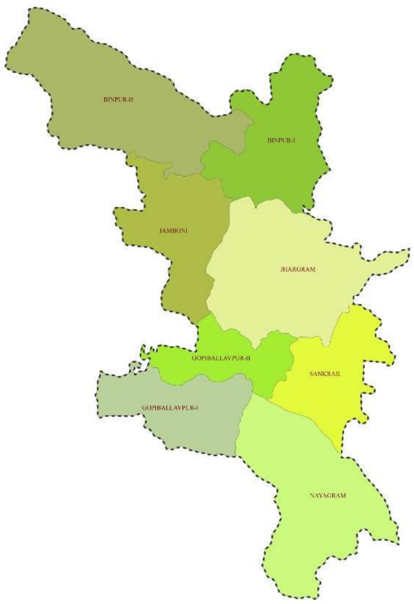
DISTRICT SURVEY REPORT OF JHARGRAM DISTRICT

(Modified)

(For mining of minor minerals)
As per Notification No.S.O.141 (E) New Delhi Dated 15th of January 2016, S.O.3611 (E) New Delhi Dated 25th of July 2018 and Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) January 2020, Issued by Ministry of Environment, Forest and Climate Change (MoEF&CC)



SEIAA Approval Date:

10th October 2025

(As published in the Minutes of 83rd Meeting of SEIAA under Miscellaneous Section, Point No.1)

1st Modification: 8th July 2024

1st Approval: 1st November 2022

PREPARED BY
Department of Industry, Commerce & Enterprises
Government of West Bengal

Version-2

Version No	DSR Status	Date	Remarks
Version-1	1st Approved DSR	01/11/22	DSR prepared as per guidelines.
Version-2	1st Modification	08/07/24	DSR modified to modification related to potential sandbars and to include potential insitu mineral deposits.

GOVERNMENT OF WEST BENGAL
DIRECTORATE OF MINES & MINERALS
4, ABANINDRANATH TAGORE SARANI (CAMAC STREET), 2ND FLOOR,
KOLKATA – 700016
e-mail: dir.dmm-wb@nic.in

No. MD/2C-726/24 Kolkata, the June, 2025

To
The Chairman,
State Expert Appraisal Committee (SEAC),
West Bengal.

Sub: Approval of Modified District Survey Report of Jhargram district reg.

Sir,

Enclosed please find the soft copy of the Modified District Survey Report (DSR) of Jhargram district in West Bengal.

This is for your kind information and necessary action for approval as per norms.

Enclo: As stated above.

Yours faithfully,

Sd/-
DIRECTOR OF MINES & MINERALS.
GOVERNMENT OF WEST BENGAL.

No. 317/1(3) MD/2C-726/24 Kolkata, the 26th June, 2025

Copy forwarded for information to:

1) The Chairman & Managing Director, West Bengal Minerals Development & Trading Corporation Ltd., 3rd Floor, DJ-10, WBIIDC Building, DJ Block, Sector II, Salt Lake City, Kolkata – 700091.
2) The Member Secretary, SEIAA, West Bengal.
3) The Additional Secretary to the Government of West Bengal, Department of Industry, Commerce & Enterprises, Mines Branch, 4, Abanindranath Tagore Sarani (Formerly 4, Camac Street), Kolkata – 700016.

25/06/25

DIRECTOR OF MINES & MINERALS.
GOVERNMENT OF WEST BENGAL.

GOVERNMENT OF WEST BENGAL
DIRECTORATE OF MINES & MINERALS
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No. 318 MD/2C-726/24 Kolkata, the 26th June, 2025

TO WHOM IT MAY CONCERN

This is to certify that the Modified District Survey Report of Jhargram District in West Bengal has been prepared in accordance with the prevailing norms applicable for the purpose. This Modified District Survey Report has been duly consulted by the District Authority concerned and the comments and observations as received from the District Authority has been incorporated in the report. Authorized officials of the Directorate of Mines & Minerals under the Deptt. of Industry, Commerce and Enterprises, Govt. of West Bengal has scrutinized the Modified District Survey Report of Jhargram District and found the same to be in order.

Now, this Modified District Survey Report of Jhargram district is forwarded to the State Level Environment Impact Assessment Authority (SEIAA), West Bengal for necessary approval.

pm

25/06/25

DIRECTOR OF MINES & MINERALS.
GOVERNMENT OF WEST BENGAL.

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Abbreviations

% DEP – Departures

° C – Degree Centigrade

BGL – Below Ground Level

CD - Community Development

Cft- Cubic Feet

CGWB - Central Ground water Board

CRIS - Customized Rainfall Information System

Cum - Cubic meter

DGMS - Directorate General of Mines Safety

DGPS - Differential Global Positioning system.

DL&LRO - District Land & Land Reform officer

DSR - District Survey Report

EC – Environmental Clearance

EIA- Environment Impact Assessment

EMGSM - Enforcement and Monitoring Guideline for Sand Mining

ENVIS - Environmental Information System

ft – Feet

GIS - Geographical Information System

GMEC - Global Management and Engineering Consultant

GSI - Geological Survey of India

Ha – Hectare

hr - Hour

IMD – Indian Meteorological Department

ISRO - The Indian Space Research Organization

KM - Kilometer

LISS - Linear Imaging Self-Scanning Sensor

LOI - Letter of Intent

LULC - Land Use Land Cover

m^2 - Square meter

MBT - Main Boundary Thrust

MCT - Main Central Thrust

MFT - Main Frontal Thrust

Mcum – Million Cubic Meters

MMDR - Mines & Minerals (Development and Regulation) Act

MMR - Metalliferous Mines Regulation

MOEF & CC - Ministry of Environment, forest & Climate Change

Mph- miles per hour

M-Sand - Mineral Sand

MSME - Micro, Small & Medium Enterprises

Mt - Metric Ton

MT – Million Tons

NGT - National Green Tribunal

NH – National Highway

NIC - National Informatics Centre

OC - Officer In Charge

OGL - Original Ground level

PSU - Public Sector Unit

R/F – Rain Fall

SSMG - Sustainable Sand Mining Guidelines

WBMDTCL- West Bengal Mineral Development and Trading Corporation Limited

The WBMMCR, 2016 – The West Bengal Minor Mineral Concession Rules, 2016

The West Bengal Sand Mining Policy, 2021

EMGSM-2020- Enforcement & Monitoring Guidelines for Sand Mining

PR	PRE MONSOON
PO	POST MONSOON
JR	JHARGRAM
NY	NAYAGRAM
JB	JAMBONI
JG	JHARGRAM
SK	SANKRAIL
GB1	GOPIBALLAVPUR I
GB2	GOPIBALLAVPUR II
BP1	BINPUR I
BP2	BINPUR II
SR	SUBARNAREKHA
KS	KANSABATI
BS	BLACK STONE

QTZ	QUARTZITE
QV	QUARTZ
LT	LATERITE, CC: CHINA CLAY, FC: FIRE CLAY AND ASSOCIATE MINERALS

GSI- Geological Survey of India

DMM- Directorate of Mines and Minerals

Definitions

Riverbed: A riverbed is the area between two banks of river where sediment deposited. During the normal flow period, river water is contained in and flows along the riverbed. However, during a flood, the river overflows the riverbed and flows onto the floodplain.

Sandbars: The sandbar is the ridge of sand or coarse sediment that is built over a period of time.

Pre monsoon Sandbars: Sandbars which are identified from satellite imagery of pre monsoon period.

Post monsoon Sandbars: Sandbars which are identified from satellite imagery of post monsoon period.

Restricted Area: Sandbars or part of sandbars which are falling within restricted area. As per the Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) 2020 the restricted zone for mining is a distance from the bank is ¼th of river width and not be less than 7.5 meters. Also, there is a no mining zone up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) 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. No mining zone has been marked for an area up to a width of 100 meters from the active edge of embankments.

Potential Zone: Sandbars which are falling within the central $3/4^{th}$ part of the riverbed and which are not falling within the restricted area.

Potential Block: Each individual sand bars of potential zone is Potential Block.

River bed occurrence: River bed occurrence means sand, stone, boulder, pebbles, gravel accumulated in the river bed by natural phenomenon.

Replenishment: Quantum of sand deposited in a mined out void during monsoon period.

Aggradations: Aggradation (or alluviation) is the term used in geology for the increase in land elevation, typically in a river system, due to the deposition of sediment. Aggradation occurs in areas in which the supply of sediment is greater than the amount of material that the system is able to transport.

Act: It means the Mines and Minerals (Development and Regulation) Act, 1957(67 of 1957), as subsequently amended.

Mineral: It means minor minerals as defined in clause (e) of section 3 of the Act.

Sand: A natural resource, is a minor mineral as defined under S 3(e) of the Mines and Minerals (Development and Regulation) Act, 1957 (" MMDR Act").

Lease: It means a mining lease granted under West Bengal Minor Mineral Concession Rules, 2016.

Mining: Excavation of mineral by manual method or using machineries.

EXECUTIVE SUMMARY

The district Jhargram lies in the Southwestern corner of the State of West Bengal. It is bounded by the district of Bankura on the north, Purulia district and Jharkhand State are on the west, Orissa state is on the south and Paschim Medinipur district on the east. The district lies between the Kangsabati River in the north and the Subarnarekha in the south and covers an area of 3037.64 Sq. km.

The district is a part of Chhotonagpur plateau; it gradually slopes down towards east; hilly terrain occurs in the north-western portion of the district. Kakrajhore area is having the highest altitude of about 300 mts. These areas are covered with unfertile hard laterite soil/rocks. Geomorphologically the district is characterized by hard rock uplands, lateritic covered area, flat alluvial and deltaic plains. Extremely rugged topography is seen in most part of the district and rolling topography is experienced in the lateritic covered area.

The district falls under the Seismic Zone II, indicating the district is under safe earthquake–prone zone.

The drainage system of the district is mainly controlled by rivers like Kangsabati and Subarnarekha River along with their network of tributaries. The rivers of district Jhargram, owing to the typical physiographical condition of the district, emerge from the Chhotanagpur Plateau to the West, flows East or South-East ward direction according to the slope of the land and meets Bay of Bengal to the South East or tributaries of Hugli (Hooghly) to the East.

The district is generating considerable revenue from mining of minor minerals such as riverbed sand deposits. Revenue generated in the district of Jhargram from Minor minerals during the period of 2017 to 2022 is Rs. 107.43 crores.

Potential minor mineral blocks of sand have been identified based on satellite imagery study along with ground truthing and are listed in this District Survey Report. Restriction zones are defined as per the EMGSM guidelines 2020. In Jhargram district, total 108.63 Mcum potential riverbed deposits estimated.

The most part of the district consists of laterite and alluvium comprises eastern half of the district. The lateritic zones in the eastern part of the are forming one of the important minor mineral potential zones of the district. Presences of quartzo-feldspathic rock, claystone manganese ore are also holding minor mineral potential zones. A total 30 in-situ minor mineral potential blocks have been identified in the district.

The District Survey Report (DSR) has been modified to incorporate potential zones with respect to in-situ minor mineral deposits of the district. The updated DSR also includes modifications with respect to potential sandbars based on 2024 Satellite Imagery study.

1 Preface

The need for District Survey Report (DSR) have been necessitated by Ministry of Environment, Forest and Climate Change (MoEF&CC) vide there Notification No. 125 (Extraordinary, Part II Section 3, Sub-section ii), S.O. 141 (E), dated 15th January 2016. The notification was addressed to bring certain amendments with respect to the EIA notification 2006 and in order to have a better control over the legislation. District level committee's have been introduced in the system. As a part of this notification, preparation of District Survey Reports has been introduced. Subsequently, MOEF& CC has published Notification No. 3611 (E), dt. 25thJuly, 2018 regarding inclusion of the "Minerals Other than Sand" and format for preparation of the DSR has been specified. Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) January 2020, Issued by MoEF& CC is prepared in consideration of various orders/directions issued by Hon'ble NGT in matters pertaining to illegal sand mining and also based on the reports submitted by expert committees and investigation teams. This DSR has been prepared in conformity with the S O 141 (E), S O 3611 (E) and other sand mining guidelines published by MOEF& CC time to time as well as the requirement specified in West Bengal Minor Mineral Concession Rule, 2016.

The purpose of DSR is to identify the mineral potential areas where mining can be allowed; and also to distinguish areas where mining will not be allowed due to proximity to infrastructural structures and installations, areas of erosion, areas of environmental sensitivities etc. The DSR would also help to estimate the annual rate of replenishment wherever applicable.

Preparation of this DSR involved both primary and secondary data generation. The primary data generation involved the site inspection, survey, ground truthing etc. while secondary data has been acquired through various authenticated sources and satellite imagery studies. The secondary data related to district profile, local geology, mineralization and other activities are available in rather a piecemeal fashion. The district survey report of Jhargram district also describes the general geographical profile of the district, distribution of natural resources, livelihood, climatic condition, inventory of minor minerals and revenue generation.

Modification of the District Survey Report (DSR) is required because of the following:

- T0 include in-situ minor mineral potential zones of the district into the DSR.
- To include the potential sandbars based on 2024 Satellite Imagery study for quantification of potential sandbars.

The modified DSR Report has been presented in 3 parts. The 1st part contains the general information of the district. The 2nd part highlights the riverbed deposits that is sand and gravels. The 3rd part of the modified report contains the occurrences of in-stitu minor mineral deposits of the district. The modifications of the DSR of Jhargram district have been furnished in Annexure 7.

2 Introduction

The District Survey Report of Jhargram District has been prepared as per the guide line of Ministry of Environment, Forests and Climate Change (MoEF& CC), Government of India vide Notification S.O.-1533(E) dated 14th Sept, 2006 and subsequent MoEF& CC Notification S.O. 141(E) dated 15th Jan, 2016. This report shall guide systematic and scientific utilization of natural resources, so that present and future generation may be benefitted at large. Further, MoEF& CC published a notification S.O. 3611(E) Dated 25th July, 2018 and recommended the format for District Survey Report.

The main objective of DSR is 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 DSR would also help to calculate the annual rate of replenishment wherever applicable and allow time for replenishment. Besides sand mining, the DSR also include the potential development scope of in-situ minor minerals.

The objectives of the District Survey Report are as follows:

1. To identify and quantify minor mineral resources for its optimal utilization.
2. To regulate sand and gravel mining, identification of site specific end-use consumers and reduction in demand and supply gaps.
3. To facilitate use information technology (IT) for surveillance of the sand mining at each step.
4. To enable environmental clearance for cluster of sand and gravel mines.
5. To restrict illegal mining.
6. To reduce occurrences of flood in the area.
7. To maintain the aquatic habitats.
8. To protect ground water in the area by limiting extraction of material in riverbeds to an elevation above the base flow.
9. To maintain data records viz. details of mineral resource, potential area, lease, approved mining plan, co-ordinates of lease hold areas, and revenue generation.
10. To design a scientific mining plan and estimate ultimate pit limit.
11. To frame a comprehensive guideline for mining of sand and other minor minerals.

The District Survey Report (DSR) comprises secondary data on geology, mineral resources, climate, topography, land form, forest, rivers, soil, agriculture, road, transportation, irrigation etc of the district collected from various published and un-published literatures and reports as well as various websites. Data on lease and mining activities in the district, revenue etc. have been collected from the DL&LRO office of the district and from West Bengal Mineral Development Corporation Limited.

2.1 Statutory Framework

Ministry of Environment, Forest and Climate Change (MoEF& CC) has published several notifications time to time to formulate and implement the District Survey Report (DSR) for every district. Statutory Framework and its legal aspect with respect to DSR is tabulated in Table 2.1.

Table 2.1: Statutory Framework and guidelines on DSR with time scale

Year	Particulars
1994	The Ministry of Environment, Forest & Climate Change (MoEF&CC) published Environmental Impact Assessment Notification 1994 which is only applicable for the Major Minerals more than 5 ha.
2006	In order to cover the minor minerals also into the purview of EIA, the MoEF&CC has issued EIA Notification SO 1533 (E), dated 14th September 2006, made mandatory to obtain environmental clearance for both Major & Minor Mineral more than 5 Ha.
2012	Further, Hon'ble Supreme Court wide order dated the 27th February, 2012 in I.A. No.12- 13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc., ordered that "leases of minor minerals including their renewal for an area of less than five hectares be granted by the States/Union Territories only after getting environmental clearance from MoEF"; and Hon'ble National Green Tribunal, order dated the 13th January, 2015 in the matter regarding sand mining has directed for making a policy on environmental clearance for mining leases in cluster for minor Minerals.
2016	The MoEF&CC in compliance of above Hon'ble Supreme Court's and NGT'S order has prepared "Sustainable Sand Mining Guidelines (SSMG), 2016" in consultation with State governments, detailing the provisions on environmental clearance (EC) for cluster, creation of District Environment Impact Assessment Authority, preparation of District survey report and proper monitoring of minor mineral. There by issued Notification dated 15.01.2016 for making certain amendments in the EIA Notification, 2006, and made mandatory to obtain EC for all minor minerals. Provisions have been made for the preparation of District survey report (DSR) for River bed mining and other minor minerals.
2016	West Bengal Minor Minerals Concession Rules,2016 amended the Mines and Minerals (Development and Regulation) Act, 1957 (Act 67 of 1957), to make the rules regulating the grant of mining licenses, prospecting license-cum-mining leases and mining leases in respect of minor minerals by auction process. The rule also incorporates EIA 2016 also includes SSMG2016 for minor mineral mining.
2018	MoEF& CC published a notification S.O. 3611(E) Dated 25th July, 2018 and recommended the format for District Survey Report .The notification stated about the objective of DSR i.e "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".
2020	Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) 2020 has been published

Year	Particulars
	modifying Sustainable sand Mining Guidelines, 2016 by MoEF& CC for effective enforcement of regulatory provisions and their monitoring. The EMGSM 2020 directed the states to carry out river audits, put detailed survey reports of all mining areas online and in the public domain, conduct replenishment studies of riverbeds, constantly monitor mining with drones, aerial surveys, ground surveys and set up dedicated task forces at district levels. The guidelines also push for online sales and purchase of sand and other riverbed materials to make the process transparent. They propose night surveillance of mining activity through night-vision drones.
2021	The West Bengal Sand Mining Policy, 2021- The State Government through this policy intends to govern the excavation, transportation, storage, sale and consumption of sand. The State Government intends to appoint the West Bengal Mineral Development and Trading Corporation Ltd. ("WBMDTCL") as the designated agency, in order to effectively address the issues of indiscriminate mining of sand, black-marketing, artificial supply shortage through hoarding and to ensure compliance with environmental regulations and affordable pricing for the end consumers.
2022	The Policy of Mining of Minor Minerals in Private/Raiyati land-The state government in November 2022 introduced a new 'Raiyati' policy 2022 for the mining of minor minerals on private land. The interested Raiyat/Group of Raiyats/Company as Raiyat shall apply for grant of Letter of Intent (LoI) to the state nodal agency (WBMDTCL) for an area of minimum 1 Ha on their own land(s) along with land details for all minor minerals except morrum.

Important statutory Guidelines for sand or gravel mining:

- **The West Bengal Minor Minerals Concession Rules (WBMMCR), 2016**

1) (a) No person shall undertake mining operation in any area prohibited by the 'State Government in the public interest by notification in the *Official Gazette*.
Provided that nothing in the sub-rule shall affect any mining operation undertaken in any area in accordance with the terms and conditions of a mining lease or mineral concession already granted.
(b) No person shall transport or store or cause to be transported or stored any mineral otherwise than in accordance with the provisions of these rules and the West Bengal Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2002.

(2) No minor mineral coming out in course of digging of wells or excavation of tanks shall be disposed of by the person digging or excavating without informing the District Authority as well as the Executive Officer of the *Panchayat Samiti* or the Executive Officer of the Municipality concerned, as the case may be, about such occurrence.
Provided that disposal of such minor mineral may be allowed on pre-payment of prices of such minor mineral at the prevailing market rate as determined on the basis of the rates published by the Public Works Department / concerned department of the State Government for the concerned area from time to time.

(3) No mining of river bed occurrences shall be allowed within 300 meters, upstream and downstream, measured from the centre line of any bridge, regulator or similar hydraulic structure and from the end point of bank protection works.

(4) No river bed mining shall be allowed beneath 3 meters of the river bed or ground water Ievel, whichever is less.

(5) No mining operation in case of river bed occurrence shall be done within a distance of three (3) kilometers of a barrage axis or dam on a river unless otherwise permitted by the concerned Executive Engineer or Revenue Officer or authorized officer and such distance shall be reckoned across an imaginary line parallel to the 'barrage, or dam axis, as the case maybe.

(6) No extraction of river bed occurrence shall 'be allowed beyond the central one third of the river bed, or keeping a distance of 100 meter from the existing bank line whichever is less, unless otherwise permitted by the concerned Executive Engineer or Revenue Officer.

(7) No extraction of minerals other than river bed occurrence shall be allowed within fifty (50) meters from any road, public structure, embankment, railway line, bridge canal, road and other public works or buildings.

(8) No mining lease shall be granted without proof of existence of mineral contents in the area for which the application for a mining lease has been made in accordance with such parameters as may be prescribed by the Government from time to time.

N.B- The aforesaid application for mining lease shall succeed the competitive bidding for mining lease for a specified mineral(s).

- **Sustainable Sand Mining Management Guidelines (SSMMG), 2016 by MoEF& CC.**

  The sustainable sand Mining Management Guidelines 2016 has been prepared after extensive consultation with the States and Stakeholders over a period of one year. The main objective of the Guideline is to ensure sustainable sand mining and environment friendly management practices in order to restore and maintain the ecology of river and other sand sources.

a) Parts of the river reach that experience deposition or aggradation shall be identified first. The Lease holder/ Environmental Clearance holder may be allowed to extract the sand and gravel deposit in these locations to manage aggradation problem.

b) The distance between sites for sand and gravel mining shall depend on the replenishment rate of the river. Sediment rating curve for the potential sites shall be developed and checked against the extracted volumes of sand and gravel.

c) Sand and gravel may be extracted across the entire active channel during the dry season.

d) Abandoned stream channels on terrace and inactive flood plains be preferred rather than active channels and their deltas and flood plains. Stream should not be diverted to form inactive channel.

e) Layers of sand and gravel which could be removed from the river bed shall depend on the width of the river and replenishment rate of the river.

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

g) Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.

h) Sand and gravel shall not be extracted within 200 to 500 meter from any crucial hydraulic structure such as pumping station, water intakes, and bridges. The exact distance should be ascertained by the local authorities based on local situation. The cross-section survey should cover a minimum distance of 1.0 km upstream and 1.0 km downstream of the potential reach for extraction. The sediment sampling should include the bed material and bed material load before, during and after extraction period. Develop a sediment rating curve at the upstream end of the potential reach using the surveyed cross- section. Using the historical or gauged flow rating curve, determine the suitable period of high flow that can replenish the extracted volume. Calculate the extraction volume based on the sediment rating curve and high flow period after determining the allowable mining depth.

h) Sand and gravel could be extracted from the downstream of the sand bar at river bends. Retaining the upstream one to two thirds of the bar and riparian vegetation is accepted as a method to promote channel stability.

Flood discharge capacity of the river could be maintained in areas where there are significant flood hazard to existing structures or infrastructure. Sand and gravel mining may be allowed to maintain the natural flow capacity based on surveyed cross- section history.

i) Alternatively, off-channel or floodplain extraction is recommended to allow rivers to replenish the quantity taken out during mining.

j) The Piedmont Zone (Bhabhar area) particularly in the Himalayan foothills, where riverbed material is mined, this sandy-gravelly track constitutes excellent conduits and holds the greater potential for ground water recharge. Mining in such areas should be preferred in locations selected away from the channel bank stretches.

k) Mining depth should be restricted to 3 meter and distance from the bank should be 3 meter or 10 percent of the river width whichever less.

The borrow area should preferably be located on the river side of the proposed embankment, because they get silted up in course of time. For low embankment less than 6 m in height, borrow area should not be selected within 25 m from the toe/heel of the embankment. In case of higher embankment the distance should not be less than 50 m. In order to obviate development of flow parallel to embankment, cross bars of width eight times the depth of borrow pits spaced 50 to 60 meters center-to-center should be left in the borrow pits.

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

- **Enforcement & Monitoring Guidelines for sand Mining, 2020 (MoEF& CC)**

The Ministry of Environment Forest & Climate Change formulated the Sustainable Sand Management Guidelines 2016 which focuses on the Management of Sand Mining in the Country. But in the recent past, it has been observed that apart from management and systematic mining practices there is an urgent need to have a guideline for effective enforcement of regulatory provision and their monitoring. Section 23 C of MMDR, Act 1957 empowered the State Government to make rules for preventing illegal mining, transportation and storage of minerals. But in the recent past, it has been observed that there was large number of illegal mining cases in the Country and in some cases, many of the officers lost their lives while executing their duties for curbing illegal mining incidence. The illegal and uncontrolled illegal mining leads to loss of revenue to the State and degradation of the environment.

a) Parts of the river reach that experience deposition or aggradation shall be identified. The Leaseholder/ Environmental Clearance holder may be allowed to extract the sand and gravel deposit in these locations to manage aggradation problem.
b) The distance between sites for sand and gravel mining shall depend on the replenishment rate of the river. Sediment rating curve for the potential sites shall be developed and checked against the extracted volumes of sand and gravel.
c) Sand and gravel may be extracted across the entire active channel during the dry season.
d) Abandoned stream channels on the terrace and inactive floodplains be preferred rather than active channels and their deltas and flood plains. The stream should not be diverted to form the inactive channel.
e) Layers of sand and gravel which could be removed from the river bed shall depend on the width of the river and replenishment rate of the river.
f) Sand and gravel shall not be allowed to be extracted where erosion may occur, such as at the concave bank.
g) Segments of the braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
h) Sand and gravel shall not be extracted up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) 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.
i) The sediment sampling should include the bed material and bed material load before, during and after the extraction period. Develop a sediment rating curve at the upstream end of the potential reach using the surveyed cross-section. Using the historical or gauged flow rating curve, determine the suitable period of high flow that can replenish the extracted volume. Calculate the extraction volume based on the sediment rating curve and high flow period after determining the allowable mining depth.
j) Sand and gravel could be extracted from the downstream of the sand bar at river bends. Retaining the upstream one to two-thirds of the bar and riparian vegetation is accepted as a method to promote channel stability.
k) The flood discharge capacity of the river could be maintained in areas where there is a significant flood hazard to existing structures or infrastructure. Sand and gravel mining may be allowed to maintain the natural flow capacity based on surveyed cross-section history. Alternatively, off-channel or floodplain extraction is recommended to allow rivers to replenish the quantity taken out during mining.
l) The Piedmont Zone (Bhabhar area) particularly in the Himalayan foothills, where riverbed material is mined, this sandy-gravelly track constitutes excellent conduits and holds the greater potential for groundwater recharge. Mining in such areas should be preferred in locations selected away from the channel bank stretches.

m) Mining depth should be restricted to 3 meters and distance from the bank should be ¼th or river width and should not be less than 7.5 meters.

n) The borrow area should preferably be located on the riverside of the proposed embankment because they get silted in the course of time. For low embankment, less than 6 m in height, borrow area should not be selected within 25 m from the toe/heel of the embankment. In the case of the higher embankment, the distance should not be less than 50 m. In order to obviate the development of flow parallels to the embankment, crossbars of width eight times the depth of borrow pits spaced 50 to 60 meter center-to-center should be left in the borrow pits.

o) Demarcation of mining area with pillars and geo-referencing should be done prior to the start of mining.

p) A buffer distance /un-mined block of 50 meters after every block of 1000 meters over which mining is undertaken or at such distance as may be the directed/prescribed by the regulatory authority shall be maintained.

q) A buffer distance /unmined block of 50 meters after every block of 1000 meters over which mining is undertaken or at such distance as may be the directed/prescribed by the regulatory authority shall be maintained.

r) River bed 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 the width of the river, as the case may be and decided by regulatory authority while granting environmental clearance in consultation with irrigation department. Regulating authority while regulating the zone of river bed mining shall ensure that the objective to minimize the effects of riverbank erosion and consequential channel migration are achieved to the extent possible. In general, the area for removal of minerals shall not exceed 60% of the mine lease area, and any deviation or relaxation in this regard shall be adequately supported by the scientific report.

s) Mining Plan for the mining leases(non-government) on agricultural fields/Patta land shall only be approved if there is a possibility of replenishment of the mineral or when there is no riverbed mining possibility within 5 KM of the Patta land/Khatedari land. For government projects mining could be allowed on Patta land/Khatedari land but the mining should only be done by the Government agency and material should not be used for sale in the open market.

The minerals reserve for riverbed area is calculated on the basis of maximum depth of 3 meters and margins, width and other dimensions as mentioned in para (s) above. The area multiplied by depth gives the volume and volume multiplied with bulk density gives the quantity in Metric Ton. In case of riverbed, mineable material per hectare area available for actual mining shall not exceed the maximum quantity of 60,000 MT per annum.

Demand and Utilisation of Sand

Sand is a multi-purpose topographical material. It is known as one of the three fundamental ingredients in concrete. The composition of sand is diverse. Mostly sand is made of silica which is a common element. It can also come from another source of minerals like quartz, limestone, or gypsum.

From beds to flood plains to coastlines- we can find the sand at almost everywhere. The robustness of sand has played a significant role in everyday life. We use sand practically every other day.

Sand extraction from river beds and brick earth mining for making raw bricks are the main mining activities in the district. With a spurt in construction of real estate sectors and various govt. sponsored projects, the demand for both sand and bricks has increased manifold. The extraction of sand is carried out either manually or through semi- mechanized system. The depth of mining for both river bed sand and brick earth is restricted due to statutory provision in the regulations pertaining to conservation and development of minor minerals.

River sand mining is a common practice as habitation concentrates along the rivers and the mining locations are preferred near the markets or along the transportation route, for reducing the transportation cost.

In the real world, there are a lot of situations where we can find uses of sand. Followings are the common sand uses.

1. While bunging metal, we can mix sand with clay binder for frameworks used in the foundries.
2. Sand can be used for cleaning up oil leak or any spill by dredging sand on that spill. The material will form clumps by soaking up, and we can quickly clean the mess.
3. Sand can be used as a road base which is a protective layer underneath all roads
4. Industrial sand is used to make glass, as foundry sand and as abrasive sand.
5. One creative usage of sand is serving as a candle holder. We can try putting some sand before pouring tea light or any candle in a glass. It holds the candle still and refrain the candle from rolling by giving it an excellent decoration.
6. Adds texture and aesthetic appeal to space.
7. Sand is mostly pure to handle, promptly available and economically wise.
8. We use sand in aquariums, fabricating artificial fringing reefs, and in human-made beaches
9. Sandy soils are ideal for growing crops, fruits and vegetables like watermelon, peaches, peanuts, etc.
10. Sand can light a path by filling mason jars with sand and tea light which is another inexpensive way to make a walkway glow.
11. Sand helps to improve resistance (and thus traffic safety) in icy or snowy conditions.
12. We need sand in the beaches where tides, storms or any form of preconceived changes to the shoreline crumble the first sand.
13. Sand containing silica is used for making glass in the automobile and food industry- even household products for the kitchen.
14. Sand is a strong strand which is used for plaster, mortar, concrete, and asphalt.
15. The usual bricks formulated of clay only are way weaker and lesser in weight than blocks made of clay mixed with sand.

2.2 Methodology of DSR Preparation

The steps followed during the preparation of District Survey Report are given in Figure 2.1. The individual steps are discussed in following paragraphs.

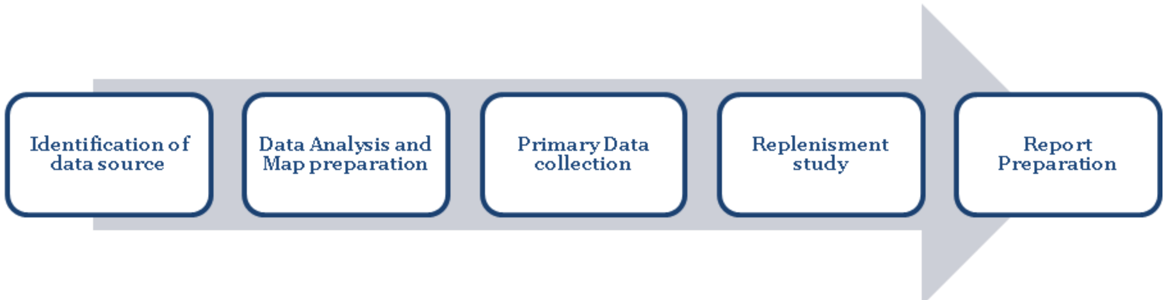


Figure 2.2.1: Steps followed in preparation of DSR

Data source Identification: District Survey Report has been prepared based on the primary data base and secondary data base collected and collated from different sources. It is very critical to identify authentic data sources before compiling the data set. The secondary data sources which are used in this DSR are mostly taken from public domain and or from the published Report in reputed journals. Information related to district profile has been taken from District Census report, 2011 and District Statistical Handbook published by the Govt. of West Bengal. Potential mineral resources of the district have been described based on the published report of Geological Survey of India (GSI) or any other govt. agencies like MECL etc. List of mining lease, name of lease holder, lease/block area, resource in already allotted mining lease, revenue from minor mineral sector etc. have been collected from the concern DL&LRO offices of the district. Satellite images have been used for map preparation related to physiography and land use/land cover of the district.

Data Analysis and Map preparation: Dataset which are captured during the report preparation, are subjected to detail analysis work. District Survey Report involves the analytical implication of the captured dataset to prepare relevant maps.

Methodology adopted for preparation of relevant maps is explained below.

<u>Land Use and Land Cover Map:</u> Land Use and Land Cover classification is a complex process and requires consideration of many factors. The major steps of image classification include determination of a suitable classification system via Visual Image Interpretation, selection of training samples, Satellite image (FCC-False Color Composite) pre-processing, selection of suitable classification approaches, post classification processing, and accuracy assessment.

Here LISS-III satellite imagery has been taken for supervised classification as supervised classification can be much more accurate than unsupervised classification, but depends heavily on the training sites, the skill of the individual processing the image, and the spectral distinctness of the classes in broader scale.

According to the Visual Image Interpretation (Tone, Pattern, Texture, Shape, Color etc.) training set of the pixel has been taken. Pictorial descriptions of Land Use classification are explained in Figure 2.2.

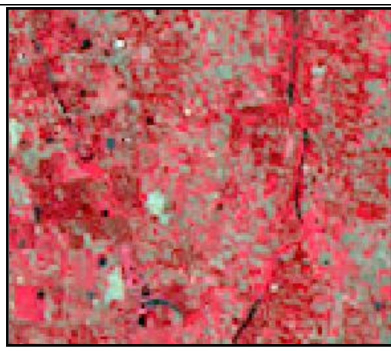
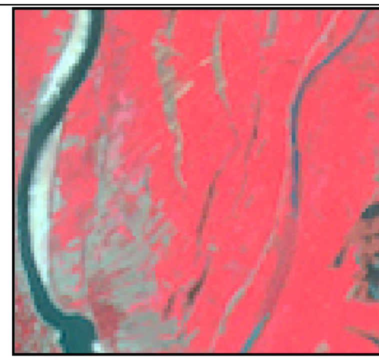
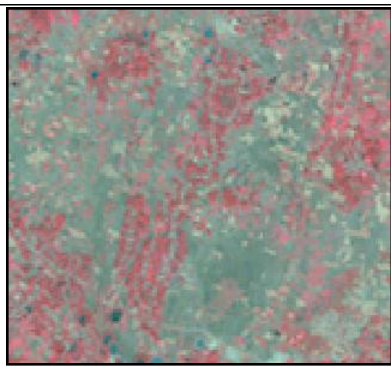
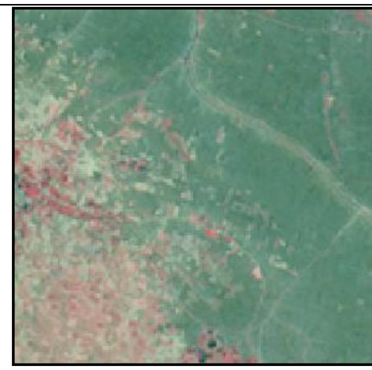
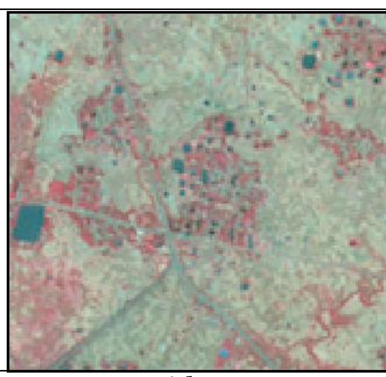
	
Agricultural Land - Based on their Geometrical shape, Red and Pink color tone, Agricultural Land has been identified.	**Vegetation Covered Area** - Area with continuous Red color tone, Vegetation Covered Area has been classified.
	
Agricultural Fallow Land - Based on their Geometrical shape, Yellowish green color tone, Agricultural Fallow Land has been identified.	**Badland Topography**- Area with Non geometrical shape and Yellowish green color tone has been identified as Bad Land Topography.
	
Settlement – Area with some geometrical shape in a Linear Pattern including Light Cyan Color has been recognized as Settlement Area.	**Water Bodies** – Area with Blue color has been classified as Water Bodies.

Figure 2.2.2: Pictorial description of Land Use Classification methods

Geomorphological Map: The major step of preparing Geomorphological Map is identifying features like – Alluvial Fan, Alluvial Plain, Hilly Region etc. from Satellite Imagery

(FCC-False Colour Composite) via Visual Image Interpretation and then digitisation has been taken into the consideration to prepare map including all the Geomorphological features according to their location. Pictorial descriptions of Geomorphological unit's classification are explained in Figure 2.3.

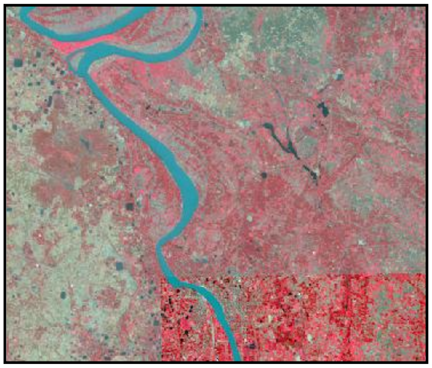
	
Flood plain-Floodplainis a generally flat area of land next to a river or stream. It stretches from the banks of the river to the outer edges of the valley.	**OX-BOW Lake-** An ox-bow lake starts out as a curve, or meander, in a river. This "U" shaped body of water identified as Ox-Box Lake from Satellite Imagery.

Figure 2.2.3: Pictorial description of Geomorphological Units Classification methods

<u>Physiographical Map:</u> The major step of preparing Physiographical Map is generating contour at a specific interval to show the elevation of the area using Cartosat DEM.

<u>Block Map/Transportation Map/Drainage Map:</u>

- Raw Data collected from **National Informatics Centre (NIC Website) during Sept 2020.**
- Data has been geo-referenced using GIS software.
- Digitization of block boundary, district boundary, state boundary, international boundary, and district headquarter, sub–district headquarter, places, road, railway, river, nala etc.
- Road name, River name, Railway name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

<u>Earthquake Map:</u>

- Raw data collected from **Ministry of Earth Science.**
- Data has been geo-referenced using GIS software.
- Digitization of Earthquake zone and superimposed it over Block Boundary.
- Zone name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

<u>Soil Map:</u>

- Raw data collected from **National Bureau of Soil Survey and Land Use Planning during Sept 2020.**

- Data has been geo-referenced using GIS software.
- Digitization of Soil classification zone and superimposed it over District Boundary.
- Soil classification has been filled in attribute table of the Layers.
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Wildlife Sanctuary and National Park location Map:

- Raw data obtained from **ENVIS Centre on Wildlife & Protected Areas during August 2020.**
- Data has been geo-referenced using GIS software.
- Digitization of Wildlife Sanctuary and National Park and superimposed it over Block Boundary.
- Wildlife Sanctuary & National Park name has been filled in attribute table of the Layers

  Final layout has been prepared by giving scale, legend, north arrow, etc.

Primary Data Collection: To prepare DSR, primary data has been collected and field work has also been carried out for the district. Field study involves assessment of the mineral resources of the district by means of pitting / trenching in specific interval. This provides clear picture of mineral matters characterization and their distribution over the area.

Replenishment study: One of the principal causes of environmental impacts on river bed mining is the removal of more sediment than the system can replenish. Therefore, there is a need for replenishment study for riverbed sand in order to nullify the adverse impacts arising due to excess sand extraction. The annual rate of replenishment carried out on every river of the district to have proper assessment of the potential sand reserve.

Four times physical survey has been carried out by GPS/DGPS/ Total Station to define the topography, contours and offsets of the riverbed. The surveys clearly depict the important attributes of the stretch of the river and its nearby important civil and other feature of importance. This information will provide the eligible spatial area for mining.

Report Preparation: The district survey report portrays general profile, geomorphology, land use pattern and geology of the district. The report then describes the availability and distribution of riverbed sands and other minor minerals in the district. Apart from delineation the potential mining blocks, the report also includes inventorization of the minerals, recent trends of production of minor minerals and revenue generation there from. Annual replenishment of the riverbed sand has been estimated using field observation, satellite imagery and empirical formula. The road network connecting arterial road to potential mining blocks has been identified. Potential environmental impacts of mining of these minerals, their mitigation measures along with risk assessment and disaster management plan have also been discussed. Finally, the reclamation strategy for already mined out areas is also chalked out.

GENERAL PART

3 General Profile of the district

a) General Information

Jhargram is a district in the state of West Bengal, India. The district lies between the Kangsabati River in the north and the Subarnarekha in the south. Jhargram has one of the lowest population densities among the districts of West Bengal, with almost all its population living in rural areas. It is a popular tourist destination known for its sal forests, elephants, ancient temples and royal palaces. The district was formed on 4 April 2017, after bifurcation from the Paschim Medinipur district as the 22nd district of West Bengal. The district has its headquarters at Jhargram (Figure 3.1). *(https://en.wikipedia.org/wiki/Jhargram_district)*

Jhargram district covers an area of 3037.64 Sq. km or 303764 hectare. Out of which 268249 hectare is agricultural land and 59497 hectare is under forest coverage. The district is a part of Chota Nagpur Plateau which gradually slopes down towards east, hilly terrain occurs in the north-western part of the district. Kakrajhore area is having the highest altitude of about 300 metres. This area is covered with unfertile hard laterite soil/rocks. The altitude of southern areas of the district belonging to Nayagram, Gopiballavpur-I & II blocks are having the altitude of about 65 mts, the soil is comparatively alluvial in these areas. The altitude of Jhargram town is around 80 mts. *(https://en.wikipedia.org/wiki/Jhargram_district)*

Jhargram district has 10 police stations, 8 community development blocks, 8 panchayat samitis, 79 gram panchayats, 2,996 mouzas, 2513 inhabited villages, 1 municipality and 1 census town. The single municipality is at Jhargram. The census town is Silda: The only subdivision, Jhargram subdivision, has its headquarters at Jhargram. The state Cabinet has given its nod to form 2 more sub-divisions. The three sub-divisions are supposed to be headquartered at Belpahari, Gopiballavpur and Jhargram (Figure 3.2). *(https://en.wikipedia.org/wiki/Jhargram_district)*

The 8 community development blocks are:

- Jhargram
- Jamboni
- Binpur-I
- Binpur-II
- Gopiballavpur-I
- Gopiballvapur-II
- Sankrail
- Nayagram

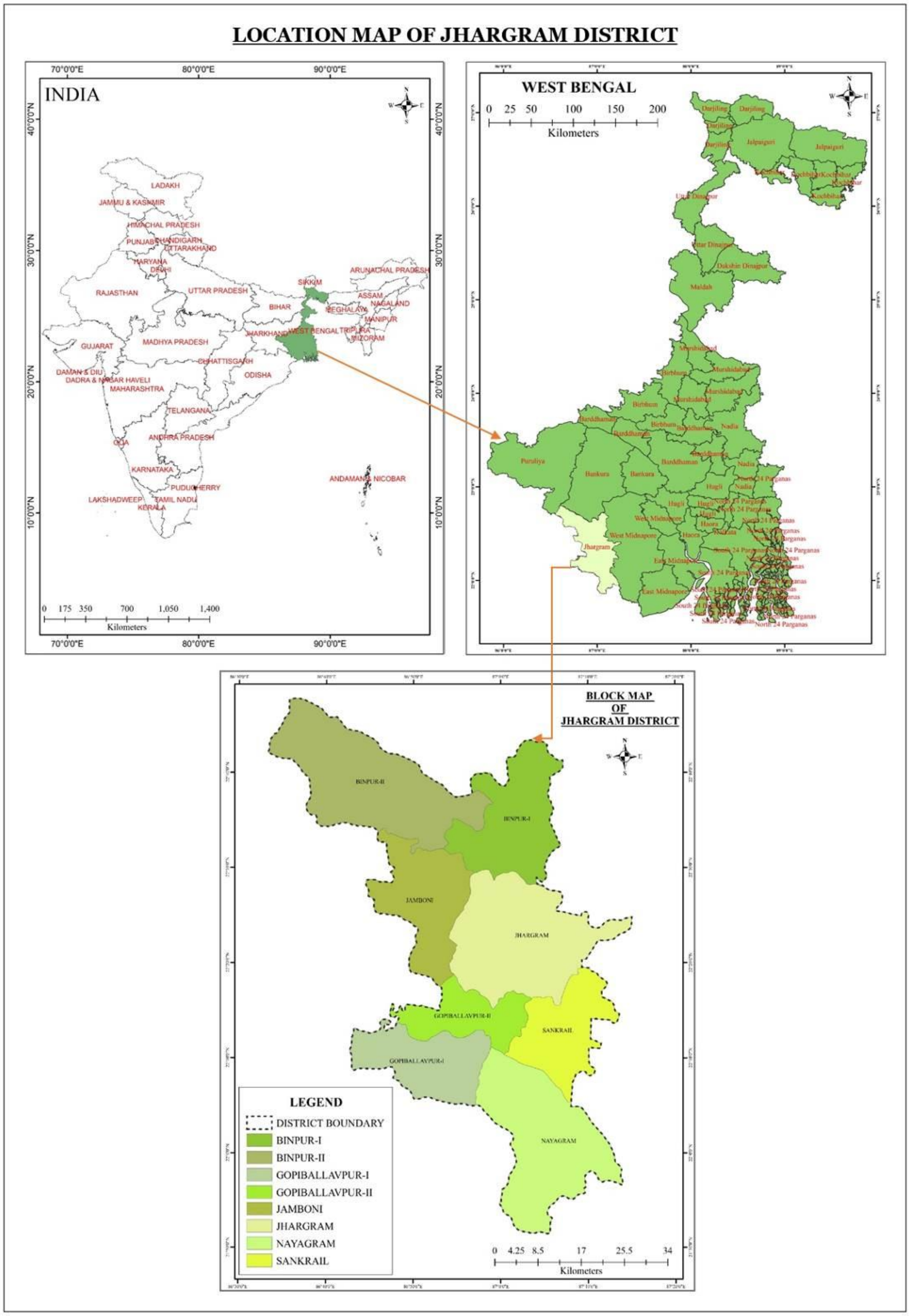


Figure 3.1: Location Map of Jhargram District

(Source: National Informatics Centre and ESRI Base Map)

Table 3.1: Block distribution of Jhargram District

District	Sub division	Police Station	Block	Block HQ
Jhargram	Jhargram	All Women PS Jhargram	Jharhram	Jharhram
		Jharhram		
		Lalgarh	Binpur-I	Lalgarh
		Binpur	Binpur-II	Belpahari
		Belpahari		
		Jamboni	Jamboni	Gidhni
		Nayagram	Nayagram	Belgaria
		Sankrail	Sankrail	Rohini
		Gopibhallavpur	Gopibhallav-pur-I	Chhatinasole
		Beliabera	Gopibhallav-pur-II	Beliabera

(Source: http://www.msmedikolkata.gov.in/uploads/2021/03/districtprofiles/2017-18/JHARGRAM.pdf)

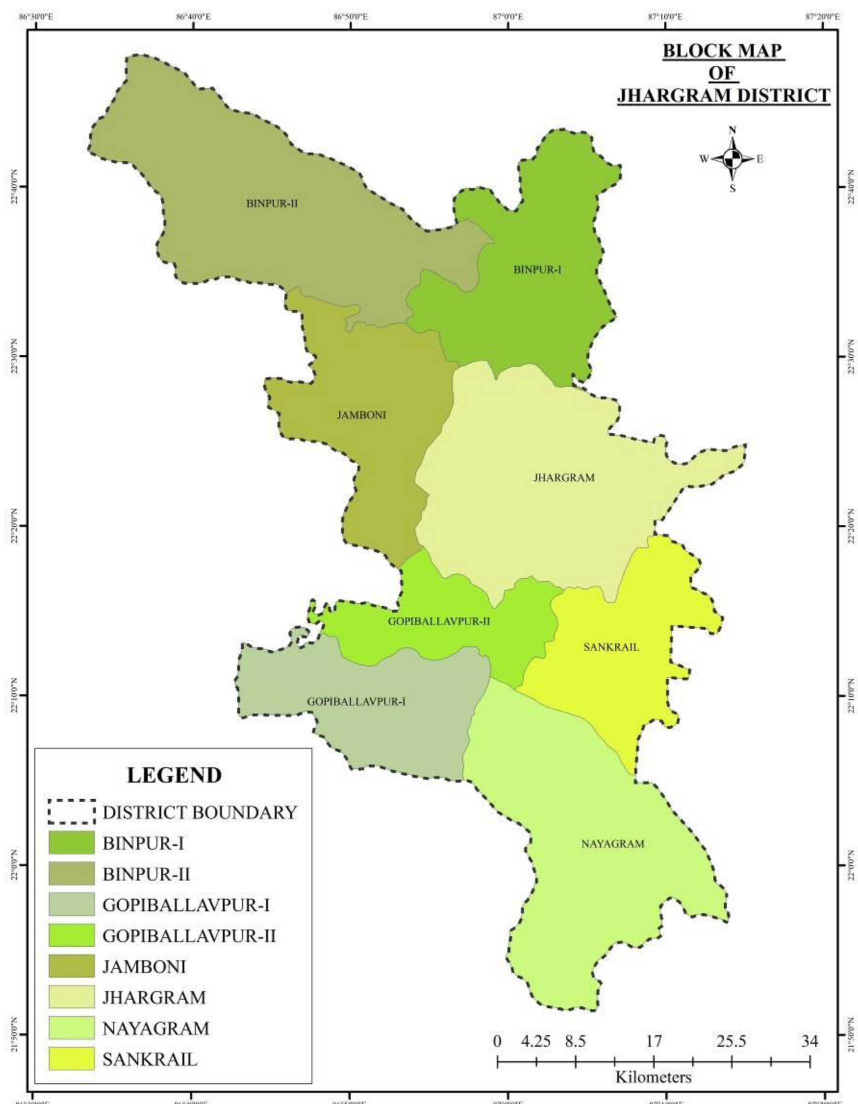


Figure 3.2: Block divisional map of Jhargram District *(Source: National Informatics Centre)*

b) Climate Condition

The weather of the district is characterized by warm-humid tropical monsoon climate in general (District Industrial Profile, Jhargram, 2017 -2018). Temperatures can reach as high as 46 °C in the hot and dry months of May and June but can plummet to 4 ° C in the chilly nights of December and January (https://jhargram.gov.in/). Although there is a difference between the climates of arid stretches in the north and west and that of the swamps in the east and south.

c) Rainfall

The average annual rainfall of Jhargram (Jhargram Forest Division) is about 1400 mm. The rainy season spreads over June to September due to southwest monsoon and the highest rainfall occurs in July and August. The rainfall starts decreasing from October and dry winter sets in. The dry season lasts until May. However, during this time this division gets some sporadic showers.

The information on annual rainfall for the five years from 2016 to 2020 for the district Jhargram is given in Table 3.2. Average rainfall of the district explained graphically in Figure 3.3.

Table 3.2: Annual rainfall (in milimeter) recorded in Jhargram District

Month	2016	2017	2018	2019	2020	Average
Jan	6	5	0	0	41.6	10.52
Feb	48	0	3.4	107.2	11.3	33.98
Mar	27.4	43.9	1.6	63.6	62.6	39.82
Apr	12	17.4	99.1	75.7	113.8	63.6
May	133.5	109.2	109.3	113	262.6	145.52
Jun	161.1	205.5	187.7	128	240.3	184.52
Jul	359.2	411.7	259.7	216.9	217.4	292.98
Aug	371.7	311.9	300.9	397.9	368.9	350.26
Sept	192.2	202.7	229.6	361.7	134.3	224.1
Oct	71.6	203.4	72.7	125.5	84	111.44
Nov	8.6	32.1	7.1	40	10.8	19.72
Dec	0	9.3	23.8	7.6	0	8.14
Yearly Total	1391.3	1552.1	1294.9	1637.1	1547.6	1484.6

Source: Website of Indian Meteorological Department, Govt. of India

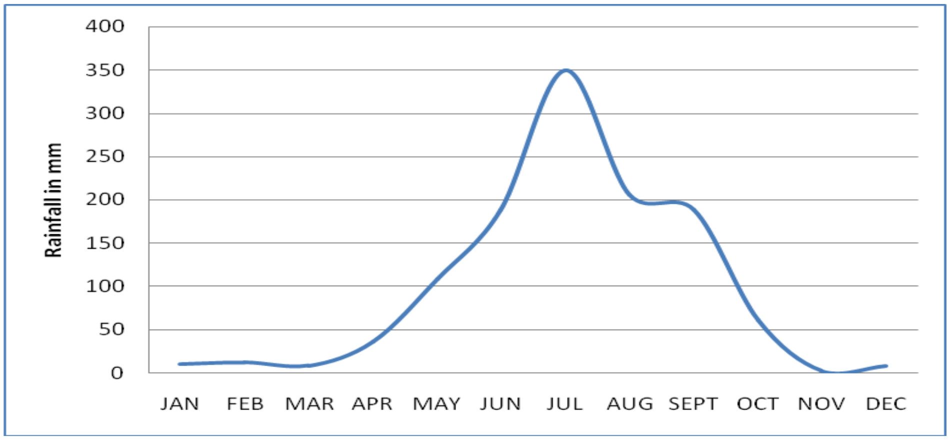


Figure 3.3: Graphical representation of Jhargram District rainfall

- **Temperature:**

Jhargram district experiences dry and hot summer with maximum temperature of 46°C (114.8°F) and that does not come down below 29°C. June to September has shown maximum average rainfall with moderate temperature. Monsoon in Jhargram lasts till the middle of the month of October. Winters in Jhargram are pleasant and enjoyable, with mercury dropping to about 4°C (39.2°F).

The average maximum and minimum temperature recorded in Jhargram is given in Table 3.3.

Table 3.3: Monthly mean temperature (in °C) distribution of Jhargram District

Parameters	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Average Temperature (°C)	19.3	22.1	27.3	31.4	32.2	31.2	28.9	28.8	28.7	27	22.7	19.7
Minimum Temperature (°C)	12.5	15.2	20	24.3	26.4	26.4	25.7	25.7	25.3	22.7	16.7	13.1
Maximum	26.2	29	34.6	38.6	38	36	32.1	31.9	32.1	31.4	28.8	26.3

- **Relative Humidity, Wind speed & Wind direction**

Humidity is observed as high throughout the year, but in the summer months, March and April, the relative humidity is comparatively low, begins some 64 to 75 percent in the mornings and 30 to 40 percent in the afternoons. From May the humidity increases. Skies are moderately to heavily cloudy in May. In the south-west monsoon season; the cloudiness increases and skies are mostly heavily clouded or overcast. From October the cloudiness decreases and in the next six months skies are clear or lightly clouded. Winds are generally light or moderate, with a slight increase in force in the summer seasons.

d) Topography & Terrain

The district is a part of Chotonagpur plateau; it gradually slopes down towards east; hilly terrain occurs in the north-western portion of the district. Kakrajhore area is having the highest altitude of about 300 mts. This area is covered with unfertile hard laterite soil/rocks. The altitude of southern areas of the district belonging to Nayagram, Gopiballavpur-I & II blocks are having the altitude of about 65 mts; soil is comparatively alluvial in this area. The altitude of Jhargram town is around 80 mts. There are a number of rivers in this district flow from north to south/south-east direction. The major rivers are Kangsabati, Subarnarekha, Silabati, Keleghai and Dulang (Figure 3.4).

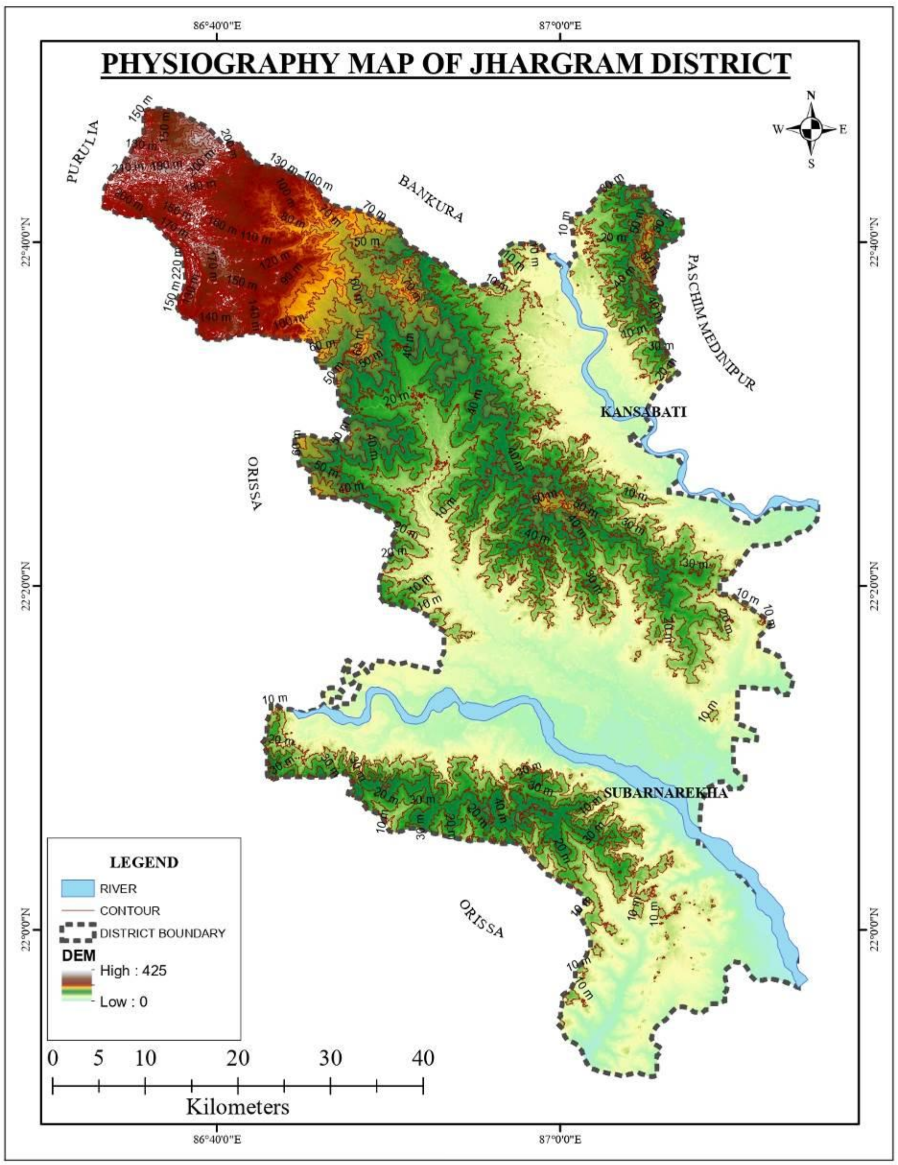


Figure 3.4: Physiographic map of Jhargram District

(Source: Cartosat-1, Bhuvan India)

e) Water Course & Hydrology

Hydrological condition of the district is guided by topography, geology, and rainfall of the region. Central Ground Water Board (CGWB) has carried out detail hydrogeological investigation of the district. Figure 3.5 represents hydrogeological map showing the hydrogeological scenario of the district.

Groundwater occurs in the district under both unconfined condition and confined condition. The water table generally declines with the varying gradients from west, north-west to east and south-east directions. In some part of the district ground water occurs under confined condition.

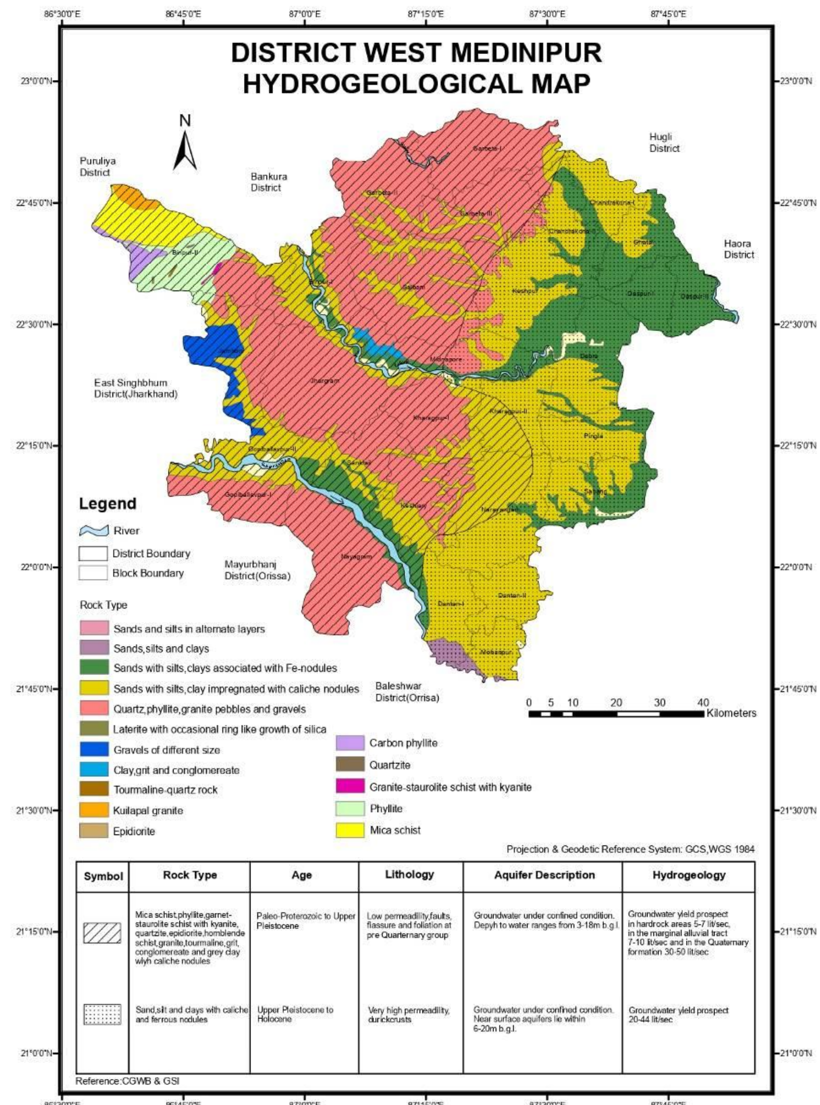


Figure 3.5: Hydrogeological map of undivided Medinipur district including Jhargram

f) Ground Water Development

Central Ground Water Board (CGWB) has carried out hydrogeological investigation in the Jhargram district. The present report incorporates data published by CGWB. Water level data has been collected from both dug-wells and tube-wells. Figure 3.6 represents water level fluctuation graph.

The hydrogeological condition of the district can be divided into two broad divisions as

- Fissured/ Fractured Formation
- Porous Formation

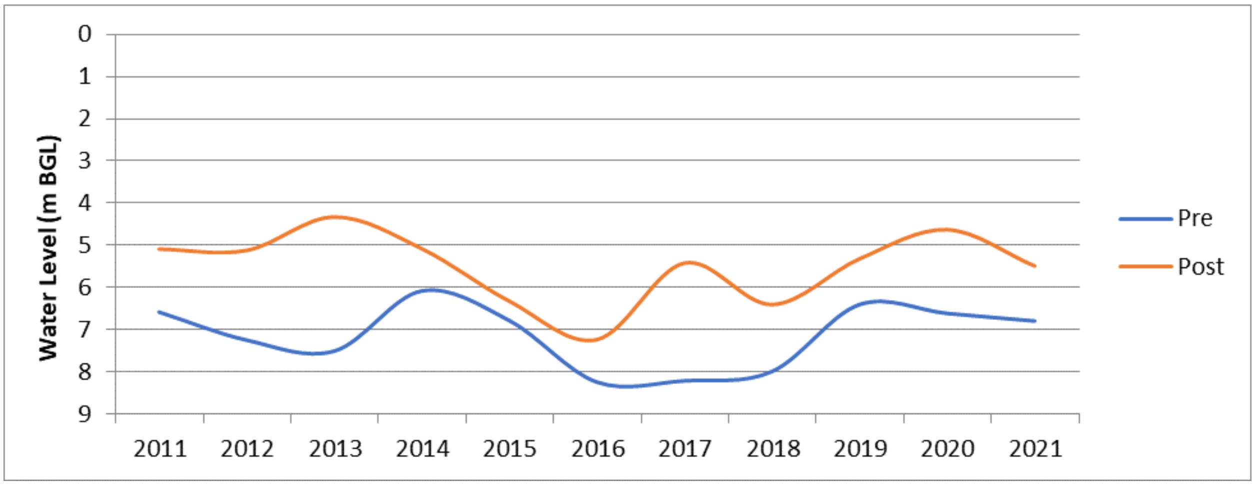
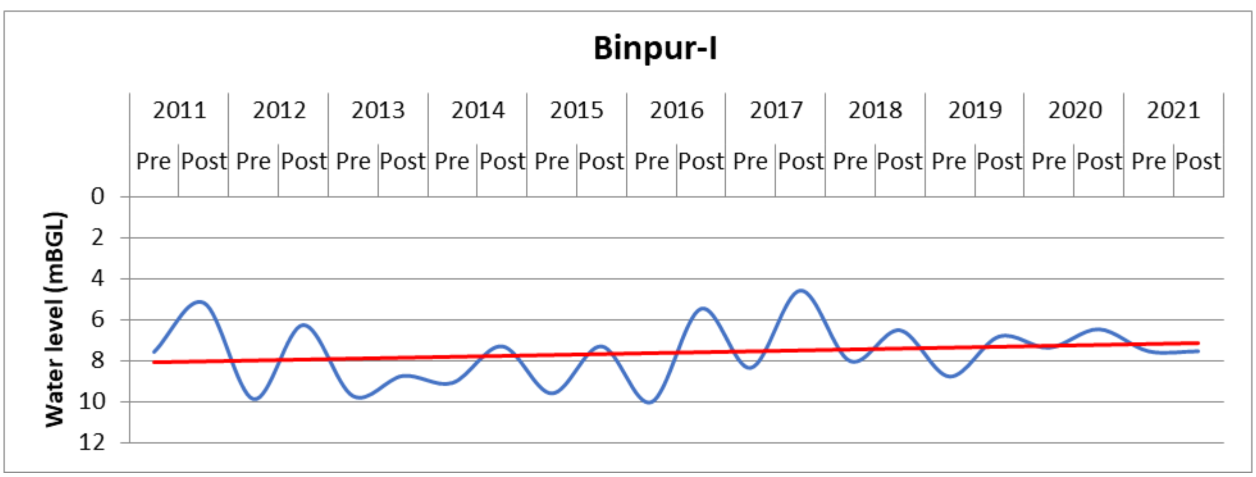
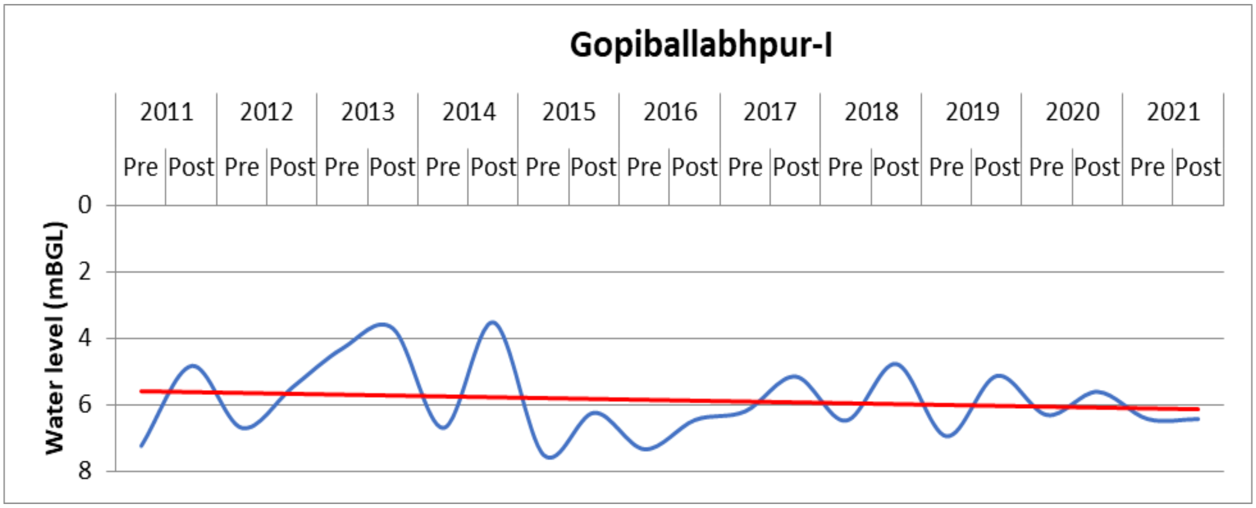
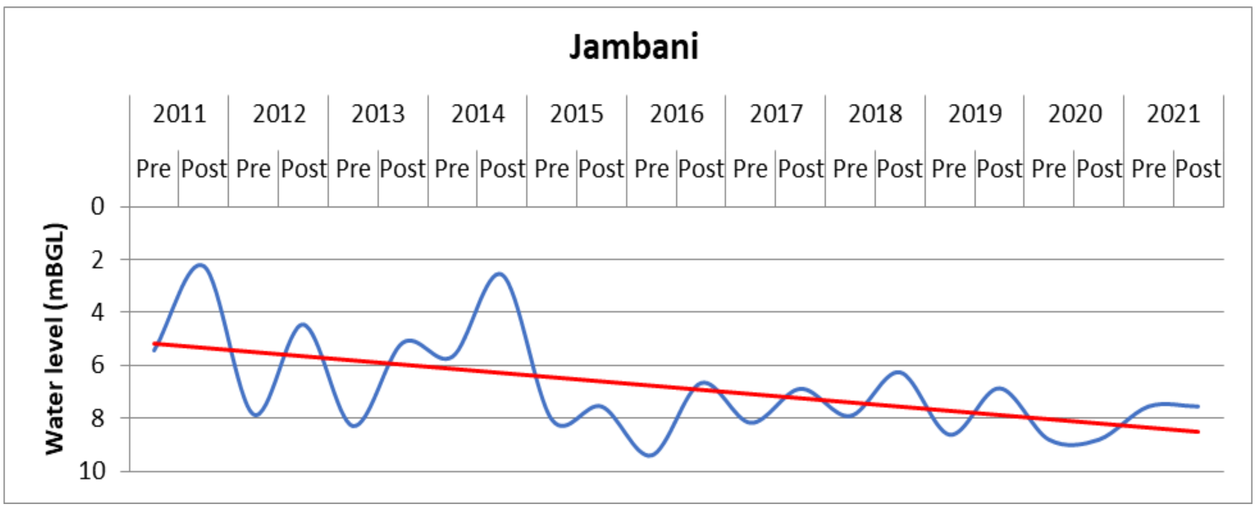


Figure 3.6: Graphical representation of pre-monsoon and post-monsoon water level data, Jhargram

Hydrographs showing variation in water level observed in between 2011 to 2021 in the district is given in Figure 3.7.




Gopiballabhpur-I
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post Pre Post
0 2 4 6 8
Water level (mBGL)


Jambani
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
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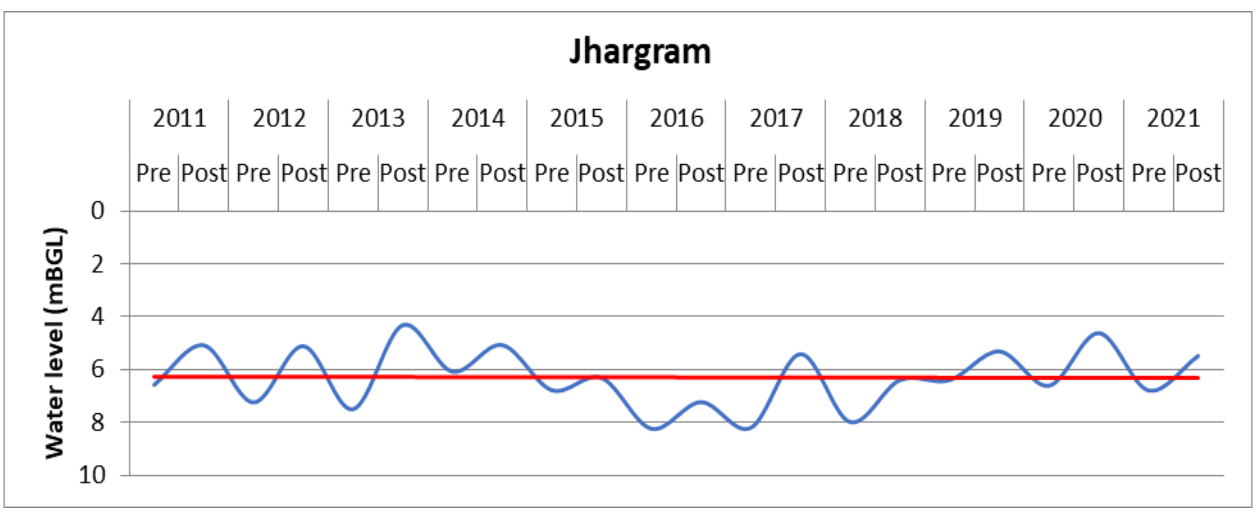
0 2 4 6 8 10
Water level (mBGL)


Jhargram
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
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0 2 4 6 8 10
Water level (mBGL)

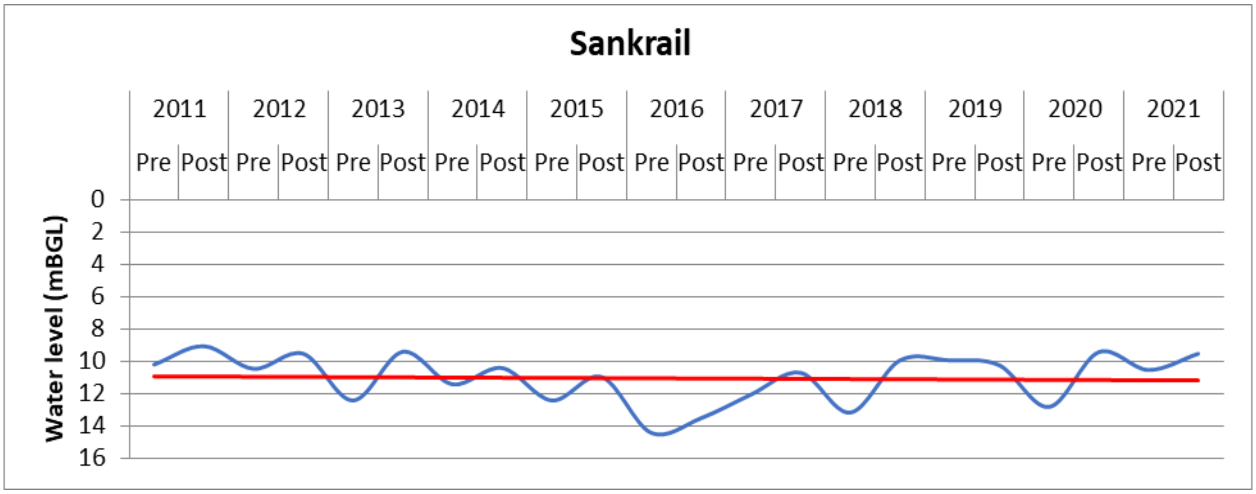


Figure 3.7: Block wise Hydrograph showing variation of water level during 2011 to 2021

g) Drainage System

The important rivers of this division are the Kangsabati (popularly known as Kasai), the Tarafeni, the Subarnarekha, and the Dulong. Apart from the above rivers, there are several rivulets viz. 'Deb', 'Palpala', Rangium', 'Kupon' etc. Most of the above rivers flow from west to east as the western side of the division is having higher altitude.

The Kangsabati River

This river enters the division on the north from Bankura district and flows along a tortuous course running to the south and southwest direction and then flows towards east keeping the Midnapore town on the left (north). The river has contracted rapidly below Midnapore and at Kapastikri (about 20 km down below from Midnapore) the river has bifurcated. One course has gone towards the north and finally has drained into the Rupnarayan river while the other course has run towards the south-east and finally has fallen into the Haldi river.

The Tarafeni River

This river originates in the northwest portion of this division near Patagarh in Banspahari Range. It runs towards east within the jurisdiction of Belpahari and Binpur police Stations and finally has fallen into the Kangsabati river.

The Subarnarekha River

This river enters the division on the west from Dhalbhum (Jharkhand State) and passes through the south of the division intersecting the Gopiballavpur Police Station and forming the northern boundary of Nayagram Police Station (Kharagpur Division). On the south of Dantan, it enters the Balasore district of Odisha and finally falls into the Bay of Bengal. The Subarnarekha has a rapid stream with a sandy bed, and its banks are generally high and well defined. In the season of high flood, the river overflows its left bank about 6 km above the point where it leaves Paschim Midnapore district to enter the Balasore district.

The Dulung River

It is the main tributary of the Subarnarekha. It originates in the northwest portion of the division near Dulungdiha (J.L.No. 100, P.S.: Binpur) and runs generally in a southern direction near the western boundary of the division till it enters Jamboni Police Station. While passing through this police station from north to south it is joined by the Kupon river, Banshir Khal, Polpala Khal, Deb River and Putrangi Khal. Thereafter, it enters Gopiballavpur Police Station where its general direction is from west to east and then Sankrail police station where it again runs in a southerly direction and joins the Subarnarekha.

Drainage map of Jhargram district is furnished as Figure 3.8 and in Plate 1A.

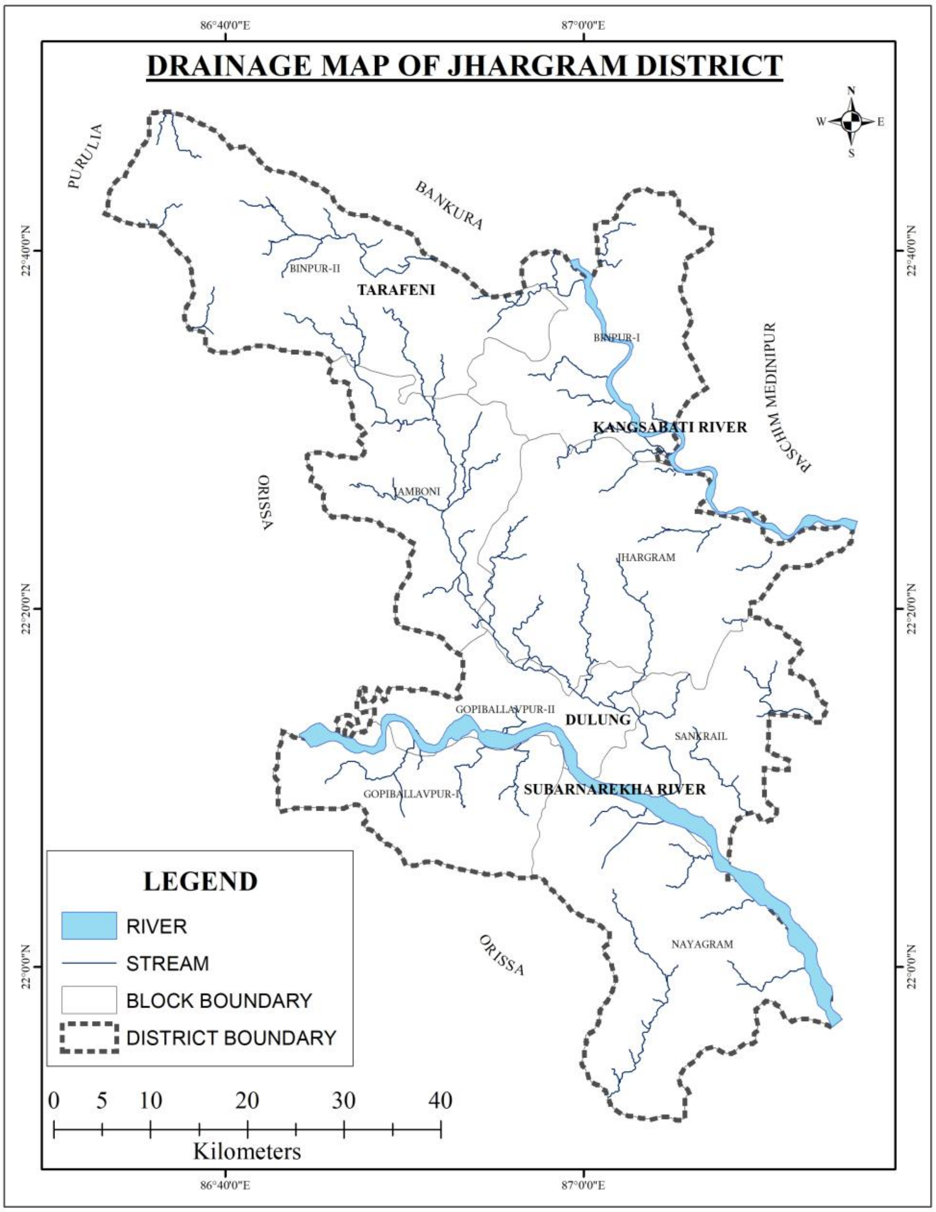


Figure 3.8: Drainage map of Jhargram District

(Source: National Informatics Centre)

h) Demography

Jhargram district had a population of 1,136,548 in the 2011 census. 96.52% of the total population was rural and only 3.48% was urban population, concentrated in Jhargram municipality. Scheduled Castes and Scheduled Tribes made up 235,506 (20.11%) and 333,848 (29.37%) of the total population respectively.

Table 3.4 shows the district demographic profile based on Census 2011. Block-wise literacy rate of the population is described as the percentage of literates. Figures 3.9 and 3.10 representing block wise population distribution and literacy rate respectively.

Table 3.4: Blockwise distribution of Inhabitat Villages & House-holds of Jhargram District in numbers

Division	Police Station	C.D. Block / M	Panchayat			Mouzas	Inhabited Villages (R)	House-holds
			Samity	Gram	Gram Sansad	(2001)	(2011)	(2011)
Jhargram Sub-Div.	**10**	**8/1**	**8**	**79**	**806**	**2996**	**2513**	**254527**
	Jhargram & Jhargram Women	Jhargram	1	13	129	604	489	37864
		Jhargram(M)	-	-	-	-	-	14235
	Lalgarh	Binpur-I	1	10	115	553	427	33936
	Belpahari	Binpur-II	1	10	128	470	401	38681
	Binpur							
	Jamboni	Jamboni	1	10	85	338	281	25773
	Nayagram	Nayagram	1	12	104	336	294	32074
	Sankrail	Sankrail	1	10	87	287	247	25795
	Gopiballavpur	Gopiballavpur-I	1	7	80	216	199	22943
	Beliaberah	Gopiballavpur-II	1	7	78	192	175	23226

(Source: Census, 2011)

Table 3.5: Blockwise distribution of male and female ratio of Jhargram District in numbers

Sub-Division / C.D. Block / M	Rural Population			Urban Population			Total Population		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jhargram Sub-Div.	**541010**	**528102**	**1069112**	**33737**	**33699**	**67436**	**574747**	**561801**	**1136548**
Jhargram	85970	84127	170097	-	-	-	85970	84127	170097
Binpur-I	78929	77224	156153	-	-	-	78929	77224	156153
Binpur-II	79793	79005	158798	2861	2863	5724	82654	81868	164522

Sub-Division / C.D. Block / M	Rural Population			Urban Population			Total Population		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jhargram Sub-Div.	**541010**	**528102**	**1069112**	**33737**	**33699**	**67436**	**574747**	**561801**	**1136548**
Jamboni	57607	55590	113197	-	-	-	57607	55590	113197
Nayagram	71537	70662	142199	-	-	-	71537	70662	142199
Sankrail	58240	57178	115418	-	-	-	58240	57178	115418
Gopiballavpur-I	55475	52779	108254	-	-	-	55475	52779	108254
Gopiballavpur-II	53459	51537	104996	-	-	-	53459	51537	104996
Jhargram(M)	-	-	-	30876	30836	61712	30876	30836	61712

(Source: Census, 2011)

Table 3.6: Blockwise distribution of population and density of Jhargram District in numbers

Sub-Division / C.D. Block / M	Area (Sq. Km.) (2001)	Population (Number)	Density of Population (per Sq. Km.)	P.C. of Population to district Population
Jhargram Sub-Div.	**3037.64**	**1136548**	**374**	**19.22**
Jhargram	515.11	170097	330	2.88
Binpur-I	357.62	156153	437	2.64
Binpur-II	583.50	164522	282	2.78
Jamboni	318.13	113197	356	1.91
Nayagram	501.44	142199	284	2.41
Sankrail	276.80	115418	417	1.95
Gopiballavpur-I	275.83	108254	392	1.83
Gopiballavpur-II	192.17	104996	546	1.78
Jhargram(M)	17.04	61712	3622	1.04

(Source: Census, 2011)

Table 3.7: Blockwise literacy distribution of Jhargram District (in %)

Sub-Division / C.D. Block / M	Rural			Urban			Combined		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jhargram Sub-Div.	**79.21**	**60.20**	**69.81**	**92.26**	**83.59**	**87.93**	**80.00**	**61.65**	**70.92**
Jhargram	80.55	63.73	72.23	-	-	-	80.55	63.73	72.23
Binpur-I	79.72	59.58	69.74	-	-	-	79.72	59.58	69.74
Binpur-II	80.50	59.55	70.06	88.64	74.06	81.37	80.79	60.07	70.46
Jamboni	82.04	62.88	72.63	-	-	-	82.04	62.88	72.63

Sub-Division / C.D. Block / M	Rural			Urban			Combined		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jhargram Sub-Div.	**79.21**	**60.20**	**69.81**	**92.26**	**83.59**	**87.93**	**80.00**	**61.65**	**70.92**
Nayagram	74.06	53.25	63.70	-	-	-	74.06	53.25	63.70
Sankrail	81.01	65.55	73.35	-	-	-	81.01	65.55	73.35
Gopiballavpur-I	75.11	55.26	65.44	-	-	-	75.11	55.26	65.44
Gopiballavpur-II	80.45	62.04	71.40	-	-	-	80.45	62.04	71.40
Jhargram(M)	-	-	-	92.59	84.46	88.53	92.59	84.46	88.53

(Source: Census, 2011)

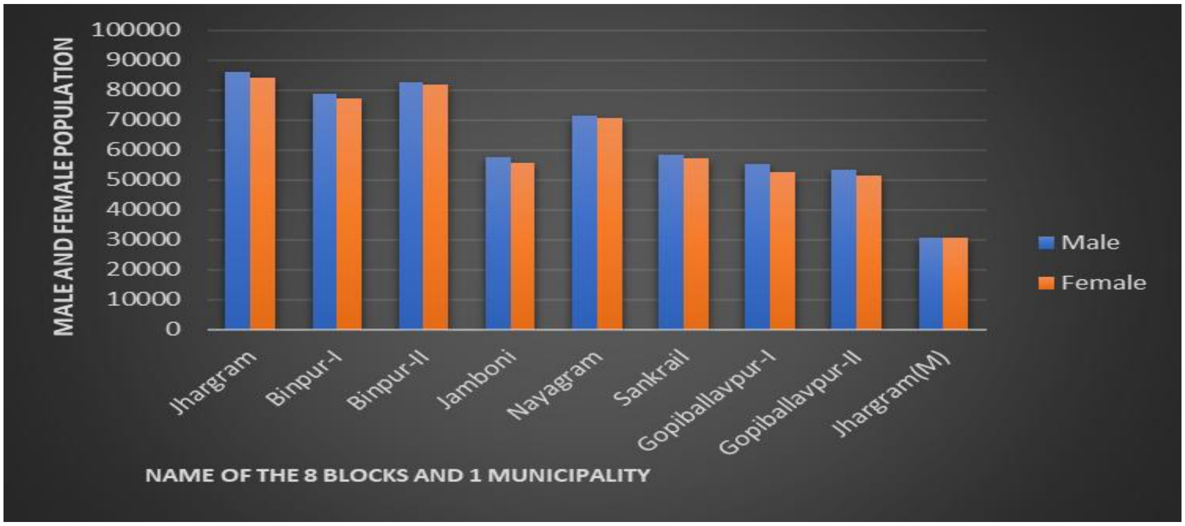


Figure 3.9: Population distribution of the district

(Source: Census, 2011)

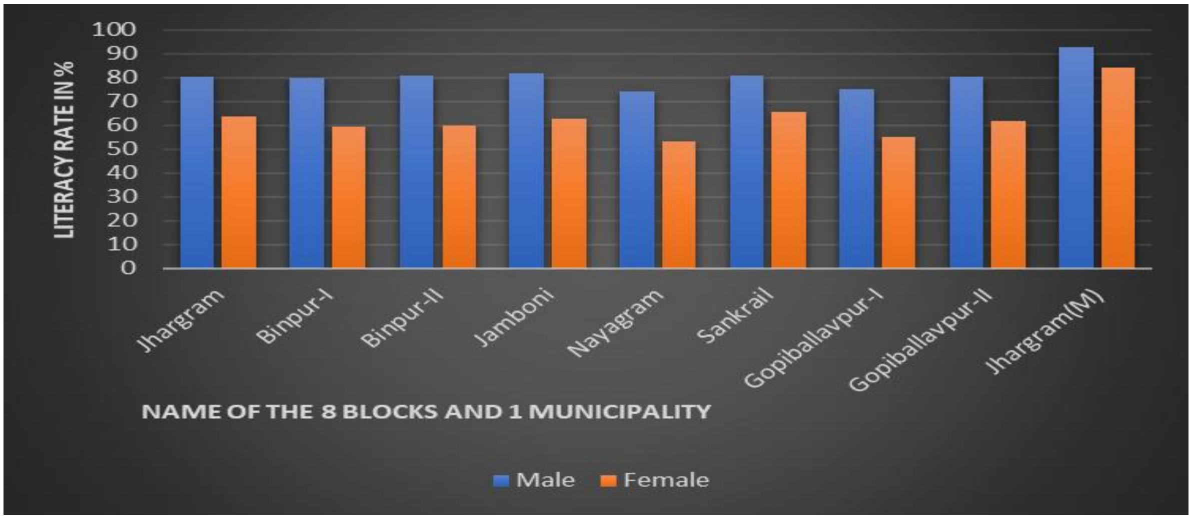


Figure 3.10: Figure showing Block-wise Literacy rate of the district

(Source: Census, 2011)

i) Cropping pattern

Cropping intensity may be defined as the ratio between net cultivated area and total cultivated area. It indicates the intensity of cultivation in a region in a crop year. Higher will be the gross cropped area higher will be the intensity of cropping. Suitable soil, climatic condition, irrigation facilities help the farmers to grow more than one crop and thus increasing the intensity of cropping. Jhargram district covers an area of 303764 hectare and out of which 268249 hectare is agricultural land. High intensity of cropping (155-175%) was observed in Jhargram block during 2001-2011. In the year 2011 to 2012 Jhargram subdivision shows a cropping intensity of 131 percent which is less than national, state and regional levels (Bureau of Applied Economics and Statistics, 2012). Crop Diversification Index from 2007-2008 and 2010-11 in Jhargram block was 46.53 and 47.16 respectively and this crop diversification level largely depends upon the geoclimatic, socio- economic conditions and technological development in the region. Cropping intensity of the district is 2018 - 2019 is 136% (Annual Action Plant, Seva Bharati Krishi Vigyan Kendra, and ICAR 2018 - 2019).

Jhargram district is rich in horticultural crops. All kinds of horticultural crops are grown in this district. Horticulture production is the largest source of our food chain. The district produces mostly crops such as vegetables, mainly Gopiballavpur 1, Gopiballavpur-11, Jhargram, Sankrail, Jamboni, and Binpur-1 Blocks. Fruit crops are grown primarily on Noyagram, Gopiballavpur-1, Jamboni, etc. In addition, cashew nut has grown in all blocks of Jhargram districts. Vegetables, fruits, and cashew nuts are profitable crops, and the cultivation of these crops helps raise economic status in a short period.

(Source: https://www.agrifarming.in/district-wise-crop-production-in-west-bengal-major-crops-in-west-bengal)

j) Land Form and Seismicity

Bureau of Indian Standards, based on the past seismic history, grouped the country into four seismic zones, viz. Zone-II, -III, -IV and –V. Of these, Zone V is the most seismically active region, while zone II is the least. The whole area of Jhargram district falls under the Seismic Zone II, indicating that the district is under low intensity Seismic zone.

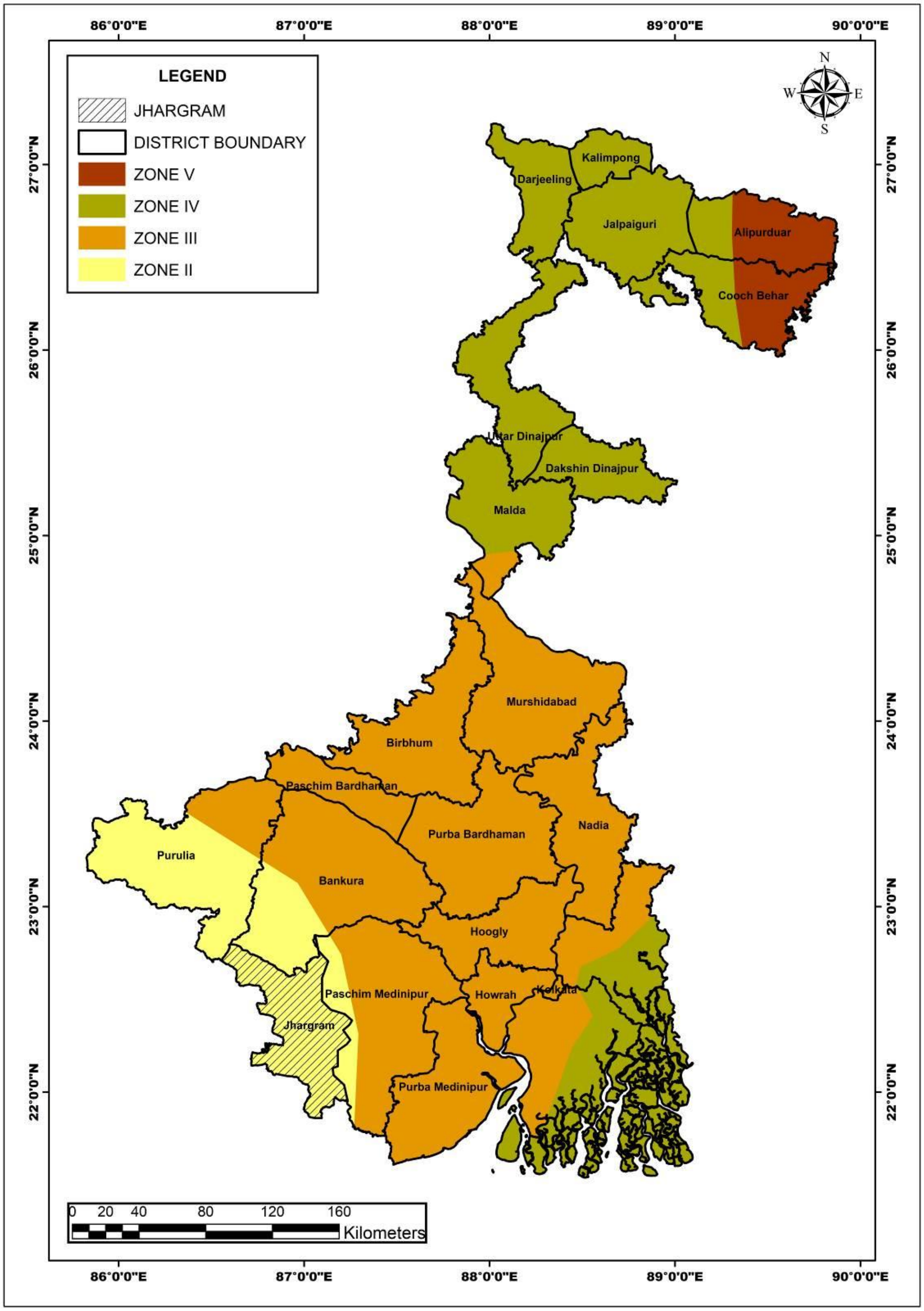


Figure 3.11: Earthquake zonation map of West Bengal highlighting the Jhargram district position

(Source: https://pib.gov.in/PressReleasePage.aspx?PRID=1740656)

- **Floods:** List of affected blocks and municipalities in Jhargram District is furnished below in table 3.8.

Table 3.8: List of affected blocks and municipalities in Jhargram District

Vulnerable Blocks /Municipality	Partly affected Blocks /Municipality	Water logging Blocks /Municipality
Sankrail	Binpur II	Jhargram Municipality
Nayagram	Jhargram	
Gopiballavpur I	Jamboni	
Gopiballavpur II		
Binpur I		

k) Flora

Before 2017 Jhargram was recognized as an important block of West Medinipur. West Bengal Forest department was a pioneer in initiating Joint Forest Management (JFM) in India by involving both foresters and local communities in order to protect degraded forests. The research by Joint Forest Management (JFM) identified 23 families, 33 genera and 36 tree species in the area.

Dominant families were Anacardiaceae and Combretaceae (Gupta and Mishra, 2019). The main produce of the forests is sal, jhaw, akashmoni, eucalyptus, mahua, haritaki, bayra etc. Minor forest products are sal seeds, mahua, medicinal plants like amlaki, kalomegh, kurchi, satamul, diaskoria, sarpagandhas, etc. Besides, forest products like dates, blackberries, 'kakrol', bankundri are also available in the forests of this district (District Industrial Profile, Jhargram, Ministry of MSME, Govt. of India 2017 2018).

l) Fauna

Jhargram has a rich ecological and wildlife heritage. Wildlife of Jhargram includes diversified mammals, birds, reptiles, amphibians, fishes, birds and reptiles. District's wildlife heritage is significantly enriched by some species of different apes, various migratory birds, several endangered species of chameleon, diverse types of mongoose, many other reptiles along with scavengers like vultures, eagles, jackals, hyenas, etc. Numbers of areas in the district can be considered as hotspots of wildlife existences. As for example, Jungle mahal Zoological Park which was previously known as Jhargram Zoo has been established as a Deer Park in the year 1980, within a patch of natural forest at Khas jungle mouza, J.L No. 395 under Dhabani Beat of Jhargram Division at Jhargram of former Medinipur district and currently The Jungle mahal Zoological Park is situated within the municipal limits of Jhargram town, has 147 species of mammals, 65 species of birds, 147 species of Reptiles. Biodiversity Heritage Sites (BHS) of Jhargram district, under the jurisdiction of Jamboni Block BMC shelters faunal diversity of insects, spider squirrels, birds, mammals, reptiles, amphibians etc. (http://wbbb.gov.in/bhs.php) Additionally, the grove has protected 26 species of animals including amphibians and reptiles.

Location of Wild Life Sanctuary and National Parks are shown in the Map of West Bengal (Figure 3.12).

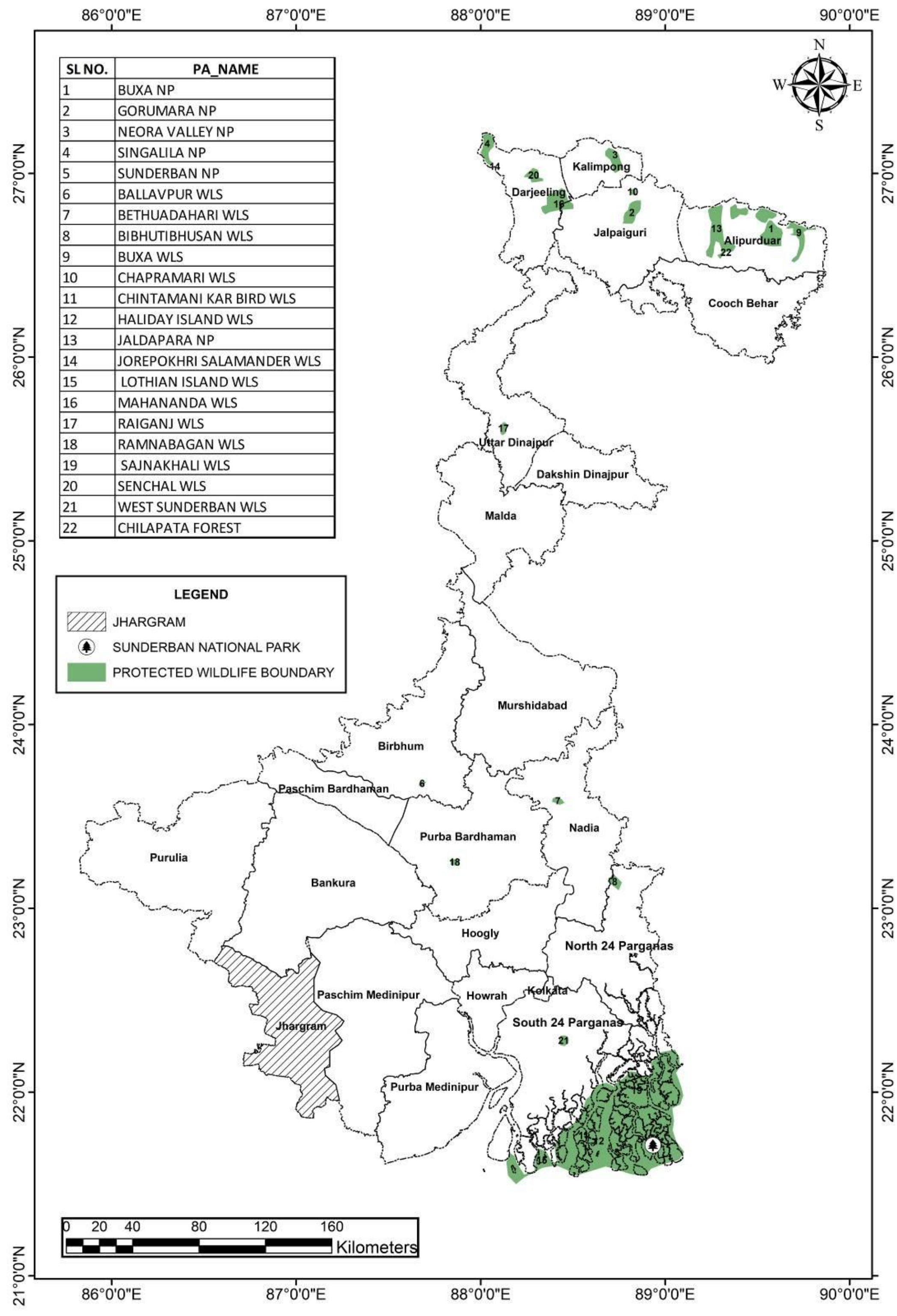


Figure 3.12: District location with respect to Wild Life Sanctuary of West Bengal

(Source: http://wiienvis.nic.in/)

4 Geomorphology

4.1 General Landforms

Being a part of Chotonagpur plateau, the geomorphological point of view Jhargram can be divided into three physiographic Units viz., (a) Plains, (h) Piedmont and (c) Hills. The district gradually slopes down towards east; hilly terrain occurs in the north-western portion of the district. The geological formation of Jhargram is mainly lateritic, which occupies the central as well as the southern parts of the district, whereas the eastern part gradually gives way to the alluvium of the Lower Ganga plain. The plains command the largest area followed by the Piedmont and the hills.

4.2 Soil and rock pattern

The district is fundamentally shielded with unfertile hard laterite rocks and/or soil. Other than lateritic soil, the district soil can be broadly classified into four types, viz., red sandy, red gravelly, older and newer alluvium. The most major soil type of the district is lateritic along with existence of Newer Alluvial patches near the river basins which tumble over in the wet season. The lateritic soils are slightly acidic with pH range 5.5 to 6.5 and poor in calcium, organic matter, and available phosphates and in bases. Laterite soil has a little water holding capacity. In some portions of the district red graveled and sandy soils appear with few patches of Older Alluvium. The red soils are poor in organic matter and available plant nutrients and coarse textured with pH around 6.0 to 6.6. Inthe alluvial tract three types of local soils are abundant e.g., clayey soil known as 'entel'; the loam soil, known as 'doash'/'dorash/'doesta' and sandy loam soil known as 'beledoash'.The pH of alluviums ranges from pH 6.0 to 8.0 i.e., marginally acidic and to some extent alkaline (shodhganga.in flibnet.ac.in./bitstream/).

Soil type of Jhargram district can be divided into 11 categories as furnished in Table 4.1 (**Bhunia et al. 2012**).

Table 4.1: Soil characteristics of the Jhargram district and their percent of area covered

Soil Code	Description	Taxonomic name
W036	Very deep, poorly drained, fine cracking soils occuring on level to nearly level low-lying alluvial plains with clayey surface associated with very deep, imperfectly drained, fine soils	Fine, Vertic Ochraqualfs
		Fine, Typic Ustochrepts
W064	Very deep, moderately well drained, coarse loamy soils occuring on very gently sloping flood plain with loamy surface, moderate erosion and moderate flooding associated with very deep, moderately well drained, fine loamy soils	Coarse loamy, Typic Ustifluvents
		Fine loamy, Typic Ustifluvents
W065	Very deep, moderately well drained, fine loamy soils occuring on very gently sloping flood plain with loamy surface, moderate erosion and moderate flooding associated with very deep, well drained, sandy soils	Fine loamy, Typic Ustifluvents
		Typic Ustifluvents
W067	Very deep, imperfectly drained, coarse loamy soils occuring on very gently sloping to undulating dissected upland with loamy surface and moderate erosion associated with very deep, moderately well drained, fine loamy soils	Coarse loamy, Typic Haplaquepts
		Fine loamy, Typic Haplaquepts
W068	Very deep, imperfectly drained, fine loamy soils occuring on very gently sloping to undulating dissected upland with loamy	Fine loamy, Ultic Paleaustalfs

Soil Code	Description	Taxonomic name
	surface and moderate erosion associated with very deep, moderately well drained, fine loamy soils	Fine loamy, Rhodic Paleaustalfs
W069	Very deep, poorly drained, fine loamy soils developed on old alluviam occuring on gently sloping to undulating disected upland with loamy surface and slight erosion associated with very deep, poorly drained, fine soils	Fine loamy, Aeric Ochraqualfs
		Fine, Aquic Haplaquepts
W070	Very deep, poorly drained, fine soil occuring on gently sloping upland with loamy surface associated with very deep, imperfectly drained, fine soils	Fine, Aeric Ochraqualfs
		Fine, Typic Ochraqualfs
W0108	Very shallow, somewhat exessively drained, gravelly loamy soils occurring on gently sloping narrow hill slopes with gravelly loamy surface and moderate erosion associated with deep, well drained, coarse loamy soils	Loamy-skeletal, Lithic Ustorthentsts
		Fine Loamy, Typic Haplustalfs
W0109	Very shallow, well drained, coarse loamy soils on gently sloping hill slopes with gravelly loamy surface and severe erosion associated with rock outcrops	Loamy, Lithic Ustorthentsts
		Rock outcrops
W0110	Shallow, moderately well drained, coarse loamy soils on gently sloping subdued hill slopes with loamy surface and severe erosion associated with very shallow, well drained, coarse loamy soils	Loamy, Lithic Ustorthentsts
		Loamy, Lithic Ustorthentsts
W0112	Very deep, moderately well drained, fine loamy soils occuring on very gently sloping to undulating upland with loamy surface and moderate erosion associated with moderately deep, well drained, fine loamy soils	Fine Loamy, Typic Haplustalfs
		Fine, Typic Paleustalfs

There are various types of rocks that are present in the district. The parent rock is usually composed of feldspathic schistose. The major parts of the area are covered with laterites with oldest outcrops which are of the Archaean eon and the alluvium is of recent origin. The laterites of Jhargram are not homogeneous and contain all possible gradation from loose gravelly formation to hard compact pisolitic masses. In the north-west part of Binpur block micaceous schists crop occurs beneath a stream laterite flats near the village of' Silda. Around 13 kilometers away towards west an abrupt low ridge rises from the lateritic plain and the ridge is mainly made of grey and bluish-grey micaceous schists with bands of gneiss that has a resemblance with the rocks of Silda village. Group of hills of irregular shape to the west of this ridge, are principally composed of hard grey and greyish-white gritty quartzites associated with irregular veins of vein quartz.

Figure 4.1 is showing soil pattern of the Jhargram district.

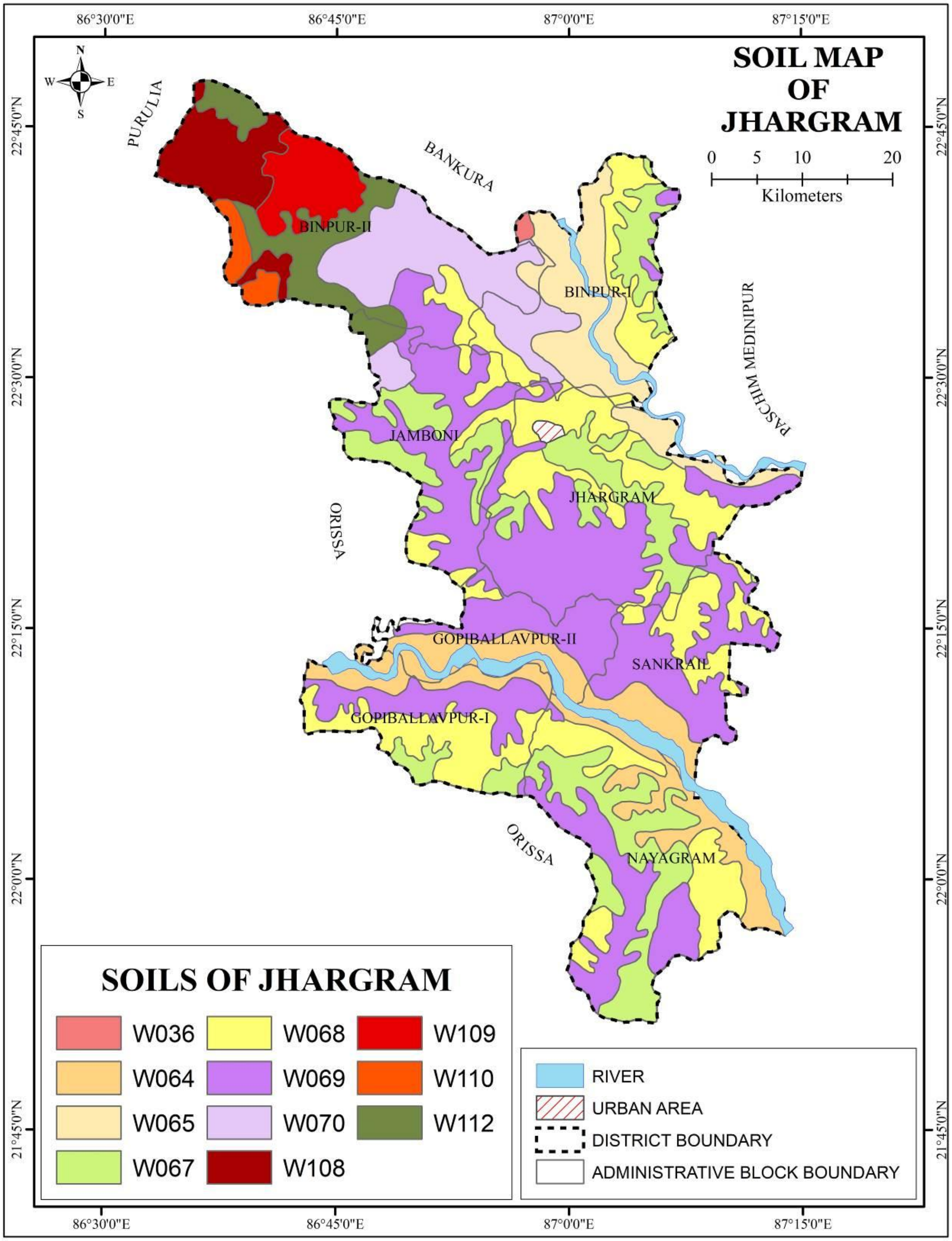


Figure 4.1: Soil Map of Jhargram District
(Source: https://esdac.jrc.ec.europa.eu/content/west-bengal-soils-sheet-2)

4.3 Different geomorphologic units

The district is a part of Chotonagpur plateau; it gradually slopes down towards east; hilly terrain occurs in the north-western portion of the district. Kakrajhore area is having the highest altitude of about 300 mts. These areas are covered with unfertile hard laterite soil/rocks. The altitude of southern areas of the district belonging to Nayagram, Gopiballavpur-I & II blocks are having the altitude of about 65 mts; soil is comparatively alluvial in this area. Geo-morphologically the study area is classified into seven units such as badlands, flood plains; deltaic fan surface, pediments and Pedi plains, ridges and hills and upland plains. Upland plain is spread out all over the area and more than 60 % area of Jhargram, 80 % area of Jamboni has good ground water potentiality. Badland topography is found in Binpur-I, where the ground water potentiality is low. Flood plains areas exhibit an excellent ground water potentiality which arefound along three main channels in the Kangsabati Command area. The area covered by low ridges and hills in Binpur-II has low ground water potentiality. Figure 4.2 shows the geomorphological variation of Jhargram district.

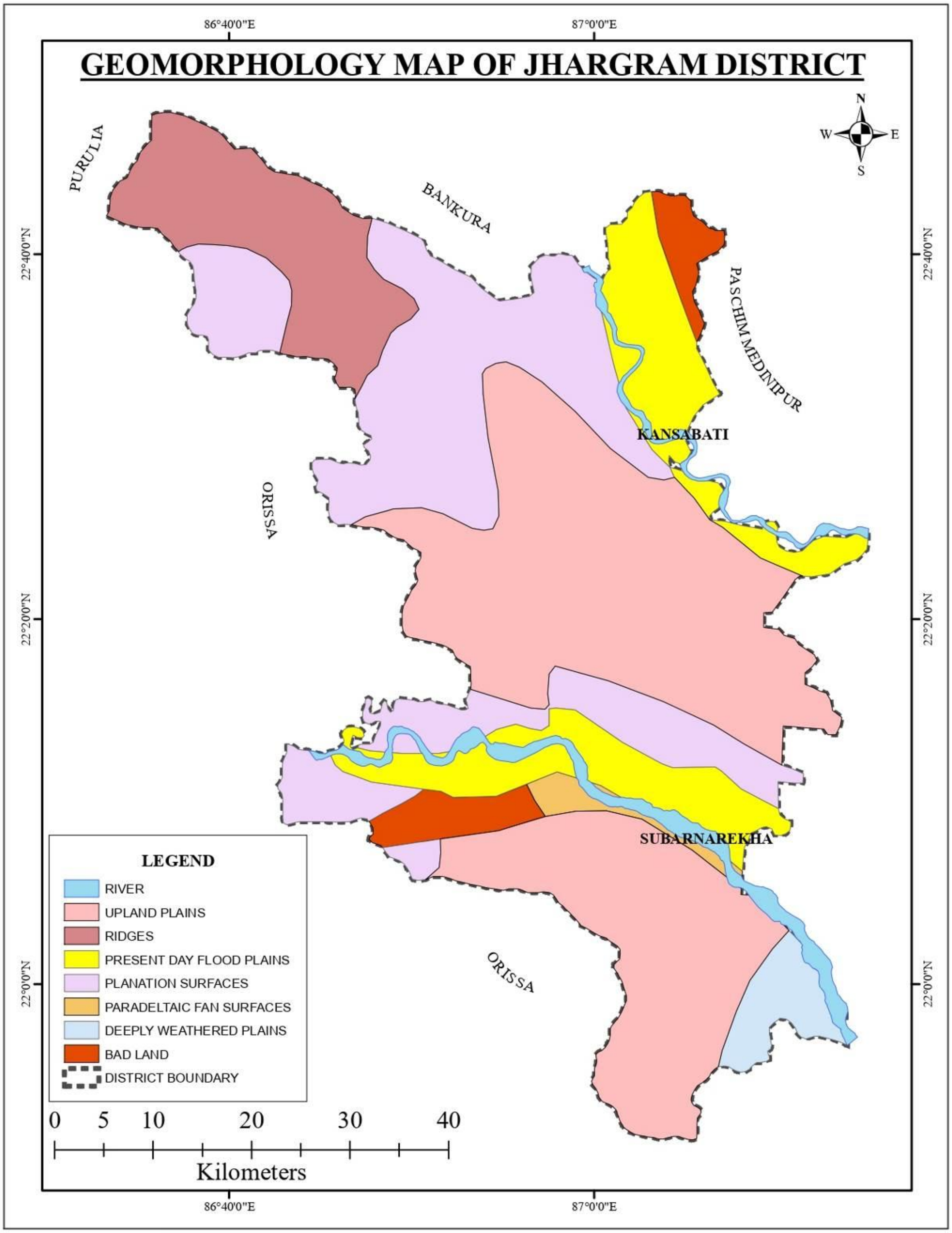


Figure 4.2: Geomorphological map of Jhargram District

(Source: Resourcesat-1&2 – Liss-3, Bhuvan India)

5 Land use pattern of the district

Jhargram is characterized by hard rock uplands, lateritic covered fringe, flat alluvial and deltaic plains.

Land use of the district is characterized by agricultural land, non agricultural land, forest land and cultivable waste land.

Table 5.1: Land Use Statistics (2018–2019)

Landuse	Area in Ha	
Net Cropped Area	168448	Ha
Area under non-agricultural use	38927	Ha
Area under Forest	73647	Ha
Area under current fallow (2016-17)	3377	Ha
Cultivable waste land	21417	Ha
Gross cropped area	229713	Ha
Area cultivated more than once	70495	Ha
Cropping intensity	136	%

Source: Annual Action Plant, Seva Bharati Krishi Vigyan Kendra, ICAR 2018 - 2019

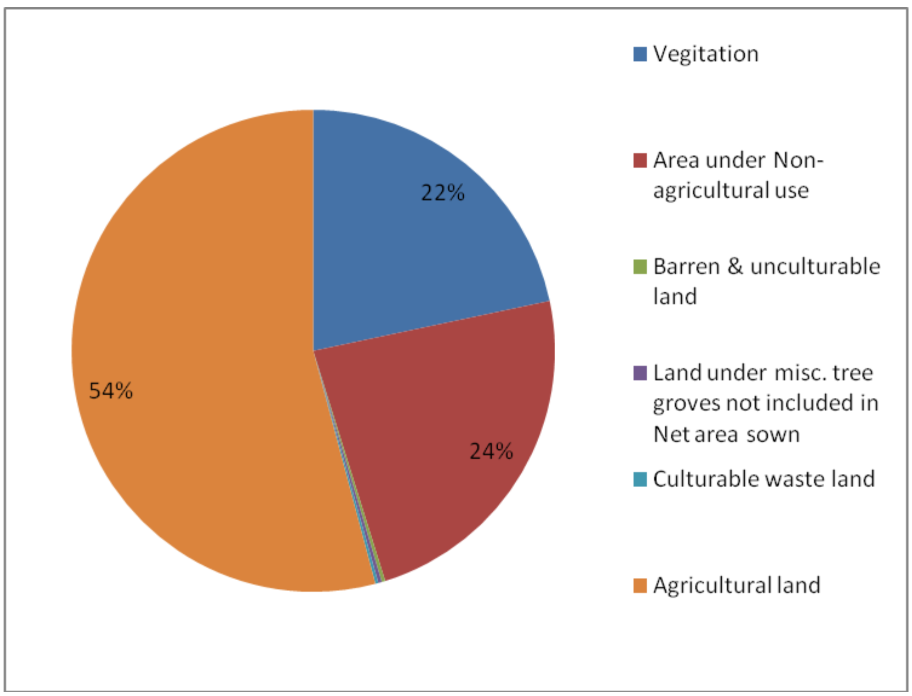


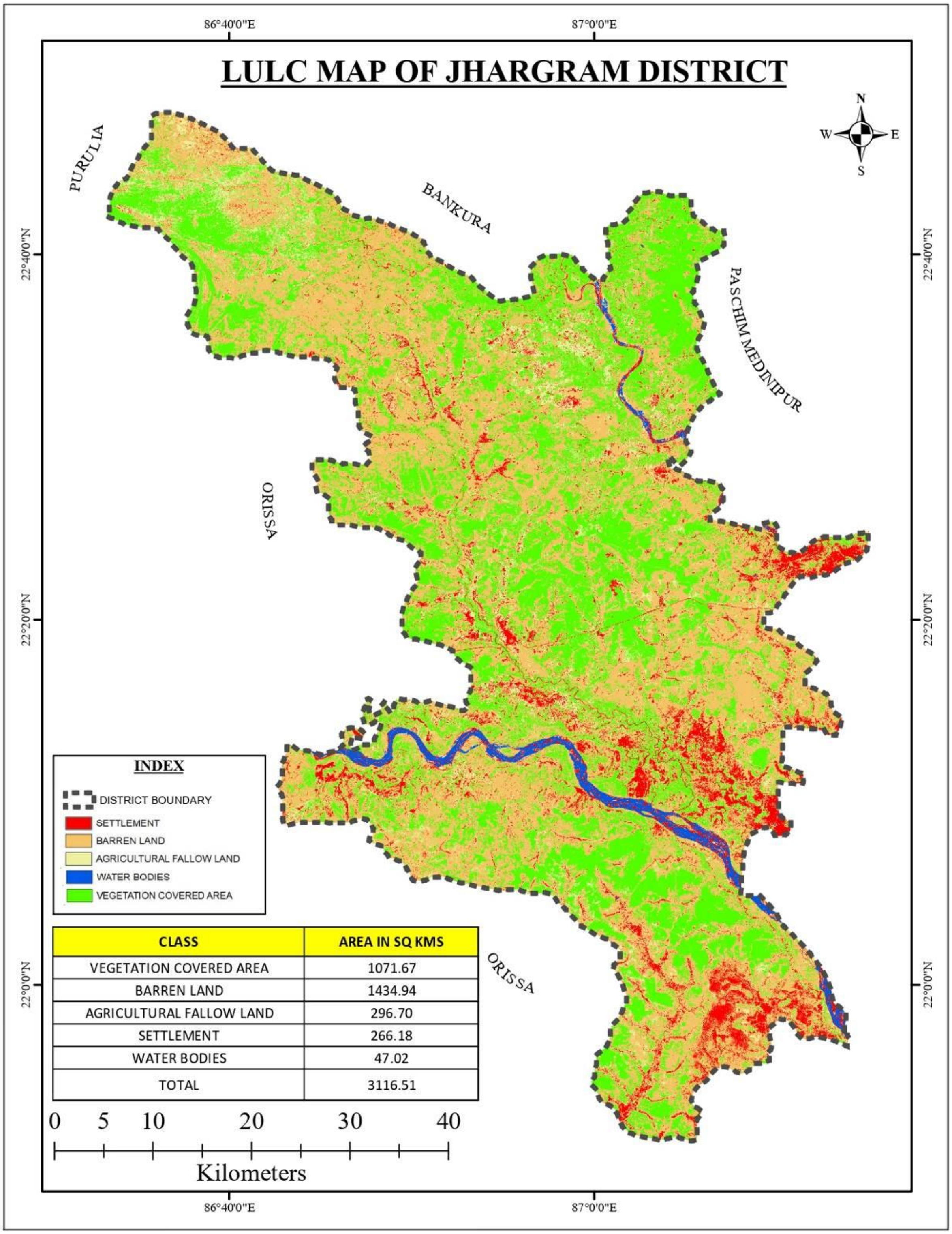
Figure 5.1: Land use pattern of Jhargram District

Table 5.2: Distribution of Villages According to Agricultural Land Use (Census, 2011)

Name of C.D. Block	Total area (in Hectares)	Percentage of cultivable area to total area	Percentage of irrigated area to cultivable area
Binpur-II	54444.72	28.32	41.72
Binpur-I	30714.58	64.67	79.02
Jhargram	46316.63	47.06	53.18
Jamboni	27781.42	53.31	30.47
Gopiballavpur-II	18425.84	67	37.89
Gopiballavpur-I	25853.75	52.18	30.59
Nayagram	43671.84	46.87	22.88
Sankrail	24396.54	71.41	70.4

Table 5.2 shows the distribution of agricultural land, both irrigated and non-irrigated land in different blocks of Jhargram district. In the district around 61% land area is available for cultivation. Irrigation is considered as an important factor for cultivation. As per the Census 2011 dataset, 57% of the cultivable land is under irrigation. The proportions of cultivable area in Binpur-II block with respect to its total area is lowest. Nayagram, Jamboni and Gopiballavpur-I blocks have less proportion of irrigated area.

Figure 5.2 is the Land Use Land Cover map of the district.



CLASS	AREA IN SQ KMS
VEGETATION COVERED AREA	1071.67
BARREN LAND	1434.94
AGRICULTURAL FALLOW LAND	296.70
SETTLEMENT	266.18
WATER BODIES	47.02
TOTAL	3116.51

Figure 5.2: Land Use Land Cover map of Jhargram District
(Source: Resourcesat-1&2 – Liss-3, Bhuvan India)

5.1 Forest -detail of the district

For scientific management of forests vested in Government under Estate Acquisition Act, 1953, Jhargram Forest under the administrative setup of Jhargram Division erstwhile parent division styled as Midnapur Division was bifurcated into two divisions viz. West Midnapur Division (renamed as Jhargram Division) with headquarters at Jhargram and East Midnapur Division with headquarters at Midnapur. The West Midnapore Division came into existence on 29.01.1954. It has mainly dry Sal forests with very less under growth due to excessive underground fires and over grazing. As on 01.04.2021, there are 4 Forest divisions in Jhargram district Viz. Jhargram (70% of total district covering both forest and non forest areas), Kharagpur (25%), Midnapore (3%) and Rupnanrayan (2%) divisions. Forest divisions also work in non forest areas for prevention of Forest offences, management of wildlife such as migration of elephants, felling permission and issuance of transit passes for trees felled outside the forest areas, development of community infrastructure for people dependent on forests, disaster management works, etc.

Table 5.3: Forest area scenario of Jhargram (2017 - 18)

Nos. of Range	Nos. of Beats	Nos. of Mouza	Total Forest (in Ha.)	Reserve (in Ha.)	Protected (in Ha.)
12	36	808	59498	2349.6	52395

Source*: District Industrial Profile, 2017 - 18*

5.2 Agriculture and Irrigation

Production figures for the year 2010-11 show the production of rice at 1,718.6 thousand tons of which aman was 1,002.2 thousand tons boro 629.6 thousand tones. Among others, total pulses produced was 4.1 thousand tons, total oil seeds were 94.7 thousand tons, total fibers (98.0 per cent jute) were 42.6 thousand bales (of 180 kg. each), potato was 2,482.4 thousand tones, dry chilies were 6,000 tones and ginger 2,500 tons (Census, 2011).

Table 5.4 shows the crop production capacity of the Jhargram district.

Table 5.4: Production of Principal Crops in the undivided Jhargram District

(In Thousand tonnes)

Crops	2009-10	2010-11	2011-12	2012-13	2013-14
Foodgrains :					
1. **Rice**	**1756.5**	**1718.6**	**1774.0**	**1880.2**	**1742.6**
Aus	61.6	86.8	75.7	85.8	87.3
Aman	1195.0	1002.2	1245.6	1315.9	1053.4
Boro	499.9	629.6	452.7	478.5	601.9
2. Wheat	12.5	11.3	9.4	11.0	10.9

Crops	2009-10	2010-11	2011-12	2012-13	2013-14
3. Barley	-	-	-	-	-
4. Maize	2.9	2.4	2.4	3.0	6.4
5. Other Cereals	-	-	-	-	-
Total Cereals	**1771.9**	**1732.3**	**1785.8**	**1894.2**	**1759.9**
6. Gram	(b)	(b)	(b)	-	(b)
7. Tur	(b)	0.2	(b)	0.2	0.3
8. Other Pulses	4.1	3.9	3.0	3.5	4.2
Total Pulses	**4.1**	**4.1**	**3.0**	**3.7**	**4.5**
Total Foodgrains	**1776.0**	**1736.4**	**1788.8**	**1897.9**	**1764.4**
Oil Seeds :					
1. Rapeseed & Mustard	10.2	11.7	11.7	13.5	15.8
2. Linseed	-	-	-	(b)	(b)
3. Other Oil seeds	83.7	83.0	67.2	82.2	88.4
Total Oil seeds	**93.9**	**94.7**	**78.9**	**95.7**	**104.2**
Fibres : *					
1. Jute	42.7	41.6	37.8	42.7	64.7
2. Mesta	-	-	-	4.6	-
3. Other Fibres	0.9	1.0	0.9	0.9	1.0
Total Fibres	**43.6**	**42.6**	**38.7**	**48.2**	**65.7**
Miscellaneous crops :					
1. Sugarcane	134.4	89.7	524.3	503.6	708.2
2. Potato	2448.1	2482.4	1148.6	1463.6	1224.1
3. Tobacco	-	-	-	-	-
4. Tea	-	-	-	-	-
5. Chillies (dry)	6.0	6.0	6.0	6.1	6.2
6. Ginger	2.5	2.5	2.5	2.5	2.6
Total Miscellaneous crops	**2591.0**	**2580.6**	**1681.4**	**1975.8**	**1941.1**

(Source: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook)

5.3 Horticulture

The district has a suitable agro-climatic condition for cultivation of mulberry and horticulture crops such as mango, banana, guava, lemon, mousambi, papaya, cashew and jackfruit. The major agricultural fruit crops grown in the district are given in Table 5.5.

Table 5.5: Production of Fruits and Vegetables in the district

Name of Fruits / Vegetables	Production (Thousand tonnes)				
	2009-10	2010-11	2011-12	2012-13	2013-14
A. Fruits :					
Mango	12.49	14.49	16.43	16.58	10.50
Banana	37.18	38.00	39.08	40.27	39.38
Pineapple	1.26	1.26	1.25	1.20	0.90
Papaya	10.34	10.41	10.50	10.97	11.50
Guava	14.91	14.91	14.66	15.19	15.34
Jackfruit	9.76	9.76	9.80	9.94	9.85
Litchi	0.62	0.62	0.68	0.69	0.70
Mandarin Orange	-	-	-	-	-
Other Citrus	5.92	5.92	6.21	6.38	6.11
Sapota	2.81	2.81	2.82	2.51	2.62
Others	3.28	3.32	2.78	2.50	2.55
Total	**49.17**	**98.57**	**101.50**	**104.21**	**106.23**
B. Vegetables :					
Tomato	69.80	70.71	71.09	74.93	72.73
Cabbage	148.31	150.39	150.69	151.28	138.30
Cauliflower	109.91	111.36	111.66	111.30	101.50
Peas	2.89	2.98	1.98	1.99	2.16
Brinjal	178.80	162.72	186.90	186.75	174.50
Onion	43.23	44.41	44.42	45.03	44.20
Cucurbits	115.00	119.11	119.22	120.50	120.88
Ladies Finger	45.03	46.39	45.79	46.66	51.48
Radish	23.02	4.03	24.13	25.34	27.70
Others	111.42	155.23	114.95	117.37	116.84
Total	**838.47**	**847.41**	**867.33**	**870.83**	**881.15**

(Source: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook)

The floriculture of the district consists of various types of orchids, decorative plants, temperate and tropical flowers, etc.Tuberose, marigold, rose and seasonal flowers are the main flowers of Jhargram district (Table 5.6). In this district the most popular flower is marigold.

Table 5.6: Production of Flowers in the district

Name of Flowers	**Production**					
	Unit	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Rose	Crore Cut Flower	20.980	21.300	21.841	24.360	26.150
Chrysanthemum	"	1.818	1.818	1.880	1.790	2.000
Gladiolus	"	1.970	2.100	2.150	2.162	2.230
Tuberose	"	20.800	22.000	24.000	25.920	26.700
Marigold	' 000 MT	5.532	5.532	6.201	6.239	6.598
Jasmine	"	0.092	0.092	0.093	0.091	0.091
Seasonal Flower	"	1.383	1.393	1.440	1.450	1.300
Misc.Flower	"	0.395	0.397	0.398	0.354	0.247

(Source: http://wbpspm.gov.in/publications/District%20Statistical%20Handbook)

5.4 Mining

Jhargram district does not hold huge minerals deposits. The district is having riverbed deposits which are mainly generates the revenue. In-situ deposits, such as lateritic clay are found in many parts of the district. The extracted laterite is used for various purposes. In Jhargram district, quartz is also noted.

6 Geology

The district is underlain by unconsolidated alluvium of Recent age. The Jhargram district is covered by the Quaternary un-consolidated formations which are mainly divisible into two units:

i. Platforms sediments mainly covered by laterite forming upland area
ii. Recent sediments forming plain area

The Laterite upland area are underlain by a thick sequence of clay, silt, sand of various grades and gravel down to the depth of 350 m. The Quaternary formation comprises Newer Alluvium of Recent age and Older Alluvium of Pleistocene age. The Older Alluvium is restricted to the fringe area of the platform terrain towards west and northwest and is overlain by Newer Alluvium towards east, south and south east. The Older Alluvium comprises predominantly of yellow to reddish brown clays with kankar and ferruginous gravel and sand of fine to medium texture.

The Newer Alluvium consists of predominantly of clay with occasional intercalation of silt and fine sand and is light grey in color. The Quaternary sediments are underlain by semi-consolidated Tertiary sediments of Mio-Pliocene age. The Tertiary sediments comprise of graded sand-silt clay beds indicating cyclic sedimentation.

The top of the Tertiary sediment is generally represented by grey clay. This grey clay bed is persistent throughout the area and is considered as marker bed which separates the Upper Litho system and Lower Litho System.

The quartzo-feldspathic unconsolidated Quaternary sediments vary considerably in thickness from 120 m in the west to over 150 m in the east and from 150 m in the NW direction to over 180 m in SE direction. It is predominantly arenaceous in the north and northeast to most argillaceous in the south and southeast. The thickness of the Newer Alluvium varies between 10 and 60 m in the NW-SE direction. The Newer Alluvium is devoid of any significant granular zones.

Figure 6.1 is the geological map of Jhargram district.

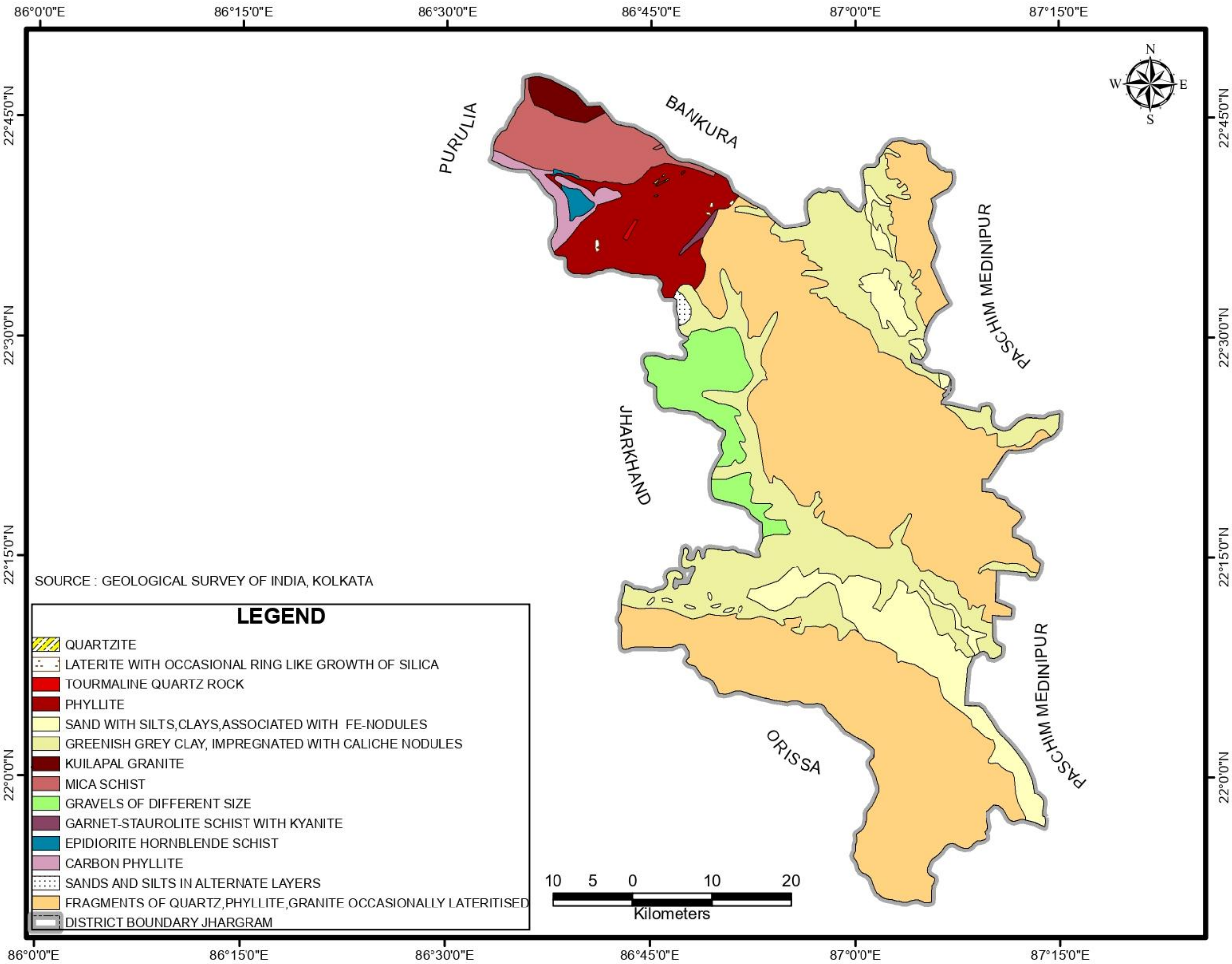


Figure 6.1: Geological map of Jhargram district
(Source: GSI, 2007)

Table 6.1: Geological succession of Jhargram

AGE	GEOLOGICAL UNIT	LITHOLOGY
Holocene	Present day flood plain deposits	Alternating layers of sand and silt
	Present day beach deposits	Fine medium greyish brown sands
	Recent dune sand	Well sorted white to greyish yellow sands
	Basudebpur Formation	Sand, silt and clay (un-oxidized or occasionally oxidized)
	Panskura Formation	Laterite
Upper Pleistocene to Holocene	Sijua Formation	Clay and grit
Pleistocene	Lalgarh Formation	Fragments of quartz, phyllite, granite occasionally laterite
Carboniferous to Triassic	Laterite	Laterite with occasional ring like growth of silica
	Tertiary Gravel bed	Gravels of different size
	Bhairab Banki	Clay, grit and conglomerate
Meso-proterozoic	Younger Volcanics	Tourmaline-quartz rock
		Kuilapal granite
Paleo-Proterozoic	Dalma Volcanics	Quartzite
		Epidote/ hornblende schist
	Singhbhum Group	Quartzite
		Mica schist, occasionally garnetiferous
		Calc-gneiss and granulite
		Garnet-staurolite schist with kayanite
		Garnetiferous phyllite

(Source: GSI, 2007)

PART A: RIVERBED DEPOSITS

7 Mineral wealth

7.1 Overview of mineral resources:

The occurrence of major minerals in the district of Jhargram is not well established. Main mineable mineral of the district is sand from the riverbed.

7.2 Sand and other riverbed minerals:

The mineral resources of the district whose categorization and estimation have been done are furnished in this section.

I. Drainage

The rivers of district Jhargram, owing to the typical physiographical condition of the district, emerge from the Chhotanagpur Plateau to the West, flows East or South-East ward direction according to the slope of the land and meets Bay of Bengal to the Southeast or tributaries of Hugli (Hooghly) to the East. All the rivers in this region are rain-fed and flow to the fullest during monsoon. Brief description of the few major rivers (Table 7.1 and Table 7.2) of district Jhargram are given in the subsequent paragraphs.

Subarnarekha River: River Subarnarekha is a transboundary river flowing through the states of Jharkhand, West Bengal and Odisha. Being originated near Nagri village in Jharkhand in the Chhotanagpur Plateau region, Subarnarekha enters the district near Bhatandiha in C. D. Block Gopiballavpur I, creating the borders of C. D. Blocks Gopiballavpur II with Gopiballavpur I; C. D. Block Sankrail with C. D. Block Nayagram and then exits the district to enter State of Odisha. Floods are common in the course of Subarnarekha and causes havoc during monsoon.

Kangshabati River: River Kangshabati is one of the most important rivers of district Jhargram. Like other important rivers in the district, it originates in the Chhotanagpur Plateau near Muruguma in Jhalda II C. D. Block of district Purulia. It then passes through district Bankura and enters district Jhargram near village Basantapur in Binpur I C.D. Block. Kangshabati Irrigation Project and Kangshabati reservoir is built in the upper course of the river to utilise the river water for irrigation purpose across the western districts of West Bengal.

a) Drainage System with description of main rivers

Table 7.1: Drainage system with description of main rivers

Sl.No.	Name of the River	Area drained (Sq.km)	% Area drained in the district
1	Kangsabati	25.7	0. 8%

Sl.No.	Name of the River	Area drained (Sq.km)	% Area drained in the district
2	Subarnarekha	83.5	2.74%

b) Salient Features of important rivers and streams

Table.7.2: Salient Features of important rivers and streams

S.No.	Name of the River or Stream	Total Length in District (in Km)	Place of origin	Altitude at Origin
1	Kangsabati	71.9	Jabarban peak of Ghoramarapahar	600m
2	Subarnarekha	53.6	Piska/Nagri, Ranchi, Jharkhand	689m

II. Annual deposition of riverbed minerals

Annual deposition of riverbed minerals is dependent on various factors which are explained below.

A) Geomorphological studies

Geomorphological characteristic of a river is foremost factor for annual deposition of sedimentary load. The study includes the following parameter:

i) Place of Origin

Details of origin of rivers of Jhargram district are furnished in Table 7.3.

Table 7.3: Place of Origin of important rivers and streams

S.No.	Name of the River or Stream	Place of origin
1	Kangsabati	Jabarban peak of Ghoramarapahar
2	Subarnarekha	Piska/Nagri, Ranchi, Jharkhand

ii) Catchment Area

The Jhargram district is mainly drained by the Kangsabati and Subarnarekha. These rivers and its tributary rivers are forming the main catchment area.

iii) General profile of river stream

River profile has been studied along the cross-section lines which was chosen based on the drastic variation of the river widths, proximity of the operating sand 'ghats' and the position of the sand bars.

Relative disposition of rivers in Jhargram district along with the distribution of the section lines are shown in Figure 7.1. River profile section and cross section views are presented in Figures 7.2 and 7.3.

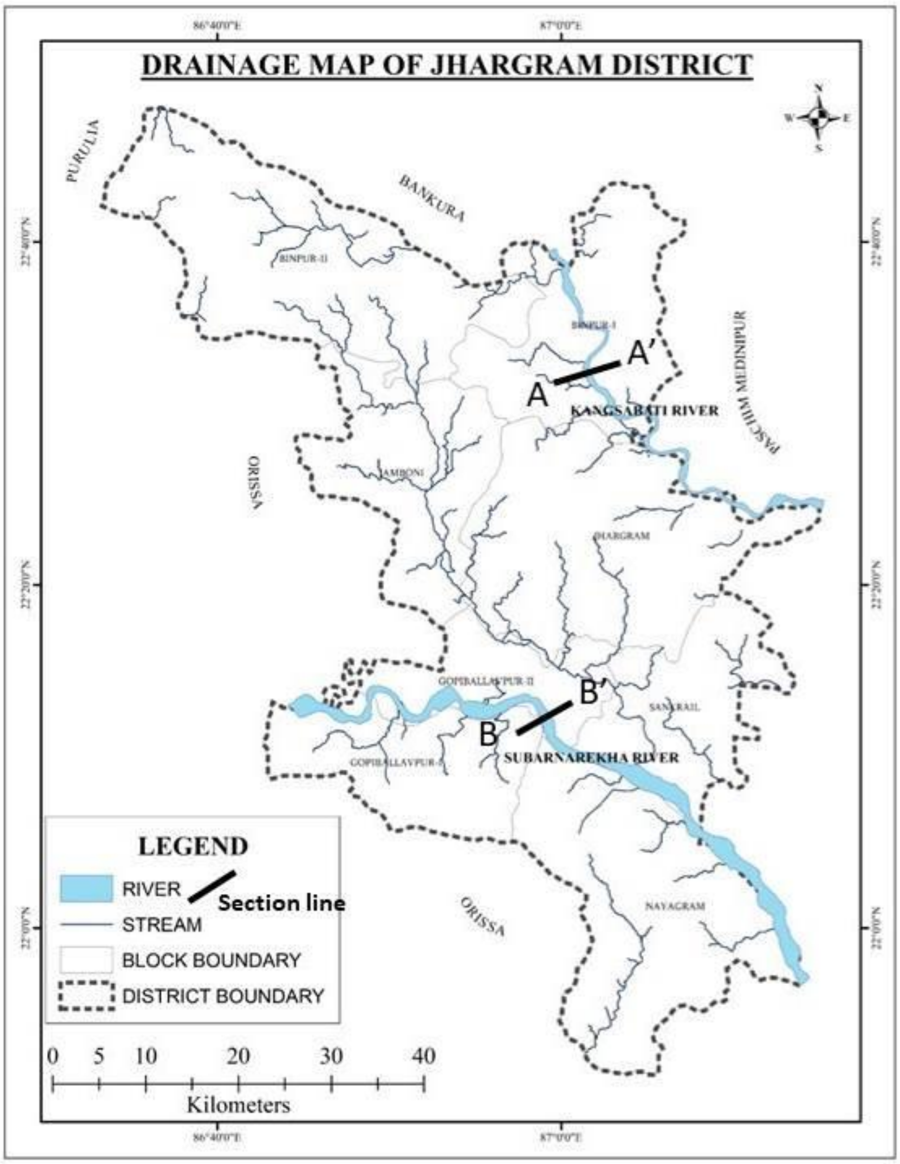
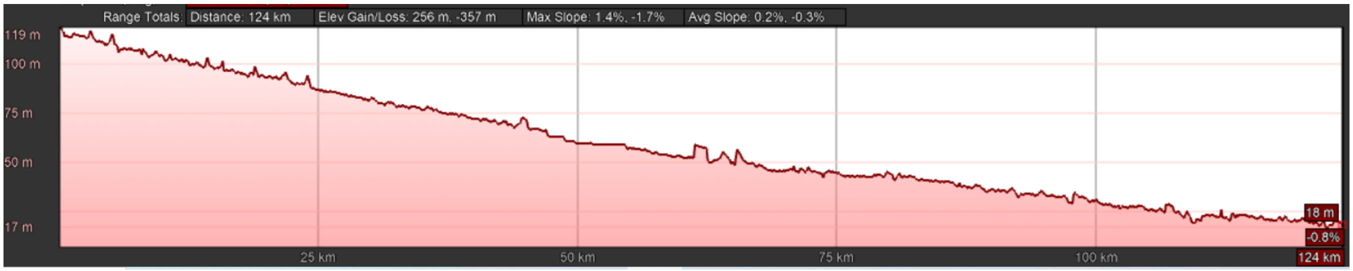


Figure 7.1: Map showing the major rivers along which profile section drawn



NW **SE**

Figure 7.2A: Profile section of Kangsabati River

NW **SE**

Figure 7.2B: Profile section of Subarnarekha River

A **A'**

Figure 7.3A: Cross section view of Kangsabati River

B **B'**

Figure 7.3B: Cross section view of Subarnarekha River

iv) Annual deposition factor

Annual deposition of riverbed materials depends on various factors, such as process of deposition, mode of sediment transport, sediment transport rate, and sediment yield of the river.

1. Process of deposition

Deposition is the processes where material being transported by a river is deposited. Deposition occurs when the forces responsible for sediment transportation are no longer sufficient to overcome the forces of gravity and friction, creating a resistance to motion; this is known as the null-point hypothesis. This can be when a river enters a shallow area or towards its mouth where it meets another body of water.

The principle underlying the null point theory is due to the gravitational force; finer sediments remain in the water column for longer durations allowing transportation outside the surf zone to deposit under calmer conditions. The gravitational effect or settling velocity determines the location of deposition for finer sediments, whereas a grain's internal angle of friction determines the deposition of larger grains on a shore profile.

Deposition of non-cohesive sediments: Large-grain sediments are transported by either bedload or suspended load. In case of bedload, when there is insufficient bed shear stress and fluid turbulence is insufficient to keep the sediment moving, the grains looses horizontal movement and rapidly come to rest. In case of suspended load the grains longer distance vertically through the fluid before coming to rest.

Deposition of cohesive sediments: The cohesion of sediment occurs with the small grain sizes associated with silts and clays, or particles smaller than 4Φ or 62.5 µm. If these fine particles remain dispersed in the water column, Stokes law applies to the settling velocity of the individual grains. The face of a clay platelet has a slight negative charge where as the edge has a slight positive charge.When two platelets come into close proximity with each other the face of one particle and the edge of the other are electrostatically attracted, and then have a higher combined mass which leads to quicker deposition through a higher fall velocity.

2. Mode of sediment transport in rivers

Sediment transport in rivers provides a dynamic linkage between flow and channel form. Mainly there are three processes by which sediment load is transported and these are (i) rolling or traction, in which the particle moves along a sedimentary bed but is too heavy to be lifted from it; (ii) saltation; and (iii) suspension, in which particles remain permanently above the bed, sustained there by the turbulent flow of the water.

Another name for sediment transport is sediment load. The total load includes all particles moving as bedload, suspended load, and wash load.

Bed load: Bedload is the portion of sediment transport that rolls, slides or bounces along the bottom of a waterway. This sediment is not truly suspended, as it sustains intermittent contact with the streambed, and the movement is neither uniform nor continuous. Bedload occurs when the force of the water flow is strong enough to overcome the weight and cohesion of the sediment. While the particles are pushed along, they typically do not move as fast as the water around them, as the flow rate is not great enough to fully suspend them. Bedload transport can occur during low flows (smaller particles) or at high flows (for larger particles). Approximately 5-20% of total sediment transport is bedload. In situations where the flow rate is strong enough, some of the smaller bedload particles can be pushed up into the water column and become suspended.

Suspended load: While there is often overlap, the suspended load and suspended sediment are not the same thing. Suspended sediment are any particles found in the water column, whether the water is flowing or not. The suspended load, on the other hand, is the amount of sediment carried downstream within the water column by the water flow. Suspended loads require moving water, as the water flow creates small upward currents (turbulence) that keep the particles above the bed. The size of the particles that can be carried as suspended load is dependent on the flow rate. Larger particles are more likely to fall through the upward currents to the bottom, unless the flow rate increases, increasing the turbulence at the streambed. In addition, suspended sediment will not necessarily remain suspended if the flow rate slows.

Wash load: The wash load is a subset of the suspended load. This load is composed of the finest suspended sediment (typically less than 0.00195 mm in diameter). The wash load is differentiated from the suspended load because it will not settle to the bottom of a waterway during a low or no flow period. Instead, these particles remain in permanent suspension as they are small enough to bounce off water molecules and stay afloat. However, during flow periods, the wash load and suspended load are indistinguishable.

3. Sediment Transport Rate

The rate at which sediment is moved past a cross section of the flow is called either the sediment transport rate or the sediment discharge. It‘s related to the sediment load, but it‘s different, just because different fractions of the sediment load are transported at different rates. It can be measured in mass per unit time, or in weight per unit time, or in volume per unit time. The sediment transport rate is commonly denoted by Qs.

4. Estimation of Sedimentation

There are two approaches to obtaining values describing sediment loads in streams. One is based on direct measurement of the quantities of interest, and the other on relations developed between hydraulic parameters and sediment transport potential.

The total bed material load is equal to the sum of the bedload and the bed material part of the suspended load; in terms of volume transport per unit width, qt = qb + qs. Here wash load, i.e. that part of the suspended load that is too fine to be contained in measurable quantities in the river bed, is excluded from qs.

There are number of equations to compute the total sediment load. Most of these equations have some theoretical and empirical bases.

In 1973, Ackers and White developed a general theory for sediment transport which was calibrated against the flume-transport data then available. Their functions have been widely accepted as one of the best available procedures for estimating the total bed load over the full width of the flow section.

Dendy Bolton formula is often used to calculate the sedimentation yield. But use of these equations to predict sediment yield for a specific location would be unwise because of the wide variability caused by local factors not considered in the equations development. However, they may provide a quick, rough approximation of mean sediment yields on a regional basis. Computed sediment yields normally would be low for highly erosive areas and high for well stabilized drainage basins with high plant density because the equations are derived from average values. The equations express the general relationships between sediment yield, runoff, and drainage area.

5. Sediment Yield

The water that reaches a stream and its tributaries carries sediment eroded from the entire area drained by it. The total amount of erosional debris exported from such a drainage basin is its sediment load or sediment discharge and the sediment yield is the sediment discharge divided by the total drainage area of the river upstream of the cross section at which the sediment discharge is measured or estimated. Sediment yield is generally expressed as a volume or weight per unit area of drainage basin—e.g., as tons per square kilometre. Further, sediment yield is usually measured during a period of years, and the results are thus expressed as an annual average.

v) Replenishment Study (As per EMGSM guidelines, 2020):

Replenishment study for a river solely depends on estimation of sediment load for any river system and the estimation is a time consuming and should be done over a period. The process in general is very slow and hardly measurable on season-to-season basis except otherwise the effect of flood is induced which is again a cyclic phenomenon. Usually, replenishment or sediment deposition quantities can be estimated in the following ways as given below:

A. Replenishment study based on satellite imagery involves demarcation of sand bars potential for riverbed mining. Both pre and post monsoon images need to be analysed to established potential sand bars. Volume estimation of sand is done by multiplying Depth and Area of the sand bar. The sand bars are interpreted with the help of satellite imagery. Ground truthing has been done for 100% of the total identified sand bars. During ground truthing, width and length of each segment were physically measured. It has also been observed that in few cases, sand bars have attained more than 3 meters height from the average top level of the river beds. Considerations of sand resources have been restricted within 3 meters from the average top surface of the river bed.
B. Direct field measurement of the existing leases involving estimation of the volume diference of sand during pre and post-monsoon period. With systematic data acquisition, a model has developed for calculation of sediment yield and annual replenishment with variable components.
C. The replenishment estimation based on a theoretical empirical formula with the estimation of bed-load transport comprising of analytical models to calculate the replenishment estimation.

A. Replenishment estimation based on satellite imagery study

Sedimentation in any river is dependent on sediment yield which depends on soil erosion in river's catchment area. Catchment yield is computed using Strange's Monsoon runoff tables for runoff coefficient against rainfall return period. Peak flood discharge is calculated by using Dickens, Jarvis and Rational formula at 25, 50 and 100 years return period. The estimation of bed load transport is done using Ackers and White Equation.

Methodology Adopted: To delineate replenishment percentage in the river bed of the district, below mentioned steps have been followed.

- **Field data collation:**

Field data collations were done during June 2020 for pre monsoon period and during December 2020 for post monsoon period for the river ghats on continuous basis. Figure 7.4 shows the site view of Subarnarekha River. However, the non-operational areas were covered through traverses. In both the cases, relative elevation levels were captured through GPS/DGPS/ Electronic Total Station. Thickness of the sand bars was measured through sectional profiles. In few instances, sieve analysis of the sands was carried out to assess their particle size distribution.

Figure 7.4: Site View of River Subarnarekha

- **Selection of Study profiles:**

Study profiles are selected based on the occurrence of the sand bars in the channel profiles. Aerial extents of each of the profiles are mapped from satellite imagery.

- **Data Compilation:**

Following data were compiled for generation of the annual replenishment report:

  - Elevation levels of the different sand ghats and sand bars as measured at site.
  - Extents of the sand bars are measured from the pre monsoon satellite imagery.
  - Sand production data of the district.

- **Assessment of sediment load in the river:**

Assessment of sediment load in a river is subjective to study of the whole catchment area, weathering index of the various rock types which acts as a source of sediments in the specific river bed, rainfall data over a period not less than 20 years, and finally the detail monitoring of the river bed upliftment with time axis. Again, the sediment load estimation is not a dependent variable of the district boundary, but it largely depends upon the aerial extent of the catchment areas, which crosses the district and state boundaries.

- **Estimation of annual sand deposition:**

The major sand producing rivers of Jhargram district are Kangsabati and Subarnarekha River. Planning has been done for systematic sand mining in the rivers.

While calculation of the areas of sand bar, a classification system has been adopted with three categories of land identified within the channel areas which is as follows:

a. The untapped sand bars.
b. The sand bars worked in the pre-monsoon period.
c. Main channel course within the channel.

A summary of sediment load comparison between pre- and post-monsoon periods for different in Jhargram district is given in Table 7.4 and details of each sand bars along with their sand resources in pre monsoon and post monsoon periods are provided in Annexure-2. Maps showing distribution of sand bars on rivers of the Jhargram district during pre- and post-monsoon periods are depicted in Plate-2A and 2B respectively.

Table 7.4: Sediment Load comparison between Pre- and Post-monsoon periods for different rivers

River Name	Pre-Monsoon no of ghats	Post-Monsoon no of ghats	Pre-Monsoon Sediment Load (Mcum)	Post Monsoon Sediment Load (Mcum)	Difference (Mcum)	Difference (%)
Kangsabati River	19	22	17.68	40.86	23.18	131%
Subarnarekha River	45	43	90.21	185.99	95.77	106%
Total	**64**	**65**	**107.90**	**226.84**	**118.95**	**110%**

Thus, in Jhargram district, about 118.95 million cum of sand has been found as an incremental volume increase when compared between pre- and post-monsoon sand reserve data. The percentage difference is about 110% which is replenishment and aggradation rate for the year.

Long-term satellite imagery study has also been carried out for sand producing rivers of Jhargram district to analyse the changes in river course. A representative map, showing long-term (from 2001 to 2021) erosion-accretion areas on both the banks of Subarnarekha River, Jhargram has been prepared and furnished in Plate No. 5. Map shows changes in river channel through erosion and accretion of river bank and in the process the river shows narrowing of width of the river course by almost 1592m to 1153m from 2001 to 2021.

B. Replenishment estimation based on field investigation

The study was carried out on existing mining leases. In order to assess the annual replenishment rate, an approach of direct measurement methodology has been adopted. The depth and area of the mining leases are measured through DGPS/Total station just before the closure of the mines in pre-monsoon period and the same areas are resurveyed in the post-monsoon period. The differences between the depths of the surveyed areas are accounted for the volumetric measurement of the replenished sand.

Table 7.5 represents field measurement of replenishment rate estimated for major rivers.

Table 7.5: Replenishment rate of the district

River Name	Location (Mauza)	Area	Surface RL	Thickness	Volume	After mining floor RL	Surface RL after Replenishment	Thickness Replenished	Volume Replenished	Difference in RL	Replenishment Rate
		m2	m	m	cum	m	m	m	cum	m	%
Kangsabati	Bhuladanga	50000	54	2.88	0.144	51.12	53.93	2.81	0.140	0.07	97.4%
Kangsabati	Dainmari	50000	45	2.90	0.145	42.10	44.94	2.84	0.142	0.06	98.0%
Kangsabati	Kansabati	50000	39	2.94	0.147	36.06	38.96	2.90	0.145	0.04	98.5%
Subarnarekha	Chanpasar	50000	43	2.90	0.145	40.10	42.94	2.84	0.142	0.06	98.0%
Subarnarekha	Askola	50000	37	2.85	0.143	34.15	36.96	2.81	0.140	0.04	98.5%
Subarnarekha	Malincha	50000	29	2.90	0.145	26.10	28.96	2.86	0.143	0.04	98.5%

Based on field investigation, the average replenishment rate for the year 2020 is about 98.15%.

C. Replenishment estimation based on an empirical formula:

The river reaches with sand provide the resource and thus it is necessary to ascertain the rate of replenishment of the mineral. Regular replenishment study needs to be carried out to keep a balance between deposition and extraction.

Sediment load deposition in a river is dependent on catchment area, weathering index of the various rock types of the catchment area, land-use pattern of the area, rainfall data and grain size distribution of the sediments. Again, the sediment load estimation is not a dependent variable of the district boundary, but it largely depends upon the aerial extents of the catchment areas, which crosses the district and state boundaries.

i. Methodology of the study:

The replenishment estimation is based on a theoretical empirical formula with the estimation of bedload transport comprising of analytical models to calculate the replenishment estimation. Sedimentation in riverbed depends on catchment yield, peak flood discharge due to rainfall, bed load transport rates and sediment yield characteristic of the river. Some of the common methods used for replenishment study are explained below.

a. Catchment Yield Calculation:

The total quantity of surface water that can be expected in a given period from a stream at the outlet of its catchment is known as yield of the catchment in that period. The annual yield from a catchment is the end product of various processes such as precipitation, infiltration and evapotranspiration operating on the catchment.

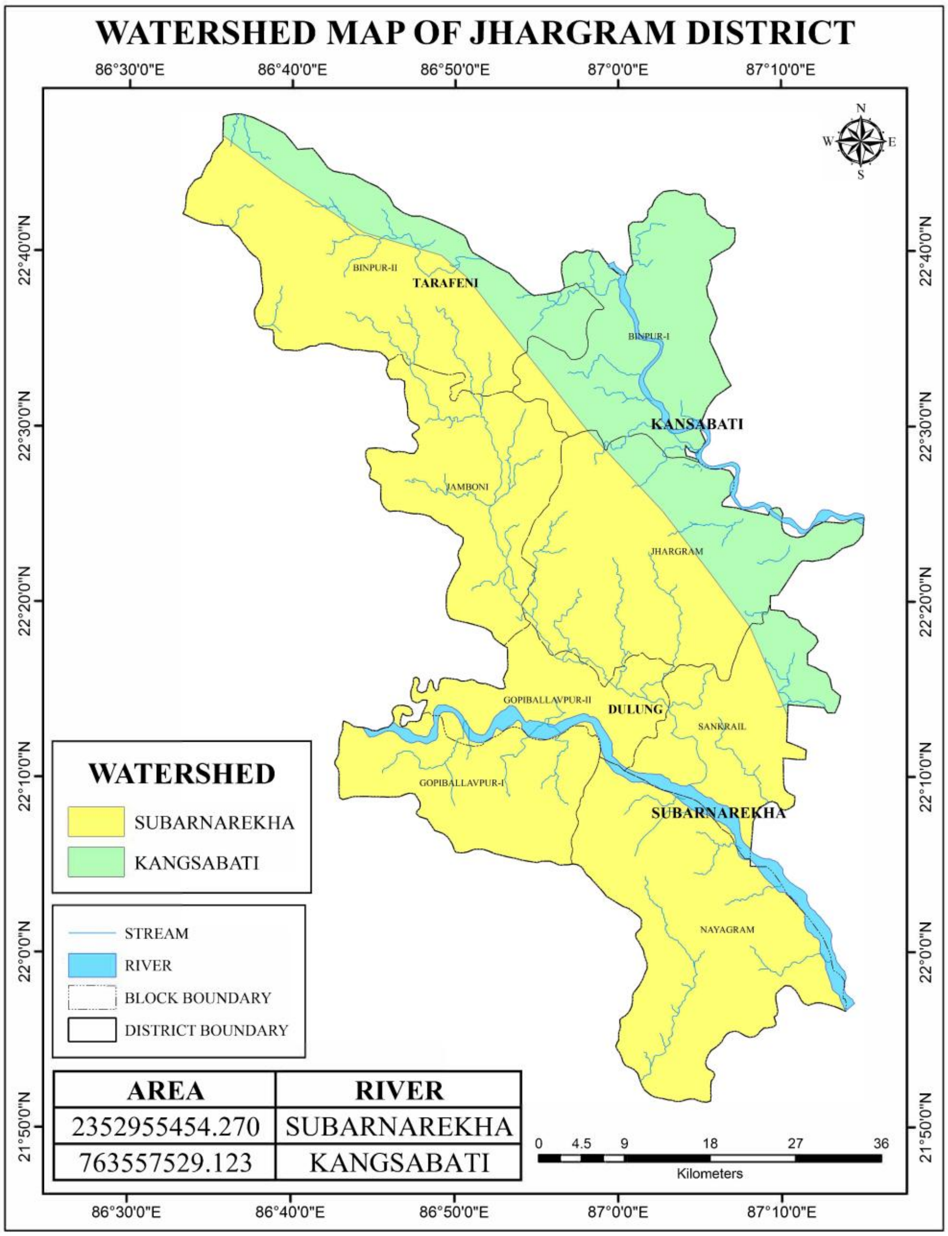


Figure 7.5: Watershed map of Jhargram district

Catchment Yield can be estimated using following formula:

Catchment Yield (m^3) =Catchment area (m^2) × Runoff coefficient (%) ×Rainfall (m)

The runoff generated from the watershed is analyzed using Strange's Table to get the reliable yield results. Runoff from a catchment is dependent upon annual rainfall as well as catchment characteristics such as soil types and the type of groundcover / land usage. Remote sensing was used for demarcation of catchment area relevant to the drainage system. Runoff coefficient of the catchment has been established based on Strange's Table.

Strange (1892) studied the available rainfall and runoff and obtained yield ratios as functions of indicators representing catchment characteristics (Subramanya, 2008). Catchments are classified as good, average and bad according to the relative magnitudes of yield of sediment. For example, catchment with good forest cover and having soils of high permeability would be classified as bad, while catchment having soils of low permeability and having little or no vegetal cover is termed good. Based on the study Strange established runoff coefficient table as given in Table 7.6.

Table 7.6: Runoff coefficient of the catchment based on Strange's table

Total monsoon rainfall (mm)	Runoff coefficient (%)			Total monsoon rainfall (mm)	Runoff coefficient (%)		
	Good catchment	Average catchment	Bad catchment		Good catchment	Average catchment	Bad catchment
25.4	0.1	0.1	0.1	787.4	27.4	20.5	13.7
50.8	0.2	0.2	0.1	812.8	28.5	21.3	14.2
76.2	0.4	0.3	0.2	838.2	29.6	22.2	14.8
101.6	0.7	0.5	0.3	863.6	30.8	23.1	15.4
127	1	0.7	0.5	889	31.9	23.9	15.9
152.4	1.5	1.1	0.7	914.4	33	24.7	16.5
177.8	2.1	1.5	1	939.8	34.1	25.5	17
203.2	2.8	2.1	1.4	965.2	35.3	26.4	17.6
228.6	3.5	2.6	1.7	990.6	36.4	27.3	18.2
254	4.3	3.2	2.1	1016	37.5	28.1	18.7
279.4	5.2	3.9	2.6	1041.4	38.6	28.9	19.3
304.8	6.2	4.6	3.1	1066.8	39.8	29.8	19.9
330.2	7.2	5.4	3.6	1092.2	40.9	30.6	20.4
355.6	8.3	6.2	4.1	1117.6	42	31.5	21
381	9.4	7	4.7	1143	43.1	32.3	21.5
406.4	10.5	7.8	5.2	1168.4	44.3	33.2	22.1
431.8	11.6	8.7	5.8	1193.8	45.4	34	22.7
457.2	12.8	9.6	6.4	1219.2	46.5	34.8	23.2
482.6	13.9	10.4	6.9	1244.6	47.6	35.7	23.8
508	15	11.3	7.5	1270	48.8	36.6	24.4
533.4	16.1	12	8	1295.4	49.9	37.4	24.9

Total monsoon rainfall (mm)	Runoff coefficient (%)			Total monsoon rainfall (mm)	Runoff coefficient (%)		
	Good catchment	Average catchment	Bad catchment		Good catchment	Average catchment	Bad catchment
558.8	17.3	12.9	8.6	1320.8	51	38.2	25.5
584.2	18.4	13.8	9.2	1346.2	52.1	39	26
609.6	19.5	14.6	9.7	1371.6	53.3	39.9	26.6
635	20.6	15.4	10.3	1397	54.4	40.8	27.2
660.4	21.8	16.3	10.9	1422.4	55.5	41.6	27.7
685.8	22.9	17.1	11.4	1447.8	56.6	42.4	28.3
711.2	24	18	12	1473.2	57.8	43.3	28.9
736.6	25.1	18.8	12.5	1498.6	58.9	44.4	29.4
762	26.3	19.7	13.1	1524	60	45	30

Rainfalls return period for 25, 50 and 100 years calculated as below:

As per Weibull's Formula (Subramanya, 2008),

Return period/Recurrence interval = (n+1)/m
Where: n number of years on record;
m is the rank of observed occurrences when arranged in descending order.

b. Peak Flood Discharge Calculation:

The term "peak discharge" stands for the highest concentration of runoff from the basin area. The accurate estimation of flood discharge remains one of the major challenges as it depends upon physical characteristic of the catchment area and the flood intensity, duration and distribution pattern. There have been many different approaches for determining the peak runoff from an area. As a result, many different models (equations) for peak discharge estimation have been developed. Formulas used for Peak Discharge calculation areas below:

As per Dicken's formula (Subramanya, 2008),

$$Q = CA^{3/4}$$

Where: Q is Maximum flood discharge (m^3/sec) in a river
A is Area of catchment in Sq. Km
C is Constant whose value varies widely between 2.8 to 5.6 for catchments in plains and 14 to 28 for catchments in hills

As per Jarvis formula (Subramanya, 2008),

$$Q = CA^{1/2}$$

Where: Q is Maximum flood discharge (m^3/sec) in a river
A is Area of catchment in Sq. Km
C is Constant whose value varies between 1.77 as minimum and 177 as maximum. Limiting or 100 percent chance floods are given by the value of C of 177

As per Rational formula ((Subramanya, 2008)**,**

Q = CIA

Where: Q is Maximum flood discharge (m^3/sec) in a river

A is Area of catchment in Sq. Km

C is Runoff coefficient which depends on the characteristics of the catchment area. It is a ratio of runoff: rainfall

I is Intensity of rainfall (in m/sec)

c. Bed Load Transport Calculation:

The most important problems in river engineering are to predict bed load transport rates in torrential floods flowing from mountainous streams. Three modes of transport namely; rolling, sliding and saltation may occur simultaneously in bed load transport. The different modes of transportation are closely related and it is difficult, if not impossible, to separate them completely. There are number of equations to compute the total sediment load. Most of these equations have some theoretical and empirical bases.

Ackers and White Equation:

Ackers and White (1973) used dimensional analysis based on flow power concept and their proposed formula is as follows.

$$C_t = C_s G_s \left(d_{50}/h\right) \left(V/U_*\right)^{n'} \left[\left(F_{gr}/A_1\right) - 1\right]^m$$

The dimensionless particle d_{gr} is calculated by:

$$d_{gr} = d_{50} \left(g(G_s-1)/v^2\right)^{1/3}$$

The particle mobility factor F_{gr} is calculated by:

$$F_{gr} = \left(U_\times^{n'}/(G_s-1)g\, d_{50}\right)^{1/2} \times \left(V/(5.66\log(10h/d_{50}))\right)^{1-n'}$$

Where,

A_1 = Critical particle mobility factor
C_s = Concentration coefficient in the sediment transport function
C_t = Total sediment concentration
d_{50} = Median grain size
d_{gr} = Dimensionless particle diameter
F_{gr} = Particle mobility parameter
g = Acceleration of gravity
D_s, S_g = Specific gravity
h = Water depth
m = Exponent in the sediment transport function
n' = Manning roughness coefficient
U_* = Shear velocity
V = Mean flow velocity
ν = Kinematic viscosity

Meyer – Peter's equation:

Meyer-Peter's equation (Ponce, 1989) is based on experimental work carried out at the Federal Institute of Technology, Zurich. Mayer-Peter gave a dimensionless equation based on rational laws. Mayer- Peter equation gave an empirical formula of bed load transport rates in flumes and natural rivers. The simplified Meyer-Peter's equation is given below:

$$g_b = 0.417[\tau 0 \, (\eta'/\eta)^{1.5} - \tau c]^{1.5}$$

Where,
gb = Rate of bed load transport (by weight) in N per m width of channel per second.

η' = Manning's coefficient pertaining to grain size on an unrippled bed and Strickler formula i.e. η' = (1/24) x d1/6 where d is the median size (d_{50}) of the bed sediment in m.

η = The actual observed value of the rugosity coefficient on rippled channels. Its value is generally taken as 0.020 for discharges of more than 11cumecs, and 0.0225 for lower discharges.

τc = Critical shear stress required to move the grain in N/m2 and given by equation τc = 0.687da, where da is mean or average size of the sediment in mm. This arithmetic average size is usually found to vary between d_{50} and d_{60}.

τ0= Unit tractive force produced by flowing water i.e.γwRS. Truly speaking, its value should be taken as the unit tractive force produced by the flowing water on bed = 0.97γwRS. R is the hydraulic mean depth of the channel (depth of flow for wider channel) and S is the bed slope.

d. Sediment Yield Estimation:

Sedimentation occurs as the velocity decreases along with its ability to carry sediment. Coarse sediments deposit first, then interfere with the channel conveyance, and may cause additional river meanders and distributaries. The area of the flowing water expands, the depth decreases, the velocity is reduced, and eventually even fine sediments begin to deposit. As a result, deltas may be formed in the upper portion of reservoirs. The deposited material may later be moved to deeper portions of the reservoir by hydraulic processes within the water body.

There are many sediment transport equations which are suitable for use in the prediction of the rate of replenishment of river. Some of the famous sediment transport equations are:

1. Dendy – Bolton Equation
2. Yang Equations
3. Engelund-Hansen Equation
4. Modified Universal Soil Loss Equation (MUSLE) developed by Williams and Berndt (1977)

Dendy – Bolton Equation:

Dendy – Bolton formula (Dendy and Bolton 1976) is often used to calculate the sedimentation yield because:

- The formula uses catchment area and mean annual runoff as key determinants.
- It does not differentiate in basin wide smaller streams and their characteristics.
- Dendy and Bolton equation calculates all types of sediment yield i.e. sheet and rill erosion sediments, gully erosion sediments, channel bed and bank erosion sediments and mass movement etc.

Dendy-Bolton determined the combined influence of runoff and drainage area on sediment yield to compute the sediment yield. They developed two equations i.e. for run off less than 2 inch and for run off more than 2 inch, which are given below:

For run off less than 2 inch:

$$(Q<2in)\ S=1289\times (Q)^{0.46}\times [1.43-0.26\ Log\ (A)]$$

For run off more than 2 inches:

$$(Q > 2\ in):\ S= 1958\times (e^{-0.055\times Q}) \times [1.43-0.26\ Log\ (A)]$$

Where: S = Sediment yield (tons/sq miles/yr)

Q = Mean Annual runoff (inch)

A = Net drainage are in sq mile

Dendy-Bolton formula is often used to calculate the sediment yield. But use of these equations to predict sediment yield for a specific location would be unwise because of the wide variability caused by local factors not considered in the equations development. However, they may provide a quick, rough approximation of mean sediment yields on a regional basis for preliminary watershed planning. Computed sediment yields normally would be low for highly erosive areas and high for well stabilized drainage basins with high vegetation density because the equations are derived from average values. The equations express the general relationships between sediment yield, runoff, and drainage area. Many variables influence sediment yield from a drainage basin. They include climate, drainage area, soils, geology, topography, vegetation and land use. The effect of any of these variables may vary greatly from one geographic location to another, and the relative importance of controlling factors often varies within a given land resource area. Studies revealed that sediment yield per unit area generally decreases as drainage area increases. As drainage area increases, average land slope usually decreases; and there is less probability of an intense rainstorm over the entire basin. Both phenomena tend to decrease sediment yield per unit area.

Modified Universal Soil Loss Equation (MUSLE):

Modified universal soil loss equation (MUSLE) for estimation of sediment yield is also widely used. MUSLE is a modification of the Universal Soil Loss Equation (USLE). USLE is an estimate of sheet and rill soil movement down a uniform slope using rainfall energy as the erosive force acting on the soil (Wischmeier and Smith 1978). Depending on soil characteristics (texture, structure, organic matter, and permeability) some soils erode easily while others are inherently more resistant to the erosive action of rainfall.

MUSLE is similar to USLE except for the energy component. USLE depends strictly upon rainfall as the source of erosive energy. MUSLE uses storm-based runoff volumes and runoff peak flows to simulate erosion and sediment yield (Williams 1995). The use ofrunoff variables rather than rainfall erosivity as the driving force enables MUSLE to estimate sediment yields for individual storm events. The generalized formula of MUSLE is as below:

$$\mathbf{Y=11.8 \times (Q \times qP).56 \times K \times Ls \times C \times P}$$

Where,
Y = sediment yield of stream (t/yr/km2),
Q = average annual runoff (m3),
K = soil erodibility factor,
qP = Highest discharge recorded (m3/s),
Ls = gradient/slope length,
C = cover management factor,
P = erosion control practice

ii. Estimation of Replenishment:

Jhargram district is mainly drained by the Kangsabati and Subarnarekha rivers. These rivers and its tributary rivers are forming the main catchment area.

For replenishment study, following assumption/calculation are taken in to consideration:

- Catchment area (Watershed area) against each river has been calculated based on remote sensing data.
- Rainfall runoff coefficient as per Strange's table for the catchment area is consider 45%, as the rainfall in the district is more than 1485mm and the characteristic of the catchment of the district is average in nature.
- Peak flood discharge of the river of the district calculated based on Dicken's formula which is more applicable to north Indian and central Indian catchment. Here Dicken constant C is taken as 12 in present study as per published literature by Saha (2002).
- Bed load transport has not been computed in the regional aspect of the district, as the values are highly dependent on local factors such as particle mobility factor, roughness coefficient, Shear velocity, Mean flow velocity, Kinematic viscosity etc.
- Sedimentation yield calculated as per Dendy and Bolton formula as the equations express the general relationships between sediment yield, runoff, and drainage area.

- Computed sediment yields by Dendy Bolton formula normally would be low for highly erosive areas and high for well stabilized drainage basins with high plant density because the equations are derived from average values.
- Dendy and Boltan formula also say that actual sediment yield from individual drainage basin may vary 10-fold or even 100-fold from computed yields. Since the district river basins comprise sedimentary rocks with good average rainfall therefore the estimated replenishment is considered as 50-fold of computed results sediment yield.

The data estimated for each river in the district are given in Table 7.7.

Table 7.7: Replenishment parameter estimated for each river in the district

Estimation parameter	Kangsabati	Subarnarekha
Catchment Area (m^2)	763560000	2352960000
Annual Rainfall (m) (in 2020)	1.55	1.55
Strange Runoff coefficient (%)	45%	45%
Annual Run-off (m) (in 2020)	0.341	0.341
Catchment Yield (m^3)	532583100	1641189600
Peak Flood Discharge (m^3/sec)	55120560.24	128201218.88
Flow depth d (m)	0.5	0.5
Channel width b (m)	180	150
Mean velocity v (m/s)	0.05	0.05
Channel slope S_o (m/m)	0.001	0.001
Sediment Yield (Tons/year)	14517.3	37520.26
Estimated Annual Replenishment (in million m3)	0.27186	0.70263

Sedimentation rate of a river is dependent on the annual rainfall of the district. Sedimentation rate for the period 2016-2020 of each river is presented in Table 7.8 and Figure 7.6.

Table 7.8: Year-wise sedimentation rate for last 5 years of each river

Year	Kangsabati (Tonne/km²/yr)	Subarnarekha (Tonne/km²/yr)	Annual Rainfall(mm)
2016	26.6	22.37	**1391.3**
2017	18.83	15.79	**1552.1**
2018	32.8	27.56	**1294.9**
2019	15.66	13.14	**1637.1**
2020	19.01	15.95	**1547.6**

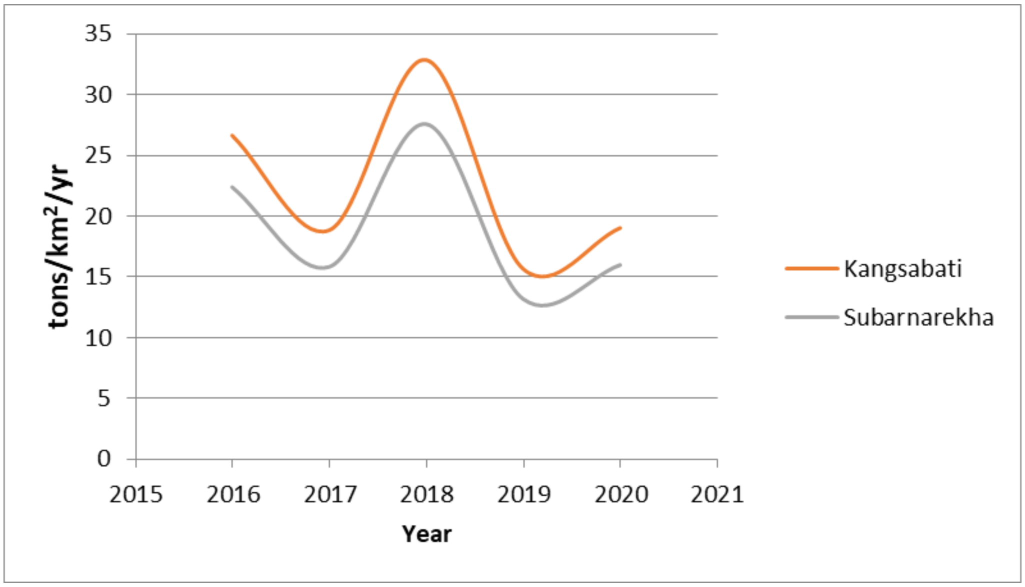


Figure 7.6: Graphical representation of year-wise sedimentation rate

The estimation of sedimentation rate based on empirical formula need critical analysis of different factors related to the LULC property of the catchment area, slope geometry, sediment erosion factor of catchment litho-type. This will help to assess replenishment rate more precisely.

Replenishment studies based on empirical formula for existing mining leases have also been conducted and are given in Table 7.9.

Table 7.9: River wise replenishment rate estimation based on empirical formula

River Name	Location	Lease Area	Surface RL Before mining	Mine out Thickness	Mine out Volume	Annual Rainfall-2020	Estimated Replenished Volume as per Dandy-Bolton	Replenishment Rate
		m2	m	m	cum	m	cum	%
Kangsabati	Bhuladanga	50000	54	2.88	0.144	1.48	0.107	74.5%
Kangsabati	Dainmari	50000	45	2.90	0.145		0.109	75.5%
Kangsabati	Kansabati	50000	39	2.94	0.147		0.112	76.0%
Subarnarekha	Chanpasar	50000	43	2.90	0.145		0.107	74.0%
Subarnarekha	Askola	50000	37	2.85	0.143		0.105	73.5%
Subarnarekha	Malincha	50000	29	2.90	0.145		0.107	73.5%

Illustration of Replenishment Estimation is given in Table 7.10.

Table 7.10: Illustration of replenishment rate calculation based on 3 methods

Based on Satellite imageries		Based on field investigation		Based on empirical formula	
Particulars	Estimation	Particulars	Estimation	Particulars	Estimation
		River Name	Kangsabati	River Name	Kangsabati
River	Kangsabati	Location	Bhuladanga	Location	Bhuladanga
Total Premonsoon Sand Bar Area	9574076 (sq.m)	Mining Area	50000 (Sq.m)	Lease Area	50000 (Sq.m)
Average Pre monsoon Thickness	2.0 (m)	Pre monsoon RL	54 (m)	Surface RL Before mining	54 (m)
Total Volume	17.68 (Mcum)	Sand Thickness	2.88 (m)	Mine out Thickness	2.88 (m)
Total Postmonsoon Sand Bar Area	9168832 (sq.m)	Volume excavated (Cum)	144000.00 (Cum)	Mine out Volume (Cum)	144000.00 (Cum)
Average Postmonsoon Thickness	2.5 (m)	Post monsoon RL	53.93 (m)	Drainage area for lease block	0.037 (Sq.km)
Total Volume	22.92 (M.cum)	Thickness	2.81 (m)	Monsoon Rainfall-2020	1.48 (m)
Total Pre and Post monsoon Volume Difference	5.24 (M.cum)	Volume deposited (Cum)	140256.00 (Cum)	Estimated Volume as per Dendy- Bolton (S = 1280 Q0.46[1.43 - 0.26 log(A)]) Where, Q is runoff, A is drainage area)	107280.00 (Cum)
Replenishment and Agrredation %	130%	Replenishment Rate	97.4%	Replenishment Rate	91.5%

Replenishment studies have been carried out in the district based on three different methodologies as illustrated in Table 7.10. Table 7.11 explained comparison of the outcome of these three methodologies adopted for the district.

Table 7.11: Comparison of replenishment study

Replenishment Study Method	**Kangsabati**	**Subarnarekha**
Estimated Annual Replenishment based on Satellite imageries **(*)**	131%	106%
Estimated Annual Replenishment based on field investigation	97.97%	98.33%
Estimated Annual Replenishment based on empirical formula	91.33%	90.67%

(*) Replenishment study based on satellite imagery involves estimation of replenish volume along with aggredation volume.

vi) Total potential of minor mineral in the riverbed

The major sand producing rivers of the Jhargram district are Kangsabati and Subarnarekha Rivers. The total mineable potential sand resources are 108.63 Mcum.

B. Geological studies

i) Lithology of the catchment area

The major portion of the district consists of a rolling country covered by laterite and alluvium. While metamorphic or gneissose rocks are found in the extreme north-western part of the district. The major formation of this area is Lalgarh formation, which contains fragments of quartz, granite pebbles, phyllite but occasionally lateralitized.

ii) Tectonics and structural behavior of rocks

The most characteristic geological feature of the district is the area of laterite and associated rocks of sand and gravel. At some places one finds hard beds of laterite. At other places it is decomposed and reorganized. Locally, the ferruginous rock is called kankar.

The area has an undulating micro-relief with highs and lows. The maximum elevation is found to be 310 m above mean sea level (msl). Generally, the elevation declines from north-west to eastern and southeastern direction.

C. Climate Factors

i) Intensity of rainfall

The average annual rainfall in the district is 1485mm. The variations in the annual rainfall within the district and from year to year are not large. The rainfall during the monsoon season – June to September – constitutes 70 percent of the annual rainfall; July and August are the rainiest months. The district receives a mean annual rainfall varying from 1295 mm to 1637mm.

ii) Climate zone

Jhargram district belongs to humid tropical monsoon climatic region. According to District Meteorological Department, there is very minor variation of temperature, rainfall and relative humidity in the district. The climate of this district is characterized by an oppressive hot summer, high humidity nearly all the year round and a well distributed rainfall in the south west monsoon season

iii) Temperature variation

Temperature along with other meteorological conditions of the district is more or less uniform. The cold season commences by about the middle of November when the temperature begins to decrease. January is the coldest month with the mean daily maximum and minimum temperature at 28°C and 10°C respectively. By about the end of February the temperature begins to increase and April is s the hottest month, the mean maximum daily temperature is 39 °C and the mean minimum daily temperature is 25 °C.

Annual Deposition:

Annual deposition of riverbed minerals has been calculated on post-monsoon sand volume. The pre-monsoon sand volume of the river is the depleted resources and is replenished by the monsoon rainfall. For the purpose of estimating mineable mineral potential, the thickness of the sand bar considered extractable based on base flow level is given in Table 7.12.

Table 7.12: River wise thickness of sand bar considered mineable

River Name	Considered Mining Thickness (m)
Kangsabati River	3.0
Subarnarekha River	3.0

Based on geomorphology, geology, climate and mineable thickness of sand bar the annual deposition of riverbed minerals has been estimated. Sand bar area recommended for mineral concession in the table is calculated as per the Enforcement and Monitoring Guidelines for Sand Mining (EMGSM) 2020. As per guidelines, mining depth restricted to 3 meters depth and distance from the bank is ¼th of river width and not less than 7.5 meters. Also, mining is prohibitated up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) 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. The annual minable mineral potential is given in Table 7.13.

Table 7.13: Annual mineable mineral potential

Sl. No.	River or Stream	Portion of the river stream recommended for mineral concession	Length of area recommended for mineral concession (in meter)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in Sqm)	Mineable mineral potential (in Mcum) (60% of total mineral potential
1	Kangsabati River	42%	33710.80011	450	10850830.874	19.53
2	Subarnarekha River	59%	69268.93706	978.6	49497507.2	89.10
						108.63

III. Riverbed Mineral Potential

Process of disposition etc:

Sand: Huge quantities of quality sands are found to occur in part of rivers. Smaller patches are also available locally in the other smaller rivers as well. Table 7.14 summarizes the potential riverbed mineral deposits of the district.

Table 7.14: Resources of Potential Riverbed Mineral

Boulder (Mcum)	Pebbles/Gravel (Mcum)	Sand/White sand (Mcum)	Total Mineable, Mineral Potential (Mcum)
-	-	108.63	108.63

Based on satellite imagery study and field investigation, potential zones for riverbed deposits for each river of the district have been identified and the details of the zones are provided in Table 7.15.

Table 7.15: Potential Zone of Riverbed Mineral

Sl.No	Rivers or Streams	Location of potential zones						Area within prohibited zone as per rule 3 of WBMMC Rules, 2016 (in sq.m)
		Administrative Block	Mouza	JL No.	Zone	Co-ordinates		
						Latitude	Longitude	
1	KANGSABATI RIVER	BINPUR I	SIJUA	572	1	22° 38' 48.418" N	87° 0' 11.379" E	967777.0088
						22° 34' 59.288" N	87° 1' 57.529" E	
		BINPUR I	JAGANNATHPUR	733	2	22° 34' 18.475" N	87° 2' 31.808" E	887155.7351
						22° 29' 58.305" N	87° 5' 18.300" E	
		BINPUR I	PAYRAGURI	0	2A	22° 28' 49.496" N	87° 5' 10.093" E	163146.3345
						22° 27' 50.959" N	87° 6' 33.956" E	
		JHARGRAM	SATPATI	489	3	22° 26' 51.018" N	87° 7' 1.130" E	49405.81431
						22° 26' 23.263" N	87° 6' 53.917" E	
		JHARGRAM	AKHRASOL	0	3A	22° 25' 33.813" N	87° 7' 20.127" E	57915.4411
						22° 25' 22.816" N	87° 8' 0.434" E	
		JHARGRAM	SHYAMKISHORPUR	803	4	22° 25' 14.989" N	87° 9' 7.843" E	121896.7874
						22° 24' 50.562" N	87° 9' 53.331" E	
2	SUBARNAREKHA RIVER	GOPIBALLAVPUR I	ATANGI	40	1	22° 12' 56.995" N	86° 44' 29.748" E	1310848.156
						22° 13' 30.780" N	86° 48' 52.250" E	
		GOPIBALLAVPUR II	ASANBONI	158	2	22° 13' 31.277" N	86° 48' 52.433" E	2451231.496
						22° 13' 37.495" N	86° 53' 55.966" E	
		GOPIBALLAVPUR II	PANUAYAN	275	3	22° 12' 35.752" N	86° 54' 23.301" E	2303459.167
						22° 10' 24.256" N	87° 0' 24.603" E	
		NAYAGRAM	GOPALPUR	311	4	22° 10' 57.401" N	86° 59' 16.315" E	442081.7053
						22° 9' 48.228" N	87° 1' 33.432" E	
		SANKRAIL	RAGRA	59	5	22° 10' 25.926" N	87° 0' 26.925" E	3625743.286
						22° 5' 35.741" N	87° 8' 4.999" E	
		NAYAGRAM	JADAVPUR	73	6	22° 4' 53.573" N	87° 8' 32.580" E	636959.4892
						22° 3' 27.295" N	87° 10' 14.226" E	
		NAYAGRAM	KAMALAPUR	212	7	22° 1' 12.846" N	87° 12' 12.407" E	675055.2101
						21° 57' 48.627" N	87° 13' 32.971" E	

NO MINING ZONE:

As per the Enforcement and Monitoring Guidelines for Sand Mining (EMGSM) 2020 the restricted zone for mining is a distance from the bank is ¼th of river width and not be less than 7.5 meters. Also there is a no mining zone up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) 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.

No mining zone has been marked for an area up to a width of 100 meters from the active edge of embankments. Also, the concave side of the river is marked as no mining zone, as mining is this area will affect the course of river in future and will erode the river bank. A representative map of no mining zone shown on River Subarnarekha of Jhargram district is given in Figure 7.7. Table 7.16 summarized the area of no mining zones demarcated for each river of the district.

Table 7.16: No mining zone in the district

Sl.No	Rivers or Streams	Location of potential zones Administrative Block	Zone	Area within prohibited zone as per rule 3 of WBMMC Rules, 2016 (in sq.m)
1	KANGSABATI RIVER	BINPUR I	KS_ZONE_1	967777.0088
		BINPUR I	KS_ZONE_2	887155.7351
		BINPUR I	KS_ZONE_2A	163146.3345
		JHARGRAM	KS_ZONE_3	49405.81431
		JHARGRAM	KS_ZONE_3A	57915.4411
		JHARGRAM	KS_ZONE_4	121896.7874
2	SUBARNAREKHA RIVER	GOPIBALLAVPUR I	SR_ZONE_1	1310848.156
		GOPIBALLAVPUR II	SR_ZONE_2	2451231.496
		GOPIBALLAVPUR II	SR_ZONE_3	2303459.167
		NAYAGRAM	SR_ZONE_4	442081.7053
		SANKRAIL	SR_ZONE_5	3625743.286
		NAYAGRAM	SR_ZONE_6	636959.4892
		NAYAGRAM	SR_ZONE_7	675055.2101

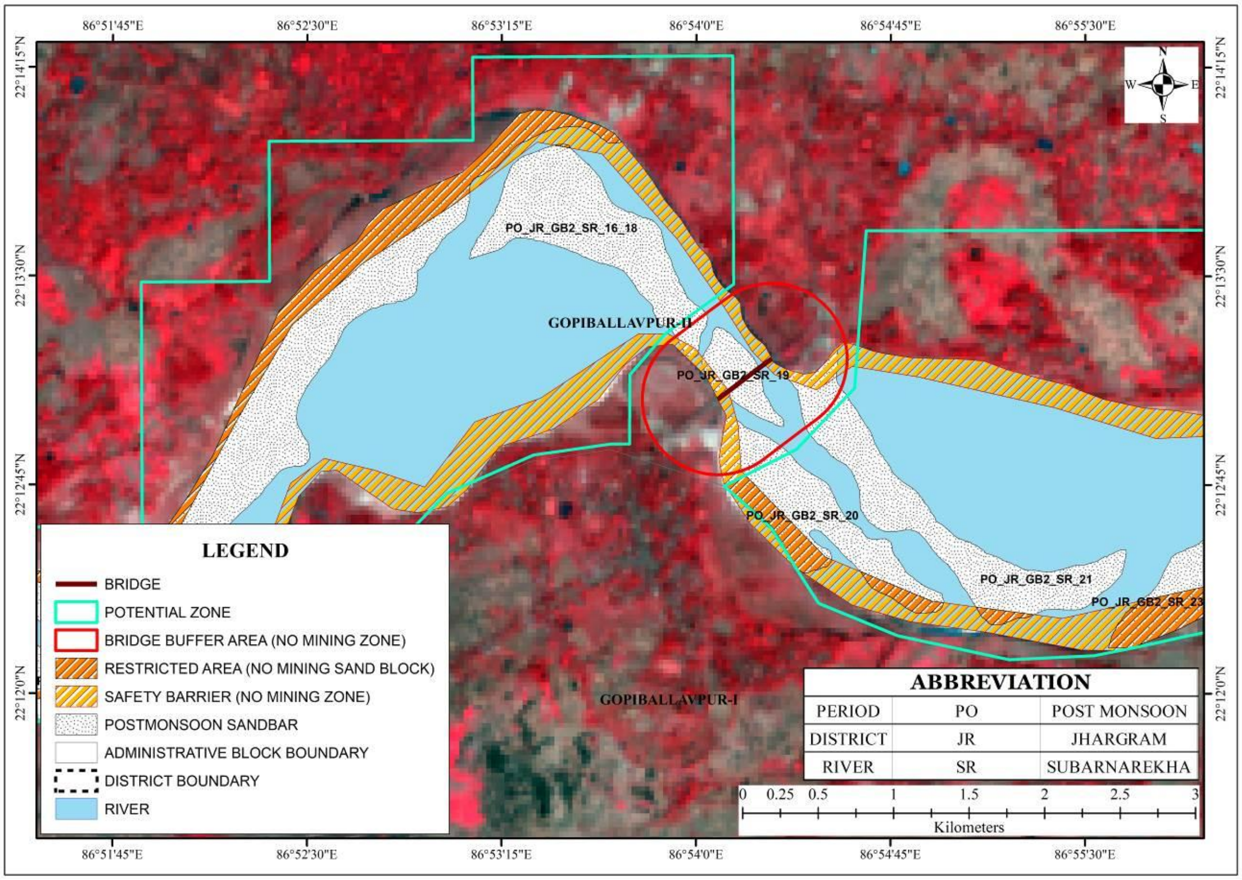


Figure 7.7: A representative map showing no-mining zone demarcated on Subarnarekha River

8 Overview of mining activity in the district

8.1 General overview

The district is not very rich in mineral resources and there are no large mines in the district. However, collection of sand, from the river-bed is the minor mineral sources. These materials are primarily utilized for construction purpose.

8.2 List of existing mining leases of the districts

Details of existing mining leases of the districts are furnished in Table 8.1.

Table 8.1: Details of Sand mining leases of the districts

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocoordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
1	Praneshyam Rakshit	105/SB2021	Subarna rekha	Gopiballavpur-I	Tikayetput	375	519(P)	22°11'37.66"N	86°59'11.92"E	313699.5576	05-04-2023
								22°11'30.11"N	86°59'10.27"E		
								22°11'29.67"N	86°59'05.33"E		
								22°11'35.27"N	86°59'04.00"E		
2	Uttam Satpathy	84/SB2021	Subarnarekha	Gopiballavpur-II	Malincha	194	1561(P)	22°13'05.28"N	86°56'56.81"E	341962.592	05-04-2023
								22°12'59.94"N	86°57'00.40"E		
								22°12'56.54"N	86°56'54.60"E		
								22°13'01.13"N	86°56'49.66"E		
3	Diljot Singh Sabharwal, Prop. Blessing Pvt. Ltd. New Industrial Estate.	211/SB2021	Subarnarekha	Gopiballavpur-I	Kanchanpur	39	1501(P)	22°12'25.16"N	86°47'20.50"E	417977.96	05-04-2023
								22°12'17.93"N	86°47'15.06"E		
								22°12'21.53"N	86°47'09.40"E		
								22°12'28.82"N	86°47'14.97"E		
4	M/s S.G. Projects Ltd. Ajay Singh	210/SB2021	Subarnarekha	Gopiballavpur-I	Narasinghapur	38	307 (P) & 312 (P)	22°12'14.15"N	86°47'38.86"E	416549.219	05-04-2023
								22°12'06.92"N	86°47'32.69"E		
								22°12'10.17"N	86°47'26.74"E		
								22°12'16.97"N	86°47'31.91"E		
5	M/s S.G. Projects Ltd. Ajay Singh	207/SB2021	Subarnarekha	Gopiballavpur-I	Narasinghapur	38	307 (P) & 312 (P)	22°12'14.39"N	86°47'27.27"E	417528.025	05-04-2023
								22°12'10.83"N	86°47'24.58"E		
								22°12'08.53"N	86°47'15.99"E		
								22°12'11.89"N	86°47'15.76"E		
								22°12'17.87"N	86°47'20.28"E		
6	M/s S.G. Projects Ltd. Ajay Singh	212/SB2021	Subarnarekha	Gopiballavpur-II	Dangaria	372	582(P)	22°11'14.25"N	86°59'24.19"E	412858.9608	05-04-2023
								22°11'08.55"N	86°59'19.23"E		
								22°11'09.44"N	86°59'16.96"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
								22°11'09.75"N	86°59'15.95"E		
								22°11'10.54"N	86°59'15.53"E		
								22°11'12.03"N	86°59'12.69"E		
								22°11'14.99"N	86°59'11.17"E		
								22°11'16.41"N	86°59'11.85"E		
7	Starnet Marketing Pvt. Ltd. Prop. Mr. Debiprasad Chatterjee	215/SB2021	Subarnarekha	Gopiballavpur-II	Dangaria	372	583(P)	22°10'54.76"N	86°59'45.34"E	67446.8652	05-04-2023
								22°10'52.02"N	86°59'46.80"E		
								22°10'58.51"N	86°59'41.62"E		
								22°10'59.72"N	86°59'41.42"E		
								22°10'59.69"N	86°59'44.10"E		
								22°10'58.52"N	86°59'45.02"E		
8	Arimdam Bala	108/SB2021	Subarnarekha	Gopiballavpur-I	Gargaria	9	1(P)	22°12'32.38"N	86°45'07.02"E	318439.6644	05-04-2023
								22°12'24.31"N	86°45'04.92"E		
								22°12'23.44"N	86°45'03.33"E		
								22°12'323.24"N	86°44'59.32"E		
								22°12'32.77"N	86°45'02.70"E		
9	Kanchan Sahoo	104/SB2021	Subarnarekha	Gopiballavpur-II	Akna	193	1132(P)	22°13'20.98"N	86°57'18.20"E	371220.221	05-04-2023
								22°13'12.98"N	86°57'26.06"E		
								22°13'11.32"N	86°57'24.58"E		
								22°13'16.68"N	86°57'12.76"E		
10	Karamchand Pal	106/SB2021	Subarnarekha	Gopiballavpur-I	Tikayetpur	375	519(P)	22°11'45.54"N	86°59'11.60"E	411951.1968	05-04-2023
								22°11'43.00"N	86°59'12.69"E		
								22°11'39.88"N	86°59'12.13"E		
								22°11'37.26"N	86°59'03.55"E		
								22°11'42.97"N	86°59'02.18"E		
11	Sk. Jakir Hossen	83/SB2021	Subarnarekha	Gopiballavpur-II	Malincha	194	1561(P)	22°12'59.00"N	86°57'01.75"E	1,83,664.338	05-04-2023
								22°12'56.89"N	86°57'06.20"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
								22°12'53.07"N	86°56'58.21"E		
								22°12'55.45"N	86°56'55.66"E		
12	Suvendu Debnath	90/SB2021	Subarnarekha	Gopiballavpur-II	Chorchita	75	8205 (P)	22°12'25.20"N	86°51'10.16"E	417468.8232	05-04-2023
								22°12'19.73"N	86°51'16.14"E		
								22°12'15.07"N	86°51'11.62"E		
								22°12'20.17"N	86°51'4.90"E		
13	Manik Bera	87/SB2021	Subarnarekha	Gopiballavpur-II	Bhutkahalia	155	337(P), 354(P)	22°13'48.47"N	86°53'20.34"E	413454.9276	05-04-2023
								22°13'38.53"N	86°53'21.26"E		
								22°13'38.72"N	86°53'18.02"E		
								22°13'37.06"N	86°53'15.92"E		
								22°13'46.84"N	86°53'14.93"E		
								22°13'49.02"N	86°53'16.13"E		
14	Sushanta Mondal	117/SB2021	Subarnarekha	Sankrail	Chabukya	67	425(P)	22°09'41.37"N	87°02'35.05"E	308442.44	05-04-2023
								22°09'44.02"N	87°02'26.43"E		
								22°09'46.98"N	87°02'26.52"E		
								22°09'49.05"N	87°02'35.08"E		
15	M/S Pirbaba Enterprise	82/SB2021	Subarnarekha	Gopiballavpur-II	Akna	193	1132(P)	22°13'24.34"N	86°57'14.81"E	249899.5356	05-04-2023
								22°13'22.10"N	86°57'17.00"E		
								22°13'17.52"N	86°57'10.97"E		
								22°13'21.34"N	86°57'04.82"E		
16	Sk. Karim	107/SB2021	Subarnarekha	Gopiballavpur-I	Jahanpur	375	519(P)	22°11'54.18"N	86°59'08.67"E	4,17,966.12	05-04-2023
								22°11'47.40"N	86°59'10.81"E		
								22°11'44.95"N	86°59'01.79"E		
								22°11'50.77"N	86°59'00.39"E		
17	Sk. Selimuddin	95/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°12'54.77"N	86°56'31.25"E	218439.5928	05-04-2023
								22°12'48.69"N	86°56'34.56"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
								22°12'46.98"N	86°56'28.55"E		
								22°12'51.17"N	86°56'26.66"E		
18	Sk. Karim	92/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°12'57.24"N	86°56'49.44"E	3,45,345	05-04-2023
								22°12'51.71"N	86°56'55.34"E		
								22°12'49.64"N	86°56'51.04"E		
								22°12'56.45"N	86°56'43.97"E		
19	Sayed Asfak Ali	96/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°12'56.09"N	86°56'41.44"E	4,12,772.131	05-04-2023
								22°12'51.05"N	86°56'46.54"E		
								22°12'48.54"N	86°56'36.95"E		
								22°12'55.79"N	86°56'33.05"E		
20	Sk. Karim	110/SB2021	Subarnarekha	Gopiballavpur-I	Satma	10	1(P)	22°12'37.09"N	86°45'24.71"E	368039.1	05-04-2023
								22°12'34.24"N	86°45'26.31"E		
								22°12'29.13"N	86°45'16.09"E		
								22°12'33.72"N	86°45'14.21"E		
21	Premankur Maity	98/SB2021	Subarnarekha	Gopiballavpur-II	Khariparia	251	159(P)	22°12'51.18"N	86°56'24.55"E	2,26,281.8844	05-04-2023
								22°12'48.37"N	86°56'25.78"E		
								22°12'46.23"N	86°56'19.85"E		
								22°12'52.47"N	86°56'17.05"E		
22	Ezaharul Hossain	109/SB2021	Subarnarekha	Gopiballavpur-I	Gargaria	9	1(P)	22°12'32.31"N	86°45'13.69"E	253159.5924	05-04-2023
								22°12'28.91"N	86°45'15.73"E		
								22°12'25.03"N	86°45'07.05"E		
								22°12'32.16"N	86°45'09.07"E		
23	M/S Chakraborty Enterprise	118/SB2021	Subarnarekha	Sankrail	Chabukya	67	425(P)	22°09'48.99"N	87°02'37.03"E	1,83,378.18	05-04-2023
								22°09'48.96"N	87°02'37.29"E		
								22°09'48.97"N	87°02'37.92"E		
								22°09'48.47"N	87°02'39.20"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
								22°09'48.47"N	87°02'39.78"E		
								22°09'48.23"N	87°02'41.24"E		
								22°09'48.21"N	87°02'42.34"E		
								22°09'47.69"N	87°02'43.17"E		
								22°09'47.01"N	87°02'44.65"E		
								22°09'46.91"N	87°02'45.05"E		
								22°09'44.89"N	87°02'44.98"E		
								22°09'45.52"N	87°02'36.86"E		
24	Rakhal Mahato	79/SB2021	Subarnarekha	Gopiballavpur-II	Pithapura	188	1057(P)	22°13'28.76"N	86°57'31.74"E	358408.908	05-04-2023
								22°13'26.17"N	86°57'32.33"E		
								22°13'21.33"N	86°57'20.17"E		
								22°13'24.63"N	86°57'16.83"E		
25	Tanay Maity	97/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°13'6.73"N	86°56'39.38"E	115116.3156	05-04-2023
								22°13'3.06"N	86°56'43.27"E		
								22°13'2.20"N	86°56'37.38"E		
								22°13'2.41"N	86°56'35.61"E		
								22°13'5.30"N	86°56'37.43"E		
26	Raju Mandal	100/SB2021	Subarnarekha	Gopiballavpur-II	Topagaria	251	159(P)	22°12'52.41"N	86°56'14.74"E	3,74,693.405	05-04-2023
								22°12'47.36"N	86°56'16.97"E		
								22°12'43.39"N	86°56'06.08"E		
								22°12'44.18"N	86°56'05.94"E		
								22°12'50.11"N	86°56'08.82"E		
27	Tanay Maity	94/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°12'46.68"N	86°56'37.93"E	2,26,495.0116	05-04-2023
								22°12'43.93"N	86°56'39.37"E		
								22°12'40.13"N	86°56'31.64"E		
								22°12'44.41"N	86°56'29.77"E		
28	Soumen Gope	89/SB2021	Subarnarekha	Gopiballavpur-	Chorchita	75	6557(P),	22°12'35.77"N	86°52'0.61"E	408174.1092	05-04-2023

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
				II			8205(P)	22°12'29.96"N	86°52'8.15"E		
								22°12'25.74"N	86°52'3.64"E		
								22°12'33.97"N	86°51'56.73"E		
								22°12'35.06"N	86°52'0.20"E		
29	Tanay Maity	93/SB2021	Subarnarekha	Gopiballavpur-II	Chhatina	252	475(P)	22°12'49.54"N	86°56'48.24"E	89,106.90	05-04-2023
								22°12'48.70"N	86°56'49.05"E		
								22°12'44.88"N	86°56'41.23"E		
								22°12'47.21"N	86°56'39.95"E		
30	Mithu Saha	78/SB2021	Subarnarekha	Gopiballavpur-II	Agarboni	189	988(P)	22°13'32.22"N	86°58'04.61"E	59900.5836	05-04-2023
								22°13'31.14"N	86°58'05.36"E		
								22°13'29.96"N	87°58'00.49"E		
								22°13'33.32"N	87°57'59.61"E		
31	Ashis Kumar Manna	80/SB2021	Subarnarekha	Gopiballavpur-II	Pithapur	188	1057(P)	22°13'24.68"N	86°57'32.71"E	4,14,129.8304	05-04-2023
								22°13'19.76"N	86°57'34.55"E		
								22°13'16.04"N	86°57'25.50"E		
								22°13'20.23"N	86°57'21.24"E		
32	Bidhan Patra	112/SB2021	Kangsabati	Binpur-I	Dhamro	814	1(P), 2(P)	22°32'54.01"N	87° 1'27.13"E	4,25,904.8632	05-04-2023
								22°32'54.28"N	87° 1'32.70"E		
								22°32'47.86"N	87° 1'33.02"E		
								22°32'45.41"N	87° 1'32.01"E		
								22°32'45.20"N	87° 1'26.60"E		
								22°32'53.42"N	87° 1'26.09"E		
33	Tanay Maity	99/SB2021	Subarnarekha	Gopiballavpur-II	Khariparia	251	159(P)	22°12'46.55"N	86°56'26.61"E	390306.9456	05-04-2023
								22°12'39.21"N	86°56'29.88"E		
								22°12'36.40"N	86°56'24.25"E		
								22°12'44.41"N	86°56'20.63"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
34	Adyamaa Trade Link Pvt. Ltd.	224/SB2021	Subarnarekha	Gopiballavpur-II	Chorchita	75	8202(P), 8205(P) & 6590(P)	22°12'33.21"N	86°50'44.79"E	408927.948	05-04-2023
								22°12'30.92"N	86°50'57.32"E		
								22°12'22.86"N	86°50'48.71"E		
35	Altaf Hossain	86/SB2021	Subarnarekha	Gopiballavpur-II	Bhutkahalia	155	336(P), 337(P)	22°13'57.00"N	86°53'05.75"E	125600	05-04-2023
								22°13'48.50"N	86°53'09.92"E		
								22°13'44.90"N	86°53'06.68"E		
								22°13'52.78"N	86°52'59.81"E		
36	Najmul Khan	11/SB2021	Subarnarekha	Gopiballavpur-I	Jagannathpur	190	139(P)	22°13'16.29"N	86°58'31.00"E	5,60,350	05-04-2023
								22°13'09.42"N	86°58'27.31"E		
								22°13'14.61"N	86°58'21.60"E		
								22°13'21.44"N	86°58'25.21"E		
37	Greego Drive Pvt. Ltd.	88/SB2021	Subarnarekha	Gopiballavpur-II	Balia	156	982(P), 1283(P)	22°14'0.11"N	86°53'28.03"E	110997	05-04-2023
								22°13'49.79"N	86°53'25.90"E		
								22°13'50.83"N	86°53'17.39"E		
								22°13'58.21"N	86°53'22.87"E		
38	Mandira Das Adhikari Chanda	113/SB2021	Subarnarekha	Sankrail	Baisakhipal	58	532(P)	22°10'11.17"N	87°1'29.52"E	3,56,595	05-04-2023
								22°10'12.01"N	87°1'41.45"E		
								22°10'06.44"N	87°1'41.57"E		
								22°10'09.40"N	87°1'33.91"E		
								22°10'09.81"N	87°1'29.52"E		
39	Simanta Mondal	114/SB2021	Subarnarekha	Sankrail	Naihat	286	1831(P)	22°05'44.48"N	87°07'42.71"E	127500	05-04-2023
								22°05'47.28"N	87°07'45.62"E		
								22°05'39.37"N	87°07'55.60"E		
								22°05'35.78"N	87°07'52.97"E		
40	Prasanta Mondal	116/SB2021	Subarnarekha	Sankrail	Chabukya	67	425(P)	22°10'05.06"N	87°02'25.05"E	115800	05-04-2023
								22°10'00.07"N	87°02'25.0"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
								22°10'00.01"N	87°02'34.05"E		
								22°10'05.09"N	87°02'34.09"E		
41	Srikanta Mondal	101/SB2021	Subarnarekha	Gopiballavpur-II	Dangaria	372	583(P)	22°10'53.43"N	86°59'58.90"E	130317	05-04-2023
								22°10'44.80"N	86°59'54.04"E		
								22°10'46.71"N	86°59'50.99"E		
								22°10'49.38"N	86°59'48.91"E		
								22°10'56.08"N	86°59'53.40"E		
42	Srikanta Mondal	115/SB2021	Subarnarekha	Sankrail	Naihat	286	1831(P)	22°05'48.70"N	87°07'45.48"E	129000	05-04-2023
								22°05'52.03"N	87°07'48.63"E		
								22°05'44.65"N	87°07'57.77"E		
								22°05'40.39"N	87°07'55.98"E		
43	Greego Drive Pvt. Ltd.	91/SB2021	Subarnarekha	Gopiballavpur-II	Kirtansole	77	511(P), 538(P)	22°13'59.27"N	86°49'21.53"E	130257	05-04-2023
								22°14'00.54"N	86°49'25.94"E		
								22°13'51.61"N	86°49'22.87"E		
								22°13'51.47"N	86°49'15.01"E		
								22°13'51.81"N	86°49'14.72"E		
								22°13'54.12"N	86°49'16.46"E		
								22°13'55.20"N	86°49'17.67"E		
								22°13'57.92"N	86°49'19.88"E		
44	Anupam Senapati	81/SB2021	Subarnarekha	Gopiballavpur-II	Pithapur	188	1057(P)	22°13'18.29"N	86°57'35.01"E	126212	05-04-2023
								22°13'10.68"N	86°57'37.58"E		
								22°13'08.68"N	86°57'32.71"E		
								22°13'14.89"N	86°57'26.59"E		
45	Animesh Senapati	85/SB2021	Subarnarekha	Gopiballavpur-Ii	Kuliana	248	1869(P)	22°12'40.86"N	86°55'45.15"E	111141	05-04-2023
								22°12'35.72"N	86°55'48.29"E		
								22°12'34.99"N	86°55'37.08"E		
								22°12'40.19"N	86°55'33.82"E		

Sl. NO.	Name of H1 Bidder	Sand Ghat ID on centralized portal	River Name	Block Name	Mouza	JL. No.	Plot	Latitude (minimum 4 geo coordinates)	Longitude (minimum 4 geocordinates)	Minable Reserve (in 5 Years in Cum.)	LoI Date
46	Mithu Saha	77/SB2021	Subarnarekha	Gopiballavpur-II	Agarboni	189	988(P)	22°13'33.08"N	86°58'20.53"E	126255	05-04-2023
								22°13'26.99"N	86°58'19.63"E		
								22°13'28.42"N	86°58'10.22"E		
								22°13'34.56"N	86°58'11.17"E		
47	Saktipada Ray	103/SB2021	Subarnarekha	Gopiballavpur-II	Chormundi	207	298(P)	22°13'05.46"N	86°54'55.67"E	126201	05-04-2023
								22°12'56.65"N	86°54'53.02"E		
								22°12'58.34"N	86°54'46.64"E		
								22°13'07.00"N	86°54'49.27"E		
48	Anuran Kumar Senapati	102/SB2021	Subarnarekha	Gopiballavpur-II	Chormundi	207	298(P)	22°13'07.76"N	86°54'46.22"E	126622	05-04-2023
								22°12'59.14"N	86°54'43.70"E		
								22°13'00.71"N	86°54'37.28"E		
								22°13'09.48"N	86°54'39.81"E		
49	Ajay Singh	204/SB2021	Subarnarekha	Gopiballavpur-I	Janaghati	36	786(P)	22°12'21.13"N	86°48'44.42"E	64000	05-04-2023
								22°12'14.73"N	86°48'42.86"E		
								22°12'11.51"N	86°48'40.34"E		
								22°12'08.65"N	86°48'34.34"E		
								22°12'10.62"N	86°48'31.05"E		
								22°12'13.50"N	86°48'37.20"E		

Based on DSR potential blocks, sand blocks are auctioned for the district which area given as Table 8.2 and map of these blocks are given as Figure 8.1.

Table 8.2: List of WBMDTCL Sand Auction Block of the district

Sr. No	Name	Block	Potential Sandblock	River	Area(HA)	Status
1	MIN_JH_1-I	Binpur-1	JR_BP1_KS_3	Kangsabati / Kansai	6.01	Auctioned
2	MIN_JH_2	Binpur-1	JR_BP1_KS_13	Kangsabati / Kansai	4.00	Auctioned
3	MIN_JH_1-II	Binpur-1	JR_BP1_KS_3	Kangsabati / Kansai	21.64	Auctioned
4	MIN_JH_5	Binpur-1	JR_BP1_KS_7	Kangsabati / Kansai	10.68	Auctioned
5	MIN_JH_6	Binpur-1	JR_BP1_KS_8	Kangsabati / Kansai	11.35	Auctioned
6	MIN_JH_7	Binpur-1	JR_BP1_KS_11	Kangsabati / Kansai	40.57	Auctioned
7	MIN_JH_8	Binpur-1	JR_BP1_KS_11	Kangsabati / Kansai	36.58	Auctioned
8	MIN_JH_10	Gopiballavpur-II	JR_GB2_SR_14(XIVB)	Subarnarekha	10.50	Auctioned
9	MIN_JH_11	Gopiballavpur-II	JR_GB2_SR_14(XIVB)	Subarnarekha	18.82	Auctioned
10	MIN_JH_14	Nayagram	JR_NY_SR_43	Subarnarekha	47.34	Auctioned
11	MIN_JH_13	Nayagram	JR_NY_SR_43	Subarnarekha	38.26	Auctioned
12	MIN_JH_16	Binpur-1	JR_BP1_KS_10	Kangsabati / Kansai	2.76	Auctioned
13	MIN_JH_17	Gopiballavpur-I	JR_GB1_SR_8	Subarnarekha	6.05	Auctioned
14	MIN_JH_18	Gopiballavpur-I	JR_GB1_SR_2	Subarnarekha	8.46	Auctioned
15	MIN_JH_19& 20	Gopiballavpur - I	JR_GB1_SR_2	Subarnarekha	8.47	Auctioned
16	MIN_JH_21A	Gopiballavpur - I	JR_GB1_SR_3_4_5_6	Subarnarekha	27.57	Auctioned
17	MIN_JH_21B	Gopiballavpur - I	JR_GB1_SR_3_4_5_6	Subarnarekha	25.37	Auctioned
18	MIN_JH_22	Gopiballavpur - I	JR_GB1_SR_7	Subarnarekha	28.14	Auctioned
19	MIN_JH_23A	Gopiballavpur - I	JR_GB1_SR_9	Subarnarekha	22.04	Auctioned
20	MIN_JH_23B	Gopiballavpur - I	JR_GB1_SR_9	Subarnarekha	16.56	Auctioned
21	MIN_JH_24A	Gopiballavpur - II	JR_GB2_SR_13	Subarnarekha	18.56	Auctioned
22	MIN_JH_24B	Gopiballavpur - II	JR_GB2_SR_13	Subarnarekha	16.28	Auctioned
23	MIN_JH_25	Gopiballavpur - II	JR_GB2_SR_16, JR_GB2_SR_16_18	Subarnarekha	29.51	Auctioned
24	MIN_JH_26A	Gopiballavpur - II	JR_GB2_SR_25	Subarnarekha	29.24	Auctioned
25	MIN_JH_26B	Gopiballavpur - II	JR_GB2_SR_25	Subarnarekha	22.74	Auctioned
26	MIN_JH_27	Gopiballavpur - II	JR_GB2_SR_26_28A	Subarnarekha	25.18	Auctioned
27	MIN_JH_29A	Sankrail	JR_SK_SR_31	Subarnarekha	13.01	Auctioned

Sr. No	Name	Block	Potential Sandblock	River	Area(HA)	Status
28	MIN_JH_29B	Sankrail	JR_SK_SR_31	Subarnarekha	20.54	Auctioned
29	MIN_JH_31A	Sankrail	JR_SK_SR_34_37	Subarnarekha	10.98	Auctioned
30	MIN_JH_31B	Sankrail	JR_SK_SR_34_37	Subarnarekha	21.00	Auctioned
31	MIN_JH_31C	Sankrail	JR_SK_SR_34_37	Subarnarekha	21.00	Auctioned
32	MIN_JH_31D	Sankrail	JR_SK_SR_34_37	Subarnarekha	21.00	Auctioned
33	MIN_JH_31E	Sankrail	JR_SK_SR_34_37	Subarnarekha	21.00	Auctioned
34	MIN_JH_31F	Sankrail	JR_SK_SR_34_37	Subarnarekha	21.00	Auctioned
35	MIN_JH_32A _I	Sankrail	JR_SK_SR_39	Subarnarekha	6.06	Auctioned
36	MIN_JH_32A _II	Sankrail	JR_SK_SR_39	Subarnarekha	5.00	Auctioned
37	MIN_JH_32B	Sankrail	JR_SK_SR_39	Subarnarekha	21.00	Auctioned
38	MIN_JH_32C	Sankrail	JR_SK_SR_39	Subarnarekha	21.00	Auctioned
39	MIN_JH_32D	Sankrail	JR_SK_SR_39	Subarnarekha	20.99	Auctioned
40	MIN_JH_32E	Sankrail	JR_SK_SR_39	Subarnarekha	21.00	Auctioned
41	MIN_JH_33A	Nayagram	JR_NY_SR_41	Subarnarekha	15.19	Auctioned
42	MIN_JH_33B	Nayagram	JR_NY_SR_41	Subarnarekha	15.65	Auctioned
43	MIN_JH_33C	Nayagram	JR_NY_SR_41	Subarnarekha	22.41	Auctioned
44	MIN_JH_33D	Nayagram	JR_NY_SR_41	Subarnarekha	25.52	Auctioned
45	MIN_JH_34A	Nayagram	JR_NY_SR_41	Subarnarekha	28.88	Auctioned
46	MIN_JH_34B	Nayagram	JR_NY_SR_41	Subarnarekha	28.37	Auctioned
47	MIN_JH_35A	Binpur-1	JR_BP1_KS_1_2	Kangsabati / Kansai	25.42	Auctioned
48	MIN_JH_35B _I	Binpur-1	JR_BP1_KS_1_2	Kangsabati / Kansai	10.00	Auctioned
49	MIN_JH_35B _II	Binpur-1	JR_BP1_KS_1_2	Kangsabati / Kansai	7.92	Auctioned
50	MIN_JH_38A	Gopiballavpur - II	JR_GB2_SR_14(XIVB) , JR_GB2_SR_16	Subarnarekha	30.57	Auctioned
51	MIN_JH_38B	Gopiballavpur - II	JR_GB2_SR_16	Subarnarekha	30.98	Auctioned

8.3 Detail of production of sand and other minerals during last three years

Last 3 years production of minor mineral of Jhargram district is furnished in Table 8.3.

Table 8.3: Details of production of sand as per mine plan in Jhargram district

Sl. No.	Year	Name of mineral	Total Production (in Cft.)	Total Production in cum
1	2017-2018	Sand	56,160,611.00	1,590,276.40
2	2018-2019	Sand	65,755,468.00	1,861,969.93
3	2019-2020	Sand	106,655,118.00	3,020,108.11
4	2020-2021	Sand	137,691,427.00	3,898,950.22
7	2021-2022	Sand	53,462,563.00	1,513,876.91

Conversion factor: 1cum=35.315 cft

(Source: Directorate of Mines and Minerals, West Bengal)

9 Details of revenue generated from mineral sector during last three years

Revenue generated for last 3 years in Jhargram district is furnished in Table 9.1.

Table 9.1: District revenue generation from mineral sector

Year	Royalty amount
2017-18	16,92,84,153
2018-19	33,38,71,228
2019-20	28,25,06,895
2020-2021	20,79,14,055
2021-2022	8,07,28,471

(Source: Directorate of Mines and Minerals, West Bengal)

10 Transport

The most common transport system in Jhargram district is road transport (Figure 10.1). The district is well networked with other part of the State through roadways. National Highway (NH-6) passes through the district and connects other districts like Purba Medinipur, Bankura, Birbhum and Murshidabad. Besides the National Highway, few other State Highways also passes through the district. State Highway (SH)-4 connects Sarenga, Goaltore, Chandrakona, Ghatal and Panskura. SH-5 connects Banspahan, Narayanpur, Silda, Lodhasuli, Kharagpur (via NH-6), Keshiary and Belda. SH-7connects Ram Jibanpur, Khirpai, Chandrakona, Keshpur and Medinipur. SH-9 connects Beragaria and Silda.

Broad gauge railway line runs through the South Eastern Railway line which enters from west of Jamboni block and exits it from the east of Jhargram block to connect to the Junction station of Kharagpur. Jhargram Railway Station is the major railway station in the district located on the Kharagpur-Tatanagar section of Howrah-Nagpur- Mumbai line. The Jhargram railway station comes under South Eastern Railway. Jhargram is well connected by train to nearest big city like Kolkata/Howrah (155 km), Kharagpur (39 km), Tatanagar (96 km).

A transportation map demarcating approach road to the potential sand blocks from the nearest National Highway/ Sate Highway has been prepared and presented in Figure 10.2.

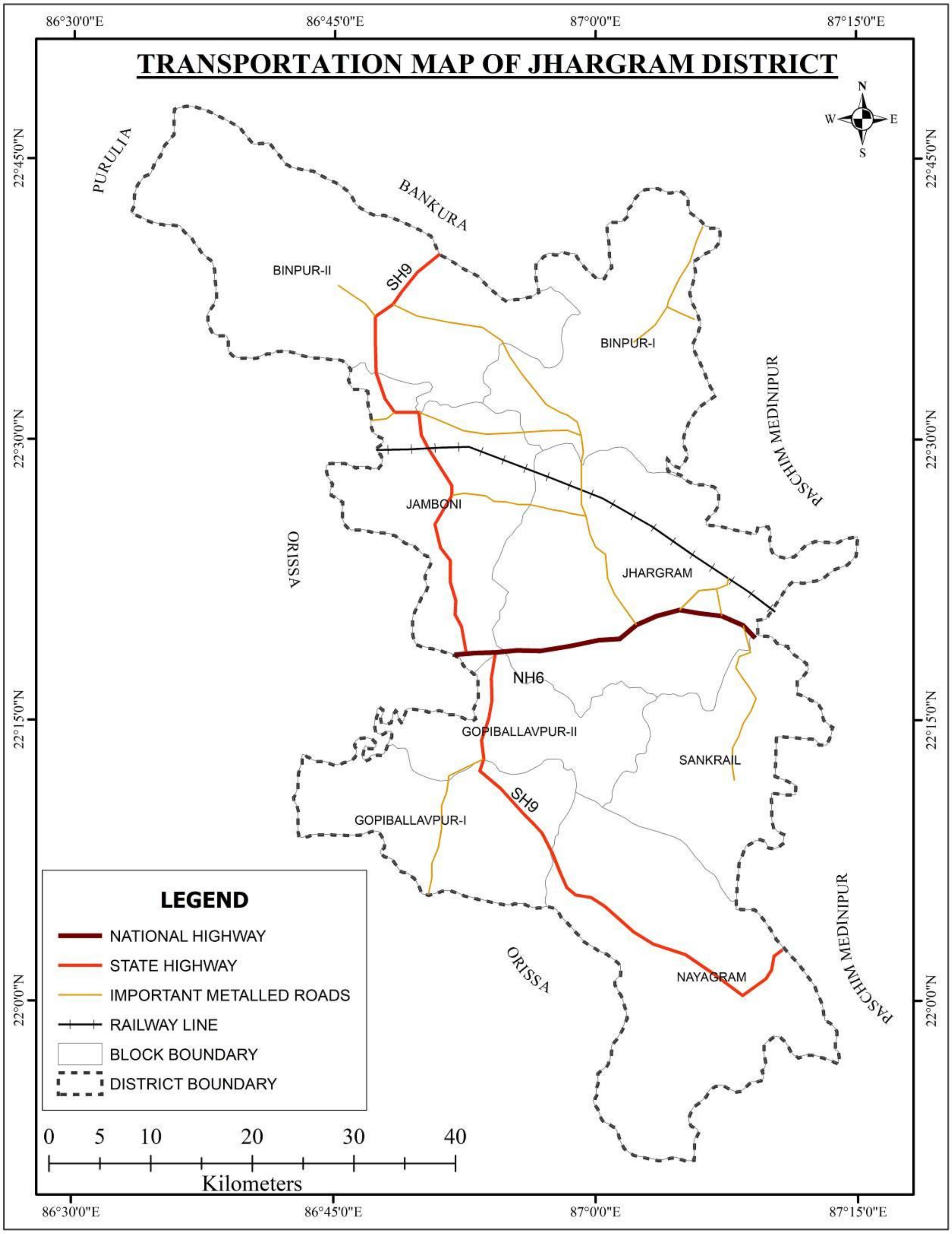


Figure 10.1: Transportation map of Jhargram District

(Source: National Informatics Centre)

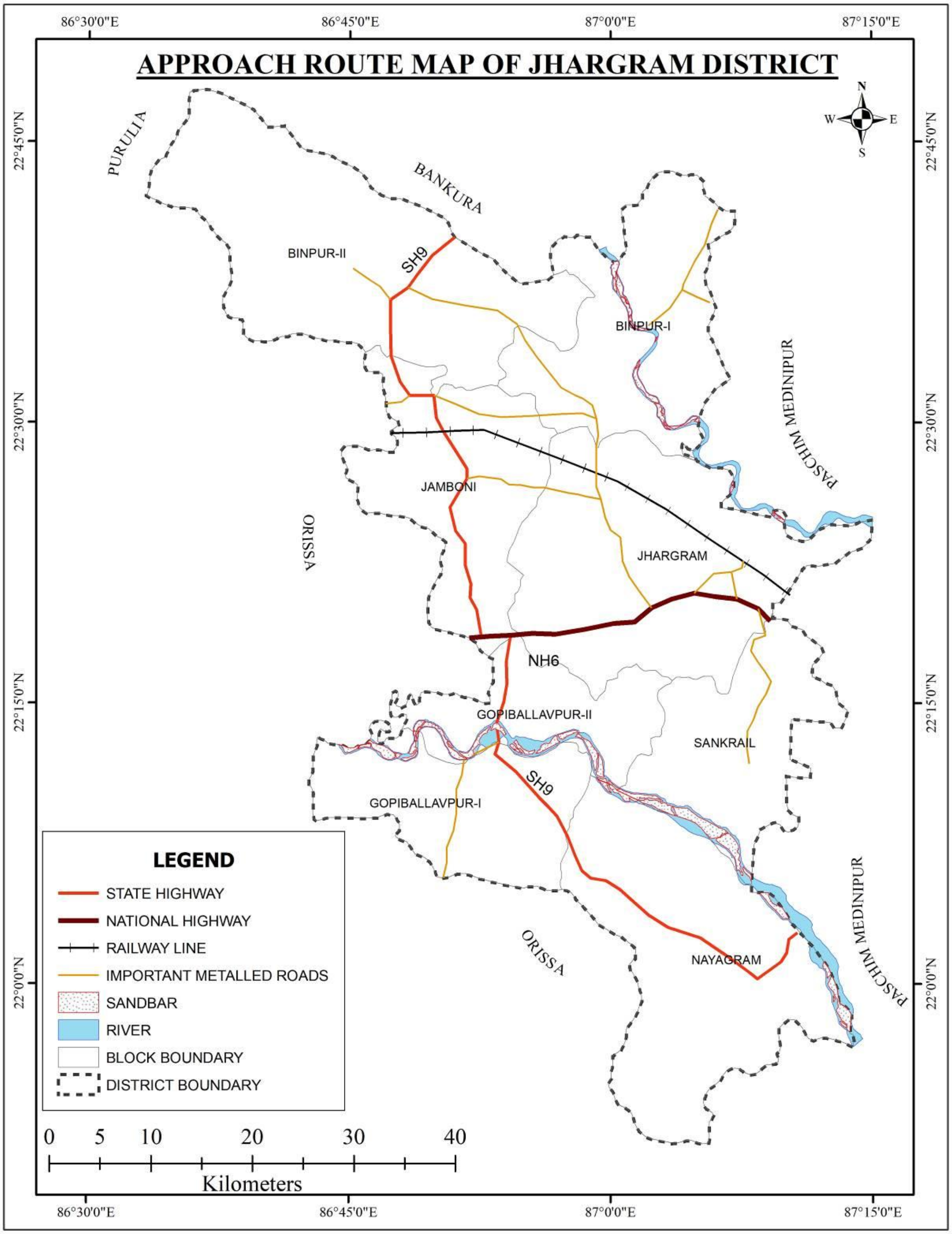


Figure 10.2: Map showing approach road to potential sand bars

(Source: National Informatics Centre)

PART B: INSITU MINOR MINERAL DEPOSITS

11 In-situ Minerals:

11.1 Mineral Reserve

Mineral resources of the district are still not well established, the district does not have reserve of any major mineral deposits.

11.2 Mineral Potential

Sand is the important riverbed mineral found to be potential for mining. Considerable quantity of quality sands is found to occur in the riverbed of the district. Other than sand, the district holds good potential for insitu minor mineral deposits. Presence of feldspathic schistose type parent rock, mica schists with bands of gneiss, phyllites and epidiorites of Archaean age, quartzites, kaolinitic clay from the decomposed felspathic rocks etc., are the potential mineral resources which can be extracted for commercial purposes.

The major parts of the district are covered with laterites rock. The laterites of Jhargram are not homogeneous and contain all possible gradation from loose gravelly formation to hard compact pisolitic masses.

In the north-west part of Binpur, block micaceous schists noted near the village of' Silda. Grey and bluish-grey micaceous schists with bands of gneissic rock reported here.

A group of hills of hard grey and greyish-white gritty quartzites associated with irregular veins of vein quartz also located in Binpur block. Bands of quartzose-grit generally form precipitous peaks which are dotted over the area.

Strongly folded mica schists, phyllites and epidiorites of Archaean age dominate the extreme northwest portion of the district.

The presence of manganese recoded from Astajhuri area of Binpur block also depicts potential deposits in the district.

The lists of identified potential zones with respect to in-situ minor minerals are furnished in Table 11.1 and Figure 11.1 depicts location of potential mineral deposits plotted on geological map of Jhargram.

Table 11.1: In-situ Minerals Occurrences

Sr. No	Name of the Mineral (Zone-Code)	Area of mineralized zone (Ha)	Depth of mineralization (m)	Geological resource (mcum)	Whether virgin or partially excavated	Nature of land (whether free for mining/ forest / agriculture)	Mineral reserve (approx..) mentioning grade	Administrative block	Co-ordinate		Area within prohibited zone as per Rule 3 of 7 WBMNC Rules 2016	Infrastructure available near the mineralized zone
1	JH_BR2_BS_ZONE_01 (Black Stone/ China clay/ Fire Clay/Laterite)	33.77	50	13.51	Virgin	Forest land	Yet to explore	BINPUR-II	22° 40' 54.513" N	86° 37' 28.514" E	NO	AVAILABLE
									22° 40' 45.079" N	86° 37' 46.160" E		
									22° 40' 31.637" N	86° 37' 32.043" E		
									22° 40' 41.602" N	86° 37' 13.049" E		
2	JH_BS_ZONE_02 (Black Stone/ China clay/ Fire Clay/Laterite)	77.74	50	31.1	Virgin	Aggricultural land	Yet to explore	BINPUR-II	22° 40' 51.185" N	86° 50' 25.667" E	NO	AVAILABLE
									22° 40' 58.380" N	86° 50' 48.556" E		
									22° 40' 34.935" N	86° 51' 7.136" E		
									22° 40' 19.593" N	86° 50' 35.604" E		
									22° 40' 41.522" N	86° 50' 30.190" E		
3	JH_BS_ZONE_03 (Black Stone/ China clay/ Fire Clay/Laterite)	39.38	50	15.75	Virgin	Aggricultural land	Yet to explore	BINPUR-II	22° 37' 10.157" N	86° 52' 16.732" E	NO	AVAILABLE
									22° 37' 31.058" N	86° 52' 35.834" E		
									22° 37' 23.948" N	86° 52' 58.705" E		
									22° 37' 11.527" N	86° 52' 33.778" E		
									22° 37' 4.246" N	86° 52' 22.214" E		
4	JH_BS_ZONE_04 (Black Stone/ China clay/ Fire Clay/Laterite)	155.5	50	62.2	Virgin	Aggricultural land	Yet to explore	BINPUR-II	22° 47' 13.178" N	86° 39' 35.936" E	NO	AVAILABLE
									22° 47' 11.601" N	86° 39' 37.408" E		
									22° 47' 8.057" N	86° 39' 39.704" E		
									22° 47' 4.838" N	86° 39' 42.280" E		
									22° 46' 59.376" N	86° 39' 45.907" E		
									22° 46' 47.996" N	86° 39' 52.495" E		
									22° 46' 44.615" N	86° 39' 53.598" E		
									22° 46' 43.542" N	86° 39' 54.895" E		
									22° 46' 41.298" N	86° 39' 58.120" E		
									22° 46' 20.077" N	86° 39' 54.715" E		
									22° 46' 40.207" N	86° 39' 27.732" E		
									22° 46' 50.700" N	86° 39' 1.177" E		
									22° 47' 24.284" N	86° 39' 9.924" E		
									22° 47' 22.382" N	86° 39' 14.727" E		
									22° 47' 20.154" N	86° 39' 21.055" E		
									22° 47' 16.674" N	86° 39' 25.577" E		
									22° 47' 15.471" N	86° 39' 29.398" E		
5	JH_BS_ZONE_05 (Black Stone/ China clay/ Fire Clay/Laterite)	186.95	50	74.78	Virgin	Aggricultural land	Yet to explore	BINPUR-II	22° 37' 10.157" N	86° 52' 16.732" E	NO	AVAILABLE
									22° 37' 31.058" N	86° 52' 35.834" E		
									22° 37' 23.948" N	86° 52' 58.705" E		
									22° 37' 11.527" N	86° 52' 33.778" E		
									22° 37' 4.246" N	86° 52' 22.214" E		
6	JH_BS_ZONE_06 (Black Stone/ China clay/ Fire Clay/Laterite)	770.66	50	308.26	Virgin	Aggricultural land	Yet to explore	BINPUR-II	22° 37' 36.364" N	86° 49' 52.303" E	NO	AVAILABLE
									22° 39' 16.286" N	86° 51' 44.545" E		
									22° 38' 43.981" N	86° 52' 45.390" E		
									22° 37' 3.009" N	86° 50' 23.115" E		
									22° 37' 36.364" N	86° 49' 52.303" E		
7	JH_GR_ZONE_01	1098.8	50	439.52	Virgin	Aggricultural/	Yet to	BINPUR-II	22° 47' 35.633" N	86° 36' 8.884" E	NO	AVAILABL

Sr. No	Name of the Mineral (Zone-Code)	Area of mineralized zone (Ha)	Depth of mineralization (m)	Geological resource (mcum)	Whether virgin or partially excavated	Nature of land (whether free for mining/ forest / agriculture)	Mineral reserve (approx..) mentioning grade	Administrative block	Co-ordinate		Area within prohibited zone as per Rule 3 of 7 WBMNC Rules 2016	Infrastructure available near the mineralized zone
	(Granite/ Quartz/ Feldspar)					Forest land	explore		22° 47' 15.521" N	86° 38' 1.179" E		E
									22° 45' 6.386" N	86° 38' 27.462" E		
									22° 45' 58.300" N	86° 36' 28.195" E		
									22° 46' 53.754" N	86° 36' 8.973" E		
8	JH_GR_ZONE_02 (Granite/ Quartz/ Feldspar)	547.57	50	219.03	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 46' 56.453" N	86° 38' 38.788" E	NO	AVAILABLE
									22° 46' 39.149" N	86° 39' 24.950" E		
									22° 45' 41.740" N	86° 40' 9.181" E		
									22° 45' 37.487" N	86° 40' 35.090" E		
									22° 45' 43.434" N	86° 41' 10.593" E		
									22° 45' 24.164" N	86° 41' 19.791" E		
									22° 45' 11.807" N	86° 41' 9.880" E		
									22° 45' 8.089" N	86° 39' 59.695" E		
									22° 45' 34.556" N	86° 39' 16.062" E		
9	JH_NG_LT_ZONE_01 (Laterite/ China clay/ Fire Clay/ Silica Sand)	152.5	35	42.7	Virgin	Aggricultural land	Yet to explore	NAYAGRAM	22° 8' 45.480" N	86° 57' 43.597" E	NO	AVAILABLE
									22° 9' 7.695" N	86° 59' 9.132" E		
									22° 8' 46.354" N	86° 59' 15.785" E		
									22° 8' 29.301" N	86° 57' 42.123" E		
10	JH_NG_LT_ZONE_02 (Laterite/ China clay/ Fire Clay/ Silica Sand)	1064.2	35	297.98	Virgin	Aggricultural land	Yet to explore	NAYAGRAM	22° 7' 59.421" N	87° 3' 26.651" E	NO	AVAILABLE
									22° 7' 26.664" N	87° 5' 29.937" E		
									22° 5' 52.456" N	87° 4' 52.016" E		
									22° 6' 32.948" N	87° 2' 55.217" E		
11	JH_NG_LT_ZONE_03 (Laterite/ China clay/ Fire Clay/ Silica Sand)	840.03	35	235.21	Virgin	Aggricultural/ Forest land	Yet to explore	NAYAGRAM	21° 52' 31.767" N	87° 2' 11.562" E	NO	AVAILABLE
									21° 54' 24.293" N	87° 4' 2.252" E		
									21° 53' 49.417" N	87° 4' 54.243" E		
									21° 51' 59.482" N	87° 3' 4.103" E		
12	JH_LT_ZONE_04 (Laterite/ China clay/ Fire Clay/ Silica Sand)	77.76	35	21.77	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 34' 15.685" N	86° 47' 36.868" E	NO	AVAILABLE
									22° 34' 25.784" N	86° 47' 20.018" E		
									22° 34' 58.647" N	86° 48' 5.638" E		
									22° 34' 37.109" N	86° 48' 8.828" E		
13	JH_LT_ZONE_05 (Laterite/ China clay/ Fire Clay/ Silica Sand)	1058.86	35	296.48	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 37' 20.713" N	86° 40' 8.040" E	NO	AVAILABLE
									22° 37' 19.083" N	86° 41' 38.446" E		
									22° 35' 14.351" N	86° 42' 2.712" E		
									22° 35' 11.931" N	86° 40' 22.928" E		
14	JH_LT_ZONE_06 (Laterite/ China clay/ Fire Clay/ Silica Sand)	142.47	35	39.89	Virgin	Aggricultural/ Forest land	Yet to explore	JAMBONI	22° 28' 6.837" N	86° 53' 27.114" E	NO	AVAILABLE
									22° 28' 34.017" N	86° 53' 21.793" E		
									22° 28' 36.033" N	86° 54' 25.834" E		
									22° 28' 8.869" N	86° 54' 22.289" E		
15	JH_LT_ZONE_07 (Laterite/ China clay/ Fire Clay/ Silica Sand)	388.18	35	108.69	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 38' 2.482" N	86° 49' 18.972" E	NO	AVAILABLE
									22° 38' 12.878" N	86° 48' 40.817" E		
									22° 39' 37.129" N	86° 49' 13.637" E		
									22° 39' 18.399" N	86° 50' 10.594" E		
16	JH_LT_ZONE_08 (Laterite/ China clay/	33.65	35	9.42	Virgin	Aggricultural/ Forest land	Yet to explore	JAMBONI	22° 20' 5.154" N	86° 52' 23.963" E	NO	AVAILABLE
									22° 20' 8.308" N	86° 52' 41.443" E		

Sr. No	Name of the Mineral (Zone-Code)	Area of mineralized zone (Ha)	Depth of mineralization (m)	Geological resource (mcum)	Whether virgin or partially excavated	Nature of land (whether free for mining/ forest / agriculture)	Mineral reserve (approx..) mentioning grade	Administrative block	Co-ordinate		Area within prohibited zone as per Rule 3 of 7 WBMNC Rules 2016	Infrastructure available near the mineralized zone
	Fire Clay/ Silica Sand)								22° 20' 1.724" N 22° 19' 57.690" N 22° 19' 49.608" N 22° 19' 46.267" N	86° 52' 46.815" E 86° 52' 48.619" E 86° 52' 51.907" E 86° 52' 33.847" E		
17	JH_LT_ZONE_09 (Laterite/ China clay/ Fire Clay/ Silica Sand)	3860.76	35	1081.01	Virgin	Aggricultural/ Forest land	Yet to explore	SANKRAIL	22° 17' 56.746" N 22° 18' 9.491" N 22° 14' 55.099" N 22° 14' 58.244" N	87° 6' 14.848" E 87° 11' 1.889" E 87° 10' 31.365" E 87° 7' 28.860" E	NO	AVAILABLE
18	JH_LT_ZONE_10 (Laterite/ China clay/ Fire Clay/ Silica Sand)	769.54	35	215.47	Virgin	Aggricultural/ Forest land	Yet to explore	JHARGRAM	22° 20' 14.584" N 22° 20' 24.944" N 22° 19' 4.745" N 22° 18' 37.224" N	86° 56' 14.977" E 86° 57' 30.954" E 86° 58' 17.914" E 86° 56' 30.024" E	NO	AVAILABLE
19	JH_LT_ZONE_11 (Laterite/ China clay/ Fire Clay/ Silica Sand)	27.56	35	7.72	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 34' 52.031" N 22° 34' 53.906" N 22° 34' 36.101" N 22° 34' 33.457" N	86° 48' 13.148" E 86° 48' 24.191" E 86° 48' 37.341" E 86° 48' 15.832" E	NO	AVAILABLE
20	JH_LT_ZONE_12 (Laterite/ China clay/ Fire Clay/ Silica Sand)	123.69	35	34.63	Virgin	Aggricultural/ Forest land	Yet to explore	GOPIBALLAVPUR-I	22° 7' 40.897" N 22° 7' 48.853" N 22° 7' 6.621" N 22° 7' 1.143" N	86° 53' 35.493" E 86° 54' 9.432" E 86° 54' 15.697" E 86° 53' 43.454" E	NO	AVAILABLE
21	JH_BR2_QV_ZONE_01 (Quartz Vein/ Pegmatite/ Quartz)	17.33	35	4.85	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 44' 56.108" N 22° 44' 56.318" N 22° 44' 55.821" N 22° 44' 43.307" N 22° 44' 43.348" N 22° 44' 44.085" N 22° 44' 49.541" N	86° 39' 54.748" E 86° 40' 2.204" E 86° 40' 11.836" E 86° 40' 10.544" E 86° 40' 2.904" E 86° 39' 56.989" E 86° 39' 55.248" E	NO	AVAILABLE
22	JH_BR2_QV_ZONE_02 (Quartz Vein/ Pegmatite/ Quartz)	39.01	35	10.92	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 41' 36.477" N 22° 41' 51.388" N 22° 41' 38.289" N 22° 41' 23.434" N	86° 35' 55.495" E 86° 36' 6.316" E 86° 36' 26.639" E 86° 36' 16.620" E	NO	AVAILABLE
23	JH_BR2_QV_ZONE_03 (Quartz Vein/ Pegmatite/ Quartz)	99.01	35	27.72	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 39' 25.194" N 22° 39' 31.502" N 22° 39' 12.093" N 22° 39' 17.106" N 22° 39' 11.358" N 22° 39' 0.736" N 22° 38' 45.170" N 22° 39' 2.235" N	86° 45' 4.803" E 86° 45' 19.720" E 86° 45' 27.406" E 86° 45' 49.450" E 86° 45' 50.959" E 86° 45' 54.510" E 86° 45' 20.690" E 86° 45' 13.066" E	NO	AVAILABLE
24	JH_BR2_QV_ZONE_04 (Quartz Vein/ Pegmatite/ Quartz)	82.51	35	23.1	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 39' 34.290" N 22° 39' 41.883" N 22° 39' 20.641" N 22° 39' 3.851" N	86° 45' 55.591" E 86° 46' 22.952" E 86° 46' 38.770" E 86° 46' 5.487" E	NO	AVAILABLE

Sr. No	Name of the Mineral (Zone-Code)	Area of mineralized zone (Ha)	Depth of mineralization (m)	Geological resource (mcum)	Whether virgin or partially excavated	Nature of land (whether free for mining/ forest / agriculture)	Mineral reserve (approx..) mentioning grade	Administrative block	Co-ordinate		Area within prohibited zone as per Rule 3 of 7 WBMNC Rules 2016	Infrastructure available near the mineralized zone
25	JH_QV_ZONE_05 (Quartz Vein/ Pegmatite/ Quartz)	1298.97	35	363.71	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 39' 57.247" N	86° 44' 12.469" E	NO	AVAILABLE
									22° 41' 47.002" N	86° 46' 3.313" E		
									22° 41' 26.446" N	86° 48' 3.209" E		
									22° 39' 37.251" N	86° 45' 46.975" E		
									22° 39' 32.635" N	86° 45' 12.371" E		
26	JH_BR2_QTZ_ZONE_01 (Quartz Vein/ Pegmatite/ Quartz)	442.8	35	123.98	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 36' 27.487" N	86° 43' 12.935" E	NO	AVAILABLE
									22° 36' 56.359" N	86° 42' 34.659" E		
									22° 37' 37.797" N	86° 43' 17.284" E		
									22° 38' 15.576" N	86° 43' 47.723" E		
									22° 38' 3.564" N	86° 44' 8.824" E		
									22° 37' 51.097" N	86° 44' 29.877" E		
									22° 37' 19.961" N	86° 43' 59.772" E		
27	JH_BR2_QTZ_ZONE_02 (Quartz Vein/ Pegmatite/ Quartz)	76.98	35	21.55	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 38' 32.095" N	86° 43' 55.224" E	NO	AVAILABLE
									22° 38' 34.262" N	86° 44' 0.752" E		
									22° 38' 36.679" N	86° 44' 5.908" E		
									22° 38' 49.781" N	86° 44' 38.505" E		
									22° 38' 31.842" N	86° 44' 46.241" E		
									22° 38' 23.388" N	86° 44' 31.784" E		
									22° 38' 23.329" N	86° 44' 14.725" E		
									22° 38' 16.636" N	86° 44' 1.315" E		
28	JH_BR2_QTZ_ZONE_03 (Quartz Vein/ Pegmatite/ Quartz)	17.1	35	4.79	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 38' 29.529" N	86° 49' 51.791" E	NO	AVAILABLE
									22° 38' 21.287" N	86° 50' 2.269" E		
									22° 38' 11.215" N	86° 49' 51.982" E		
									22° 38' 18.563" N	86° 49' 41.025" E		
29	JH_BR2_QTZ_ZONE_04 (Quartz Vein/ Pegmatite/ Quartz)	18.67	35	5.23	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 38' 58.345" N	86° 51' 2.282" E	NO	AVAILABLE
									22° 39' 6.818" N	86° 50' 52.246" E		
									22° 39' 18.867" N	86° 51' 1.164" E		
									22° 39' 9.100" N	86° 51' 12.850" E		
30	JH_BR2_QTZ_ZONE_05 (Quartz Vein/ Pegmatite/ Quartz)	157.95	35	44.23	Virgin	Aggricultural/ Forest land	Yet to explore	BINPUR-II	22° 37' 4.213" N	86° 42' 11.355" E	NO	AVAILABLE
									22° 37' 7.430" N	86° 42' 4.228" E		
									22° 37' 8.524" N	86° 42' 2.137" E		
									22° 37' 22.607" N	86° 41' 54.048" E		
									22° 37' 30.319" N	86° 42' 3.817" E		
									22° 37' 45.260" N	86° 42' 43.469" E		
									22° 37' 27.246" N	86° 43' 3.940" E		
									22° 36' 57.642" N	86° 42' 23.414" E		

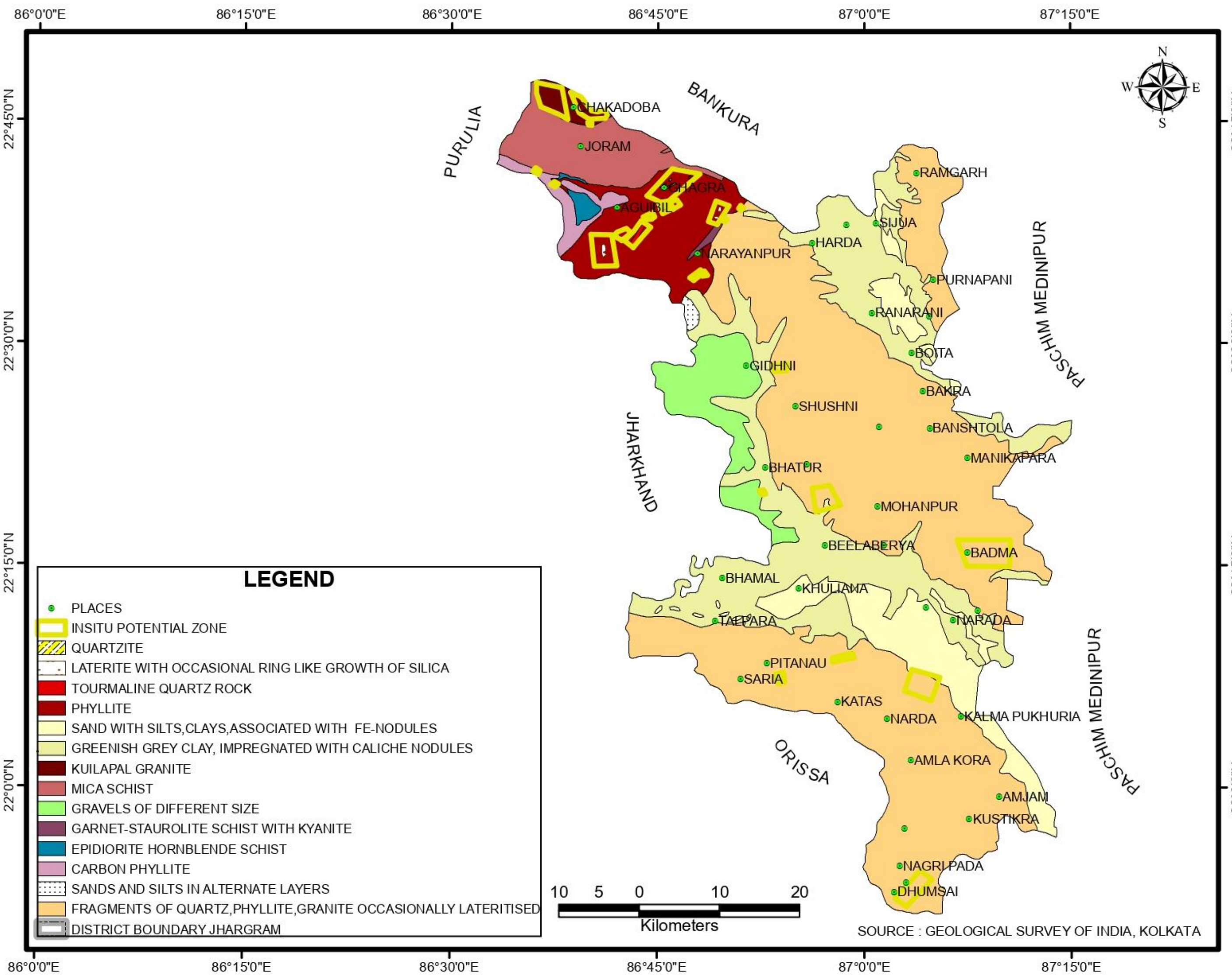


Figure 11.1: **In-situ mineral occurrences shown on geological map of Jhargram district (Source: GSI, 2007)**

11.3 Mineral development prospect of the district with respect to Minor Mineral

The district is not very rich in mineral reserve and there are no mines in the district. However, collections of sand, stone from the river-bed of the river terrain are the minor mineral sources. In this district some of big rivers are flowing like Kangsabati and Subarnarekha, so in this region it has been observed that the different geomorphic features like Alluvium Plain, Alluvial Fan etc, which are created by river deposition activity.In this region there is huge deposition of sand, clay has been found, so the sand mining or the sand industry should be the very useful for this district.

11.4 Exploration requirement of the district

In the district the sand industry might be very much useful. Therefore, there is a need more scientific sand mining procedure. So, the scope of sand Exploration in this district is very high. Also, it is highly recommended to conduct detailed exploration with respect to lateritic deposits reported in the major part of the district to establish mineral resources. Presence of quartzo-feldspathic rock, kaolinitic schist along with presence of Manganese need detailed exploration.

12 Remedial measure to mitigate the impact of mining

12.1 Environmental Sensitivity

Jhargram district represents a unique geo-environmental setup. As human population increases, forests are being depleted for the extension of agricultural lands, introduction of new settlements, roadways etc

Due to unprecedented growth of population during the last few decades, nature has started reacting sharply to the accumulated human guilt. Soil erosion and its conservation play an important role.

The land use practices play the most important role in determining the stability factors in respect of landslide hazards. Stone quarrying from the slope is another way of human intervention that causes occasional slope failure.

12.2 Sand mining Impact

Another serious environmental problem around the globe in recent years is of sand and gravel mining. Sand mining is a process of extraction of sand from an open pit, river bed, sea beaches, ocean floor, river banks, deltas and island dunes. The extracted sand could be utilised for various types of manufacturing, such as concrete used in the construction of building and other structures. The sand can also be used as an abrasive. The demand for sand will increase with population growth and urbanization. The high demand of sand has led to unsustainable sand mining process resulting in illegal mining.

Although most jurisdictions have legal limit on the location and volume of sand that can be mined, illegal sand extraction is taking place in many parts of the country due to rapid urbanisation and industrialisation.

Removal or extraction of too much sand from rivers leads to erosion of river banks. Deltas can recede due to sand mining. These destructive effects of sand mining ultimately results in loss of fertile land and property. It also destabilizes the ground and causes failure of engineering structures.

In-stream mining directly alters the channel geometry and bed elevation. Removing sediment from the channel disrupts the pre-existing balance between sediment supply and transporting capacity, typically inducing incision upstream and downstream of the extraction site. The resultant incision alters the frequency of floodplain inundation along the river courses, lowers valley floor water table and frequently leads to destruction of bridges and channelization structures.

Sand Mining in beaches disturbs the ecosystem of different fauna of the beaches. The sand mining from natural barriers, made up of sand, causes flooding of the natural habitat. The sand mining activity destroys the aesthetic beauty of beaches and river bank and makes the ecosystem unstable. If there are popular tourist destination, tourism potential of such areas will decline.

It can be concluded that there has been little in depth research on the environmental, social and political effects of land use practices and calls for urgent attention by the competent authority.

12.3 Remedial measure

12.3.1 Sustainable Mining Practices:

- The depth of mining in riverbed shall not exceed 3 meter or base flow level whichever is less, provided that where the Joint Inspection Committee certifies about excessive deposit or over accumulation of mineral in certain reaches requiring channelization, it can go above 3 meters.
- Mining shall be done in layers of 1 meter depth to avoid ponding effect and after first layer is excavated, the process will be repeated for the next layers.
- No stream should be diverted for the purpose of sand mining. No natural water course and/ or water resources are obstructed due to mining operations.
- No blasting shall be resorted to in river mining and without permission at any other place.

12.3.2 Monitoring the Mining of Mineral and its Transportation:

- For each mining lease site the access should be controlled in a way that vehicles carrying mineral from that area are tracked and accounted for.
- There should be regular monitoring of the mining activities in the State to ensure effective compliance of stipulated EC conditions and of the provisions under the Minor Mineral Concessions Rules framed by the State Government.

12.3.3 Noise Management:

- Noise arising out of mining and processing shall be abated and controlled at source to keep within permissible limit.
- Restricted sand mining operation has to be carried out between 6 am and 7 pm.

12.3.4 Air Pollution and Dust Management:

- The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly.
- Air pollution due to dust, exhaust emission or fumes during mining and processing phase should be controlled and kept in permissible limits specified under environmental laws.

- The mineral transportation shall be carried out through covered trucks only and the vehicles carrying the mineral shall not be overloaded. Wheel washing facility should be installed and used.

12.3.5Bio-Diversity Protection:

- Restoration of flora affected by mining should be done immediately. Five times the number of trees destroyed by mining to be planted preferably of indigenous species. Each EC holder shall have to undertake plantation of trees over at least 20% of the total area of lease in the same plot or plots utilised for such working.
- No mining lease shall be granted in the forest area without forest clearance in accordance with the provisions of the Forest Conservation Act, 1980 and the rules made there under.
- Protection of natural home of any wild animal shall have to be ensured.
- No felling of tree near quarry is allowed. For mining lease within 10km of the National Park / Sanctuary or in Eco-Sensitive Zone of the Protected Area, recommendation of Standing Committee of National Board of Wild Life (NBWL) have to be obtained as per the Hon'ble Supreme Court order in I.A. No. 460 of 2004.
- Spring sources should not be affected due to mining activities. Necessary protection measures are to be incorporated.

12.3.6 Management of Instability and Erosion:

- Removal, stacking and utilization of top soil should be ensured during mining. Where top soil cannot be used concurrently, it shall be stored separately for future use keeping in view that the bacterial organism should not die and should be spread nearby area.
- The EC should stipulate conditions for adequate steps to check soil erosion and control debris flow etc. by constructing engineering structures
- Use of oversize material to control erosion and movement of sediments
- No overhangs shall be allowed to be formed due to mining and mining shall not be allowed in area where subsidence of rocks is likely to occur due to steep angle of slope.
- No extraction of stone / boulder / sand in landslide prone areas.
- Controlled clearance of riparian vegetation to be undertaken.

12.3.7Waste Management:

- Site clearance and tidiness is very much needed to have less visual impact of mining.
- Dumping of waste shall be done in earmarked places as approved in Mining Plan.
- Rubbish burial shall not be done in the rivers.

12.3.8 Pollution Prevention:

- Take all possible precautions for the protection of environment and control of pollution.
- Effluent discharge should be kept to the minimum and it should meet the standards prescribed.

12.3.9 Protection of Infrastructure:

- Mining activities shall not be done for mine lease where mining can cause danger to site of flood protection works, places of cultural, religious, historical, and archeological importance.
- For carrying out mining in proximity to any bridge or embankment, appropriate safety zone should be worked out on case to case basis, taking into account the structural parameters, location aspects and flow rate, and no mining should be carried out in the safety zone so worked out.

Mining shall not be undertaken in a mining lease located in 300-500 meter of bridge, 300 meter upstream and downstream of water supply / irrigation scheme, 100 meters from the edge of National Highway and railway line, 50 meters from a reservoir, canal or building, 25 meter from the edge of State Highway and 10 meters from the edge of other roads except on special exemption by the Sub-Divisional level Joint Inspection Committee.

13 Suggested reclamation plan for already mined out areas

As per statute all mines/quarries are to be properly reclaimed before final closure of the mine. Reclamation plans should include:

a) A baseline survey of river cross section. The study of cross section is basis for delineating channel form. Cross-sections must be surveyed between two monumented endpoints set on the river banks, and elevations should be referenced based on benchmark set in the area;

b) The proposed mining cross-section data should be plotted over the baseline data to illustrate the vertical extent of the proposed excavation;

c) The cross-section of the replenished bar should be the same as the baseline data. This illustrates that the bar elevation after the bar is replenished will be the same as the bar before extraction;

d) A planimetric map showing the aerial extent of the excavation and extent of the riparian buffers;

e) A planting plan developed by a plant ecologist familiar with the flora of the river for any areas such as roads that need to be restored;

f) Each EC holder shall have to undertake plantation of trees over at least 20% of the total area of the plot or plots of land as subject to such working in accordance with a plan approved by the concerned Divisional Forest Officer holding jurisdiction, provided further the competent authority l.e, The Divisional Forest Officer may fix up norms for plantation of trees in a particular area regarding choice of species, spacing, nos of trees and maintenance etc.

f) A monitoring plan has to establish.

14 Risk assessment and disaster management plan

Risk analysis is the systematic study of risks encountered during various stages of mining operation. Risk analysis seek to identify the risks involved in mining operations, to understand how and when they arise, and estimate the impact (financial or otherwise) of adverse outcomes. The sand mining operation in the district is mainly done manually.

14.1 Identification of risk due to river sand mining

There is no land degradation due to mining activities as mining is done only on river bed dry surface. There will be no OB or waste generation as the sand is exposed in the river bed and is completely saleable. There will be neither any stacking of soil nor creation of OB dumps. The mining activity will be carried out upto a maximum depth of 3m below the surface level. So there is no chance of slope failure, bench failure in the mines. However there are some identified risks in the mining activity which are as follows:

1. Accident during sand loading and transportation
2. Inundation/ Flooding
3. Quick Sand Condition

14.2 Mitigation measures

14.2.1 Measures to prevent accidents during loading and transportation:

- During the loading, trucks should be brought to a lower level so that the loading operation suits the ergonomic condition of the workers.
- The workers will be provided with gloves and safety shoes during loading.
- Opening of the side covers of the truck should be done carefully and with warning to prevent injury to the loaders.
- Mining operations will be done during daylight only.
- The truck will be covered with tarpaulin and maintained to prevent any spillage.
- To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all areas for reversing of lorries should be made man free as far as possible.
- All transportation within the main working will be carried out directly under the supervision and control of the management.
- Overloading should not be permitted and the maximum permissible speed limit should be ensured.
- There will be regular maintenance of the trucks and the drivers will have valid driving license.

14.2.2 Measures to prevent incidents during Inundation/ Flooding:

To minimize the risk of flooding/ inundation following measures should be under taken:

- Mining will be completely closed during the monsoon months.
- Proper weather information particularly on rain should be kept during the operational period of mines so that precautionary measures will be undertaken.

14.2.3 Measures for mitigation to quick sand condition:

- Quick sand zone and deep water zone will be clearly demarcated and all the mine workers will be made aware of the location.
- Mining will be done strictly as per the approved mining plan.

14.3 Disaster management plan

As the depth of mining will be maximum of 3m below the surface level considering local condition, the risk related to mining activity is much less. The mining operation will be carried out under the supervision of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS. All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955 and other laws applicable to mine will strictly be complied. During heavy rainfall and during the monsoon season the mining activities will be closed. Proper coordination with Irrigation Department should be maintained so that at the time of releasing water, if any, from the dam suitable warning/information is given in advance. Special attention and requisite precautions shall be taken while working in areas of geological weakness like existence of slip, fault etc. The mining site will be supplied with first aid facilities and the entire mines worker will have access to that.

15 Conclusions and Recommendations

The District Survey Report has been prepared in conformity with the S O 141 (E), S O 3611 (E) and other sand mining guidelines published by MoEF&CC time to time as well as the requirement specified in WBMMCR, 2016.

Potential areas of economic mineralization and mineral deposition have been identified and list is furnished in the report. Estimation of annual sand deposition by replenishment study has been incorporated in the report.

The district survey report has been prepared by utilizing both primary and secondary data. The primary data generation involved the satellite imagery study, site inspection, survey, ground truthing etc. while secondary data has been acquired through various authenticated sources and satellite imagery studies.

The land surface of the district is characterized by hard rock uplands, lateritic covered area, flat alluvial and deltaic plains. Rugged topography is seen in most part of the district and rolling topography has also been observed in the lateritic covered area. Landform of the district showing gradual decline in elevation from northe-west to east and south-east.

The district is characterized by a humid tropical monsoon climate. The average annual rainfall in the district is 1485mm (2016-2020).

The district falls under the Seismic Zone II, indicating the district is under safe earthquake–prone zone.

Jhargram district does not hold huge minerals deposits. Lateritic rocks are found in many parts of the district. The extracted laterite is used for various purposes. Quartzo-feldspathic rock, keolinitic schist, manganese bearing rocks are also noted in the north-western part of the district.

The district is generating considerable revenue from mining minor minerals such as riverbed sand deposits. Revenue generated in the district of Jhargram from minor minerals during the period of 2017 to 2022 is Rs. 107.43 crores.

The district has an upside potential for the development of riverbed sand. The occurrence has been reported by the Directorate of Mines and Minerals, Government of West Bengal and others in previous instances. It requires further systematic and scientific approach to quantify the resource along with their grade assessment. The occurrences are mostly observed in the Kangsabati and Subarnarekha River. This report also recommends undertaking detail exploration (G2 level) program to assess the mineral occurrences in the major rivers of the district and should have a proper development and production plan for the specified minerals.

15.1. Conclusion

I. The riverbeds of the district are enriched with sand which is highly potential for mining.

II. The replenishment study has been carried out during the preparation of this DSR. Both field-based surveys coupled with satellite imagery study and empirical studies were carried out to determine the rate of replenishment in each river of the district.

III. The determined values of various methods as adopted for replenishment study gives a comparable value and in all cases the values are found to be much more as compared to the capping limit (60%) as suggested in the Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) January 2020, Issued by Ministry of Environment, Forest and Climate Change (MoEF&CC) 2020.

IV. Field base study shows variation of replenishment from 97.5 to 98.5% in the district with an average of 98.15% and for theoretical replenishment study based on mining lease shows variation from 73.5% to 76% with an average of 74.50% of replenishment rate in the district.

V. The total potential riverbed deposit for the district comes to about 108.63 Mcum and a total 30 in-situ minor mineral potential blocks have been identified in the district.

15.2. Recommendation:

1. The mining lease distribution for the district must be carried out by involving a district level committee constituted with inter-disciplinary members of various department including irrigation and waterways, DL&LRO, forest, biodiversity, wetland management, SWID or any other relevant department which the district authority may find suitable to include.
2. While recommending for Mining Leases, the District Level Committee should ensure the protection of Biodiversity Zones as recorded by relevant Government Agenesis from time to time.
3. During finalization of mining leases for the district, strict adherence of Supreme Court orders No 1501 dated 03/06/2022 should be followed.
4. Efforts should be given to restrict distribution of mining leases along the confluence zone of the rivers where rich aquatic habitats are reported.
5. Since the state of West Bengal has royalty system in volumetric measurement, specific gravity for sand and gravel has not been determined during this study. However, during the finalization of mining lease if it is found necessary such test may be initiated by the state government on case-to-case basis.
6. It is recommended to have a periodical review along with primary data collection during pre - and post-monsoon periods to record the seasonal variance of the sedimentation rate on annual basis and update replenishment rate of the district.

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PLATE 1

DRAINAGE MAP OF THE DISTRICT

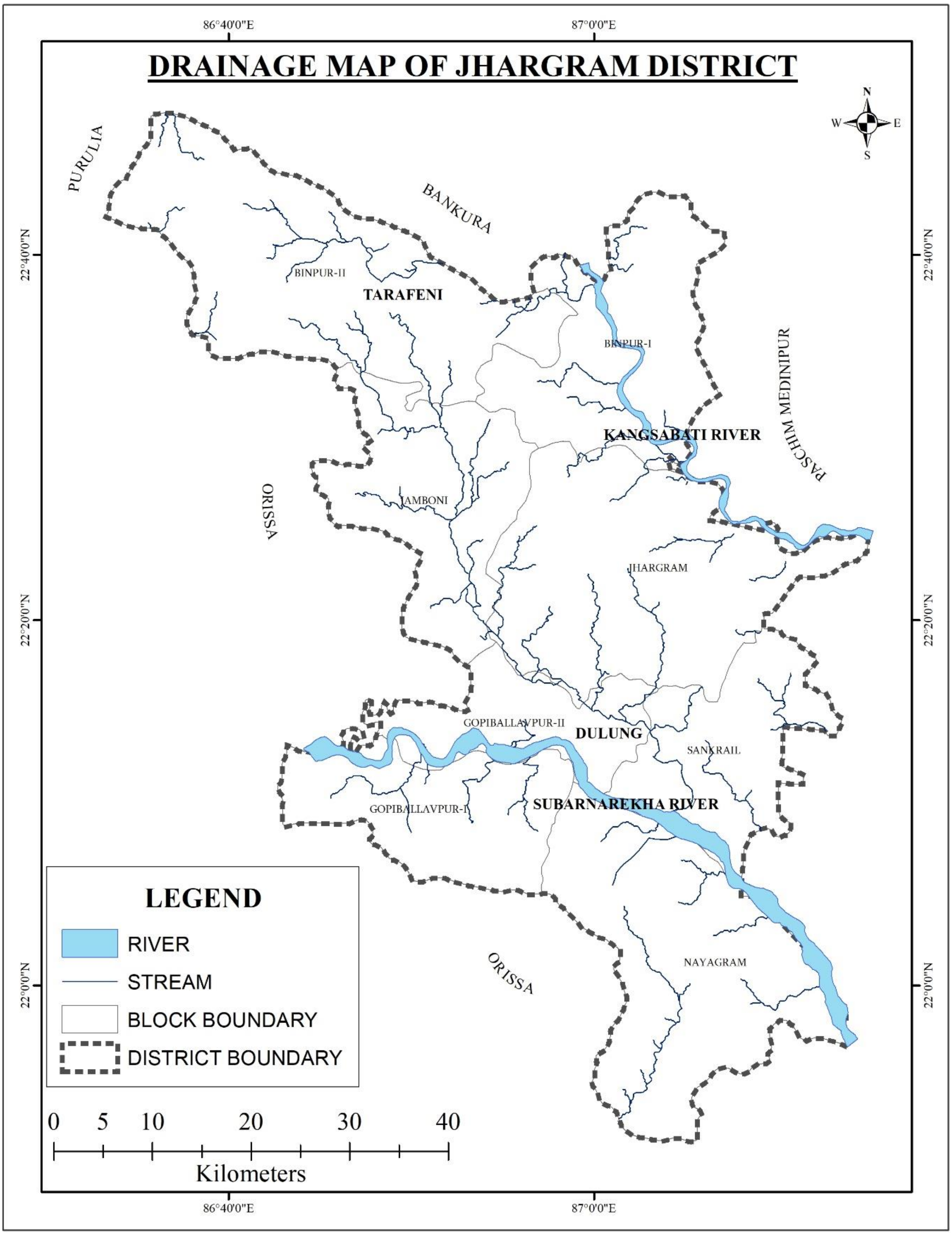


Plate 1A: Drainage Map of the District *(Source: National Informatics Centre -NIC Website, Sept 2020)*

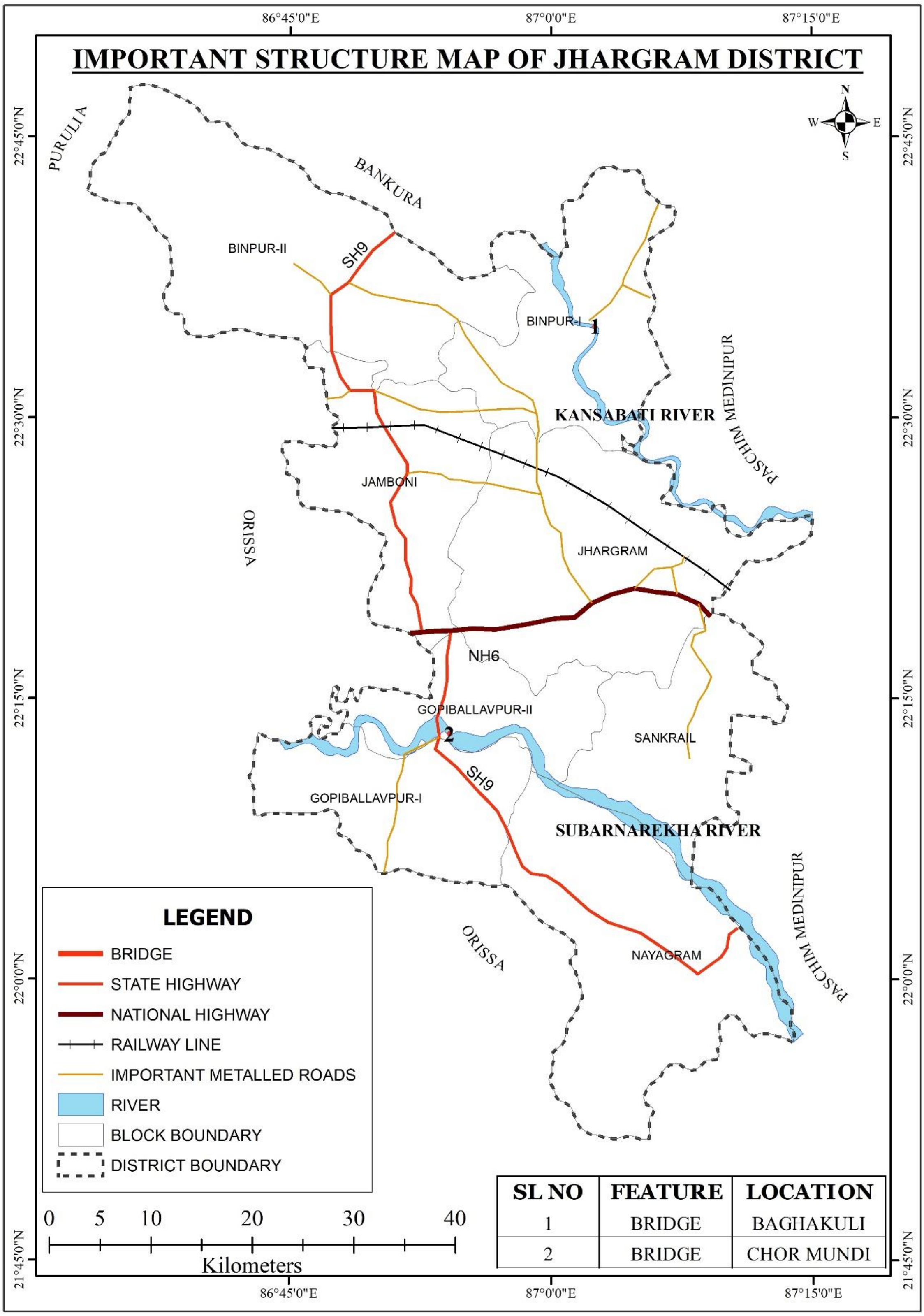


Plate No 1B: Location Map of dams, barrages, bridge showing on drainage system of the district *(Source: National Informatics Centre -NIC Website, Sept 2020)*

PLATE 2A

DISTRIBUTION MAP OF SAND BARS ON RIVERS DURING PRE-MONSOON PERIOD OF JHARGRAM DISTRICT

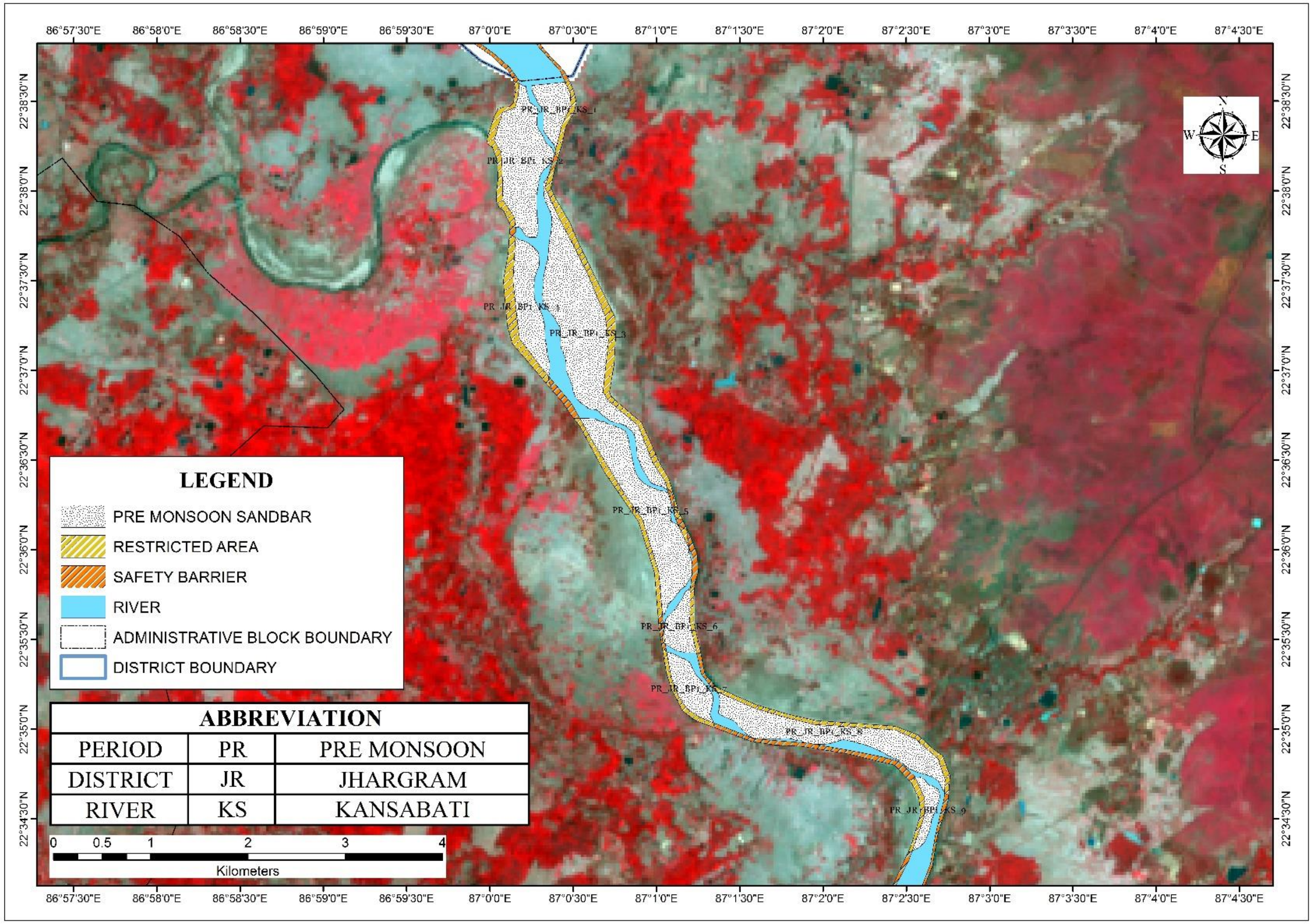


Plate 2A1: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

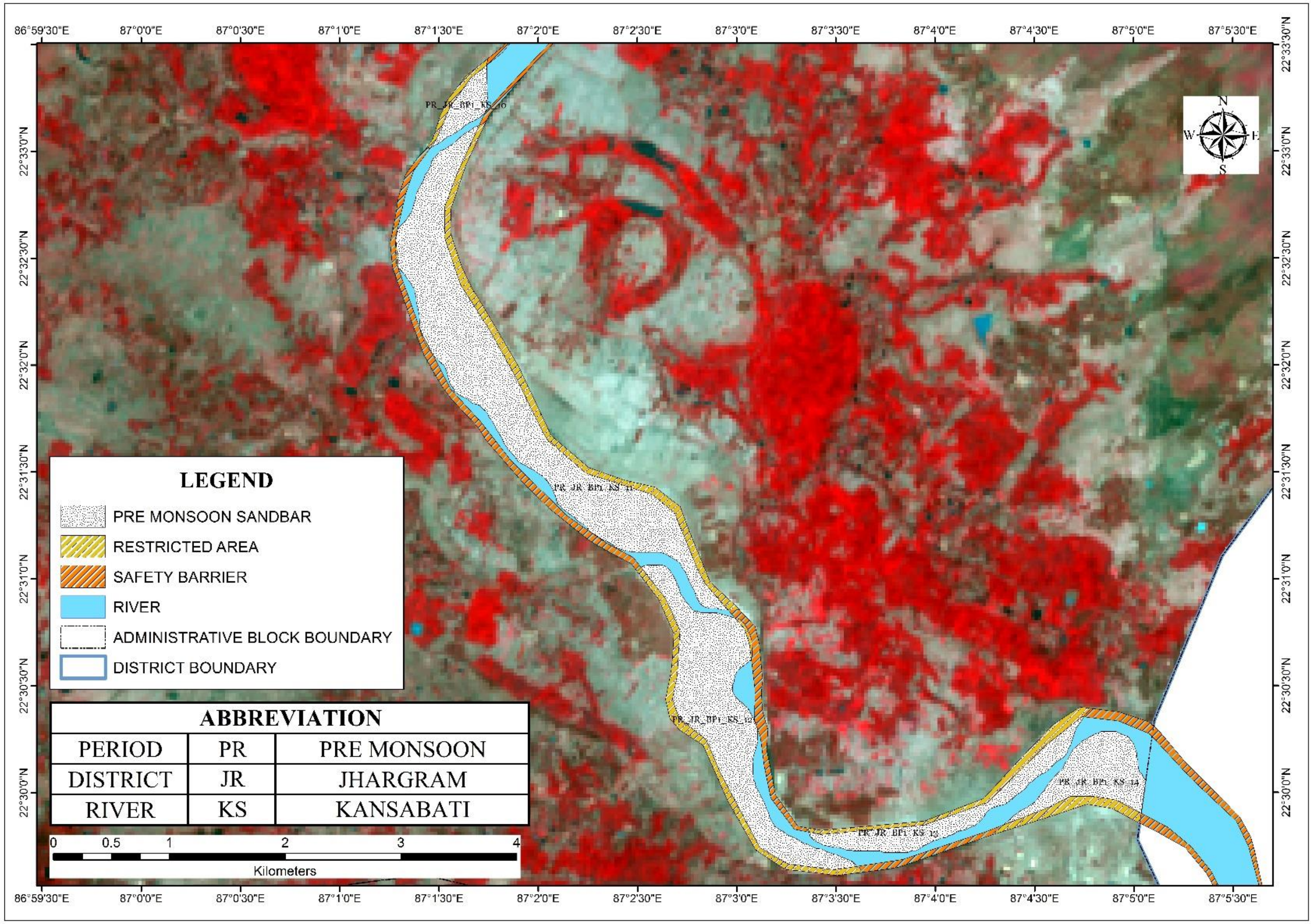


Plate 2A2: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

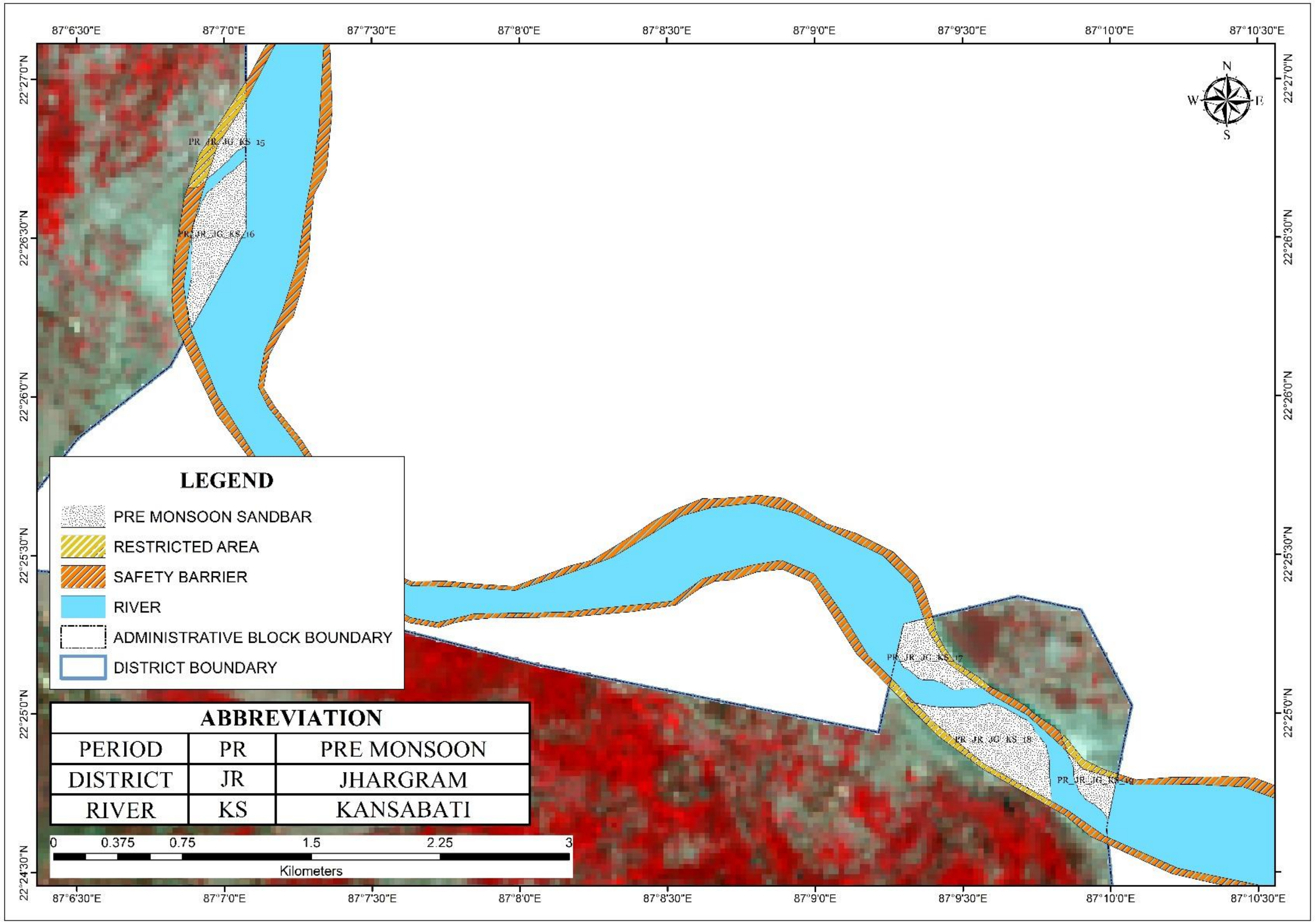


Plate 2A3: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

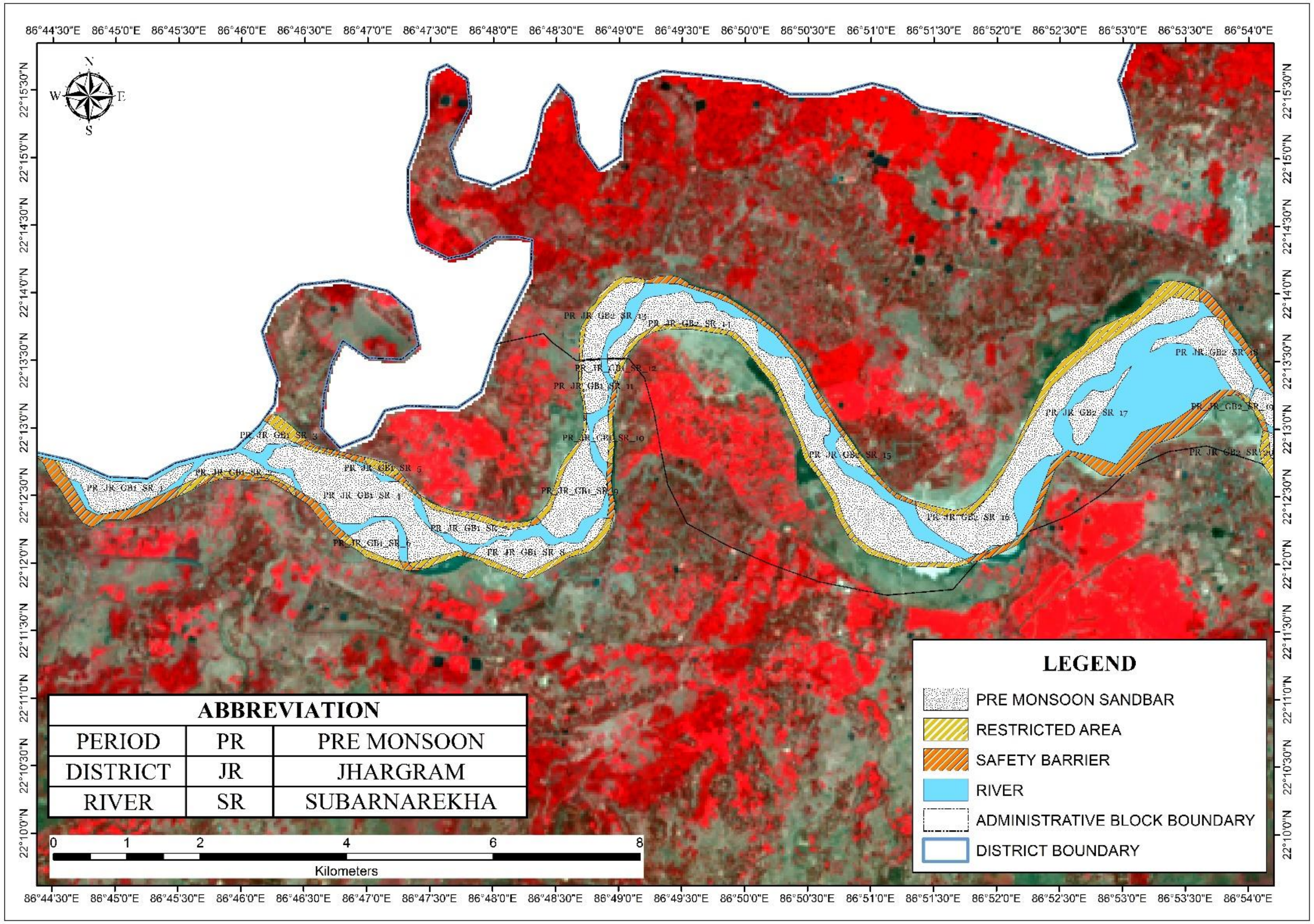


Plate 2A4: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

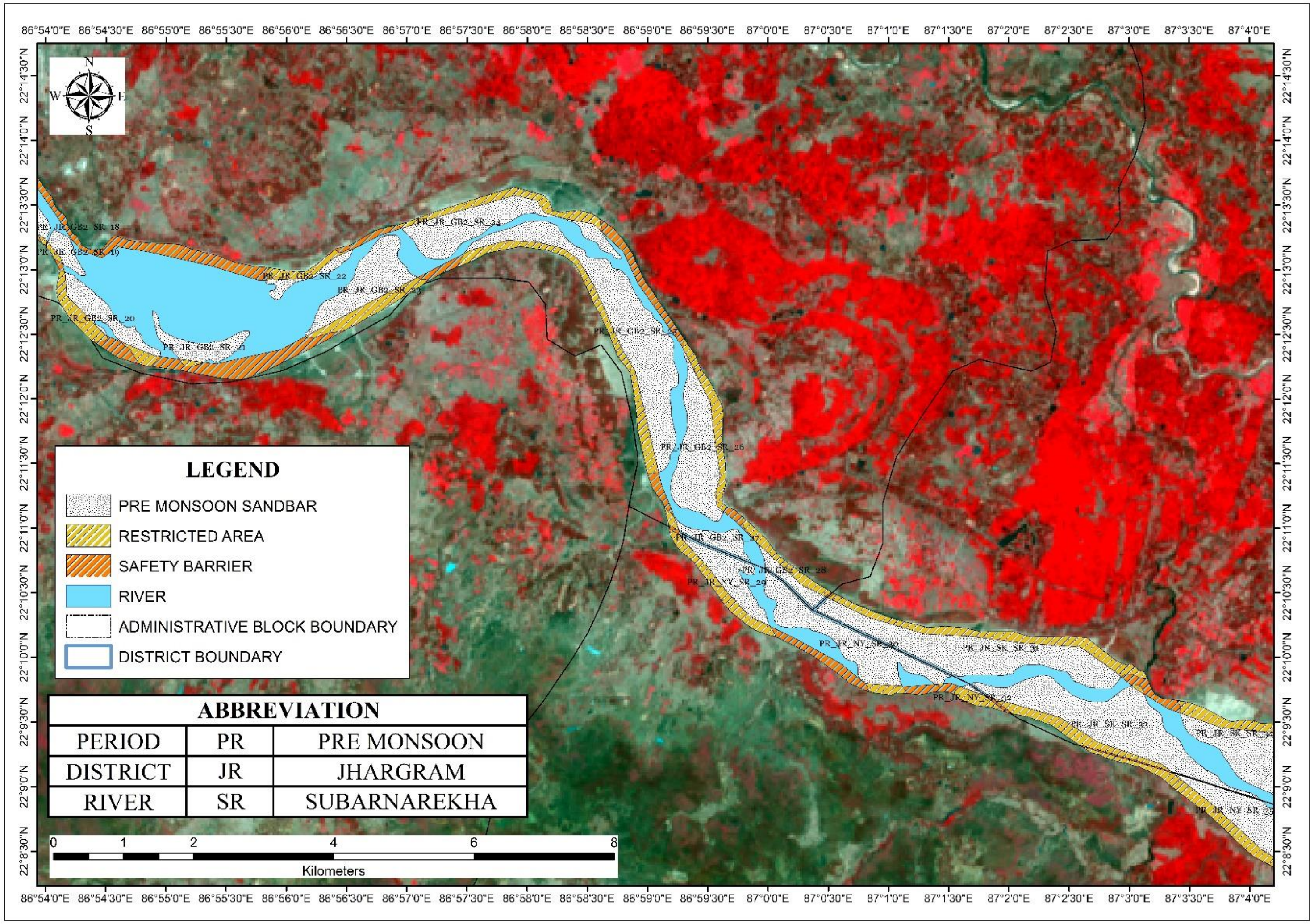


Plate 2A5: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

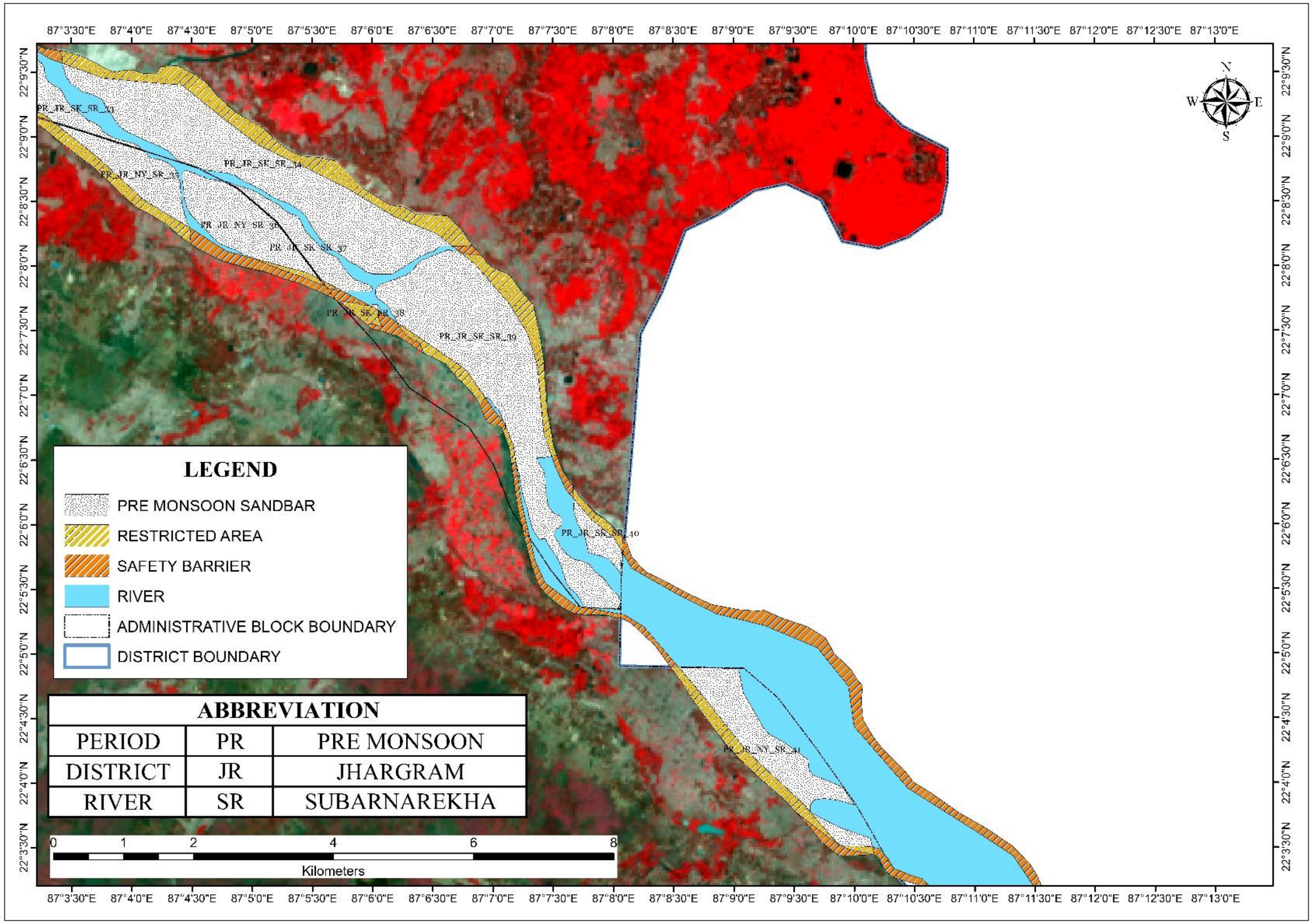


Plate 2A6: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

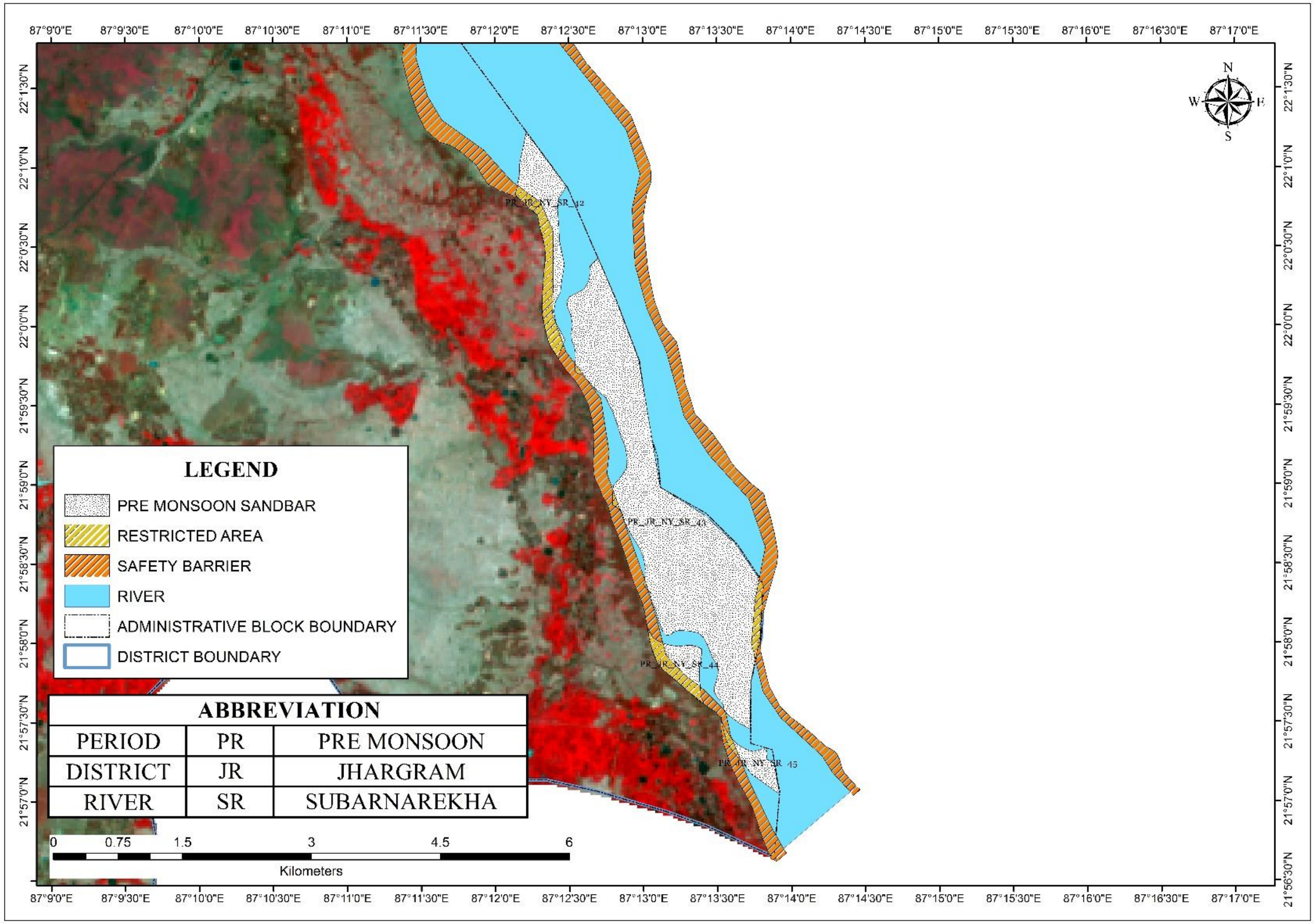


Plate 2A7: Distribution Map of Sand Bars on Rivers During Pre-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, March 2020)*

PLATE 2B

DISTRIBUTION MAP OF SAND BARS ON RIVERS DURING POST-MONSOON PERIOD OF JHARGRAM DISTRICT

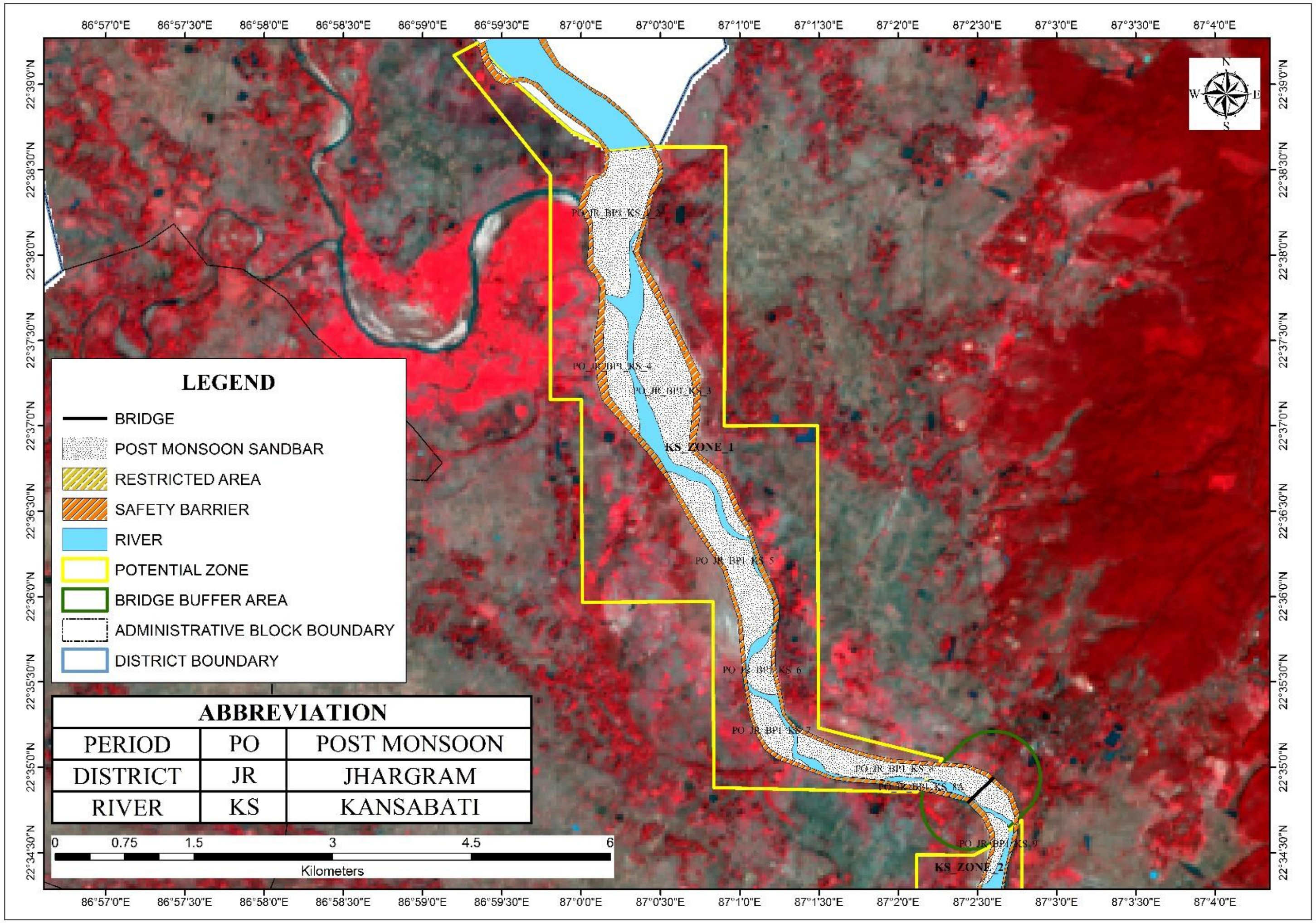


Plate 2B1: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

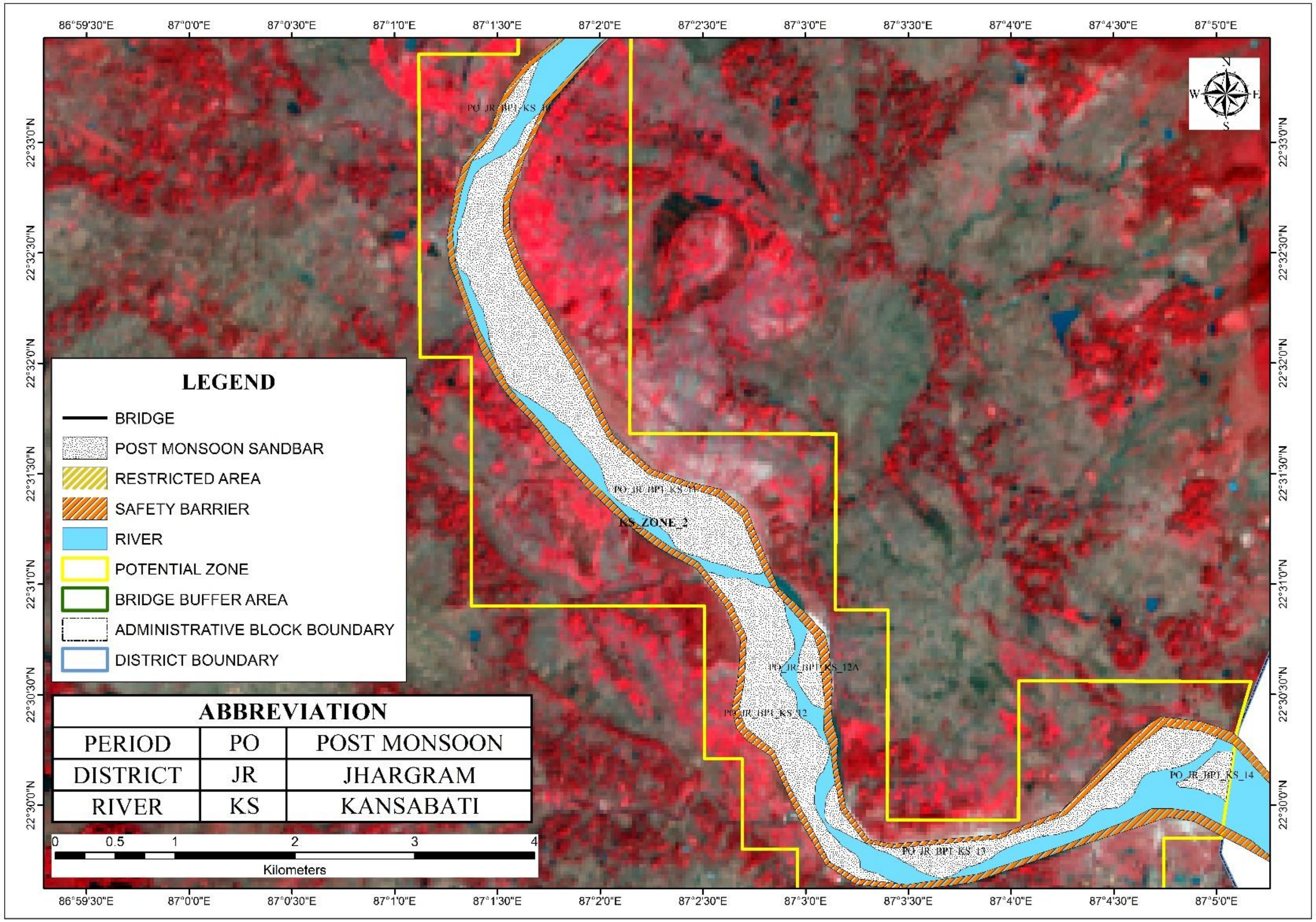


Plate 2B2: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

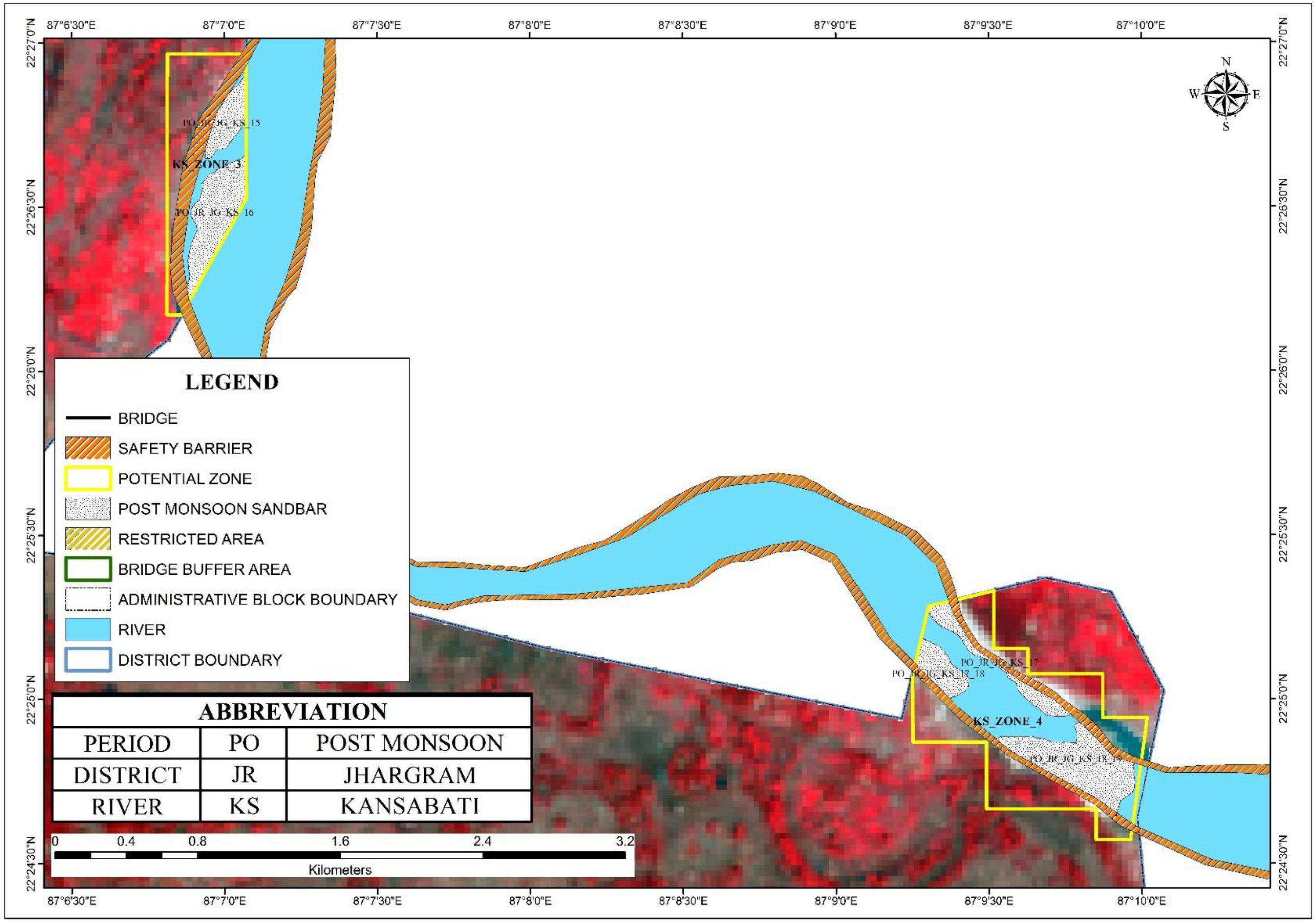


Plate 2B3: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

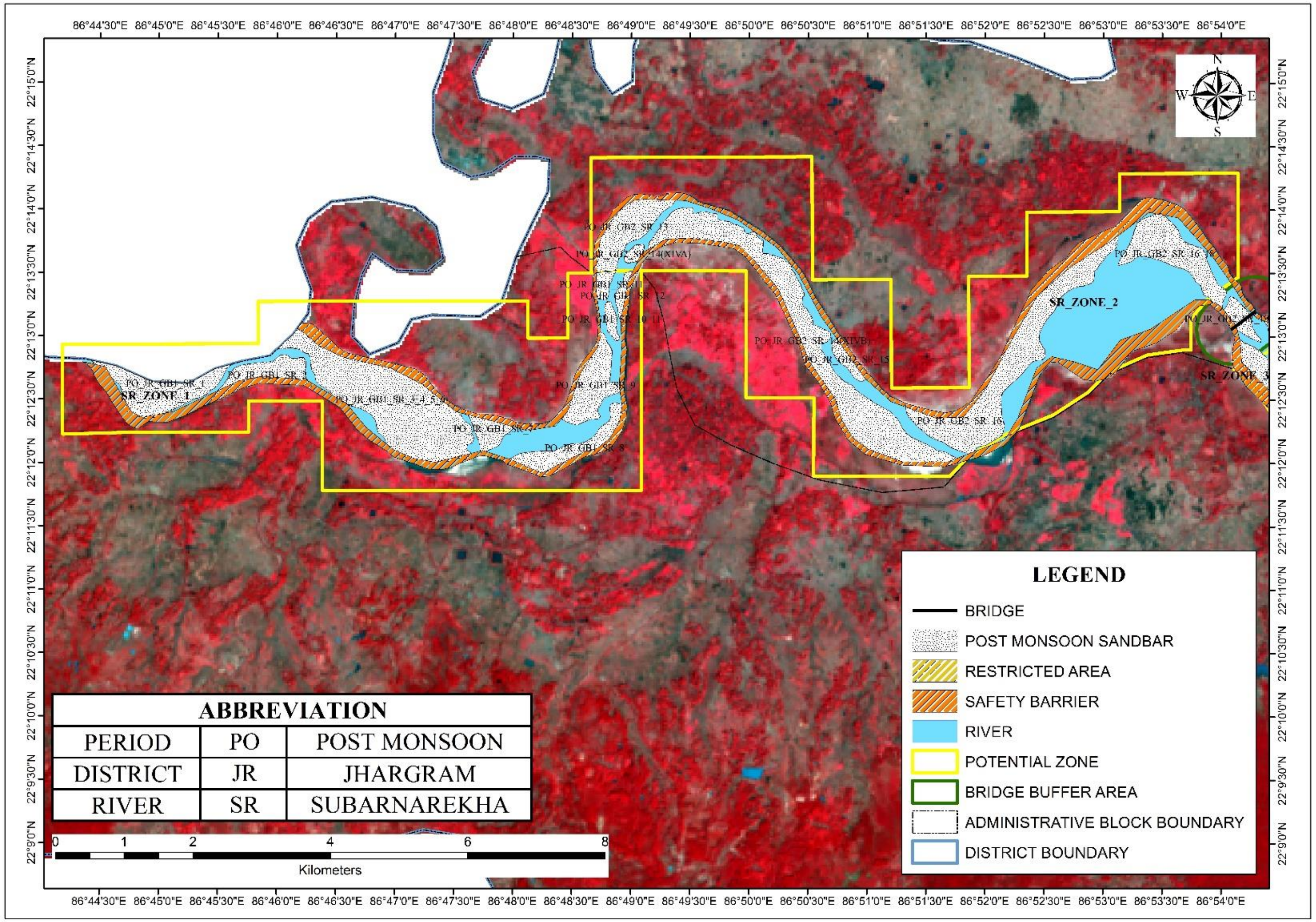


Plate 2B4: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

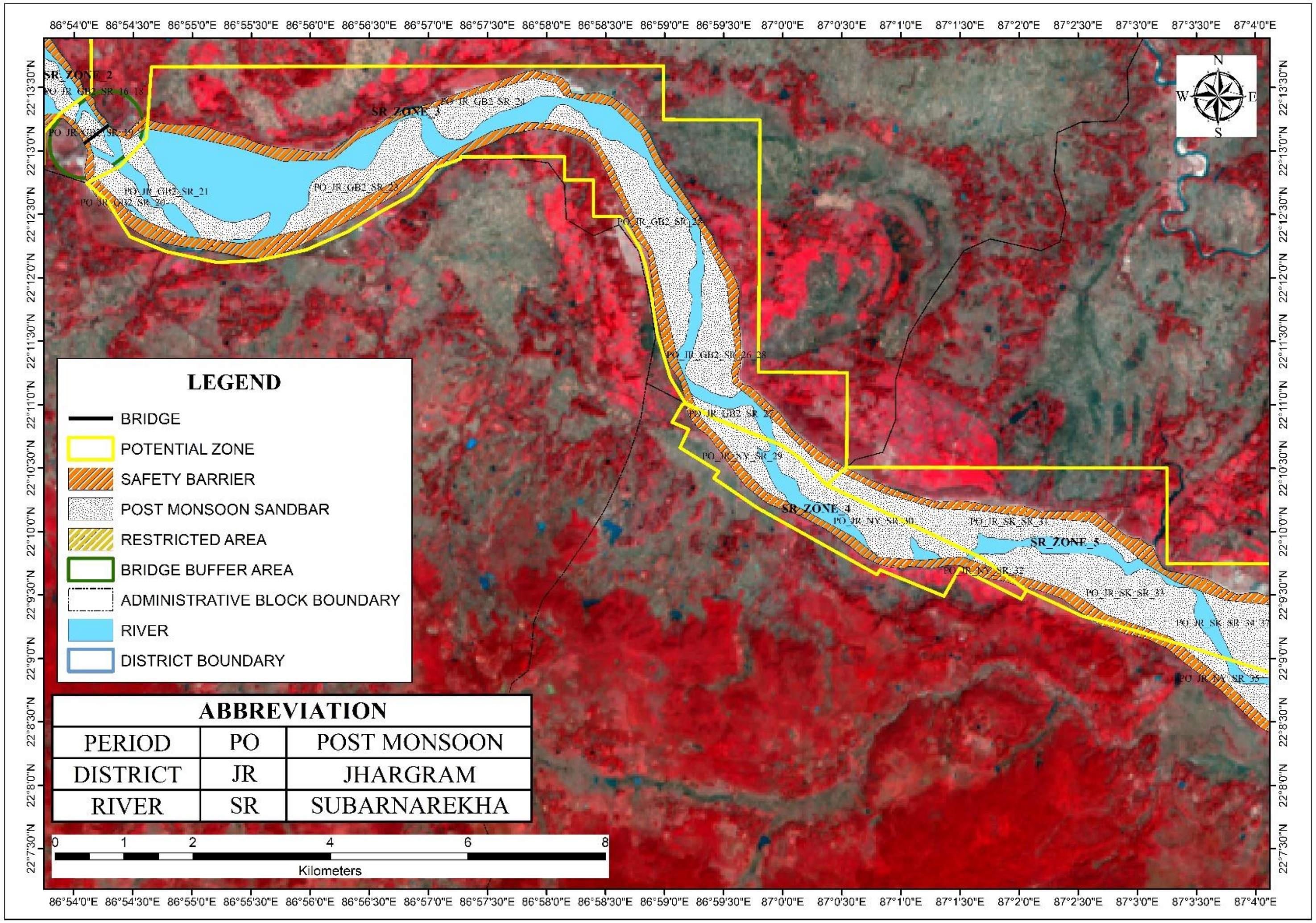


Plate 2B5: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

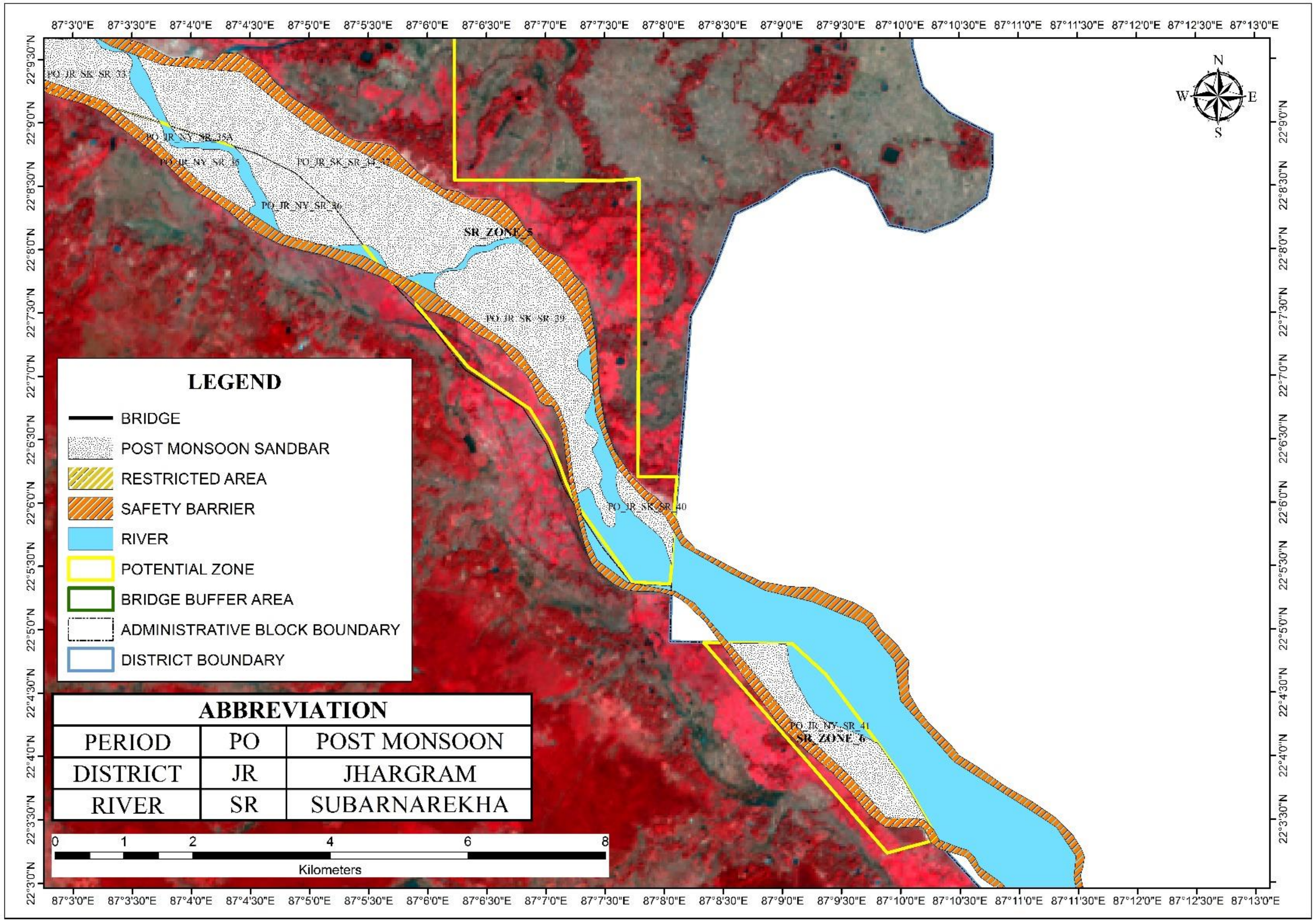


Plate 2B6: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

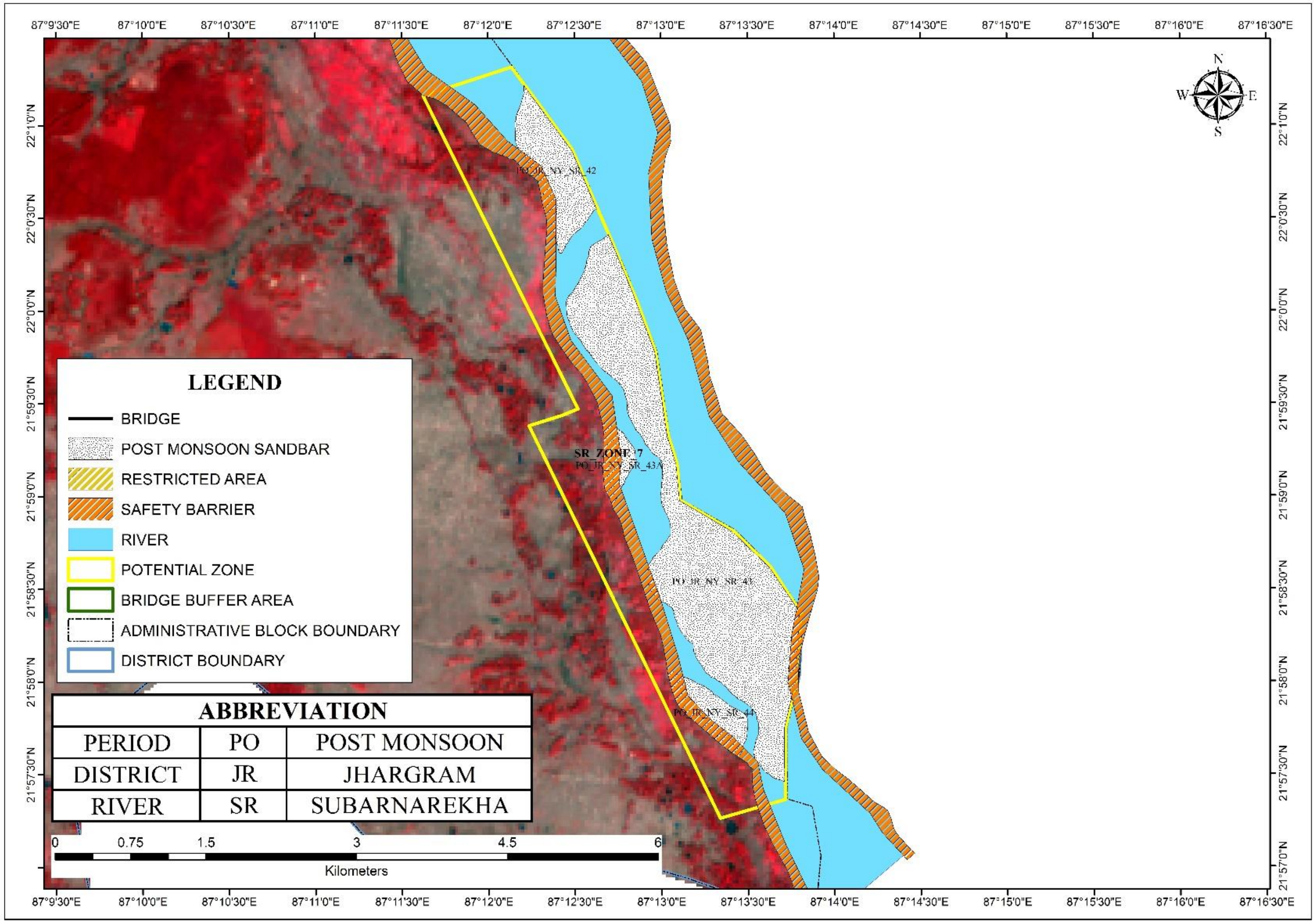


Plate 2B7: Distribution Map of Sand Bars on Rivers During Post-Monsoon Period of Jhargram District *(Source: ISRO RESOURCE Sat 2 LISS III Sensor, November 2020)*

PLATE 3

WATERSHED MAP OF THE DISTRICT

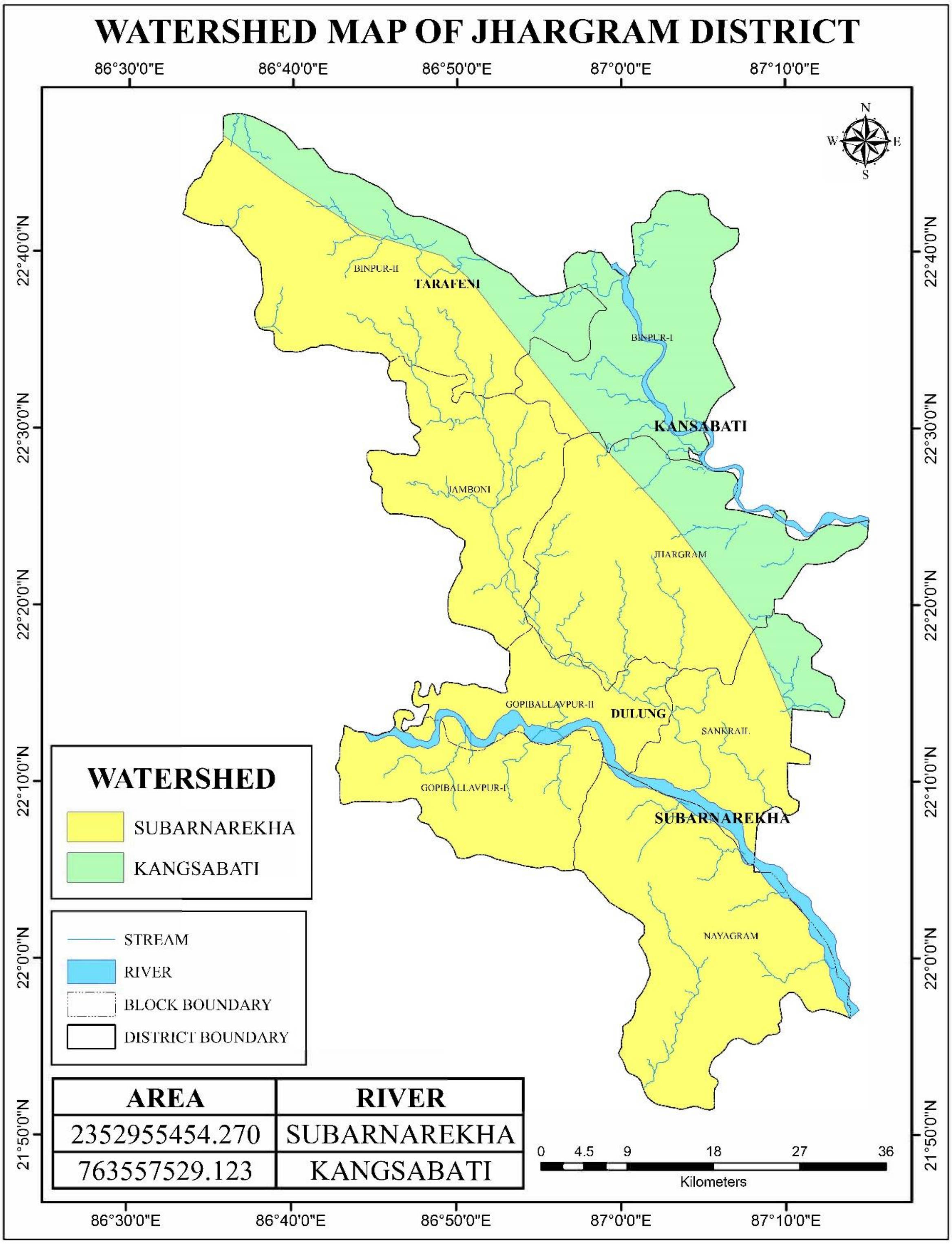


Plate 3A: Watershed Map of Jhargram District *(Source: World Wild Fund for Nature, September 2020)*

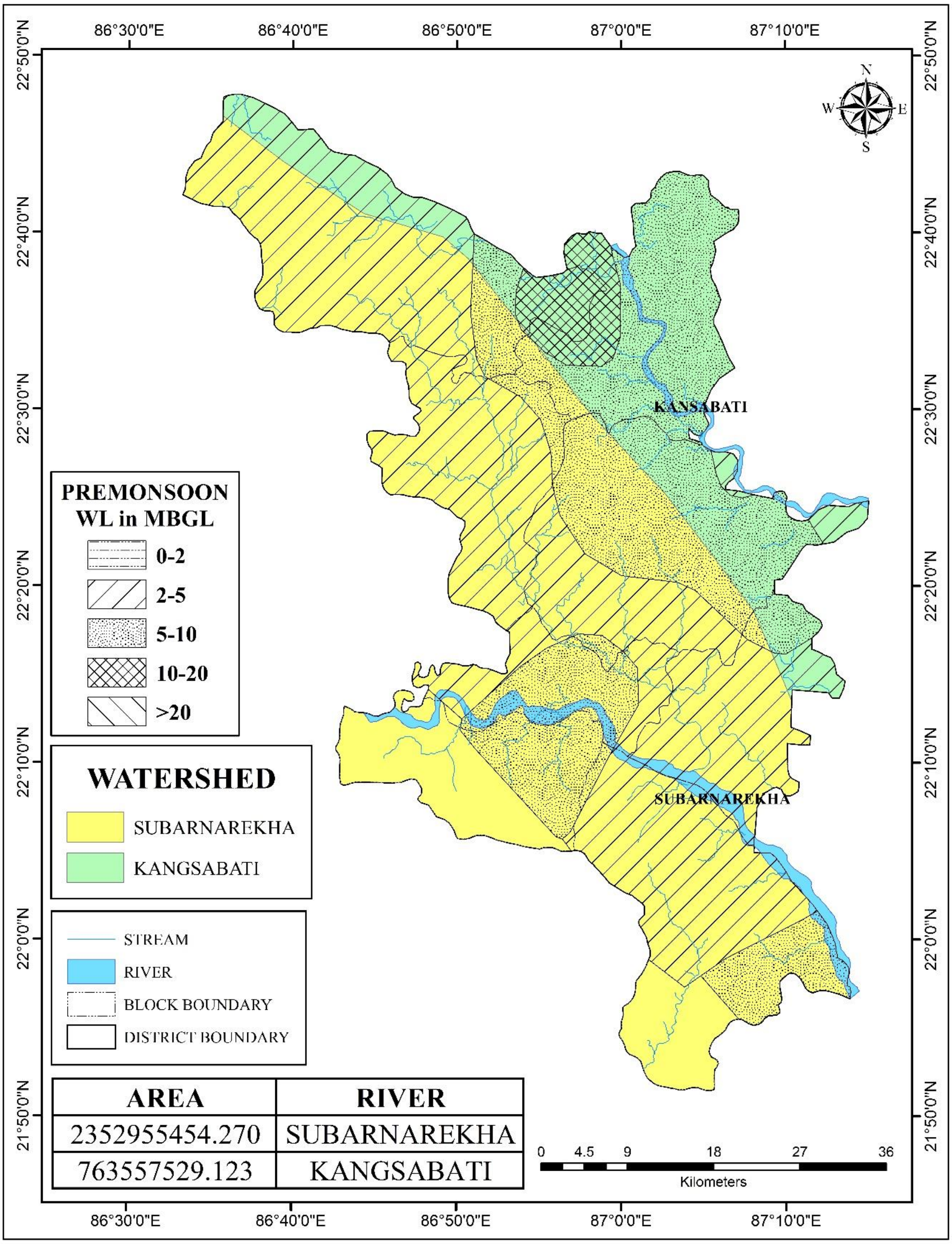


Plate 3B: District Watershed map showing ground water level during Pre-monsoon period *(Source: World Wild Fund for Nature, September 2020)*

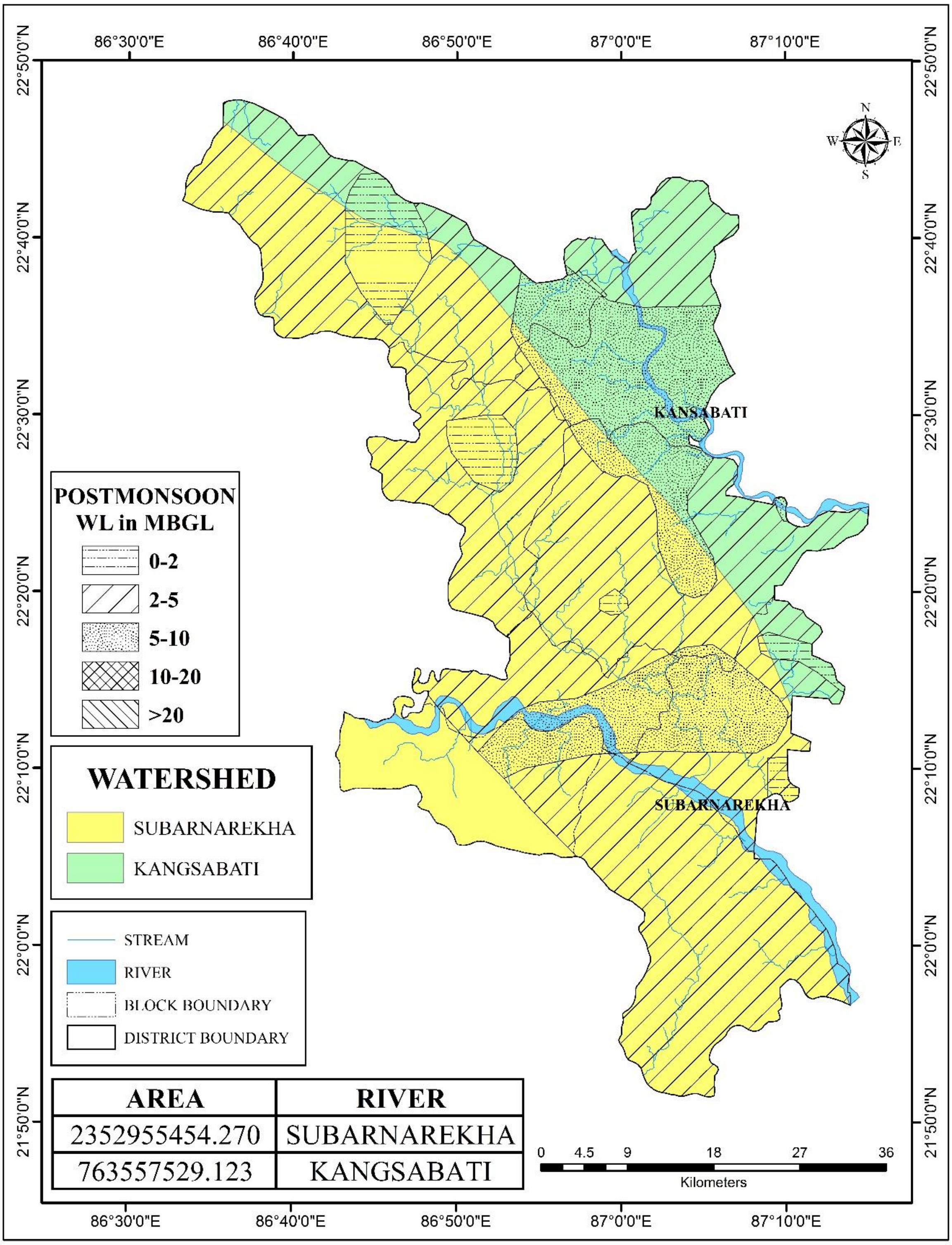


Plate 3C: District Watershed map showing ground water level during Post-monsoon period *(Source: World Wild Fund for Nature, September 2020)*

PLATE 4

FIELD SURVEY PHOTOGRAPHS

	
4A: Picture of Kangasabati Riverbed deposit (Date: 15-05-22, Lat: 22° 26' 49" N and Long: 87° 7' 1" E)	4B: Picture of Subarnarekha Riverbed deposit (Date: 15-05-22, Lat: 22° 12" N and Long: 86° 44' 46" E)

PLATE 5

LONG TERM EROSION-ACCRETION MAP OF RIVER BANK

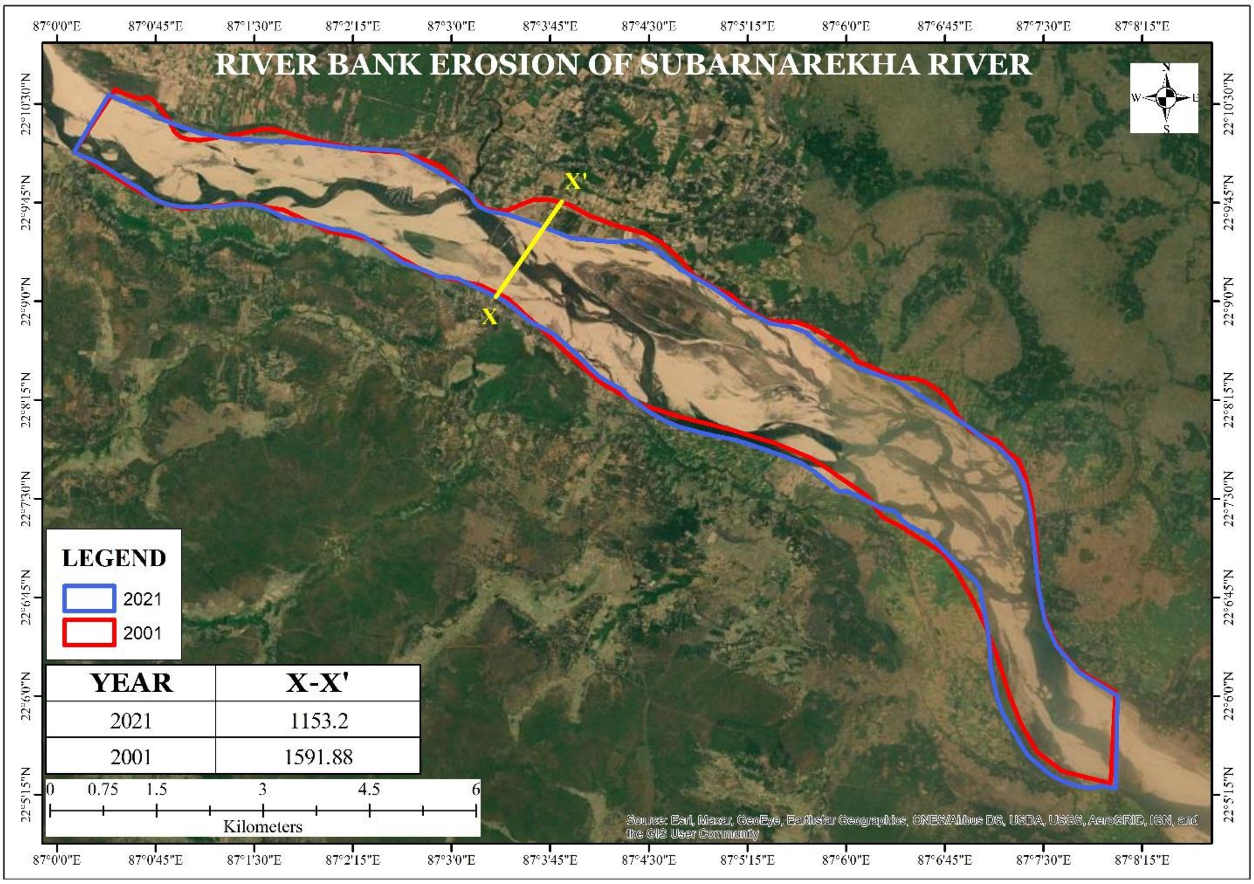


Plate 5: Map showing long-term (10-year or more) erosion-accretion areas on both the banks of Subarnarekha River, Jhargram *(Source: ISRO RESOURCE Sat 2 LISS III Sensor)*

PLATE 6

GEOLOGICAL MAP OF JHARGRAM

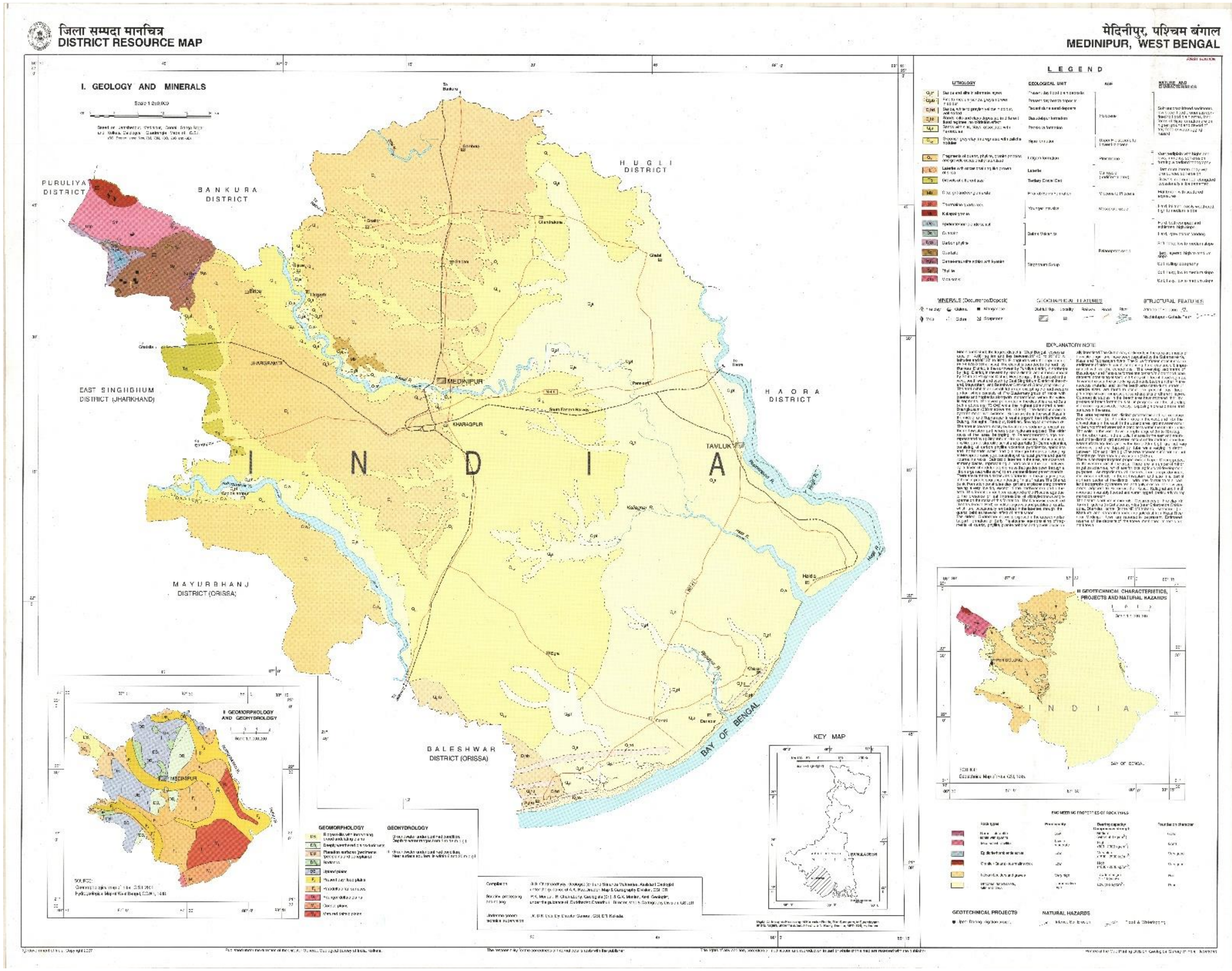


Plate 5: Geological Map Un-divided Medinipur district (Source: GSI 2007)

Annexure 1

Compliance as per Enforcement & Monitoring Guidelines for sand Mining, 2020 (MoEF& CC) for preparation of District Survey Report

Sl. No.	Particulars	Status
1	District Survey Report for sand mining shall be prepared before the auction/e-auction/grant of the mining lease/Letter of Intent (LoI) by Mining department or department dealing the mining activity in respective states.	Noted.
2	In order to make the inventory of River Bed Material, a detailed survey of the district needs to be carried out, to identify the source of River Bed Material and alternative source of sand (M-Sand). The source will include rivers, de-siltation of reservoir/dams, Patta lands/Khatedari Land, M-sand etc.	Complied with and explained in Chapter 7 pg no 49 to 79.
3	District Survey Report is to be prepared in such a way that it not only identifies the mineral-bearing area but also define the mining and no mining zones considering various environmental and social factors.	Complied with and furnished in pg no 72-73.
4	Identification of the source of Sand & M-Sand. The sources may be from Rivers, Lakes, Ponds, Dams, De-silting locations, Patta land/Khtedari lands. The details in case of Rivers such as [name, length of river, type (Perennial or Non-Perennial), Villages, Tehsil, District], in case of Lakes, Ponds, Dams, De-silting locations [Name, owned/maintained by (State Govt./PSU), area, Villages, Tehsil, District] in case of Patta land/Khtedari lands [Owner Name, Sy No, Area, Agricultural/Non-Agricultural, Villages, Tehsil, District], in case of M-Sand Plant [Owner Name, Sy No, Area, Quantity/Annum, Villages, Tehsil, District], needs to be recorded .	Complied with and given in table 7.4 pg 57.
5	Defining the sources of Sand/M-Sand in the district is the next step for identification of the potential area of deposition/aggradation wherein mining lease could be granted. Detailed survey needs to be carried out for quantification of minerals. The purpose of mining in the river bed is for channelization of rivers so as to avoid the possibility of flooding and to maintain the flow of the rivers. For this, the entire river stretch needs to be surveyed and original ground level (OGL) to be recorded and area of aggradation/deposition needs to be ascertained by comparing the level difference between the outside riverbed OGL and water level. Once the area of aggradation/deposition is identified, then the quantity of River Bed Material available needs to be calculated. The next step is channelization of the river bed and for this central ¾th part of the river, width needs to be identified on a map. Out of the ¾th part area, where there is a deposition/aggradation of the material needs to be identified. The remaining ¼th area needs to be kept as no mining zone for the protection of banks. The specific gravity of the material also needs to be ascertained by analyzing the sample from a NABL accredited lab. Thus, the quantity of material available in metric ton needs to be calculated for mining and no mining zone.	Complied with and given in table 7.15 pg 71.

Sl. No.	Particulars	Status
6	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 each side of the bank shall not be more than 100 meters.	Benchmark Pillars are established in strategic locations while boundary pillars will be fixed while fixation of the mining lease boundary subsequent to district level verification.
7	Identifying the mining and no mining zone shall follow with defining the area of sensitivity by ascertaining the distance of the mining area from the protected area, forest, bridges, important structures, habitation etc. and based on the sensitivity the area needs to be defined in sensitive and non-sensitive area.	Complied with and furnished in pg no 72 to 73.
8	Demand and supply of the Riverbed Material through market survey needs to be carried out. In addition to this future demand for the next 5 years also needs to be considered.	Complied with and given in pg no 10-11.
9	It is suggested that as far as possible the sensitive areas should be avoided for mining, unless local safety condition arises. Such deviation shall be temporary & shall not be a permanent feature.	Complied with and furnished in pg no 72 to 73.
10	Sand and gravel could be extracted from the downstream of the sand bar at river bends. Retaining the upstream one to two-thirds of the bar and riparian vegetation is accepted as a method to promote channel stability.	Noted. The DSR is composing of all the potential sand zones for defining the resources. In a subsequent phase blocking of potential zones shall be done in due consultation with the district level committee. The areas mentioned in the observation points shall be excluded while blocking of sand mining leases which are part of these potential zones marked in this DSR.
11	The final area selected for the mining should be then divided into mining lease as per the requirement of State Government. It is suggested the mining lease area should be so selected as to cover the entire deposition area. Dividing a large area of deposition/aggradation into smaller mining leases should be avoided as it leads to loss of mineral and indirectly promote illegal mining.	Shall be Complied with.
12	Cluster situation shall be examined. A cluster is formed when one mining lease of homogenous mineral is within 500 meters of the other mining lease. In order to reduce the cluster formation mining lease size should be defined in such a way that distance between any two clusters preferably should not be less than 2.5 Km. Mining lease should be defined in such a way that the total area of the mining leases in a cluster should not be more than 10 Ha.	Noted. Due care will be taken while distribution of mining leases either to prevent cluster situation or keeping the prescribed distance in-between two mining clusters.
13	The number of a contiguous cluster needs to be ascertained. Contiguous cluster is formed when one cluster is at a distance of 2.5 Km from the other cluster.	Noted and shall be complied with.

Sl. No.	Particulars	Status
14	The mining outside the riverbed on Patta land/Khatedari land be granted when there is possibility of replenishment of material. In case, there is no replenishment then mining lease shall only be granted when there is no riverbed mining possibility within 5 KM of the Patta land/Khatedari land. For government projects, mining could be allowed on Patta land/Khatedari land but the mining should only be done by the Government agency and material should not be used for sale in the open market. Cluster situation as mentioned in para k above is also applicable for the mining in Patta land/Khatedari land.	Noted.
15	The State Government should define the transportation route from the mining lease considering the maximum production from the mines as at this stage the size of mining leases, their location, the quantity of mineral that can be mined safely etc. is available with the State Government. It is suggested that the transportation route should be selected in such a way that the movement of trucks/tippers/tractors from the villages having habitation should be avoided. The transportation route so selected should be verified by the State Government for its carrying capacity.	Noted and final transport route will be submitted during preparation of mine plan.
16	Potential site for mining having its impact on the forest, protected area, habitation, bridges etc, shall be avoided. For this, a sub-divisional committee may be formed which after the site visit shall decide its suitability for mining.	Shall be Complied with.
17	Public consultation-The Comments of the various stakeholders may be sought on the list of mining lease to be auctioned. The State Government shall give an advertisement in the local and national newspaper for seeking comments of the general public on the list of mining lease included in the DSR. The DSR should be placed in the public domain for at least one month from the date of publication of the advertisement for obtaining comments of the general public. The comments so received shall be placed before the sub-divisional committee for active consideration. The final list of sand mining areas [leases to be granted on riverbed &Patta land/Khatedari land, de-siltation location (ponds/lakes/dams), M-Sand Plants (alternate source of sand)] after the public hearing needs to be defined in the final DSR.	After publication of the West Bengal Sand Mining Policy, 2021, it is now eminent that State owned The West Bengal Mineral Development and Trading Corporation Limited (WBMDTCL) shall be responsible for mining of sand/ gravel/ river bed materials in whole state of West Bengal. However, the existing mining leases which were in effect before hand of this Gazzate notification July 2021 will be in operation till the year 2027-28. In order to have the rational distribution of mining leases as per the prevailing norms and guidelines grant of mining leases in the state of West Bengal shall be carried out in phases till all the blocks are under the ambit of WBMDTCL. This DSR thus consist of the identified potential sand deposite areas within which the existing and future mining leases shall occur. The details of the mining leases as and when granted shall follow the procedure described in EMGSM 2020 and prevailing norms.
18	The LOI should not be granted for mining area falling on both riverbed and outside riverbed. Therefore, in the same lease, both types of area should not be included.	Shall be Complied with.

Annexure 2

Estimation of Sand Resources based on sediment load comparison between Pre and Post Monsoon period of Jhargram District

Abbreviation used in the table as below

ABBREVIATION FORM		
PERIOD	PR	PRE-MONSOON
	PO	POST-MONSOON
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
	JB	JAMBONI
	JG	JHARGRAM
	SK	SANKRAIL
	GB1	GOPIBALLAVPUR I
	GB2	GOPIBALLAVPUR II
	BP1	BINPUR I
	BP2	BINPUR II
RIVER	SR	SUBARNAREKHA
	KS	KANSABATI

Pre monsoon						**Post monsoon**					
S L No	**Sand Bar_Code**	**RL (m)**	**Area in sq.m.**	**Sand Thickness in m.**	**Sand Volume in M. Cum**	**S L No**	**Sand Bar_Code**	**RL (m)**	**Area in sq.m.**	**Sand Thickness in m.**	**Sand Volume in M. Cum**
Estimation of Sand Resources in Pre monsoon period & Post monsoon period of Kangsabati River											
1	PR_JR_BP1_KS_1	52.5	193499.3074	2	0.39	1	PO_JR_BP1_KS_1_2A	53	872771.5993	3.00	2.62
2	PR_JR_BP1_KS_2	52.5	618815.0292	2	1.24	2	PO_JR_BP1_KS_1_2	53	1085094.338	3.00	3.26
3	PR_JR_BP1_KS_3	52.5	1145114.769	2	2.29	3	PO_JR_BP1_KS_3	53	1340703.691	3.00	4.02
4	PR_JR_BP1_KS_4	49.5	433337.0816	2	0.87	4	PO_JR_BP1_KS_4	50	445636.5547	3.00	1.34
5	PR_JR_BP1_KS_5	49.5	732498.1152	2		5	PO_JR_BP1_KS_5	50	746606.8045	3.00	2.24
6	PR_JR_BP1_KS_6	47.5	163055.4659	2	0.33	6	PO_JR_BP1_KS_6	48	202648.911	3.00	0.61
7	PR_JR_BP1_KS_7	46.5	214704.7048	2	0.43	7	PO_JR_BP1_KS_7	47	233178.2032	3.00	0.70
8	PR_JR_BP1_KS_8	45.5	664407.9311	2	1.33	8	PO_JR_BP1_KS_8	46	674565.7254	3.00	2.02
9	PR_JR_BP1_KS_9	44.5	119409.4695	2	0.24	9	PO_JR_BP1_KS_9	45	373252.8443	3.00	1.12
10	PR_JR_BP1_KS_10	45.5	168834.4888	2	0.34	10	PO_JR_BP1_KS_10	46	311649.5485	3.00	0.93
11	PR_JR_BP1_KS_11	43.5	2138808.899	2	4.28	11	PO_JR_BP1_KS_11	44	2039696.698	3.00	6.12
12	PR_JR_BP1_KS_12	42.5	1264681.963	2	2.53	12	PO_JR_BP1_KS_12	43	1073516.818	3.00	3.22
						13	PO_JR_BP1_KS_12A	41	225467.2494	3.00	0.68
13	PR_JR_BP1_KS_13	39.5	532037.8645	2	1.06	14	PO_JR_BP1_KS_13	40	1154079.754	3.00	3.46
14	PR_JR_BP1_KS_14	37.5	513076.6385	2	1.03	15	PO_JR_BP1_KS_14	38	637258.8731	3.00	1.91
						16	PO_JR_BP1_KS_14A	38	1186420.615	3.00	3.56
15	PR_JR_JG_KS_15	32.5	80464.60393	2	0.16	17	PO_JR_JG_KS_15	33	88699.97365	3.00	0.27
16	PR_JR_JG_KS_16	33.5	175712.6448	2	0.35	18	PO_JR_JG_KS_16	34	110342.0065	3.00	0.33

Pre monsoon						Post monsoon					
S L No	**Sand Bar_Code**	**RL (m)**	**Area in sq.m**	**Sand Thickn**	**Sand Volu**	**S l**	**Sand Bar_Code**	**RL (m)**	**Area in sq.m**	**Sand Thickn**	**Sand Volu**
						19	PO_JR_JG_KS_16A	34	269041.3269	3.00	0.81
17	PR_JR_JG_KS_17	31.5	106963.4652	2	0.21	20	PO_JR_JG_KS_17	31	225912.2309	3.00	0.68
18	PR_JR_JG_KS_18	31.5	249633.4889	2	0.50	21	PO_JR_JG_KS_17_18	32	163710.3212	3.00	0.49
19	PR_JR_JG_KS_19	30.5	59020.12285	2	0.12	22	PO_JR_JG_KS_18_19	31	159489.7772	3.00	0.48
Estimation of Sand Resources in Pre monsoon period & Post monsoon period of Subarnarekha River											
1	PR_JR_GB1_SR_1	47.5	513245.93	2	1.03	1	PO_JR_GB1_SR_1	48	1787414.938	3.00	5.36
2	PR_JR_GB1_SR_2	44.5	352437.883	2	0.70	2	PO_JR_GB1_SR_2	45	446378.0633	3.00	1.34
3	PR_JR_GB1_SR_3	41.5	206403.2629	2	0.41	3	PO_JR_GB1_SR_3_4_5_6	42	2539942.398	3.00	7.62
4	PR_JR_GB1_SR_4	41	1524891.654	2	3.05						
5	PR_JR_GB1_SR_5	41	65725.75512	2	0.13						
6	PR_JR_GB1_SR_6	41	314108.7183	2	0.63						
7	PR_JR_GB1_SR_7	40.5	420337.47	2	0.84	4	PO_JR_GB1_SR_7	41	566484.6293	3.00	1.70
8	PR_JR_GB1_SR_8	36.5	626357.4536	2	1.25	5	PO_JR_GB1_SR_8	37	806944.1357	3.00	2.42
9	PR_JR_GB1_SR_9	36.5	737260.2796	2	1.47	6	PO_JR_GB1_SR_9	37	711869.0422	3.00	2.14
10	PR_JR_GB1_SR_10	36.5	138745.6771	2	0.28	7	PO_JR_GB1_SR_10_11	37	74800.86032	3.00	0.22
11	PR_JR_GB1_SR_11	37.5	237227.2045	2	0.47	8	PO_JR_GB1_SR_11	40	98876.38119	3.00	0.30
12	PR_JR_GB1_SR_12	37.5	49839.285	2	0.10	9	PO_JR_GB1_SR_12	38	123558.3645	3.00	0.37
13	PR_JR_GB2_SR_13	36.5	475964.627	2	0.95	10	PO_JR_GB2_SR_13	37	655817.5533	3.00	1.97
14	PR_JR_GB2_SR_14	35.5	2547763.244	2	5.10	11	PO_JR_GB2_SR_14(XIVA)	37	54183.76397	3.00	0.16
						12	PO_JR_GB2_SR_14(XIVB)	35	3567859.856	3.00	10.70
15	PR_JR_GB2_SR_15	33.5	120500.5764	2	0.24	13	PO_JR_GB2_SR_15	34	144495.362	3.00	0.43
16	PR_JR_GB2_SR_16	31.5	2355537.631	2	4.71	14	PO_JR_GB2_SR_16	31	3549417.398	3.00	10.65
17	PR_JR_GB2_SR_18	30.5	480062.8736	2	0.96	15	PO_JR_GB2_SR_16_18	31	3158797.181	3.00	9.48
18	PR_JR_GB2_SR_17	30.5	260740.4215	2	0.52		PO_JR_GB2_SR_17	31	0		
19	PR_JR_GB2_SR_19	29.5	165084.4347	2	0.33	16	PO_JR_GB2_SR_19	30	160280.2917	3.00	0.48
20	PR_JR_GB2_SR_20	29.5	650089.5279	2	1.30	17	PO_JR_GB2_SR_20	30	1034812.294	3.00	3.10
21	PR_JR_GB2_SR_21	29.5	344145.1739	2	0.69	18	PO_JR_GB2_SR_21	30	3292639.52	3.00	9.88
22	PR_JR_GB2_SR_22	30.5	263789.2538	2	0.53		PO_JR_GB2_SR_22	31	0	3.00	0.00
23	PR_JR_GB2_SR_23	31.5	1024448.725	2	2.05	19	PO_JR_GB2_SR_23	32	2673995.76	3.00	8.02
24	PR_JR_GB2_SR_24	30.5	1206885.176	2	2.41	20	PO_JR_GB2_SR_24	31	1515916.009	3.00	4.55
25	PR_JR_GB2_SR_25	30.5	2402425.695	2	4.80	21	PO_JR_GB2_SR_25	31	2591886.254	3.00	7.78
26	PR_JR_GB2_SR_26	29.5	1237916.928	2	2.48	22	PO_JR_GB2_SR_26_28A	30	1376749.27	3.00	4.13
27	PR_JR_GB2_SR_28	29	339182.4887	2	0.68	23	PO_JR_GB2_SR_26_28B	30	406282.59	3.00	1.22

Pre monsoon						Post monsoon					
S L No	**Sand Bar_Code**	**RL (m)**	**Area in sq.m**	**Sand Thickn**	**Sand Volu**	**S L**	**Sand Bar_Code**	**RL (m)**	**Area in sq.m**	**Sand Thickn**	**Sand Volu**
28	PR_JR_GB2_SR_27	28.5	229422.8219	2	0.46	24	PO_JR_GB2_SR_27	29	306251.3311	3.00	0.92
29	PR_JR_NY_SR_29	28.5	687875.4996	2	1.38	25	PO_JR_NY_SR_29	29	927316.35	3.00	2.78
30	PR_JR_NY_SR_30	27.5	1056035.648	2	2.11	26	PO_JR_NY_SR_30	28	1242936.219	3.00	3.73
31	PR_JR_SK_SR_31	27.5	2147276.805	2	4.29	27	PO_JR_SK_SR_31	28	1982174.836	3.00	5.95
32	PR_JR_NY_SR_32	26.5	107230.5043	2	0.21		PO_JR_NY_SR_32	27	0	3.00	0.00
33	PR_JR_SK_SR_33	27.5	1971368.479	2	3.94	28	PO_JR_SK_SR_33	28	3991210.394	3.00	11.97
34	PR_JR_SK_SR_34	25.5	5114124.704	2	10.23	29	PO_JR_SK_SR_34_37	26	7258316.099	3.00	21.77
35	PR_JR_SK_SR_37	25.5	550835.1718	2	1.10						
36	PR_JR_NY_SR_35	25.5	1267754.918	2	2.54		PO_JR_NY_SR_35	26	0	3.00	0.00
							PO_JR_NY_SR_35A	24	0	3.00	0.00
37	PR_JR_NY_SR_36	24.5	1239253.432	2	2.48		PO_JR_NY_SR_36	25	0	3.00	0.00
38	PR_JR_SK_SR_38	24.5	105195.7934	2	0.21		PO_JR_SK_SR_38	25	0		
39	PR_JR_SK_SR_39	22.5	4713141.725	2	9.43	30	PO_JR_SK_SR_39	23	3881934.876	3.00	11.65
40	PR_JR_SK_SR_40	22.5	364357.8231	2	0.73	31	PO_JR_SK_SR_40	23	1385117.083	3.00	4.16
41	PR_JR_NY_SR_41	21.5	1881030.576	2	3.76	32	PO_JR_NY_SR_41	22	4572834.543	3.00	13.72
42	PR_JR_NY_SR_42	18.5	624636.9362	2	1.25	33	PO_JR_NY_SR_42	19	630112.3863	3.00	1.89
43	PR_JR_NY_SR_43	16.5	3597538.103	2	7.20	34	PO_JR_NY_SR_43	16	3922251.608	3.00	11.77
						35	PO_JR_NY_SR_43A	15	251909.4911	3.00	0.76
44	PR_JR_NY_SR_44	13.5	237989.6368	2	0.48	36	PO_JR_NY_SR_44	14	303299.9136	3.00	0.91
45	PR_JR_NY_SR_45	12.5	150356.011	2	0.30		PO_JR_NY_SR_45	13	0		

Annexure 3
Boundary Coordinates of Potential Blocks of Jhargram District

Abbreviation used in the table as below

ABBREVIATION FORM		
PERIOD	PR	PRE-MONSOON
	PO	POST-MONSOON
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
	JB	JAMBONI
	JG	JHARGRAM
	SK	SANKRAIL
	GB1	GOPIBALLAVPUR I
	GB2	GOPIBALLAVPUR II
	BP1	BINPUR I
	BP2	BINPUR II
RIVER	SR	SUBARNAREKHA
	KS	KANSABATI

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
JR_BP1_KS_1_2	1	22° 37' 45.142" N	87° 0' 15.613" E
	2	22° 37' 46.119" N	87° 0' 10.858" E
	3	22° 37' 46.387" N	87° 0' 9.257" E
	4	22° 37' 51.568" N	87° 0' 8.656" E
	5	22° 37' 57.041" N	87° 0' 4.652" E
	6	22° 38' 12.839" N	87° 0' 4.096" E
	7	22° 38' 16.970" N	87° 0' 1.537" E
	8	22° 38' 26.160" N	87° 0' 4.430" E
	9	22° 38' 28.018" N	87° 0' 9.102" E
	10	22° 38' 31.426" N	87° 0' 10.103" E
	11	22° 38' 35.207" N	87° 0' 10.942" E
	12	22° 38' 36.931" N	87° 0' 10.552" E
	13	22° 38' 40.069" N	87° 0' 8.094" E
	14	22° 38' 46.573" N	87° 0' 3.434" E
	15	22° 38' 50.411" N	86° 59' 59.870" E
	16	22° 38' 58.993" N	87° 0' 1.983" E
	17	22° 38' 53.434" N	87° 0' 10.851" E
	18	22° 38' 48.673" N	87° 0' 17.010" E
	19	22° 38' 40.252" N	87° 0' 25.210" E
	20	22° 38' 32.652" N	87° 0' 28.947" E
	21	22° 38' 28.521" N	87° 0' 29.125" E
	22	22° 38' 21.913" N	87° 0' 25.861" E
	23	22° 38' 8.863" N	87° 0' 22.203" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	24	22° 38' 8.085" N	87° 0' 20.537" E
	25	22° 38' 4.477" N	87° 0' 18.285" E
	26	22° 37' 55.531" N	87° 0' 18.156" E
	27	22° 37' 53.362" N	87° 0' 18.559" E
	28	22° 37' 49.829" N	87° 0' 18.500" E
	29	22° 37' 46.895" N	87° 0' 17.806" E
JR_BP1_KS_1_2A	1	22° 39' 8.602" N	86° 59' 30.933" E
	2	22° 39' 14.855" N	86° 59' 23.004" E
	3	22° 39' 25.780" N	86° 59' 16.286" E
	4	22° 39' 35.331" N	86° 59' 18.510" E
	5	22° 39' 48.001" N	86° 59' 28.613" E
	6	22° 39' 38.132" N	86° 59' 40.772" E
	7	22° 39' 17.775" N	86° 59' 43.004" E
	8	22° 39' 13.955" N	86° 59' 44.746" E
	9	22° 39' 6.355" N	86° 59' 50.323" E
	10	22° 39' 3.662" N	86° 59' 45.714" E
	11	22° 39' 3.475" N	86° 59' 41.739" E
JR_BP1_KS_3	1	22° 36' 46.012" N	87° 0' 37.888" E
	2	22° 36' 47.955" N	87° 0' 32.225" E
	3	22° 36' 50.623" N	87° 0' 29.166" E
	4	22° 36' 56.044" N	87° 0' 24.718" E
	5	22° 36' 58.884" N	87° 0' 23.699" E
	6	22° 37' 0.604" N	87° 0' 23.977" E
	7	22° 37' 9.381" N	87° 0' 23.143" E
	8	22° 37' 16.501" N	87° 0' 21.494" E
	9	22° 37' 17.350" N	87° 0' 21.021" E
	10	22° 37' 18.416" N	87° 0' 20.765" E
	11	22° 37' 19.913" N	87° 0' 20.042" E
	12	22° 37' 21.197" N	87° 0' 19.779" E
	13	22° 37' 21.839" N	87° 0' 19.761" E
	14	22° 37' 21.918" N	87° 0' 19.759" E
	15	22° 37' 27.443" N	87° 0' 17.313" E
	16	22° 37' 30.913" N	87° 0' 17.891" E
	17	22° 37' 32.653" N	87° 0' 17.837" E
	18	22° 37' 35.054" N	87° 0' 17.763" E
	19	22° 37' 36.147" N	87° 0' 17.730" E
	20	22° 37' 37.017" N	87° 0' 17.248" E
	21	22° 37' 38.113" N	87° 0' 16.754" E
	22	22° 37' 41.418" N	87° 0' 13.652" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	23	22° 37' 43.136" N	87° 0' 12.792" E
	24	22° 37' 44.767" N	87° 0' 13.279" E
	25	22° 37' 45.531" N	87° 0' 16.486" E
	26	22° 37' 46.895" N	87° 0' 17.806" E
	27	22° 37' 50.598" N	87° 0' 19.715" E
	28	22° 37' 55.933" N	87° 0' 19.159" E
	29	22° 38' 1.971" N	87° 0' 19.271" E
	30	22° 38' 3.099" N	87° 0' 19.240" E
	31	22° 38' 4.006" N	87° 0' 19.447" E
	32	22° 38' 5.592" N	87° 0' 20.340" E
	33	22° 38' 6.314" N	87° 0' 21.411" E
	34	22° 38' 1.152" N	87° 0' 19.809" E
	35	22° 37' 31.248" N	87° 0' 35.706" E
	36	22° 37' 18.085" N	87° 0' 41.459" E
	37	22° 37' 10.100" N	87° 0' 42.704" E
	38	22° 36' 52.753" N	87° 0' 40.686" E
	39	22° 36' 49.999" N	87° 0' 42.584" E
	40	22° 36' 41.573" N	87° 0' 53.379" E
	41	22° 36' 29.346" N	87° 0' 58.538" E
	42	22° 36' 22.682" N	87° 1' 3.223" E
	43	22° 36' 20.921" N	87° 1' 3.743" E
	44	22° 36' 21.065" N	87° 1' 2.768" E
	45	22° 36' 21.063" N	87° 1' 1.895" E
	46	22° 36' 21.657" N	87° 1' 1.021" E
	47	22° 36' 21.855" N	87° 1' 0.147" E
	48	22° 36' 23.641" N	87° 0' 57.738" E
	49	22° 36' 25.230" N	87° 0' 56.418" E
	50	22° 36' 25.828" N	87° 0' 55.758" E
	51	22° 36' 27.822" N	87° 0' 54.871" E
	52	22° 36' 28.821" N	87° 0' 54.645" E
	53	22° 36' 29.821" N	87° 0' 53.981" E
	54	22° 36' 30.422" N	87° 0' 53.977" E
	55	22° 36' 31.223" N	87° 0' 53.531" E
	56	22° 36' 32.026" N	87° 0' 53.305" E
	57	22° 36' 33.231" N	87° 0' 53.297" E
	58	22° 36' 39.099" N	87° 0' 47.513" E
	59	22° 36' 42.189" N	87° 0' 43.253" E
	60	22° 36' 46.012" N	87° 0' 38.554" E
JR_BP1_KS_4	1	22° 36' 57.008" N	87° 0' 22.098" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	2	22° 37' 10.575" N	87° 0' 10.658" E
	3	22° 37' 30.091" N	87° 0' 8.322" E
	4	22° 37' 44.551" N	87° 0' 9.152" E
	5	22° 37' 36.147" N	87° 0' 17.730" E
	6	22° 37' 30.913" N	87° 0' 17.891" E
	7	22° 37' 27.443" N	87° 0' 17.313" E
	8	22° 37' 15.223" N	87° 0' 19.719" E
	9	22° 37' 3.195" N	87° 0' 21.415" E
JR_BP1_KS_5	1	22° 36' 35.445" N	87° 0' 50.290" E
	2	22° 36' 34.367" N	87° 0' 50.303" E
	3	22° 36' 30.486" N	87° 0' 52.613" E
	4	22° 36' 25.065" N	87° 0' 55.022" E
	5	22° 36' 19.449" N	87° 1' 3.551" E
	6	22° 36' 18.815" N	87° 1' 4.229" E
	7	22° 36' 16.212" N	87° 1' 5.134" E
	8	22° 36' 11.284" N	87° 1' 5.144" E
	9	22° 36' 10.241" N	87° 1' 5.594" E
	10	22° 36' 9.408" N	87° 1' 5.819" E
	11	22° 36' 8.784" N	87° 1' 6.268" E
	12	22° 36' 6.500" N	87° 1' 8.281" E
	13	22° 36' 6.214" N	87° 1' 8.897" E
	14	22° 35' 59.402" N	87° 1' 12.282" E
	15	22° 35' 58.669" N	87° 1' 12.280" E
	16	22° 35' 57.058" N	87° 1' 12.926" E
	17	22° 35' 50.926" N	87° 1' 12.661" E
	18	22° 35' 49.705" N	87° 1' 11.814" E
	19	22° 35' 47.076" N	87° 1' 10.264" E
	20	22° 35' 45.867" N	87° 1' 8.501" E
	21	22° 35' 45.062" N	87° 1' 6.519" E
	22	22° 35' 44.458" N	87° 1' 5.860" E
	23	22° 35' 43.053" N	87° 1' 4.324" E
	24	22° 35' 41.650" N	87° 1' 3.669" E
	25	22° 35' 38.852" N	87° 1' 3.021" E
	26	22° 35' 37.376" N	87° 1' 2.228" E
	27	22° 35' 52.716" N	87° 1' 0.810" E
	28	22° 36' 10.270" N	87° 0' 54.918" E
	29	22° 36' 18.635" N	87° 0' 48.580" E
	30	22° 36' 35.776" N	87° 0' 37.349" E
	31	22° 36' 45.852" N	87° 0' 31.245" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	32	22° 36' 45.632" N	87° 0' 34.820" E
	33	22° 36' 42.363" N	87° 0' 38.084" E
	34	22° 36' 40.629" N	87° 0' 41.774" E
	35	22° 36' 40.623" N	87° 0' 43.147" E
	36	22° 36' 39.963" N	87° 0' 45.903" E
	37	22° 36' 39.531" N	87° 0' 46.594" E
	38	22° 36' 39.099" N	87° 0' 47.513" E
	39	22° 36' 37.163" N	87° 0' 49.588" E
JR_BP1_KS_6	1	22° 35' 31.861" N	87° 1' 2.738" E
	2	22° 35' 34.227" N	87° 1' 3.013" E
	3	22° 35' 39.513" N	87° 1' 4.997" E
	4	22° 35' 40.181" N	87° 1' 5.942" E
	5	22° 35' 40.451" N	87° 1' 7.181" E
	6	22° 35' 42.724" N	87° 1' 9.469" E
	7	22° 35' 45.829" N	87° 1' 11.321" E
	8	22° 35' 46.711" N	87° 1' 12.113" E
	9	22° 35' 35.761" N	87° 1' 11.994" E
	10	22° 35' 18.468" N	87° 1' 16.143" E
	11	22° 35' 12.848" N	87° 1' 21.206" E
	12	22° 35' 12.574" N	87° 1' 21.273" E
	13	22° 35' 12.706" N	87° 1' 20.288" E
	14	22° 35' 14.905" N	87° 1' 16.887" E
	15	22° 35' 16.050" N	87° 1' 16.101" E
	16	22° 35' 18.128" N	87° 1' 15.061" E
	17	22° 35' 20.478" N	87° 1' 13.594" E
	18	22° 35' 23.371" N	87° 1' 11.126" E
	19	22° 35' 24.286" N	87° 1' 8.601" E
	20	22° 35' 25.208" N	87° 1' 5.788" E
	21	22° 35' 27.196" N	87° 1' 3.428" E
JR_BP1_KS_7	1	22° 35' 24.286" N	87° 1' 8.601" E
	2	22° 35' 23.371" N	87° 1' 11.126" E
	3	22° 35' 20.478" N	87° 1' 13.594" E
	4	22° 35' 18.128" N	87° 1' 15.061" E
	5	22° 35' 16.050" N	87° 1' 16.101" E
	6	22° 35' 12.963" N	87° 1' 18.391" E
	7	22° 35' 12.082" N	87° 1' 19.630" E
	8	22° 35' 10.151" N	87° 1' 20.525" E
	9	22° 35' 8.631" N	87° 1' 20.566" E
	10	22° 35' 6.613" N	87° 1' 19.811" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	11	22° 35' 3.479" N	87° 1' 20.177" E
	12	22° 35' 2.857" N	87° 1' 21.135" E
	13	22° 35' 2.732" N	87° 1' 22.620" E
	14	22° 35' 1.737" N	87° 1' 24.258" E
	15	22° 35' 0.869" N	87° 1' 25.621" E
	16	22° 35' 0.094" N	87° 1' 26.303" E
	17	22° 35' 6.868" N	87° 1' 11.034" E
	18	22° 35' 11.102" N	87° 1' 7.921" E
	19	22° 35' 27.196" N	87° 1' 3.428" E
	20	22° 35' 25.208" N	87° 1' 5.788" E
JR_BP1_KS_8	1	22° 35' 12.848" N	87° 1' 21.206" E
	2	22° 35' 6.956" N	87° 1' 35.534" E
	3	22° 35' 1.610" N	87° 1' 57.001" E
	4	22° 35' 0.502" N	87° 2' 14.616" E
	5	22° 34' 55.943" N	87° 2' 10.867" E
	6	22° 34' 55.943" N	87° 2' 9.856" E
	7	22° 34' 56.310" N	87° 2' 6.532" E
	8	22° 34' 56.678" N	87° 2' 2.007" E
	9	22° 34' 56.556" N	87° 1' 57.999" E
	10	22° 34' 55.701" N	87° 1' 53.850" E
	11	22° 34' 56.069" N	87° 1' 47.857" E
	12	22° 34' 56.558" N	87° 1' 42.792" E
	13	22° 34' 57.050" N	87° 1' 38.788" E
	14	22° 34' 58.937" N	87° 1' 30.738" E
	15	22° 35' 2.242" N	87° 1' 25.253" E
	16	22° 35' 3.826" N	87° 1' 21.102" E
	17	22° 35' 4.858" N	87° 1' 20.657" E
	18	22° 35' 12.574" N	87° 1' 21.273" E
JR_BP1_KS_9	1	22° 34' 22.513" N	87° 2' 40.025" E
	2	22° 34' 14.900" N	87° 2' 38.617" E
	3	22° 34' 5.263" N	87° 2' 34.701" E
	4	22° 33' 49.330" N	87° 2' 22.111" E
	5	22° 33' 49.848" N	87° 2' 18.569" E
	6	22° 33' 53.032" N	87° 2' 16.995" E
	7	22° 33' 57.673" N	87° 2' 18.400" E
	8	22° 34' 2.729" N	87° 2' 22.501" E
	9	22° 34' 3.700" N	87° 2' 25.615" E
	10	22° 34' 14.674" N	87° 2' 32.814" E
	11	22° 34' 16.484" N	87° 2' 33.049" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	12	22° 34' 19.599" N	87° 2' 32.202" E
	13	22° 34' 31.021" N	87° 2' 36.532" E
	14	22° 34' 34.250" N	87° 2' 36.533" E
	15	22° 34' 39.908" N	87° 2' 43.217" E
	16	22° 34' 37.585" N	87° 2' 42.905" E
	17	22° 34' 34.695" N	87° 2' 40.903" E
	18	22° 34' 21.479" N	87° 2' 36.525" E
	19	22° 34' 20.790" N	87° 2' 36.970" E
JR_BP1_KS_10	1	22° 33' 40.187" N	87° 1' 58.920" E
	2	22° 33' 29.918" N	87° 1' 50.650" E
	3	22° 33' 25.401" N	87° 1' 47.986" E
	4	22° 33' 20.023" N	87° 1' 46.363" E
	5	22° 33' 14.322" N	87° 1' 46.246" E
	6	22° 33' 4.502" N	87° 1' 33.452" E
	7	22° 33' 2.635" N	87° 1' 31.636" E
	8	22° 32' 57.715" N	87° 1' 28.586" E
	9	22° 32' 55.737" N	87° 1' 25.066" E
	10	22° 32' 55.135" N	87° 1' 22.781" E
	11	22° 33' 3.059" N	87° 1' 29.026" E
	12	22° 33' 12.455" N	87° 1' 33.363" E
	13	22° 33' 20.508" N	87° 1' 39.479" E
	14	22° 33' 22.590" N	87° 1' 42.265" E
	15	22° 33' 31.052" N	87° 1' 46.448" E
	16	22° 33' 35.138" N	87° 1' 49.923" E
JR_BP1_KS_11	1	22° 31' 32.508" N	87° 1' 59.767" E
	2	22° 31' 34.060" N	87° 1' 58.522" E
	3	22° 31' 35.034" N	87° 1' 57.899" E
	4	22° 31' 36.596" N	87° 1' 56.647" E
	5	22° 31' 37.769" N	87° 1' 55.180" E
	6	22° 31' 42.165" N	87° 1' 51.661" E
	7	22° 31' 44.928" N	87° 1' 42.779" E
	8	22° 31' 46.993" N	87° 1' 40.006" E
	9	22° 31' 52.797" N	87° 1' 35.083" E
	10	22° 31' 53.205" N	87° 1' 34.216" E
	11	22° 31' 54.167" N	87° 1' 33.061" E
	12	22° 32' 1.234" N	87° 1' 29.266" E
	13	22° 32' 2.903" N	87° 1' 28.781" E
	14	22° 32' 4.758" N	87° 1' 28.085" E
	15	22° 32' 5.381" N	87° 1' 28.068" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	16	22° 32' 6.457" N	87° 1' 27.589" E
	17	22° 32' 8.374" N	87° 1' 27.302" E
	18	22° 32' 9.220" N	87° 1' 27.274" E
	19	22° 32' 10.919" N	87° 1' 26.782" E
	20	22° 32' 11.771" N	87° 1' 26.316" E
	21	22° 32' 12.624" N	87° 1' 26.288" E
	22	22° 32' 13.906" N	87° 1' 26.027" E
	23	22° 32' 15.430" N	87° 1' 25.186" E
	24	22° 32' 16.184" N	87° 1' 24.520" E
	25	22° 32' 17.696" N	87° 1' 23.800" E
	26	22° 32' 18.646" N	87° 1' 23.527" E
	27	22° 32' 19.216" N	87° 1' 23.075" E
	28	22° 32' 20.167" N	87° 1' 22.804" E
	29	22° 32' 20.740" N	87° 1' 22.142" E
	30	22° 32' 22.463" N	87° 1' 22.020" E
	31	22° 32' 23.230" N	87° 1' 21.552" E
	32	22° 32' 24.001" N	87° 1' 21.285" E
	33	22° 32' 24.578" N	87° 1' 20.207" E
	34	22° 32' 25.930" N	87° 1' 18.650" E
	35	22° 32' 28.452" N	87° 1' 17.837" E
	36	22° 32' 29.422" N	87° 1' 17.773" E
	37	22° 32' 31.174" N	87° 1' 17.866" E
	38	22° 32' 31.960" N	87° 1' 18.015" E
	39	22° 32' 32.748" N	87° 1' 18.371" E
	40	22° 32' 33.340" N	87° 1' 18.325" E
	41	22° 32' 36.314" N	87° 1' 18.512" E
	42	22° 32' 38.299" N	87° 1' 19.642" E
	43	22° 32' 38.898" N	87° 1' 19.600" E
	44	22° 32' 39.899" N	87° 1' 19.738" E
	45	22° 32' 41.505" N	87° 1' 20.470" E
	46	22° 32' 43.727" N	87° 1' 20.946" E
	47	22° 32' 44.735" N	87° 1' 21.306" E
	48	22° 32' 45.341" N	87° 1' 21.267" E
	49	22° 32' 46.560" N	87° 1' 21.611" E
	50	22° 32' 47.990" N	87° 1' 22.151" E
	51	22° 32' 50.856" N	87° 1' 23.247" E
	52	22° 32' 51.473" N	87° 1' 23.636" E
	53	22° 32' 52.710" N	87° 1' 24.847" E
	54	22° 32' 53.330" N	87° 1' 25.669" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	55	22° 32' 54.572" N	87° 1' 27.749" E
	56	22° 32' 55.401" N	87° 1' 29.211" E
	57	22° 32' 56.647" N	87° 1' 32.168" E
	58	22° 32' 57.482" N	87° 1' 33.205" E
	59	22° 32' 59.362" N	87° 1' 35.710" E
	60	22° 33' 0.000" N	87° 1' 36.113" E
	61	22° 33' 1.889" N	87° 1' 36.886" E
	62	22° 33' 2.524" N	87° 1' 37.290" E
	63	22° 33' 3.797" N	87° 1' 37.880" E
	64	22° 33' 4.649" N	87° 1' 38.493" E
	65	22° 33' 5.289" N	87° 1' 39.336" E
	66	22° 33' 6.998" N	87° 1' 41.008" E
	67	22° 33' 7.428" N	87° 1' 41.645" E
	68	22° 33' 7.787" N	87° 1' 42.381" E
	69	22° 32' 44.653" N	87° 1' 31.772" E
	70	22° 32' 35.951" N	87° 1' 31.651" E
	71	22° 32' 22.568" N	87° 1' 36.510" E
	72	22° 32' 9.460" N	87° 1' 45.578" E
	73	22° 31' 51.388" N	87° 1' 57.784" E
	74	22° 31' 45.148" N	87° 2' 1.604" E
	75	22° 31' 36.657" N	87° 2' 5.740" E
	76	22° 31' 29.692" N	87° 2' 14.379" E
	77	22° 31' 23.685" N	87° 2' 34.473" E
	78	22° 31' 18.616" N	87° 2' 41.229" E
	79	22° 31' 3.358" N	87° 2' 47.872" E
	80	22° 31' 3.161" N	87° 2' 47.422" E
	81	22° 31' 2.801" N	87° 2' 46.997" E
	82	22° 31' 3.162" N	87° 2' 42.402" E
	83	22° 31' 3.523" N	87° 2' 41.622" E
	84	22° 31' 4.245" N	87° 2' 39.049" E
	85	22° 31' 4.968" N	87° 2' 37.074" E
	86	22° 31' 5.331" N	87° 2' 35.278" E
	87	22° 31' 5.694" N	87° 2' 34.287" E
	88	22° 31' 6.057" N	87° 2' 32.286" E
	89	22° 31' 6.602" N	87° 2' 30.897" E
	90	22° 31' 6.784" N	87° 2' 29.897" E
	91	22° 31' 7.329" N	87° 2' 29.114" E
	92	22° 31' 7.694" N	87° 2' 28.120" E
	93	22° 31' 7.876" N	87° 2' 26.915" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	94	22° 31' 14.160" N	87° 2' 14.293" E
	95	22° 31' 19.872" N	87° 2' 6.442" E
	96	22° 31' 25.208" N	87° 2' 2.409" E
JR_BP1_KS_12	1	22° 30' 7.210" N	87° 3' 7.609" E
	2	22° 29' 59.897" N	87° 3' 4.735" E
	3	22° 29' 55.759" N	87° 3' 4.897" E
	4	22° 29' 50.004" N	87° 3' 9.790" E
	5	22° 29' 46.571" N	87° 3' 14.806" E
	6	22° 29' 43.032" N	87° 3' 15.856" E
	7	22° 29' 41.422" N	87° 3' 21.164" E
	8	22° 29' 38.684" N	87° 3' 26.721" E
	9	22° 29' 39.923" N	87° 3' 15.557" E
	10	22° 29' 44.573" N	87° 3' 7.002" E
	11	22° 30' 14.833" N	87° 2' 50.788" E
	12	22° 30' 21.134" N	87° 2' 42.455" E
	13	22° 30' 26.297" N	87° 2' 40.568" E
	14	22° 30' 32.905" N	87° 2' 42.015" E
	15	22° 30' 45.606" N	87° 2' 42.797" E
	16	22° 30' 54.591" N	87° 2' 38.465" E
	17	22° 31' 3.363" N	87° 2' 30.984" E
	18	22° 31' 1.735" N	87° 2' 36.473" E
	19	22° 31' 1.545" N	87° 2' 42.923" E
	20	22° 31' 0.060" N	87° 2' 45.347" E
	21	22° 30' 59.036" N	87° 2' 50.238" E
	22	22° 30' 55.454" N	87° 2' 53.481" E
	23	22° 30' 49.554" N	87° 2' 54.806" E
	24	22° 30' 44.149" N	87° 2' 56.826" E
	25	22° 30' 41.480" N	87° 2' 56.662" E
	26	22° 30' 37.252" N	87° 2' 52.963" E
	27	22° 30' 35.510" N	87° 2' 52.629" E
	28	22° 30' 32.578" N	87° 2' 54.601" E
	29	22° 30' 30.695" N	87° 2' 56.901" E
	30	22° 30' 25.435" N	87° 2' 57.452" E
	31	22° 30' 23.593" N	87° 2' 58.850" E
	32	22° 30' 21.416" N	87° 3' 2.317" E
	33	22° 30' 18.601" N	87° 3' 4.031" E
	34	22° 30' 16.129" N	87° 3' 6.589" E
JR_BP1_KS_12A	1	22° 30' 37.096" N	87° 2' 57.574" E
	2	22° 30' 37.795" N	87° 2' 57.749" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	3	22° 30' 39.713" N	87° 2' 57.919" E
	4	22° 30' 45.042" N	87° 2' 59.873" E
	5	22° 30' 54.257" N	87° 2' 59.361" E
	6	22° 30' 50.706" N	87° 3' 3.527" E
	7	22° 30' 47.264" N	87° 3' 3.989" E
	8	22° 30' 29.100" N	87° 3' 5.455" E
	9	22° 30' 26.102" N	87° 3' 5.414" E
	10	22° 30' 21.313" N	87° 3' 5.349" E
	11	22° 30' 24.926" N	87° 3' 0.470" E
	12	22° 30' 33.795" N	87° 2' 57.589" E
JR_BP1_KS_13	1	22° 29' 52.345" N	87° 4' 14.682" E
	2	22° 29' 48.503" N	87° 4' 6.576" E
	3	22° 29' 43.847" N	87° 3' 58.614" E
	4	22° 29' 40.938" N	87° 3' 47.973" E
	5	22° 29' 40.354" N	87° 3' 41.410" E
	6	22° 29' 39.201" N	87° 3' 35.516" E
	7	22° 29' 40.172" N	87° 3' 26.382" E
	8	22° 29' 46.543" N	87° 3' 16.569" E
	9	22° 29' 54.793" N	87° 3' 7.046" E
	10	22° 29' 55.280" N	87° 3' 6.319" E
	11	22° 29' 56.096" N	87° 3' 5.732" E
	12	22° 29' 58.226" N	87° 3' 5.542" E
	13	22° 29' 59.048" N	87° 3' 5.641" E
	14	22° 30' 0.040" N	87° 3' 5.723" E
	15	22° 30' 0.700" N	87° 3' 5.840" E
	16	22° 30' 1.701" N	87° 3' 5.918" E
	17	22° 30' 2.363" N	87° 3' 6.209" E
	18	22° 30' 3.193" N	87° 3' 6.488" E
	19	22° 30' 4.693" N	87° 3' 7.582" E
	20	22° 30' 5.857" N	87° 3' 8.630" E
	21	22° 29' 58.479" N	87° 3' 10.244" E
	22	22° 29' 49.720" N	87° 3' 17.412" E
	23	22° 29' 48.285" N	87° 3' 25.472" E
	24	22° 29' 50.917" N	87° 3' 56.707" E
	25	22° 29' 57.242" N	87° 4' 15.794" E
	26	22° 30' 13.535" N	87° 4' 33.701" E
	27	22° 30' 21.295" N	87° 4' 44.434" E
	28	22° 30' 20.078" N	87° 4' 55.457" E
	29	22° 30' 18.273" N	87° 5' 0.140" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	30	22° 30' 17.732" N	87° 4' 59.953" E
	31	22° 30' 17.381" N	87° 4' 59.921" E
	32	22° 30' 16.859" N	87° 4' 59.345" E
	33	22° 30' 14.949" N	87° 4' 57.942" E
	34	22° 30' 13.906" N	87° 4' 55.730" E
	35	22° 30' 13.215" N	87° 4' 55.143" E
	36	22° 30' 12.524" N	87° 4' 54.204" E
	37	22° 30' 11.146" N	87° 4' 51.452" E
	38	22° 30' 10.973" N	87° 4' 50.734" E
	39	22° 30' 10.802" N	87° 4' 50.545" E
	40	22° 30' 10.539" N	87° 4' 49.580" E
	41	22° 30' 4.232" N	87° 4' 45.201" E
	42	22° 29' 59.245" N	87° 4' 36.864" E
	43	22° 29' 54.644" N	87° 4' 30.946" E
	44	22° 29' 53.142" N	87° 4' 23.340" E
JR_BP1_KS_14	1	22° 30' 2.953" N	87° 4' 46.233" E
	2	22° 30' 9.061" N	87° 4' 50.034" E
	3	22° 30' 16.628" N	87° 5' 1.521" E
	4	22° 30' 16.493" N	87° 5' 4.760" E
	5	22° 30' 2.161" N	87° 5' 19.330" E
	6	22° 29' 58.323" N	87° 5' 18.293" E
	7	22° 29' 58.305" N	87° 5' 18.300" E
	8	22° 29' 51.459" N	87° 5' 22.493" E
	9	22° 29' 49.166" N	87° 5' 11.694" E
	10	22° 29' 57.952" N	87° 4' 54.578" E
	11	22° 29' 58.991" N	87° 4' 41.021" E
	12	22° 29' 57.303" N	87° 4' 37.328" E
JR_BP1_KS_14A	1	22° 27' 51.569" N	87° 6' 31.251" E
	2	22° 27' 50.036" N	87° 6' 37.815" E
	3	22° 27' 39.138" N	87° 6' 14.500" E
	4	22° 27' 36.735" N	87° 6' 4.574" E
	5	22° 27' 37.986" N	87° 5' 44.874" E
	6	22° 27' 40.196" N	87° 5' 32.951" E
	7	22° 27' 52.257" N	87° 5' 6.962" E
	8	22° 28' 7.463" N	87° 4' 52.943" E
	9	22° 28' 13.353" N	87° 4' 49.628" E
	10	22° 28' 27.605" N	87° 4' 45.747" E
	11	22° 28' 31.528" N	87° 4' 47.194" E
	12	22° 28' 46.297" N	87° 5' 5.639" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	13	22° 28' 49.996" N	87° 5' 8.962" E
	14	22° 28' 48.812" N	87° 5' 11.789" E
	15	22° 28' 38.068" N	87° 5' 2.416" E
	16	22° 28' 30.131" N	87° 4' 57.371" E
	17	22° 28' 30.118" N	87° 4' 57.364" E
	18	22° 28' 23.308" N	87° 4' 57.628" E
	19	22° 28' 19.277" N	87° 4' 58.906" E
	20	22° 28' 9.866" N	87° 5' 2.250" E
	21	22° 28' 2.926" N	87° 5' 9.577" E
	22	22° 27' 57.157" N	87° 5' 14.690" E
	23	22° 27' 49.371" N	87° 5' 25.998" E
	24	22° 27' 43.370" N	87° 5' 48.040" E
	25	22° 27' 46.277" N	87° 6' 7.239" E
JR_JG_KS_15	1	22° 26' 46.043" N	87° 6' 57.932" E
	2	22° 26' 51.036" N	87° 7' 1.142" E
	3	22° 26' 49.326" N	87° 7' 3.143" E
	4	22° 26' 48.237" N	87° 7' 5.504" E
	5	22° 26' 44.164" N	87° 7' 2.908" E
	6	22° 26' 42.925" N	87° 7' 1.535" E
	7	22° 26' 42.194" N	87° 7' 1.515" E
	8	22° 26' 40.850" N	87° 7' 0.441" E
	9	22° 26' 40.516" N	87° 6' 58.823" E
	10	22° 26' 40.267" N	87° 6' 58.326" E
	11	22° 26' 39.092" N	87° 6' 57.587" E
	12	22° 26' 38.283" N	87° 6' 55.960" E
	13	22° 26' 36.935" N	87° 6' 54.230" E
	14	22° 26' 43.482" N	87° 6' 56.449" E
JR_JG_KS_16	1	22° 26' 30.113" N	87° 6' 58.913" E
	2	22° 26' 25.171" N	87° 6' 55.923" E
	3	22° 26' 21.600" N	87° 6' 51.838" E
	4	22° 26' 28.607" N	87° 6' 52.931" E
	5	22° 26' 31.351" N	87° 6' 55.144" E
	6	22° 26' 34.808" N	87° 6' 56.045" E
	7	22° 26' 42.453" N	87° 7' 2.655" E
	8	22° 26' 43.577" N	87° 7' 5.398" E
	9	22° 26' 46.805" N	87° 7' 8.371" E
	10	22° 26' 45.880" N	87° 7' 9.648" E
	11	22° 26' 35.737" N	87° 7' 3.511" E
JR_JG_KS_16A	1	22° 25' 21.640" N	87° 7' 56.654" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	2	22° 25' 21.247" N	87° 7' 54.741" E
	3	22° 25' 19.316" N	87° 7' 45.359" E
	4	22° 25' 17.643" N	87° 7' 41.149" E
	5	22° 25' 17.972" N	87° 7' 39.232" E
	6	22° 25' 18.437" N	87° 7' 34.585" E
	7	22° 25' 21.816" N	87° 7' 26.665" E
	8	22° 25' 26.708" N	87° 7' 21.116" E
	9	22° 25' 31.185" N	87° 7' 17.566" E
	10	22° 25' 32.371" N	87° 7' 16.671" E
	11	22° 25' 35.511" N	87° 7' 14.304" E
	12	22° 25' 35.877" N	87° 7' 14.028" E
	13	22° 25' 35.155" N	87° 7' 16.646" E
	14	22° 25' 34.067" N	87° 7' 19.469" E
	15	22° 25' 33.987" N	87° 7' 19.676" E
	16	22° 25' 33.435" N	87° 7' 21.109" E
	17	22° 25' 33.422" N	87° 7' 21.141" E
	18	22° 25' 33.381" N	87° 7' 21.248" E
	19	22° 25' 33.140" N	87° 7' 21.874" E
	20	22° 25' 33.114" N	87° 7' 21.971" E
	21	22° 25' 32.505" N	87° 7' 24.292" E
	22	22° 25' 32.116" N	87° 7' 25.772" E
	23	22° 25' 30.017" N	87° 7' 30.937" E
	24	22° 25' 27.550" N	87° 7' 35.398" E
	25	22° 25' 26.601" N	87° 7' 38.591" E
	26	22° 25' 25.778" N	87° 7' 45.439" E
	27	22° 25' 24.999" N	87° 7' 50.992" E
	28	22° 25' 23.703" N	87° 7' 57.078" E
	29	22° 25' 23.778" N	87° 7' 57.355" E
	30	22° 25' 23.545" N	87° 7' 58.101" E
	31	22° 25' 22.818" N	87° 8' 0.426" E
JR_JG_KS_17	1	22° 25' 14.592" N	87° 9' 19.119" E
	2	22° 25' 20.216" N	87° 9' 15.823" E
	3	22° 25' 22.841" N	87° 9' 20.254" E
	4	22° 25' 15.444" N	87° 9' 23.076" E
	5	22° 25' 9.437" N	87° 9' 27.038" E
	6	22° 25' 3.371" N	87° 9' 36.094" E
	7	22° 24' 59.729" N	87° 9' 43.020" E
	8	22° 24' 51.537" N	87° 9' 52.337" E
	9	22° 24' 53.861" N	87° 9' 46.489" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	10	22° 24' 56.105" N	87° 9' 43.219" E
	11	22° 24' 58.007" N	87° 9' 30.390" E
	12	22° 24' 59.988" N	87° 9' 28.449" E
	13	22° 25' 4.203" N	87° 9' 27.710" E
JR_JG_KS_17_18	1	22° 25' 14.157" N	87° 9' 16.804" E
	2	22° 25' 8.865" N	87° 9' 20.983" E
	3	22° 25' 5.768" N	87° 9' 25.125" E
	4	22° 25' 3.855" N	87° 9' 26.019" E
	5	22° 24' 58.951" N	87° 9' 27.413" E
	6	22° 24' 55.509" N	87° 9' 27.804" E
	7	22° 25' 0.095" N	87° 9' 22.280" E
	8	22° 25' 6.432" N	87° 9' 15.646" E
	9	22° 25' 7.249" N	87° 9' 14.791" E
	10	22° 25' 7.602" N	87° 9' 14.421" E
	11	22° 25' 10.965" N	87° 9' 10.900" E
	12	22° 25' 11.221" N	87° 9' 10.633" E
	13	22° 25' 15.115" N	87° 9' 8.040" E
	14	22° 25' 15.480" N	87° 9' 8.611" E
	15	22° 25' 16.555" N	87° 9' 10.164" E
	16	22° 25' 17.804" N	87° 9' 11.968" E
	17	22° 25' 18.269" N	87° 9' 12.687" E
JR_JG_KS_18_19	1	22° 24' 54.741" N	87° 9' 38.514" E
	2	22° 24' 54.623" N	87° 9' 42.846" E
	3	22° 24' 49.718" N	87° 9' 53.183" E
	4	22° 24' 48.341" N	87° 9' 52.942" E
	5	22° 24' 42.531" N	87° 9' 49.651" E
	6	22° 24' 50.477" N	87° 9' 34.080" E
	7	22° 24' 54.375" N	87° 9' 29.255" E
	8	22° 24' 56.953" N	87° 9' 29.262" E
	9	22° 24' 57.088" N	87° 9' 31.631" E
JR_GB1_SR_1	1	22° 12' 37.293" N	86° 45' 30.497" E
	2	22° 12' 33.457" N	86° 45' 25.727" E
	3	22° 12' 30.911" N	86° 45' 20.762" E
	4	22° 12' 28.919" N	86° 45' 16.685" E
	5	22° 12' 23.633" N	86° 45' 4.654" E
	6	22° 12' 21.376" N	86° 44' 51.538" E
	7	22° 12' 23.846" N	86° 44' 46.211" E
	8	22° 12' 40.322" N	86° 44' 35.897" E
	9	22° 12' 55.751" N	86° 44' 25.159" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	10	22° 13' 1.553" N	86° 44' 24.580" E
	11	22° 13' 1.298" N	86° 44' 37.989" E
	12	22° 13' 3.772" N	86° 44' 47.450" E
	13	22° 13' 3.071" N	86° 44' 51.373" E
	14	22° 13' 0.018" N	86° 44' 57.165" E
	15	22° 12' 56.316" N	86° 45' 2.379" E
	16	22° 12' 47.629" N	86° 45' 12.035" E
	17	22° 12' 46.861" N	86° 45' 19.958" E
	18	22° 12' 47.182" N	86° 45' 36.117" E
JR_GB1_SR_2	1	22° 12' 49.375" N	86° 46' 7.386" E
	2	22° 12' 49.383" N	86° 46' 10.043" E
	3	22° 12' 49.879" N	86° 46' 11.469" E
	4	22° 12' 49.721" N	86° 46' 13.593" E
	5	22° 12' 47.920" N	86° 46' 14.794" E
	6	22° 12' 44.985" N	86° 46' 14.732" E
	7	22° 12' 43.522" N	86° 46' 14.171" E
	8	22° 12' 39.809" N	86° 46' 14.967" E
	9	22° 12' 38.784" N	86° 46' 15.768" E
	10	22° 12' 40.881" N	86° 45' 52.941" E
	11	22° 12' 38.798" N	86° 45' 40.967" E
	12	22° 12' 33.966" N	86° 45' 29.904" E
	13	22° 12' 35.697" N	86° 45' 31.409" E
	14	22° 12' 40.193" N	86° 45' 34.989" E
	15	22° 12' 44.078" N	86° 45' 37.731" E
	16	22° 12' 45.220" N	86° 45' 39.828" E
	17	22° 12' 46.867" N	86° 45' 47.043" E
	18	22° 12' 47.367" N	86° 45' 50.395" E
	19	22° 12' 47.701" N	86° 45' 53.399" E
	20	22° 12' 48.040" N	86° 45' 57.819" E
	21	22° 12' 50.013" N	86° 46' 0.483" E
	22	22° 12' 51.004" N	86° 46' 2.440" E
	23	22° 12' 50.684" N	86° 46' 5.629" E
JR_GB1_SR_3_4_5_6	1	22° 12' 55.095" N	86° 45' 59.160" E
	2	22° 12' 56.914" N	86° 46' 2.047" E
	3	22° 13' 0.592" N	86° 46' 7.885" E
	4	22° 12' 58.856" N	86° 46' 16.905" E
	5	22° 12' 55.351" N	86° 46' 21.218" E
	6	22° 12' 49.999" N	86° 46' 33.500" E
	7	22° 12' 44.662" N	86° 46' 58.202" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	8	22° 12' 42.471" N	86° 47' 2.791" E
	9	22° 12' 37.385" N	86° 47' 13.443" E
	10	22° 12' 24.053" N	86° 47' 31.354" E
	11	22° 12' 23.747" N	86° 47' 32.712" E
	12	22° 12' 21.064" N	86° 47' 34.333" E
	13	22° 12' 18.599" N	86° 47' 37.608" E
	14	22° 12' 17.442" N	86° 47' 38.773" E
	15	22° 12' 15.999" N	86° 47' 39.125" E
	16	22° 12' 14.128" N	86° 47' 39.126" E
	17	22° 12' 11.983" N	86° 47' 40.197" E
	18	22° 12' 4.495" N	86° 47' 38.623" E
	19	22° 11' 55.899" N	86° 47' 31.422" E
	20	22° 11' 55.143" N	86° 47' 20.286" E
	21	22° 12' 5.718" N	86° 47' 0.583" E
	22	22° 12' 16.997" N	86° 46' 45.100" E
	23	22° 12' 27.930" N	86° 46' 35.546" E
	24	22° 12' 31.942" N	86° 46' 28.236" E
	25	22° 12' 34.236" N	86° 46' 25.561" E
	26	22° 12' 37.389" N	86° 46' 20.880" E
	27	22° 12' 39.056" N	86° 46' 19.575" E
	28	22° 12' 42.108" N	86° 46' 19.056" E
	29	22° 12' 44.105" N	86° 46' 17.572" E
	30	22° 12' 49.533" N	86° 46' 17.009" E
	31	22° 12' 51.567" N	86° 46' 15.671" E
	32	22° 12' 54.041" N	86° 46' 8.748" E
	33	22° 12' 54.013" N	86° 46' 0.550" E
JR_GB1_SR_7	1	22° 12' 22.945" N	86° 47' 36.274" E
	2	22° 12' 15.286" N	86° 48' 7.296" E
	3	22° 12' 17.507" N	86° 48' 21.635" E
	4	22° 12' 20.799" N	86° 48' 24.586" E
	5	22° 12' 17.329" N	86° 48' 27.487" E
	6	22° 12' 14.350" N	86° 48' 28.233" E
	7	22° 12' 9.567" N	86° 48' 6.217" E
	8	22° 12' 2.066" N	86° 47' 57.456" E
	9	22° 12' 2.235" N	86° 47' 49.991" E
	10	22° 12' 0.332" N	86° 47' 44.096" E
	11	22° 12' 2.430" N	86° 47' 42.112" E
	12	22° 12' 14.139" N	86° 47' 40.015" E
	13	22° 12' 17.442" N	86° 47' 38.773" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	14	22° 12' 18.680" N	86° 47' 38.345" E
JR_GB1_SR_8	1	22° 12' 14.977" N	86° 48' 33.239" E
	2	22° 12' 20.637" N	86° 48' 41.254" E
	3	22° 12' 21.062" N	86° 48' 43.529" E
	4	22° 12' 21.980" N	86° 48' 44.278" E
	5	22° 12' 22.760" N	86° 48' 44.163" E
	6	22° 12' 28.306" N	86° 48' 53.412" E
	7	22° 12' 28.387" N	86° 48' 55.281" E
	8	22° 12' 27.073" N	86° 48' 55.497" E
	9	22° 12' 19.843" N	86° 48' 54.176" E
	10	22° 12' 11.783" N	86° 48' 49.307" E
	11	22° 12' 7.025" N	86° 48' 43.104" E
	12	22° 12' 5.158" N	86° 48' 35.787" E
	13	22° 11' 55.220" N	86° 48' 14.732" E
	14	22° 12' 2.066" N	86° 47' 57.456" E
	15	22° 12' 9.567" N	86° 48' 6.217" E
JR_GB1_SR_9	1	22° 12' 55.030" N	86° 48' 51.591" E
	2	22° 12' 42.714" N	86° 48' 50.929" E
	3	22° 12' 41.822" N	86° 48' 54.047" E
	4	22° 12' 37.315" N	86° 48' 53.935" E
	5	22° 12' 29.840" N	86° 48' 55.041" E
	6	22° 12' 26.958" N	86° 48' 51.164" E
	7	22° 12' 22.760" N	86° 48' 44.163" E
	8	22° 12' 21.062" N	86° 48' 43.529" E
	9	22° 12' 20.637" N	86° 48' 41.254" E
	10	22° 12' 20.633" N	86° 48' 39.157" E
	11	22° 12' 18.751" N	86° 48' 34.475" E
	12	22° 12' 18.062" N	86° 48' 32.931" E
	13	22° 12' 18.332" N	86° 48' 31.163" E
	14	22° 12' 18.534" N	86° 48' 29.700" E
	15	22° 12' 19.219" N	86° 48' 28.071" E
	16	22° 12' 20.799" N	86° 48' 24.586" E
	17	22° 12' 24.260" N	86° 48' 27.688" E
	18	22° 12' 42.718" N	86° 48' 34.465" E
	19	22° 12' 54.844" N	86° 48' 42.877" E
	20	22° 13' 0.077" N	86° 48' 44.496" E
	21	22° 13' 1.922" N	86° 48' 44.582" E
	22	22° 13' 1.535" N	86° 48' 45.663" E
JR_GB1_SR_10_11	1	22° 12' 58.286" N	86° 48' 51.580" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	2	22° 13' 2.547" N	86° 48' 47.984" E
	3	22° 13' 5.079" N	86° 48' 47.721" E
	4	22° 13' 7.511" N	86° 48' 46.975" E
	5	22° 13' 13.821" N	86° 48' 46.421" E
	6	22° 13' 15.205" N	86° 48' 46.822" E
	7	22° 13' 16.193" N	86° 48' 47.510" E
	8	22° 13' 16.610" N	86° 48' 49.088" E
	9	22° 13' 15.131" N	86° 48' 50.190" E
	10	22° 13' 13.426" N	86° 48' 50.876" E
	11	22° 13' 11.586" N	86° 48' 51.892" E
	12	22° 13' 8.837" N	86° 48' 52.775" E
	13	22° 13' 6.606" N	86° 48' 52.968" E
	14	22° 13' 4.713" N	86° 48' 52.499" E
	15	22° 13' 1.896" N	86° 48' 52.884" E
	16	22° 12' 59.649" N	86° 48' 54.181" E
	17	22° 12' 58.221" N	86° 48' 54.168" E
	18	22° 12' 57.935" N	86° 48' 53.008" E
JR_GB1_SR_11	1	22° 13' 17.102" N	86° 48' 47.377" E
	2	22° 13' 17.005" N	86° 48' 46.333" E
	3	22° 13' 17.384" N	86° 48' 45.150" E
	4	22° 13' 18.146" N	86° 48' 43.409" E
	5	22° 13' 18.012" N	86° 48' 42.780" E
	6	22° 13' 22.655" N	86° 48' 42.100" E
	7	22° 13' 30.110" N	86° 48' 42.376" E
	8	22° 13' 30.500" N	86° 48' 48.304" E
	9	22° 13' 30.780" N	86° 48' 52.250" E
	10	22° 13' 28.062" N	86° 48' 50.568" E
	11	22° 13' 26.942" N	86° 48' 50.520" E
	12	22° 13' 23.525" N	86° 48' 48.882" E
	13	22° 13' 22.436" N	86° 48' 48.627" E
	14	22° 13' 19.506" N	86° 48' 48.594" E
JR_GB1_SR_12	1	22° 13' 7.007" N	86° 48' 54.791" E
	2	22° 13' 9.582" N	86° 48' 53.592" E
	3	22° 13' 12.910" N	86° 48' 53.187" E
	4	22° 13' 15.335" N	86° 48' 52.193" E
	5	22° 13' 18.046" N	86° 48' 51.982" E
	6	22° 13' 19.386" N	86° 48' 52.044" E
	7	22° 13' 20.261" N	86° 48' 52.308" E
	8	22° 13' 23.500" N	86° 48' 54.503" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	9	22° 13' 24.075" N	86° 48' 54.887" E
	10	22° 13' 25.818" N	86° 48' 55.795" E
	11	22° 13' 26.572" N	86° 48' 56.005" E
	12	22° 13' 29.892" N	86° 48' 56.759" E
	13	22° 13' 30.415" N	86° 48' 58.546" E
	14	22° 13' 30.959" N	86° 48' 59.463" E
	15	22° 13' 30.957" N	86° 49' 0.933" E
	16	22° 13' 25.729" N	86° 48' 58.304" E
JR_GB2_SR_13	1	22° 13' 31.257" N	86° 48' 52.424" E
	2	22° 13' 30.563" N	86° 48' 42.393" E
	3	22° 13' 34.220" N	86° 48' 42.528" E
	4	22° 13' 45.788" N	86° 48' 44.288" E
	5	22° 13' 54.055" N	86° 48' 49.305" E
	6	22° 14' 0.670" N	86° 48' 55.359" E
	7	22° 14' 4.395" N	86° 49' 1.418" E
	8	22° 14' 4.952" N	86° 49' 7.037" E
	9	22° 14' 4.413" N	86° 49' 22.464" E
	10	22° 14' 0.921" N	86° 49' 19.026" E
	11	22° 13' 59.052" N	86° 49' 15.863" E
	12	22° 13' 56.849" N	86° 49' 14.271" E
	13	22° 13' 55.395" N	86° 49' 12.945" E
	14	22° 13' 50.754" N	86° 49' 9.381" E
	15	22° 13' 48.654" N	86° 49' 7.750" E
	16	22° 13' 46.462" N	86° 49' 4.760" E
	17	22° 13' 43.953" N	86° 48' 58.389" E
	18	22° 13' 42.605" N	86° 48' 57.063" E
	19	22° 13' 41.380" N	86° 48' 56.649" E
	20	22° 13' 38.300" N	86° 48' 54.955" E
	21	22° 13' 35.384" N	86° 48' 53.289" E
	22	22° 13' 32.943" N	86° 48' 52.955" E
JR_GB2_SR_14(XIVA)	1	22° 13' 34.659" N	86° 48' 59.117" E
	2	22° 13' 34.890" N	86° 48' 57.545" E
	3	22° 13' 35.673" N	86° 48' 56.599" E
	4	22° 13' 38.299" N	86° 48' 56.624" E
	5	22° 13' 40.002" N	86° 48' 57.877" E
	6	22° 13' 40.659" N	86° 48' 59.276" E
	7	22° 13' 41.898" N	86° 49' 0.493" E
	8	22° 13' 43.486" N	86° 49' 2.818" E
	9	22° 13' 43.490" N	86° 49' 4.776" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	10	22° 13' 43.661" N	86° 49' 6.135" E
	11	22° 13' 42.992" N	86° 49' 6.569" E
	12	22° 13' 41.250" N	86° 49' 6.506" E
	13	22° 13' 39.630" N	86° 49' 5.656" E
	14	22° 13' 39.367" N	86° 49' 5.163" E
	15	22° 13' 35.451" N	86° 49' 3.194" E
	16	22° 13' 34.976" N	86° 49' 0.830" E
JR_GB2_SR_14(XIVB)	1	22° 11' 47.355" N	86° 51' 13.418" E
	2	22° 11' 55.779" N	86° 51' 3.661" E
	3	22° 12' 20.373" N	86° 50' 47.287" E
	4	22° 12' 30.696" N	86° 50' 43.727" E
	5	22° 12' 47.825" N	86° 50' 30.844" E
	6	22° 13' 22.506" N	86° 50' 14.834" E
	7	22° 13' 36.743" N	86° 50' 1.952" E
	8	22° 13' 42.932" N	86° 49' 55.290" E
	9	22° 13' 44.782" N	86° 49' 46.637" E
	10	22° 13' 46.622" N	86° 49' 29.111" E
	11	22° 13' 45.990" N	86° 49' 17.576" E
	12	22° 13' 41.329" N	86° 49' 8.840" E
	13	22° 13' 43.187" N	86° 49' 8.684" E
	14	22° 13' 54.996" N	86° 49' 15.122" E
	15	22° 14' 0.703" N	86° 49' 20.892" E
	16	22° 14' 3.183" N	86° 49' 26.781" E
	17	22° 14' 1.040" N	86° 49' 34.293" E
	18	22° 14' 0.152" N	86° 49' 41.149" E
	19	22° 13' 55.572" N	86° 49' 44.133" E
	20	22° 13' 51.470" N	86° 49' 57.073" E
	21	22° 13' 49.003" N	86° 49' 58.167" E
	22	22° 13' 49.148" N	86° 50' 3.224" E
	23	22° 13' 45.722" N	86° 50' 6.965" E
	24	22° 13' 39.545" N	86° 50' 6.671" E
	25	22° 13' 39.136" N	86° 50' 10.041" E
	26	22° 13' 36.815" N	86° 50' 17.639" E
	27	22° 13' 34.425" N	86° 50' 20.875" E
	28	22° 13' 31.290" N	86° 50' 21.950" E
	29	22° 13' 28.255" N	86° 50' 23.767" E
	30	22° 13' 19.894" N	86° 50' 28.025" E
	31	22° 13' 4.642" N	86° 50' 35.571" E
	32	22° 13' 2.030" N	86° 50' 41.124" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	33	22° 12' 58.831" N	86° 50' 41.029" E
	34	22° 12' 57.016" N	86° 50' 37.168" E
	35	22° 12' 54.626" N	86° 50' 36.755" E
	36	22° 12' 50.655" N	86° 50' 38.497" E
	37	22° 12' 47.046" N	86° 50' 41.340" E
	38	22° 12' 41.249" N	86° 50' 45.263" E
	39	22° 12' 38.751" N	86° 50' 48.513" E
	40	22° 12' 36.694" N	86° 50' 52.835" E
	41	22° 12' 33.706" N	86° 50' 55.887" E
	42	22° 12' 28.119" N	86° 51' 4.620" E
	43	22° 12' 24.732" N	86° 51' 11.503" E
	44	22° 12' 21.275" N	86° 51' 15.292" E
	45	22° 12' 15.995" N	86° 51' 18.442" E
	46	22° 12' 11.577" N	86° 51' 24.187" E
	47	22° 12' 6.060" N	86° 51' 32.603" E
	48	22° 12' 0.800" N	86° 51' 39.424" E
	49	22° 11' 57.367" N	86° 51' 56.176" E
	50	22° 11' 58.674" N	86° 52' 7.973" E
	51	22° 11' 51.180" N	86° 51' 58.555" E
	52	22° 11' 46.519" N	86° 51' 41.095" E
JR_GB2_SR_15	1	22° 12' 38.904" N	86° 50' 56.142" E
	2	22° 12' 41.403" N	86° 50' 52.792" E
	3	22° 12' 45.209" N	86° 50' 49.918" E
	4	22° 12' 47.203" N	86° 50' 46.515" E
	5	22° 12' 52.715" N	86° 50' 42.437" E
	6	22° 12' 56.275" N	86° 50' 42.073" E
	7	22° 12' 59.049" N	86° 50' 44.535" E
	8	22° 12' 40.002" N	86° 50' 59.248" E
	9	22° 12' 38.906" N	86° 50' 57.697" E
JR_GB2_SR_16	1	22° 13' 5.758" N	86° 52' 33.190" E
	2	22° 12' 56.464" N	86° 52' 31.905" E
	3	22° 12' 47.380" N	86° 52' 29.793" E
	4	22° 12' 43.980" N	86° 52' 25.673" E
	5	22° 12' 31.677" N	86° 52' 20.701" E
	6	22° 12' 0.729" N	86° 52' 4.665" E
	7	22° 12' 1.544" N	86° 51' 38.460" E
	8	22° 12' 6.060" N	86° 51' 32.603" E
	9	22° 12' 11.577" N	86° 51' 24.187" E
	10	22° 12' 15.995" N	86° 51' 18.442" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	11	22° 12' 19.813" N	86° 51' 16.324" E
	12	22° 12' 26.654" N	86° 51' 19.708" E
	13	22° 12' 22.634" N	86° 51' 31.480" E
	14	22° 12' 25.676" N	86° 51' 45.723" E
	15	22° 12' 41.368" N	86° 52' 1.906" E
	16	22° 13' 2.620" N	86° 52' 16.110" E
	17	22° 13' 17.122" N	86° 52' 21.949" E
	18	22° 13' 23.366" N	86° 52' 27.652" E
	19	22° 13' 39.067" N	86° 52' 44.443" E
	20	22° 13' 53.236" N	86° 53' 0.452" E
	21	22° 14' 1.516" N	86° 53' 18.348" E
	22	22° 13' 41.959" N	86° 53' 9.149" E
	23	22° 13' 32.513" N	86° 53' 0.407" E
	24	22° 13' 19.262" N	86° 52' 48.790" E
	25	22° 13' 17.296" N	86° 52' 42.053" E
JR_GB2_SR_16_18	1	22° 13' 3.664" N	86° 53' 24.058" E
	2	22° 13' 1.114" N	86° 53' 16.517" E
	3	22° 12' 52.852" N	86° 53' 4.133" E
	4	22° 12' 44.438" N	86° 52' 57.235" E
	5	22° 12' 42.293" N	86° 52' 51.322" E
	6	22° 12' 50.617" N	86° 52' 33.941" E
	7	22° 12' 47.380" N	86° 52' 29.793" E
	8	22° 12' 56.464" N	86° 52' 31.905" E
	9	22° 13' 5.758" N	86° 52' 33.190" E
	10	22° 13' 13.364" N	86° 52' 35.763" E
	11	22° 13' 17.296" N	86° 52' 42.053" E
	12	22° 13' 21.609" N	86° 52' 56.837" E
	13	22° 13' 26.434" N	86° 53' 4.227" E
	14	22° 13' 33.627" N	86° 53' 7.563" E
	15	22° 13' 38.002" N	86° 53' 9.279" E
	16	22° 13' 55.319" N	86° 53' 16.551" E
	17	22° 14' 1.861" N	86° 53' 20.602" E
	18	22° 14' 2.683" N	86° 53' 25.973" E
	19	22° 14' 0.752" N	86° 53' 33.045" E
	20	22° 13' 39.891" N	86° 53' 53.757" E
	21	22° 13' 37.004" N	86° 53' 55.240" E
	22	22° 13' 29.777" N	86° 53' 44.538" E
	23	22° 13' 25.424" N	86° 53' 39.296" E
	24	22° 13' 19.715" N	86° 53' 34.801" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	25	22° 13' 11.187" N	86° 53' 31.124" E
	26	22° 13' 7.584" N	86° 53' 30.407" E
JR_GB2_SR_20	1	22° 12' 23.773" N	86° 55' 1.179" E
	2	22° 12' 21.983" N	86° 55' 2.644" E
	3	22° 12' 18.685" N	86° 55' 4.765" E
	4	22° 12' 17.539" N	86° 55' 5.269" E
	5	22° 12' 17.717" N	86° 54' 56.052" E
	6	22° 12' 18.743" N	86° 54' 43.853" E
	7	22° 12' 21.440" N	86° 54' 35.821" E
	8	22° 12' 35.258" N	86° 54' 22.500" E
	9	22° 12' 41.922" N	86° 54' 32.243" E
	10	22° 12' 37.007" N	86° 54' 35.546" E
	11	22° 12' 35.688" N	86° 54' 38.014" E
	12	22° 12' 33.214" N	86° 54' 40.920" E
	13	22° 12' 33.363" N	86° 54' 43.828" E
	14	22° 12' 27.935" N	86° 54' 53.299" E
	15	22° 12' 26.324" N	86° 54' 57.689" E
JR_GB2_SR_21	1	22° 12' 18.685" N	86° 55' 4.765" E
	2	22° 12' 21.983" N	86° 55' 2.644" E
	3	22° 12' 23.773" N	86° 55' 1.179" E
	4	22° 12' 25.161" N	86° 55' 0.447" E
	5	22° 12' 27.681" N	86° 54' 58.364" E
	6	22° 12' 30.657" N	86° 54' 55.042" E
	7	22° 12' 34.980" N	86° 54' 50.897" E
	8	22° 12' 35.270" N	86° 54' 49.666" E
	9	22° 12' 34.973" N	86° 54' 46.450" E
	10	22° 12' 34.969" N	86° 54' 43.537" E
	11	22° 12' 37.013" N	86° 54' 39.938" E
	12	22° 12' 39.971" N	86° 54' 37.973" E
	13	22° 12' 45.103" N	86° 54' 37.327" E
	14	22° 12' 49.495" N	86° 54' 42.872" E
	15	22° 12' 57.597" N	86° 54' 48.965" E
	16	22° 13' 8.065" N	86° 54' 52.311" E
	17	22° 13' 1.640" N	86° 55' 23.006" E
	18	22° 12' 55.042" N	86° 55' 46.373" E
	19	22° 12' 55.719" N	86° 56' 3.833" E
	20	22° 12' 48.403" N	86° 55' 57.978" E
	21	22° 12' 32.911" N	86° 55' 52.787" E
	22	22° 12' 19.086" N	86° 55' 38.458" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	23	22° 12' 16.232" N	86° 55' 24.746" E
JR_GB2_SR_23	1	22° 12' 14.208" N	86° 55' 35.144" E
	2	22° 12' 23.281" N	86° 55' 46.635" E
	3	22° 12' 29.401" N	86° 55' 49.942" E
	4	22° 12' 34.075" N	86° 55' 58.075" E
	5	22° 12' 36.743" N	86° 55' 59.323" E
	6	22° 12' 42.785" N	86° 55' 59.637" E
	7	22° 12' 50.872" N	86° 56' 5.726" E
	8	22° 12' 57.440" N	86° 56' 17.566" E
	9	22° 13' 5.994" N	86° 56' 26.913" E
	10	22° 13' 10.249" N	86° 56' 35.486" E
	11	22° 13' 13.406" N	86° 56' 44.883" E
	12	22° 13' 15.501" N	86° 56' 49.691" E
	13	22° 13' 16.027" N	86° 56' 51.068" E
	14	22° 13' 15.327" N	86° 56' 55.741" E
	15	22° 13' 11.673" N	86° 56' 59.089" E
	16	22° 13' 6.897" N	86° 57' 0.339" E
	17	22° 12' 59.542" N	86° 57' 6.579" E
	18	22° 12' 57.694" N	86° 57' 13.485" E
	19	22° 12' 48.160" N	86° 56' 59.600" E
	20	22° 12' 39.128" N	86° 56' 52.367" E
	21	22° 12' 30.152" N	86° 56' 37.653" E
	22	22° 12' 29.376" N	86° 56' 32.386" E
	23	22° 12' 15.817" N	86° 56' 17.144" E
	24	22° 12' 14.007" N	86° 56' 9.382" E
JR_GB2_SR_24	1	22° 13' 36.738" N	86° 57' 51.712" E
	2	22° 13' 37.268" N	86° 57' 53.607" E
	3	22° 13' 37.308" N	86° 57' 58.662" E
	4	22° 13' 37.343" N	86° 58' 2.969" E
	5	22° 13' 36.988" N	86° 58' 5.434" E
	6	22° 13' 35.895" N	86° 58' 13.017" E
	7	22° 13' 35.356" N	86° 58' 14.718" E
	8	22° 13' 33.143" N	86° 58' 21.706" E
	9	22° 13' 30.356" N	86° 58' 25.754" E
	10	22° 13' 27.555" N	86° 58' 29.824" E
	11	22° 13' 25.572" N	86° 58' 32.705" E
	12	22° 13' 23.494" N	86° 58' 34.272" E
	13	22° 13' 23.483" N	86° 58' 34.280" E
	14	22° 13' 25.376" N	86° 58' 28.366" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	15	22° 13' 25.246" N	86° 58' 24.068" E
	16	22° 13' 25.562" N	86° 58' 20.330" E
	17	22° 13' 25.181" N	86° 58' 11.339" E
	18	22° 13' 25.122" N	86° 58' 7.681" E
	19	22° 13' 23.176" N	86° 57' 58.421" E
	20	22° 13' 18.010" N	86° 57' 46.916" E
	21	22° 13' 13.750" N	86° 57' 42.203" E
	22	22° 13' 10.435" N	86° 57' 39.076" E
	23	22° 13' 7.397" N	86° 57' 31.043" E
	24	22° 13' 2.964" N	86° 57' 21.734" E
	25	22° 13' 3.159" N	86° 57' 17.946" E
	26	22° 13' 3.416" N	86° 57' 12.955" E
	27	22° 13' 6.857" N	86° 57' 7.532" E
	28	22° 13' 7.967" N	86° 57' 6.237" E
	29	22° 13' 10.627" N	86° 57' 4.039" E
	30	22° 13' 12.183" N	86° 57' 3.288" E
	31	22° 13' 14.322" N	86° 57' 2.172" E
	32	22° 13' 14.753" N	86° 57' 1.826" E
	33	22° 13' 16.048" N	86° 57' 0.783" E
	34	22° 13' 17.352" N	86° 56' 59.580" E
	35	22° 13' 19.248" N	86° 56' 58.002" E
	36	22° 13' 19.345" N	86° 56' 57.837" E
	37	22° 13' 24.676" N	86° 57' 15.824" E
	38	22° 13' 29.937" N	86° 57' 36.049" E
	39	22° 13' 30.183" N	86° 57' 36.995" E
	40	22° 13' 32.213" N	86° 57' 42.856" E
JR_GB2_SR_25	1	22° 11' 42.032" N	86° 59' 0.526" E
	2	22° 11' 57.219" N	86° 58' 56.750" E
	3	22° 12' 32.305" N	86° 58' 43.016" E
	4	22° 12' 52.019" N	86° 58' 33.703" E
	5	22° 13' 4.823" N	86° 58' 25.493" E
	6	22° 13' 9.778" N	86° 58' 18.395" E
	7	22° 13' 12.874" N	86° 58' 5.307" E
	8	22° 13' 13.269" N	86° 57' 57.960" E
	9	22° 13' 16.239" N	86° 58' 1.112" E
	10	22° 13' 19.492" N	86° 58' 3.108" E
	11	22° 13' 21.570" N	86° 58' 5.686" E
	12	22° 13' 21.922" N	86° 58' 9.190" E
	13	22° 13' 20.895" N	86° 58' 17.964" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	14	22° 13' 22.277" N	86° 58' 24.069" E
	15	22° 13' 21.633" N	86° 58' 27.950" E
	16	22° 13' 18.277" N	86° 58' 33.774" E
	17	22° 13' 12.082" N	86° 58' 37.795" E
	18	22° 12' 59.692" N	86° 58' 49.580" E
	19	22° 12' 54.242" N	86° 58' 51.570" E
	20	22° 12' 53.002" N	86° 58' 51.814" E
	21	22° 12' 50.111" N	86° 58' 54.321" E
	22	22° 12' 47.546" N	86° 58' 55.565" E
	23	22° 12' 46.796" N	86° 58' 56.137" E
	24	22° 12' 44.710" N	86° 58' 57.236" E
	25	22° 12' 43.230" N	86° 58' 57.594" E
	26	22° 12' 40.455" N	86° 59' 0.162" E
	27	22° 12' 38.293" N	86° 59' 3.360" E
	28	22° 12' 35.717" N	86° 59' 6.176" E
	29	22° 12' 34.862" N	86° 59' 6.397" E
	30	22° 12' 34.012" N	86° 59' 6.319" E
	31	22° 12' 32.462" N	86° 59' 6.627" E
	32	22° 12' 31.347" N	86° 59' 7.430" E
	33	22° 12' 31.070" N	86° 59' 8.007" E
	34	22° 12' 30.097" N	86° 59' 9.111" E
	35	22° 12' 26.934" N	86° 59' 12.517" E
	36	22° 12' 23.407" N	86° 59' 12.437" E
	37	22° 12' 22.870" N	86° 59' 12.673" E
	38	22° 12' 22.066" N	86° 59' 12.586" E
	39	22° 12' 20.867" N	86° 59' 13.336" E
	40	22° 12' 19.806" N	86° 59' 13.512" E
	41	22° 12' 18.075" N	86° 59' 13.757" E
	42	22° 12' 16.246" N	86° 59' 15.665" E
	43	22° 12' 1.997" N	86° 59' 16.895" E
	44	22° 11' 57.866" N	86° 59' 16.618" E
	45	22° 11' 49.794" N	86° 59' 14.030" E
	46	22° 11' 44.700" N	86° 59' 14.956" E
	47	22° 11' 34.374" N	86° 59' 13.848" E
	48	22° 11' 28.307" N	86° 59' 12.463" E
	49	22° 11' 20.120" N	86° 59' 6.982" E
JR_GB2_SR_26_28A	1	22° 11' 16.365" N	86° 59' 10.427" E
	2	22° 11' 19.608" N	86° 59' 11.302" E
	3	22° 11' 22.862" N	86° 59' 13.441" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	4	22° 11' 24.046" N	86° 59' 13.735" E
	5	22° 11' 25.527" N	86° 59' 14.340" E
	6	22° 11' 27.011" N	86° 59' 14.629" E
	7	22° 11' 35.064" N	86° 59' 17.021" E
	8	22° 11' 38.978" N	86° 59' 18.856" E
	9	22° 11' 39.881" N	86° 59' 19.159" E
	10	22° 11' 47.141" N	86° 59' 19.040" E
	11	22° 11' 49.270" N	86° 59' 18.685" E
	12	22° 11' 50.181" N	86° 59' 18.671" E
	13	22° 11' 56.599" N	86° 59' 18.564" E
	14	22° 11' 59.978" N	86° 59' 19.151" E
	15	22° 12' 1.212" N	86° 59' 19.773" E
	16	22° 12' 2.751" N	86° 59' 20.070" E
	17	22° 12' 11.132" N	86° 59' 19.933" E
	18	22° 12' 11.748" N	86° 59' 19.279" E
	19	22° 12' 17.052" N	86° 59' 18.223" E
	20	22° 12' 22.611" N	86° 59' 18.133" E
	21	22° 11' 58.371" N	86° 59' 31.285" E
	22	22° 11' 24.225" N	86° 59' 36.166" E
	23	22° 11' 16.102" N	86° 59' 33.801" E
	24	22° 11' 10.182" N	86° 59' 34.688" E
	25	22° 11' 2.087" N	86° 59' 45.154" E
	26	22° 11' 0.556" N	86° 59' 34.502" E
	27	22° 11' 2.750" N	86° 59' 22.028" E
	28	22° 11' 9.587" N	86° 59' 11.641" E
	29	22° 11' 14.283" N	86° 59' 10.800" E
JR_GB2_SR_26_28B	1	22° 10' 46.279" N	86° 59' 53.173" E
	2	22° 10' 48.811" N	86° 59' 51.688" E
	3	22° 10' 52.024" N	86° 59' 50.682" E
	4	22° 10' 55.007" N	86° 59' 49.748" E
	5	22° 10' 56.257" N	86° 59' 48.958" E
	6	22° 10' 58.086" N	86° 59' 49.451" E
	7	22° 10' 54.368" N	86° 59' 53.442" E
	8	22° 10' 51.733" N	86° 59' 56.272" E
	9	22° 10' 33.558" N	87° 0' 17.116" E
	10	22° 10' 28.057" N	87° 0' 29.252" E
	11	22° 10' 26.677" N	87° 0' 27.557" E
	12	22° 10' 24.006" N	87° 0' 24.298" E
	13	22° 10' 22.313" N	87° 0' 22.210" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	14	22° 10' 26.435" N	87° 0' 17.746" E
	15	22° 10' 35.151" N	87° 0' 8.477" E
	16	22° 10' 41.264" N	86° 59' 59.097" E
	17	22° 10' 42.167" N	86° 59' 56.512" E
	18	22° 10' 43.260" N	86° 59' 54.322" E
	19	22° 10' 44.134" N	86° 59' 54.162" E
	20	22° 10' 44.800" N	86° 59' 54.040" E
	21	22° 10' 45.751" N	86° 59' 53.482" E
JR_GB2_SR_27	1	22° 11' 0.556" N	86° 59' 34.502" E
	2	22° 11' 2.087" N	86° 59' 45.154" E
	3	22° 10' 58.530" N	86° 59' 49.576" E
	4	22° 10' 56.257" N	86° 59' 48.958" E
	5	22° 10' 55.007" N	86° 59' 49.748" E
	6	22° 10' 48.811" N	86° 59' 51.688" E
	7	22° 10' 44.800" N	86° 59' 54.040" E
	8	22° 10' 43.260" N	86° 59' 54.322" E
	9	22° 10' 53.726" N	86° 59' 26.251" E
	10	22° 10' 58.738" N	86° 59' 15.802" E
	11	22° 11' 5.489" N	86° 59' 13.213" E
	12	22° 11' 3.494" N	86° 59' 16.018" E
	13	22° 10' 59.737" N	86° 59' 24.486" E
	14	22° 10' 59.157" N	86° 59' 27.610" E
	15	22° 10' 59.328" N	86° 59' 31.008" E
JR_NY_SR_29	1	22° 10' 44.158" N	86° 59' 49.254" E
	2	22° 10' 43.108" N	86° 59' 52.193" E
	3	22° 10' 41.290" N	86° 59' 55.148" E
	4	22° 10' 35.008" N	86° 59' 55.980" E
	5	22° 10' 30.361" N	86° 59' 56.165" E
	6	22° 10' 26.575" N	86° 59' 58.937" E
	7	22° 10' 23.993" N	87° 0' 4.665" E
	8	22° 10' 20.551" N	87° 0' 6.697" E
	9	22° 10' 16.335" N	87° 0' 9.469" E
	10	22° 10' 13.495" N	87° 0' 13.072" E
	11	22° 10' 11.688" N	87° 0' 15.382" E
	12	22° 10' 10.053" N	87° 0' 14.735" E
	13	22° 10' 9.077" N	87° 0' 13.288" E
	14	22° 10' 13.818" N	87° 0' 2.684" E
	15	22° 10' 18.990" N	86° 59' 51.114" E
	16	22° 10' 29.936" N	86° 59' 40.027" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	17	22° 10' 42.533" N	86° 59' 29.604" E
	18	22° 10' 55.131" N	86° 59' 17.186" E
	19	22° 10' 57.421" N	86° 59' 16.307" E
	20	22° 10' 52.831" N	86° 59' 26.044" E
JR_NY_SR_30	1	22° 10' 17.888" N	87° 0' 9.535" E
	2	22° 10' 23.993" N	87° 0' 7.150" E
	3	22° 10' 27.617" N	86° 59' 59.530" E
	4	22° 10' 32.380" N	86° 59' 57.097" E
	5	22° 10' 41.696" N	86° 59' 56.510" E
	6	22° 10' 41.719" N	86° 59' 56.510" E
	7	22° 10' 34.920" N	87° 0' 8.066" E
	8	22° 10' 21.867" N	87° 0' 22.050" E
	9	22° 9' 50.347" N	87° 1' 34.029" E
	10	22° 9' 47.726" N	87° 1' 32.311" E
	11	22° 9' 48.211" N	87° 1' 30.890" E
	12	22° 9' 47.436" N	87° 1' 21.209" E
	13	22° 9' 50.176" N	87° 1' 17.360" E
	14	22° 9' 56.061" N	87° 1' 7.454" E
	15	22° 9' 58.035" N	87° 1' 5.300" E
	16	22° 9' 52.375" N	87° 1' 5.008" E
	17	22° 9' 48.956" N	87° 1' 6.337" E
	18	22° 9' 46.782" N	87° 1' 6.960" E
	19	22° 9' 48.415" N	87° 0' 48.000" E
	20	22° 9' 49.571" N	87° 0' 47.028" E
	21	22° 9' 56.317" N	87° 0' 39.333" E
	22	22° 10' 9.398" N	87° 0' 16.606" E
	23	22° 10' 14.297" N	87° 0' 15.582" E
JR_SK_SR_31	1	22° 9' 52.868" N	87° 1' 38.408" E
	2	22° 9' 50.747" N	87° 1' 34.219" E
	3	22° 10' 22.195" N	87° 0' 22.342" E
	4	22° 10' 27.975" N	87° 0' 29.433" E
	5	22° 10' 18.549" N	87° 0' 50.228" E
	6	22° 10' 10.973" N	87° 1' 17.870" E
	7	22° 10' 10.006" N	87° 1' 39.600" E
	8	22° 10' 6.464" N	87° 2' 11.047" E
	9	22° 10' 6.160" N	87° 2' 35.072" E
	10	22° 9' 47.254" N	87° 3' 0.875" E
	11	22° 9' 47.254" N	87° 2' 59.746" E
	12	22° 9' 46.768" N	87° 2' 59.159" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	13	22° 9' 46.526" N	87° 2' 58.062" E
	14	22° 9' 45.314" N	87° 2' 55.262" E
	15	22° 9' 46.283" N	87° 2' 53.479" E
	16	22° 9' 48.714" N	87° 2' 52.364" E
	17	22° 9' 50.665" N	87° 2' 49.858" E
	18	22° 9' 52.868" N	87° 2' 46.829" E
	19	22° 9' 54.094" N	87° 2' 45.856" E
	20	22° 9' 54.340" N	87° 2' 42.644" E
	21	22° 9' 54.833" N	87° 2' 41.059" E
	22	22° 9' 55.079" N	87° 2' 28.942" E
	23	22° 9' 55.324" N	87° 2' 27.872" E
	24	22° 9' 55.325" N	87° 2' 25.988" E
	25	22° 9' 56.063" N	87° 2' 23.869" E
	26	22° 9' 56.309" N	87° 2' 23.344" E
	27	22° 9' 57.049" N	87° 2' 21.777" E
	28	22° 9' 57.049" N	87° 2' 20.696" E
	29	22° 9' 57.297" N	87° 2' 18.552" E
	30	22° 9' 57.641" N	87° 2' 16.128" E
	31	22° 9' 56.356" N	87° 2' 12.157" E
	32	22° 9' 54.722" N	87° 2' 6.891" E
	33	22° 9' 54.121" N	87° 2' 0.608" E
	34	22° 9' 56.557" N	87° 1' 53.654" E
	35	22° 9' 56.534" N	87° 1' 41.208" E
	36	22° 9' 54.586" N	87° 1' 39.000" E
JR_SK_SR_33	1	22° 9' 10.391" N	87° 3' 16.415" E
	2	22° 9' 20.727" N	87° 2' 44.493" E
	3	22° 9' 32.297" N	87° 2' 25.429" E
	4	22° 9' 41.842" N	87° 1' 49.705" E
	5	22° 9' 45.859" N	87° 1' 37.786" E
	6	22° 9' 48.885" N	87° 1' 38.361" E
	7	22° 9' 52.058" N	87° 1' 45.457" E
	8	22° 9' 52.746" N	87° 1' 51.924" E
	9	22° 9' 52.938" N	87° 2' 2.732" E
	10	22° 9' 52.052" N	87° 2' 16.683" E
	11	22° 9' 53.943" N	87° 2' 24.628" E
	12	22° 9' 52.564" N	87° 2' 32.388" E
	13	22° 9' 47.311" N	87° 2' 48.092" E
	14	22° 9' 39.664" N	87° 2' 53.774" E
	15	22° 9' 40.877" N	87° 2' 58.202" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	16	22° 9' 42.341" N	87° 3' 1.620" E
	17	22° 9' 42.098" N	87° 3' 5.490" E
	18	22° 9' 41.367" N	87° 3' 7.009" E
	19	22° 9' 40.154" N	87° 3' 10.313" E
	20	22° 9' 38.698" N	87° 3' 12.046" E
	21	22° 9' 35.556" N	87° 3' 14.455" E
	22	22° 9' 34.834" N	87° 3' 16.214" E
	23	22° 9' 33.872" N	87° 3' 20.009" E
	24	22° 9' 33.632" N	87° 3' 21.020" E
	25	22° 9' 32.911" N	87° 3' 27.383" E
	26	22° 9' 31.235" N	87° 3' 29.061" E
	27	22° 9' 21.050" N	87° 3' 32.795" E
	28	22° 8' 58.327" N	87° 3' 46.734" E
	29	22° 8' 54.282" N	87° 3' 48.303" E
	30	22° 8' 47.482" N	87° 3' 52.826" E
	31	22° 8' 44.640" N	87° 3' 58.090" E
	32	22° 8' 42.916" N	87° 4' 5.756" E
	33	22° 8' 43.085" N	87° 4' 13.700" E
	34	22° 8' 43.769" N	87° 4' 22.014" E
	35	22° 8' 42.561" N	87° 4' 30.973" E
	36	22° 8' 26.981" N	87° 4' 39.925" E
	37	22° 8' 18.033" N	87° 4' 37.426" E
	38	22° 8' 14.091" N	87° 4' 39.621" E
JR_SK_SR_34_37	1	22° 8' 45.400" N	87° 4' 13.032" E
	2	22° 8' 45.834" N	87° 4' 3.333" E
	3	22° 8' 48.849" N	87° 3' 55.483" E
	4	22° 9' 13.188" N	87° 3' 41.743" E
	5	22° 9' 26.422" N	87° 3' 35.350" E
	6	22° 9' 31.751" N	87° 3' 32.681" E
	7	22° 9' 27.564" N	87° 3' 45.081" E
	8	22° 9' 24.106" N	87° 4' 24.988" E
	9	22° 8' 56.413" N	87° 5' 2.662" E
	10	22° 8' 35.873" N	87° 5' 47.875" E
	11	22° 8' 22.640" N	87° 6' 11.660" E
	12	22° 8' 15.055" N	87° 6' 31.901" E
	13	22° 8' 6.373" N	87° 6' 43.669" E
	14	22° 8' 5.362" N	87° 6' 39.790" E
	15	22° 8' 3.684" N	87° 6' 33.338" E
	16	22° 8' 1.771" N	87° 6' 29.485" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	17	22° 8' 1.534" N	87° 6' 23.735" E
	18	22° 7' 58.917" N	87° 6' 20.881" E
	19	22° 7' 54.663" N	87° 6' 18.122" E
	20	22° 7' 51.387" N	87° 6' 14.472" E
	21	22° 7' 51.155" N	87° 6' 10.591" E
	22	22° 7' 49.295" N	87° 6' 6.839" E
	23	22° 7' 48.600" N	87° 6' 3.962" E
	24	22° 7' 47.678" N	87° 5' 53.914" E
	25	22° 7' 46.757" N	87° 5' 48.357" E
	26	22° 7' 51.047" N	87° 5' 39.600" E
	27	22° 7' 58.691" N	87° 5' 35.467" E
	28	22° 8' 1.313" N	87° 5' 30.974" E
	29	22° 8' 0.621" N	87° 5' 17.203" E
	30	22° 8' 3.854" N	87° 5' 5.198" E
	31	22° 8' 9.885" N	87° 4' 52.039" E
	32	22° 8' 42.159" N	87° 4' 34.730" E
	33	22° 8' 46.177" N	87° 4' 27.187" E
JR_SK_SR_39	1	22° 7' 42.536" N	87° 7' 8.230" E
	2	22° 7' 28.485" N	87° 7' 17.380" E
	3	22° 7' 14.303" N	87° 7' 22.051" E
	4	22° 7' 9.133" N	87° 7' 16.326" E
	5	22° 7' 4.782" N	87° 7' 16.038" E
	6	22° 7' 2.242" N	87° 7' 17.100" E
	7	22° 6' 59.710" N	87° 7' 20.560" E
	8	22° 6' 56.013" N	87° 7' 23.942" E
	9	22° 6' 52.468" N	87° 7' 23.944" E
	10	22° 6' 46.064" N	87° 7' 22.018" E
	11	22° 6' 44.112" N	87° 7' 20.683" E
	12	22° 6' 41.926" N	87° 7' 19.876" E
	13	22° 6' 39.267" N	87° 7' 19.854" E
	14	22° 6' 37.343" N	87° 7' 20.881" E
	15	22° 6' 34.948" N	87° 7' 24.239" E
	16	22° 6' 32.329" N	87° 7' 26.538" E
	17	22° 6' 30.199" N	87° 7' 26.504" E
	18	22° 6' 28.079" N	87° 7' 25.696" E
	19	22° 6' 25.735" N	87° 7' 23.342" E
	20	22° 6' 22.705" N	87° 7' 24.587" E
	21	22° 6' 21.083" N	87° 7' 25.334" E
	22	22° 6' 14.194" N	87° 7' 28.535" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	23	22° 6' 11.696" N	87° 7' 28.488" E
	24	22° 6' 9.343" N	87° 7' 26.986" E
	25	22° 6' 3.847" N	87° 7' 28.954" E
	26	22° 5' 58.133" N	87° 7' 33.792" E
	27	22° 5' 55.972" N	87° 7' 35.213" E
	28	22° 5' 51.406" N	87° 7' 35.288" E
	29	22° 5' 49.006" N	87° 7' 34.780" E
	30	22° 5' 48.471" N	87° 7' 32.596" E
	31	22° 5' 52.197" N	87° 7' 28.672" E
	32	22° 5' 55.957" N	87° 7' 28.031" E
	33	22° 5' 59.199" N	87° 7' 25.459" E
	34	22° 6' 2.743" N	87° 7' 24.251" E
	35	22° 6' 7.220" N	87° 7' 21.521" E
	36	22° 6' 4.294" N	87° 7' 15.787" E
	37	22° 6' 4.283" N	87° 7' 15.750" E
	38	22° 6' 11.617" N	87° 7' 13.931" E
	39	22° 6' 35.990" N	87° 7' 10.406" E
	40	22° 6' 46.526" N	87° 7' 6.203" E
	41	22° 7' 11.943" N	87° 6' 46.497" E
	42	22° 7' 38.015" N	87° 6' 5.555" E
	43	22° 7' 42.163" N	87° 6' 3.516" E
	44	22° 7' 47.968" N	87° 6' 5.926" E
	45	22° 7' 49.925" N	87° 6' 11.706" E
	46	22° 7' 50.492" N	87° 6' 18.150" E
	47	22° 7' 51.905" N	87° 6' 20.043" E
	48	22° 7' 53.584" N	87° 6' 19.959" E
	49	22° 7' 56.724" N	87° 6' 22.616" E
	50	22° 7' 58.430" N	87° 6' 26.509" E
	51	22° 7' 59.854" N	87° 6' 33.276" E
	52	22° 8' 1.285" N	87° 6' 35.215" E
	53	22° 8' 2.715" N	87° 6' 40.302" E
	54	22° 8' 2.701" N	87° 6' 46.872" E
	55	22° 8' 1.839" N	87° 6' 49.815" E
JR_SK_SR_40	1	22° 6' 4.455" N	87° 7' 36.735" E
	2	22° 6' 8.336" N	87° 7' 35.771" E
	3	22° 6' 12.245" N	87° 7' 35.496" E
	4	22° 6' 17.142" N	87° 7' 35.910" E
	5	22° 6' 3.166" N	87° 7' 48.255" E
	6	22° 5' 54.861" N	87° 8' 3.798" E

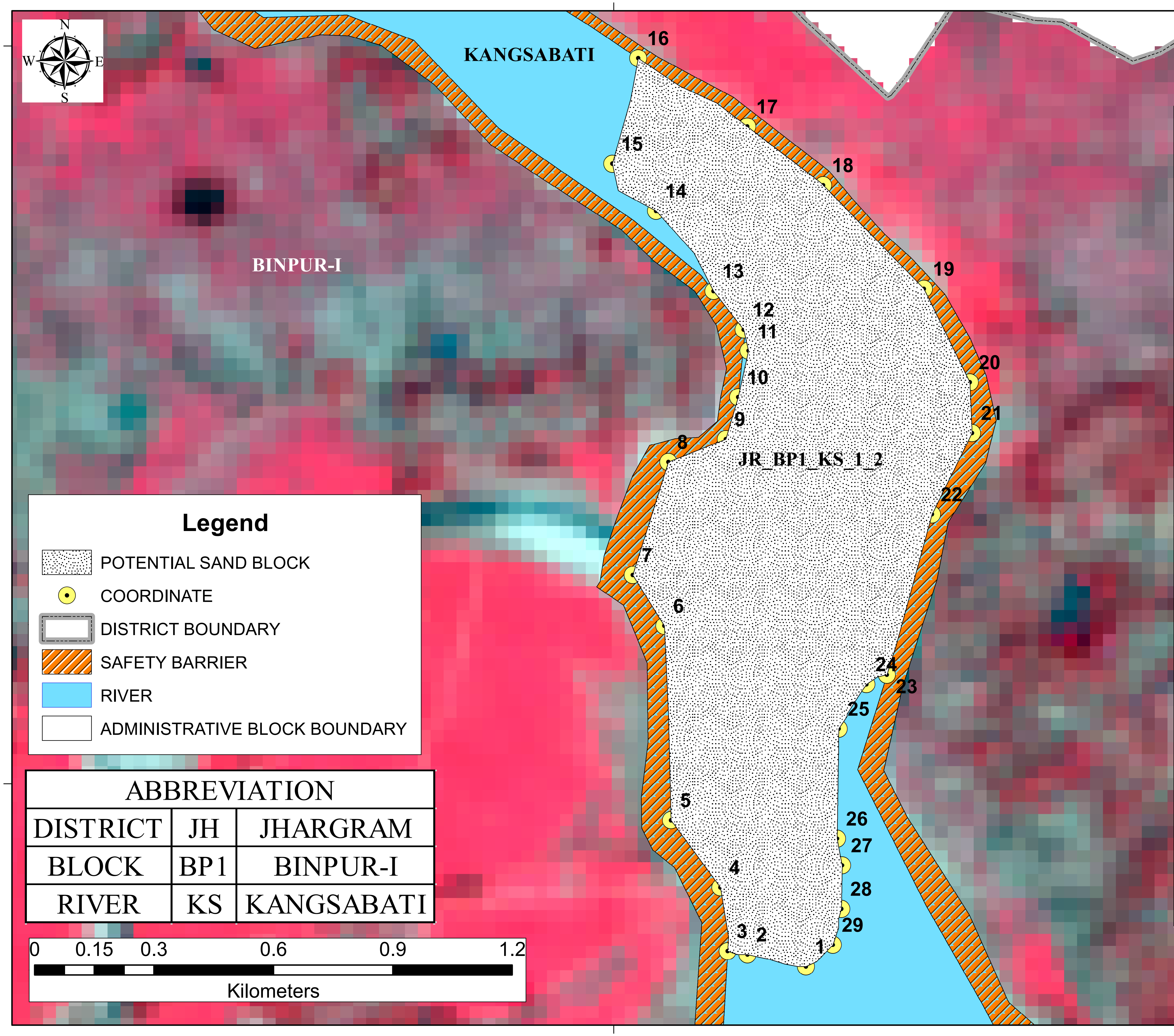
SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	7	22° 5' 48.403" N	87° 8' 8.640" E
	8	22° 5' 38.640" N	87° 8' 10.938" E
	9	22° 5' 36.501" N	87° 8' 14.961" E
	10	22° 5' 18.231" N	87° 8' 4.674" E
	11	22° 5' 21.258" N	87° 7' 47.062" E
	12	22° 5' 27.107" N	87° 7' 39.925" E
	13	22° 5' 37.521" N	87° 7' 37.349" E
	14	22° 5' 45.513" N	87° 7' 32.128" E
	15	22° 5' 49.570" N	87° 7' 36.252" E
JR_NY_SR_41	1	22° 3' 30.372" N	87° 10' 7.274" E
	2	22° 3' 30.593" N	87° 9' 52.652" E
	3	22° 3' 50.438" N	87° 9' 34.285" E
	4	22° 4' 14.629" N	87° 9' 6.393" E
	5	22° 5' 12.795" N	87° 8' 14.753" E
	6	22° 5' 16.878" N	87° 8' 14.817" E
	7	22° 5' 7.747" N	87° 8' 33.454" E
	8	22° 5' 9.171" N	87° 9' 18.263" E
	9	22° 4' 22.820" N	87° 9' 49.682" E
	10	22° 4' 1.034" N	87° 10' 1.884" E
	11	22° 3' 28.847" N	87° 10' 16.982" E
JR_NY_SR_42	1	22° 1' 12.528" N	87° 12' 12.414" E
	2	22° 1' 15.025" N	87° 12' 12.972" E
	3	22° 0' 44.468" N	87° 12' 31.568" E
	4	22° 0' 36.711" N	87° 12' 43.783" E
	5	22° 0' 34.020" N	87° 12' 44.837" E
	6	22° 0' 28.270" N	87° 12' 39.713" E
	7	22° 0' 29.117" N	87° 12' 34.544" E
	8	22° 0' 27.074" N	87° 12' 32.776" E
	9	22° 0' 24.220" N	87° 12' 29.155" E
	10	22° 0' 21.183" N	87° 12' 26.908" E
	11	22° 0' 18.593" N	87° 12' 25.571" E
	12	22° 0' 18.589" N	87° 12' 24.683" E
	13	22° 0' 23.067" N	87° 12' 23.482" E
	14	22° 0' 36.112" N	87° 12' 23.501" E
	15	22° 0' 46.858" N	87° 12' 18.422" E
	16	22° 0' 52.309" N	87° 12' 10.500" E
	17	22° 0' 52.334" N	87° 12' 10.500" E
	18	22° 0' 54.516" N	87° 12' 9.500" E
	19	22° 1' 0.901" N	87° 12' 9.327" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
	20	22° 1' 2.901" N	87° 12' 9.751" E
	21	22° 1' 9.469" N	87° 12' 12.238" E
JR_NY_SR_43	1	22° 0' 23.308" N	87° 12' 43.550" E
	2	21° 59' 53.301" N	87° 12' 56.513" E
	3	21° 59' 8.773" N	87° 13' 5.876" E
	4	21° 58' 59.115" N	87° 13' 7.507" E
	5	21° 58' 46.599" N	87° 13' 30.463" E
	6	21° 58' 47.992" N	87° 13' 34.386" E
	7	21° 58' 56.271" N	87° 13' 36.822" E
	8	21° 58' 57.164" N	87° 13' 38.223" E
	9	21° 58' 56.052" N	87° 13' 41.211" E
	10	21° 58' 54.230" N	87° 13' 42.982" E
	11	21° 58' 36.184" N	87° 13' 49.448" E
	12	21° 58' 15.399" N	87° 13' 45.134" E
	13	21° 58' 1.049" N	87° 13' 43.896" E
	14	21° 57' 53.245" N	87° 13' 38.626" E
	15	21° 57' 47.689" N	87° 13' 33.794" E
	16	21° 57' 49.866" N	87° 13' 32.454" E
	17	21° 57' 58.453" N	87° 13' 22.086" E
	18	21° 58' 2.602" N	87° 13' 15.498" E
	19	21° 58' 9.680" N	87° 13' 11.053" E
	20	21° 58' 12.209" N	87° 13' 10.943" E
	21	21° 58' 17.877" N	87° 13' 5.518" E
	22	21° 58' 23.919" N	87° 13' 3.487" E
	23	21° 58' 25.893" N	87° 12' 59.867" E
	24	21° 58' 25.951" N	87° 12' 59.848" E
	25	21° 58' 37.613" N	87° 12' 55.407" E
	26	21° 58' 53.805" N	87° 12' 49.241" E
	27	21° 59' 1.053" N	87° 12' 51.537" E
	28	21° 59' 22.092" N	87° 12' 50.779" E
	29	21° 59' 26.622" N	87° 12' 48.476" E
	30	21° 59' 34.239" N	87° 12' 47.056" E
	31	21° 59' 50.629" N	87° 12' 31.753" E
	32	21° 59' 57.357" N	87° 12' 27.686" E
	33	22° 0' 2.718" N	87° 12' 27.003" E
	34	22° 0' 12.543" N	87° 12' 27.946" E
	35	22° 0' 19.354" N	87° 12' 31.279" E
	36	22° 0' 25.129" N	87° 12' 37.488" E
	37	22° 0' 27.124" N	87° 12' 46.445" E

SANDBAR CODE	POINT ID	LATITUDE	LONGITUDE
JR_NY_SR_43A	1	21° 59' 4.178" N	87° 12' 45.290" E
	2	21° 59' 12.025" N	87° 12' 46.188" E
	3	21° 59' 21.876" N	87° 12' 44.603" E
	4	21° 59' 20.251" N	87° 12' 46.938" E
	5	21° 59' 14.771" N	87° 12' 50.830" E
	6	21° 59' 11.207" N	87° 12' 50.985" E
	7	21° 59' 1.053" N	87° 12' 51.537" E
	8	21° 58' 53.805" N	87° 12' 49.241" E
JR_NY_SR_44	1	21° 57' 38.834" N	87° 13' 28.148" E
	2	21° 57' 55.373" N	87° 13' 9.101" E
	3	21° 58' 1.449" N	87° 13' 7.482" E
	4	21° 57' 56.707" N	87° 13' 17.502" E
	5	21° 57' 55.184" N	87° 13' 19.345" E
	6	21° 57' 52.233" N	87° 13' 23.413" E
	7	21° 57' 48.641" N	87° 13' 29.427" E
	8	21° 57' 42.291" N	87° 13' 29.507" E

Annexure 4
Map showing of Potential Blocks of Jhargram District

POTENTIAL BLOCK JR_BP1_KS_1_2 OF KANGSABATI RIVER

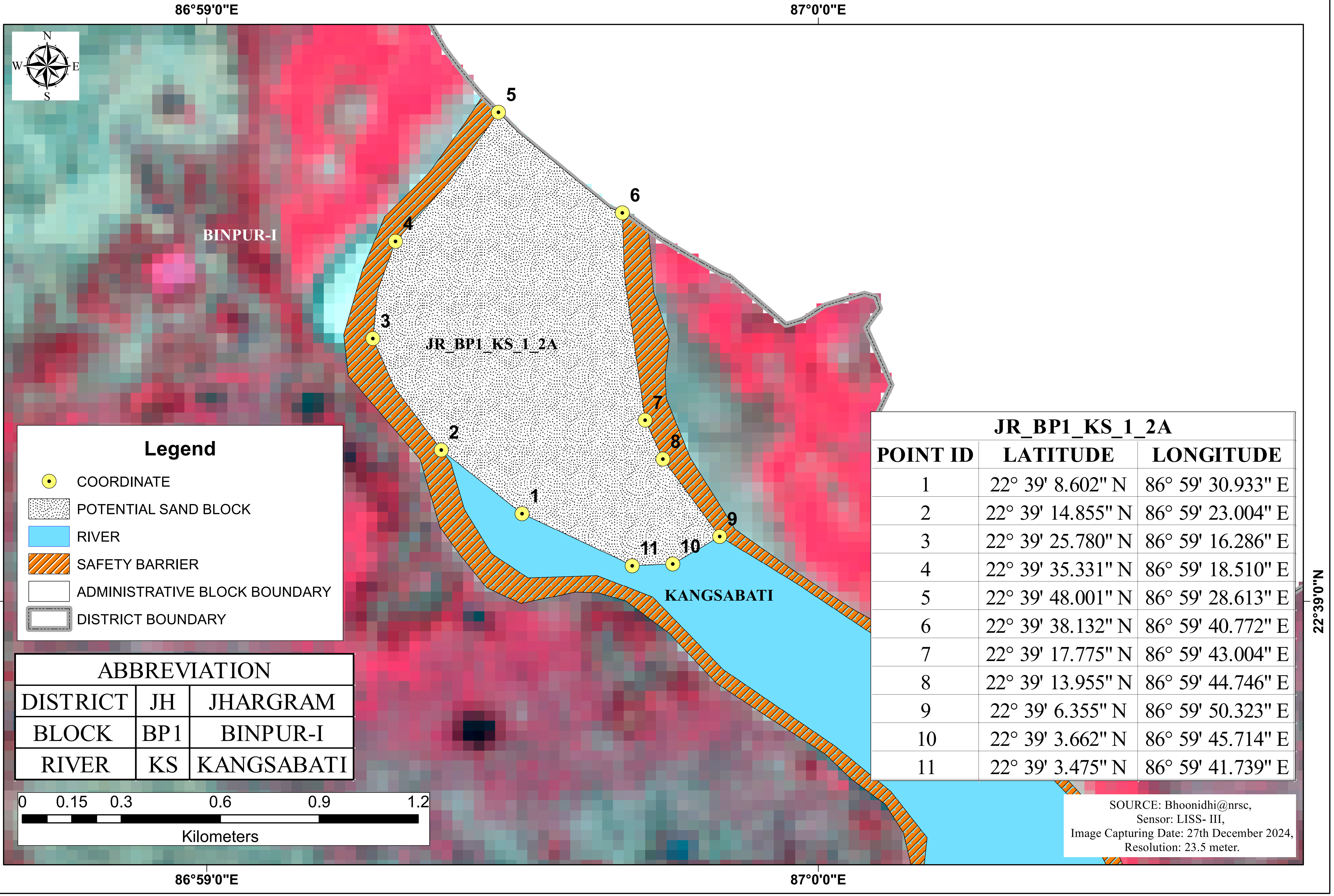


JR_BP1_KS_1_2		
POINT ID	LATITUDE	LONGITUDE
1	22° 37' 45.142" N	87° 0' 15.613" E
2	22° 37' 46.119" N	87° 0' 10.858" E
3	22° 37' 46.387" N	87° 0' 9.257" E
4	22° 37' 51.568" N	87° 0' 8.656" E
5	22° 37' 57.041" N	87° 0' 4.652" E
6	22° 38' 12.839" N	87° 0' 4.096" E
7	22° 38' 16.970" N	87° 0' 1.537" E
8	22° 38' 26.160" N	87° 0' 4.430" E
9	22° 38' 28.018" N	87° 0' 9.102" E
10	22° 38' 31.426" N	87° 0' 10.103" E
11	22° 38' 35.207" N	87° 0' 10.942" E
12	22° 38' 36.931" N	87° 0' 10.552" E
13	22° 38' 40.069" N	87° 0' 8.094" E
14	22° 38' 46.573" N	87° 0' 3.434" E
15	22° 38' 50.411" N	86° 59' 59.870" E
16	22° 38' 58.993" N	87° 0' 1.983" E
17	22° 38' 53.434" N	87° 0' 10.851" E
18	22° 38' 48.673" N	87° 0' 17.010" E
19	22° 38' 40.252" N	87° 0' 25.210" E
20	22° 38' 32.652" N	87° 0' 28.947" E
21	22° 38' 28.521" N	87° 0' 29.125" E
22	22° 38' 21.913" N	87° 0' 25.861" E
23	22° 38' 8.863" N	87° 0' 22.203" E
24	22° 38' 8.085" N	87° 0' 20.537" E
25	22° 38' 4.477" N	87° 0' 18.285" E
26	22° 37' 55.531" N	87° 0' 18.156" E
27	22° 37' 53.362" N	87° 0' 18.559" E
28	22° 37' 49.829" N	87° 0' 18.500" E
29	22° 37' 46.895" N	87° 0' 17.806" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_BP1_KS_1_2A OF KANGSABATI RIVER

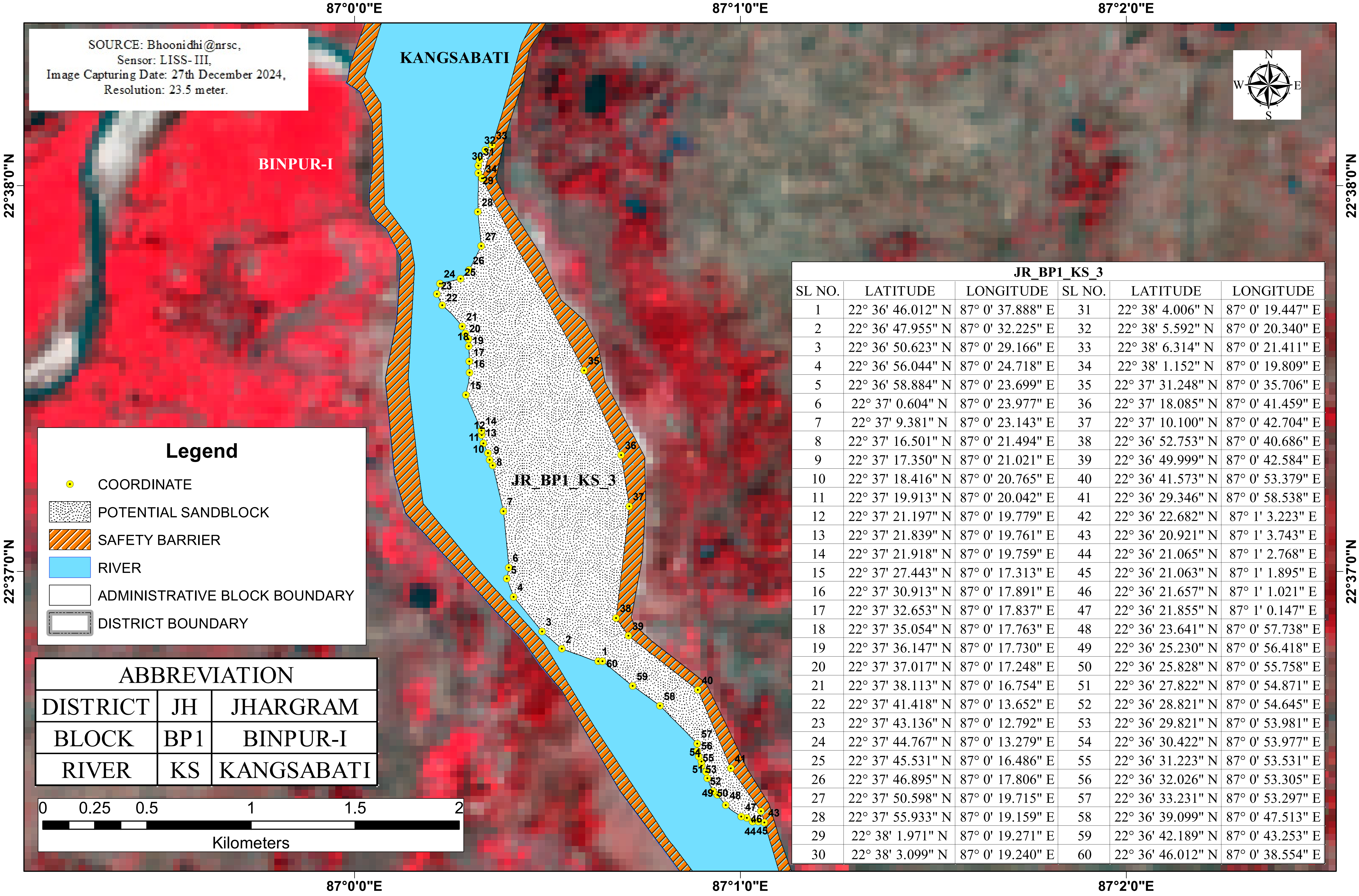


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_1_2A		
POINT ID	LATITUDE	LONGITUDE
1	22° 39' 8.602" N	86° 59' 30.933" E
2	22° 39' 14.855" N	86° 59' 23.004" E
3	22° 39' 25.780" N	86° 59' 16.286" E
4	22° 39' 35.331" N	86° 59' 18.510" E
5	22° 39' 48.001" N	86° 59' 28.613" E
6	22° 39' 38.132" N	86° 59' 40.772" E
7	22° 39' 17.775" N	86° 59' 43.004" E
8	22° 39' 13.955" N	86° 59' 44.746" E
9	22° 39' 6.355" N	86° 59' 50.323" E
10	22° 39' 3.662" N	86° 59' 45.714" E
11	22° 39' 3.475" N	86° 59' 41.739" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_BP1_KS_3 OF KANGSABATI RIVER

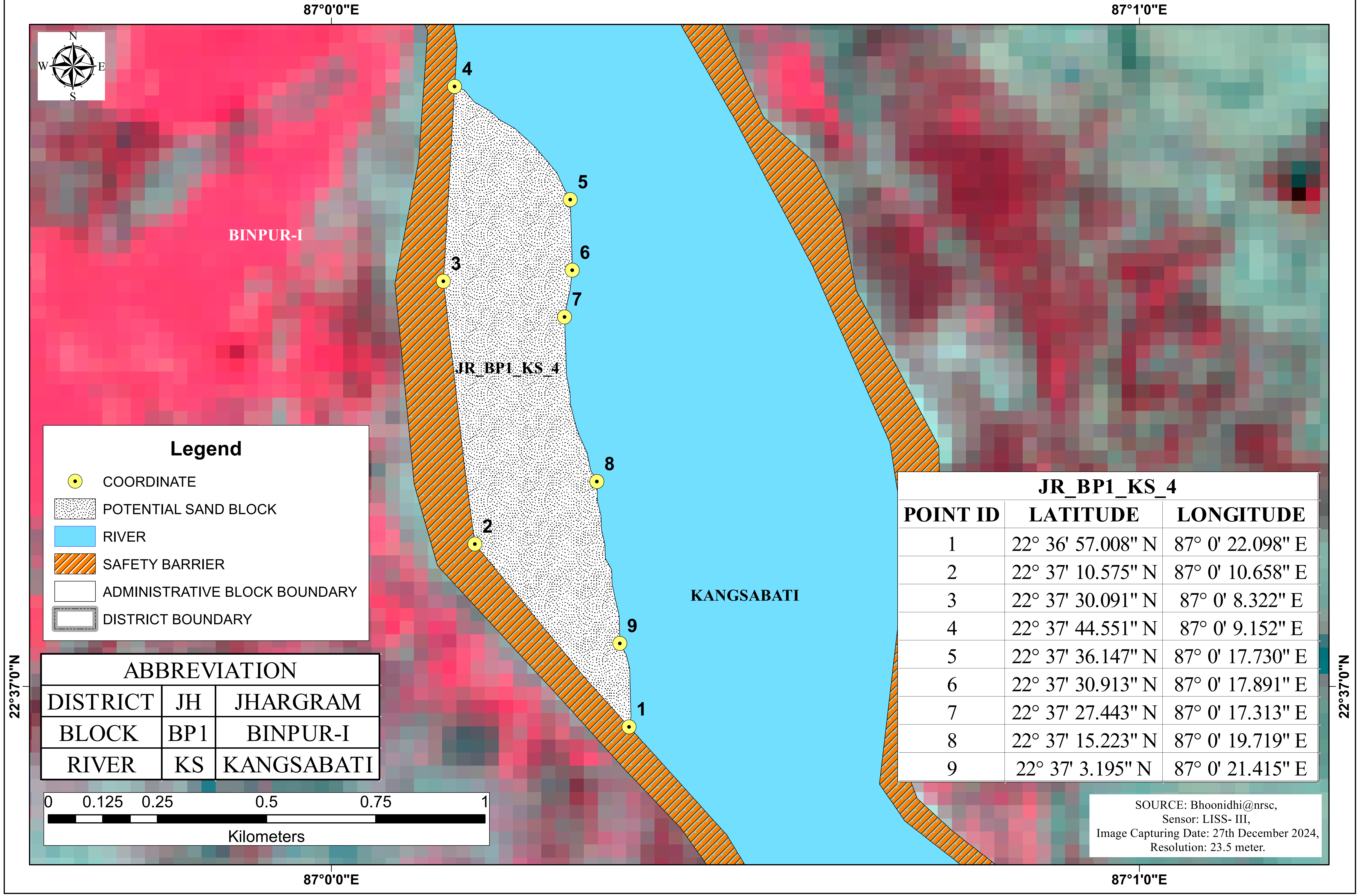


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_3

SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 36' 46.012" N	87° 0' 37.888" E	31	22° 38' 4.006" N	87° 0' 19.447" E
2	22° 36' 47.955" N	87° 0' 32.225" E	32	22° 38' 5.592" N	87° 0' 20.340" E
3	22° 36' 50.623" N	87° 0' 29.166" E	33	22° 38' 6.314" N	87° 0' 21.411" E
4	22° 36' 56.044" N	87° 0' 24.718" E	34	22° 38' 1.152" N	87° 0' 19.809" E
5	22° 36' 58.884" N	87° 0' 23.699" E	35	22° 37' 31.248" N	87° 0' 35.706" E
6	22° 37' 0.604" N	87° 0' 23.977" E	36	22° 37' 18.085" N	87° 0' 41.459" E
7	22° 37' 9.381" N	87° 0' 23.143" E	37	22° 37' 10.100" N	87° 0' 42.704" E
8	22° 37' 16.501" N	87° 0' 21.494" E	38	22° 36' 52.753" N	87° 0' 40.686" E
9	22° 37' 17.350" N	87° 0' 21.021" E	39	22° 36' 49.999" N	87° 0' 42.584" E
10	22° 37' 18.416" N	87° 0' 20.765" E	40	22° 36' 41.573" N	87° 0' 53.379" E
11	22° 37' 19.913" N	87° 0' 20.042" E	41	22° 36' 29.346" N	87° 0' 58.538" E
12	22° 37' 21.197" N	87° 0' 19.779" E	42	22° 36' 22.682" N	87° 1' 3.223" E
13	22° 37' 21.839" N	87° 0' 19.761" E	43	22° 36' 20.921" N	87° 1' 3.743" E
14	22° 37' 21.918" N	87° 0' 19.759" E	44	22° 36' 21.065" N	87° 1' 2.768" E
15	22° 37' 27.443" N	87° 0' 17.313" E	45	22° 36' 21.063" N	87° 1' 1.895" E
16	22° 37' 30.913" N	87° 0' 17.891" E	46	22° 36' 21.657" N	87° 1' 1.021" E
17	22° 37' 32.653" N	87° 0' 17.837" E	47	22° 36' 21.855" N	87° 1' 0.147" E
18	22° 37' 35.054" N	87° 0' 17.763" E	48	22° 36' 23.641" N	87° 0' 57.738" E
19	22° 37' 36.147" N	87° 0' 17.730" E	49	22° 36' 25.230" N	87° 0' 56.418" E
20	22° 37' 37.017" N	87° 0' 17.248" E	50	22° 36' 25.828" N	87° 0' 55.758" E
21	22° 37' 38.113" N	87° 0' 16.754" E	51	22° 36' 27.822" N	87° 0' 54.871" E
22	22° 37' 41.418" N	87° 0' 13.652" E	52	22° 36' 28.821" N	87° 0' 54.645" E
23	22° 37' 43.136" N	87° 0' 12.792" E	53	22° 36' 29.821" N	87° 0' 53.981" E
24	22° 37' 44.767" N	87° 0' 13.279" E	54	22° 36' 30.422" N	87° 0' 53.977" E
25	22° 37' 45.531" N	87° 0' 16.486" E	55	22° 36' 31.223" N	87° 0' 53.531" E
26	22° 37' 46.895" N	87° 0' 17.806" E	56	22° 36' 32.026" N	87° 0' 53.305" E
27	22° 37' 50.598" N	87° 0' 19.715" E	57	22° 36' 33.231" N	87° 0' 53.297" E
28	22° 37' 55.933" N	87° 0' 19.159" E	58	22° 36' 39.099" N	87° 0' 47.513" E
29	22° 38' 1.971" N	87° 0' 19.271" E	59	22° 36' 42.189" N	87° 0' 43.253" E
30	22° 38' 3.099" N	87° 0' 19.240" E	60	22° 36' 46.012" N	87° 0' 38.554" E

POTENTIAL BLOCK JR_BP1_KS_4 OF KANGSABATI RIVER

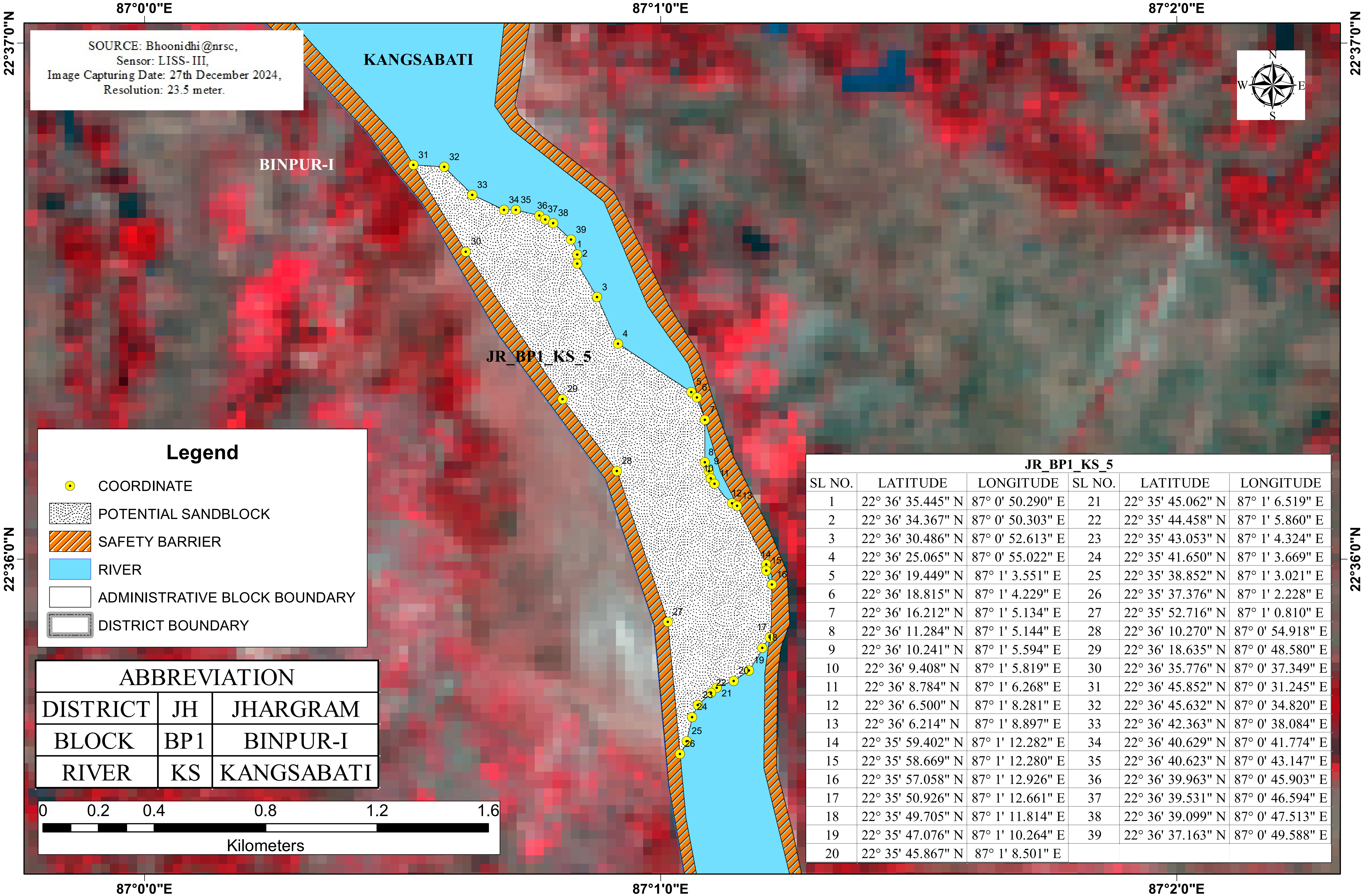


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_4		
POINT ID	LATITUDE	LONGITUDE
1	22° 36' 57.008" N	87° 0' 22.098" E
2	22° 37' 10.575" N	87° 0' 10.658" E
3	22° 37' 30.091" N	87° 0' 8.322" E
4	22° 37' 44.551" N	87° 0' 9.152" E
5	22° 37' 36.147" N	87° 0' 17.730" E
6	22° 37' 30.913" N	87° 0' 17.891" E
7	22° 37' 27.443" N	87° 0' 17.313" E
8	22° 37' 15.223" N	87° 0' 19.719" E
9	22° 37' 3.195" N	87° 0' 21.415" E

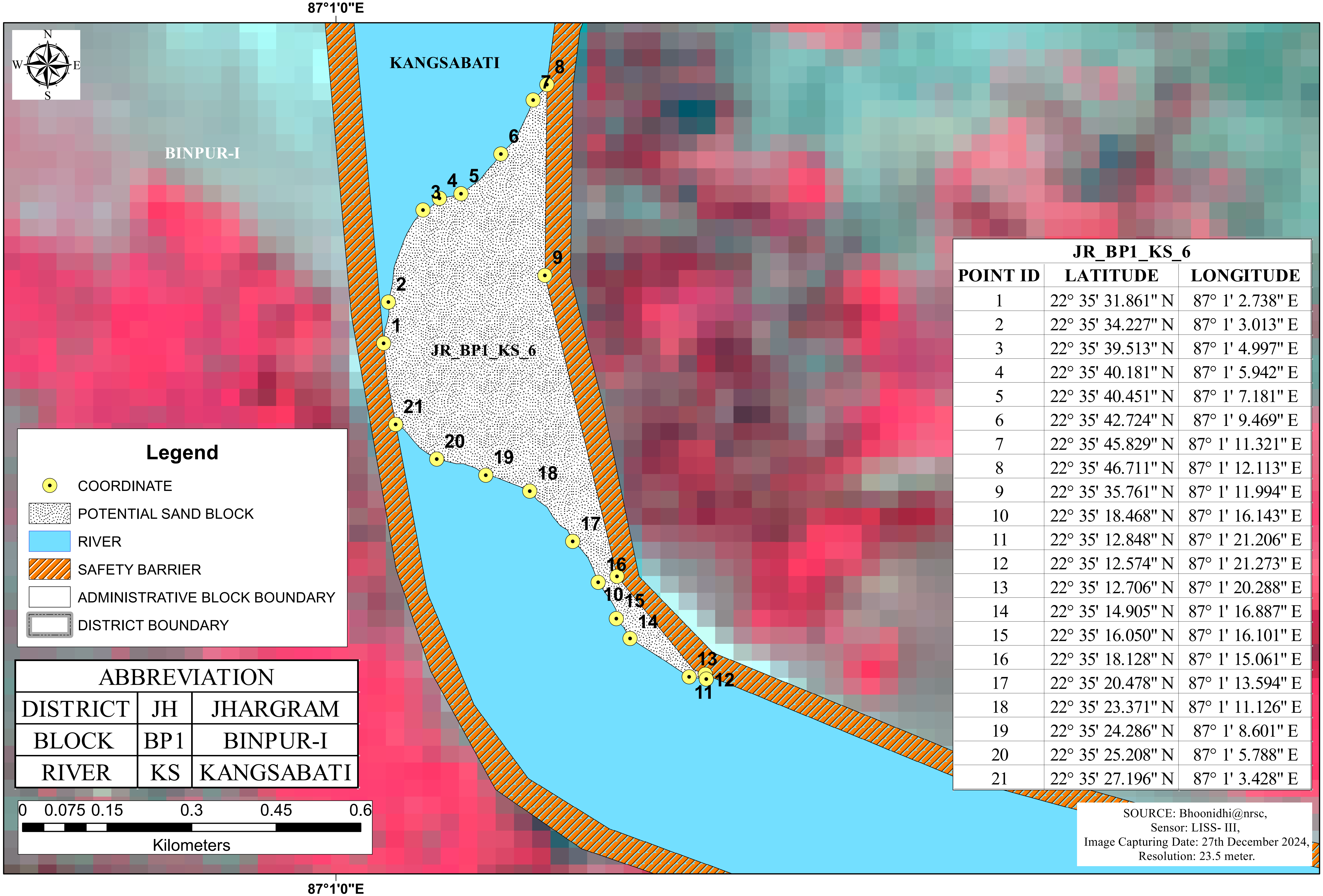
SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_BP1_KS_5 OF KANGSABATI RIVER



JR_BP1_KS_5					
SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 36' 35.445" N	87° 0' 50.290" E	21	22° 35' 45.062" N	87° 1' 6.519" E
2	22° 36' 34.367" N	87° 0' 50.303" E	22	22° 35' 44.458" N	87° 1' 5.860" E
3	22° 36' 30.486" N	87° 0' 52.613" E	23	22° 35' 43.053" N	87° 1' 4.324" E
4	22° 36' 25.065" N	87° 0' 55.022" E	24	22° 35' 41.650" N	87° 1' 3.669" E
5	22° 36' 19.449" N	87° 1' 3.551" E	25	22° 35' 38.852" N	87° 1' 3.021" E
6	22° 36' 18.815" N	87° 1' 4.229" E	26	22° 35' 37.376" N	87° 1' 2.228" E
7	22° 36' 16.212" N	87° 1' 5.134" E	27	22° 35' 52.716" N	87° 1' 0.810" E
8	22° 36' 11.284" N	87° 1' 5.144" E	28	22° 36' 10.270" N	87° 0' 54.918" E
9	22° 36' 10.241" N	87° 1' 5.594" E	29	22° 36' 18.635" N	87° 0' 48.580" E
10	22° 36' 9.408" N	87° 1' 5.819" E	30	22° 36' 35.776" N	87° 0' 37.349" E
11	22° 36' 8.784" N	87° 1' 6.268" E	31	22° 36' 45.852" N	87° 0' 31.245" E
12	22° 36' 6.500" N	87° 1' 8.281" E	32	22° 36' 45.632" N	87° 0' 34.820" E
13	22° 36' 6.214" N	87° 1' 8.897" E	33	22° 36' 42.363" N	87° 0' 38.084" E
14	22° 35' 59.402" N	87° 1' 12.282" E	34	22° 36' 40.629" N	87° 0' 41.774" E
15	22° 35' 58.669" N	87° 1' 12.280" E	35	22° 36' 40.623" N	87° 0' 43.147" E
16	22° 35' 57.058" N	87° 1' 12.926" E	36	22° 36' 39.963" N	87° 0' 45.903" E
17	22° 35' 50.926" N	87° 1' 12.661" E	37	22° 36' 39.531" N	87° 0' 46.594" E
18	22° 35' 49.705" N	87° 1' 11.814" E	38	22° 36' 39.099" N	87° 0' 47.513" E
19	22° 35' 47.076" N	87° 1' 10.264" E	39	22° 36' 37.163" N	87° 0' 49.588" E
20	22° 35' 45.867" N	87° 1' 8.501" E			

POTENTIAL BLOCK JR_BP1_KS_6 OF KANGSABATI RIVER



JR_BP1_KS_6		
POINT ID	LATITUDE	LONGITUDE
1	22° 35' 31.861" N	87° 1' 2.738" E
2	22° 35' 34.227" N	87° 1' 3.013" E
3	22° 35' 39.513" N	87° 1' 4.997" E
4	22° 35' 40.181" N	87° 1' 5.942" E
5	22° 35' 40.451" N	87° 1' 7.181" E
6	22° 35' 42.724" N	87° 1' 9.469" E
7	22° 35' 45.829" N	87° 1' 11.321" E
8	22° 35' 46.711" N	87° 1' 12.113" E
9	22° 35' 35.761" N	87° 1' 11.994" E
10	22° 35' 18.468" N	87° 1' 16.143" E
11	22° 35' 12.848" N	87° 1' 21.206" E
12	22° 35' 12.574" N	87° 1' 21.273" E
13	22° 35' 12.706" N	87° 1' 20.288" E
14	22° 35' 14.905" N	87° 1' 16.887" E
15	22° 35' 16.050" N	87° 1' 16.101" E
16	22° 35' 18.128" N	87° 1' 15.061" E
17	22° 35' 20.478" N	87° 1' 13.594" E
18	22° 35' 23.371" N	87° 1' 11.126" E
19	22° 35' 24.286" N	87° 1' 8.601" E
20	22° 35' 25.208" N	87° 1' 5.788" E
21	22° 35' 27.196" N	87° 1' 3.428" E

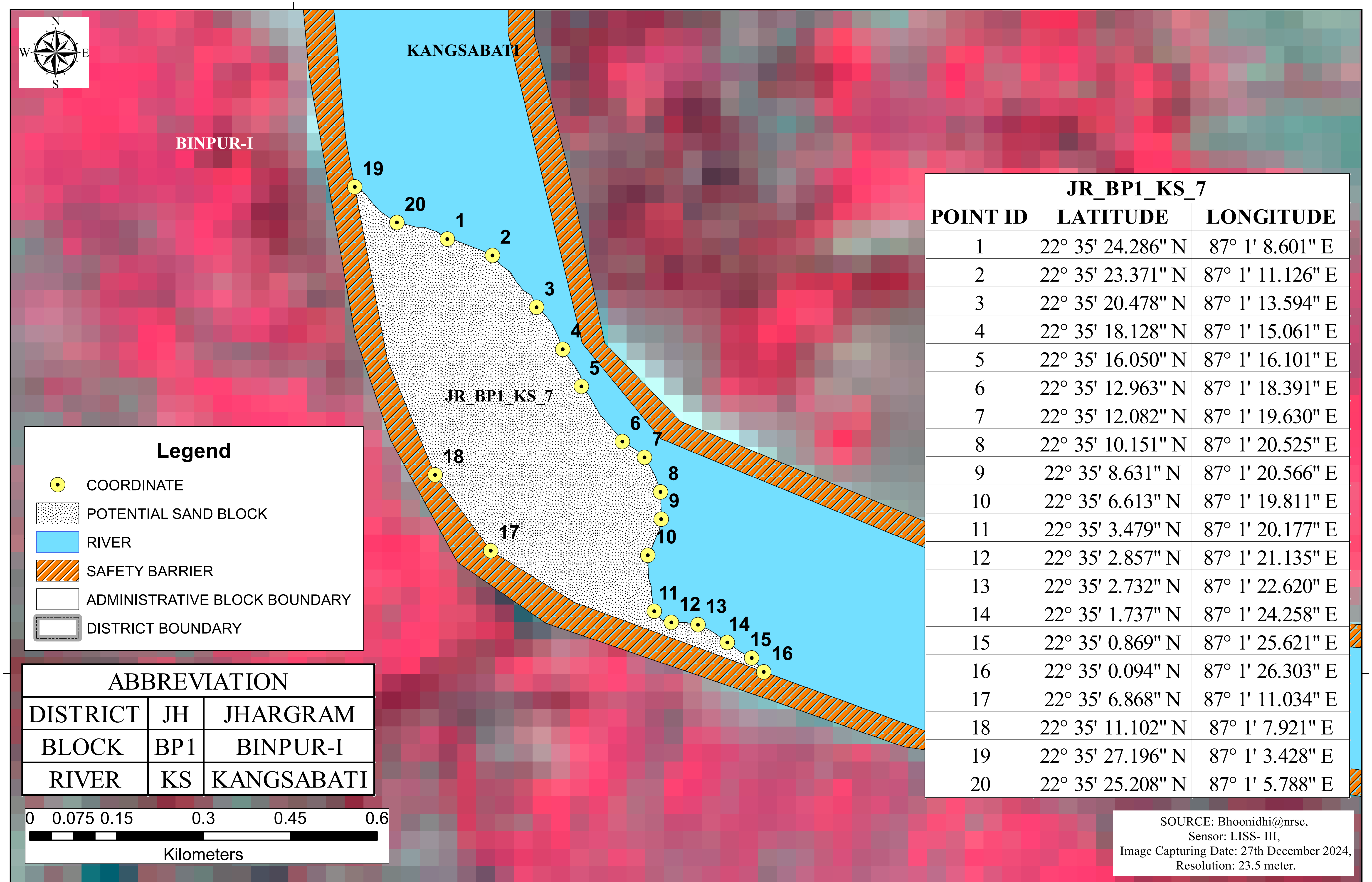
Legend

- COORDINATE
- POTENTIAL SAND BLOCK
- RIVER
- SAFETY BARRIER
- ADMINISTRATIVE BLOCK BOUNDARY
- DISTRICT BOUNDARY

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

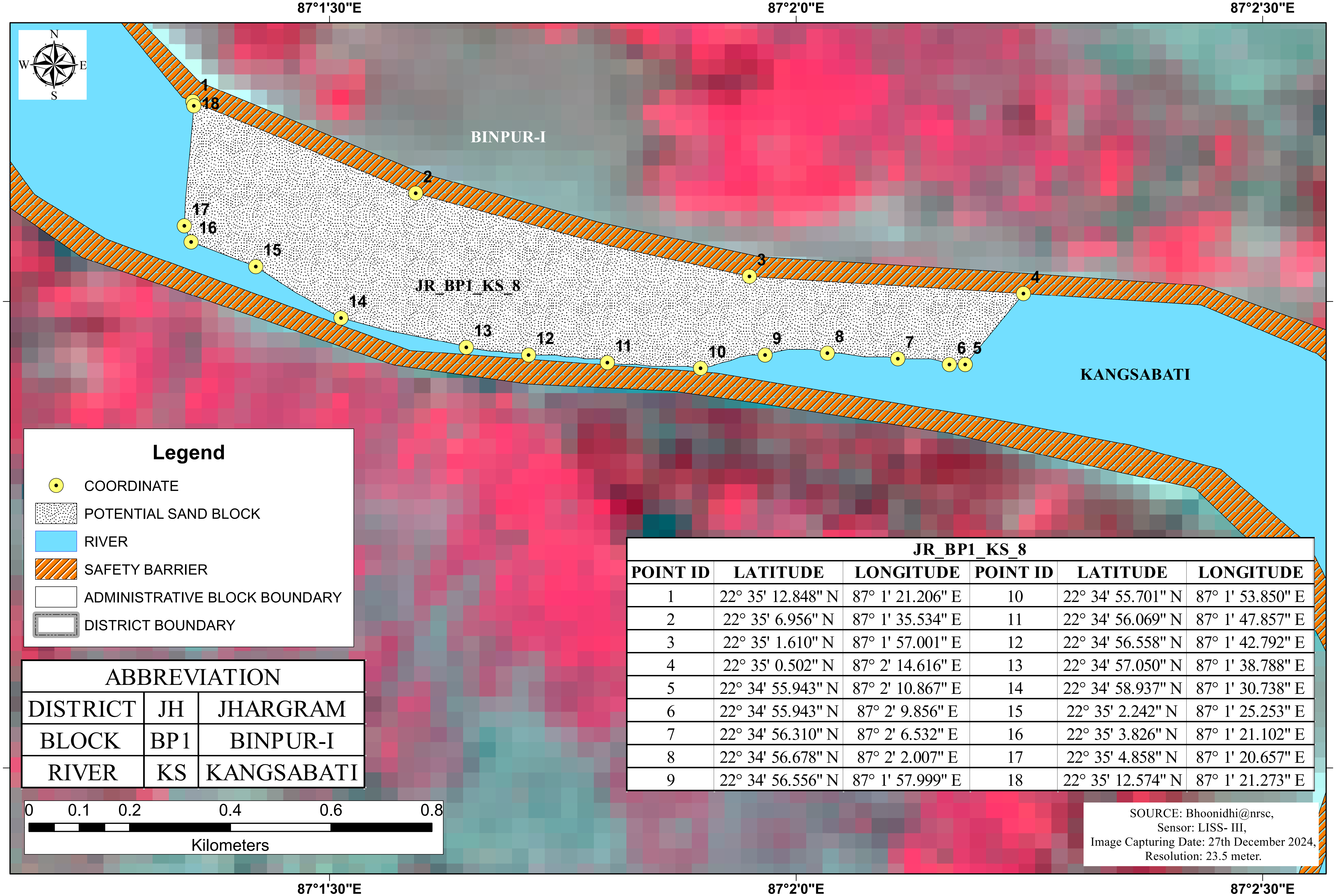
POTENTIAL BLOCK JR_BP1_KS_7 OF KANGSABATI RIVER



ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_7		
POINT ID	LATITUDE	LONGITUDE
1	22° 35' 24.286" N	87° 1' 8.601" E
2	22° 35' 23.371" N	87° 1' 11.126" E
3	22° 35' 20.478" N	87° 1' 13.594" E
4	22° 35' 18.128" N	87° 1' 15.061" E
5	22° 35' 16.050" N	87° 1' 16.101" E
6	22° 35' 12.963" N	87° 1' 18.391" E
7	22° 35' 12.082" N	87° 1' 19.630" E
8	22° 35' 10.151" N	87° 1' 20.525" E
9	22° 35' 8.631" N	87° 1' 20.566" E
10	22° 35' 6.613" N	87° 1' 19.811" E
11	22° 35' 3.479" N	87° 1' 20.177" E
12	22° 35' 2.857" N	87° 1' 21.135" E
13	22° 35' 2.732" N	87° 1' 22.620" E
14	22° 35' 1.737" N	87° 1' 24.258" E
15	22° 35' 0.869" N	87° 1' 25.621" E
16	22° 35' 0.094" N	87° 1' 26.303" E
17	22° 35' 6.868" N	87° 1' 11.034" E
18	22° 35' 11.102" N	87° 1' 7.921" E
19	22° 35' 27.196" N	87° 1' 3.428" E
20	22° 35' 25.208" N	87° 1' 5.788" E

POTENTIAL BLOCK JR_BP1_KS_8 OF KANGSABATI RIVER

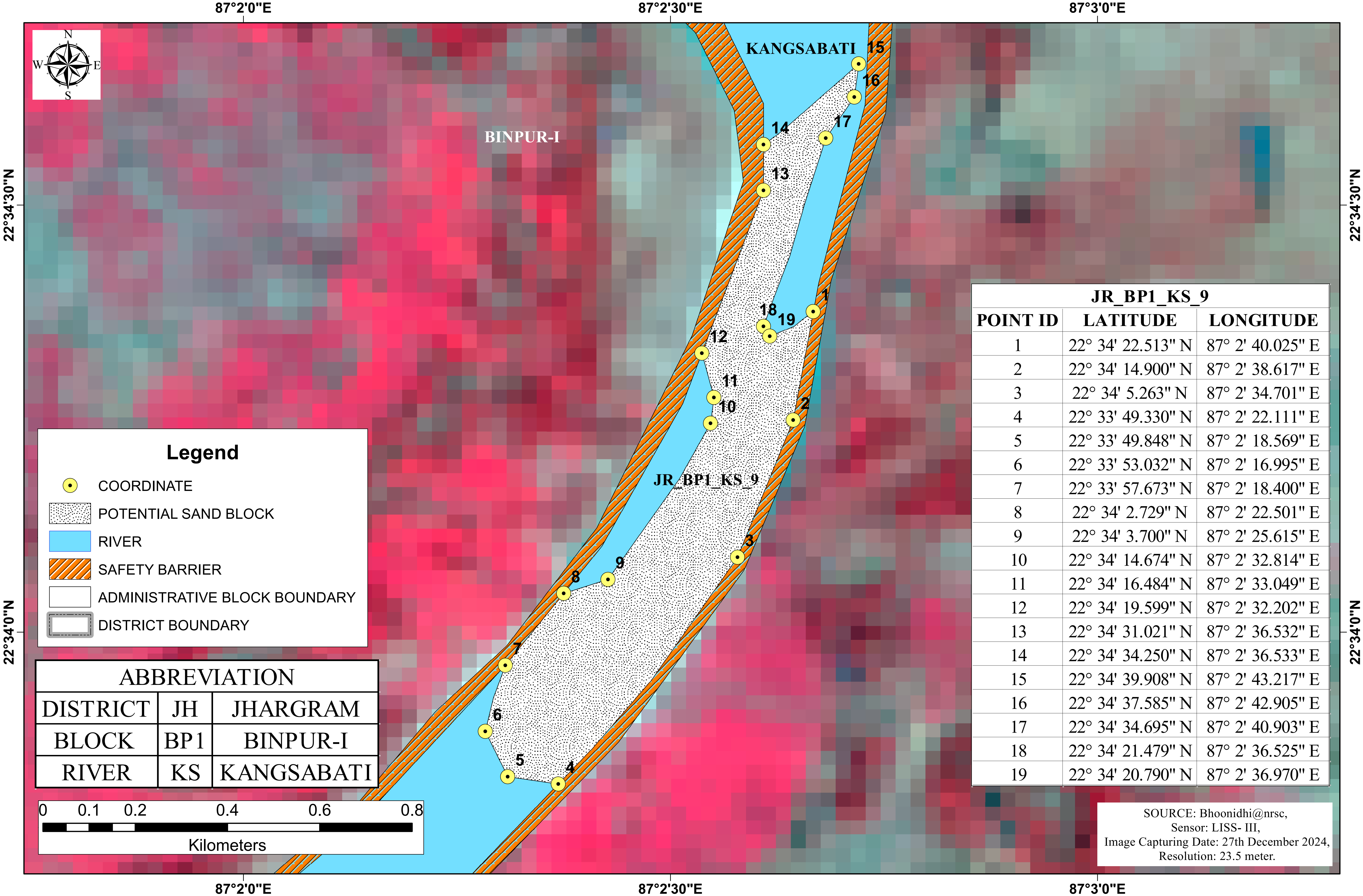


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_8

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 35' 12.848" N	87° 1' 21.206" E	10	22° 34' 55.701" N	87° 1' 53.850" E
2	22° 35' 6.956" N	87° 1' 35.534" E	11	22° 34' 56.069" N	87° 1' 47.857" E
3	22° 35' 1.610" N	87° 1' 57.001" E	12	22° 34' 56.558" N	87° 1' 42.792" E
4	22° 35' 0.502" N	87° 2' 14.616" E	13	22° 34' 57.050" N	87° 1' 38.788" E
5	22° 34' 55.943" N	87° 2' 10.867" E	14	22° 34' 58.937" N	87° 1' 30.738" E
6	22° 34' 55.943" N	87° 2' 9.856" E	15	22° 35' 2.242" N	87° 1' 25.253" E
7	22° 34' 56.310" N	87° 2' 6.532" E	16	22° 35' 3.826" N	87° 1' 21.102" E
8	22° 34' 56.678" N	87° 2' 2.007" E	17	22° 35' 4.858" N	87° 1' 20.657" E
9	22° 34' 56.556" N	87° 1' 57.999" E	18	22° 35' 12.574" N	87° 1' 21.273" E

POTENTIAL BLOCK JR_BP1_KS_9 OF KANGSABATI RIVER

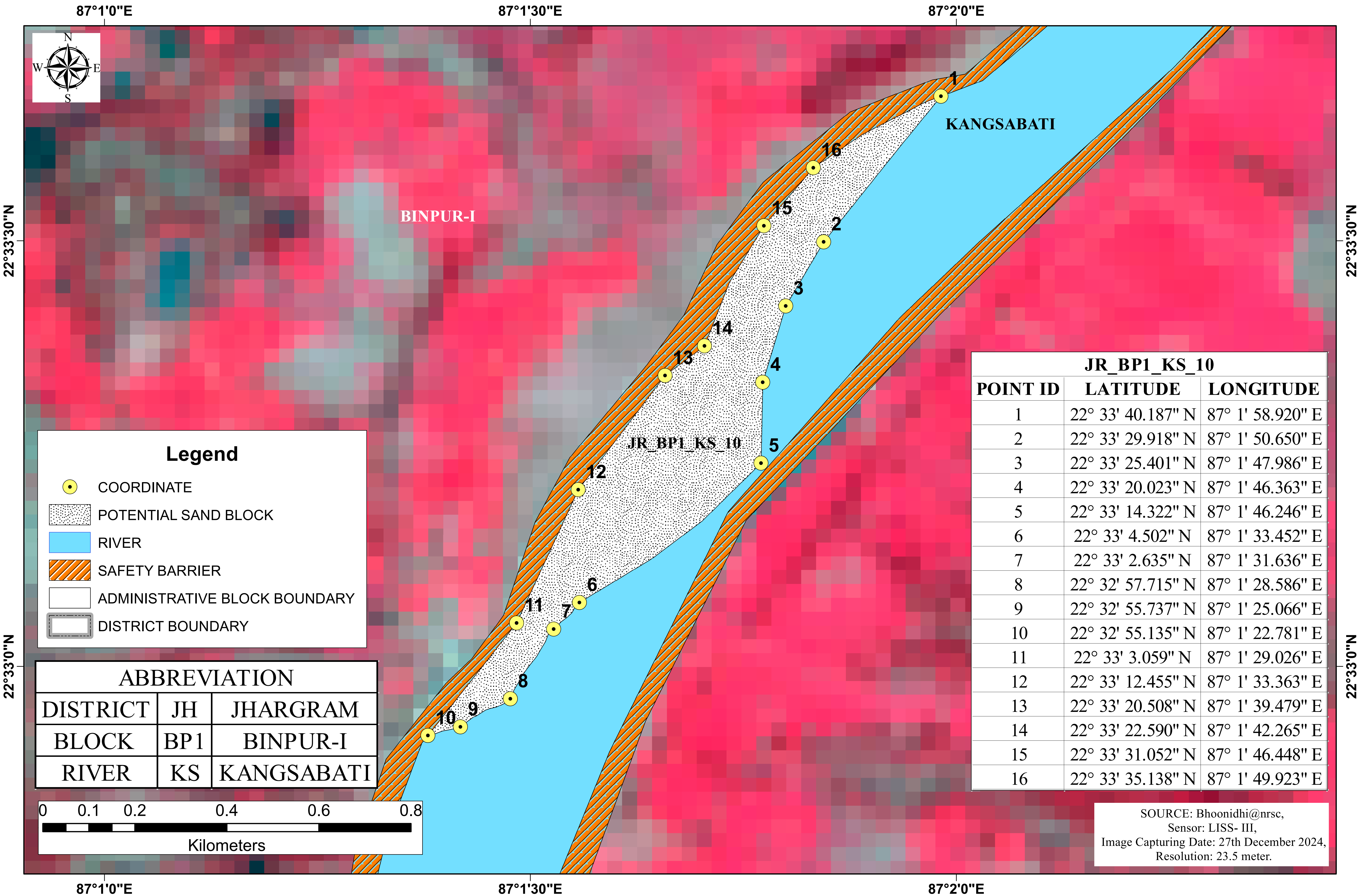


JR_BP1_KS_9		
POINT ID	LATITUDE	LONGITUDE
1	22° 34' 22.513" N	87° 2' 40.025" E
2	22° 34' 14.900" N	87° 2' 38.617" E
3	22° 34' 5.263" N	87° 2' 34.701" E
4	22° 33' 49.330" N	87° 2' 22.111" E
5	22° 33' 49.848" N	87° 2' 18.569" E
6	22° 33' 53.032" N	87° 2' 16.995" E
7	22° 33' 57.673" N	87° 2' 18.400" E
8	22° 34' 2.729" N	87° 2' 22.501" E
9	22° 34' 3.700" N	87° 2' 25.615" E
10	22° 34' 14.674" N	87° 2' 32.814" E
11	22° 34' 16.484" N	87° 2' 33.049" E
12	22° 34' 19.599" N	87° 2' 32.202" E
13	22° 34' 31.021" N	87° 2' 36.532" E
14	22° 34' 34.250" N	87° 2' 36.533" E
15	22° 34' 39.908" N	87° 2' 43.217" E
16	22° 34' 37.585" N	87° 2' 42.905" E
17	22° 34' 34.695" N	87° 2' 40.903" E
18	22° 34' 21.479" N	87° 2' 36.525" E
19	22° 34' 20.790" N	87° 2' 36.970" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

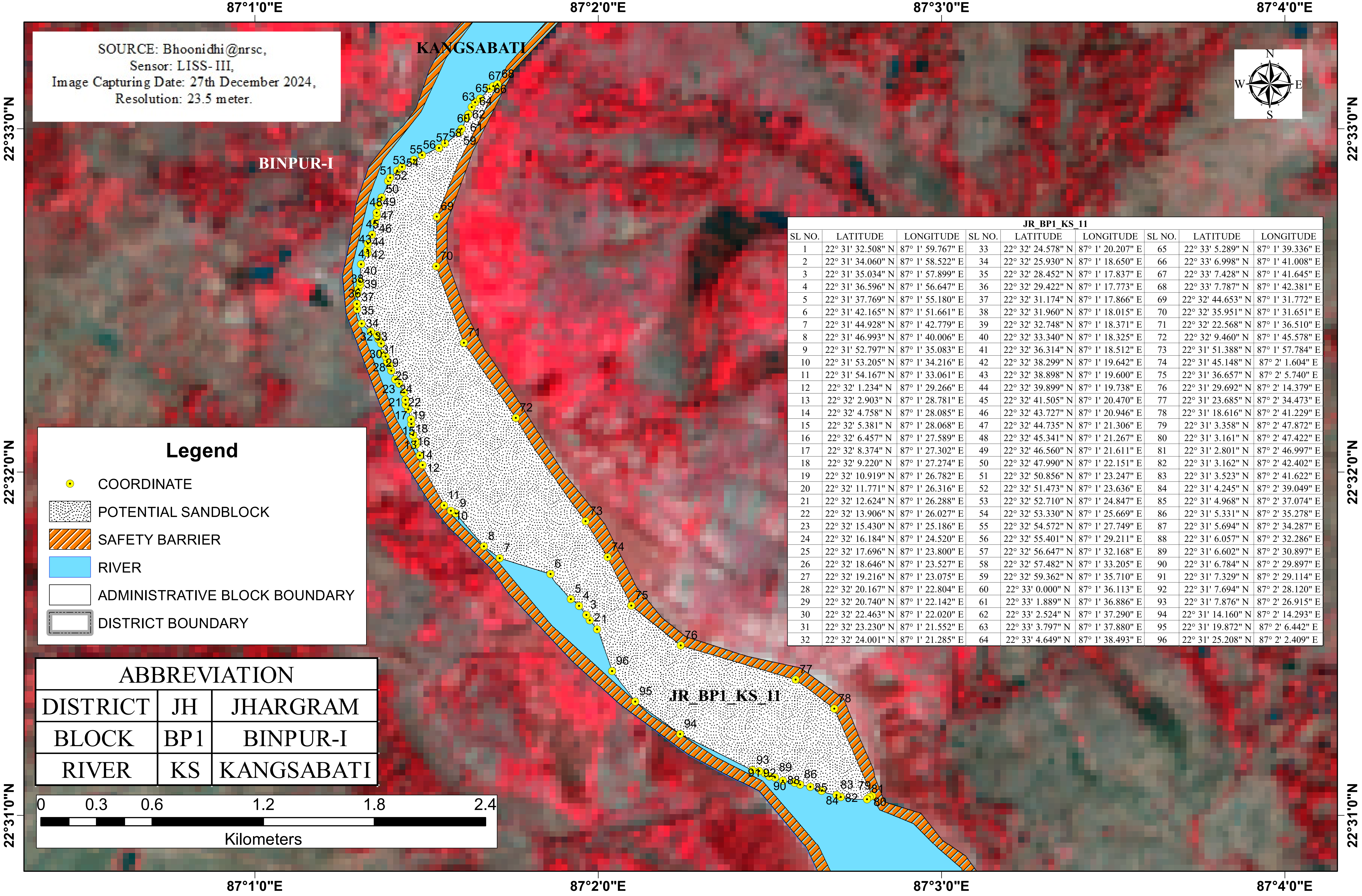
POTENTIAL BLOCK JR_BP1_KS_10 OF KANGSABATI RIVER



ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_10		
POINT ID	LATITUDE	LONGITUDE
1	22° 33' 40.187" N	87° 1' 58.920" E
2	22° 33' 29.918" N	87° 1' 50.650" E
3	22° 33' 25.401" N	87° 1' 47.986" E
4	22° 33' 20.023" N	87° 1' 46.363" E
5	22° 33' 14.322" N	87° 1' 46.246" E
6	22° 33' 4.502" N	87° 1' 33.452" E
7	22° 33' 2.635" N	87° 1' 31.636" E
8	22° 32' 57.715" N	87° 1' 28.586" E
9	22° 32' 55.737" N	87° 1' 25.066" E
10	22° 32' 55.135" N	87° 1' 22.781" E
11	22° 33' 3.059" N	87° 1' 29.026" E
12	22° 33' 12.455" N	87° 1' 33.363" E
13	22° 33' 20.508" N	87° 1' 39.479" E
14	22° 33' 22.590" N	87° 1' 42.265" E
15	22° 33' 31.052" N	87° 1' 46.448" E
16	22° 33' 35.138" N	87° 1' 49.923" E

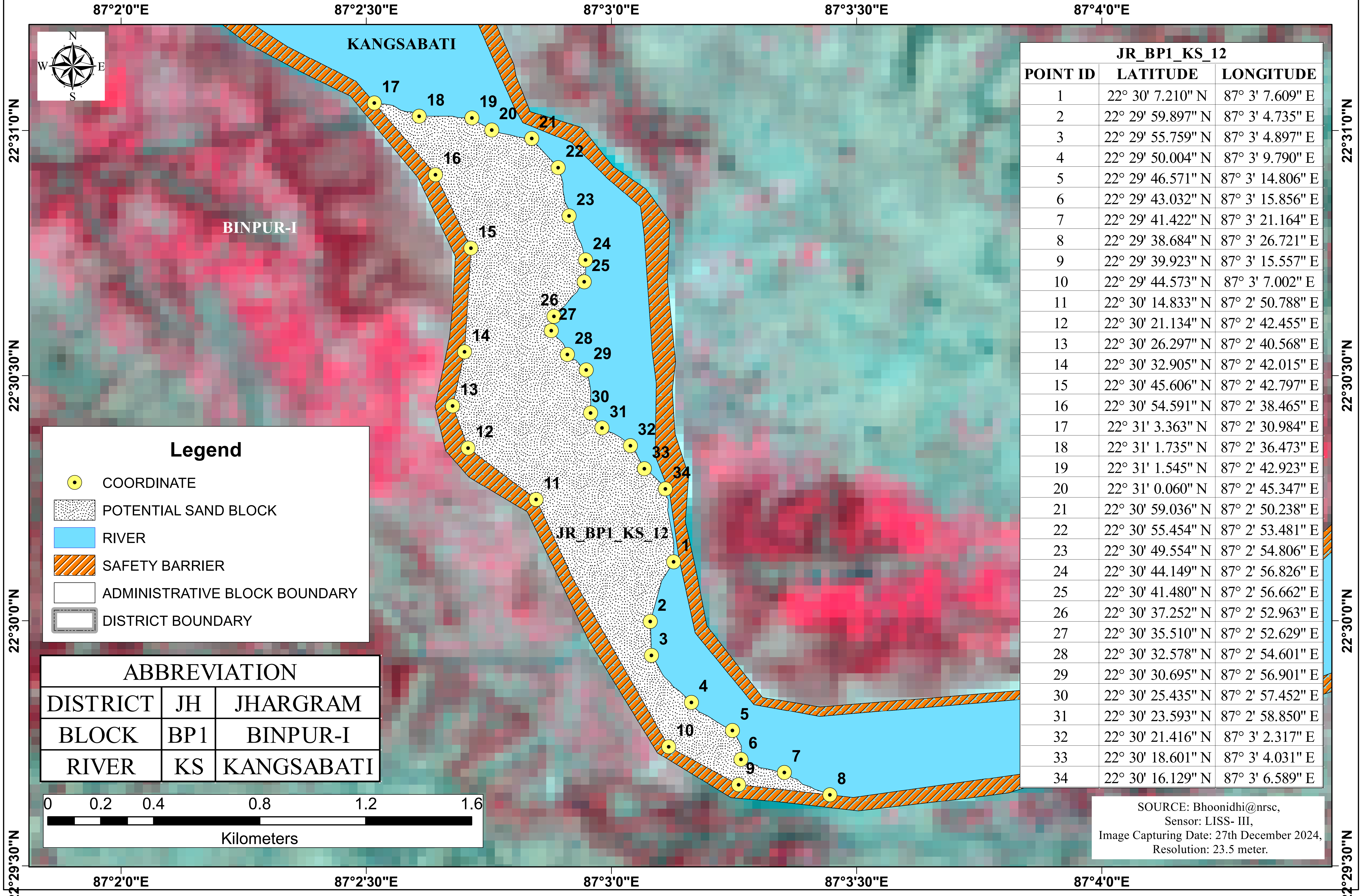
POTENTIAL BLOCK JR_BP1_KS_11 OF KANGSABATI RIVER



JR_BP1_KS_11

SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 31' 32.508" N	87° 1' 59.767" E	33	22° 32' 24.578" N	87° 1' 20.207" E	65	22° 33' 5.289" N	87° 1' 39.336" E
2	22° 31' 34.060" N	87° 1' 58.522" E	34	22° 32' 25.930" N	87° 1' 18.650" E	66	22° 33' 6.998" N	87° 1' 41.008" E
3	22° 31' 35.034" N	87° 1' 57.899" E	35	22° 32' 28.452" N	87° 1' 17.837" E	67	22° 33' 7.428" N	87° 1' 41.645" E
4	22° 31' 36.596" N	87° 1' 56.647" E	36	22° 32' 29.422" N	87° 1' 17.773" E	68	22° 33' 7.787" N	87° 1' 42.381" E
5	22° 31' 37.769" N	87° 1' 55.180" E	37	22° 32' 31.174" N	87° 1' 17.866" E	69	22° 32' 44.653" N	87° 1' 31.772" E
6	22° 31' 42.165" N	87° 1' 51.661" E	38	22° 32' 31.960" N	87° 1' 18.015" E	70	22° 32' 35.951" N	87° 1' 31.651" E
7	22° 31' 44.928" N	87° 1' 42.779" E	39	22° 32' 32.748" N	87° 1' 18.371" E	71	22° 32' 22.568" N	87° 1' 36.510" E
8	22° 31' 46.993" N	87° 1' 40.006" E	40	22° 32' 33.340" N	87° 1' 18.325" E	72	22° 32' 9.460" N	87° 1' 45.578" E
9	22° 31' 52.797" N	87° 1' 35.083" E	41	22° 32' 36.314" N	87° 1' 18.512" E	73	22° 31' 51.388" N	87° 1' 57.784" E
10	22° 31' 53.205" N	87° 1' 34.216" E	42	22° 32' 38.299" N	87° 1' 19.642" E	74	22° 31' 45.148" N	87° 2' 1.604" E
11	22° 31' 54.167" N	87° 1' 33.061" E	43	22° 32' 38.898" N	87° 1' 19.600" E	75	22° 31' 36.657" N	87° 2' 5.740" E
12	22° 32' 1.234" N	87° 1' 29.266" E	44	22° 32' 39.899" N	87° 1' 19.738" E	76	22° 31' 29.692" N	87° 2' 14.379" E
13	22° 32' 2.903" N	87° 1' 28.781" E	45	22° 32' 41.505" N	87° 1' 20.470" E	77	22° 31' 23.685" N	87° 2' 34.473" E
14	22° 32' 4.758" N	87° 1' 28.085" E	46	22° 32' 43.727" N	87° 1' 20.946" E	78	22° 31' 18.616" N	87° 2' 41.229" E
15	22° 32' 5.381" N	87° 1' 28.068" E	47	22° 32' 44.735" N	87° 1' 21.306" E	79	22° 31' 3.358" N	87° 2' 47.872" E
16	22° 32' 6.457" N	87° 1' 27.589" E	48	22° 32' 45.341" N	87° 1' 21.267" E	80	22° 31' 3.161" N	87° 2' 47.422" E
17	22° 32' 8.374" N	87° 1' 27.302" E	49	22° 32' 46.560" N	87° 1' 21.611" E	81	22° 31' 2.801" N	87° 2' 46.997" E
18	22° 32' 9.220" N	87° 1' 27.274" E	50	22° 32' 47.990" N	87° 1' 22.151" E	82	22° 31' 3.162" N	87° 2' 42.402" E
19	22° 32' 10.919" N	87° 1' 26.782" E	51	22° 32' 50.856" N	87° 1' 23.247" E	83	22° 31' 3.523" N	87° 2' 41.622" E
20	22° 32' 11.771" N	87° 1' 26.316" E	52	22° 32' 51.473" N	87° 1' 23.636" E	84	22° 31' 4.245" N	87° 2' 39.049" E
21	22° 32' 12.624" N	87° 1' 26.288" E	53	22° 32' 52.710" N	87° 1' 24.847" E	85	22° 31' 4.968" N	87° 2' 37.074" E
22	22° 32' 13.906" N	87° 1' 26.027" E	54	22° 32' 53.330" N	87° 1' 25.669" E	86	22° 31' 5.331" N	87° 2' 35.278" E
23	22° 32' 15.430" N	87° 1' 25.186" E	55	22° 32' 54.572" N	87° 1' 27.749" E	87	22° 31' 5.694" N	87° 2' 34.287" E
24	22° 32' 16.184" N	87° 1' 24.520" E	56	22° 32' 55.401" N	87° 1' 29.211" E	88	22° 31' 6.057" N	87° 2' 32.286" E
25	22° 32' 17.696" N	87° 1' 23.800" E	57	22° 32' 56.647" N	87° 1' 32.168" E	89	22° 31' 6.602" N	87° 2' 30.897" E
26	22° 32' 18.646" N	87° 1' 23.527" E	58	22° 32' 57.482" N	87° 1' 33.205" E	90	22° 31' 6.784" N	87° 2' 29.897" E
27	22° 32' 19.216" N	87° 1' 23.075" E	59	22° 32' 59.362" N	87° 1' 35.710" E	91	22° 31' 7.329" N	87° 2' 29.114" E
28	22° 32' 20.167" N	87° 1' 22.804" E	60	22° 33' 0.000" N	87° 1' 36.113" E	92	22° 31' 7.694" N	87° 2' 28.120" E
29	22° 32' 20.740" N	87° 1' 22.142" E	61	22° 33' 1.889" N	87° 1' 36.886" E	93	22° 31' 7.876" N	87° 2' 26.915" E
30	22° 32' 22.463" N	87° 1' 22.020" E	62	22° 33' 2.524" N	87° 1' 37.290" E	94	22° 31' 14.160" N	87° 2' 14.293" E
31	22° 32' 23.230" N	87° 1' 21.552" E	63	22° 33' 3.797" N	87° 1' 37.880" E	95	22° 31' 19.872" N	87° 2' 6.442" E
32	22° 32' 24.001" N	87° 1' 21.285" E	64	22° 33' 4.649" N	87° 1' 38.493" E	96	22° 31' 25.208" N	87° 2' 2.409" E

POTENTIAL BLOCK JR_BP1_KS_12 OF KANGSABATI RIVER

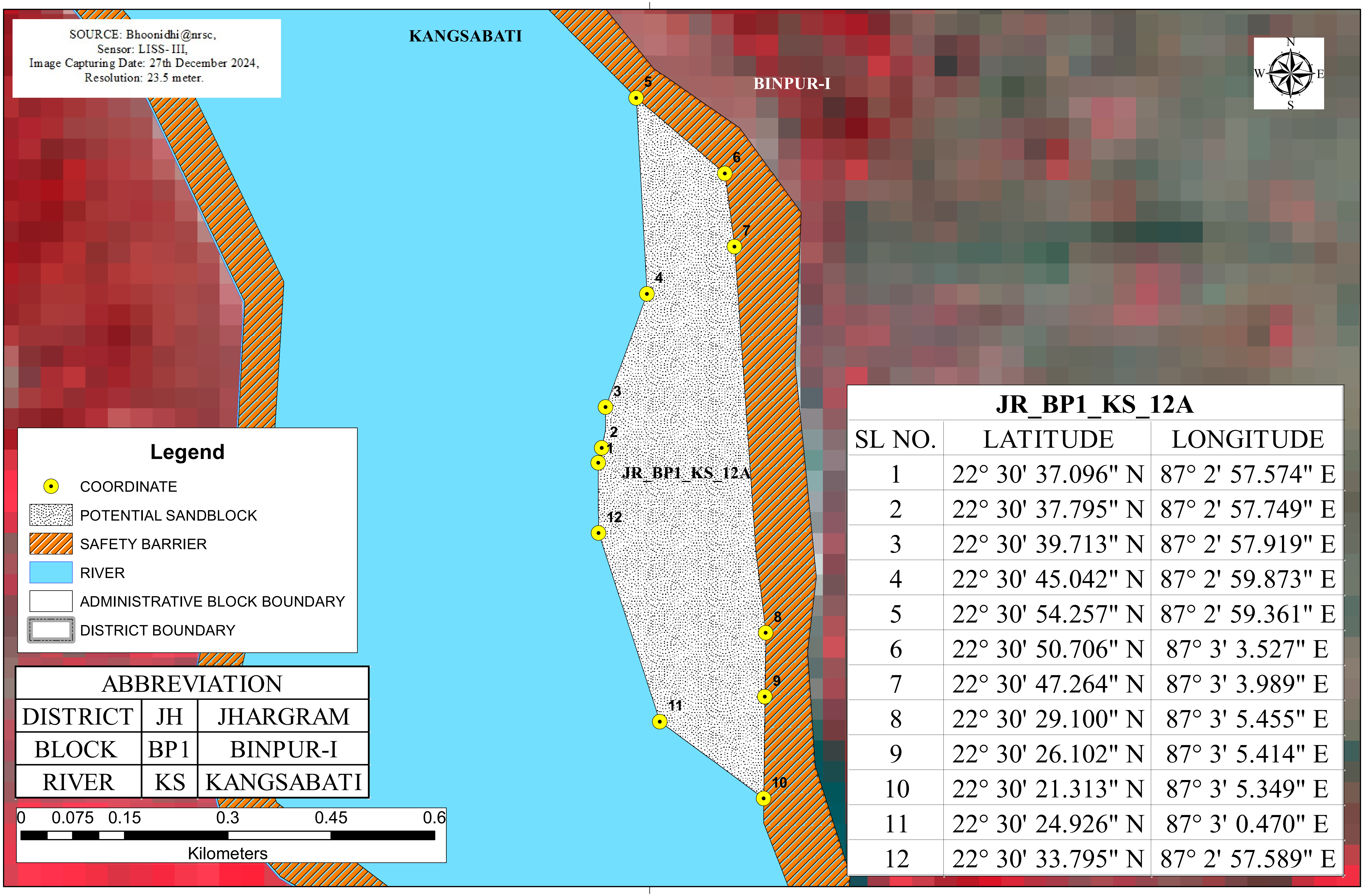


JR_BP1_KS_12		
POINT ID	LATITUDE	LONGITUDE
1	22° 30' 7.210" N	87° 3' 7.609" E
2	22° 29' 59.897" N	87° 3' 4.735" E
3	22° 29' 55.759" N	87° 3' 4.897" E
4	22° 29' 50.004" N	87° 3' 9.790" E
5	22° 29' 46.571" N	87° 3' 14.806" E
6	22° 29' 43.032" N	87° 3' 15.856" E
7	22° 29' 41.422" N	87° 3' 21.164" E
8	22° 29' 38.684" N	87° 3' 26.721" E
9	22° 29' 39.923" N	87° 3' 15.557" E
10	22° 29' 44.573" N	87° 3' 7.002" E
11	22° 30' 14.833" N	87° 2' 50.788" E
12	22° 30' 21.134" N	87° 2' 42.455" E
13	22° 30' 26.297" N	87° 2' 40.568" E
14	22° 30' 32.905" N	87° 2' 42.015" E
15	22° 30' 45.606" N	87° 2' 42.797" E
16	22° 30' 54.591" N	87° 2' 38.465" E
17	22° 31' 3.363" N	87° 2' 30.984" E
18	22° 31' 1.735" N	87° 2' 36.473" E
19	22° 31' 1.545" N	87° 2' 42.923" E
20	22° 31' 0.060" N	87° 2' 45.347" E
21	22° 30' 59.036" N	87° 2' 50.238" E
22	22° 30' 55.454" N	87° 2' 53.481" E
23	22° 30' 49.554" N	87° 2' 54.806" E
24	22° 30' 44.149" N	87° 2' 56.826" E
25	22° 30' 41.480" N	87° 2' 56.662" E
26	22° 30' 37.252" N	87° 2' 52.963" E
27	22° 30' 35.510" N	87° 2' 52.629" E
28	22° 30' 32.578" N	87° 2' 54.601" E
29	22° 30' 30.695" N	87° 2' 56.901" E
30	22° 30' 25.435" N	87° 2' 57.452" E
31	22° 30' 23.593" N	87° 2' 58.850" E
32	22° 30' 21.416" N	87° 3' 2.317" E
33	22° 30' 18.601" N	87° 3' 4.031" E
34	22° 30' 16.129" N	87° 3' 6.589" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_BP1_KS_12A OF KANGSABATI RIVER

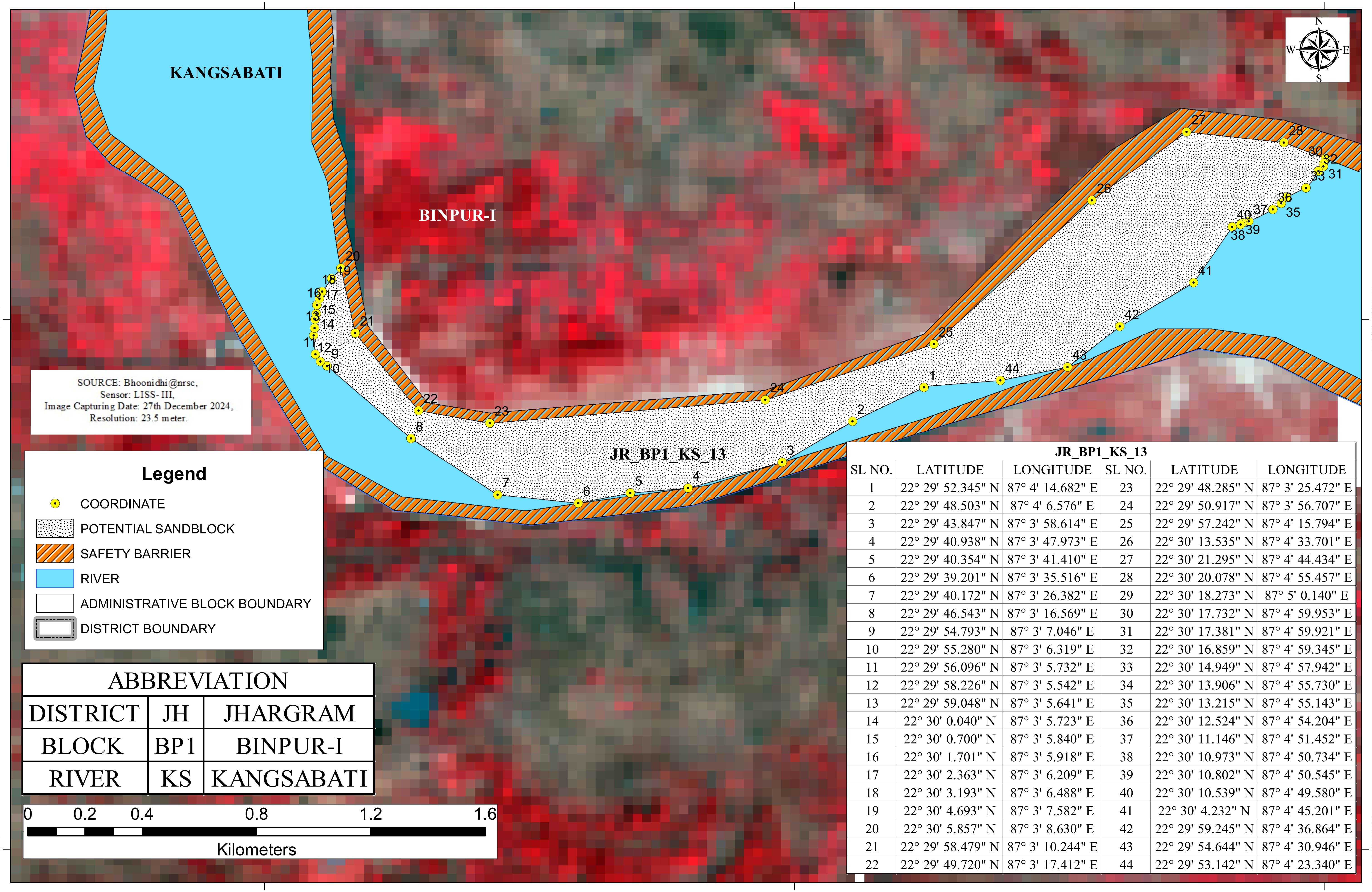


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_12A

SL NO.	LATITUDE	LONGITUDE
1	22° 30' 37.096" N	87° 2' 57.574" E
2	22° 30' 37.795" N	87° 2' 57.749" E
3	22° 30' 39.713" N	87° 2' 57.919" E
4	22° 30' 45.042" N	87° 2' 59.873" E
5	22° 30' 54.257" N	87° 2' 59.361" E
6	22° 30' 50.706" N	87° 3' 3.527" E
7	22° 30' 47.264" N	87° 3' 3.989" E
8	22° 30' 29.100" N	87° 3' 5.455" E
9	22° 30' 26.102" N	87° 3' 5.414" E
10	22° 30' 21.313" N	87° 3' 5.349" E
11	22° 30' 24.926" N	87° 3' 0.470" E
12	22° 30' 33.795" N	87° 2' 57.589" E

POTENTIAL BLOCK JR_BP1_KS_13 OF KANGSABATI RIVER

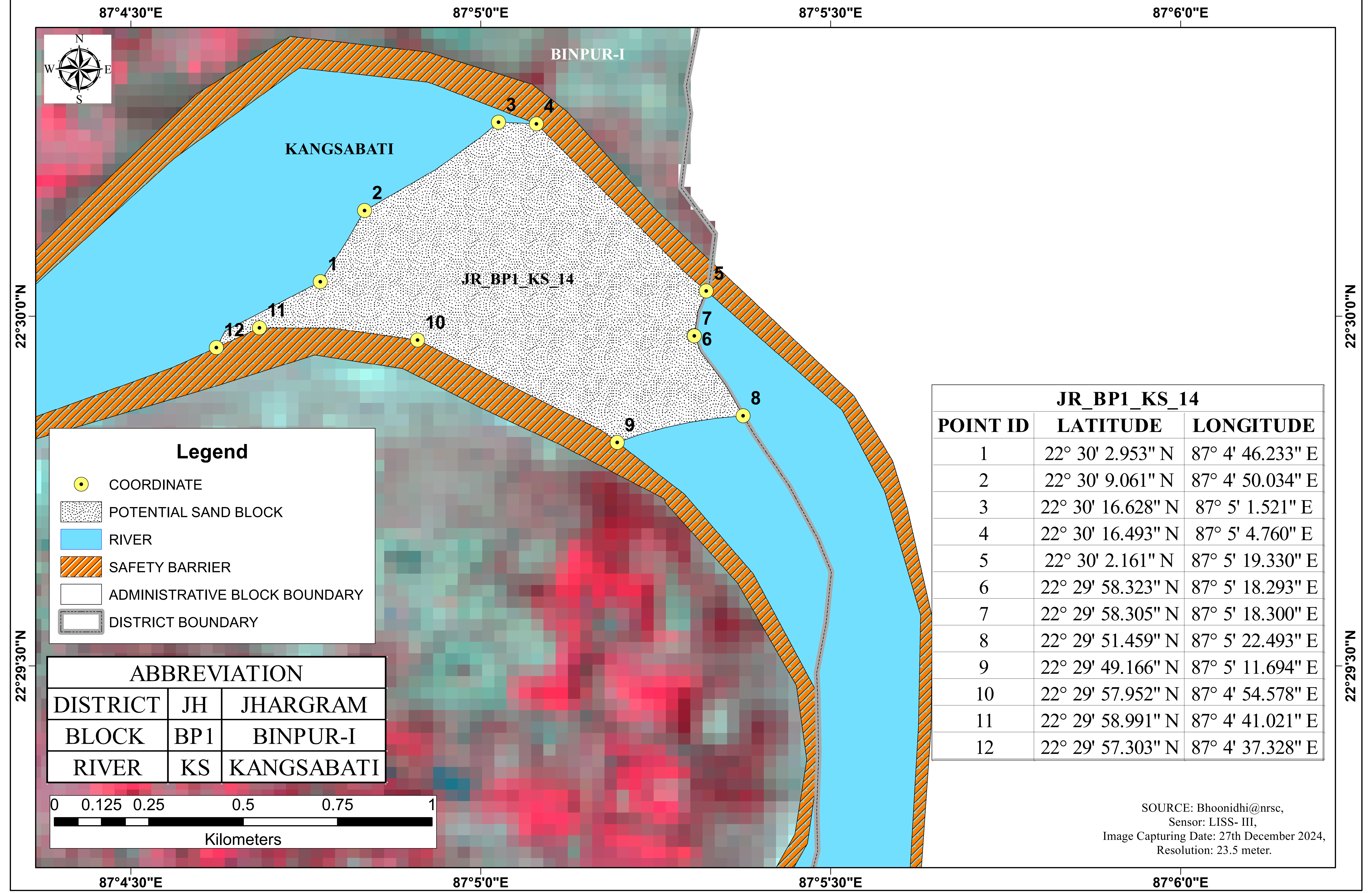


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_13

SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 29' 52.345" N	87° 4' 14.682" E	23	22° 29' 48.285" N	87° 3' 25.472" E
2	22° 29' 48.503" N	87° 4' 6.576" E	24	22° 29' 50.917" N	87° 3' 56.707" E
3	22° 29' 43.847" N	87° 3' 58.614" E	25	22° 29' 57.242" N	87° 4' 15.794" E
4	22° 29' 40.938" N	87° 3' 47.973" E	26	22° 30' 13.535" N	87° 4' 33.701" E
5	22° 29' 40.354" N	87° 3' 41.410" E	27	22° 30' 21.295" N	87° 4' 44.434" E
6	22° 29' 39.201" N	87° 3' 35.516" E	28	22° 30' 20.078" N	87° 4' 55.457" E
7	22° 29' 40.172" N	87° 3' 26.382" E	29	22° 30' 18.273" N	87° 5' 0.140" E
8	22° 29' 46.543" N	87° 3' 16.569" E	30	22° 30' 17.732" N	87° 4' 59.953" E
9	22° 29' 54.793" N	87° 3' 7.046" E	31	22° 30' 17.381" N	87° 4' 59.921" E
10	22° 29' 55.280" N	87° 3' 6.319" E	32	22° 30' 16.859" N	87° 4' 59.345" E
11	22° 29' 56.096" N	87° 3' 5.732" E	33	22° 30' 14.949" N	87° 4' 57.942" E
12	22° 29' 58.226" N	87° 3' 5.542" E	34	22° 30' 13.906" N	87° 4' 55.730" E
13	22° 29' 59.048" N	87° 3' 5.641" E	35	22° 30' 13.215" N	87° 4' 55.143" E
14	22° 30' 0.040" N	87° 3' 5.723" E	36	22° 30' 12.524" N	87° 4' 54.204" E
15	22° 30' 0.700" N	87° 3' 5.840" E	37	22° 30' 11.146" N	87° 4' 51.452" E
16	22° 30' 1.701" N	87° 3' 5.918" E	38	22° 30' 10.973" N	87° 4' 50.734" E
17	22° 30' 2.363" N	87° 3' 6.209" E	39	22° 30' 10.802" N	87° 4' 50.545" E
18	22° 30' 3.193" N	87° 3' 6.488" E	40	22° 30' 10.539" N	87° 4' 49.580" E
19	22° 30' 4.693" N	87° 3' 7.582" E	41	22° 30' 4.232" N	87° 4' 45.201" E
20	22° 30' 5.857" N	87° 3' 8.630" E	42	22° 29' 59.245" N	87° 4' 36.864" E
21	22° 29' 58.479" N	87° 3' 10.244" E	43	22° 29' 54.644" N	87° 4' 30.946" E
22	22° 29' 49.720" N	87° 3' 17.412" E	44	22° 29' 53.142" N	87° 4' 23.340" E

POTENTIAL BLOCK JR_BP1_KS_14 OF KANGSABATI RIVER



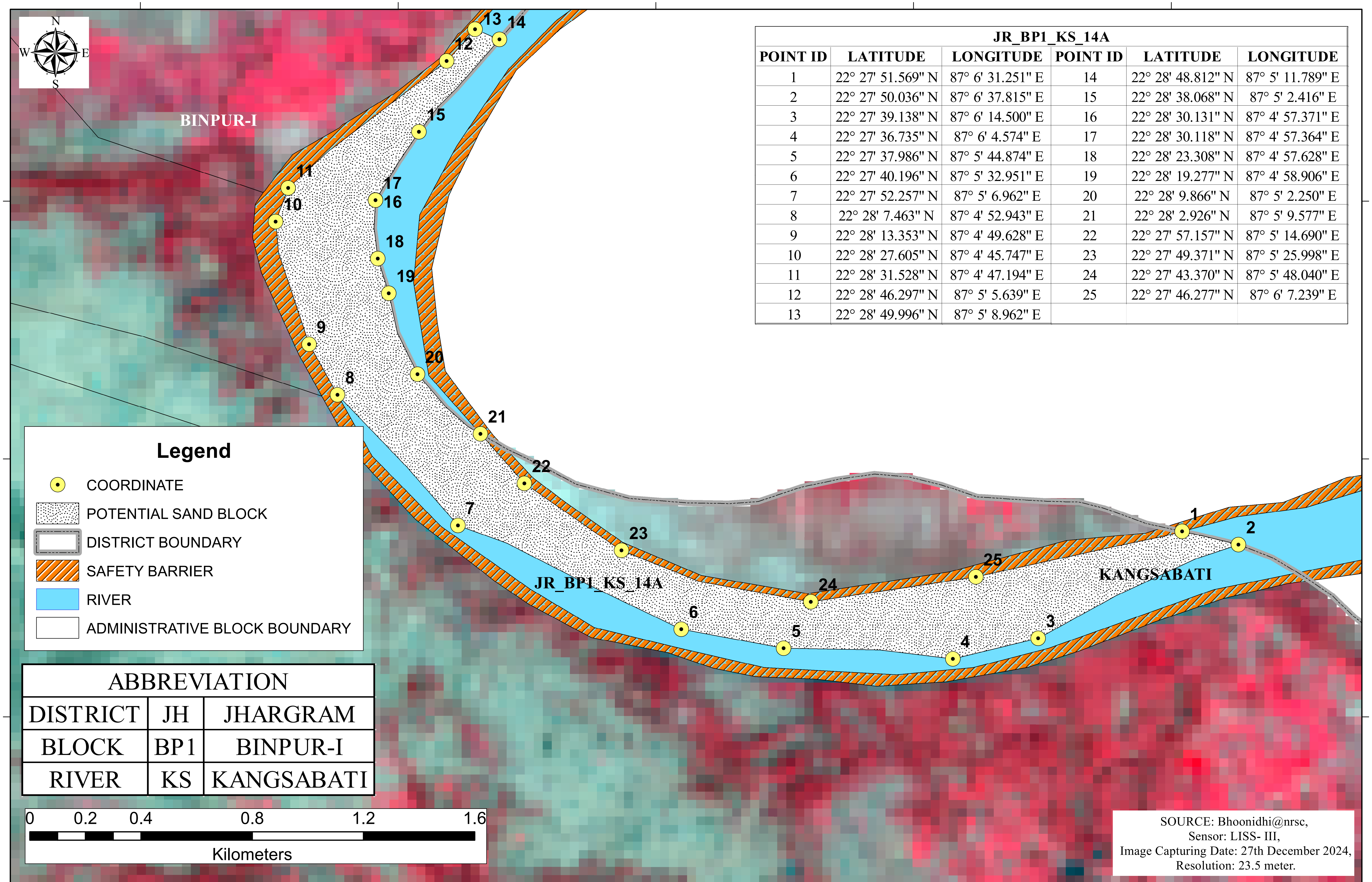
ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

JR_BP1_KS_14

POINT ID	LATITUDE	LONGITUDE
1	22° 30' 2.953" N	87° 4' 46.233" E
2	22° 30' 9.061" N	87° 4' 50.034" E
3	22° 30' 16.628" N	87° 5' 1.521" E
4	22° 30' 16.493" N	87° 5' 4.760" E
5	22° 30' 2.161" N	87° 5' 19.330" E
6	22° 29' 58.323" N	87° 5' 18.293" E
7	22° 29' 58.305" N	87° 5' 18.300" E
8	22° 29' 51.459" N	87° 5' 22.493" E
9	22° 29' 49.166" N	87° 5' 11.694" E
10	22° 29' 57.952" N	87° 4' 54.578" E
11	22° 29' 58.991" N	87° 4' 41.021" E
12	22° 29' 57.303" N	87° 4' 37.328" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_BP1_KS_14A OF KANGSABATI RIVER



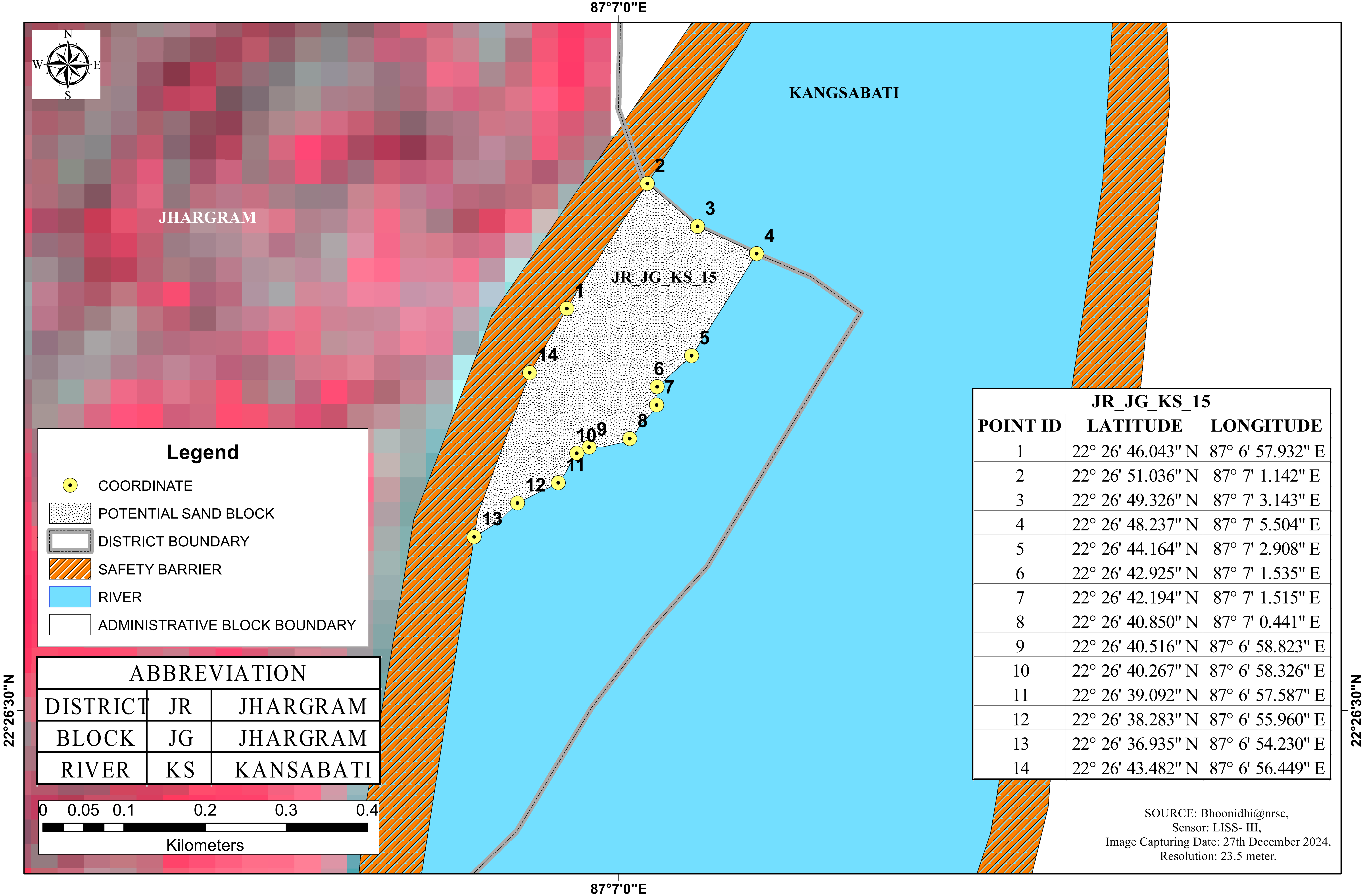
JR_BP1_KS_14A

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 27' 51.569" N	87° 6' 31.251" E	14	22° 28' 48.812" N	87° 5' 11.789" E
2	22° 27' 50.036" N	87° 6' 37.815" E	15	22° 28' 38.068" N	87° 5' 2.416" E
3	22° 27' 39.138" N	87° 6' 14.500" E	16	22° 28' 30.131" N	87° 4' 57.371" E
4	22° 27' 36.735" N	87° 6' 4.574" E	17	22° 28' 30.118" N	87° 4' 57.364" E
5	22° 27' 37.986" N	87° 5' 44.874" E	18	22° 28' 23.308" N	87° 4' 57.628" E
6	22° 27' 40.196" N	87° 5' 32.951" E	19	22° 28' 19.277" N	87° 4' 58.906" E
7	22° 27' 52.257" N	87° 5' 6.962" E	20	22° 28' 9.866" N	87° 5' 2.250" E
8	22° 28' 7.463" N	87° 4' 52.943" E	21	22° 28' 2.926" N	87° 5' 9.577" E
9	22° 28' 13.353" N	87° 4' 49.628" E	22	22° 27' 57.157" N	87° 5' 14.690" E
10	22° 28' 27.605" N	87° 4' 45.747" E	23	22° 27' 49.371" N	87° 5' 25.998" E
11	22° 28' 31.528" N	87° 4' 47.194" E	24	22° 27' 43.370" N	87° 5' 48.040" E
12	22° 28' 46.297" N	87° 5' 5.639" E	25	22° 27' 46.277" N	87° 6' 7.239" E
13	22° 28' 49.996" N	87° 5' 8.962" E			

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	BP1	BINPUR-I
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_JG_KS_15 OF KANGSABATI RIVER

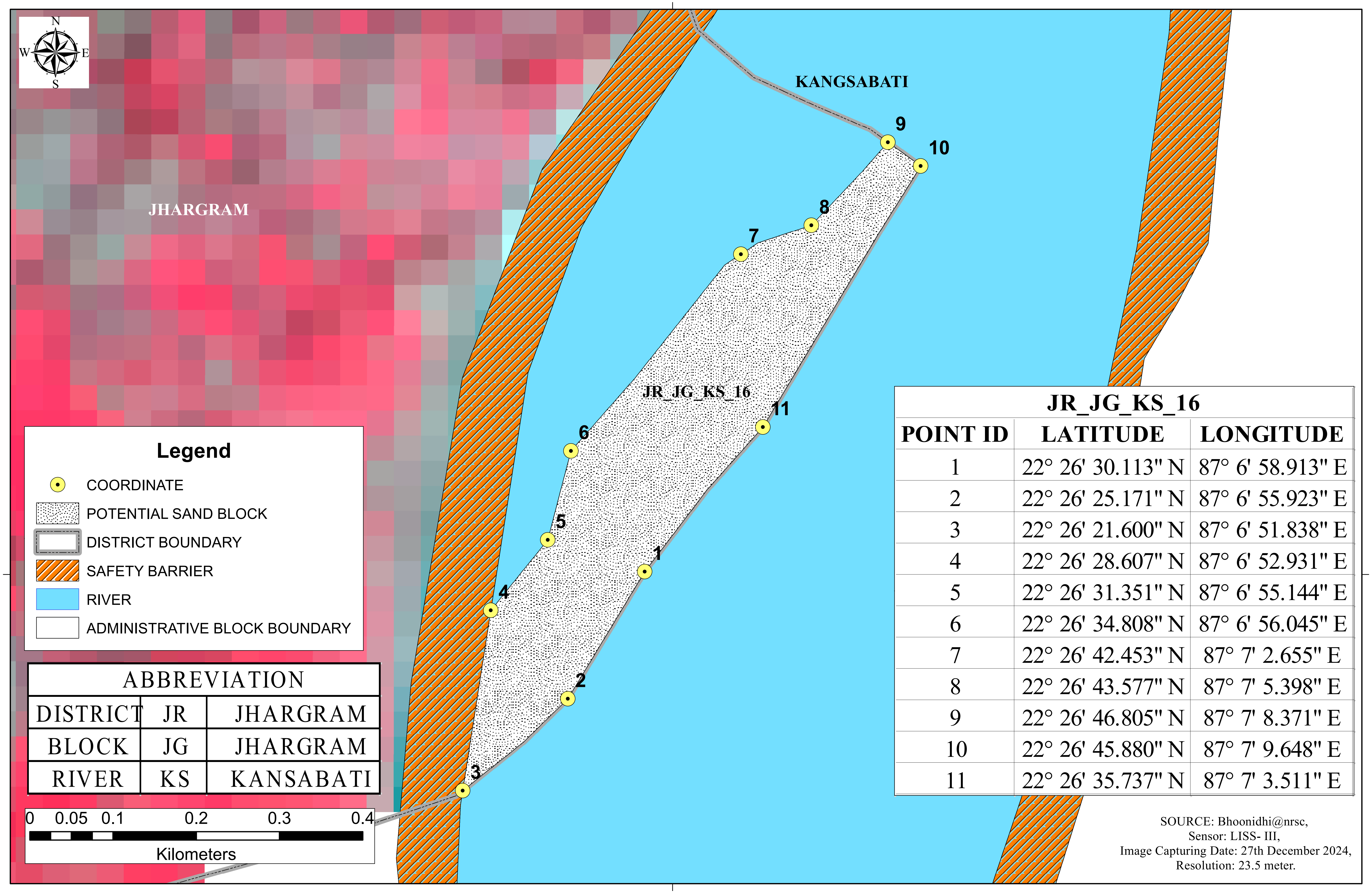


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	JG	JHARGRAM
RIVER	KS	KANSABATI

JR_JG_KS_15

POINT ID	LATITUDE	LONGITUDE
1	22° 26' 46.043" N	87° 6' 57.932" E
2	22° 26' 51.036" N	87° 7' 1.142" E
3	22° 26' 49.326" N	87° 7' 3.143" E
4	22° 26' 48.237" N	87° 7' 5.504" E
5	22° 26' 44.164" N	87° 7' 2.908" E
6	22° 26' 42.925" N	87° 7' 1.535" E
7	22° 26' 42.194" N	87° 7' 1.515" E
8	22° 26' 40.850" N	87° 7' 0.441" E
9	22° 26' 40.516" N	87° 6' 58.823" E
10	22° 26' 40.267" N	87° 6' 58.326" E
11	22° 26' 39.092" N	87° 6' 57.587" E
12	22° 26' 38.283" N	87° 6' 55.960" E
13	22° 26' 36.935" N	87° 6' 54.230" E
14	22° 26' 43.482" N	87° 6' 56.449" E

POTENTIAL BLOCK JR_JG_KS_16 OF KANGSABATI RIVER

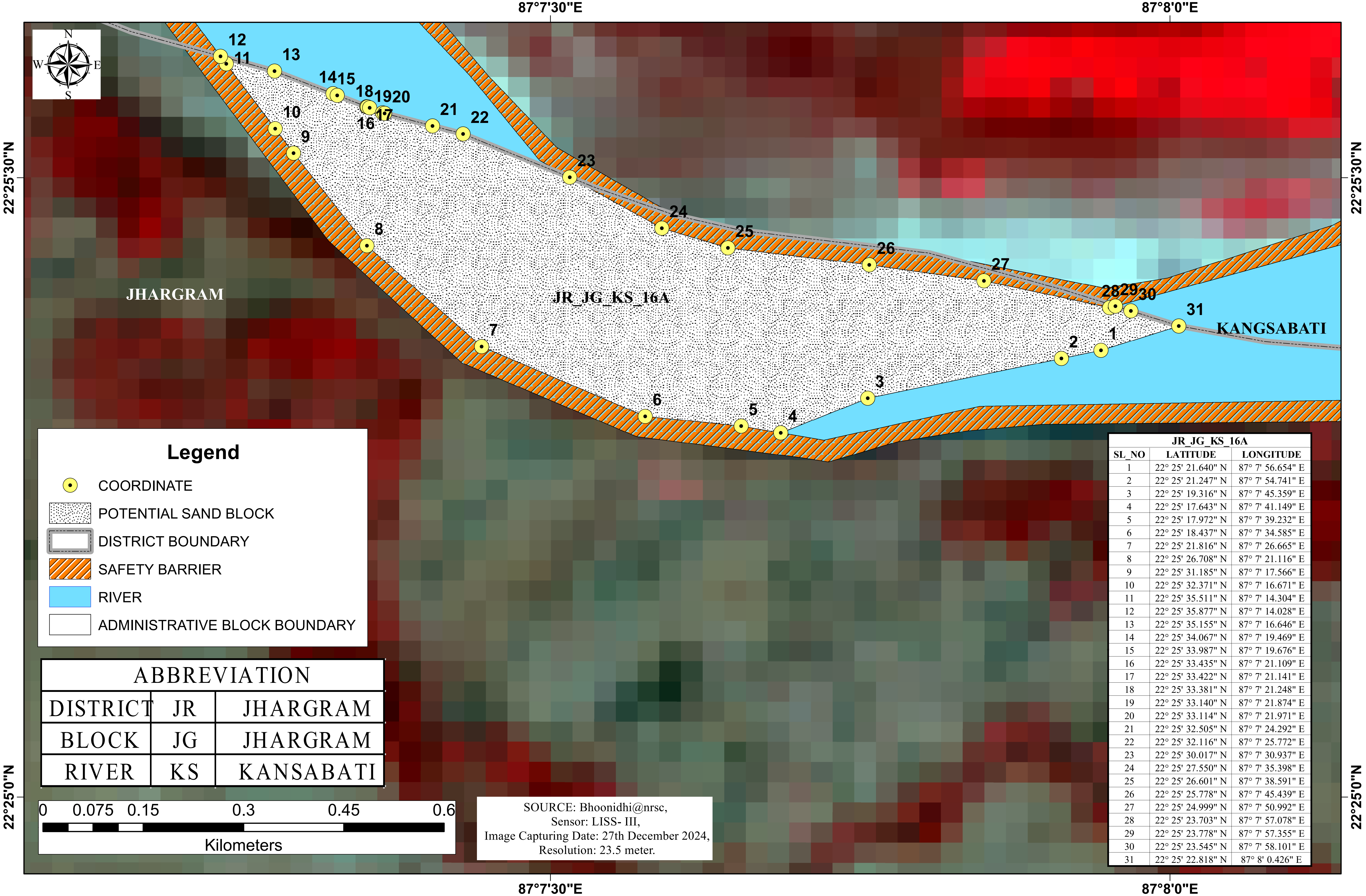


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	JG	JHARGRAM
RIVER	KS	KANSABATI

JR_JG_KS_16		
POINT ID	LATITUDE	LONGITUDE
1	22° 26' 30.113" N	87° 6' 58.913" E
2	22° 26' 25.171" N	87° 6' 55.923" E
3	22° 26' 21.600" N	87° 6' 51.838" E
4	22° 26' 28.607" N	87° 6' 52.931" E
5	22° 26' 31.351" N	87° 6' 55.144" E
6	22° 26' 34.808" N	87° 6' 56.045" E
7	22° 26' 42.453" N	87° 7' 2.655" E
8	22° 26' 43.577" N	87° 7' 5.398" E
9	22° 26' 46.805" N	87° 7' 8.371" E
10	22° 26' 45.880" N	87° 7' 9.648" E
11	22° 26' 35.737" N	87° 7' 3.511" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

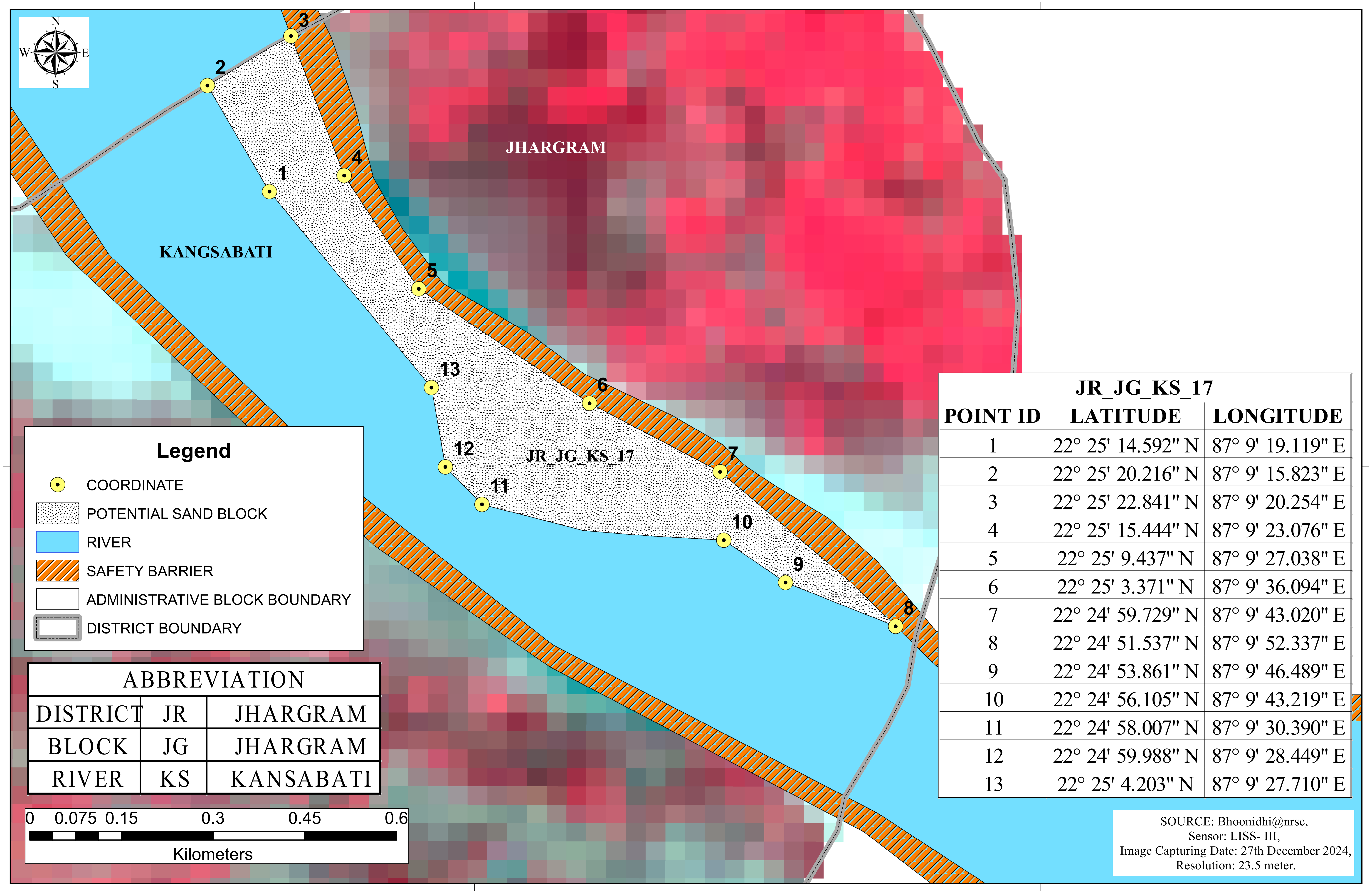
POTENTIAL BLOCK JR_JG_KS_16A OF KANGSABATI RIVER



ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	JG	JHARGRAM
RIVER	KS	KANSABATI

JR_JG_KS_16A		
SL_NO	LATITUDE	LONGITUDE
1	22° 25' 21.640" N	87° 7' 56.654" E
2	22° 25' 21.247" N	87° 7' 54.741" E
3	22° 25' 19.316" N	87° 7' 45.359" E
4	22° 25' 17.643" N	87° 7' 41.149" E
5	22° 25' 17.972" N	87° 7' 39.232" E
6	22° 25' 18.437" N	87° 7' 34.585" E
7	22° 25' 21.816" N	87° 7' 26.665" E
8	22° 25' 26.708" N	87° 7' 21.116" E
9	22° 25' 31.185" N	87° 7' 17.566" E
10	22° 25' 32.371" N	87° 7' 16.671" E
11	22° 25' 35.511" N	87° 7' 14.304" E
12	22° 25' 35.877" N	87° 7' 14.028" E
13	22° 25' 35.155" N	87° 7' 16.646" E
14	22° 25' 34.067" N	87° 7' 19.469" E
15	22° 25' 33.987" N	87° 7' 19.676" E
16	22° 25' 33.435" N	87° 7' 21.109" E
17	22° 25' 33.422" N	87° 7' 21.141" E
18	22° 25' 33.381" N	87° 7' 21.248" E
19	22° 25' 33.140" N	87° 7' 21.874" E
20	22° 25' 33.114" N	87° 7' 21.971" E
21	22° 25' 32.505" N	87° 7' 24.292" E
22	22° 25' 32.116" N	87° 7' 25.772" E
23	22° 25' 30.017" N	87° 7' 30.937" E
24	22° 25' 27.550" N	87° 7' 35.398" E
25	22° 25' 26.601" N	87° 7' 38.591" E
26	22° 25' 25.778" N	87° 7' 45.439" E
27	22° 25' 24.999" N	87° 7' 50.992" E
28	22° 25' 23.703" N	87° 7' 57.078" E
29	22° 25' 23.778" N	87° 7' 57.355" E
30	22° 25' 23.545" N	87° 7' 58.101" E
31	22° 25' 22.818" N	87° 8' 0.426" E

POTENTIAL BLOCK JR_JG_KS_17 OF KANGSABATI RIVER

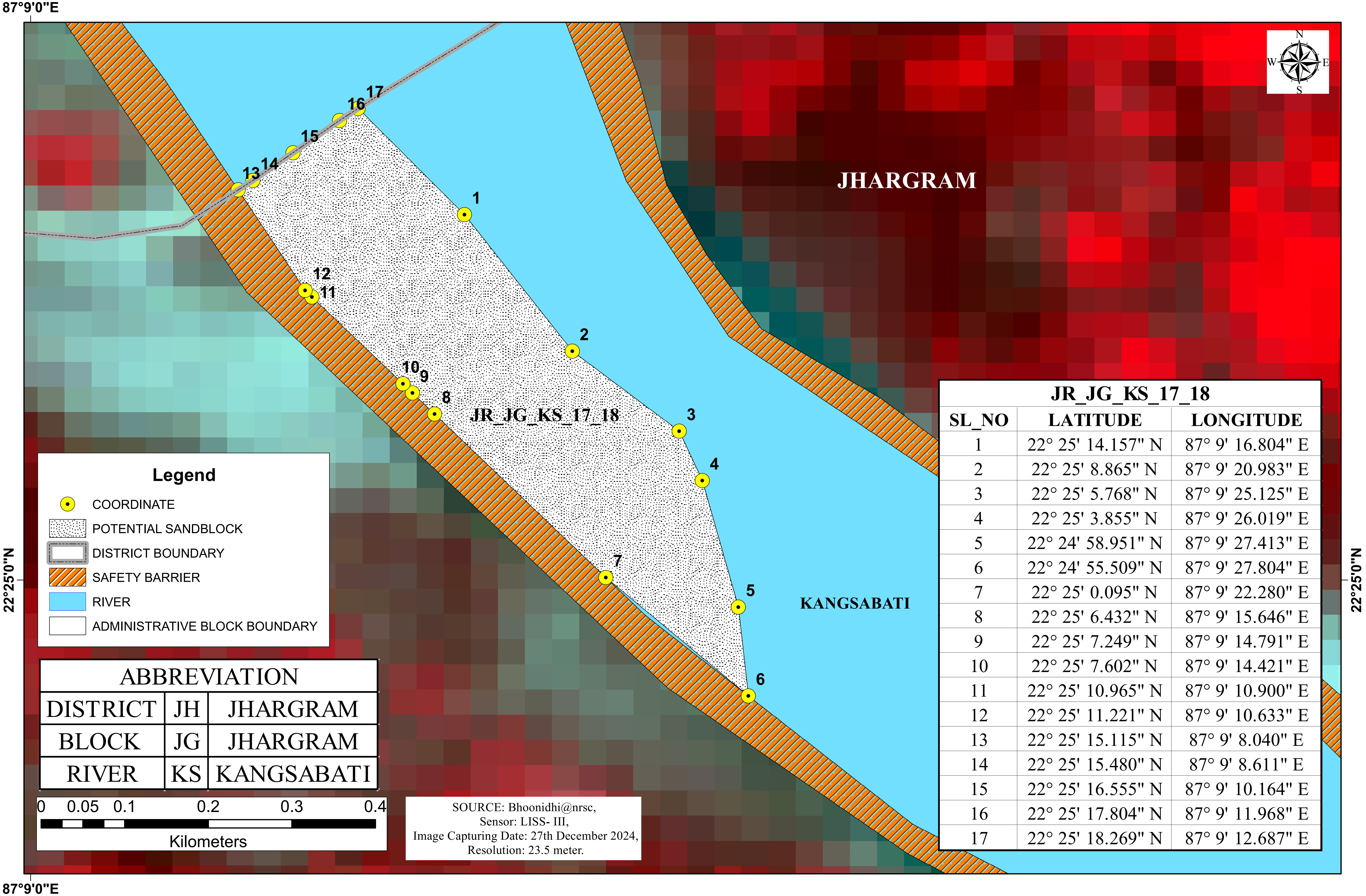


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	JG	JHARGRAM
RIVER	KS	KANSABATI

JR_JG_KS_17

POINT ID	LATITUDE	LONGITUDE
1	22° 25' 14.592" N	87° 9' 19.119" E
2	22° 25' 20.216" N	87° 9' 15.823" E
3	22° 25' 22.841" N	87° 9' 20.254" E
4	22° 25' 15.444" N	87° 9' 23.076" E
5	22° 25' 9.437" N	87° 9' 27.038" E
6	22° 25' 3.371" N	87° 9' 36.094" E
7	22° 24' 59.729" N	87° 9' 43.020" E
8	22° 24' 51.537" N	87° 9' 52.337" E
9	22° 24' 53.861" N	87° 9' 46.489" E
10	22° 24' 56.105" N	87° 9' 43.219" E
11	22° 24' 58.007" N	87° 9' 30.390" E
12	22° 24' 59.988" N	87° 9' 28.449" E
13	22° 25' 4.203" N	87° 9' 27.710" E

POTENTIAL BLOCK JR_JG_KS_17_18 OF KANGSABATI RIVER

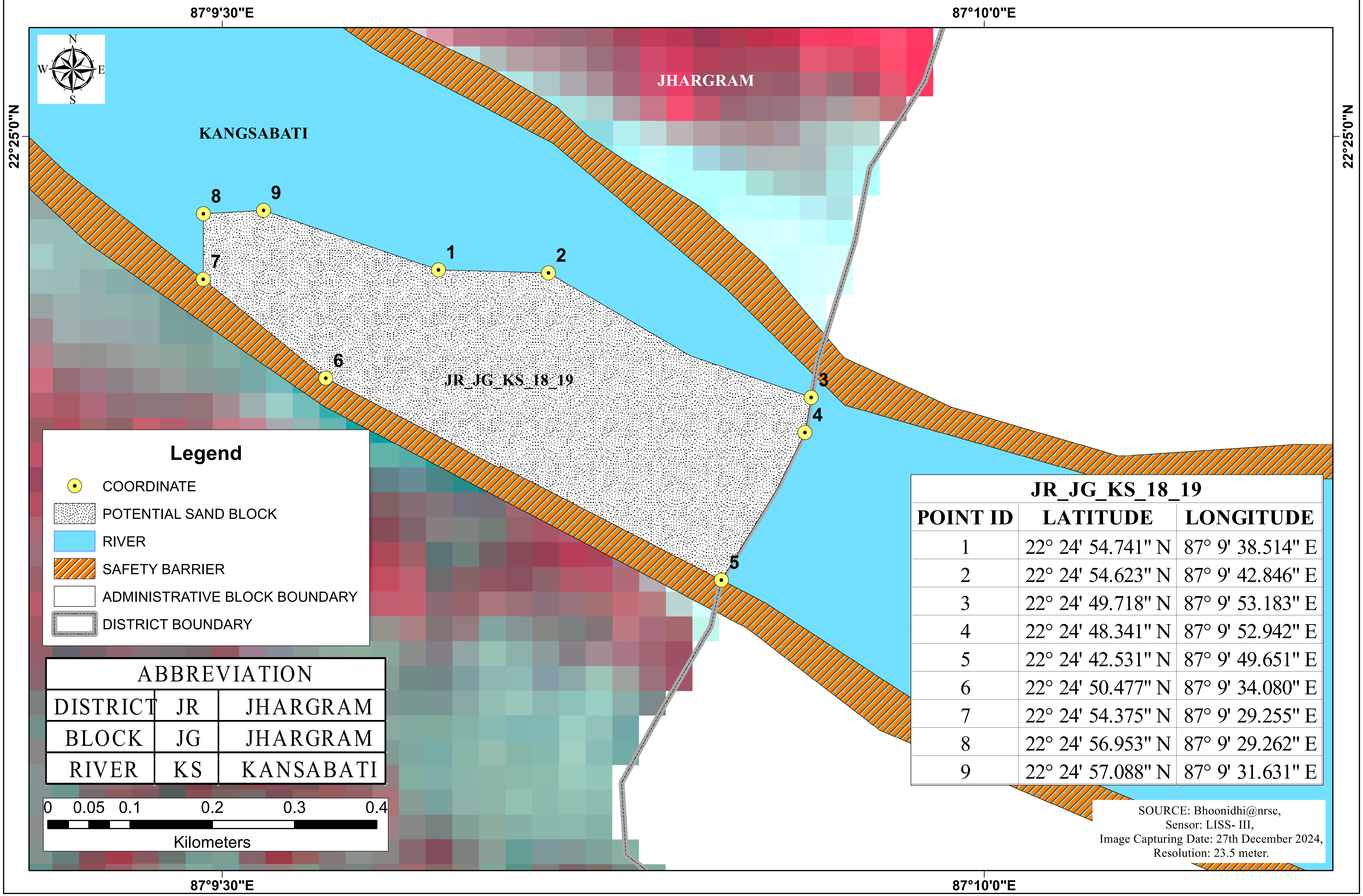


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	JG	JHARGRAM
RIVER	KS	KANGSABATI

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

JR_JG_KS_17_18		
SL_NO	LATITUDE	LONGITUDE
1	22° 25' 14.157" N	87° 9' 16.804" E
2	22° 25' 8.865" N	87° 9' 20.983" E
3	22° 25' 5.768" N	87° 9' 25.125" E
4	22° 25' 3.855" N	87° 9' 26.019" E
5	22° 24' 58.951" N	87° 9' 27.413" E
6	22° 24' 55.509" N	87° 9' 27.804" E
7	22° 25' 0.095" N	87° 9' 22.280" E
8	22° 25' 6.432" N	87° 9' 15.646" E
9	22° 25' 7.249" N	87° 9' 14.791" E
10	22° 25' 7.602" N	87° 9' 14.421" E
11	22° 25' 10.965" N	87° 9' 10.900" E
12	22° 25' 11.221" N	87° 9' 10.633" E
13	22° 25' 15.115" N	87° 9' 8.040" E
14	22° 25' 15.480" N	87° 9' 8.611" E
15	22° 25' 16.555" N	87° 9' 10.164" E
16	22° 25' 17.804" N	87° 9' 11.968" E
17	22° 25' 18.269" N	87° 9' 12.687" E

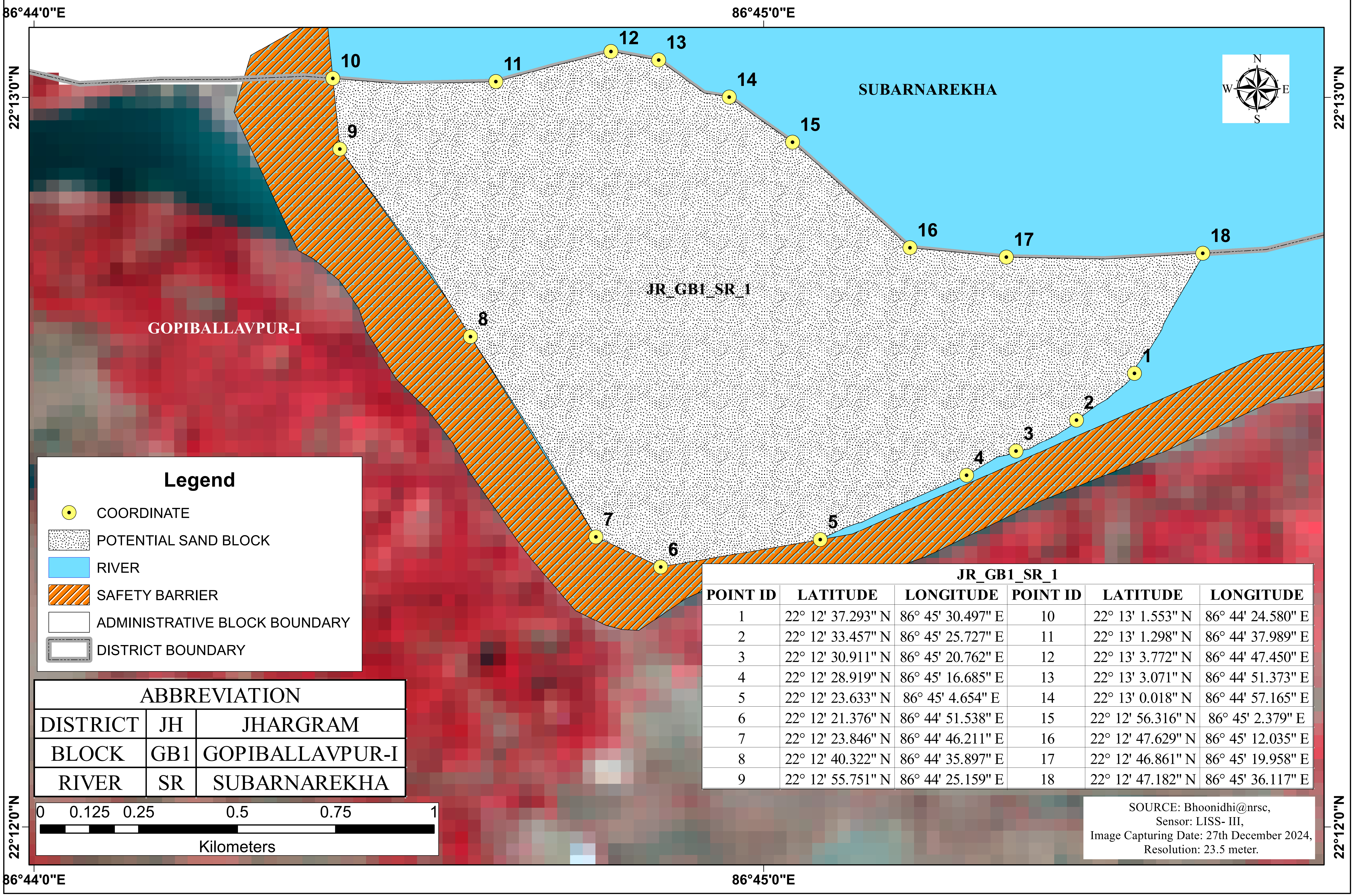
POTENTIAL BLOCK JR_JG_KS_18_19 OF KANGSABATI RIVER



JR_JG_KS_18_19

POINT ID	LATITUDE	LONGITUDE
1	22° 24' 54.741" N	87° 9' 38.514" E
2	22° 24' 54.623" N	87° 9' 42.846" E
3	22° 24' 49.718" N	87° 9' 53.183" E
4	22° 24' 48.341" N	87° 9' 52.942" E
5	22° 24' 42.531" N	87° 9' 49.651" E
6	22° 24' 50.477" N	87° 9' 34.080" E
7	22° 24' 54.375" N	87° 9' 29.255" E
8	22° 24' 56.953" N	87° 9' 29.262" E
9	22° 24' 57.088" N	87° 9' 31.631" E

POTENTIAL BLOCK JR_GB1_SR_1 OF SUBARNAREKHA RIVER

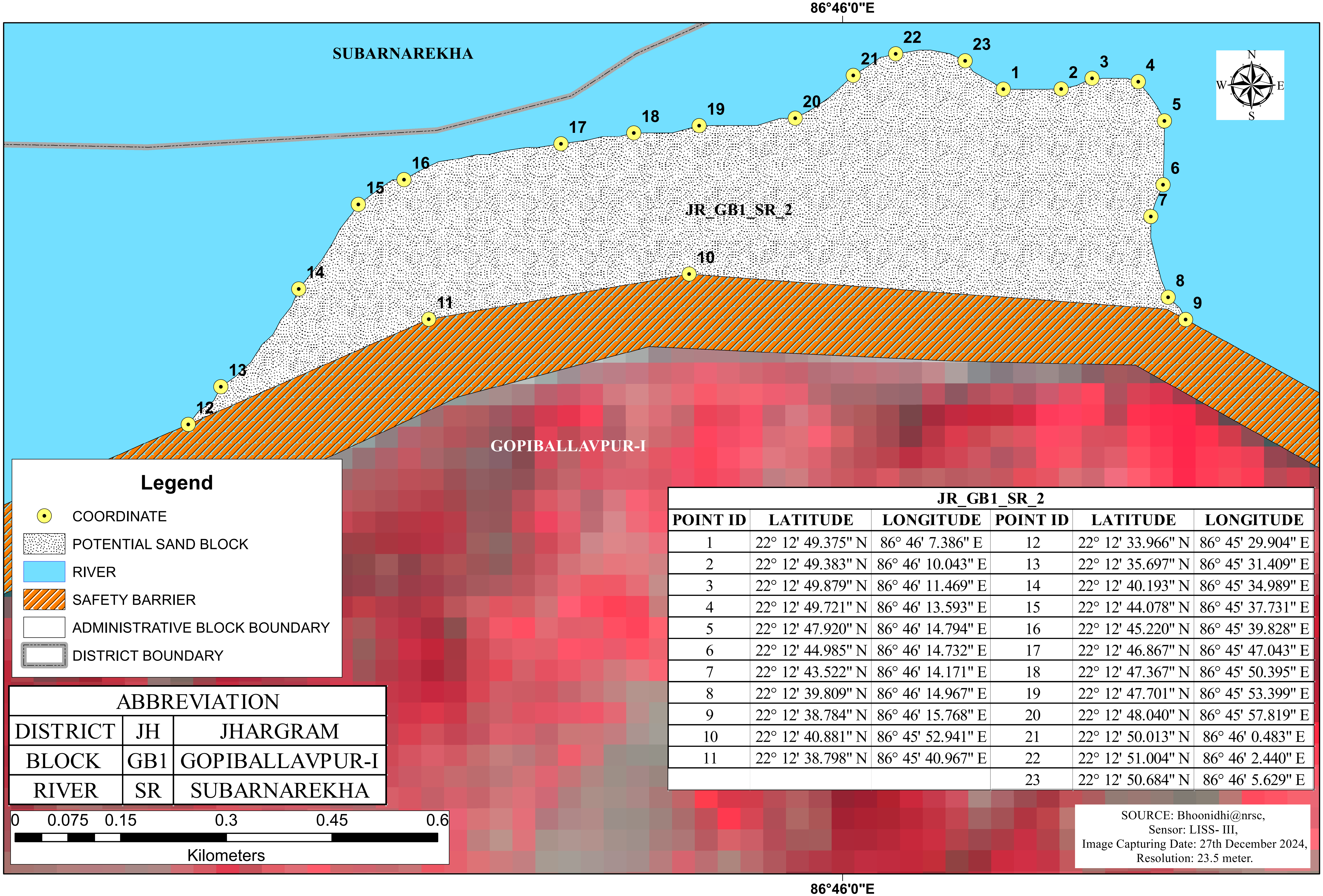


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

JR_GB1_SR_1

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 12' 37.293" N	86° 45' 30.497" E	10	22° 13' 1.553" N	86° 44' 24.580" E
2	22° 12' 33.457" N	86° 45' 25.727" E	11	22° 13' 1.298" N	86° 44' 37.989" E
3	22° 12' 30.911" N	86° 45' 20.762" E	12	22° 13' 3.772" N	86° 44' 47.450" E
4	22° 12' 28.919" N	86° 45' 16.685" E	13	22° 13' 3.071" N	86° 44' 51.373" E
5	22° 12' 23.633" N	86° 45' 4.654" E	14	22° 13' 0.018" N	86° 44' 57.165" E
6	22° 12' 21.376" N	86° 44' 51.538" E	15	22° 12' 56.316" N	86° 45' 2.379" E
7	22° 12' 23.846" N	86° 44' 46.211" E	16	22° 12' 47.629" N	86° 45' 12.035" E
8	22° 12' 40.322" N	86° 44' 35.897" E	17	22° 12' 46.861" N	86° 45' 19.958" E
9	22° 12' 55.751" N	86° 44' 25.159" E	18	22° 12' 47.182" N	86° 45' 36.117" E

POTENTIAL BLOCK JR_GB1_SR_2 OF SUBARNAREKHA RIVER



Legend

- COORDINATE
- POTENTIAL SAND BLOCK
- RIVER
- SAFETY BARRIER
- ADMINISTRATIVE BLOCK BOUNDARY
- DISTRICT BOUNDARY

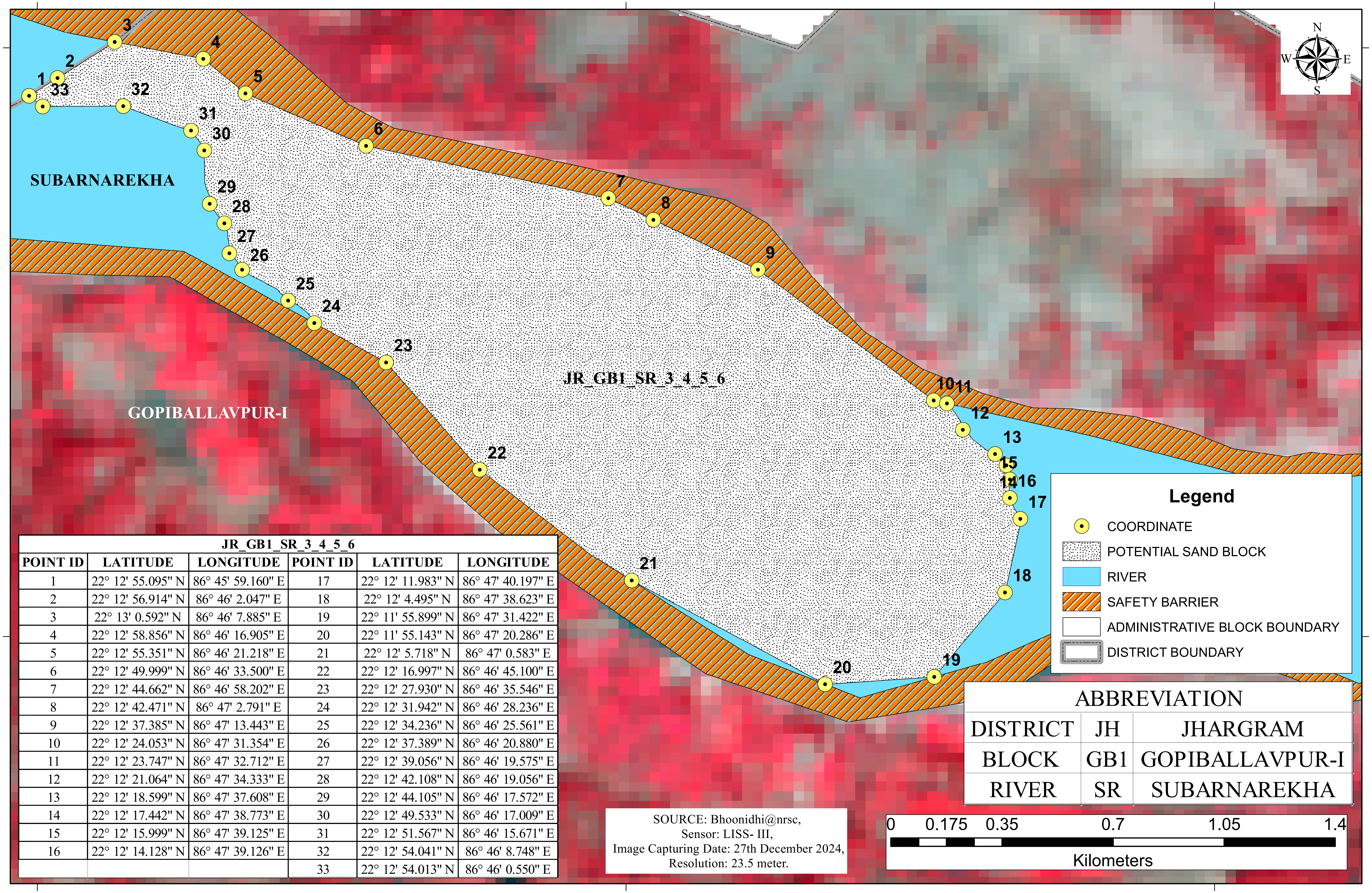
ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

0 0.075 0.15 0.3 0.45 0.6
Kilometers

JR_GB1_SR_2					
POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 12' 49.375" N	86° 46' 7.386" E	12	22° 12' 33.966" N	86° 45' 29.904" E
2	22° 12' 49.383" N	86° 46' 10.043" E	13	22° 12' 35.697" N	86° 45' 31.409" E
3	22° 12' 49.879" N	86° 46' 11.469" E	14	22° 12' 40.193" N	86° 45' 34.989" E
4	22° 12' 49.721" N	86° 46' 13.593" E	15	22° 12' 44.078" N	86° 45' 37.731" E
5	22° 12' 47.920" N	86° 46' 14.794" E	16	22° 12' 45.220" N	86° 45' 39.828" E
6	22° 12' 44.985" N	86° 46' 14.732" E	17	22° 12' 46.867" N	86° 45' 47.043" E
7	22° 12' 43.522" N	86° 46' 14.171" E	18	22° 12' 47.367" N	86° 45' 50.395" E
8	22° 12' 39.809" N	86° 46' 14.967" E	19	22° 12' 47.701" N	86° 45' 53.399" E
9	22° 12' 38.784" N	86° 46' 15.768" E	20	22° 12' 48.040" N	86° 45' 57.819" E
10	22° 12' 40.881" N	86° 45' 52.941" E	21	22° 12' 50.013" N	86° 46' 0.483" E
11	22° 12' 38.798" N	86° 45' 40.967" E	22	22° 12' 51.004" N	86° 46' 2.440" E
			23	22° 12' 50.684" N	86° 46' 5.629" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_GB1_SR_3_4_5_6 OF SUBARNAREKHA RIVER



JR_GB1_SR_3_4_5_6

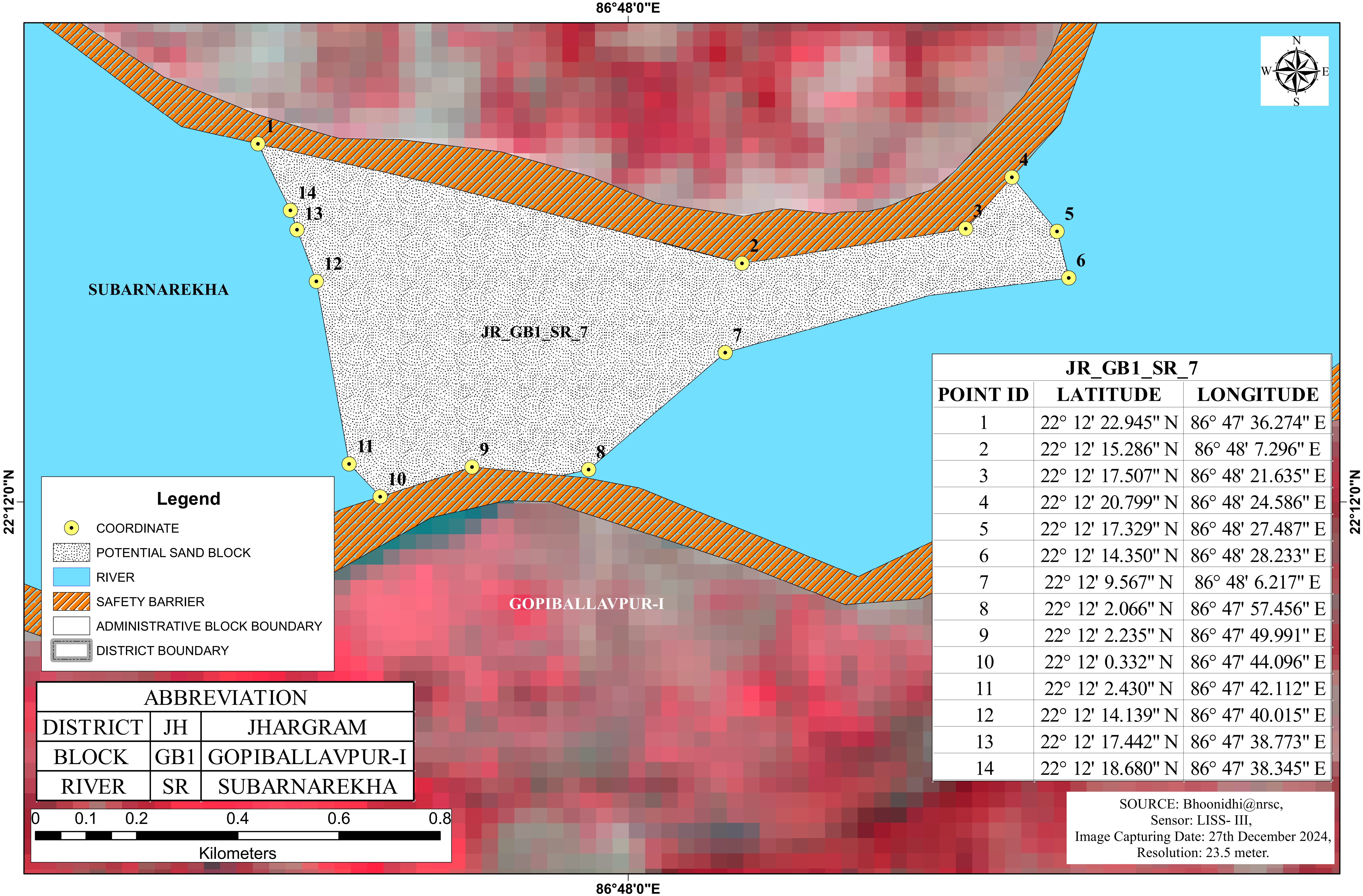
POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 12' 55.095" N	86° 45' 59.160" E	17	22° 12' 11.983" N	86° 47' 40.197" E
2	22° 12' 56.914" N	86° 46' 2.047" E	18	22° 12' 4.495" N	86° 47' 38.623" E
3	22° 13' 0.592" N	86° 46' 7.885" E	19	22° 11' 55.899" N	86° 47' 31.422" E
4	22° 12' 58.856" N	86° 46' 16.905" E	20	22° 11' 55.143" N	86° 47' 20.286" E
5	22° 12' 55.351" N	86° 46' 21.218" E	21	22° 12' 5.718" N	86° 47' 0.583" E
6	22° 12' 49.999" N	86° 46' 33.500" E	22	22° 12' 16.997" N	86° 46' 45.100" E
7	22° 12' 44.662" N	86° 46' 58.202" E	23	22° 12' 27.930" N	86° 46' 35.546" E
8	22° 12' 42.471" N	86° 47' 2.791" E	24	22° 12' 31.942" N	86° 46' 28.236" E
9	22° 12' 37.385" N	86° 47' 13.443" E	25	22° 12' 34.236" N	86° 46' 25.561" E
10	22° 12' 24.053" N	86° 47' 31.354" E	26	22° 12' 37.389" N	86° 46' 20.880" E
11	22° 12' 23.747" N	86° 47' 32.712" E	27	22° 12' 39.056" N	86° 46' 19.575" E
12	22° 12' 21.064" N	86° 47' 34.333" E	28	22° 12' 42.108" N	86° 46' 19.056" E
13	22° 12' 18.599" N	86° 47' 37.608" E	29	22° 12' 44.105" N	86° 46' 17.572" E
14	22° 12' 17.442" N	86° 47' 38.773" E	30	22° 12' 49.533" N	86° 46' 17.009" E
15	22° 12' 15.999" N	86° 47' 39.125" E	31	22° 12' 51.567" N	86° 46' 15.671" E
16	22° 12' 14.128" N	86° 47' 39.126" E	32	22° 12' 54.041" N	86° 46' 8.748" E
			33	22° 12' 54.013" N	86° 46' 0.550" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

ABBREVIATION

DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_GB1_SR_7 OF SUBARNAREKHA RIVER

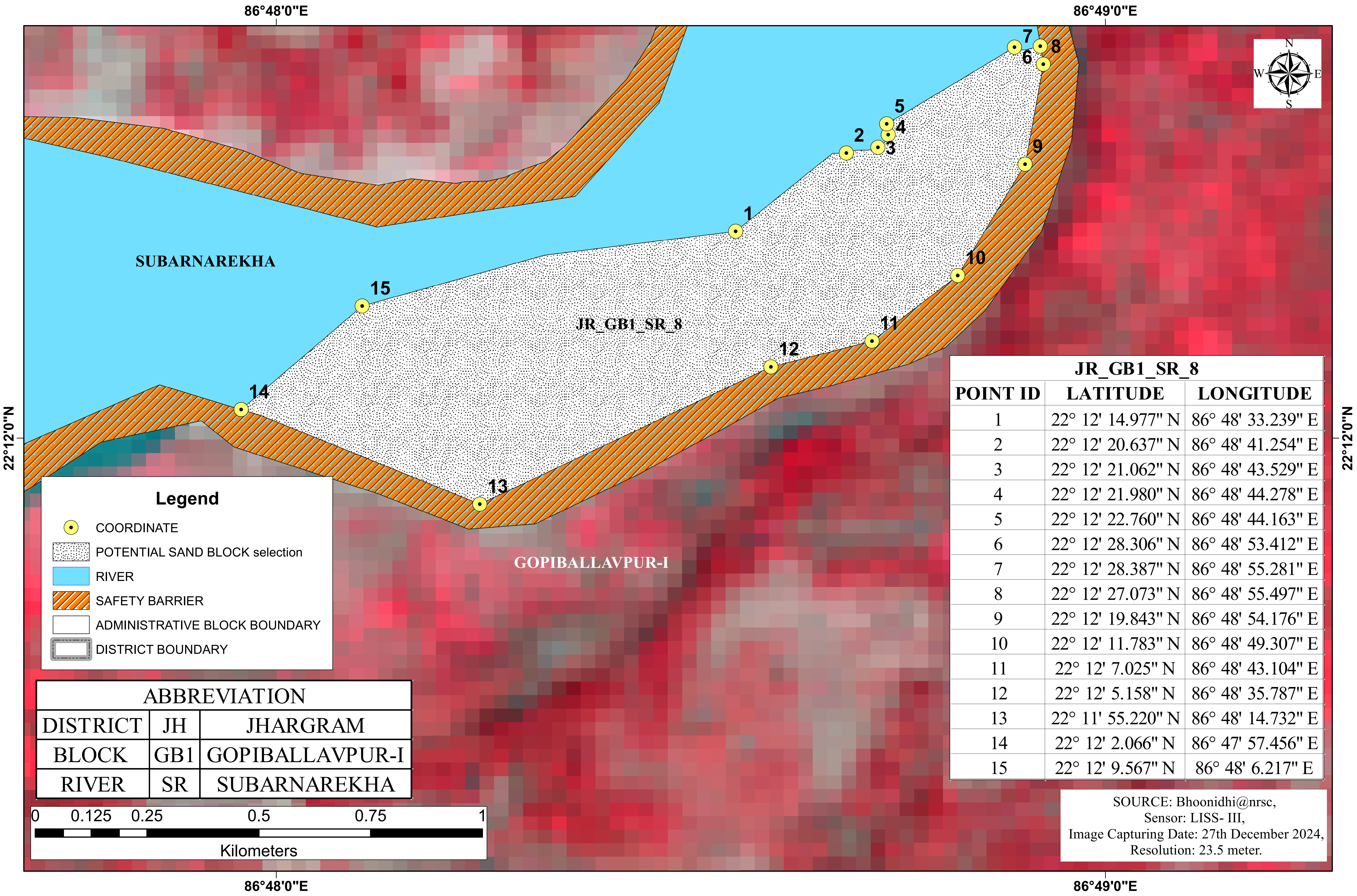


JR_GB1_SR_7

POINT ID	LATITUDE	LONGITUDE
1	22° 12' 22.945" N	86° 47' 36.274" E
2	22° 12' 15.286" N	86° 48' 7.296" E
3	22° 12' 17.507" N	86° 48' 21.635" E
4	22° 12' 20.799" N	86° 48' 24.586" E
5	22° 12' 17.329" N	86° 48' 27.487" E
6	22° 12' 14.350" N	86° 48' 28.233" E
7	22° 12' 9.567" N	86° 48' 6.217" E
8	22° 12' 2.066" N	86° 47' 57.456" E
9	22° 12' 2.235" N	86° 47' 49.991" E
10	22° 12' 0.332" N	86° 47' 44.096" E
11	22° 12' 2.430" N	86° 47' 42.112" E
12	22° 12' 14.139" N	86° 47' 40.015" E
13	22° 12' 17.442" N	86° 47' 38.773" E
14	22° 12' 18.680" N	86° 47' 38.345" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_GB1_SR_8 OF SUBARNAREKHA RIVER

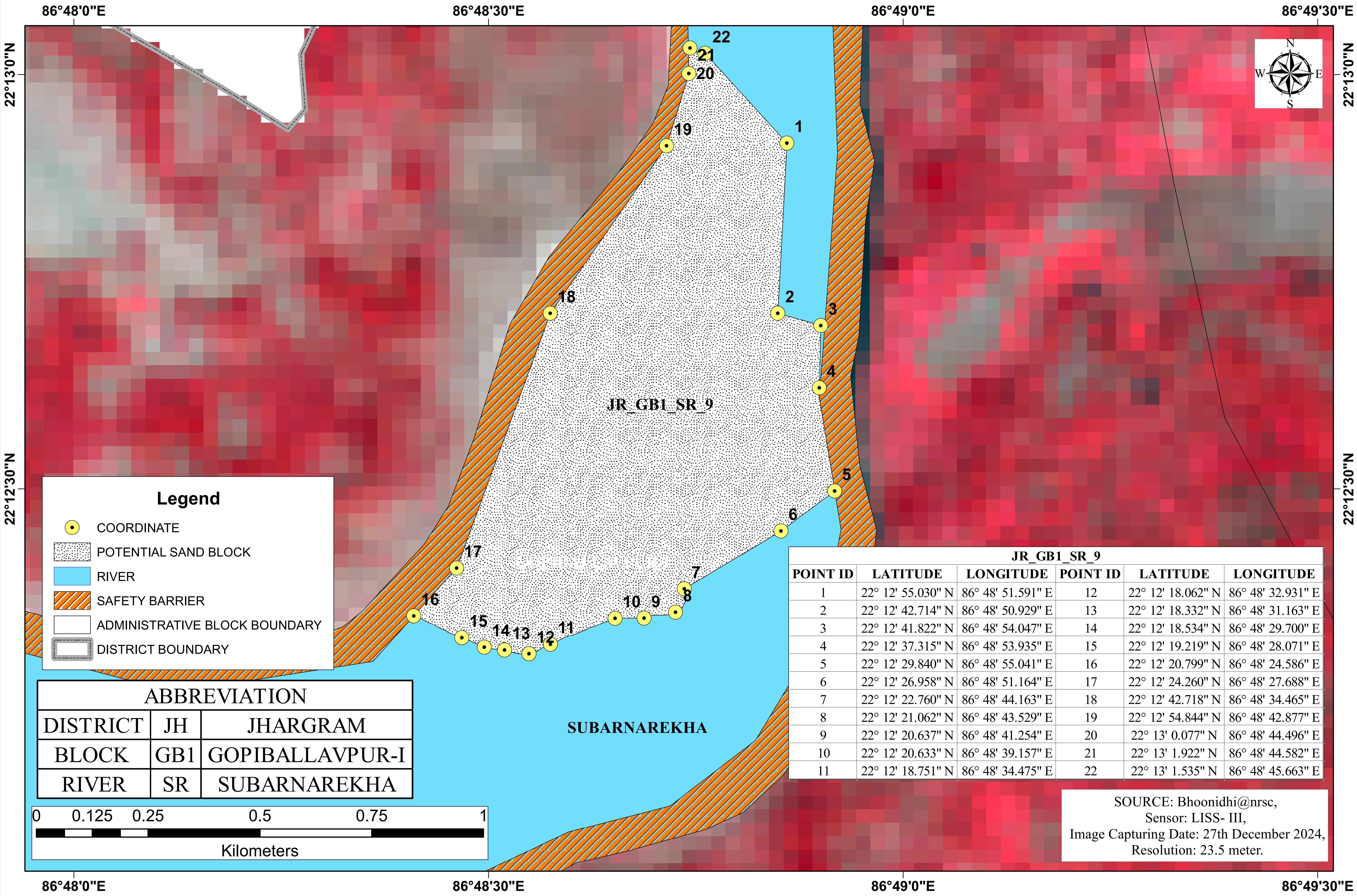


JR_GB1_SR_8		
POINT ID	LATITUDE	LONGITUDE
1	22° 12' 14.977" N	86° 48' 33.239" E
2	22° 12' 20.637" N	86° 48' 41.254" E
3	22° 12' 21.062" N	86° 48' 43.529" E
4	22° 12' 21.980" N	86° 48' 44.278" E
5	22° 12' 22.760" N	86° 48' 44.163" E
6	22° 12' 28.306" N	86° 48' 53.412" E
7	22° 12' 28.387" N	86° 48' 55.281" E
8	22° 12' 27.073" N	86° 48' 55.497" E
9	22° 12' 19.843" N	86° 48' 54.176" E
10	22° 12' 11.783" N	86° 48' 49.307" E
11	22° 12' 7.025" N	86° 48' 43.104" E
12	22° 12' 5.158" N	86° 48' 35.787" E
13	22° 11' 55.220" N	86° 48' 14.732" E
14	22° 12' 2.066" N	86° 47' 57.456" E
15	22° 12' 9.567" N	86° 48' 6.217" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_GB1_SR_9 OF SUBARNAREKHA RIVER

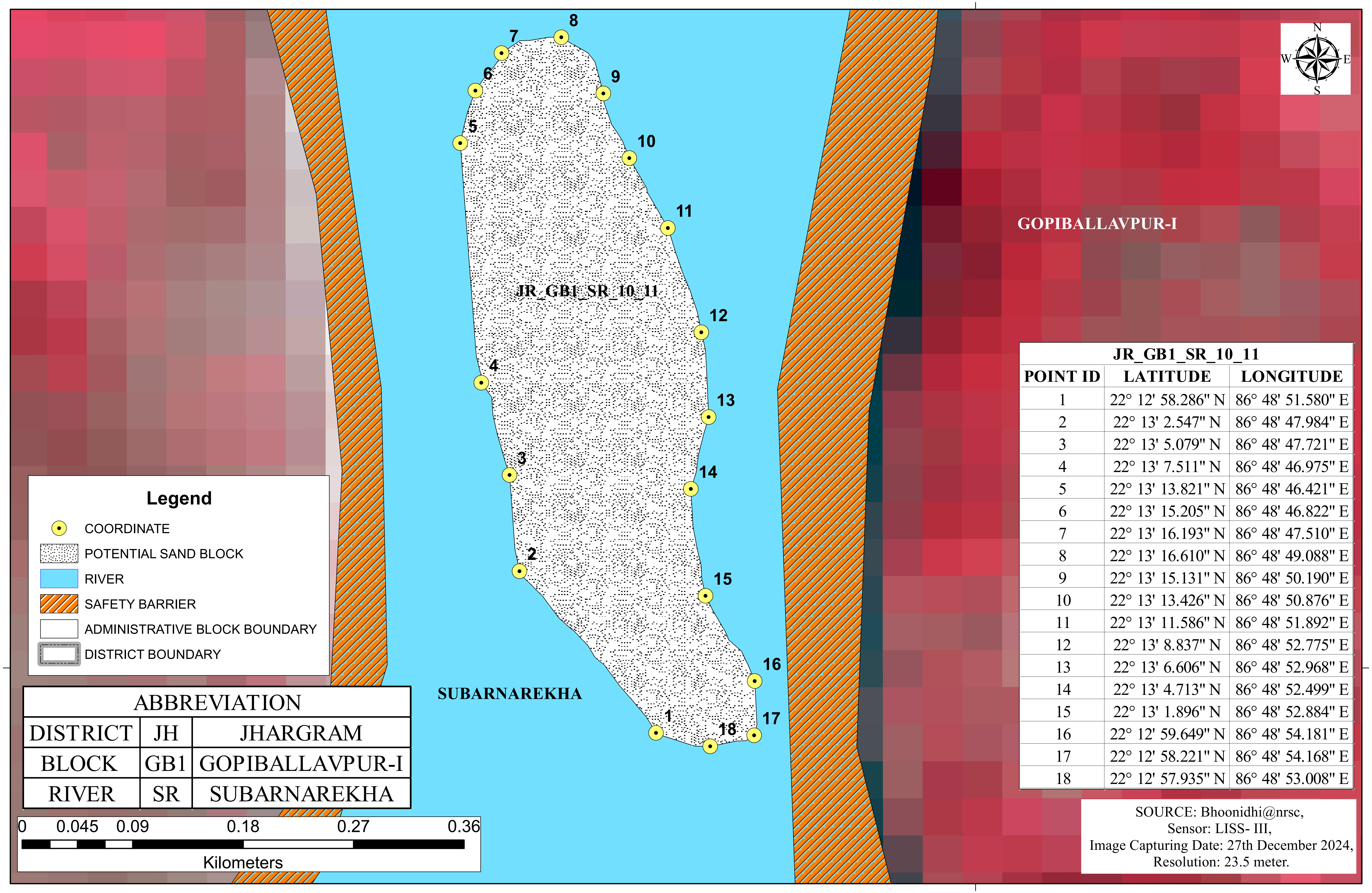


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

JR_GB1_SR_9

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 12' 55.030" N	86° 48' 51.591" E	12	22° 12' 18.062" N	86° 48' 32.931" E
2	22° 12' 42.714" N	86° 48' 50.929" E	13	22° 12' 18.332" N	86° 48' 31.163" E
3	22° 12' 41.822" N	86° 48' 54.047" E	14	22° 12' 18.534" N	86° 48' 29.700" E
4	22° 12' 37.315" N	86° 48' 53.935" E	15	22° 12' 19.219" N	86° 48' 28.071" E
5	22° 12' 29.840" N	86° 48' 55.041" E	16	22° 12' 20.799" N	86° 48' 24.586" E
6	22° 12' 26.958" N	86° 48' 51.164" E	17	22° 12' 24.260" N	86° 48' 27.688" E
7	22° 12' 22.760" N	86° 48' 44.163" E	18	22° 12' 42.718" N	86° 48' 34.465" E
8	22° 12' 21.062" N	86° 48' 43.529" E	19	22° 12' 54.844" N	86° 48' 42.877" E
9	22° 12' 20.637" N	86° 48' 41.254" E	20	22° 13' 0.077" N	86° 48' 44.496" E
10	22° 12' 20.633" N	86° 48' 39.157" E	21	22° 13' 1.922" N	86° 48' 44.582" E
11	22° 12' 18.751" N	86° 48' 34.475" E	22	22° 13' 1.535" N	86° 48' 45.663" E

POTENTIAL BLOCK JR_GB1_SR_10_11 OF SUBARNAREKHA RIVER



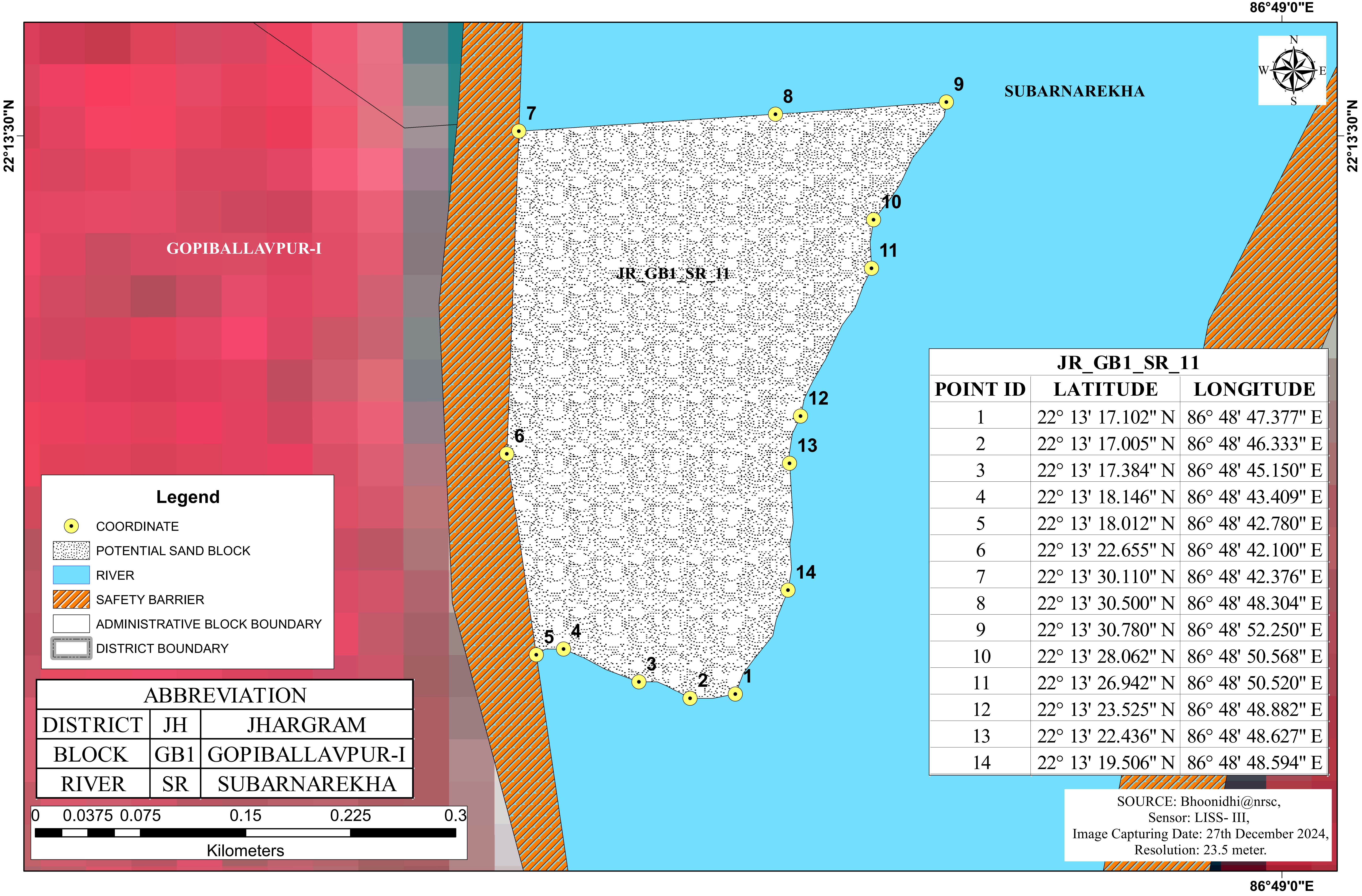
JR_GB1_SR_10_11

POINT ID	LATITUDE	LONGITUDE
1	22° 12' 58.286" N	86° 48' 51.580" E
2	22° 13' 2.547" N	86° 48' 47.984" E
3	22° 13' 5.079" N	86° 48' 47.721" E
4	22° 13' 7.511" N	86° 48' 46.975" E
5	22° 13' 13.821" N	86° 48' 46.421" E
6	22° 13' 15.205" N	86° 48' 46.822" E
7	22° 13' 16.193" N	86° 48' 47.510" E
8	22° 13' 16.610" N	86° 48' 49.088" E
9	22° 13' 15.131" N	86° 48' 50.190" E
10	22° 13' 13.426" N	86° 48' 50.876" E
11	22° 13' 11.586" N	86° 48' 51.892" E
12	22° 13' 8.837" N	86° 48' 52.775" E
13	22° 13' 6.606" N	86° 48' 52.968" E
14	22° 13' 4.713" N	86° 48' 52.499" E
15	22° 13' 1.896" N	86° 48' 52.884" E
16	22° 12' 59.649" N	86° 48' 54.181" E
17	22° 12' 58.221" N	86° 48' 54.168" E
18	22° 12' 57.935" N	86° 48' 53.008" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_GB1_SR_11 OF SUBARNAREKHA RIVER

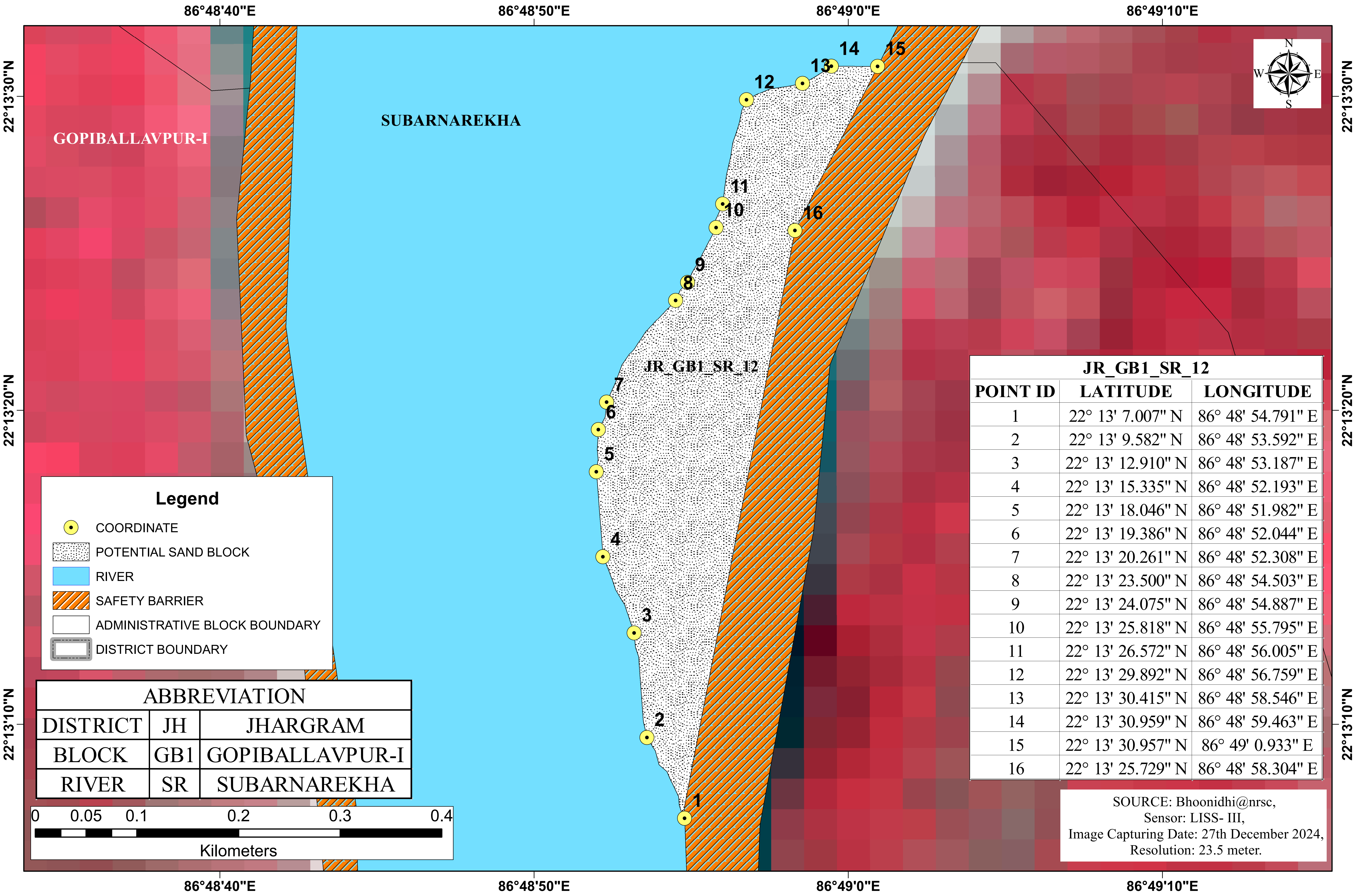


JR_GB1_SR_11		
POINT ID	LATITUDE	LONGITUDE
1	22° 13' 17.102" N	86° 48' 47.377" E
2	22° 13' 17.005" N	86° 48' 46.333" E
3	22° 13' 17.384" N	86° 48' 45.150" E
4	22° 13' 18.146" N	86° 48' 43.409" E
5	22° 13' 18.012" N	86° 48' 42.780" E
6	22° 13' 22.655" N	86° 48' 42.100" E
7	22° 13' 30.110" N	86° 48' 42.376" E
8	22° 13' 30.500" N	86° 48' 48.304" E
9	22° 13' 30.780" N	86° 48' 52.250" E
10	22° 13' 28.062" N	86° 48' 50.568" E
11	22° 13' 26.942" N	86° 48' 50.520" E
12	22° 13' 23.525" N	86° 48' 48.882" E
13	22° 13' 22.436" N	86° 48' 48.627" E
14	22° 13' 19.506" N	86° 48' 48.594" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

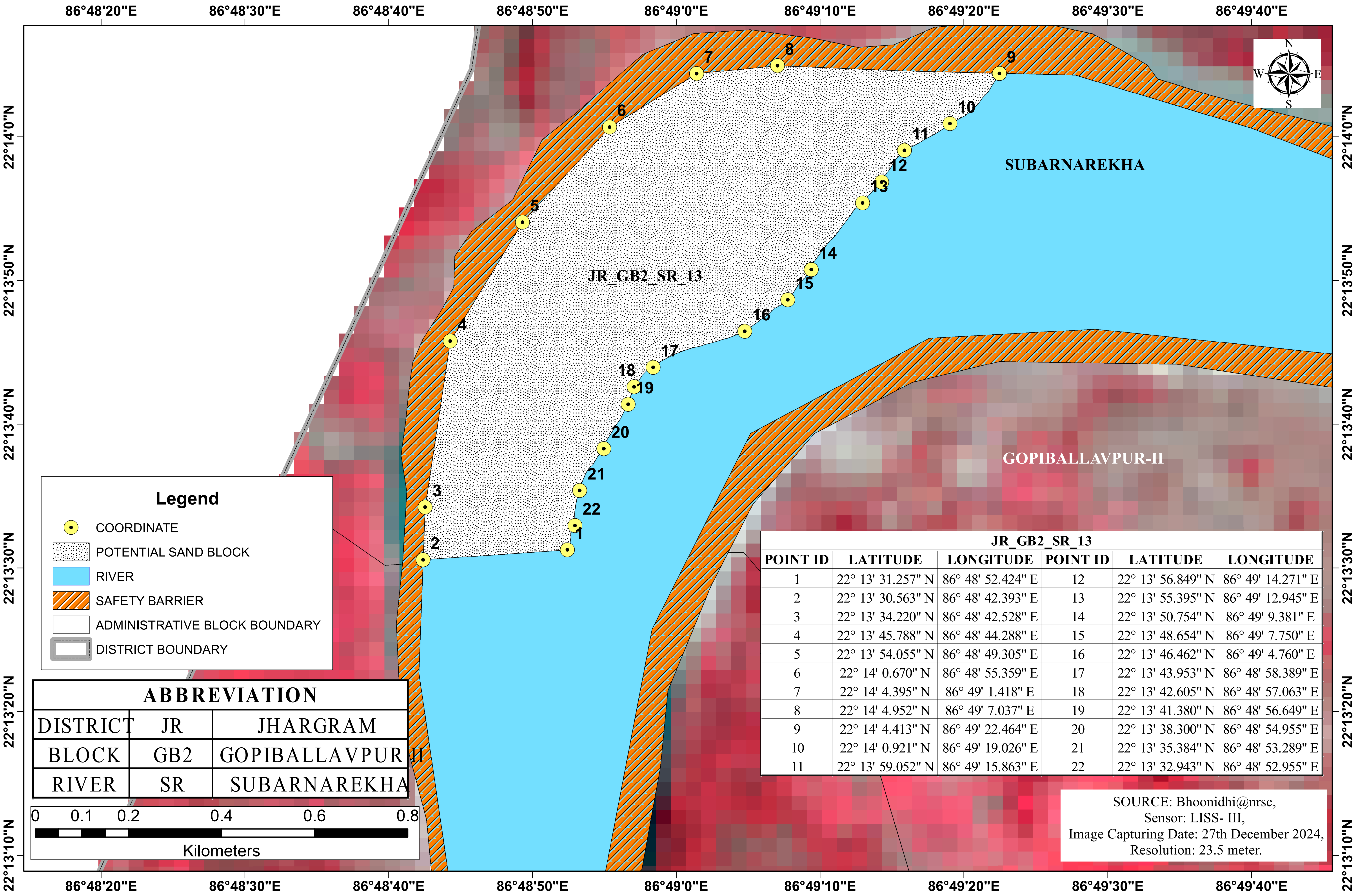
POTENTIAL BLOCK JR_GB1_SR_12 OF SUBARNAREKHA RIVER



ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB1	GOPIBALLAVPUR-I
RIVER	SR	SUBARNAREKHA

JR_GB1_SR_12		
POINT ID	LATITUDE	LONGITUDE
1	22° 13' 7.007" N	86° 48' 54.791" E
2	22° 13' 9.582" N	86° 48' 53.592" E
3	22° 13' 12.910" N	86° 48' 53.187" E
4	22° 13' 15.335" N	86° 48' 52.193" E
5	22° 13' 18.046" N	86° 48' 51.982" E
6	22° 13' 19.386" N	86° 48' 52.044" E
7	22° 13' 20.261" N	86° 48' 52.308" E
8	22° 13' 23.500" N	86° 48' 54.503" E
9	22° 13' 24.075" N	86° 48' 54.887" E
10	22° 13' 25.818" N	86° 48' 55.795" E
11	22° 13' 26.572" N	86° 48' 56.005" E
12	22° 13' 29.892" N	86° 48' 56.759" E
13	22° 13' 30.415" N	86° 48' 58.546" E
14	22° 13' 30.959" N	86° 48' 59.463" E
15	22° 13' 30.957" N	86° 49' 0.933" E
16	22° 13' 25.729" N	86° 48' 58.304" E

POTENTIAL BLOCK JR_GB2_SR_13 OF SUBARNAREKHA RIVER



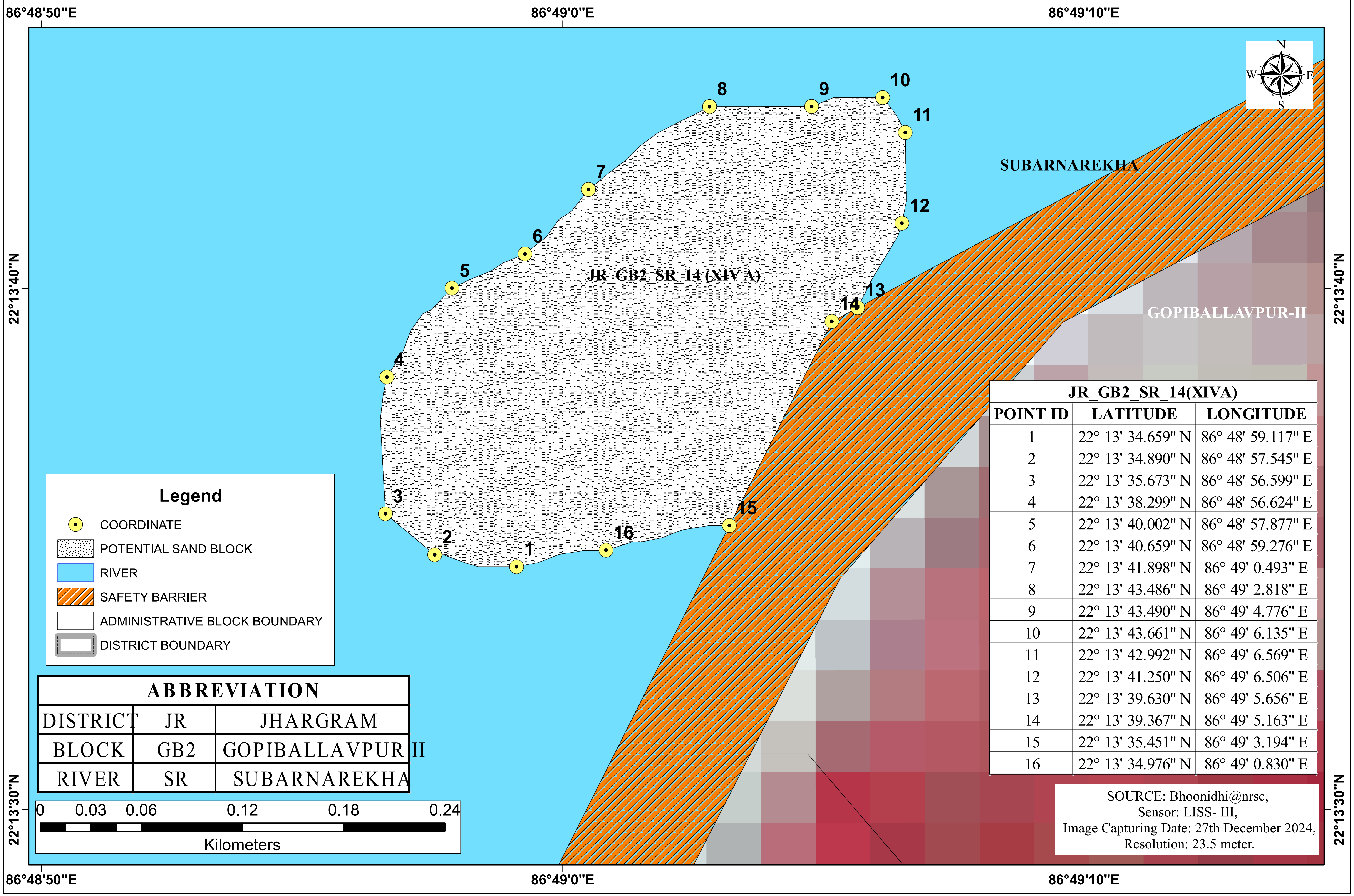
ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_13

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 13' 31.257" N	86° 48' 52.424" E	12	22° 13' 56.849" N	86° 49' 14.271" E
2	22° 13' 30.563" N	86° 48' 42.393" E	13	22° 13' 55.395" N	86° 49' 12.945" E
3	22° 13' 34.220" N	86° 48' 42.528" E	14	22° 13' 50.754" N	86° 49' 9.381" E
4	22° 13' 45.788" N	86° 48' 44.288" E	15	22° 13' 48.654" N	86° 49' 7.750" E
5	22° 13' 54.055" N	86° 48' 49.305" E	16	22° 13' 46.462" N	86° 49' 4.760" E
6	22° 14' 0.670" N	86° 48' 55.359" E	17	22° 13' 43.953" N	86° 48' 58.389" E
7	22° 14' 4.395" N	86° 49' 1.418" E	18	22° 13' 42.605" N	86° 48' 57.063" E
8	22° 14' 4.952" N	86° 49' 7.037" E	19	22° 13' 41.380" N	86° 48' 56.649" E
9	22° 14' 4.413" N	86° 49' 22.464" E	20	22° 13' 38.300" N	86° 48' 54.955" E
10	22° 14' 0.921" N	86° 49' 19.026" E	21	22° 13' 35.384" N	86° 48' 53.289" E
11	22° 13' 59.052" N	86° 49' 15.863" E	22	22° 13' 32.943" N	86° 48' 52.955" E

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_GB2_SR_14 (XIV A) OF SUBARNAREKHA RIVER

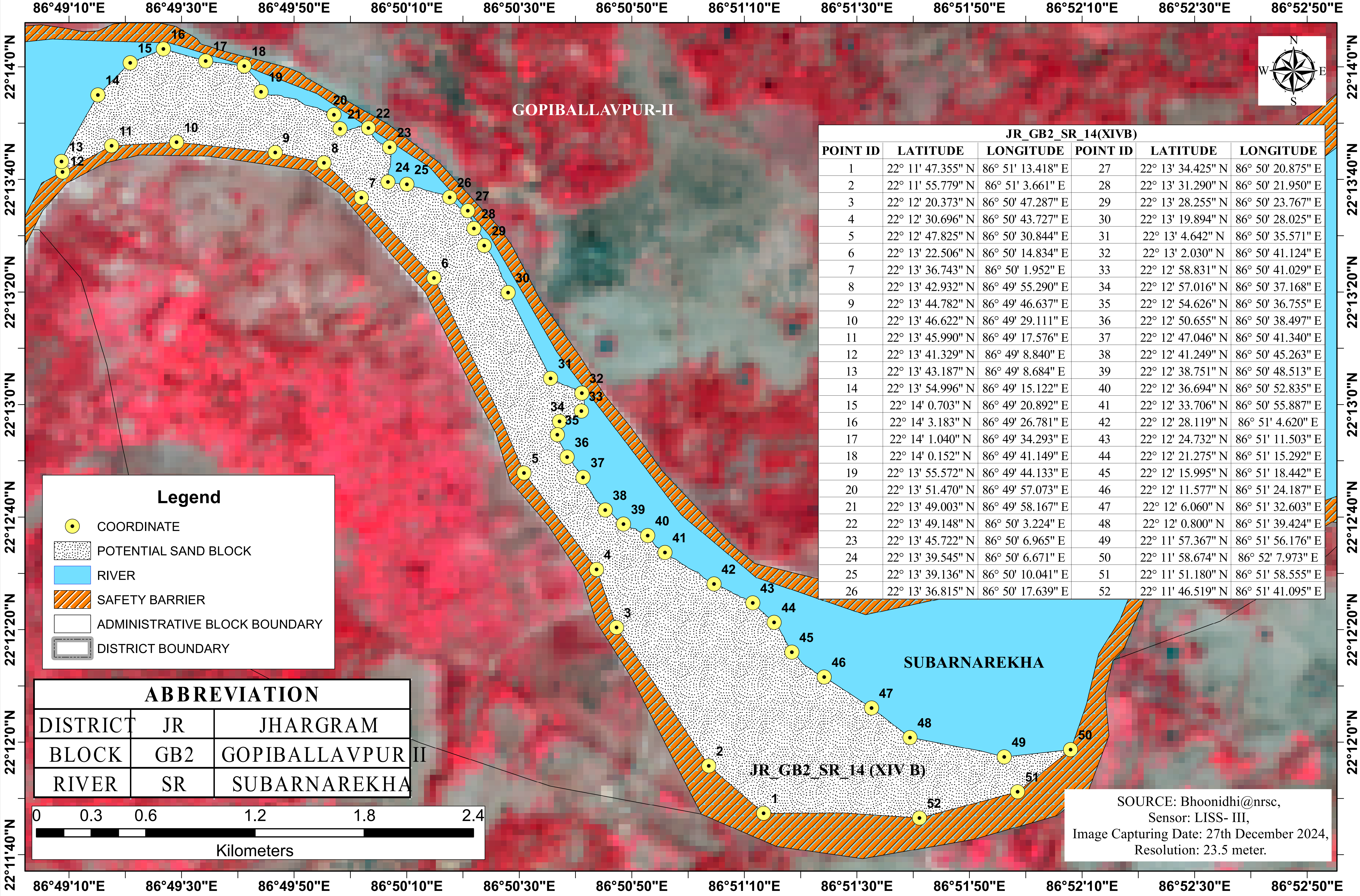


JR_GB2_SR_14(XIVA)		
POINT ID	LATITUDE	LONGITUDE
1	22° 13' 34.659" N	86° 48' 59.117" E
2	22° 13' 34.890" N	86° 48' 57.545" E
3	22° 13' 35.673" N	86° 48' 56.599" E
4	22° 13' 38.299" N	86° 48' 56.624" E
5	22° 13' 40.002" N	86° 48' 57.877" E
6	22° 13' 40.659" N	86° 48' 59.276" E
7	22° 13' 41.898" N	86° 49' 0.493" E
8	22° 13' 43.486" N	86° 49' 2.818" E
9	22° 13' 43.490" N	86° 49' 4.776" E
10	22° 13' 43.661" N	86° 49' 6.135" E
11	22° 13' 42.992" N	86° 49' 6.569" E
12	22° 13' 41.250" N	86° 49' 6.506" E
13	22° 13' 39.630" N	86° 49' 5.656" E
14	22° 13' 39.367" N	86° 49' 5.163" E
15	22° 13' 35.451" N	86° 49' 3.194" E
16	22° 13' 34.976" N	86° 49' 0.830" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_GB2_SR_14 (XIV B) OF SUBARNAREKHA RIVER



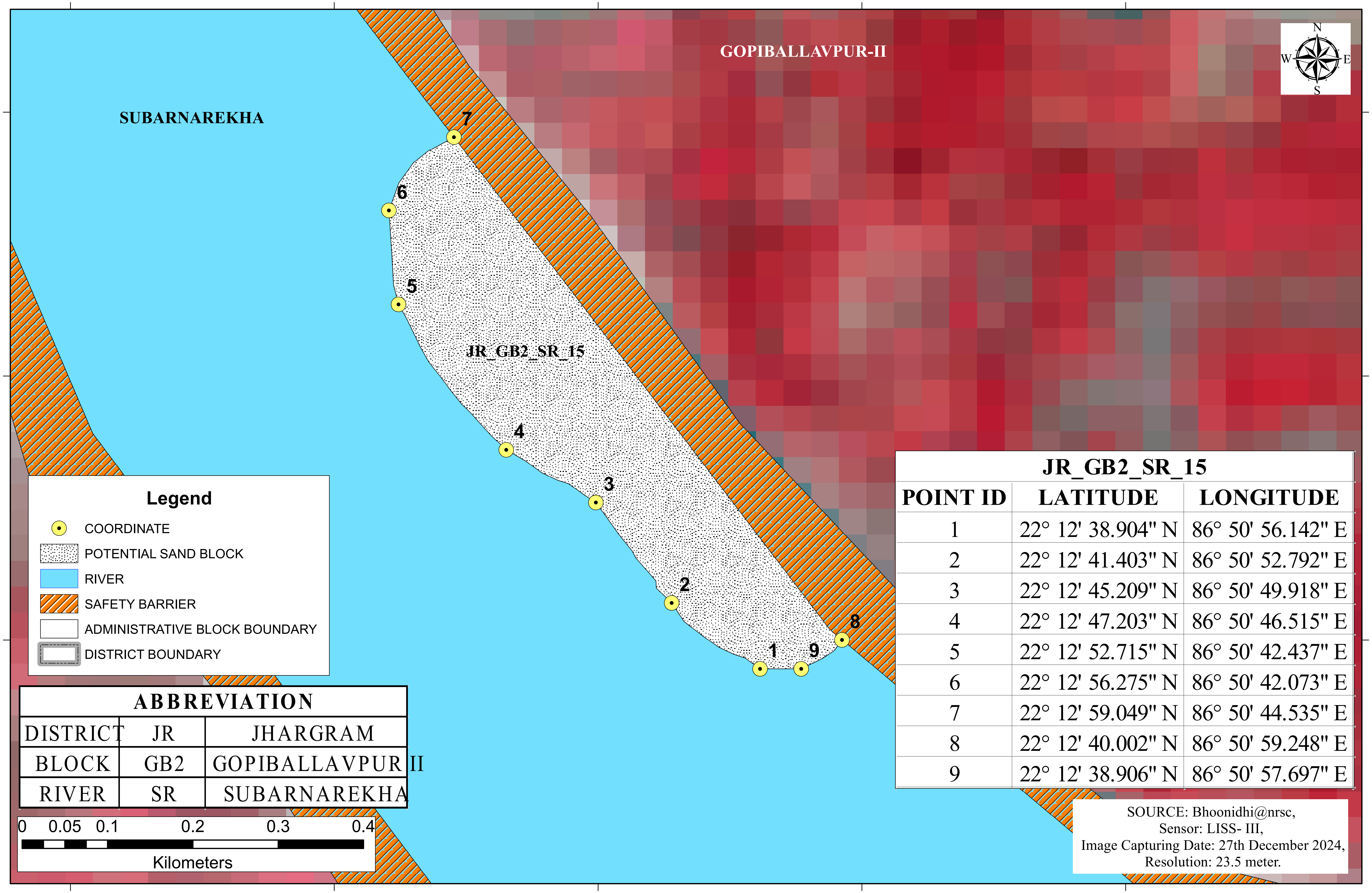
JR_GB2_SR_14(XIVB)

POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 11' 47.355" N	86° 51' 13.418" E	27	22° 13' 34.425" N	86° 50' 20.875" E
2	22° 11' 55.779" N	86° 51' 3.661" E	28	22° 13' 31.290" N	86° 50' 21.950" E
3	22° 12' 20.373" N	86° 50' 47.287" E	29	22° 13' 28.255" N	86° 50' 23.767" E
4	22° 12' 30.696" N	86° 50' 43.727" E	30	22° 13' 19.894" N	86° 50' 28.025" E
5	22° 12' 47.825" N	86° 50' 30.844" E	31	22° 13' 4.642" N	86° 50' 35.571" E
6	22° 13' 22.506" N	86° 50' 14.834" E	32	22° 13' 2.030" N	86° 50' 41.124" E
7	22° 13' 36.743" N	86° 50' 1.952" E	33	22° 12' 58.831" N	86° 50' 41.029" E
8	22° 13' 42.932" N	86° 49' 55.290" E	34	22° 12' 57.016" N	86° 50' 37.168" E
9	22° 13' 44.782" N	86° 49' 46.637" E	35	22° 12' 54.626" N	86° 50' 36.755" E
10	22° 13' 46.622" N	86° 49' 29.111" E	36	22° 12' 50.655" N	86° 50' 38.497" E
11	22° 13' 45.990" N	86° 49' 17.576" E	37	22° 12' 47.046" N	86° 50' 41.340" E
12	22° 13' 41.329" N	86° 49' 8.840" E	38	22° 12' 41.249" N	86° 50' 45.263" E
13	22° 13' 43.187" N	86° 49' 8.684" E	39	22° 12' 38.751" N	86° 50' 48.513" E
14	22° 13' 54.996" N	86° 49' 15.122" E	40	22° 12' 36.694" N	86° 50' 52.835" E
15	22° 14' 0.703" N	86° 49' 20.892" E	41	22° 12' 33.706" N	86° 50' 55.887" E
16	22° 14' 3.183" N	86° 49' 26.781" E	42	22° 12' 28.119" N	86° 51' 4.620" E
17	22° 14' 1.040" N	86° 49' 34.293" E	43	22° 12' 24.732" N	86° 51' 11.503" E
18	22° 14' 0.152" N	86° 49' 41.149" E	44	22° 12' 21.275" N	86° 51' 15.292" E
19	22° 13' 55.572" N	86° 49' 44.133" E	45	22° 12' 15.995" N	86° 51' 18.442" E
20	22° 13' 51.470" N	86° 49' 57.073" E	46	22° 12' 11.577" N	86° 51' 24.187" E
21	22° 13' 49.003" N	86° 49' 58.167" E	47	22° 12' 6.060" N	86° 51' 32.603" E
22	22° 13' 49.148" N	86° 50' 3.224" E	48	22° 12' 0.800" N	86° 51' 39.424" E
23	22° 13' 45.722" N	86° 50' 6.965" E	49	22° 11' 57.367" N	86° 51' 56.176" E
24	22° 13' 39.545" N	86° 50' 6.671" E	50	22° 11' 58.674" N	86° 52' 7.973" E
25	22° 13' 39.136" N	86° 50' 10.041" E	51	22° 11' 51.180" N	86° 51' 58.555" E
26	22° 13' 36.815" N	86° 50' 17.639" E	52	22° 11' 46.519" N	86° 51' 41.095" E

ABBREVIATION

DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

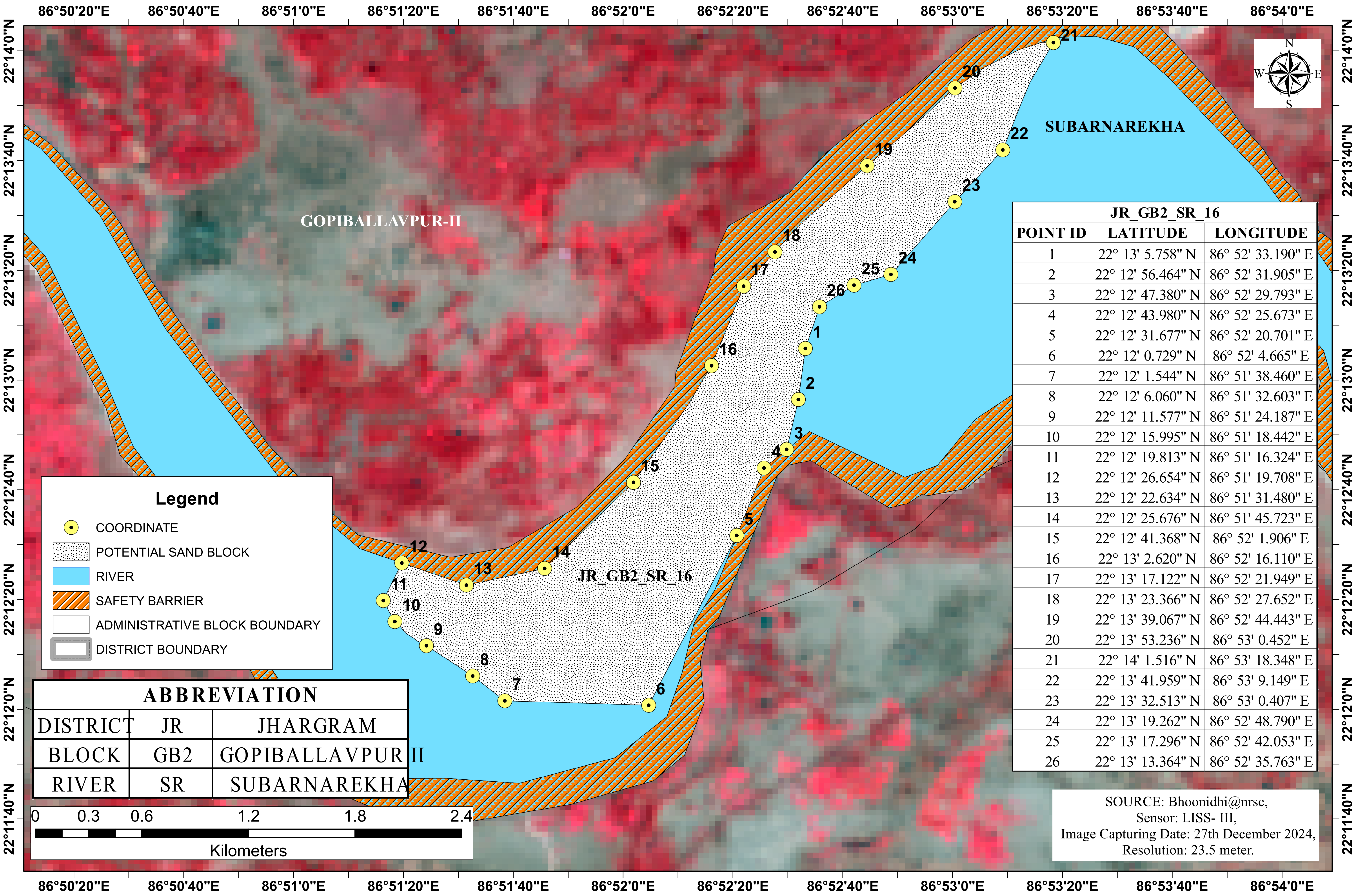
POTENTIAL BLOCK JR_GB2_SR_15 OF SUBARNAREKHA RIVER



JR_GB2_SR_15		
POINT ID	LATITUDE	LONGITUDE
1	22° 12' 38.904" N	86° 50' 56.142" E
2	22° 12' 41.403" N	86° 50' 52.792" E
3	22° 12' 45.209" N	86° 50' 49.918" E
4	22° 12' 47.203" N	86° 50' 46.515" E
5	22° 12' 52.715" N	86° 50' 42.437" E
6	22° 12' 56.275" N	86° 50' 42.073" E
7	22° 12' 59.049" N	86° 50' 44.535" E
8	22° 12' 40.002" N	86° 50' 59.248" E
9	22° 12' 38.906" N	86° 50' 57.697" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_GB2_SR_16 OF SUBARNAREKHA RIVER



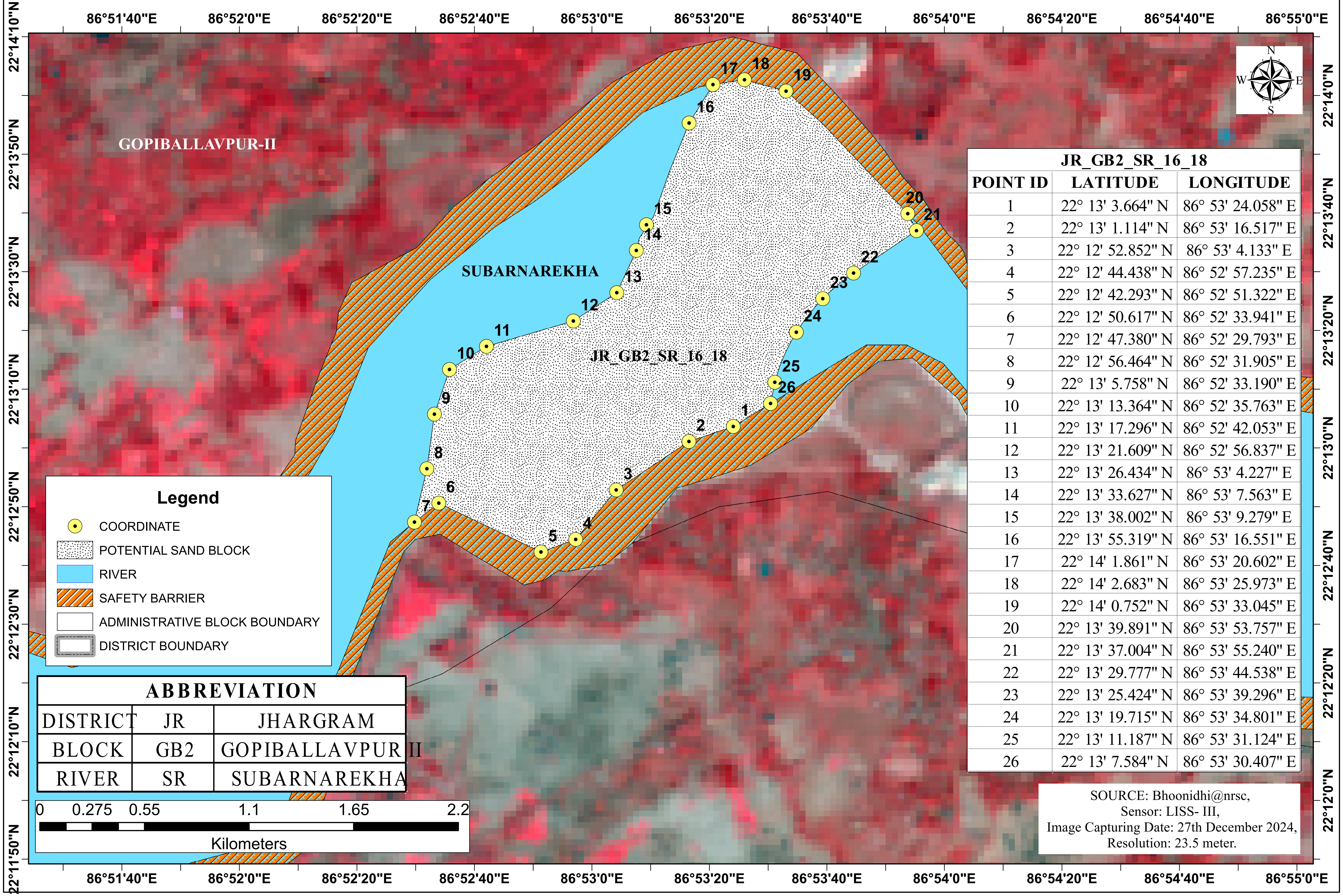
JR_GB2_SR_16

POINT ID	LATITUDE	LONGITUDE
1	22° 13' 5.758" N	86° 52' 33.190" E
2	22° 12' 56.464" N	86° 52' 31.905" E
3	22° 12' 47.380" N	86° 52' 29.793" E
4	22° 12' 43.980" N	86° 52' 25.673" E
5	22° 12' 31.677" N	86° 52' 20.701" E
6	22° 12' 0.729" N	86° 52' 4.665" E
7	22° 12' 1.544" N	86° 51' 38.460" E
8	22° 12' 6.060" N	86° 51' 32.603" E
9	22° 12' 11.577" N	86° 51' 24.187" E
10	22° 12' 15.995" N	86° 51' 18.442" E
11	22° 12' 19.813" N	86° 51' 16.324" E
12	22° 12' 26.654" N	86° 51' 19.708" E
13	22° 12' 22.634" N	86° 51' 31.480" E
14	22° 12' 25.676" N	86° 51' 45.723" E
15	22° 12' 41.368" N	86° 52' 1.906" E
16	22° 13' 2.620" N	86° 52' 16.110" E
17	22° 13' 17.122" N	86° 52' 21.949" E
18	22° 13' 23.366" N	86° 52' 27.652" E
19	22° 13' 39.067" N	86° 52' 44.443" E
20	22° 13' 53.236" N	86° 53' 0.452" E
21	22° 14' 1.516" N	86° 53' 18.348" E
22	22° 13' 41.959" N	86° 53' 9.149" E
23	22° 13' 32.513" N	86° 53' 0.407" E
24	22° 13' 19.262" N	86° 52' 48.790" E
25	22° 13' 17.296" N	86° 52' 42.053" E
26	22° 13' 13.364" N	86° 52' 35.763" E

ABBREVIATION

DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_GB2_SR_16_18 OF SUBARNAREKHA RIVER



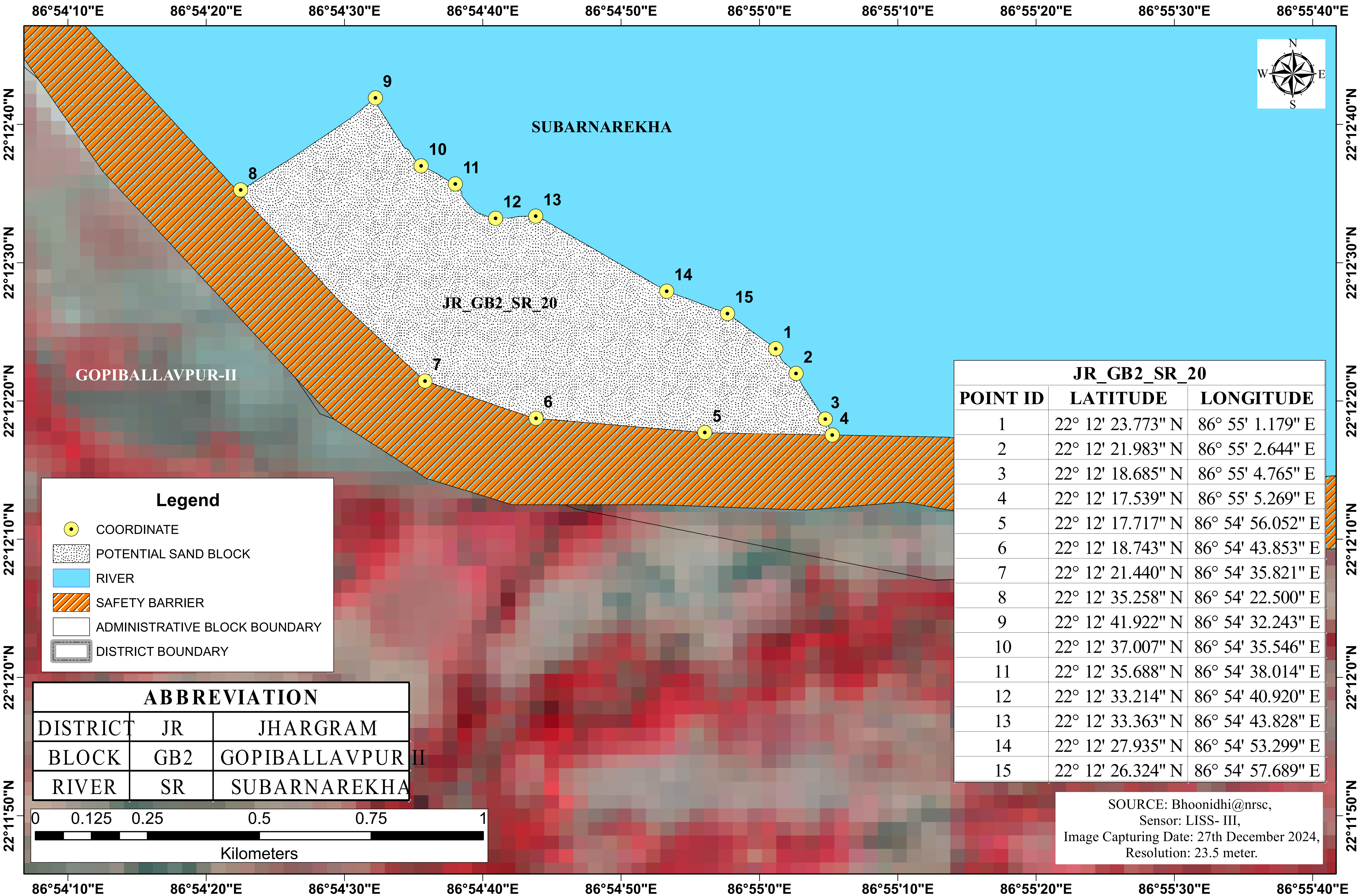
JR_GB2_SR_16_18

POINT ID	LATITUDE	LONGITUDE
1	22° 13' 3.664" N	86° 53' 24.058" E
2	22° 13' 1.114" N	86° 53' 16.517" E
3	22° 12' 52.852" N	86° 53' 4.133" E
4	22° 12' 44.438" N	86° 52' 57.235" E
5	22° 12' 42.293" N	86° 52' 51.322" E
6	22° 12' 50.617" N	86° 52' 33.941" E
7	22° 12' 47.380" N	86° 52' 29.793" E
8	22° 12' 56.464" N	86° 52' 31.905" E
9	22° 13' 5.758" N	86° 52' 33.190" E
10	22° 13' 13.364" N	86° 52' 35.763" E
11	22° 13' 17.296" N	86° 52' 42.053" E
12	22° 13' 21.609" N	86° 52' 56.837" E
13	22° 13' 26.434" N	86° 53' 4.227" E
14	22° 13' 33.627" N	86° 53' 7.563" E
15	22° 13' 38.002" N	86° 53' 9.279" E
16	22° 13' 55.319" N	86° 53' 16.551" E
17	22° 14' 1.861" N	86° 53' 20.602" E
18	22° 14' 2.683" N	86° 53' 25.973" E
19	22° 14' 0.752" N	86° 53' 33.045" E
20	22° 13' 39.891" N	86° 53' 53.757" E
21	22° 13' 37.004" N	86° 53' 55.240" E
22	22° 13' 29.777" N	86° 53' 44.538" E
23	22° 13' 25.424" N	86° 53' 39.296" E
24	22° 13' 19.715" N	86° 53' 34.801" E
25	22° 13' 11.187" N	86° 53' 31.124" E
26	22° 13' 7.584" N	86° 53' 30.407" E

ABBREVIATION

DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

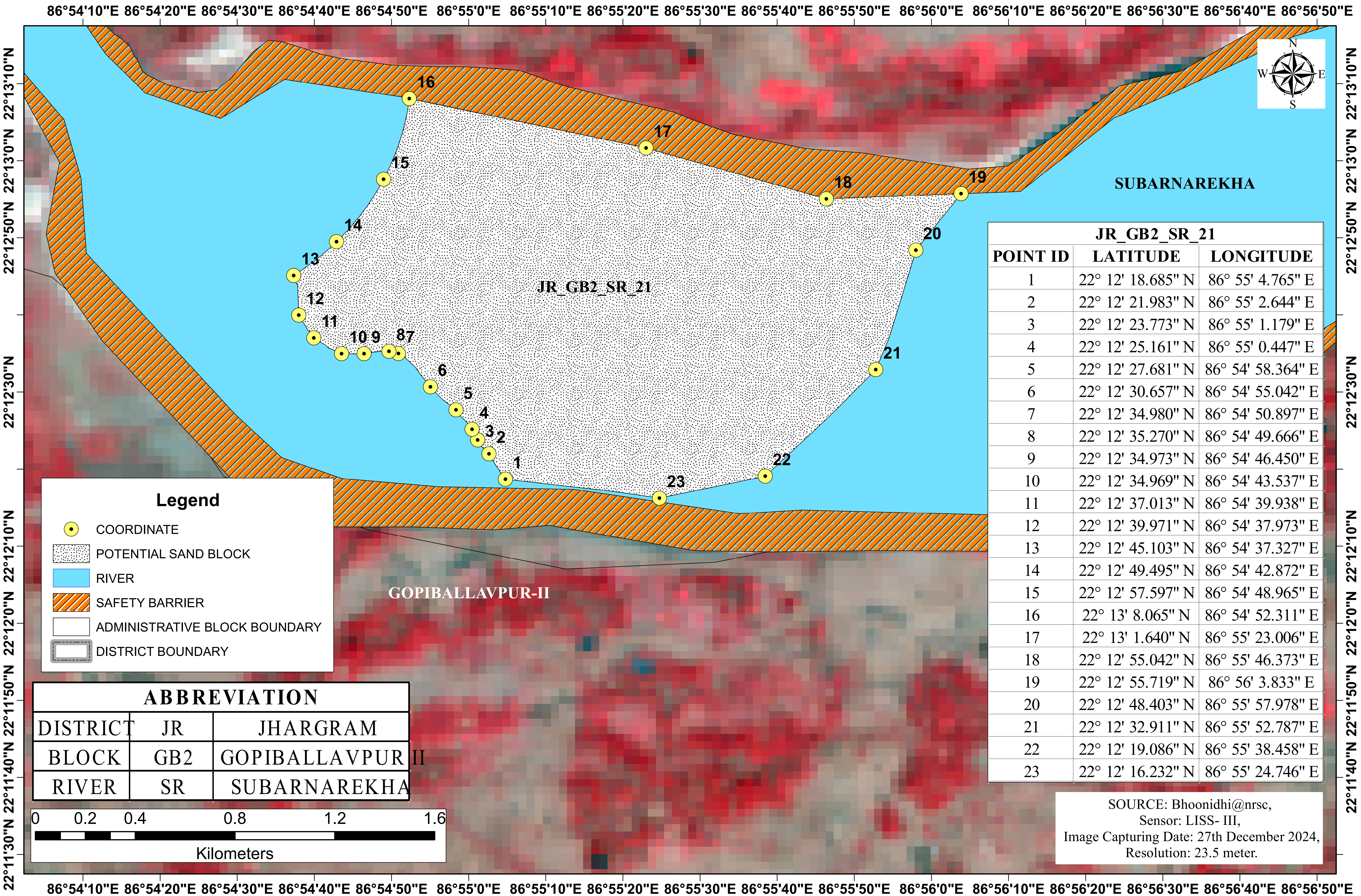
POTENTIAL BLOCK JR_GB2_SR_20 OF SUBARNAREKHA RIVER



JR_GB2_SR_20		
POINT ID	LATITUDE	LONGITUDE
1	22° 12' 23.773" N	86° 55' 1.179" E
2	22° 12' 21.983" N	86° 55' 2.644" E
3	22° 12' 18.685" N	86° 55' 4.765" E
4	22° 12' 17.539" N	86° 55' 5.269" E
5	22° 12' 17.717" N	86° 54' 56.052" E
6	22° 12' 18.743" N	86° 54' 43.853" E
7	22° 12' 21.440" N	86° 54' 35.821" E
8	22° 12' 35.258" N	86° 54' 22.500" E
9	22° 12' 41.922" N	86° 54' 32.243" E
10	22° 12' 37.007" N	86° 54' 35.546" E
11	22° 12' 35.688" N	86° 54' 38.014" E
12	22° 12' 33.214" N	86° 54' 40.920" E
13	22° 12' 33.363" N	86° 54' 43.828" E
14	22° 12' 27.935" N	86° 54' 53.299" E
15	22° 12' 26.324" N	86° 54' 57.689" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_GB2_SR_21 OF SUBARNAREKHA RIVER



JR_GB2_SR_21

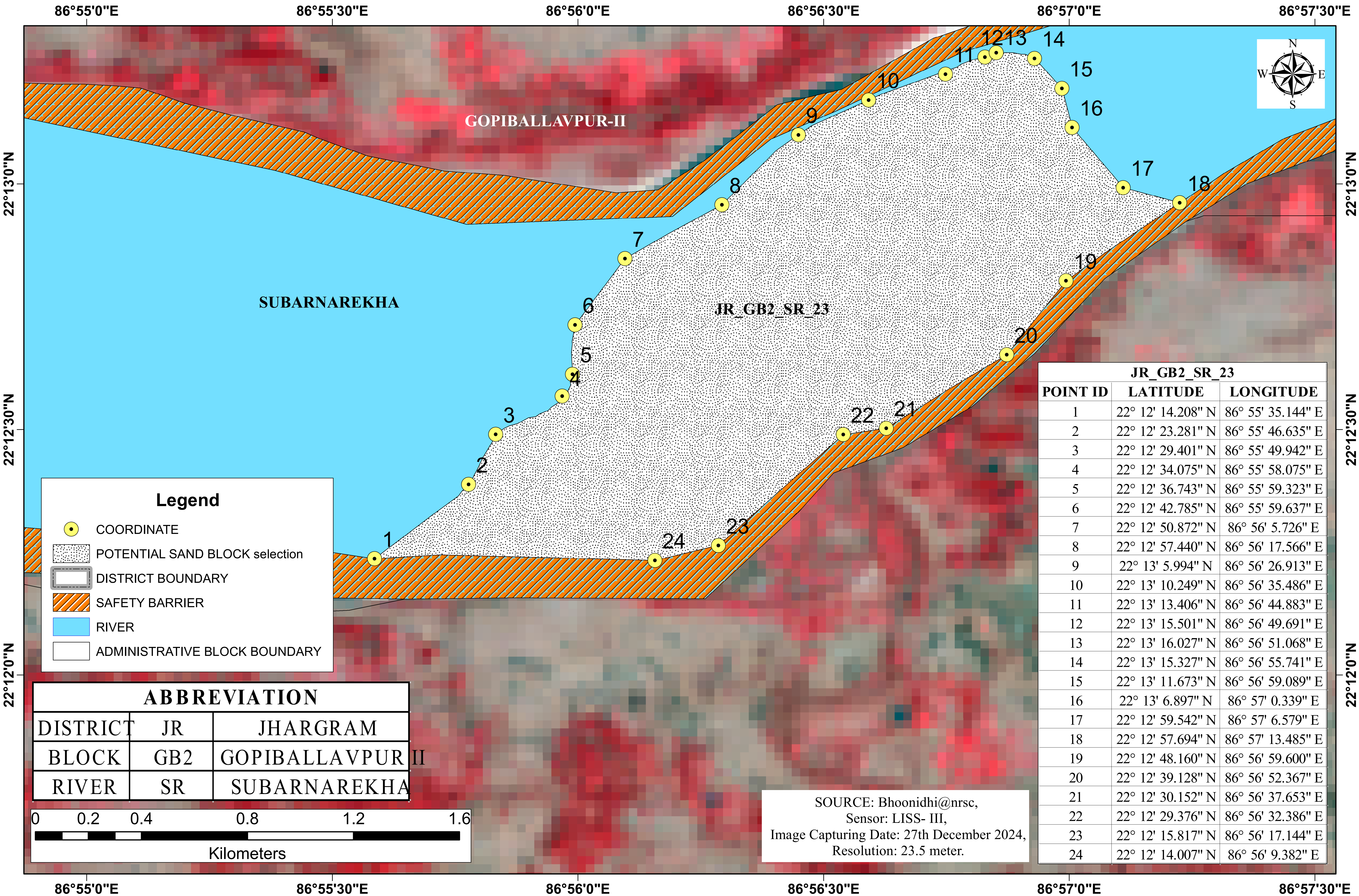
POINT ID	LATITUDE	LONGITUDE
1	22° 12' 18.685" N	86° 55' 4.765" E
2	22° 12' 21.983" N	86° 55' 2.644" E
3	22° 12' 23.773" N	86° 55' 1.179" E
4	22° 12' 25.161" N	86° 55' 0.447" E
5	22° 12' 27.681" N	86° 54' 58.364" E
6	22° 12' 30.657" N	86° 54' 55.042" E
7	22° 12' 34.980" N	86° 54' 50.897" E
8	22° 12' 35.270" N	86° 54' 49.666" E
9	22° 12' 34.973" N	86° 54' 46.450" E
10	22° 12' 34.969" N	86° 54' 43.537" E
11	22° 12' 37.013" N	86° 54' 39.938" E
12	22° 12' 39.971" N	86° 54' 37.973" E
13	22° 12' 45.103" N	86° 54' 37.327" E
14	22° 12' 49.495" N	86° 54' 42.872" E
15	22° 12' 57.597" N	86° 54' 48.965" E
16	22° 13' 8.065" N	86° 54' 52.311" E
17	22° 13' 1.640" N	86° 55' 23.006" E
18	22° 12' 55.042" N	86° 55' 46.373" E
19	22° 12' 55.719" N	86° 56' 3.833" E
20	22° 12' 48.403" N	86° 55' 57.978" E
21	22° 12' 32.911" N	86° 55' 52.787" E
22	22° 12' 19.086" N	86° 55' 38.458" E
23	22° 12' 16.232" N	86° 55' 24.746" E

ABBREVIATION

DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

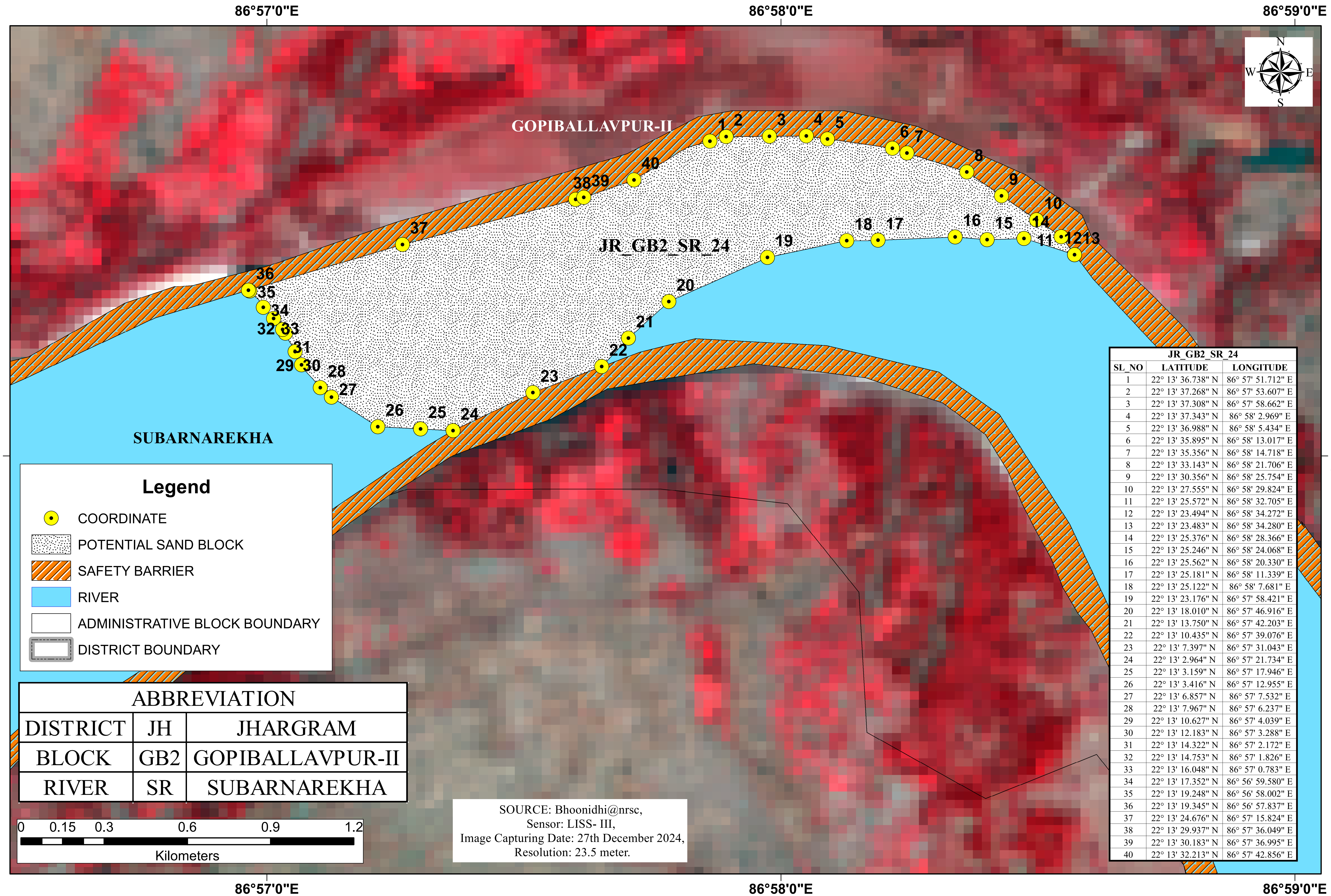
POTENTIAL BLOCK JR_GB2_SR_23 OF SUBARNAREKHA RIVER



ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_23		
POINT ID	LATITUDE	LONGITUDE
1	22° 12' 14.208" N	86° 55' 35.144" E
2	22° 12' 23.281" N	86° 55' 46.635" E
3	22° 12' 29.401" N	86° 55' 49.942" E
4	22° 12' 34.075" N	86° 55' 58.075" E
5	22° 12' 36.743" N	86° 55' 59.323" E
6	22° 12' 42.785" N	86° 55' 59.637" E
7	22° 12' 50.872" N	86° 56' 5.726" E
8	22° 12' 57.440" N	86° 56' 17.566" E
9	22° 13' 5.994" N	86° 56' 26.913" E
10	22° 13' 10.249" N	86° 56' 35.486" E
11	22° 13' 13.406" N	86° 56' 44.883" E
12	22° 13' 15.501" N	86° 56' 49.691" E
13	22° 13' 16.027" N	86° 56' 51.068" E
14	22° 13' 15.327" N	86° 56' 55.741" E
15	22° 13' 11.673" N	86° 56' 59.089" E
16	22° 13' 6.897" N	86° 57' 0.339" E
17	22° 12' 59.542" N	86° 57' 6.579" E
18	22° 12' 57.694" N	86° 57' 13.485" E
19	22° 12' 48.160" N	86° 56' 59.600" E
20	22° 12' 39.128" N	86° 56' 52.367" E
21	22° 12' 30.152" N	86° 56' 37.653" E
22	22° 12' 29.376" N	86° 56' 32.386" E
23	22° 12' 15.817" N	86° 56' 17.144" E
24	22° 12' 14.007" N	86° 56' 9.382" E

POTENTIAL BLOCK JR_GB2_SR_24 OF SUBARNAREKHA RIVER

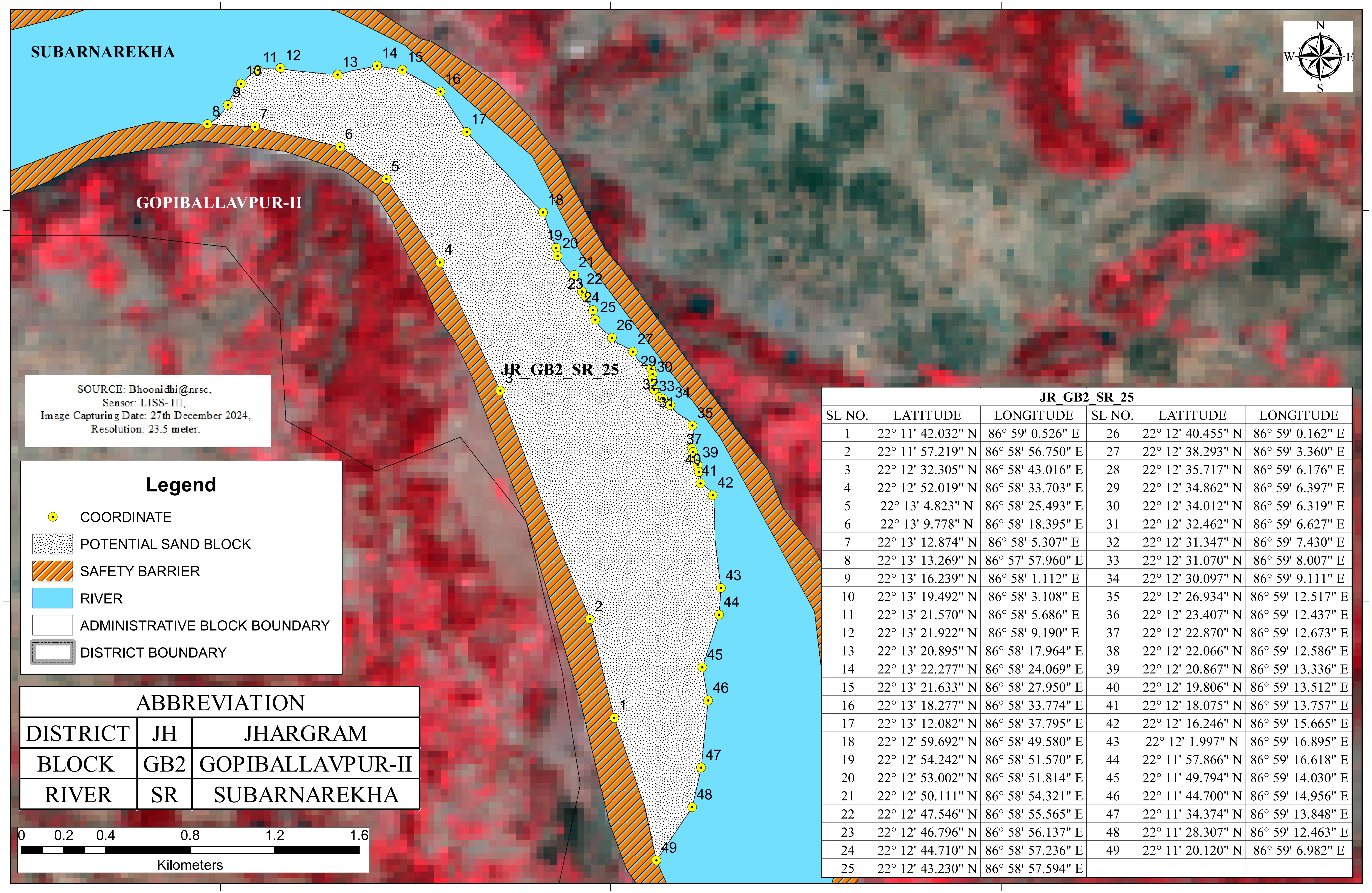


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR-II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_24

SL_NO	LATITUDE	LONGITUDE
1	22° 13' 36.738" N	86° 57' 51.712" E
2	22° 13' 37.268" N	86° 57' 53.607" E
3	22° 13' 37.308" N	86° 57' 58.662" E
4	22° 13' 37.343" N	86° 58' 2.969" E
5	22° 13' 36.988" N	86° 58' 5.434" E
6	22° 13' 35.895" N	86° 58' 13.017" E
7	22° 13' 35.356" N	86° 58' 14.718" E
8	22° 13' 33.143" N	86° 58' 21.706" E
9	22° 13' 30.356" N	86° 58' 25.754" E
10	22° 13' 27.555" N	86° 58' 29.824" E
11	22° 13' 25.572" N	86° 58' 32.705" E
12	22° 13' 23.494" N	86° 58' 34.272" E
13	22° 13' 23.483" N	86° 58' 34.280" E
14	22° 13' 25.376" N	86° 58' 28.366" E
15	22° 13' 25.246" N	86° 58' 24.068" E
16	22° 13' 25.562" N	86° 58' 20.330" E
17	22° 13' 25.181" N	86° 58' 11.339" E
18	22° 13' 25.122" N	86° 58' 7.681" E
19	22° 13' 23.176" N	86° 57' 58.421" E
20	22° 13' 18.010" N	86° 57' 46.916" E
21	22° 13' 13.750" N	86° 57' 42.203" E
22	22° 13' 10.435" N	86° 57' 39.076" E
23	22° 13' 7.397" N	86° 57' 31.043" E
24	22° 13' 2.964" N	86° 57' 21.734" E
25	22° 13' 3.159" N	86° 57' 17.946" E
26	22° 13' 3.416" N	86° 57' 12.955" E
27	22° 13' 6.857" N	86° 57' 7.532" E
28	22° 13' 7.967" N	86° 57' 6.237" E
29	22° 13' 10.627" N	86° 57' 4.039" E
30	22° 13' 12.183" N	86° 57' 3.288" E
31	22° 13' 14.322" N	86° 57' 2.172" E
32	22° 13' 14.753" N	86° 57' 1.826" E
33	22° 13' 16.048" N	86° 57' 0.783" E
34	22° 13' 17.352" N	86° 56' 59.580" E
35	22° 13' 19.248" N	86° 56' 58.002" E
36	22° 13' 19.345" N	86° 56' 57.837" E
37	22° 13' 24.676" N	86° 57' 15.824" E
38	22° 13' 29.937" N	86° 57' 36.049" E
39	22° 13' 30.183" N	86° 57' 36.995" E
40	22° 13' 32.213" N	86° 57' 42.856" E

POTENTIAL BLOCK JR_GB2_SR_25 OF SUBARNAREKHA RIVER

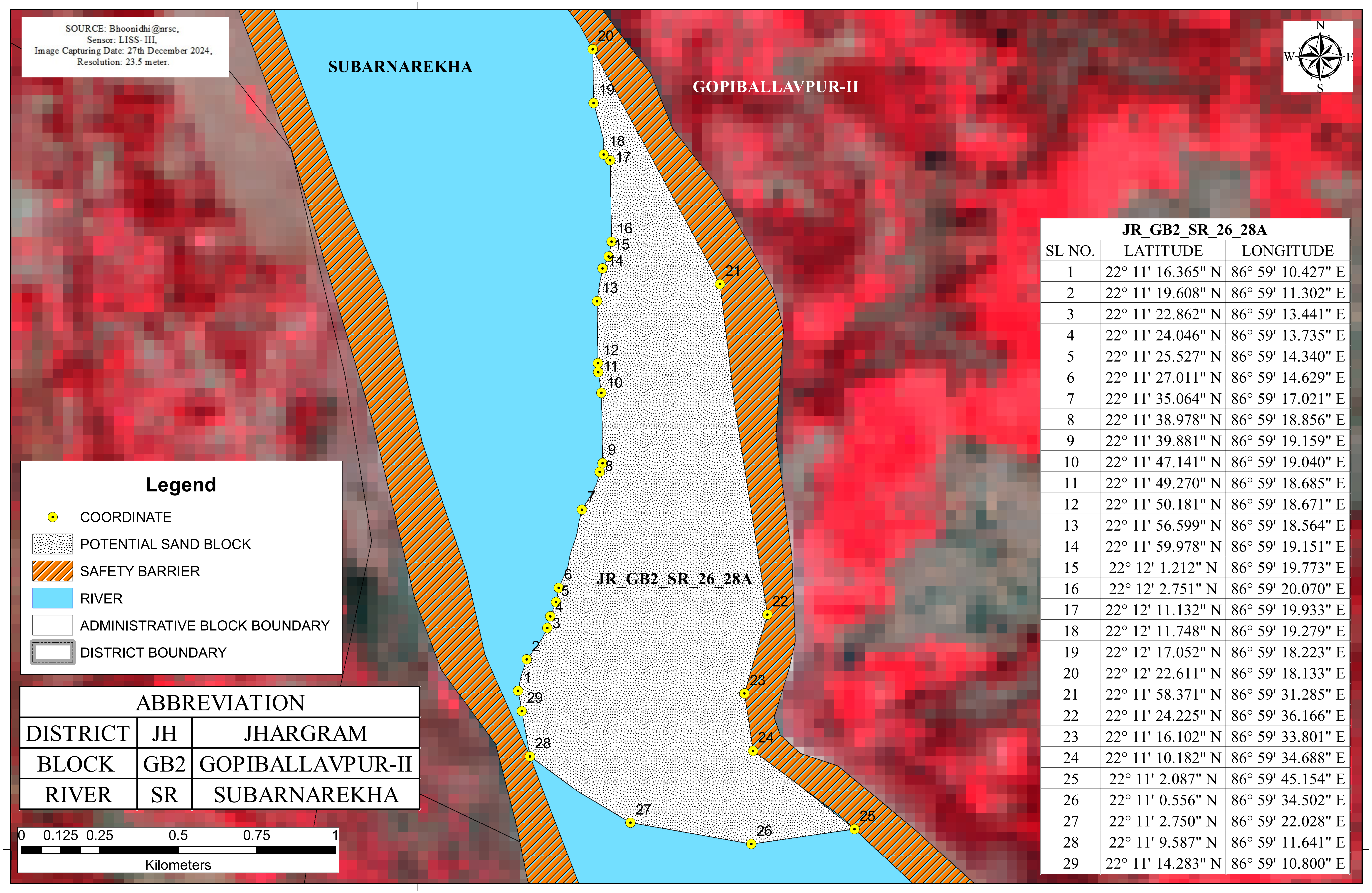


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR-II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_25

SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 11' 42.032" N	86° 59' 0.526" E	26	22° 12' 40.455" N	86° 59' 0.162" E
2	22° 11' 57.219" N	86° 58' 56.750" E	27	22° 12' 38.293" N	86° 59' 3.360" E
3	22° 12' 32.305" N	86° 58' 43.016" E	28	22° 12' 35.717" N	86° 59' 6.176" E
4	22° 12' 52.019" N	86° 58' 33.703" E	29	22° 12' 34.862" N	86° 59' 6.397" E
5	22° 13' 4.823" N	86° 58' 25.493" E	30	22° 12' 34.012" N	86° 59' 6.319" E
6	22° 13' 9.778" N	86° 58' 18.395" E	31	22° 12' 32.462" N	86° 59' 6.627" E
7	22° 13' 12.874" N	86° 58' 5.307" E	32	22° 12' 31.347" N	86° 59' 7.430" E
8	22° 13' 13.269" N	86° 57' 57.960" E	33	22° 12' 31.070" N	86° 59' 8.007" E
9	22° 13' 16.239" N	86° 58' 1.112" E	34	22° 12' 30.097" N	86° 59' 9.111" E
10	22° 13' 19.492" N	86° 58' 3.108" E	35	22° 12' 26.934" N	86° 59' 12.517" E
11	22° 13' 21.570" N	86° 58' 5.686" E	36	22° 12' 23.407" N	86° 59' 12.437" E
12	22° 13' 21.922" N	86° 58' 9.190" E	37	22° 12' 22.870" N	86° 59' 12.673" E
13	22° 13' 20.895" N	86° 58' 17.964" E	38	22° 12' 22.066" N	86° 59' 12.586" E
14	22° 13' 22.277" N	86° 58' 24.069" E	39	22° 12' 20.867" N	86° 59' 13.336" E
15	22° 13' 21.633" N	86° 58' 27.950" E	40	22° 12' 19.806" N	86° 59' 13.512" E
16	22° 13' 18.277" N	86° 58' 33.774" E	41	22° 12' 18.075" N	86° 59' 13.757" E
17	22° 13' 12.082" N	86° 58' 37.795" E	42	22° 12' 16.246" N	86° 59' 15.665" E
18	22° 12' 59.692" N	86° 58' 49.580" E	43	22° 12' 1.997" N	86° 59' 16.895" E
19	22° 12' 54.242" N	86° 58' 51.570" E	44	22° 11' 57.866" N	86° 59' 16.618" E
20	22° 12' 53.002" N	86° 58' 51.814" E	45	22° 11' 49.794" N	86° 59' 14.030" E
21	22° 12' 50.111" N	86° 58' 54.321" E	46	22° 11' 44.700" N	86° 59' 14.956" E
22	22° 12' 47.546" N	86° 58' 55.565" E	47	22° 11' 34.374" N	86° 59' 13.848" E
23	22° 12' 46.796" N	86° 58' 56.137" E	48	22° 11' 28.307" N	86° 59' 12.463" E
24	22° 12' 44.710" N	86° 58' 57.236" E	49	22° 11' 20.120" N	86° 59' 6.982" E
25	22° 12' 43.230" N	86° 58' 57.594" E			

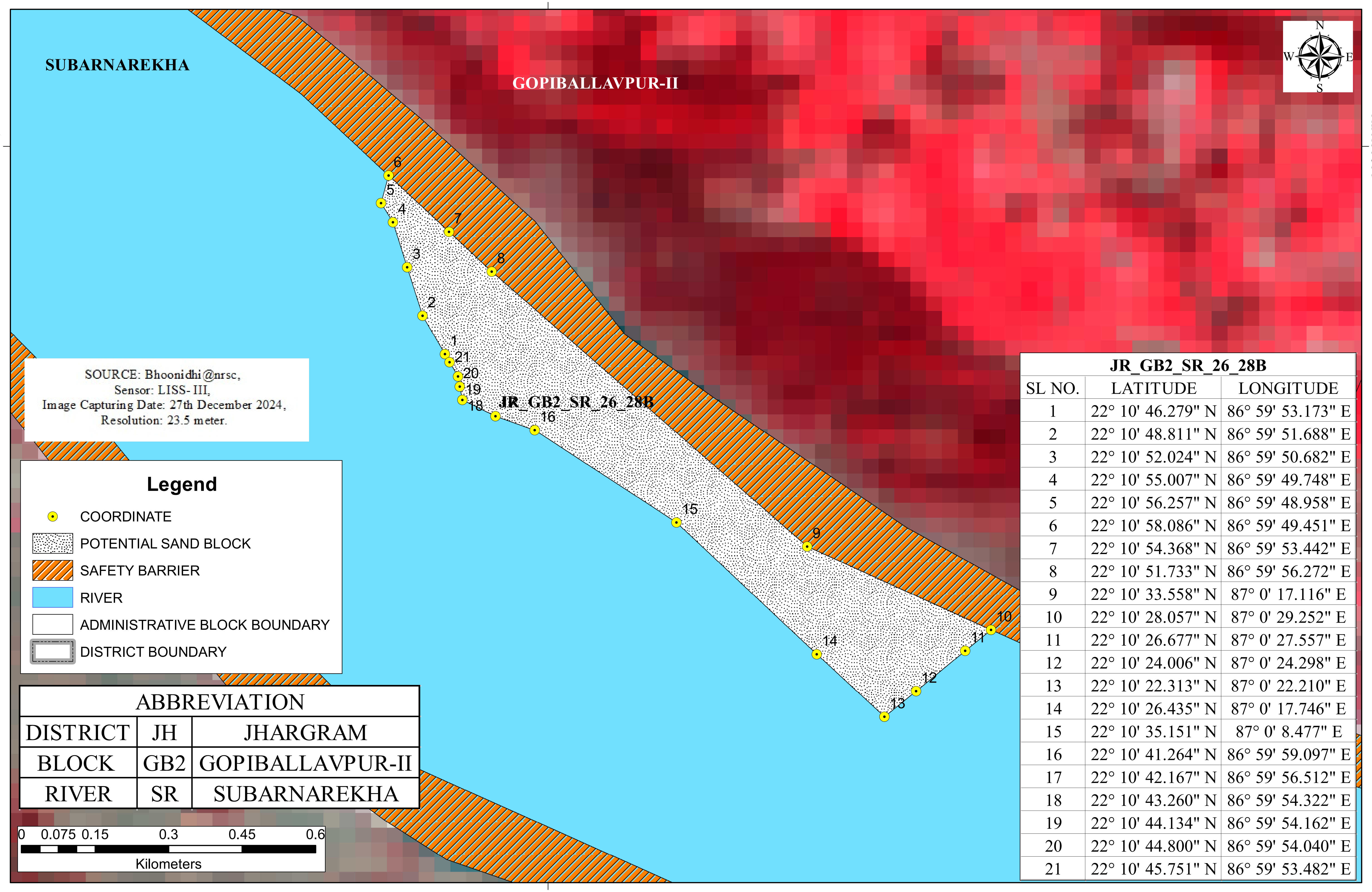
POTENTIAL BLOCK JR_GB2_SR_26_28A OF SUBARNAREKHA RIVER



ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR-II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_26_28A		
SL NO.	LATITUDE	LONGITUDE
1	22° 11' 16.365" N	86° 59' 10.427" E
2	22° 11' 19.608" N	86° 59' 11.302" E
3	22° 11' 22.862" N	86° 59' 13.441" E
4	22° 11' 24.046" N	86° 59' 13.735" E
5	22° 11' 25.527" N	86° 59' 14.340" E
6	22° 11' 27.011" N	86° 59' 14.629" E
7	22° 11' 35.064" N	86° 59' 17.021" E
8	22° 11' 38.978" N	86° 59' 18.856" E
9	22° 11' 39.881" N	86° 59' 19.159" E
10	22° 11' 47.141" N	86° 59' 19.040" E
11	22° 11' 49.270" N	86° 59' 18.685" E
12	22° 11' 50.181" N	86° 59' 18.671" E
13	22° 11' 56.599" N	86° 59' 18.564" E
14	22° 11' 59.978" N	86° 59' 19.151" E
15	22° 12' 1.212" N	86° 59' 19.773" E
16	22° 12' 2.751" N	86° 59' 20.070" E
17	22° 12' 11.132" N	86° 59' 19.933" E
18	22° 12' 11.748" N	86° 59' 19.279" E
19	22° 12' 17.052" N	86° 59' 18.223" E
20	22° 12' 22.611" N	86° 59' 18.133" E
21	22° 11' 58.371" N	86° 59' 31.285" E
22	22° 11' 24.225" N	86° 59' 36.166" E
23	22° 11' 16.102" N	86° 59' 33.801" E
24	22° 11' 10.182" N	86° 59' 34.688" E
25	22° 11' 2.087" N	86° 59' 45.154" E
26	22° 11' 0.556" N	86° 59' 34.502" E
27	22° 11' 2.750" N	86° 59' 22.028" E
28	22° 11' 9.587" N	86° 59' 11.641" E
29	22° 11' 14.283" N	86° 59' 10.800" E

POTENTIAL BLOCK JR_GB2_SR_26_28B OF SUBARNAREKHA RIVER



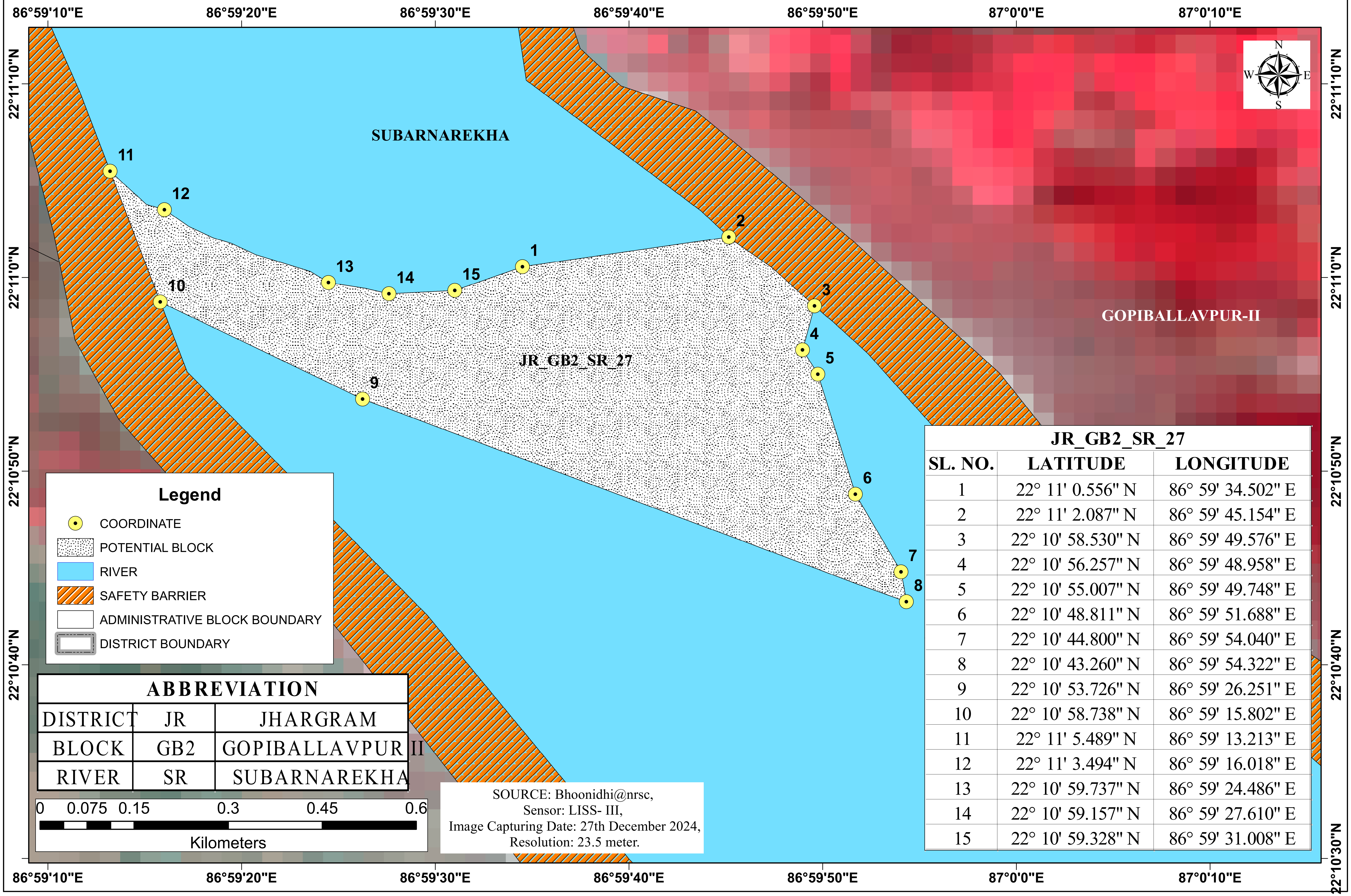
SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR-II
RIVER	SR	SUBARNAREKHA

JR_GB2_SR_26_28B

SL NO.	LATITUDE	LONGITUDE
1	22° 10' 46.279" N	86° 59' 53.173" E
2	22° 10' 48.811" N	86° 59' 51.688" E
3	22° 10' 52.024" N	86° 59' 50.682" E
4	22° 10' 55.007" N	86° 59' 49.748" E
5	22° 10' 56.257" N	86° 59' 48.958" E
6	22° 10' 58.086" N	86° 59' 49.451" E
7	22° 10' 54.368" N	86° 59' 53.442" E
8	22° 10' 51.733" N	86° 59' 56.272" E
9	22° 10' 33.558" N	87° 0' 17.116" E
10	22° 10' 28.057" N	87° 0' 29.252" E
11	22° 10' 26.677" N	87° 0' 27.557" E
12	22° 10' 24.006" N	87° 0' 24.298" E
13	22° 10' 22.313" N	87° 0' 22.210" E
14	22° 10' 26.435" N	87° 0' 17.746" E
15	22° 10' 35.151" N	87° 0' 8.477" E
16	22° 10' 41.264" N	86° 59' 59.097" E
17	22° 10' 42.167" N	86° 59' 56.512" E
18	22° 10' 43.260" N	86° 59' 54.322" E
19	22° 10' 44.134" N	86° 59' 54.162" E
20	22° 10' 44.800" N	86° 59' 54.040" E
21	22° 10' 45.751" N	86° 59' 53.482" E

POTENTIAL BLOCK JR_GB2_SR_27 OF SUBARNAREKHA RIVER

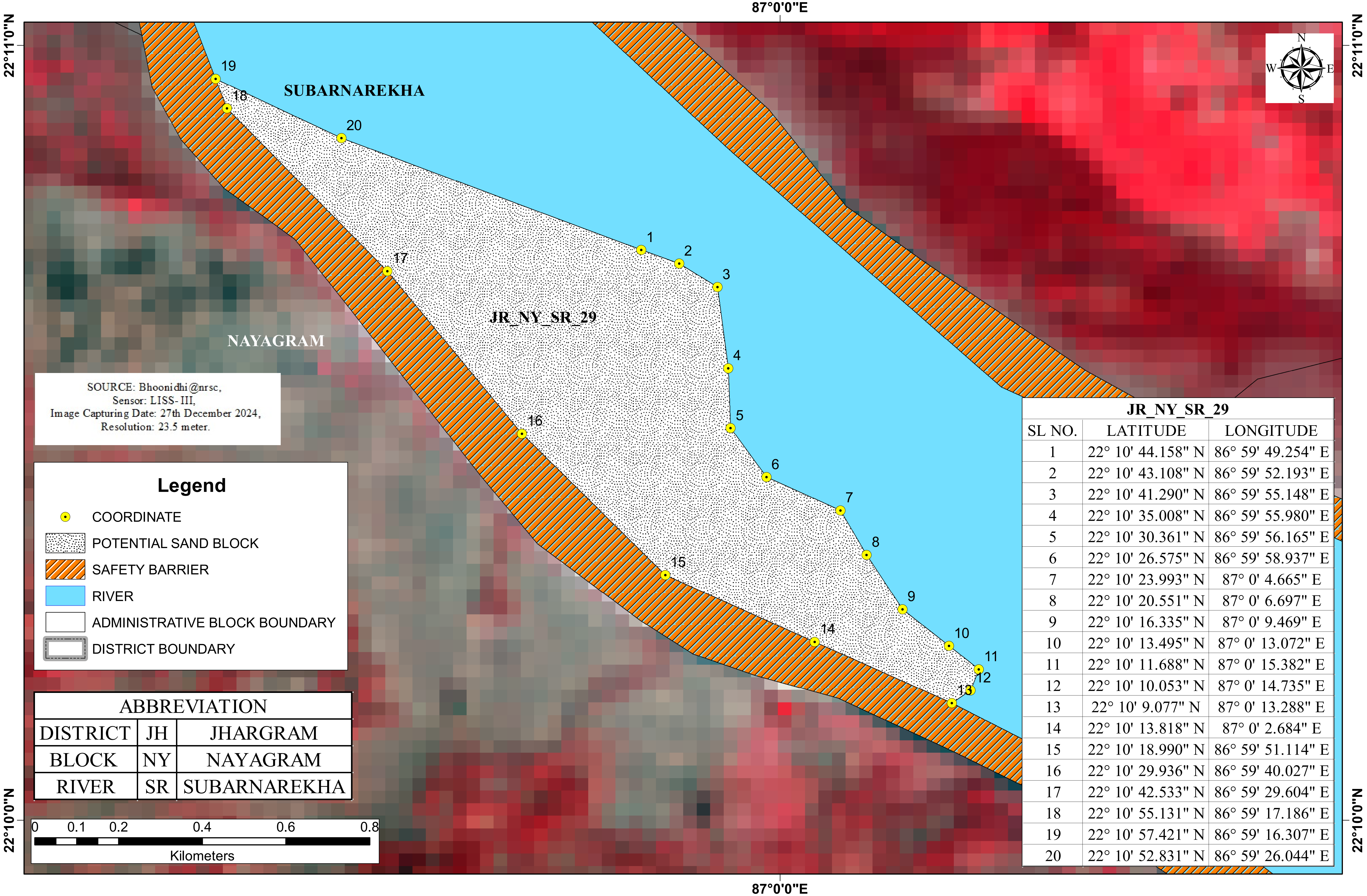


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	GB2	GOPIBALLAVPUR II
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

JR_GB2_SR_27		
SL. NO.	LATITUDE	LONGITUDE
1	22° 11' 0.556" N	86° 59' 34.502" E
2	22° 11' 2.087" N	86° 59' 45.154" E
3	22° 10' 58.530" N	86° 59' 49.576" E
4	22° 10' 56.257" N	86° 59' 48.958" E
5	22° 10' 55.007" N	86° 59' 49.748" E
6	22° 10' 48.811" N	86° 59' 51.688" E
7	22° 10' 44.800" N	86° 59' 54.040" E
8	22° 10' 43.260" N	86° 59' 54.322" E
9	22° 10' 53.726" N	86° 59' 26.251" E
10	22° 10' 58.738" N	86° 59' 15.802" E
11	22° 11' 5.489" N	86° 59' 13.213" E
12	22° 11' 3.494" N	86° 59' 16.018" E
13	22° 10' 59.737" N	86° 59' 24.486" E
14	22° 10' 59.157" N	86° 59' 27.610" E
15	22° 10' 59.328" N	86° 59' 31.008" E

POTENTIAL BLOCK JR_NY_SR_29 OF SUBARNAREKHA RIVER

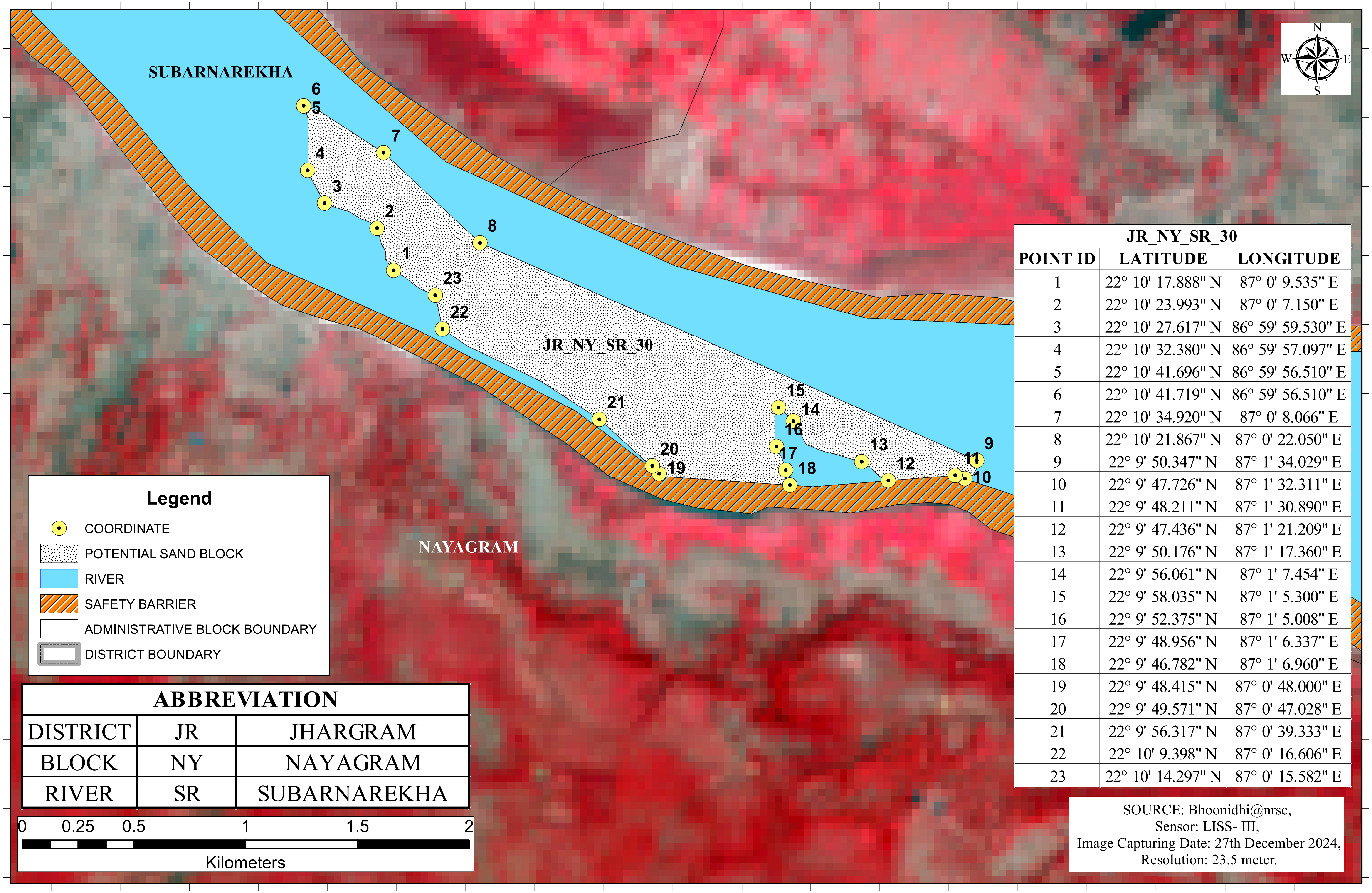


ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

JR_NY_SR_29

SL NO.	LATITUDE	LONGITUDE
1	22° 10' 44.158" N	86° 59' 49.254" E
2	22° 10' 43.108" N	86° 59' 52.193" E
3	22° 10' 41.290" N	86° 59' 55.148" E
4	22° 10' 35.008" N	86° 59' 55.980" E
5	22° 10' 30.361" N	86° 59' 56.165" E
6	22° 10' 26.575" N	86° 59' 58.937" E
7	22° 10' 23.993" N	87° 0' 4.665" E
8	22° 10' 20.551" N	87° 0' 6.697" E
9	22° 10' 16.335" N	87° 0' 9.469" E
10	22° 10' 13.495" N	87° 0' 13.072" E
11	22° 10' 11.688" N	87° 0' 15.382" E
12	22° 10' 10.053" N	87° 0' 14.735" E
13	22° 10' 9.077" N	87° 0' 13.288" E
14	22° 10' 13.818" N	87° 0' 2.684" E
15	22° 10' 18.990" N	86° 59' 51.114" E
16	22° 10' 29.936" N	86° 59' 40.027" E
17	22° 10' 42.533" N	86° 59' 29.604" E
18	22° 10' 55.131" N	86° 59' 17.186" E
19	22° 10' 57.421" N	86° 59' 16.307" E
20	22° 10' 52.831" N	86° 59' 26.044" E

POTENTIAL BLOCK JR_NY_SR_30 OF SUBARNAREKHA RIVER

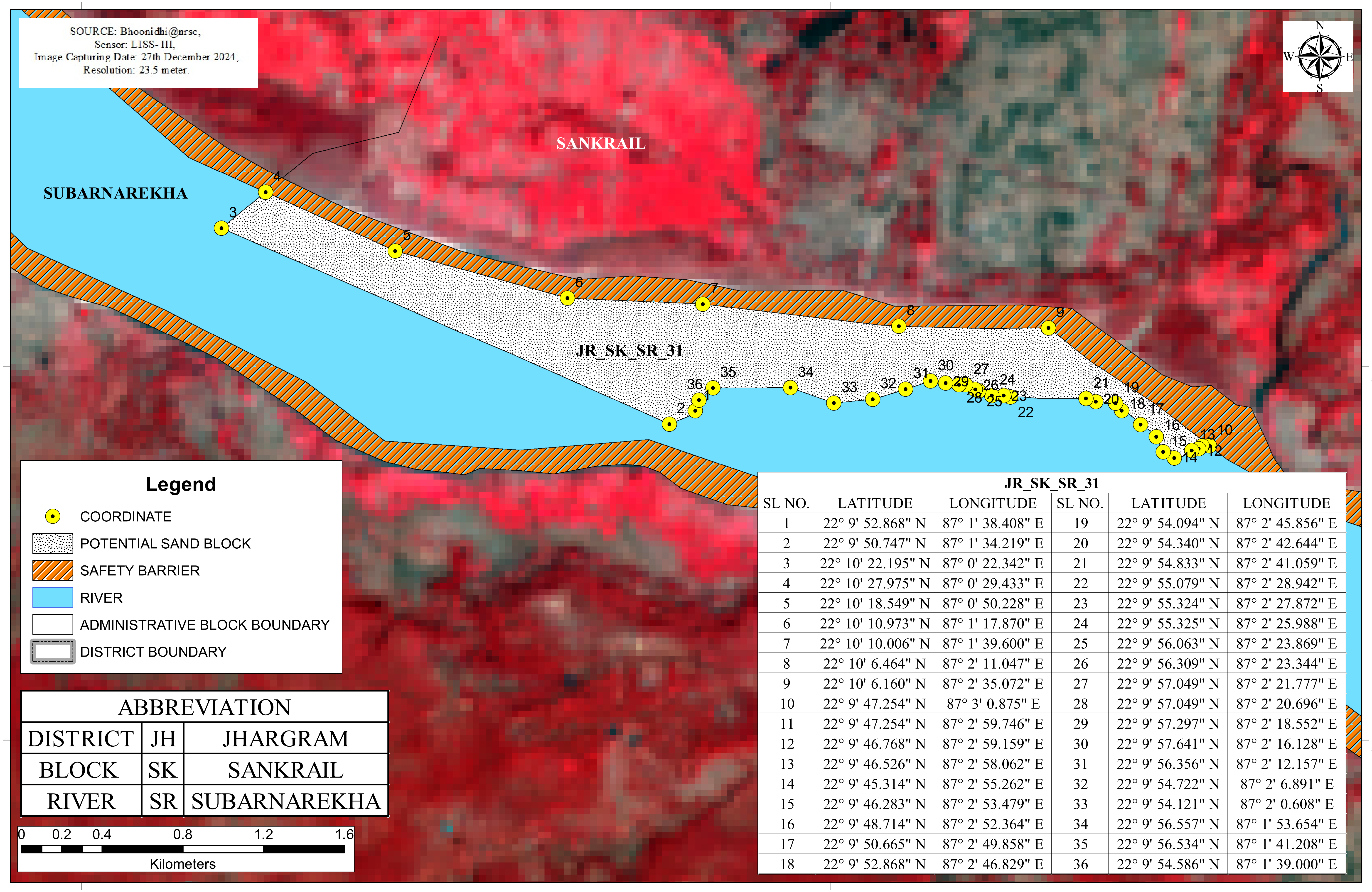


JR_NY_SR_30		
POINT ID	LATITUDE	LONGITUDE
1	22° 10' 17.888" N	87° 0' 9.535" E
2	22° 10' 23.993" N	87° 0' 7.150" E
3	22° 10' 27.617" N	86° 59' 59.530" E
4	22° 10' 32.380" N	86° 59' 57.097" E
5	22° 10' 41.696" N	86° 59' 56.510" E
6	22° 10' 41.719" N	86° 59' 56.510" E
7	22° 10' 34.920" N	87° 0' 8.066" E
8	22° 10' 21.867" N	87° 0' 22.050" E
9	22° 9' 50.347" N	87° 1' 34.029" E
10	22° 9' 47.726" N	87° 1' 32.311" E
11	22° 9' 48.211" N	87° 1' 30.890" E
12	22° 9' 47.436" N	87° 1' 21.209" E
13	22° 9' 50.176" N	87° 1' 17.360" E
14	22° 9' 56.061" N	87° 1' 7.454" E
15	22° 9' 58.035" N	87° 1' 5.300" E
16	22° 9' 52.375" N	87° 1' 5.008" E
17	22° 9' 48.956" N	87° 1' 6.337" E
18	22° 9' 46.782" N	87° 1' 6.960" E
19	22° 9' 48.415" N	87° 0' 48.000" E
20	22° 9' 49.571" N	87° 0' 47.028" E
21	22° 9' 56.317" N	87° 0' 39.333" E
22	22° 10' 9.398" N	87° 0' 16.606" E
23	22° 10' 14.297" N	87° 0' 15.582" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

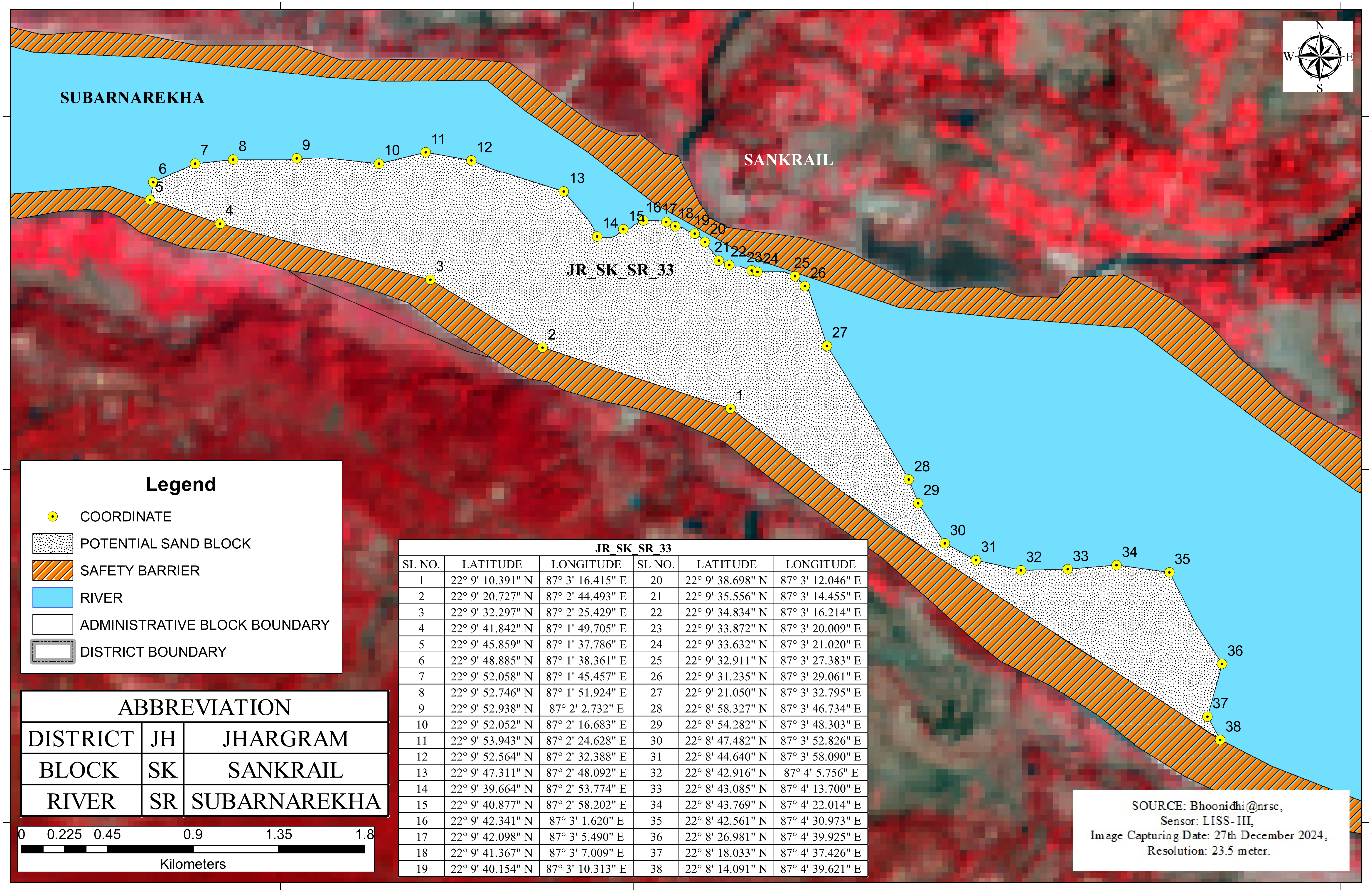
SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_SK_SR_31 OF SUBARNAREKHA RIVER



JR_SK_SR_31					
SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 9' 52.868" N	87° 1' 38.408" E	19	22° 9' 54.094" N	87° 2' 45.856" E
2	22° 9' 50.747" N	87° 1' 34.219" E	20	22° 9' 54.340" N	87° 2' 42.644" E
3	22° 10' 22.195" N	87° 0' 22.342" E	21	22° 9' 54.833" N	87° 2' 41.059" E
4	22° 10' 27.975" N	87° 0' 29.433" E	22	22° 9' 55.079" N	87° 2' 28.942" E
5	22° 10' 18.549" N	87° 0' 50.228" E	23	22° 9' 55.324" N	87° 2' 27.872" E
6	22° 10' 10.973" N	87° 1' 17.870" E	24	22° 9' 55.325" N	87° 2' 25.988" E
7	22° 10' 10.006" N	87° 1' 39.600" E	25	22° 9' 56.063" N	87° 2' 23.869" E
8	22° 10' 6.464" N	87° 2' 11.047" E	26	22° 9' 56.309" N	87° 2' 23.344" E
9	22° 10' 6.160" N	87° 2' 35.072" E	27	22° 9' 57.049" N	87° 2' 21.777" E
10	22° 9' 47.254" N	87° 3' 0.875" E	28	22° 9' 57.049" N	87° 2' 20.696" E
11	22° 9' 47.254" N	87° 2' 59.746" E	29	22° 9' 57.297" N	87° 2' 18.552" E
12	22° 9' 46.768" N	87° 2' 59.159" E	30	22° 9' 57.641" N	87° 2' 16.128" E
13	22° 9' 46.526" N	87° 2' 58.062" E	31	22° 9' 56.356" N	87° 2' 12.157" E
14	22° 9' 45.314" N	87° 2' 55.262" E	32	22° 9' 54.722" N	87° 2' 6.891" E
15	22° 9' 46.283" N	87° 2' 53.479" E	33	22° 9' 54.121" N	87° 2' 0.608" E
16	22° 9' 48.714" N	87° 2' 52.364" E	34	22° 9' 56.557" N	87° 1' 53.654" E
17	22° 9' 50.665" N	87° 2' 49.858" E	35	22° 9' 56.534" N	87° 1' 41.208" E
18	22° 9' 52.868" N	87° 2' 46.829" E	36	22° 9' 54.586" N	87° 1' 39.000" E

POTENTIAL BLOCK JR_SK_SR_33 OF SUBARNAREKHA RIVER

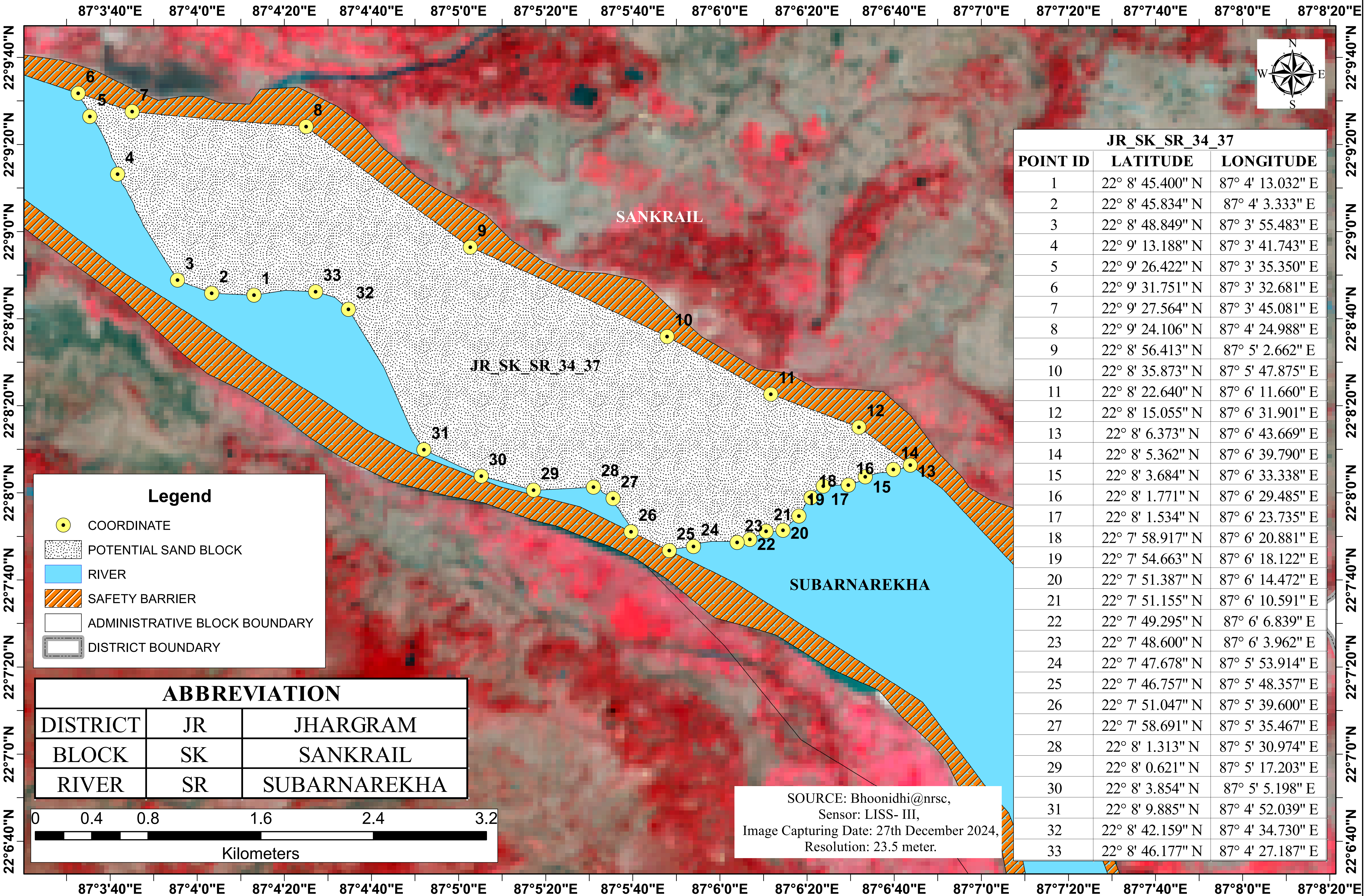


JR_SK_SR_33					
SL NO.	LATITUDE	LONGITUDE	SL NO.	LATITUDE	LONGITUDE
1	22° 9' 10.391" N	87° 3' 16.415" E	20	22° 9' 38.698" N	87° 3' 12.046" E
2	22° 9' 20.727" N	87° 2' 44.493" E	21	22° 9' 35.556" N	87° 3' 14.455" E
3	22° 9' 32.297" N	87° 2' 25.429" E	22	22° 9' 34.834" N	87° 3' 16.214" E
4	22° 9' 41.842" N	87° 1' 49.705" E	23	22° 9' 33.872" N	87° 3' 20.009" E
5	22° 9' 45.859" N	87° 1' 37.786" E	24	22° 9' 33.632" N	87° 3' 21.020" E
6	22° 9' 48.885" N	87° 1' 38.361" E	25	22° 9' 32.911" N	87° 3' 27.383" E
7	22° 9' 52.058" N	87° 1' 45.457" E	26	22° 9' 31.235" N	87° 3' 29.061" E
8	22° 9' 52.746" N	87° 1' 51.924" E	27	22° 9' 21.050" N	87° 3' 32.795" E
9	22° 9' 52.938" N	87° 2' 2.732" E	28	22° 8' 58.327" N	87° 3' 46.734" E
10	22° 9' 52.052" N	87° 2' 16.683" E	29	22° 8' 54.282" N	87° 3' 48.303" E
11	22° 9' 53.943" N	87° 2' 24.628" E	30	22° 8' 47.482" N	87° 3' 52.826" E
12	22° 9' 52.564" N	87° 2' 32.388" E	31	22° 8' 44.640" N	87° 3' 58.090" E
13	22° 9' 47.311" N	87° 2' 48.092" E	32	22° 8' 42.916" N	87° 4' 5.756" E
14	22° 9' 39.664" N	87° 2' 53.774" E	33	22° 8' 43.085" N	87° 4' 13.700" E
15	22° 9' 40.877" N	87° 2' 58.202" E	34	22° 8' 43.769" N	87° 4' 22.014" E
16	22° 9' 42.341" N	87° 3' 1.620" E	35	22° 8' 42.561" N	87° 4' 30.973" E
17	22° 9' 42.098" N	87° 3' 5.490" E	36	22° 8' 26.981" N	87° 4' 39.925" E
18	22° 9' 41.367" N	87° 3' 7.009" E	37	22° 8' 18.033" N	87° 4' 37.426" E
19	22° 9' 40.154" N	87° 3' 10.313" E	38	22° 8' 14.091" N	87° 4' 39.621" E

ABBREVIATION		
DISTRICT	JH	JHARGRAM
BLOCK	SK	SANKRAIL
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_SK_SR_34_37 OF SUBARNAREKHA RIVER

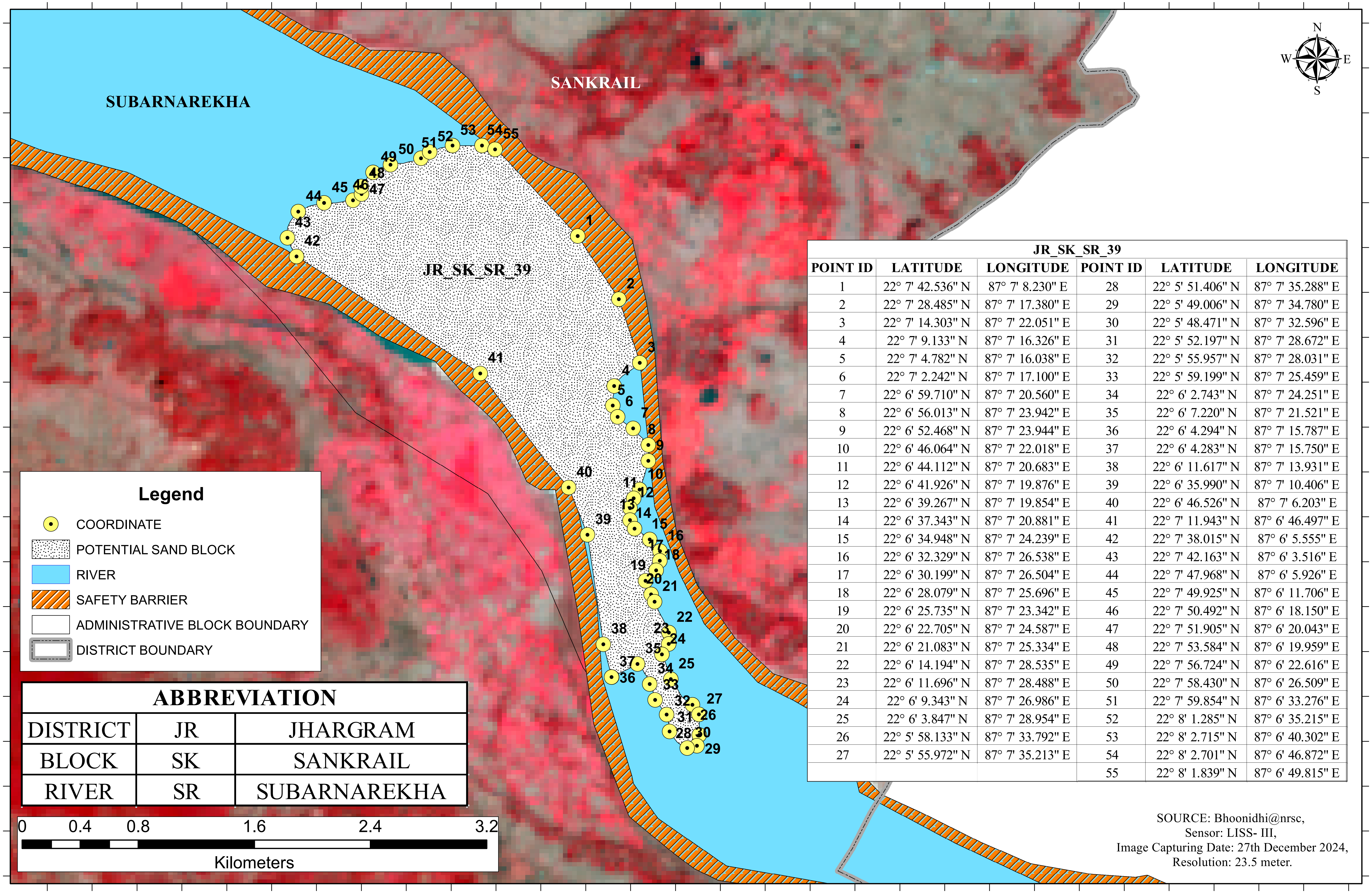


JR_SK_SR_34_37		
POINT ID	LATITUDE	LONGITUDE
1	22° 8' 45.400" N	87° 4' 13.032" E
2	22° 8' 45.834" N	87° 4' 3.333" E
3	22° 8' 48.849" N	87° 3' 55.483" E
4	22° 9' 13.188" N	87° 3' 41.743" E
5	22° 9' 26.422" N	87° 3' 35.350" E
6	22° 9' 31.751" N	87° 3' 32.681" E
7	22° 9' 27.564" N	87° 3' 45.081" E
8	22° 9' 24.106" N	87° 4' 24.988" E
9	22° 8' 56.413" N	87° 5' 2.662" E
10	22° 8' 35.873" N	87° 5' 47.875" E
11	22° 8' 22.640" N	87° 6' 11.660" E
12	22° 8' 15.055" N	87° 6' 31.901" E
13	22° 8' 6.373" N	87° 6' 43.669" E
14	22° 8' 5.362" N	87° 6' 39.790" E
15	22° 8' 3.684" N	87° 6' 33.338" E
16	22° 8' 1.771" N	87° 6' 29.485" E
17	22° 8' 1.534" N	87° 6' 23.735" E
18	22° 7' 58.917" N	87° 6' 20.881" E
19	22° 7' 54.663" N	87° 6' 18.122" E
20	22° 7' 51.387" N	87° 6' 14.472" E
21	22° 7' 51.155" N	87° 6' 10.591" E
22	22° 7' 49.295" N	87° 6' 6.839" E
23	22° 7' 48.600" N	87° 6' 3.962" E
24	22° 7' 47.678" N	87° 5' 53.914" E
25	22° 7' 46.757" N	87° 5' 48.357" E
26	22° 7' 51.047" N	87° 5' 39.600" E
27	22° 7' 58.691" N	87° 5' 35.467" E
28	22° 8' 1.313" N	87° 5' 30.974" E
29	22° 8' 0.621" N	87° 5' 17.203" E
30	22° 8' 3.854" N	87° 5' 5.198" E
31	22° 8' 9.885" N	87° 4' 52.039" E
32	22° 8' 42.159" N	87° 4' 34.730" E
33	22° 8' 46.177" N	87° 4' 27.187" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	SK	SANKRAIL
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

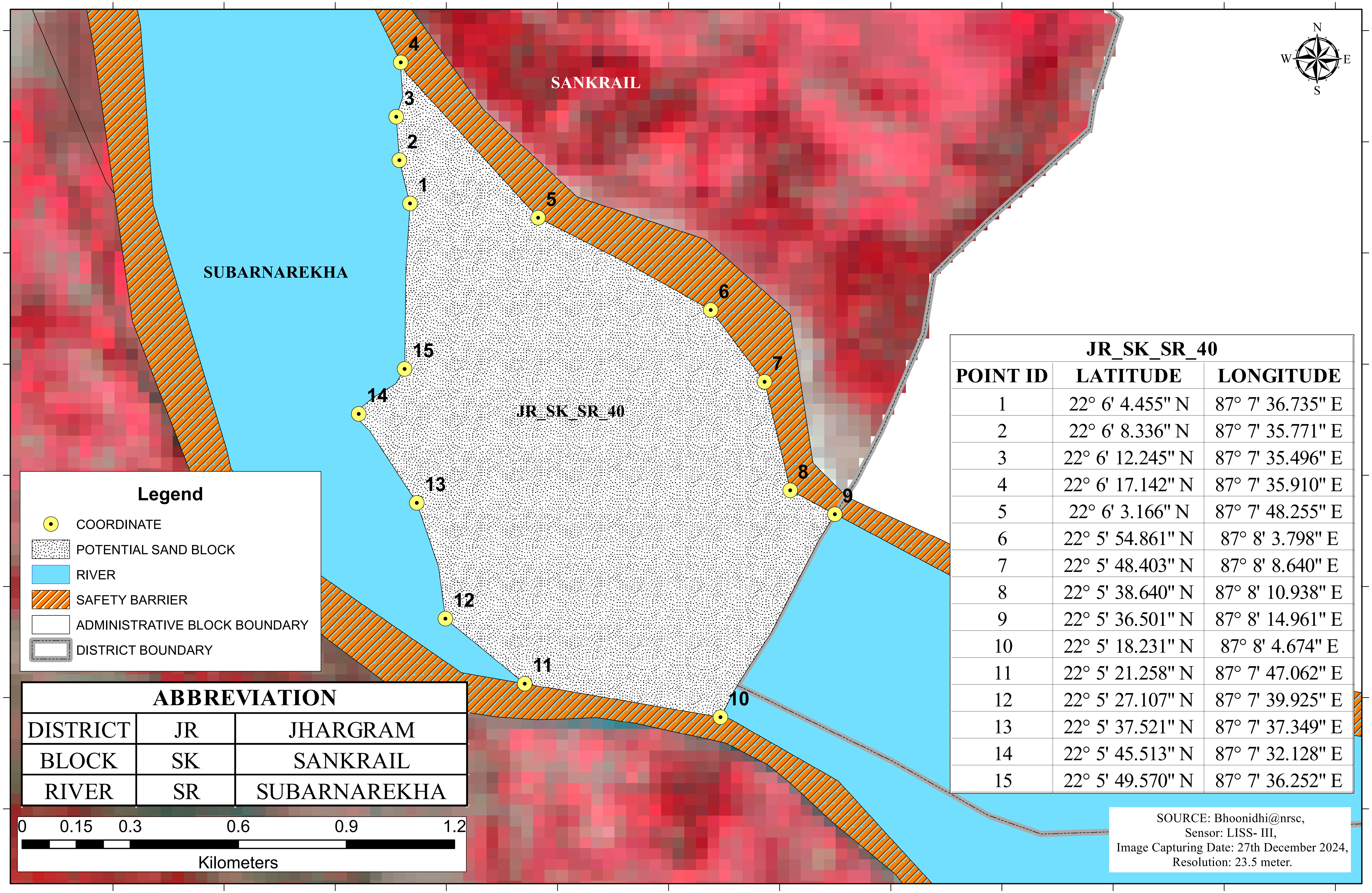
POTENTIAL BLOCK JR_SK_SR_39 OF SUBARNAREKHA RIVER



JR_SK_SR_39					
POINT ID	LATITUDE	LONGITUDE	POINT ID	LATITUDE	LONGITUDE
1	22° 7' 42.536" N	87° 7' 8.230" E	28	22° 5' 51.406" N	87° 7' 35.288" E
2	22° 7' 28.485" N	87° 7' 17.380" E	29	22° 5' 49.006" N	87° 7' 34.780" E
3	22° 7' 14.303" N	87° 7' 22.051" E	30	22° 5' 48.471" N	87° 7' 32.596" E
4	22° 7' 9.133" N	87° 7' 16.326" E	31	22° 5' 52.197" N	87° 7' 28.672" E
5	22° 7' 4.782" N	87° 7' 16.038" E	32	22° 5' 55.957" N	87° 7' 28.031" E
6	22° 7' 2.242" N	87° 7' 17.100" E	33	22° 5' 59.199" N	87° 7' 25.459" E
7	22° 6' 59.710" N	87° 7' 20.560" E	34	22° 6' 2.743" N	87° 7' 24.251" E
8	22° 6' 56.013" N	87° 7' 23.942" E	35	22° 6' 7.220" N	87° 7' 21.521" E
9	22° 6' 52.468" N	87° 7' 23.944" E	36	22° 6' 4.294" N	87° 7' 15.787" E
10	22° 6' 46.064" N	87° 7' 22.018" E	37	22° 6' 4.283" N	87° 7' 15.750" E
11	22° 6' 44.112" N	87° 7' 20.683" E	38	22° 6' 11.617" N	87° 7' 13.931" E
12	22° 6' 41.926" N	87° 7' 19.876" E	39	22° 6' 35.990" N	87° 7' 10.406" E
13	22° 6' 39.267" N	87° 7' 19.854" E	40	22° 6' 46.526" N	87° 7' 6.203" E
14	22° 6' 37.343" N	87° 7' 20.881" E	41	22° 7' 11.943" N	87° 6' 46.497" E
15	22° 6' 34.948" N	87° 7' 24.239" E	42	22° 7' 38.015" N	87° 6' 5.555" E
16	22° 6' 32.329" N	87° 7' 26.538" E	43	22° 7' 42.163" N	87° 6' 3.516" E
17	22° 6' 30.199" N	87° 7' 26.504" E	44	22° 7' 47.968" N	87° 6' 5.926" E
18	22° 6' 28.079" N	87° 7' 25.696" E	45	22° 7' 49.925" N	87° 6' 11.706" E
19	22° 6' 25.735" N	87° 7' 23.342" E	46	22° 7' 50.492" N	87° 6' 18.150" E
20	22° 6' 22.705" N	87° 7' 24.587" E	47	22° 7' 51.905" N	87° 6' 20.043" E
21	22° 6' 21.083" N	87° 7' 25.334" E	48	22° 7' 53.584" N	87° 6' 19.959" E
22	22° 6' 14.194" N	87° 7' 28.535" E	49	22° 7' 56.724" N	87° 6' 22.616" E
23	22° 6' 11.696" N	87° 7' 28.488" E	50	22° 7' 58.430" N	87° 6' 26.509" E
24	22° 6' 9.343" N	87° 7' 26.986" E	51	22° 7' 59.854" N	87° 6' 33.276" E
25	22° 6' 3.847" N	87° 7' 28.954" E	52	22° 8' 1.285" N	87° 6' 35.215" E
26	22° 5' 58.133" N	87° 7' 33.792" E	53	22° 8' 2.715" N	87° 6' 40.302" E
27	22° 5' 55.972" N	87° 7' 35.213" E	54	22° 8' 2.701" N	87° 6' 46.872" E
			55	22° 8' 1.839" N	87° 6' 49.815" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	SK	SANKRAIL
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_SK_SR_40 OF SUBARNAREKHA RIVER

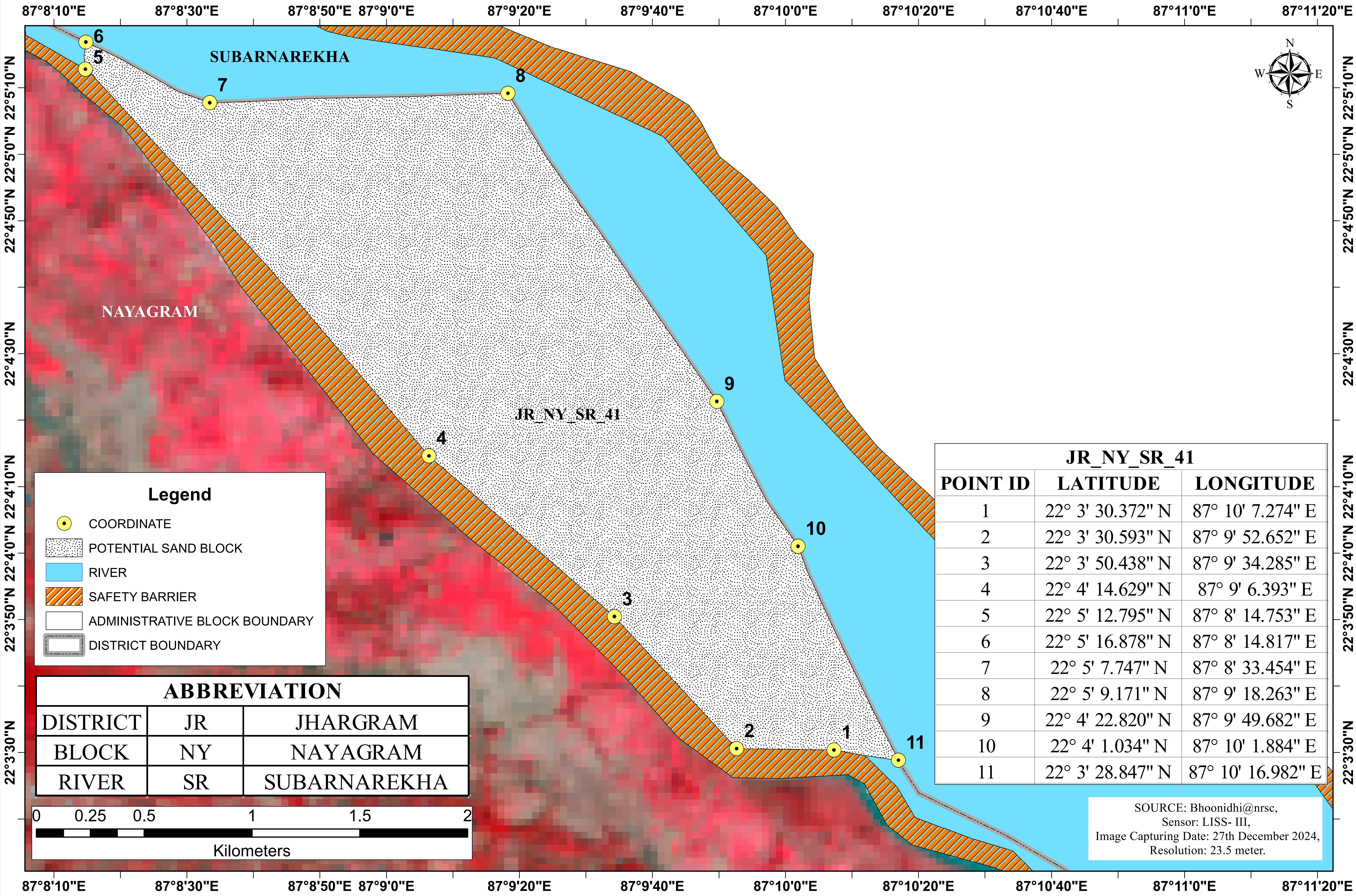


JR_SK_SR_40		
POINT ID	LATITUDE	LONGITUDE
1	22° 6' 4.455" N	87° 7' 36.735" E
2	22° 6' 8.336" N	87° 7' 35.771" E
3	22° 6' 12.245" N	87° 7' 35.496" E
4	22° 6' 17.142" N	87° 7' 35.910" E
5	22° 6' 3.166" N	87° 7' 48.255" E
6	22° 5' 54.861" N	87° 8' 3.798" E
7	22° 5' 48.403" N	87° 8' 8.640" E
8	22° 5' 38.640" N	87° 8' 10.938" E
9	22° 5' 36.501" N	87° 8' 14.961" E
10	22° 5' 18.231" N	87° 8' 4.674" E
11	22° 5' 21.258" N	87° 7' 47.062" E
12	22° 5' 27.107" N	87° 7' 39.925" E
13	22° 5' 37.521" N	87° 7' 37.349" E
14	22° 5' 45.513" N	87° 7' 32.128" E
15	22° 5' 49.570" N	87° 7' 36.252" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	SK	SANKRAIL
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

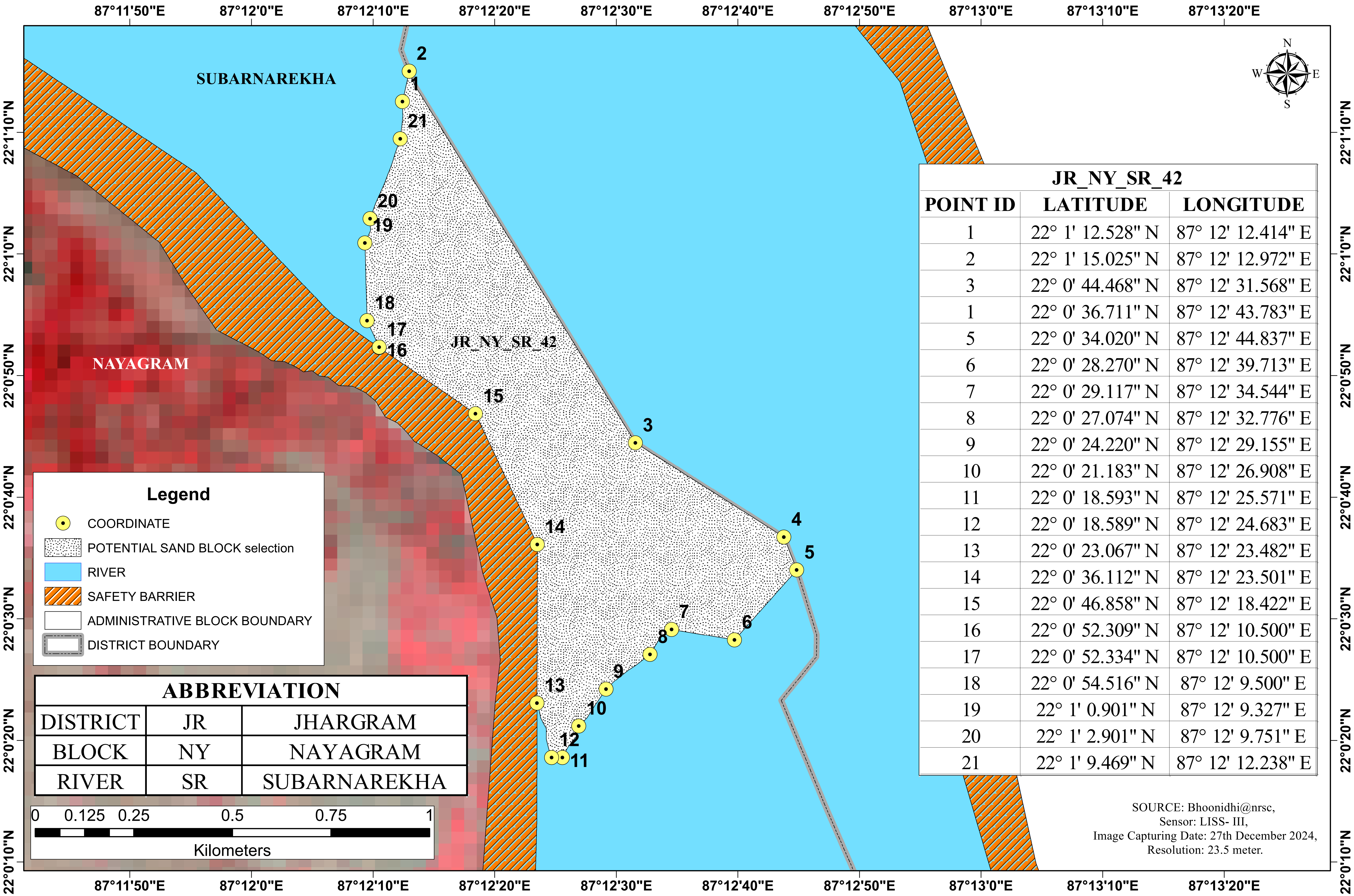
POTENTIAL BLOCK JR_NY_SR_41 OF SUBARNAREKHA RIVER



JR_NY_SR_41		
POINT ID	LATITUDE	LONGITUDE
1	22° 3' 30.372" N	87° 10' 7.274" E
2	22° 3' 30.593" N	87° 9' 52.652" E
3	22° 3' 50.438" N	87° 9' 34.285" E
4	22° 4' 14.629" N	87° 9' 6.393" E
5	22° 5' 12.795" N	87° 8' 14.753" E
6	22° 5' 16.878" N	87° 8' 14.817" E
7	22° 5' 7.747" N	87° 8' 33.454" E
8	22° 5' 9.171" N	87° 9' 18.263" E
9	22° 4' 22.820" N	87° 9' 49.682" E
10	22° 4' 1.034" N	87° 10' 1.884" E
11	22° 3' 28.847" N	87° 10' 16.982" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

POTENTIAL BLOCK JR_NY_SR_42 OF SUBARNAREKHA RIVER

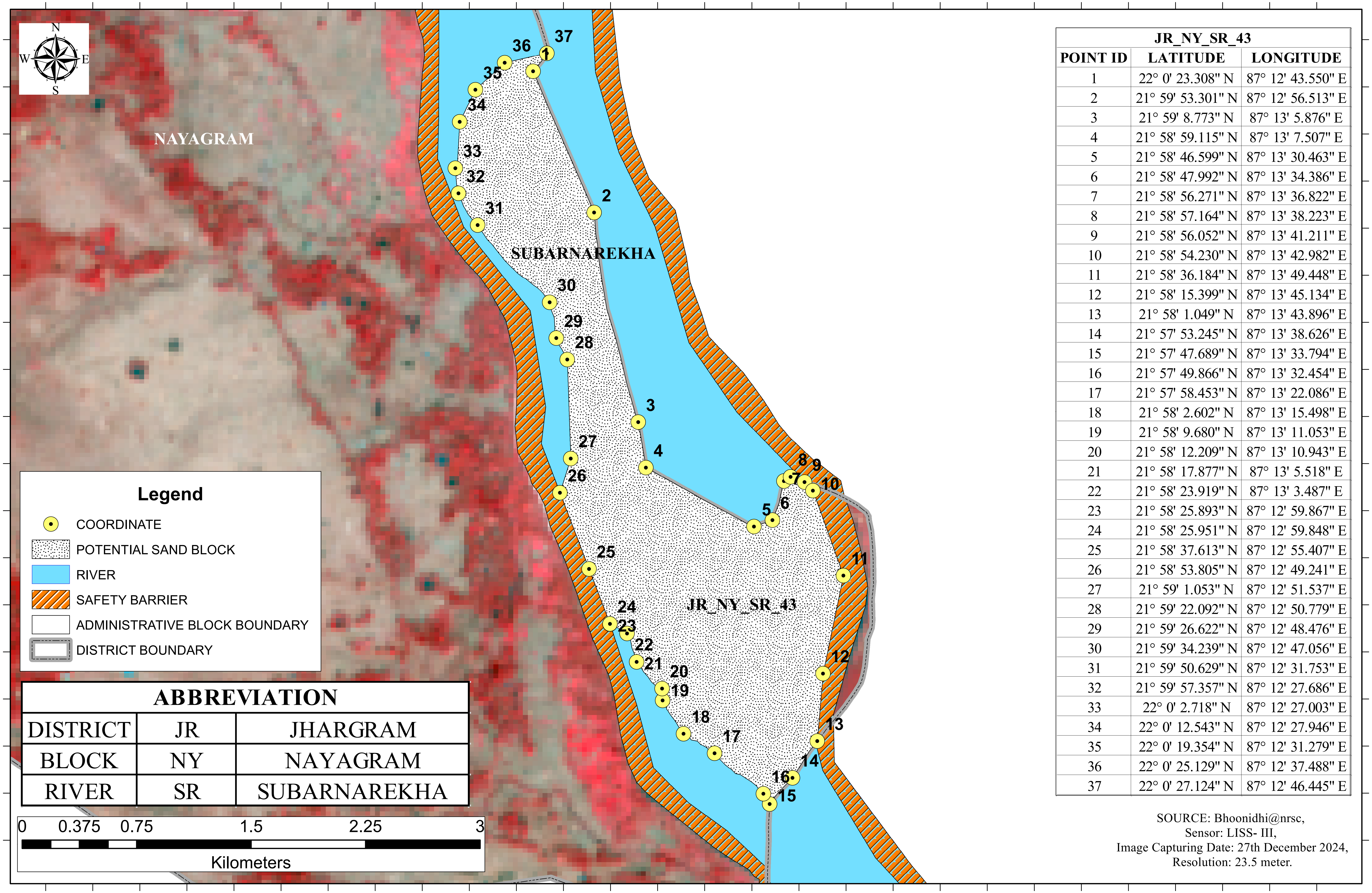


JR_NY_SR_42		
POINT ID	LATITUDE	LONGITUDE
1	22° 1' 12.528" N	87° 12' 12.414" E
2	22° 1' 15.025" N	87° 12' 12.972" E
3	22° 0' 44.468" N	87° 12' 31.568" E
1	22° 0' 36.711" N	87° 12' 43.783" E
5	22° 0' 34.020" N	87° 12' 44.837" E
6	22° 0' 28.270" N	87° 12' 39.713" E
7	22° 0' 29.117" N	87° 12' 34.544" E
8	22° 0' 27.074" N	87° 12' 32.776" E
9	22° 0' 24.220" N	87° 12' 29.155" E
10	22° 0' 21.183" N	87° 12' 26.908" E
11	22° 0' 18.593" N	87° 12' 25.571" E
12	22° 0' 18.589" N	87° 12' 24.683" E
13	22° 0' 23.067" N	87° 12' 23.482" E
14	22° 0' 36.112" N	87° 12' 23.501" E
15	22° 0' 46.858" N	87° 12' 18.422" E
16	22° 0' 52.309" N	87° 12' 10.500" E
17	22° 0' 52.334" N	87° 12' 10.500" E
18	22° 0' 54.516" N	87° 12' 9.500" E
19	22° 1' 0.901" N	87° 12' 9.327" E
20	22° 1' 2.901" N	87° 12' 9.751" E
21	22° 1' 9.469" N	87° 12' 12.238" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_NY_SR_43 OF SUBARNAREKHA RIVER

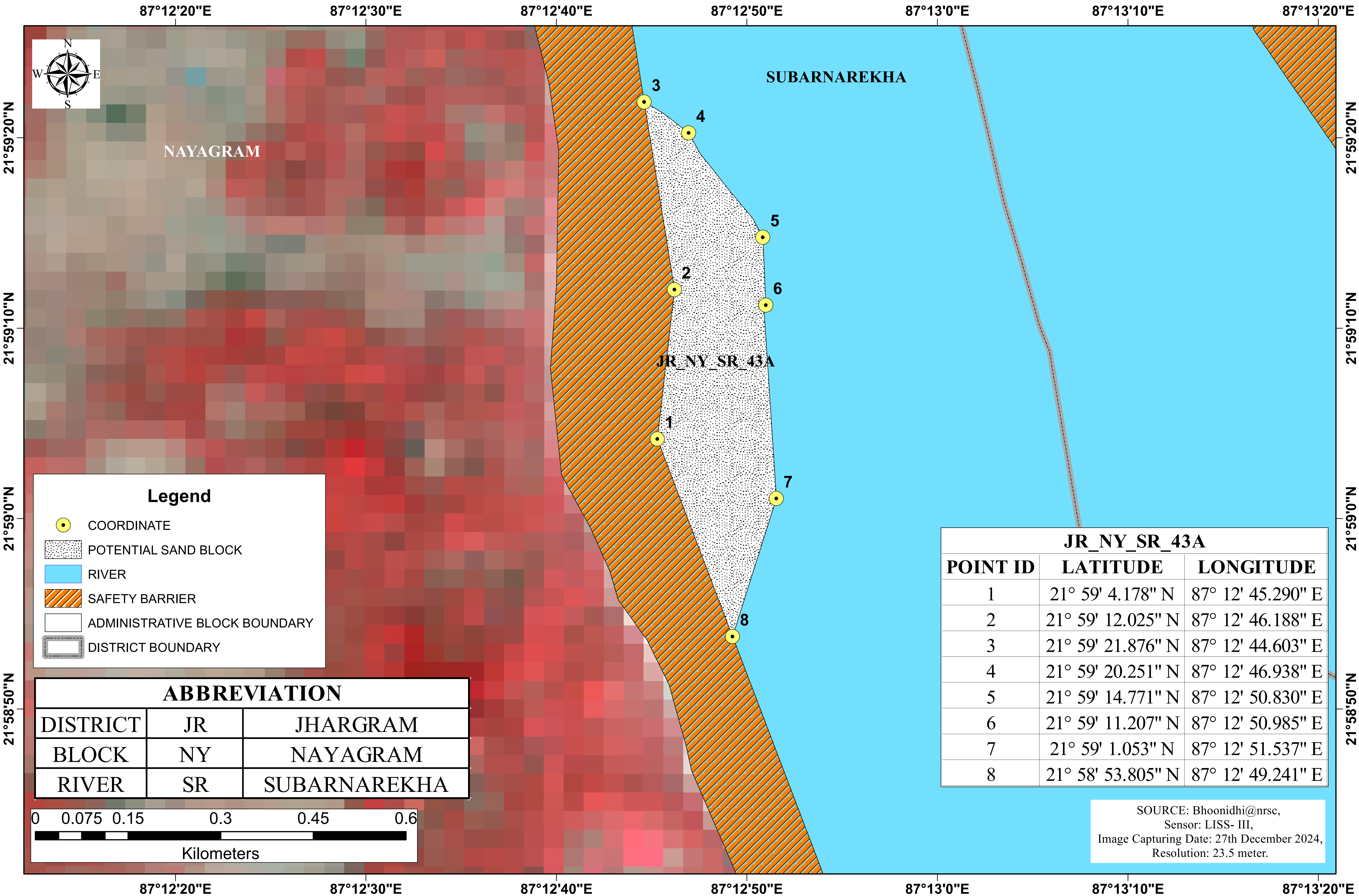


JR_NY_SR_43		
POINT ID	LATITUDE	LONGITUDE
1	22° 0' 23.308" N	87° 12' 43.550" E
2	21° 59' 53.301" N	87° 12' 56.513" E
3	21° 59' 8.773" N	87° 13' 5.876" E
4	21° 58' 59.115" N	87° 13' 7.507" E
5	21° 58' 46.599" N	87° 13' 30.463" E
6	21° 58' 47.992" N	87° 13' 34.386" E
7	21° 58' 56.271" N	87° 13' 36.822" E
8	21° 58' 57.164" N	87° 13' 38.223" E
9	21° 58' 56.052" N	87° 13' 41.211" E
10	21° 58' 54.230" N	87° 13' 42.982" E
11	21° 58' 36.184" N	87° 13' 49.448" E
12	21° 58' 15.399" N	87° 13' 45.134" E
13	21° 58' 1.049" N	87° 13' 43.896" E
14	21° 57' 53.245" N	87° 13' 38.626" E
15	21° 57' 47.689" N	87° 13' 33.794" E
16	21° 57' 49.866" N	87° 13' 32.454" E
17	21° 57' 58.453" N	87° 13' 22.086" E
18	21° 58' 2.602" N	87° 13' 15.498" E
19	21° 58' 9.680" N	87° 13' 11.053" E
20	21° 58' 12.209" N	87° 13' 10.943" E
21	21° 58' 17.877" N	87° 13' 5.518" E
22	21° 58' 23.919" N	87° 13' 3.487" E
23	21° 58' 25.893" N	87° 12' 59.867" E
24	21° 58' 25.951" N	87° 12' 59.848" E
25	21° 58' 37.613" N	87° 12' 55.407" E
26	21° 58' 53.805" N	87° 12' 49.241" E
27	21° 59' 1.053" N	87° 12' 51.537" E
28	21° 59' 22.092" N	87° 12' 50.779" E
29	21° 59' 26.622" N	87° 12' 48.476" E
30	21° 59' 34.239" N	87° 12' 47.056" E
31	21° 59' 50.629" N	87° 12' 31.753" E
32	21° 59' 57.357" N	87° 12' 27.686" E
33	22° 0' 2.718" N	87° 12' 27.003" E
34	22° 0' 12.543" N	87° 12' 27.946" E
35	22° 0' 19.354" N	87° 12' 31.279" E
36	22° 0' 25.129" N	87° 12' 37.488" E
37	22° 0' 27.124" N	87° 12' 46.445" E

ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

SOURCE: Bhoonidhi@nrsc,
Sensor: LISS- III,
Image Capturing Date: 27th December 2024,
Resolution: 23.5 meter.

POTENTIAL BLOCK JR_NY_SR_43A OF SUBARNAREKHA RIVER

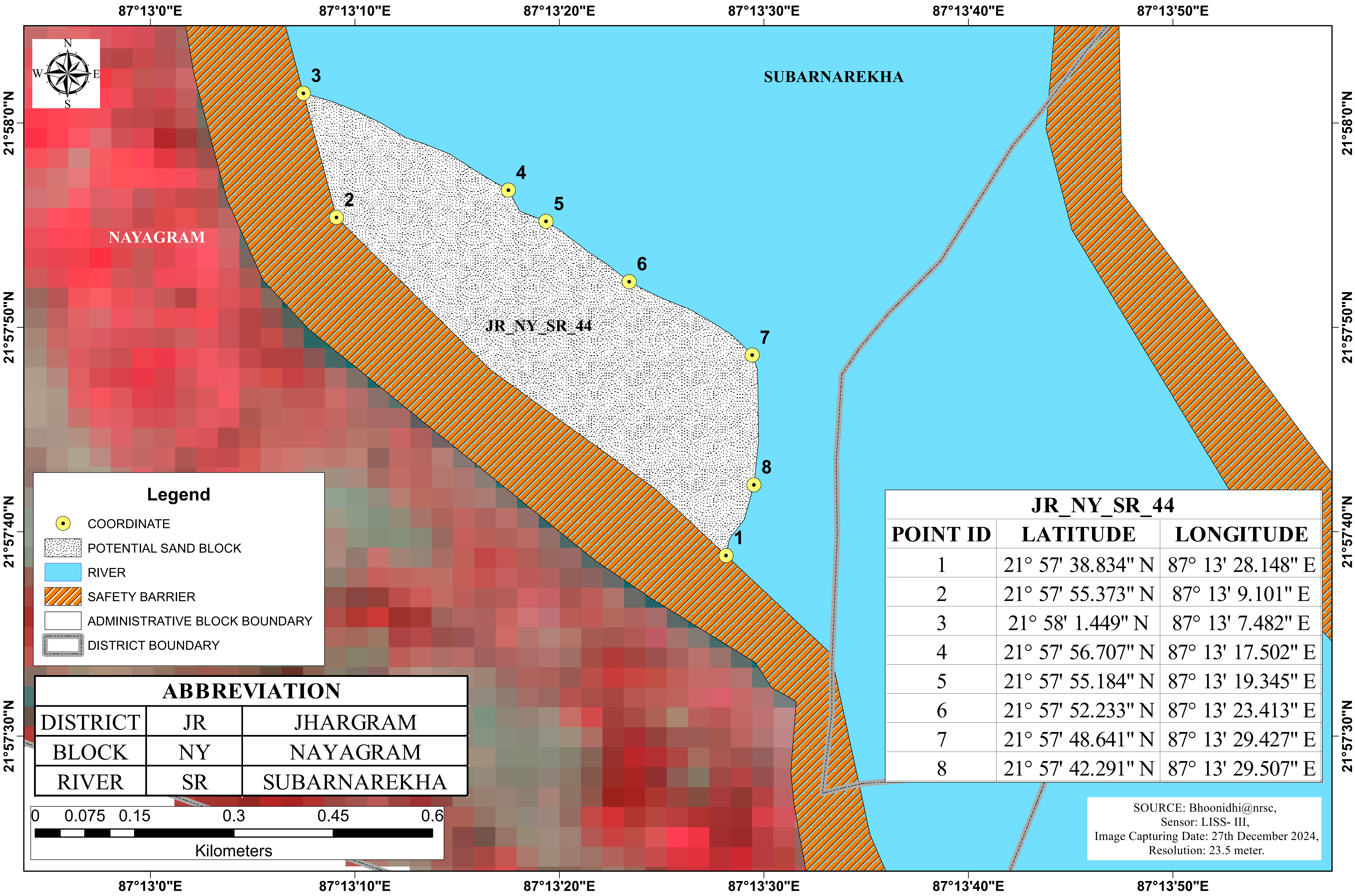


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

JR_NY_SR_43A

POINT ID	LATITUDE	LONGITUDE
1	21° 59' 4.178" N	87° 12' 45.290" E
2	21° 59' 12.025" N	87° 12' 46.188" E
3	21° 59' 21.876" N	87° 12' 44.603" E
4	21° 59' 20.251" N	87° 12' 46.938" E
5	21° 59' 14.771" N	87° 12' 50.830" E
6	21° 59' 11.207" N	87° 12' 50.985" E
7	21° 59' 1.053" N	87° 12' 51.537" E
8	21° 58' 53.805" N	87° 12' 49.241" E

POTENTIAL BLOCK JR_NY_SR_44 OF SUBARNAREKHA RIVER

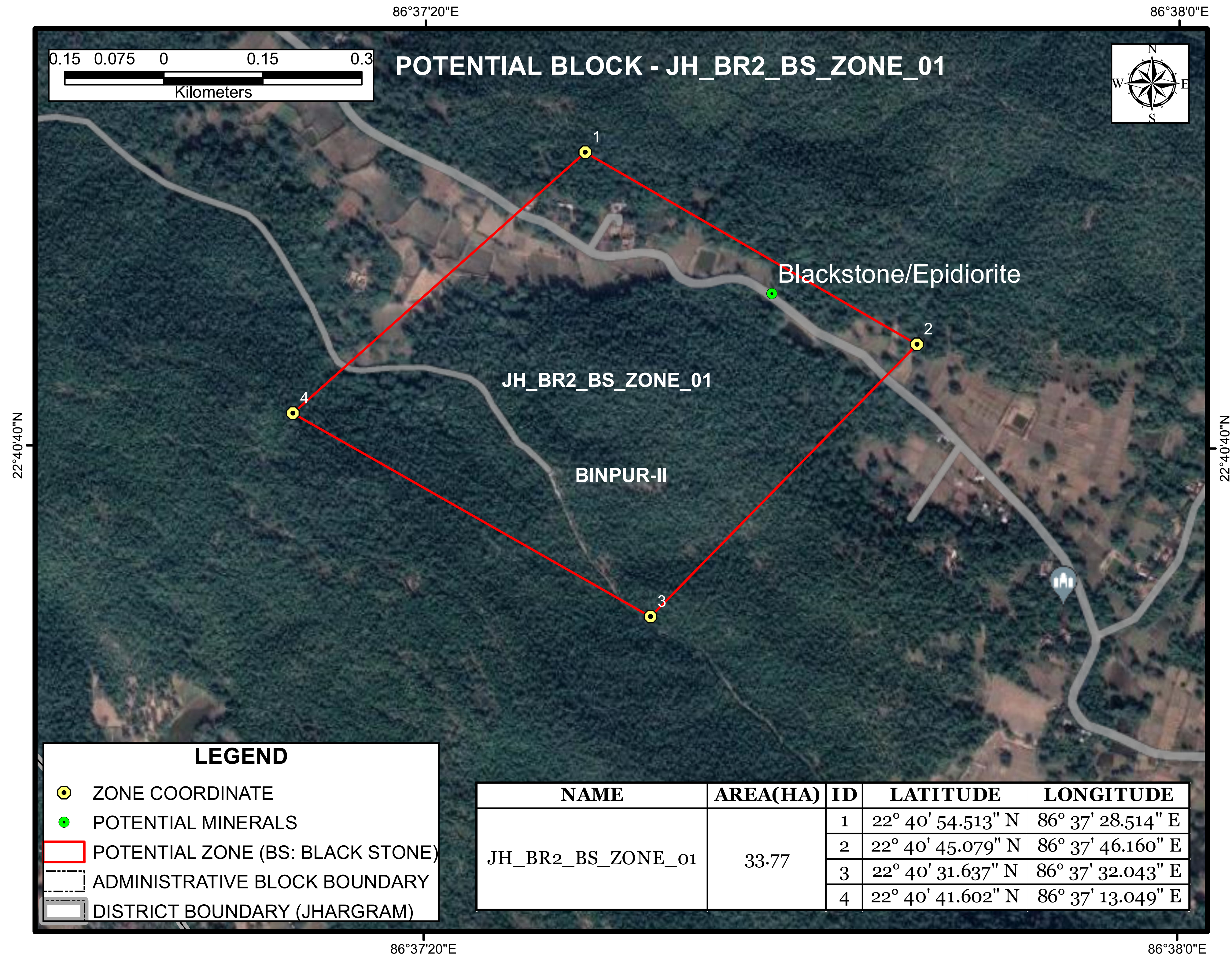


ABBREVIATION		
DISTRICT	JR	JHARGRAM
BLOCK	NY	NAYAGRAM
RIVER	SR	SUBARNAREKHA

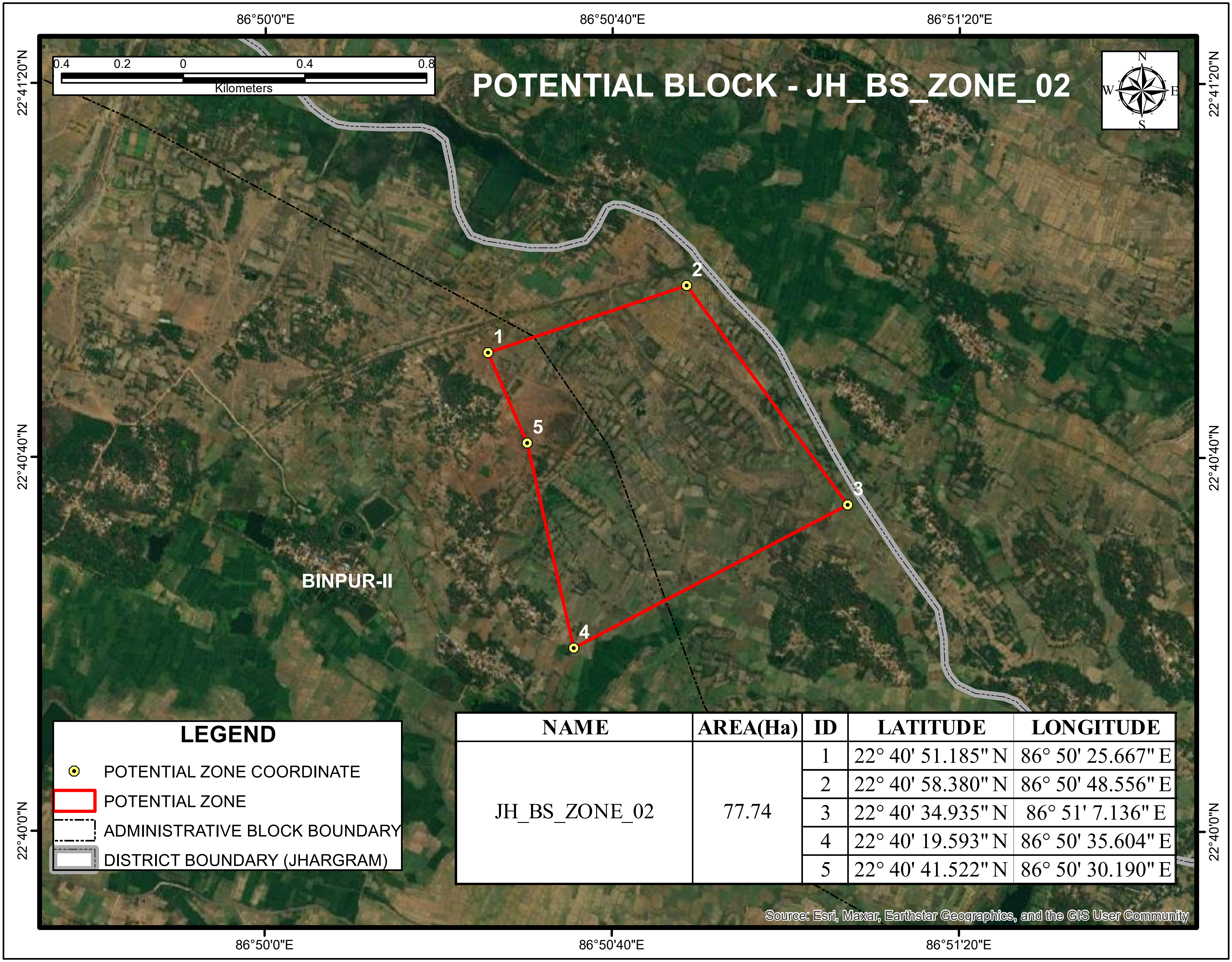
JR_NY_SR_44

POINT ID	LATITUDE	LONGITUDE
1	21° 57' 38.834" N	87° 13' 28.148" E
2	21° 57' 55.373" N	87° 13' 9.101" E
3	21° 58' 1.449" N	87° 13' 7.482" E
4	21° 57' 56.707" N	87° 13' 17.502" E
5	21° 57' 55.184" N	87° 13' 19.345" E
6	21° 57' 52.233" N	87° 13' 23.413" E
7	21° 57' 48.641" N	87° 13' 29.427" E
8	21° 57' 42.291" N	87° 13' 29.507" E

Annexure 5
Map showing of Potential In-situ mineral Blocks of Jhargram District

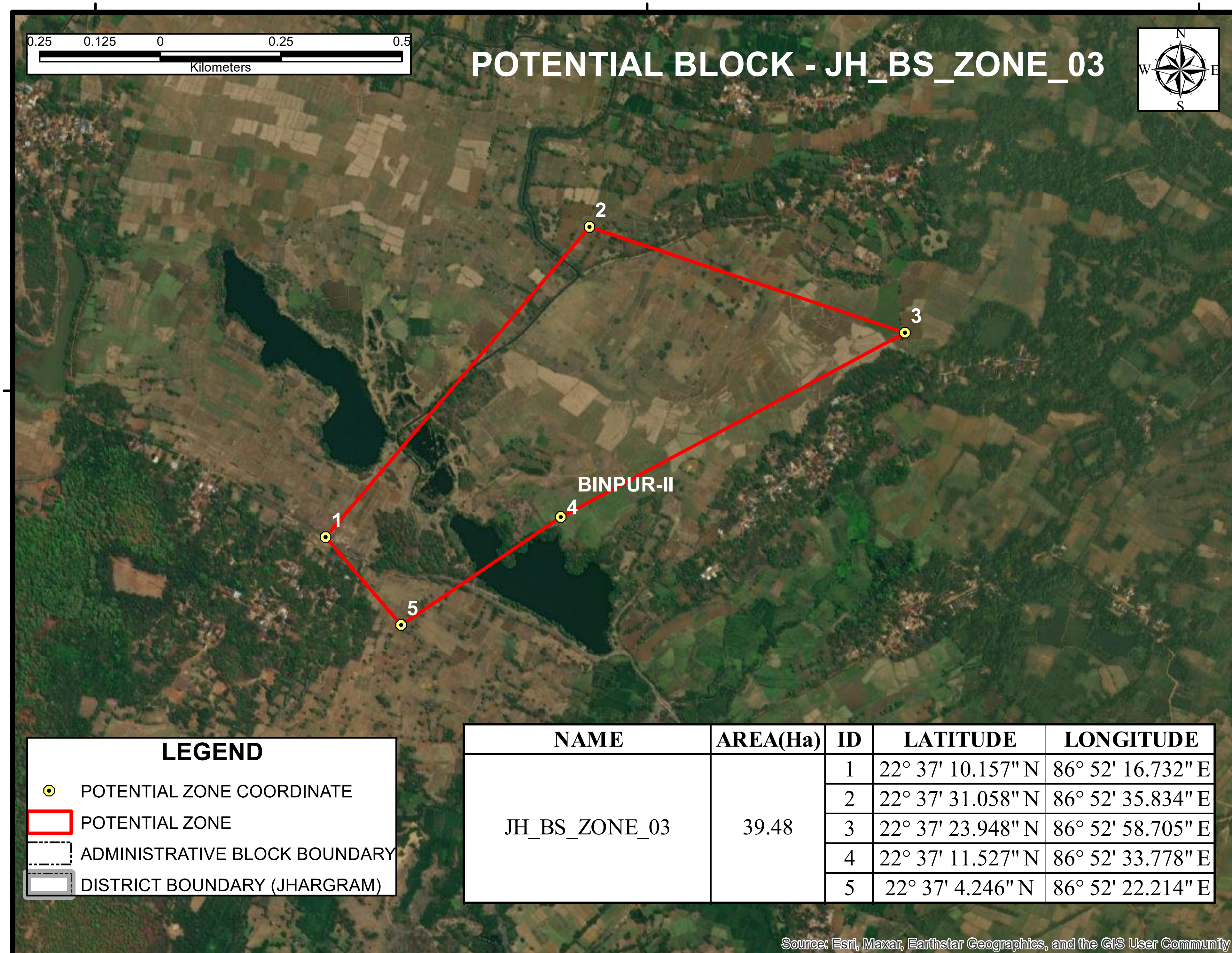


NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_BS_ZONE_01	33.77	1	22° 40' 54.513" N	86° 37' 28.514" E
		2	22° 40' 45.079" N	86° 37' 46.160" E
		3	22° 40' 31.637" N	86° 37' 32.043" E
		4	22° 40' 41.602" N	86° 37' 13.049" E

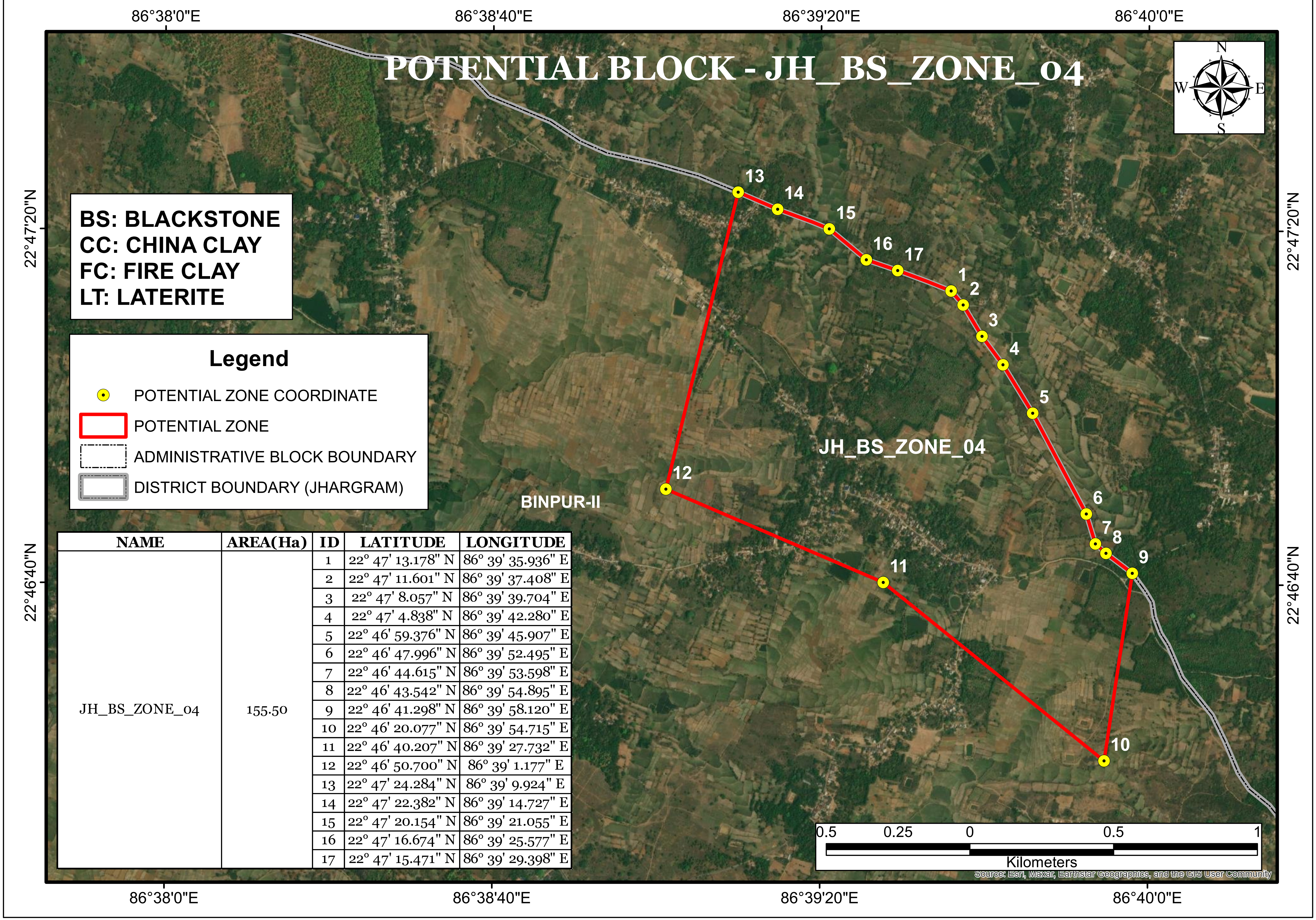


NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BS_ZONE_02	77.74	1	22° 40' 51.185" N	86° 50' 25.667" E
		2	22° 40' 58.380" N	86° 50' 48.556" E
		3	22° 40' 34.935" N	86° 51' 7.136" E
		4	22° 40' 19.593" N	86° 50' 35.604" E
		5	22° 40' 41.522" N	86° 50' 30.190" E

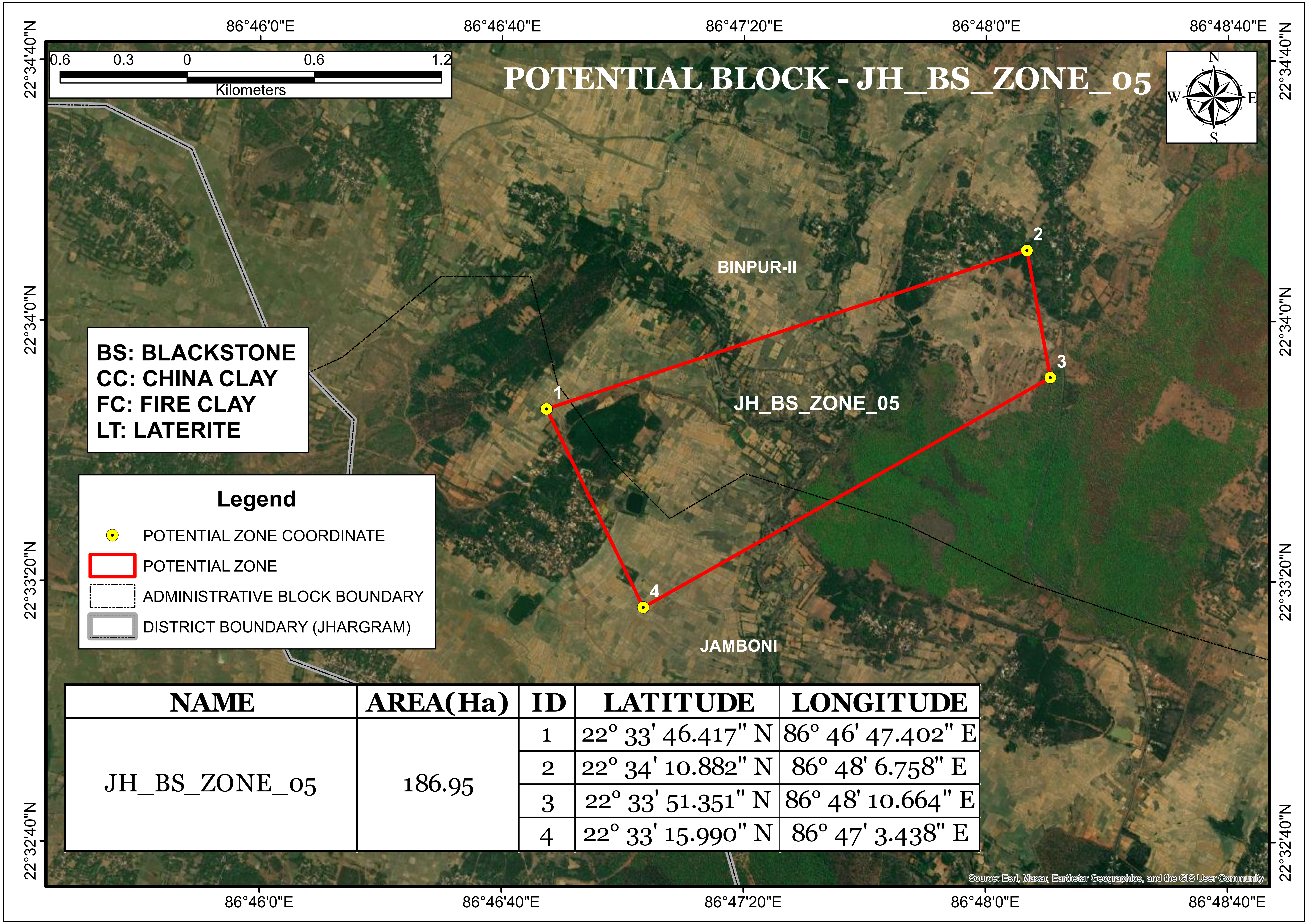
POTENTIAL BLOCK - JH_BS_ZONE_03



NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BS_ZONE_03	39.48	1	22° 37' 10.157" N	86° 52' 16.732" E
		2	22° 37' 31.058" N	86° 52' 35.834" E
		3	22° 37' 23.948" N	86° 52' 58.705" E
		4	22° 37' 11.527" N	86° 52' 33.778" E
		5	22° 37' 4.246" N	86° 52' 22.214" E

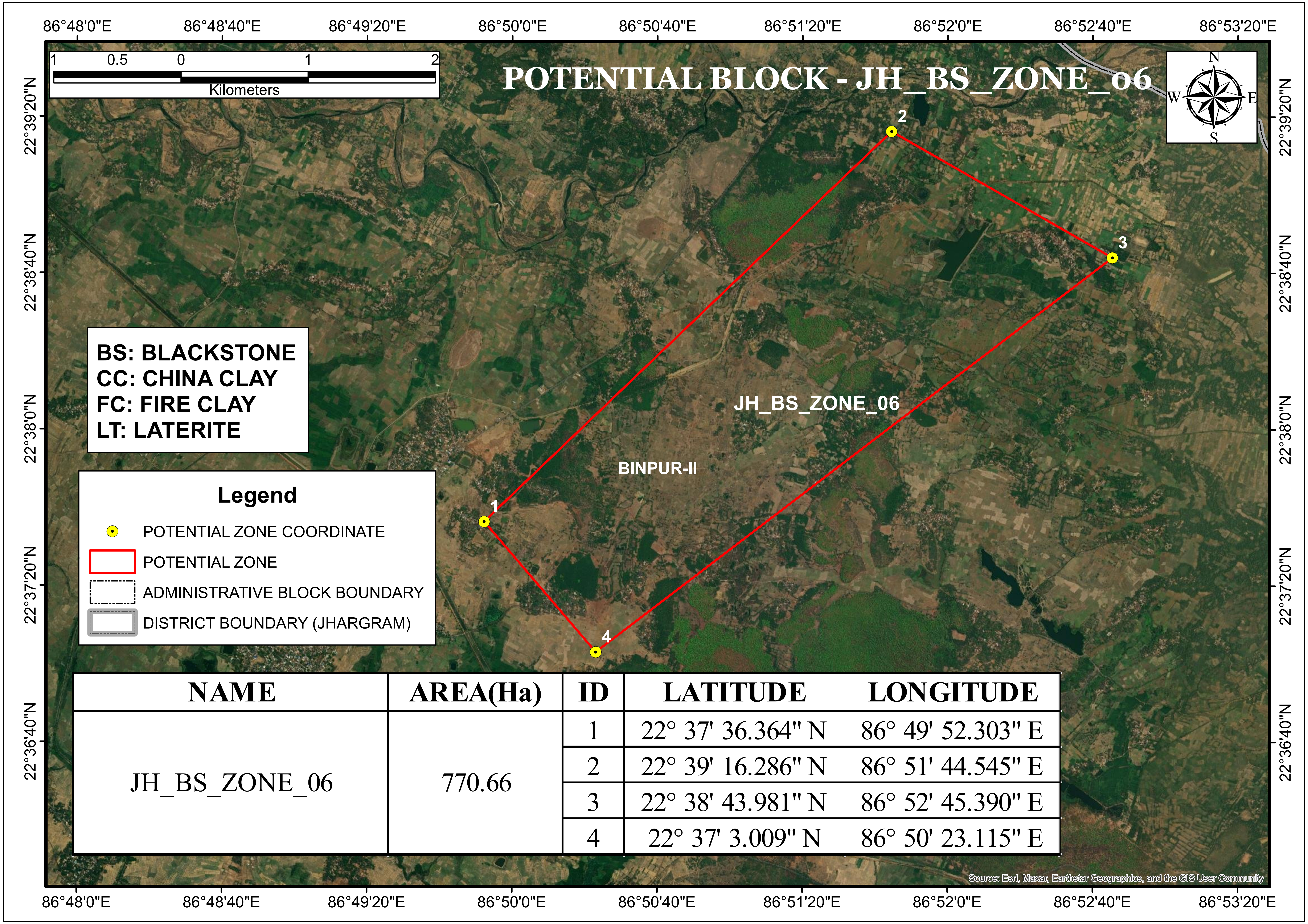


NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BS_ZONE_04	155.50	1	22° 47' 13.178" N	86° 39' 35.936" E
		2	22° 47' 11.601" N	86° 39' 37.408" E
		3	22° 47' 8.057" N	86° 39' 39.704" E
		4	22° 47' 4.838" N	86° 39' 42.280" E
		5	22° 46' 59.376" N	86° 39' 45.907" E
		6	22° 46' 47.996" N	86° 39' 52.495" E
		7	22° 46' 44.615" N	86° 39' 53.598" E
		8	22° 46' 43.542" N	86° 39' 54.895" E
		9	22° 46' 41.298" N	86° 39' 58.120" E
		10	22° 46' 20.077" N	86° 39' 54.715" E
		11	22° 46' 40.207" N	86° 39' 27.732" E
		12	22° 46' 50.700" N	86° 39' 1.177" E
		13	22° 47' 24.284" N	86° 39' 9.924" E
		14	22° 47' 22.382" N	86° 39' 14.727" E
		15	22° 47' 20.154" N	86° 39' 21.055" E
		16	22° 47' 16.674" N	86° 39' 25.577" E
		17	22° 47' 15.471" N	86° 39' 29.398" E

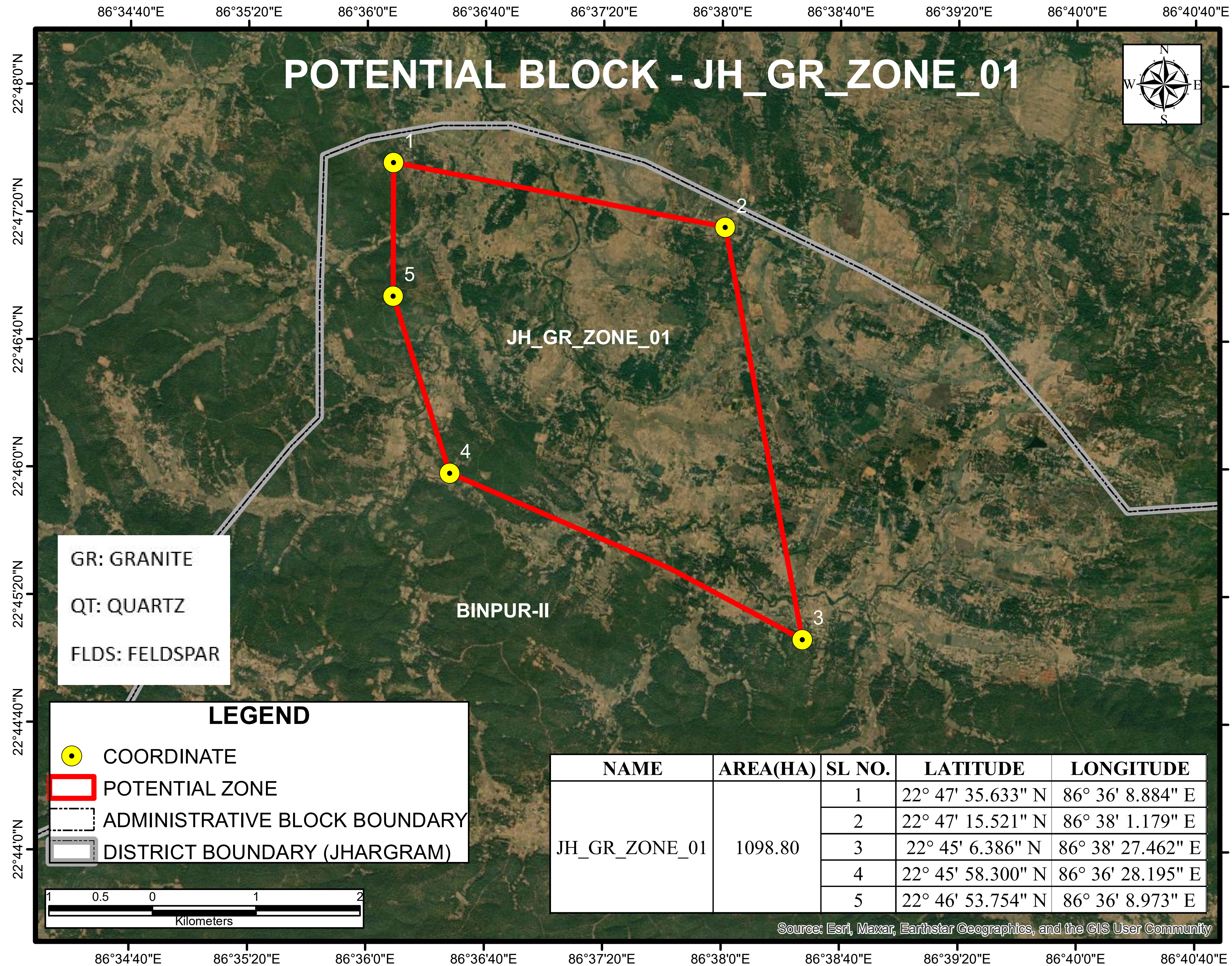


NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BS_ZONE_05	186.95	1	22° 33' 46.417" N	86° 46' 47.402" E
		2	22° 34' 10.882" N	86° 48' 6.758" E
		3	22° 33' 51.351" N	86° 48' 10.664" E
		4	22° 33' 15.990" N	86° 47' 3.438" E

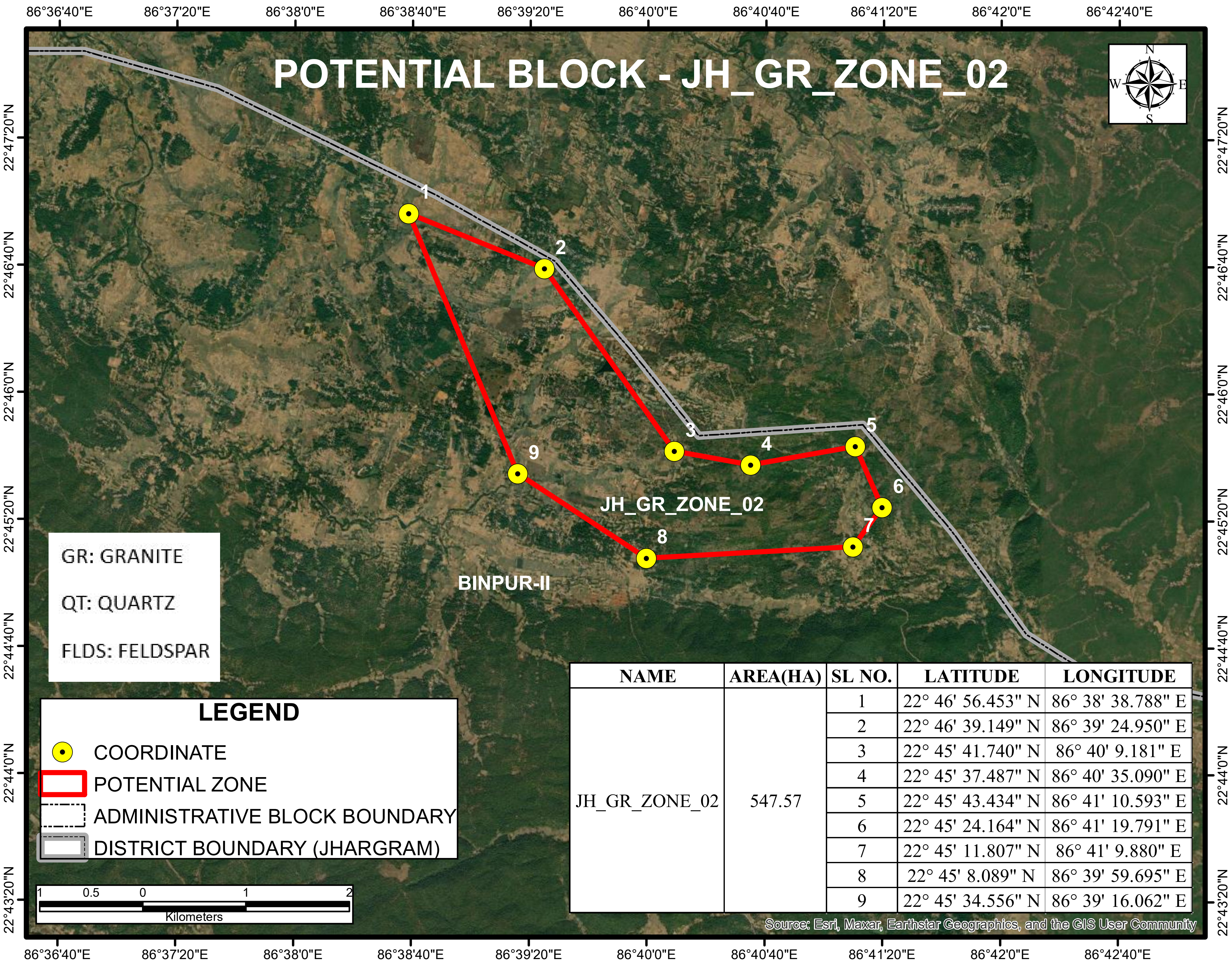
POTENTIAL BLOCK - JH_BS_ZONE_06



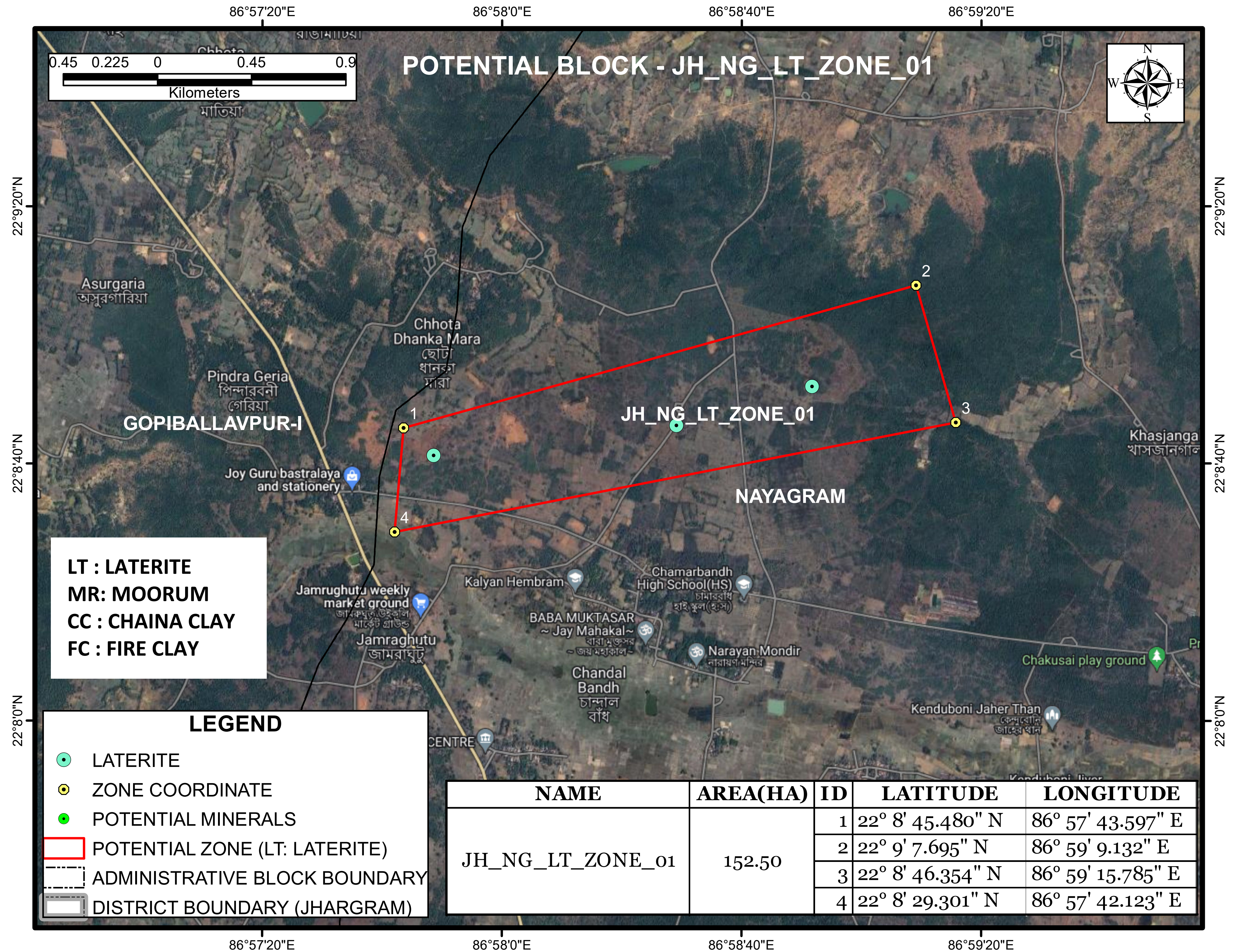
NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BS_ZONE_06	770.66	1	22° 37' 36.364" N	86° 49' 52.303" E
		2	22° 39' 16.286" N	86° 51' 44.545" E
		3	22° 38' 43.981" N	86° 52' 45.390" E
		4	22° 37' 3.009" N	86° 50' 23.115" E



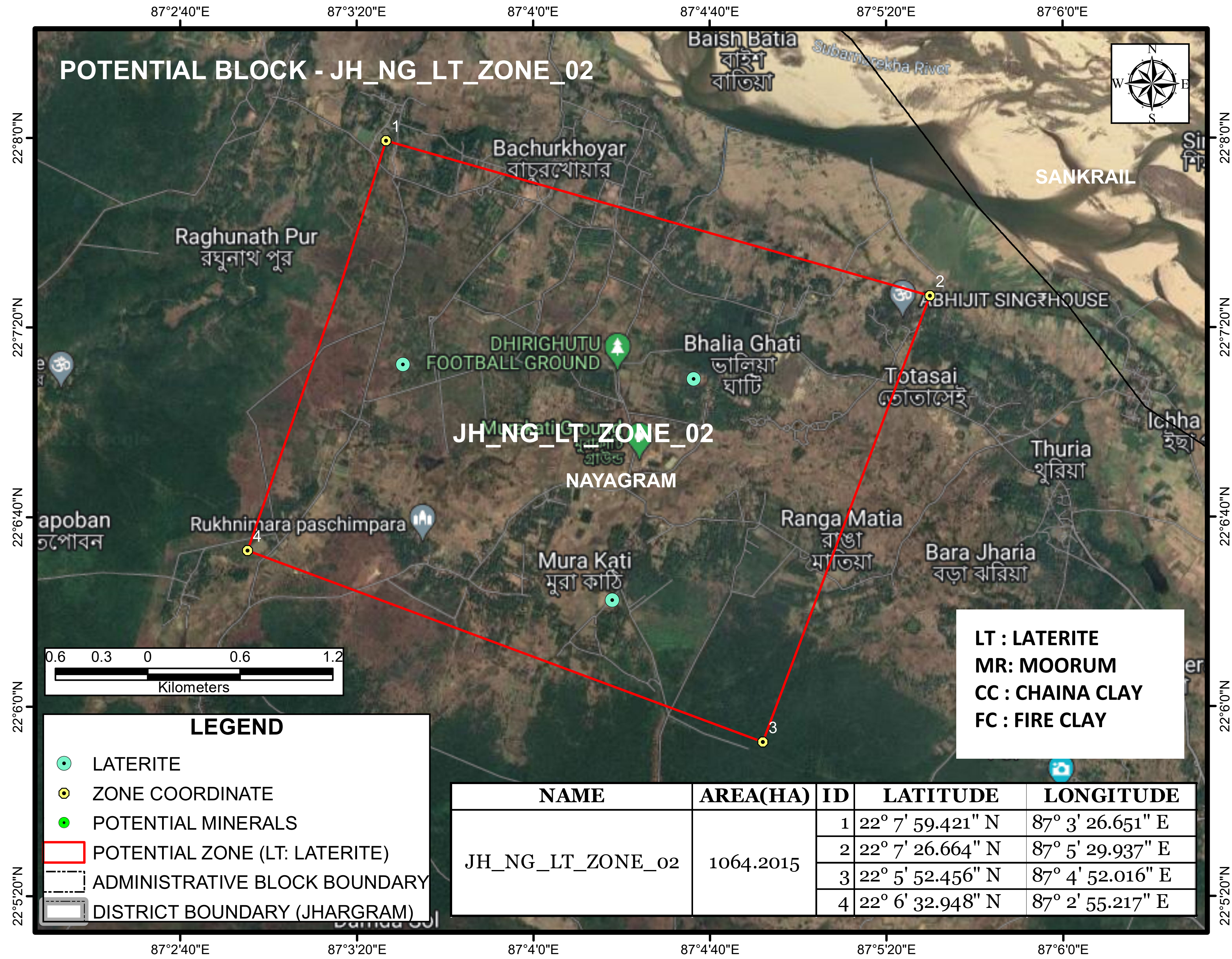
NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_GR_ZONE_01	1098.80	1	22° 47' 35.633" N	86° 36' 8.884" E
		2	22° 47' 15.521" N	86° 38' 1.179" E
		3	22° 45' 6.386" N	86° 38' 27.462" E
		4	22° 45' 58.300" N	86° 36' 28.195" E
		5	22° 46' 53.754" N	86° 36' 8.973" E



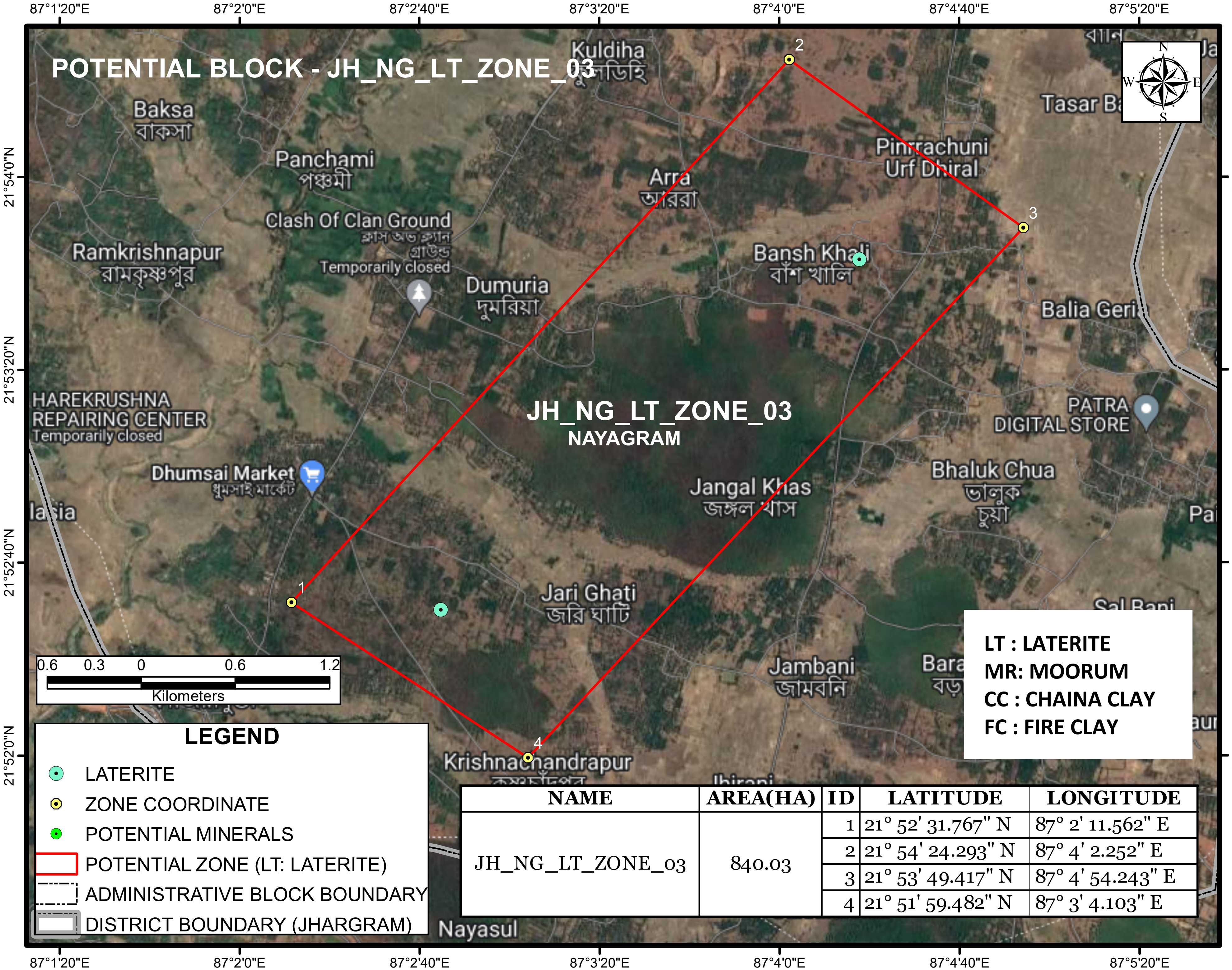
NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_GR_ZONE_02	547.57	1	22° 46' 56.453" N	86° 38' 38.788" E
		2	22° 46' 39.149" N	86° 39' 24.950" E
		3	22° 45' 41.740" N	86° 40' 9.181" E
		4	22° 45' 37.487" N	86° 40' 35.090" E
		5	22° 45' 43.434" N	86° 41' 10.593" E
		6	22° 45' 24.164" N	86° 41' 19.791" E
		7	22° 45' 11.807" N	86° 41' 9.880" E
		8	22° 45' 8.089" N	86° 39' 59.695" E
		9	22° 45' 34.556" N	86° 39' 16.062" E



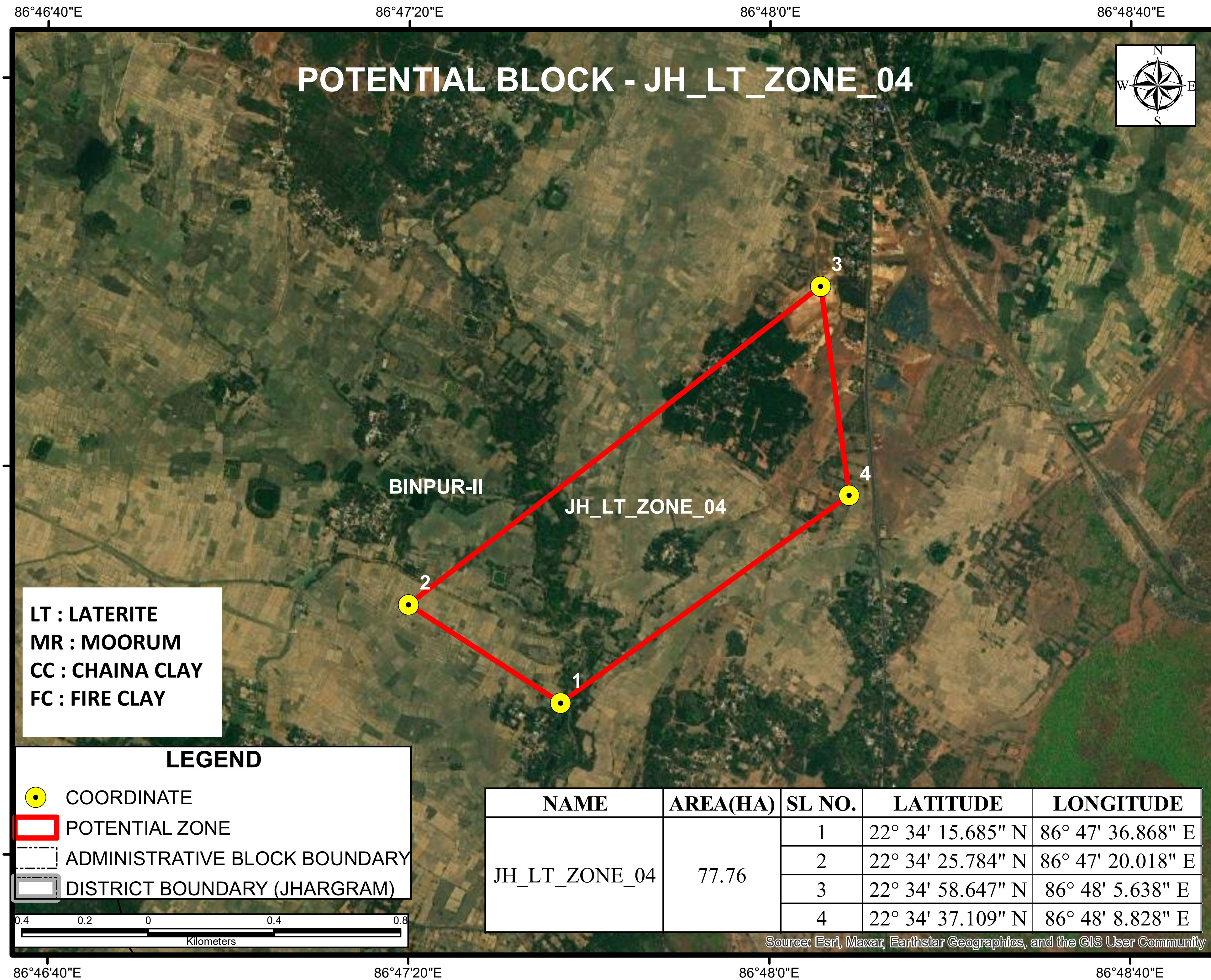
NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_NG_LT_ZONE_01	152.50	1	22° 8' 45.480" N	86° 57' 43.597" E
		2	22° 9' 7.695" N	86° 59' 9.132" E
		3	22° 8' 46.354" N	86° 59' 15.785" E
		4	22° 8' 29.301" N	86° 57' 42.123" E



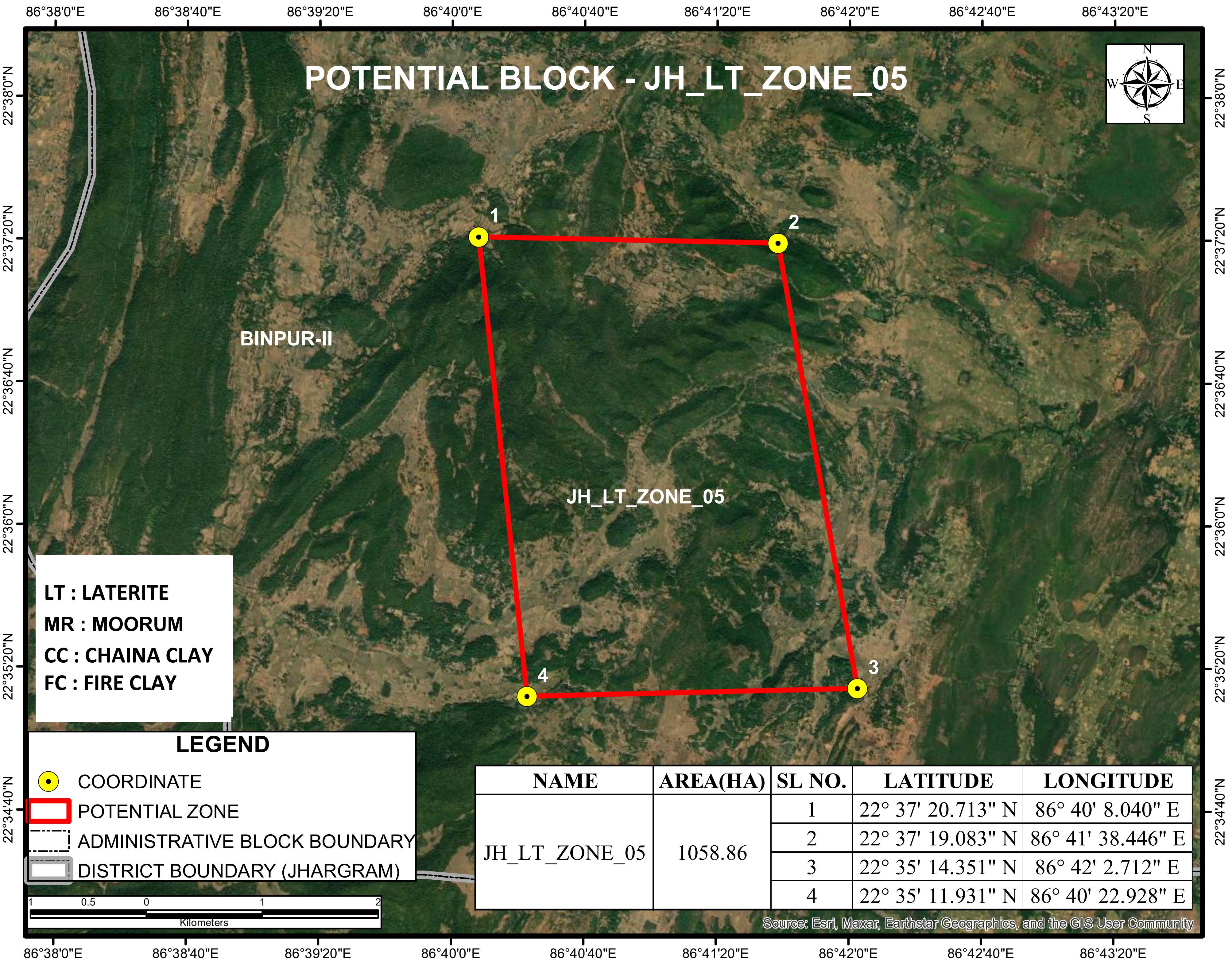
NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_NG_LT_ZONE_02	1064.2015	1	22° 7' 59.421" N	87° 3' 26.651" E
		2	22° 7' 26.664" N	87° 5' 29.937" E
		3	22° 5' 52.456" N	87° 4' 52.016" E
		4	22° 6' 32.948" N	87° 2' 55.217" E



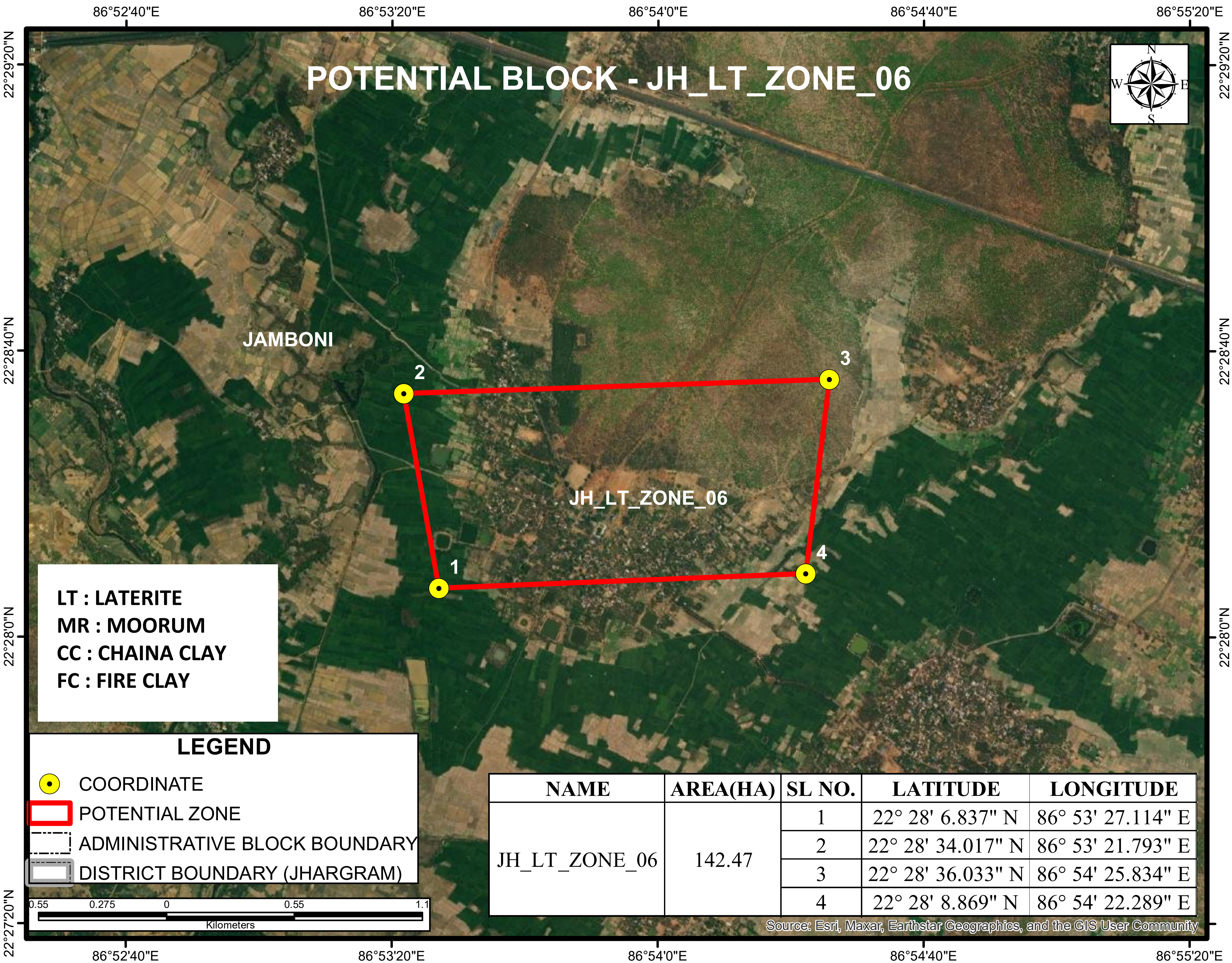
NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_NG_LT_ZONE_03	840.03	1	21° 52' 31.767" N	87° 2' 11.562" E
		2	21° 54' 24.293" N	87° 4' 2.252" E
		3	21° 53' 49.417" N	87° 4' 54.243" E
		4	21° 51' 59.482" N	87° 3' 4.103" E



NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_04	77.76	1	22° 34' 15.685" N	86° 47' 36.868" E
		2	22° 34' 25.784" N	86° 47' 20.018" E
		3	22° 34' 58.647" N	86° 48' 5.638" E
		4	22° 34' 37.109" N	86° 48' 8.828" E

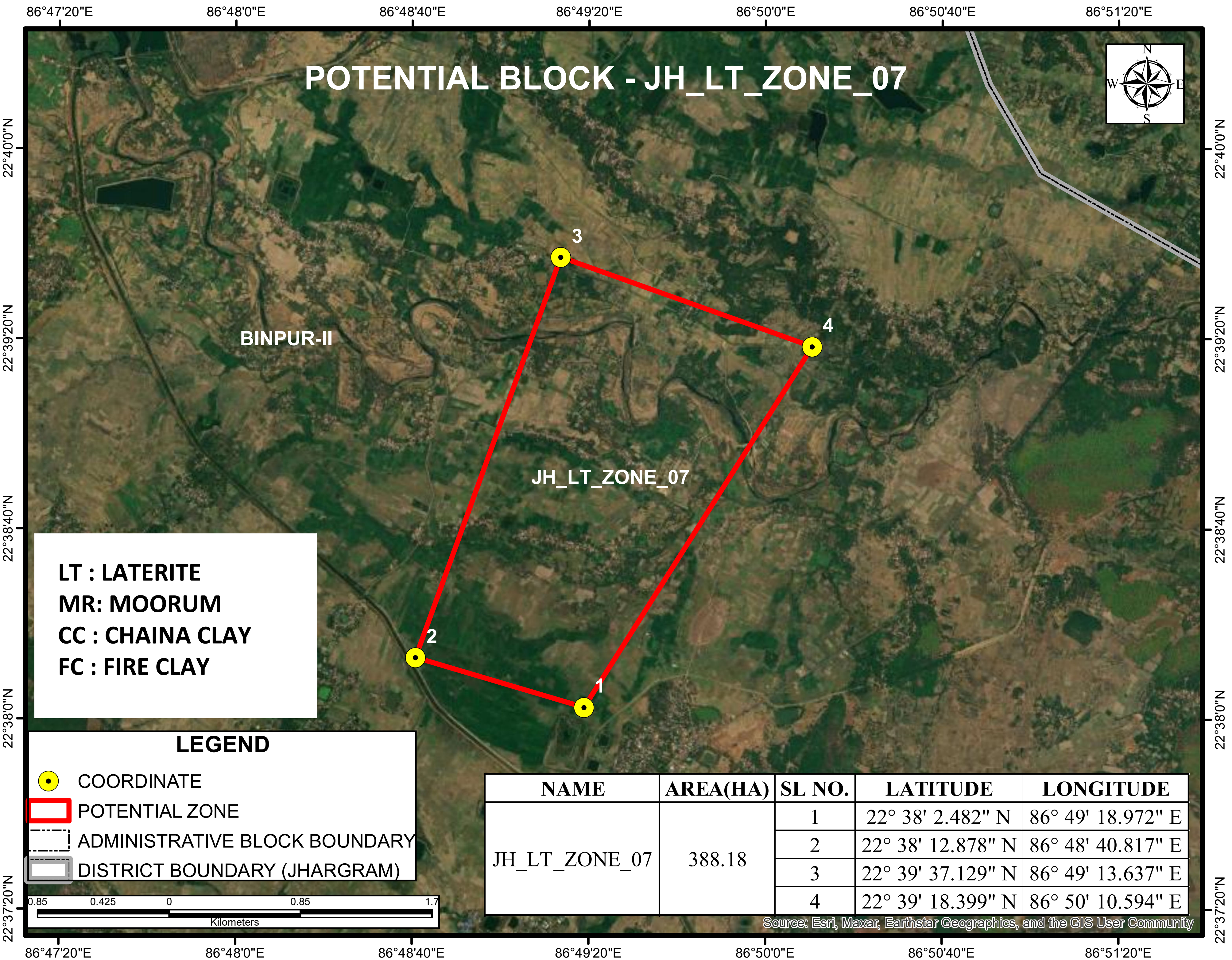


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_05	1058.86	1	22° 37' 20.713" N	86° 40' 8.040" E
		2	22° 37' 19.083" N	86° 41' 38.446" E
		3	22° 35' 14.351" N	86° 42' 2.712" E
		4	22° 35' 11.931" N	86° 40' 22.928" E

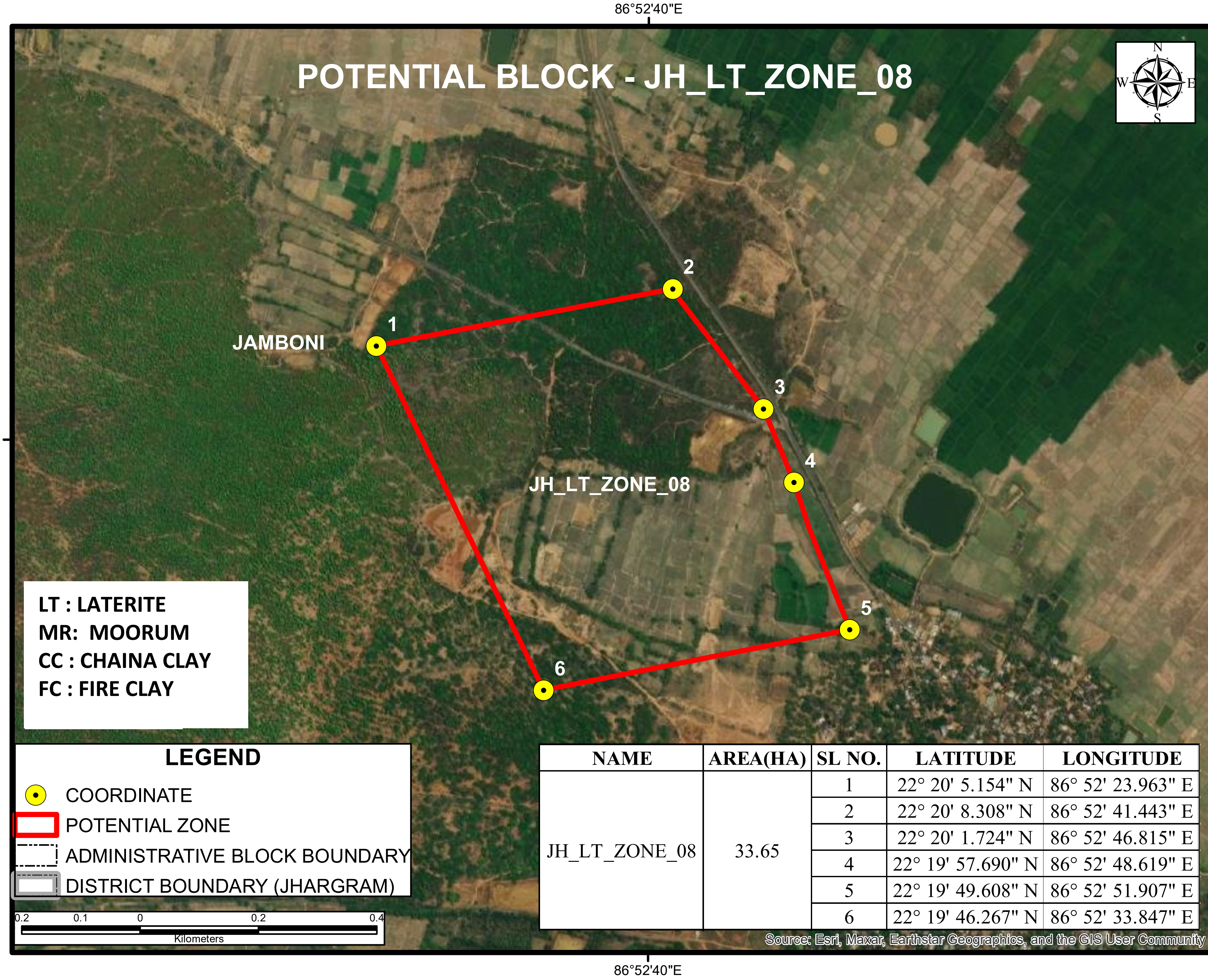


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_06	142.47	1	22° 28' 6.837" N	86° 53' 27.114" E
		2	22° 28' 34.017" N	86° 53' 21.793" E
		3	22° 28' 36.033" N	86° 54' 25.834" E
		4	22° 28' 8.869" N	86° 54' 22.289" E

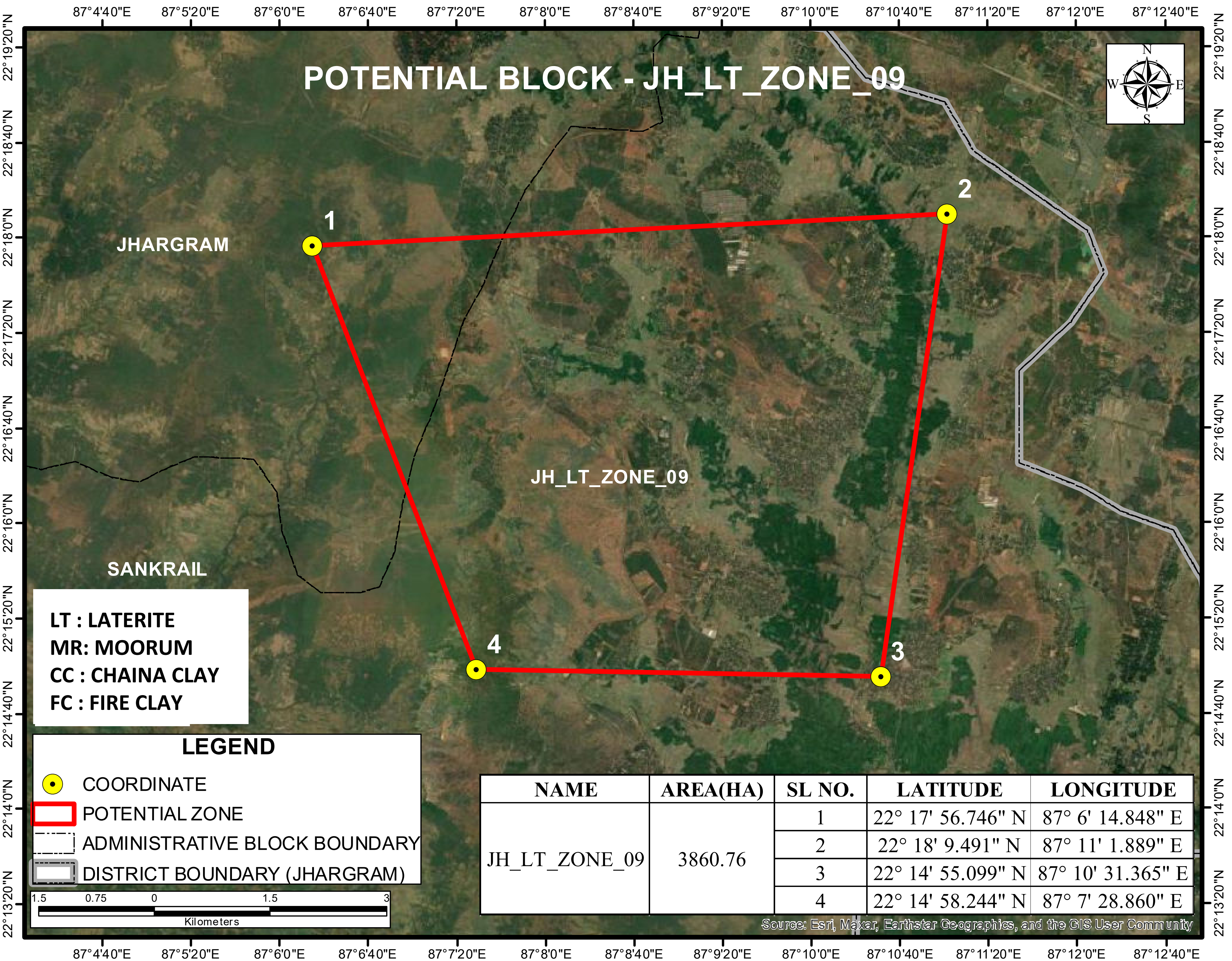
POTENTIAL BLOCK - JH_LT_ZONE_07



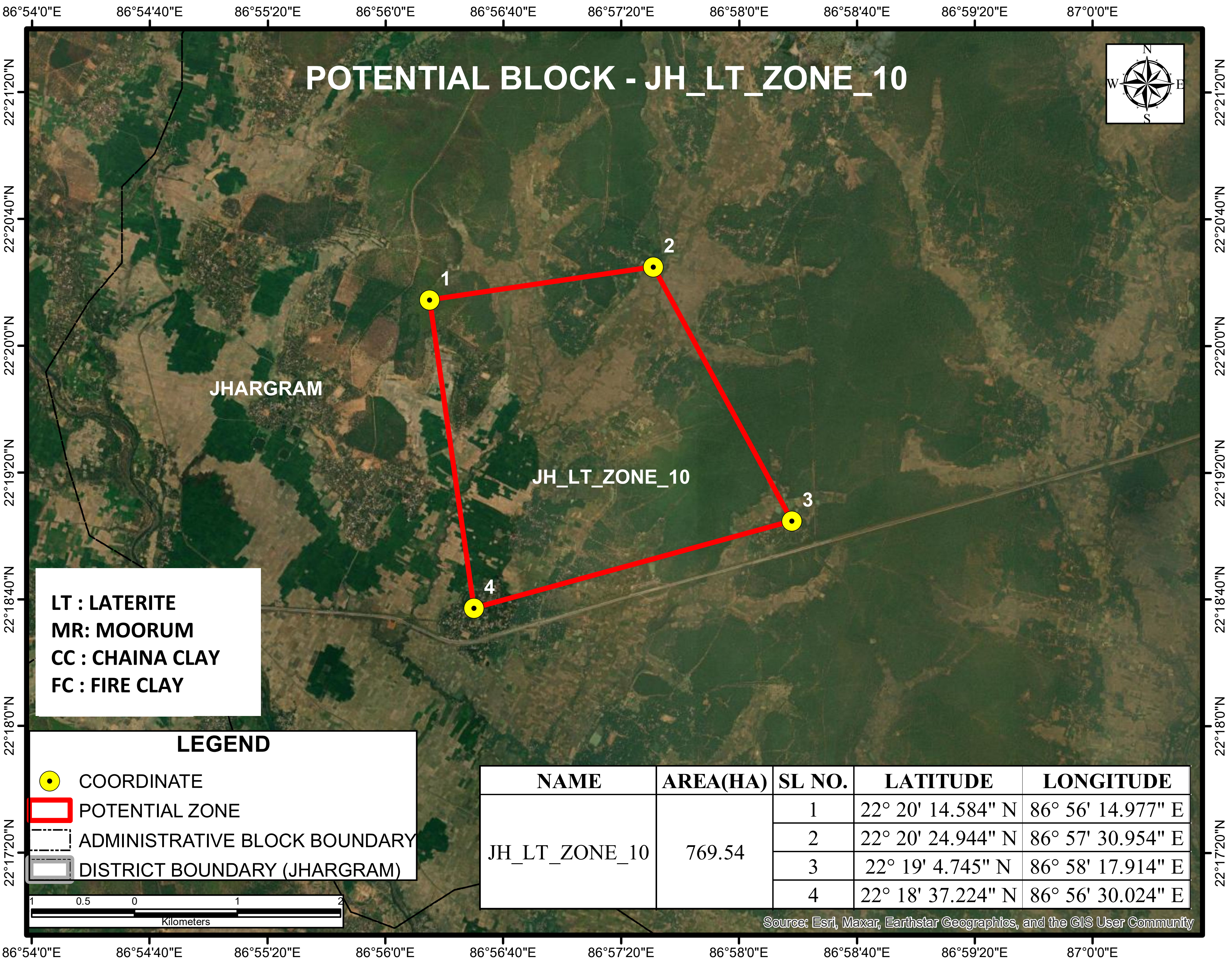
NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_07	388.18	1	22° 38' 2.482" N	86° 49' 18.972" E
		2	22° 38' 12.878" N	86° 48' 40.817" E
		3	22° 39' 37.129" N	86° 49' 13.637" E
		4	22° 39' 18.399" N	86° 50' 10.594" E



NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_08	33.65	1	22° 20' 5.154" N	86° 52' 23.963" E
		2	22° 20' 8.308" N	86° 52' 41.443" E
		3	22° 20' 1.724" N	86° 52' 46.815" E
		4	22° 19' 57.690" N	86° 52' 48.619" E
		5	22° 19' 49.608" N	86° 52' 51.907" E
		6	22° 19' 46.267" N	86° 52' 33.847" E

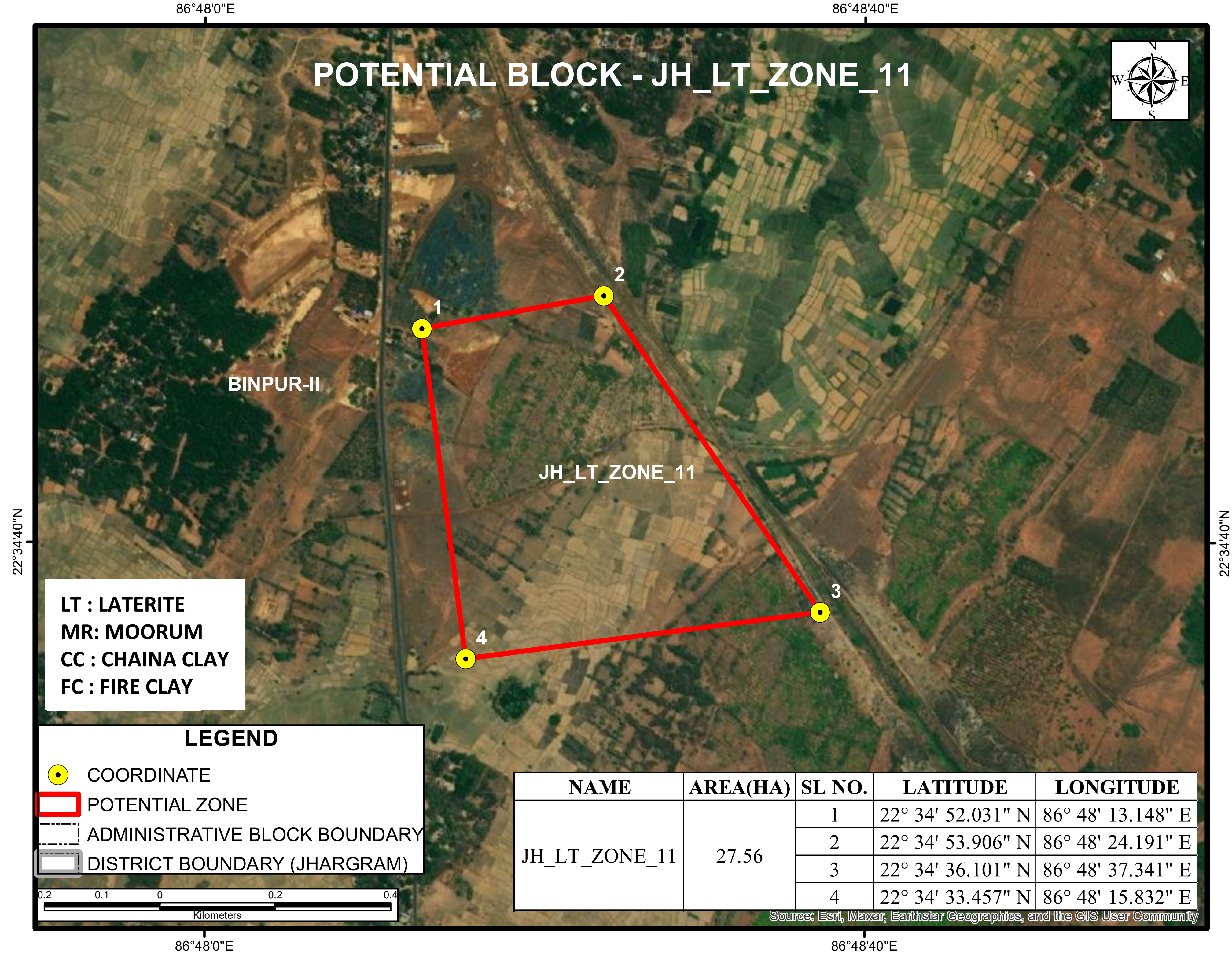


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_09	3860.76	1	22° 17' 56.746" N	87° 6' 14.848" E
		2	22° 18' 9.491" N	87° 11' 1.889" E
		3	22° 14' 55.099" N	87° 10' 31.365" E
		4	22° 14' 58.244" N	87° 7' 28.860" E

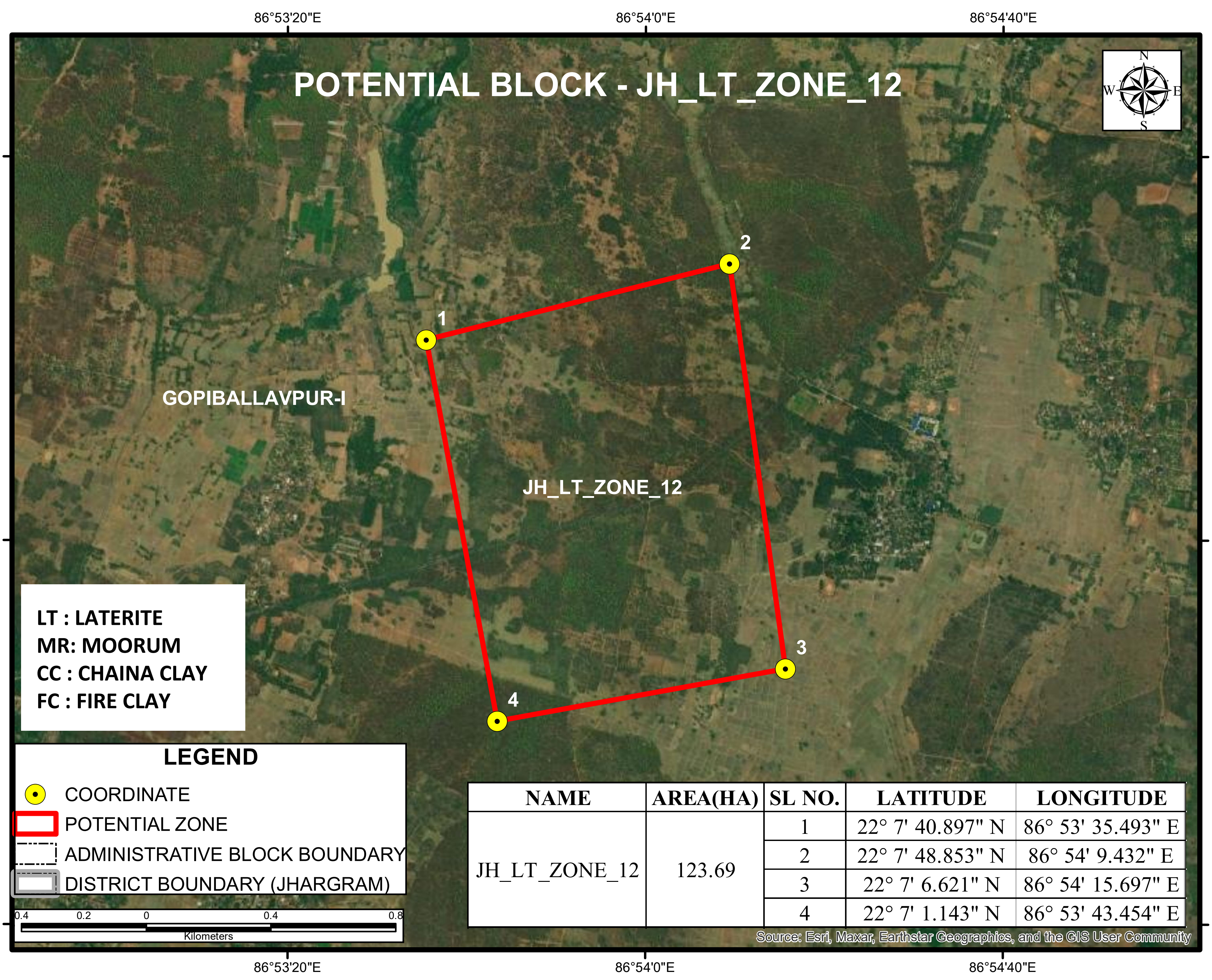


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_10	769.54	1	22° 20' 14.584" N	86° 56' 14.977" E
		2	22° 20' 24.944" N	86° 57' 30.954" E
		3	22° 19' 4.745" N	86° 58' 17.914" E
		4	22° 18' 37.224" N	86° 56' 30.024" E

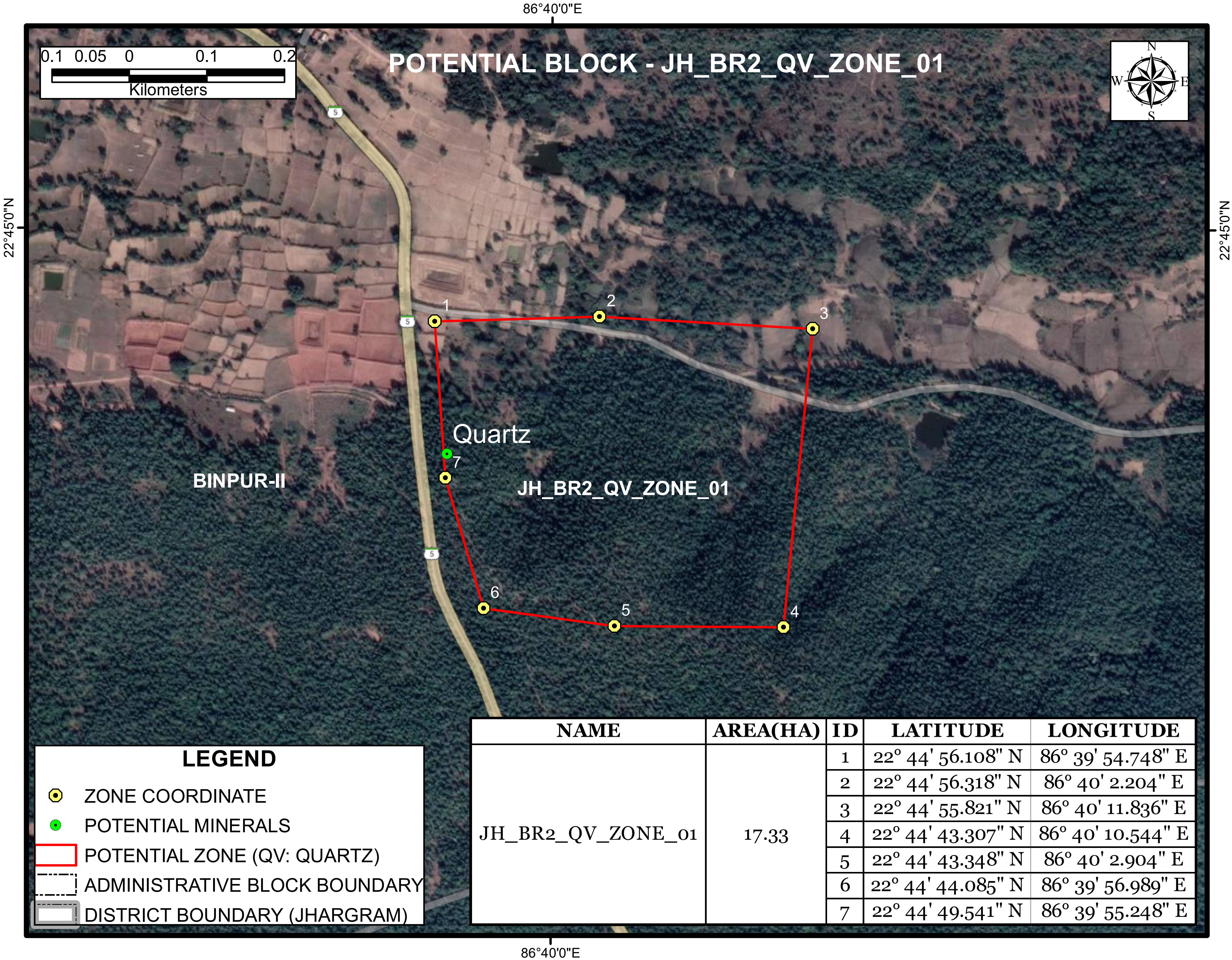
POTENTIAL BLOCK - JH_LT_ZONE_11



NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_11	27.56	1	22° 34' 52.031" N	86° 48' 13.148" E
		2	22° 34' 53.906" N	86° 48' 24.191" E
		3	22° 34' 36.101" N	86° 48' 37.341" E
		4	22° 34' 33.457" N	86° 48' 15.832" E

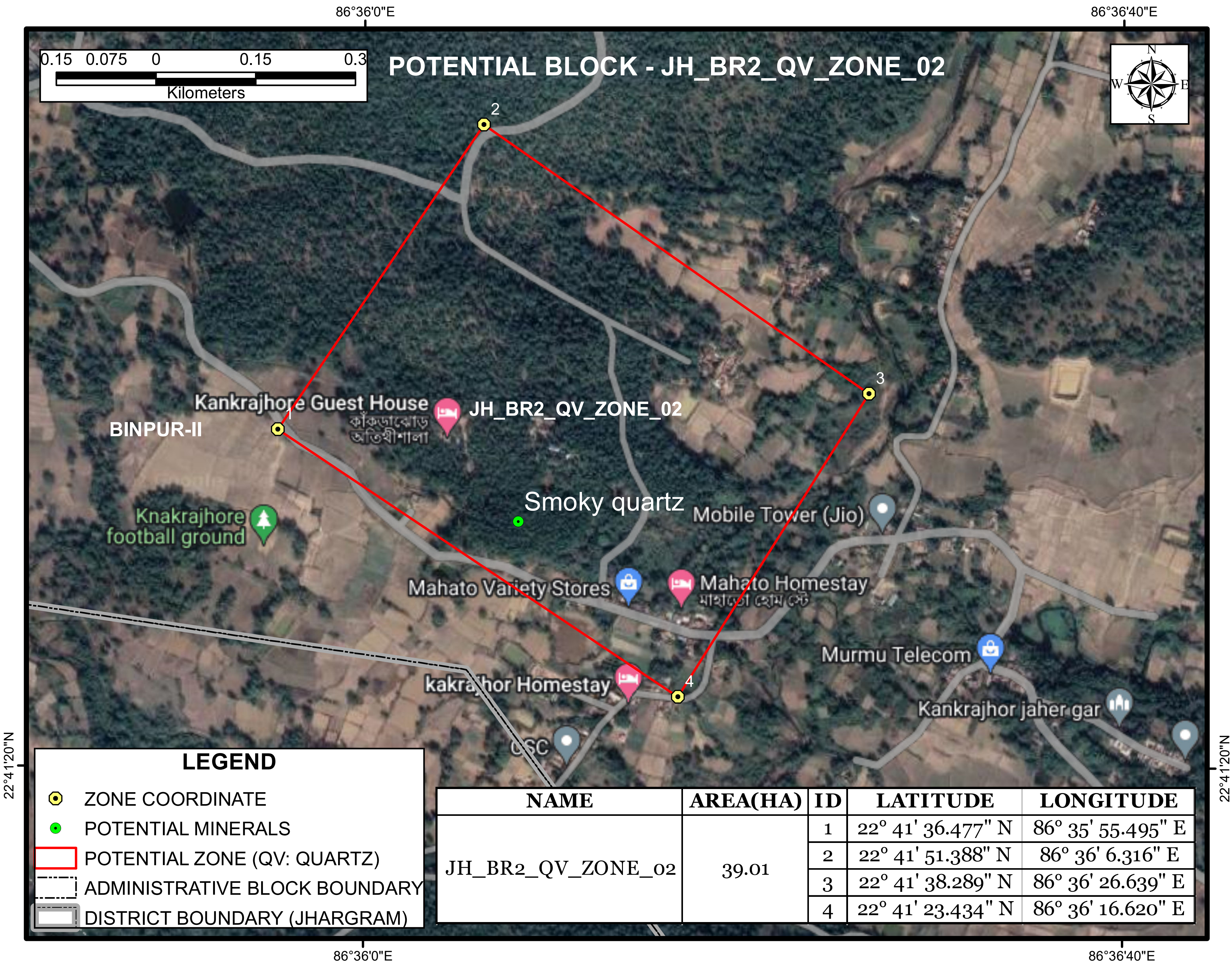


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_LT_ZONE_12	123.69	1	22° 7' 40.897" N	86° 53' 35.493" E
		2	22° 7' 48.853" N	86° 54' 9.432" E
		3	22° 7' 6.621" N	86° 54' 15.697" E
		4	22° 7' 1.143" N	86° 53' 43.454" E

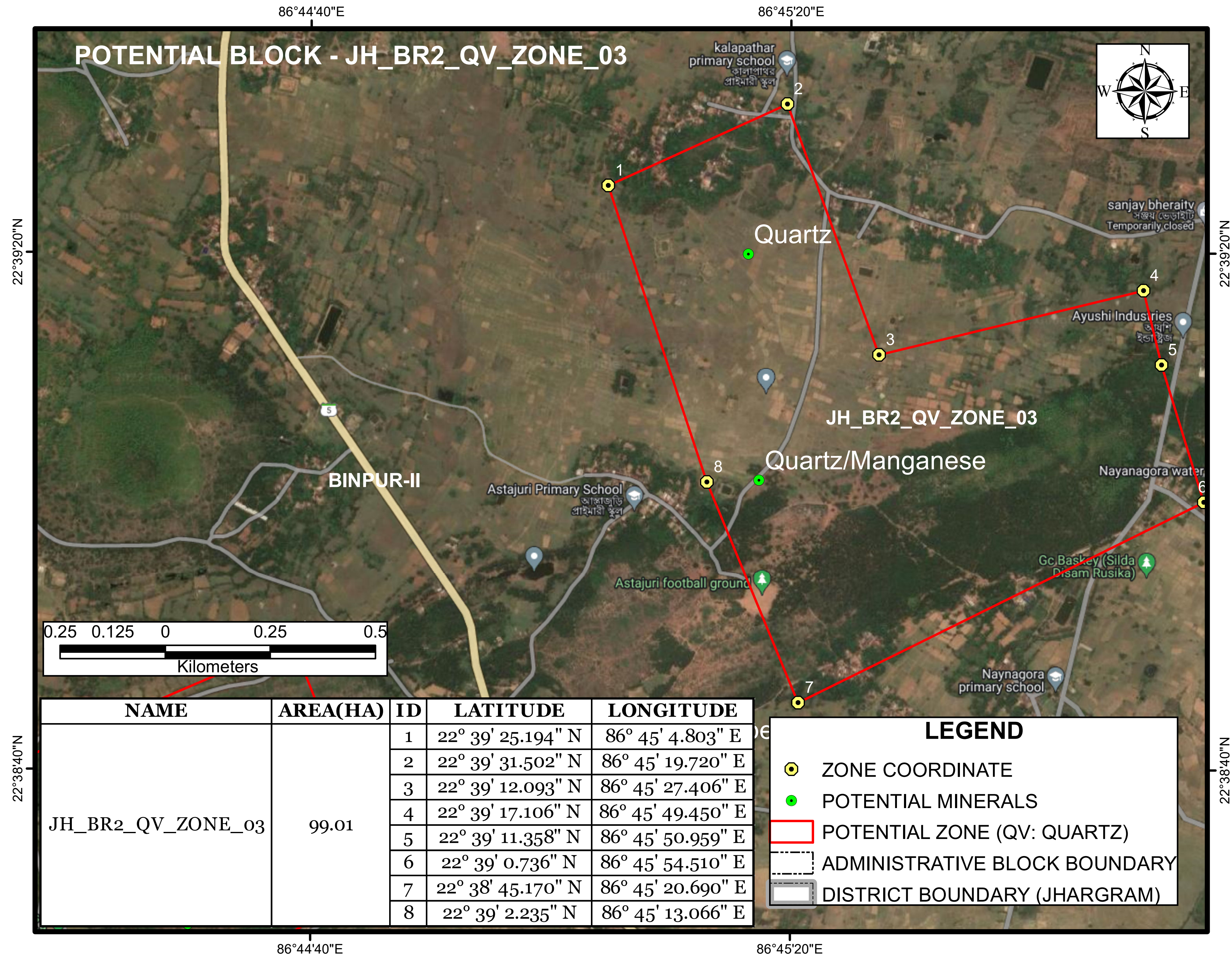


NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QV_ZONE_01	17.33	1	22° 44' 56.108" N	86° 39' 54.748" E
		2	22° 44' 56.318" N	86° 40' 2.204" E
		3	22° 44' 55.821" N	86° 40' 11.836" E
		4	22° 44' 43.307" N	86° 40' 10.544" E
		5	22° 44' 43.348" N	86° 40' 2.904" E
		6	22° 44' 44.085" N	86° 39' 56.989" E
		7	22° 44' 49.541" N	86° 39' 55.248" E

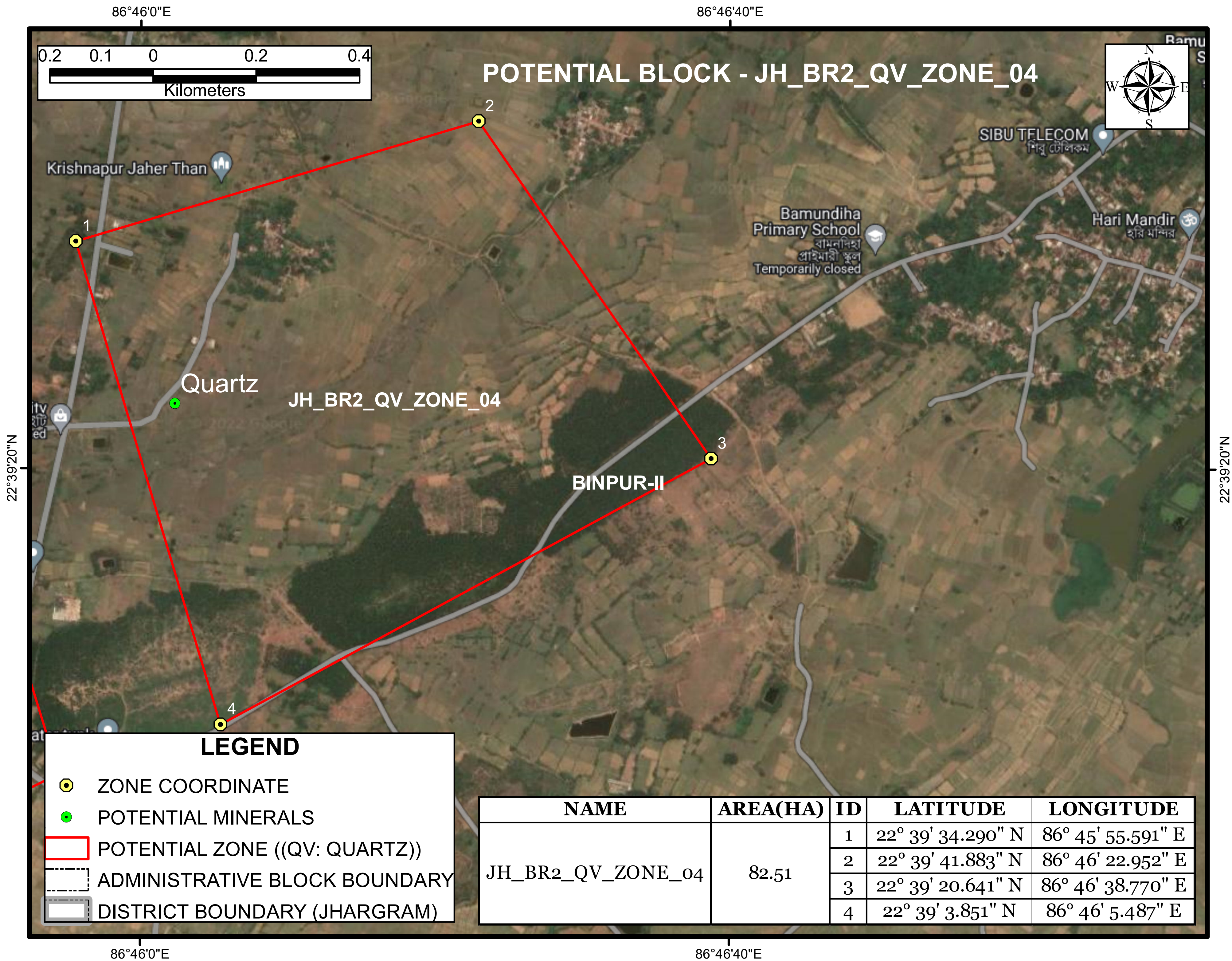
POTENTIAL BLOCK - JH_BR2_QV_ZONE_02



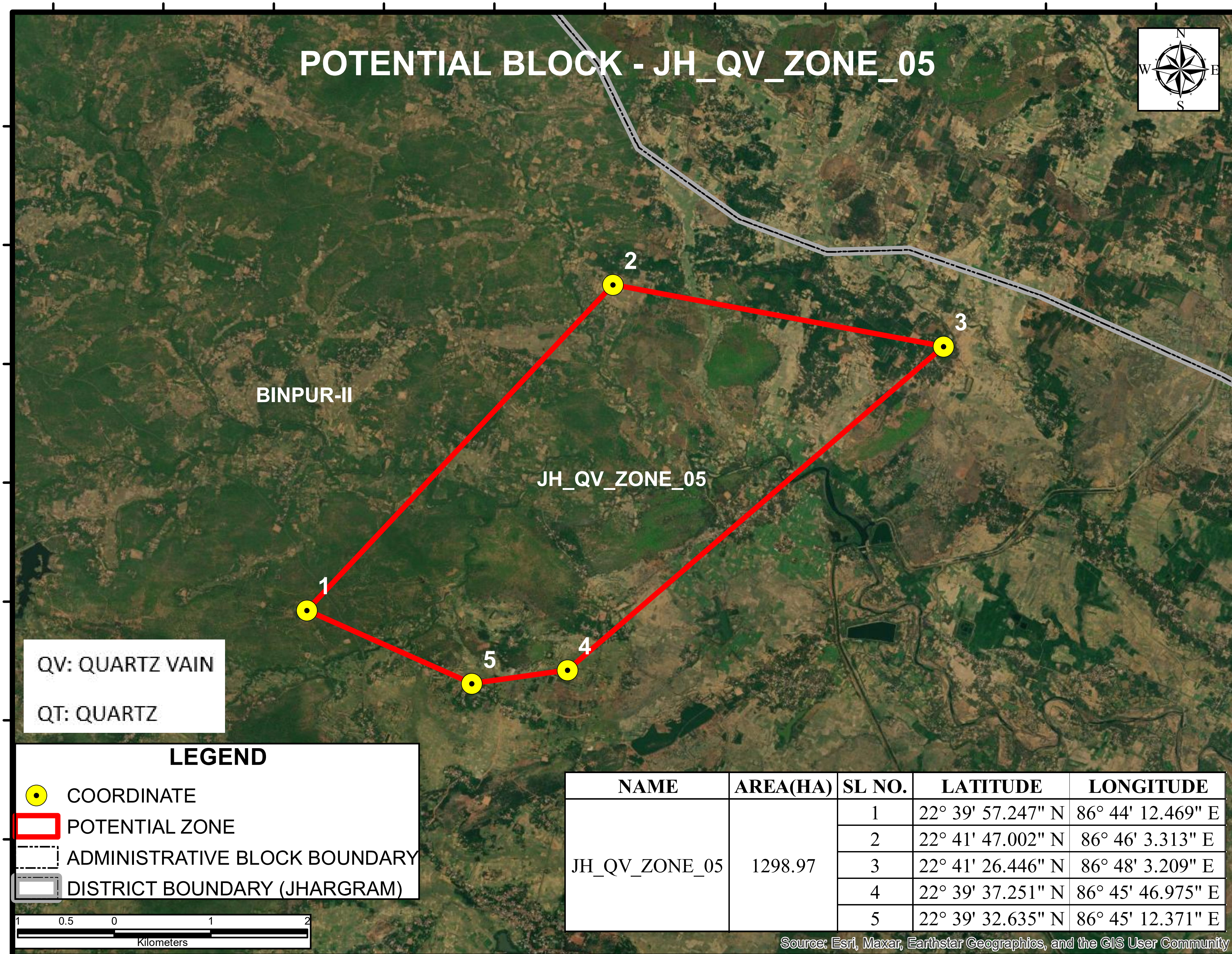
NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QV_ZONE_02	39.01	1	22° 41' 36.477" N	86° 35' 55.495" E
		2	22° 41' 51.388" N	86° 36' 6.316" E
		3	22° 41' 38.289" N	86° 36' 26.639" E
		4	22° 41' 23.434" N	86° 36' 16.620" E



NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QV_ZONE_03	99.01	1	22° 39' 25.194" N	86° 45' 4.803" E
		2	22° 39' 31.502" N	86° 45' 19.720" E
		3	22° 39' 12.093" N	86° 45' 27.406" E
		4	22° 39' 17.106" N	86° 45' 49.450" E
		5	22° 39' 11.358" N	86° 45' 50.959" E
		6	22° 39' 0.736" N	86° 45' 54.510" E
		7	22° 38' 45.170" N	86° 45' 20.690" E
		8	22° 39' 2.235" N	86° 45' 13.066" E

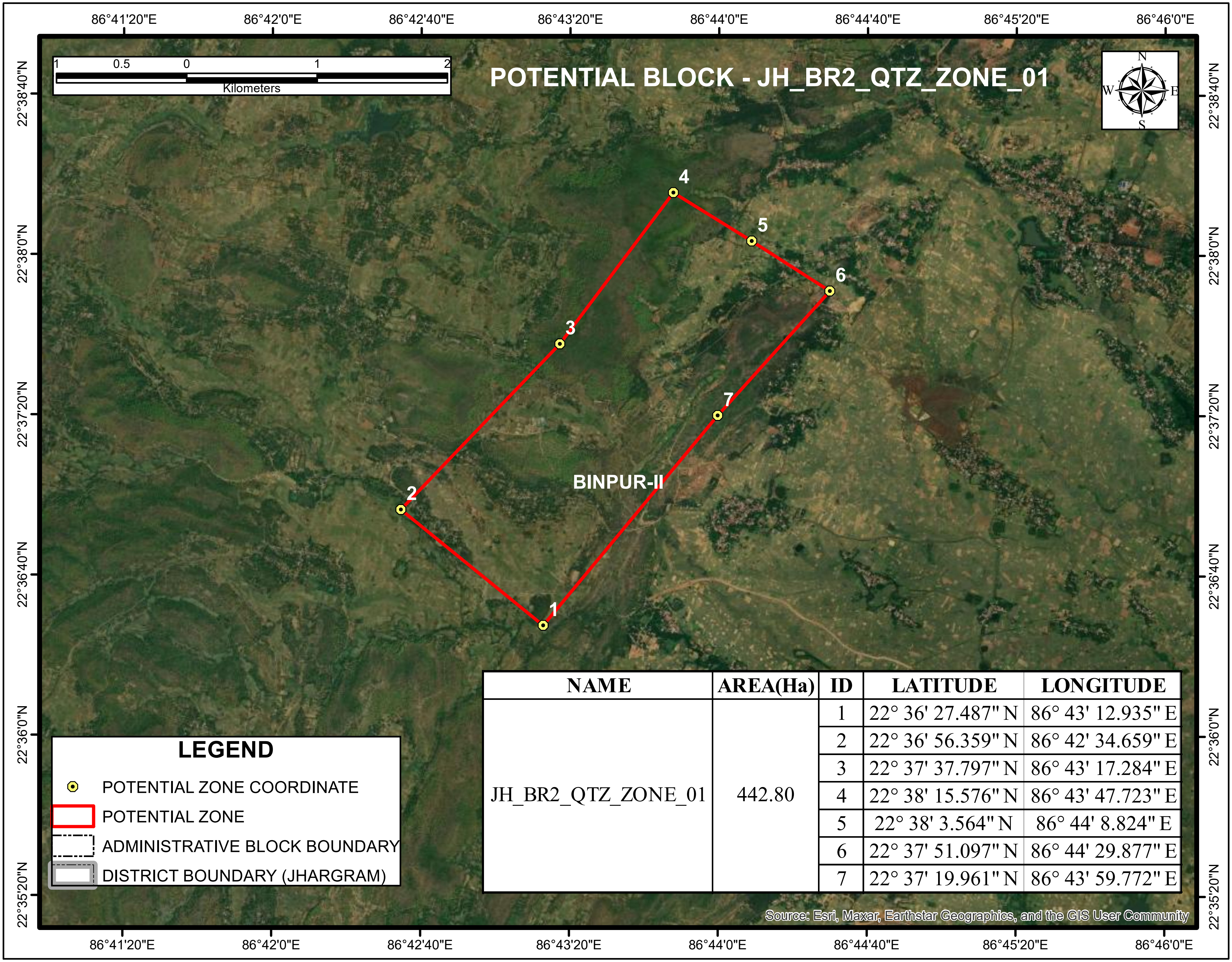


NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QV_ZONE_04	82.51	1	22° 39' 34.290" N	86° 45' 55.591" E
		2	22° 39' 41.883" N	86° 46' 22.952" E
		3	22° 39' 20.641" N	86° 46' 38.770" E
		4	22° 39' 3.851" N	86° 46' 5.487" E

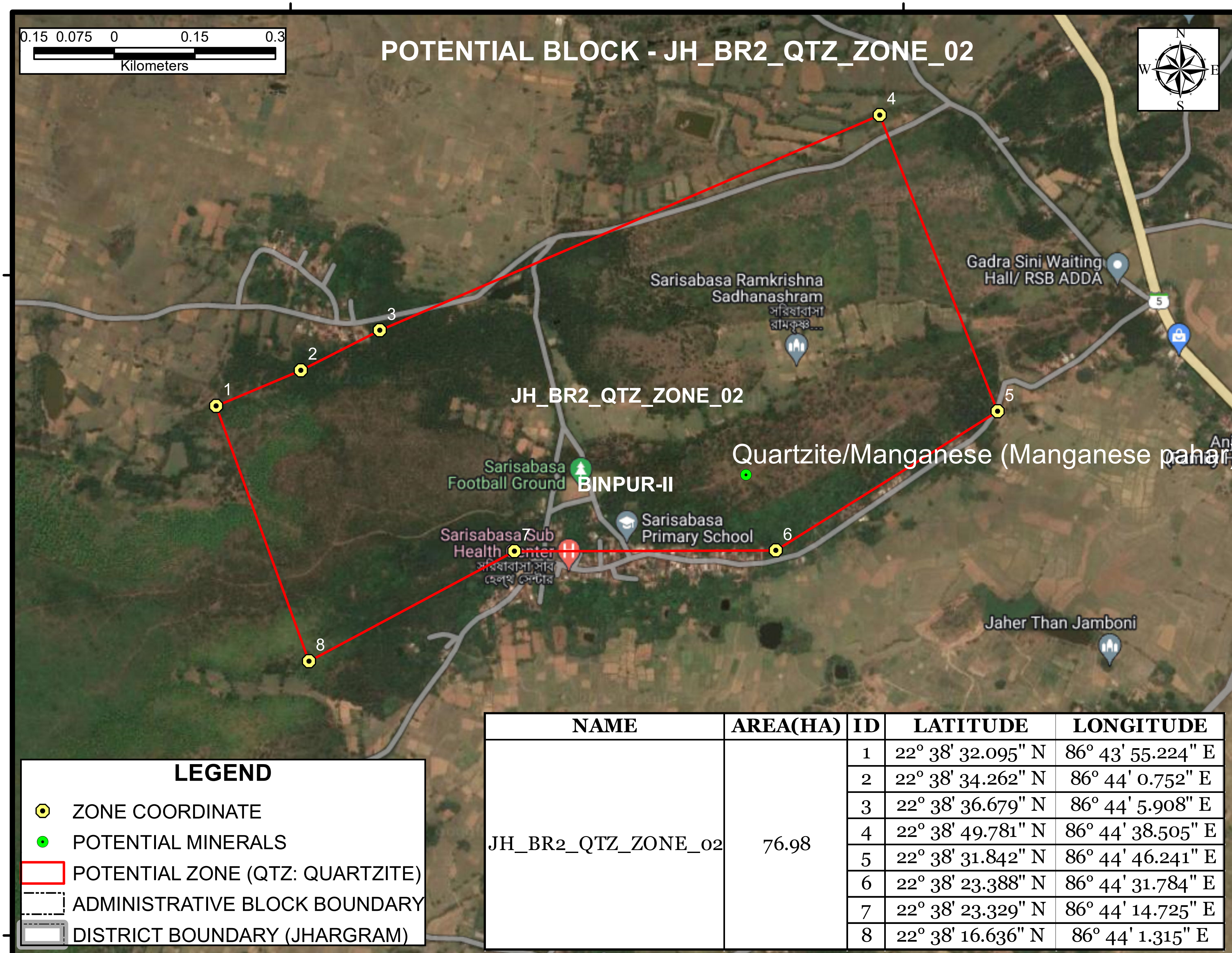


NAME	AREA(HA)	SL NO.	LATITUDE	LONGITUDE
JH_QV_ZONE_05	1298.97	1	22° 39' 57.247" N	86° 44' 12.469" E
		2	22° 41' 47.002" N	86° 46' 3.313" E
		3	22° 41' 26.446" N	86° 48' 3.209" E
		4	22° 39' 37.251" N	86° 45' 46.975" E
		5	22° 39' 32.635" N	86° 45' 12.371" E

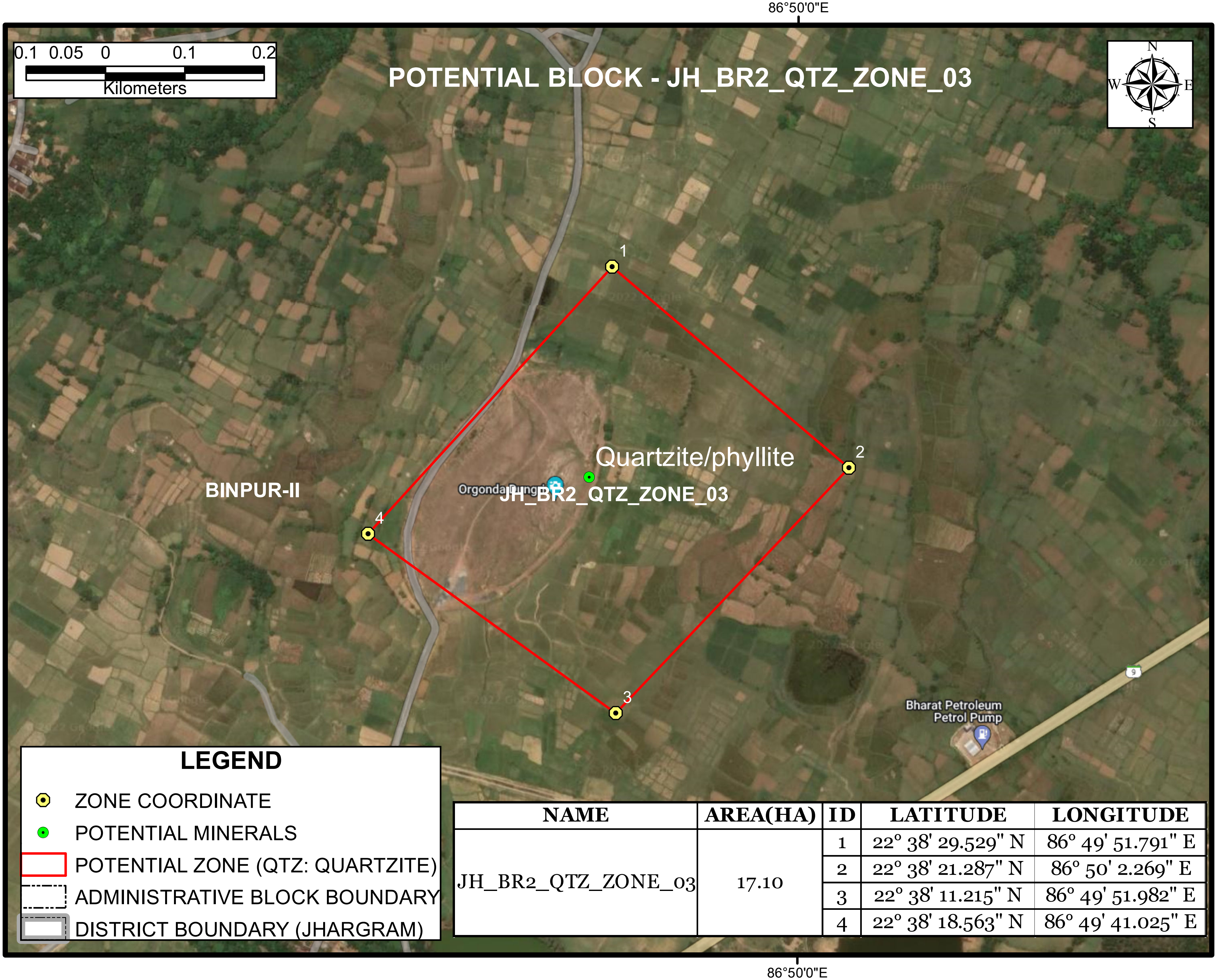
POTENTIAL BLOCK - JH_BR2_QTZ_ZONE_01



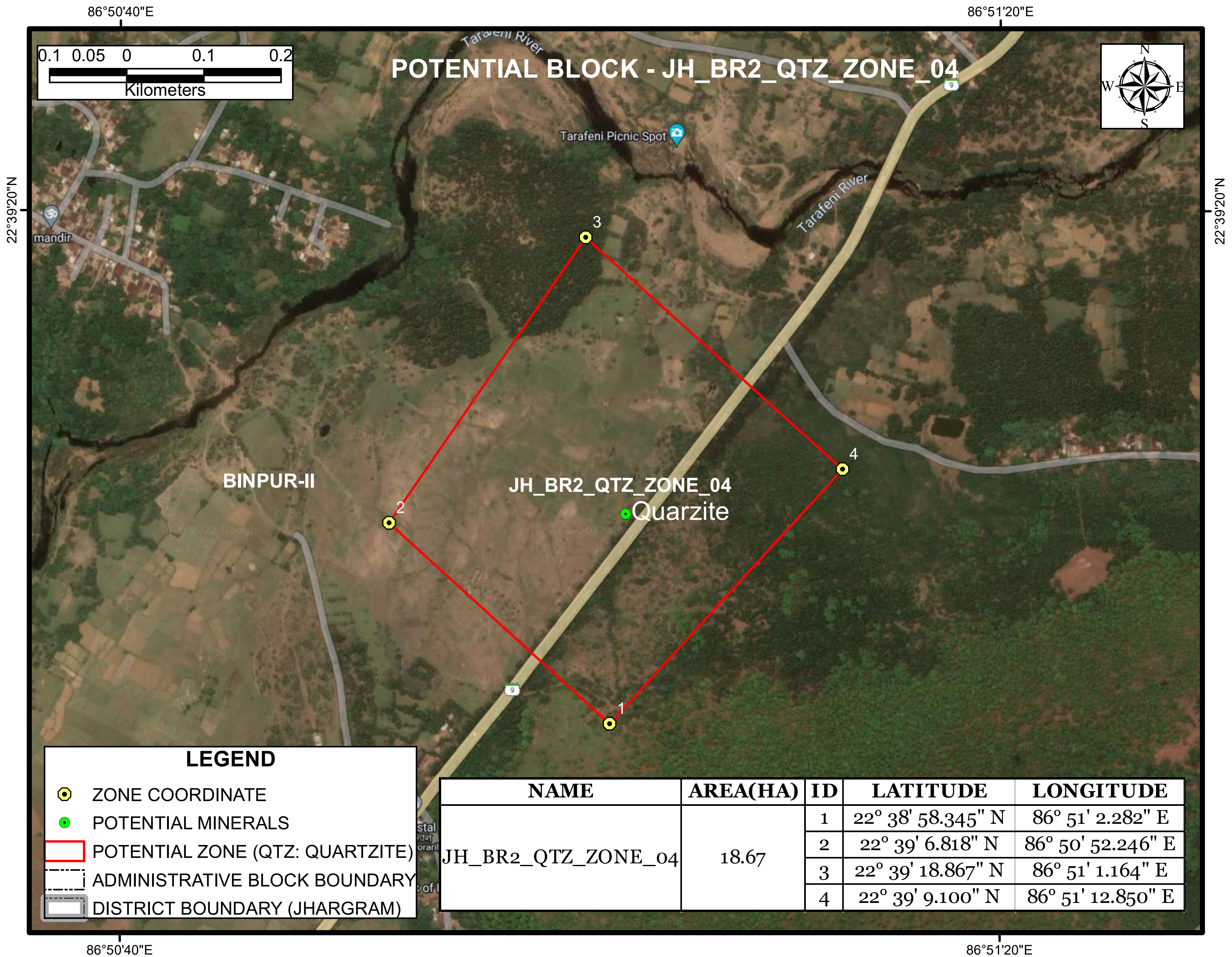
NAME	AREA(Ha)	ID	LATITUDE	LONGITUDE
JH_BR2_QTZ_ZONE_01	442.80	1	22° 36' 27.487" N	86° 43' 12.935" E
		2	22° 36' 56.359" N	86° 42' 34.659" E
		3	22° 37' 37.797" N	86° 43' 17.284" E
		4	22° 38' 15.576" N	86° 43' 47.723" E
		5	22° 38' 3.564" N	86° 44' 8.824" E
		6	22° 37' 51.097" N	86° 44' 29.877" E
		7	22° 37' 19.961" N	86° 43' 59.772" E



NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QTZ_ZONE_02	76.98	1	22° 38' 32.095" N	86° 43' 55.224" E
		2	22° 38' 34.262" N	86° 44' 0.752" E
		3	22° 38' 36.679" N	86° 44' 5.908" E
		4	22° 38' 49.781" N	86° 44' 38.505" E
		5	22° 38' 31.842" N	86° 44' 46.241" E
		6	22° 38' 23.388" N	86° 44' 31.784" E
		7	22° 38' 23.329" N	86° 44' 14.725" E
		8	22° 38' 16.636" N	86° 44' 1.315" E

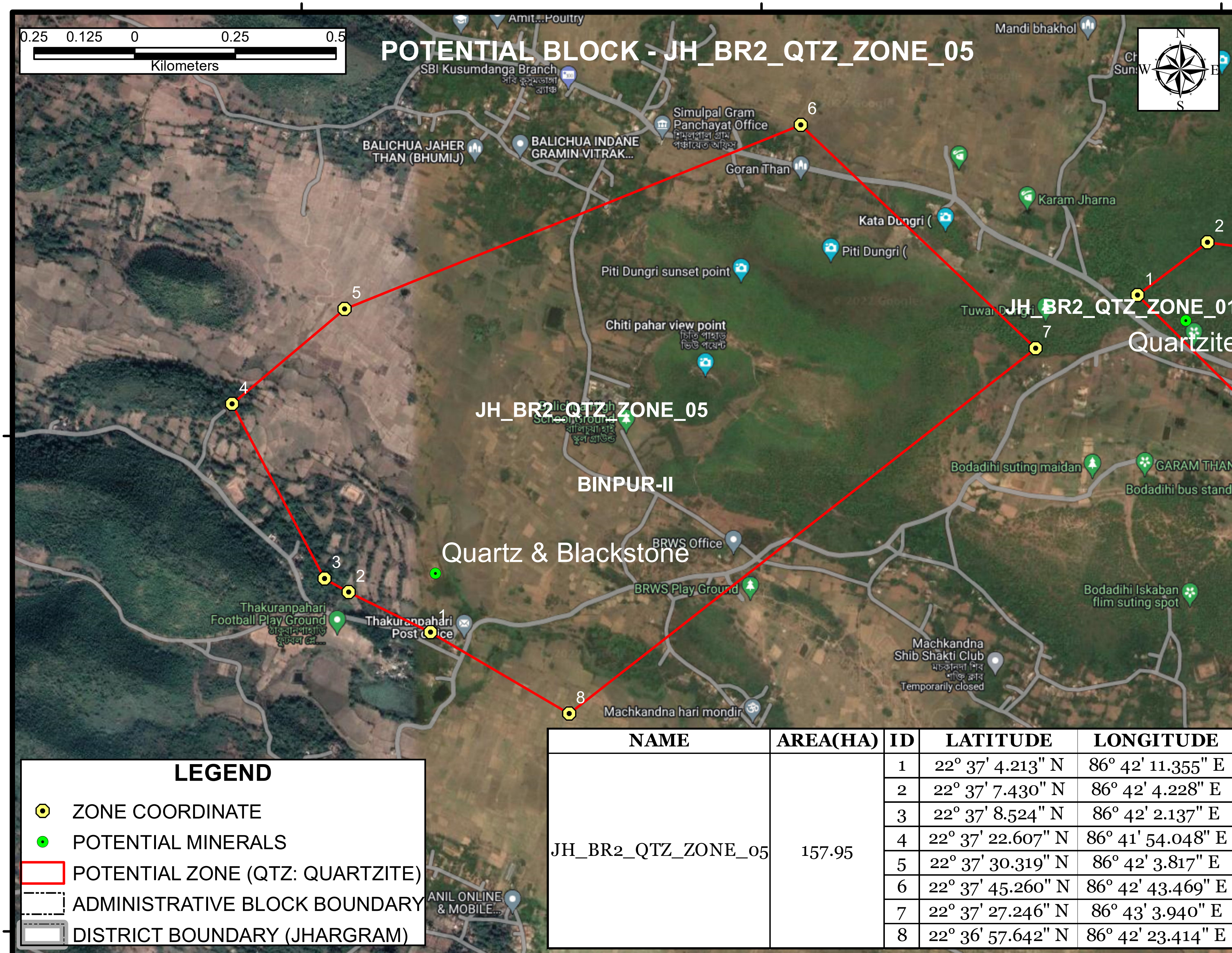


NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QTZ_ZONE_03	17.10	1	22° 38' 29.529" N	86° 49' 51.791" E
		2	22° 38' 21.287" N	86° 50' 2.269" E
		3	22° 38' 11.215" N	86° 49' 51.982" E
		4	22° 38' 18.563" N	86° 49' 41.025" E



NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QTZ_ZONE_04	18.67	1	22° 38' 58.345" N	86° 51' 2.282" E
		2	22° 39' 6.818" N	86° 50' 52.246" E
		3	22° 39' 18.867" N	86° 51' 1.164" E
		4	22° 39' 9.100" N	86° 51' 12.850" E

POTENTIAL BLOCK - JH_BR2_QTZ_ZONE_05



NAME	AREA(HA)	ID	LATITUDE	LONGITUDE
JH_BR2_QTZ_ZONE_05	157.95	1	22° 37' 4.213" N	86° 42' 11.355" E
		2	22° 37' 7.430" N	86° 42' 4.228" E
		3	22° 37' 8.524" N	86° 42' 2.137" E
		4	22° 37' 22.607" N	86° 41' 54.048" E
		5	22° 37' 30.319" N	86° 42' 3.817" E
		6	22° 37' 45.260" N	86° 42' 43.469" E
		7	22° 37' 27.246" N	86° 43' 3.940" E
		8	22° 36' 57.642" N	86° 42' 23.414" E

Annexure 6
SEIAA Minutes of Meeting

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State Environment Impact Assessment Authority
Pranisampad Bhawan, 5th Floor, Sector-III, Salt Lake, Kolkata - 700106
(West Bengal)
Minutes of SEIAA Meeting

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Subject:-	78th meeting of SEIAA
Venue:-	Conference Room, Paribesh Bhawan, West Bengal Pollution Control Board, Bidhannagar, Kolkata - 700 106.
From :-	01 November 2022
To :-	01 November 2022

1. Proposal No. :- **SIA/WB/MIS/270950/2022** File No- **EN/T-II-1/030/2022** Proposed modification of Residential Complex 'The 102' at D. H Road, Mouza - Sarmestarchak, JL. No.- 17, Touzi No- 351, BI, R.S Dag No. - 115 & 117, corresponding to L.R Dag Nos. - 114 & 116, Mouza - Daulatpur, J.L No – 79, Touzi No. - 1776, R.S./L.R. Dag Nos. - 28,29,30,31,32,33,34, 47(P), 48 & 49, PO - Pailan Hat, P.S - Bishnupur, within Kulerdari Gram Panchayat, Dist - South 24 Parganas, West Bengal by **M/s. PS Vinayak Complex LLP.**	Type- **EC**

INTRODUCTION

The proponent made online application vide proposal no. **SIA/WB/MIS/270950/2022** dated **03 May 2022** seeking environment clearance under the provisions of the EIA Notification, 2006 for the above mentioned project. The proposed project activity is listed at SL.No. **8(a) Building and Construction projects** , under Category "**B2** " of EIA Notification 2006 and the proposal is appraised at State level.

SEAC recommended the proposed project for Environmental Clearance during its 48th meeting held on 10.08.2022 with the following additional conditions :

a) Environmental parameters and the beneficiary details should be displayed on the display board.

b) Embankment protection should be as per stipulated guidelines.

SEIAA considered the recommendation of SEAC during the 74th SEIAA meeting held on 15.09.2022 and observed that the project proponent (PP) was requested to upload the following documents in the PARIVESH Portal and present their case before SEIAA :

1. The title Deed of the additional land procured.
2. Mouza map showing all the Dag Nos. mentioning the coordinates within the project boundary. The additional land area for exclusive tree plantation should be separately marked.
3. All the Mutation Certificates and land conversion certificates of all the dag nos.

Accordingly, the PP was requested to appear before SEIAA for hearing in the 78th meeting on 01.11.2022. The PP gave a presentation before SEIAA.

PROJECT DETAILS

The project of M/s **PS VINAYAK COMPLEX LLP** located in as follows :

State of the project				
S. No.	**State**	**District**	**Tehsil**	**Village**
(1.)	West Bengal	South 24 Parganas	Bishnupur - I	Sarmestarchak, Daulatpur

14. **Project configuration/product details**

S. No.	**Project configuration/product**	**Quantity**	**Unit**	**Other Unit**	**Mode of Transport/Transmission**	**Other Mode of Transport**

1. Ground Coverage with percentage of the total land area	
2. Service Area with percentage of the total land area	
3. Waterbody Area (if any), with percentage of the total land area	
4. Exclusive Tree Plantation Area with percentage of the total land area	
5. Other Green Area with percentage of the total land area	
6. Total Paved Area with percentage of the total land area	
7. Area for services	
8. Other area, if any.	
Peak power demand load for the project	
Solar power plant generation in KW & % of the connected load	
No. of Parking spaces proposed	
No. of Trees proposed	
Backup Power	
Project Cost (Rs.)	

MISCELLANEOUS

1. 'Godrej Prakriti' at 187, B. T. Road, Sodepur, Ward No. 14, Panihati, PIN : 700115, Dist. - North 24 Parganas of **M/s. Godrej Properties Pvt. Ltd.**

INTRODUCTION

The PP obtained Environmental Clearance for the proposed residential cum commercial complex 'Godrej Prakriti' at 187, F/1, B. T. Road, Ward No. 14, under Panihati Municipality, JL no. 7 & 9, Mouza – Rambhadrabati & Sukhchar, Dist. - North 24 Pgs., P.S. - Khardah, Kolkata – 700115, West Bengal.

SEIAA considered the reply dated 23.08.2022 to the show cause notice submitted by the project proponent and also the inspection report dated 21.03.2022 submitted by the WBPCB, during the 77th meeting of SEIAA held on 14.10.2022 and decided to intimate the project proponent to be present for a hearing before SEIAA. Representatives of the WBPCB who had conducted the site inspection were also requested to be present during the hearing.

The PP was requested to appear before SEIAA for hearing in the 78th meeting on 01.11.2022.

SEIAA considered the deliberations made by the project proponent in the hearing wherein the PP submitted that they were not prepared with the requisite details and documents of the case and therefore, requested for a fresh date for hearing. It was also decided that SEIAA would make a site visit to assess the present status of the project.

2. Discussion on draft DSR of **Jhargram**.

   DSR of Jhargram is approved.

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment Authority (SEIAA), WEST BENGAL)
***

Minutes of 83rd meeting of SEIAA (Reconstituted on 17.05.2023) State Environment Impact Assessment Authority meeting held from 10/10/2025 to 10/10/2025

Date: 13/10/2025

MoM ID:	EC/MOM/SEIAA/110283/10/2025
Agenda ID:	EC/AGENDA/SEIAA/110283/10/2025
Meeting Venue:	Conference Room of the New Administrative Building of Environment Department, Govt. of West Bengal at IB-180, Sector-III, Salt Lake, Kolkata-700106.
Meeting Mode:	Hybrid

Date & Time:

10/10/2025	11:30 AM	05:30 PM

1. Opening remarks

SEIAA members greeted each other and started discussion point wise as per the agenda.

2. Confirmation of the minutes of previous meeting

Minutes of 82nd Meeting of SEIAA, WB is uploaded in the PARIVESH Portal and same is confirmed by SEIAA.

3. Details of proposals considered by the committee

Day 1 -10/10/2025

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Environmental Clearance for Proposed Expansion of Residential cum Institutional Complex by M/s Amba Highrise Private Limited by **AMBA HIGHRISE PRIVATE LIMITED** located at **KOLKATA,WEST BENGAL**

MISCELLANEOUS
1. Discussion on revised DSR of Jhargram and Paschim Medinipur Districts. **The SEAC, during its 84th meeting held on 10.09.2025, decided that the revised DSRs may be sent to SEIAA for their consideration and approval.** **SEIAA considering the recommendation of SEAC approved the revised DSRs of Jhargram and Paschim Medinipur Districts.**

Annexure 7

Reasons For DSR Modification

DSR AMENDMENT STATEMENT

Objectives for DSR Modification

- The primary need for Modification of DSR is to include in-situ minor mineral potential zones of the district. The government of West Bengal implemented a Policy of Mining of Minor Minerals in Private/ Raiyati Land in West Bengal. The minor mineral (Sand/ other than Sand) mining can only be possible if the potentiality is mentioned in the approved DSR, and then only environmental clearance of the mining block will be granted.
- Also, to in-corporate modification in potential sandbars based on 2022 satellite imagery studies.

Modifications:

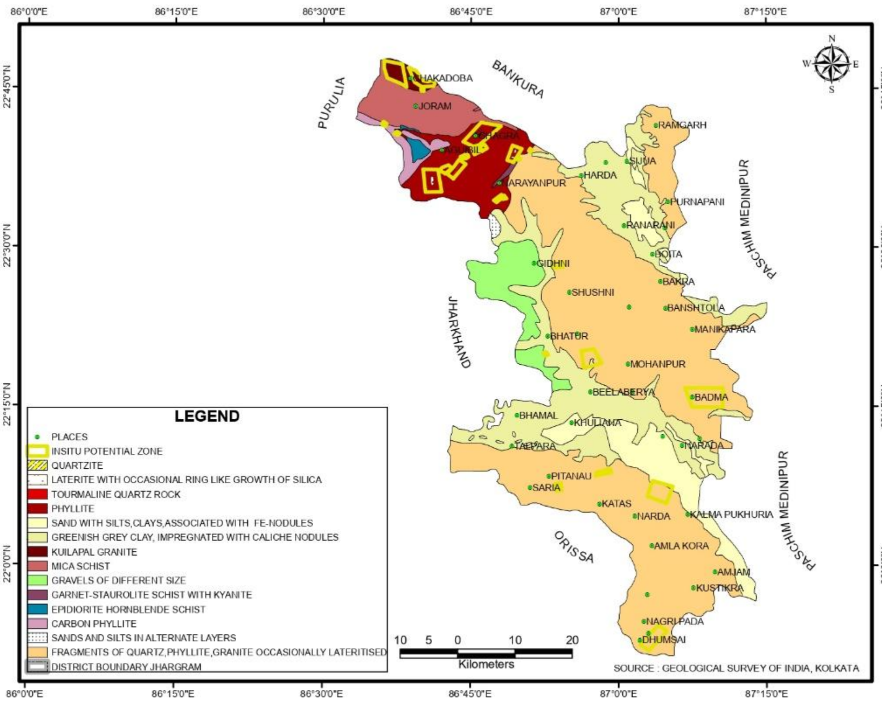
1. Modified text part (Chapters) of the DSR to include both Sand and Other than Sand minerals resources of the district. Amendment DSR contain chapters in following manners.

Table 1: Distribution of chapters in the DSR

GENERAL PART	PART A- RIVERBED DEPOSITS	PART B- INSITU MINOR MINERAL DEPOSITS
General Profile of the District	Overview of mineral resources	In-situ Minerals Reserve and potentiality
Physiography of the District	Sand and other riverbed minerals	Mineral Development Prospect of the district
Land Use Pattern of The District	Drainage System	Existing Minor Mineral Leases of the District
Geology	Annual deposition of riverbed minerals	Exploration Requirement of the district
	Replenishment Study as per EMGSM guidelines 2020	Remedial measure to mitigate the impact of Mining
	Total potential of minor mineral in the river bed	Suggested reclamation plan for already mined out areas
	Overview Of Mining Activity in The District	Risk assessment & disaster management plan
	Details Of Revenue Generated from Mineral Sector During Last Five Years	

2. Modification in In-situ minor mineral potential resources. In-situ potential zones are demarcated based on the available Geological information from GSI and DMM. Wherever possible, potential blocks are also identified based on the LOI issued to various mine owners under West Bengal Raiyati policy. A total 30 potential zone has been demarcated, previously it was 13 nos.

A



B

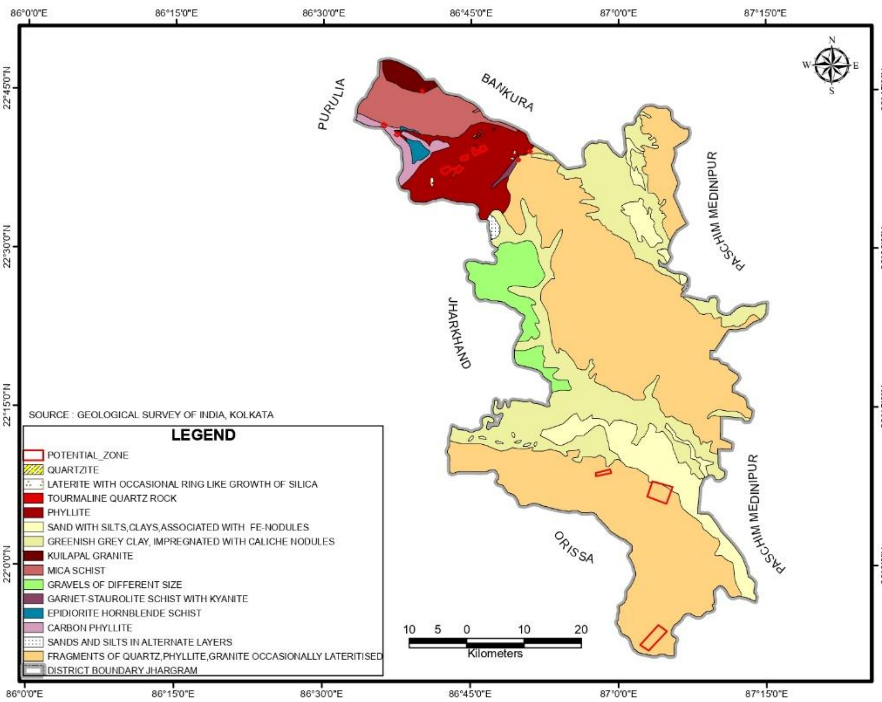


Figure 1: Map of Insitu potential zones marked on Geological map of Jhargram; A: as per amendment DSR and B: as per approved DSR.

3. Modification/ addition of potential in-situ zones in the DSR is the dynamic process and will be updated on regular basis due effectiveness of Raiyati Policy under which Raiyat are applying for mining leases. Therefore, the changes/ amendment will be made in the DSR on regular intervals to includes mining leases approved by authority.
4. District boundary modified in the amended DSR. Prevoisly district boundary was collected from district portal and in the present DSR boundary was collected from Survey of India and it's verified from district authority for any modification.

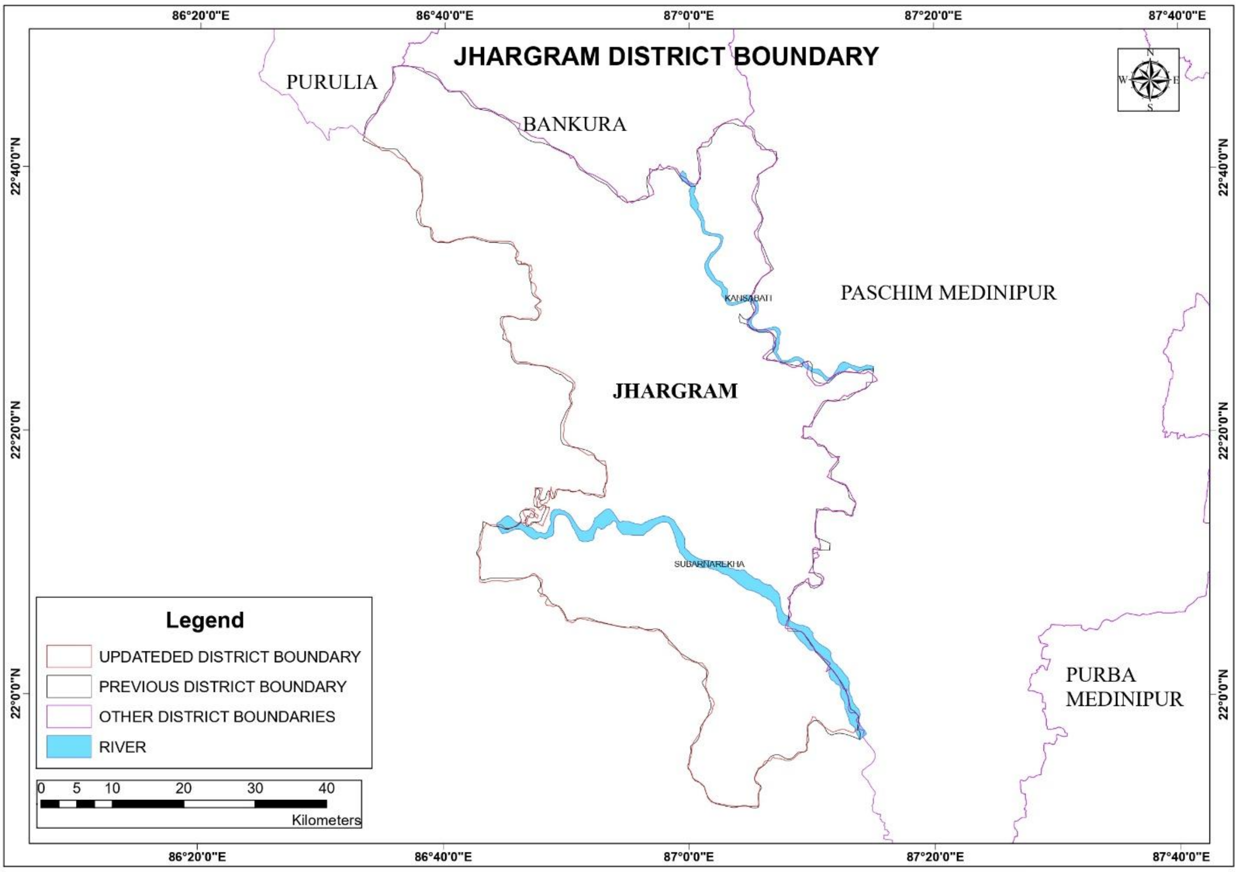
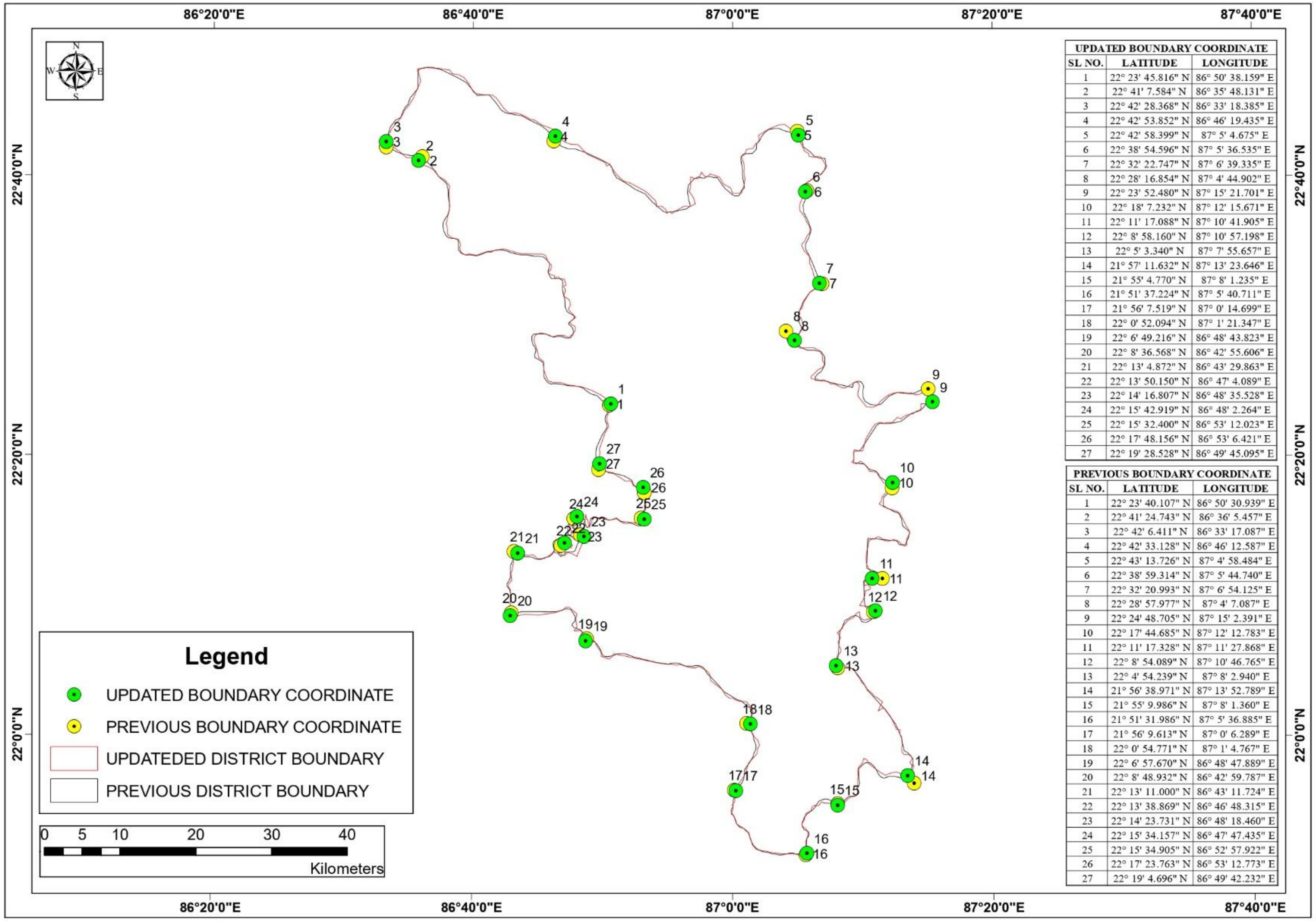


Figure 2: Map showing changes in district boundary



UPDATED BOUNDARY COORDINATE		
SL NO.	LATITUDE	LONGITUDE
1	22° 23' 45.816" N	86° 50' 38.159" E
2	22° 41' 7.584" N	86° 35' 48.131" E
3	22° 42' 28.368" N	86° 33' 18.385" E
4	22° 42' 53.852" N	86° 46' 19.435" E
5	22° 42' 58.399" N	87° 5' 4.675" E
6	22° 38' 54.596" N	87° 5' 36.535" E
7	22° 32' 22.747" N	87° 6' 39.335" E
8	22° 28' 16.854" N	87° 4' 44.902" E
9	22° 23' 52.480" N	87° 15' 21.701" E
10	22° 18' 7.232" N	87° 12' 15.671" E
11	22° 11' 17.088" N	87° 10' 41.905" E
12	22° 8' 58.160" N	87° 10' 57.198" E
13	22° 5' 3.340" N	87° 7' 55.657" E
14	21° 57' 11.632" N	87° 13' 23.646" E
15	21° 55' 4.770" N	87° 8' 1.235" E
16	21° 51' 37.224" N	87° 5' 40.711" E
17	21° 56' 7.519" N	87° 0' 14.699" E
18	22° 0' 52.094" N	87° 1' 21.347" E
19	22° 6' 49.216" N	86° 48' 43.823" E
20	22° 8' 36.568" N	86° 42' 55.606" E
21	22° 13' 4.872" N	86° 43' 29.863" E
22	22° 13' 50.150" N	86° 47' 4.089" E
23	22° 14' 16.807" N	86° 48' 35.528" E
24	22° 15' 42.919" N	86° 48' 2.264" E
25	22° 15' 32.400" N	86° 53' 12.023" E
26	22° 17' 48.156" N	86° 53' 6.421" E
27	22° 19' 28.528" N	86° 49' 45.095" E

PREVIOUS BOUNDARY COORDINATE		
SL NO.	LATITUDE	LONGITUDE
1	22° 23' 40.107" N	86° 50' 30.939" E
2	22° 41' 24.743" N	86° 36' 5.457" E
3	22° 42' 6.411" N	86° 33' 17.087" E
4	22° 42' 33.128" N	86° 46' 12.587" E
5	22° 43' 13.726" N	87° 4' 58.484" E
6	22° 38' 59.314" N	87° 5' 44.740" E
7	22° 32' 20.993" N	87° 6' 54.125" E
8	22° 28' 57.977" N	87° 4' 7.087" E
9	22° 24' 48.705" N	87° 15' 2.391" E
10	22° 17' 44.685" N	87° 12' 12.783" E
11	22° 11' 17.328" N	87° 11' 27.868" E
12	22° 8' 54.089" N	87° 10' 46.765" E
13	22° 4' 54.239" N	87° 8' 2.940" E
14	21° 56' 38.971" N	87° 13' 52.789" E
15	21° 55' 9.986" N	87° 8' 1.360" E
16	21° 51' 31.986" N	87° 5' 36.885" E
17	21° 56' 9.613" N	87° 0' 6.289" E
18	22° 0' 54.771" N	87° 1' 4.767" E
19	22° 6' 57.670" N	86° 48' 47.889" E
20	22° 8' 48.932" N	86° 42' 59.787" E
21	22° 13' 11.000" N	86° 43' 11.724" E
22	22° 13' 38.869" N	86° 46' 48.315" E
23	22° 14' 23.731" N	86° 48' 18.460" E
24	22° 15' 34.157" N	86° 47' 47.435" E
25	22° 15' 34.905" N	86° 52' 57.922" E
26	22° 17' 23.763" N	86° 53' 12.773" E
27	22° 19' 4.696" N	86° 49' 42.232" E

Figure 3: Map showing major shifting in district boundary

5. Due to district boundary modification, potential sand bars also changed, and, in some cases, new sandbar added with respect to 2022 satellite images. Changes in sand resources are tabulated below.

Sl. No.	River or Stream	Considered Thickness (m)	Area recommended for mineral potential (as per approve DSR) (sq.km)	Mineable mineral potential (As per approve DSR) (million cubic meter)	Area recommended for mineral potential (as per modified DSR) (sq.km)	Mineable mineral potential (As per Modified DSR) (million cubic meter)	Resource modification (million cubic meter)
1	Kangsabati	3.0	7.07	10.60	10.85	19.53	8.93
2	Subarnarekha	3.0	34.06	51.09	49.50	89.10	38.00

6. Sandbar addition/deletion are highlighted below:

SANDBAR AS PER MODIFIED DSR	SANDBAR AS PAER APPROVED DSR	REMARKS
PO_JR_GB1_SR_1	PO_JR_GB1_SR_1	Modified based on satellite imagery study
PO_JR_GB1_SR_2	PO_JR_GB1_SR_2	No change
PO_JR_GB1_SR_3_4_5_6	PO_JR_GB1_SR_3_4_5_6	Modified based on satellite imagery study
PO_JR_GB1_SR_7	PO_JR_GB1_SR_7	No change
PO_JR_GB1_SR_8	PO_JR_GB1_SR_8	Modified based on satellite imagery study
PO_JR_GB1_SR_9	PO_JR_GB1_SR_9	No change
PO_JR_GB1_SR_10_11	PO_JR_GB1_SR_10_11	No change
PO_JR_GB1_SR_11	PO_JR_GB1_SR_11	No change
PO_JR_GB1_SR_12	PO_JR_GB1_SR_12	No change
PO_JR_GB2_SR_13	PO_JR_GB2_SR_13	No change
PO_JR_GB2_SR_14(XIVA)	PO_JR_GB2_SR_14(XIVA)	No change
PO_JR_GB2_SR_14(XIVB)	PO_JR_GB2_SR_14(XIVB)	Modified based on satellite imagery study
PO_JR_GB2_SR_15	PO_JR_GB2_SR_15	No change
PO_JR_GB2_SR_16	PO_JR_GB2_SR_16	Modified based on satellite imagery study
PO_JR_GB2_SR_16_18	PO_JR_GB2_SR_16_18	Modified based on satellite imagery study
PO_JR_GB2_SR_19	PO_JR_GB2_SR_19	No change
PO_JR_GB2_SR_20	PO_JR_GB2_SR_20	Modified based on satellite imagery study
PO_JR_GB2_SR_21	PO_JR_GB2_SR_21	Modified based on satellite imagery study
PO_JR_GB2_SR_23	PO_JR_GB2_SR_23	Modified based on satellite imagery study
PO_JR_GB2_SR_24	PO_JR_GB2_SR_24	Modified based on satellite imagery study
PO_JR_GB2_SR_25	PO_JR_GB2_SR_25	Modified based on satellite imagery study
PO_JR_GB2_SR_27	PO_JR_GB2_SR_27	Modified based on satellite imagery study
PO_JR_NY_SR_29	PO_JR_NY_SR_29	Modified based on satellite imagery study
PO_JR_NY_SR_30	PO_JR_NY_SR_30	No change
PO_JR_SK_SR_31	PO_JR_SK_SR_31	Modified based on satellite imagery study
PO_JR_NY_SR_32	PO_JR_NY_SR_32	No change
PO_JR_SK_SR_33	PO_JR_SK_SR_33	Modified based on satellite imagery study
PO_JR_SK_SR_34_37	PO_JR_SK_SR_34_37	No change

SANDBAR AS PER MODIFIED DSR	SANDBAR AS PAER APPROVED DSR	REMARKS
PO_JR_NY_SR_35	PO_JR_NY_SR_35	No change
PO_JR_NY_SR_35A	PO_JR_NY_SR_35A	No change
PO_JR_NY_SR_36	PO_JR_NY_SR_36	No change
PO_JR_SK_SR_39	PO_JR_SK_SR_39	No change
PO_JR_SK_SR_40	PO_JR_SK_SR_40	Modified based on satellite imagery study
PO_JR_NY_SR_41	PO_JR_NY_SR_41	Modified based on satellite imagery study
PO_JR_NY_SR_42	PO_JR_NY_SR_42	Modified based on satellite imagery study
PO_JR_NY_SR_43	PO_JR_NY_SR_43	Modified based on satellite imagery study
PO_JR_NY_SR_43A	PO_JR_NY_SR_43A	No change
PO_JR_NY_SR_44	PO_JR_NY_SR_44	No change
PO_JR_BP1_KS_1_2	PO_JR_BP1_KS_1_2	Modified based on satellite imagery study
PO_JR_BP1_KS_3	PO_JR_BP1_KS_3	Modified based on satellite imagery study
PO_JR_BP1_KS_4	PO_JR_BP1_KS_4	No change
PO_JR_BP1_KS_5	PO_JR_BP1_KS_5	Modified based on satellite imagery study
PO_JR_BP1_KS_6	PO_JR_BP1_KS_6	No change
PO_JR_BP1_KS_7	PO_JR_BP1_KS_7	No change
PO_JR_BP1_KS_8	PO_JR_BP1_KS_8	No change
PO_JR_BP1_KS_8A	PO_JR_BP1_KS_8A	No change
PO_JR_BP1_KS_9	PO_JR_BP1_KS_9	No change
PO_JR_BP1_KS_10	PO_JR_BP1_KS_10	No change
PO_JR_BP1_KS_11	PO_JR_BP1_KS_11	Modified based on satellite imagery study
PO_JR_BP1_KS_12	PO_JR_BP1_KS_12	No change
PO_JR_BP1_KS_12A	PO_JR_BP1_KS_12A	Modified based on satellite imagery study
PO_JR_BP1_KS_13	PO_JR_BP1_KS_13	Modified based on satellite imagery study
PO_JR_BP1_KS_14	PO_JR_BP1_KS_14	Modified based on satellite imagery study
PO_JR_JG_KS_15	PO_JR_JG_KS_15	Modified based on satellite imagery study
PO_JR_JG_KS_16	PO_JR_JG_KS_16	Modified based on satellite imagery study
PO_JR_JG_KS_17	PO_JR_JG_KS_17	Modified based on satellite imagery study
PO_JR_JG_KS_17_18	PO_JR_JG_KS_17_18	Modified based on satellite imagery study
PO_JR_JG_KS_18_19	PO_JR_JG_KS_18_19	Modified based on satellite imagery study