/}59.1^{//}$	$91^{0} 39^{/} 30.3^{//}$	

				26^{0} 23$^{/}$01.8$^{//}$	91^{0} 39$^{/}$ 33.3$^{//}$	
				26^{0} 23$^{/}$02.4$^{//}$	91^{0} 39$^{/}$ 30.8$^{//}$	
				26^{0} 23$^{/}$00.7$^{//}$	91^{0} 39$^{/}$ 28.3$^{//}$	
89	Kamrup	Sadar Beat, Rangia	Patta Land Ordinary Earth MPA at Moukuchi Village	26^{0} 22$^{/}$47.2$^{//}$	91^{0} 39$^{/}$ 34.3$^{//}$	
				26^{0} 22$^{/}$49.2$^{//}$	91^{0} 39$^{/}$ 34.6$^{//}$	
				26^{0} 22$^{/}$49.2$^{//}$	91^{0} 39$^{/}$ 31.9$^{//}$	
				26^{0} 22$^{/}$47.6$^{//}$	91^{0} 39$^{/}$ 29.8$^{//}$	
				26^{0} 22$^{/}$50.2$^{//}$	91^{0} 39$^{/}$ 37.9$^{//}$	
				26^{0} 22$^{/}$50.2$^{//}$	91^{0} 39$^{/}$ 40.4$^{//}$	
				26^{0} 22$^{/}$51.2$^{//}$	91^{0} 39$^{/}$ 40.6$^{//}$	
				26^{0} 22$^{/}$51.3$^{//}$	91^{0} 39$^{/}$ 41.6$^{//}$	
				26^{0} 22$^{/}$ 51.6$^{//}$	91^{0} 39$^{/}$ 41.5$^{//}$	
				26^{0} 22$^{/}$52.0$^{//}$	91^{0} 39$^{/}$ 38.5$^{//}$	
90	Kamrup	Sadar Beat, Rangia	Hahara PP Land Ordinary Earth MPA **Plot-1**	26^{0} 22$^{/}$44.0$^{//}$	91^{0} 39$^{/}$ 18.6$^{//}$	
				26^{0} 22$^{/}$42.8$^{//}$	91^{0} 39$^{/}$ 19.4$^{//}$	
				26^{0} 22$^{/}$42.5$^{//}$	91^{0} 39$^{/}$ 21.6$^{//}$	
				26^{0} 22$^{/}$43.3$^{//}$	91^{0} 39$^{/}$ 22.0$^{//}$	
				26^{0} 22$^{/}$ 45.5$^{//}$	91^{0} 39$^{/}$ 23.2$^{//}$	
91	Kamrup	Sadar Beat, Rangia	Hahara PP Land Ordinary Earth MPA **Plot-2**	26^{0} 22$^{/}$46.8$^{//}$	91^{0} 39$^{/}$ 19.2$^{//}$	
				26^{0} 22$^{/}$ 46.9$^{//}$	91^{0} 39$^{/}$ 20.9$^{//}$	
				26^{0} 22$^{/}$47.3$^{//}$	91^{0} 39$^{/}$ 21.0$^{//}$	
				26^{0} 22$^{/}$47.2$^{//}$	91^{0} 39$^{/}$ 19.8$^{//}$	
				26^{0} 22$^{/}$48.0$^{//}$	91^{0} 39$^{/}$ 20.3$^{//}$	
				26^{0} 22$^{/}$ 48.4$^{//}$	91^{0} 39$^{/}$ 18.6$^{//}$	
92	Kamrup	Sadar Beat, Rangia	Moukuchi PP Land Ordinary Clay MPA	26^{0} 23$^{/}$ 03.0$^{//}$	91^{0} 39$^{/}$ 43.3$^{//}$	
				26^{0} 23$^{/}$ 02.8$^{//}$	91^{0} 39$^{/}$ 45.5$^{//}$	
				26^{0} 22$^{/}$ 57.9$^{//}$	91^{0} 39$^{/}$ 41.2$^{//}$	
				26^{0} 22$^{/}$ 59.9$^{//}$	91^{0} 39$^{/}$ 45.4$^{//}$	
93	Kamrup			26^{0} 24$^{/}$ 26.6$^{//}$	91^{0} 39$^{/}$ 01.3$^{//}$	

		Sadar Beat, Rangia	Kekenikuchi Ordinary Earth MPA	26^{0} 24$^{/}$ 24.6$^{//}$	91^{0} 39$^{/}$ 0.26$^{//}$	
				26^{0} 24$^{/}$ 29.5$^{//}$	91^{0} 39$^{/}$ 03.8$^{//}$	
				26^{0} 24$^{/}$ 25.2$^{//}$	91^{0} 39$^{/}$ 06.4$^{//}$	
				26^{0} 24$^{/}$ 25.2$^{//}$	91^{0} 39$^{/}$ 17.2$^{//}$	
				26^{0} 24$^{/}$ 25.7$^{//}$	91^{0} 39$^{/}$ 19.3$^{//}$	
				26^{0} 24$^{/}$ 21.0$^{//}$	91^{0} 39$^{/}$ 17.0$^{//}$	
				26^{0} 24$^{/}$ 21.0$^{//}$	91^{0} 39$^{/}$ 19.0$^{//}$	
94	Kamrup	Sadar Beat, Rangia	Soneswar PP Land Ordinary Clay MPA	26^{0} 20$^{/}$ 31.2$^{//}$	91^{0} 38$^{/}$ 46.0$^{//}$	
				26^{0} 20$^{/}$ 26.7$^{//}$	91^{0} 38$^{/}$ 47.7$^{//}$	
				26^{0} 20$^{/}$ 31.5$^{//}$	91^{0} 38$^{/}$ 48.4$^{//}$	
				26^{0} 20$^{/}$ 26.9$^{//}$	91^{0} 38$^{/}$ 49.8$^{//}$	
95	Kamrup	Sadar Beat, Rangia	Moukuchi PP Land Ordinary Earth MPA	26^{0} 23$^{/}$ 02.2$^{//}$	91^{0} 39$^{/}$ 35.8$^{//}$	
				26^{0} 23$^{/}$ 02.0$^{//}$	91^{0} 39$^{/}$ 37.5$^{//}$	
				26^{0} 23$^{/}$ 04.1$^{//}$	91^{0} 39$^{/}$ 38.0$^{//}$	
				26^{0} 23$^{/}$ 03.5$^{//}$	91^{0} 39$^{/}$ 39.2$^{//}$	
				26^{0} 23$^{/}$ 05.5$^{//}$	91^{0} 39$^{/}$ 41.2$^{//}$	
				26^{0} 23$^{/}$ 07.2$^{//}$	91^{0} 39$^{/}$ 40.5$^{//}$	
96	Kamrup	Sadar Beat, Rangia	Azara P.P. Land Ordinary Earth MPA	26^{0} 21$^{/}$ 24.7$^{//}$	91^{0} 38$^{/}$ 47.6$^{//}$	
				26^{0} 21$^{/}$ 23.7$^{//}$	91^{0} 38$^{/}$ 48.4$^{//}$	
				26^{0} 21$^{/}$ 20.0$^{//}$	91^{0} 38$^{/}$ 46.2$^{//}$	
				26^{0} 21$^{/}$ 19.7$^{//}$	91^{0} 38$^{/}$ 47.6$^{//}$	
97	Kamrup	Sadar Beat, Rangia	Dwigunpar Ordinary Clay MPA	26^{0} 19$^{/}$ 57.30$^{//}$	91^{0} 39$^{/}$ 14.00$^{//}$	
				26^{0} 19$^{/}$ 57.60$^{//}$	91^{0} 39$^{/}$ 11.90$^{//}$	
				26^{0} 19$^{/}$ 52.00$^{//}$	91^{0} 39$^{/}$ 10.00$^{//}$	
				26^{0} 19$^{/}$ 52.50$^{//}$	91^{0} 39$^{/}$ 8.10$^{//}$	

13A. List of quarrying permit of Kamrup District under North Kamrup Division, Rangia.

Sl no.	Name of District	Name of Range	Name of Govt land Permit area	GPS coordinates		Remarks
				Latitude N.	Longitude E.	
1	Kamrup	NR, Hajo	Charmoujuli Village Govt land Ordinary clay MPA no.1	26^{0} $12^{/}$ $21.1^{//}$	91^{0} $37^{/}$ $36.9^{//}$	
				26^{0} $12^{/}$ $25.6^{//}$	91^{0} $37^{/}$ $33.0^{//}$	
				26^{0} $12^{/}$ $22.8^{//}$	91^{0} $37^{/}$ $26.0^{//}$	
				26^{0} $12^{/}$ $18.6^{//}$	91^{0} $37^{/}$ $30.0^{//}$	
2	Kamrup	NR, Hajo	Charmoujuli Village Govt land Ordinary clay MPA no.2	26^{0} $12^{/}$ $21.1^{//}$	91^{0} $37^{/}$ $36.9^{//}$	
				26^{0} $12^{/}$ $16.2^{//}$	91^{0} $37^{/}$ $41.6^{//}$	
				26^{0} $12^{/}$ $20.6^{//}$	91^{0} $37^{/}$ $37.5^{//}$	
				26^{0} $12^{/}$ $18.1^{//}$	91^{0} $37^{/}$ $30.7^{//}$	
				26^{0} $12^{/}$ $15.2^{//}$	91^{0} $37^{/}$ $33.3^{//}$	
3	Kamrup	NR, Hajo	Niz Hajo Ordinary Clay MPA	26^{0} $14^{/}$ $54.8^{//}$	91^{0} $31^{/}$ $48.2^{//}$	
				26^{0} $14^{/}$ $55.7^{//}$	91^{0} $31^{/}$ $47.8^{//}$	
4	Kamrup	Sila Range	Madhyam Khanda MPA for Silt/Earth	26^{0} $11^{/}$ $38.39^{//}$	91^{0} $43^{/}$ $26.26^{//}$	
				26^{0} $11^{/}$ $39.50^{//}$	91^{0} $43^{/}$ $25.10^{//}$	
5	Kamrup	Sila Range	Silsakoo MPA for Silt/Earth	26^{0} $11^{/}$ $50.5^{//}$	91^{0} $43^{/}$ $41.4^{//}$	
				26^{0} $11^{/}$ $45.1^{//}$	91^{0} $43^{/}$ $35.9^{//}$	
6	Kamrup	NR, Hajo	Charnouyali NC MPA for Silt/Earth	26^{0} $11^{/}$ $22.4^{//}$	91^{0} $38^{/}$ $17.8^{//}$	
				26^{0} $11^{/}$ $18.8^{//}$	91^{0} $38^{/}$ $17.5^{//}$	
7	Kamrup	NR, Hajo	Agyathuri Ghat MPA for Silt/Earth	26^{0} $11^{/}$ $07.3^{//}$	91^{0} $38^{/}$ $24.0^{//}$	
				26^{0} $11^{/}$ $07.4^{//}$	91^{0} $38^{/}$ $29.6^{//}$	
8	Kamrup	Sila Range	Sila Govt Land Stone MPA	26^{0} $14^{/}$ $21.6^{//}$	91^{0} $41^{/}$ $45.8^{//}$	
				26^{0} $14^{/}$ $22.2^{//}$	91^{0} $41^{/}$ $45.0^{//}$	
9				26^{0} $11^{/}$ $45.1^{//}$	91^{0} $38^{/}$ $01.0^{//}$	

	Kamrup	NR Hajo	Rakhyasini Char Ordinary Earth / Clay MPA	$26^{0}\ 11^{/}\ 44.4^{//}$	$91^{0}\ 37^{/}\ 51.5^{//}$	
10	Kamrup	Sila Range	Madhyam Khanda Ghat MPA for Silt/Earth	$26^{0}\ 11^{/}\ 58.28^{//}$	$91^{0}\ 43^{/}\ 53.03^{//}$	
				$26^{0}\ 11^{/}\ 54.11^{//}$	$91^{0}\ 43^{/}\ 48.01^{//}$	
11	Kamrup	Sila Range	Dakhin Phulung Ordinary Earth MPA	$26^{0}\ 13^{/}\ 07.5^{//}$	$91^{0}\ 44^{/}\ 48.7^{//}$	
				$26^{0}\ 13^{/}\ 11.1^{//}$	$91^{0}\ 44^{/}\ 57.1^{//}$	
12	Kamrup	Sila Range	Dakhin Phulung Ordinary clay/Earth MPA	$26^{0}\ 11^{/}\ 30.1^{//}$	$91^{0}\ 43^{/}\ 34.1^{//}$	
				$26^{0}\ 11^{/}\ 36.0^{//}$	$91^{0}\ 43^{/}\ 43.7^{//}$	
13	Kamrup	Sila Range	Amingaon –I MPA	$26^{0}\ 11^{/}\ 00.89^{//}$	$91^{0}\ 38^{/}\ 46.68^{//}$	
				$26^{0}\ 10^{/}\ 59.14^{//}$	$91^{0}\ 38^{/}\ 45.84^{//}$	
				$26^{0}\ 11^{/}\ 01.65^{//}$	$91^{0}\ 38^{/}\ 27.52^{//}$	
				$26^{0}\ 11^{/}\ 05.34^{//}$	$91^{0}\ 38^{/}\ 28.38^{//}$	
14	Kamrup	NR Hajo	Rakhayakhi Char MCA	$26^{0}\ 11^{/}\ 57.76^{//}$	$91^{0}\ 36^{/}\ 29.67^{//}$	
				$26^{0}\ 11^{/}\ 54.98^{//}$	$91^{0}\ 36^{/}\ 31.74^{//}$	
				$26^{0}\ 11^{/}\ 49.72^{//}$	$91^{0}\ 36^{/}\ 24.85^{//}$	
				$26^{0}\ 11^{/}\ 52.50^{//}$	$91^{0}\ 36^{/}\ 22.62^{//}$	
15	Kamrup	NR Hajo	Barlah MCA	$26^{0}\ 9^{/}\ 48.01^{//}$	$91^{0}\ 30^{/}\ 13.02^{//}$	
				$26^{0}\ 9^{/}\ 52.50^{//}$	$91^{0}\ 30^{/}\ 22.40^{//}$	
				$26^{0}\ 9^{/}\ 54.89^{//}$	$91^{0}\ 30^{/}\ 21.18^{//}$	
				$26^{0}\ 9^{/}\ 50.24^{//}$	$91^{0}\ 30^{/}\ 11.23^{//}$	

16	Kamrup	NR Hajo	Baruahbari MCA	26^{0} 15$^{/}$ 53.89$^{//}$	91^{0} 30$^{/}$ 26.73$^{//}$	
				26^{0} 15$^{/}$ 51.88$^{//}$	91^{0} 30$^{/}$ 27.64$^{//}$	
				26^{0} 15$^{/}$ 49.16$^{//}$	91^{0} 30$^{/}$ 20.56$^{//}$	
				26^{0} 15$^{/}$ 51.17$^{//}$	91^{0} 30$^{/}$ 19.37$^{//}$	
17	Kamrup	NR Hajo	Bamundi MCA	26^{0} 10$^{/}$ 33.00$^{//}$	91^{0} 27$^{/}$ 55.40$^{//}$	
				26^{0} 10$^{/}$ 33.20$^{//}$	91^{0} 28$^{/}$ 05.70$^{//}$	
				26^{0} 10$^{/}$ 35.30$^{//}$	91^{0} 28$^{/}$ 11.00$^{//}$	
				26^{0} 10$^{/}$ 35.21$^{//}$	91^{0} 27$^{/}$ 59.13$^{//}$	
18	Kamrup	Sila Range	Agyathuri Ghat MPA for Silt/Earth	26^{0} 11$^{/}$ 03.0$^{//}$	91^{0} 38$^{/}$ 57.4$^{//}$	
				26^{0} 11$^{/}$ 02.1$^{//}$	91^{0} 38$^{/}$ 54.5$^{//}$	
19	Kamrup	Sila Range	Agyathuri Ghat MPA for Silt/Earth	26^{0} 11$^{/}$ 10.9$^{//}$	91^{0} 38$^{/}$ 35.7$^{//}$	
				26^{0} 11$^{/}$ 14.8$^{//}$	91^{0} 38$^{/}$ 27.1$^{//}$	
20	Kamrup	NR Hajo	Bamundi Hill Stone Quarry	26^{0} 11$^{/}$ 13.4$^{//}$	91^{0} 29$^{/}$ 00.6$^{//}$	
				26^{0} 11$^{/}$ 14.84$^{//}$	91^{0} 29$^{/}$ 05.0$^{//}$	
21	Kamrup	Sila Range	Agyathuri Ghat MPA for Silt/Earth	26^{0} 11$^{/}$ 22.7$^{//}$	91^{0} 38$^{/}$ 16.7$^{//}$	
				26^{0} 11$^{/}$ 09.8$^{//}$	91^{0} 38$^{/}$ 10.8$^{//}$	
22	Kamrup	NR Hajo	Rakhyasini Char Ordinary Clay MPA	26^{0} 12$^{/}$ 01.8$^{//}$	91^{0} 36$^{/}$ 21.4$^{//}$	
				26^{0} 11$^{/}$ 58.2$^{//}$	91^{0} 36$^{/}$ 25.5$^{//}$	
23	Kamrup	Sila Range	Amingaon -7 MPA	26^{0} 11$^{/}$ 22.91$^{//}$	91^{0} 38$^{/}$ 2.00$^{//}$	
				26^{0} 11$^{/}$ 7.07$^{//}$	91^{0} 37$^{/}$ 57.67$^{//}$	
				26^{0} 11$^{/}$ 7.67$^{//}$	91^{0} 37$^{/}$ 54.84$^{//}$	

				$26^{0}\ 11^{/}\ 25.51^{//}$	$91^{0}\ 37^{/}\ 59.42^{//}$	
24	Kamrup	Sila Range	Amingaon -3 MPA	$26^{0}\ 11^{/}\ 11.03^{//}$	$91^{0}\ 38^{/}\ 20.01^{//}$	
				$26^{0}\ 11^{/}\ 3.41^{//}$	$91^{0}\ 38^{/}\ 16.60^{//}$	
				$26^{0}\ 11^{/}\ 4.53^{//}$	$91^{0}\ 38^{/}\ 10.97^{//}$	
				$26^{0}\ 11^{/}\ 13.92^{//}$	$91^{0}\ 38^{/}\ 14.99^{//}$	
25	Kamrup	Sila Range	Amingaon -4 MPA	$26^{0}\ 11^{/}\ 14.22^{//}$	$91^{0}\ 38^{/}\ 14.51^{//}$	
				$26^{0}\ 11^{/}\ 4.58^{//}$	$91^{0}\ 38^{/}\ 10.53^{//}$	
				$26^{0}\ 11^{/}\ 5.51^{//}$	$91^{0}\ 38^{/}\ 6.64^{//}$	
				$26^{0}\ 11^{/}\ 17.61^{//}$	$91^{0}\ 38^{/}\ 10.18^{//}$	
26	Kamrup	Sila Range	Amingaon -5 MPA	$26^{0}\ 11^{/}\ 18.30^{//}$	$91^{0}\ 38^{/}\ 9.62^{//}$	
				$26^{0}\ 11^{/}\ 5.30^{//}$	$91^{0}\ 38^{/}\ 5.83^{//}$	
				$26^{0}\ 11^{/}\ 6.09^{//}$	$91^{0}\ 38^{/}\ 2.15^{//}$	
				$26^{0}\ 11^{/}\ 20.24^{//}$	$91^{0}\ 38^{/}\ 6.34^{//}$	
27	Kamrup	Sila Range	Amingaon -7 MPA	$26^{0}\ 11^{/}\ 20.45^{//}$	$91^{0}\ 38^{/}\ 5.81^{//}$	
				$26^{0}\ 11^{/}\ 6.33^{//}$	$91^{0}\ 38^{/}\ 1.28^{//}$	
				$26^{0}\ 11^{/}\ 6.96^{//}$	$91^{0}\ 37^{/}\ 58.22^{//}$	
				$26^{0}\ 11^{/}22.69^{//}$	$91^{0}\ 38^{/}\ 2.67^{//}$	
28	Kamrup	Sila Range	Amingaon -2 MPA	$26^{0}\ 11^{/}\ 06.28^{//}$	$91^{0}\ 38^{/}\ 27.95^{//}$	
				$26^{0}\ 11^{/}\ 01.86^{//}$	$91^{0}\ 38^{/}\ 26.75^{//}$	
				$26^{0}\ 11^{/}\ 03.81^{//}$	$91^{0}\ 38^{/}\ 17.40^{//}$	

				$26^{0} 11^{/} 10.31^{//}$	$91^{0} 38^{/} 20.29^{//}$	
29	Kamrup	NR Hajo	Rakhyasini Char Ordinary Clay MPA	$26^{0} 11^{/} 28.2^{//}$	$91^{0} 38^{/} 14.5^{//}$	
				$26^{0} 11^{/} 20.6^{//}$	$91^{0} 38^{/} 15.7^{//}$	
30	Kamrup	Sila Range	Rangmahal River bed MPA	$26^{0} 13^{/} 21.2^{//}$	$91^{0} 44^{/} 53.5^{//}$	
				$26^{0} 13^{/} 19.6^{//}$	$91^{0} 44^{/} 56.3^{//}$	
				$26^{0} 13^{/} 21.0^{//}$	$91^{0} 44^{/} 59.9^{//}$	
				$26^{0} 13^{/} 11.4^{//}$	$91^{0} 44^{/} 57.8^{//}$	
				$26^{0} 13^{/} 14.6^{//}$	$91^{0} 45^{/} 01.6^{//}$	
				$26^{0} 13^{/} 17.4^{//}$	$91^{0} 4^{/} 03.8^{//}$	
31	Kamrup	Sila Range	Agyathuri Ghat MPA-1 for ordinary clay	$26^{0} 11^{/} 15.4^{//}$	$91^{0} 38^{/} 11.5^{//}$	
				$26^{0} 11^{/} 23.87^{//}$	$91^{0} 38^{/} 19.3^{//}$	
32	Kamrup	Sila Range	Rangmahal River bed MPA	$26^{0} 13^{/} 07.9^{//}$	$91^{0} 44^{/} 57.6^{//}$	
				$26^{0} 13^{/} 07.3^{//}$	$91^{0} 44^{/} 51.3^{//}$	
				$26^{0} 13^{/} 05.7^{//}$	$91^{0} 44^{/} 39.3^{//}$	
				$26^{0} 13^{/} 07.0^{//}$	$91^{0} 44^{/} 43.5^{//}$	
				$26^{0} 13^{/} 09.7^{//}$	$91^{0} 44^{/} 48.1^{//}$	
33	Kamrup	Sila Range	Agyathuri Ghat MPA (Plot-1) for Silt/Earth	$26^{0} 11^{/} 23.2^{//}$	$91^{0} 38^{/} 12.1^{//}$	
				$26^{0} 11^{/} 08.2^{//}$	$91^{0} 38^{/} 01.5^{//}$	
34	Kamrup		Agyathuri Ghat MPA (Plot-1) for Silt/Earth	$26^{0} 11^{/} 03.0^{//}$	$91^{0} 38^{/} 57.4^{//}$	
				$26^{0} 10^{/} 58.2^{//}$	$91^{0} 38^{/} 56.3^{//}$	
35	Kamrup	Sila Range	Dakhin Phulung Ordinary clay/Earth MPA	$26^{0} 13^{/} 05.5^{//}$	$91^{0} 44^{/} 38.6^{//}$	
				$26^{0} 13^{/} 05.0^{//}$	$91^{0} 44^{/} 47.6^{//}$	
36	Kamrup	NR Hajo	Rakhyasini Char Ordinary Clay MPA	$26^{0} 12^{/} 02.7^{//}$	$91^{0} 36^{/} 23.5^{//}$	
				$26^{0} 11^{/} 58.8^{//}$	$91^{0} 36^{/} 30.9^{//}$	
37	Kamrup	Sadar Beat, Rangia	Kekohati Village Patta Land Ordinary Earth MPA	$26^{0} 27^{/} 11.9^{//}$	$91^{0} 34^{/} 08.1^{//}$	
				$26^{0} 27^{/} 11.5^{//}$	$91^{0} 34^{/} 07.9^{//}$	
				$26^{0} 27^{/} 11.8^{//}$	$91^{0} 34^{/} 03.4^{//}$	

				$26^{0}\ 27^{/}\ 11.1^{//}$	$91^{0}\ 34^{/}\ 04.4^{//}$	
38	Kamrup	Sila Range	Sila Government Land Earth MPA	$26^{0}\ 14^{/}\ 25.3^{//}$	$91^{0}\ 41^{/}\ 48.3^{//}$	
				$26^{0}\ 14^{/}\ 24.4^{//}$	$91^{0}\ 41^{/}\ 43.0^{//}$	
				$26^{0}\ 14^{/}\ 25.4^{//}$	$91^{0}\ 41^{/}\ 43.5^{//}$	
				$26^{0}\ 14^{/}\ 23.8^{//}$	$91^{0}\ 41^{/}\ 44.5^{//}$	
39	Kamrup	NR Hajo	Rakhysinichar Ordinary Clay MPA	$26^{0}\ 12^{/}01.8^{//}$	$91^{0}\ 36^{/}\ 21.4^{//}$	
				$26^{0}\ 12^{/}02.5^{//}$	$91^{0}\ 36^{/}\ 23.0^{//}$	
				$26^{0}\ 11^{/}57.5^{//}$	$91^{0}\ 36^{/}\ 23.8^{//}$	
				$26^{0}\ 11^{/}58.2^{//}$	$91^{0}\ 36^{/}\ 25.5^{//}$	
40	Kamrup	NR Hajo	Niz Hajo Govt. Land MPA	$26^{0}\ 14^{/}38.0^{//}$	$91^{0}\ 32^{/}\ 10.8^{//}$	
				$26^{0}\ 14^{/}39.1^{//}$	$91^{0}\ 32^{/}\ 12.1^{//}$	
				$26^{0}\ 14^{/}40.6^{//}$	$91^{0}\ 32^{/}\ 09.2^{//}$	
				$26^{0}\ 14^{/}39.7^{//}$	$91^{0}\ 32^{/}\ 07.3^{//}$	
41	Kamrup	NR Hajo	Charmoujuli Govt. Land Ordinary Earth MPA on Brahmaputra River Bed	$26^{0}\ 11^{/}31.8^{//}$	$91^{0}\ 38^{/}\ 06.9^{//}$	
				$26^{0}\ 11^{/}28.6^{//}$	$91^{0}\ 38^{/}\ 08.6^{//}$	
				$26^{0}\ 11^{/}30.9^{//}$	$91^{0}\ 37^{/}\ 46.1^{//}$	
				$26^{0}\ 11^{/}28.2^{//}$	$91^{0}\ 37^{/}\ 47.1^{//}$	
42	Kamrup	NR Hajo	Charmoujuli(1) Village Ordinary Clay MPA	$26^{0}\ 12^{/}01.8^{//}$	$91^{0}\ 36^{/}\ 21.4^{//}$	
				$26^{0}\ 11^{/}54.1^{//}$	$91^{0}\ 36^{/}\ 21.5^{//}$	
				$26^{0}\ 11^{/}54.1^{//}$	$91^{0}\ 36^{/}\ 28.7^{//}$	
				$26^{0}\ 12^{/}02.0^{//}$	$91^{0}\ 36^{/}\ 28.9^{//}$	
43	Kamrup	NR Hajo	Charmoujuli(2) Village Ordinary Clay MPA	$26^{0}\ 11^{/}55.1^{//}$	$91^{0}\ 35^{/}\ 60.0^{//}$	
				$26^{0}\ 11^{/}46.9^{//}$	$91^{0}\ 35^{/}\ 59.8^{//}$	
				$26^{0}\ 11^{/}47.0^{//}$	$91^{0}\ 36^{/}\ 06.8^{//}$	
				$26^{0}\ 11^{/}55.4^{//}$	$91^{0}\ 36^{/}\ 06.8^{//}$	
44	Kamrup	NR Hajo	Charmoujuli(3) Village Ordinary Clay MPA	$26^{0}\ 11^{/}53.5^{//}$	$91^{0}\ 36^{/}\ 09.4^{//}$	
				$26^{0}\ 11^{/}53.8^{//}$	$91^{0}\ 36^{/}\ 17.4^{//}$	
				$26^{0}\ 12^{/}01.0^{//}$	$91^{0}\ 36^{/}\ 17.6^{//}$	

				$26^0 12^/00.8^{//}$	$91^0 36^/ 09.5^{//}$	
45	Kamrup	NR Hajo	Charmoujuli Govt. Land Ordinary Clay MPA(GPS Point IJKL)	$26^0 12^/02.0^{//}$	$91^0 37^/ 43.1^{//}$	
				$26^0 11^/55.5^{//}$	$91^0 37^/ 44.1^{//}$	
				$26^0 11^/50.0^{//}$	$91^0 37^/ 37.3^{//}$	
				$26^0 12^/01.0^{//}$	$91^0 37^/ 36.0^{//}$	
46	Kamrup	NR Hajo	Charmoujuli Govt. Land Ordinary Clay MPA(GPS Point EFGH)	$26^0 11^/20.1^{//}$	$91^0 37^/ 37.6^{//}$	
				$26^0 11^/30.6^{//}$	$91^0 37^/ 33.1^{//}$	
				$26^0 11^/30.1^{//}$	$91^0 37^/ 29.3^{//}$	
				$26^0 11^/20.7^{//}$	$91^0 37^/ 29.0^{//}$	
47	Kamrup	NR Hajo	Charmoujuli Govt. Land Ordinary Clay MPA(GPS Point MNOP)	$26^0 12^/01.7^{//}$	$91^0 37^/ 32.9^{//}$	
				$26^0 12^/01.1^{//}$	$91^0 37^/ 23.7^{//}$	
				$26^0 11^/56.4^{//}$	$91^0 37^/ 24.6^{//}$	
				$26^0 11^/56.8^{//}$	$91^0 37^/ 33.5^{//}$	
48	Kamrup	NR Hajo	Sarmajuli Gaon Ordinary Clay MPA Near Agyathuri on Brahmaputra River Bed	$26^0 11^/24.72^{//}$	$91^0 38^/ 07.44^{//}$	
				$26^0 11^/22.62^{//}$	$91^0 38^/ 05.29^{//}$	
				$26^0 11^/20.73^{//}$	$91^0 38^/ 07.69^{//}$	
				$26^0 11^/23.26^{//}$	$91^0 38^/ 09.89^{//}$	
49	Kamrup	NR Hajo	Charmajulipam Ordinary Clay MPA	$26^0 11^/20.901^{//}$	$91^0 38^/28.638^{//}$	
				$26^0 11^/21.2^{//}$	$91^0 38^/24.4^{//}$	
				$26^0 11^/7.356^{//}$	$91^0 38^/28.48^{//}$	
				$26^0 11^/07.5^{//}$	$91^0 38^/24.3^{//}$	
50	Kamrup	NR Hajo	2 No. Dalibari Govt. Land Ordinary Clay MPA on	$26^0 12^/04.0^{//}$	$91^0 37^/ 47.1^{//}$	
				$26^0 12^/10.0^{//}$	$91^0 37^/ 44.1^{//}$	
				$26^0 12^/09.2^{//}$	$91^0 37^/ 28.8^{//}$	

			Brahmaputra River Bed	$26^{0} 12^{/}04.0^{//}$	$91^{0} 37^{/} 30.0^{//}$	
51	Kamrup	NR Hajo	Rakhyasini Char Ordinary Clay MPA	$26^{0} 11^{/}32.1^{//}$	$91^{0} 38^{/} 03.3^{//}$	
				$26^{0} 11^{/}28.2^{//}$	$91^{0} 38^{/} 07.0^{//}$	
				$26^{0} 11^{/}30.0^{//}$	$91^{0} 37^{/} 58.1^{//}$	
				$26^{0} 11^{/}25.1^{//}$	$91^{0} 38^{/} 01.8^{//}$	
52	Kamrup	NR Hajo	Rakhysinichar Ordinary Clay MPA	$26^{0}12^{/} 23.67^{//}$	$91^{0} 37^{/} 25.84^{//}$	
				$26^{0}12^{/} 21.75^{//}$	$91^{0} 37^{/} 35.49^{//}$	
				$26^{0}12^{/} 15.90^{//}$	$91^{0} 37^{/} 33.98^{//}$	
				$26^{0}12^{/} 18.17^{//}$	$91^{0} 37^{/} 24.43^{//}$	
53	Kamrup	NR Hajo	Sarmajulipam Ordinary Clay MPA	$26^{0} 11^{/} 17.8^{//}$	$91^{0} 38^{/} 10.3^{//}$	
				$26^{0} 11^{/} 21.3^{//}$	$91^{0} 37^{/} 11.9^{//}$	
				$26^{0} 11^{/} 25.9^{//}$	$91^{0} 38^{/} 56.8^{//}$	
				$26^{0} 11^{/}22.58^{//}$	$91^{0} 38^{/} 55.2^{//}$	
54	Kamrup	NR Hajo	Rakhysinichar Ordinary Clay MPA	$26^{0} 11^{/}28.2^{//}$	$91^{0} 38^{/} 14.5^{//}$	
				$26^{0} 11^{/}27.1^{//}$	$91^{0} 38^{/} 16.0^{//}$	
				$26^{0} 11^{/}19.2^{//}$	$91^{0} 38^{/} 17.7^{//}$	
				$26^{0} 11^{/}20.6^{//}$	$91^{0} 38^{/} 15.7^{//}$	
55	Kamrup	Sila Range	North Guwahati Govt. Land Ordinary Clay MPA	$26^{0}10^{/}44.240^{//}$	$91^{0}42^{/}47.240^{//}$	
				$26^{0}10^{/}57.850^{//}$	$91^{0}43^{/}11.830^{//}$	
				$26^{0}10^{/}48.460^{//}$	$91^{0}42^{/}43.800^{//}$	
				$26^{0}10^{/}53.690^{//}$	$91^{0}43^{/}15.220^{//}$	
56	Kamrup	NR Hajo	2 No. Dalibari Ordinary Clay MPA	$26^{0} 11^{/} 49.2^{//}$	$91^{0} 37^{/} 56.8^{//}$	
				$26^{0} 11^{/} 53.5^{//}$	$91^{0} 37^{/} 53.7^{//}$	
				$26^{0} 11^{/} 52.6^{//}$	$91^{0} 37^{/} 44.6^{//}$	

				26^{0} $11^{/}$ $48.3^{//}$	91^{0} $37^{/}$ $47.8^{//}$	
57	Kamrup	NR Hajo	Sarmajuli Ordinary Clay MPA	26^{0} $11^{/}$ $22.6^{//}$	91^{0} $38^{/}$ $10.9^{//}$	
				26^{0} $11^{/}$ $21.3^{//}$	91^{0} $38^{/}$ $11.8^{//}$	
				26^{0} $11^{/}$ $12.3^{//}$	91^{0} $38^{/}$ $05.1^{//}$	
				26^{0} $11^{/}$ $12.0^{//}$	91^{0} $38^{/}$ $11.7^{//}$	
58	Kamrup	NR Hajo	Rakhysinichar Ordinary Clay MPA	26^{0} $12^{/}$ $02.7^{//}$	91^{0} $36^{/}$ $23.5^{//}$	
				26^{0} $12^{/}$ $04.2^{//}$	91^{0} $36^{/}$ $27.2^{//}$	
				26^{0} $11^{/}$ $57.4^{//}$	91^{0} $36^{/}$ $27.6^{//}$	
				26^{0} $11^{/}$ $58.8^{//}$	91^{0} $36^{/}$ $30.9^{//}$	
59	Kamrup	NR Hajo	Sarmajuli Ordinary Clay MPA	26^{0} $11^{/}$ $47.00^{//}$	91^{0} $37^{/}$ $57.30^{//}$	
				26^{0} $11^{/}$ $45.19^{//}$	91^{0} $37^{/}$ $53.93^{//}$	
				26^{0} $11^{/}$ $33.46^{//}$	91^{0} $38^{/}$ $3.46^{//}$	
				26^{0} $11^{/}$ $35.70^{//}$	91^{0} $38^{/}$ $6.70^{//}$	
60	Kamrup	Sila Range	Madhyamkhanda, Dakhin Phulung & Silsako Ordinary Clay MPA **(Plot-1)**	26^{0} $11^{/}$ $48.08^{//}$	91^{0} $43^{/}$ $44.25^{//}$	
				26^{0} $11^{/}$ $40.73^{//}$	91^{0} $43^{/}$ $40.31^{//}$	
				26^{0} $11^{/}$ $36.82^{//}$	91^{0} $43^{/}$ $45.54^{//}$	
				26^{0} $11^{/}$ $50.62^{//}$	91^{0} $44^{/}$ $2.25^{//}$	
				26^{0} $11^{/}$ $55.46^{//}$	91^{0} $43^{/}$ $55.35^{//}$	
				26^{0} $11^{/}$ $49.20^{//}$	91^{0} $43^{/}$ $41.08^{//}$	
61	Kamrup	Sila Range	Madhyamkhanda, Dakhin Phulung &	26^{0} $12^{/}$ $1.23^{//}$	91^{0} $44^{/}$ $4.86^{//}$	
				26^{0} $11^{/}$ $56.30^{//}$	91^{0} $44^{/}$ $12.48^{//}$	

			Silsako Ordinary Clay MPA **Plot-2**	$26^{0}\ 12^{/}\ 4.20^{//}$	$91^{0}\ 44^{/}\ 27.70^{//}$	
				$26^{0}\ 12^{/}\ 9.97^{//}$	$91^{0}\ 44^{/}\ 21.29^{//}$	
62	Kamrup	Sila Range	Madhyamkhanda, Dakhin Phulung & Silsako Ordinary Clay MPA **Plot-3**	$26^{0}\ 12^{/}\ 50.06^{//}$	$91^{0}\ 44^{/}\ 32.92^{//}$	
				$26^{0}\ 12^{/}\ 54.39^{//}$	$91^{0}\ 44^{/}\ 42.59^{//}$	
				$26^{0}\ 12^{/}\ 49.92^{//}$	$91^{0}\ 44^{/}\ 42.44^{//}$	
				$26^{0}\ 12^{/}\ 46.14^{//}$	$91^{0}\ 44^{/}\ 31.93^{//}$	
63	Kamrup	Sila Range	Madhyamkhanda & Silsako Ordinary Clay MPA **(Plot 1)**	$26^{0}\ 11^{/}\ 56.41^{//}$	$91^{0}\ 43^{/}\ 56.31^{//}$	
				$26^{0}\ 12^{/}\ 1.12^{//}$	$91^{0}\ 44^{/}\ 4.44^{//}$	
				$26^{0}\ 11^{/}\ 58.36^{//}$	$91^{0}\ 44^{/}\ 8.82^{//}$	
				$26^{0}\ 11^{/}\ 52.86^{//}$	$91^{0}\ 43^{/}\ 59.87^{//}$	
64	Kamrup	Sila Range	Madhyamkhanda & Silsako Ordinary Clay MPA **Plot-2**	$26^{0}\ 11^{/}\ 48.85^{//}$	$91^{0}\ 43^{/}\ 40.28^{//}$	
				$26^{0}\ 11^{/}\ 44.26^{//}$	$91^{0}\ 43^{/}\ 35.76^{//}$	
				$26^{0}\ 11^{/}\ 41.53^{//}$	$91^{0}\ 43^{/}\ 40.19^{//}$	
				$26^{0}\ 11^{/}\ 47.46^{//}$	$91^{0}\ 43^{/}\ 43.91^{//}$	

13B. List of proposed mining quarries of Kamrup District under North Kamrup Division, Rangia.

Sl no.	Name of District	Name of Range	Name of the Mahal	GPS coordinates		Remarks
				Latitude N.	Longitude E.	
1	Kamrup	Sila Range	Gopeswar Stone Quarry & Mining Zone	$26^{0}\ 18^{/}\ 59.80^{//}$	$91^{0}\ 43^{/}\ 32.00^{//}$	
				$26^{0}\ 19^{/}\ 03.10^{//}$	$91^{0}\ 43^{/}\ 32.10^{//}$	
2	Kamrup	Sila Range	Gopeswar East Stone Quarry no.1	$26^{0}\ 19^{/}\ 00.170^{//}$	$91^{0}\ 43^{/}\ 54.520^{//}$	
				$26^{0}\ 19^{/}\ 00.746^{//}$	$91^{0}\ 43^{/}\ 57.075^{//}$	
				$26^{0}\ 19^{/}\ 01.770^{//}$	$91^{0}\ 44^{/}\ 00.101^{//}$	
				$26^{0}\ 19^{/}\ 02.560^{//}$	$91^{0}\ 44^{/}\ 01.510^{//}$	
				$26^{0}\ 19^{/}\ 04.645^{//}$	$91^{0}\ 44^{/}\ 01.483^{//}$	
				$26^{0}\ 19^{/}\ 07.771^{//}$	$91^{0}\ 44^{/}\ 01.090^{//}$	
				$26^{0}\ 19^{/}\ 09.490^{//}$	$91^{0}\ 43^{/}\ 59.900^{//}$	
				$26^{0}\ 19^{/}\ 08.980^{//}$	$91^{0}\ 43^{/}\ 57.948^{//}$	
				$26^{0}\ 19^{/}\ 07.570^{//}$	$91^{0}\ 43^{/}\ 55.191^{//}$	
				$26^{0}\ 19^{/}\ 06.160^{//}$	$91^{0}\ 43^{/}\ 53.190^{//}$	
				$26^{0}\ 19^{/}\ 04.106^{//}$	$91^{0}\ 43^{/}\ 53.057^{//}$	
				$26^{0}\ 19^{/}\ 01.941^{//}$	$91^{0}\ 43^{/}\ 53.638^{//}$	

3	Kamrup	Sila Range	Gopeswar Stone quarry no. 4	26° 19' 9.595"	91° 44' 3.972"	
				26° 19' 12.052"	91° 44' 6.202"	
				26° 19' 13.609"	91° 44' 7.599"	
				26° 19' 12.994"	91° 44' 10.414"	
				26° 19' 14.802"	91° 44' 11.629"	
				26° 19' 16.134"	91° 44' 8.614"	
				26° 19' 17.203"	91° 44' 6.191"	
				26° 19' 17.049"	91° 44' 1.802"	
				26° 19' 14.782"	91° 43' 58.315"	
				26° 19' 13.086"	91° 43' 57.036"	
				26° 19' 11.837"	91° 43' 59.102"	
				26° 19' 12.044"	91° 44' 0.772"	
				26° 19' 10.673"	91° 44' 2.777"	
4	Kamrup	Sila Range	Kumnagar Stone Quarry Block	26^{0} $19^{/}$ $11.610^{//}$	91^{0} $45^{/}$ $46.330^{//}$	
				26^{0} $19^{/}$ $10.341^{//}$	91^{0} $45^{/}$ $48.787^{//}$	
				26^{0} $19^{/}$ $08.743^{//}$	91^{0} $45^{/}$ $52.452^{//}$	
				26^{0} $19^{/}$ $07.480^{//}$	91^{0} $45^{/}$ $55.240^{//}$	
				26^{0} $19^{/}$ $09.139^{//}$	91^{0} $45^{/}$ $56.345^{//}$	

				26^{0} $19^{/}$ $11.404^{//}$	91^{0} $45^{/}$ $57.495^{//}$	
				26^{0} $19^{/}$ $13.390^{//}$	91^{0} $45^{/}$ $58.030^{//}$	
				26^{0} $19^{/}$ $14.404^{//}$	91^{0} $45^{/}$ $55.243^{//}$	
				26^{0} $19^{/}$ $15.536^{//}$	91^{0} $45^{/}$ $51.473^{//}$	
				26^{0} $19^{/}$ $16.560^{//}$	91^{0} $45^{/}$ $49.400^{//}$	
				26^{0} $19^{/}$ $15.284^{//}$	91^{0} $45^{/}$ $48.686^{//}$	
				26^{0} $19^{/}$ $13.193^{//}$	91^{0} $45^{/}$ $47.582^{//}$	
				26^{0} $19^{/}$ $09.510^{//}$	91^{0} $45^{/}$ $54.470^{//}$	
				26^{0} $19^{/}$ $08.237^{//}$	91^{0} $43^{/}$ $57.332^{//}$	
				26^{0} $19^{/}$ $06.541^{//}$	91^{0} $45^{/}$ $00.833^{//}$	
				26^{0} $19^{/}$ $05.030^{//}$	91^{0} $45^{/}$ $01.070^{//}$	
				26^{0} $19^{/}$ $03.598^{//}$	91^{0} $45^{/}$ $01.091^{//}$	
				26^{0} $19^{/}$ $01.657^{//}$	91^{0} $45^{/}$ $01.112^{//}$	
				26^{0} $19^{/}$ $59.680^{//}$	91^{0} $45^{/}$ $59.750^{//}$	
				26^{0} $19^{/}$ $00.947^{//}$	91^{0} $45^{/}$ $57.676^{//}$	
				26^{0} $19^{/}$ $02.671^{//}$	91^{0} $45^{/}$ $55.259^{//}$	

13C. List of mines already granted EC under North Kamrup Division, Rangia.

Sl no.	Name of District	Name of Range	Name of the Mahal	GPS coordinates		Remarks
				Latitude N.	Longitude E.	
1	Kamrup	Sila Range	Gopeswar Stone Quarry no.3	$26^{0}\ 19^{/}\ 19.0^{//}$	$91^{0}\ 43^{/}\ 56.9^{//}$	
				$26^{0}\ 19^{/}\ 16.0^{//}$	$91^{0}\ 43^{/}\ 55.3^{//}$	
2	Kamrup	Sila Range	NKD-S-01 Rangmahal MPA	$26^{0}\ 13^{/}\ 06.5^{//}$	$91^{0}\ 44^{/}\ 37.3^{//}$	
				$26^{0}\ 13^{/}\ 10.4^{//}$	$91^{0}\ 44^{/}\ 38.8^{//}$	
3	Kamrup	Sila Range	Mandakata Stone MCA.	$26^{0}\ 18^{/}\ 40.0^{//}$	$91^{0}\ 46^{/}\ 29.9^{//}$	
				$26^{0}\ 18^{/}\ 41.4^{//}$	$91^{0}\ 46^{/}\ 31.5^{//}$	
				$26^{0}\ 18^{/}\ 40.4^{//}$	$91^{0}\ 46^{/}\ 32.6^{//}$	
				$26^{0}\ 18^{/}\ 43.4^{//}$	$91^{0}\ 46^{/}\ 34.8^{//}$	
				$26^{0}\ 18^{/}\ 44.8^{//}$	$91^{0}\ 46^{/}\ 33.0^{//}$	
				$26^{0}\ 18^{/}\ 40.7^{//}$	$91^{0}\ 46^{/}\ 29.0^{//}$	

14. Revenue Collection for last Five(5) years against MCA & MPA

Sl. No.	Year	Revenue received from minor minerals (in Rs.)
1	2019-20	19406242.00
2	2020-21	16088325.00
3	2021-22	15764566.00
4	2022-23	69729460.00
5	2023-24	99394931.00
	Total	**220383524.00**

. 15. Remedial measures in order to mitigate the impact of sand mining

Air Environment :

The only source of air pollution during mining is excavation, transportation, loading and handling of minerals. Following measures are suggested to mitigate the negative impact of the mining activities to control the spreading of pollutants by plantation of trees along the haul roads, especially near settlements, planning transportation routes of mined mineral by shortest routes and regular water sprinkling on unpaved roads.

A. Air Emmissions :

Probable Impact	Mitigation Suggested
1) Dust and air emission particularly due to excavation, construction and movement of vehicles leading to air pollution	1) Provision for spraying water to reduce dust emission on unpaved roads, particularly near existing settlements, (> 2 L per m^2) 2) Excavated topsoil to be preserved and reused for landscaping 3) Amount of exposed ground stockpiles to be minimized so that re-suspension due to wind and following dust fall may be prevented.

	4) Care should be taken in making arrangement of the soil in such a manner such that the existing drainage pattern, even if altered, will still ensure that runoff does not carry away topsoil but reaches the water bodies with which it is connected. 5) To ensure that all generators, vehicles, compressors are regularly serviced and well maintained.

Other measures to be adapted:

** Transportation of material must be carried out during day time only.

** To plan multiple transportation routes in different direction to minimize the dust generation. Planned paved roads outside the mining lease area will minimize dust generation. in order to minimize transportation over unpaved roads, it is advised to plan transportation so as to each the nearest paved road by shortest route.

** All the workers are to be provided with Dust mask at points like excavation and loading.

** Plantation of trees along haul roads.

** Speed of trucks to be limited to 20km/hr.

** The loaded material should be covered with tarpaulin during transportation.

B Movement of Traffic :

Probable Impact	Mitigation Suggested
1) Due to mining activity, number of vehicles per hour will increase in the existing traffic leading to undesired sound resulting in impact in human health.	1) Truck drivers to be instructed to make minimum use of horns in the village area and sensitive zones. It is advisable to plant local species of trees (fruit bearing and medicinal) along the haul road, in consultation with Forest Department.
2) Increase in number of vehicle movement will lead to air pollution affecting the health of local villagers with respiratory system, asthma, breathing problems etc.	2) All vehicles must possess proper ad up-to-date PUC Certificate. Plantation of trees, as stated earlier will minimize the effect f air pollution. Moreover, Regular health check-up camps should be organized.
3)Vehicles moving with over-speed can lead to accidents.	3) Vehicle speed should be limited to 20 km/hr. Nearby medical facilities must be available in case of any mishap.

C. Noise Pollutioin

Probable Impact	Mitigation Suggested
1).Impact of noise due to mining activities	1) Noise generated from the equipment like generators must be within prescribed limit of 75 dB. The noise must not be continuous.
2) Prolonged exposure of noise from the machinery can cause hypertension, hearing loss, sleep disturbances etc.	2) Noise measurement should be done at specified intervals and the data must adhere to permissible limits as per National Ambient Noise Quality Standards.
3) Increase in number of transports will lead to more noise and discomfort.	3) Truck drivers to be instructed to make minimum use of horns. Plantations along the approach roads will minimize noise propagation.

D, Water Environment:

Probable Impact	Mitigation Suggested
1). Flow pattern might get changed due to river bed mining.	1) Diversion of flow pattern should be avoided. Thus there will be no change in flow pattern, surface hydrology and ground water regime.
2) Increase in mining depth will result in increase in flow velocity	2) Mining activities must be restricted to 3m depth which will not affect the flow pattern.
3). Change in qualities of ground water and surface water.	3) Mining should not be done below the water levels. Water samples should be tested at regular basis as a precautionary measure. Mining

4) Mode of waste water discharge	will be done as per approved Mining Plan and approved Rules and Regulations e.g. mining should be restricted to central 3/4th width of the river and should not be less than 7.5 meters etc. 4) It is advised to use portable bio-toilets so that no sewage or liquid effluent will contaminate the ground water due to percolation.	E

E. Soil Environment:

Probable Impact	Mitigation Suggested
1) Mining activity may lead to increase of soil erosion and degradation which results in adverse impact in soil quality.	1) Plantation of local species trees on regular basis along the haul roads, outer periphery within the mining area will help to enhance the binding property of the soil and check erosion. Water to be sprinkled on unpaved roads.
2) Extraction of top soil from outside riverbed may affect the soil fertility and productivity	2) Of course, if it is a river bed, then top soil will not be generated.
3) Soil erosion takes place during the flood.	3) To construct dams for protection of river banks. No bank cutting is permitted.

F. <u>Land Use</u>

Probable Impact	Mitigation Suggested
1) In case mining activity is carried out outside riverbed, a pit will be formed which will cause soil erosion.	1) In such a case, proper reclamation to be implemented either by planting of trees or converting the pit into a fishery project.
2) Mining in riverbed may lead to a change in complete land use pattern and even land geometry, sediment transportation capacity, bed elevation etc. leading to a change in flow pattern of the river and erosion in the downstream.	2) Mining should be carried out only during non-monsoon seasons so that the excavated area is replenished naturally during the subsequent rainy season. Pre and post-monsoon survey for sedimentation in the riverbed should be carried out regularly.

	Dams to be constructed at required places for protection of banks. Safety distance from the bank inwards to be maintained not to disturb the channel geometry.

G. Hydrogeology :

Probable Impact	Mitigation Suggested
1) Ground water contamination is very much susceptible for mining in river beds, due to intersection with water table.	1) Proper analysis and monitoring must be done so that intersection with water table is avoided. Moreover, depth of mining should not exceed 3 m.
2) Any change in topography will divert the river flow.	2) Mining activity should not involve any diversion or modification of topography.
3) Any change in slope of mining area will lead to soil erosion and rain water run-off channel may get diverted.	3) Maximum depth permissible for riverbed mining is 3 m, which must be adhered to.

H. Biological Environment:

Probable Impact	Mitigation Suggested
1) Transportation of minerals in trucks or dumpers will hamper the movement of wild animals like jungle ca, jackal and other reptiles. Moreover, Fugitive emission from vehicle movement will form a layer on plant leaves leading to reduction in gaseous exchange process. This will ultimately affect the growth of plants (stomatal index may get minimized) There is also a possibility of collision with wildlife as and when they attempt to cross the road.	1) Movement of vehicles should be limited during day time only. Access roads should never encroach into the riparian zone. Water to be sprinkled on unpaved roads which will minimize dust generation.
2) Human settlement in the mining area will destroy the vegetation cover and disturb the reptiles.	2) Human settlement not to be permitted in the mining lease area or nearby.
3) Adverse effects on benthic fauna which inhabits the bottom sandy substratum in case indiscriminate mining is carried out. Extraction of excessive sand from riverbed will affect the eco-biology of many terrestrial insects whose initial life begins in aquatic environments.	3) Mining should be carried out as per principles laid down by the authorities. As such, there will be no impact on benthic fauna.

I. Socio-economical effect :

Probable Impacts	Mitigation Suggested
1. Mining and t5ransportation activities will generate small shops, dhabas, garage, restaurants, vegetable shops etc. along the roads creating direct employment.	1. Positive impact, welcome
2. Local people will get employment in the mining activities.	2. Positive impact, welcome.
3. There will be generation of solid wastes along the roads due the shops opened.	3. Garbage bins to be provided at proper places.
4. Deep pits created in the channel can lead to accidents for villagers who goes to collect river water for their own domestic purposes.	4. Proper reclamation procedure to be adapted in the mined out areas. Mining must be carried out in non-monsoon period so the excavated portion gets replenished during the subsequent rainy season.
5. There is huge possibility of accidents due to rash driving of dumpers carrying the materials through the village roads.	5. Shortest and safe roads to be used to reach the nearest paved roads. It will be better if graveled roads are constructed between mine lease area and the nearest paved road.
6. Generation of dust due to traffic movement will be injurious to health for the villagers.	6. Water to be sprinkled regularly on unpaved roads to minimize dust generation. Speed of vehicles carrying

	the material to be controlled within limit. Moreover, materials being carried to be covered properly with tarpaulin.

15.1. Remedial Measures for Land Environment

1) The Mining activities must be carried out within the lease area only.
2) The surface run-off from the lease area should be retained within the lease area and to be used for plantation, dust suppression etc. so that there is no erosion of soil from the lease area and surroundings on account of mining activity.
3) Retaining wall and garland drains for the proposed waste dump to be constructed to arrest wash offs from the dumps. The dump must have inner slope with catch drains at inward side of the terrace and the catch drain of the individual terrace is to be connected to the garland drain outside to periphery of the dump.
4) The waste materials are to be used for construction of road.
5) Maintenance and repair work of vehicles and machineries should be carried out outside the mining area.

15.2 Remedial Measures for Waste Management

1) Solid waste to be dumped systematically with proper repose angle.
2) Solid waste is to be stabilized in the following manner:

   a) Stabilization of dump with top soil and tree plantation shall make the dump stable.

   b) Dump should be terraced for every 5 m height.

c) Gradation of the dump should be done automatically as coarse materials go down to the bottom at finer at the top. As such the drain of rain water will flow freely to the bottom without hampering the stability of the dump

d) ! m height parapet should be constructed for dumps more than 6 m height.

16. Risk Assessment and Disaster Management

Most of the accidents occur during transportation by trucks / dumpers and movement of mining equipment. Following mitigation matters to be adapted :

a) Regular training of all vehicle / machinery drivers / operators to be ensured.

b) Regular maintenance and testing of all mining equipment according to manufacturer's guidelines.

c) All safety precautions and provisions of MMR 1961 shall be strictly followed.

d) Broad sign to be provided at each and every turning point of vehicles.

e) All transportation activities within the main working area should be carried out under direct supervision and control of the management.

f) At the embankment and tripping points, reversing lorries should be made man-free, have proper indication lamps and warning horns.

17. Hazard Identification and Risk Assessment (HIRA)

Hazard Identification and risk Assessment are two processes necessary for maintaining a high level of safety and efficiency in the workplace. These processes aim to identify potential risks and hazards, assess their severity, and put the management team in a better position to put controls and take preventive and corrective actions.

It is desired that the entire mining operation is carried out under the supervision of the Mining Engineer or Mines Manager having second class mine's manager's certificate of competency to take adequate measure during following circumstances :

1) Slope failure at mine faces
2) Accident due to sliding of dumps
3) Accident due to storage of fuel
4) Accident due to fly-rock generation
5) Accident due to transportation or movement of heavy machineries
6) Accident due to use of explosives
7) Mishandling of mining equipment

It is advisable that a 5 x 5 risk assessment Matrix is prepared on day-to-day basis.

In this matter, Likelihood (Probability) is put along the x-axis and pertains to the extent how likely the risk may occur. The 5 risk rating levels under this component are…. **Rare** – unlikely to happen and/or have minor or negligible consequences

Unlikely – possible to happen and/or will have moderate consequences.

Moderate – likely to happen and/or have moderate consequences

Likely – almost sure to happen and/or to have major consequences

Almost certain – sure to happen and have major consequences.

Impact which is also called severity, is placed along the y-axis to determine the level of effects that the hazard can cause to workplace, health and safety.

The levels are

Insignificant – won't cause serious injuries or illness

Minor – can cause injuries or illness only to a mild extent.

Significant – can cause injuries that may require medical treatment but limited one.

Major -- can cause irreversible injuries that require constant medical attention

Severe – can cause fatality

17.1. Risk and Mitigation Measures

A. Over Burden Risk : The overburden dumps is susceptible to landslides. If the dump is very high, It may slide down at the quarry edge or may cause failure of the pit slope due to excessive loading. This may lead to loss of life and property. Siltation of surface water may also cause run-off from overburden dumps.

Mitigation: I) Height of overburden dump should be restricted.

2) Proper garland drain and bund to be constructed around the dump. This will prevent slippage

3) No loose rock or stone or loose tree to be allowed within 3 meters of the edge of the quarry

4) In order to prevent siltation of surface water, it is necessary to construct retaining wall on the downside of each overburden dump

B Fuel Storage: Major storage of fuel in the mining lease area is strictly prohibited.

C Water Logging: in case mine pit gets filled up with rainwater, adequate number of pumps of proper capacity should be arranged well in advance Garland drainage should be properly maintained to prevent inflow of rain water into the pit.

17.2 Disaster Management

. Disaster is an event, natural or manmade, sudden or progressive which impacts with such severity that the affected community or workers must respond by taking exceptional measures. It is a sudden or progressive occurrence of such magnitude as to effect normal working conditions or pattern of life.

Types of Disaster : Fire and explosion, Large oil spillage, Toxic gas release, Flood, Cyclone, Equipment failure, Transportation of hazardous material, improper storage of debris etc. etc.

Phases of Disaster : 1) Warning Phase : Many disasters are preceded by some sort of warning. During any industrial operation, a detection and alarm system to be installed in such cases.

2) Impact phase – This is the period when the disaster actually strikes and very little can be done in order to lessen the effects of it.

3) Rescue phase : This phase starts after the impact phase and to be continued till the situation becomes under control.

4) Relief and Rehabilitation phase.

As such, during mining activities, the workforce must be made aware of all the above factors and proper responsibilities to be assigned to each individual or coordinators in the organization about each phases of disaster and make preparatory work before the emergency, implement operational plan during the emergency and carry out investigation of the causes of disaster after the emergency.

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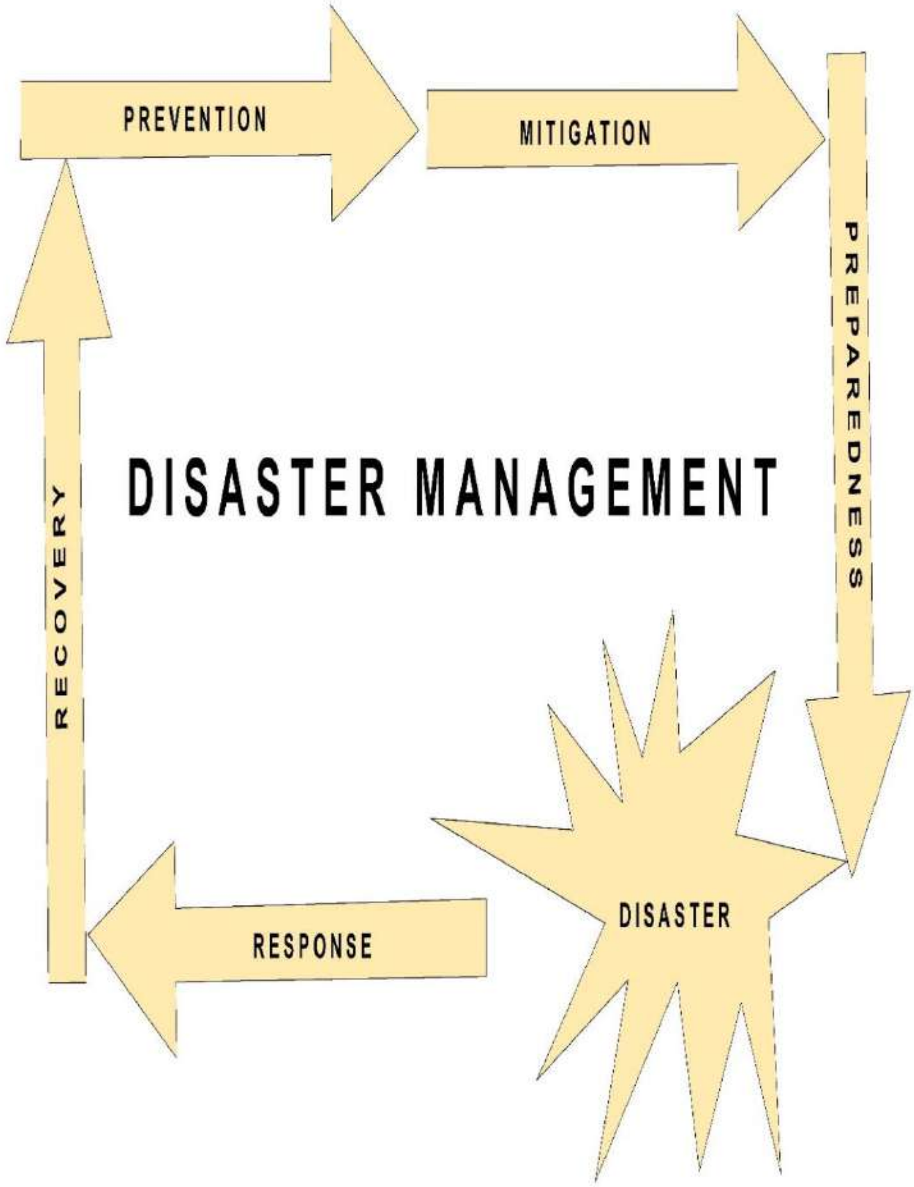
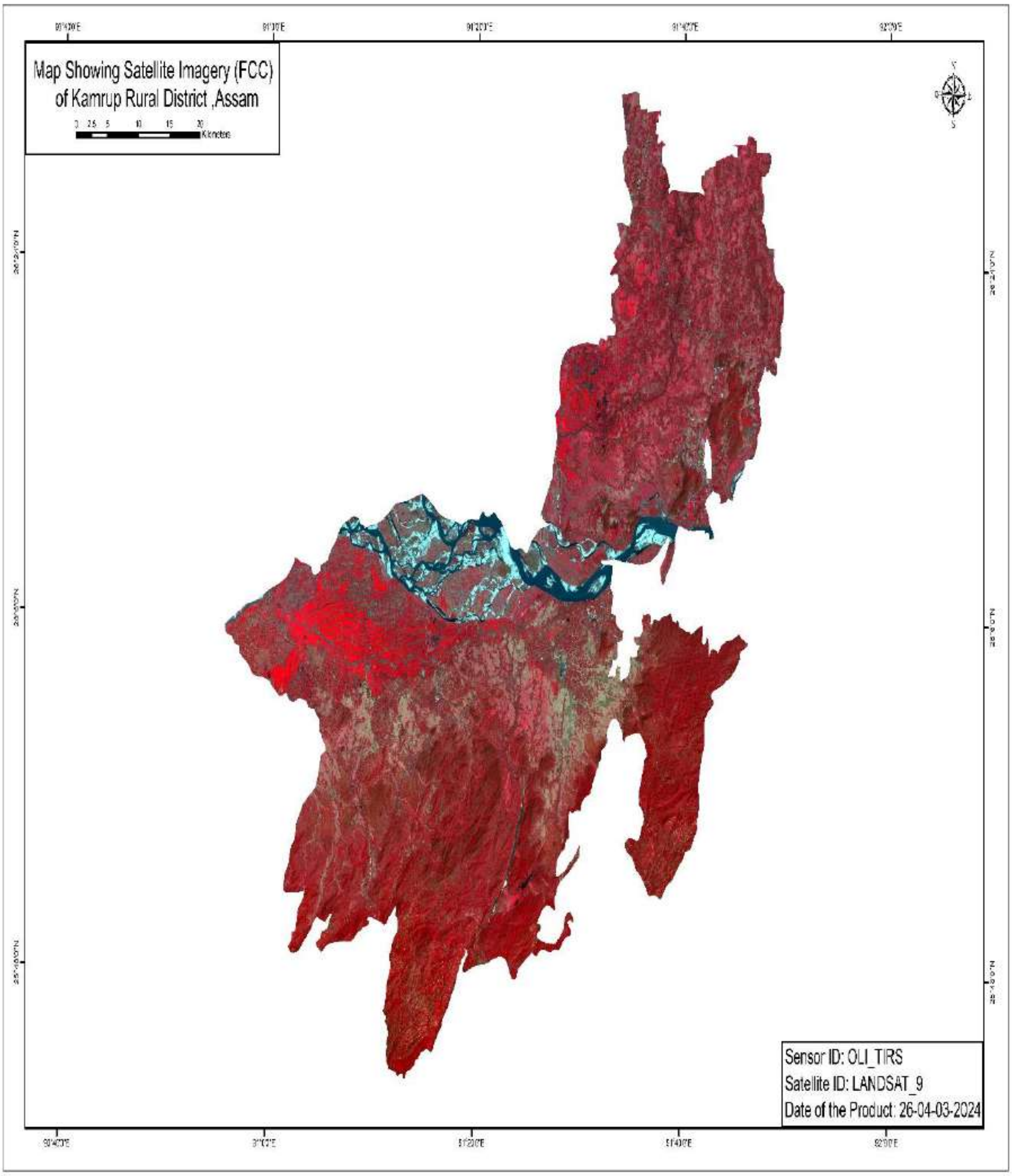

PREVENTION
MITIGATION
PREPAREDNESS
DISASTER MANAGEMENT
DISASTER
RESPONSE
RECOVERY

MAPS


Map Showing Satellite Imagery (FCC)
of Kamrup Rural District ,Assam
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Kilometers
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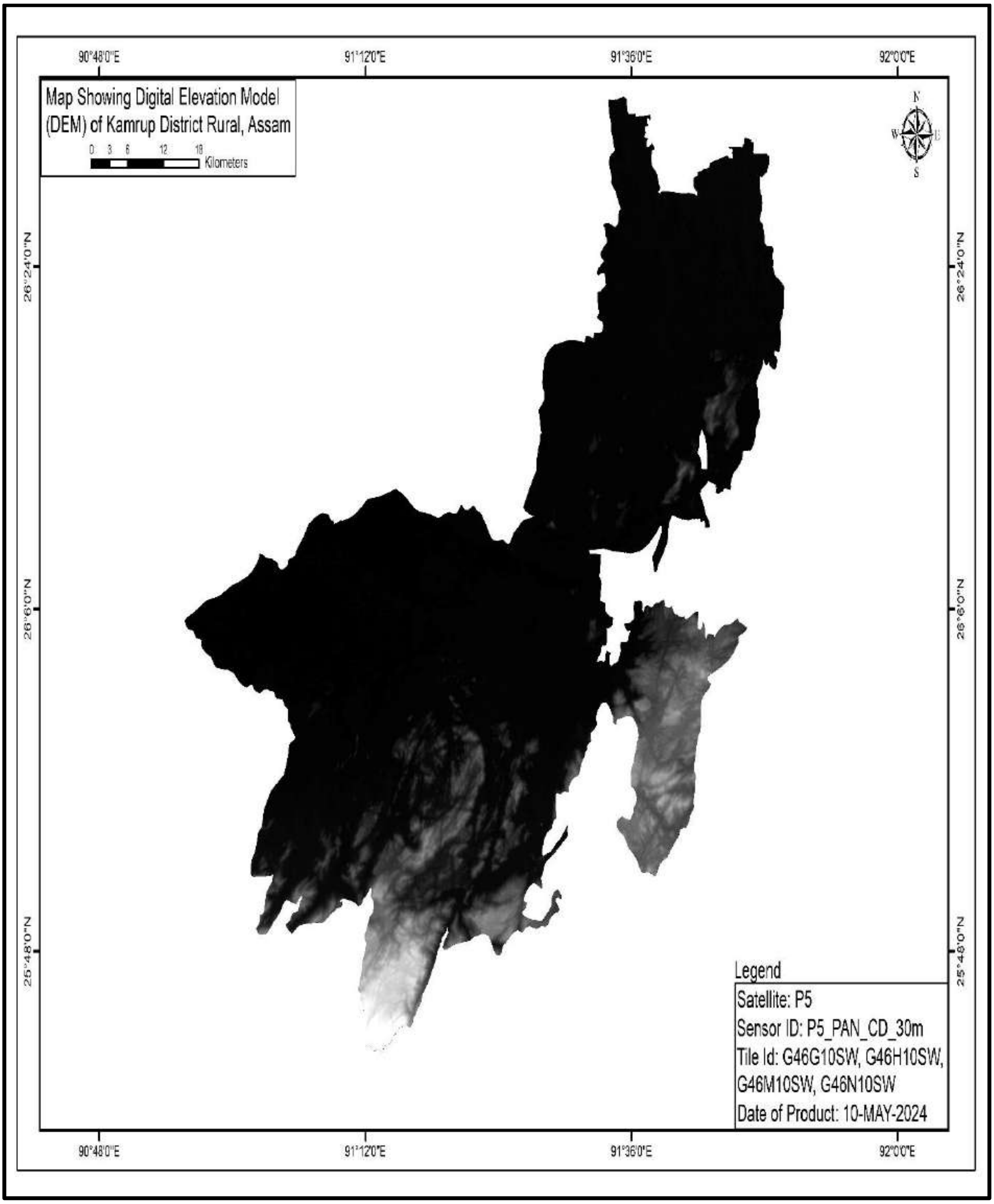
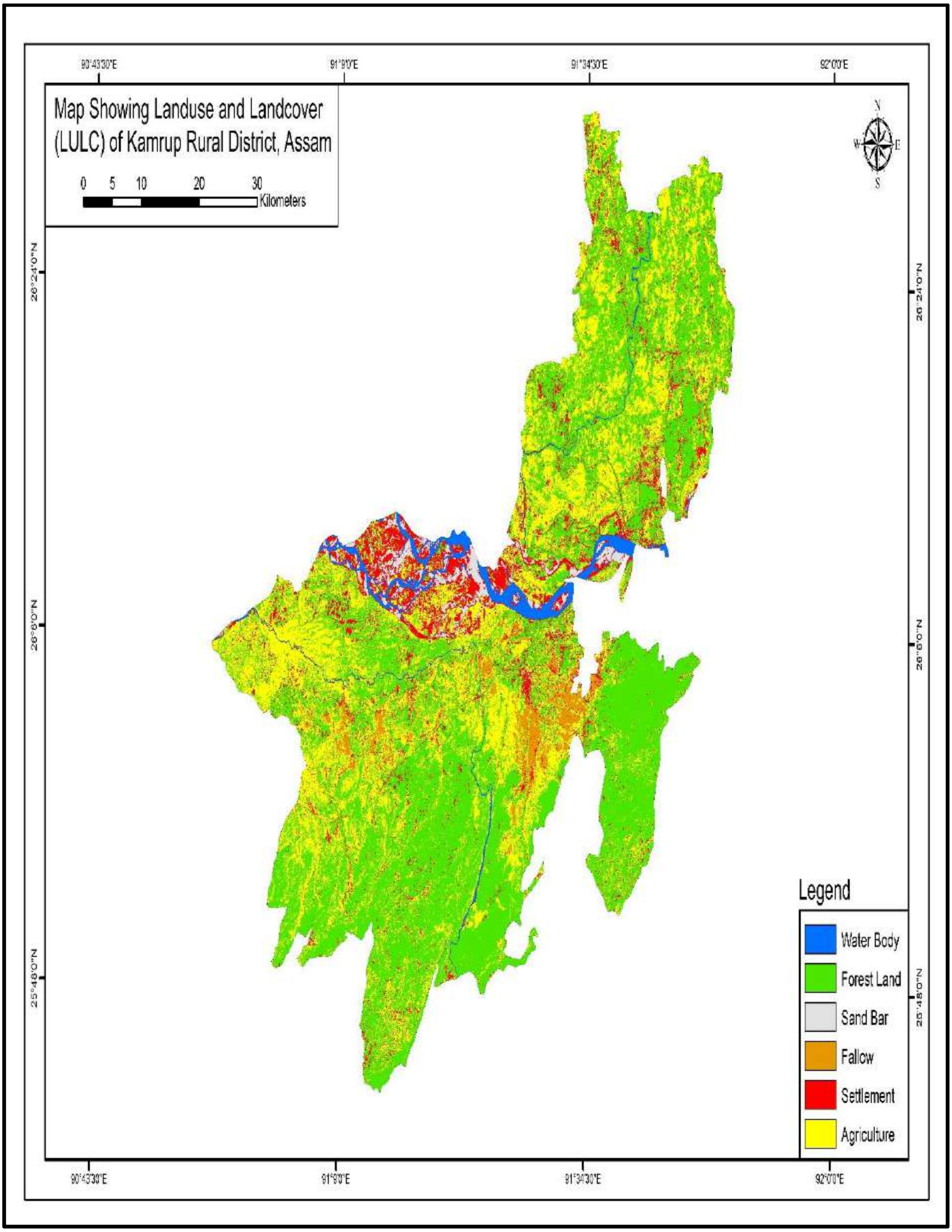
Satellite ID: LANDSAT_9
Date of the Product: 26-04-03-2024

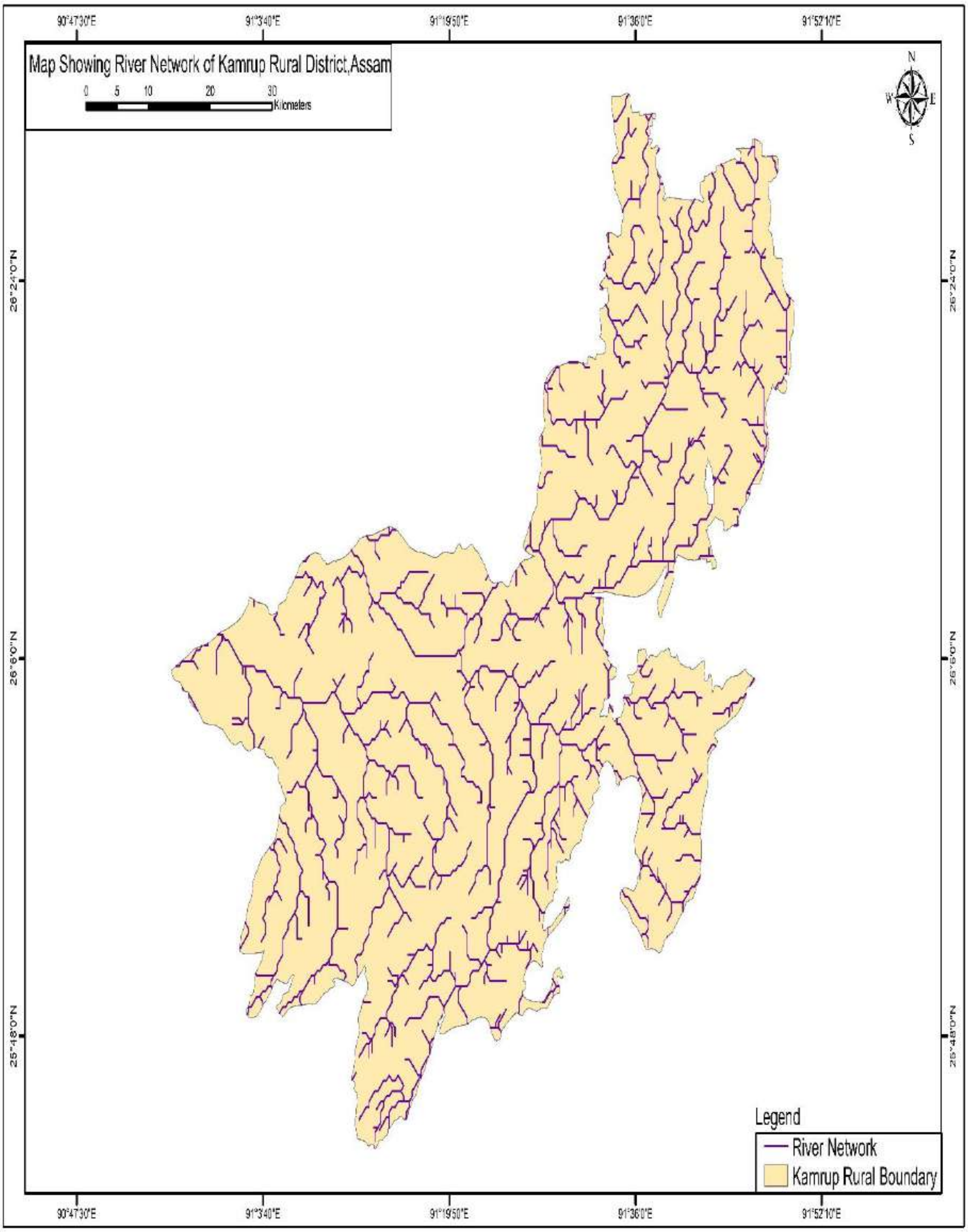
Map: 1


90°48'0"E
91°12'0"E
91°36'0"E
92°0'0"E
Map Showing Digital Elevation Model
(DEM) of Kamrup District Rural, Assam
0 3 6 12 18
Kilometers
N
S
W
E
26°24'0"N
26°6'0"N
25°48'0"N
Legend
Satellite: P5
Sensor ID: P5_PAN_CD_30m
Tile Id: G46G10SW, G46H10SW,
G46M10SW, G46N10SW
Date of Product: 10-MAY-2024

Map: 2

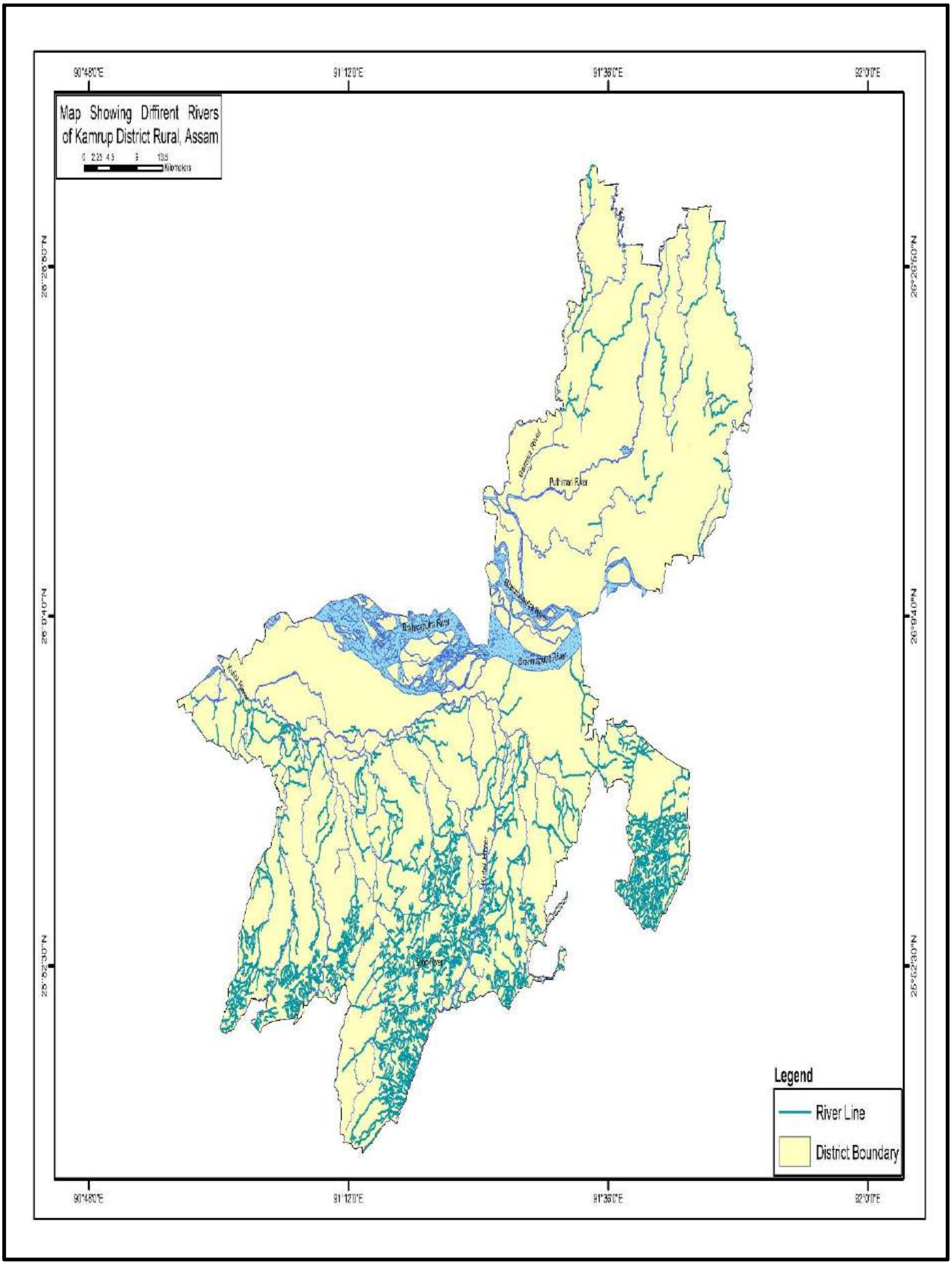

Map Showing Landuse and Landcover (LULC) of Kamrup Rural District, Assam
0 5 10 20 30 Kilometers
90°43'30"E
91°9'0"E
91°34'30"E
92°0'0"E
26°24'0"N
26°6'0"N
25°48'0"N
N
S
E
W
Legend
Water Body
Forest Land
Sand Bar
Fallow
Settlement
Agriculture

Map: 3

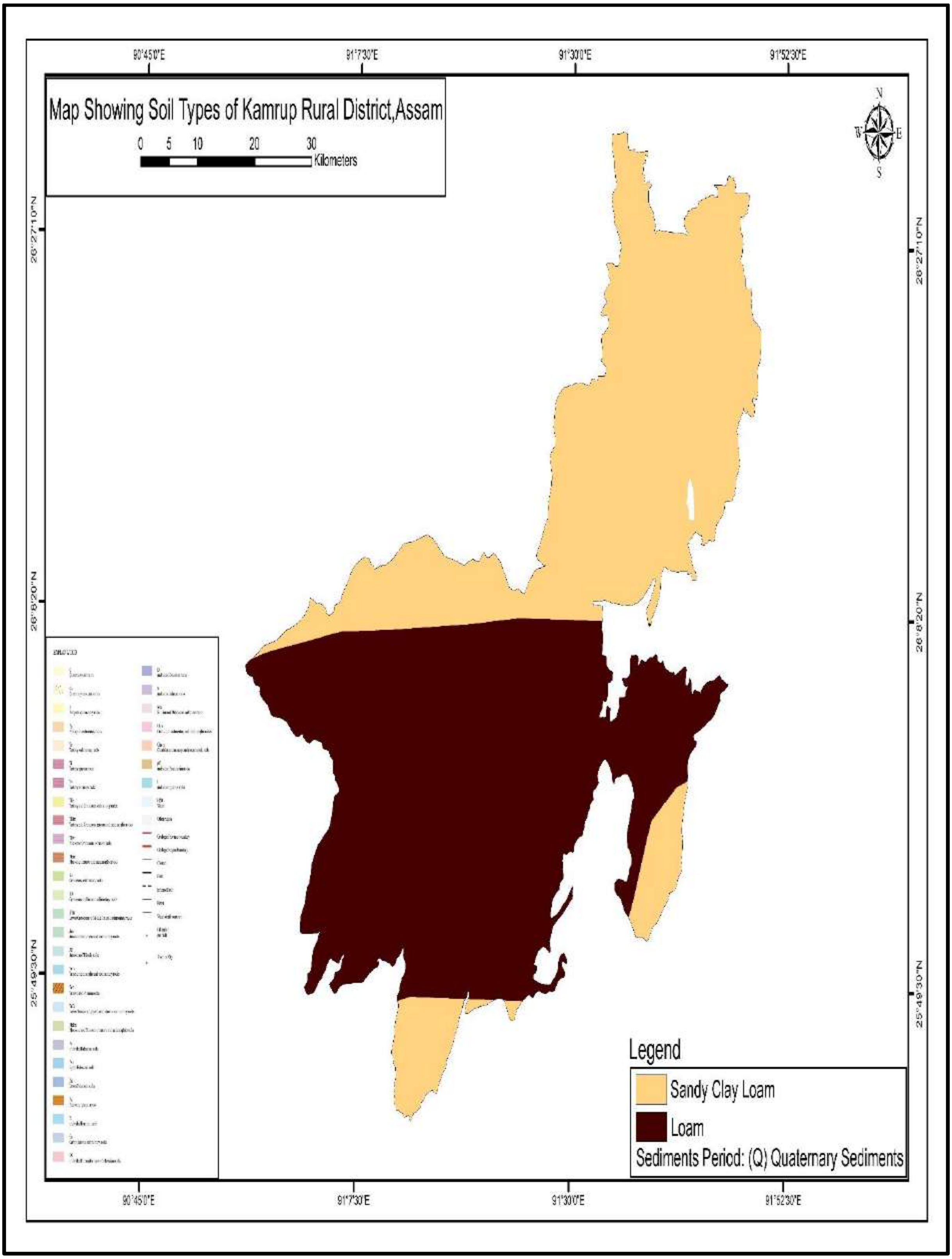


Map Showing River Network of Kamrup Rural District,Assam
0 5 10 20 30
Kilometers
N
W
E
S
90°47'30"E
91°3'40"E
91°19'50"E
91°36'0"E
91°52'10"E
26°24'0"N
26°6'0"N
25°48'0"N
Legend
River Network
Kamrup Rural Boundary

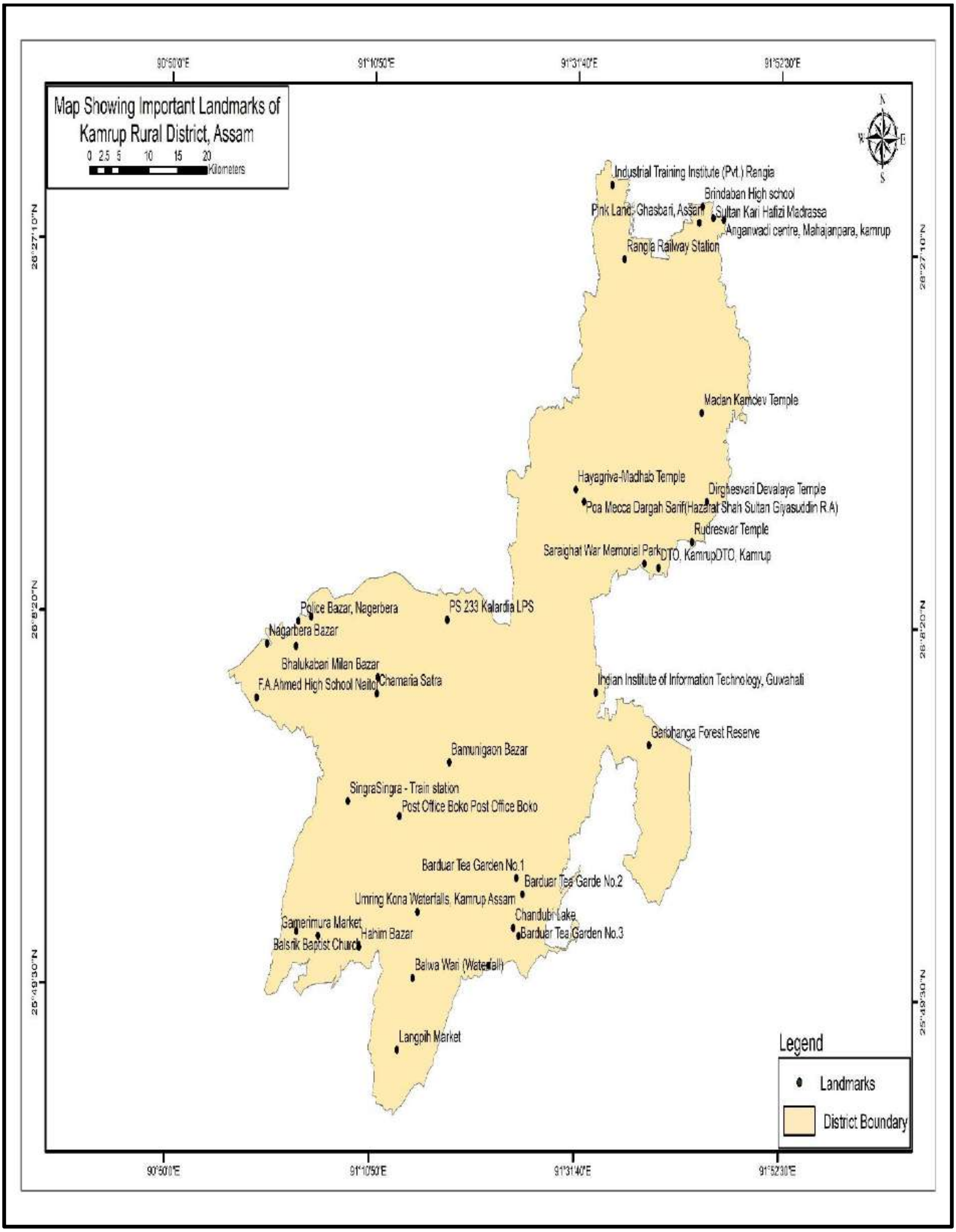
Map: 4


Map Showing Diffirent Rivers of Kamrup District Rural, Assam
Kilometers
Legend
River Line
District Boundary

Map: 5


Map Showing Soil Types of Kamrup Rural District,Assam
0 5 10 20 30
Kilometers
N
S
W
E
90°45'0"E
91°7'30"E
91°30'0"E
91°52'30"E
26°27'10"N
26°8'20"N
25°49'30"N
Legend
Sandy Clay Loam
Loam
Sediments Period: (Q) Quaternary Sediments

Map: 6


Map Showing Important Landmarks of Kamrup Rural District, Assam
0 2.5 5 10 15 20
Kilometers
90°50'0"E
91°10'50"E
91°31'40"E
91°52'30"E
26°27'10"N
26°8'20"N
25°49'30"N
Industrial Training Institute (Pvt.) Rangia
Brindaban High school
Pink Land: Ghasbari, Assam
Sultan Kari Hafizi Madrassa
Anganwadi centre, Mahajanpara, kamrup
Rangia Railway Station
Madan Kamdev Temple
Hayagriva-Madhab Temple
Dirghesvari Devalaya Temple
Poa Mecca Dargah Sarif(Hazarat Shah Sultan Giyasuddin R.A)
Rudreswar Temple
Saraighat War Memorial Park
DTO, KamrupDTO, Kamrup
Police Bazar, Nagerbera
PS 233 Kalardia LPS
Nagarbera Bazar
Bhalukabari Milan Bazar
F.A.Ahmed High School Nalto
Chamaria Satra
Indian Institute of Information Technology, Guwahati
Garbhanga Forest Reserve
Bamunigaon Bazar
SingraSingra - Train station
Post Office Boko Post Office Boko
Barduar Tea Garden No.1
Barduar Tea Garde No.2
Umring Kona Waterfalls, Kamrup Assam
Chandubi Lake
Gamerimura Market
Hahim Bazar
Barduar Tea Garden No.3
Balsrik Baptist Church
Balwa Wari (Waterfall)
Langpih Market
Legend
Landmarks
District Boundary
N
S
E
W

Map: 7

Joint Inspection Photographs by Office of The District Commissioner,Kamrup Rural District and Office of The Divisional Forest Officer, North Kamrup Division

Image 1: Agyathuri MPA

Image 2: Batha 2 MPA

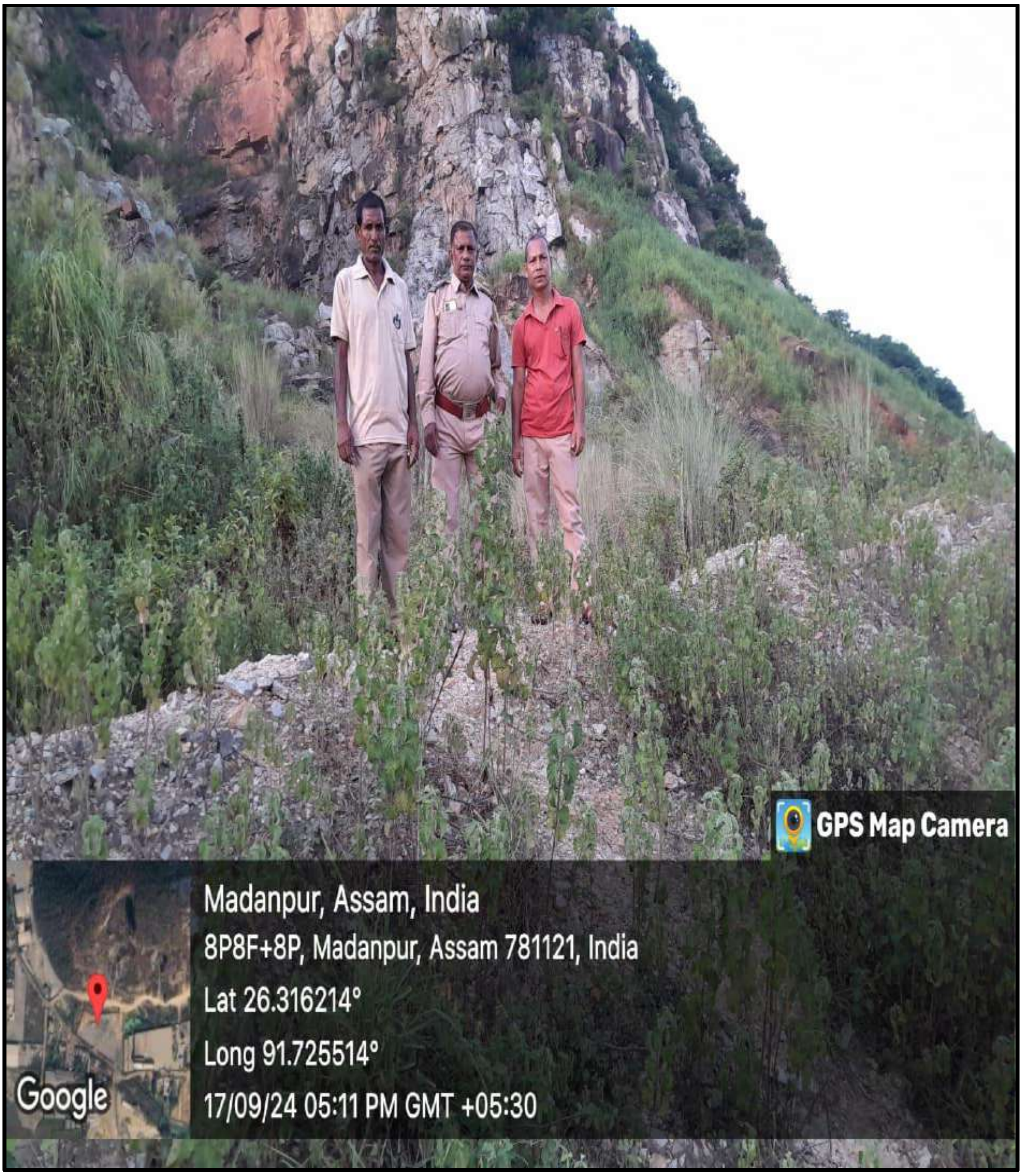


Image 3: Gopeswar MPA

Image 4: Kahipara MPA

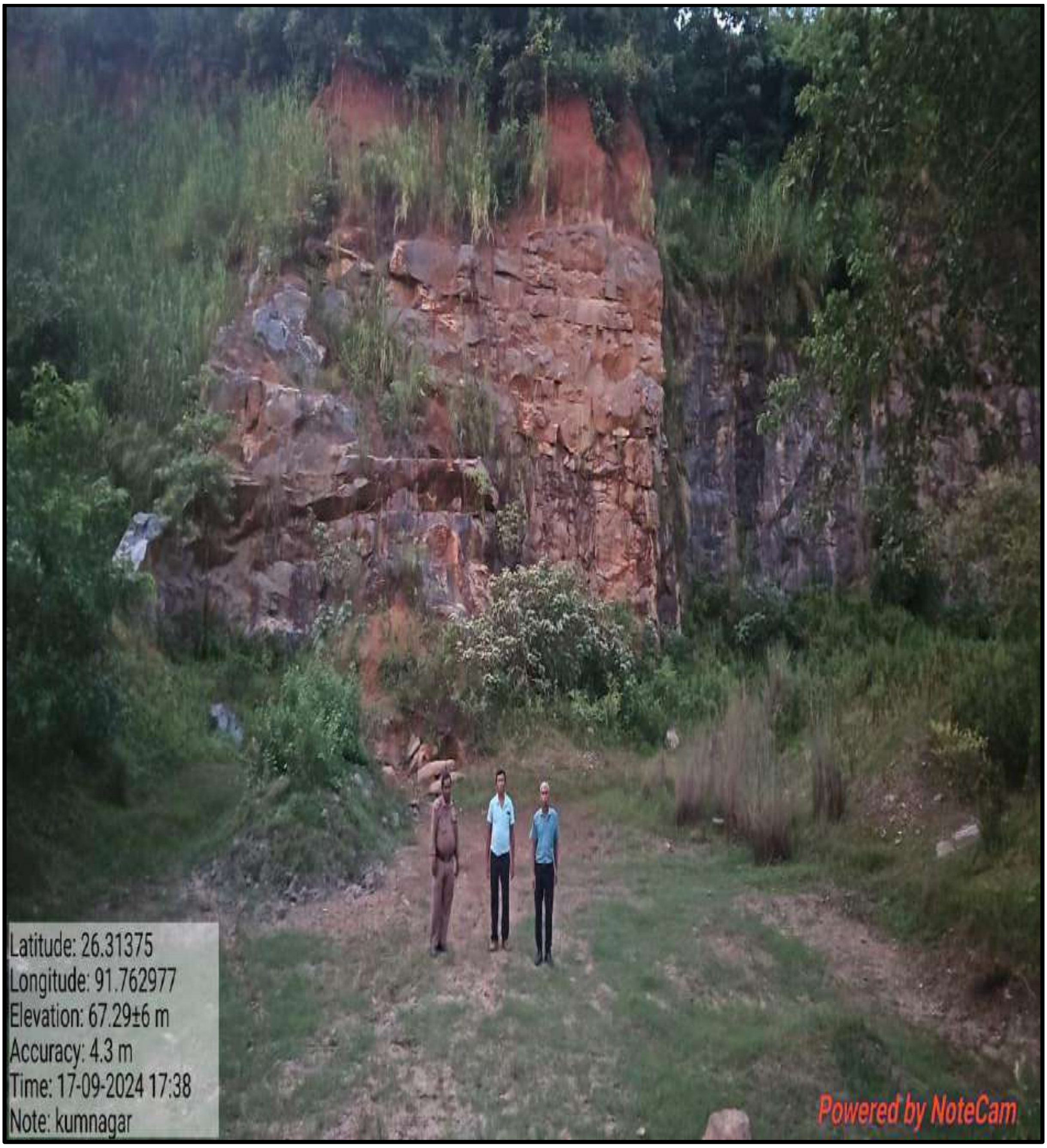


Image 5: Kumnagar MPA

Image 6: Madhyakhanda 2 MPA

Image 7: Madhyamkhanda sand MCA

Image 8: Rajaduar River Sand Area MPA

Image 9: Silsakha MPA