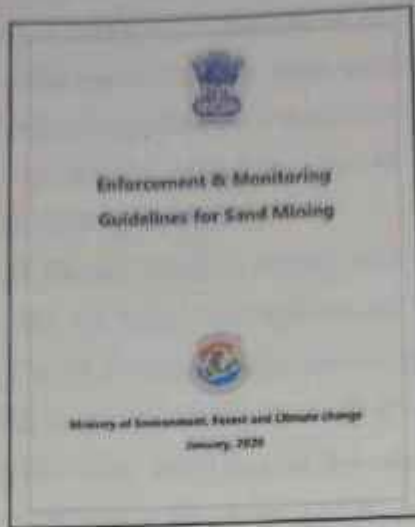


FINAL DISTRICT SURVEY REPORT NAGAON DISTRICT, ASSAM STATE



**For River Bed Mining (Sand) and Minor Minerals
other than River Bed Mining
(Stone and Brick Earth)**

**Submitted by Divisional Forest Officer, Nagaon Division,
Nagaon, Assam
DECEMBER, 2024**

Foreword

In Pursuance to the Gazette Notification, published by Ministry of Environment, Forest, and Climate Change (MoEF&CC), the Government of India, Notification No. S. O. 141(E) Appendix-X, Dated 15.01.2016 and S.O. 3611 (E) New Delhi 25th July 2018 laid procedure for preparation of District Survey Report of Sand mining or river bed mining and minor mineral other than Sand mining or river bed mining.

The notification and guidelines suggest the preparation of District Survey Report for the better management of the Sand extraction. The main purpose of District Survey Report (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".

This District survey report of Nagaon District, Assam State has been prepared as per the guidelines and notification, for the better management of River Bed Mining (Sand) in *volume I* (covering chapter 1 to 11 & District wise details) and Minor Minerals other than River Bed Mining (Stone and Brick Earth) in *volume II* (Covering chapters 13 to 27 and chapter 7- Surface and Ground water only) rest of the chapters are common which are covered in *Volume I* as per Notification No. S. O. 141(E) Appendix-X, Dated 15.01.2016 and S.O. 3611 (E) New Delhi 25th July 2018 in single report due to presence of only two minor minerals i.e Sand, Stone and Brick Earth.

Monitoring Guidelines for Sand Mining (EMGSM) January 2020, issued by the Ministry of Environment, Forest and Climate Change 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 from time to time as well as the requirement specified in AMMCR, 2013 and subsequent amendments till date. As per Assam Minor Mineral Concession Rule, 2013: Y-category Minor.

The main objective of the preparation of District Survey Report (as per the Sustainable Sand Mining Guideline) is to ensure the following:

- (i) Identification of areas of aggradations or deposition where mining can be allowed;



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শিল্প ও খনি বিভাগ
Ministry of Environment, Forest & Climate
Change, Govt. of India

(ii) 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;

(iii) Identification of mineral wealth in the district;

(iv) Identification of areas where no mining zone.

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असिस्टेंट फॉरेस्ट ऑफिसर
असिस्टेंट फॉरेस्ट ऑफिसर
असिस्टेंट फॉरेस्ट ऑफिसर

Acknowledgments

The Office of the Divisional Forest Officer, In-charge, Nagaon Division, Nagaon is highly grateful to Shri Narendra Kr. Shah, IAS, District Commissioner, Nagaon cum the Chairman, DSR Committee, Nagaon and all other Member of the Committee. We are also thankful to all the concerned staff of office of the District Commissioner, Nagaon for providing all the support needed to complete this District Survey report.

Divisional Forest Officer, Nagaon Division, Nagaon appreciates the contribution of Range Forest Officers, Beat Forest officers, Frontline Staff of Forest Department, drivers on duty and local people, who directly or indirectly helped in carrying out the field studies.

This is an in-house prepared Final District Survey Report, wherein we acknowledge the help of Gaheli Environmental Laboratory, New Delhi & Gujarat (our knowledge partner) and its staff members, who helped in shaping the report.

Nagaon Division, Nagaon,

Divisional Forest Officer,

Cum

Member Secretary,

DSR Committee, Nagaon




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কম জায়গায় সাক্ষরিত
কর্তৃক কম মত
Divisional Forest Officer
Nagaon Division


Certificate


This is to certify that this Final District Survey Report for River Bed Mining (Sand) and Minor Minerals other than River Bed Mining (Stone and Brick Earth) of Nagaon district is prepared in accordance with the prescribed procedure and format vide MoEF& CC Notification S.O. 141 (E), dated 15.01.2016, MoEF& CC Notification S.O. 3611(E), dated 25.07.2018 and is in consonance with the Sustainable Sand Mining Guidelines - January 2020 published by MoEF& CC. There is no discrepancy in information across all submitted documents including hard copy and soft copy of the submitted DSR and whenever specific permissions are required, we will approach the concerned authorities i.e. State Level Expert Appraisal Committee (SEAC), Assam / State Level Environment Impact Assessment Authority (SEIAA).

The information furnished in the Final District Survey Report is true and correct to the best of our knowledge /findings.


Member
SEIAA, Assam


Chairman
State Level Environment Impact
Assessment Authority, Assam.
Bamunimaidam, Ghty-21


Member Secretary
State Level Environment Impact
Assessment Authority, Assam.
Bamunimaidam, Ghty-21


জন সার্বজনীন প্রাণিকারী
স্বর্গীয় জন সার্বজনীন
Divisional Forest Officer
Nagaon (A. 2018)

CONTENTS

S. No.	Particulars	Page No.
River Bed Mining		
1.	Chapter 1: Introduction	1-10
2.	Chapter 2: Overview of Mining in the District	11
3.	Chapter 3: The List of Mining Leases in the District with location, area and period of validity	12-16
4.	Chapter 4: Details of Royalty or Revenue Received in Last Three Years	17
5.	Chapter 5: Detail of Production of Sand or Bajri or minor mineral in last three years	18-19
6.	Chapter 6: Process of Deposition of Sediments in the Rivers of The District	20-24
7.	Chapter 7: General Profile of Nagaon District	25-32
8.	Chapter 8: Land Utilization Pattern in the district: Forest, Agriculture, Horticulture, Mining etc	33
9.	Chapter 9: Physiography of the District	34-35
10.	Chapter 10: Rainfall: month-wise	36
11.	Chapter 11: Geology And Mineral Wealth	37-41
12.	a. District wise detail of river or stream and other sand source; b. District wise availability of sand or gravel or aggregate resources c. District wise detail of existing mining leases of sand and aggregates.	42-96
Other Relevant Submissions		
	d. Replenishment Study: Nagaon District, Assam	97-106
	e. Contour Maps of River bed Minerals	107-166
	f. Google Timeline Images & Site Visit Photographs	167-246
	g. Site Visit photographs by the members of District DSR Committee	247-250
	h. Cluster Map	251-252
	i. Transportation Map	253-254

Minerals: Sand, Stone and Brick Earth



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Non-River Bed Mining		
13.	Chapter 7: Surface Water and Ground Water scenario of the district	255-256
14	Chapter 13: List of Letter of Intent (LOI) Holders in the District along with its validity as per the following format	257-261
15	Chapter 14: Total Mineral Reserve available in the District	262
16	Chapter 15: Quality /Grade of Mineral available in the District	263-264
17	Chapter 16: Use of Mineral	265
18	Chapter 17: Demand and Supply of the Mineral in the last three years	266
19	Chapter 18: Mining leases marked on the map of the district	267
20	Chapter 19: Details of the area of where there is a cluster of mining leases viz. number of mining leases, location (latitude and longitude)	268-269
21	Chapter 20: Details of Eco-Sensitive Area, if any, in the District	270-272
22	Chapter 21: Impact on the Environment (Air, Water, Noise, Soil, Flora & Fauna, land use, agriculture, forest etc.) due to mining activity	273-276
23	Chapter 22: Remedial Measures to mitigate the impact of mining on the Environment	277-280
24	Chapter 23: Reclamation of Mined out area (best practice already implemented in the district, requirement as per rules and regulation, proposed reclamation plan)	281-283
25	Chapter 24: Risk Assessment & Disaster Management Plan	284-290
26	Chapter 25: Details of the Occupational Health issues in the District. (Last five-year data of number of patients of Silicosis & Tuberculosis is also needs to be submitted)	291-292
27	Chapter 26: Plantation and Green Belt development in respect of leases already granted in the District	293-294
28	Chapter 27: Any other information	295-309

List of Annexure

Annexure No.	Name	Page no.
Annexure 1	Notification No. S.O. 141(E) dated 15 th January, 2016 published by Ministry of Environment, Forest and Climate Change	1-27
Annexure 2	Notification No. S.O. 3611(E) dated 25 th July, 2018 published by Ministry of Environment, Forest and Climate Change	28-39
Annexure 3	Sustainable Sand Mining Management Guidelines – 2016 published by Ministry of Environment, Forest and Climate Change	40-140
Annexure 4	Enforcement & Monitoring Guidelines for Sand Mining – January 2020 published by Ministry of Environment, Forest and Climate Change	141-223
Annexure 5	Honorable NGT Court Order OA 34 of 2022 29.09.2022 regarding DSR	224-238
Annexure 6	Office Memorandum F. No. IA-Z-11013/156/2023-IA-II (NCM) dated 18 th September 2023 published by Ministry of Environment, Forest and Climate Change	239-251
Annexure 7	Assam Minor Mineral Concession Rules 2013	252-392
Annexure 8	Assam Minor Mineral Concession (Amendment) Rules, 2021	393-398
Annexure 9	Honorable NGT Court Order OA No. 360/2015 dated 05.04.2019 regarding the steps required to be taken for environment protection from unregulated sand mining	399-437
Annexure 10	Honorable NGT Court Order OA No. 360/2015 dated 26.02.2021 regarding updation of enforcement and monitoring mechanism to control and regulate illegal sand mining (including riverbed sand mining)	438-477
Annexure 11	Honorable NGT Order before Principal Bench in the O.A. NO 85/2018 (WZ) dated 30.09.2020	478-555
Annexure 12	Details of EC, mine approval letter and range report /proposed leases	556-614
Annexure 13	Draft notification declaring Eco sensitive Zone around the Laokhowa Burhachapori Wildlife Sanctuary dated 27.11.2015	615-638
Annexure 14	Forest diversion Permission letter	639-650
Annexure 15	Mineral Testing Report	651-669

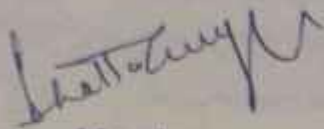
Minerals: Sand, Stone and Brick Earth



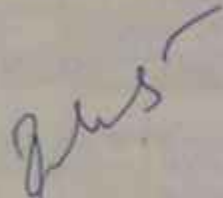
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 ডায়েক্টর জেনারেল
 জলবায়ু ও পরিবেশ
 Environmental Forest Office

Recommended to the SEIAA for approval
of the DSR of Nagaon district

Member
SEAC : Assam



Member
SEAC : Assam



Member
SEAC : Assam

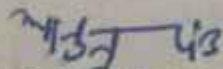
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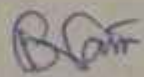
Member
SEAC : Assam



Member Secretary
SEAC : Assam
MOEF & CC, GOI



Chairman
SEAC : Assam
MOEF & CC, GOI


Barenalee Nath
Jt. Director, DGM, Assam.

RIVER BED MINING (SAND)



The Nagaon town area is situated on both sides of the River Kolong which is the life line of Nagaon and also acts as the natural outlet for carrying the storm water generated within the city. Nagaon is the District Head Quarter of Nagaon district. A fascinating and bewildering mix of cultures, both Hindu and Islamic is seen in the Nagaon district. The Nagaon town is located at a distance of 123 kms, east of Dispur, Guwahati the state capital and has connectivity to nearby urban centers like Hojai (80 kms south-east), Tezpur (70 kms north-east), Kampur (32 kms south-west), Dhing (25 kms north-west) and Raha (22 kms west).

Source: <http://nagaonmunix.in/AboutNagaon>

1.2 HISTORY OF THE DISTRICT

Till 1826, Nagaon was under Burmese rule. It came under British rule after the Yandaboo treaty was ratified. Nagaon was carved out as a separate administrative district unit in the year 1832. It took a couple of years before the British finally settle on the present site of Nagaon town, on the bank of the Kalong River as the district headquarters in 1839. Known earlier as Khagorijan, the district headquarter was later renamed Nowgong and gradually it developed into a flourishing town.

It became a municipality in the year 1893. The eastern, western, and southern fringes of the newly organized district were once ruled by different small feudal kings or their agents. An extensive and undulating plain intersected by big and small hills and rivers- the geography of the segments determined who their masters ought to be. The residual effects of the rule of the Bhuyans were imaginatively utilized and reorganized by Momai Tamuli Barbarooah, an intrepid officer of the Ahom King Pratap Singa in the first half of the Seventeenth Century. This area, until then, was more of a strategic than administrative concern. It was a newly organized village system- hence called "Nagaon", Na meaning new.

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Source: <https://nagaon.assam.gov.in/about-us/history>

1.3 ARCHAEOLOGICAL SITE IN NAGAON DISTRICT

Matharbari Archaeological Site, Baropujia

Matharbari Archaeological Site has remains of a stone temple. A shrine was erected long ago on this site. The temple relics are datable to c.1000 CE. This site also houses a tank.

Rajbari Group of temples, Rajbari

Rajbari Archaeological Site is a group of at least nine Siva temples enclosed within a massive brick-built boundary wall. Both stone and bricks are found employed as building material in raising the temples. Concentration of these temple structures altogether converted this site into a complex of nine temples. Of these, three temples had been built of bricks using stone for doorframes, pillar bases and columns. The ground plans of three of these brick-built temples have been excavated and conserved from 2003-04 and 2005-06. Upon the *garbhagrha* of two temples modern structures have been raised enshrining in these a Yonipith and a Uma - Maheswara respectively. The other temple plinth has a *garbhagrha* raised of stone. The site has numerous stone temple relics stylistically datable to 11th century CE.

Sankhadevi Archaeological Site, Jogijan

Shankhyadevi site has a group of temples, located on Jogijan, a small tributary of the Kapili river. The site has three mounds containing remains of three stone temples. Of these, one mound has been salvaged and stone relics of a temple dedicated to Devi Durga have been unearthed. The remains include fragments of a massive stone door jamb with carving of a figure of Durga in the upper central part of the door frame. Doorjamb, carved stone *pranala* from *garbhagriha*, doorsils, lintels, pillars and numerous other carved temple relics are found in this site. Numerous fragments of stone temples are scattered everywhere. The two other mounds are undisturbed. The site has a stone stairway leading to the river indicating earlier communication that was maintained through river to the temples of this site.



Mahadeosal Archaeological Site, Mahadeosal

Mahadeosal Archaeological Site has structural relics of a stone temple datable to c. 1000 CE. The site overall represents its historic location on river front. Large tanks, trees and numerous sculptured stone blocks once used as components of the temple are to be found lying on this site. Some temple components like temple door frames are large in size. A stone pillar bearing carvings of *dasavatara* figures of Visnu are also to be found inside the modern shrine. This indicates the largeness of the temple that once existed on this site.

Kawaimari Archaeological Site, Kampur

Remains of stone temple architecture datable to c. 1100 CE exist here. Stone architectural evidence indicates the erstwhile existence of a Siva temple.

Hatimura Temple, Jakhlabandha

The Hatimura Temple is situated on a hillock of massive rock base on the southern bank of the Brahmaputra. The outcrop of rocks at this site is galore. In one of these a rock is carved a figure of Ganesa. A rock-cut figure of a *dasabhuja* Durga is to be found on the hilltop along with the Hatimura brick temple constructed during the reign of the Ahom king Swargadeo Pramatta Singha (1744-1751 CE). The site is surrounded by the Brahmaputra in three directions and as such has panoramic natural beauty. Being located in isolation, visitors to this temple get momentum during festivals.

Na-Nath, Archaeological Site, Kenduguri

This is situated on an old water channel to the west of the Rajbari and Sankhya Devi Archaeological Sites. The site has eight brick temples divided in symmetrical plan facing each other in two lines. The temple structures have components of stone pillar posts, bases, door jambs, doorsills, Siva linga and Yonipith.

This group of brick-built temples are unique in Assam for these structures have been found embellished with terracotta plaques laid horizontally on the outer face of the walls. The variety of representation includes diverse aspects of nature, figures of gods and goddesses, human and animal figures, floral designs, scenes from public life, religious life and other aspects -all carved to decorate the brick temple walls.

Such decorative arrangements in walls of temples as seen at Nath Archaeological Site recalls artistic development of temple architecture during the Gupta period. Judging by the style, these pieces of archaeological evidence at Na-Nath can be dated to c.800 CE. The eight brick built Siva temples with one at Kenduguri nearby make altogether nine temples for which the site is known as Na-Nath.

Maudanga Ruins, Maudanga

Ruins of a temple, sculptured stone blocks and icons of divine figures are to be found here.

Warigadeng Archaeological Site

Numerous remains of brick architecture exist in this site.

Sibpur Ruins, Sibpur

Remains of two stone temples exist in the form of mounds.

Gachtal Archaeological Site, Dabaka

Gachtal Archaeological Site has two stone temples dedicated to Siva. There is evidence of *agarbhagha* and *mandapa* with at least four doorways. The carvings on the door lintels and jambs consists of Ganesa, worshippers, a figure of Siva standing with a rosary in the right hand and a trident in the left hand, water vases flanked by vyalas, elephants, flowers, foliage, animals, twisted serpents and vases placed on *amalaka*. Figures of Saivite characters such as doorkeepers holding *sula* and *pasa* are notable. The evidence indicates development of stone temples at the site during 10-11th century CE. A stone inscription datable to c.1200-1300 CE has been recovered from this site.

Mikirati Archaeological Site, Dabaka

Mikirati Archaeological Site has at least ten brick mounds containing evidence of brick temple structures in them. One such brick mound unearthed by the Directorate in the years 2005-06 reveals the brick-built plinth of a temple with a *pranala*. The evidence is datable to c. 700 – 800 AD. The other brick mounds remain yet to be explored.

The site has evidence of a stone temple. The stone sculptures and temple relics of Mikirati display a lingering trend of Indian Classical Art. Native cultural belief and practices also manifest in the expression of art. A temple plinth with its *mandapa* and *garbhagha* with

Minerals: Sand, Stone and Brick Earth



a linga and yonipith are found here. These pieces of evidence point towards the development of a stone temple architecture since 10th-11th century CE.

Akashiganga Archaeological Site, Parokhwa

Remains of about three temple exist at Akashiganga Archaeological Site. Akashiganga is a rocky spot on a stream surrounded by forests. The beauty of the site is enhanced by a waterfall locally called Akashiganga and this waterfalls serves as a natural picturesque background for the temple ruins. A large section of the stone temple remains have been shifted to an archaeological park and a site gallery installed nearby. Besides numerous fragments, carved temple relics, other evidence of the site include stone pillar capitals, some with carvings, amalakas, door frame, doorsills and jambs, pedestals, horizontal lotus moulded architraves and angasekharas of temples. Figures of Ganas, dancing ganas and floral designs are also to be found here.

The ruins indicate the existence of a Siva temple in the site. Its unique natural beauty, hilly topography and forest attract people and the site remains a place for recreation over the ages.

Kenduguri Archaeological Site, Kenduguri

Remains of both stone and brick and evidence of brick temples exist in this site in the form of a mound. The site is yet to be developed.

Devasthan Archaeological Site, Devasthan

Devasthan Archaeological Site has atleast nine mounds containing brick remains of temples. Stone temple relics exposed in the site include door jambs, lintels, sculptures, Siva linga and Yonipith. Discovery of stone temple relics in the site suggests that both stone and bricks were used in temple construction. One exposed brick mound has been found with a Siva linga and Yonipith and another with a *garbhagriha*. Some sculptures of Gods and Goddesses and carved relics of a temple are preserved in a gallery erected on the site, which also houses a tank.

Amtala Archaeological Site, Hojai

Here exist ruins of a stone temple stylistically datable to c. 9th - 10th century CE. The site has a pair of historical tanks in the eastern and western directions respectively. During the years 2012-13, the Directorate of Archaeology, Assam, has carried out archaeological

excavations in the site and exposed a brick built temple plinth measuring 10 x 13 m. to the north-east of the modern Siva Temple. Further excavation carried out in western tank has revealed stone stairways and a brick embankment and floor.

Gosaijuri Archaeological Site, Dabaka

This site has brick and stone temple ruins and also an image of Visnu.

Bandura Archaeological Site, Kampur

Ruins of a stone temple datable to c. 10th -11th CE are found at the site.

Basundhari Archaeological Site, Basundhari

The site has the image of a rock-cut Ganesa.

Missa Fort, Missa

It is a Garrison of Circa 17th century. It bears historical glory in reciting the history of the region. It was constructed by Ahom king Swargadeo Pratap Singha.

Samdhara Garh, Samuguri, Kaliabar

It is an Ahom period mud rampart with circular bastions at regular intervals.

Source: <https://archaeology.assam.gov.in/information-services/detail/list-of-protected-archaeological-sites-and-monuments>

1.4 DEMOGRAPHIC CHARACTERISTICS OF THE DISTRICT

The total area of the district is 411030 sq.km and the population of the district is 28,23,768 persons. There are only 7 Revenue Circles, and 1412 Villages in the district. The district has 2 subdivisions.

Out of the total population, there are 14,39,112 (50.96 per cent) males and 13,84,656 (49.04 per cent) females. The sex ratio of the district is recorded as 962 females per 1000 males and among in the children in the age-group 0-6 the sex ratio is worked out as 964 females per 1000 males which is higher than the total sex ratio of the district.

1.5 NEED FOR DSR

In pursuance to the Gazette Notification, Ministry of Environment, Forest, and Climate Change (MoEF&CC), the Government of India Notification No. S.O. 141 (E) Appendix--

Minerals: Sand, Stone and Brick Earth



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কম ভাষণল প্রকল্পের
সম্বন্ধে কল মতামত

X, dated 15.01.2016 & S.O. 3611 (E) New Delhi, 25.07.2018 laid procedure for preparation of District Survey Report of sand mining or river bed mining.

Apart from other aspects, it categorically mentions that -

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.

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.

Ministry of Environment, Forests and Climate Change (MoEF & CC) has released guidelines to monitor and check illegal sand mining in the country Sustainable Sand Management Guidelines (SSMG), 2016 focuses on the management of sand mining.

The main objectives of these Guidelines include environmentally sustainable and socially responsible mining; conservation of the river equilibrium and its natural environment by protection and restoration of the ecological system; avoiding pollution of river water; and prevention of depletion of ground water reserves. The Guidelines explain the deleterious impacts of indiscrete mining and provides the guidelines for sustainable sand and gravel mining. It lays down the structure of district survey report and provides recommendations for river bed mining, off-channel or floodplain extraction, extraction methods and reclamation plans. It highlights the impact of marine sand mining on marine biodiversity. It also discusses the legal regime relating to mining of minor minerals. The Guidelines talk about management of mining in cluster and post-flood sand deposits on agricultural field of farmers. It lays down the standard environmental conditions for sand mining and the procedure for monitoring system for sustainable sand mining.

Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) January 2020, issued by Ministry of Environment, Forest and Climate Change 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 from time to time as well as the requirement specified in AMMCR, 2013.

1.6 SAND MINING GUIDELINES

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

As per the guidelines prescribed in above said documents, special attention has been given to the following aspects:

- 1 The permanent boundary pillars need to be erected after the identification of an area of aggradation and deposition outside the bank of the river at a safe location for future surveying. The distance between boundary pillars on both sides of the bank shall not be more than 100 meters
- 2 Proper channelization of rivers is to be carried out so as to avoid the possibility of flooding and to maintain the flow of rivers
- 3 The mining plan should include the original ground level (OGL), available from the District Survey Report (DSR) and to be recorded at an interval not more than 10 m x 10 m along and across the length of the river. The area of aggradation /deposition needs to be ascertained by comparing the level difference between the OGL and water level.
- 4 Riverbed sand mining shall be restricted within the central 3/4th width of the river/ rivulet or 7.5 meters(inward) from river banks but up to 10% of the width of the river. The central 3/4th part of the river needs to be identified on a map, out of which the area of deposition/aggradation needs to be identified. The remaining 1/4th area needs to be marked as 'no mining zone
- 5 The sediment sampling should include the bed material and bed material load before, during and after the extraction period. The above exercise by DSR require four surveys i.e. 1st survey in the month of April, 2nd survey at the time of closing of mines for monsoon, 3rd survey needs to be carried out after monsoon to know the quantum of material deposited/replenished and the 4th survey to be carried out at the end of march to know the quantum of material excavated. The above information will be available in District Survey Report (DSR).
- 6 The particle size distribution and bulk density of deposited material are required to be assessed by a NABL-recognized laboratory.
- 7 Depth of mining should be restricted to 3 meters and distance from the bank should be 1/4th at the river width and should not be less than 7.5 meters. Alternatively, the distance from the bank should be 3 meters or 10% of the river width, whichever is less
- 8 Demarcation of the mining area with pillars and geo referencing should be done prior to the start of the mining operation.

Minerals: Sand, Stone and Brick Earth



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

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

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

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

13 River mining from outside should not affect rivers. No mining shall be permitted in an area up to a width of 100 meters from the active edge of the embankments or distance prescribed by irrigation department. The mining from area outside river bed shall be permitted subject to a condition that a safety margin of two (2) meters shall be maintained above the groundwater level while undertaking mining operation.

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

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

In compliance of sand mining guidelines and to adhere to the rule under the Assam Minor Mineral Concession Rules, 2013 there will be provision of installation of *weigh-bridge and fitting of GPS in all vehicles carrying minor minerals* which are to be treated as violation and breach of agreement. No mining activities shall be allowed without installation of weigh-bridge by the mineral concession holders and without fitting of GPS in the vehicles by the vehicle owners involved in transportation of minor minerals in future.

In compliance to *Enforcement & Monitoring Guidelines for Sand Mining, MoEF&CC, January, 2020*, all the lease owners will provide following provisions to curb illegal mining:

- (i) All the mineral-carrying vehicles (from source to destination) will be tracked through installed GPS or RFID.
- (ii) There will be installation of electronic *weigh-bridge on the mine site*
- (iii) Issue of online royalty passes for individual lease.

CHAPTER 2: OVERVIEW OF MINING IN THE DISTRICT

2.1 INTRODUCTION:

Nagaon district has been endowed with various valuable mineral resources. Sand, Stone and Brick Earth are mined out from the district.

Table 2.1: Mineral-wise leases in the district

River Bed Mines		
Sr. No.	River Name	No. of Leases
1	Borpani River	4
2	Kopili River	10
3	Jamuna River	1
Non- River Bed Mines		
Sr. No.	Mineral Name	No. of Leases
4	Stone	11
5	Brick Earth	2
TOTAL		28

2.2 DETAILS OF MINERAL BASED INDUSTRIES

Sand, Stone and Brick Earth are basic aggregates in the construction work. This mineral has a huge demand in any infrastructure project within District as well as within other district.

CHAPTER -3: THE LIST OF MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY

3.1 DETAILS OF MINE LEASES IN THE DISTRICT

In the Nagaon district, there are 28 leases covering a total area of 145.80 hectares. Out of these, 17 leases are of Sand mineral, 11 lease are for Stone and 02 lease are of Brick Earth.

Out of the 30 leases, 03 are exiting mines (02 of Sand, and 01 of stone), 09 leases having approved mine plan (03 of Sand, 05 of stone and 1 of Brick Earth), 08 are identified as Mining area in past and is proposed for future mine zone (06 of Sand, and 02 of stone) and 8 leases (04 of sand, 02 of Stone, and 02 of Brick Earth) are new proposals expected to be considered for permits or grants in the near future.

The following Tables show the mineral-wise lease area details:

Table 3.1: Sand Mine Leases: Existing mines with EC

S. No	Continuous S. No.	Mine Name	River	Lease Area in Ha	Current Status
1	1	Nisari Sand Permit Area No. 1 (A) of 2020-22	Jamuna	4.30	Existing Mine
2	2	Jamunamukh-Kopili Nodi Sand Permit Aarea No. 1A (Revenue Portion) (2019-26)	Kopili	23.50	Existing Mine

Table 3.2: Sand Mine Leases Proposed (Mine plan is approved)

S. No	Continuous S. No.	Mine Name	River	Lease Area in Ha	Current Status
1	3.	Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion)	Borpani	4.50	Proposed (Mine Plan is approved)
2	4.	Chaparmukh-Kopili Nodi Bamunijan Sibheta Sand Permit Area in (Revenue	Kopili	2.00	Proposed (Mine Plan is approved)

		Portion)			
3	5.	Chaparmukh-Kopili Nodi Sand Permit Area Part- 1 (C) (Rev. Portion)	Kopili	2.50	Proposed (Mine Plan is approved)

Table 3.3: Sand Mine Leases Proposed (Mining Area in past)

S. No	Continuous S. No.	Mine Name	River	Lease Area in Ha	Current Status
1	6.	Borpani Sand Permit Area No. 1 (A) of 2020-22	Borpani	4.95	Proposed (Mining Area in past)
2	7.	Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)	Kopili	4.74	Proposed (Mining Area in past)
3	8.	Chaparmuk-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion) of 2016-18- 2018-20	Kopili	4.60	Proposed (Mining Area in past)
4	9.	Chaprmukh-Kopili Nodi Sand Permit Area No. 1 (C) (Rev. Portion) of 2018-20	Kopili	2.55	Proposed (Mining Area in past)
5	10.	Jamunamukh-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion)	Kopili	4.20	Proposed (Mining Area in past)
6.	11.	Jamunamukh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion)	Kopili	4.50	Proposed (Mining Area in past)

Minerals: Sand, Stone and Brick Earth

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Table 3.4: Sand Mine Leases (Future Proposal)

S. No	Continuous S. No	Mine Name	River	Lease Area (in Ha.)	Current Status
1.	12.	Borpani Sand Permit Area (Govt. Permit)	Borpani	4.95	Future proposal
2.	13.	Borpani Sand Permit Area Part-1(B) Down Site (Govt. Permit)	Borpani	2.02	Future proposal
3.	14.	Guimari Govt. Sand Permit Area (Rev. portion)	Kopili	4.93	Future proposal
4.	15	New Proposal 3	Kopili	2.52	Future proposal

Table 3.5: Stone Mine Lease (Existing mine)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
3.	16	Langkajuri Stone Mahal Mining Permit Area	-	5.0	Existing mine

Table 3.6: Stone Mine Lease Proposed (Mine Plan is approved)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
4	17	Dhansila Pahar Stone Contract Area No. 1 (Proposed Reserve Forest)	-	13.41	Proposed (Mine Plan is approved)
5	18	Dhansila Pahar Stone Contract Area No. 2	-	12.74	Proposed (Mine Plan is approved)

		(Proposed Reserve Forest)			
6	19	Dhul Pahar Stone Contract Area (Reserve Forest)	-	5.22	Proposed (Mine Plan is approved)
7	20	Kathalguri Stone Contract Area No. 1 (Reserve Forest)	-	10.00	Proposed (Mine Plan is approved)
8	21	Kathalguri Stone Contract Area No. 2 (Reserve Forest)	-	10.00	Proposed (Mine Plan is approved)

Table 3.7: Stone Mine Lease Proposed (Mining Area in past)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
7	22	Dhulpahar Stone Mahal No. 1	-	1.00	Proposed (Mining Area in past)
8	23	Tapatjuri Stone Mahal No. 1	-	1.00	Proposed (Mining Area in past)

Table 3.8: Brick Earth Mine Lease Proposed (Mine Plan is approved)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
9.	24	Shiv Sankar Brick Earth Mining Permit Area	-	0.37	Proposed (Mine Plan is approved)

Table 3.9: Stone Mine Lease Proposed (Future Proposal)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
5.	25	Basundhari Stone Mahal No. 1 (A)	-	7.6	Future Proposal



6.	26	Bipin Stone Mahal of 2018-23	-	1.0	Future Proposal
7.	27	Kafitoli Stone Mahal No. 1 under Kothiatoli Range	-	1.0	Future Proposal

Table 3.10: Brick Earth Mine Lease Proposed (Future Proposal)

S. No	Continuous S. No	Mine Name	River	Lease Area (In Ha)	Current Status
8.	28	Sahari Brick Earth permit Area (Hanuman Bricks)	-	0.7	Future Proposal

CHAPTER 4: DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS


Table 4.1 Quantity of mineral -wise (minor) in last five years (2019-20) to (2024-25)

Minor Minerals (Cum.)							
S. No.	District	Year	Sand	Stone	Earth	Brick Earth	Total
1	Nagaon	2019-20	27974.57	34456	0	7000	69430.57
2		2020-21	45391.28	25618.984	45	16510	87565.264
3		2021-22	42247.96	34102.7	2544	13200	92094.66
4		2022-23	55389.694	95295.45	159627.16	68107	378419.304
5		2023-24	69354.115	124697.216	284672.198	124250	602973.529
6		2024-25	7800.5	37780.192	3612	0	49192.692
Total (INR)			248158.119	351950.542	450500.358	229067	1279676.019

**Table 4.2- Revenue received mineral wise (minor) in last five years
(2019-20) to (2024-25)**

Minor Minerals (Amount in Rs.)							
S. No.	District	Year	Stone	Sand	Earth	Brick Earth	Total
1	Nagaon	2019-20	14923344	10414985	0	315000	25653329
2		2020-21	10704963	12579142	113960	742950	24141015
3		2021-22	11897618	12549189	1068960	594000	26109767
4		2022-23	27193218	16475029	6669553	3064830	53402630
5		2023-24	25793681	14233328	13421174	5591250	59039433
6		2024-25	7859028	1807083	586500	0	10252611
Total			98371852	68058756	21860147	10308030	198598785

Minerals: Sand, Stone and Brick Earth


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 Regional Forest Officer

CHAPTER 5: DETAIL OF PRODUCTION OF SAND OR BAJRI OR MINOR MINERAL IN LAST THREE YEARS

Table 5.1: Sand Production details in last five years under Nagaon District

S. No.	Name of Mineral	Year	Units of quantity	Quantity
1.	Sand	2019-20	m ³	27974.57
2.	Sand	2020-21	m ³	45391.28
3.	Sand	2021-22	m ³	42247.96
4.	Sand	2022-23	m ³	55389.694
5.	Sand	2023-24	m ³	69354.115
6	Sand	2024-25(Up to Oct,24)	m ³	7800.5

Table 5.2: Stone Production details in last five years under Nagaon District

S. No.	Name of Mineral	Year	Units of quantity	Quantity
1.	Stone	2019-20	m ³	34456
2.	Stone	2020-21	m ³	25618.984
3.	Stone	2021-22	m ³	34102.7
4.	Stone	2022-23	m ³	95295.45
5.	Stone	2023-24	m ³	124697.216
6	Stone	2024-25(Up to Oct,24)	m ³	37780.192

Table 5.3: Earth Production details in last five years under Nagaon District

S. No.	Name of Mineral	Year	Units of quantity	Quantity
1.	Earth	2019-20	m ³	0
2.	Earth	2020-21	m ³	45
3.	Earth	2021-22	m ³	2544
4.	Earth	2022-23	m ³	159627.16

Minerals: Sand, Stone and Brick Earth 18

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 নগাঁও জিলা



5.	Earth	2023-24	m ³	284672.198
6.	Earth	2024-25 (UptoOct,24)	m ³	3612

Table 5.4: Brick Earth Production details in last five years under Nagaon District

S. No.	Name of Mineral	Year	Units of quantity	Quantity
1.	Brick Earth	2019-20	m ³	7000
2.	Brick Earth	2020-21	m ³	16510
3.	Brick Earth	2021-22	m ³	13200
4.	Brick Earth	2022-23	m ³	68107
5.	Brick Earth	2023-24	m ³	124250
6.	Brick Earth	2024-25 (UptoOct,24)	m ³	0



CHAPTER 6: PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS OF THE DISTRICT

6.1 INTRODUCTION

Streams, any running water from a rivulet to a raging river, complete the hydrologic cycle by returning precipitation that falls on land to the oceans. Some of this water moves over the surface and some moves through the groundwater. Flowing water does the work of both erosion and deposition.

6.2 EROSION BY STREAMS

Flowing streams pick up and transport weathered materials by eroding sediments from their banks. Streams also carry ions and ionic compounds that dissolve easily in the water. Sediments are carried as the following loads: dissolved, suspended, and bed. A dissolved load is composed of ions in the solution. These ions are usually carried by the water to the ocean. Sediments carried as solids as the stream flows are called suspended loads. The size of particles that can be carried within a load is determined by the stream's velocity. Faster streams can carry larger particles. Streams that carry larger particles have greater competence. Streams with a steep gradient (slope) have a faster velocity and greater competence. Particles that are too large to be carried as suspended loads are bumped and pushed along the stream bed, called bed load. Bed load sediments do not move continuously, but rather in intermittent movements called saltation. Streams with high velocities and steep gradients do a great deal of down cutting into the stream bed, which is primarily accomplished by the movement of particles that make up the bed load.

6.3 STAGES OF STREAMS

As stream flows from higher elevations, like in the mountains, towards lower elevations, like the ocean, the work of the stream changes. At a stream's headwaters, often high in the mountains, gradients are steep. The stream moves fast and does lots of work eroding the stream bed. As a stream moves into lower areas, the gradient is not as steep. Now the stream does more work eroding the edges of its banks. Many streams develop curves in their channels called meanders. As streams move onto flatter ground, the stream erodes the outer edges of their banks to carve a floodplain, which is a flat-level area surrounding the stream channel. The base level is where a stream meets a large body of standing water, usually the ocean, but sometimes a lake or pond. Streams work to down cut their stream beds until they

Minerals: Sand, Stone and Brick Earth

reach base level. The higher the elevation, the farther the stream is from where it will reach the base level and the more cutting it has to do.

6.4 STREAM DEPOSITION

As a stream gets closer to the base level, its gradient lowers and it deposits more material than it erodes. On flatter ground, streams deposit material on the inside of meanders. A stream's floodplain is much broader and shallower than the stream's channel. When a stream flows onto its floodplain, its velocity slows and it deposits much of its load. These sediments are rich in nutrients and make excellent farmland. A stream at the flood stage carries lots of sediments. When its gradient decreases, the stream overflows its banks and broadens its channel. The decrease in gradient causes the stream to deposit its sediments, the largest first. These large sediments build a higher area around the edges of the stream channel, creating natural levees.

When a river enters the standing water, its velocity slows to a stop. The stream moves back and forth across the region and drops its sediments in a wide triangular-shaped deposit called a delta. If a stream falls down a steep slope onto a broad flat valley, an alluvial fan develops. Alluvial fans generally form in arid regions.

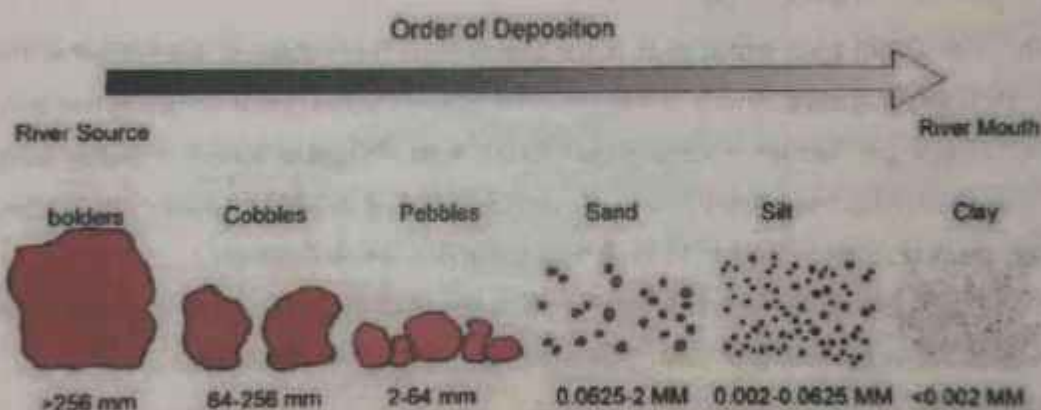


Figure 6.1: Representative diagram - Order of Deposition in River stream from origin to river mouth



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6.5 DRAINAGE CONTRIBUTING TO SEDIMENT DEPOSITION IN NAGAON DISTRICT:

The main river is the Brahmaputra flowing on the northern part of the district from east to west with its tributaries Kopili, Kalong and Sonai rivers. Among these, Kopili is the major river originating in the hills of Karbi Anglong to the south and flows on north-westerly direction and meet with Diyang River near Dhing. It follows north-westerly direction from Dhing to the same north-westerly trend up to Kampur and deflects towards west. Kalong, the tributary of Kopili joins the later near Jagiroad.

Apart from the above main rivers small streams and nalas attribute to the main rivers. The main river systems of the district is described below:

Kalong : The along takes off from Brahmaputra about 13 Km NE of Silghat and after flowing a meandering course through middle of the district, rejoins the parent river at kajalimukh about 24 Km upstream of Guwahati. In its upper reaches, the kalong is joined by Diju and Missa which drain the NW slopes of the Mikir Hills.

The region between kalong and Brahmaputra is drained by a large number of water courses and forms bills. The river Kalong forms an important role during flood period with water and submerging the entire water courses.

Kopili : The Kopili river which rises in the Jaintia Hills flows through North Cachar Hills, Mikir Hills and Nagaon district. Coming down the hills it flows in a NW direction and meets the eastern tributary Jamuna at Jamunamukh further west of Nagaon district. It finally merges into Kalong near Jagiroad after a course of 262 Km (102 Km in Nagaon district) . The Kopili basin comprises an area of about 1300 sq. Km and is rich in rice cultivation.

Jamuna : The Jamuna is the main tributary of Kopili and originate from the Mikir hills. After flowing for about 120 Km from east to west, it falls in Kopili at Jamunamukh.

Hydrogeology

large area near Lunding is occupied by the transgressive Surma Series which dip at very low but variable angles. The Surmas are predominantly argillaceous and as such clay and shale dominate over sandstone and siltstone. The northern and central parts of the district are mostly covered by alluvium of the Brahmaputra river system.

The Quaternary Group of sediments represented by unconsolidated alluvium covers large part of the district. These deposits comprise sands of various grades with minor silt and clay. The older alluvium comprising sand, silt and clay occurs in the present day channel of rivers Kalang and Kopili. The Newer alluvium is confined broadly to the area north of Kalang River and comprises medium to very coarse sand with gravel.

Minerals: Sand, Stone and Brick Earth

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A critical appraisal of aquifer zones encountered in the boreholes reveal that in the flood plain area is in the Kalang sub-basin the aquifers are not only extensive but thick and prolific. Clay predominance increases in the south and fine to medium grained sands occur in relatively very thin lenses indicating that the formations possibly belong to arenaceous facies of Tipam Group or Dupitila Group of Tertiary age.

Hydrogeologically the district is proved to be potential. Ground water in Nagaon district occurs in secondary porosity like fractures, fissures of Precambrian rocks and in the semi consolidated and unconsolidated formations of Tertiary and Quaternary age respectively. While the greater part of the district falls in Kalang sub-basin. In the Kalang sub-basin the alluvial formations show two characteristic features. In the northern part of the district particularly north of Sonai river, the alluvium comprising medium to coarse sand with gravel and pebbles from a single aquifer system of massive thickness. But in the south central and southern parts, which is broadly underlain by older alluvium, the clay proportion increases markedly. The clay beds act as confining layers. Thus ground water occurs both under confined, semi-confined and unconfined conditions.

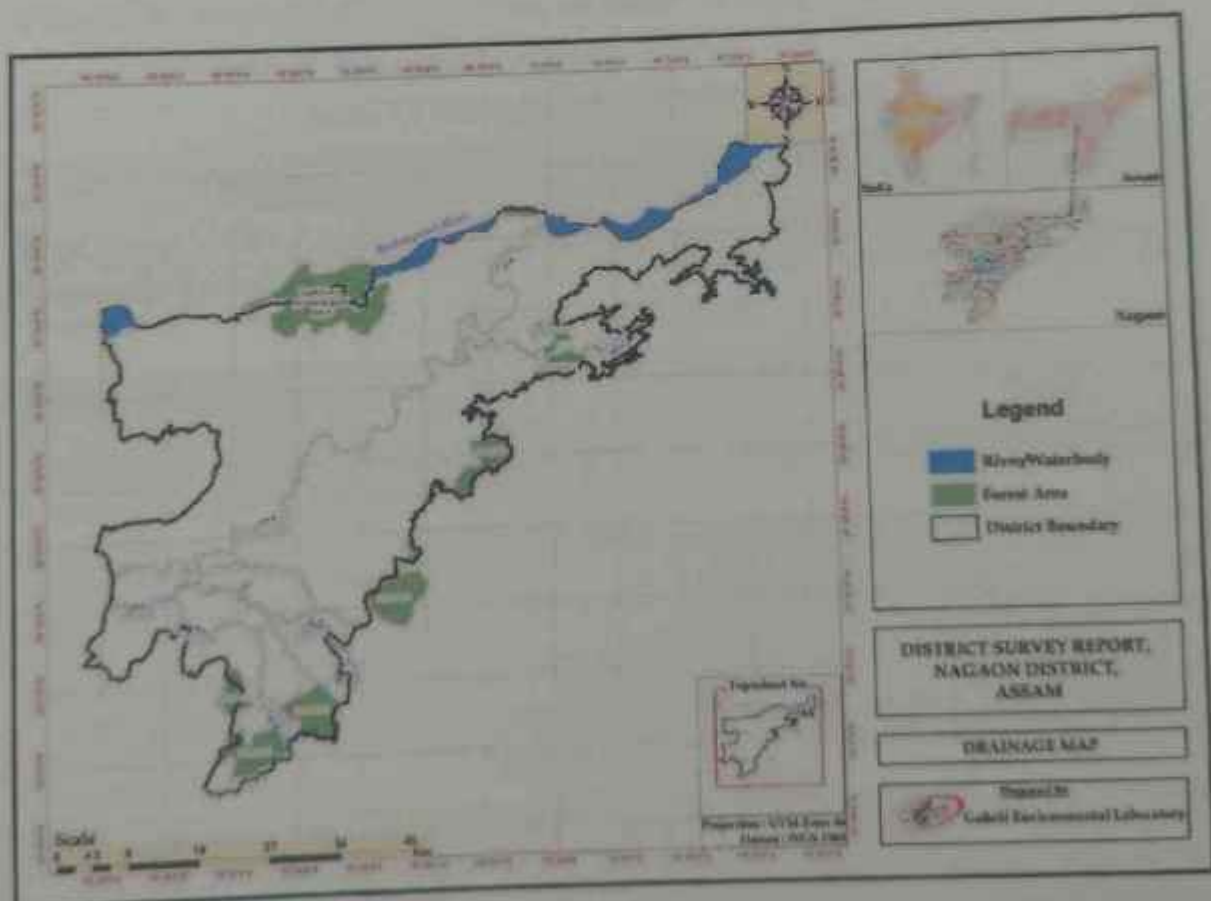


Figure 6.1: Drainage map of the Nagaon District



Table 6.1: Area of Catchment and Basin within Nagaon District:

S. No.	Name of River	Area Drained (In Ha.) (District)
1.	Borpani River	297.685
2.	Kopili River	526.664
3.	Brahmaputra River	4984.492
4.	Jamuna River	38.840

(Source: Digitized from Satellite Data)

CHAPTER 7: GENERAL PROFILE OF NAGAON DISTRICT

7.1 INTRODUCTION

The district of Nagaon stands on the south bank of the mighty river Brahmaputra. It is located in a central geographical position in the State of Assam. The district lies between 25°45" and 26°45" North latitudes and 91°50" and 93°20" East longitudes. On the north the district is bounded by the river Brahmaputra, on the east by Golaghat and Karbi- Anglong district, on south by Karbi Anglong and Dima Hasao districts and west by the Marigaon district which had been carved out of erstwhile Nagaon District.

At present the district Nagoan comprises three civil sub-divisions namely Kaliabor, Nagoan and Hojai. The districts consist of 7 revenue circles. All the Revenue circles comprise a total of 1412 villages. The names of Revenue Circles are: Kaliabor, Samaguri, Rupahi, Dhing, Nagaon, Raha, and Kampur,. The district possesses 13 Community Development Blocks. The district covers an area of 2,287 Sq.Km out of the State total areas of 78,438 Sq. Km The rank of the district in term of area is 4th among the district of Assam. The district has 17 towns. Out of which 4 towns are MBs, 4 are TCs and 9 are CTs.

Table 7.1 General profile of Nagaon District

Particular	Statistics
Geographical Area	2,287 Sq.km
Geographical Location	25°45' to 26°45' North latitudes and 91°50' and 93°20' East longitude
Temperature	34° Centigrade (Maximum), 11° Centigrade (Minimum)
Average Annual Rainfall (mm)	1541 mm
Boundaries	North- Bharmaputra River and Sonitpur District East- Golaghat & karbi anglong District West- Morigaon District South- Hojai & Dima Hasao District
District Headquarters	Nagaon town
Sub- Division	2 Nos. Nagaon Kaliabor
Revenue Circle	7 Nos.

Minerals: Sand, Stone and Brick Earth



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 আৰু প্ৰদূষণ
 নিয়ন্ত্ৰণ বোৰ্ড
 Kamrup Environmental
 Pollution Control Board

	Nagaon Raha Kampur Dhing Rupahi Samaguri Kaliabor
Development Block	13 Nos. Khagorijan Pakhimoria Dolonghat Raha Batadraba Juria Ruphihut Bajiagaon Pachim Kaliabor Kaliabor Lowkhowa Barhampur Kathiatoli
Number of Villages (As per Census 2011)	1412
Municipal Board	4 Nos. Nagaon MB Dhing MB Raha MB Kampur MB
Population (As per Census 2011)	Total : 28,23,768 Male : 14,39,112 Female : 13,84,656 Density (per square kilometers) : 711 Sex Ratio (No. of female per 1000 male): 962

Minerals: Sand, Stone and Brick Earth

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Historical Places/Places of Interest in Nagaon :	1) Bratadowa Than / Baishanvi Temple 2) Kamakhya Temple at Sailghat 3) Champawati water fall (23 KM east from Nagaon town) 4) Baduli Khurung at Kandali (25KM east from Nagaon town) 5) Ranthali traditional orngament manufacturing village (About 20KM far from Nagaon Town) 6) Silghat (Jute mill)
Literacy Rate	72.4 %
Language	Major Language Spoken: Assamese, Hindi and Bangali
Major Physiographic Units	Piedment plain, flat alluvial plain (older and younger alluvial) and Inselberges (Granites & Gneisses)
Major Drainage	Brahmaputra and its tributaries mainly Kolong, Kopili, Sonai and Diyang.
National Park	Kaziranga National Park
Wild Life Sanctuary	Laokhowa-Bura Chapori Wildlife Sanctuary

Source: <https://nagaon.assam.gov.in/about-us/district-profile> and *District Census Handbook, Nagaon, 2011*



অসম পৰিবেশন সংৰক্ষণ আয়তন
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 The Assam State Environmental Impact Assessment Authority

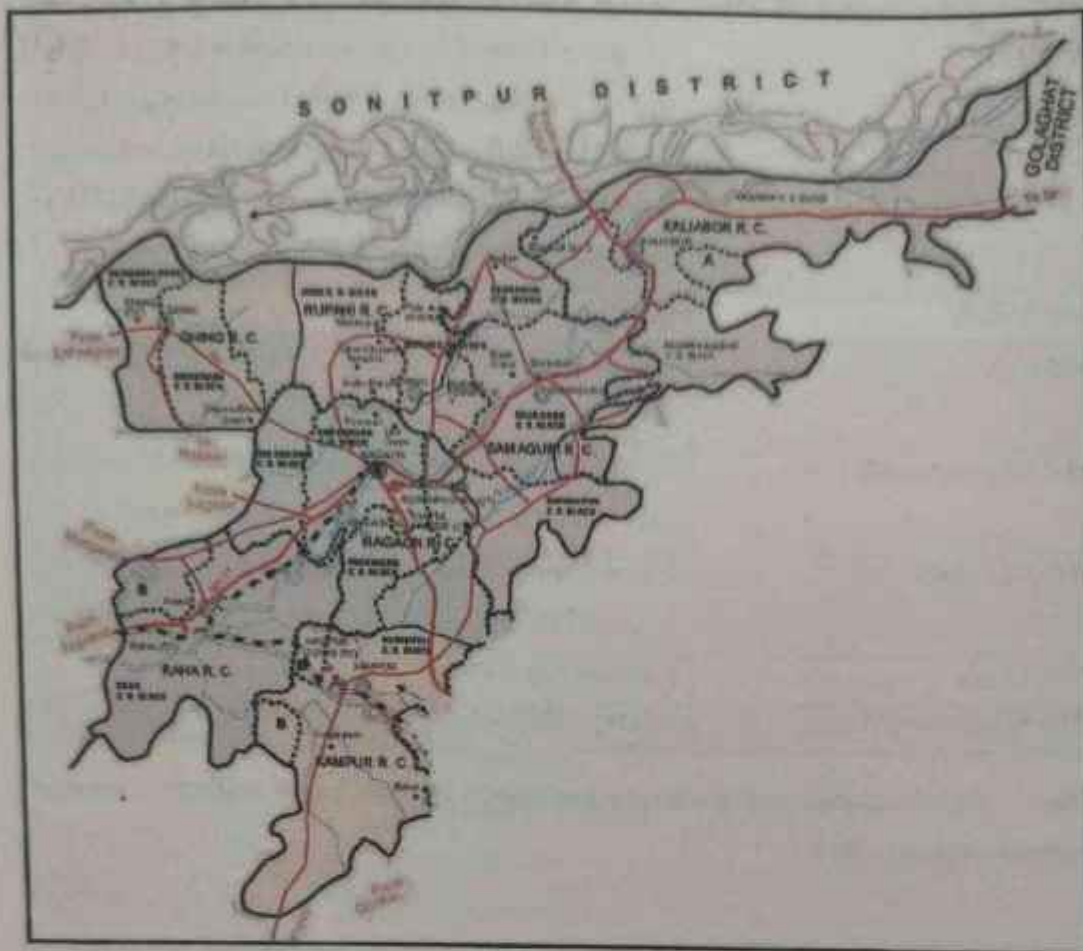


Figure 7.1 Map of Nagaon District

7.2 INFRASTRUCTURAL FACILITIES AND AMENITIES IN THE DISTRICT:

Information on amenities has been provided based on information available in 2011 Census. The Infrastructural facilities and amenities like Education and Health is provided in subsequent paragraphs of this section.

(a) Medical Facilities:

According to the Census-2011, there are 80 primary Health Centers and 354 Primary Health Sub centers present in the district. Apart from these, there are 33 Maternity and Child Welfare Centers, 26 Hospital Allopathic, 5 Hospital Alternative Medicine, 35 dispensaries, 58 Veterinary Hospitals and 170 Family Welfare Centers. The data for the medical facilities of the district demonstrate the poor condition and lack of basic health facilities in the district.

Minerals: Sand, Stone and Brick Earth

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 ডিস্ট্রিক্ট ফোর্স (১৭৫৪)
 নগাঁও (অসম)

Table 7.2: Health care Amenities in the District

Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternal & Child Welfare Centre (Numbers)	Hospital Allpat hic (Numbers)	Hospital Alternat ive Medicine (Numbers)	Dispens ary (Numbers)	Veterin ary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
80	354	33	26	5	35	58	7	170

(b) Educational Facilities:

In the district, the numbers of Primary schools include 2477 Govt. and 489 Private schools, 1340 Govt. Middle Schools, 279 Private Middle Schools and Secondary Schools include 316 Government schools and 144 private schools and Senior Secondary Schools include 68 Government and 22 private schools.

Also, there are 20 Government Arts and Science Degree Colleges, 16 Private Arts and Science Degree College, 2 Govt. Management Institute, 3 Govt. Polytechnic, 5 Govt. Vocational Training School/ITI , 15 Private Vocational Training School/ITI, 29 Government Non-Formal Training Centers, 2 Private Non-Formal Training Centre, 2 Government School for Disabled and 1 Private School for Disabled.

The data shows that Primary schools, Secondary schools / Senior Secondary Schools and College are good enough in the 'District'.

Table 7.3: Educational Amenities in the District

Govt Primary School (Number s)	Private Primary School (Number s)	Govt Middle School (Number s)	Private Middle School (Number s)	Govt Secondary School (Number s)	Private Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Private Senior Secondary School (Numbers)
2477	489	1340	279	316	144	68	22
Govt Arts and Science Degree College	Private Arts and Science Degree College	Govt Engineer ing College	Private Engineer ing College	Govt Medicine College (Number s)	Private Medicine College (Numbers)	Govt Managem ent Institute (Numbers)	Private Managem ent Institute

Minerals: Sand, Stone and Brick Earth

20



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College (Number)	College (Number)	(Number)	(Number)	(Number)	(Number)	(Number)	(Number)
20	16	0	0	0	0	2	0
Govt Polytechnic (Number)	Private Polytechnic (Number)	Govt Vocational Training School/ITI (Number)	Private Vocational Training School/ITI (Number)	Government Non-Formal Training Centre (Number)	Private Non-Formal Training Centre (Number)	Government School for Disabled (Number)	Private School for Disabled (Number)
3	0	5	15	29	2	2	1

(Source: As per Census Data, 2011)

7.3 NATIONAL PARK AND WILDLIFE SANCTUARY IN THE DISTRICT:

KAZIRANGA NATIONAL PARK

Kaziranga National Park lies partly in Golaghat District and partly in Nagaon District of Assam. It is the oldest park in Assam covers an area of 430 Sq kms along the river Brahmaputra on the North and the Karbi Anglong hills on the South. The National Highway 37 passes through the park area and tea estates, hemmed by table-top tea bushes. One can even see the rhinos and wild elephants straying near the highway.

Kaziranga National Park a world heritage site is famous for the Great Indian one horned rhinoceros, the landscape of Kaziranga is of sheer forest, tall elephant grass, rugged reeds, marshes & shallow pools. It has been declared as National Park in 1974.

Kaziranga National Park is one of the last areas in eastern India undisturbed by a human presence. It is inhabited by the world's largest population of one-horned rhinoceroses, as well as many mammals, including tigers, elephants, panthers and bears, and thousands of birds.

Source: <https://nagaon.assam.gov.in/tourist-place-detail/220>



Figure 7.1: Kaziranga National Park

LAOKHOWA-BURACHAPORI WILDLIFE SANCTUARY'S

The Laokhowa and Burhachapori Wildlife Sanctuaries are two centrally located Protected Areas of Assam, surrounded by many key PAs like Kaziranga National Park to the east, Orang National park and Pobitora Wildlife sanctuaries to the west, Pakke-Nameri NPs to the north and the rich reserve Forests of Karbi Anglong to the south. The PAs act as connecting corridor for migration of animals between Kaziranga and Orang National parks and hence, has been identified as Buffer Zones of Kaziranga Tiger Reserve. The mighty Brahmaputra River flows through the northern boundary of the Burhachapori Wildlife Sanctuaries creating a large number of river islands. The rich ecosystem of the Laokhowa Burhachapori characterized by grasslands, woodlands and numerous wetlands along with the Brahmaputra River Islands are home to numerous species of endangered mammals, reptiles and birds.

Minerals: Sand, Stone and Brick Earth





Figure 7.2: Wildlife Found in Laokhowa-Burachapori Wildlife Sanctuary's

7.4 DETAILS OF FOREST AREA UNDER VARIOUS RF'S IN THE DISTRICT

Table 7.4: Details of forest area under various RFs

Sl No	Name of RFs	Area in (Ha)
1	Barpani RF	3127.90
2	Lutumari RF	3187
3	Jakota RF	139
4	Pilkhana RF	166
5	Bamuni RF	87.42
6	Daboka RF	170
7	Dhuadalani RF	5
8	Kamakhya Hill RF	518
9	Kaphitali RF	292
10	South Diyu RF	1347
11	North Diyu RF	987
12	Swang RF	2645
Total		12671.32

CHAPTER 8: LAND UTILIZATION PATTERN IN THE DISTRICT: FOREST, AGRICULTURE, HORTICULTURE, MINING ETC

Land use map of the district have been prepared using the Satellite Image LISS 4, May, 2024. The false color composite map has been decoded to obtain the larger classification of land use in to Agriculture, settlement, plantation, horticulture, forest, mining, wasteland, reservoir, water body and river.

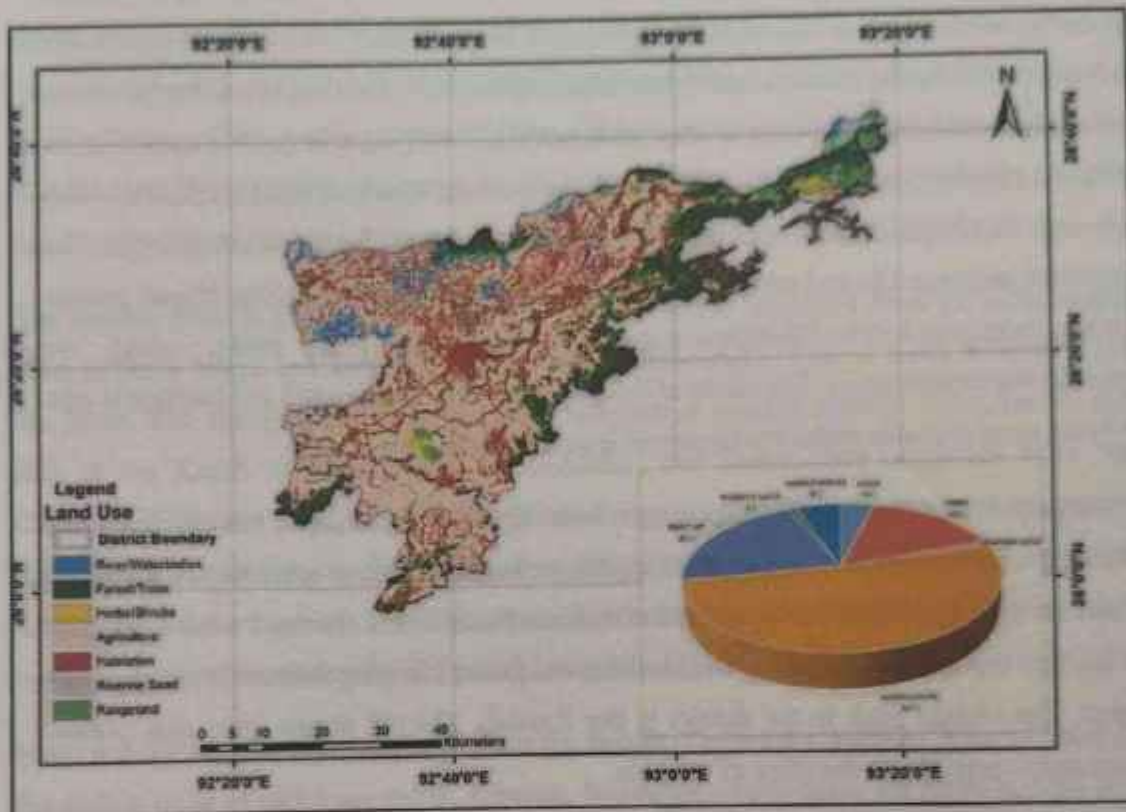


Figure 8.1: Land Use Land Cover Map

Table 8.1: Land use breakup of the Nagaon District

S. No.	Particulars	Percentage
1.	Agriculture	52 %
2.	Built-up	21 %
3.	Riverine Sand	1 %
4.	Herb/Shrubs	5 %
5.	River	4 %
6.	Tress	16 %
7.	Marshy Land	1 %
	Total	100%

Minerals: Sand, Stone and Brick Earth



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CHAPTER 9: PHYSIOGRAPHY OF THE DISTRICT

9.1 PHYSICAL FEATURES

Topographically, the district Nagaon is a heterogeneous land composed of both high hills, low lands and level plains like that of other districts of Assam. Across the centre of the plain there are wide fields of cultivated land extending from Silghat on the North-East to Jaji on the south-west. There are wide expanses of grassland on the north-west and of forest and hills on the south and east. The general appearance of the district is extremely picturesque. On every side there are swamps and rivers, hills and woods, which depict variety of scene. The land bordering the south bank of the Brahmaputra is low-lying area and is deeply flooded during the rainy seasons. For the greater part of the year the area is covered with grasses and reeds such as Khagari, Ekra and Nal (reed) which grow from three to six meters high. The higher land produces Ulu and other kinds of shorter grasses used for thatching. Nepali grazers generally keep large herds of Buffaloes and Cows on the chars or sand banks, which are formed by the Brahmaputra. The South of the Kopili between Dharamatul and the hills is also low lying areas It is also subject to flood and is covered with high grasses.

The elevated tracts consist of a range of low hills. The major portion of the hilly tract lies within the erstwhile Karbi Anglong & Dima Hasao but the Western spurs from Kulthars to Dabaka lie in Nagoan. The hill is covered with dense forest. There are many other small hills and hillocks that can be seen in the Doboka reserved forest, Lunding reserved forest and near Silghat. The highest peak in the district is Bar Kandali. The hill people grow rice, potato, cotton and vegetables on the slope of the hills.

The principal river is the Brahamaputra, which flows along the northern border of the district. The main tributaries in the districts are the Diphlu, Kalang, Sonai, Leteri and Pakaria. The Brahmaputra river gets another name Lauhitya which is evidently a Sanskrit form of a Tibeto-Burman name Luhit. The word Luhitya means blood. It is so called because the river becomes red in colour during the rainy season when it cuts through the red soil. As per mythology however, it is said that Parashuram, the great saint had washed off his blood stains of matricide with the water of the Brahmaputra and regained his sainthood. The river got crimson with Parashuram's mother's blood and so the river came to be known as the Lauhitya. The other opinion is that name Brahamaputra means son of Bramha. The Ahoms called the river Nam-Dao-Phi. It means the river of the 'Star-God'.

Minerals: Sand, Stone and Brick Earth

34

The river Kalang takes off from the Brahmaputra about thirteen kms north-east of Silghat and after flowing a tortuous course through the middle of the district passes Kaliabor, Nagoan, Raha and Jagi. It rejoins the parent stream at Kajalimukh. In its upper reaches the Diyu and the Missa join it. The Nanoi or Haria flows for some distance parallel to the Kalang river and finally falls at Raha, the Kopili after receiving the waters from Barapani and Umiam falls into the Kalang at Jagi.

The Kopili River rises in the Jaintia hill and passing through Dima Hasao (N.C Hills) it joined by a branch channel with the Kalong river and at Jagi it finally meets the main stream of the Kalang. This combined channel finds its way in to the mighty Brahmaputra near Kajalimukh. The principal tributaries on the right bank are the Doiang, Lankajan and the Jamuna. On the left bank the Kolanga, Barapani and the Umian join the Kopili.

The Jamuna River is the main tributary of the Kopili which originates from the Khanbamun Hills of Dima Hasao and falls in the Kopili near Jamunamukh. Several small tributaries led the River. The Barapani which originates at Meghalaya passing through Dima Hasao and falls at the Kapili of Nagaon near Chaparmukh. The Nanoi river originates from the Chapanala Hills and flows through the plains of Nagaon district. It meets the Kalang near Raha. The Umian originates from Meghalaya and flows from South to North and meets the Kopili at Naldhara Noabeel. In addition to above rivers there are other important tributaries, many streams and streamlets locally called Jan and Juri in the district.

Beels and marshes are scattered throughout the district. There are more than hundred beels in the district most of which are public fisheries. Important among them are Mora Kalang and Kachudhara which have formed in the old bed of the Kalang. Other important beels is the Pota-Kalang in the town mauza, Lalung beel in the Namali mauz and Haribhanga beel near Laokhoa beel and marshes teem with fish and are the haunt of wild birds like the crane, pelican or fish eagle and the kingfisher. Beels and marshes dominate the economy of the district to a great extent. The district is rich in fish and is a source of income for the district as well as for the people.



CHAPTER 10: RAINFALL: MONTH-WISE

10.1 CLIMATE OF THE DISTRICT

The area experiences hot sub tropical humid climate. A hot and humid pre-monsoon from March to mid May, a prolonged southwest monsoon or rainy season from mid May to September, a pleasant post-monsoon or retreating monsoon from October to November and a cold pleasant winter from December to February are the characteristics of the general climate. Summer runs concurrently with the later part of the pre-monsoon season and continues throughout the monsoon season. Sometimes, the monsoon commences in mid-May and ends in mid-September. Therefore, the boundaries between the seasons are not very rigid.

10.2 TEMPERATURE

The mean daily maximum temperature during winter is about 25°C and minimum is 11°C. The mean daily maximum temperature during summer is 34°C and the minimum is 24° C. The relative humidity varies from month to month and increases from 76% to 84% during the South west monsoon and is about 77% in rest of the year. The humidity varies throughout the year but seldom drops down below 67%. The average annual rainfall is 1541 mm. Rainfall is confined mainly during the monsoon season.

10.3 RAINFALL OF THE DISTRICT

Table 10.1: Month wise yearly rainfall data in the Nagaon district

Month	2018	2019	2020	2021	2022
January	7.5	2.4	11.8	1.5	31.0
February	1.1	22.6	7.2	2.6	20.0
March	32.8	44.0	7.8	19.7	4.5
April	94.2	81.6	106.5	25.1	80.2
May	72.5	152.1	153.2	88.0	95.1
June	254.9	161.4	150.1	146.5	188.3
July	157.3	178.8	118.5	155.1	100.9
August	253.8	188.4	92.4	143.6	113.8
September	68.5	121.2	162.5	93.4	67.3
October	14.6	128.4	158.4	48.2	105.4
November	0.8	11.9	6.0	0.0	0.0
December	28.5	1.6	0.0	1.5	2.5
Average	82.21	89.53	81.20	60.43	67.41

Source: CRIS, Hydromet Division, IMD-District Nagaon

CHAPTER 11: GEOLOGY AND MINERAL WEALTH

11.1 INTRODUCTION

Nagaon district is situated in the central portion of Assam State and is represented by a vast plain with small hills on northern, southern and eastern part. Nagaon is the district headquarter of the district.

The district is bounded by Brahmaputra & Sonitpur district on the north, towards south lies West Karbi Anglong and North Cachar Hills, towards its east lies the districts of East Karbi Anglong and Golaghat.

The district extends between 25° 45' to 26° 45' North Latitudes. Its highlands include the Hatimura Parbat with an elevation of 186.5 m, the Barkandali with an altitude of 853 m and the Kamakhya Parbat with an altitude of 244 m. The average altitude of the district is 60.6 m. Its major rivers include the Brahmaputra, Kalong, Sonai, Nanoi, Jamuna, Kopili and the Barapani.

11.2 GEOMORPHOLOGY OF THE DISTRICT

The major geomorphic units in the district are - i. Denudational hills, ii. Piedmont zone, iii. Flood plain deposits with Charland and Swampy areas.

- i. Denudational Hills: It occupies eastern and southern part of the district comprising parts of Karbi angling hills and N.C.hills. They are NE-SW trending rugged topographic highs standing out due to differentiated erosion. The hilly terrain is covered by thick mantle of lateritic deposit and is densely forested.
- ii. Piedmont Zones: These zones occur at the contact of the Denudational hills and plains. They are high land forms deposited adjacent to hill slopes by fluvial action. They consist of assorted admixture of cobbles, pebbles, sand and a matrix of clay.
- iii. Flood Plain deposits: Flood Plain deposit occupy a major part of the district with huge thickness of unconsolidated alluvial sediment deposited by the mighty Brahmaputra and its tributaries. The Kopili River on the south and the Kalong River on the north-east have deposited the sediment during floods.
- iv. Charland: Charland is relatively low lying area along the river Brahmaputra within the recent flood plain. The area is characterized by fertile land with sandy and silty loam. The Charland is formed due to oscillation of the river water which is either washed away by subsequent floods or strengthened by further deposition.



71
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v. Swampy areas: Swampy areas are low lying areas or the natural depressions created due to change of river courses as abandoned channels or meander lakes. They are locally known as beels and are found abundantly in the district.

Source: CGWB, Aquifer Mapping and Management of Ground Water resources, Nagaon district, Assam

11.3 GEOLOGY OF THE DISTRICT

Geologically the district is underlain by rocks of Precambrian age consisting of granites and gneisses, rocks belonging to Barail and Surma series of Tertiary age and Quaternary alluvium. Since the Archaean and Precambrian granites and gneisses form the basement or are found as inselbergs projecting out the plains alluvial stretch. They are not of much significance from ground water point of view. The younger Tertiary formations are found confined to Luming, Lanka and Hojai areas and in the east and north east. The rocks comprise massive and compact sandstones and shales.

The district is occupied by Consolidated Formations belonging to Pre-Cambrian Groups of rocks, Semi-consolidated Formations of Tertiary age and overlain by Unconsolidated Alluvial sediments of Quaternary age. The Pre-Cambrian rocks occupy about 3 % and the semi-consolidated Tertiary Group is an about 5 % of the TGA of the district. The Unconsolidated.

Source: Ground Water Information Booklet, Nagaon district, Assam

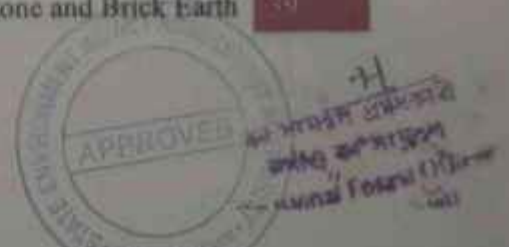
11.3.1 Regional Geology

The Assam plateau lies along the contribution of the Archeans of Bihar and comprise Garo, Khasi, Jaintia hills and to its north-east is the detached area of Mikir hills. Tertiary rocks are well developed in the northern- eastern and south-eastern part where they exhibit a more or less complete geological succession ranging from Paleocene to Lower- Pleistocene. The generalized geological succession of Assam is as follows:

Age		Group	Formation	Description of Litho units
Quaternary	Recent		Khadar-newer alluvium	Clay, sand, silt etc.
Unconformity				

	Pleistocene		Bhanger-Older alluvium	Clay, coarse sand, gravel & boulder
Tertiary	Pleistocene	Dihing	Dihing	Pebble bed, sandy clay, conglomerate and sand stone
	Mio-Pliocene		Dupitila (Surma Valley) & Namsang (Upper Assam)	Sandstone, mottled clay, grid, conglomerate bed
	Miocene	Tipam	Girujan	Mottled clay, sandy shale & sandstone
		Surma	Bokabil	Sahle, Sandy Shale, sandstone etc.
			Bhuban	Alteration of sandstone, Sandy shale & conglomerate
Unconformity				
	Oligocene	Barail	Tikok Parbat	Banded sandstone with thick coal seams
			Borgolai	Sandstone & shale with numerous thin coal seams, carbonaceous shale, sandstone etc.
			Nagoan	Thin bedded hard sandstone with shale
	Eocene	Disang		Dark grey shale & sandstone
		Jayantia	Kopili	Sahle, sandstone etc.
			Sylhet Sandstone	Sandstone, coal, clay & shale
			Sylhet Limestone	Fossiliferous limestone
Unconformity				
Mesozoic	Jurassic		Volcanic	Trap, basaltic &

Minerals: Sand, Stone and Brick Earth



				doleritic rock
Unconformity				
Palaeozoic	Permian	Gondwana	Singimari	Buff colored fine grained sandstone, shale, carbonaceous shale with coal & conglomerate etc.
Unconformity				
Proterozoic	Precambrian	Shillong		Granite, pegmatite, alternating bed of clay, quartzite, phyllite, basalt conglomerate etc.
Unconformity				
Azoic	Archean	Gneissic		Granite, pegmatite, metadolerite, amphibolites, biotite, hornblende, gneiss, calc granulite, pyroxenite etc.

(Regional geology is based on Miscellaneous Publication No. 1 of Directorate of Geology and Mining, Government of Assam)

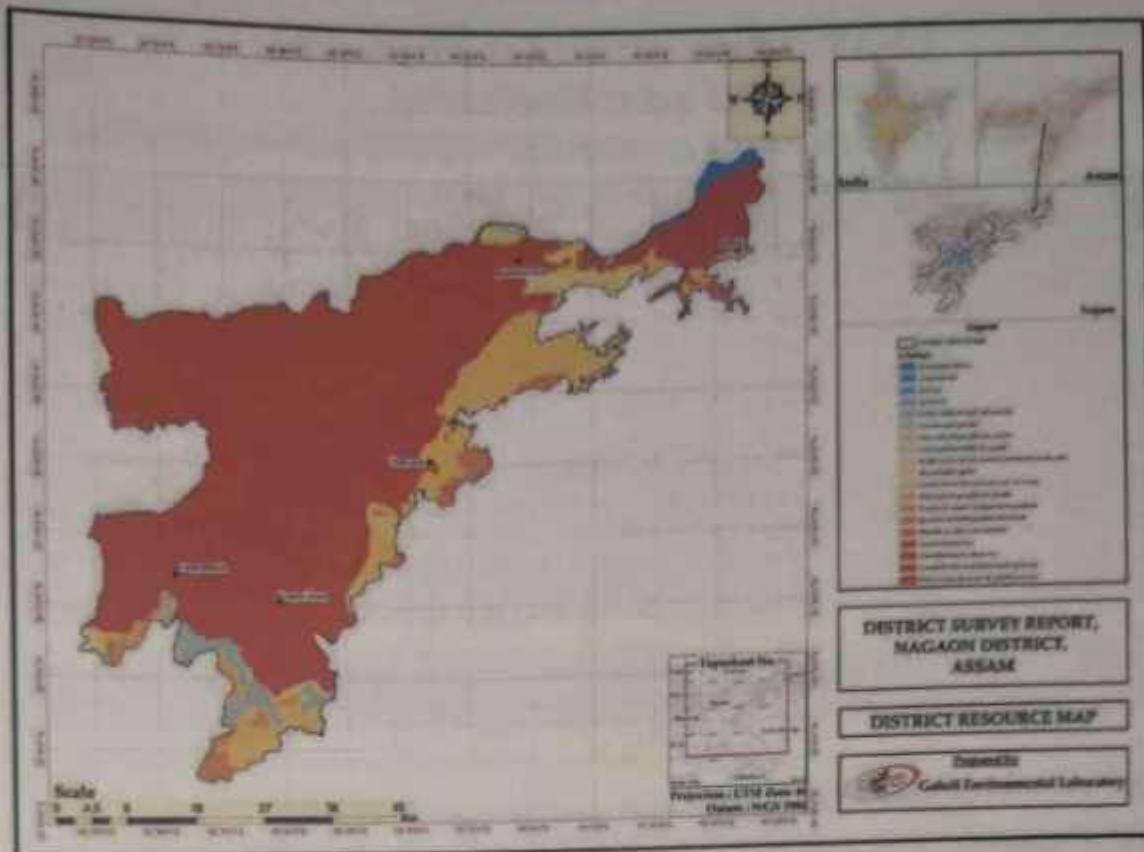


Figure 11.1: District Resource Map

Minerals: Sand, Stone and Brick Earth

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কেন্দ্র
Regional Project Office

CHAPTER 12: DISTRICT DETAILS

12.1 Identification of Rivers and other leases within the district

Table 12.1: Total no. of leases in the district (River wise and non-river bed mines)

River Bed Mines		
Sr. No.	River Name	No. of Leases
1	Borpani River	4
2	Kopili River	10
3	Jamuna River	1
Non- River Bed Mines		
Sr. No.	Mineral Name	No. of Leases
4	Stone	11
5	Brick Earth	2
TOTAL		28

12.2 Description of Individual Rivers

12.2.1 Borpani River

Borpani River originates from Shillong hills of Meghalaya about 1300m in altitude and it enters into Karbi Anglong. It enters in Nagaon District from SE direction. Two power projects is situated on Borpani River in Assam i.e., 1. Karbi Langpi Hydro Electric Project (KLHEP) which is situated in Karbi Anglong District of Assam and 2. Karbi Langpi Middle-II Hydro-Power Project. It is situated in Nagaon District of 24MW run-of river scheme. A Gravity and Masonary Dam is situated upon the Borpani river named Karbi Longpi Dam in Assam of about 197m in length and 35m in height. Total Length of Borpani River is about 34.6km in Nagaon District.

12.2.2 Kopili River

The Kopili river which rises in the Jaintia Hills flows through North Cachar Hills, Mikir Hills and Nagaon district. Coming down the hills it flows in a NW direction and meets the eastern tributary Jamuna at Jamunamukh further west of Nagaon district. It finally merges into Kalong near Jagiroad after a course of 262 Km (102 Km in Nagaon district) . The Kopili basin comprises an area of about 1300 sq. Km and is rich in rice cultivation.

12.2.3 Jamuna River

The Jamuna River, the main tributary of the Kopili originates from the Khanbamun hills in Karbi Anglong District and flows from east to west and falls in the Kopili near Jamunamukh.

The Jamuna River flows through the town of Jamunamukh in the Hojai district of Assam, India

12.3 Description of mine leases river wise

Table 12.2: Status of leases in the district (River wise)

S. No.	River Name	No. of Leases	Number of Existing Mine (with EC)	Number of leases Proposed (Mine Plan is approved)	Number of leases Proposed (Mining Area in Past)	Number of leases Future Proposal
1	Borpani River	4	0	1	1	2
2	Kopili River	10	1	2	5	2
4	Jamuna River	1	1	0	0	0
	TOTAL	15	2	3	6	4

Table 12.3: Status of leases in the rivers (Mineral-wise)

S. No.	River Name	No. of Leases	Sand
1	Borpani River	4	4
2	Kopili River	10	10
4	Jamuna River	1	1
	TOTAL	15	

12.4 Description of Individual lease-River wise

12.4.1 Description of Leases in Borpani River

Table 12.4: Details of Borpani River

Sr. No.	Description	Area in Ha.	Percentage of Total area (In %)	Cumulative %
1.	Borpani River area in the district	297.685	100	100
2.	Area already granted in the Borpani River	9.45	3.17	3.17



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 District Survey Report
 Nagaon District, Assam

3.	No of lease not recommended for future Quarry Lease grant due extracted up to a distance of 1 kilometer (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.	2.38	0.80	0.00
4.	Area not recommended for future Quarry Lease grant due to 100 m Buffer from any railway line or bridge	0.00	0.00	0.00
5.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway and other roads	6.30	2.11	2.91
6.	Area not recommended for future Quarry Lease grant due to non-availability of un-mined block 50 meters width after every block of 1,000 meters over which is undertaken or at such distance as may be directed by the competent authority	0.00	0.00	0.00
7.	Area not recommended for future Quarry Lease grant due to 100 m Buffer Local Minor Check Dam	0.00	0.00	0.00
8.	Area not recommended for future Quarry Lease grant due to 500 m buffer from the irrigation Structure/Reservoir & Submergence Area	0.00	0.00	0.00
9.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Canal/Tank/Lake	0.00	0.00	0.00

Minerals: Sand, Stone and Brick Earth

41

10.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Ropeway or ropeway trestle or station	0.00	0.00	0.00
11.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Heritage site, Protected monuments	0.00	0.00	0.00
12.	Area not recommended for future Quarry Lease grant due to Eco-sensitive Zone	0.00	0.00	0.00
13.	Applicability of Cluster (Other lease within 500 meter radius.	--	--	--

Table 12.5: Details of Individual leases of Borpani River (Proposed (Mine Plan is approved))

S No.	Mine Name	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion)	Sand	4.50	Track 1	
				26° 9'21.40"N	92°34'13.71"E
				26° 9'17.94"N	92°34'10.87"E
				26° 9'17.93"N	92°34'12.11"E
				26° 9'20.04"N	92°34'15.24"E
				Track 2	
				26° 8'51.18"N	92°31'52.26"E
				26° 8'49.74"N	92°31'51.84"E
				26° 8'42.90"N	92°32'10.20"E
				26° 8'43.65"N	92°32'9.97"E
				Track 3	
				26°10'16.57"N	92°31'10.28"E
				26°10'16.24"N	92°31'9.09"E
				26°10'11.41"N	92°31'11.38"E
				26°10'11.56"N	92°31'12.78"E
				Track 4	
				26°10'58.86"N	92°30'36.30"E
				26°10'53.70"N	92°30'35.58"E
				26°10'53.28"N	92°30'36.84"E
				26°10'58.80"N	92°30'37.80"E

Minerals: Sand, Stone and Brick Earth

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Table 12.6: Details of Individual leases of Borpani River (Proposed (Mining Area in past))

S No.	Permit area details	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Borpani Sand Permit Area No. 1 (A) of 2020-22	Sand	4.95	Part 1	
				26° 9'11.03"N	92°34'25.80"E
				26° 9'11.44"N	92°34'26.65"E
				26° 9'10.43"N	92°34'34.16"E
				26° 9'9.90"N	92°34'34.90"E
				Part 2	
				26° 5'42.60"N	92°37'23.20"E
				26° 5'47.94"N	92°37'9.93"E
				26° 5'54.07"N	92°37'9.63"E
				26° 5'52.19"N	92°37'8.40"E
				26° 5'59.31"N	92°37'9.31"E
				26° 5'56.58"N	92°37'7.98"E
				26° 6'1.53"N	92°37'7.19"E
				26° 6'5.92"N	92°37'9.64"E
				26° 6'6.85"N	92°37'8.00"E
				26° 6'12.92"N	92°37'5.25"E
				26° 6'14.03"N	92°37'7.11"E
26° 6'17.28"N	92°37'8.47"E				
26° 6'18.35"N	92°37'7.82"E				

Table 12.7: Details of Individual leases of Borpani River (Future Proposal)

S No.	Permit area details	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Borpani Sand Permit Area (Govt. Permit)	Sand	4.95	25°58'14.7" N	92°35'30.2" E
				25°58'12.2" N	92°35'36.1" E
				26°04'07.1" N	92°37'11.0" E
				25°04'01.3" N	92°37'05.4" E
2.	Borpani Sand Permit Area Part-	Sand	2.02	26°10'25.20" N	92°31'15.40" E
				26°10'16.29" N	92°31'09.01" E
				26°10'17.08" N	92°31'10.06" E
				26°10'22.60" N	92°31'04.75" E

Minerals: Sand, Stone and Brick Earth

46

District Survey Office
 Nagaon, Assam

1(B) Down Site (Govt. Permit)			26°10'26.13" N	92°31'06.95" E
			26°10'25.87" N	92°31'13.85" E
			26°10'25.20" N	92°31'07.20" E
			26°10'22.40" N	92°31'06.20" E

Borpani River area in the district is 297.685 Ha and area already granted in Borpani River is 9.45 Ha. The riverbed is having a total of 04 mine leases of mineral- Sand. Out of these 04, 01 mine lease is proposed (Mine plan is available), 01 mine lease is expired (mining in past) and 02 mine leases are future proposal. There is no applicability of Cluster, as there is no presence of leases within 500-meter radius having homogeneous mineral.

On the basis of distance criteria, Go- zone and No-Go zone has been identified. Total Go zone area is 0.87 Ha and No-Go zone area is 8.68 Ha. Out of total allotted 9.45 Ha area, 6.30 Ha and 2.38 Ha Area is not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway and other roads and due extracted up to a distance of 1 kilometer (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 respectively.

Map showing the identification of Go- zone and No-Go zone for each individual lease has been prepared and given below:



অসম পৰিবেশন সংৰক্ষণ আৰু
প্ৰদূষণ নিয়ন্ত্ৰণ বিভাগ
Disposal Form



Figure 12.1: 100m Buffer Map (Google Image)



Figure 12.2: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



Figure 12.3: 100m Buffer Map (Google Image)



Figure 12.4: 100m Buffer Map (Satellite Image)

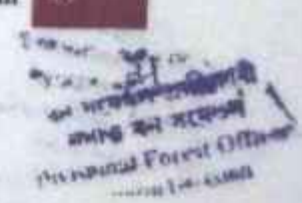




Figure 12.5: 100m Buffer Map (Google Image)

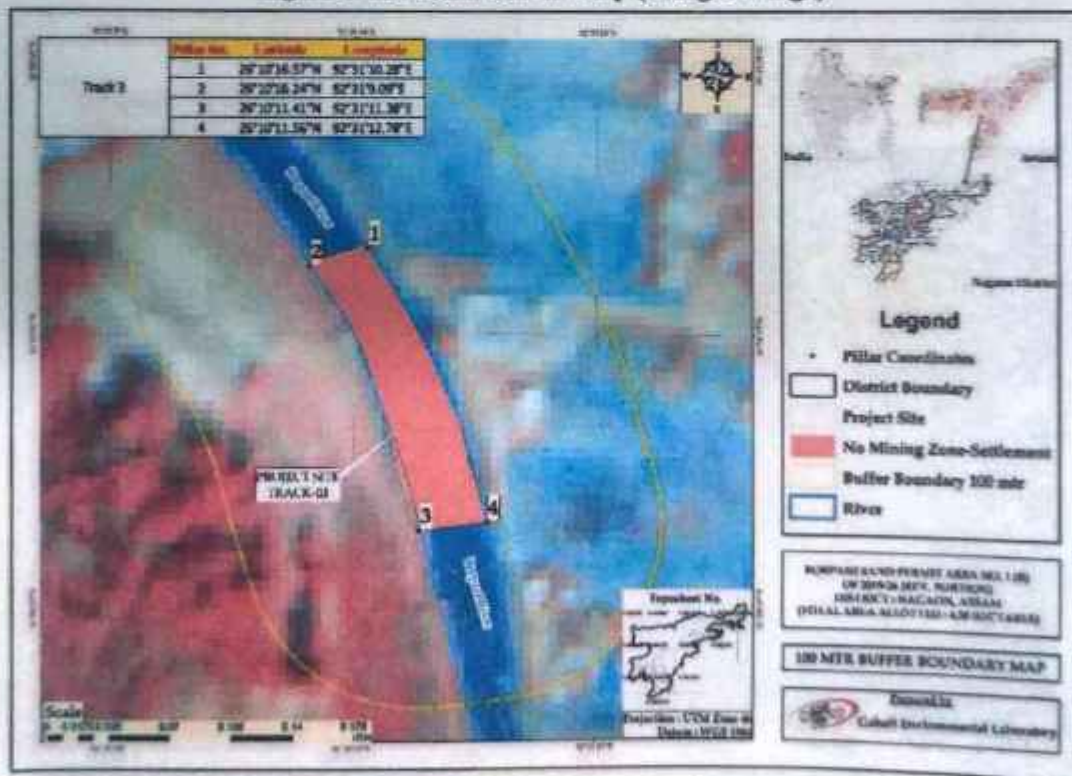


Figure 12.6: 100m Buffer Map (Satellite Image)

ডিষ্ট্রিক্ট ফরেস্ট অফিচাৰী
 নগাঁও জিলা অফীচ
 Divisional Forest Officer
 Nagaon (A-1334)



Figure 12.7: 100m Buffer Map (Google Image)

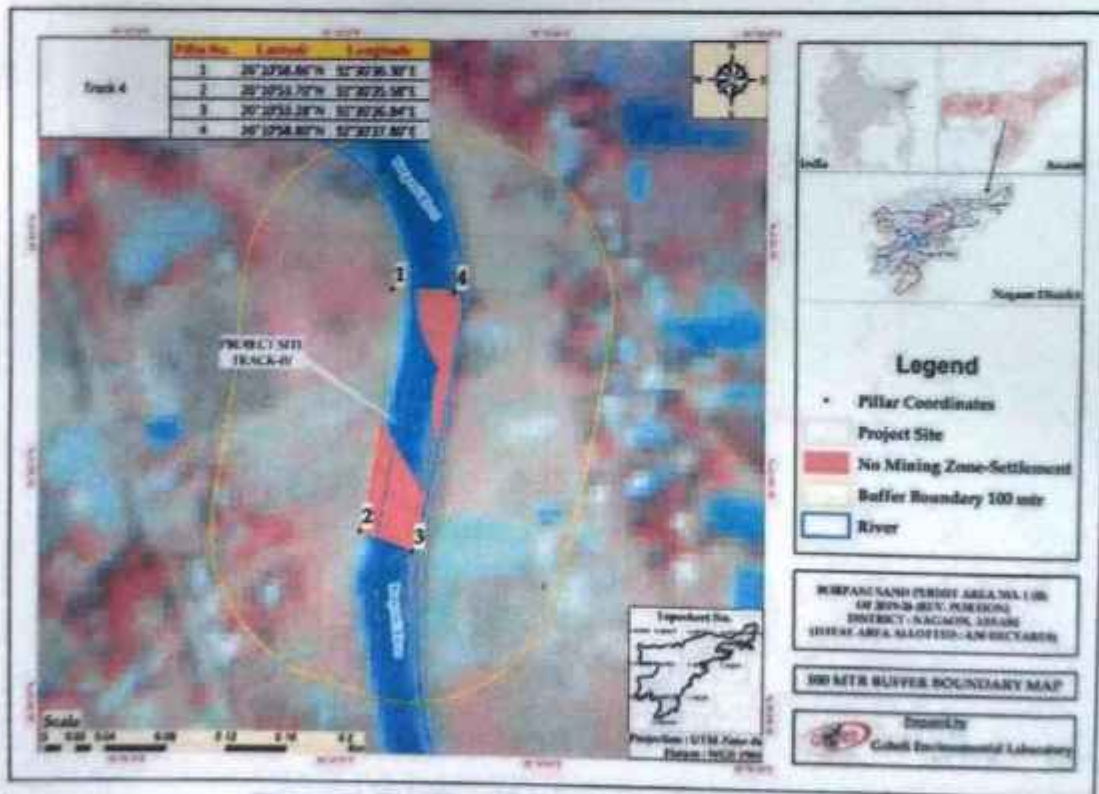


Figure 12.8: 100m Buffer Map (Satellite Image)



Handwritten signature and text in Assamese script, including the title 'Principal Forest Officer'.



Figure 12.9: 100m Buffer Map (Google Image)

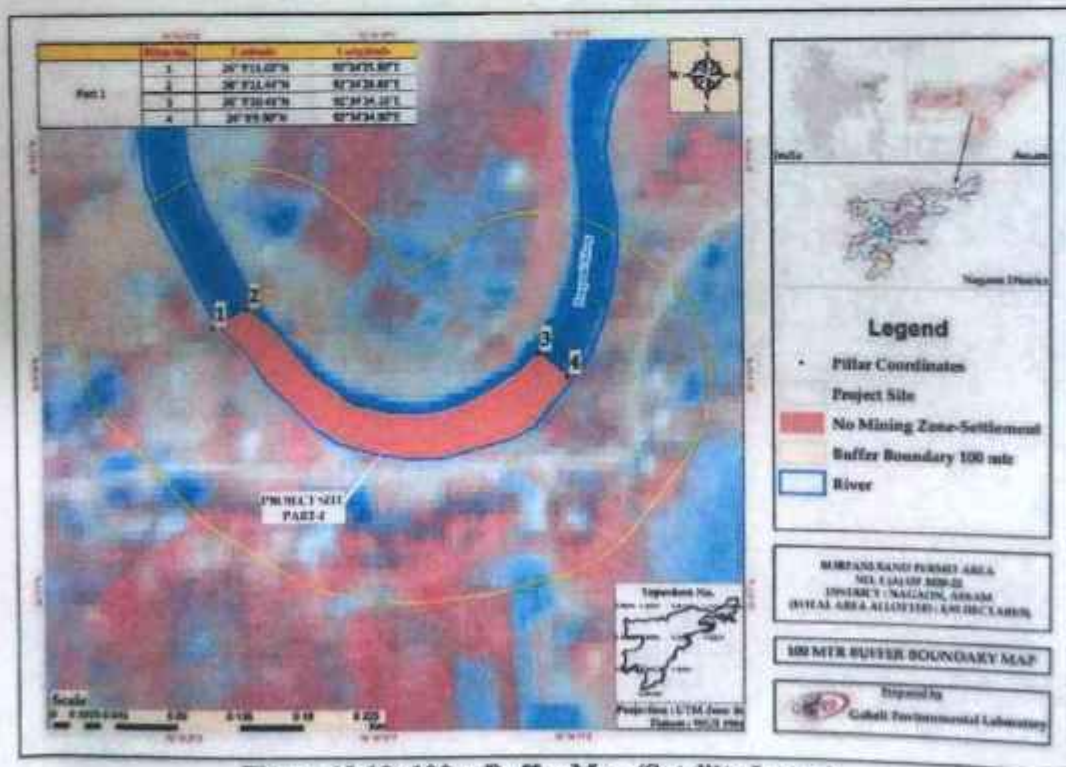


Figure 12.10: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth

Divisional Forest Officer
 Nagaon, Assam



Figure 12.11: 100m Buffer Map (Google Image)

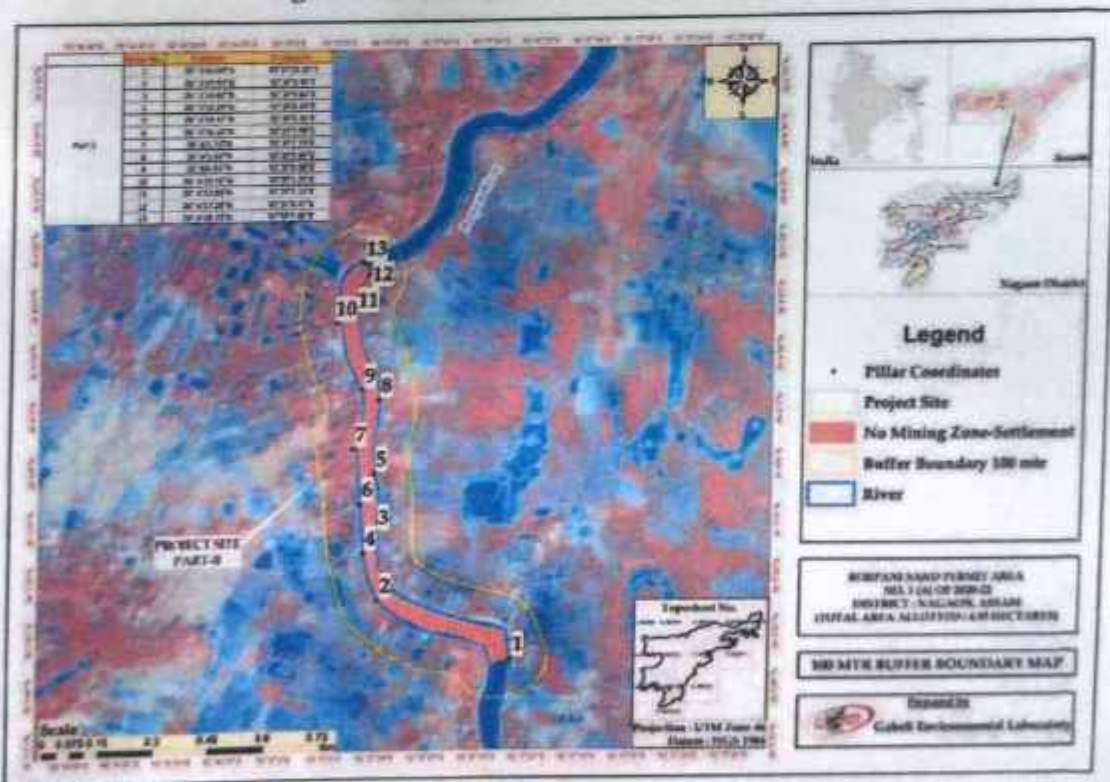


Figure 12.12: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



Handwritten signature and text in Assamese, including 'Divisional Forest Officer'.



Figure 12.13: 100m Buffer Map (Google Image)

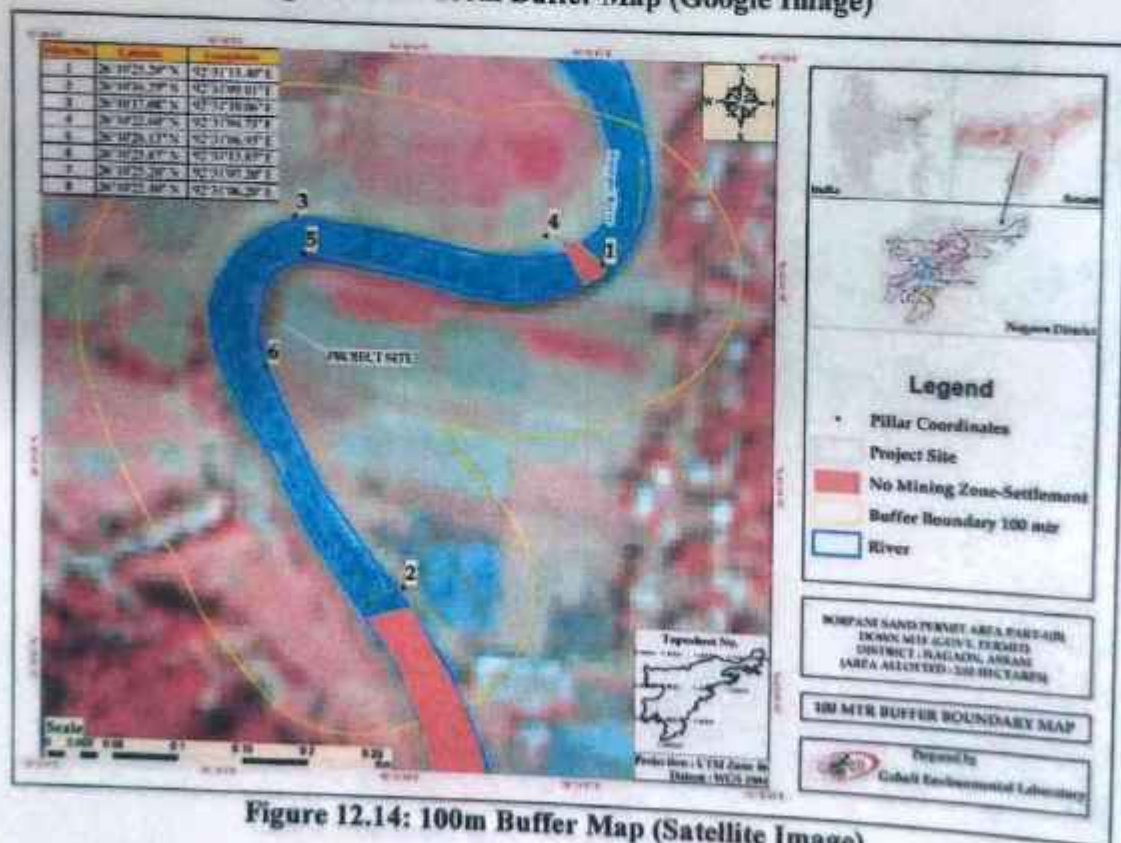



Figure 12.14: 100m Buffer Map (Satellite Image)


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 বিভাগ
 Divisional Office of Mineral Resources
 Nagaon District

Minerals: Sand, Stone and Brick Earth

12.4.2 Description of Leases in Kopili River

Table 12.8: Details of Kopili River

Sr. No.	Description	Area in Ha.	Percentage of Total area (In %)	Cumulative %
1.	Kopili River area in the district	526.664	100	0
2.	Area already granted in the Kopili River	48.59	9.22	9.22
3.	No of lease not recommended for future Quarry Lease grant due extracted up to a distance of 1 kilometer (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.	0.00	0.00	0.00
4.	Area not recommended for future Quarry Lease grant due to 100 m Buffer from any railway line or bridge	0.00	0.00	0.00
5.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway and other roads	6.94	1.31	0.00
6.	Area not recommended for future Quarry Lease grant due to non-availability of un-mined block 50 meters width after every block of 1,000 meters over which is undertaken or at such distance as may be directed by the competent authority	0.00	0.00	0.00
7.	Area not recommended for future Quarry Lease grant due to 100 m	0.00	0.00	0.00

Minerals: Sand, Stone and Brick Earth



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 National Forest Officer

Buffer Local Minor Check Dam				
8.	Area not recommended for future Quarry Lease grant due to 500 m buffer from the irrigation Structure/Reservoir & Submergence Area	0.00	0.00	0.00
9.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Canal/Tank/Lake	0.00	0.00	0.00
10.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Ropeway or ropeway trestle or station	0.00	0.00	0.00
11.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Heritage site, Protected monuments	0.00	0.00	0.00
12.	Area not recommended for future Quarry Lease grant due to Eco-sensitive Zone	0.00	0.00	0.00
13.	Applicability of Cluster (Other lease within 500 meter radius,	--	--	--

Table 12.9: Details of Individual leases of Kopili River (Existing Mines)

S No.	Permit area details	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Jamunamukh-KopiliNodi Sand Permit Aarea No. 1A (Revenue Portion) (2019-26)	Sand	23.50	26° 6'19.74"N	92°43'3.66"E
				26° 6'18.60"N	92°43'7.06"E
				26° 6'13.96"N	92°43'1.52"E
				26° 6'8.35"N	92°42'59.48"E
				26° 6'3.64"N	92°42'59.15"E
				26° 5'58.44"N	92°43'1.72"E
				26° 5'55.01"N	92°43'5.38"E
				26° 5'53.47"N	92°43'8.63"E
				26° 5'53.86"N	92°43'12.69"E
				26° 5'54.34"N	92°43'18.37"E
				26° 5'55.86"N	92°43'22.78"E
				26° 5'57.51"N	92°43'27.38"E
				26° 5'59.91"N	92°43'31.01"E
26° 6'2.30"N	92°43'34.63"E				

Minerals: Sand, Stone and Brick Earth

56

AP
 জামুনা মুখ কপিলী নদী
 সন্নিবিষ্ট ভূমি অঞ্চল
 Divisional Forest Office
 Nagaon, Assam

				26° 6'4.98"N	92°43'38.86"E
				26° 6'7.68"N	92°43'42.94"E
				26° 6'11.56"N	92°43'49.15"E
				26° 6'15.01"N	92°43'54.70"E
				26° 6'17.74"N	92°44'3.11"E
				26° 6'16.04"N	92°44'3.42"E
				26° 6'15.66"N	92°44'0.68"E
				26° 6'14.68"N	92°43'57.81"E
				26° 6'13.27"N	92°43'54.87"E
				26° 6'7.40"N	92°43'46.42"E
				26° 6'3.01"N	92°43'40.11"E
				26° 5'59.38"N	92°43'35.67"E
				26° 5'54.50"N	92°43'27.33"E
				26° 5'52.10"N	92°43'19.59"E
				26° 5'51.87"N	92°43'10.44"E
				26° 5'52.73"N	92°43'3.50"E
				26° 6'0.42"N	92°42'56.86"E
				26° 6'3.52"N	92°42'55.70"E
				26° 6'7.28"N	92°42'55.22"E
				26° 6'11.47"N	92°42'56.07"E
				26° 6'15.05"N	92°42'57.81"E
				26° 6'17.24"N	92°42'59.14"E
				26° 6'18.96"N	92°43'0.85"E

Table 12.10: Details of Individual leases of Kopili River (Proposed (Mine Plan is approved))

S No.	Permit area details	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Chaparmukh-KopiliNodiBamu nijanSilbheta Sand Permit Area in (Revenue Portion)	Sand	2.0	26°10'32.51"N	92°28'45.89"E
				26°10'32.22"N	92°28'48.01"E
				26°10'26.24"N	92°28'43.00"E
				26°10'23.43"N	92°28'45.10"E
2.	Chaparmukh-KopiliNodi Sand Permit Area Part-1 (C) (Rev.	Sand	2.5	26°11'47.80"N	92°31'7.00"E
				26°11'45.97"N	92°31'8.42"E
				26°11'46.71"N	92°30'56.94"E
				26°11'44.16"N	92°30'56.37"E

Minerals: Sand, Stone and Brick Earth



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Divisional Forest Officer
19/06/2019

Portion)				
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Table 12.11: Details of Individual leases of Kopili River (Proposed (Mining Area in past))

S No.	Permit area details	Mineral	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Chaparmukh-KopiliNodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)	Sand	4.74	Plot 1	
				26°11'50.53"N	92°33'42.77"E
				26°11'48.32"N	92°33'39.70"E
				26°11'50.69"N	92°33'37.78"E
				26°11'53.41"N	92°33'40.90"E
				Plot 2	
				26°11'35.20"N	92°33'25.45"E
				26°11'36.24"N	92°33'22.18"E
				26°11'32.71"N	92°33'20.47"E
				26°11'31.72"N	92°33'23.78"E
				Plot 3	
				26°11'23.27"N	92°33'13.33"E
				26°11'21.23"N	92°33'15.32"E
				26°11'18.37"N	92°33'11.86"E
				26°11'20.45"N	92°33'9.75"E
				Plot 4	
				26°12'7.60"N	92°32'28.57"E
				26°12'7.71"N	92°32'23.58"E
				26°12'10.28"N	92°32'22.35"E
26°12'11.12"N	92°32'27.52"E				
2.	Chaparmukh-KopiliNodi Sand Permit Area Part-1 (B) (Rev. Portion)of2016-18-2018-20	Sand	4.60	Track A	
				26° 11.872'N	92° 35.842'E
				26° 11.847'N	92° 35.850'E
				26° 11.757'N	92° 35.745'E
				26° 11.762'N	92° 35.713'E
				Track B	
				26° 11.950'N	92° 33.623'E
				26° 11.843'N	92° 33.710'E
				26° 11.722'N	92° 33.700'E

Minerals: Sand, Stone and Brick Earth

58

District Survey Office, Nagaon, Assam

				26° 11.920'N	92° 33.562'E
3.	Chaprmukh- KopiliNodi Sand Permit Area No. 1 (C) (Rev. Portion) of 2018- 20	Sand	2.55	26°11'18.50"N	92°30'24.40"E
				26°11'17.00"N	92°30'29.90"E
				26°11'42.20"N	92°30'60.00"E
				26°11'47.50"N	92°31'3.00"E
				26°12'9.40"N	92°32'13.60"E
				26°12'10.40"N	92°32'9.80"E
4	Jamunamukh- KopiliNodi Sand Permit Area Part- 1 (B) (Rev. Portion)	Sand	4.20	26° 7'8.16"N	92°43'39.48"E
				26° 7'9.36"N	92°43'39.42"E
				26° 7'9.96"N	92°43'39.78"E
				26° 7'4.74"N	92°43'49.50"E
				26° 6'58.20"N	92°43'54.90"E
				26° 6'53.40"N	92°43'56.16"E
				26° 6'52.92"N	92°43'53.76"E
				26° 6'57.00"N	92°43'52.68"E
				26° 7'1.08"N	92°43'49.98"E
				26° 7'4.14"N	92°43'46.68"E
				26° 7'6.12"N	92°43'44.04"E
				26° 7'7.32"N	92°43'41.10"E
				26° 7'8.16"N	92°43'39.48"E
5.	Jamunamukh- KopiliNodi Sand Permit Area Part- 1(C) of 2018-20 (Rev. Portion)	Sand	4.50	Block 1	
				26° 9.522'N	92° 40.820'E
				26° 9.418'N	92° 40.935'E
				26° 9.449'N	92° 40.989'E
				26° 9.575'N	92° 40.880'E
				Block 2	
				26° 8.814'N	92° 41.670'E
				26° 8.818'N	92° 41.618'E
				26° 8.727'N	92° 41.637'E
				26° 8.728'N	92°41.663'E

Minerals: Sand, Stone and Brick Earth

59



Handwritten signature and official stamp of the District Forest Officer, Nagaon District, Assam.

				Block 3	
				26° 8.734'N	92° 41.797'E
				26° 8.732'N	92° 41.753'E
				26° 8.816'N	92° 41.802'E
				26° 8.815'N	92° 41.740'E
				Block 4	
				26° 8.455'N	92° 42.302'E
				26° 8.421'N	92° 42.288'E
				26° 8.366'N	92° 42.400'E
				26° 8.450'N	92° 42.418'E

Table 12.12: Details of Individual leases of Kopili River (Future Proposal)

S No.	Permit area details	Minera l	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Guimari Govt. Sand Permit Area (Rev. portion)	Sand	4.93	26°11'36.04" N	92°34'36.23" E
				26°11'34.58" N	92°34'36.20" E
				26°11'27.87" N	92°34'59.10" E
				26°11'26.15" N	92°34'59.67" E
				26°11'18.51" N	92°35'12.10" E
				26°11'17.72" N	92°35'13.21" E
				26°11'26.10" N	92°35'26.45" E
				26°11'26.76" N	92°35'25.37" E
2.	New Proposal 3	Sand	2.52	26° 6'16.29"N	92°43'33.81"E
				26° 6'16.81"N	92°43'38.28"E
				26° 6'18.91"N	92°43'42.99"E
				26° 6'21.41"N	92°43'45.89"E
				26° 6'23.13"N	92°43'47.03"E
				26° 6'22.20"N	92°43'48.61"E
				26° 6'17.89"N	92°43'45.21"E
				26° 6'15.50"N	92°43'41.06"E
				26° 6'14.87"N	92°43'34.03"E

Kopili river area in the district is 526.664 Ha. and area already granted in Kopili River is 48.59 Ha. The riverbed is having a total of 10 mine leases of mineral- Sand. Out of these 10, 01 mine lease is existing mine, 02 proposed (Mine plan is available), 05 mine lease is expired (mining in past) and 02 mine leases are future proposal. There is no applicability of Cluster, as there is no presence of leases within 500-meter radius having homogeneous mineral.

Minerals: Sand, Stone and Brick Earth

60



On the basis of distance criteria, Go- zone and No-Go zone has been identified. Total Go zone area is 41.65 Ha and No-Go zone area is 6.94 Ha. Out of total allotted 48.59 Ha area, 6.94 Ha area is not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway. Map showing the identification of Go- zone and No-Go zone for each individual lease has been prepared and given below:



Figure 12.15: 100m Buffer Map (Google Image)



Figure 12.16: 100m Buffer Map (Satellite Image)





Figure 12.17: 100m Buffer Map (Google Image)

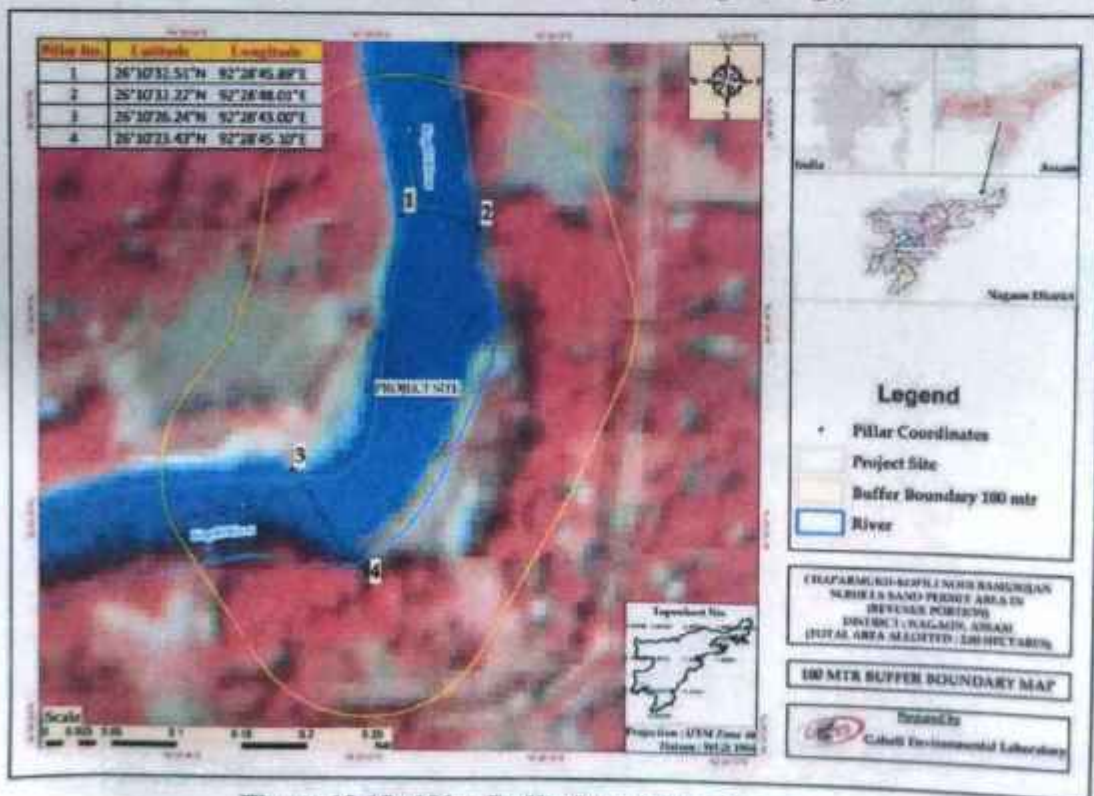


Figure 12.18: 100m Buffer Map (Satellite Image)

Divisional Forest Officer
 Nagaon, Assam



Figure 12.19: 100m Buffer Map (Google Image)



Figure 12.20: 100m Buffer Map (Satellite Image)



Handwritten signature and text in Assamese script, including 'Nagaon District Office'.



Figure 12.21: 100m Buffer Map (Google Image)

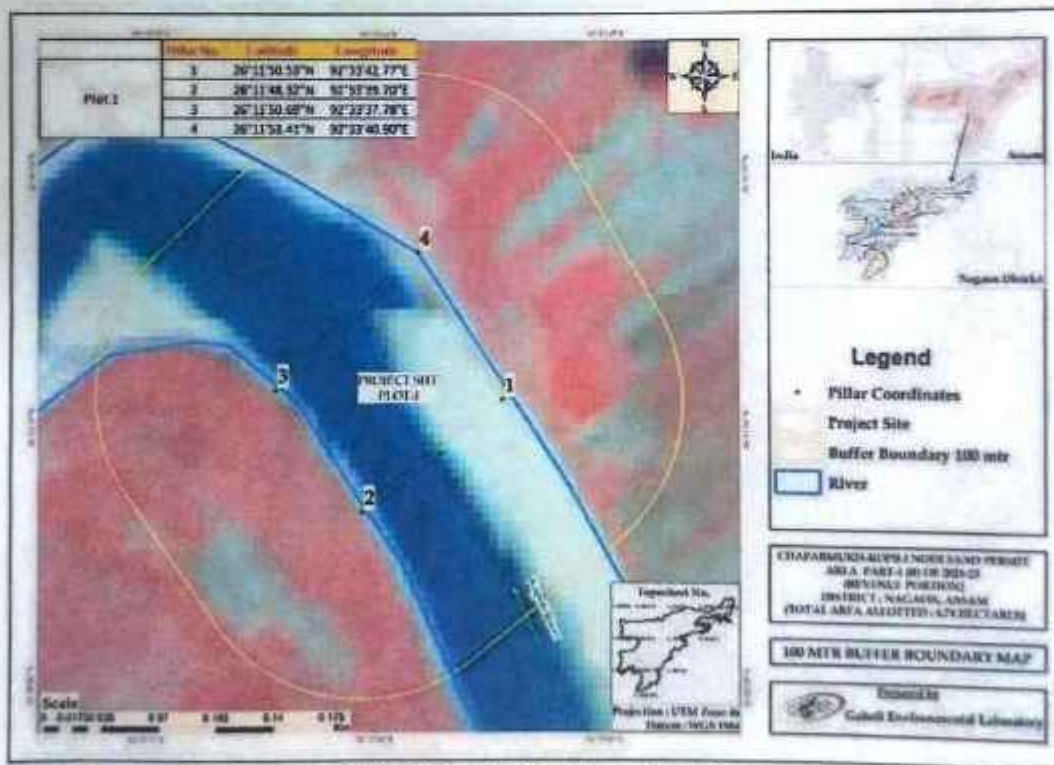


Figure 12.22: 100m Buffer Map (Satellite Image)

নগাল্যান্ড অসম
 ডিষ্টিক্ট সার্ভে অফিস
 District Survey Office
 Nagaon, Assam



Figure 12.23: 100m Buffer Map (Google Image)

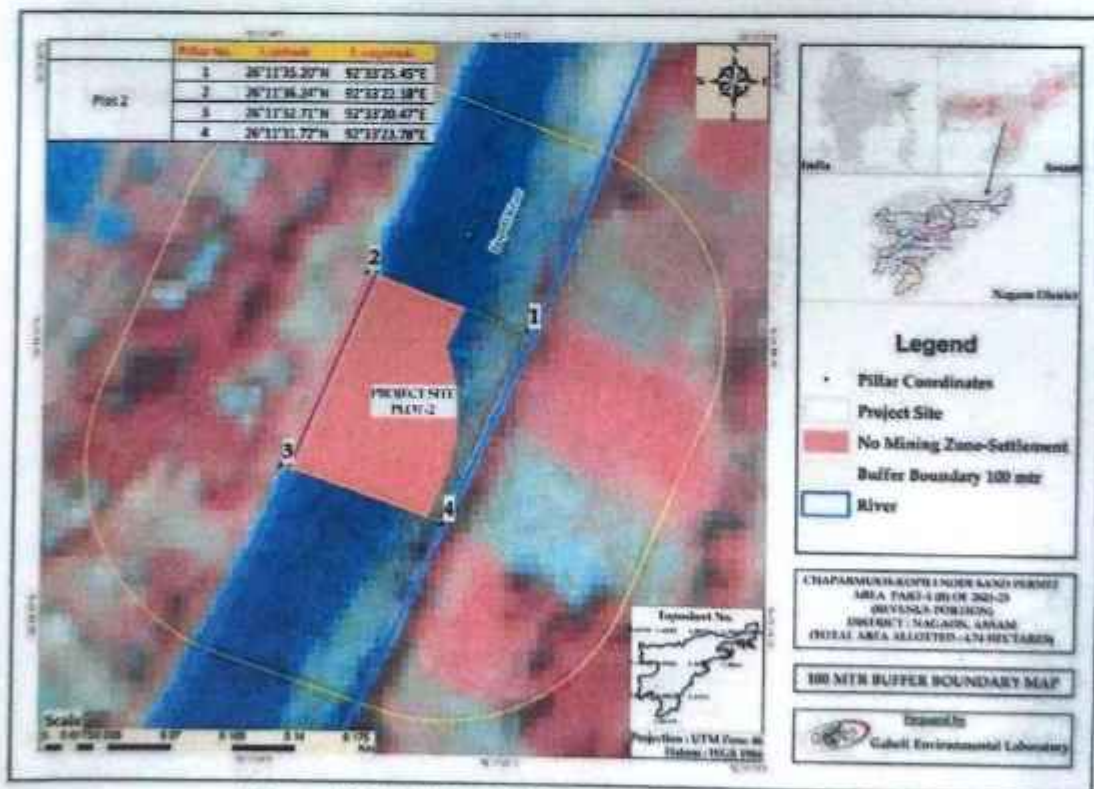


Figure 12.24: 100m Buffer Map (Satellite Image)

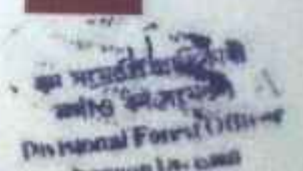




Figure 12.25: 100m Buffer Map (Google Image)

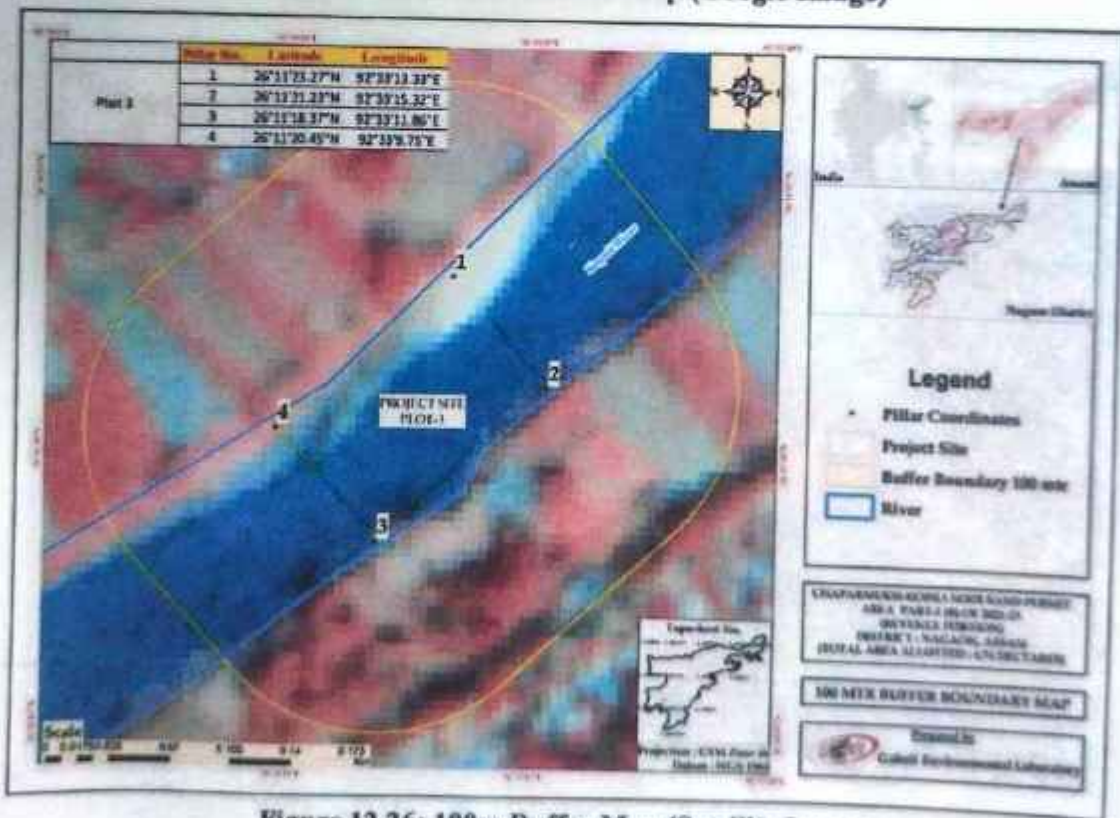


Figure 12.26: 100m Buffer Map (Satellite Image)

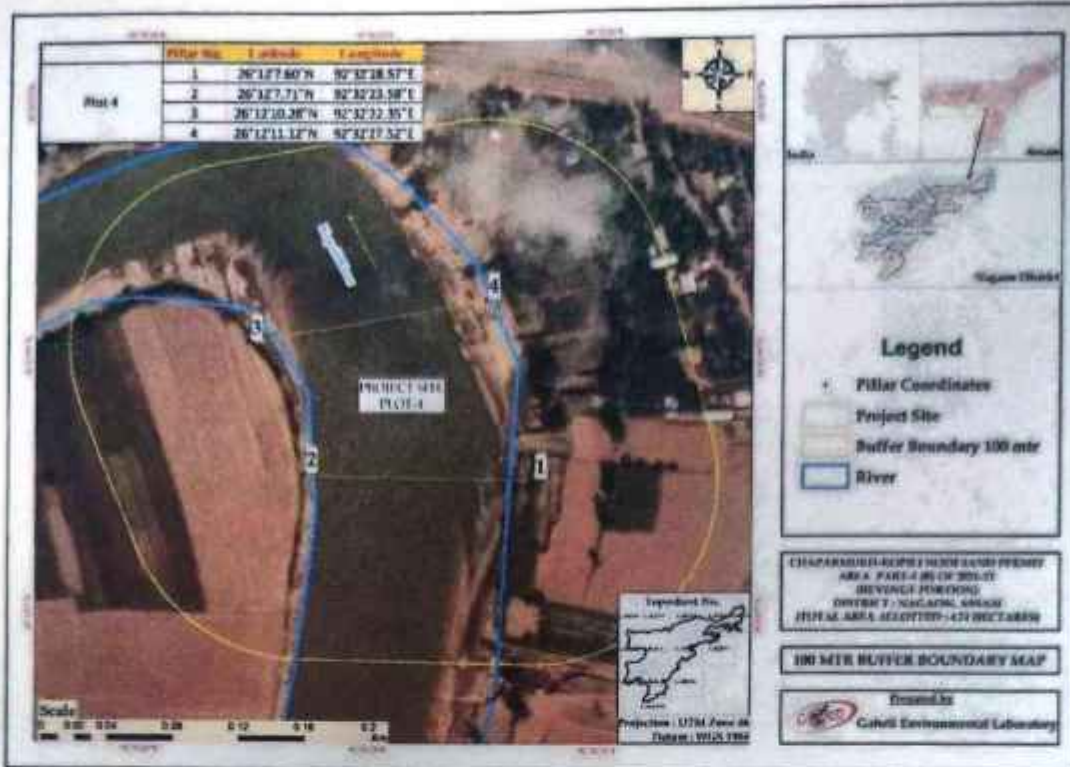


Figure 12.27: 100m Buffer Map (Google Image)

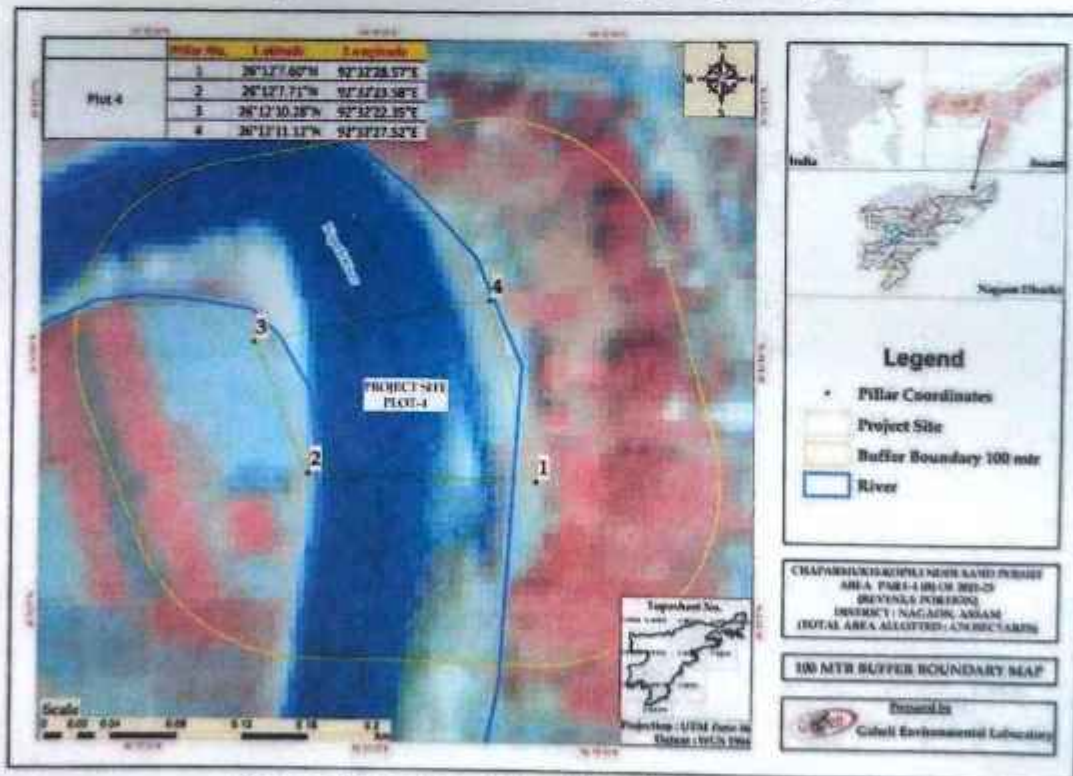


Figure 12.28: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



Handwritten signature and text in Assamese script, including the words 'মহাপ্ৰকল্প' (Mahaprosakalpa) and 'পৰিৱেশ' (Paribesh).



Figure 12.29: 100m Buffer Map (Google Image)



Figure 12.30: 100m Buffer Map (Satellite Image)

Divisional Forest Officer
Nagaon District



Figure 12.31: 100m Buffer Map (Google Image)



Figure 12.32: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



Handwritten signature and text: 'Divisional Public Health Officer' and other illegible text.



Figure 12.33: 100m Buffer Map (Google Image)

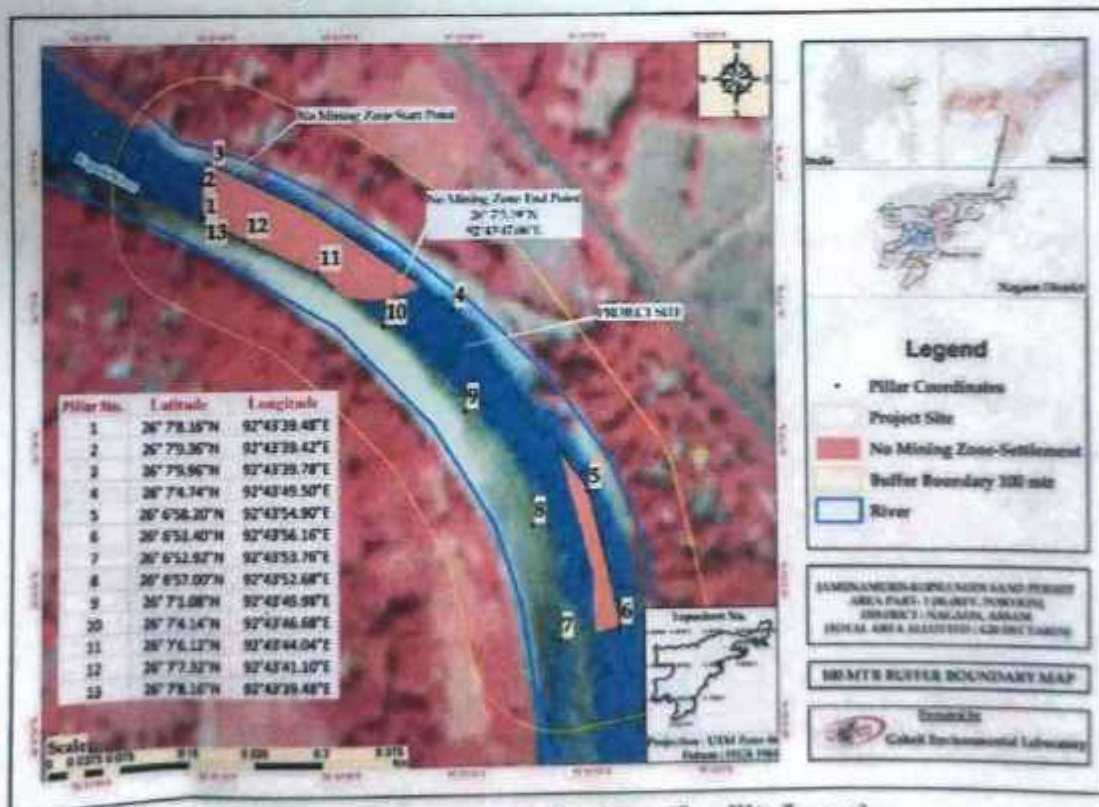


Figure 12.34: 100m Buffer Map (Satellite Image)

সংস্কৃতিক অফিস
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 নগাঁও জি.এস.ডি. অফিস



Figure 12.35: 100m Buffer Map (Google Image)

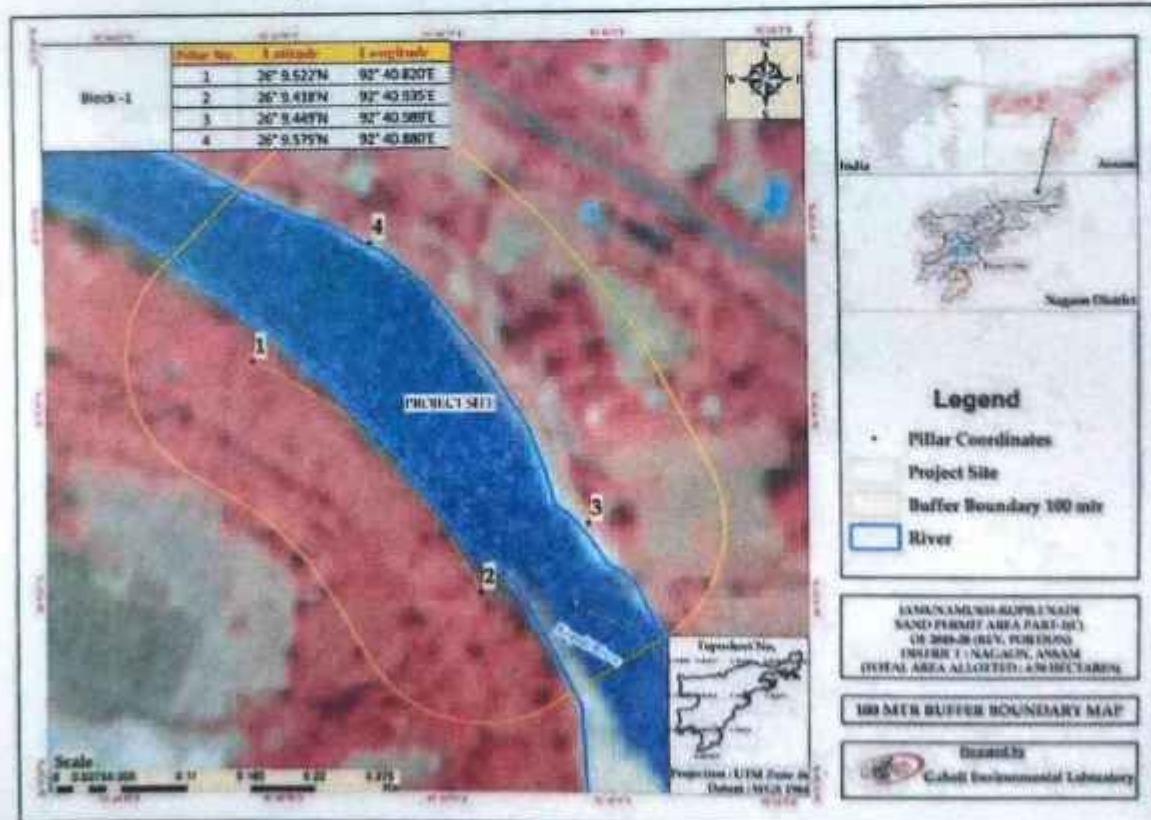


Figure 12.36: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth

71



Handwritten text in Assamese script, including the name 'শ্রী অক্ষয় চন্ডিকান্তী' and other illegible characters.

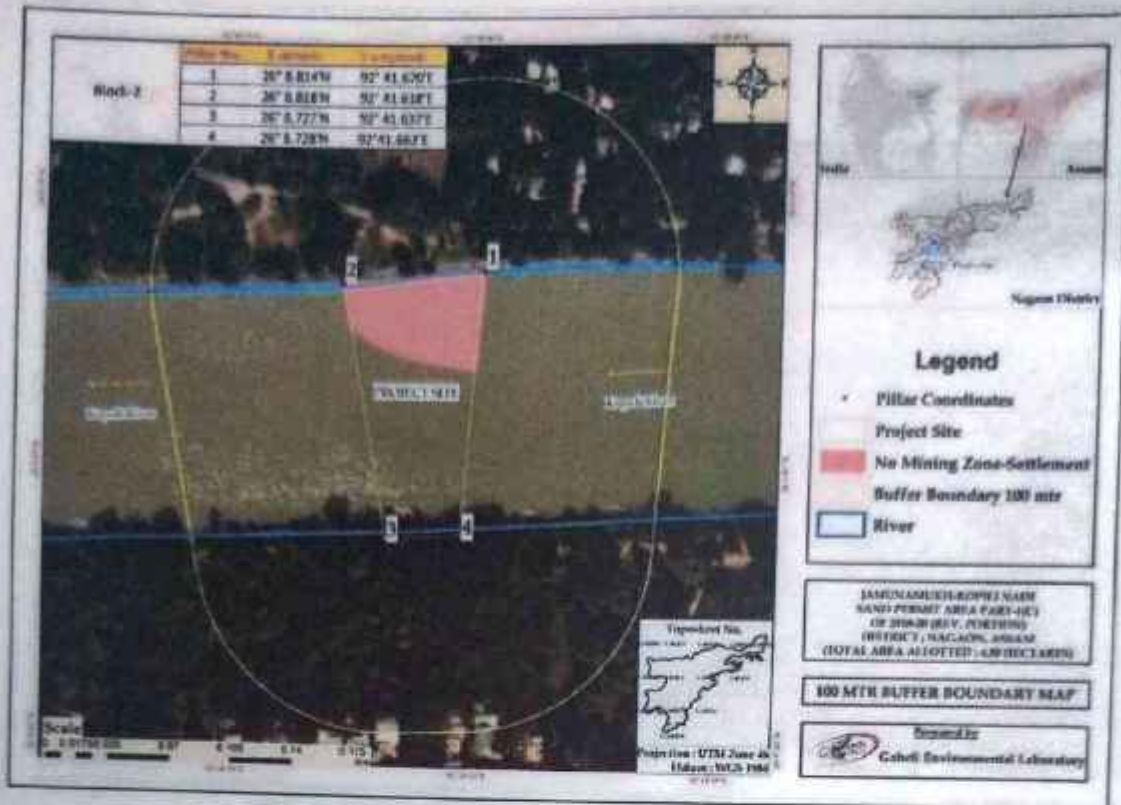


Figure 12.37: 100m Buffer Map (Google Image)

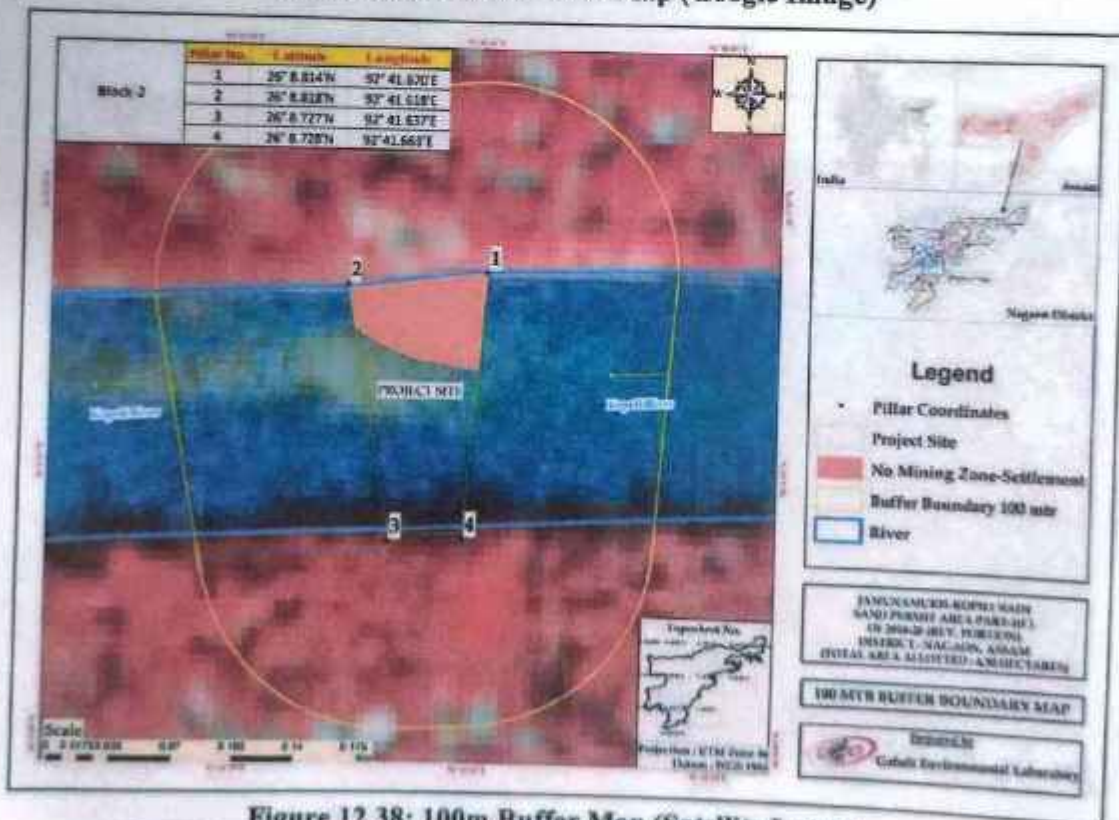


Figure 12.38: 100m Buffer Map (Satellite Image)



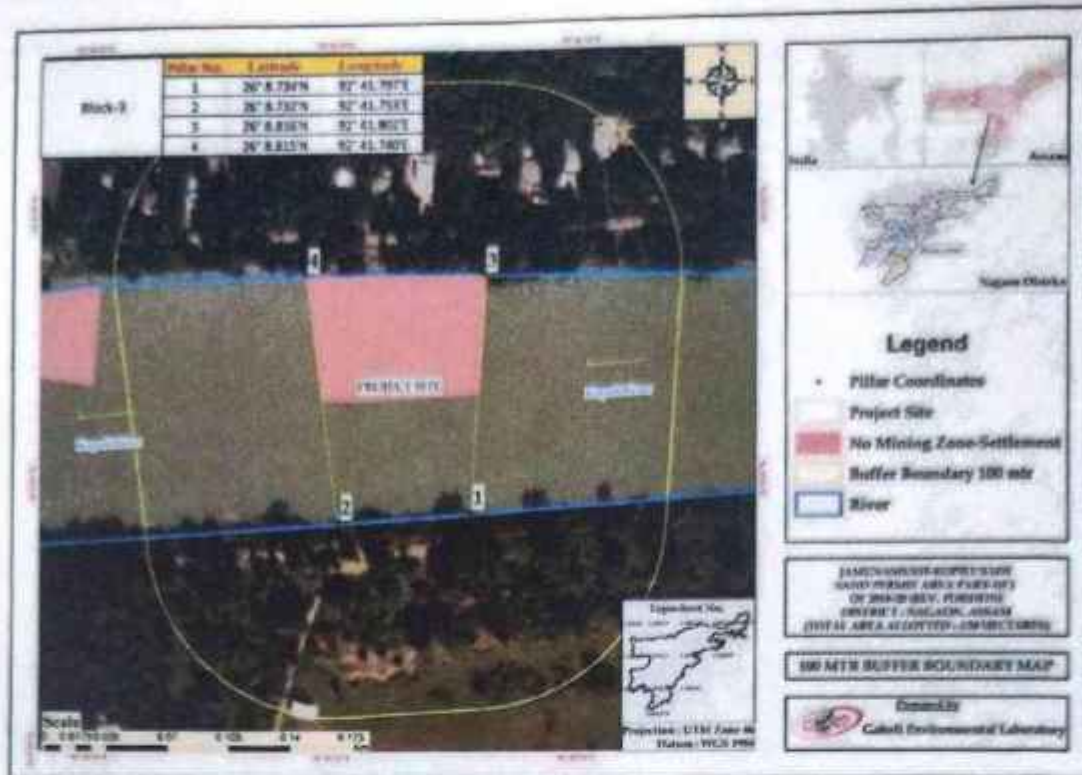


Figure 12.39: 100m Buffer Map (Google Image)

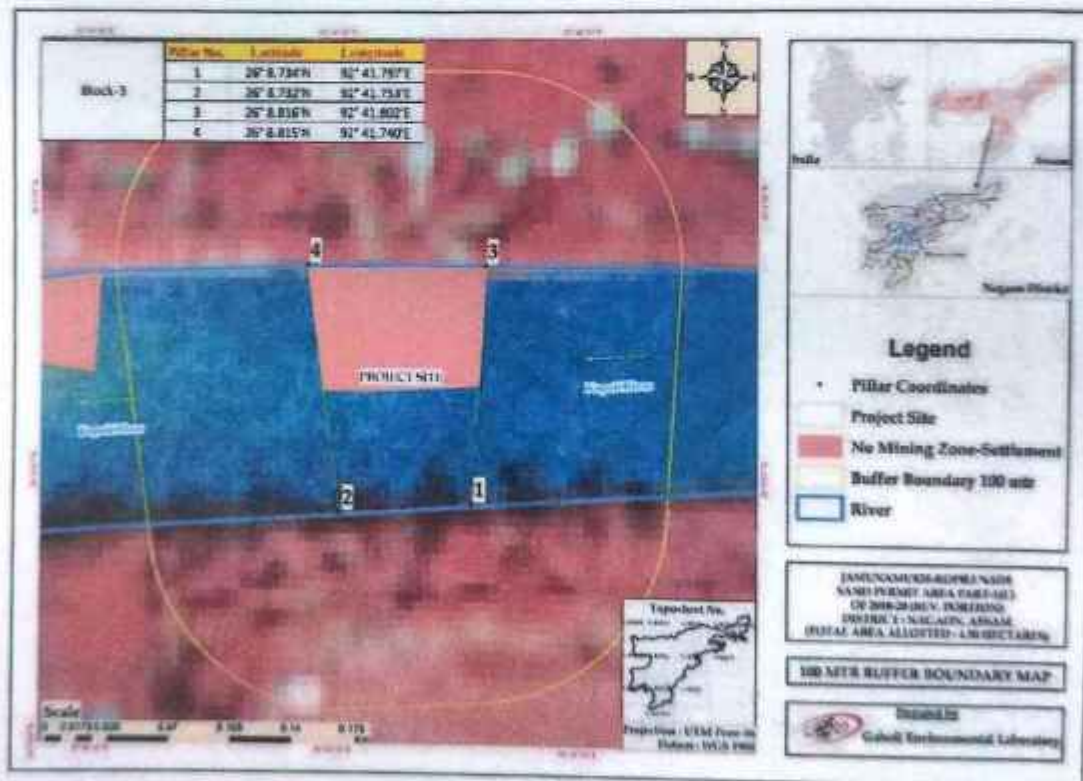


Figure 12.40: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



Handwritten signature and text in Assamese script.



Figure 12.41: 100m Buffer Map (Google Image)

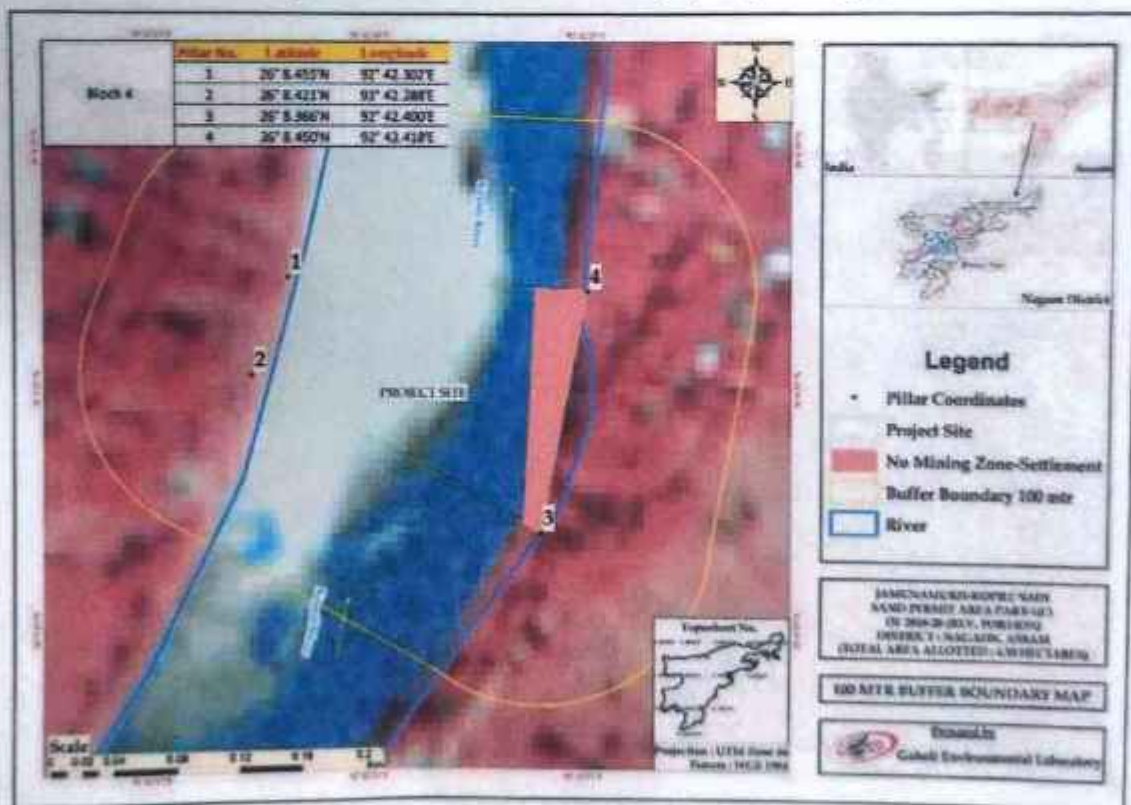


Figure 12.42: 100m Buffer Map (Satellite Image)

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Figure 12.43: 100m Buffer Map (Google Image)



Figure 12.44: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth



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নামঃ অ. মল্লিক
District Forest Officer



Figure 12.45: 100m Buffer Map (Google Image)

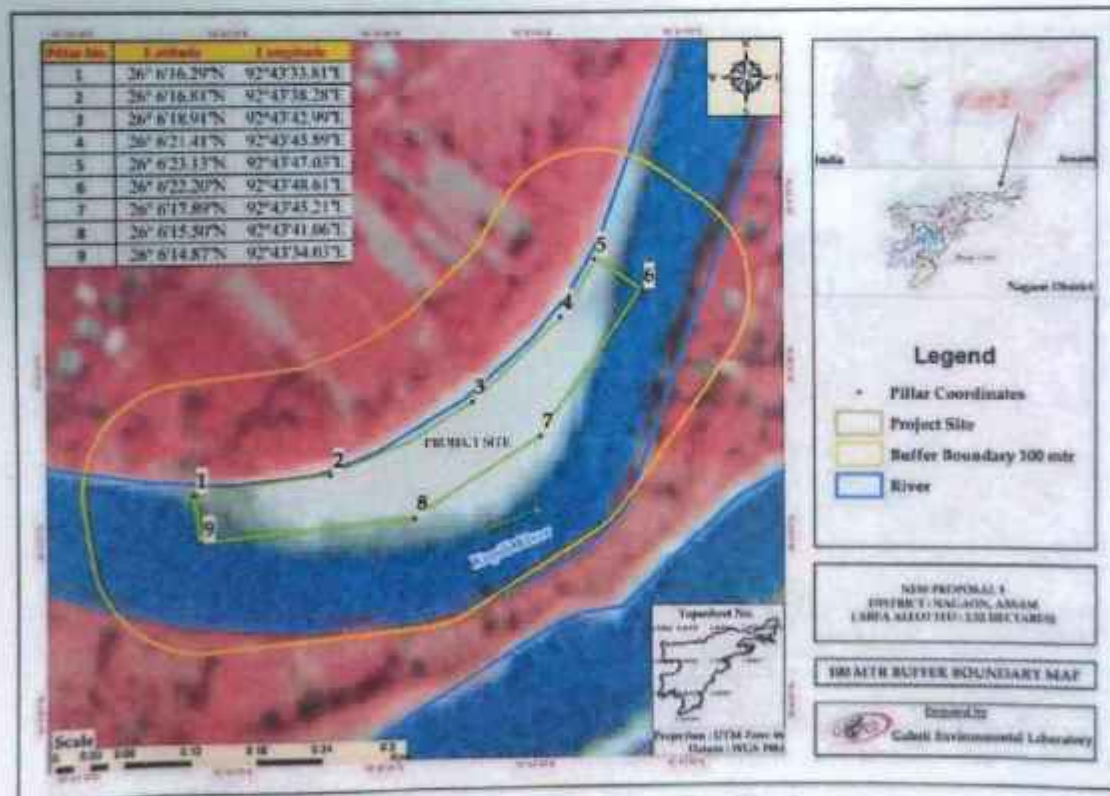


Figure 12.46: 100m Buffer Map (Satellite Image)

Handwritten signature and official stamp of the District Survey Office, Nagaon, Assam. The stamp includes the text 'District Survey Office, Nagaon, Assam' and 'Regional Forest Officer'.

12.4.3 Description of Leases in Jamuna River

Table 12.15: Details of Jamuna River

Sr. No.	Description	Area in Ha.	Percentage of Total area (In %)	Cumulative %
1.	Jamuna River area in the district	38.840	100	0
2.	Area already granted in the Jamuna River	4.30	11.07	11.07
3.	No of lease not recommended for future Quarry Lease grant due extracted up to a distance of 1 kilometer (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.	0.00	0.00	0.00
4.	Area not recommended for future Quarry Lease grant due to 100 m Buffer from any railway line or bridge	0.00	0.00	0.00
5.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway and other roads	3.97	10.22	0.00
6.	Area not recommended for future Quarry Lease grant due to non-availability of un-mined block 50 meters width after every block of 1,000 meters over which is undertaken or at such distance as may be directed by the competent authority	0.00	0.00	0.00
7.	Area not recommended for future Quarry Lease grant due to 100 m	0.00	0.00	0.00

Minerals: Sand, Stone and Brick Earth



77

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	Buffer Local Minor Check Dam			
8.	Area not recommended for future Quarry Lease grant due to 500 m buffer from the irrigation Structure/Reservoir & Submergence Area	0.00	0.00	0.00
9.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Canal/Tank/Lake	0.00	0.00	0.00
10.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Ropeway or ropeway trestle or station	0.00	0.00	0.00
11.	Area not recommended for future Quarry Lease grant due to 100 m buffer from the Heritage site, Protected monuments	0.00	0.00	0.00
12.	Area not recommended for future Quarry Lease grant due to Eco-sensitive Zone	0.00	0.00	0.00
13.	Applicability of Cluster (Other lease within 500 meter radius.	--	--	--

Table 12.16: Details of Individual leases of Jamuna River (Existing mine with EC)

S No.	Permit area details	Minera l	Mining area in Ha.	Coordinates	
				Latitude	Longitude
1.	Nisari Sand Permit Area No. 1 (A) of 2020-22	Sand	4.3	Part A	
				26°08'10.55"	92°46'02.28"
				26°08'11.90"	92°45'49.15"
				26°08'11.12"	92°45'49.13"
				26°08'09.60"	92°46'02.01"
				Part B	
				26°06'37.30"	92°47'05.51"
				26°06'40.07"	92°47'04.25"
				26°06'40.26"	92°47'03.09"
				26°06'36.55"	92°47'05.96"
				Part C	
				26°06'36.87"	92°47'51.05"
				26°06'34.90"	92°47'36.56"
				26°06'34.42"	92°47'37.23"

Minerals: Sand, Stone and Brick Earth

78

41
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 বিভাগ
 Regional Forest Officer
 Nagaon District

				26°06'36.32"	92°47'51.59"
				Part D	
				26°06'26.61"	92°48'12.29"
				26°06'26.22"	92°48'05.06"
				26°06'25.37"	92°48'05.06"
				26°06'26.00"	92°48'12.90"
				Part E	
				26°06'32.74"	92°48'25.80"
				26°06'32.15"	92°48'20.74"
				26°06'31.05"	92°48'20.20"
				26°06'32.23"	92°48'26.46"

Jamuna river area in the district is 38.840 Ha. and area already granted in Jamuna River is 4.30 Ha. The riverbed is having a total of 01 mine leases of mineral- Sand and is existing mine. There is no applicability of Cluster, as there is no presence of leases within 500-meter radius having homogeneous mineral.

On the basis of distance criteria, Go- zone and No-Go zone has been identified. Total Go zone area is 0.33 Ha and No-Go zone area is 3.97 Ha. Out of total allotted 4.30 Ha area, 3.97 Ha Area is not recommended for future Quarry Lease grant due to 100 m buffer from the outer periphery of the defined limits of any village, habitation, National Highway, State highway. Map showing the identification of Go- zone and No-Go zone for each individual lease has been prepared and given below:



Figure 12.51: 100m Buffer Map (Google Image)

Minerals: Sand, Stone and Brick Earth





Figure 12.52: 100m Buffer Map (Satellite Image)



Figure 12.53: 100m Buffer Map (Google Image)

Minerals: Sand, Stone and Brick Earth

80

APPROVED
 NAGAON DISTRICT SURVEY
 NAGAON, ASSAM

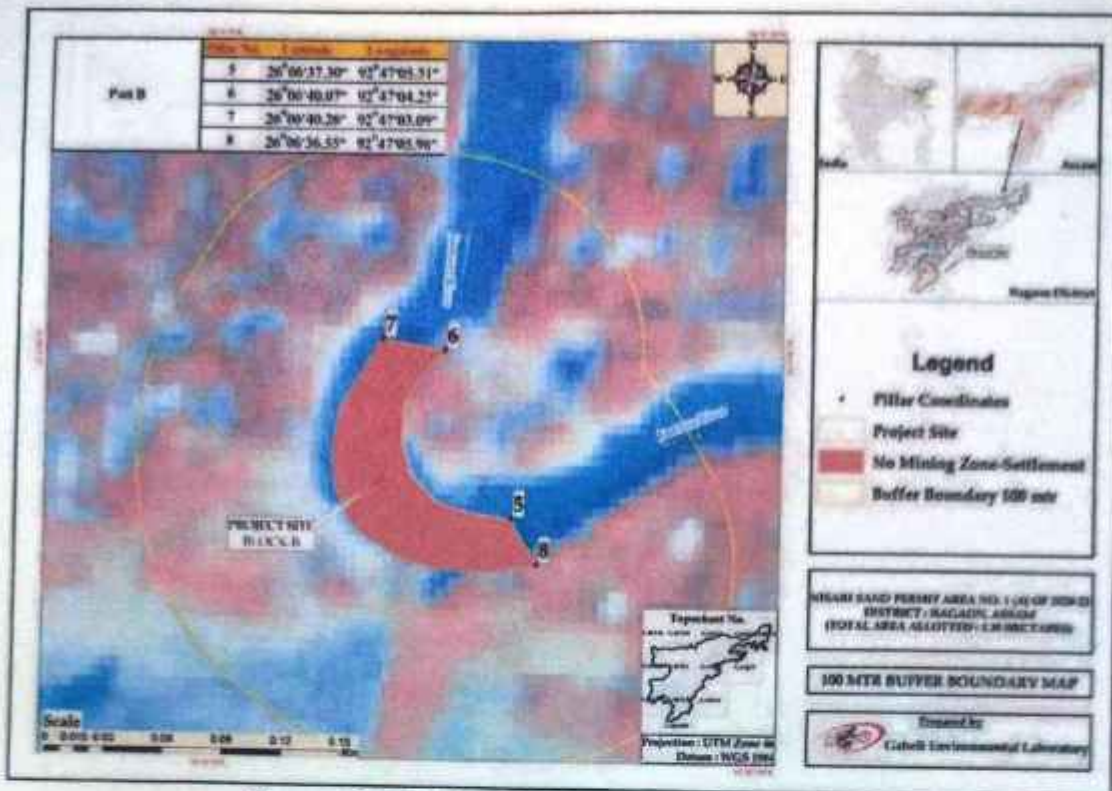


Figure 12.54: 100m Buffer Map (Satellite Image)



Figure 12.55: 100m Buffer Map (Google Image)



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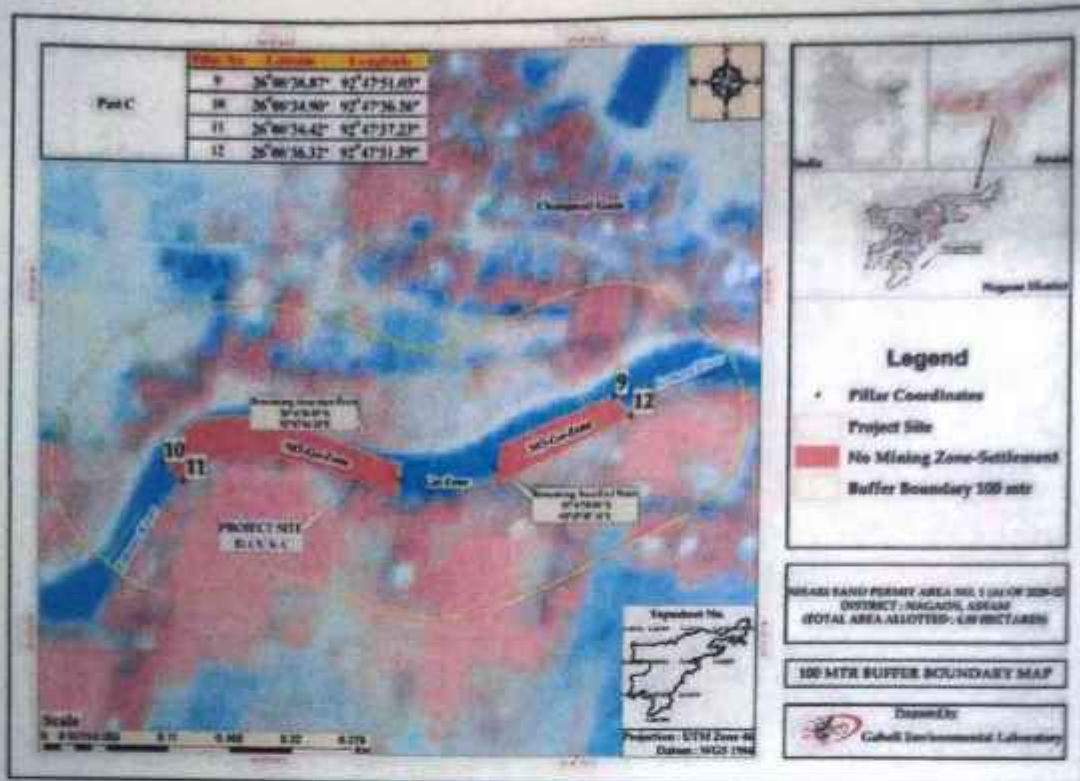


Figure 12.56: 100m Buffer Map (Satellite Image)



Figure 12.57: 100m Buffer Map (Google Image)

Handwritten signature and text: "The Regional Director, Nagaon L.A. Assam"



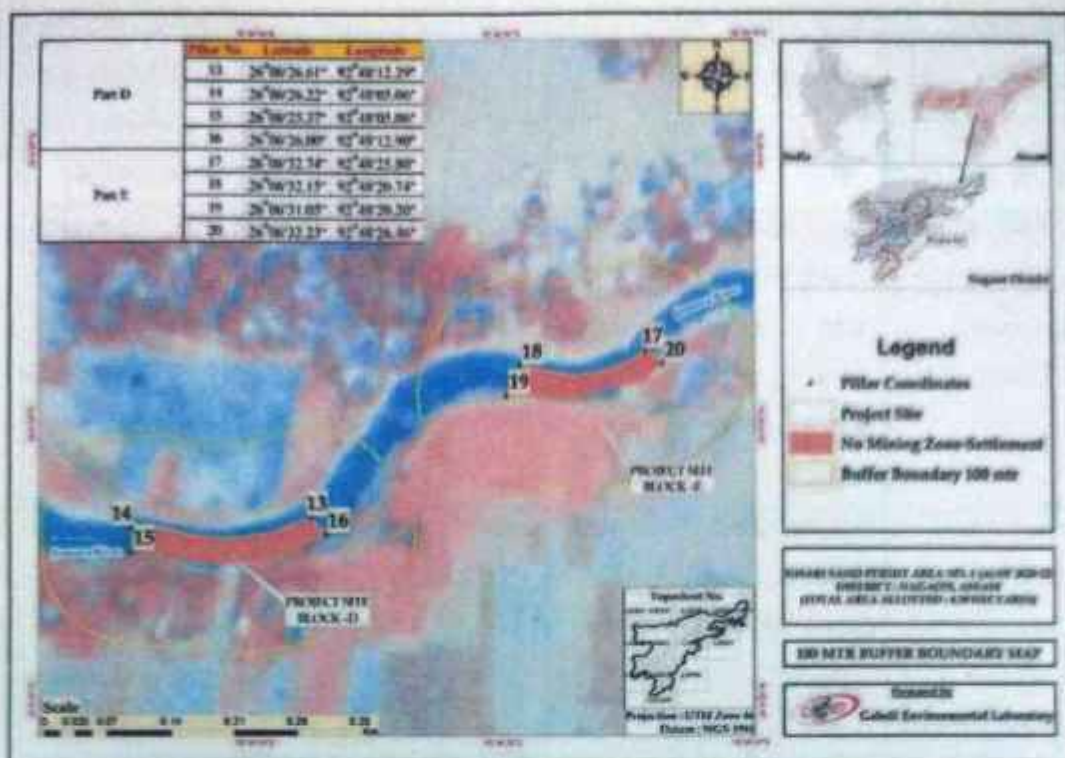


Figure 12.58: 100m Buffer Map (Satellite Image)

12.5 Inference from DSR

On the basis of distance criteria, the details of leases fall in Go- zone and no go zone for each individual lease has been given below:

Table 12.17: Inference from DSR

S. No.	Continuous S. No.	Mine Name	River Name	Lease Area	Go Zone	No Go Zone	Details of No-Go Zone
1	1	Nisari Sand Permit Area No. 1 (A) of 2020-22	Jamuna	4.30	0.33	3.97	3.97 Ha is not recommended due to presence of habitation within 100 m.
1	3.	Borpani Sand Permit Area No. 1 (B) of 2019-26	Borpani	4.50	3.63	0.87	1.25 Ha is not recommended due to presence of habitation

Minerals: Sand, Stone and Brick Earth



		(Rev. Portion)					within 100 m and 2.38 Ha due to presence of major bridge.
3	5.	Chaparmukh-Kopili Nodi Sand Permit Area Part- 1 (C) (Rev. Portion)	Kopili	2.50	0.00	2.50	2.50 Ha is not recommended due to presence of habitation within 100 m.
1	6.	Borpani Sand Permit Area No. 1 (A) of 2020-22	Borpani	4.95	0.00	4.95	4.95 Ha is not recommended due to presence of habitation within 100 m.
2	7.	Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)	Kopili	4.74	3.84	0.90	0.90 Ha is not recommended due to presence of habitation within 100 m.
3	8.	Chaparmuk-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion) of 2016-18-2018-20	Kopili	4.60	4.03	0.57	0.57 Ha is not recommended due to presence of habitation within 100 m.
5	10.	Jamunamukh-Kopili Nodi Sand Permit	Kopili	4.20	2.58	1.62	1.62 Ha is not recommended due to presence

Minerals: Sand, Stone and Brick Earth

84

11
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		Area Part- 1 (B) (Rev. Portion)					of habitation within 100 m.
6.	11.	Jamunamukh- Kopili Nodi Sand Permit Area Part- 1(C) of 2018- 20 (Rev. Portion)	Kopili	4.50	3.15	1.35	1.35 Ha is not recommended due to presence of habitation within 100 m.
2.	13.	Borpani Sand Permit Area Part-1(B) Down Site (Govt. Permit)	Borpani	2.02	1.92	0.10	0.10 Ha is not recommended due to presence of habitation within 100 m.
6.	17	New Proposal 3	Kopili	2.52	0.84	1.68	1.68 Ha is not recommended due to presence of habitation within 100 m.

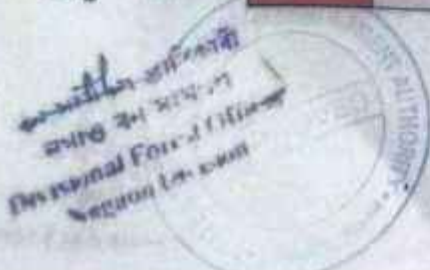


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12.6 Mineral Reserves

Table 12.18: Mineral Reserves of Sand Mine Leases

S. No	Continuons S. No.	Mine Name	River	Leave Area in Ha.	Lease Area in sq. m.	Depth in m	Volume (Area * Depth * Bulk density)	Permissible Quantity i.e. 60%	Current Status
1	1	Nisari Sand Permit Area No. 1 (A) of 2020-22	Jamuna	0.33	3300	1	8250	4950	Existing Mine
2	2	Jamunamukh-Kopili Nodi Sand Permit Aarea No. 1A (Revenue Portion) (2019-26)	Kopili	23.5	235000	1	587500	352500	Existing Mine
1	3	Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion)	Borpani	3.63	36300	1	90750	54450	Proposed (Mine Plan is approved)
2	4	Chaparmukh-Kopili Nodi Bamanujan Sibheta Sand Permit Area in (Revenue Portion)	Kopili	2	20000	1	50000	30000	Proposed (Mine Plan is approved)
3	5	Chaparmukh-Kopili Nodi Sand Permit Area Part- 1 (C) (Rev. Portion)	Kopili	0	0	1	0	0	Proposed (Mine Plan is approved)
1	6	Borpani Sand Permit Area No. 1 (A) of 2020-22	Borpani	0	0	1	0	0	Proposed (Mining Area in past)



2	7	Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)	Kopili	3.84	38400	1	96000	57600	Proposed (Mining Area past) in
3	8	Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) (Rev. Portion) of 2016-18-2018-20	Kopili	4.03	40300	1	106750	60450	Proposed (Mining Area past) in
4	9	Chaparmukh-Kopili Nodi Sand Permit Area No. 1 (C) (Rev. Portion) of 2018-20	Kopili	2.55	25500	1	63750	38250	Proposed (Mining Area past) in
5	10	Jamunamukh-Kopili Nodi Sand Permit Area Part-1 (B) (Rev. Portion)	Kopili	2.58	25800	1	64500	38700	Proposed (Mining Area past) in
6	11	Jamunamukh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion)	Kopili	3.15	31500	1	78750	47250	Proposed (Mining Area past) in
1	12	Borpani Sand Permit Area (Govt. Permit)	Borpani	4.95	49500	1	123750	74250	Future proposal
2	13	Borpani Sand Permit Area Part-1(B) Down Site (Govt. Permit)	Borpani	1.92	19200	1	48000	28800	Future proposal

Minerals: Sand, Stone and Brick Earth

87



Divisional Forest Officer
Nagaon District

3	14	Guimari Govt. Sand Permit Area (Rev. portion)	Kopili	4.93	49300	1	123250	73950	Future proposal
4	15	New Proposal 3	Kopili	0.84	8400	1	21000	12600	Future proposal
		Total			582500		1456250	873750	

Table 12.19: Mineral Reserves of Stone Mine Lease

S. No	Continuous S. No.	Mine Name	Lease Area in Ha.	Lease Area in sq. m.	Volume as per approved mine plan in cum	Current Status
3.	16	Langkaijuri Stone Mahal Mining Permit Area	5.0	50000	25,00,000	Existing Mine with EC
4.	17	Dhansila Pahar Stone Contract Area No. 1 (Proposed Reserve Forest)	13.41	134100	60,34,500	Proposed (Mining Plan is approved)
5.	18	Dhansila Pahar Stone Contract Area No. 2 (Proposed Reserve Forest)	12.74	127400	63,70,000	Proposed (Mining Plan is approved)
6.	19	DhulPahar Stone Contract Area (Reserve Forest)	5.22	52200	23,49,000	Proposed (Mining Plan is approved)
7	20	Kathalguri Stone Contract Area No. 1 (Reserve Forest)	10	100000	55,00,000	Proposed (Mining Plan is approved)
8	21	Kathalguri Stone Contract Area No. 2 (Reserve Forest)	10	100000	55,00,000	Proposed (Mining Plan is approved)
7	22	Dhulpahar Stone Mahal No. 1	1	10000	1,50,000	Proposed (Mining area in past)
8	23	Tapajuri Stone Mahal No. 1	1	10000	1,44,000	Proposed (Mining area in past)

Minerals: Sand, Stone and Brick Earth

5	24	Barunbhari Stone Mahal No. 1 (A)	7.6	76000	-	Future proposal
6	25	Bipin Stone Mahal of 2018-23	1	10000	-	Future proposal
7	26	Kaflait Stone Mahal No. 1 under Kothiatoli Range	1	10000	-	Future proposal
			67.97	679700	2,85,47,500	

Table 12.20: Mineral Reserves of Brick Stone Mine Lease

S. No	Continuous S. No.	Mine Name	Lease Area in Ha.	Lease Area in sq. m.	Volume as per approved mine plan in cum	Current Status
9	27	Shiv Sankar Brick Earth Mining Permit Area	0.37	3700	3,610	Proposed (Mine Plan is approved)
8	28	Sahari Brick Earth permit Area (Hanuman Bricks)	0.7	7000	--	Future Proposal
			1.07	10700	3,610	




প্রোগ্রামার
মহাপরিচালক
পরিবেশ বন্যপ্রাণী
সংরক্ষণ বিভাগ
গুৱাহাটী

12.6 Drainage system with description of main rivers

Table 12.21: Drainage system with description of main rivers

S. No.	Name of River	Area drained (Sq.km)	% Area drained in the district
1.	Borpani River	2.97685	0.130
2.	Kopili River	5.26664	0.230
3.	Brahmaputra River	49.84492	2.179
4.	Jamuna River	0.3884	0.016

(Source: Digitized from Satellite Data)


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 নগাঁও জেলা
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12.7 Salient Features of Important River and streams

Table 12.22: Salient Features of Important River and streams

S. No.	Name of River or stream	Total length in the District (in km)	Place of Origin	Altitude at Origin	Portion of the River or Stream Recommended for Mineral Concession	Length of the area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in Sq. m)	Mineable Mineral potential (in metric tonnes) (.60 % of total mineral potential)
1.	Borpani River	61.6	Borpani River originates from Shillong hills of Meghalaya about 1300m in altitude and it enters into Karbi Anglong. It enters in Nagaon District from SE direction. Two power projects is situated on Borpani River in Assam i.e., 1. Karbi Langpi Hydro Electric Project (KLLHEP) which is situated in Karbi Anglong District	-	Borpani river	1.890	50	94500	141750

Minerals: Sand, Stone and Brick Earth

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District Survey Report

Nagaon District, Assam State

2.	Kopili River	67.10	-	Kopili river	4.049	120	485900	728850

of Assam and 2. Karbilongpi Middle-II Hydro-Power Project. It is situated in Nagaon District of 24MWw run-of river scheme. A Gravity and Masonary Dam is situated upon the Borpani river named Karbilongpi Dam in Assam of about 197m in length and 35m in height. Total Length of Borpani River is about 34.6km in Nagaon District.

The Kopili River which rises in the Jaintia Hills (Meghalaya) flows north and north-east winding through the Jaintia Hills and North Cachar Hills. It is joined by the Doiang River below the

Minerals: Sand, Stone and Brick Earth



3.	Jamuna River	--	foothills and the combined channel flows in a north- westerly direction	The Jamuna River, the main tributary of the Kopili originates from the Khanbamon hills in Karbi Anglong District and flows from east to west and falls in the Kopili near Jamunamukh. The Jamuna River flows through the town of Jamunamukh in the Hojai district of Assam, India		1.075	40	43000	64500
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12.8 Mineral Potential

Table 12.23: Mineral Potential for sand mines

S. No.	Boulder (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)	Calculation Parameter
1.	--	8,73,750	8,73,750	60 % of total mineral potential

Table 12.24: Mineral Potential for non-sand mines

S. No.	Stone/Brick earth (CUM)	Total Mineable Mineral Potential (CUM)	Calculation Parameter
1.	2,85,51,110	2,85,51,110	100 % of total mineral potential

12.9 Annual Deposition

Detailed study has been carried out to calculate the annual deposition/replenishment in different riverbed of the district. Replenishment study of district was done using advance remote sensing tools as well as field work. The morphological changes in river have been investigated using integration of topo sheets by the Survey of India (SOI) (1:50,000 scale), Google earth imagery, LISS-4 satellite imagery, Digital Elevation Model (DEM), and published geological maps. During field work, to assess the extent of sand filling, surveys conducted: before and after the monsoon season - mobilization factor.

As per the conclusion of study report, the district has sizeable Sand reserves in Kopili River, Borpani river, and Jamuna river system.

The field investigation over time and satellite images of landform migration, erosion and re-distribution of sand deposits confirms the timely, annual replenishment of sand facilitated by geological setup, gradient of river bed, rainfall pattern and intensity.

Mineral wise lease distributed (deposits) in the various rivers of the Nagaon district and their yearly replenishment have been observed using Google timescale imageries (2019-2024). Such mineral deposits were also confirmed during field work carried by Gaheli Environmental Laboratory, New Delhi & Gujarat (knowledge partner) and its staff members in November 2024. Then the contour maps of 1 m interval for all the leases obtained from processing of satellite imageries supported SRTM data (May 2024 (Pre-monsoon) & November 2024 (post monsoon)) were analyzed.

Minerals: Sand, Stone and Brick Earth

92



The average rate of Replenishment River wise calculated on an average 1.5 m in Kopilli River, 1.0 m in Borpani River. This study concludes that, if we consider 1-meter ultimate depth of working for Sand than annual deposition will be up to 100 % for Nagaon District.

REPLENISHMENT
NAGAON DISTRICT



12.10 Salient Features of Important River and streams of the district

Table 12.25: Salient Features of Important River and streams of the district

S. No.	River or stream	Portion of the River or Stream Recommended for Mineral Concession	Length of the area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in Sq. m)	Minerale Mineral potential (in metric tonnes) (60 % of total mineral potential)
1.	Borpani River	Borpani River	1.890	50	94500	141750
2.	Kopili River	Kopili River	4.049	120	485900	728850
3.	Jamuna River	Jamuna River	1.075	40	43000	64500
Total for the district			7.014	210	623400	935100

DEPARTMENT OF WATER RESOURCES, DISASTERS MANAGEMENT AND IRRIGATION

REPLENISHMENT STUDY, NAGAON DISTRICT, ASSAM

The study is being conducted to assess the status of ground water resources in the study area and to estimate the recharge to the aquifer. The study area is located in the Nagaon district of Assam. The study area is bounded by the following coordinates: North 24° 30' 00" and South 24° 30' 00" and East 92° 30' 00" and West 92° 30' 00". The study area is bounded by the following coordinates: North 24° 30' 00" and South 24° 30' 00" and East 92° 30' 00" and West 92° 30' 00".

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REPLENISHMENT STUDY: NAGAON DISTRICT, ASSAM

The study area is bounded by the following coordinates: North 24° 30' 00" and South 24° 30' 00" and East 92° 30' 00" and West 92° 30' 00". The study area is bounded by the following coordinates: North 24° 30' 00" and South 24° 30' 00" and East 92° 30' 00" and West 92° 30' 00".

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REPLENISHMENT STUDY: NAGAON DISTRICT, ASSAM

1.0 INTRODUCTION

The need for replenishment study for river bed sand is required in order to nullify the adverse impacts arising due to excessing sand extraction. Mining within or near riverbed has a direct impact on the stream's physical characteristics, such as channel geometry, bed elevation, substratum composition and stability, in-stream roughness of the bed, flow velocity, discharge capacity, sediment transport capacity, turbidity, temperature etc. Alteration or modification of the above attributes may cause an impact on the ecological equilibrium of the riverine regime, disturbance in channel configuration and flow-paths. This may also cause an adverse impact on in stream biota and riparian habitats.

It is assumed that the riparian habitat disturbance is minimum if the replenishment is equal to excavation for a given stretch. Therefore, to minimize the adverse impact arising out of sand mining in a given river stretch, it is imperative to have a study of replenishment of material during the defined period.

1.1 GENERIC STRUCTURE OF REPLENISHMENT STUDY

Initially replenishment study requires four surveys. The **first survey** needs to be carried out in the month of April for recording the level of mining lease before the monsoon. The **second survey** is at the time of closing of mines for monsoon season. This survey will provide the quantity of the material excavated before the offset of monsoon. The **third survey** needs to be carried out after the monsoon to know the quantum of material deposited/replenished in the mining lease. The **fourth survey** at the end of March to know the quantity of material excavated during the financial year. For the subsequent years, there will be a requirement of only three surveys. The results of year-wise surveys help the state government to establish the replenishment rate of the river. *Based on the replenishment rate future auction may be planned.*

The replenishment period may vary on nature of the channel and season of deposition arising due to variation in the flow. Such period and season may vary on the geographical and precipitation characteristic of the region and requires to be defined by the local agencies preferable with the help of the Central Water Commission and Indian Meteorological Department. The excavation will, therefore, be limited to estimated replenishment estimated with consideration of other regulatory provisions.

Minerals: Sand, Stone and Brick Earth



1.2 METHODOLOGY FOR REPLENISHMENT STUDY

The replenishment estimation is based on a theoretical empirical formula with the estimation of bed load transport comprising of analytical models to calculate the replenishment estimation. The iso-pluvial maps of IMD can be used for estimation of rainfall. Catchment yield is computed using different standard empirical formulas relevant to the geographical and channel attributes. eg. Strange's Monsoon runoff curves for runoff coefficient). Peak flood discharge for the study area can be calculated by using Dickens, Jarvis and Rational formula at 25, 50 and 100 years return period. The estimation of bed load transport using Ackers and White Equation or similar can be made. A simulation model is used with basic data generated from the field in the pre-study and post-study period (preferably pre-monsoon and post-monsoon) to estimate the volume of replenished material. The particle size distribution and bulk density of the deposited material are required to be assessed from a NABL recognized laboratory. Considering the bulk density and the volume, the estimation of replenishment in weight will be calculated after considering safeguards and stability of the slopes and riverine regime. Some of the common methods used for field data acquisition for replenishment study.

1.2.1. PHYSICAL SURVEY OF THE FIELD BY THE CONVENTIONAL METHOD

- i. The conventional survey technical using DGPS and other survey tools are used to define the topography, contours and offsets of the lease area. The survey should clearly depict the important attributes of the stretch of the river and its nearby important civil and other feature of importance. Such information will provide the eligible spatial area for mining. The contour and the elevation benchmarks will provide the baseline data for assessing the pre and post-study period scenario.
- ii. Physical benchmarks are to be fixed at appropriate intervals (preferable 1 in 30 m) and the Reduced Level (RL) shall be validated from a nearby standard RL. These RL should be engraved on a steel plate (Bench Plate) and shall be fixed and placed at locations which are free from any damages and are available in pre and post-study period. The bench plates shall be available for use during the mining period as reference for all mining activity. Reference pillar may also be used in place of Bench Plates with visible and readable demarcation on the ground as common reference points to control the topographic survey and mining activity.
- iii Baseline data on elevation status for a grid of 10 m x 10 m is preferred to have accuracy in the assessment. It is expected that two consecutive cross-sections in longitudinal and lateral direction should not be more than 10-meter distance apart, however, the regulatory authority

31
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Divisional Office of
Assam State



may fix these intervals depending on the geographical and site-specific conditions, only and after providing the scientific reason for such deviation.

iv The changes observed in the elevation in pre and post scenario at each node should be depicted in graphical forms with an appropriate scale to estimate the area of deposition and erosion. These graphical presentations should depict the active channel regime and the flow bed elevation with other important features required to be considered for estimation of the mining area. The area of deposition and erosion shall be calculated for each cross-section after giving due regard to the stability and safety of active channel banks, and other features of importance. The elevation level shall be in reference to the nearest bench-plates established for the purpose.

v The levels (MSL & RL) of the corner point of each grid should be identifiable and safety barriers (Non-Mining) demarcated as restricted in consensus with Mineral Concession Rules of respective State, and the provision mentioned in this Sustainable Sand Mining Management Guidelines.

vi A clear identification is required to be highlighted between grids under mineable and grids under the non-mineable area. These baseline data (pre and post) be subjected to stimulation with the help of data mine software to derive at the replenishment area and corresponding volume and estimated weight.

vii The database should be structured in a tabulated form clearly depicting the nomenclature of the section lines, latitude and longitude of the starting point, chain-age and respective levels of all the points taken on that section line.

viii Net area shall be derived after the summation of the area of deposition minus area of erosion for each cross-section. The volume will be estimated by multiplying the distance between two cross-sections with the average of net area of these two consecutive cross-sections.

ix One sample per 900 square meters (30 m x 30 m) shall be preferred sample density for assessment of bulk density for estimation of deposition rate. Care should be taken that the sample for assessment of bulk density is taken from the deposition zone and not from erosion. However, depending on the site condition, river morphology and geographical condition, sample density may be adjusted. Reason for such deviation shall be appropriately highlighted in the report with supporting scientific data.



1.2.2. USE OF UAV/DRONE AND OTHER IMAGE DATA PROCESSING TECHNIQUES

With the development in image data processing tools and its accuracy acceptability, Drone/UAV fitted with the advance camera are used for survey purposes. Such technology has promising potential in the survey of sand mining zones due to its fast and reliable output deliveries. The survey is conducted using a set of instruments and compatible software to utilize the properly referenced data for depicting the topography of the study area. Instrument calibration and software compatibility and its validation with the ground data are an essential requirement for using this technique.

(Source: Enforcement & Monitoring Guidelines for Sand Mining, MoEF&CC, Jan 2020)

2.0 METHODOLOGY USED FOR REPLENISHMENT STUDY FOR THE REGION

We have selected conventional survey technical using DGPS and other survey tools are used to define the topography, contours and offsets of the lease area.

The following methodology used for replenishment study of the region which is as follows:

Study of Google Images on time scale for year 2019 to 2024 (Pre and Post Monsoon)

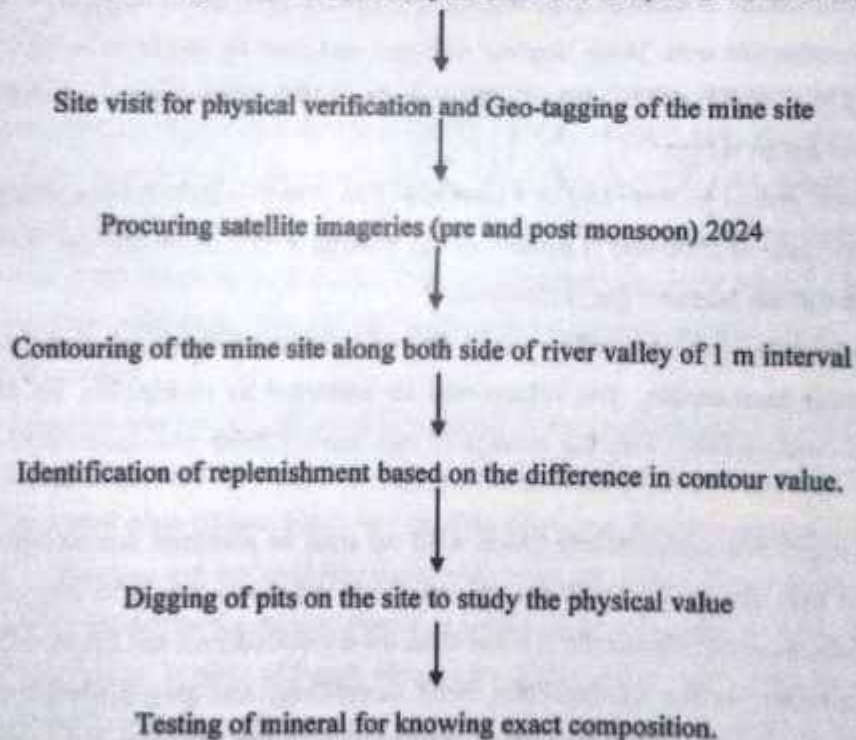


Figure 2.1 Methodology used for replenishment study of the region

2.1 DRAINAGE NETWORK IN NAGAON DISTRICT

The Kolong River, a tributary of the Brahmaputra River, flows through Nagaon and in the process divides the city into two distinct regions: Nagaon and Haibargaon.

Minerals: Sand, Stone and Brick Earth

100

Nagaon is bounded on the north by the Sonitpur district and the Brahmaputra River. On the south, it borders the West Karbi Anglong district, Dima Hasao and Hojai District. On the east, it is bounded by East Karbi Anglong district and the Golaghat district, while on the west it neighbors the Marigaon district.

There are several beels, marshy areas and swamps in the district, including the regions of Marikalong, Potakalong, Haribhanga, Jongalbalahu, Samaguri Beel, Gatanga Beel Urigadang and Nawbhanga. These wetlands are former channels of the Kolong and Kopili rivers. The district headquarters are located in Nagaon town. A part of the Kaziranga National Park is located within the Nagaon district. The district is bounded by the Brahmaputra river in the north (across the river is Sonitpur district, Karbi Anglong West and Hojai in the south, East Karbi Anglong and Golaghat district in the east. The district is a perfect example oxoman (un-even in Assamese) (অসমান) from where the word Assam originated, as it possesses rivers, river valleys, hills, jungles, and plains.

(Source: <https://nagaon.assam.gov.in/>)

The river system in Nagaon district is as follows:

The Kolong River: The point of origin of the Kolong River is located in between the hills of Kukurakata and Hatimura which is a distributary of Brahmaputra. The total length of the river is approximately 218.62 km and flows through the districts of Nagaon, Morigaon and Kamrup metro. The river empties itself to the Brahmaputra again at Kajalimukh near Guwahati in a joint channel with the Kopili River – a major south bank tributary of Brahmaputra that flows into Kolong River near Jagibhakatgaon of Morigaon district.

The river Kolong is fed with several rivulets namely Diyu, Misha, Diphalu, Haria-Nanoi and Titaimari or Rahasuti. Receiving the water from aforesaid rivulets, the river Kolong become bigger and enters the district of Morigaon passing through the National High Way-37 at Bhatigaon and Mulankota Manipurtup area under Raha circle. In the district of Morigaon, another important river Kapili joins Kolong course at Dukhutimukh of Jagibhakatgaon area.

(Source: <https://www.pcbassam.org/Action Plan for Kolong River>)

The Kopili River: The River Kopili is one of the important major tributaries of the Brahmaputra on its left bank. It originates from the Saipong Reserve Forest situated in south east of Meghalaya and passes through the borders of Meghalaya, North Cachar hills and Karbi Anglong and enters the plains in Nagaon district of Assam and finally joins the Brahmaputra at Kopilimukh. Its total length is 256 km of which 78 km from the common border of Meghalaya and Assam and the remaining 178 km lie in Assam. Kopili River is an

Minerals: Sand, Stone and Brick Earth



Handwritten signature and text, including 'M. S. Saha' and 'M. S. Saha'.

interstate river in Northeast India that flows through the states of Meghalaya and Assam and is the largest south bank tributary of the Brahmaputra in Assam. The river Kopili rises in the North Cachar Hills District in Borail Range at an altitude of 1525 meter. Then it passes through Kopili Ghat, Penumbra, Kheroni, Rajagoan, Kampur, Amsoi, Kumoi, and Mayang. The river covers a vast area of North Cachar Hill, Karbi Anglong, Nagaon, and Morigaon District.

(Source: IWAI: Final Feasibility Report On "Detailed Hydrographic Survey in Kopili River in Assam")

Borpani River

Borpani River originates from Shillong hills of Meghalaya about 1300m in altitude and it enters into Karbi Anglong. It enters in Nagaon District from SE direction. Two power projects is situated on Borpani River in Assam i.e., 1. Karbi Langpi Hydro Electric Project (KLHEP) which is situated in Karbi Anglong District of Assam and 2. Karbi Langpi Middle-II Hydro-Power Project. It is situated in Nagaon District of 24 MW run-of river scheme. A Gravity and Masonry Dam is situated upon the Borpani River named Karbi Longpi Dam in Assam of about 197m in length and 35m in height. Total Length of Borpani River is about 34.6km in Nagaon District.

2.3 MINELEASES MAPPING

Study of Google Images on time scale for year 2019 to 2024 (Pre and Post Monsoon), there after Site visit for physical verification and Geo-tagging of the mine site was done. After that, procuring the LISS-4 satellite data, based on this satellite data all the Sand, Stone and Brick Earth mine leases in Nagaon district have been mapped are shown in **Figure 2.3**.

The mine leases existing and running are shown in **yellow color**, mine lease proposed having approved mine plan are shown in **pink color**, mine lease proposed (mine lease in past) shown in **blue color**, and the leases which can be explored in future/new proposal are shown in **red color**.

The mine lease proposed but not permitted orange

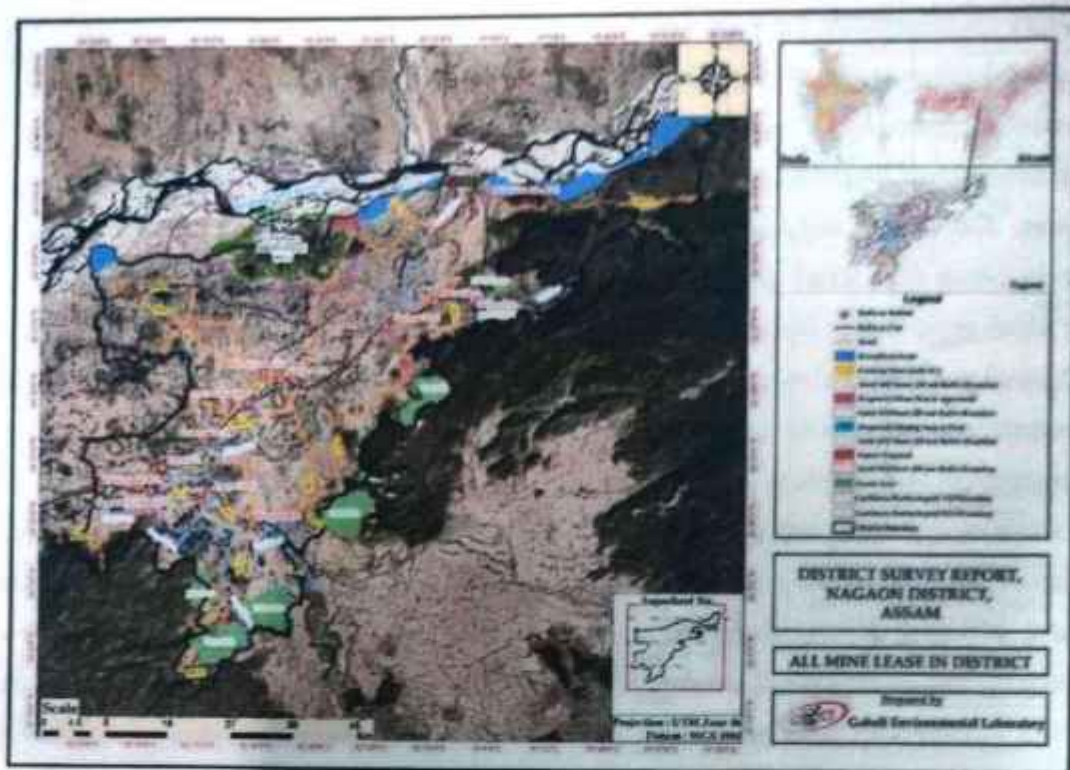


Figure 2.1 Map of All mine leases in Nagaon district

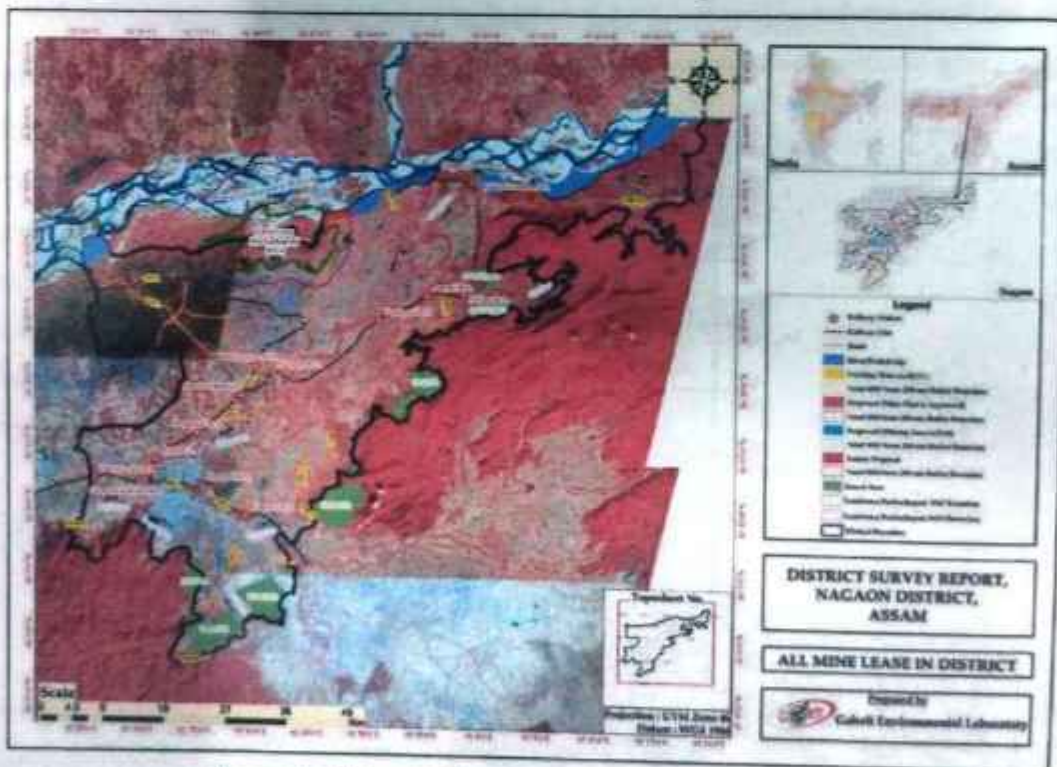


Figure 2.2 Map of All mine leases in Nagaon district

Minerals: Sand, Stone and Brick Earth

103



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Divisional Forest Officer
Nagaon Division

2.4 REPLENISHMENT OF SAND

The natural phenomenon of re-distribution of Sand within the river/stream owing to natural processes viz., monsoon/precipitation on account of erosion from upland segment of the river to its downstream segments is referred as replenishment of sand for that particular lower segment. The various segments of Borpani and Kopili River had been mapped for sand deposits, which were found to be concentrated within geomorphic landforms. The erosion in river which generates the sand sediments by breaking down of sediment from source rock due to physical and chemical weathering. This triggering especially in the Indian subcontinent dependent on climatic factor namely monsoon, as the Indian Summer Monsoon is considered synonymous to the climatic perils.

The monsoonal strength and its fluctuations are one of the end-member which triggers mass movement in sand and its redistribution along the river length, which in present terms on account of mining activity would serve as replenishment. The replenishment as suggested would be driven by changes in monsoonal strength, upland geological formations, gradient of the river and the reach of the river segment. The reach of the river segment is also important to note for natural replenishment of sand as the fluvial dynamics is different in uplands, middle and lower reaches of the river even in same or varied geological domains. **The figure 2.4** shows map of mineral wise leases distributed in the various rivers of the Nagaon district.



Figure 2.3: Mineral Wise Map of Nagaon district (Google Map)

Minerals: Sand, Stone and Brick Earth

104

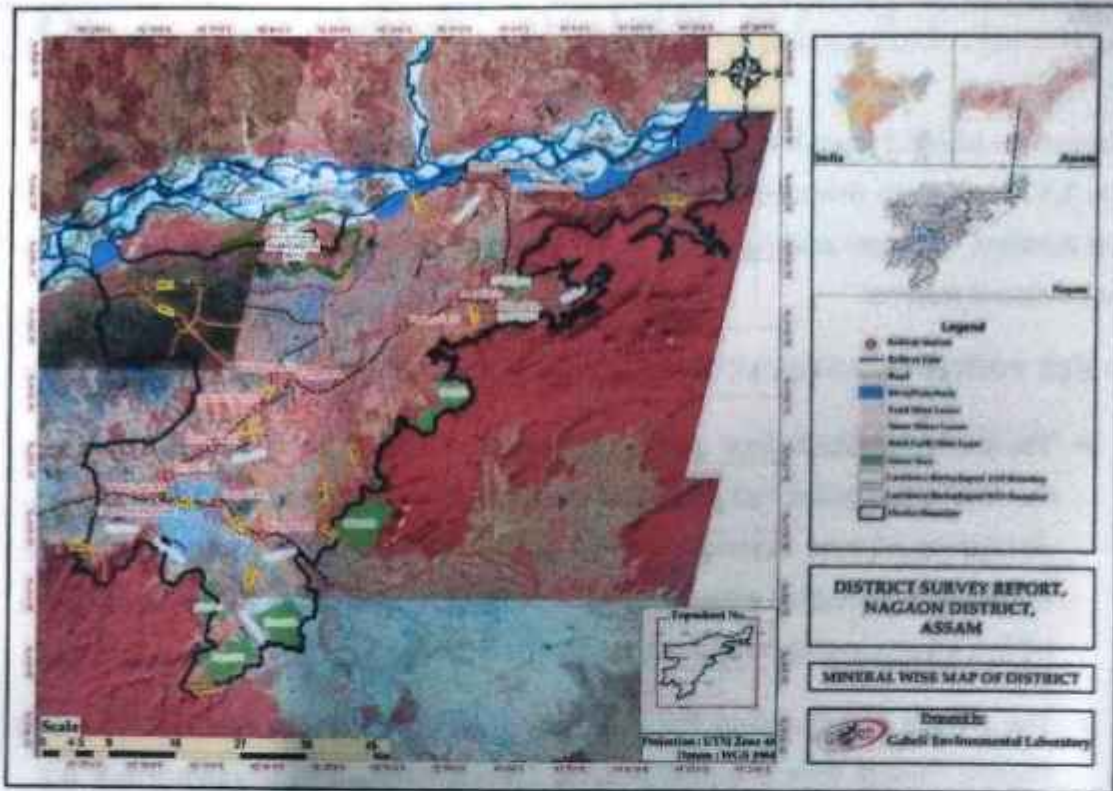


Figure 2.4: Mineral Wise Map of Nagaon district (Satellite Map)

Mineral wise lease distributed (deposits) in the various rivers of the Nagaon district are shown in figure 2.4 and their yearly replenishment have been observed using Google timescale imageries (2019-2024). Such mineral deposits were also confirmed during field work carried by Gaheli Environmental Laboratory (our knowledge partner) and its staff members in November 2024. Then the contour maps of 1 m interval for all the leases obtained from processing of satellite imageries supported SRTM data (May 2024 (Pre-monsoon) & November 2024 (post monsoon)) were analyzed. The average rate of replenishment river wise calculated and shown in following table 2.1:

Table 2.1 Average rate of Replenishment River wise

S. No	Name of River	Number of leases present in the river	Values in Contour Map May 2024 (in meters)			Values in Contour November 2024 (in meters)			Average Rate of replenishment (in meters)
			Min	Max	Difference	Min	Max	Difference	
1	Borpani	4	61	62	1.0	62	62	1.0	1.0 m
2.	Kopili	10	51	52.5	1.5	52.5	54	1.5	1.5 m

Minerals: Sand, Stone and Brick Earth 105



3.	Jamuna	1	64	65.5	1.5	65	66.5	1.5	1.5 m
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Based on the table 2.1 it can be inferred that the average rate of replenishment varies from 1.0 m to 1.5 m in various rivers of Nagaon. Though there is deposition up to 1.5 m in various river stretches, but as per guidelines only 1 m is allowed for mining. So, we have considered 1 m as mineral reserves.

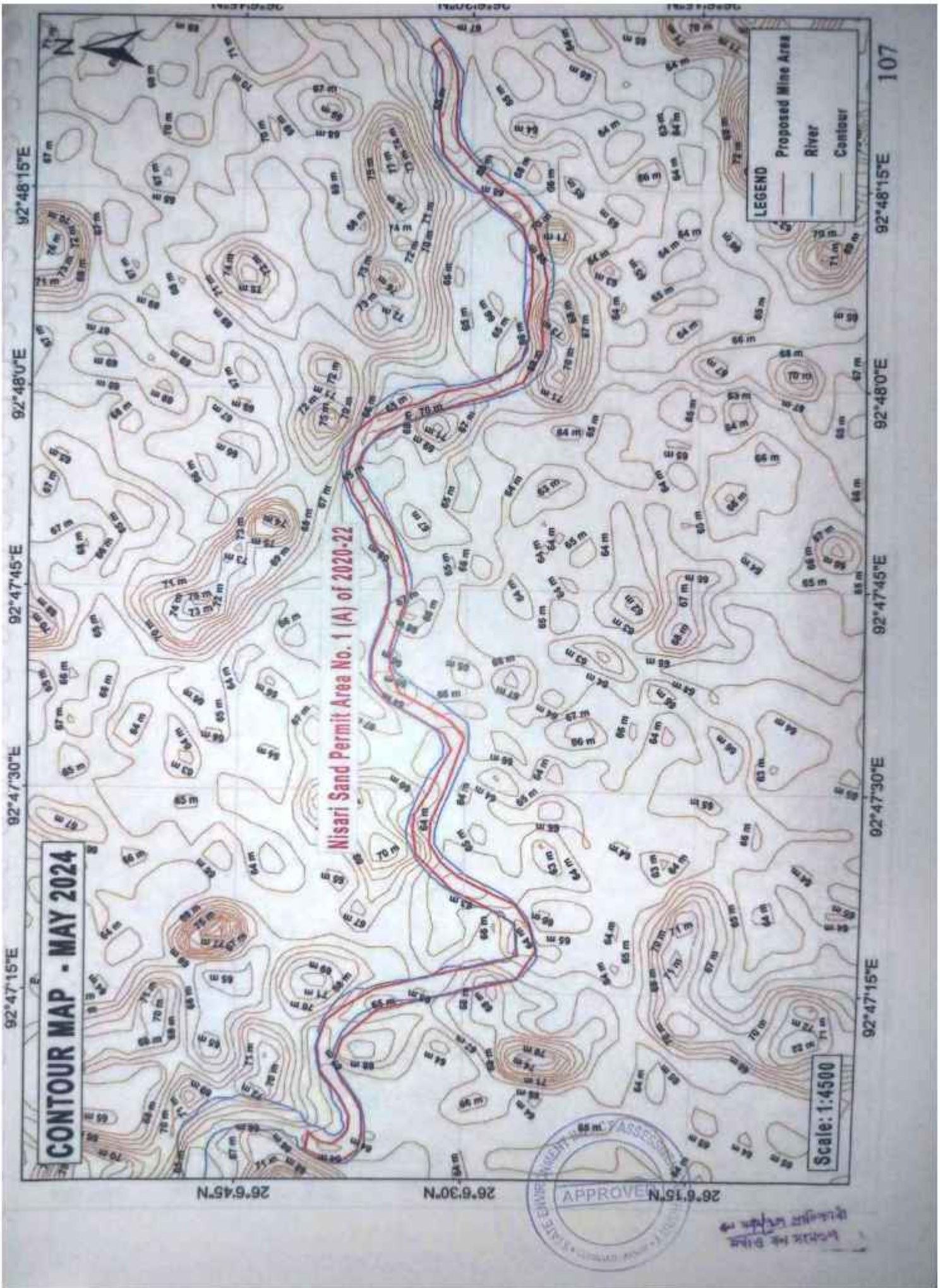
3.0 KEY POINTS FOR SUSTAINABLE REPLENISHMENT IN NAGAON DISTRICT

- The district has sizable Sand reserves in Borpani, Jamuna, and Kopili River. Based on the field investigation and satellite images of landform migration, erosion and re-distribution of sand deposits confirms the timely, annual replenishment of sand facilitated by geological setup, gradient of river bed, rainfall pattern and intensity. The table 2.1 shows average rate of replenishment river wise
- The average rate of replenishment varies from 1.0m to 1.5 m in various rivers of Nagaon. Though there is deposition up to 1.5 m in various river stretches, but as per guidelines only 1 m is allowed for mining. So, we have considered 1 m as mineral reserves.
- In order to ensure sustainable and systematic sand mining with monitored protection of the environment, the MoEF & CC Sustainable Sand Mining Management Guidelines – 2016, MoEF & CC Enforcement & Monitoring Guidelines for Sand Mining – January 2020, Assam Minor Mineral Concession Rules, 2013 (Compliance of sand mining guidelines) and related Honorable NGT order will be followed.

Disclaimer: The present study is based on the available satellite images, remote sensing data set, past and present field investigation. The area of the existing Sand leases were provided by the office of the Divisional Forest Officer, Nagaon Division, Nagaon and Geology & Mining Department, Government of Assam based on which the estimation and analysis was done. The results have no bearing on economic viability of the lease or proposed area.

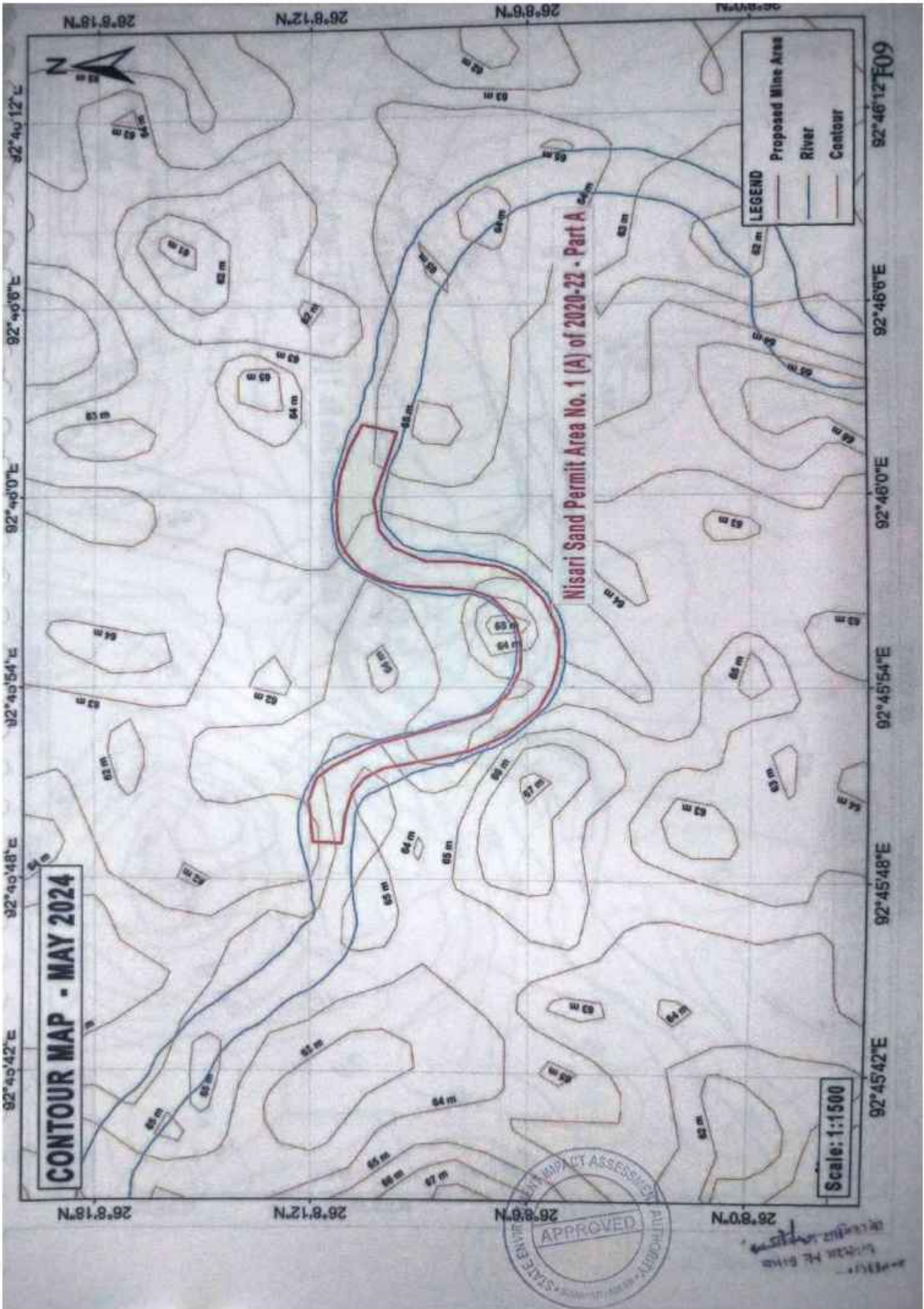
CONTOUR MAPS

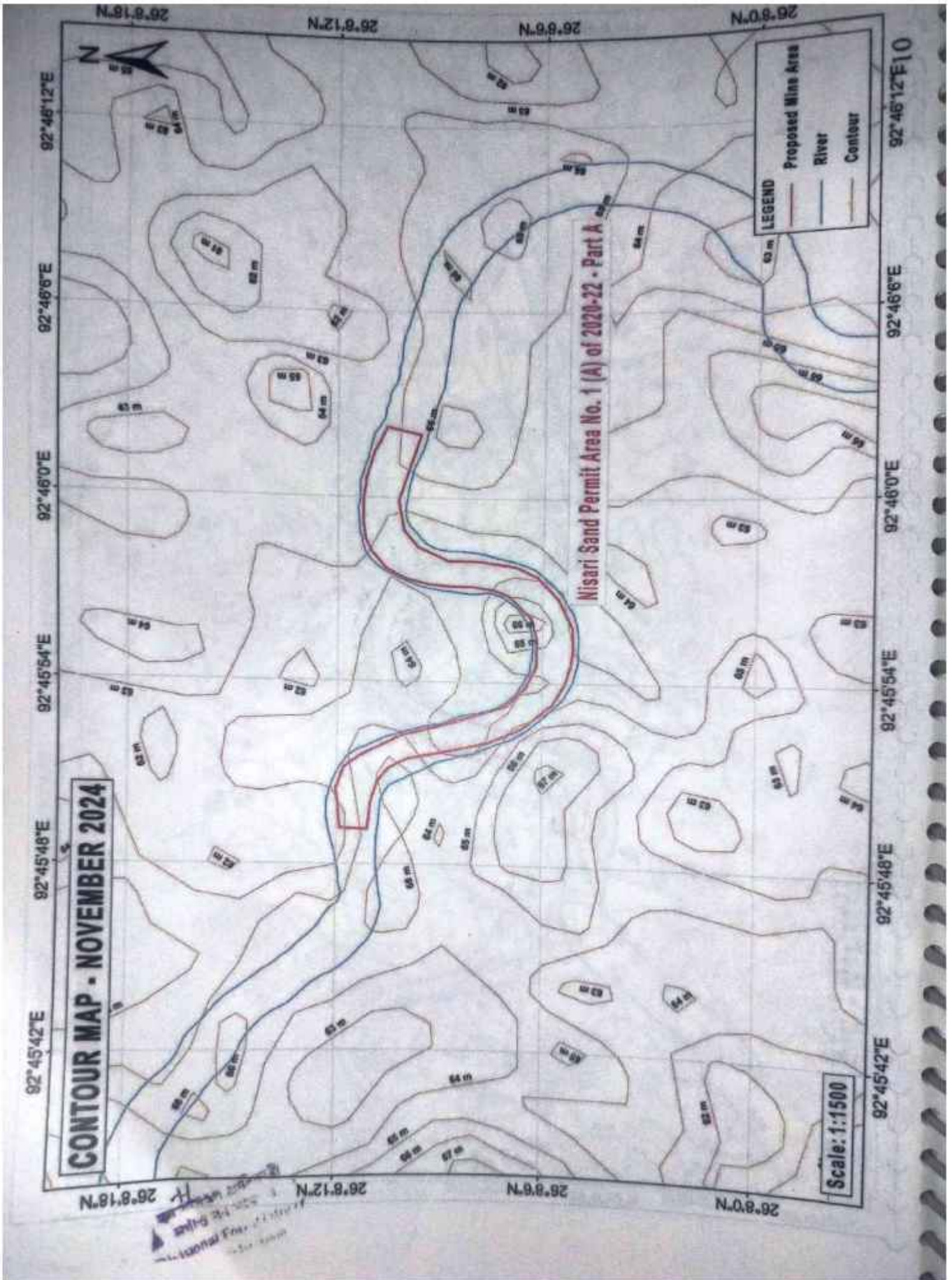


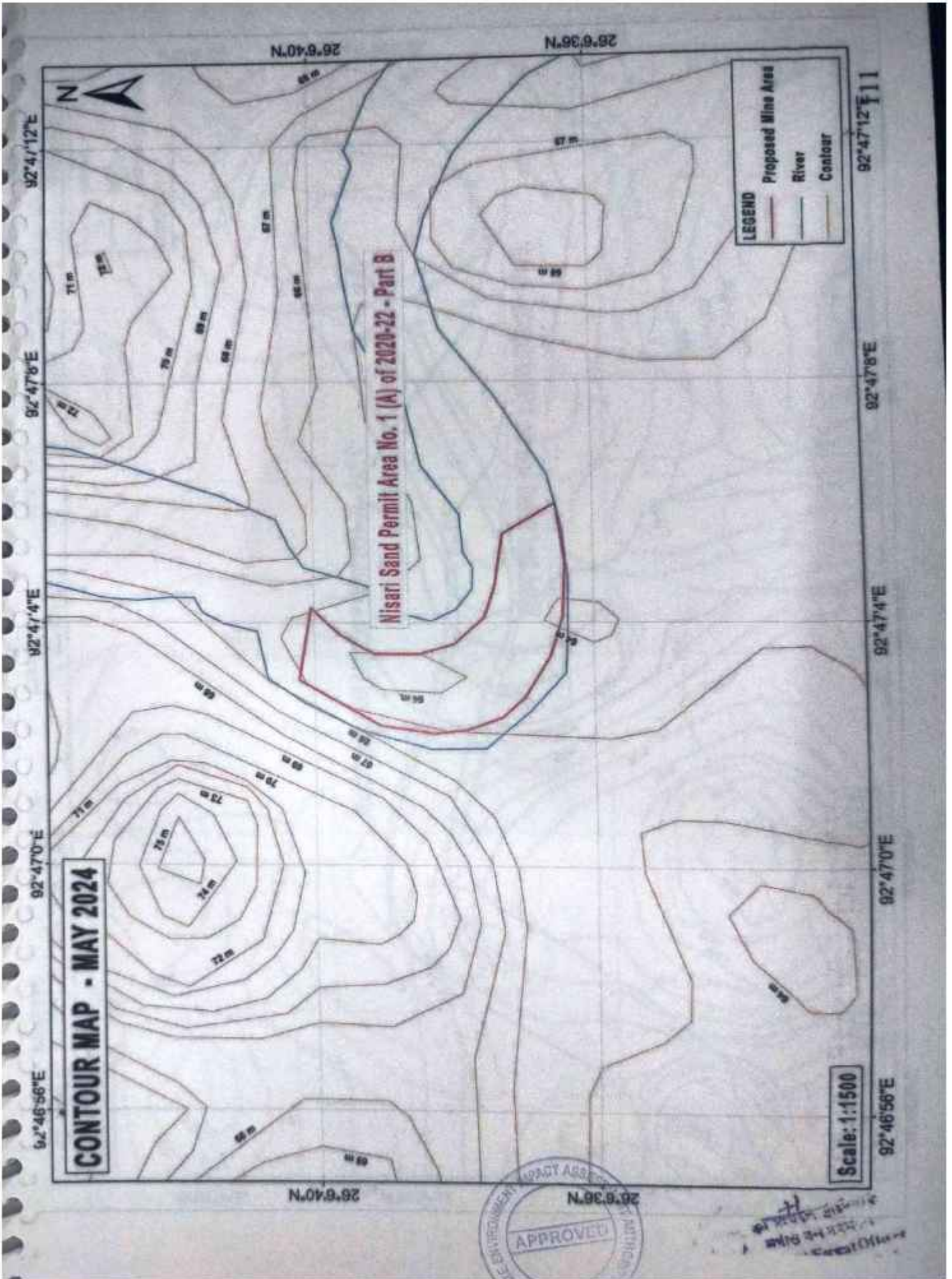


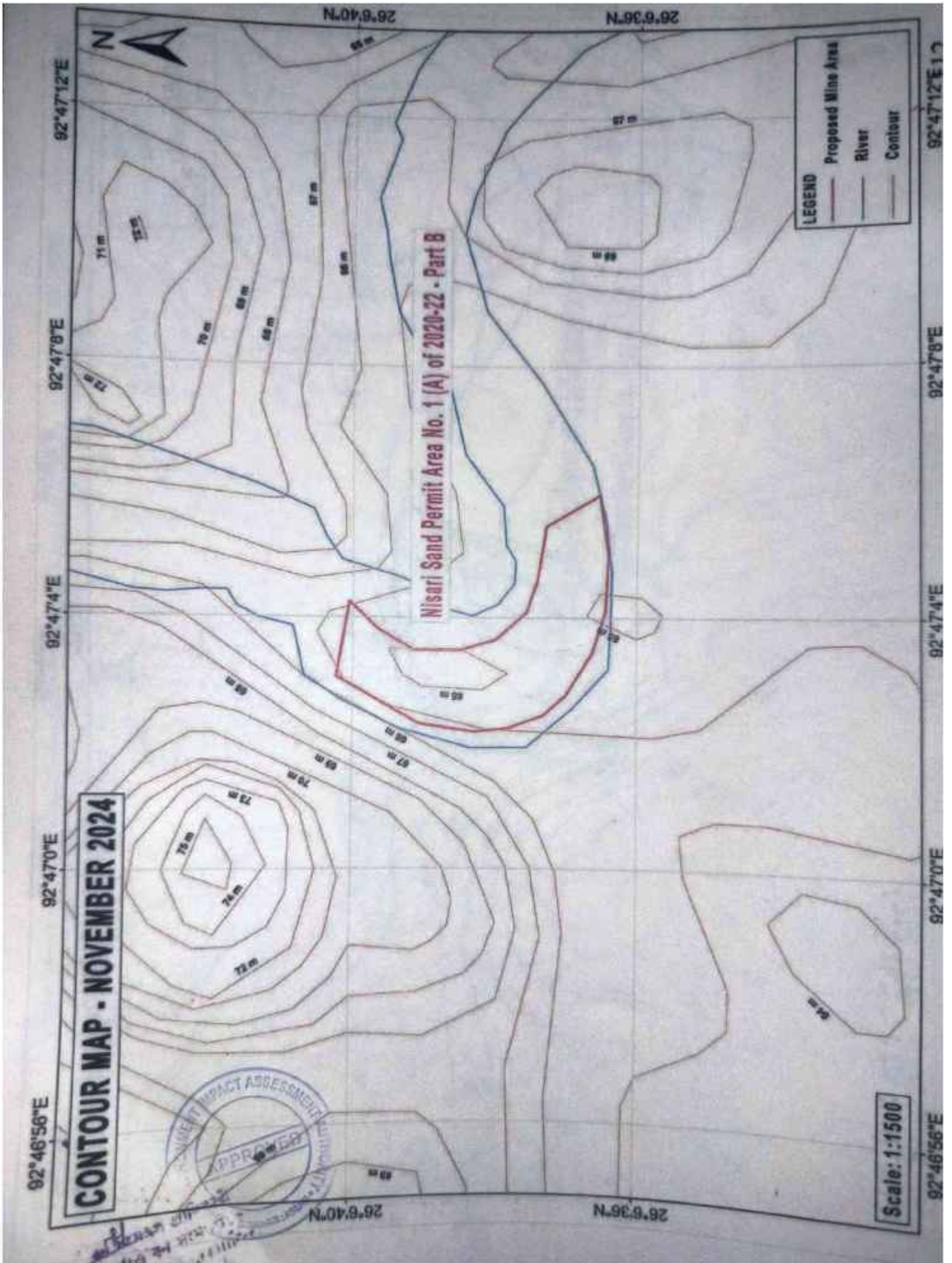


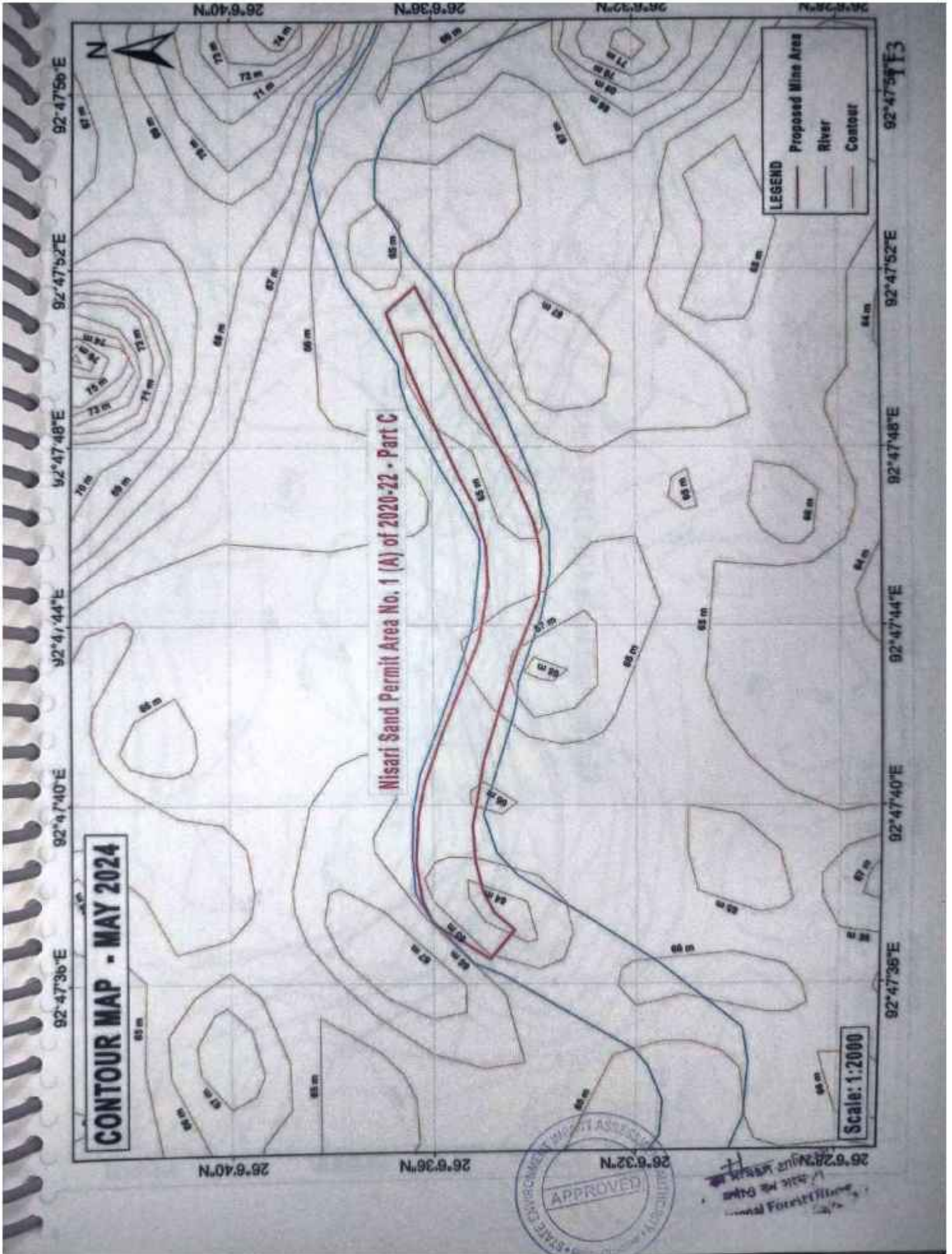
Geological Survey of India
Regional Office, Bangalore
Date: 10/11/2024

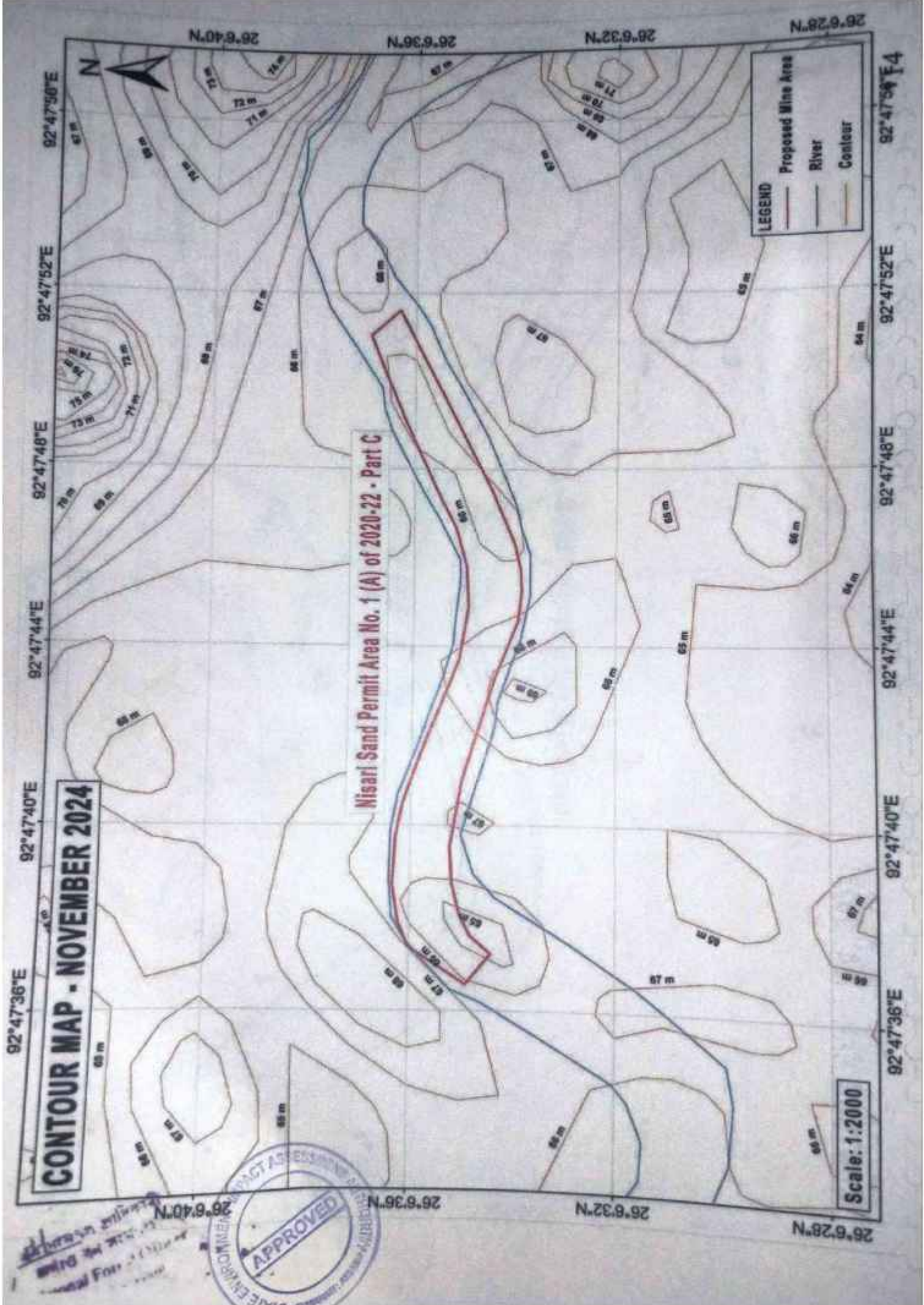












CONTOUR MAP - NOVEMBER 2024

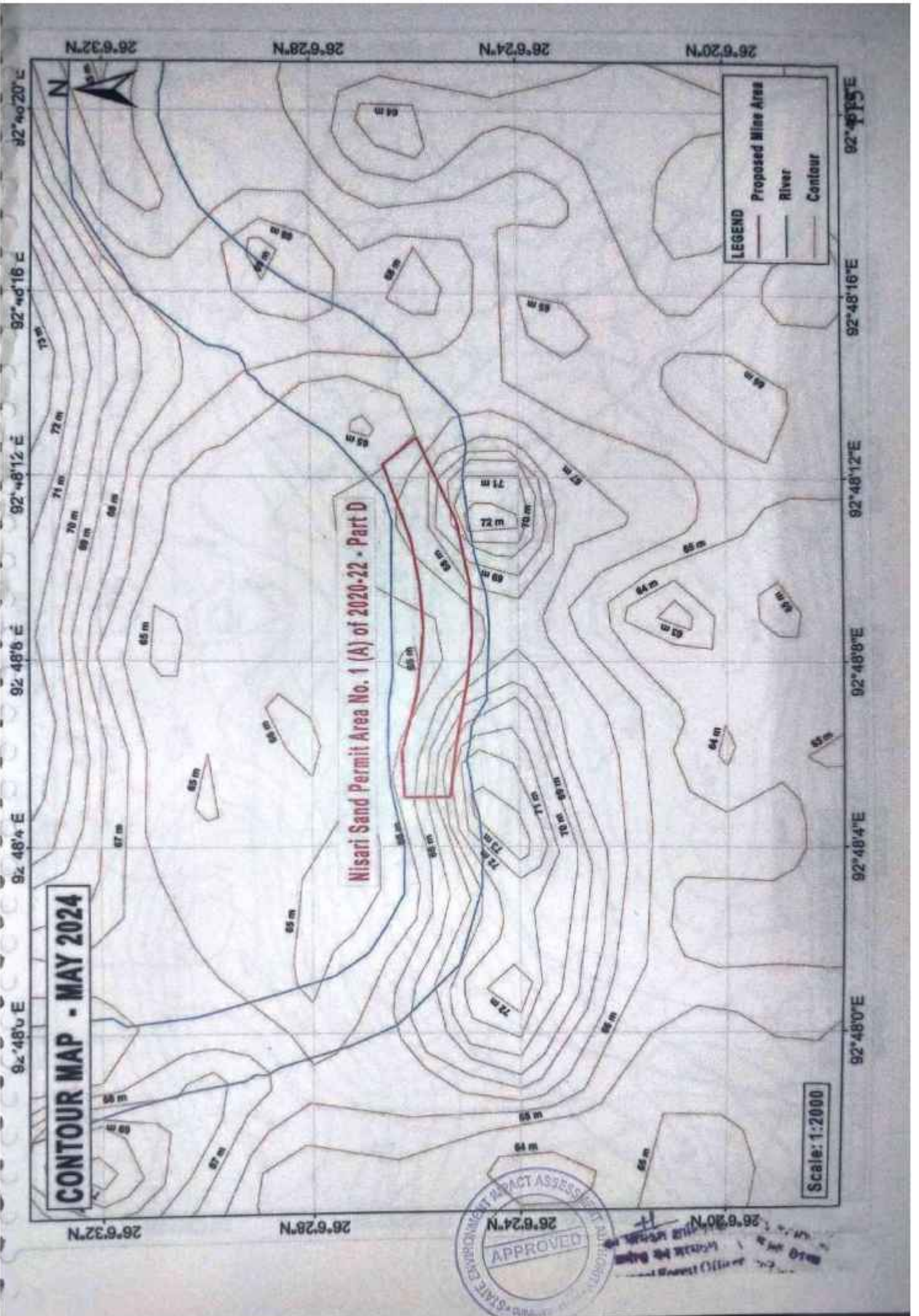
Nisar Sand Permit Area No. 1 (A) of 2020-22 - Part C

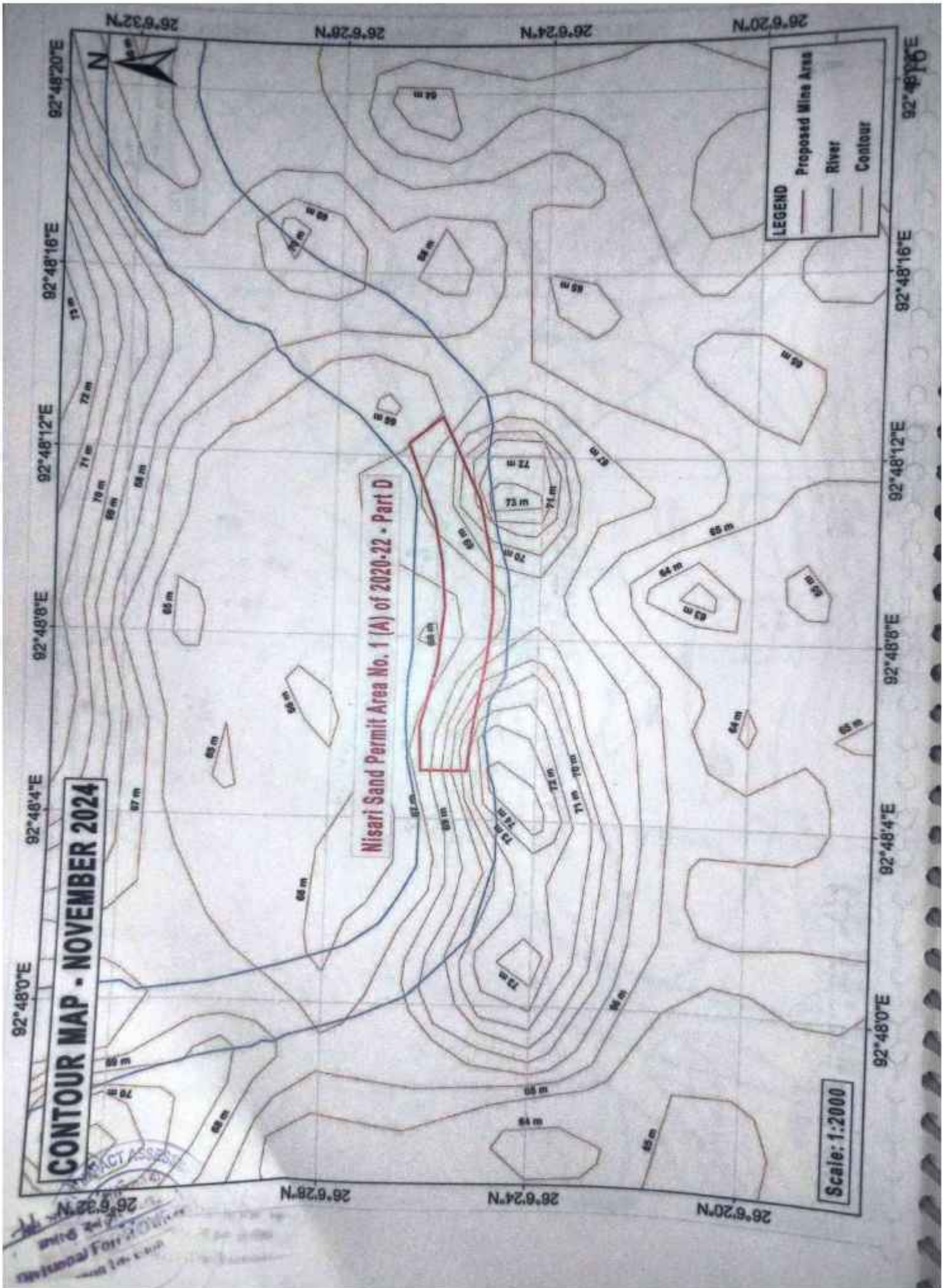
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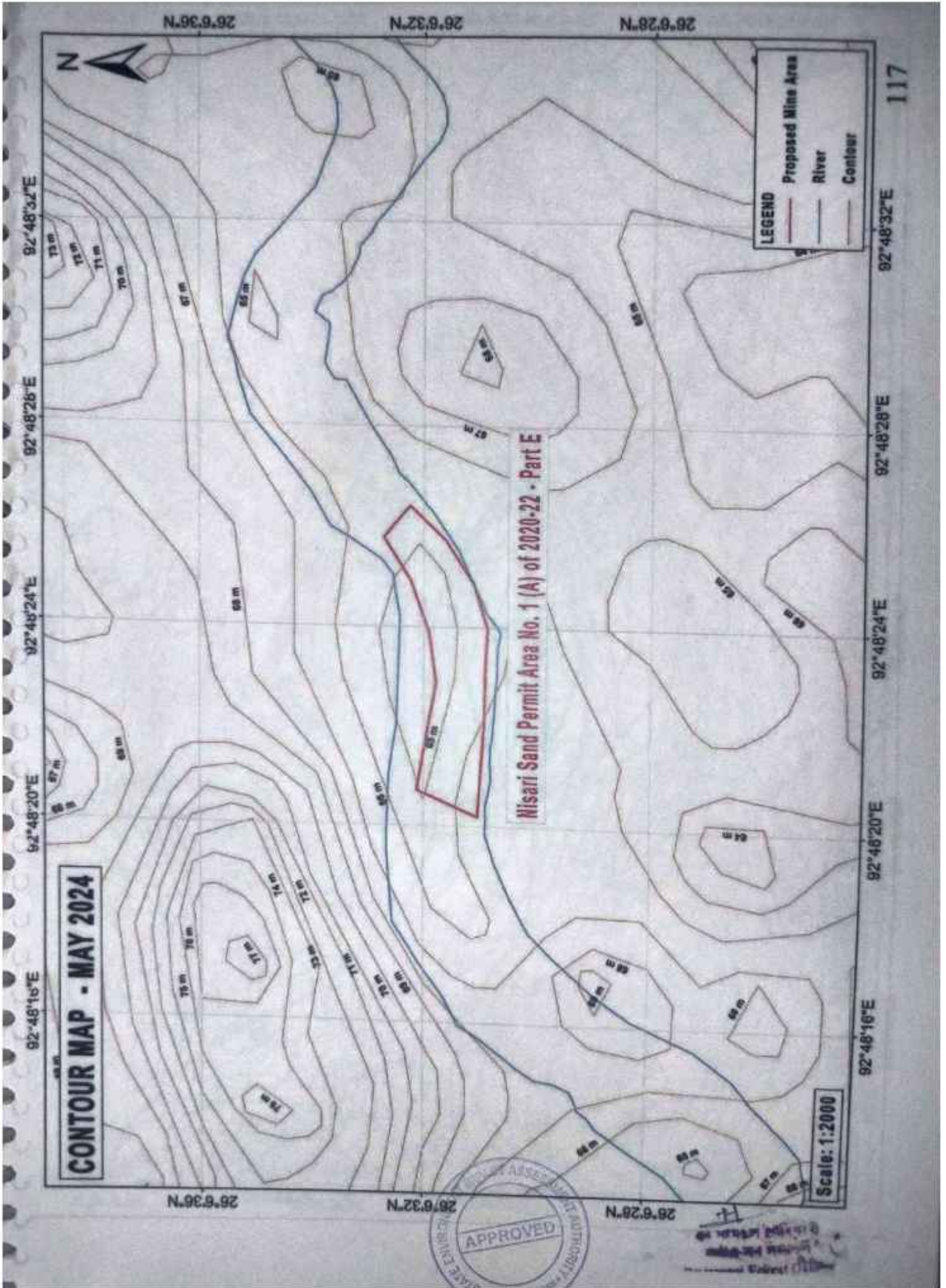
LEGEND

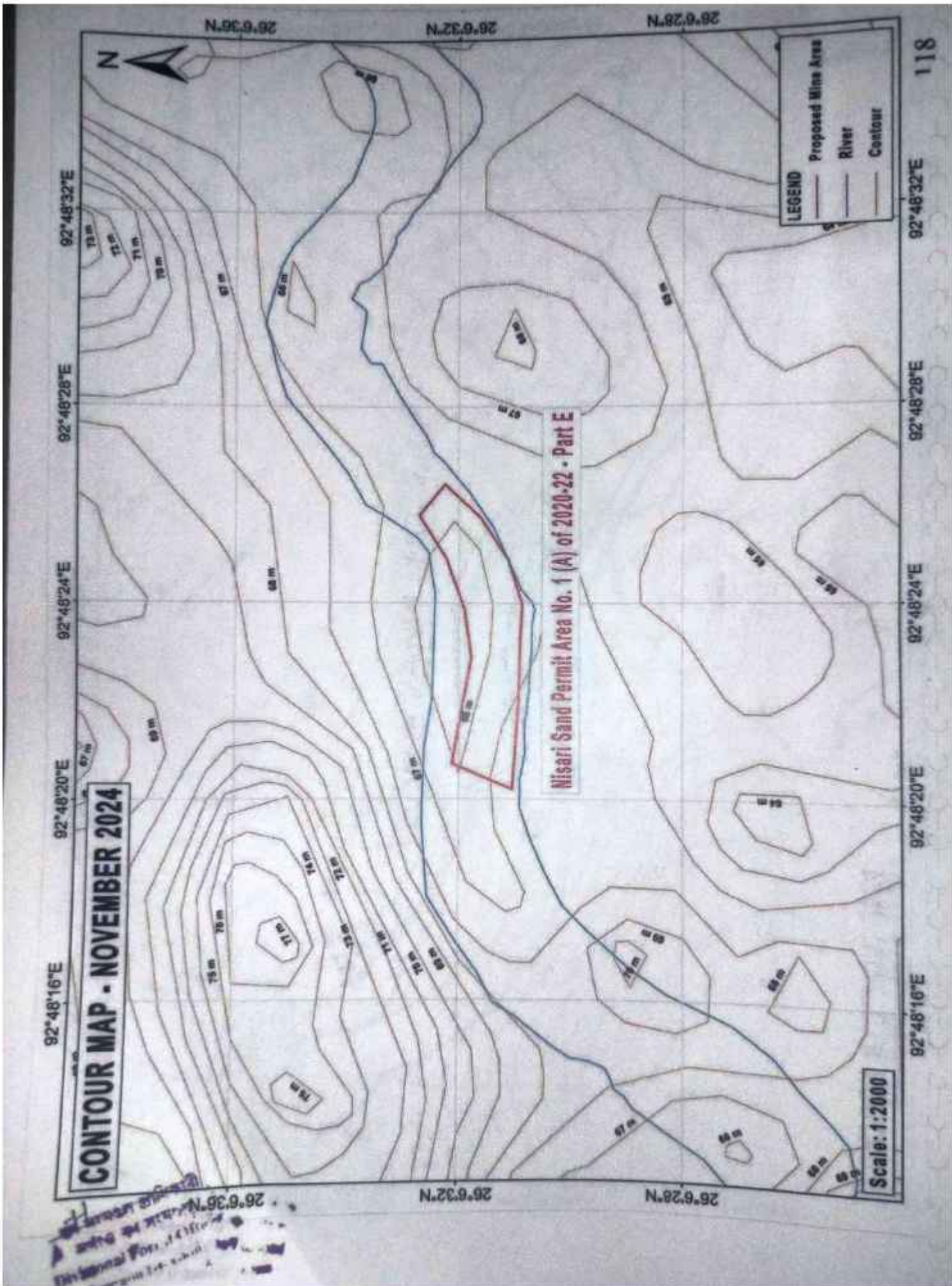
-  Proposed Mine Area
-  River
-  Contour











CONTOUR MAP - NOVEMBER 2024

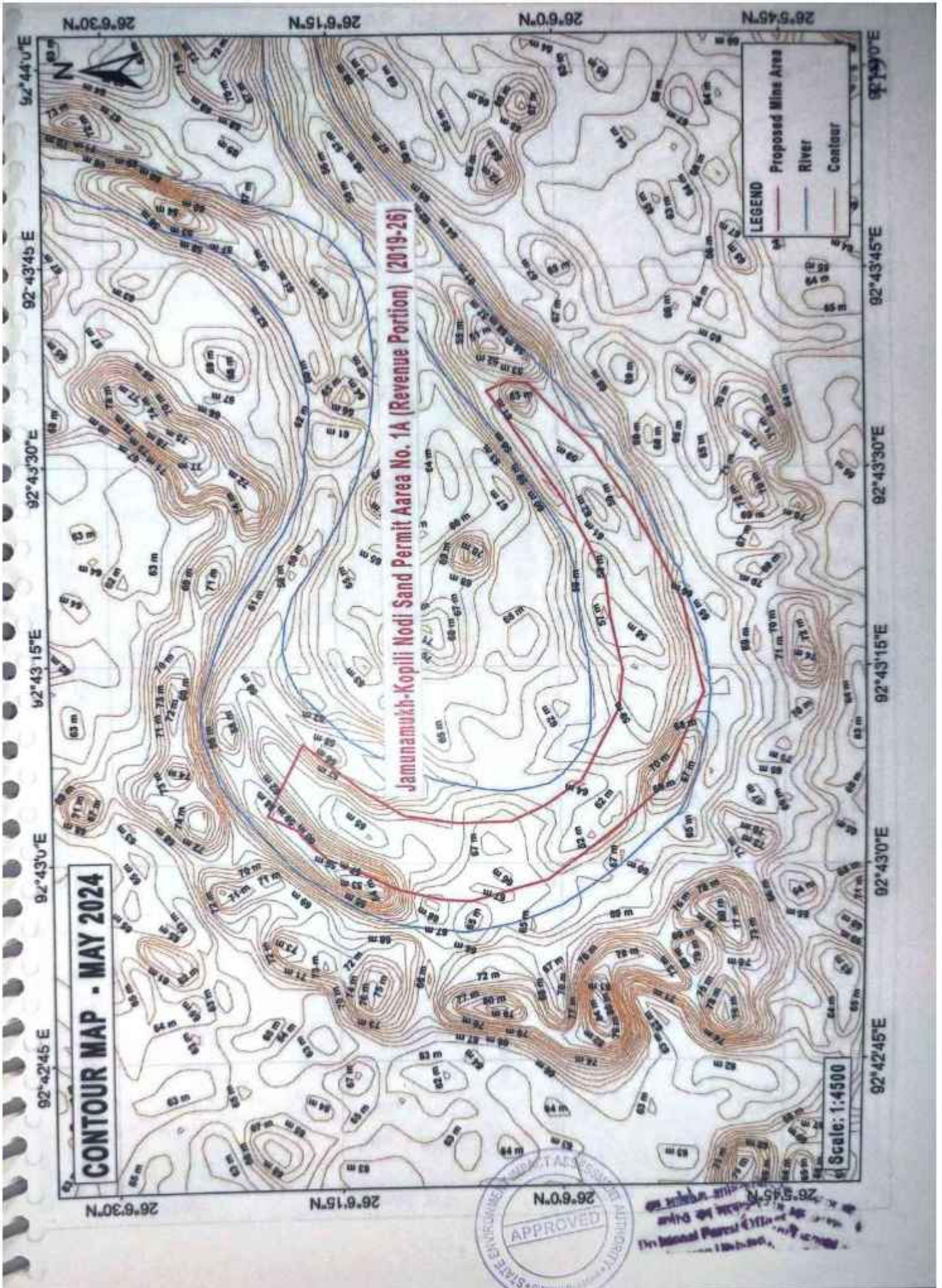
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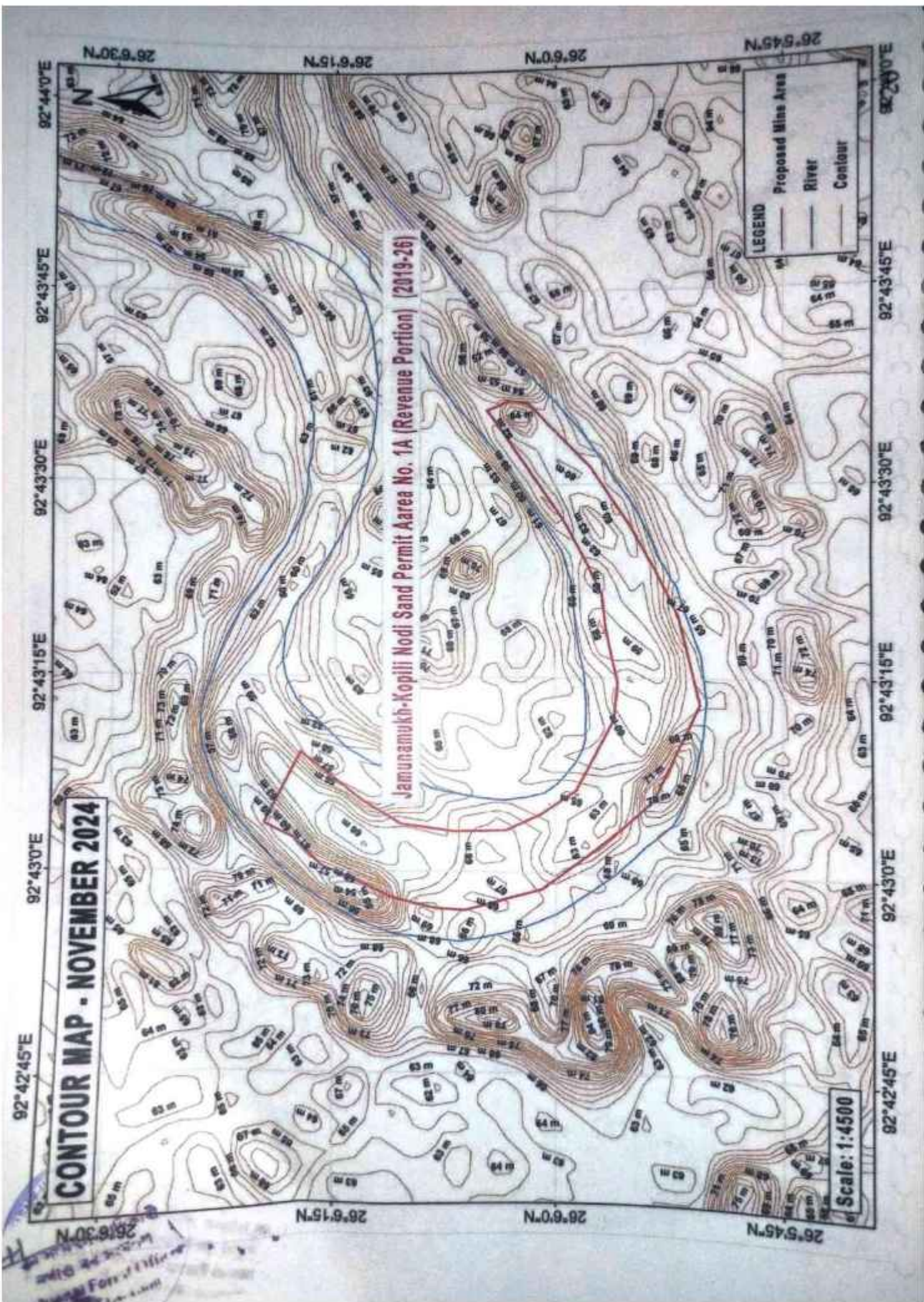
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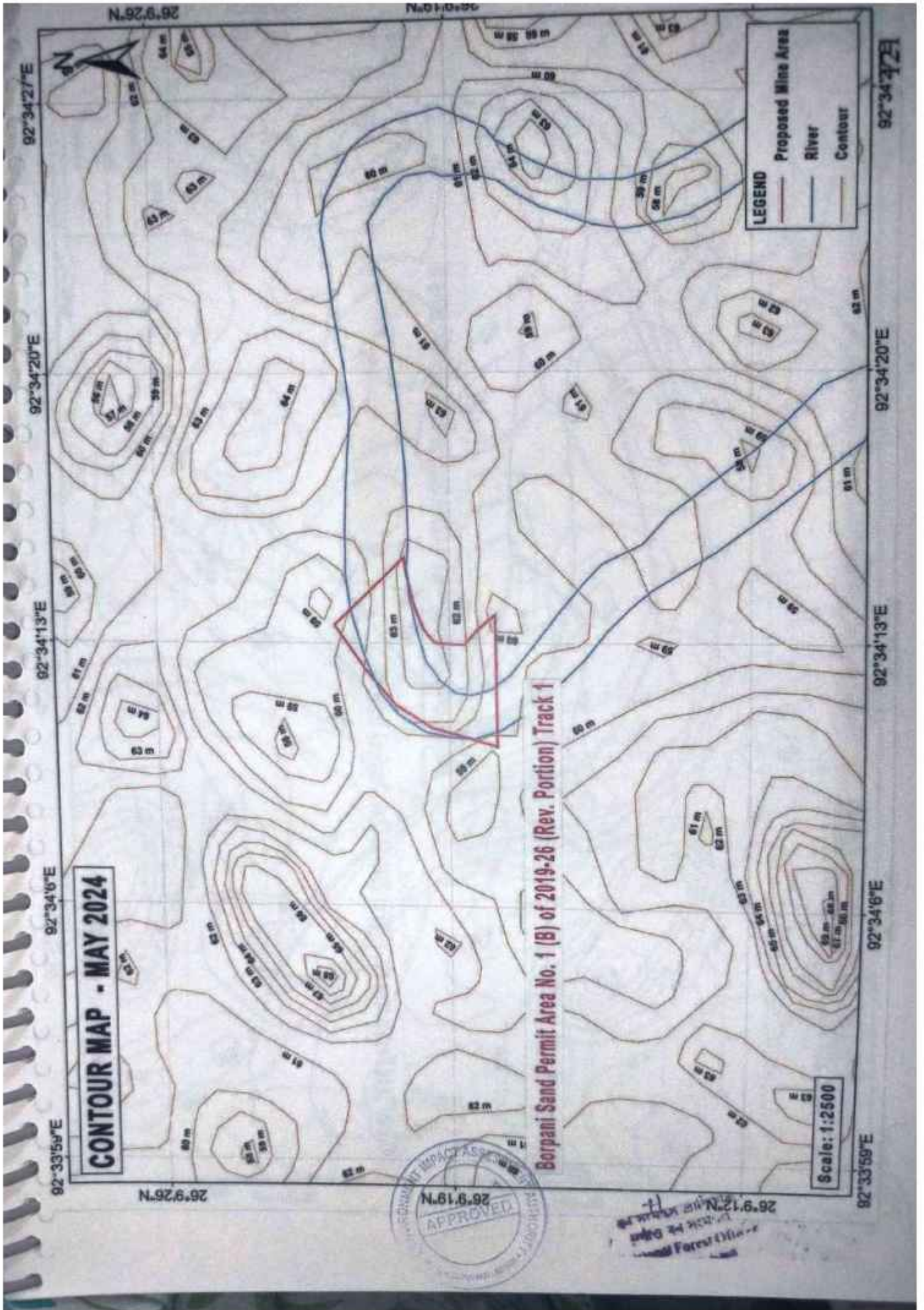
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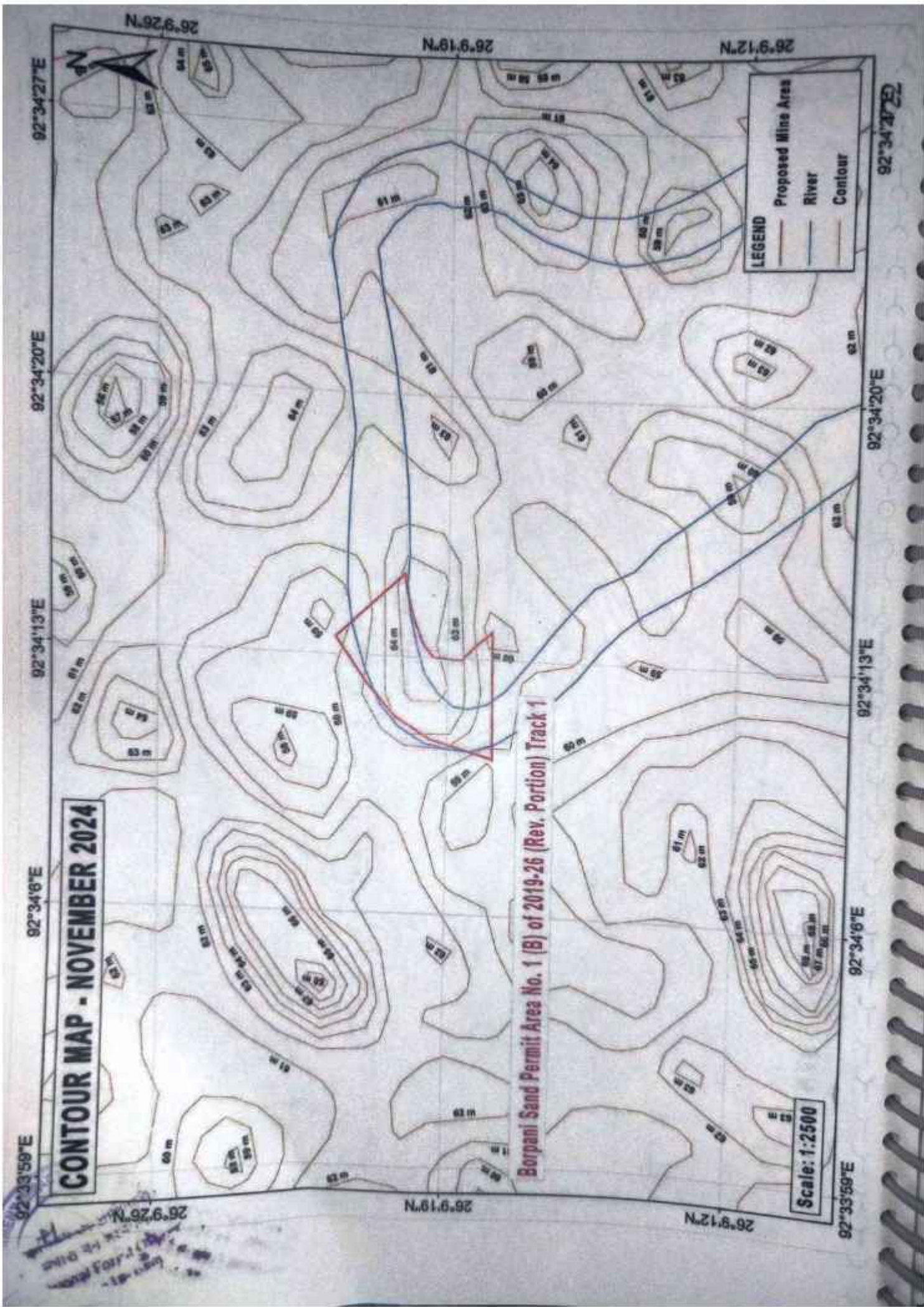
- Proposed Mine Area
- River
- Contour

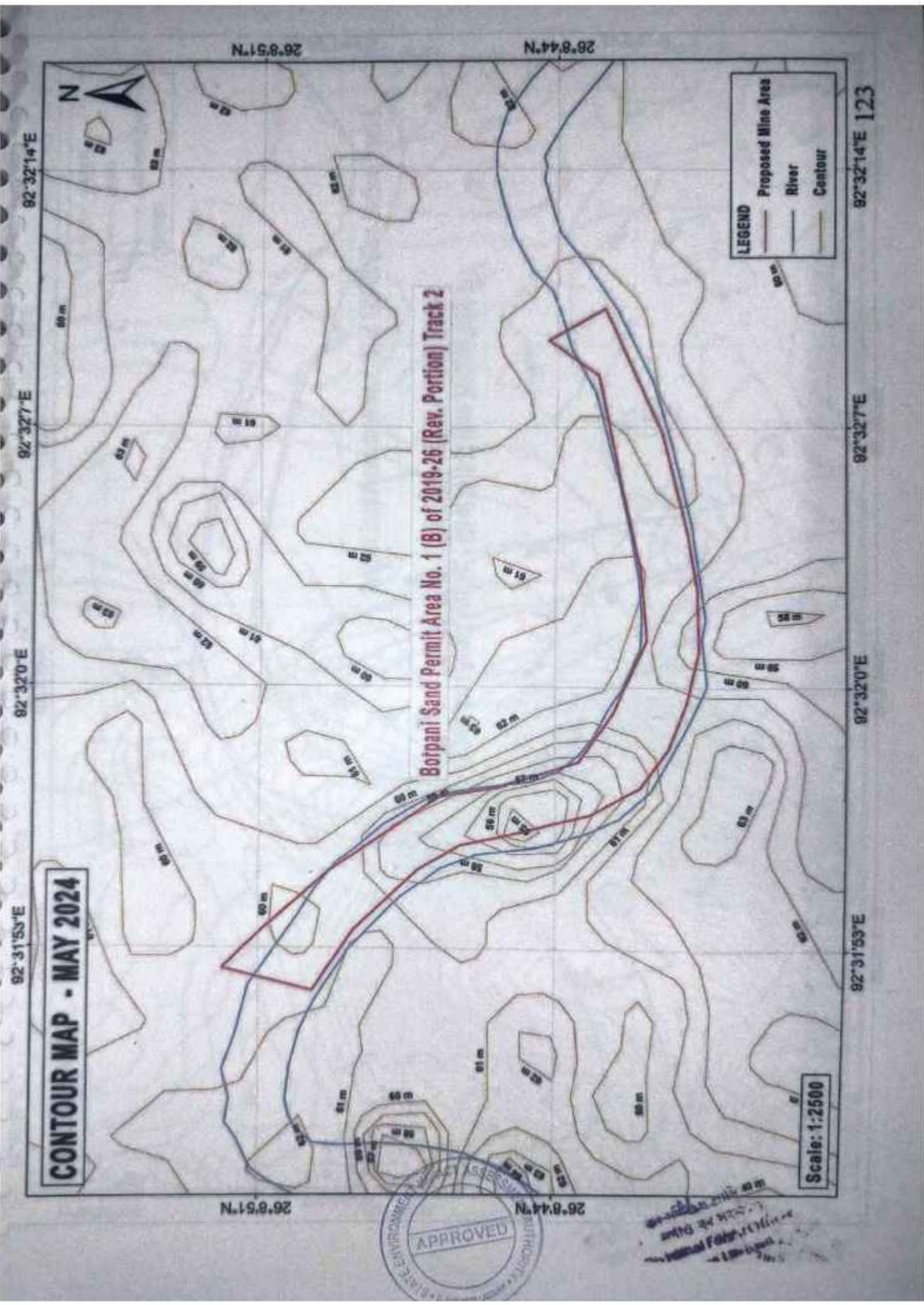
118











26.851N

26.844N



LEGEND

	Proposed Mine Area
	River
	Contour

Botpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion) Track 2

CONTOUR MAP - MAY 2024

Scale: 1:2500



26.851N

26.844N

92°32'14"E

92°32'7"E

92°32'0"E

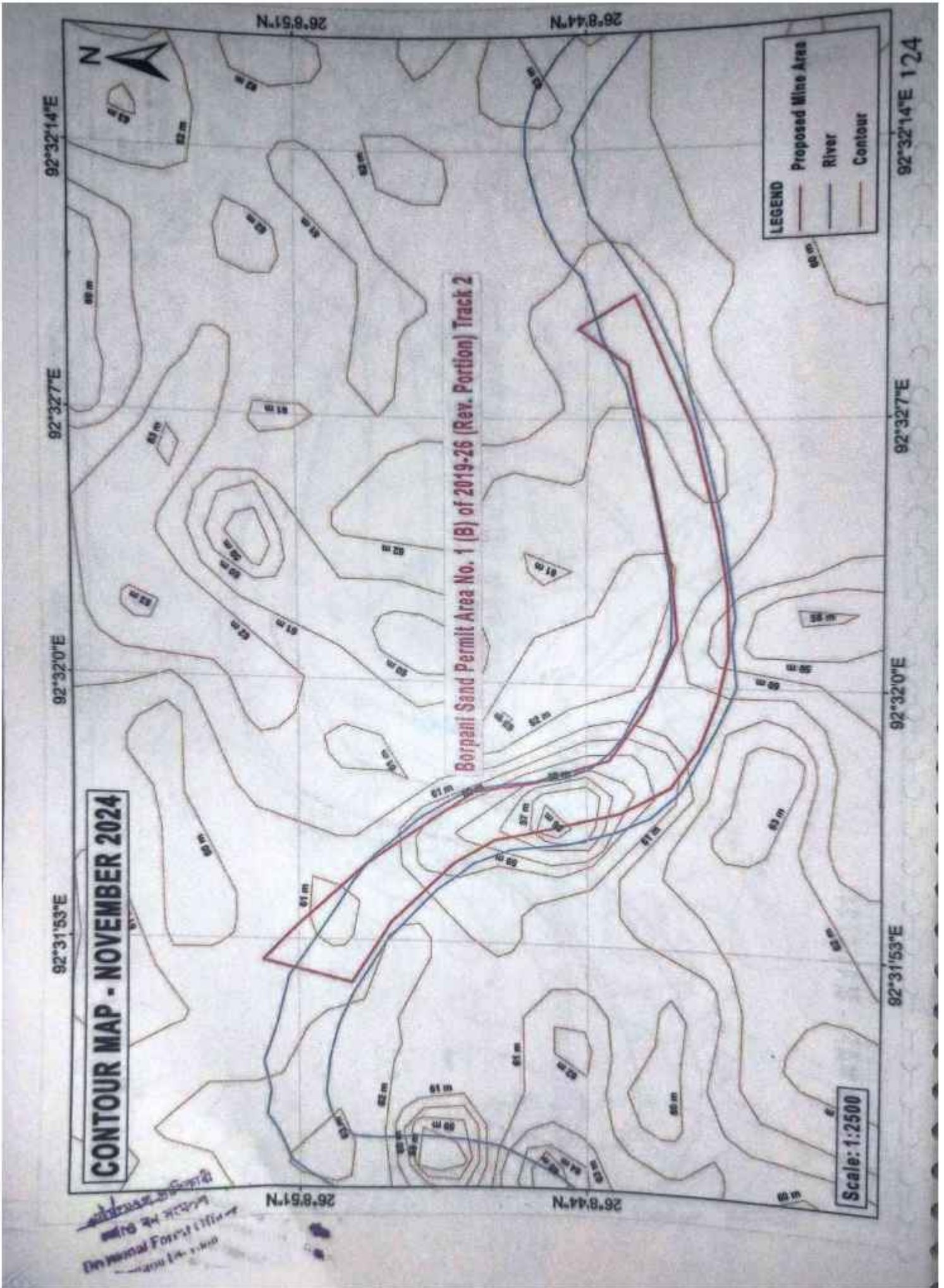
92°31'53"E

92°32'14"E 123

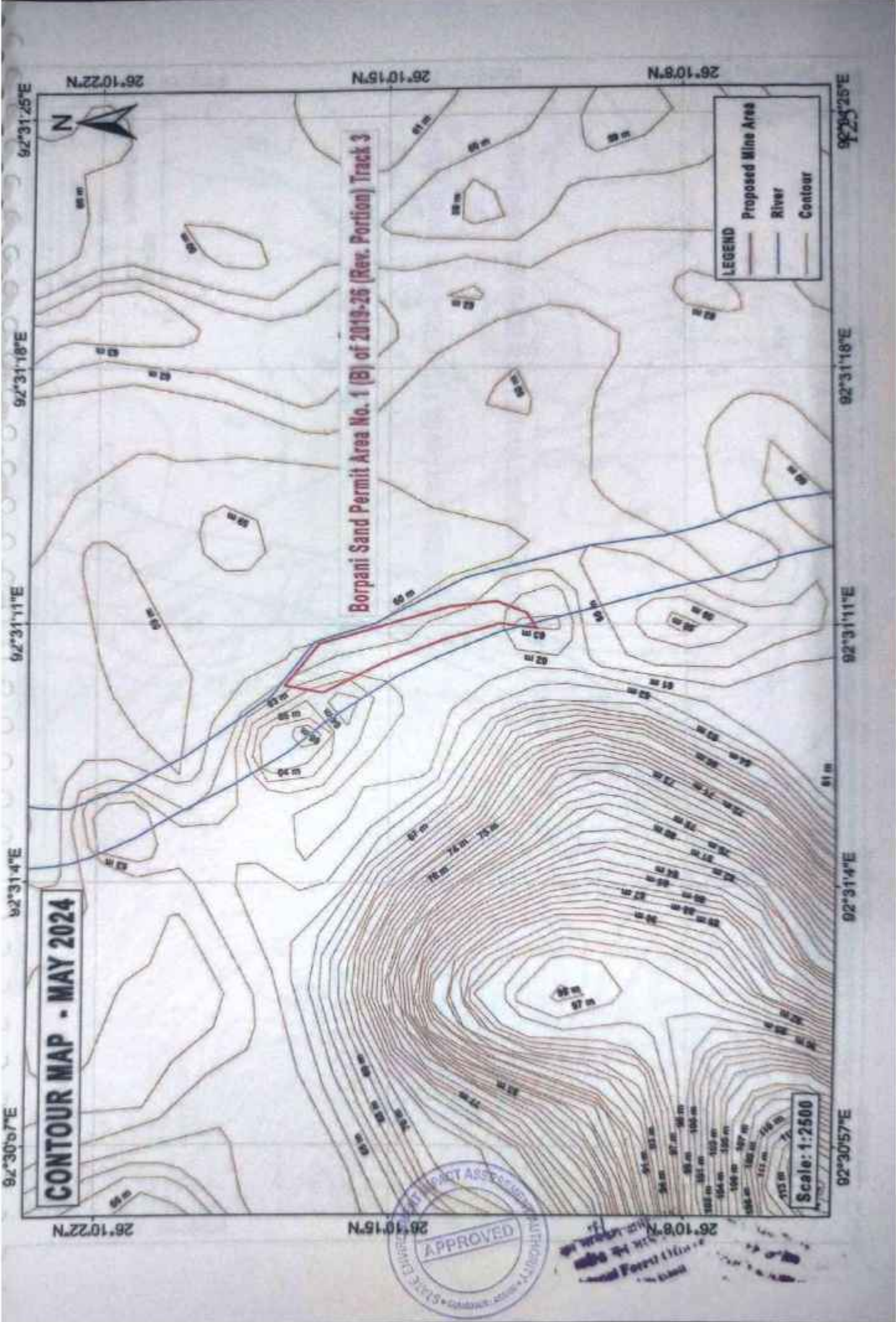
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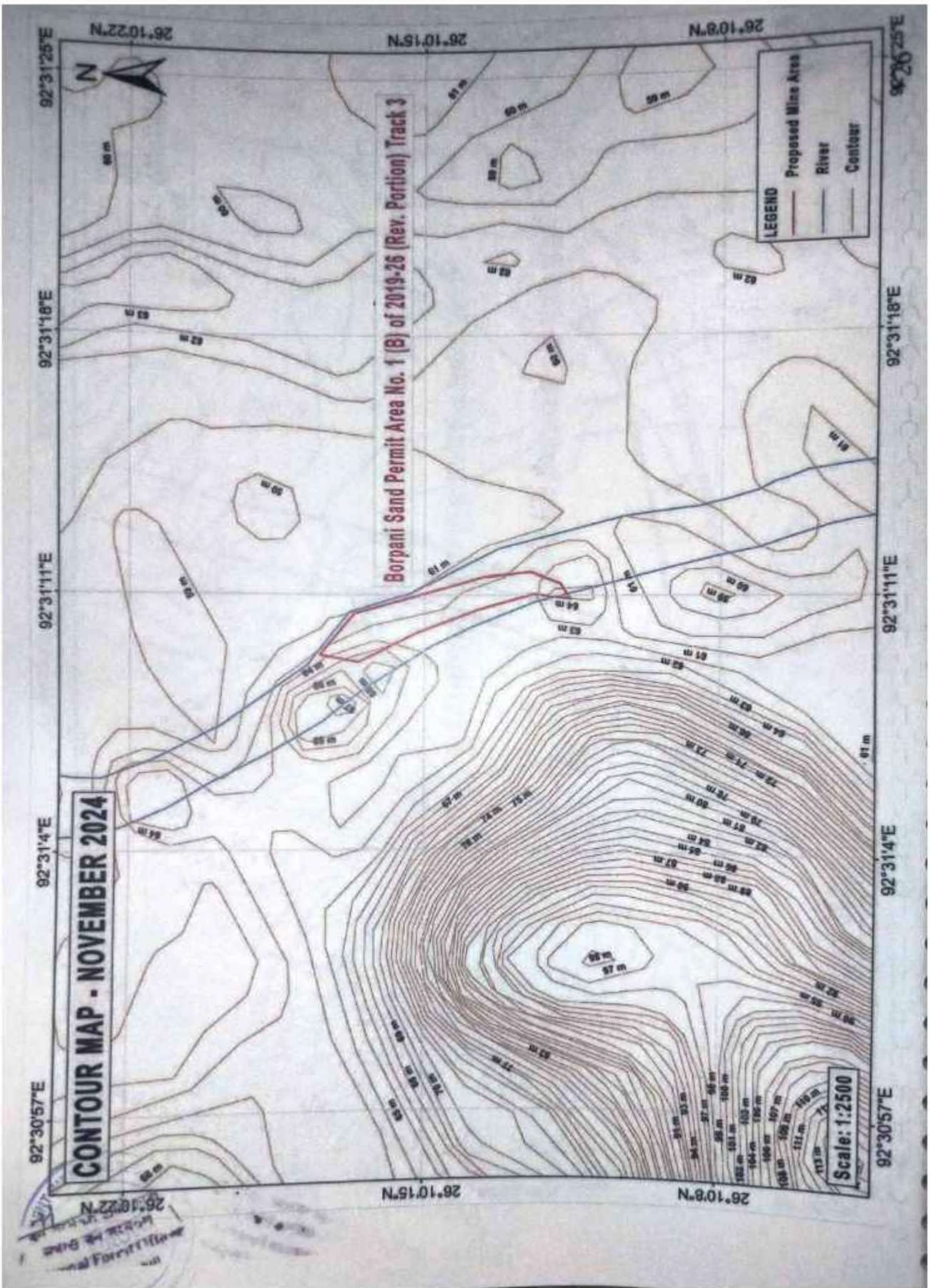
92°32'0"E

92°31'53"E



Handwritten notes:
 1. The map is a contour map.
 2. The map is a topographic map.
 3. The map is a map of the Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion) Track 2.





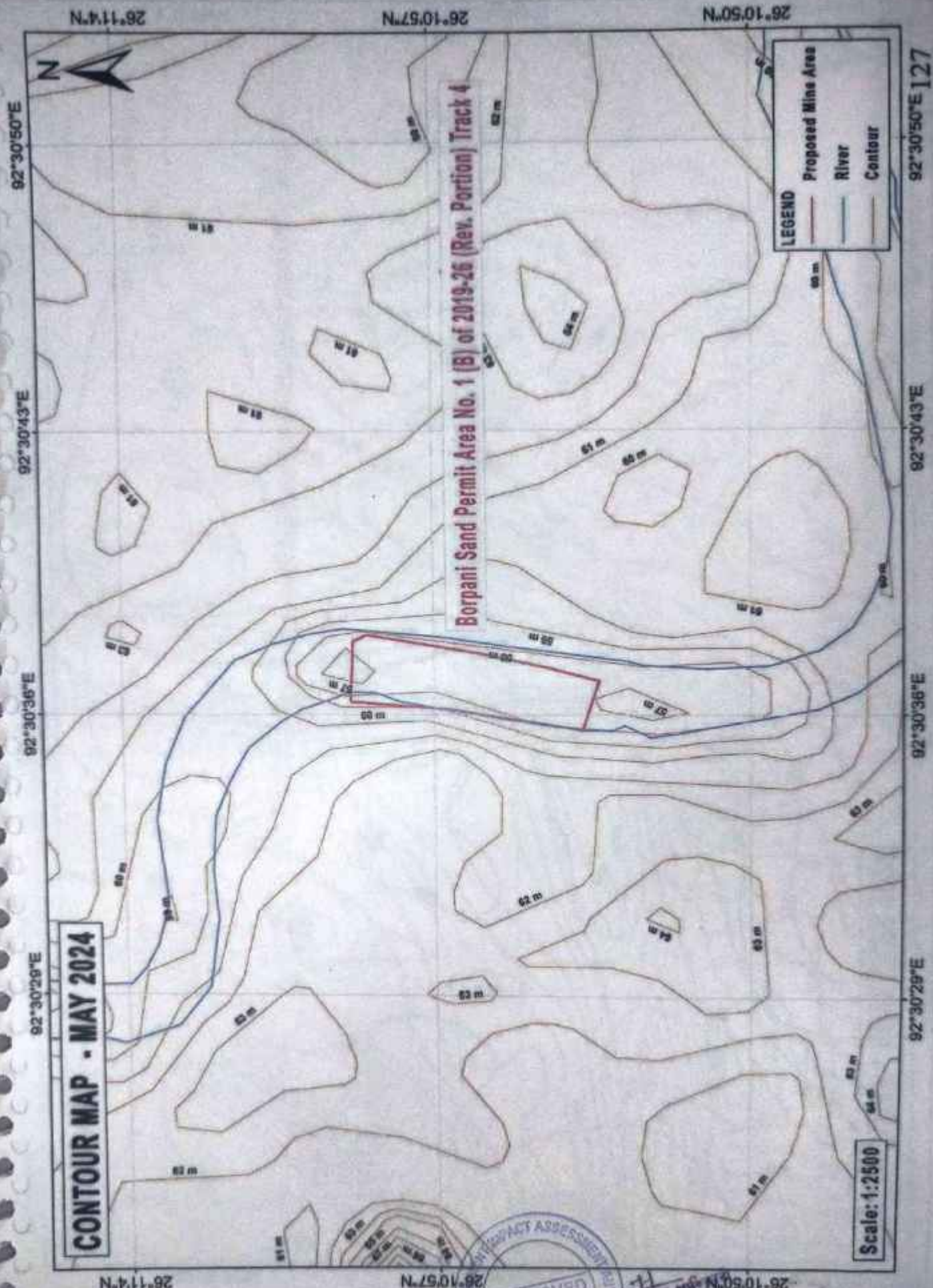
CONTOUR MAP - MAY 2024

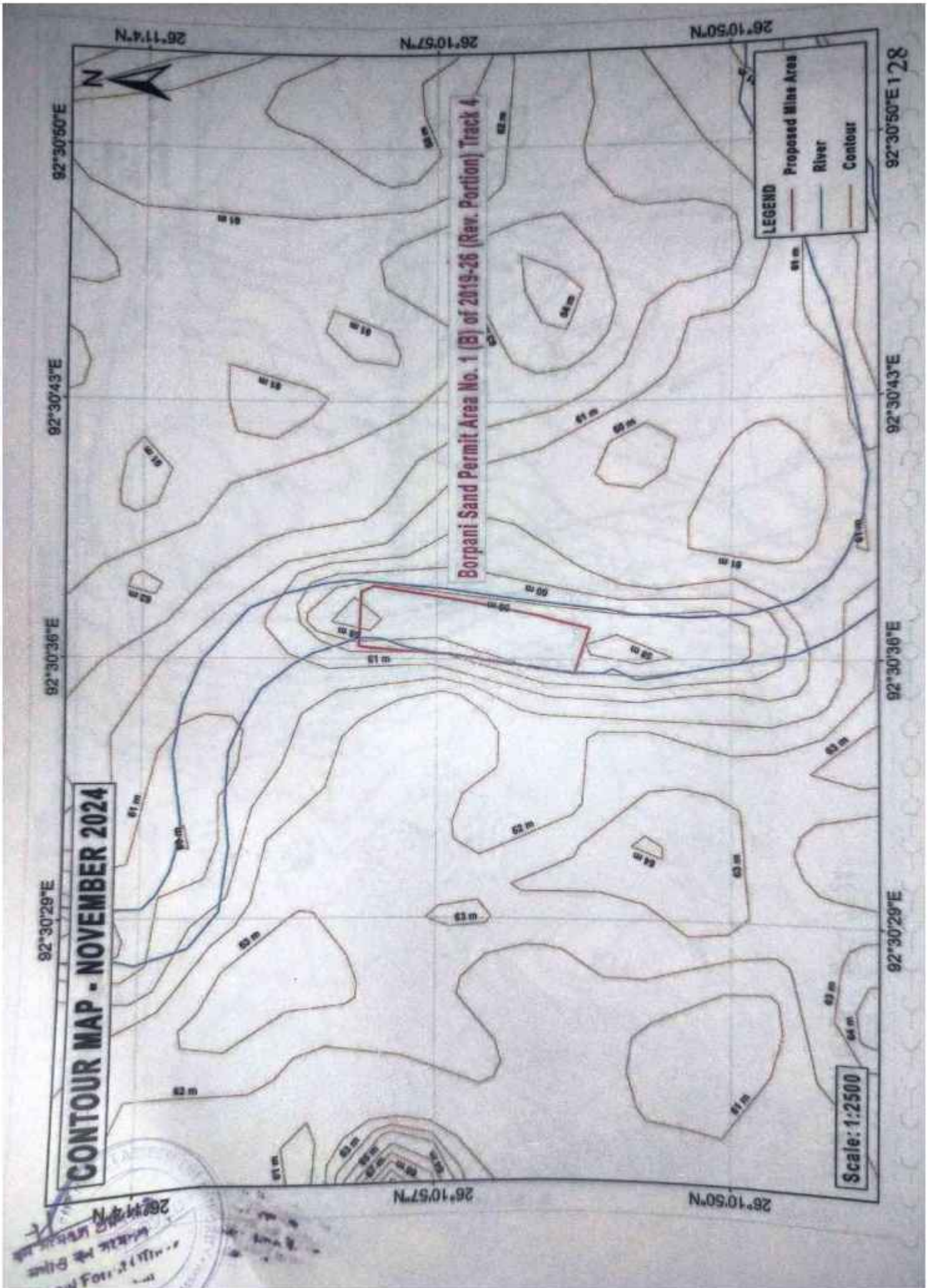
Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion) Track 4

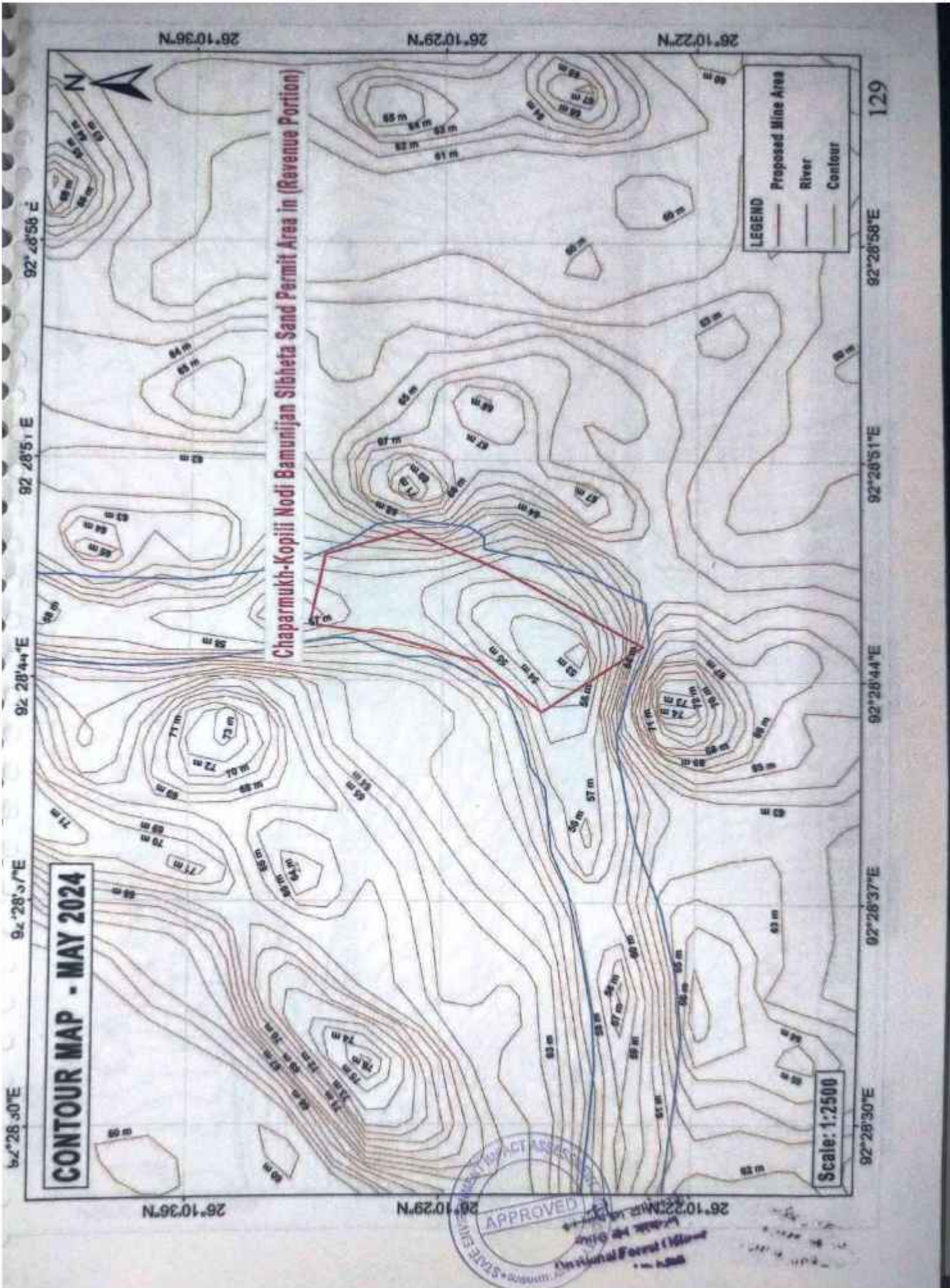
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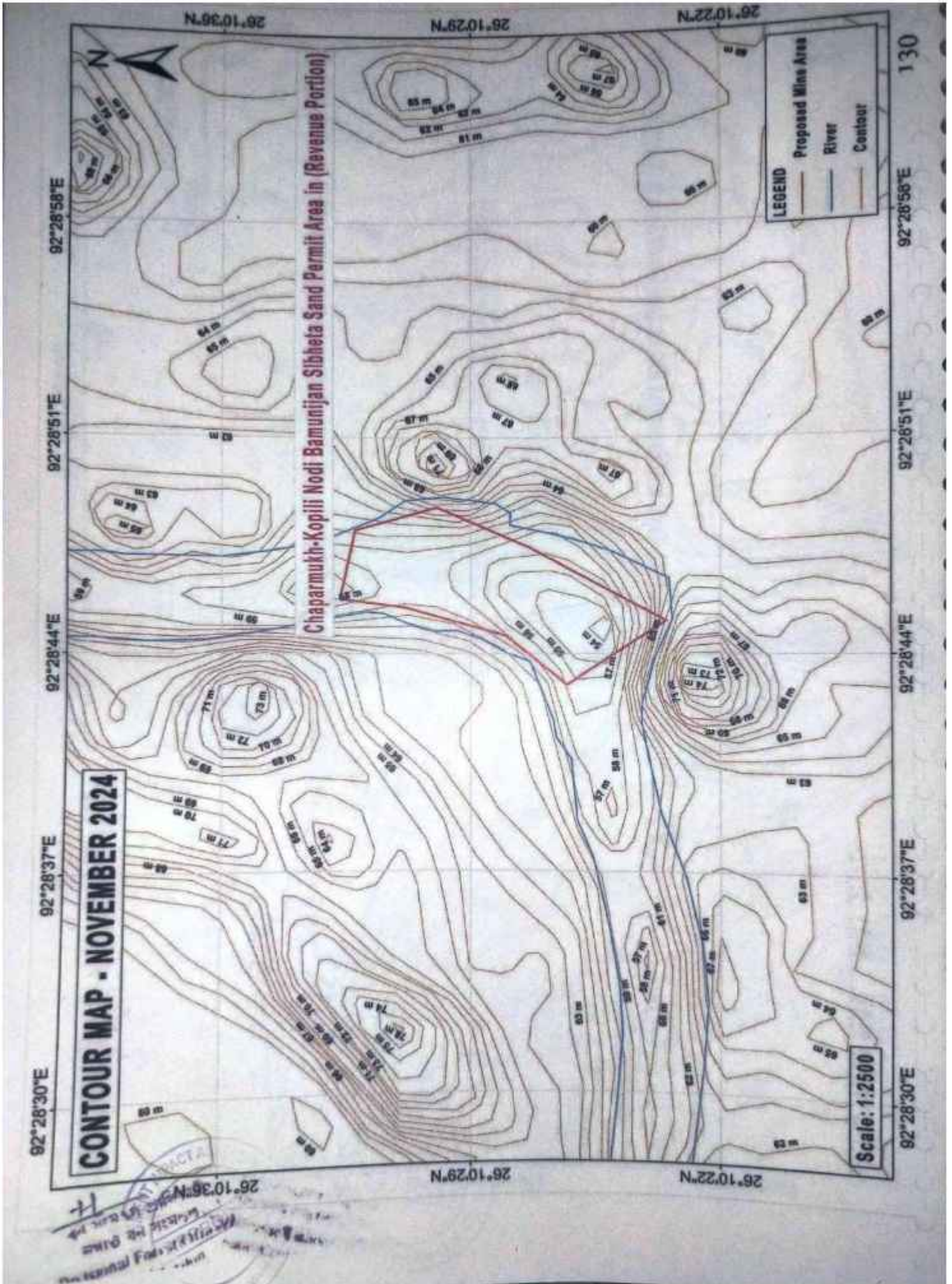
- Proposed Mins Area
- River
- Contour

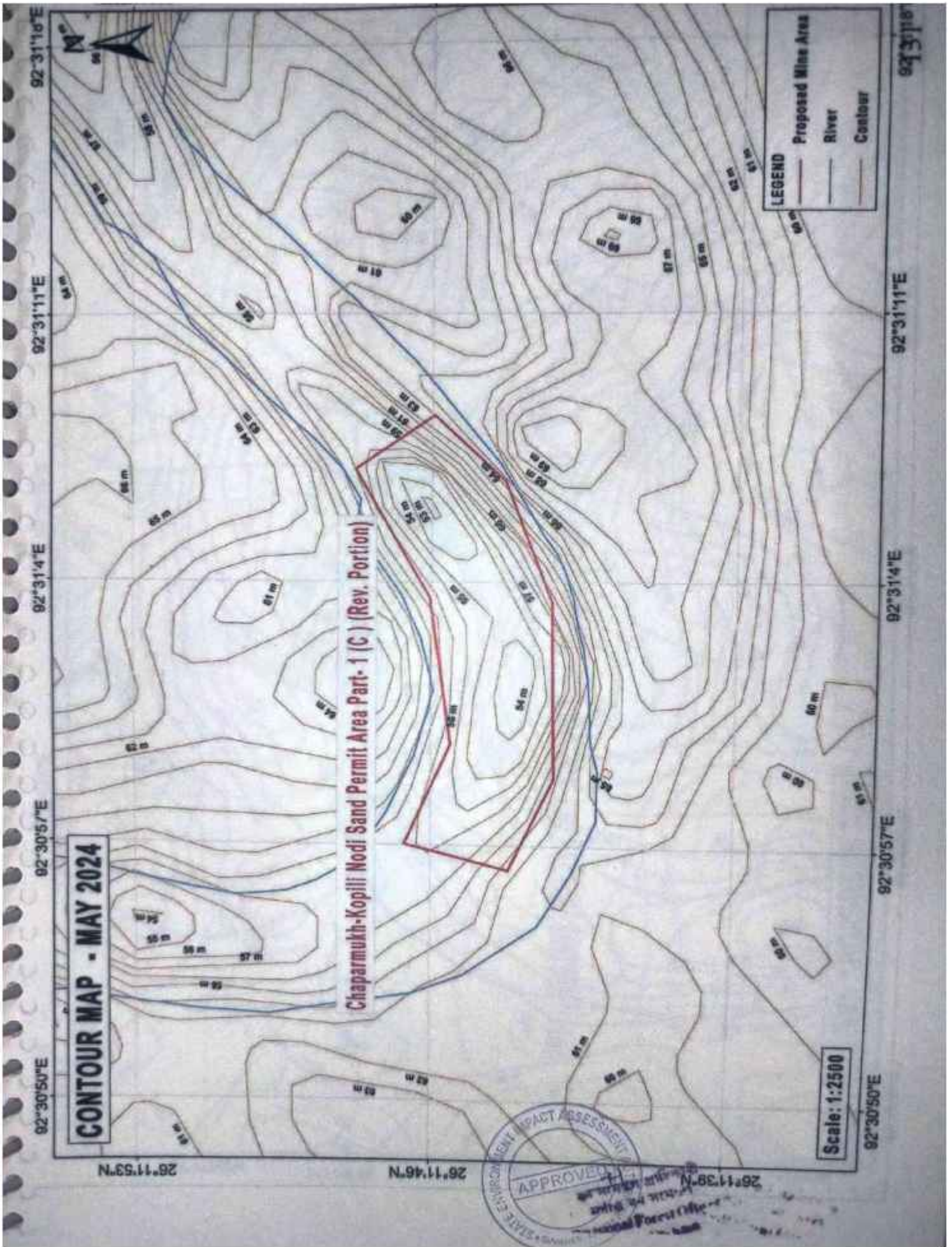
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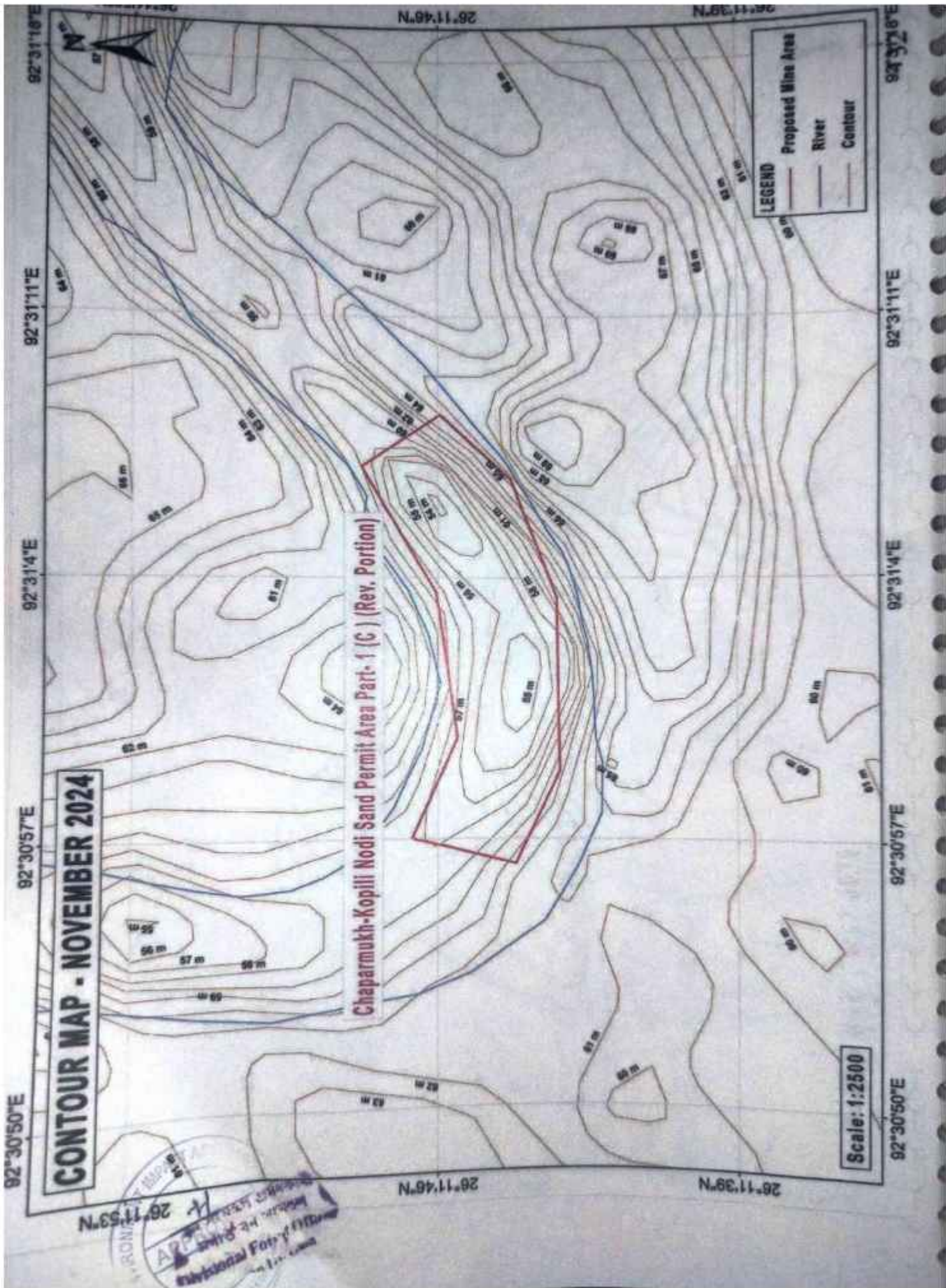












CONTOUR MAP - NOVEMBER 2024

Chaparmukh-Kopilli Nodi Sand Permit Area Part- 1 (C) (Rev. Portion)

LEGEND

	Proposed Mine Area
	River
	Contour

Scale: 1:2500



 DEPARTMENT OF MINES AND GEOLOGY, ASSAM

N.26.9'12"N

N.26.9'5"N



LEGEND

- Proposed Mine Area (Red outline)
- River (Blue line)
- Contour (Brown line)

133

92°34'41"E

92°34'41"E

92°34'34"E

92°34'34"E

92°34'27"E

92°34'27"E

92°34'20"E

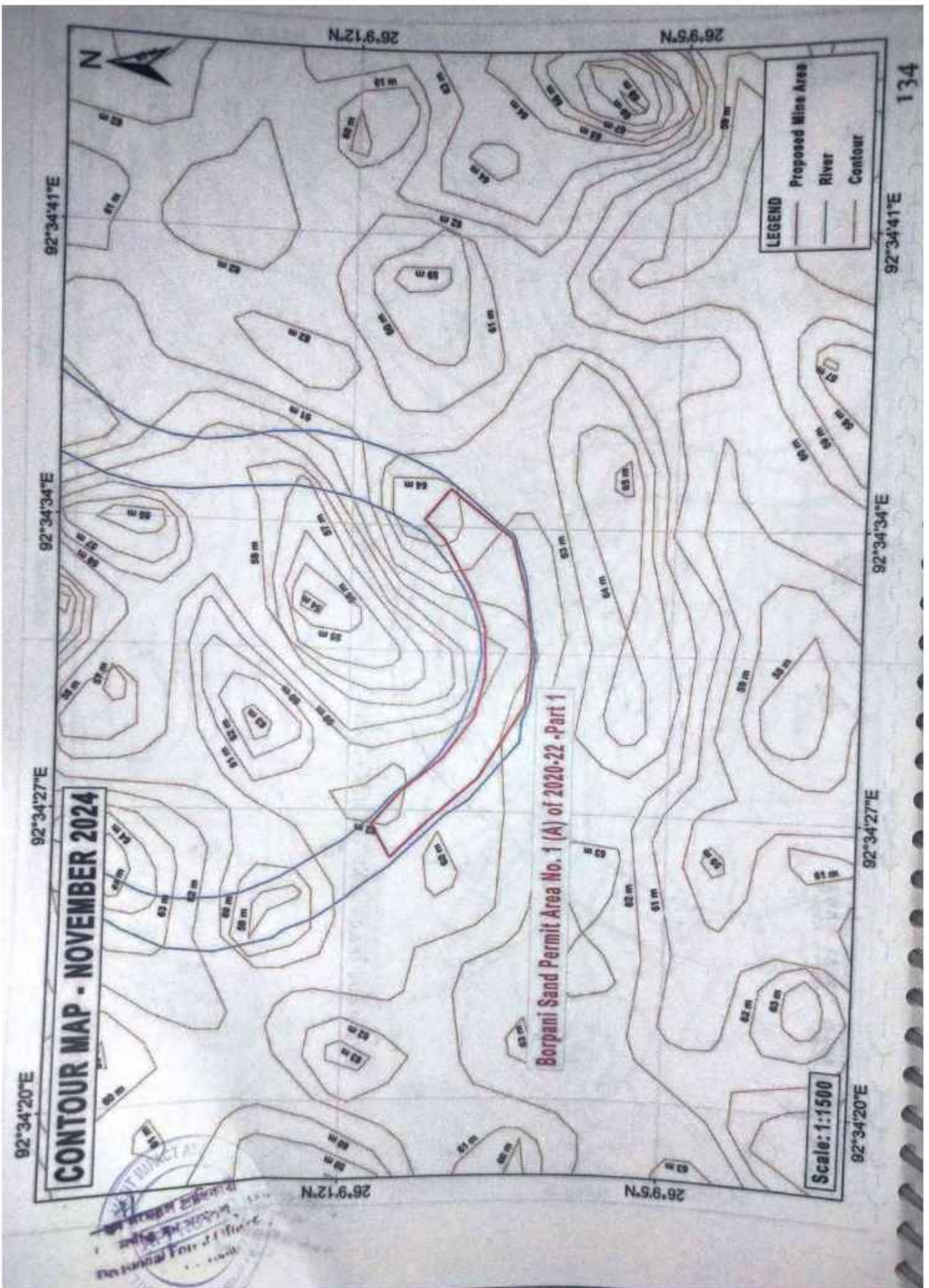
92°34'20"E

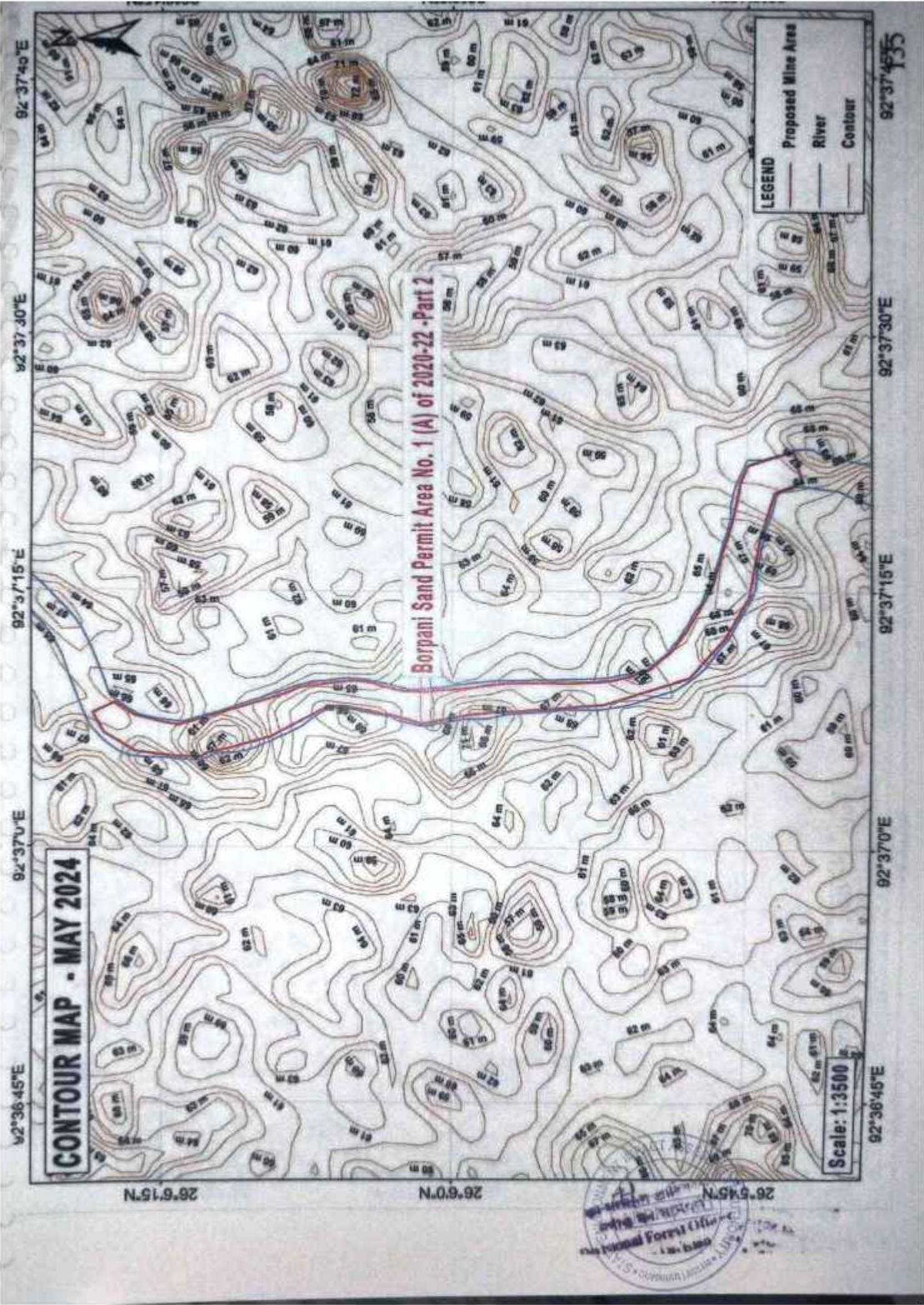
CONTOUR MAP - MAY 2024

Borpani Sand Permit Area No. 1 (A) of 2020-22 -Part 1

Scale: 1:1500







CONTOUR MAP - MAY 2024

Borpani Sand Permit Area No. 1 (A) of 2020-22 -Part 2

LEGEND	
	Proposed Mine Area
	River
	Contour

Scale: 1:3500





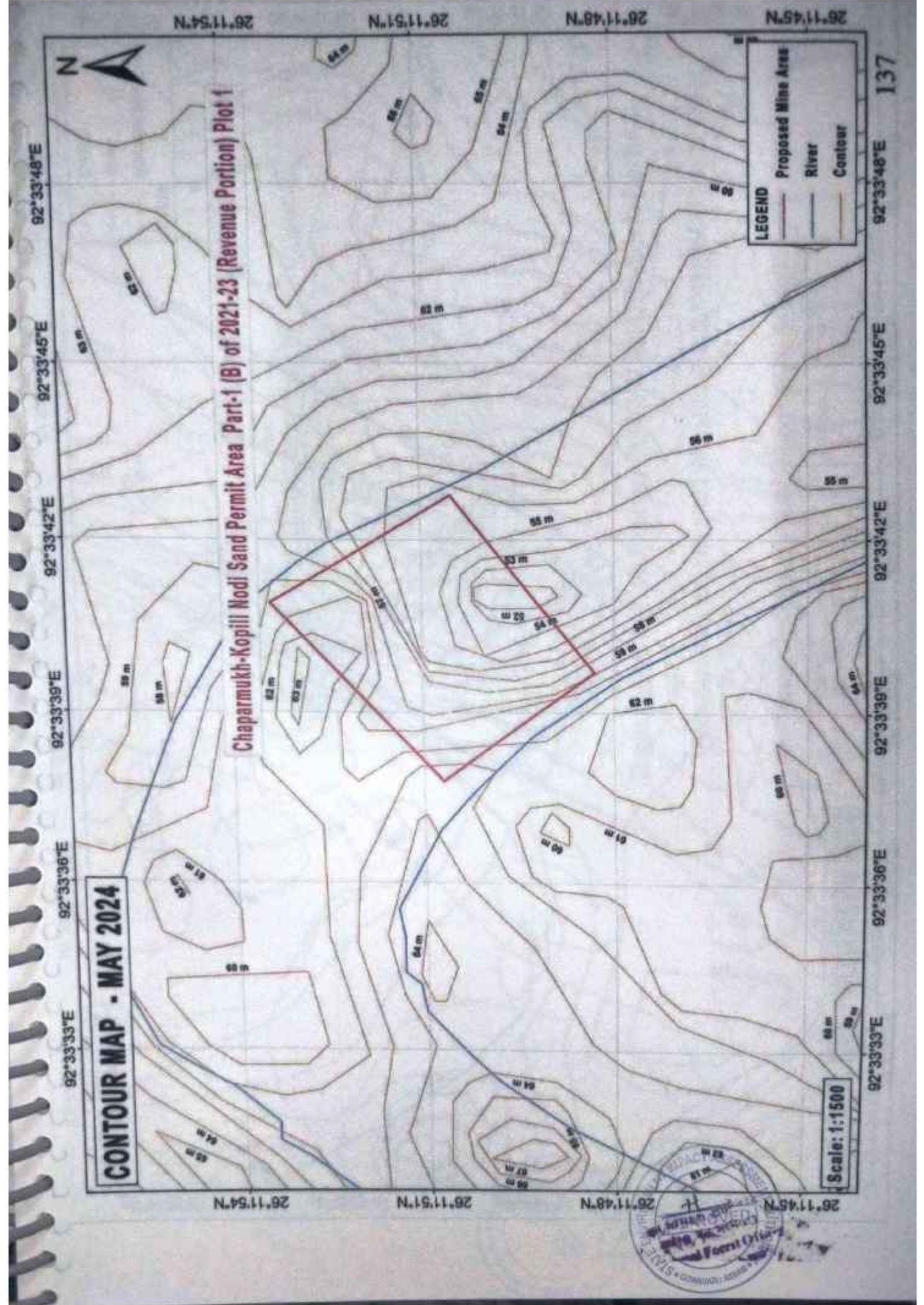
CONTOUR MAP - NOVEMBER 2024

Borpani Sand Permit Area No. 1 (A) of 2020-22 - Part 2

LEGEND

	Proposed Mine Area
	River
	Contour

Scale: 1:3500



CONTOUR MAP - MAY 2024

Chaparmukh-Kopill Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion) Plot 1

LEGEND

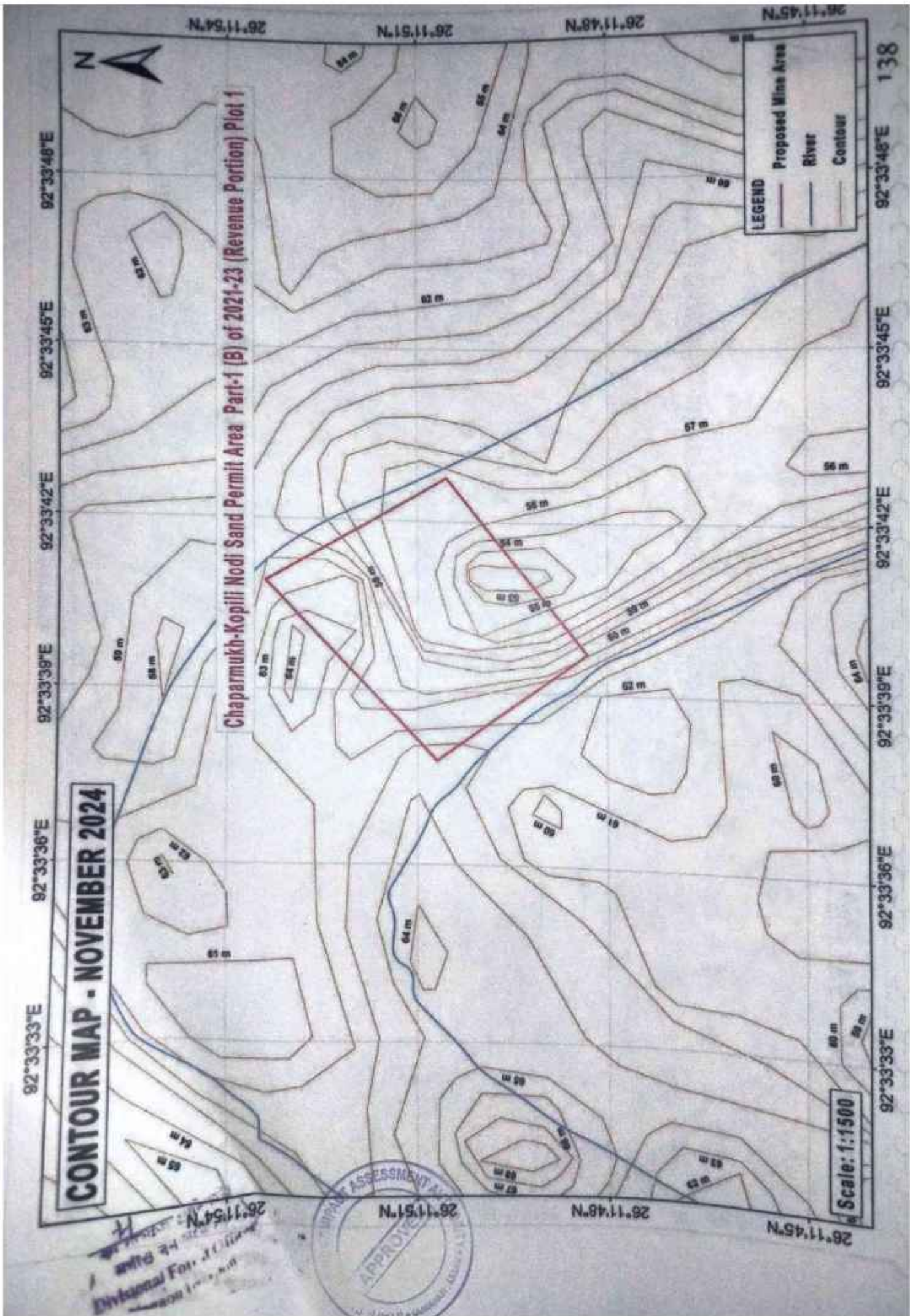
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- River
- Contour

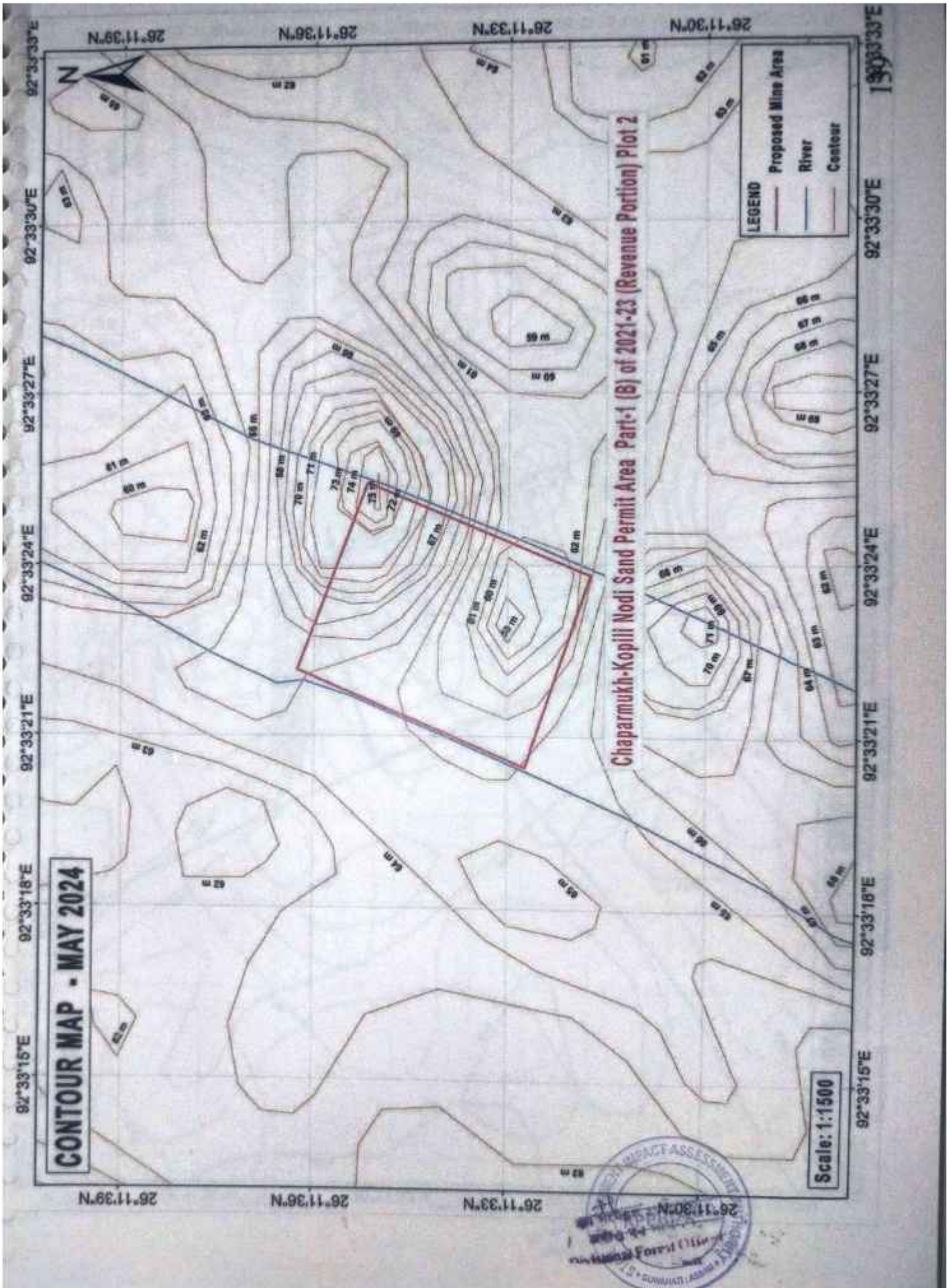
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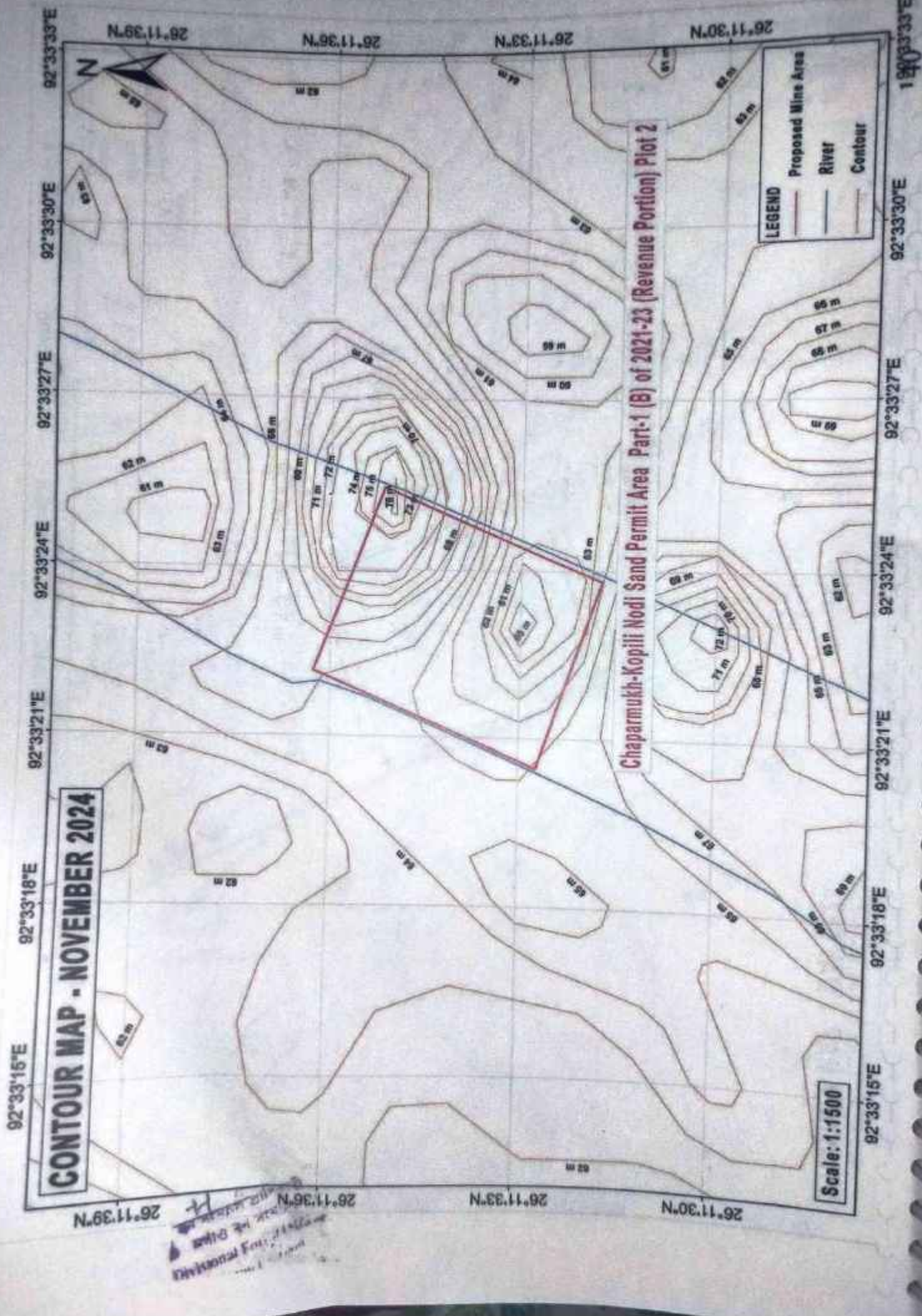


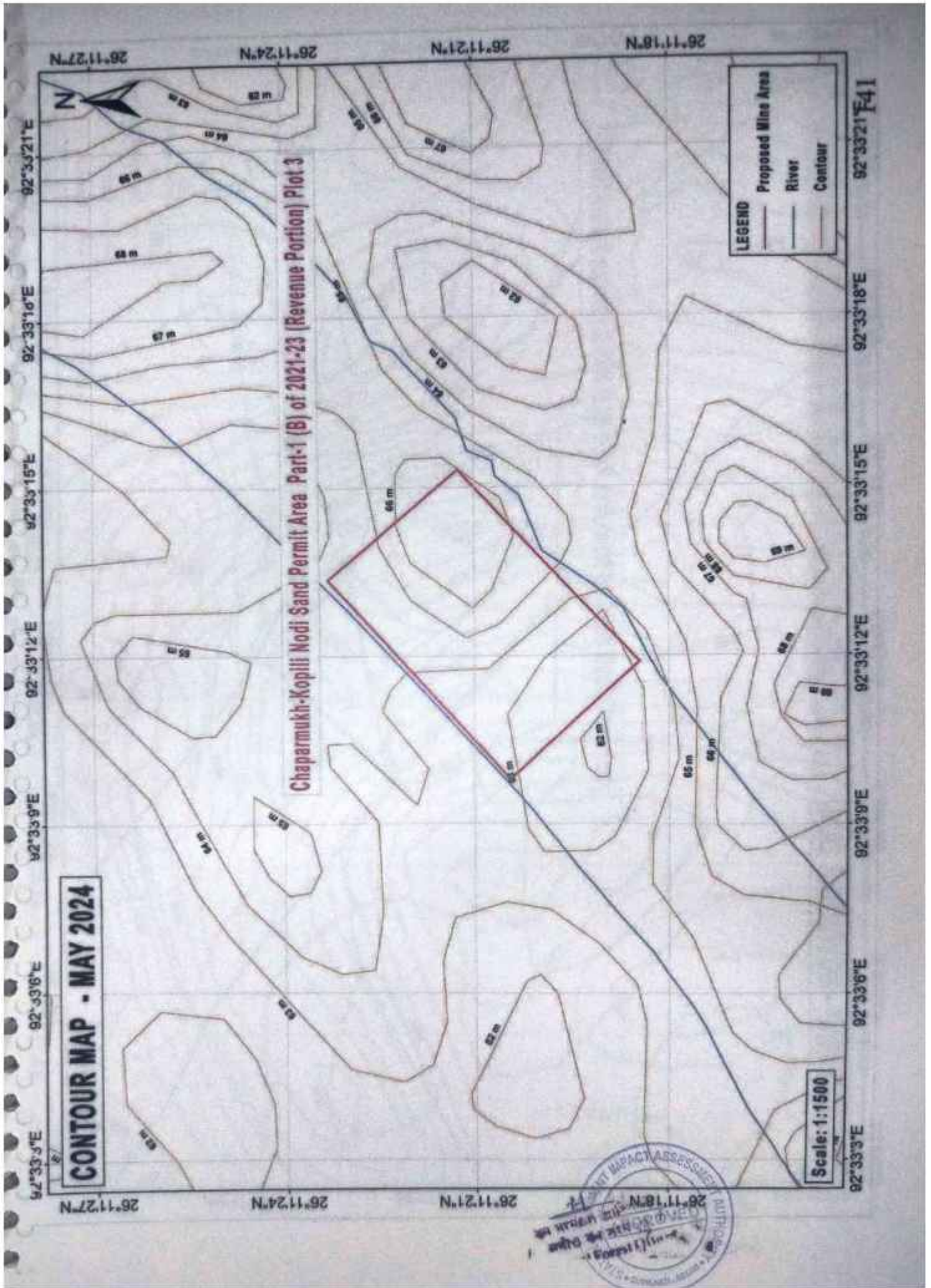
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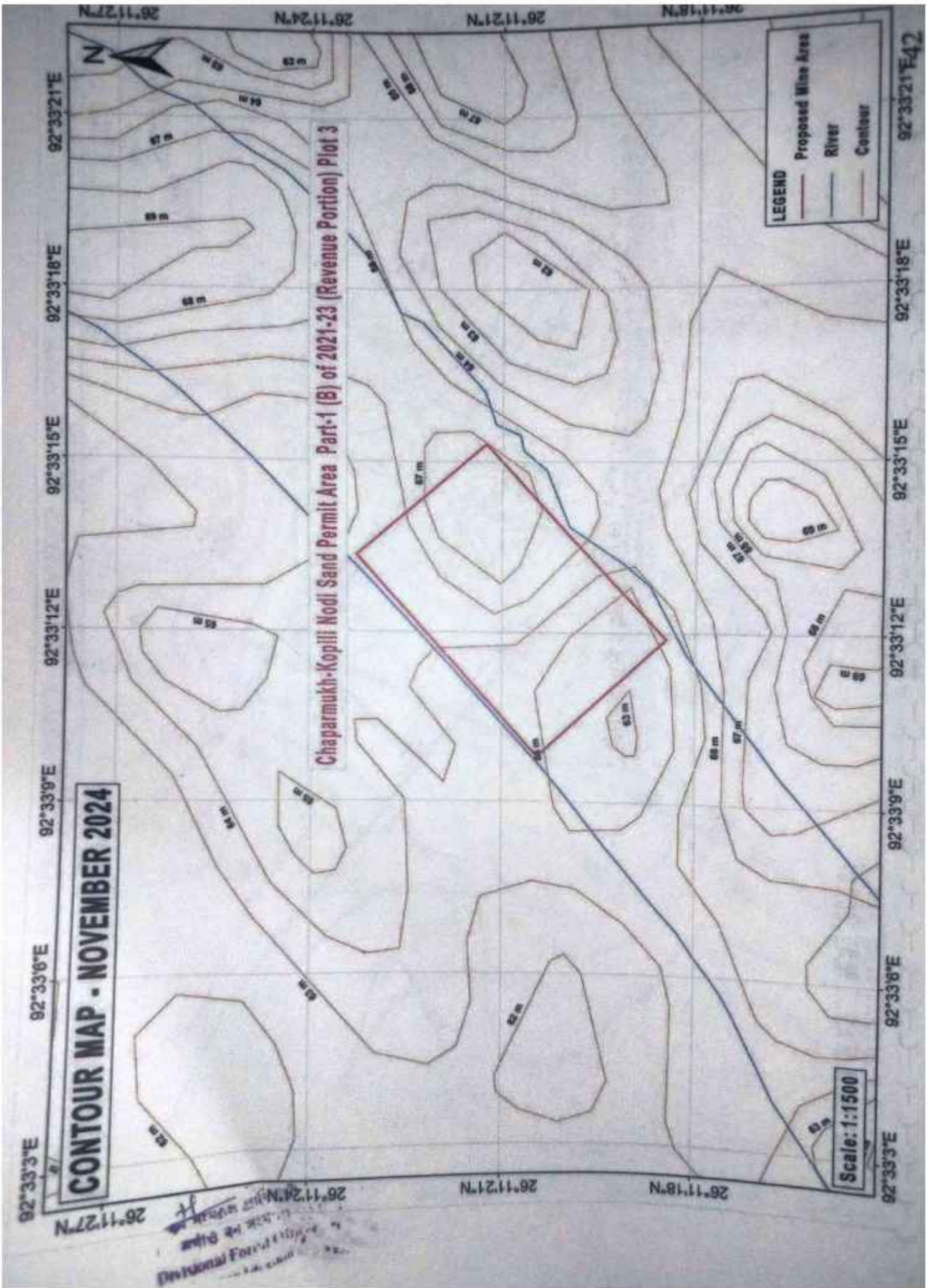
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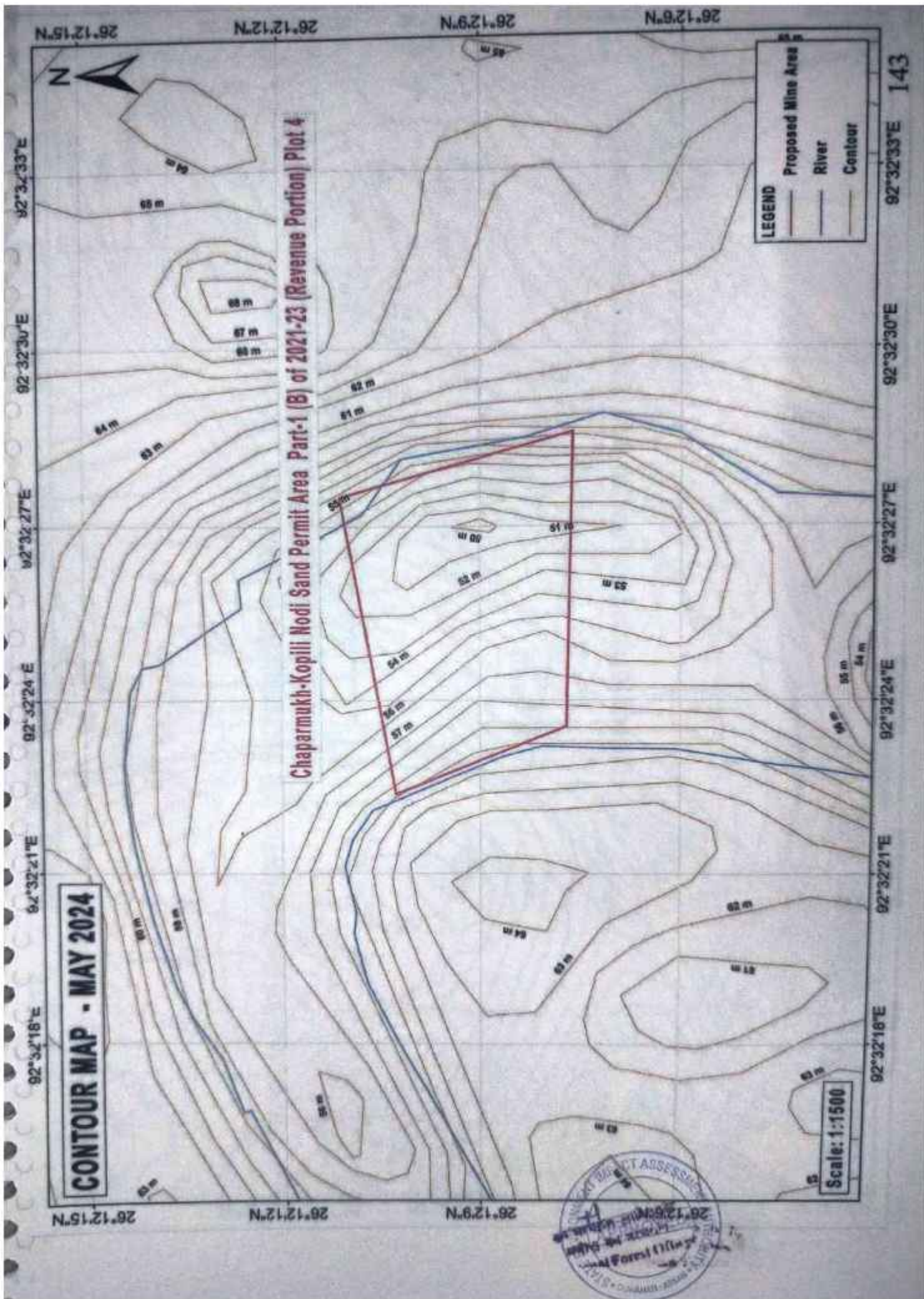


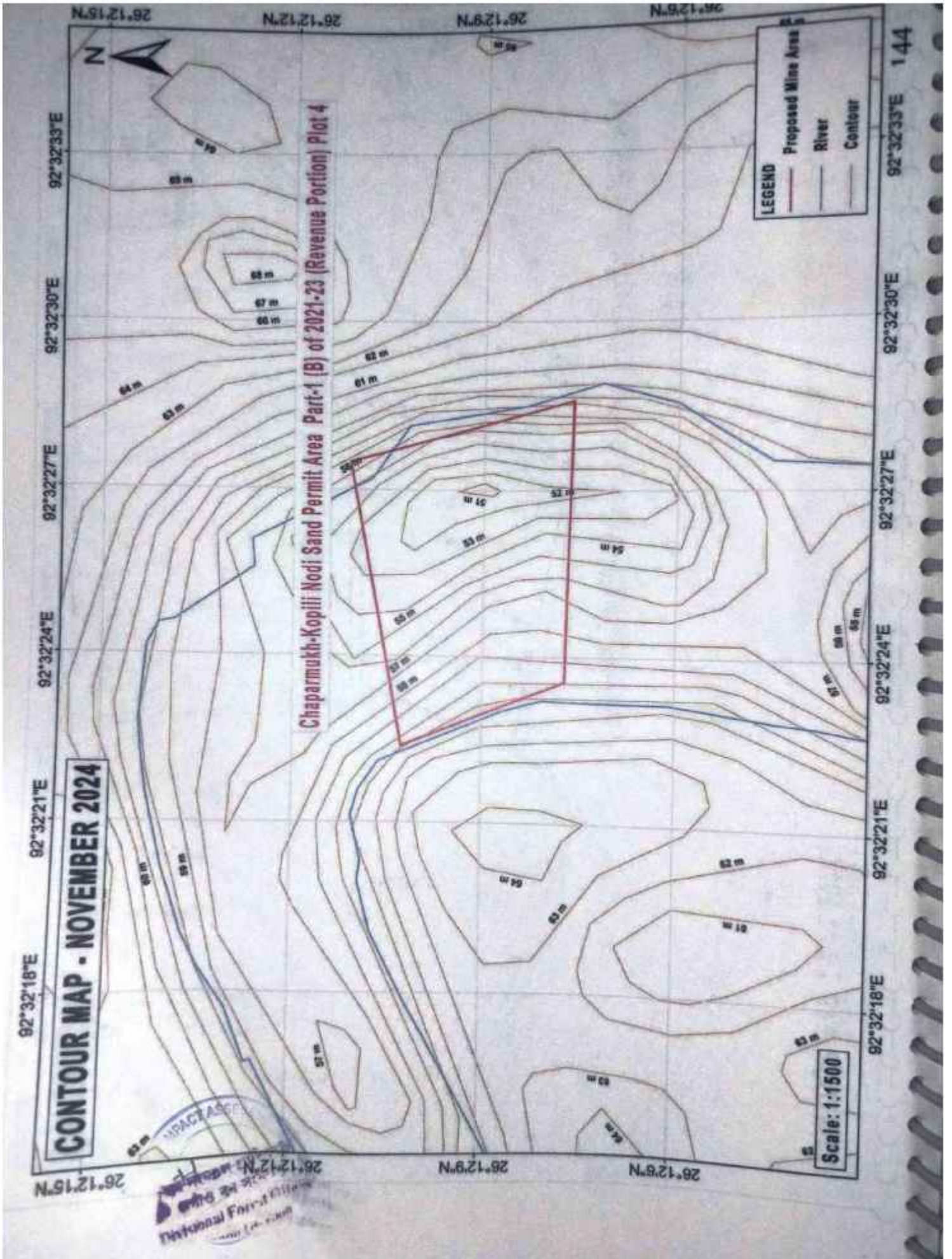


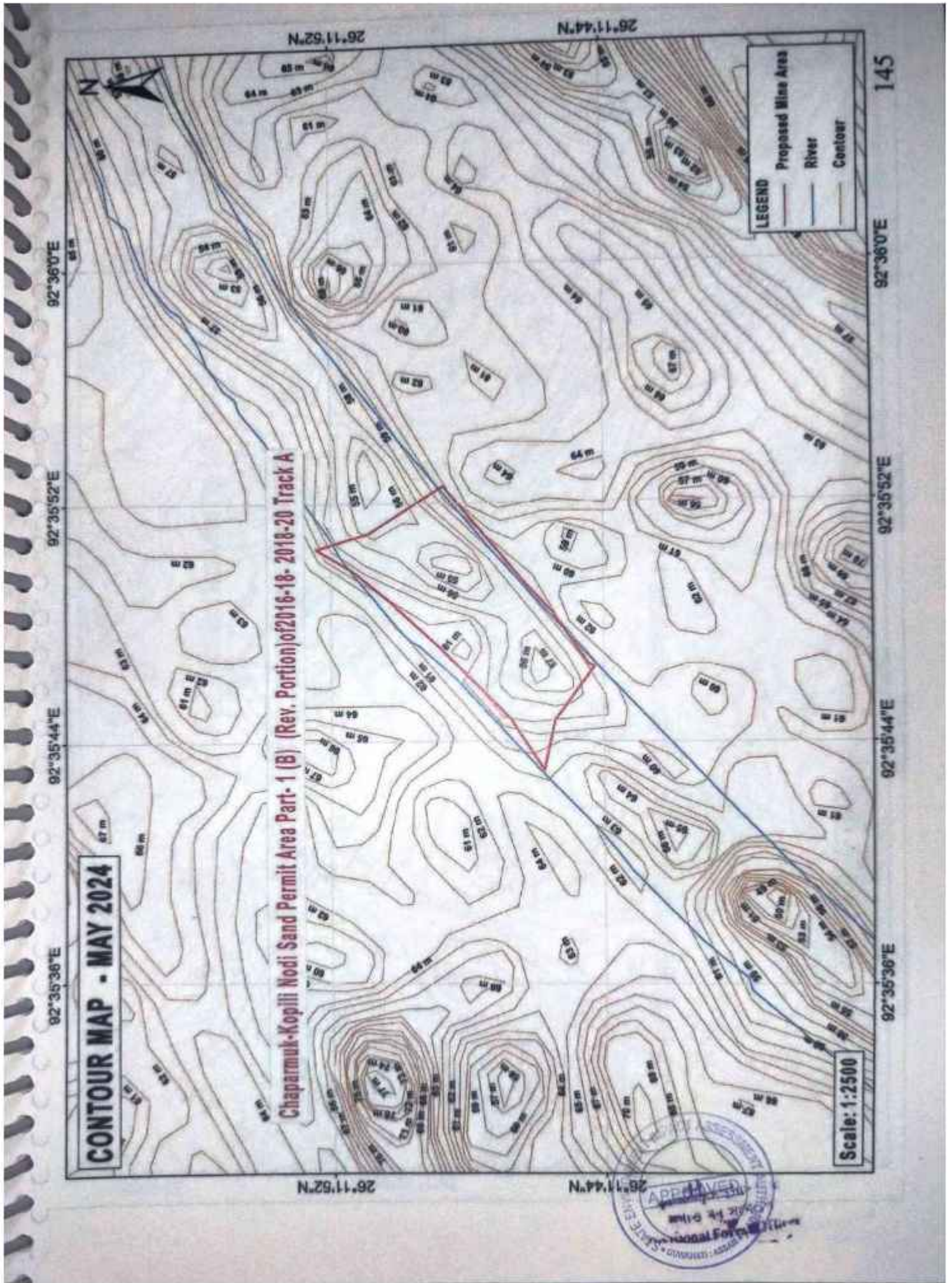












26°11'44"N 26°11'52"N

LEGEND

- Proposed Mine Area
- River
- Contour

146

92°36'0"E

92°35'52"E

92°35'44"E

92°35'36"E

92°36'0"E

92°35'52"E

92°35'44"E

92°35'36"E

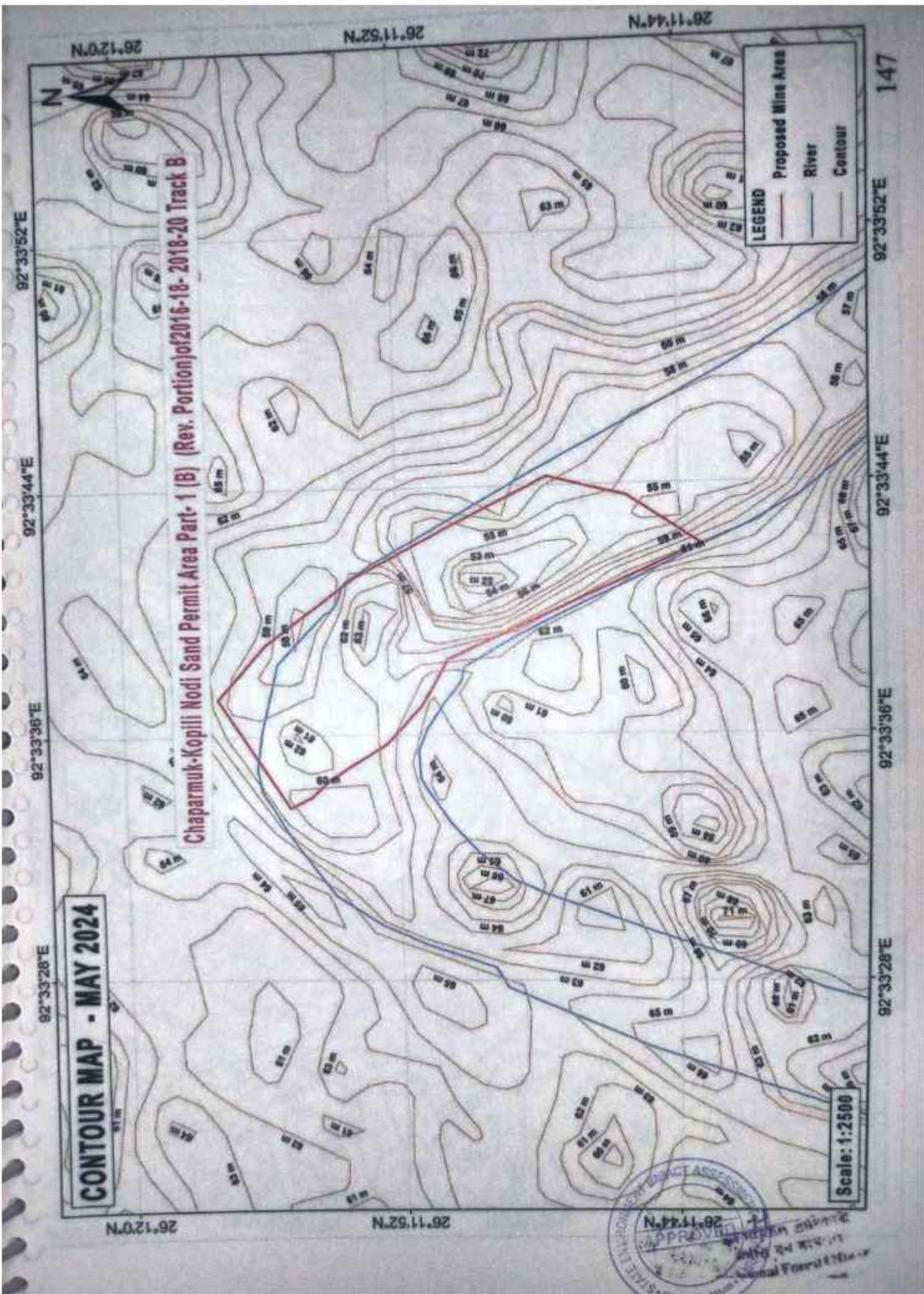
CONTOUR MAP - NOVEMBER 2024

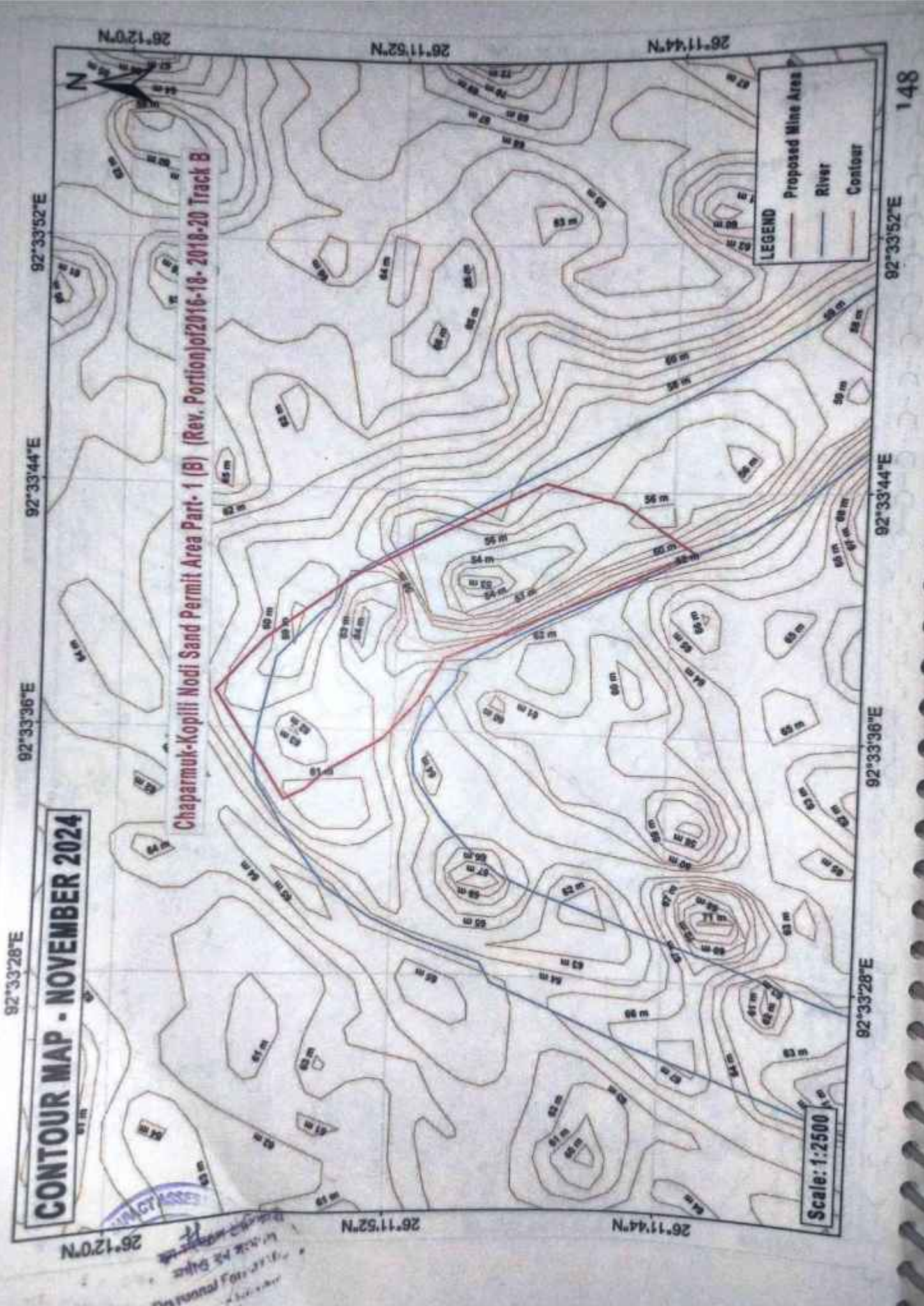
Chaparmuk-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion) of 2016-18- 2018-20 Track A

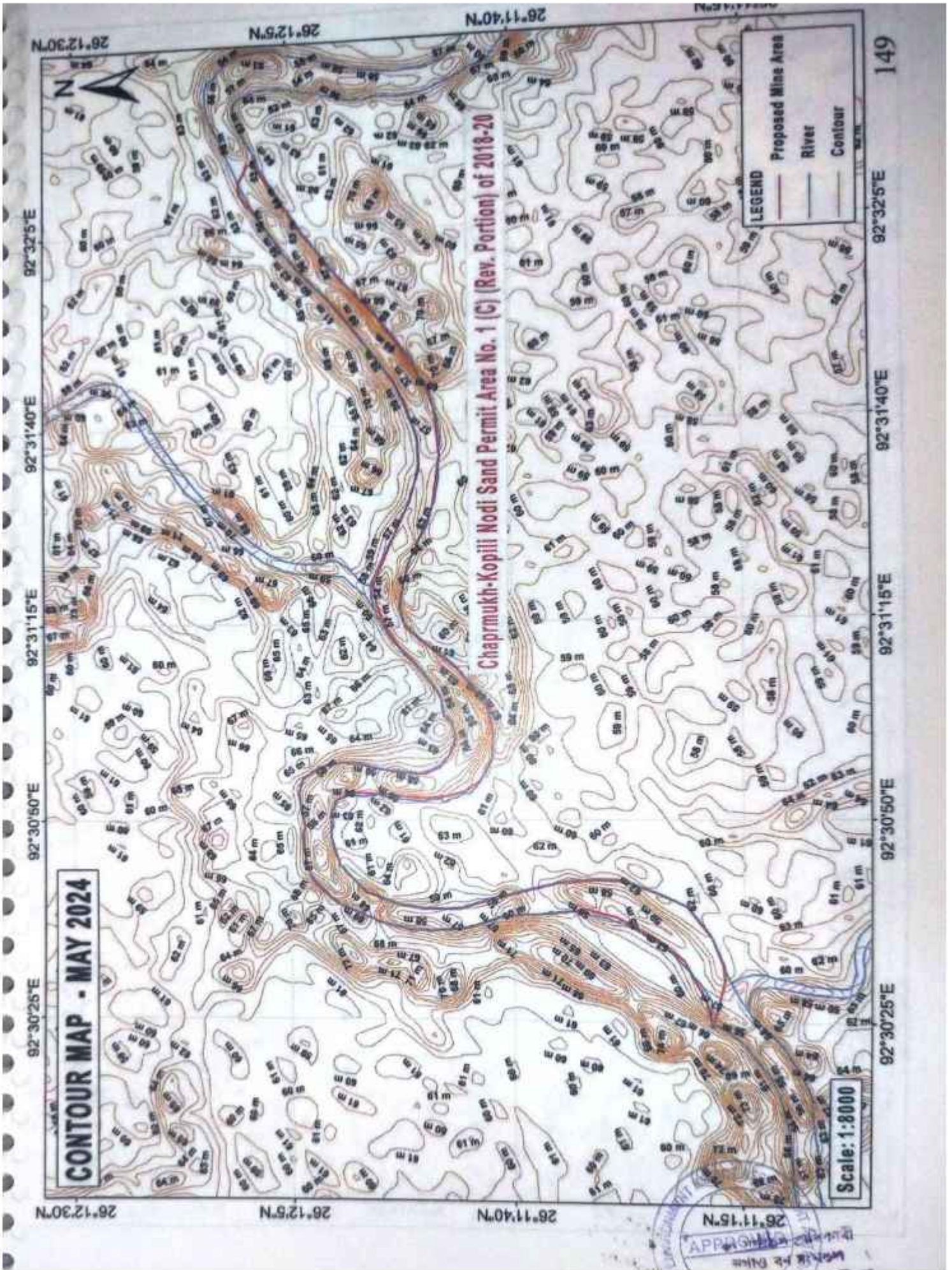
Scale: 1:2500

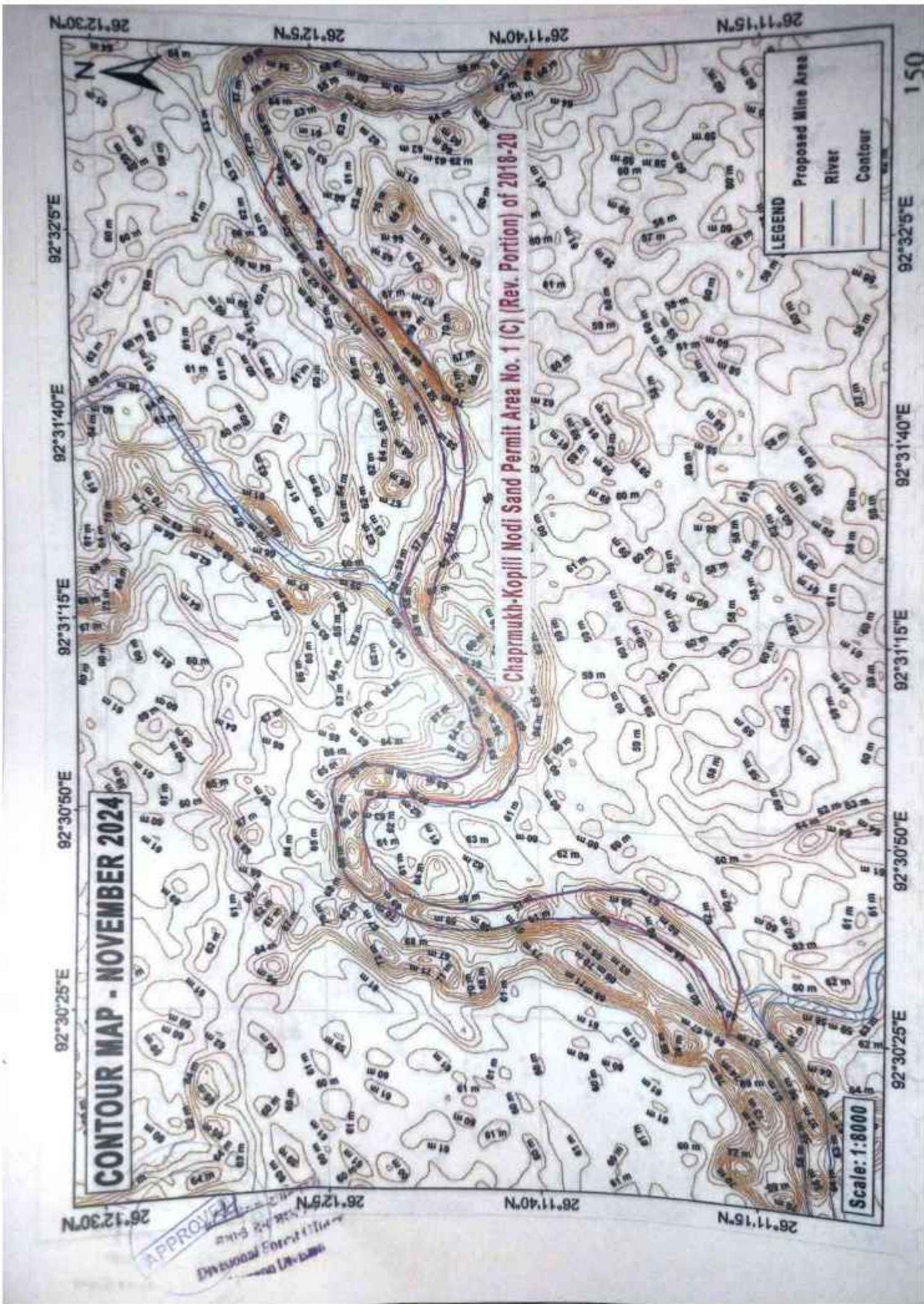


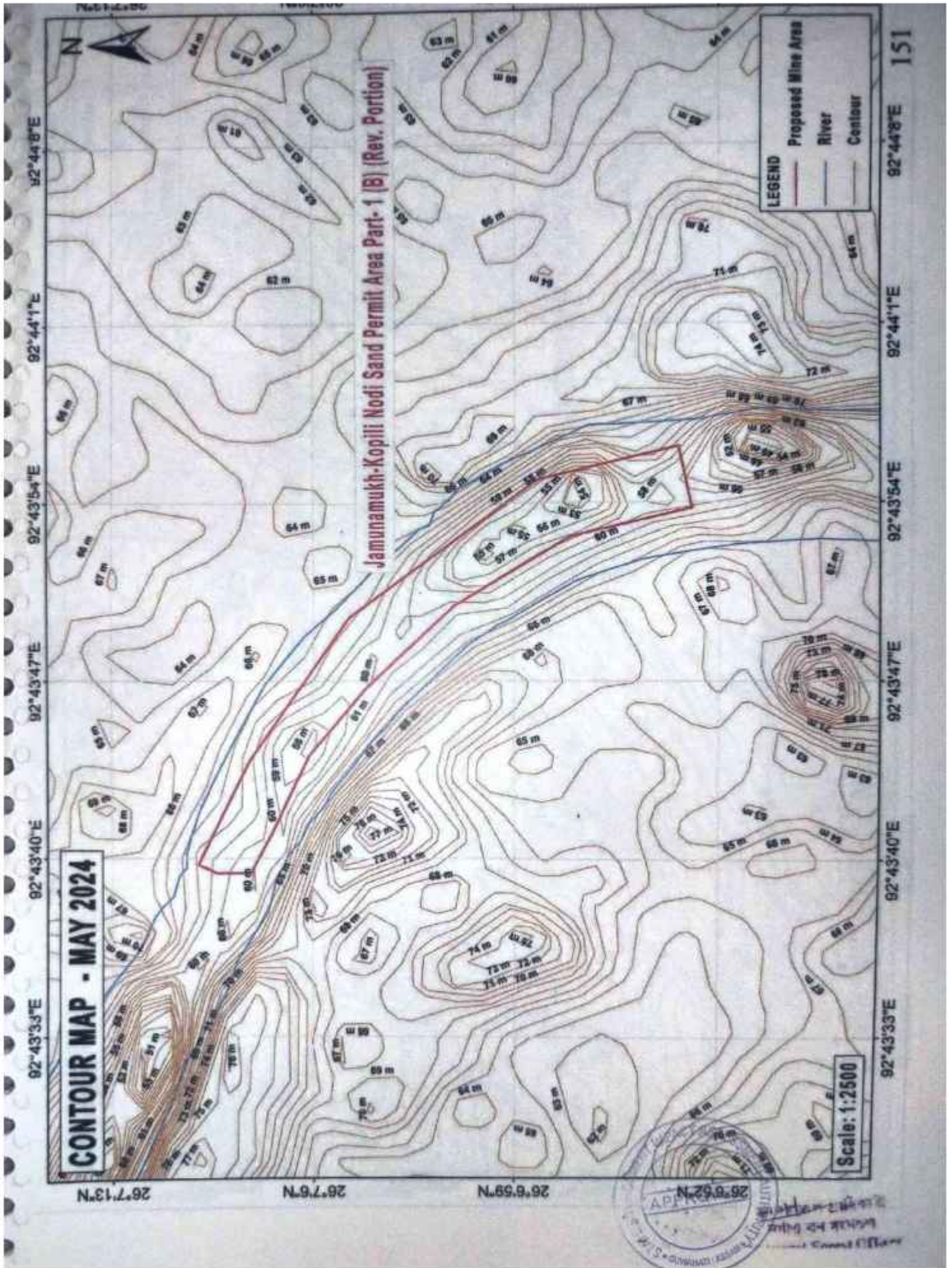
26°11'52"N
 26°11'44"N
 Divisional Forest Officer
 Forest Range
 Forest Division

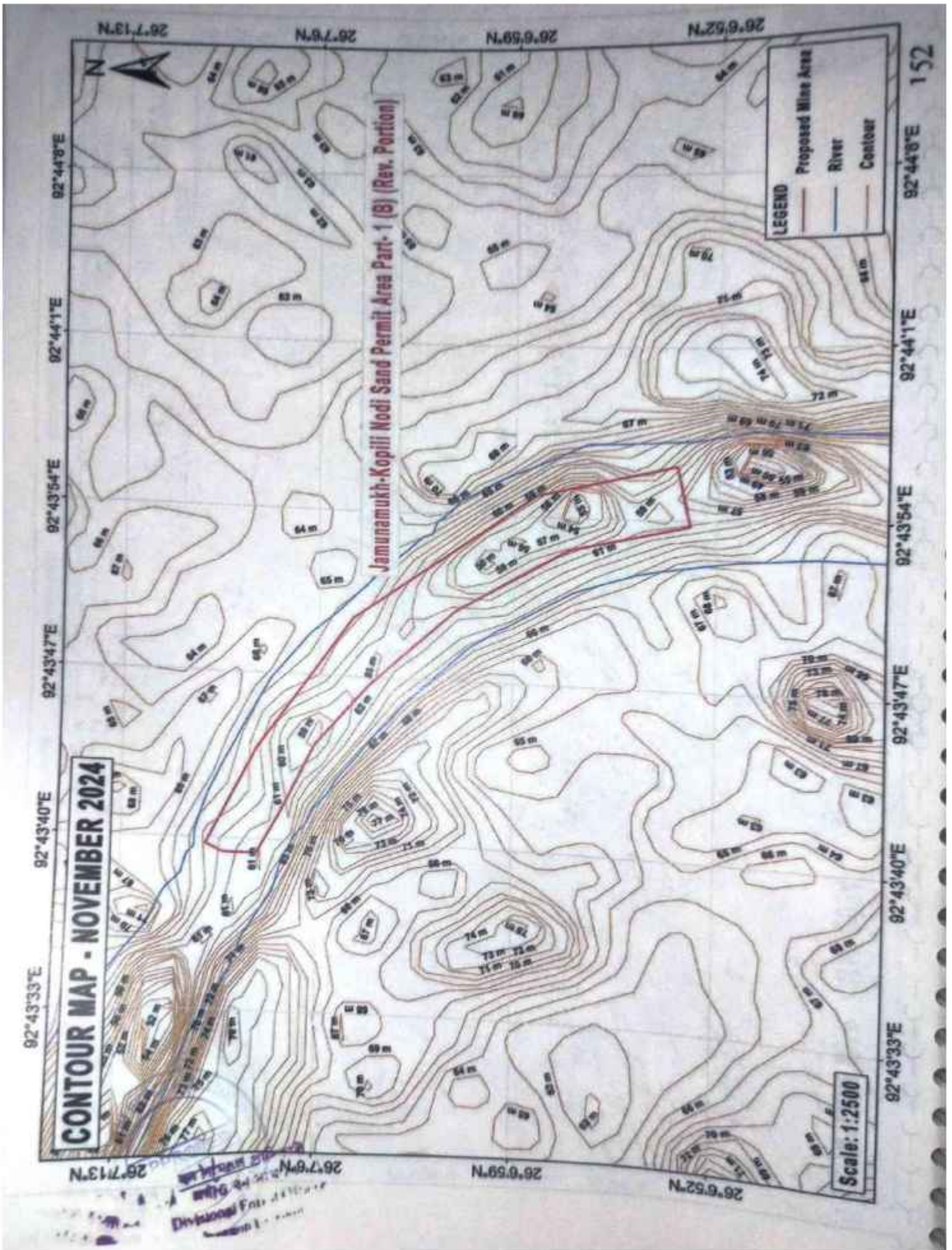


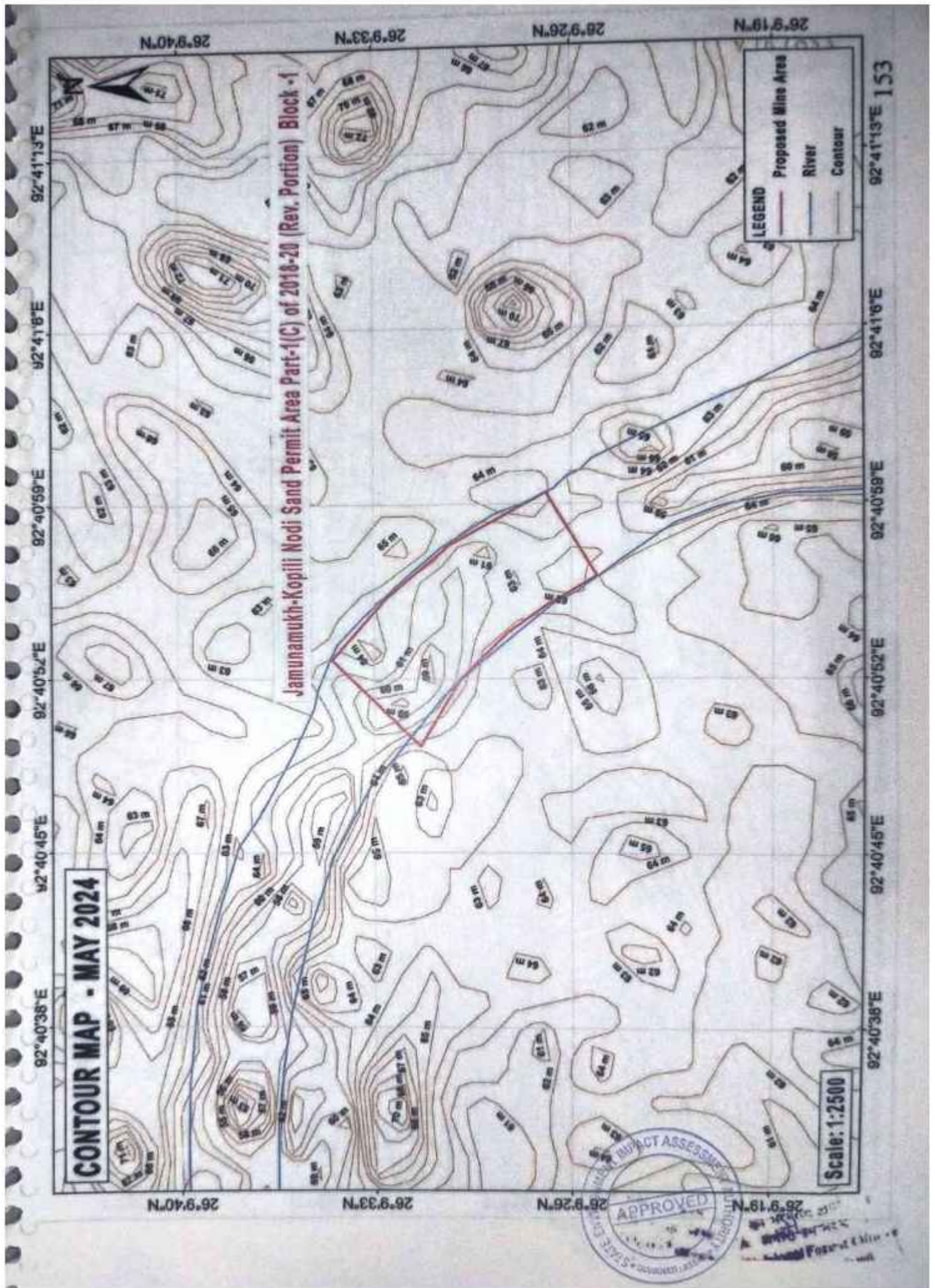












CONTOUR MAP - MAY 2024

Jamunamukh-Kopili Nodi Sand Permit Area Part-(C) of 2018-20 (Rev. Portion) Block -1

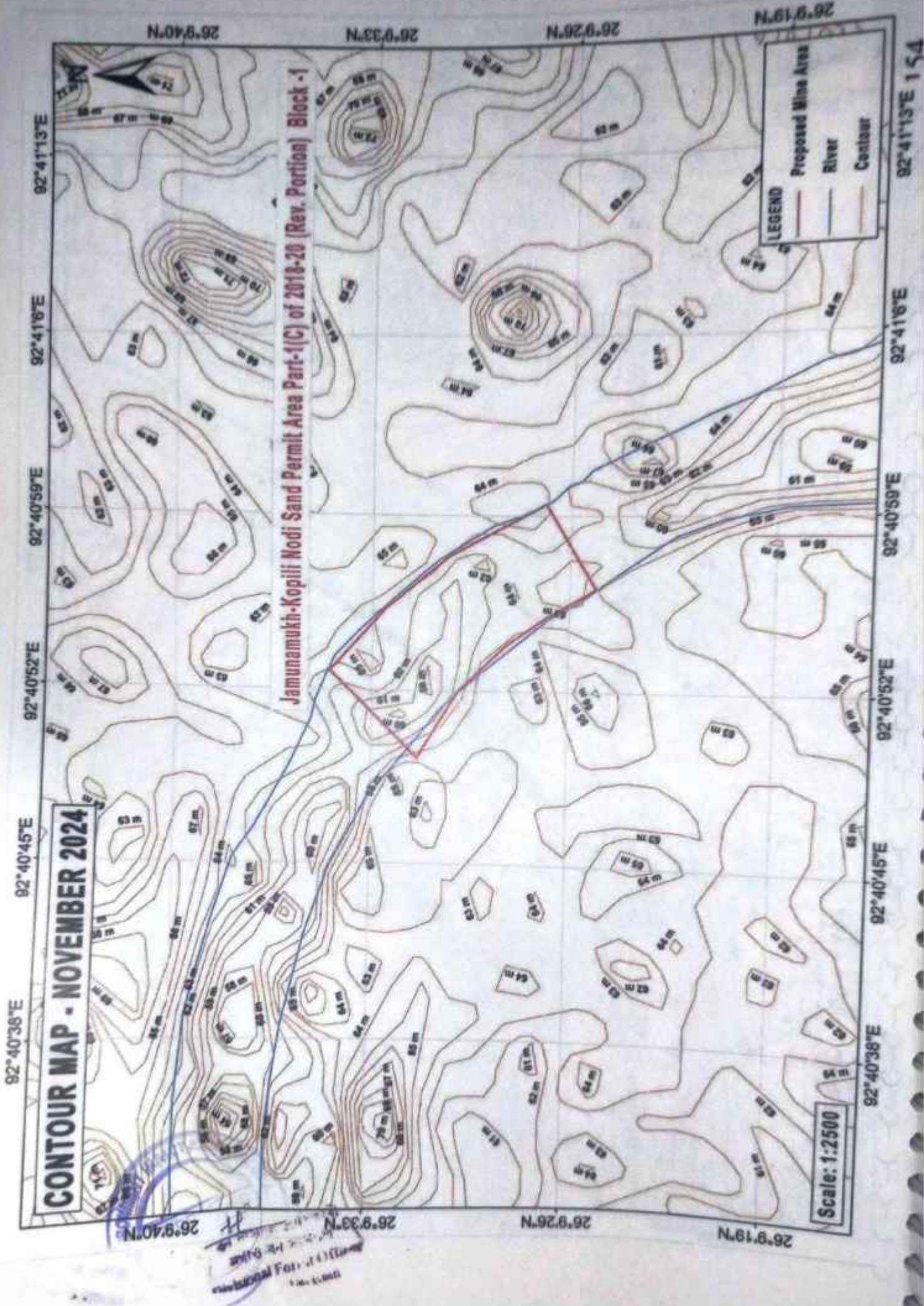
LEGEND

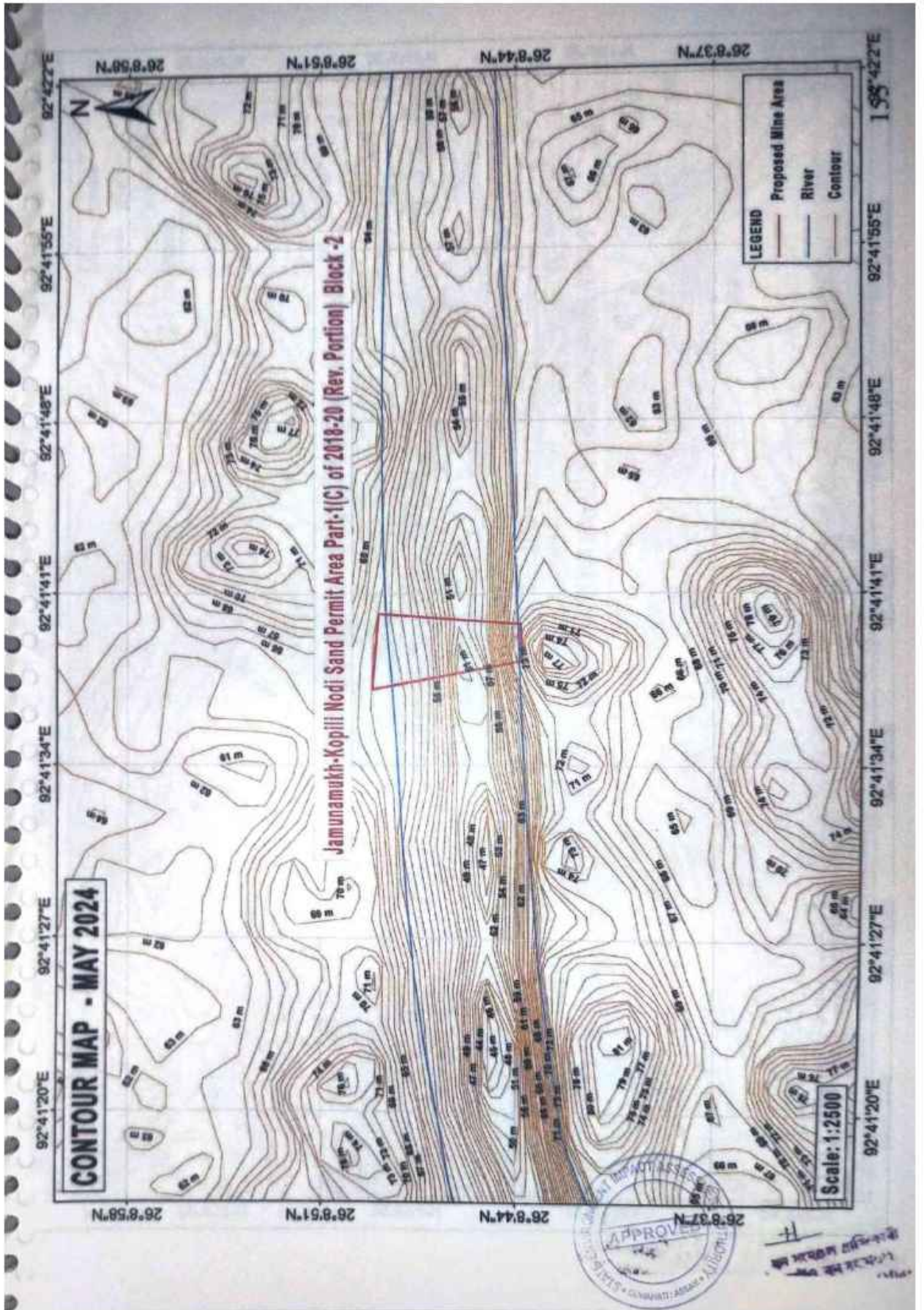
- Proposed Mine Area
- River
- Contour

Scale: 1:2500



Jamunamukh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion) Block - 1





CONTOUR MAP - MAY 2024

Jamunamukh-Kopilli Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion) Block -2

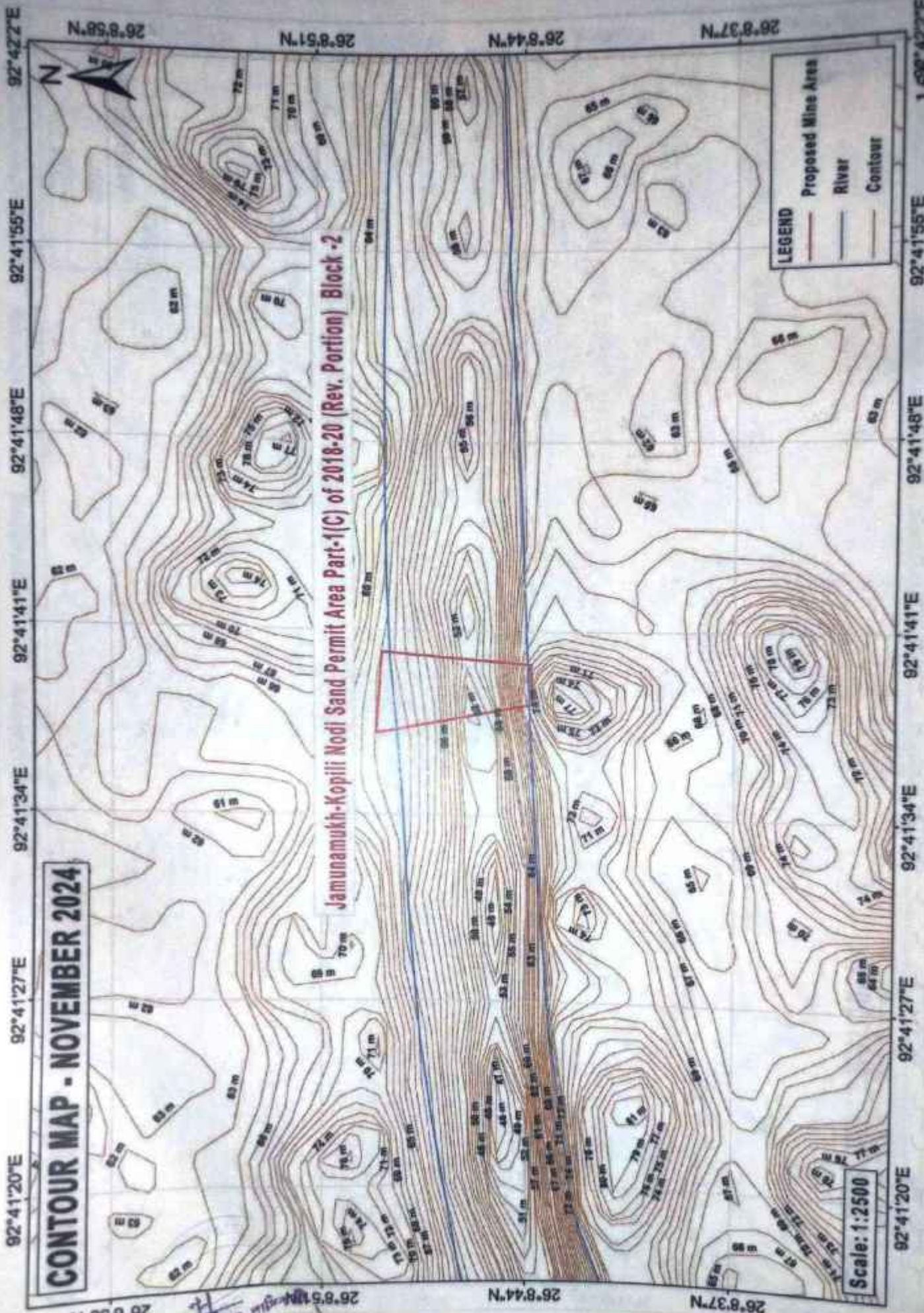
LEGEND

	Proposed Mine Area
	River
	Contour

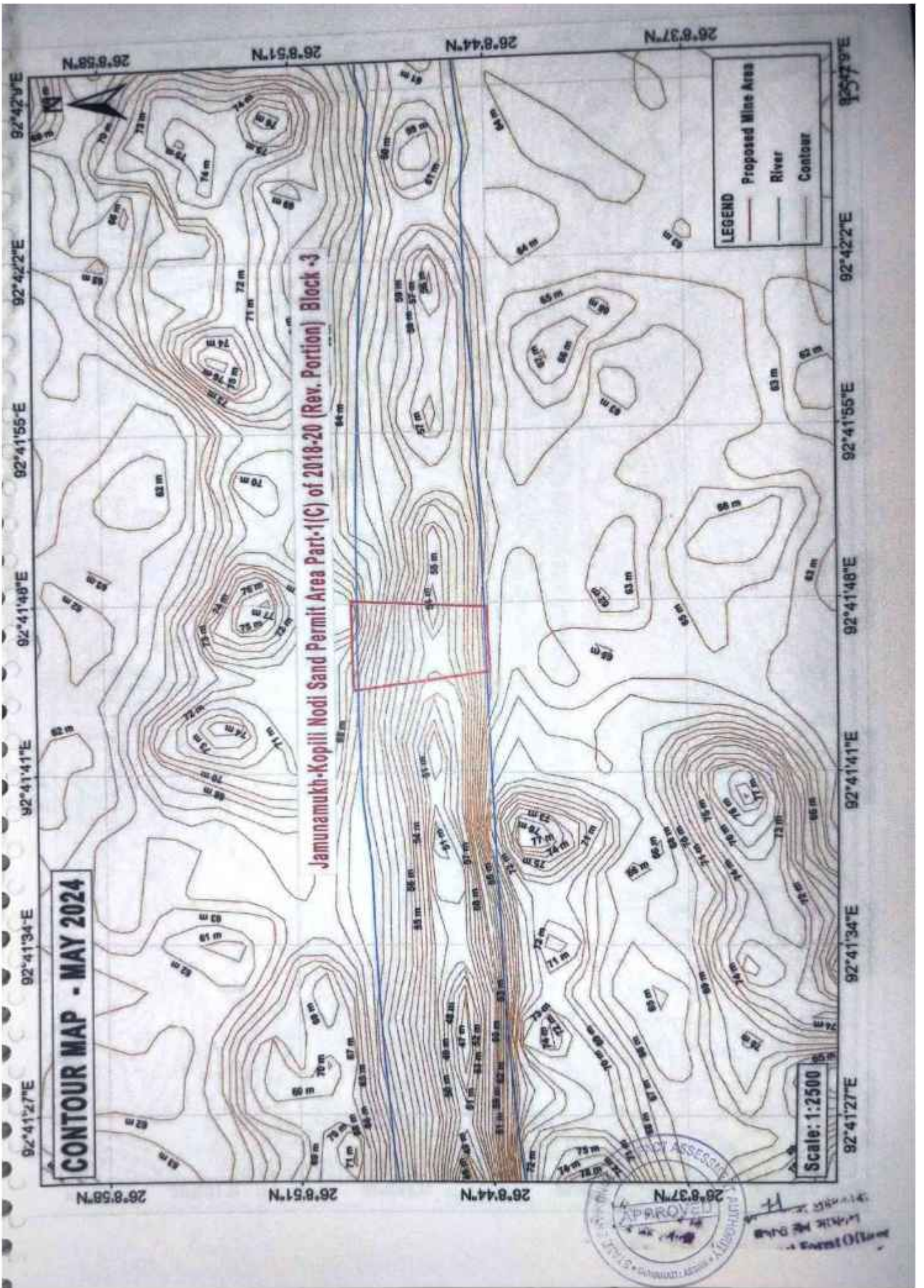
Scale: 1:2500

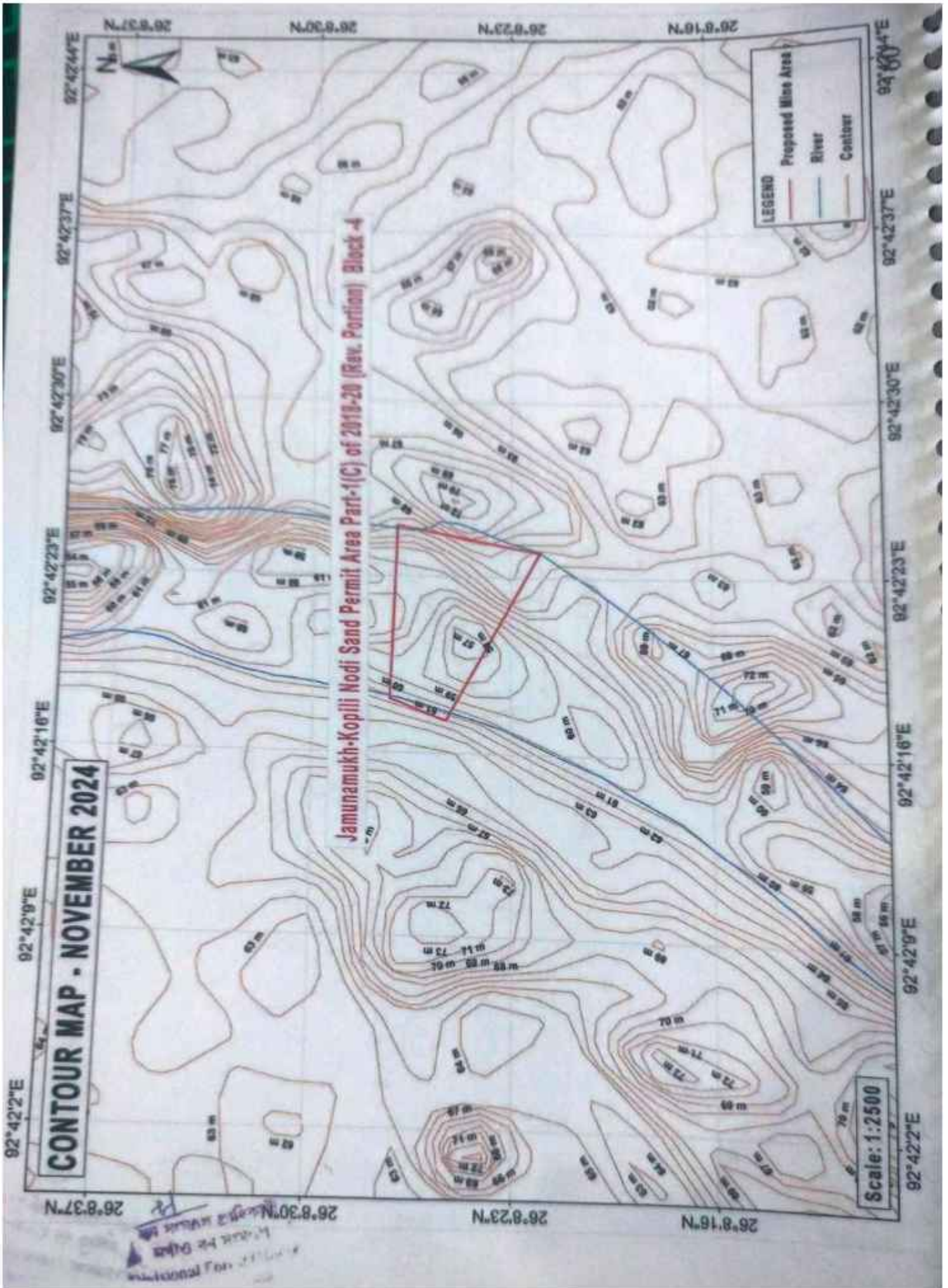


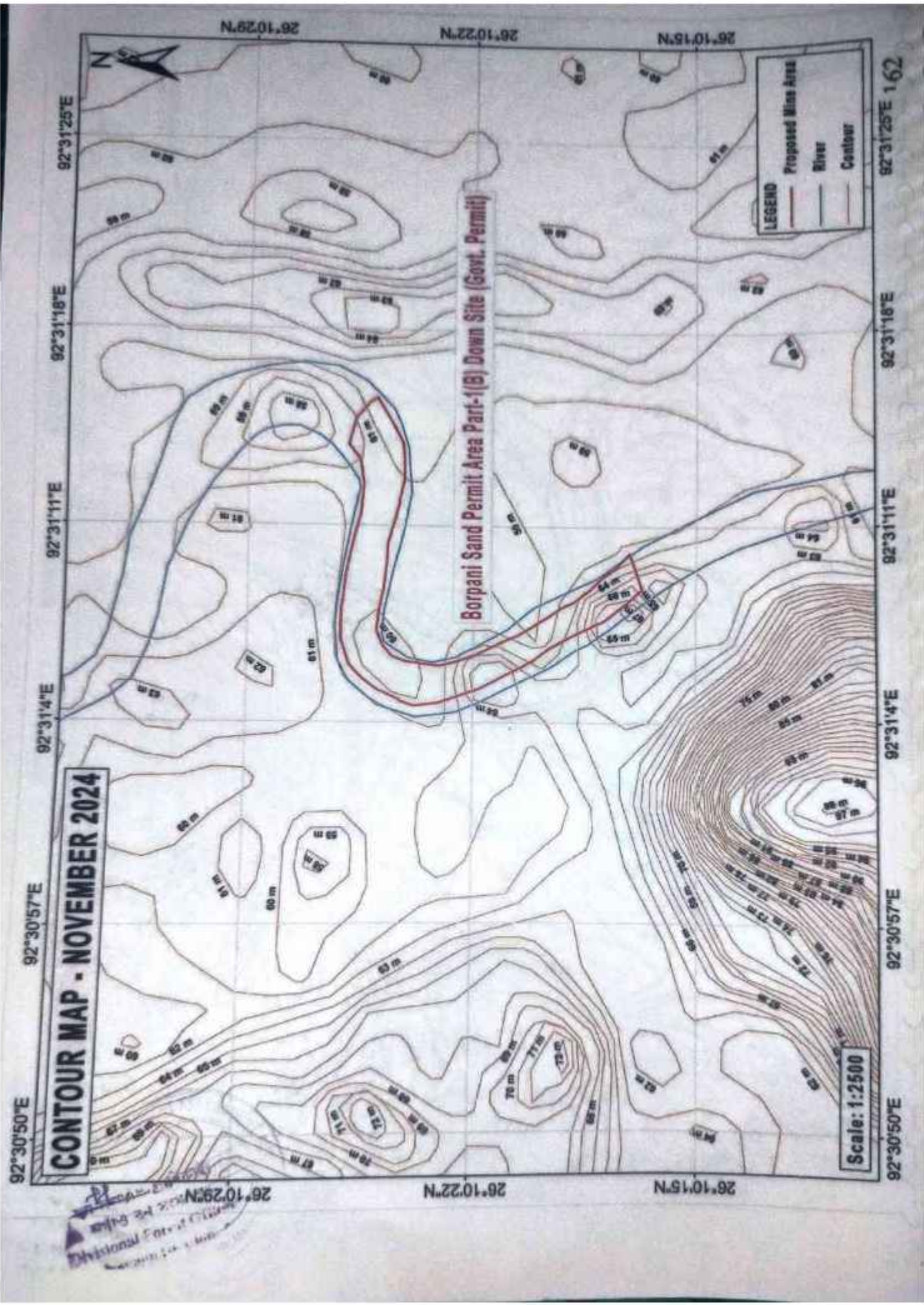
Handwritten signature and notes at the bottom right of the map.



26°8'58"N
 26°8'51"N
 26°8'44"N
 26°8'37"N
 26°8'30"N
 26°8'23"N
 26°8'16"N
 26°8'9"N
 26°8'2"N
 26°7'55"N
 26°7'48"N
 26°7'41"N
 26°7'34"N
 26°7'27"N
 26°7'20"N
 26°7'13"N
 26°7'6"N
 26°7'0"N
 26°6'53"N
 26°6'46"N
 26°6'39"N
 26°6'32"N
 26°6'25"N
 26°6'18"N
 26°6'11"N
 26°6'4"N
 26°5'57"N
 26°5'50"N
 26°5'43"N
 26°5'36"N
 26°5'29"N
 26°5'22"N
 26°5'15"N
 26°5'8"N
 26°5'1"N
 26°4'54"N
 26°4'47"N
 26°4'40"N
 26°4'33"N
 26°4'26"N
 26°4'19"N
 26°4'12"N
 26°4'5"N







CONTOUR MAP - NOVEMBER 2024

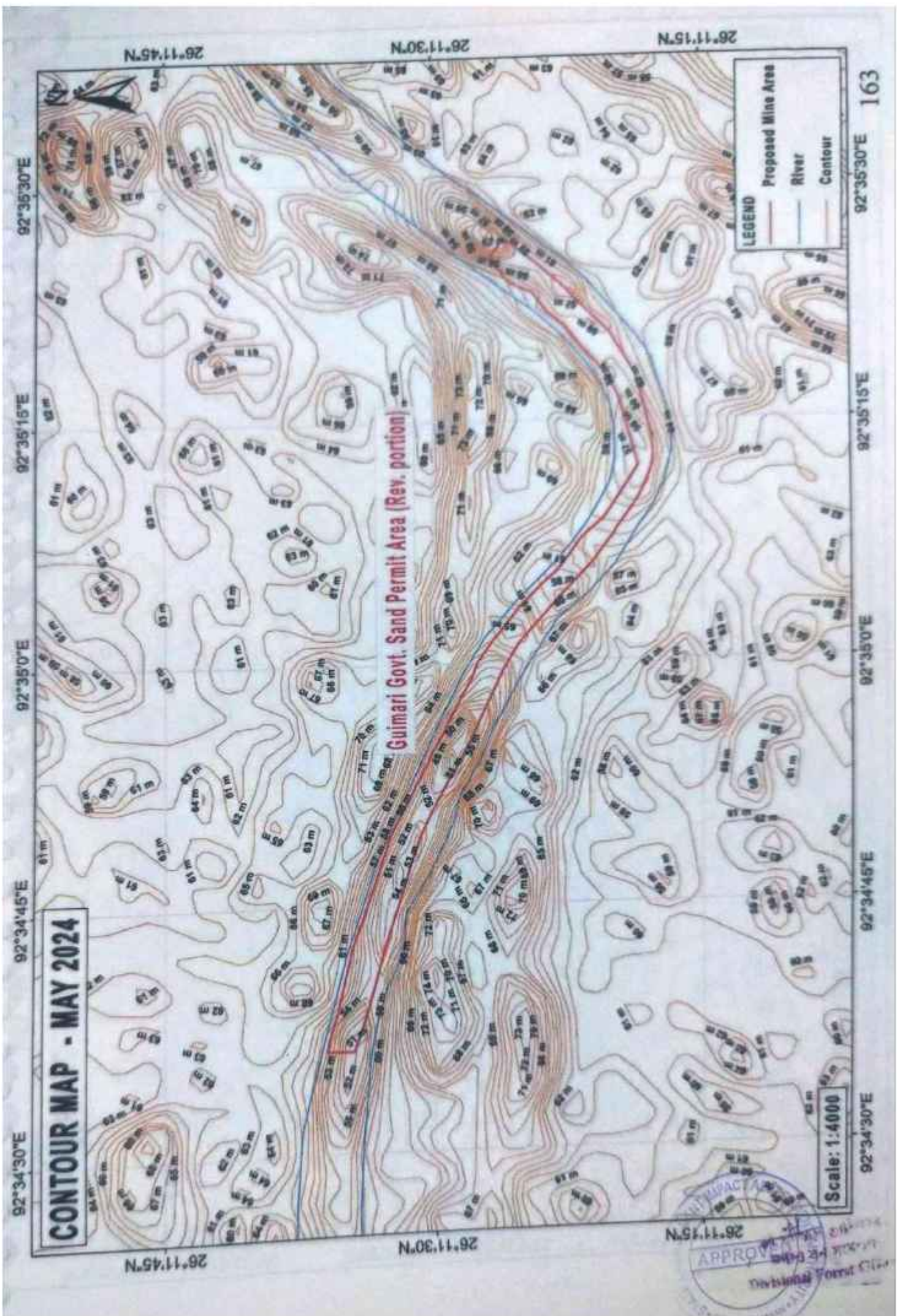
Borpani Sand Permit Area Part-1(B) Down Site (Govt. Permit)

LEGEND

	Proposed Mine Area
	River
	Contour

Scale: 1:2500

Ministry of Environment, Forest and Climate Change
 Government of India



CONTOUR MAP - MAY 2024

Guimari Govt. Sand Permit Area (Rev. portion)

LEGEND

	Proposed Mine Area
	River
	Contour

Scale: 1:4000

APPROVED
 26.11.15N
 92.34.30E

92°34'30"E 92°34'45"E 92°35'0"E 92°35'15"E 92°35'30"E

26°11'45"N 26°11'30"N 26°11'15"N

163



CONTOUR MAP - NOVEMBER 2024

Guimari Govt. Sand Permit Area (Rev. portion)

LEGEND

- Proposed Mine Area
- River
- Contour

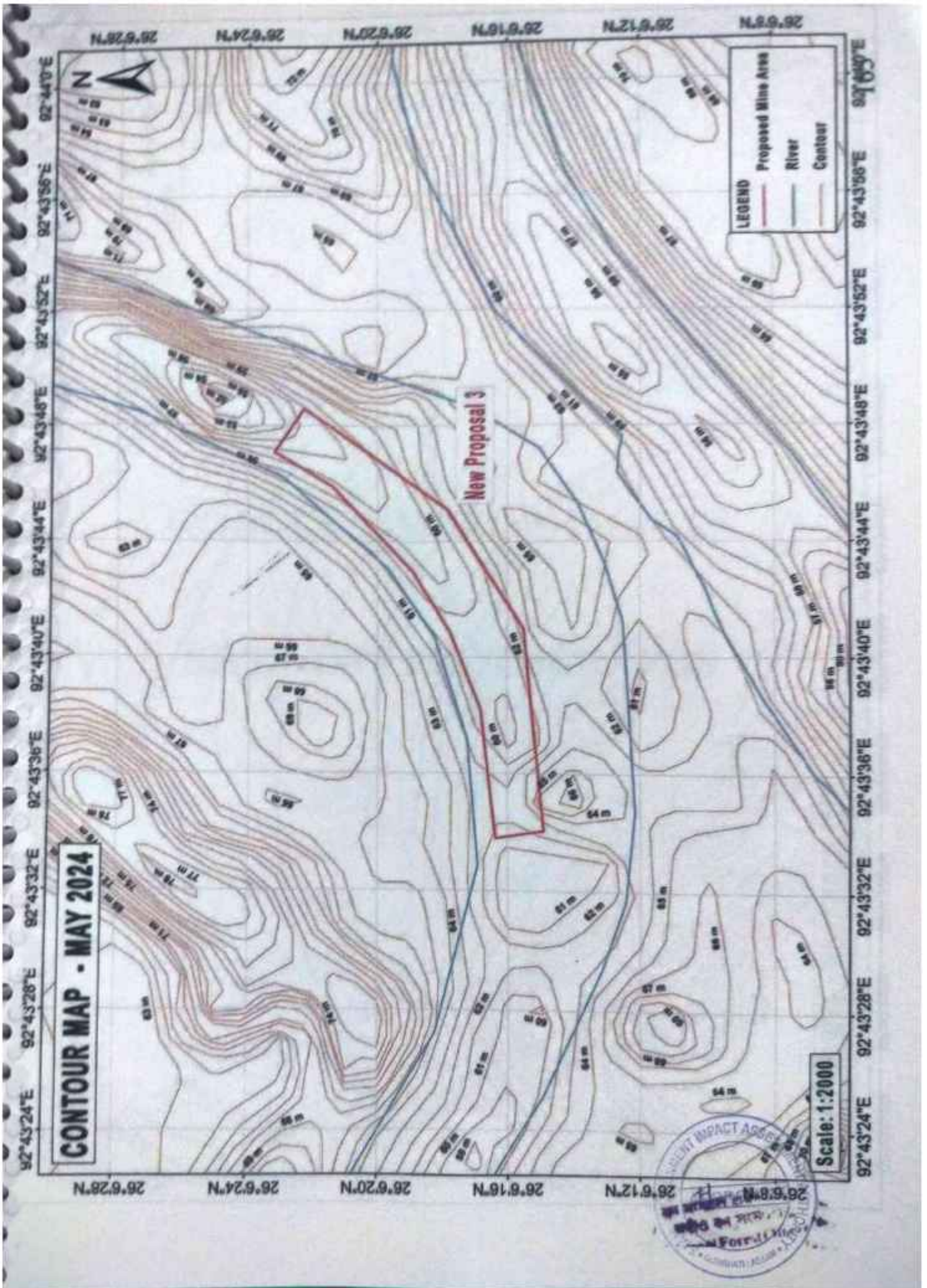
Scale: 1:4000

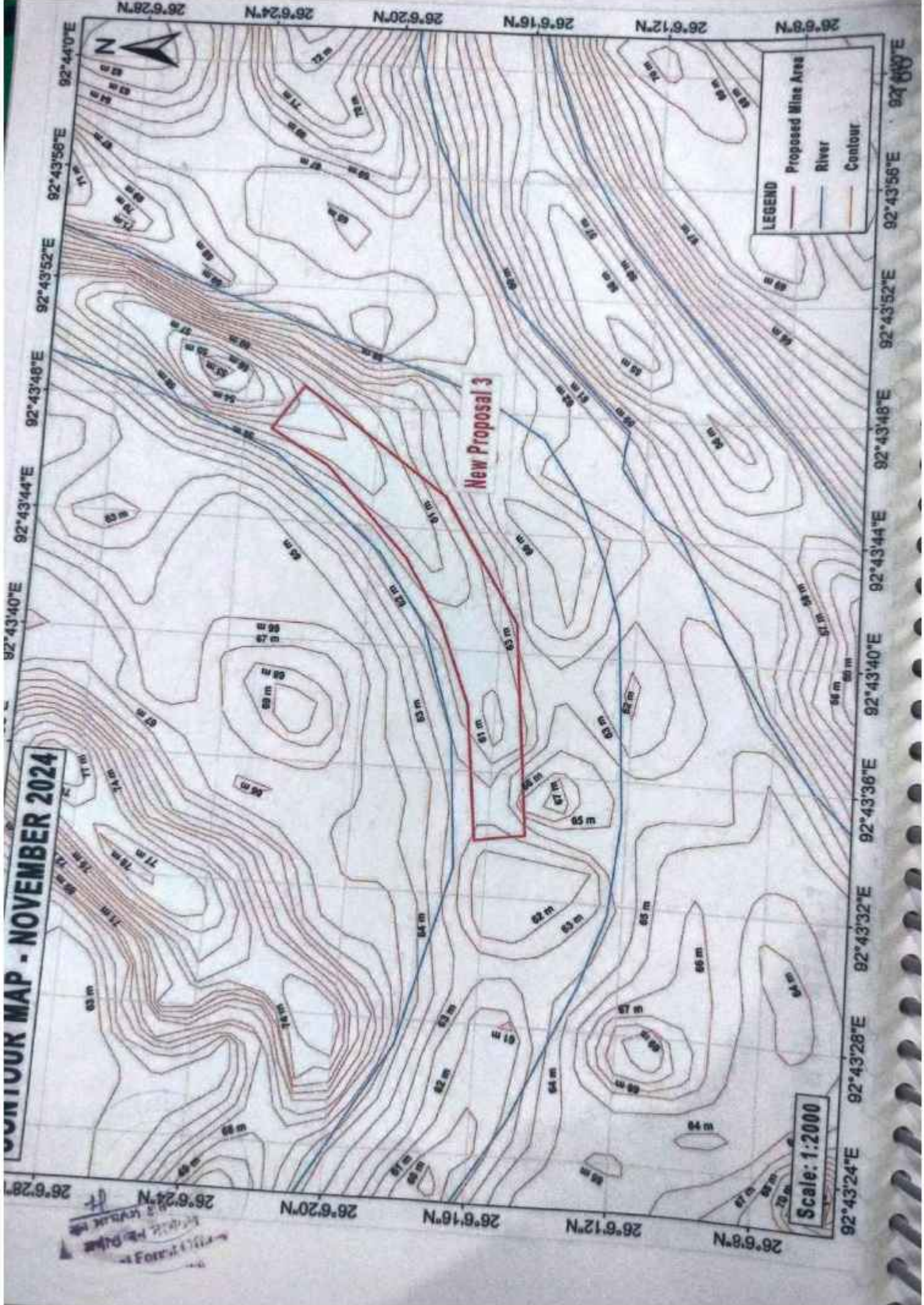
92°34'30"E 92°35'0"E 92°35'15"E 92°35'30"E

26°11'15"N 26°11'30"N 26°11'45"N

92°34'30"E 92°35'0"E 92°35'15"E 92°35'30"E

26°11'15"N 26°11'30"N 26°11'45"N





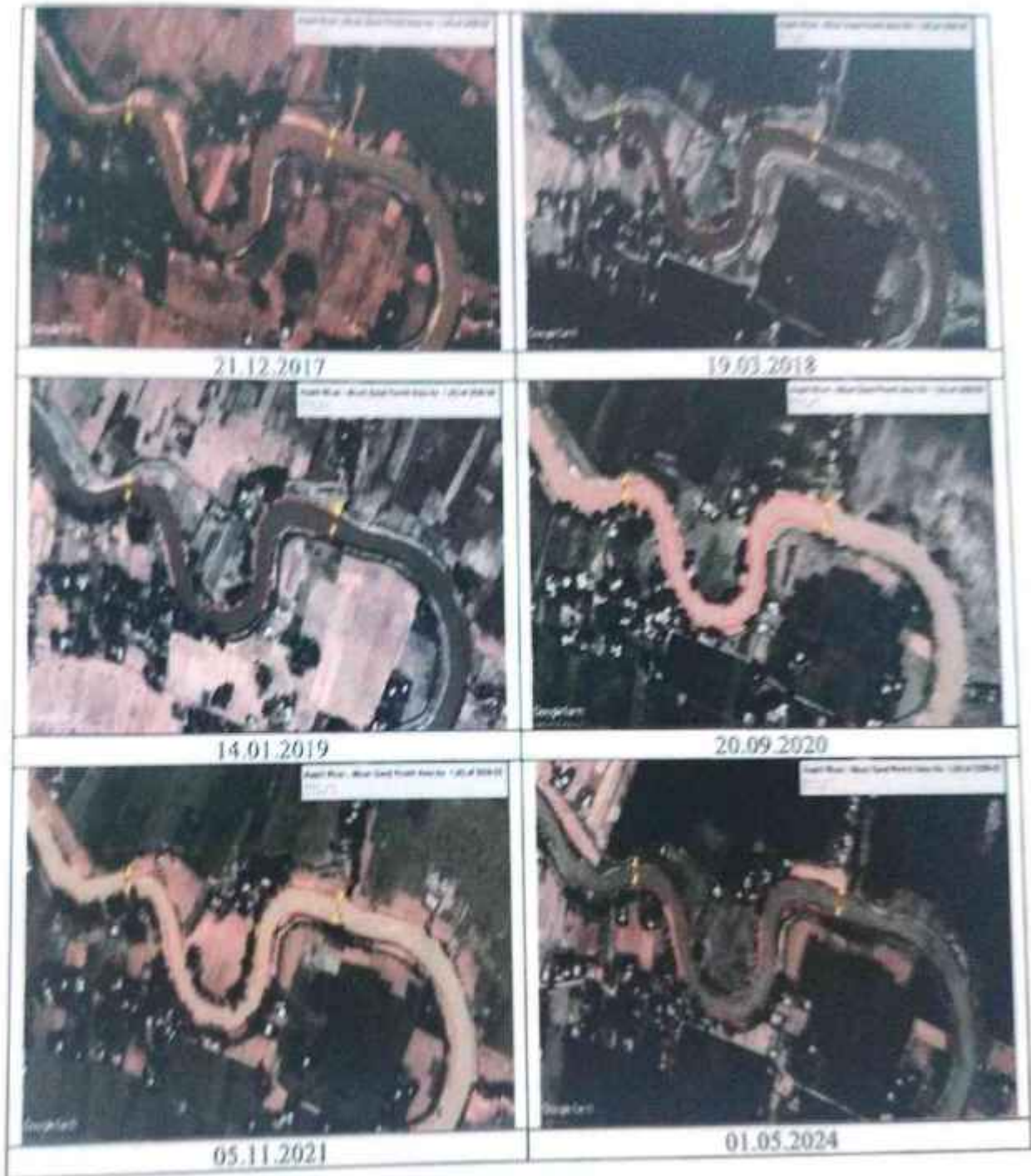
GOOGLE TIMELINE IMAGES
&
SITE VISIT PHOTOGRAPHS



Kopili River - Nisari Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.30 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 1

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

167



Handwritten signature and text:
H
কলি নদী সন্নিবেশিত
কলি নদী সন্নিবেশিত
Divisional Forest Officer
D.F.O. - Dima

District Survey Report

Site Visit Photographs

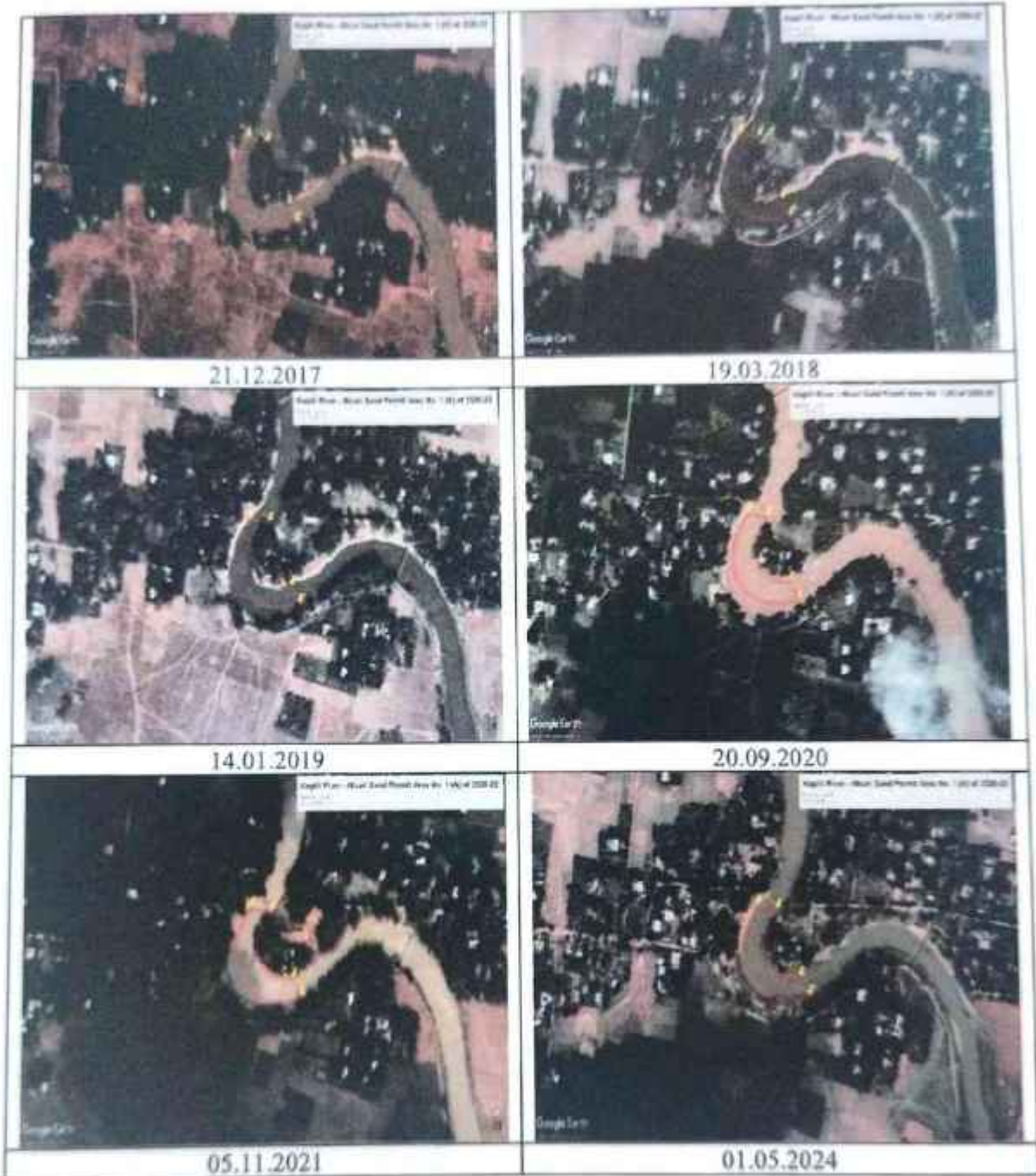
KML (Coordinates) site



Kopili River - Nisari Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.30 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 1

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

169



Handwritten signature and text in Assamese script, including 'Divisional Forest Officer'.

Site Visit Photographs

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

170

11
Divisional Forest Officer
Nagaon District

Kopili River - Nisari Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.30 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 1

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

171



Handwritten signature and text:
Divisonal Forest Officer
Nagaon District

Site Visit Photographs

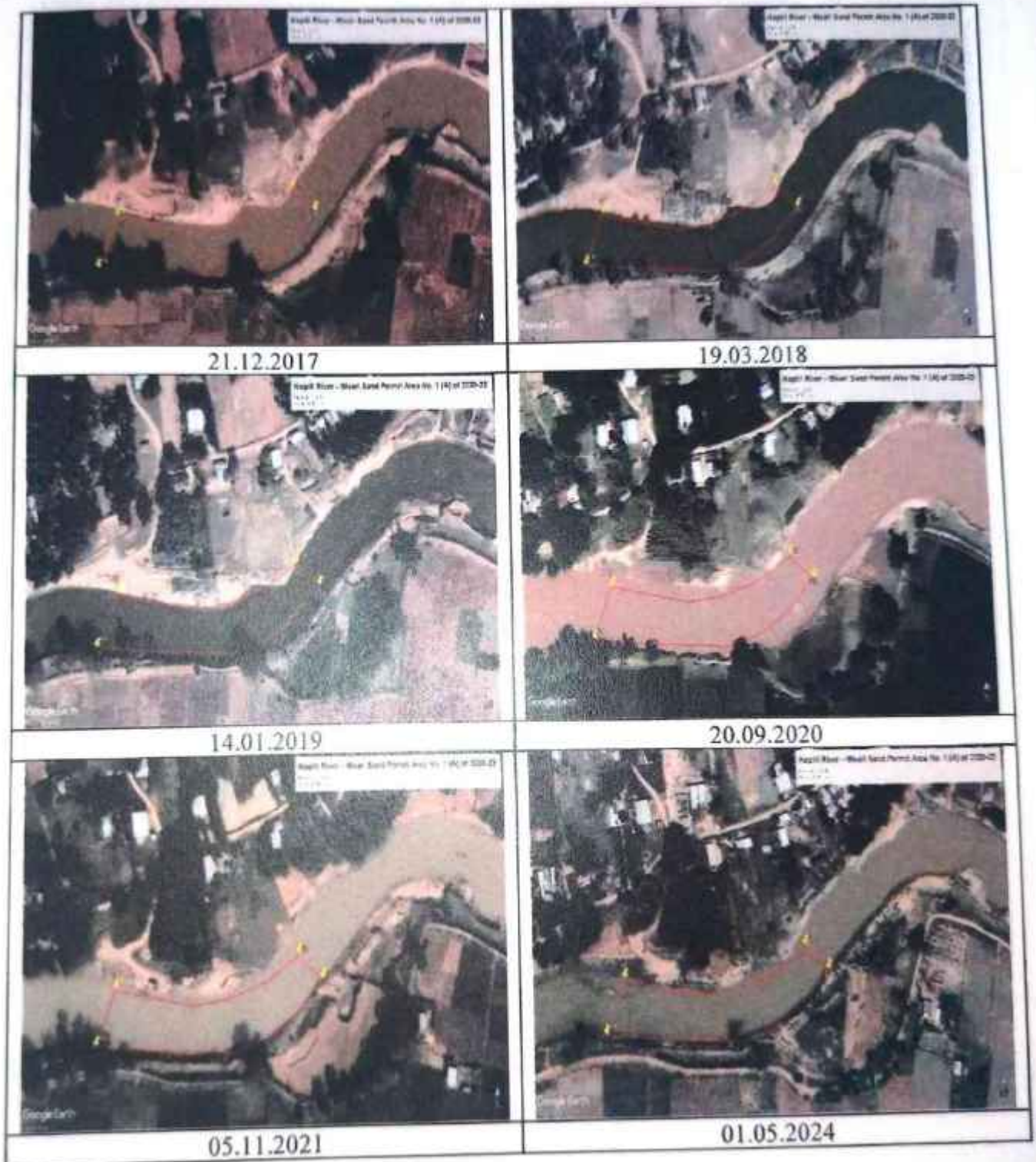
KML (Coordinates) site



Kopili River - Nisari Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.30 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 1

Google Image (different time scale with date)



Handwritten signature and date: H, 01/05/2024

Site Visit Photographs

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

176

71
আসাম চৰকাৰ
ৰাষ্ট্ৰীয় বন বিভাগ
National Forest Division

Kopili River - Nisari Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.30 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 1

Google Image (different time scale with date)



Site Visit Photographs

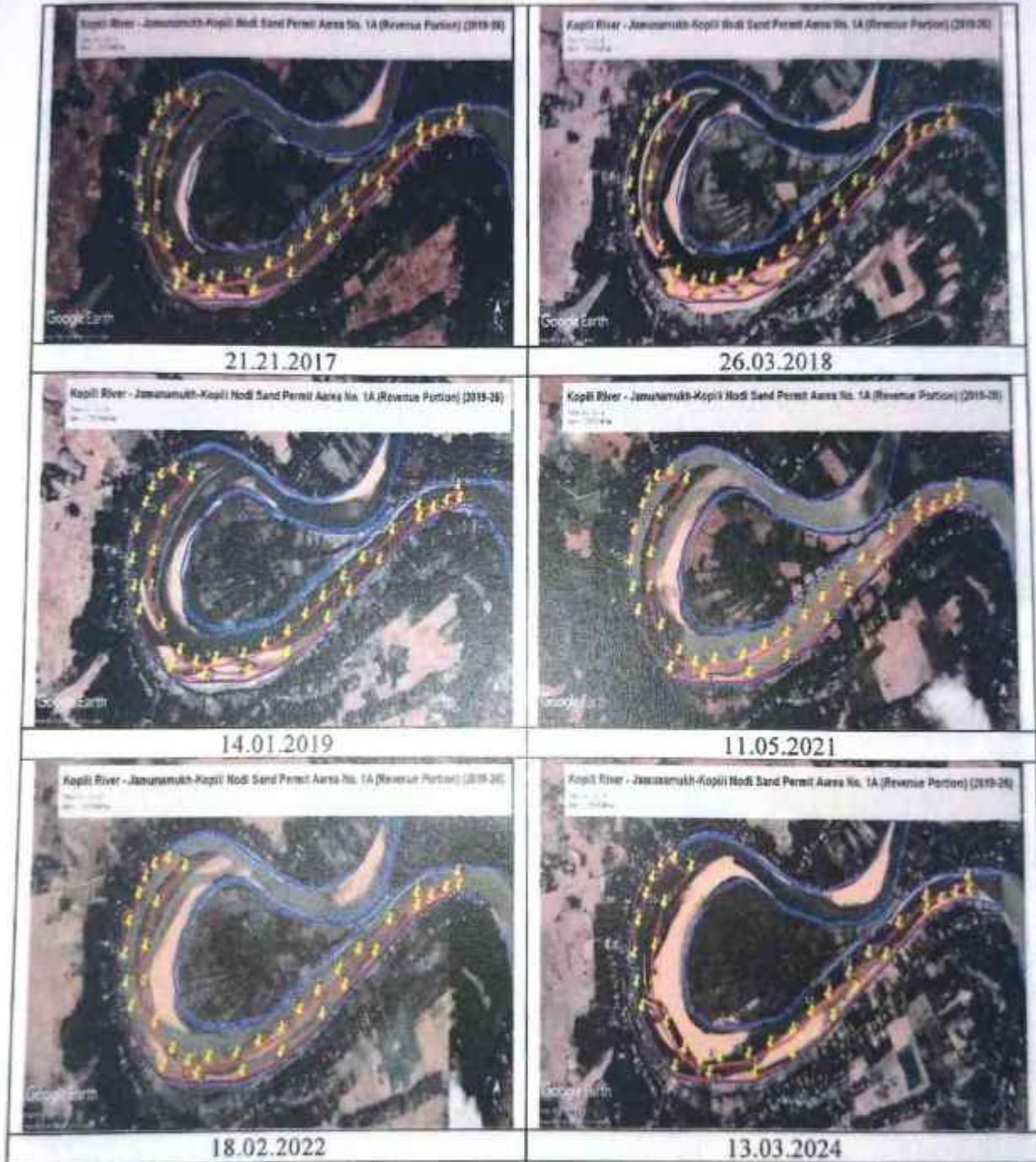
KML (Coordinates) site



**Kopili River - Jamunamukh-Kopili Nodi Sand Permit Aarea No. 1A (Revenue Portion)
(2019-26), Lease Area-23.50 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.1, S. No 2

Google Image (different time scale with date)



Handwritten signature and text, including 'Divisional Forest Officer' and 'Nagaon (M-1-100)'.

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

Borpani River - Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion), Lease Area: 4.50 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 1

Google Image (different time scale with date)



13.05.2017



15.11.2018



06.12.2019



14.11.2021



12.11.2022



13.03.2024

Site Visit Photographs



10.11.2024



10.11.2024



10.11.2024



10.11.2024

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

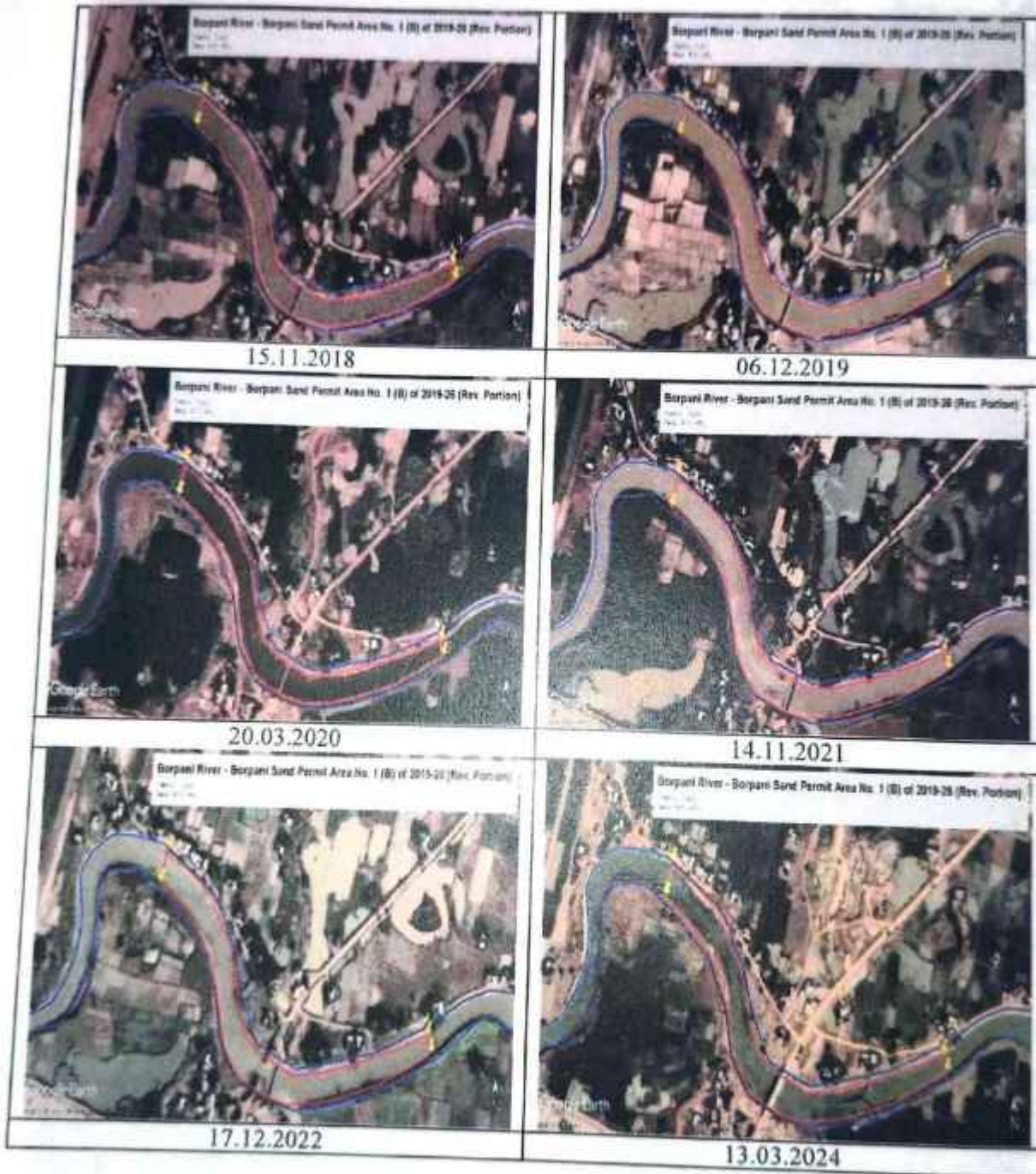
180

Handwritten signature and stamp: Divisional Forest Officer, Nagaon District, Assam.

Borpani River - Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion), Lease Area: 4.50 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 1

Google Image (different time scale with date)



11
11/11/2024
11/11/2024
District Forest Officer

Site Visit Photographs



KML (Coordinates) site



Divisional Forest Office
 Nagaon, Assam

Borpani River - Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion), Lease Area: 4.50 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 1

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

183



H
দেও অসম প্ৰতিষ্ঠানৰ
মঞ্জিৰ কৰা হৈছে
The National Forest Office
Nagaon Dist. Assam

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

Divisional Forest Officer
 Nagaon, Assam

Borpani River - Borpani Sand Permit Area No. 1 (B) of 2019-26 (Rev. Portion), Lease Area: 4.50 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 1

Google Image (different time scale with date)



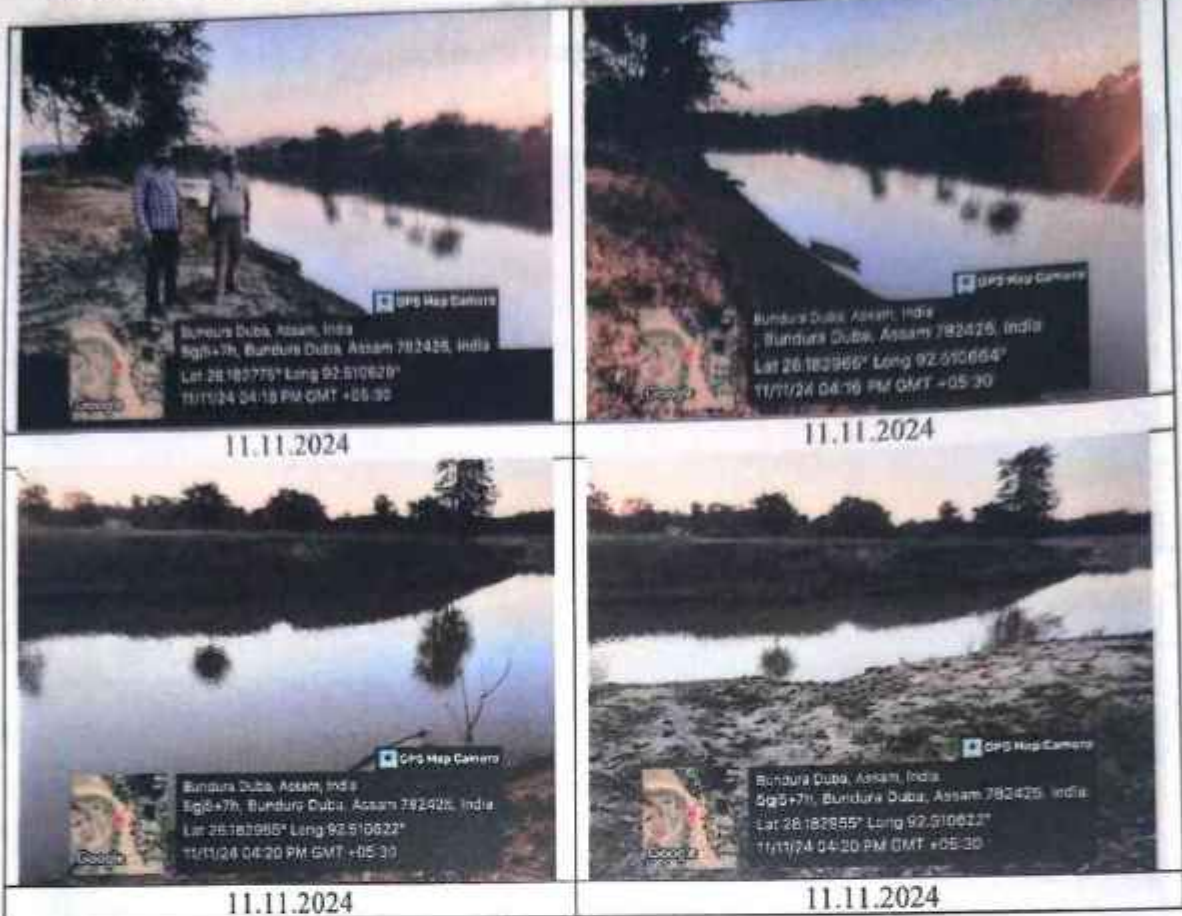
Minerals: Sand, Stone and Brick Earth

185



Handwritten signature
স্বাক্ষরিত
স্বাক্ষরিত
Divisional Forest Officer
Nagaon District

Site Visit Photographs



KML (Coordinates) site



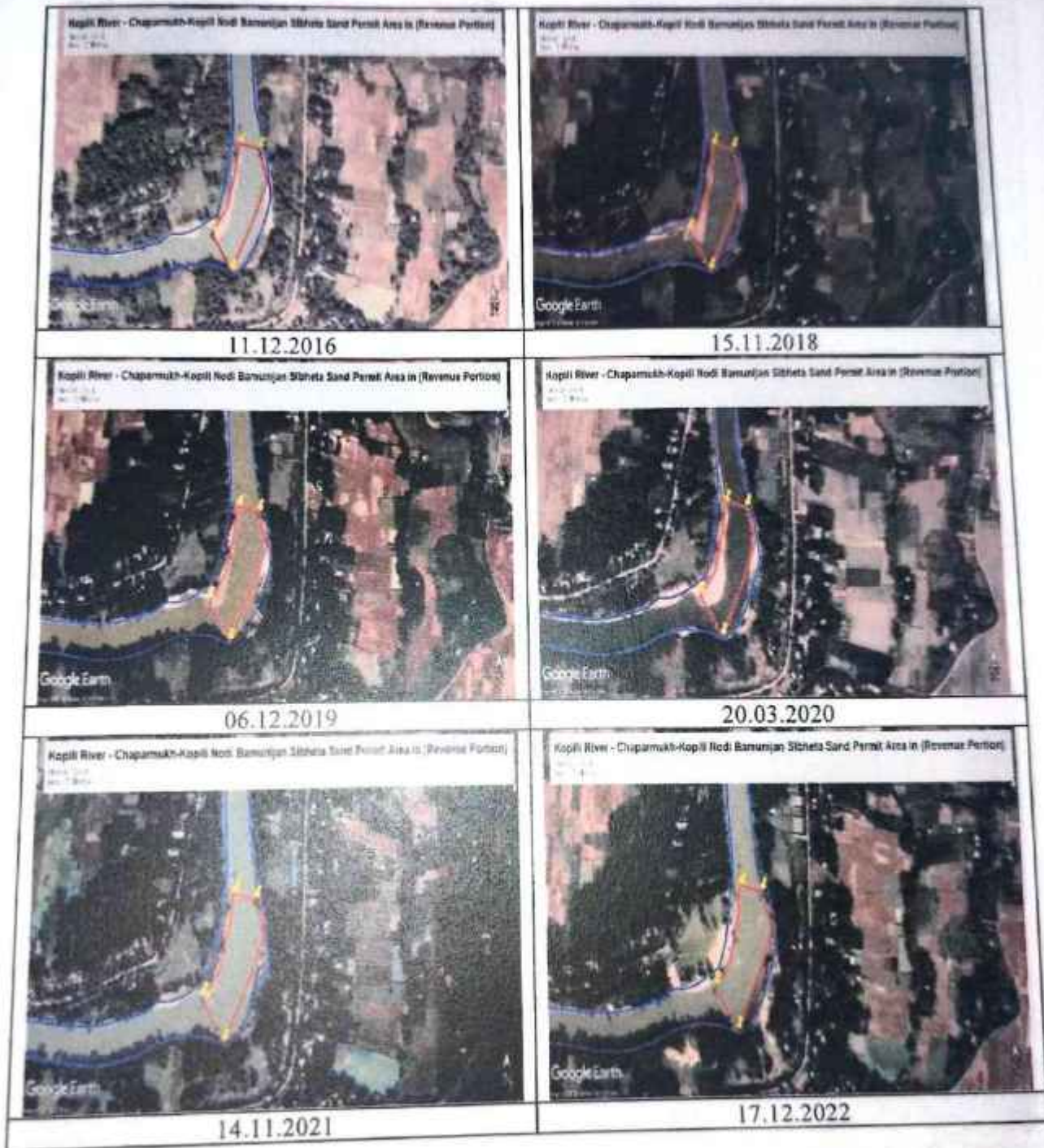
Handwritten text in Assamese script, likely a signature or official stamp, partially obscured by a redacted area.

Minerals: Sand, Stone and Brick Earth

Kopili River - Chaparmukh-Kopili Nodi Bamunijan Sibheta Sand Permit Area in (Revenue Portion), Lease Area: 2.00 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 2

Google Image (different time scale with date)



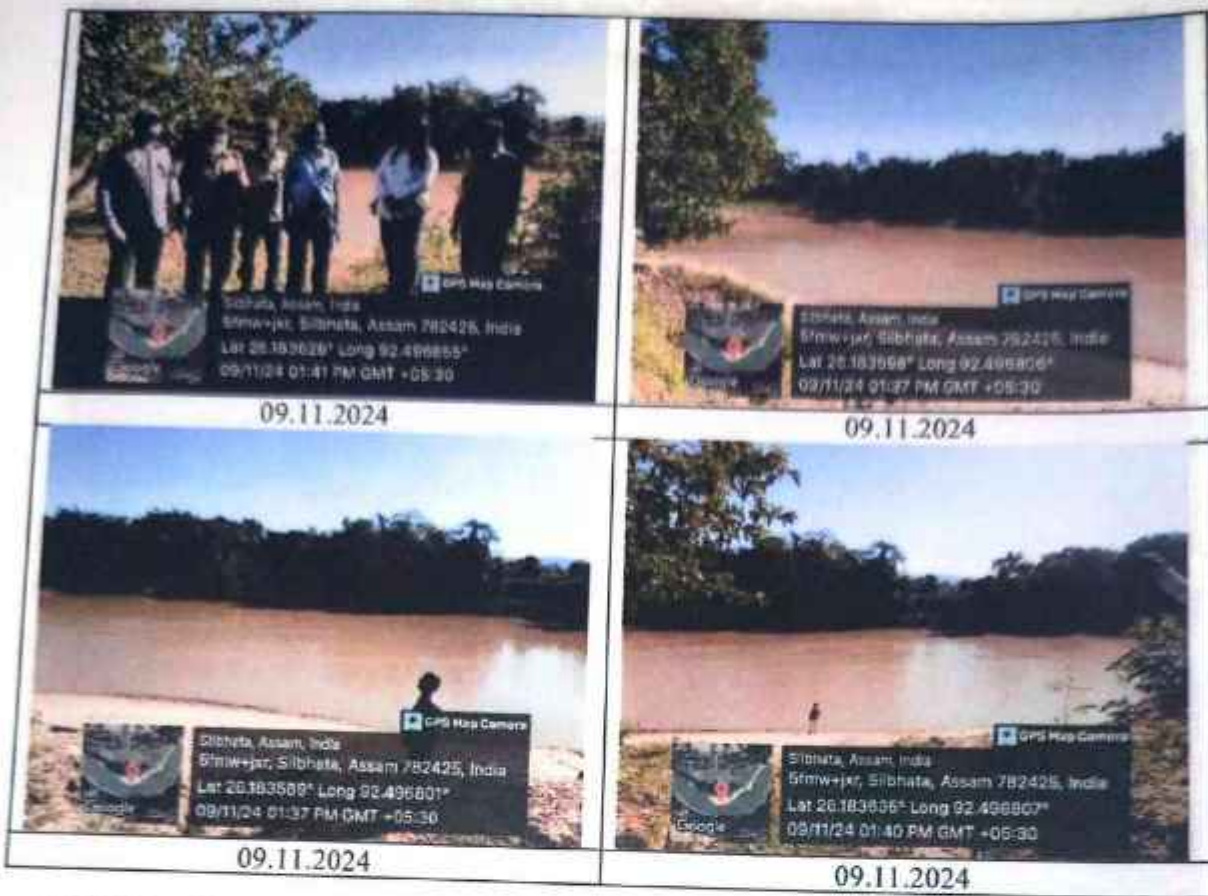
Minerals: Sand, Stone and Brick Earth

187



Handwritten signature and stamp of the Divisional Forest Officer, Nagaon District.

Site Visit Photographs



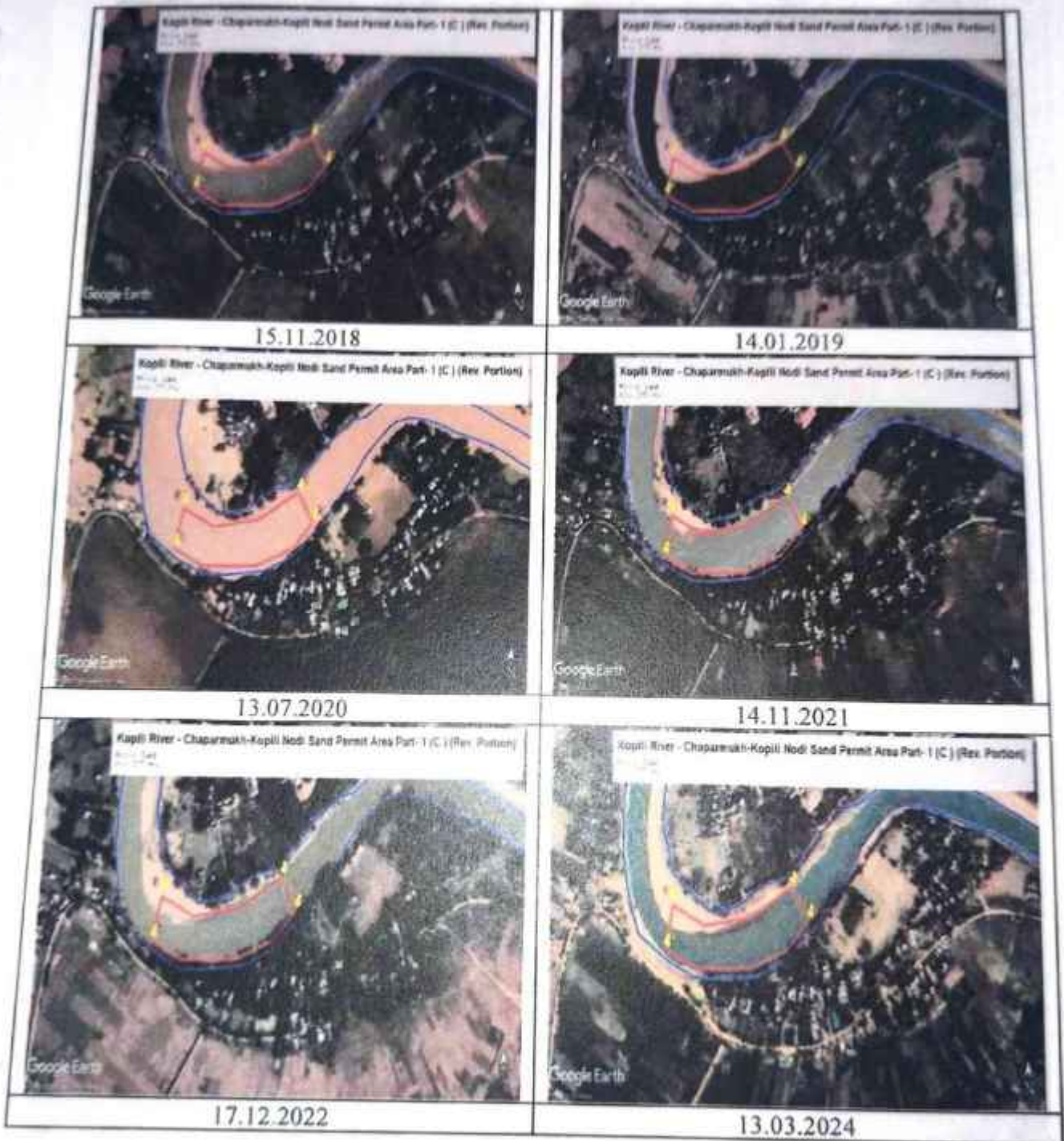
KML (Coordinates) site



**Kopili River - Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (C) (Rev. Portion),
Lease Area: 2.50 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.2, S. No 3

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

189



Handwritten signature and text in Assamese script, including 'National Forest Officer'.

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

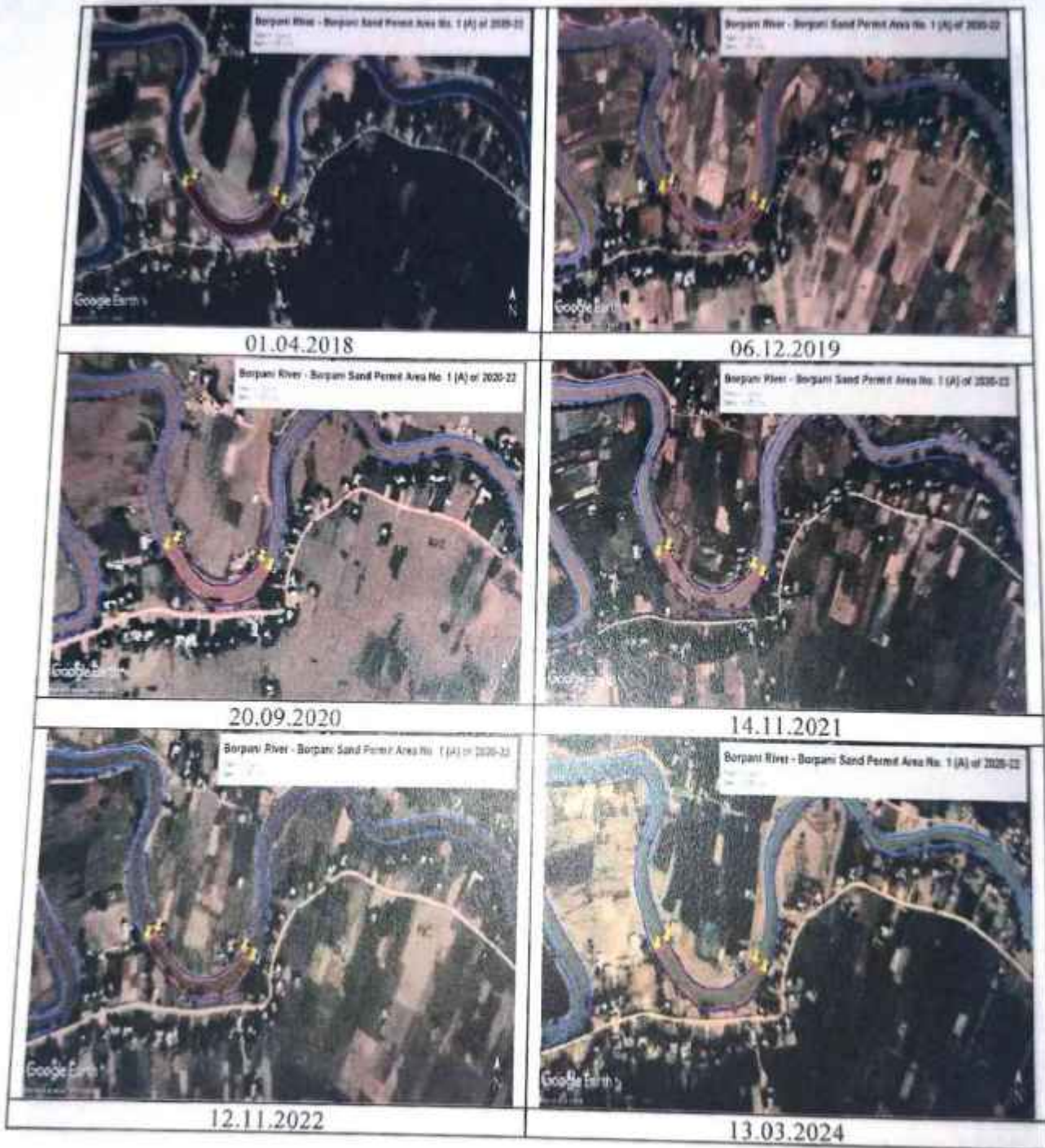
হি
 ডিভিশনাল এঞ্জিনিয়ার
 Divisional Engineer (Minerals)
 Nagaon District, Assam



Borpani River - Borpani Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.95 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 1

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

191



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স্বা স্বাক্ষরিত
১৩/০৩/২০২৪

Site Visit Photographs



KML (Coordinates) site

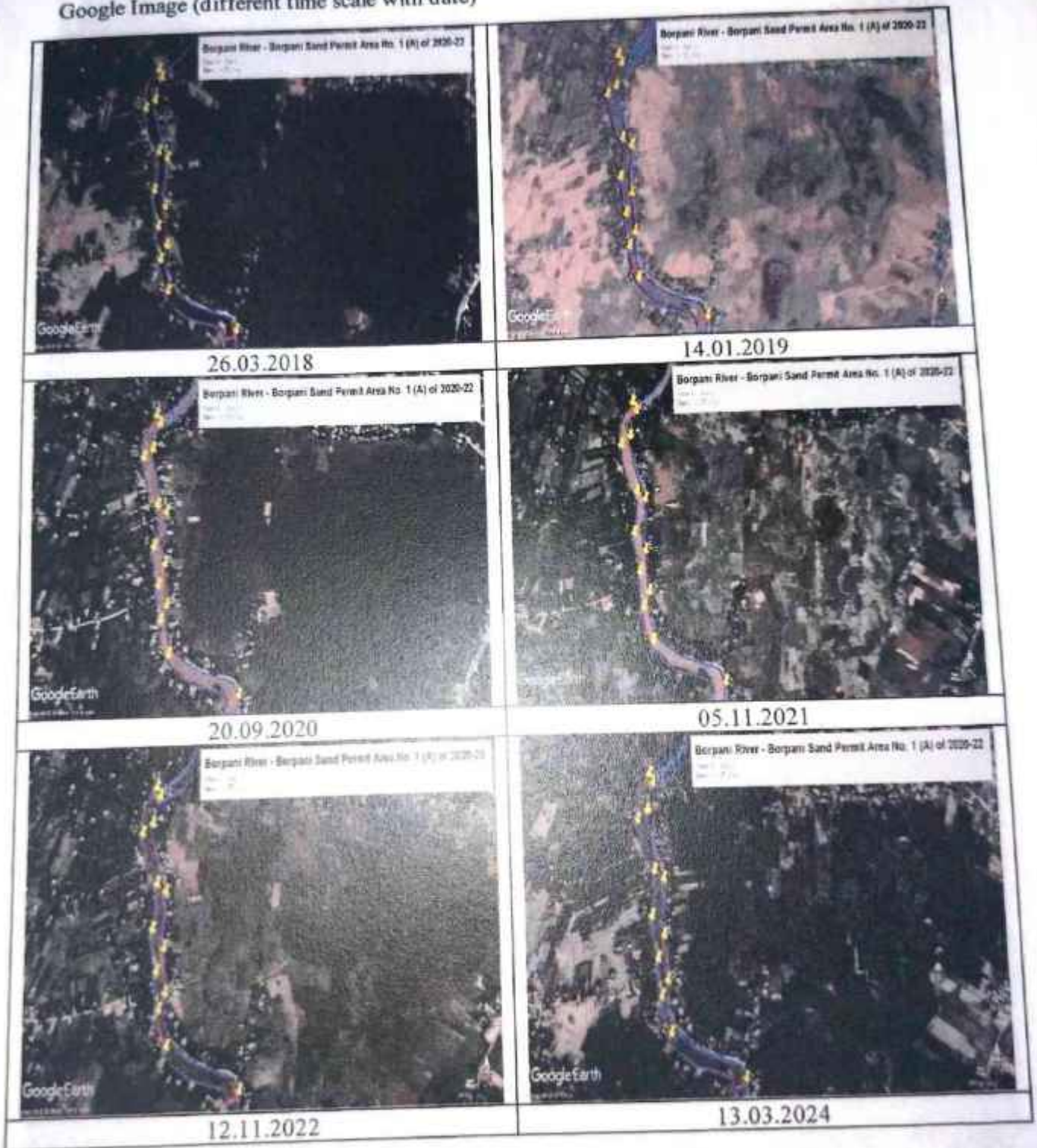


Handwritten text in Assamese script, likely a signature or official stamp, located in the bottom left corner of the page.

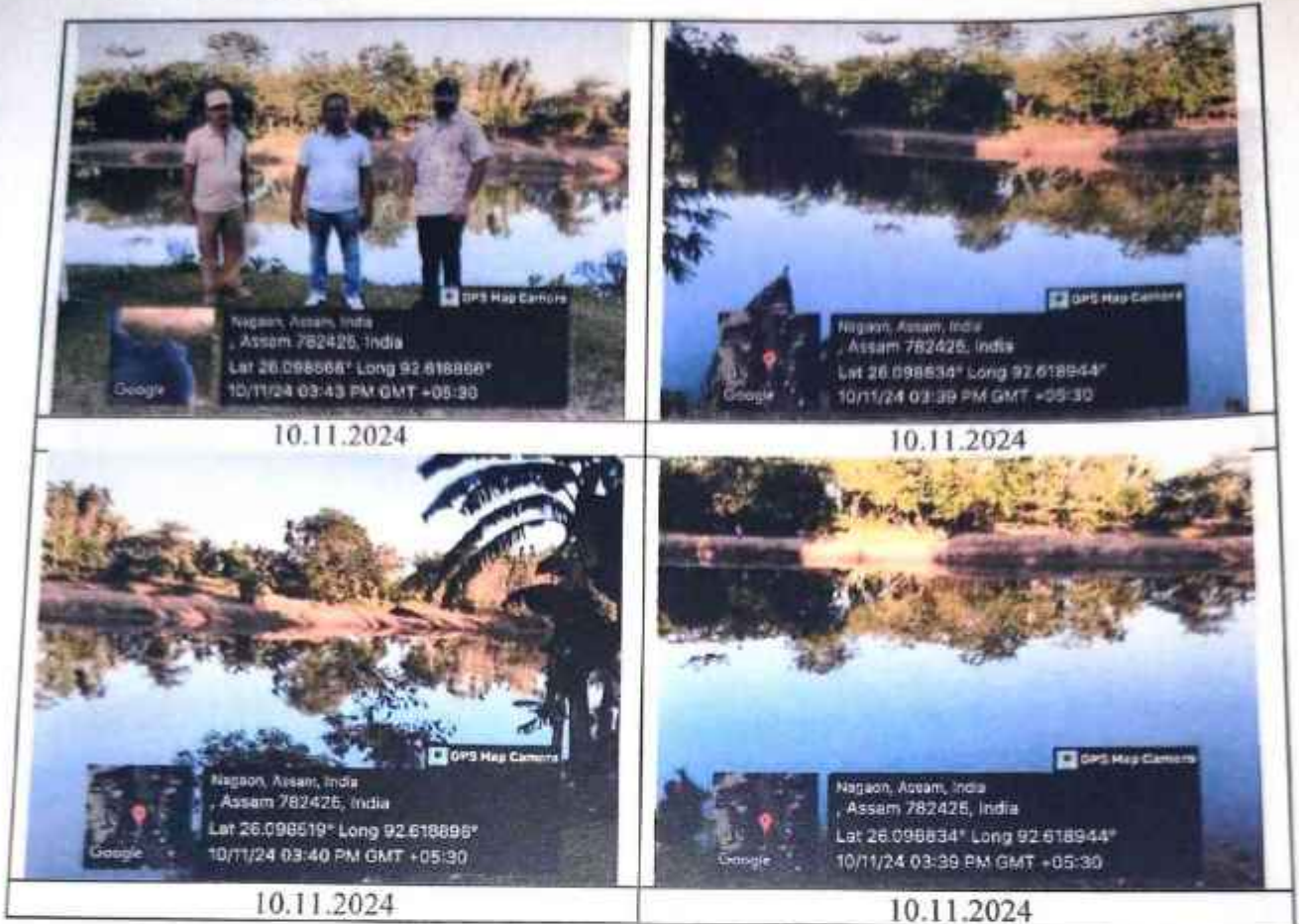
Borpani River - Borpani Sand Permit Area No. 1 (A) of 2020-22, Lease Area: 4.95 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 1

Google Image (different time scale with date)



Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

**Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)
PLOT-1, Lease Area: 4.74 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 2

Google Image (different time scale with date)



Site Visit Photographs



09.11.2024



09.11.2024



09.11.2024



09.11.2024

KML (Coordinates) site



13.03.2024

**Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)
PLOT-2, Lease Area: 4.74 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 2

Google Image (different time scale with date)



09.01.2018



06.12.2019



20.09.2020



14.11.2021



12.11.2022



13.03.2024

Minerals: Sand, Stone and Brick Earth

197



H
Divisional Forest Officer
Nagaon District

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

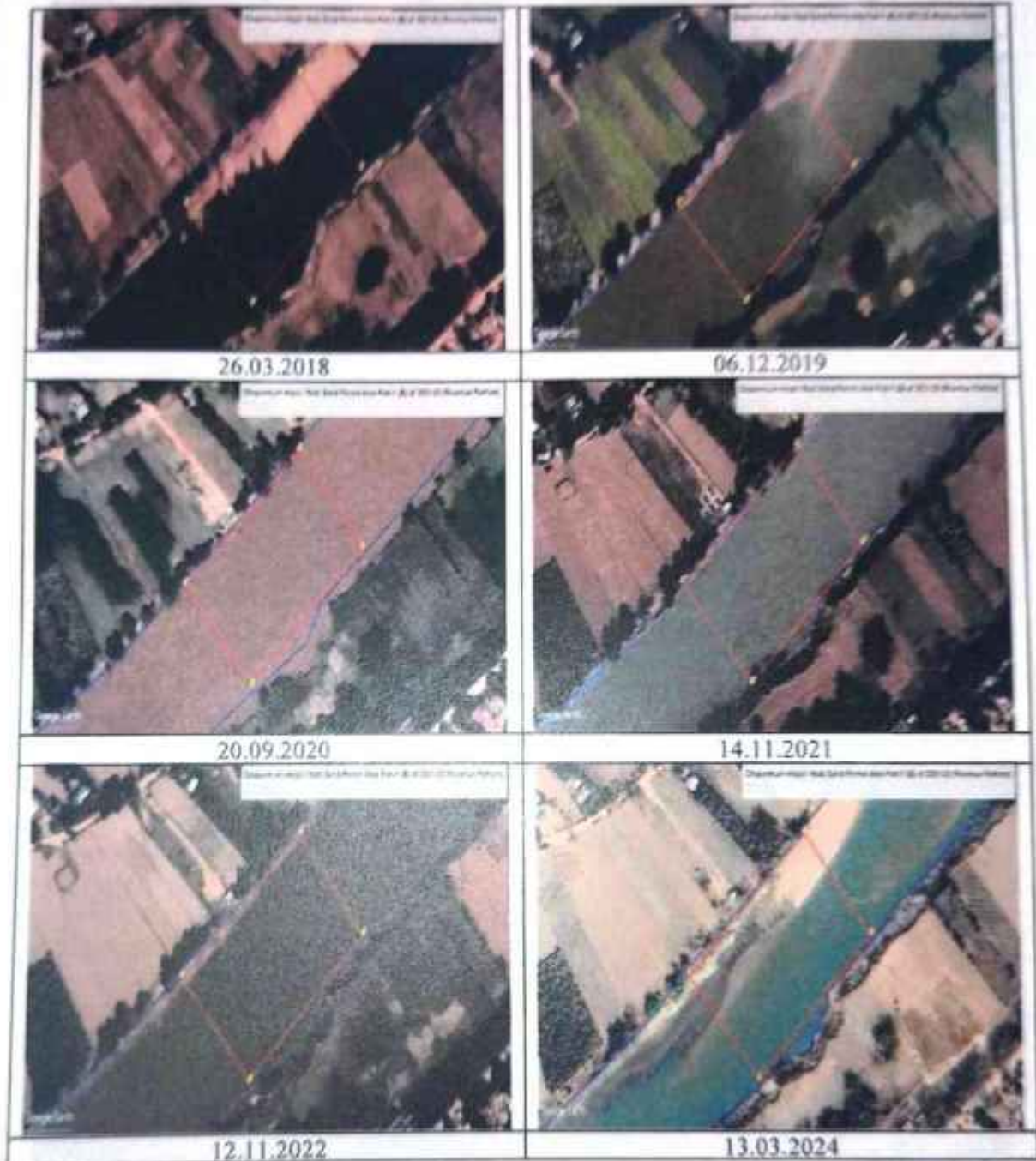
H
 অসম চৰকাৰ
 অসম চৰকাৰ
 Divisional Forest Office
 Nagaon, Assam



**Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)
PLOT-3, Lease Area: 4.74 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 2

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

199



21
Divisional Forest Officer
Nagaon District

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

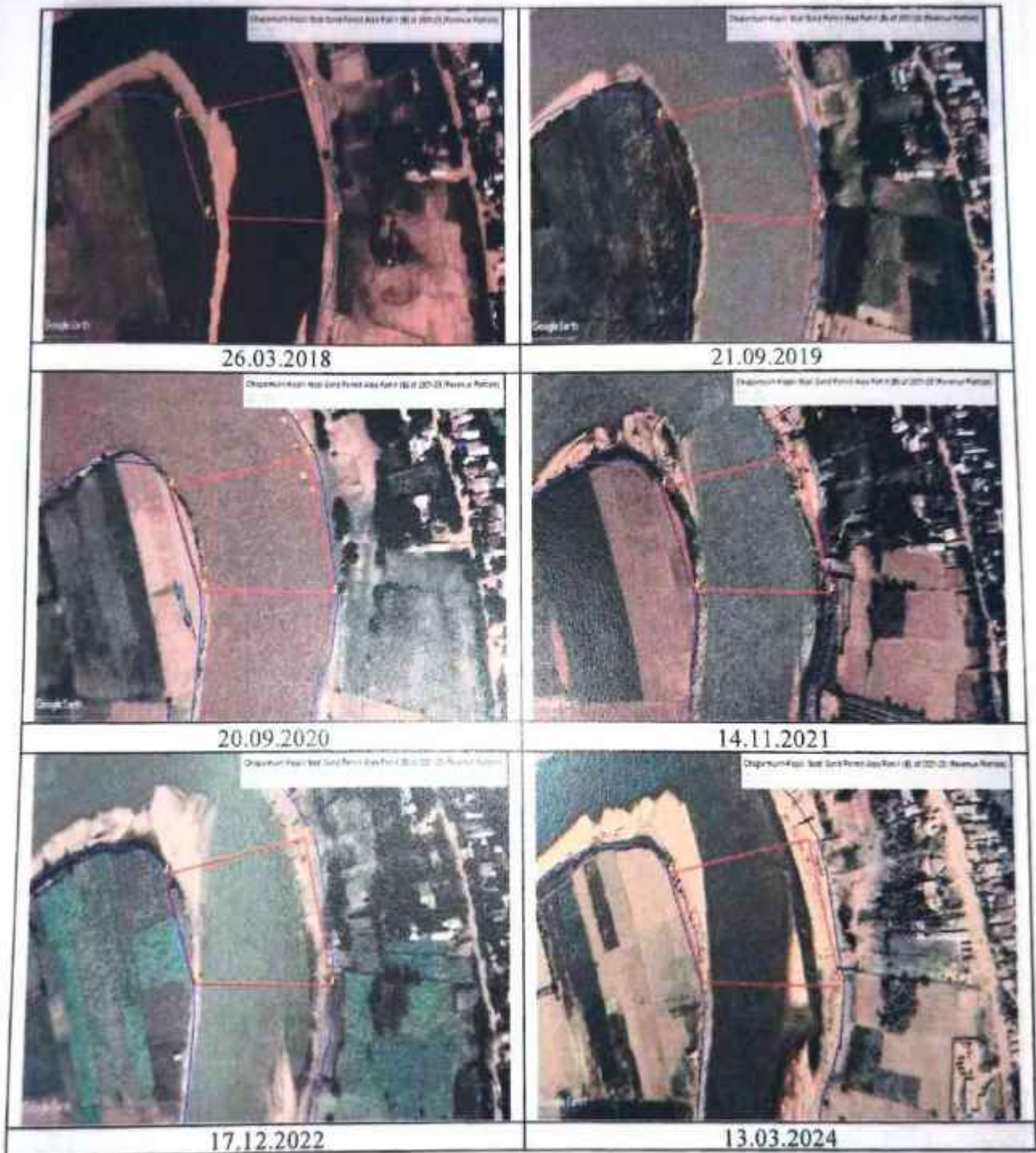
200



**Chaparmukh-Kopili Nodi Sand Permit Area Part-1 (B) of 2021-23 (Revenue Portion)
PLOT 4, Lease Area: 4.74 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 2

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

201



Handwritten text in Assamese script, including the number '41' and some illegible characters.

Site Visit Photographs



09.11.2024



09.11.2024



09.11.2024



09.11.2024

KML (Coordinates) site



13.03.2024

Handwritten signature and text in Assamese script, including 'Divisional Office'.

Chaparmuk-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion) of 2016-18- 2018-20, Lease Area: 4.60 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 3

Google Image (different time scale with date)



Handwritten signature and text in Assamese script, including the name 'Dr. Jyoti Borah'.

Site Visit Photographs



11.11.2024



11.11.2024

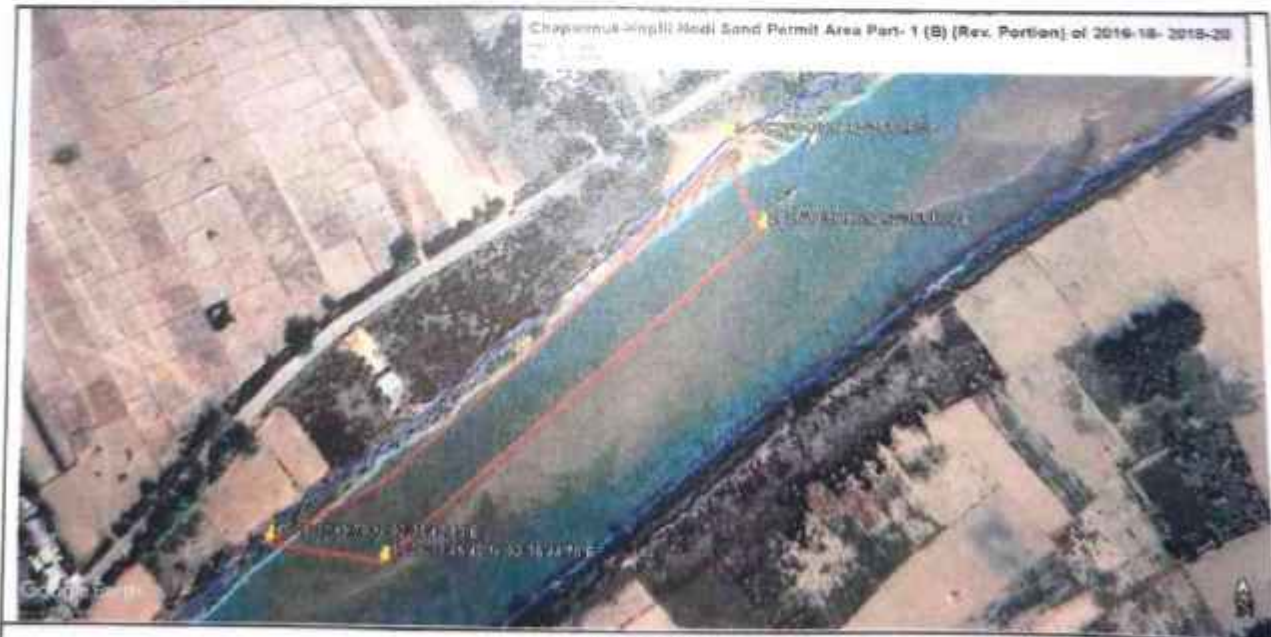


11.11.2024



11.11.2024

KML (Coordinates) site



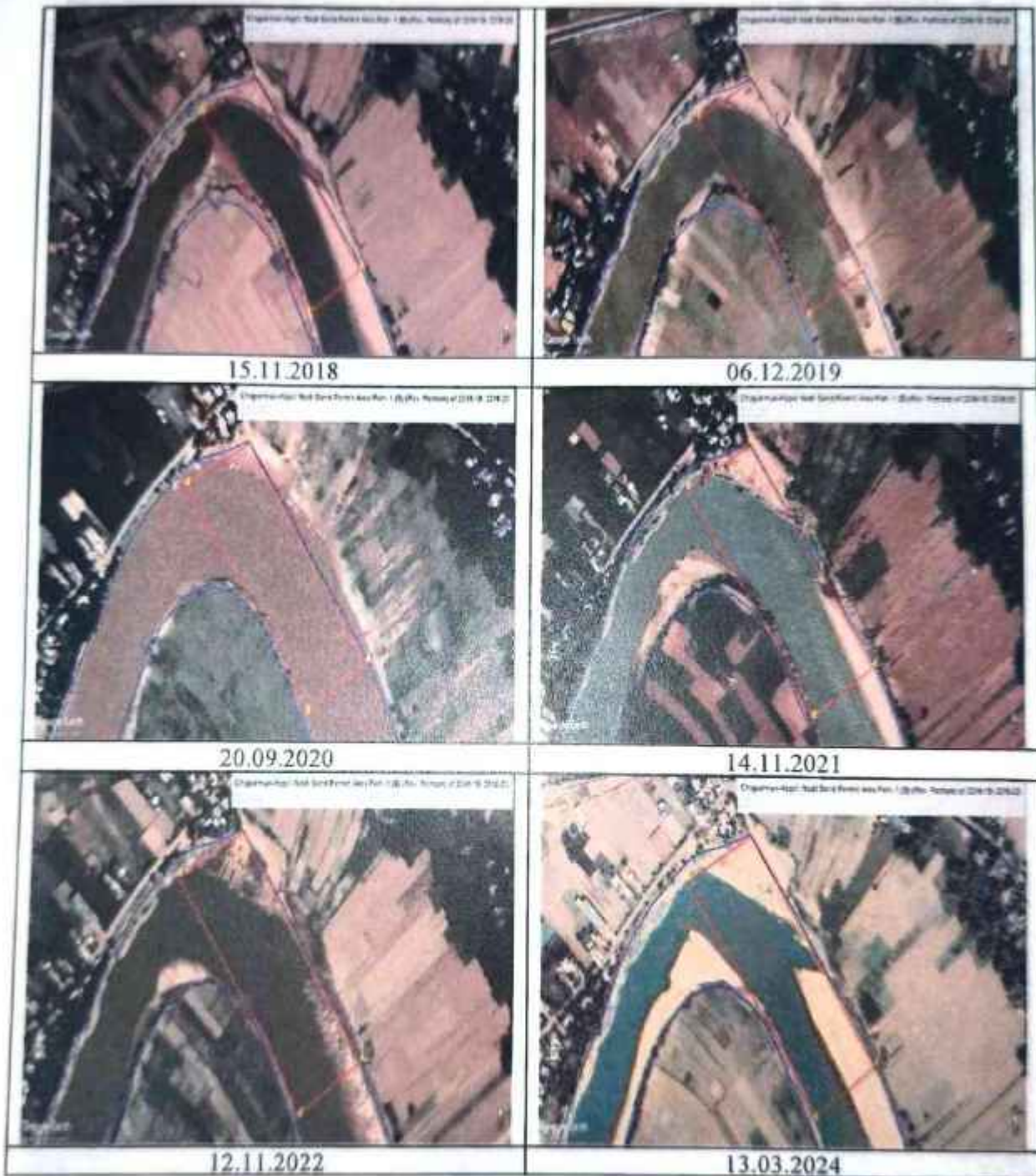
13.03.2024

71
Divisional Forest Officer
Lakhimpur

Chaparmuk-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion) of 2016-18- 2018-20 Part B, Lease Area: 4.60 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 3

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

205



Handwritten signature and text:
+1
কামলেশ্বর হুম্বৈলা
স্বাক্ষরিত
Divisional Forest Officer

Site Visit Photographs



09.11.2024



09.11.2024

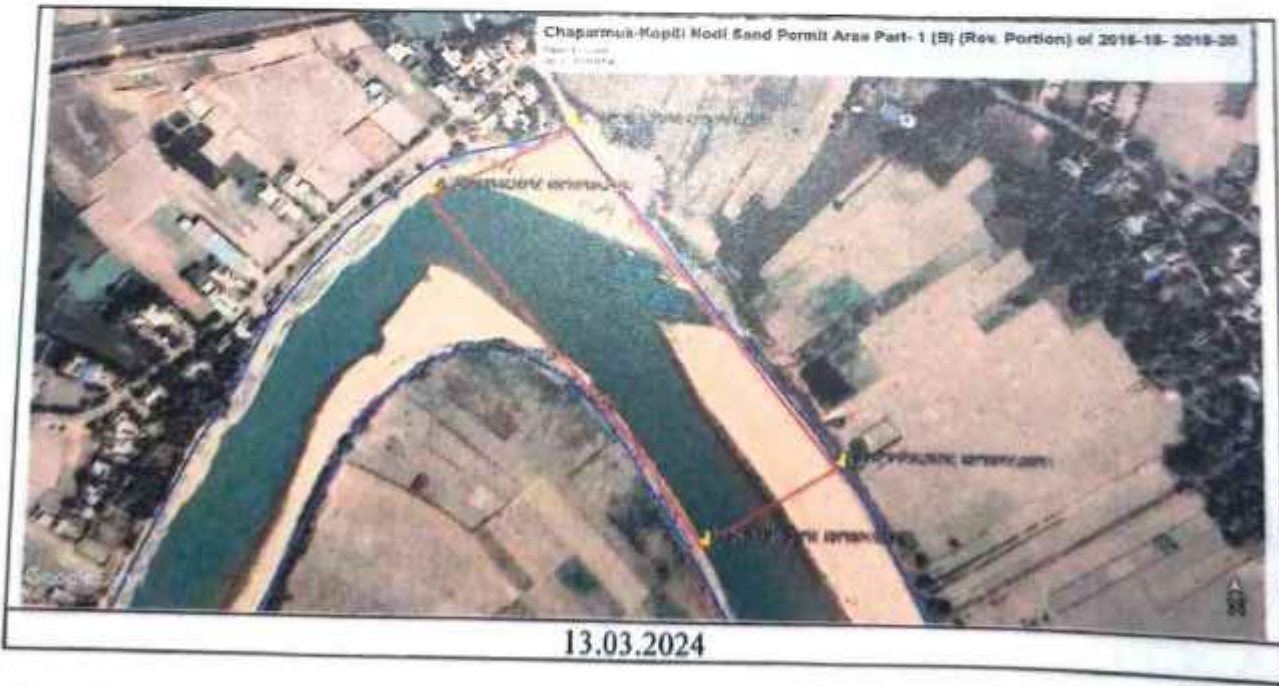


09.11.2024



09.11.2024

KML (Coordinates) site



Divisional Forest Officer

 Nagaon District, Assam

Chapmukh-Kopili Nodi Sand Permit Area No. 1 (C) (Rev. Portion) of 2018-20,

Lease Area: 2.55 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 4

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

207



H
অসম পৰিষ্কাৰ আৰু
স্বাস্থ্য বিভাগ
Divisional Forest Officer
Nagaon, Assam

Site Visit Photographs



09.11.2024



09.11.2024



09.11.2024




09.11.2024

KML (Coordinates) site



13.03.2024

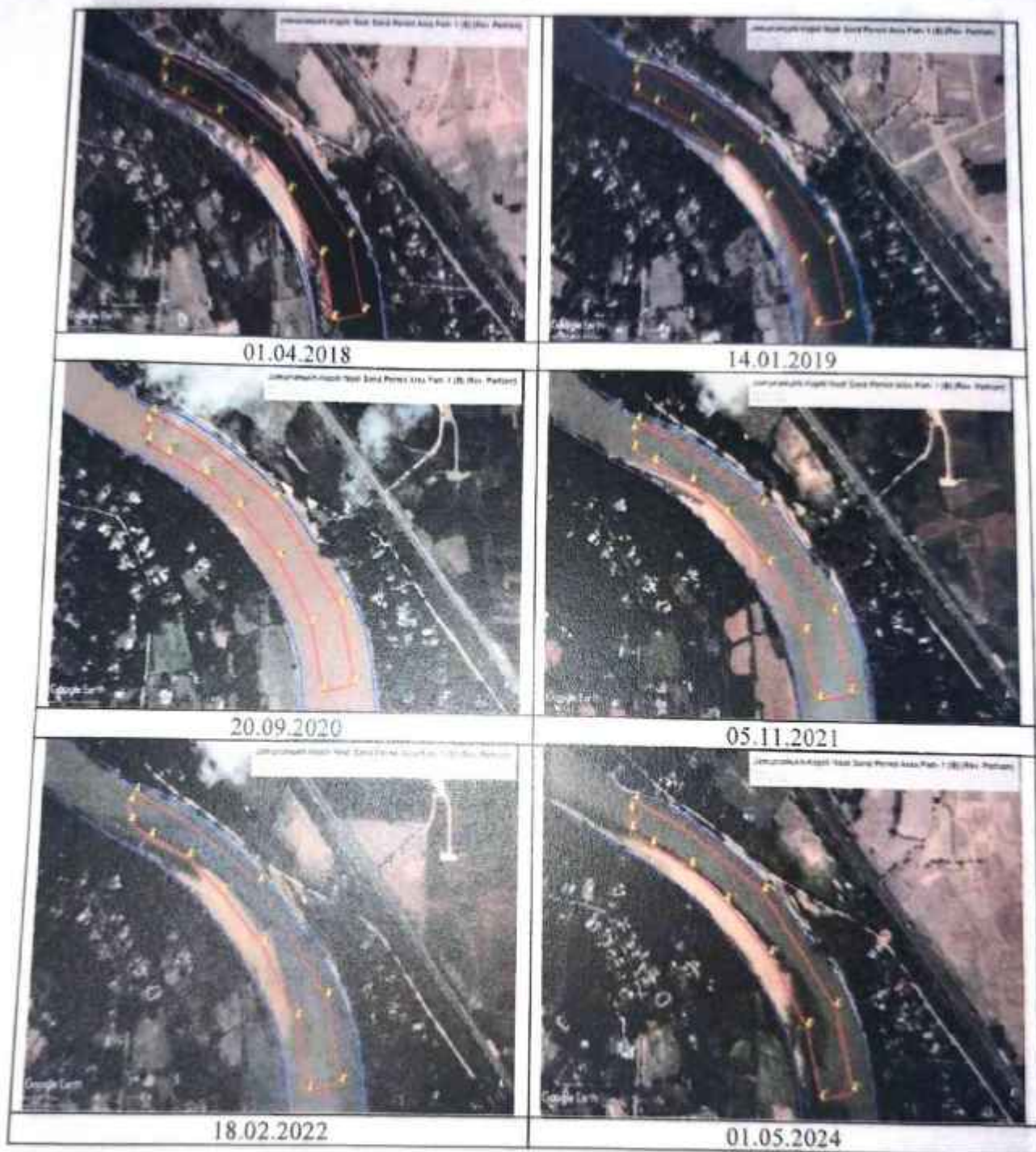

 ডি. এ. এ. এ.
 ডি. এ. এ. এ.
 Divisional Forest Officer
 Nagaon District

Jamunamukh-Kopili Nodi Sand Permit Area Part- 1 (B) (Rev. Portion),

Lease Area: 4.20 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 5

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

209



Handwritten notes and signatures in blue ink, including the number '4' and some illegible text.

Site Visit Photographs



11.11.2024



11.11.2024



11.11.2024



11.11.2024

KML (Coordinates) site



01.05.2024

Divisional Forest Officer
Nagaon

**Jamunamukh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion)
BLOCK 1, Lease Area: 4.50 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 6

Google Image (different time scale with date)



09.01.2018



14.01.2019



20.09.2020



05.11.2021



12.11.2022



13.03.2024

Minerals: Sand, Stone and Brick Earth

211



Handwritten signature and text in Assamese script.

Site Visit Photographs



11.11.2024



11.11.2024



11.11.2024



11.11.2024

KML (Coordinates) site



Handwritten notes in Assamese script, including the words 'National Forest Office'.

**Jamunamulh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion)
BLOCK 3, Lease Area: 4.50 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 6

Google Image (different time scale with date)



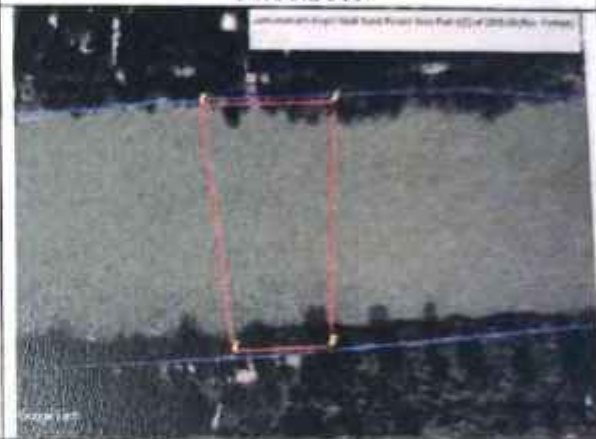
26.03.2018



14.01.2019



20.09.2020



05.11.2021



12.11.2022



13.03.2024

Site Visit Photographs

Minerals: Sand, Stone and Brick Earth

213



Handwritten signature and text, including '2019-20' and 'District Survey Report'.



11.11.2024



11.11.2024



11.11.2024



11.11.2024

KML (Coordinates) site



13.03.2024

31
Divisional Manager
Nagaon

**Jamunamukh-Kopili Nodi Sand Permit Area Part-1(C) of 2018-20 (Rev. Portion)
BLOCK 4, Lease Area: 4.50 Ha.**

Mine Lease Reference in Chapter 3 of DSR: Table 3.3, S. No 6

Google Image (different time scale with date)



19.03.2018



14.01.2019



20.09.2020



05.11.2021



12.11.2022



13.03.2024

Site Visit Photographs

Minerals: Sand, Stone and Brick Earth

215



Handwritten signature and text in Assamese script, including 'Divisional Forest Officer'.



KML (Coordinates) site



Kopili River - Guimari Govt. Sand Permit Area (Rev. portion), Lease Area: 4.93 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.4, S. No 3

Google Image (different time scale with date)



01.04.2018



06.12.2019



20.09.2020



05.11.2021



12.11.2022



13.03.2024

Minerals: Sand, Stone and Brick Earth

217



Handwritten signature and text: "Divyendu Pathan" and "Member" with a date stamp.

Site Visit Photographs



KML (Coordinates) site

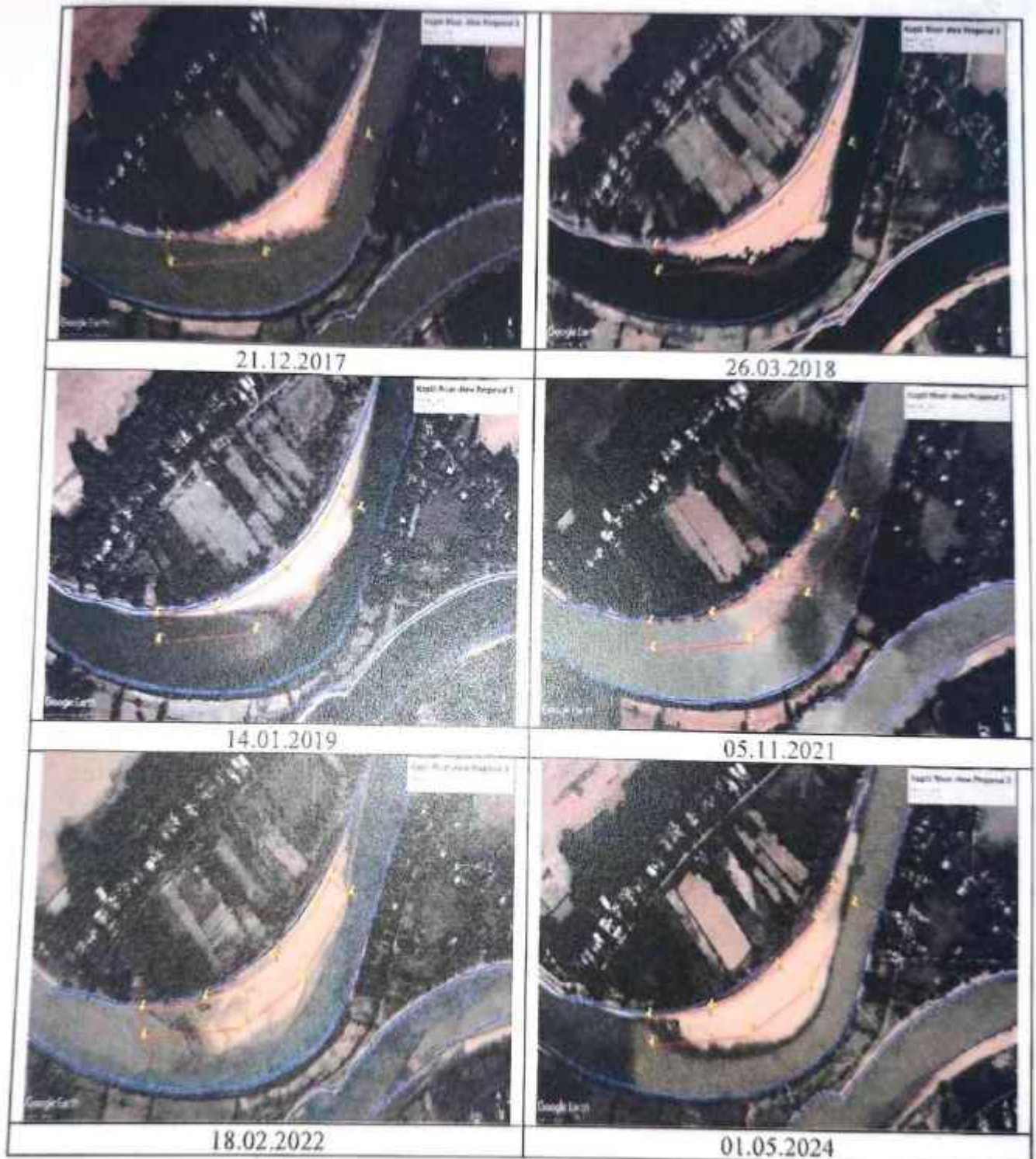


Handwritten signature and text in Assamese script, including "Divisional Forest Officer" and "Nagaon District".

Kopili River -New Proposal 3, Lease Area: 2.52 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.4, S. No 4

Google Image (different time scale with date)



Site Visit Photographs

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

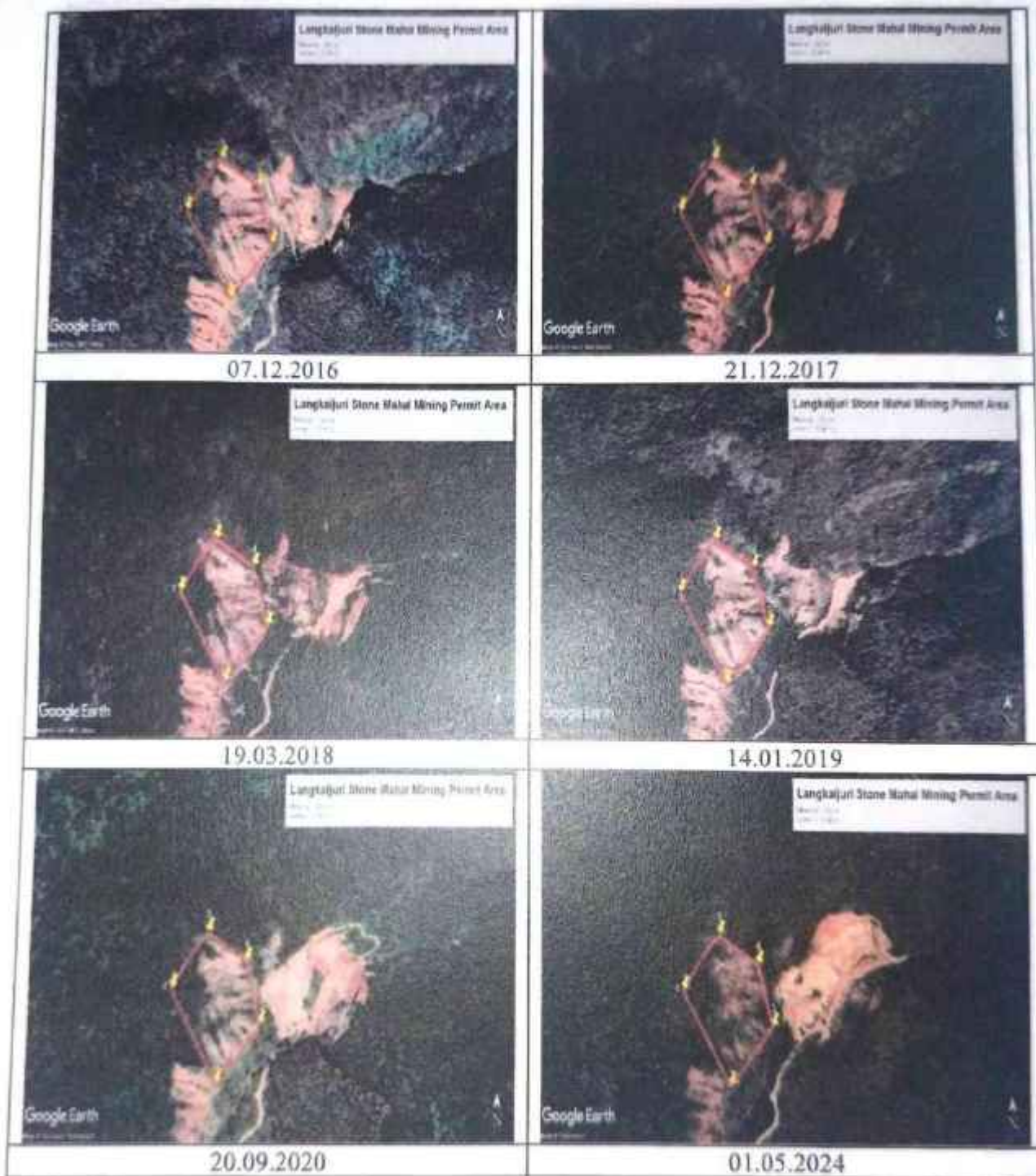
220

Divisional Forest Officer
Nagaon

Langkajuri Stone Mahal Mining Permit Area, Lease Area: 5.0 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.5, S. No 3

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

221



Handwritten signatures and notes in blue ink, including the number '41' and some illegible text.

Site Visit Photographs

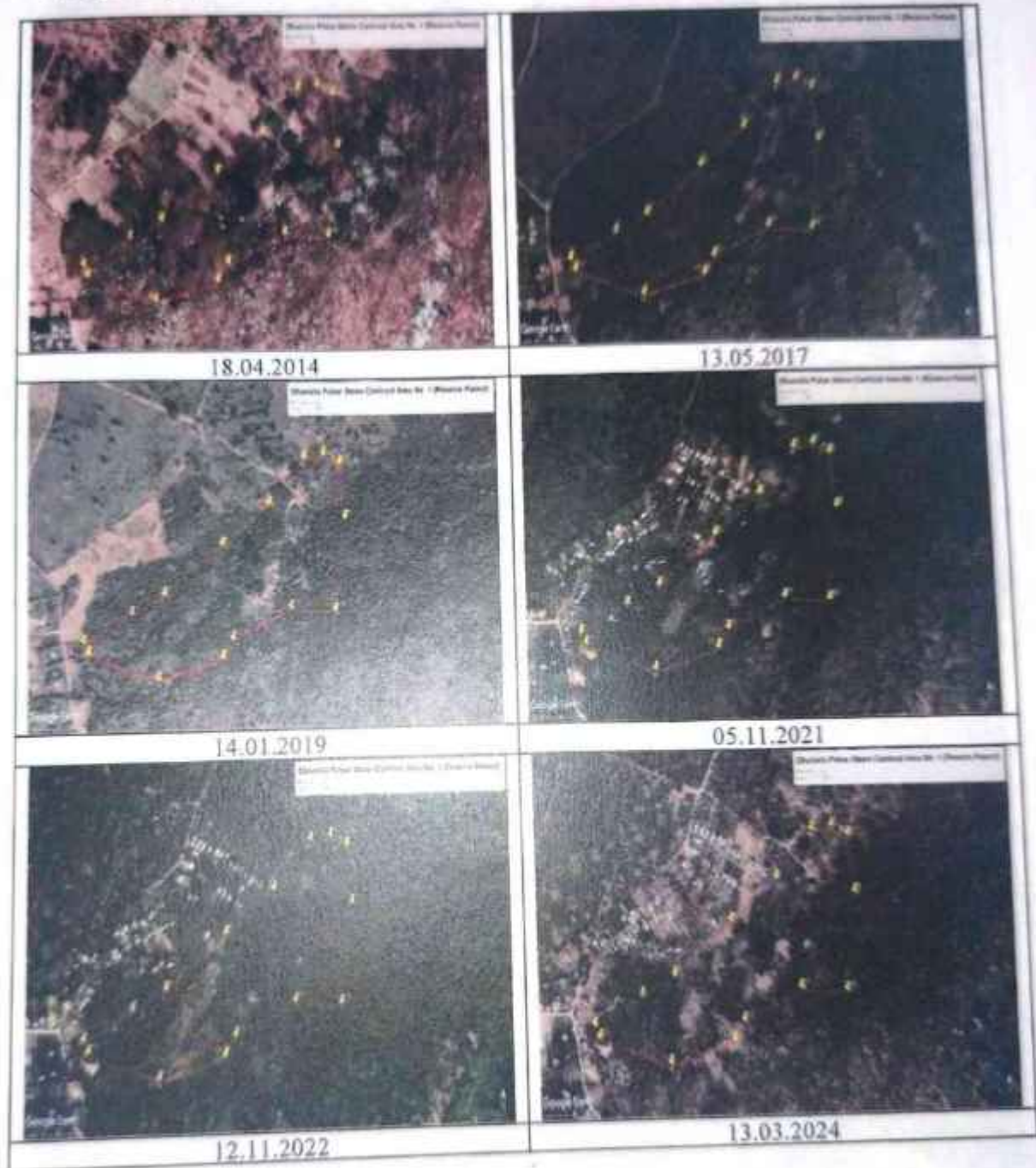
KML (Coordinates) site



Dhansila Pahar Stone Contract Area No. 1 (Reserve Forest), Lease Area: 13.41 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.6, S. No 4

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

223



Handwritten signature and some illegible text.

Site Visit Photographs



10.11.2024



10.11.2024



10.11.2024



10.11.2024

KML (Coordinates) site



13.03.2024

Minerals: Sand, Stone and Brick Earth

71
 জা. সংরক্ষণ এলাকা
 জাতীয় সংরক্ষণ
 National Forest Office
 Nagaon Dist. Assam

Dhansila Pahar Stone Contract Area No. 2 (Reserve Forest), Lease Area: 12.74 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.6, S. No 5

Google Image (different time scale with date)



Site Visit Photographs



10.11.2024



10.11.2024



10.11.2024



10.11.2024

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

226



Dhul Pahar Stone Contract Area (Reserve Forest), Lease Area: 5.22 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.6, S. No 6

Google Image (different time scale with date)



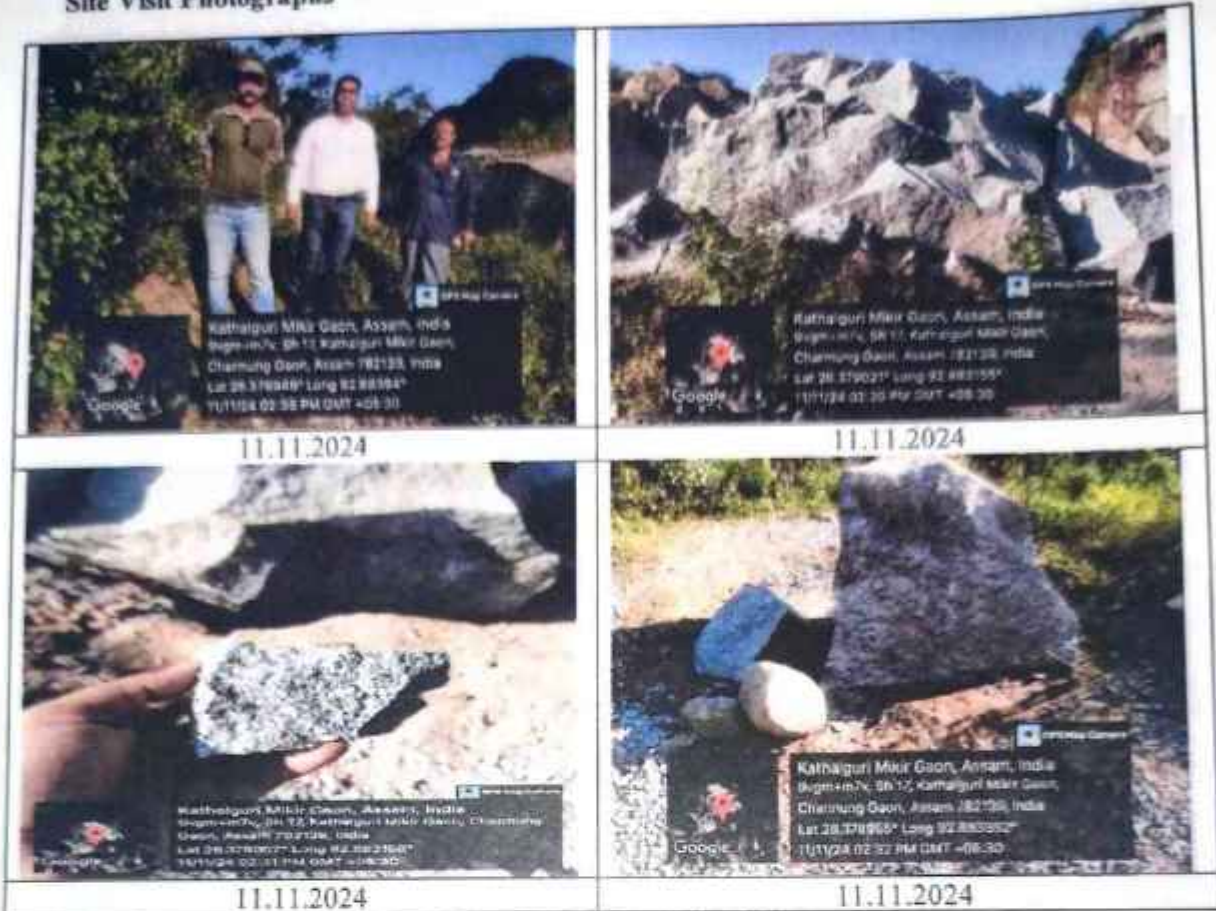
Minerals: Sand, Stone and Brick Earth

227

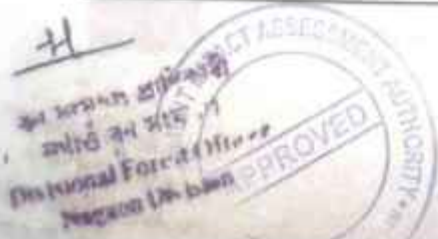
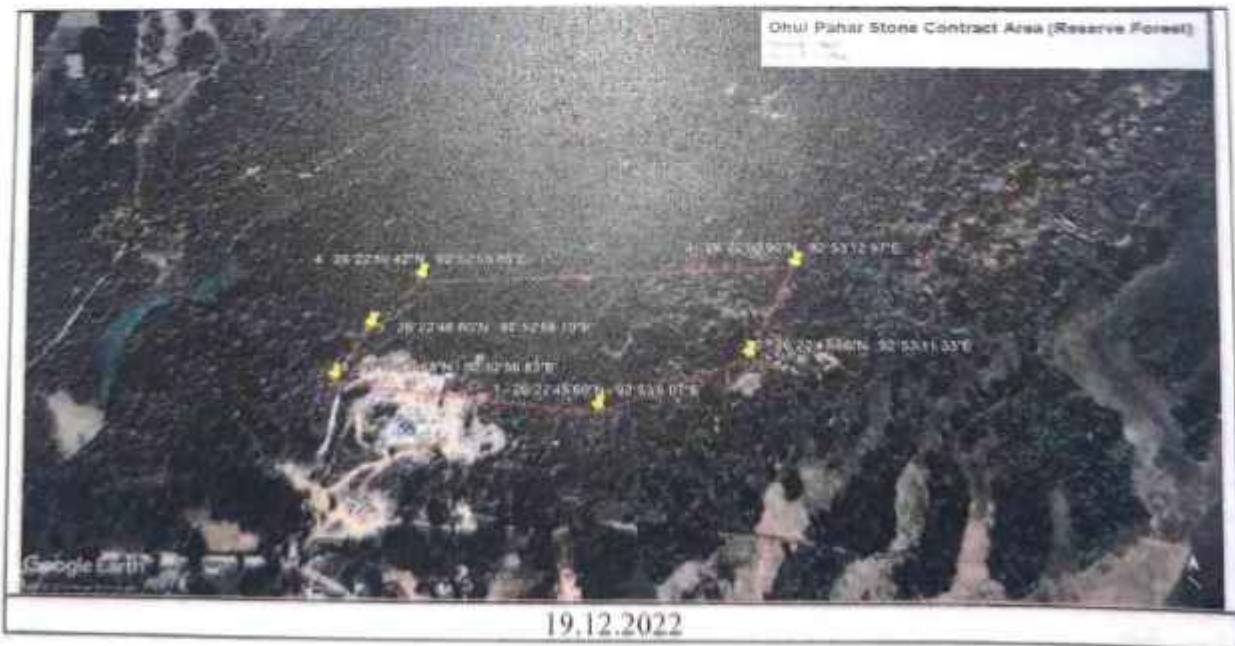


স্বাক্ষরিত
অতিরিক্ত সচিব,
জাতীয় পরিবেশ
সংরক্ষণ বোর্ড

Site Visit Photographs



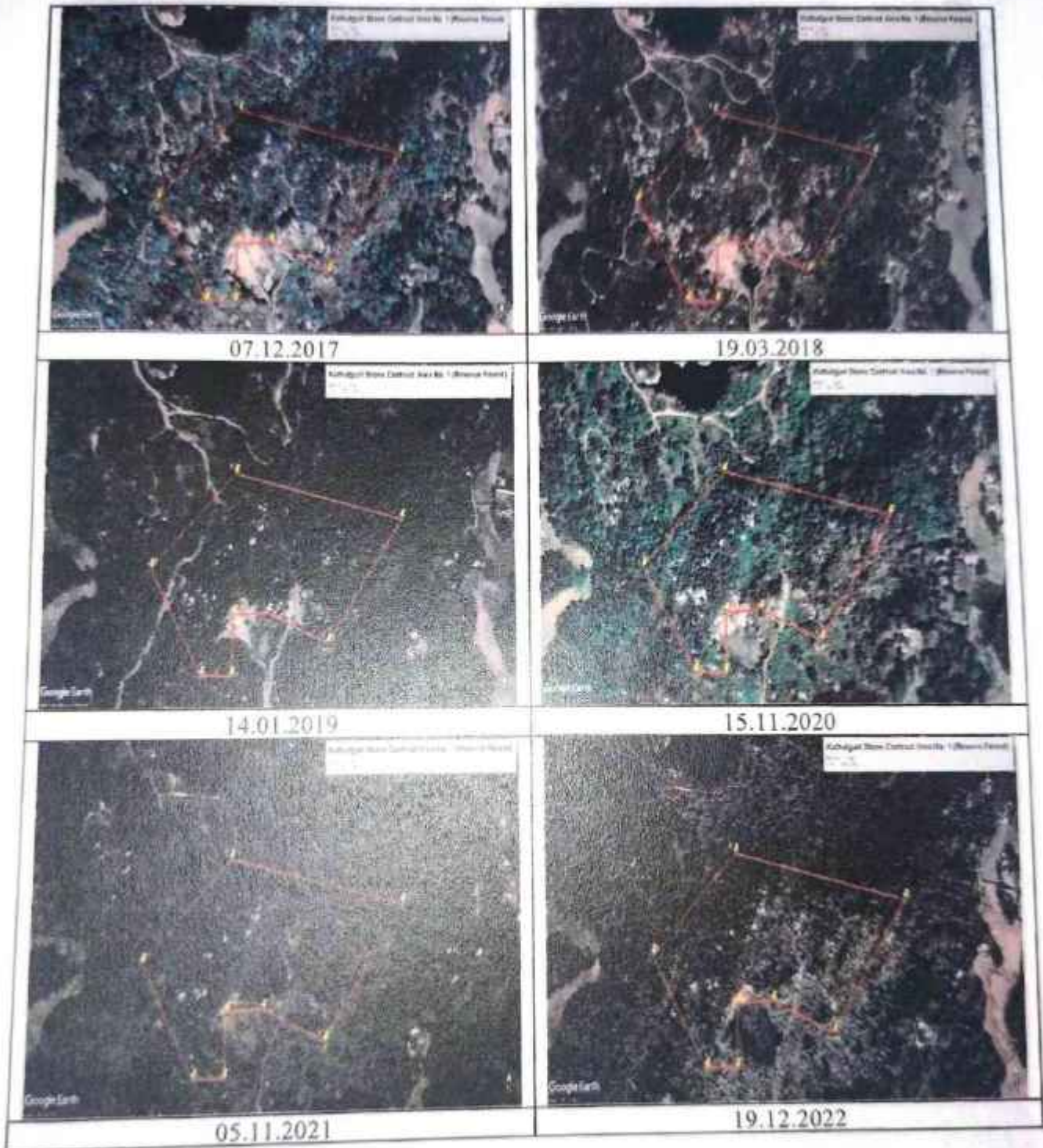
KML (Coordinates) site



Kathalguri Stone Contract Area No. 1 (Reserve Forest), Lease Area:10.00 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.6, S. No 7

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

229



Site Visit Photographs



11.11.2024



11.11.2024

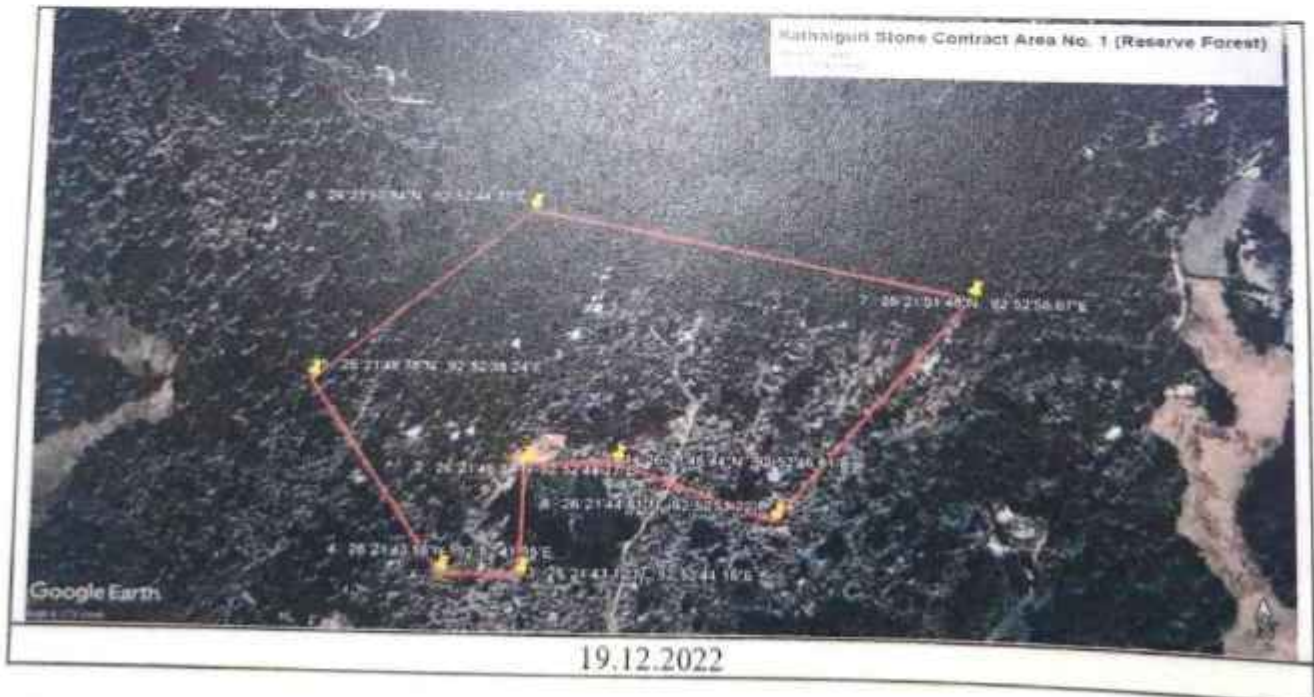


11.11.2024



11.11.2024

KML (Coordinates) site

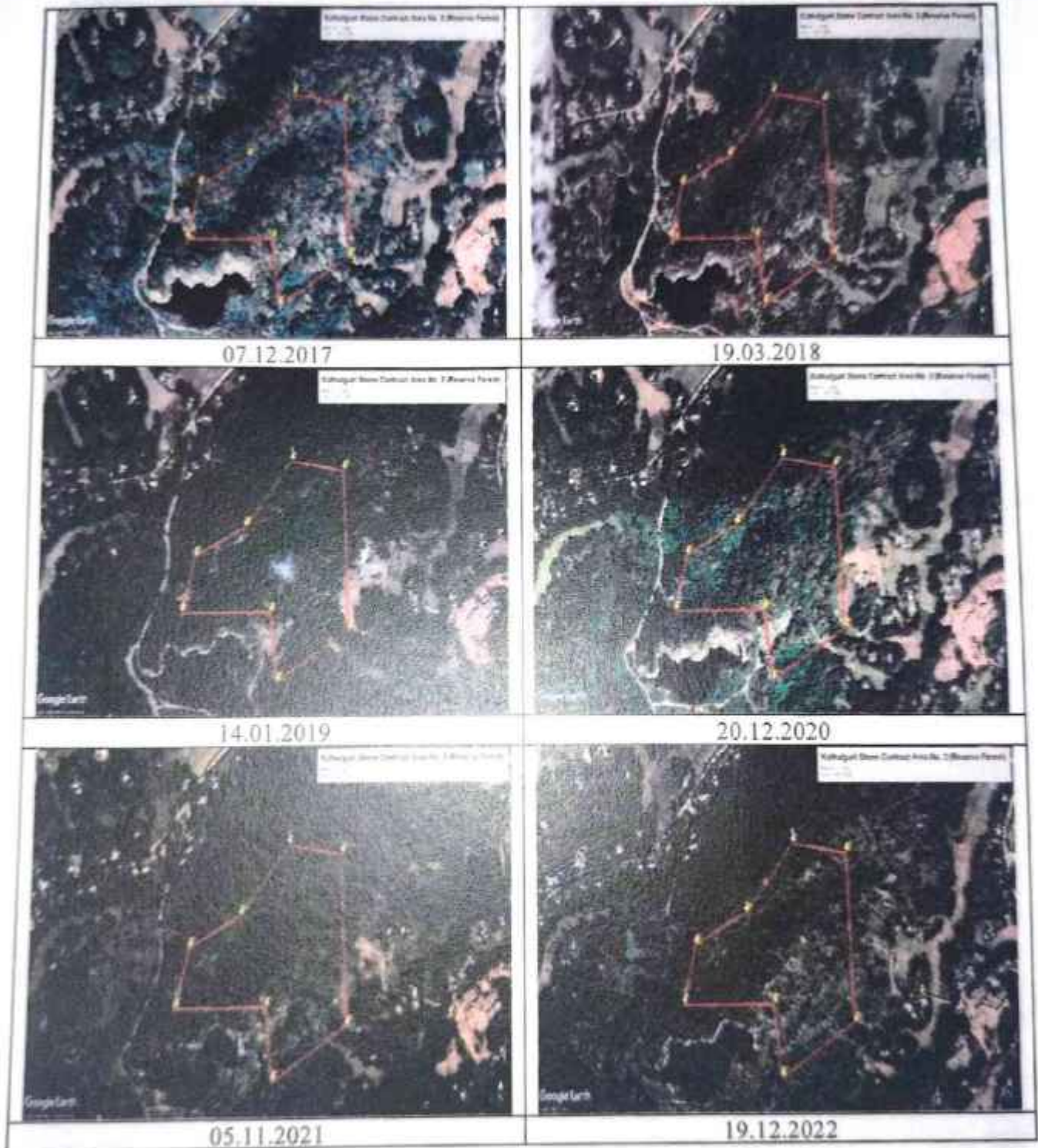


Minerals: Sand, Stone and Brick Earth

Handwritten signature and text in Assamese script.

Kathalguri Stone Contract Area No. 2 (Reserve Forest), Lease Area: 10.00 Ha.**Mine Lease Reference in Chapter 3 of DSR: Table 3.6, S. No 8**

Google Image (different time scale with date)



Site Visit Photographs



11.11.2024



11.11.2024



11.11.2024




11.11.2024

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

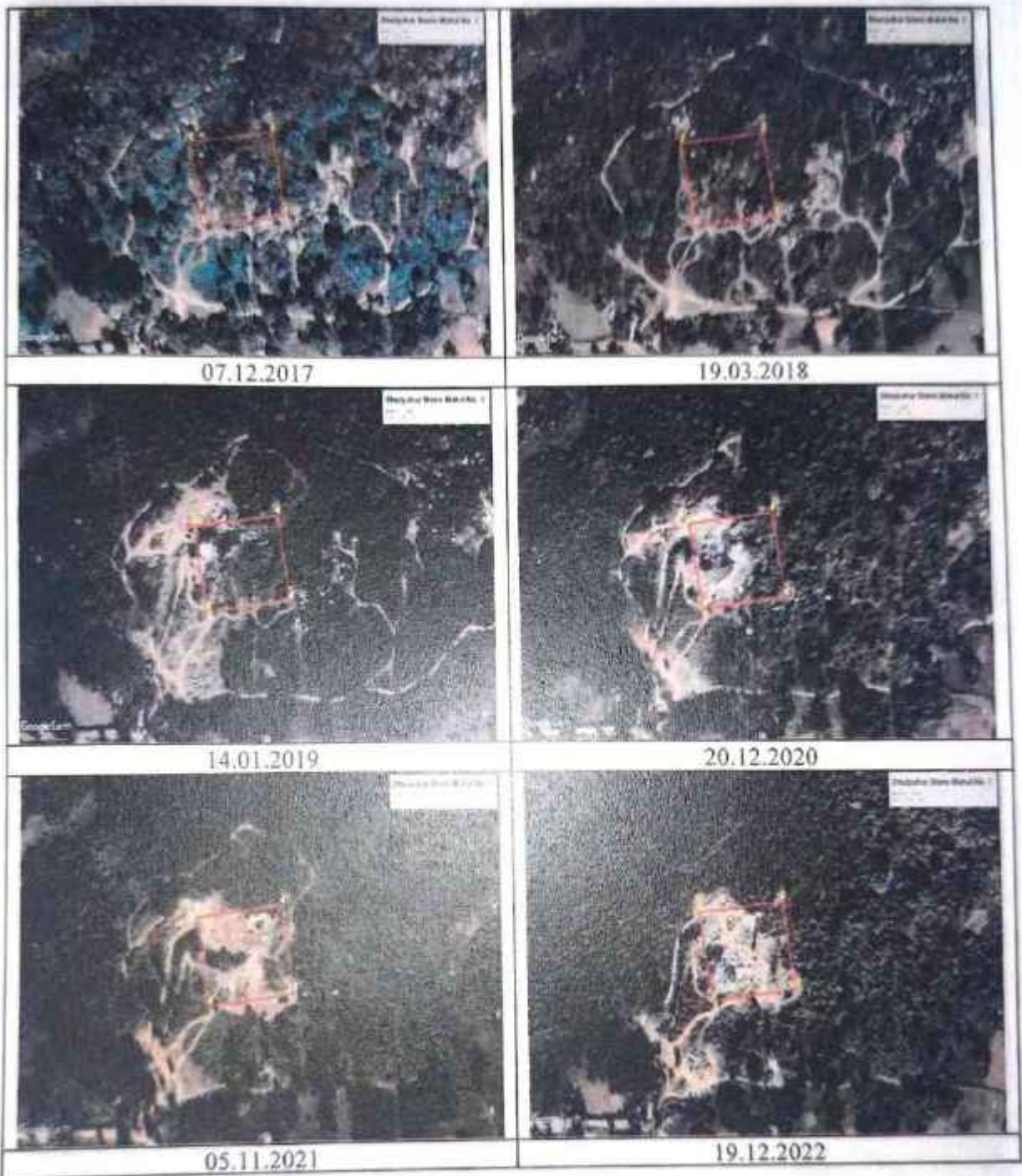
232


 Divisional Forest Officer
 Nagaon, Assam

Dhulpahar Stone Mahal No. 1, Lease Area: 1.00 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.7, S. No 7

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

233



Handwritten signature and date: 21/12/2022

Site Visit Photographs



KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth



Tapatjuri Stone Mahal No. 1, Lease Area: 1.88 Ha,

Mine Lease Reference in Chapter 3 of DSR: Table 3/7, S. No 8

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

235



Handwritten signature and text in Assamese script, including the name 'Divyanshu Kumar' and the date '13.03.2024'.

Site Visit Photographs



11.11.2024



11.11.2024



11.11.2024



11.11.2024

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

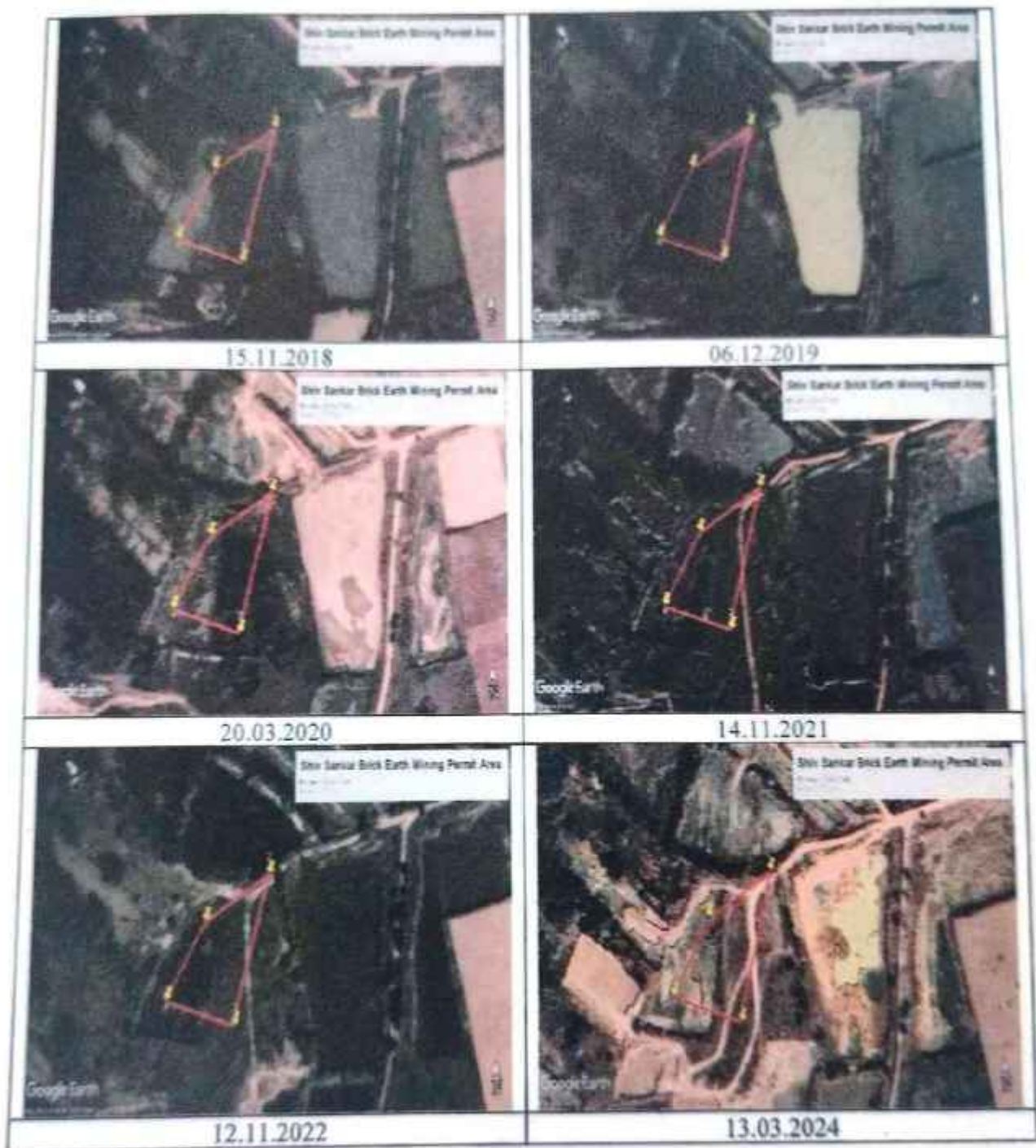
236

Handwritten signature and text in Assamese script, including the words 'National Forest Officer' and 'Nagaon District'.

Shiv Sankar Brick Earth Mining Permit Area, Lease Area: 0.37 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.8, S. No 9

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

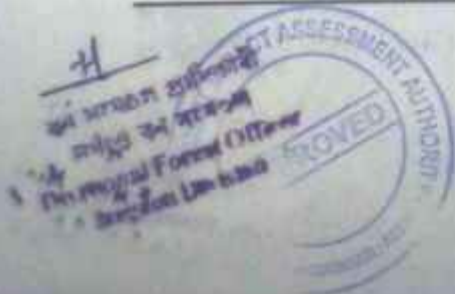
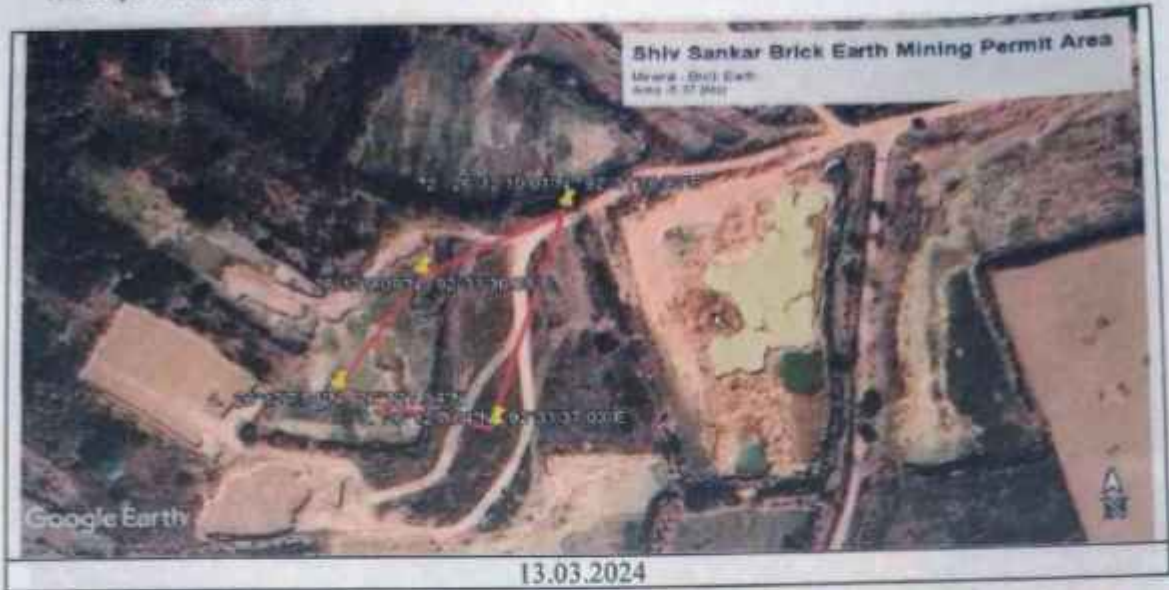
237



Handwritten signature and text: "H. K. SAHA" and "Divisional Forest Officer, Nagaon District".

Site Visit Photographs

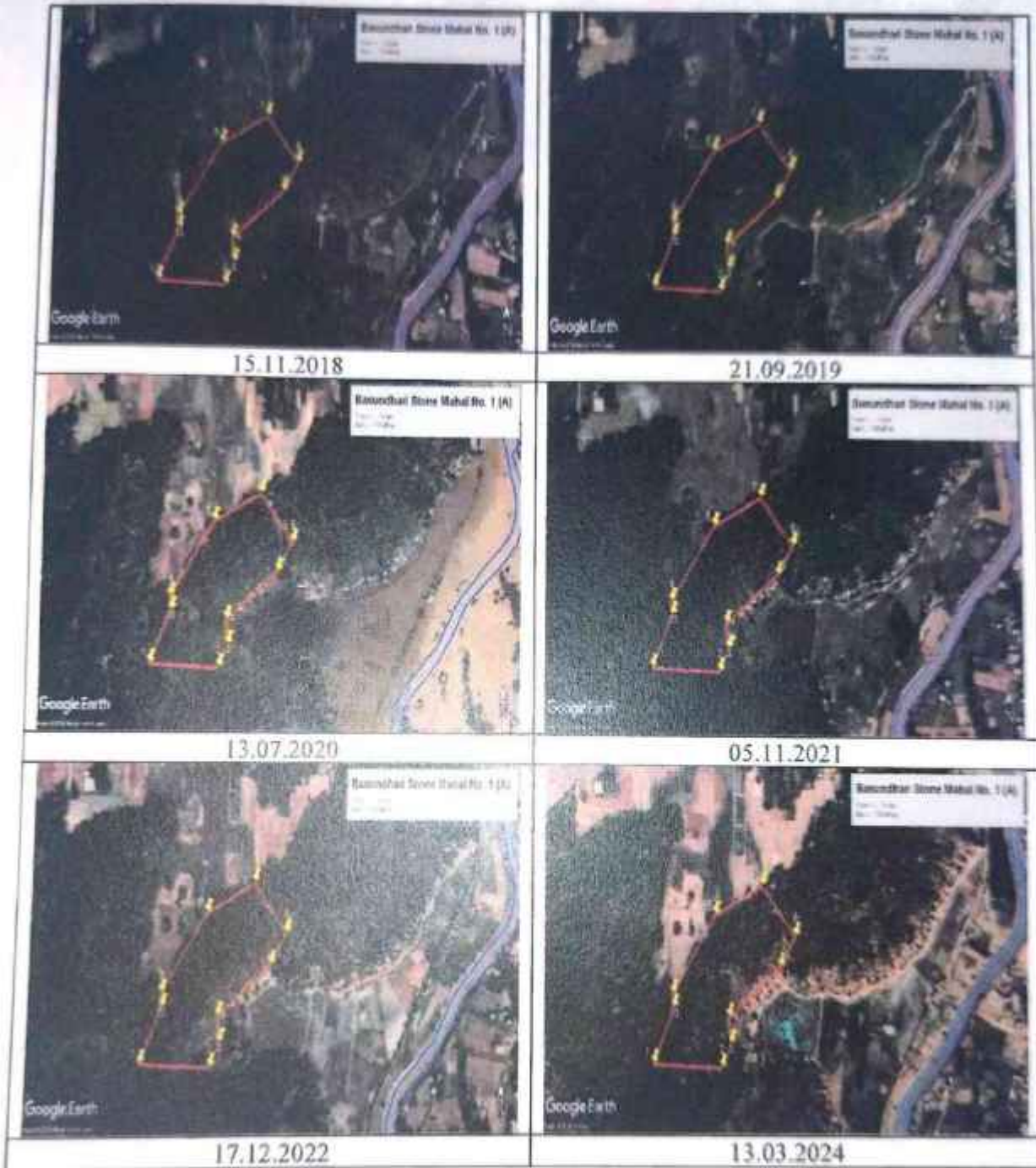
KML (Coordinates) site



Basundhari Stone Mahal No. 1 (A), Lease Area: 7.6 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.9, S. No 5

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

239



Site Visit Photographs

KML (Coordinates) site



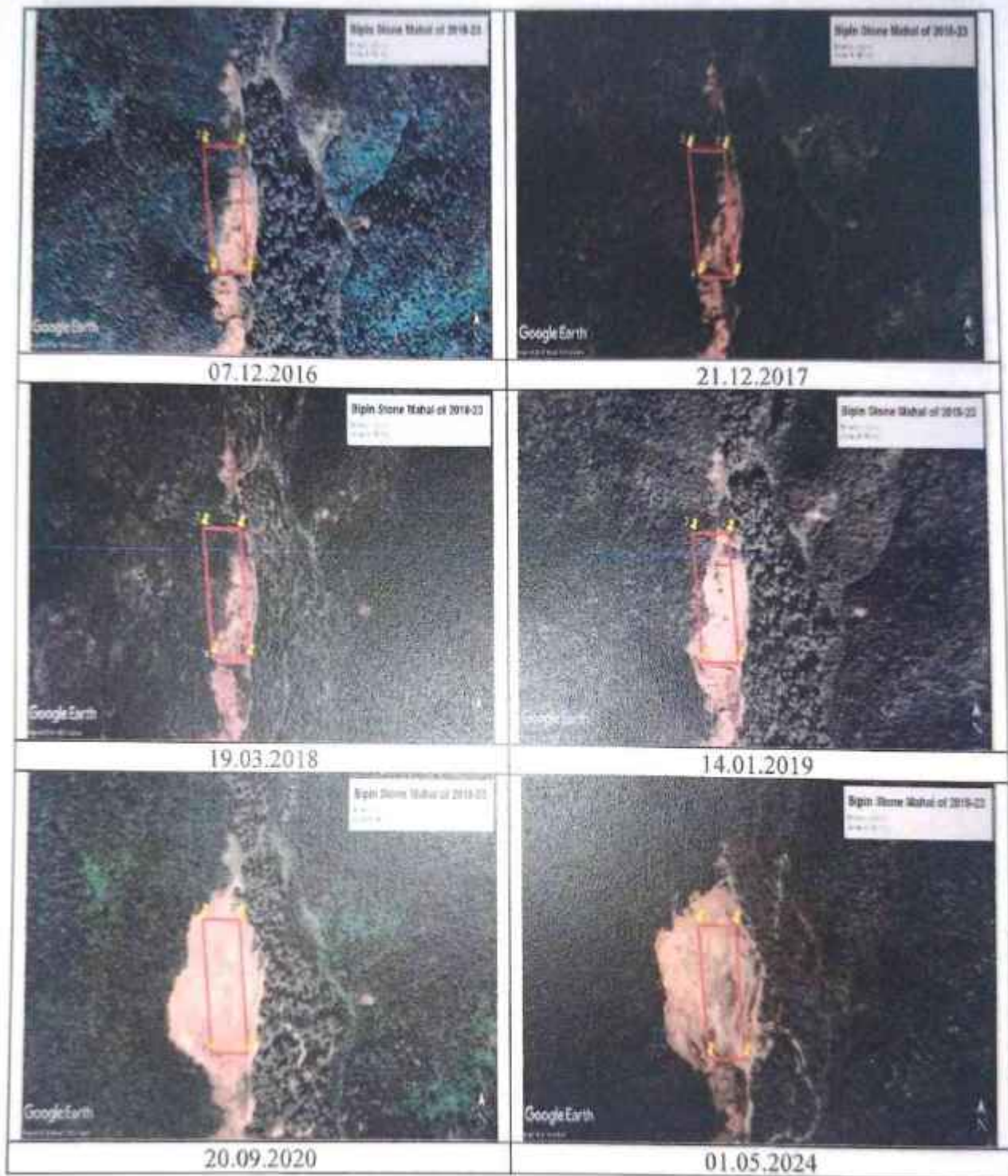
Handwritten signature and official stamp of the District Survey Office, Nagaon. The stamp includes the text 'DISTRICT SURVEY OFFICE' and 'APPROVED'.

Minerals: Sand, Stone and Brick Earth

Bipin Stone Mahal of 2018-23, Lease Area: 1.0 Ha.

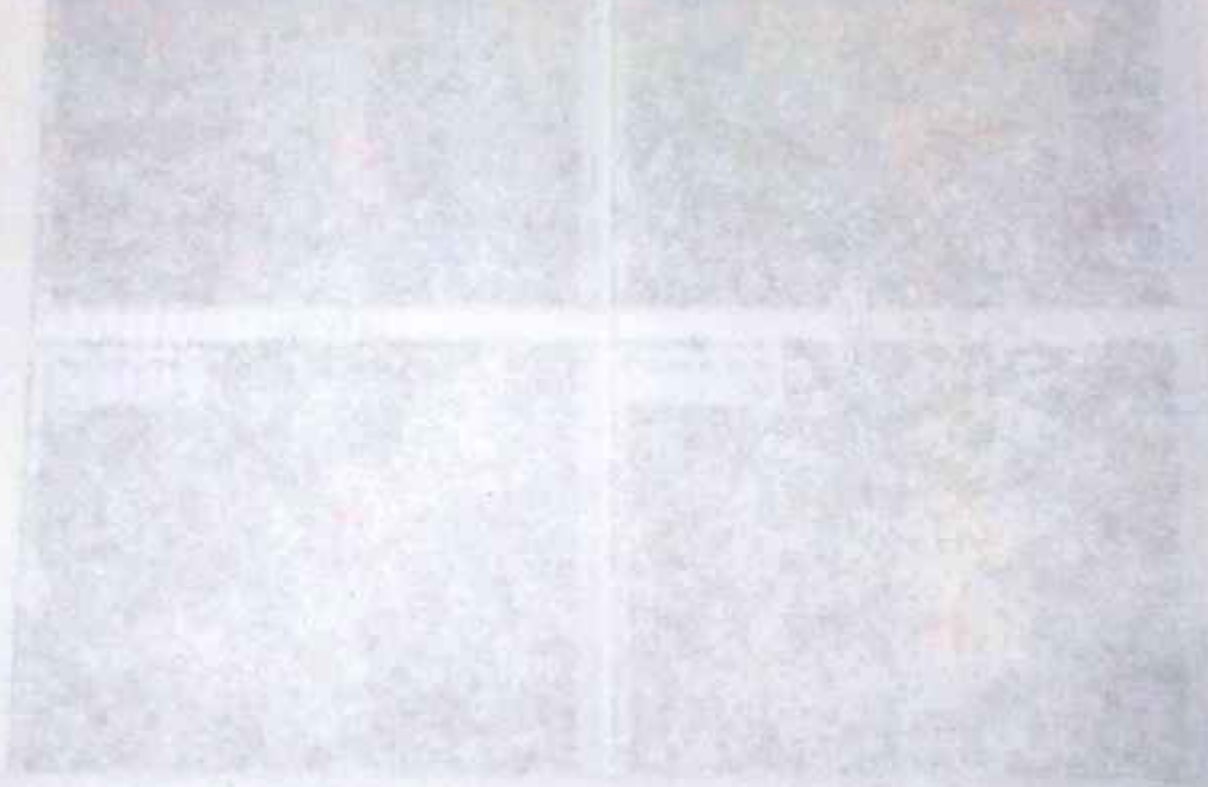
Mine Lease Reference in Chapter 3 of DSR: Table 3.9, S. No 6

Google Image (different time scale with date)



Site Visit Photographs

KML (Coordinates) site



॥
সহকারী পরিচালক
সিটিং ফিল্ড অফিসার
Divisional Forest Officer
Nagaon (A. S. D.)

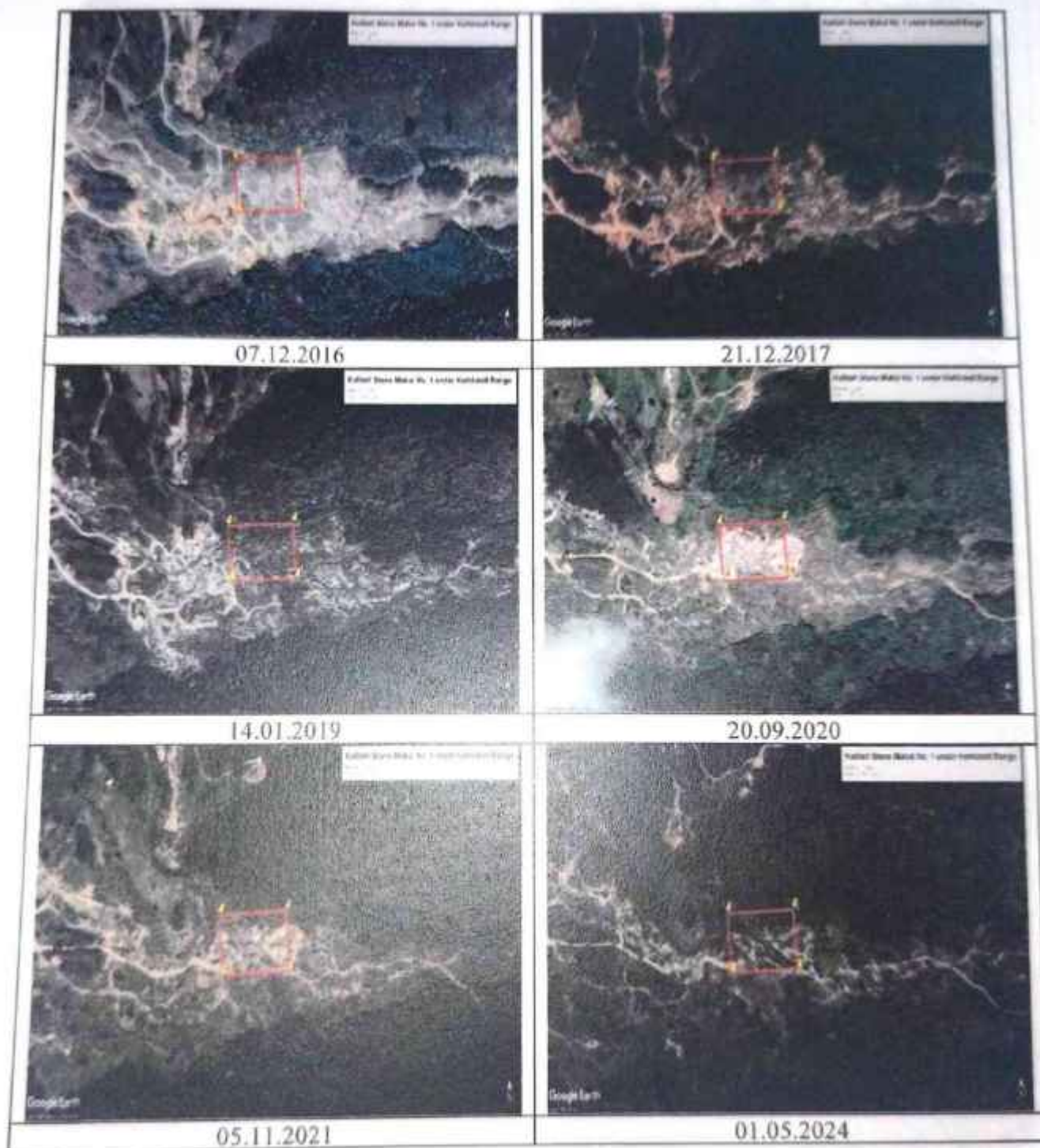
IMPACT ASSESSMENT
APPROVED

Minerals: Sand, Stone and Brick Earth

Kafitoli Stone Mahal No. 1 under Kothiatoli Range, Lease Area: 1.00 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.9, S. No 7

Google Image (different time scale with date)



Minerals: Sand, Stone and Brick Earth

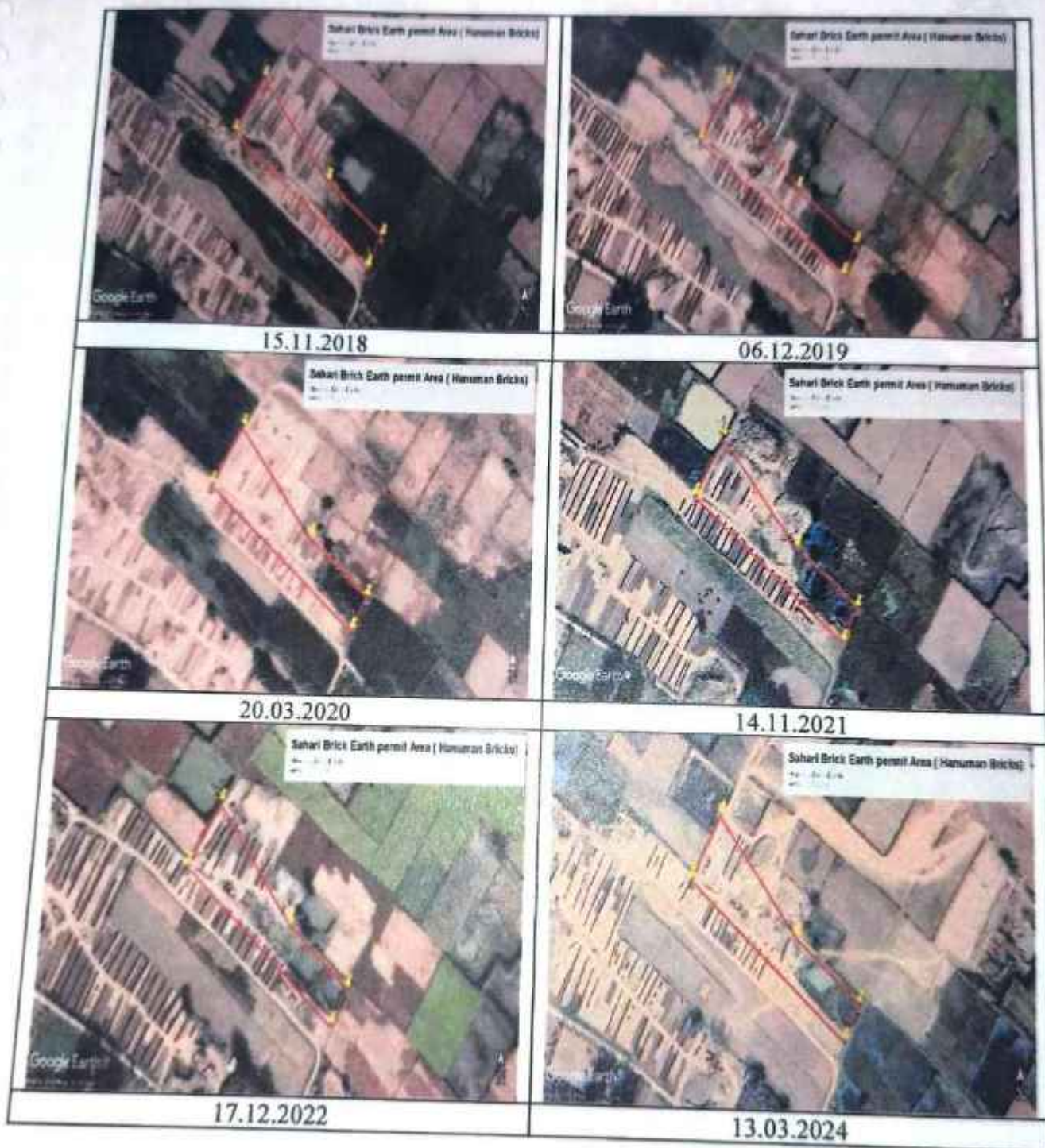
243



Sahari Brick Earth permit Area (Hanuman Bricks), Lease Area: 0.7 Ha.

Mine Lease Reference in Chapter 3 of DSR: Table 3.10, S. No 8

Google Image (different time scale with date)



Handwritten signature and text in Assamese script.

Site Visit Photographs

KML (Coordinates) site



Minerals: Sand, Stone and Brick Earth

246

**SITE VISIT PHOTOGRAPHS BY
THE MEMBERS OF DISTRICT DSR
COMMITTEE**

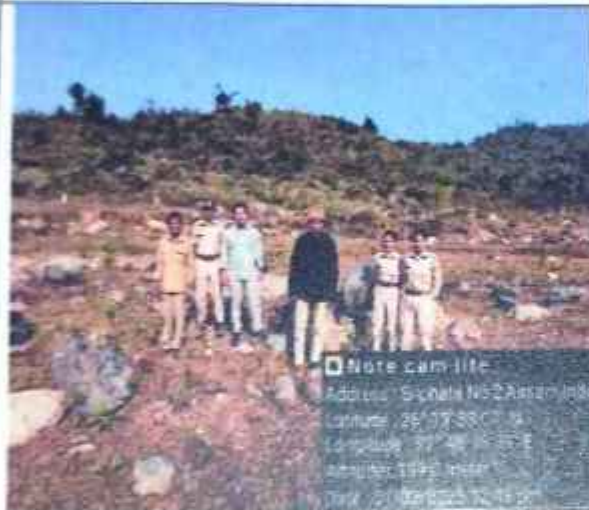


SITE VISIT BY DSR COMMITTEE- NAGAON

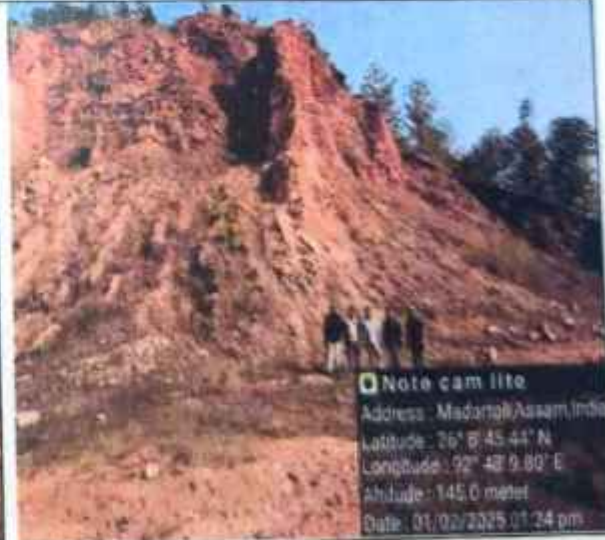
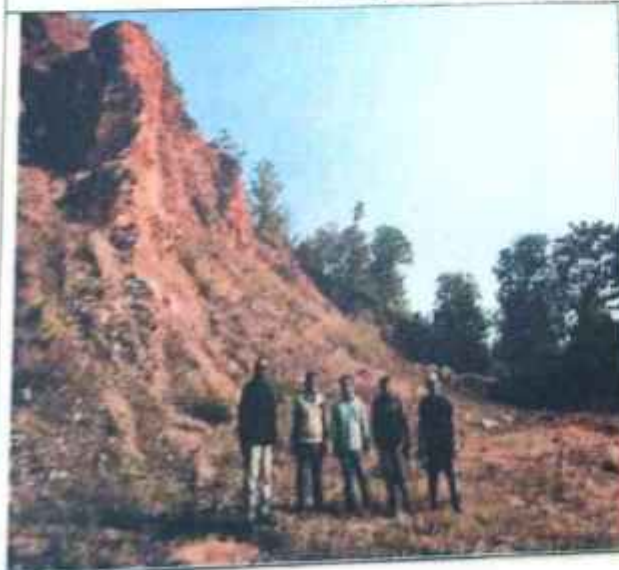
Tapatjuri Stone Quarry 1.0 Ha under Kathiatoli Range



Kafitoli Stone Quarry 1.0 Ha under Kathiatoli Range



Bheluguri Stone Mahal under Kathiatoli Range



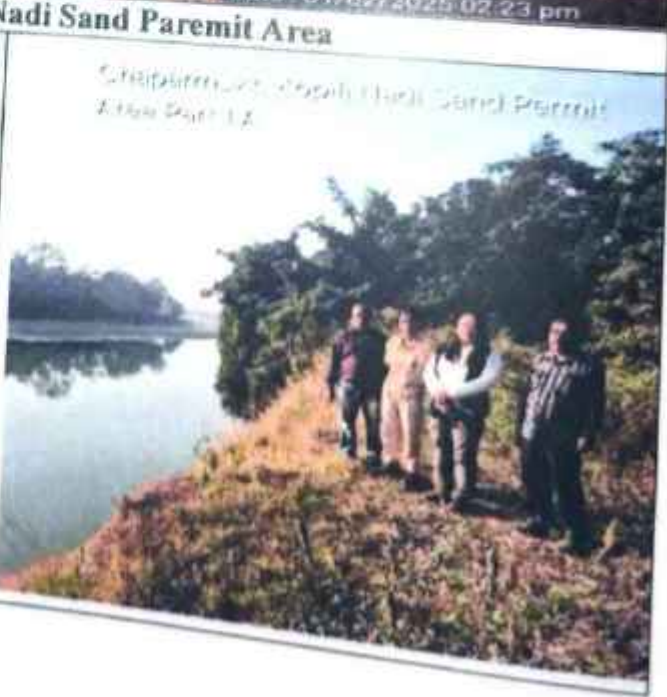
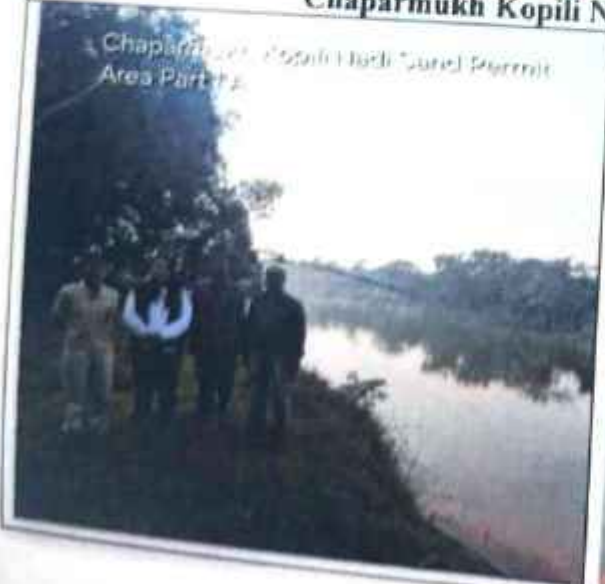
Beldanga Stone Mahal under Kathiatoli Range



Lankajuri Stone Mahal under Kathiatoli Range

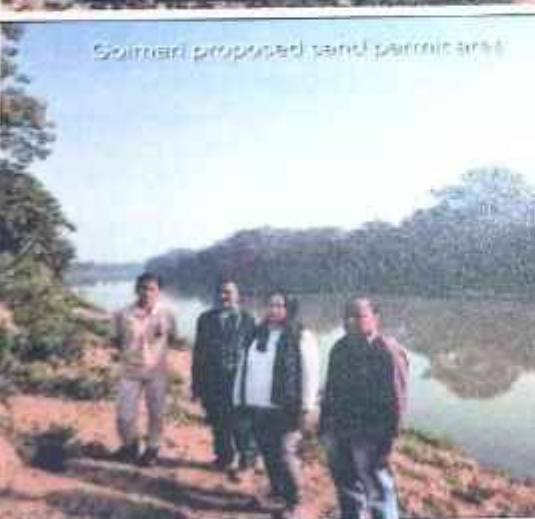
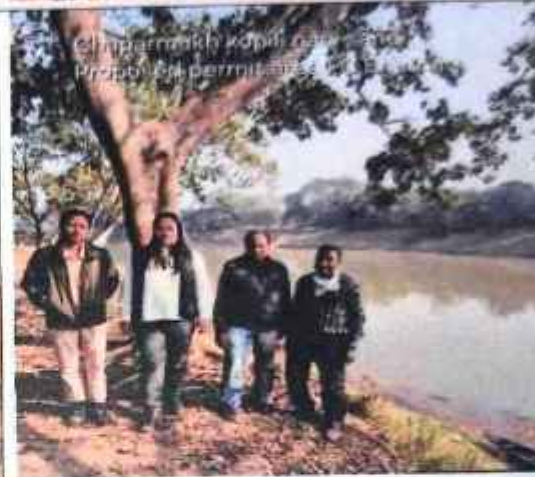


Chaparmukh Kopili Nadi Sand Paremit Area



Minerals: Sand, Stone and Brick Earth

SITE VISIT BY DSR COMMITTEE- NAGAON



অসম চৰকাৰ
 অধিকাৰী
 অসম চৰকাৰ
 অসম চৰকাৰ
 অসম চৰকাৰ
 অসম চৰকাৰ

SITE VISIT BY DSR COMMITTEE- NAGAON



Dholpahar Stone



Ghuronia pahar



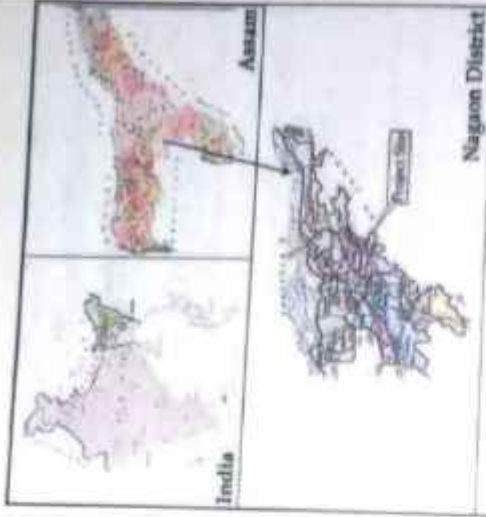
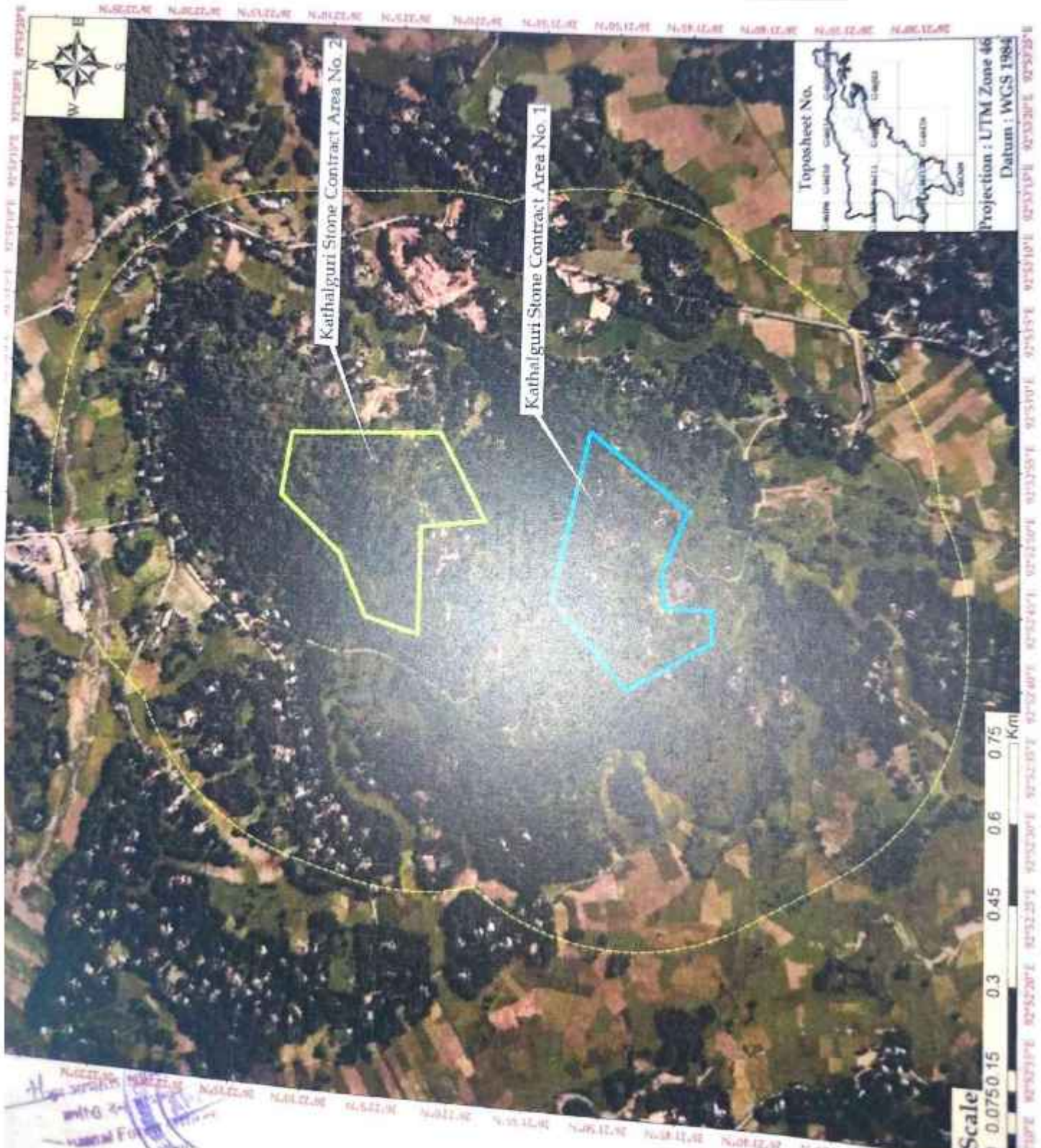
Laalpahar Plot 2



Laalpahar Plot 1

CLUSTER MAPS





Legend

- 500 mtr Cluster Boundary
- Kathalguri Stone Contract Area No. 2
- Kathalguri Stone Contract Area No. 1

**KATHALGURI STONE CONTRACT
 AREA NO. 1 & 2 (RESERVE FOREST)
 DISTRICT : NAGAON, ASSAM
 (TOTAL AREA ALLOTTED : 20.00 HECTARES)**

CLUSTER MAP - STONE MINE

Prepared by
Gaheli Environmental Laboratory

TRANSPORTATION MAPS






Legend

- Transportation Route
- Project Site
- River

CHAPAMUKH-KOPILINODI BASUNJAN
SUBHETA SAND PERMIT AREA IN
(REVENUE PORTION)
DISTRICT: NAGAOON, ASSAM
(TOTAL AREA ALLOTTED: 2.00 HECTARES)

TRANSPORTATION ROUTE MAP

Prepared by
 Gabhell Environmental Laboratory
 34



Toposheet No. 86C/25
 Projection: UTM Zone 48
 Datum: WGS 1984



**MINOR MINERALS OTHER THAN
RIVER BED MINING
(STONE & BRICK EARTH)**



CHAPTER 7: SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT (SOURCE: DISTRICT REPORT OF CGWB-NAGAON)

7.1 SURFACE WATER SOURCES

Its major rivers include the Brahmaputra, Kalong, Sonai, Nanoi, Jamuna, Kopili and the Barapani. There are several beels, marshy lands and swamps; these are abandoned channels of the Kalong and the Kopili rivers. These are the Marikalong, Potakalong, Haribhanga, Jongalbalahu, Samoguribeel, Urigadang and the Nawbhanga. These beels are major unused resources of the district. There are about two hundred numerous marshy lands here.

Together with Morigaon district, it has the shape of a broken dish. The north and the south are uplands. The general slope of the district is towards the west. The eastern, north eastern and the south eastern parts are hilly terrains. The major river is the Kalong which divides the town into two halves - Haibargaon and Nagaon. Haibargaon slopes down towards the west and then to the south west towards the Sonai. Nagaon slopes down first towards the south east and then southwards to the beels and then towards Kalong.

7.2 GROUND WATER SOURCES

Nagaon district has 25 numbers of Ground Water Monitoring Stations (GWMS). Monitoring of water levels is being carried out periodically four times in a year to observe any change in water level, in both space and time i.e. four times a year. First set of measurement is taken during pre-monsoon period (March 1st to 10th), second set is being taken during peak monsoon (August 20th to 30th), third measurement is taken during post-monsoon (November 1st to 10th) and last set is being taken during January 1st to 10th.

In Nagaon district stage of ground water development is 39 %, which shows under the SAFE category. As long-term water level trend does not show any major change so the whole district may be considered as SAFE.

In view of ground water development the district shows occurrence of enough ground water resources for the domestic and irrigation purposes. Older alluvium of fine sand and sandy clay to a maximum depth of about 20 mbgl and semi-confined to confined conditions in the deeper aquifer are potential for tapping by medium/heavy duty deep tube wells. In Younger alluvium ground water can be extracted by means of open wells and small diameter tube wells for both domestic and irrigation purposes. The estimated gross annual dynamic groundwater resource is 204957.45 ham while a net ground water resource is 184461.71 ham.

Minerals: Sand, Stone and Brick Earth

The stages of development are 39%. Thus, there is much scope for the development of ground water by way of constructing ground water abstraction structures in a planned way for profitable ground water development.

7.3 DEPTH TO WATER LEVEL

Water table generally rests within 4 to 6m of land surface in the greater part of the district. The depth to piezometric surface more or less coincides with the water table in the Kalang sub-basin and is thus generally within 6m from ground surface. However, in the Kopili sub-basin that is, in the southern part of the district it is variable from 0.5 to 14.0 m below ground surface and in certain localized areas around Hojai- Doboka and Nilbagan artesian conditions prevail indicating thereby that the piezometric surface lies above land surface.

CHAPTER 13: LIST OF LETTER OF INTENT (LOI) HOLDERS IN THE DISTRICT ALONG WITH ITS VALIDITY AS PER THE FOLLOWING FORMAT

Table 13.1: List of Letter of Intent (LOI) Holders in the district along with its validity

Sr. No	Name of the Mineral	Name of Lessee	Address and contact no of LOI holder	LOI grant order Date	Area of Mining lease to be allotted	Validity of LOI	Use (Captive / Non captive)	Location of lease	Latitude	Longitude
1.	Stone	Imdad Ali	H. No. 11, Purbanchal Path, Mathum Nagar, Dispur, Guwahati-06, Assam	29.09.2021	5.0 Ha.	5 years	Non captive	District- Nagaon, Assam	26°09'2.73"	92°49'33.89"
2.	Stone	The Divisional Forest Officer	The Divisional Forest Officer, Nagaon Forest Division, Nagaon, Assam	LOI not available	13.41 Ha	-	Non captive	Raja gaon & Panditghat, PO: Kamrup, District- Nagaon, Assam	26° 1'52.61" N 26° 1'54.44" N 26° 1'55.69" N 26° 1'59.06" N 26° 2'1.78" N 26° 2'4.89" N 26° 2'5.12" N 26° 2'4.49" N 26° 2'0.78" N	92°36'51.23"E 92°36'55.59"E 92°36'58.58"E 92°37'3.89"E 92°37'8.16"E 92°37'11.51"E 92°37'13.36"E 92°37'14.85"E 92°37'15.28"E

Minerals: Sand, Stone and Brick Earth

District Survey Report

Nagaon District, Assam State

	Biswajit Bank	Christampatty, P.O. Nagaon, District: Nagaon, Assam	available				captivity	Gaon, PO: Kothalguri, & P.S. Samaguri District- Nagaon, Assam	26°22'46.99"N 26°22'47.36"N 26°22'44.48"N	92°52'58.10"E 92°52'09"E 92°52'67"E
6.	Stone	The Divisional Forest Officer	LOI not available	1.0	-	Non captive		Titajuri Gaon, PO: Nilukazi, & P.S. Samaguri District- Nagaon, Assam	26°13'34.07"N 26°13'34.24"N 26°13'31.54"N 26°13'31.37"N	92°48'13.34"E 92°48'17.67"E 92°48'17.94"E 92°48'13.62"E
7.	Stone	The Divisional Forest Officer	LOI not available	10.0	-	Non captive		Kothalguri Milkir gaon, Nilapani & Loongsoong Gaon, PO: Kothalguri, P.S.- Kollabot, District- Nagaon, Assam	26°21'46.44"N 26°21'46.34"N 26°21'43.12"N 26°21'43.16"N 26°21'48.78"N 26°21'53.84"N 26°21'51.48"N 26°21'44.81"N	92°52'46.81"E 92°52'44.27"E 92°52'44.16"E 92°52'41.95"E 92°52'38.24"E 92°52'44.37"E 92°52'56.67"E 92°52'51.22"E

Minerals: Sand, Stone and Brick Earth



District Survey Report

Nagaon District, Assam State

8.	Stone	The Divisional Forest Officer	The Divisional Forest Officer, Nagaon Forest Division, Nagaon, Assam	LOI not available	10.0	Non captive	Kothalguri Mikir gaon, Nilapani & Loongjoong Gaon, PO: Kothalguri, PS.- Kollabor, District- Nagaon, Assam	26°22'2.91"N 26°22'6.46"N 26°22'8.36"N 26°22'12.58"N 26°22'12.01"N 26°22'1.78"N 26°21'58.56"N 26°22'2.93"N	92°52'41.10"E 92°52'42.41"E 92°52'46.81"E 92°52'50.91"E 92°52'55.55"E 92°52'56.10"E 92°52'49.70"E 92°52'49.11"E
9.	Stone	Jayanta Kr. Laskar	Village: Niz Narikali, P.O.; Niz Narikali, P.S. Kampur	LOI not available	10.0	Non captive	Tapatijuri gaon, PO: Bamuni & PS.- Samaguri, District- Nagaon, Assam	26°16'52.90"N 26°16'51.54"N 26°16'48.72"N 26°16'50.08"N	92°47'1.60"E 92°47'4.88"E 92°47'3.08"E 92°46'59.81"E
10.	Stone	-	-	LOI not available	1.0	Non captive	District- Nagaon, Assam	26°08'56.800"	92°47'53.700"
								26°09'01.975"	92°47'53.127"
								26°09'02.026"	92°47'50.877"
								26°08'56.851"	92°47'51.450"

Minerals: Sand, Stone and Brick Earth

Divisional Forest Officer
 Nagaon District, Assam

District Survey Report

Nagaon District, Assam State

11.	Brick Earth	Prasanta Saikin M/s Shiv Shankar Brick Field(Pro p. Rituparna Medhi)	Village- Chakial Gaon, P.O. Chaparmukh, District- Nagaon, Assam	-	0.37	Non captive	Chakial Gaon, P.O. Chaparmukh, P. S. Raha District- Nagaon,	26°12'09.09"	92°51'56.08"
								26°12'10.01"	92°51'58.02"
								26°12'07.04"	92°51'37.03"
								26°12'07.54"	92°51'34.95"



Minerals: Sand, Stone and Brick Earth

261

CHAPTER 14: TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

The district of Nagaon in Assam, India, is renowned for its abundant mineral reserve such as Stone Materials and Brick earth. These minerals have attracted significant attention from the mining industry due to their commercial value and various industrial applications.

Mineral exploration is a complex and continuous process that involves conducting surveys, analyzing geological data and assessing the quality and quantity of mineral deposits. As the nature of mineral reserves is often governed by local faults, and other lithological factors, it requires thorough examination and evaluation of geological formations, rock samples, and geophysical surveys.



Figure 14.1 – Field photographs of Stone Materials

Table 14.1: Estimate of explored minor mineral resources in district in active leases

Mineral	Existing lease
	Available geological reserve
Brick Earth	-
Stone	25,00,000 Cu M

Table 14.2 - Summary of identified reserve of minor minerals

Mineral	Future block			Existing lease			Total available geological reserve
	Blocks	Area (in Ha)	Available geological reserve	Blocks	Area (in Ha)	Available geological reserve	
Brick Earth	2	1.07	3,610 Cu M	-	-	-	3,610 Cu M
Stone Materials	11	67.97	2,60,47,500 Cu M	1	5.0	25,00,000 Cu M	2,85,47,500 Cu M

CHAPTER 15: QUALITY/GRADE OF MINERAL AVAILABLE IN THE DISTRICT

The Directorate of Geology & Mining, Assam carried out extensive geological exploration works to identify the potential mineral deposits of Assam. Assam has bright scope of development of mining and mineral based industries. The Quality/Grade of mineral available in the Nagaon district are Sand, and Stone.

15.1 Sand

Sand is a mixture of small grains of rock and granular materials which is mainly defined by size. Being finer than gravel and coarser than silt, sand ranges in size from 0.06 mm to 5 mm.

- Coarse sand: Sand with particles that are between 2 mm and 4.75 mm in size
- Fine sand: Sand with particles that are between 0.425 mm and 0.075 mm in size

It is mainly made of silicate minerals and silicate rock granular particles. Typically, quartz is the most dominant mineral here as it possesses highly resistant properties to weather. It is also classified according to size:

- Fine Sand: All the sand particles should pass through No. 16 sieve. This is usually used in plastering works.
- Moderately Coarse Sand: All the sand particles should pass through No. 8 sieve. This type of sand is generally used for mortar and masonry works.
- Coarse Sand: All the particles should pass through No. 4 sieve. This type of sand is suitable for concrete work.

The sand available in the district is coarse to fine grained. The sand is used for filling purposes and other construction purposes.

15.2 Stone Materials

There are two main components. They are feldspar and quartz. Apart from these two other components such as amphiboles, mica etc. is present in small amounts. Its unique composition contributes to its strength, hardness, and resistance to weathering, making it a favored material for a range of construction purposes. Quality assessment of stone material involves considerations such as mineral composition, colour variations, density, and resistance to abrasion. Unlike some minerals or metals, stone material typically doesn't

adhere to standardized grading systems. However, quarrying sites may categorize stone material based on these attributes, providing consumers with options suited to specific applications. The geological processes that lead to the formation of stone material, involving the cooling and solidification of molten rock beneath the Earth's surface, contribute to its distinctive characteristics. Local dialects and traditions may influence the naming of specific types of stone material based on color, texture, or geological origin. The chemical composition of stone material varies, but it commonly includes minerals like quartz, feldspar, and mica. Geological studies and analyses conducted on samples from specific locations provide precise details on the mineral content and characteristics of stone material in a given area. There are no specific guidelines to assess the quality/grade for minor minerals hence it is not applicable.

CHAPTER 16: USE OF MINERAL

16.1 Use of Minerals

16.1.1 Sand

Sand is a key ingredient in concrete, asphalt, and other building materials for providing strength, mass, and stability to these materials. It's essential for modern infrastructure for construction purpose and creating good foundations for patios and pathways. Sand is used to fill roads, and is often mixed with salt to treat icy and snowy roads. Sand is used to make glass containers for food and drinks. Along with this, is used in sandpaper, computer and TV screens, fiber optics, fiberglass insulation, toothpaste, pigments in paints and sealants, and weather-resistant caulking.

16.1.2 Stone

Stone is used in construction, as aggregates, and for other purposes. It will cater the huge demand of stone materials in the construction activities of Nagaon district.

16.1.3 Brick earth

Brick Earth has become a very important mineral for the manufacturing of Bricks which contributes to the expansion of infrastructure in the society. It is used for earth filling and to make bricks, which are a key component in the construction of buildings, roads, and other infrastructure of residential, commercial, industrial, and public buildings. It is responsible for preventing cracking, shrinking and warping of raw bricks. It also affects the durability of bricks.

CHAPTER 17: DEMAND AND SUPPLY OF THE MINERAL IN THE LAST THREE YEARS

17.1 Sand

The total sand estimated for the year 2024-25 (upto Oct 2024) is 7800.50 Cu.M. Sand production exhibited a notable increase, starting from 27974.57 CuM in 2019-20, escalating to 69354.115 CuM in 2023-24. The trend indicates a consistent increase in production.

17.2 Stone

Stone production has estimated for the year 2024-25 (upto Oct 2024) is 37780.192 Cu.M. Stone production exhibited a notable increase, starting from 34456 CuM in 2019-20, escalating to 124697.216 CuM in 2023-24. The trend indicates a consistent increase in production.

17.3 Brick Earth

Brick Earth production has estimated for the year 2023-24 is 124250 Cu.M. Brick Earth production exhibited a notable increase, starting from 7000 CuM in 2019-20, escalating to 68107 CuM in 2022-23. The trend indicates a consistent increase in production.

CHAPTER 18: MINING LEASES MARKED ON THE MAP OF DISTRICT

All the leases present in the district are marked on map given below:

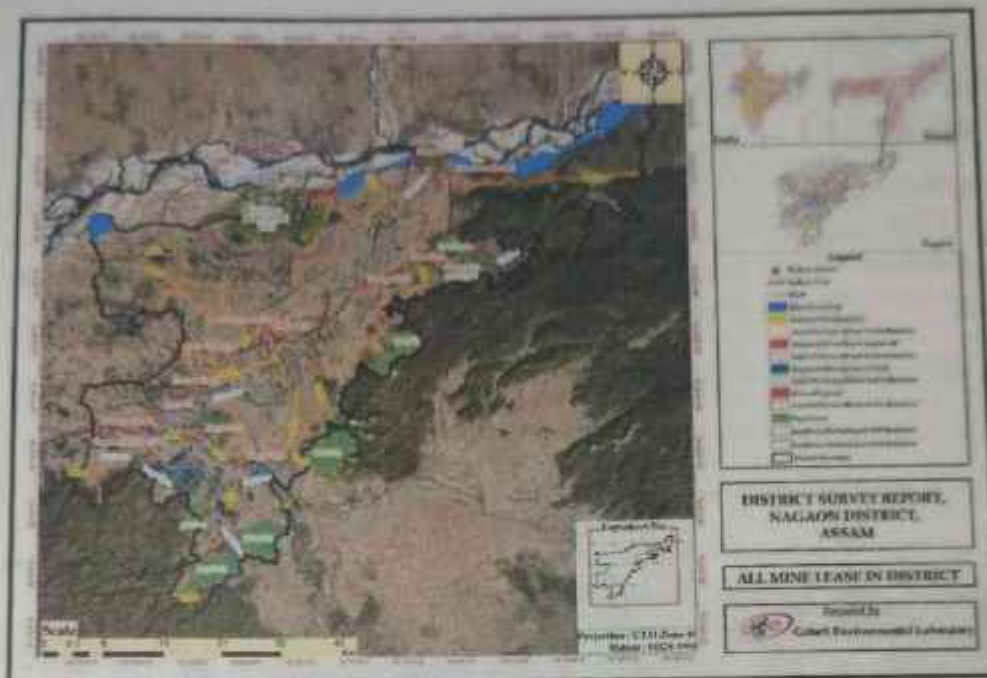


Figure 18.1: Mining Lease of Nagaon District (Google Image)

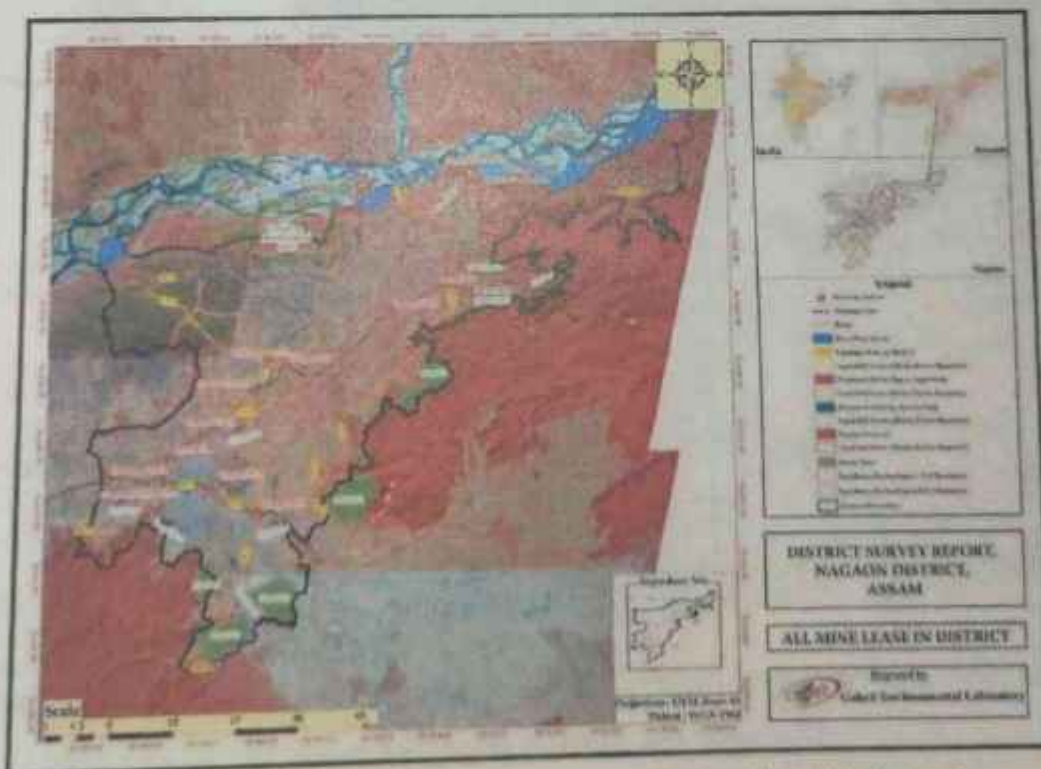


Figure 18.2: Mining Lease of Nagaon District (Satellite Image)

CHAPTER 19: DETAILS OF THE AREA OF WHERE THERE IS A CLUSTER OF MINING LEASES VIZ. NUMBER OF MINING LEASES, LOCATION (LATITUDE AND LONGITUDE)

19.1 Details of the area of where there is a cluster of mining leases viz. number of mining leases location

Cluster means a group of more than one mines formed when the distance between the peripheries of one lease is less than five hundred meters from the periphery of the other lease in a homogeneous mineral area. There is applicability of Cluster (Other lease within 500 meter radius) within Nagaon district.

The following mine leases are forming a Cluster:

1. Kathalguri Stone Contact Area No. 1 and Contact Area No. 2

The cluster map of the above mentioned leases are given below:



Figure 19.1: Cluster Map of Kathalguri Stone Contact Area No. 1 and Kathalguri Stone Contact Area No. 2 (Google Image)



Figure 19.2: Cluster Map of Kathalguri Stone Contact Area No. 1 and Kathalguri Stone Contact Area No. 2 (Satellite Image)

CHAPTER 20: Details of Eco-Sensitive Area, if any, in the District

20.1 Details of eco-sensitive area: Kaziranga National Park

Kaziranga National Park lies partly in Golaghat District and partly in Nagaon District of Assam. It is the oldest park in Assam covers an area of 430 Sq kms along the river Brahmaputra on the North and the Karbi Anglong hills on the South. The National Highway 37 passes through the park area and tea estates, hemmed by table-top tea bushes. One can even see the rhinos and wild elephants straying near the highway.

Kaziranga National Park a world heritage site is famous for the Great Indian one horned rhinoceros, the landscape of Kaziranga is of sheer forest, tall elephant grass, rugged reeds, marshes & shallow pools. It has been declared as National Park in 1974.

Kaziranga National Park is one of the last areas in eastern India undisturbed by a human presence. It is inhabited by the world's largest population of one-horned rhinoceroses, as well as many mammals, including tigers, elephants, panthers and bears, and thousands of birds.

Source: <https://nagaon.assam.gov.in/tourist-place-detail/220>

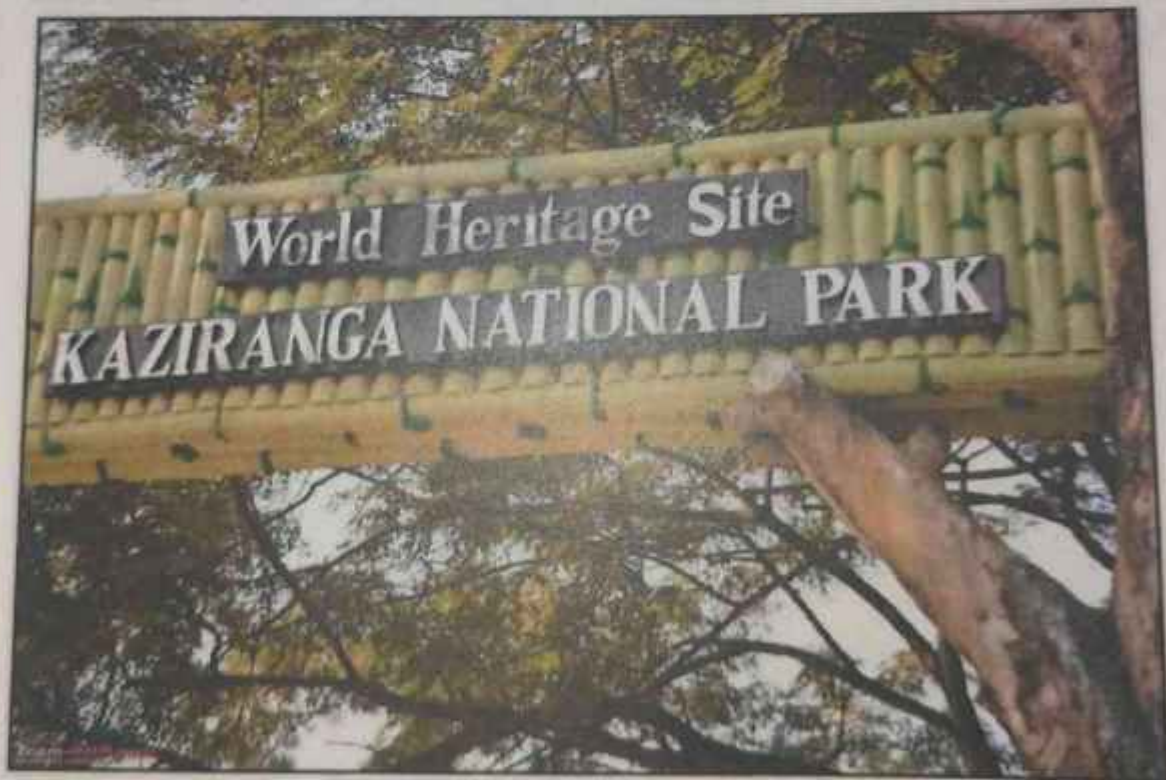


Figure 20.1: Kaziranga National Park

As per Minutes of 41st ESZ Expert Committee Meeting for the Declaration Of Eco-Sensitive Zone (ESZ) Around Protected Areas (Wildlife Sanctuaries/National Parks/Tiger Reserves) &

Minerals: Sand, Stone and Brick Earth

270

Zonal Master Plan (ZMP) Through Video Conferencing (VC) Held On 23rd To 24th June, 2020, ESZ proposal for Kaziranga National Park was submitted to Ministry on 28th July 2015. After subsequent meetings and discussions within the Ministry and by the Expert Committee, State was asked to revise the proposal integrating Kaziranga National Park and its adjoining eight (8) PAs. It was referred that in pursuance to the Hon'ble Supreme Court Order dated 12th April, 2019 in in WPC 202/1995, mining activities has now restricted in Karbi Anglong Hills, adjoining to Kaziranga National Park and also new constructions has been banned in 9 identified corridors. The revised proposal should be sent to Wildlife division of MoEF&CC and also seek concurrence of NTCA.

20.2 Details of eco-sensitive area: Laokhowa and Burhachapori Wildlife Sanctuaries

The Laokhowa and Burhachapori Wildlife Sanctuaries are two centrally located Protected Areas of Assam, surrounded by many key PAs like Kaziranga National Park to the east, Orang National park and Pobitora Wildlife sanctuaries to the west, Pakke-Nameri NPs to the north and the rich reserve Forests of Karbi Anglong to the south. The PAs act as connecting corridor for migration of animals between Kaziranga and Orang National parks and hence, has been identified as Buffer Zones of Kaziranga Tiger Reserve. The mighty Brahmaputra River flows through the northern boundary of the Burhachapori Wildlife Sanctuaries creating a large number of river islands. The rich ecosystem of the Laokhowa Burhachapori characterized by grasslands, woodlands and numerous wetlands along with the Brahmaputra River Islands are home to numerous species of endangered mammals, reptiles and birds.

The Sanctuary is yet to be declared by MOEF&CC, there is a draft notification for issued by MOEF&CC (S.O. 3236(E) dated 27.11.2015)

As per draft notification, The Eco-Sensitive Zone shall be with a peripheral area of 263.33 sq. kms with an extent varying from 1.86 kms to 7.14 kms around the boundaries of Laokhowa and Burhachapori Wildlife Sanctuaries.

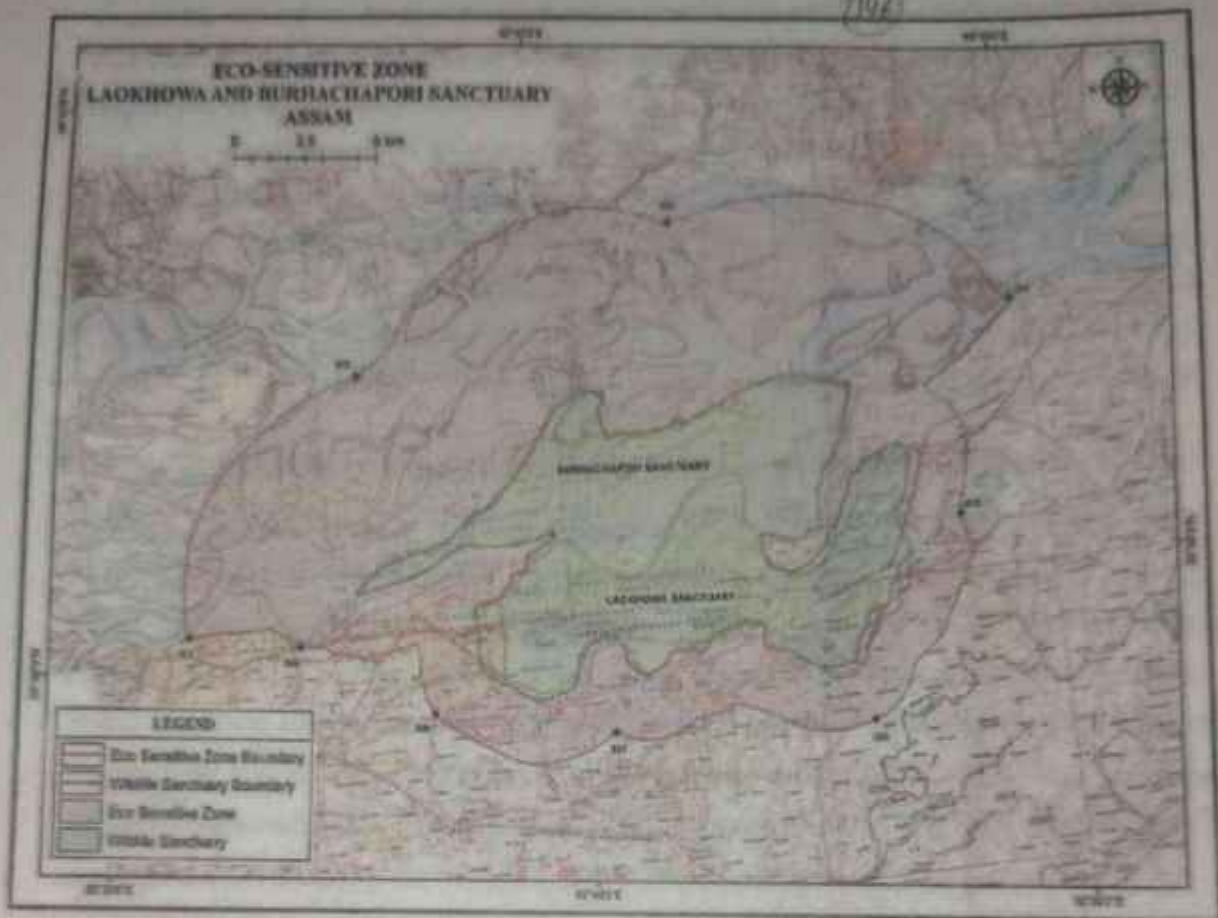


Figure 20.2: Eco Sensitive Zone of Laokhowa and Burhachapori Wildlife Sanctuaries

CHAPTER 21: IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL, FLORA & FAUNA, LAND USE, AGRICULTURE, FOREST ETC.) DUE TO MINING ACTIVITY

21.1 Impact on environment due to mining:

Mining activities are carried out in various stages, each of them having some or the other environmental impacts. Generally, the stages of mining activities include mineral deposit prospecting and exploration, mine development & preparation, mineral excavation, transportation of minerals, and treatment/processing of the minerals obtained. Mining activities result in the removal of the valuable topsoil and many a times the natural vegetative cover to reach the mineral/ore deposits. Mining activities have environmental impacts that can affect ecosystems, biodiversity, land disturbance, disruption of natural habitats water resources, air quality, and local communities. The main environmental impacts associated with open cast mining practices are summarized as follows:

Air pollution: Mining operations can generate airborne pollutants, including particulate matter, dust, and gases, which can have adverse effects on air quality and human health. The use of heavy machinery, blasting activities, and the combustion of fossil fuels contribute to air pollution in mining areas. Opencast mining operation dust of various sizes and disperse significant amount of suspended particulate matters (SPM) and gaseous pollutants in to the atmosphere. These pollutants not only affect the mine workers but also affect the nearby agricultural crops and livestock. General field observations reveal that Respirable Suspended Particulate Matter (RSPM) and Suspended Particulate Matter (SPM) are the major source of emission from opencast mining. The extent of harmful effects depends largely on prevailing meteorological conditions prevailing in the region. Depending on the size, suspended particulate matter may cause -

- Respiratory disorder in humans/animals due to inhalation of fine particles
- Lower agricultural yields due to obstruction of light needed for photosynthesis as a result of the dust cover on leaves of plants, and
- Poor visibility especially near crushers.

Water pollution: Mining activities can contaminate water bodies through the discharge of wastewater, leaching of chemicals, and the release of sediments. Mining activities are known to affect both the surface and groundwater regime. The local topography and drainage pattern may considerably influence the severity of pollution. The water composition of the mine water primarily depends upon the parent rock composition as well as the mineralization process. Due to excessive soil erosion the runoff water contains high concentration of suspended solids. These decrease the penetration of light in water bodies receiving the runoff water affecting the survival of living organisms. Acid mine drainage, caused by the exposure of sulfide minerals to air and water, can lead to the acidification of surrounding water sources, harming aquatic life and water quality. The main sources of liquid effluents in opencast mining are:

- De-watering of mine water,
- Spent water from dust suppressing system and
- Leachate run off from waste dumps.

Sometimes, the leachate water can be toxic containing heavy metals depending on the overburden composition and may pollute the ground water.

Noise pollution: In open cast mining like stone mining, blasting is a common practice which produces high intensity of noise. The noise level is comparatively high in the active zones in the quarries due to drilling, blasting and other process. In quarries involving blasting process, the exposure for long periods to these high levels of noise is likely to affect the ear diaphragms of the workers. The other sources of noise pollution are from excavators, spreaders, conveyor belts and their driving stations. Noisy working environment in the mining sites are known to result into communication impairments, task interference, sleep interference, change in personal behavior, etc. of the mine workers. The fauna in the forests and other areas surrounding the mines/industrial complexes is also affected by noise and it has generally been believed that wildlife is sensitive to noise and vibrations. The ambient air quality standards for noise level in the industrial region prescribed by Central Pollution Control Board are 65 dB (A) are to be complied.

Land Degradation and Habitat Loss: Mining operations can result in the destruction of natural landscapes, deforestation, and the loss of habitats for flora and fauna. Excavation, clearing of vegetation, and the creation of mine waste piles can cause irreversible damage to ecosystems. Opencast mining excavates large land areas to extract the mineral ore and at the same time requires huge areas to dump the overburden or leftover solid waste material. Often lands under the forest cover or agriculture are diverted for mining. Some important impacts on the land due to opencast mining may be:

- Change in topography resulting in change in drainage pattern
- Slope stability problems triggering lands slides and soil erosion
- Rapid siltation and degradation of surface water bodies and
- Solid waste/debris covering the nearby agricultural and grazing lands.

Improper disposal of mine-wastes without proper location will cause adverse impact on environment. The rejected materials, overburden, the tailing rejected after beneficiation etc. are physically, chemically and structurally unstable and when dumped on the adjoining land area, add to the deleterious impact as well as hydrological unstable for plant growth.

Land subsidence may occur in underground mining practices due to creation of voids after extraction of minerals beneath the Earth's surface.

Loss of biodiversity: Large scale operations of mining activities may contribute directly or indirectly to the depletion of the biological diversity in the region. Vegetative covers (which harbors birds, insects and other fauna) are open up at various places to expedite excavation of ore, development of mining infrastructure and dumping of overburdens. Removal of vegetative cover is often followed by massive soil erosion, siltation of river and reservoirs. It may result in the destruction or fragmentation of natural habitats, leading to the loss of biodiversity and disruption of ecological processes. Species dependent on specific ecosystems, such as wetlands or forests, are particularly vulnerable. The direct impacts on the living organisms in the mining areas may range from death of plants and animals due to mining activity or contact with toxic wastes and mine drainages, disturbance of wildlife habitat due to blasting and heavy machines. Indirect impacts may include changes in nutrient cycling, disruption of food chain and instability of ecosystem.

Thus, as it can be seen that Mining activities have wide-ranging environmental impacts, including land degradation, water and air pollution, biodiversity loss, climate change, and social disruptions. At a same time, it is pertinent to mention that the environmental impacts would depend upon the type of mineral excavated, the scale of mining operations, topography of the region, location of the lease area/mining area and the type of mining (opencast or underground etc.) including blasting or non-blasting method. And therefore, the environmental impacts are to be carefully anticipated and to be captured in the Environmental Management Plan or in the Environmental Impact Assessment (EIA) report with credible the mitigation measures. These aspects are to be evaluated during the Environment Clearance (EC) appraisal process from case-to-case basis.

The common remedial and mitigation measures are discussed in the next Chapter.

CHAPTER 22: REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT

It is a well-known that most mining activities adversely impact on the environment, leading to various ecological and social challenges. The extraction and processing of minerals can result in deforestation, habitat destruction, soil erosion, water pollution, and air pollution/greenhouse gas emissions. However, several remedial measures can be implemented to mitigate these adverse effects and promote sustainable mining practices. Through the implementation of responsible mining practices, comprehensive environmental impact assessments, adoption of mitigation measures, and meaningful engagement with local communities, the negative environmental consequences of mining can be minimized. It is crucial for mining companies, regulators, and stakeholders to work together to ensure sustainable mining practices that balance economic development with the protection and conservation of the environment for current and future generations. The main remedial measures to mitigate impact of open cast mining on the Environment are summarized as follows:

Air pollution: Precautions to mitigate air pollution in mining and mineral processing operations are very important. This involves effectively managing and reducing air pollution stemming from sources like dust, exhaust emissions, and fumes, all in accordance with the permissible limits set by prevailing environmental legislation. Specifically, measures such as wetting the main haulage roads of the mine through water sprinkling are adopted to minimize dust emissions. This approach ensures that air pollution is rigorously controlled, maintaining compliance with environmental laws and safeguarding the health of both the environment and local communities. Employing dust suppression techniques, implementing emission control technologies, and transitioning to cleaner energy sources can help mitigate air pollution and improve air quality in mining regions.

Mining operations in the district are to be conducted in accordance with established regulations. In accordance with the guidelines outlined in Notification No. B-29016/20/90/PCI-1 issued by the Central Pollution Control Board on November 18, 2009, it is stipulated that the 24-hour time-weighted average concentration of $PM_{2.5}$ should not exceed

Minerals: Sand, Stone and Brick Earth

277

APPROVED

71
National Forest Office

60 µg/m³. The measured PM_{2.5} levels within the specified area should adhere to the permissible limits set forth in the regulation.

Water pollution: Water pollution may be caused by direct discharge of mine water into the (natural) water stream and due to erosion and wash off from the mined-out area and waste dumps. The water may be acidic, alkaline, with dissolved chemicals and toxic substances or suspended solids particles depending on the mineral to be mined out, type of mining methodology and various processes involved therein. Implementing effective water management practices, such as the construction of containment ponds, treatment systems, and responsible chemical handling, is crucial for preventing and minimizing water pollution. Due to the non-usage of chemicals in mining methods, the concern regarding this matter is not relevant in the district. Water management is thus a critical aspect, addressing impacts on local water sources through sedimentation ponds, water treatment systems, and conservation practices. The goal is to restore and preserve water quality and availability in mining areas.

Noise pollution: Measures to mitigate noise pollution in mining and mineral processing activities are crucial. Noise generated directly from the mining and processing operations must be effectively managed to ensure it remains within acceptable limits as prescribed. This can be done by using quieter machines or by enclosing noisy equipment/machineries, use of acoustic barriers walls etc.

Ground vibrations. In cases where there is a potential risk of harm to public or historical structures due to their close proximity to the quarry lease area, the lessee as a part of the commitment to responsible mining practices; must conduct thorough and scientific investigations to ensure that the ground vibrations resulting from blasting activities remain within safe and acceptable limits. Further, taking necessary precautions, such as using controlled blasting techniques, adjusting blasting techniques or employing mitigating measures to ensure that they remain unharmed throughout the quarrying operations.

Removal and utilization of top soil and management of overburden: The removal and utilization of topsoil in mining operations involve two key aspects. Firstly, during mining activities, the topsoil should be carefully collected and organized at an approved location. Secondly, the collected topsoil should be put to beneficial use by either using it for plantation purposes, restoring and rehabilitating the land that is no longer needed for mining operations, or using it to stabilize and landscape the overburden dumps. The management of overburden,

Minerals: Sand, Stone and Brick Earth

278

waste rock, and non-saleable minerals resulting from mining activities should adhere to specific guidelines. Adequate measures should be implemented to secure the overburden dump effectively to prevent land degradation and the siltation of nearby water bodies. Whenever possible, waste rock or overburden should be employed to refill exhausted quarries or mines, restoring the land to its original or intended state. In situations where backfilling isn't feasible, waste dumps should undergo scientific re-vegetation using indigenous plant species to minimize erosion and surface runoff.

Afforestation and Green Belt: Afforestation practices help in restoring and enhancing the vegetative cover in mine areas in various ways. For Afforestation, factors like area to be planted, slope gradient, quality of soil, climate conditions etc. are to be considered. During plantation, priority must be given to native species. Those species have to be selected having fast growing tendency to enable to maximum canopy in short time as well as hard woody stem. Guidelines stipulated by CPCB/MoEF&CC has to be referred appropriately in this regard. These designated plantation sites should be securely fenced, with careful planning for watering and plant care, and their maintenance should continue throughout the operational period. Additionally, appropriate trees should be planted along the boundary, both sides of major roads, in the vicinity of the mine's site office, and on dormant dumps.

Environmental Management Plan (EMP): For sustainable mining activities, it is mandatory to prepare an EMP before commencing project. For effective implementation of an EMP, a mid-term corrective measure is essential, such as a time bound action plan - this includes a programmed for land reclamation, afforestation, mine water treatment, surface drainage and check dams, and waste water & sewage treatment etc. The responsibility to improve environmental management rests with the lessee /designated officer.

Environmental Impact Assessment (EIA) Report: Environmental Impact Assessment (EIA) is one of the proven management tools for integrating environmental concerns in development process and for informed decision making. As EIA and EMP have been made statutory requirements for starting new mining ventures as well as for existing mines, measures to prevent environmental degradation have become a subject of priority. Proper environmental impact assessment accompanied with a socioeconomic impact assessment should be carried out. Conducting thorough environmental impact assessments, identifying areas of high ecological value, and implementing conservation measures, such as habitat

Minerals: Sand, Stone and Brick Earth



restoration and protected area establishment, are essential for preserving biodiversity and minimizing ecosystem disruption.

The Mineral Conservation and Development Rules, 2017 especially Chapter V, provides for provisions regarding Sustainable mining practices. Further, Chapter III provides for Mining Operations whereby the lease holder has to commence mining activities in accordance with the mining plan that is approved by the Competent authority. Under Mineral Conservation & Development Rules, 2017, the existing lessees have to prepare and submit the mining plans and after every five years they have to review the mining plan. The mining plan and the Review of mining plan thus becomes an extremely vital document for the scientific and systematic mining has to be carried out in accordance with the envisaged proposals in the approved mining plan as per Rule 11(1) of Mineral Conservation & Development Rules 2017.

The standards and permissible limits of all pollutants, and noise shall be such as may be notified by the concerned authorities under the provisions of the relevant laws for the time being in force. The relevant provisions of Various Technical Circulars issued by the Directorate General of Mines Safety (DGMS) are also to be followed and complied by the lease holder.

These remedial measures pave the way for a more sustainable and responsible mining industry, fostering the protection and preservation of ecosystems and communities for future generations. And therefore, the remedial and mitigation measures with time bound action plan are to be carefully anticipated and to be captured in the Environmental Management Plan or in the Environmental Impact Assessment (EIA) report. These aspects are to be evaluated during the Environment Clearance (EC) appraisal process from case-to-case basis.

Appropriate and scientific Reclamation of Mined out area is also one of the most important remedial and mitigation measures which is discussed in the next dedicated Chapter.

CHAPTER 23: RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN)

Mine reclamation in India is gaining increasing attention and importance due to the country's extensive mining activities and the need to address their environmental and social impacts. Government and mining companies are actively involved in reclamation efforts to restore mined-out areas and mitigate the damage caused by mining operations. One of the primary goals of mine reclamation is the rehabilitation of abandoned mines, which pose significant environmental and safety hazards. Efforts concentrate on stabilizing slopes, backfilling open pits, and implementing erosion control measures to prevent soil degradation and water pollution. The Reclamation, restoration and rehabilitation of lands impacted by mining activities should be carried out incrementally to ensure their completion prior to the conclusion of mining operations and the eventual closure of the quarry or mine. This approach is aimed at transforming the affected site into a productive and sustainable area that can contribute positively to the surrounding environment and communities.

Mining activity in the district need to adhere to established regulations, placing significant importance on safeguarding the natural habitat and land preservation. The Mineral Conservation and Development Rules, 2017 especially Chapter V, provides for provisions regarding Sustainable mining practices including the following:

37(4) Wherever possible, materials such as waste rock and overburden shall be backfilled into the mine excavations with a view to restoring the land to its original use as far as possible.

37(5) Wherever back-filling of waste rock in the area excavated during mining operations is not feasible, the waste dumps shall be suitably terraced and stabilized through vegetation or otherwise.

Rehabilitating mined areas through land reclamation, re-vegetation, and habitat restoration techniques can help mitigate the impacts of land degradation and provide opportunities for

Minerals: Sand, Stone and Brick Earth

281

ecosystem recovery. Identifying and prioritizing reclamation sites are crucial for restoring affected areas. Sustainable practices are increasingly emphasized, including ecological restoration with native plant species and soil remediation to address fertility issues and contamination. These measures aim to restore biodiversity and promote long-term land health.

Creating sustainable economic opportunities post-mining, such as agriculture or tourism, benefits local communities in the long term. Mine reclamation and Geo-tourism are two interconnected concepts that can work hand in hand to promote sustainable development and environmental conservation in mining regions. However, the concept of Geo-tourism has only recently emerged. Geo-tourism is a novel addition to the rapidly expanding niche or special interest tourism that uses landscapes with significant geological and geographical significance. Unlike ecotourism, which emphasizes biotic aspects (flora and fauna), Geo-tourism emphasizes abiotic elements of nature and focuses on the interpretation and preservation.

In India, mining operations often directly impact local communities, especially in tribal and rural areas. Effective engagement with these communities is crucial for successful mine reclamation practices and positive stakeholder perception. Engaging stakeholders through consultations, information sharing, and incorporating their traditional knowledge and concerns into the reclamation plans can build trust and foster positive perceptions.

The Mines and Minerals (Development and Regulation) Act, 1957, serves as a primary legislation governing mining operations in the country. It outlines provisions for environmental protection, safety measures, and the sustainable development of mineral resources. The Environmental Impact Assessment (EIA) Notification, 2006, mandates the assessment of potential environmental impacts of mining projects, including mine reclamation activities. This regulation requires mining companies to undergo an EIA process before obtaining environmental clearances. It also outlines the measures and strategies to be undertaken for restoring the mined areas after the cessation of mining operations. They specify the intended land use, reclamation methods, and monitoring protocols to ensure the successful implementation of reclamation measures.

Minor mineral extraction regulations state that a quarry must be converted into a water reservoir, a fish farm, or a municipal solid waste dump yard or refilling for agriculture and

Minerals: Sand, Stone and Brick Earth

282

plantation after all minerals have been used up. The water reservoir or fish farm should have fencing for avoiding accidental cases.

As per AMMCR 2013, the lessee shall also deposit / pay additional amount equal to 10% of the amount of royalty/ dead rent along with the payment of royalty or dead rent, whichever is more, by the 7th of every month, to ensure the compliance of the Reclamation and Restoration works. This additional amount shall be refunded after satisfactory Reclamation/ Restoration of the area after mining in accordance with the Mine Closure Plan. Provided that in case the lessee fails to reclaim/ restore the area as per mining plan to the satisfactions of the State government, the amount deposited shall be forfeited and used for the restoration of the area.

CHAPTER 24: RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

Risk Management through Risk Assessment are now widely accepted concepts. Risk analysis is the systematic study of uncertainties and risks encountered in various areas. Risk analysis is to identify the risks involved in mining operations at various phases, potential locations and activities around the proposed site are identified and probable risks are estimated. The anticipated risks and their management plans are mentioned below:

Inundation: Inundation is a frequently occurring disaster in mines. It may be caused by direct rainfall, seepage from the backfilled areas or flooding of neighboring drainage systems. It may cause drowning of machineries, collapsing of mines benches, contamination of exposed minerals damage to roads and ramps, etc. For Ground water seepage, the pumped-out water will be passed through a settlement tank for settling of suspended matter before releasing into the nearby natural drain.

Failure of Waste Dump and Slopes: The dump slopes will be prone to serious erosion during heavy rain and suffer from weathering if left exposed. The surface erosion and chances of skin failure will cause gully formation. The instability of the dump will be caused also by the rise in ground water level, reduction in soil material strength or adverse geometry thereof. This instability will be counted upon by under-clay strength, material strength and placement method or designed geometry including topography of the foundation surface. Sometimes the rocks are blasted to win the mineral causing cracks and opening in natural binding. Such loose rocks may fall at any time causing damage to human life and machinery. The only remedy to the affect to such situation is to dress the blasted part.

Dust from the screening and crushing operations: The hazard is the inhalation of dust which is created during the screening and crushing operations. It can be controlled by providing proper enclosure to the plant area and by installing rain guns at transfer points inside the plant. Water sprinkling at the crushing and screening plant units also forms an effective measure of controlling dust generation.

Possible Dangers of Storage of Explosives in the Magazine: The explosive will be slurry explosive which will be used as booster and the main explosive will be ANFO mixture (Ammonium Nitrate and Fuel Oil Mixture). Ammonium Nitrate is one of the principal ingredients used in manufacturing of explosives. Required quantity of explosive will be obtained from the dealer who supplies at mine side through his approved explosive van. A magazine in the lease area is already constructed for storage of explosive. All precautions as per MMR 1961 will be observed.

Following steps for caution towards risk assessment are to be considered appropriately.

- As per provisions of AMMCR-2013, to report accidents- The lessee shall without delay report to the Deputy Commissioner of the district concerned and the competent authority or any other officer authorized by him, any accident which may occur at or in the leased area.
- As per Metalliferous Mines Regulations 1961, in the event of an accident within or around a mine involving loss of life or serious bodily injury, explosions, fire-related incidents, gas influx, water intrusion, rock bursts, structural failures, or other specified occurrences, the mine owner, or manager is mandated to promptly notify the Regional Inspector via telephone, express telegram, or special messenger. In cases where accidents involve electrical energy, immediate notification to the Electrical Inspector of Mines is also required. If a reported serious injury results in death or if an initially non-serious injury becomes severe, the owner, or manager must inform the District Magistrate, Chief Inspector, and Regional Inspector within 24 hours of receiving such information.
- To prevent any negative impact on the well-being of workers due to various pollutants, comprehensive safety and health measures will be implemented, including the establishment of rest shelters equipped with amenities such as drinking water for mine workers; adherence to safety protocols involving the use of safety gear like dust masks, helmets, and safety shoes, complemented by safety awareness programs, and the display of safety-related posters and slogans; training programs for employees on the proper use of safety equipment and first aid, conducting Periodical Medical Examinations (PME) for all workers by a qualified Medical Officer; provision of first aid facilities at the mine site; vigilant monitoring of factors in the work environment



and practices that may impact both the environment and workers' health; and ensuring mining operations align with approved mining and environmental plans.

- To address the risk of accidents arising from mining equipment and to manage potential hazards and disasters, precautionary measures are to be implemented as per safety regulations outlined in the Mine Act of 1952, Metalliferous Mines Regulations of 1961, and Mines Rules of 1955 throughout all mining operations; establishment of firefighting and first-aid facilities in both the mine office complex and mining area; provision of safety equipment/PPEs.

Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in a mine should be able to work under condition, which are adequately safe and healthy. At the same time the environmental condition should be such as not to impair their working efficiency. This is possible only when there is adequate safety in mines. Safety of the mine and the employees will be taken care according to the mining rules & regulations, which are well defined with laid down procedure for safety, which when scrupulously followed safety is ensured not only to manpower but also to working environment.

Disaster Management Plan

The Disaster Management Plan aims to prioritize the safety of lives, environmental protection, safeguarding of installations, and so on. To ensure the effective implementation of the disaster management plan, it should be widely disseminated to achieve the following objectives:

- Execute the rescue and medical treatment of casualties.
- Safeguard the well-being of other individuals.
- Minimize damage to property and the environment.
- Initially contain and ultimately bring the incident under control.
- Identify any deceased individuals.
- Provide for the needs of relatives affected by the incident.
- Furnish authoritative information to the news media.
- Ensure the safe rehabilitation of the affected area.
- Preserve relevant records and equipment for subsequent inquiries into the cause and circumstances of the emergency.

Protection of the pits: The pit area of the lease will be protected by fence as per DGMS circular all around the open pit with caution board displaying the danger in local language. It will be protected by displaying a board at the entry with caption like "Entry in the premises without permission is strictly prohibited" in local language.

Disaster Prevention Measures: The following control measures have been envisaged:

- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Provision of high-capacity pumps for pumping out water from the mining pit.
- Entry of unauthorized persons will be prohibited.
- Firefighting and first aid provision shall be kept in the mines office complex and mining area.
- Safety equipment such as safety boots, helmets, goggles etc. will be made available to the employees and regular checked for their use.
- Training and refresher courses for all the employees in the mine.
- Working of mine as per approved plan and regularly updating the mine plans.
- Regular maintenance and testing of all mining equipment as per manufacture's guidelines.
- Suppression of dust on the haulage roads.
- Increasing the awareness of safe practices through competitions, posters and other similar drive.
- Entrance to the mines or part of the mines to be discontinued shall be fenced off as per DGMS Circular and security Guards shall be posted for the safety and, to restrict any unauthorized entry.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out.
- Care and upkeep of plantation shall be carried out on regular basis.
- All rules and regulations shall be followed in case of any temporary discontinuance of mine.

As a precautionary measures before onset of monsoon, garland drain will be maintained to divert water from outside the mining area. The rainwater thus diverted is coursed to natural

Minerals: Sand, Stone and Brick Earth



nallahs or collected in the sumps. This helps to control the inflow of water from the virgin areas into the mine workings.

The methodology for the risk assessment has to be based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31st December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations, and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures are recorded along with pinpointed responsibilities. In the unlikely event that a consequence has occurred, disaster management kicks in. This includes instituting procedures pertaining to a number of issues such as communication, rescue, and rehabilitation. These are addressed in the disaster management plan.

Both, the Risk Assessment and Disaster Management Plan, are living documents and need to be updated whenever there are changes in operations, equipment, or procedures Assessment.

Setting-up of Emergency Infrastructure: To enable the key persons to implement the DMP, the following infrastructure will require to be set up:

Assembly Points: In case of emergency the site needs to be evacuated immediately. On evacuation people will go to pre-assigned assembly points. The shift in charge and will supervise Assembly and Head Count. A Board indicating the Assembly Point having relevant information is to be placed at point for guidance.

Liaison With State Authorities: Government authorities, local hospital, police fire services, taluka mamlatdar, district collector will be kept informed about the occurrence and development of any incident and avail necessary help and guidance from these authorities.

Fire Fighting: Person noticing the fire shall immediately raise alarm. Portable Fire Extinguisher shall be used in an attempt to extinguish the fire, by the person at site. If likely to be severe shall take following steps – Call fire tenders and call for assembly of all persons at assembly points.

Explosion: Ensure evacuation in orderly fashion. Ensure that any vehicle parked near the Fire Site is taken away to safe area. Emergency Preparedness for Electrical Shock / Accident. Source of power should be put off immediately in case of any electrical shock. Injured person should be shifted to safe place. Persons engaged in rescuing operation should use all PPEs and take appropriate precaution while removing the injured persons. In case of major injury the injured is shifted to the Dispensary/Hospital. In case of electrical fire, only CO₂ type Fire Extinguisher is used.

Cyclone And Flood: When warning of cyclone or heavy rains is received from Local Administration, withdraw all persons from work place and accumulate them in quarry building. All the equipment should be withdrawn from mine and kept in a higher site. The Quarry Manager may advise the staff to leave depending on security of situation.

Earthquake: When earthquake hits, all persons shall be encouraged to run out in the open areas designated as Assembly Points. All the electrical supply should be disconnected. All key personnel shall reach Quarry immediately and carry out designated responsibilities. Check all areas for persons trapped inside. Search and Rescue Operation shall be launched with help of Workers, if there is obvious damage to building.

First Aid: First Aid Kit consisting of basic yet important items should be made available at all strategic locations at all the times.

Treatment of Affected Persons Injured / Affected persons: shall be provided suitable first-aid treatment and sent to doctor for further treatment depending on injury. Patients requiring further treatment shall be sent in Ambulances to Hospitals.

Post Emergency Activities: Medical checkup of affected persons if any and suitable medical aid shall be provided. Exact information shall be collected regarding cause of Emergency and remedial measures suggested preventing recurrence. Detailed inquiry shall be carried out to find out the cause and recommendations made to suitable authority. Insurance Claims (if any) for damage due to consequences of emergency shall be filed.

Mock Drill: Full scale mock drill shall be conducted at least once a year in coordination with Safety Department. Manager-Quarry shall declare the emergency for mock drill and all persons concerned shall perform duties as per Responsibilities given in this Plan.

Training: Regular training of all concerned personnel to be conducted to enable the Staff to face any type of Emergency be it Natural Disasters, Fire in Equipment, Building or any explosion in quarry.

DMP Audit Since DMP is a dynamic document, it is required that its performance be audited at regular intervals, ideally by external auditors. Audit reports shall state the exact non-compliance with the particular clause of this DMP, and should include steps to be taken to attain compliance, through corrective and preventive actions.

The safety management plan: It is a scientific tool for ensuring safe operation of the mine and it is an all-time working document. It brings together a number of procedures and policies to enable the mine operator to follow a systematic monitoring approach to achieve an effective level of health and safety. The Directorate General of Mines Safety had issued following Technical Circular to implement.

- a) DGMS Tech. Cir.13 of 2002 - Safety Management System -A guideline for Implementation.
- b) DGMS Tech. Cir.8 of 2009 - System Study and Safety Audit for the purpose of eliminating the Risk of Accidents & Dangerous Occurrences
- c) DGMS (Tech) (S&T) Circular 2 of 2011 -Provision for Audit and Review

It is pertinent to note that the above are broad and yet general aspects of Risk Assessment and Disaster Management Plan typical for a mining industry. The project specific Risk Assessment and Disaster Management Plan is to be prepared and generally these would be governed by type of mineral to be excavated, level and scale of mining operations, topography and geology of the area involved, type of mining methodology & mining process etc.

CHAPTER 25: DETAILS OF THE OCCUPATIONAL HEALTH ISSUES IN THE DISTRICT

(Last five-year data of number of patients of Silicosis & Tuberculosis is also needs to be submitted)

The mining activities have ramifications for the health of not only the workers who are associated with this industry but sometimes also for the local residents which are living in the close vicinity of the mining area. The health problems range from respiratory problems, digestive problems to psychological problems.

Occupational Human Health Problems: In active mining sites, miners are persistently exposed to large concentrations of dust, gaseous pollutants, high levels of noise and sometimes accidents, which constantly pose a severe threat to miner's life. In Opencast mining, Health problems related to skin and respiratory disorder are commonly observed. The digging, blasting and drilling process in the mine generate dust particles of various sizes into the immediate atmosphere. Crystalline silica is a common but variable component of granite & few other minerals. Most of this dust is usually made up of silica (occurring as silicon dioxide SiO_2). In general, the most prevalent occupational diseases among the mine workers are:

(a) Hearing problems: Effect of heavy noise from use of heavy machineries and rock blasting cause auditory effect as well as non-auditory effects in mine workers and surrounding people. Auditory effect of noise causes impairing of hearing. Non-auditory type of effect cause loss of working efficiency due to the physiological disorders like hypertension, cardiovascular disease and so on, (b) Respiratory problems: Mineral dust particles originating from mining activities on inhalation by lungs and thereby cause a number of concerned problems like silicosis. (c) Eye problem: Dust particle from mining activities contribute to cause of certain eye problem like conjunctivitis and (d) Skin problem: Deposition of dust particles on skin may causes different skin diseases

Thus, in general, in a mine; air Pollution may cause eye irritation, sore throat, cough, chest pain and complain of sneezing; noise may cause annoyance, headache, irritation, mental disturbance sleeplessness; blasting causes shaking of the houses and other buildings and cause disturbance among the inhabitants.

The number of patients for silicosis & Tuberculosis registered during the last five years in the district is tabulated as below:

Table 25.1: Health occupational hazard

Year	No of Silicosis patients	No of Tuberculosis patients
2015	-	2761
2016	-	3300
2017	-	3067
2018	-	2713
2019	-	3135

(Source: NIKSHAY portal, Nagaon)

No case of silicosis was reported in Nagaon district during this period. TB occurs due to various reasons, no such case was identified to be having origin due to mining operation as per records of NIKSHAY portal, Nagaon.

CHAPTER 26: PLANTATION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT

The Plantation activity and Green Belt Development in the mines not only reduces the pollution level, but also improves the ecological conditions and prevents the soil erosion and increases the aesthetic beauty of the locality. Green belt is plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. It also improves the aesthetic value of local environment. Green belts are planned open spaces which are areas used only for growing vegetation cover. Green belts in and around urban and industrial areas are important for maintaining ecological health of the region. The green belt comprises of a mixture of different plant species. Greenbelt will be developed in following areas:

- Along mine lease boundary
- Along the side of mining roads
- On external overburden dump
- Boundary of the Quarry area
- Plantation Outside the Lease area

Plantation: Substantial investment has been made by lessee in the development of mine, plant and machinery with a long term perspective.

Plantation on external dumps: Plantation on the overburden dumps can only be taken up after dumping activity is stopped and the site is proposed for plantation. A layer of topsoil will be spread over the area and roughly leveled. The grasses are to be planted on the dump slope.

Plantation along the side of the haul road: Both side of the haul road will be covered under plantation.

Plantation Outside the Lease area: Besides the plantation within the lease area the lessee may propose to plant some fruit bearing trees as avenue plantation in the road side of nearby villages.

Post Plantation Care: Post plantation care is very important and should be an integral part of mine management. The post plantation care includes, regular watering, manuring, protective measures etc. Diseased and dead plants should be uprooted and replaced by fresh

Minerals: Sand, Stone and Brick Earth



saplings. Regular monitoring on survival rate and remedial action should be done in an organized and planned manner.

The strategic approach for establishing this greenbelt involves several key considerations. Firstly, the selection of plant species must prioritize those capable of rapid growth and resilience. Furthermore, these species should be wind-resistant and possess a long lifespan to ensure the sustainability of the greenbelt. The selected species should also have the capacity to form a dense crown cover, providing ample shade and habitat for ecosystem. It is advisable to prioritize the use of local and indigenous fast-growing trees and shrubs, aligning with the region's natural biodiversity. While considering the above aspects due care to be taken for selecting suitable characteristics plant species as those fast growing and evergreen trees, trees with large leaf area, locally suitable plant species, those resistant to specific pollutant and those which would maintain the regional ecological balance, soil and hydrological conditions. The plantation work for green belt development will be carried in consultation with a local forest department/horticulturist which will help minimizing adverse impact on the flora found in the area. The proposed green belt in the lease area will to be designed taking into consideration the availability of area as the efficacy of green belt in pollution control mainly depends on width of green belt, distance from pollution sources, site of the habitat from working place and tree height & density.

Few photographs reflecting the Green Belt and Plantation carried out in and around the mine in the district are as below:



Figure 26.1: The green belt development around and within the mining region

CHAPTER 27: ANY OTHER INFORMATION

Nagaon is one of the important districts of Assam and hosts significant mineral wealth of Sand, Stone and Brick Earth as other minor minerals. The district covers an area of 2,287 km² out of which 412.80 Ha is covered by leases of various minerals. In the year 2023-2024, the total revenue from other than sand minor minerals in Nagaon district was Rs. 13,05,40,029/-. A perspective has been kept in mind to sustain environment with increasing revenue.

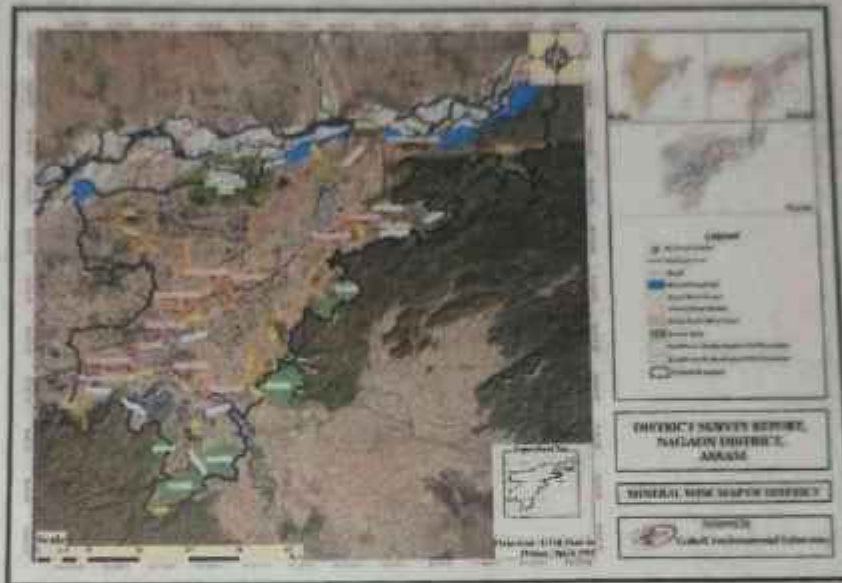


Figure 27.1: Mineral map of Nagaon district (Google Image)

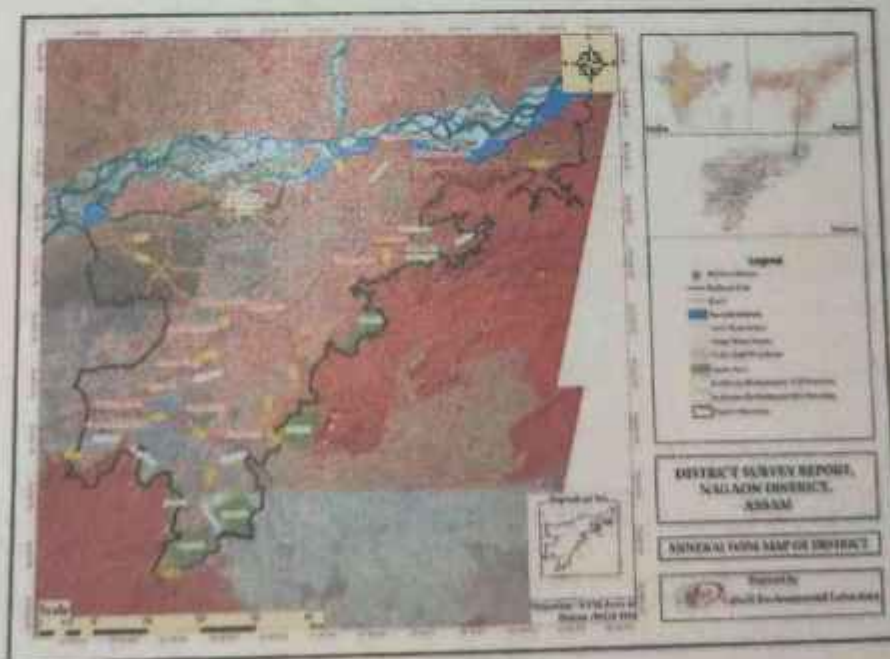


Figure 27.2: Mineral map of Nagaon district (Satellite Image)

The District Survey Report for minor minerals is prepared with an aim to demarcate the areas which are prone to erosion or degradation, along with details of eco sensitive zones and other areas where mining is to be prohibited as per MoEF&CC, 2018 and relevant provisions. With the vast mineral reserves identified in the Nagaon district, the revenue and production shows immense scope of multifold increase in future.

27.1 Inference from DSR

On the basis of distance criteria, the details of leases fall in Go- zone and no go zone for each individual lease has been given below:

S. No.	Continuous S. No.	Mine Name	Lease Area	Go Zone	No-Go Zone	Details of No-Go Zone
4	19	Dhansila Pahar Stone Contract Area No. 1 (Reserve Forest)	13.41	2.21	11.20	11.20 Ha is not recommended due to presence of habitation within 100 m.
5	20	Dhansila Pahar Stone Contract Area No. 2 (Reserve Forest)	12.74	7.71	5.03	5.03 Ha is not recommended due to presence of habitation within 100 m and 2.38 Ha due to presence of major bridge.
8	23	Kathalguri Stone Contract Area No. 2 (Reserve Forest)	10.00	9.08	0.92	0.92 Ha is not recommended due to presence of habitation within 100 m.
7	27	Basundhari Stone Mahal No. 1 (A)	7.60	5.65	1.95	1.95 Ha is not recommended due to presence of habitation within 100 m.

4 leases namely Bipin Stone Mahal of 2018-23, Dhulpahar Stone Mahal No. 1, Tapatjuri Stone Mahal No. 1, and Kathalguri Stone Contract Area No. 1 (Reserve Forest) had forest diversion permission for 1 Ha for reserve forest.

Map showing the identification of Go- zone and No-Go zone for each individual lease has been prepared and given below:



Figure 27.3: 200m Buffer Map (Google Image)

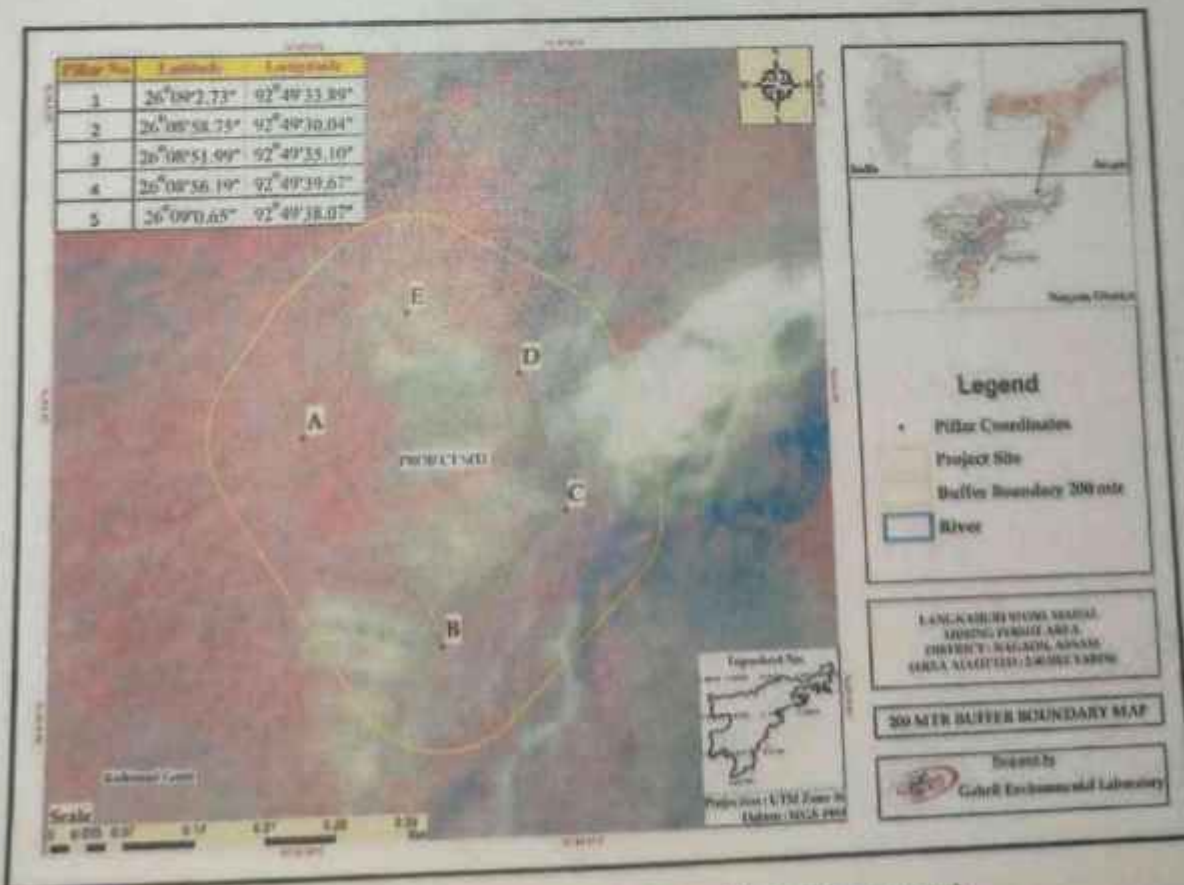


Figure 27.4: 200m Buffer Map (Satellite Image)



Figure 27.4: 200m Buffer Map (Google Image)



Figure 27.6: 200m Buffer Map (Satellite Image)



Figure 27.7: 200m Buffer Map (Google Image)

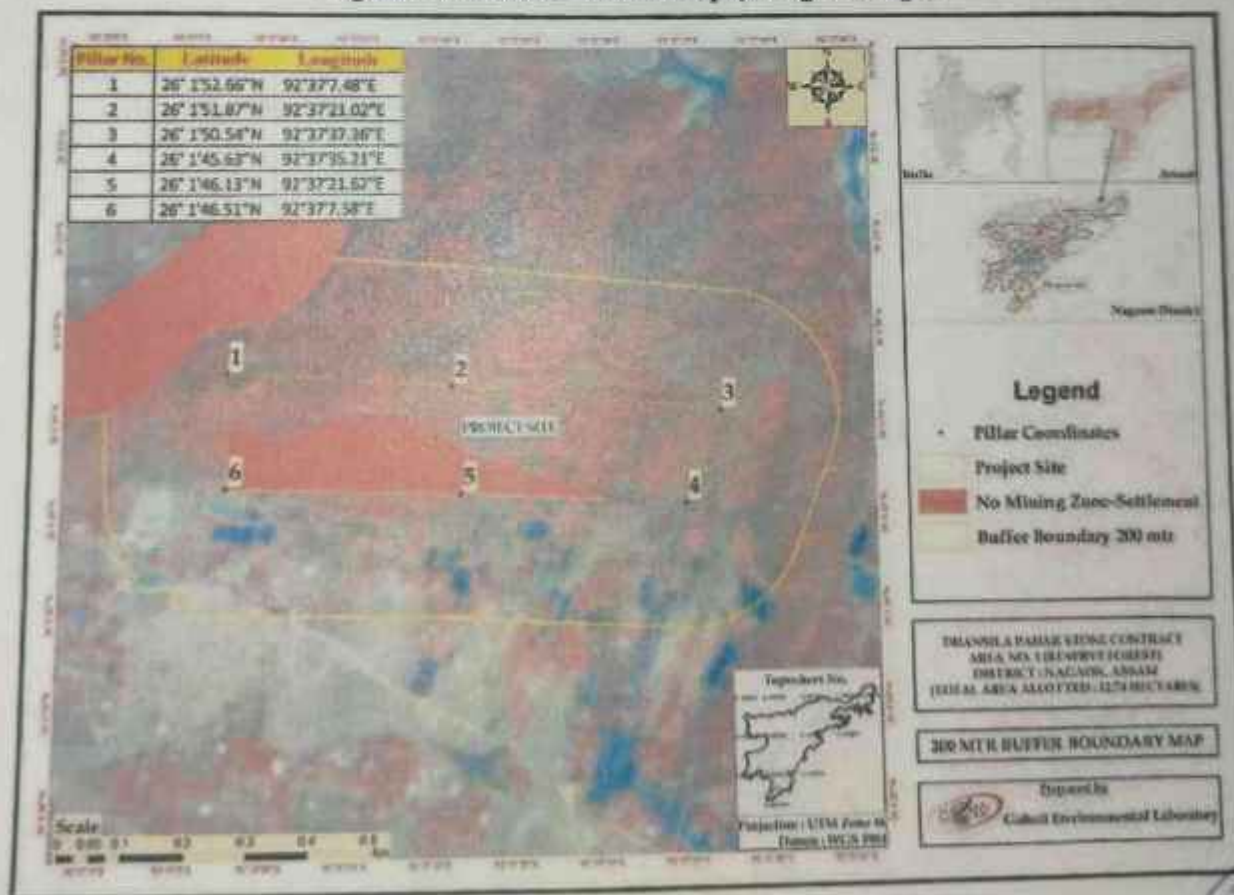


Figure 27.8: 200m Buffer Map (Satellite Image)



Figure 27.9: 200m Buffer Map (Google Image)

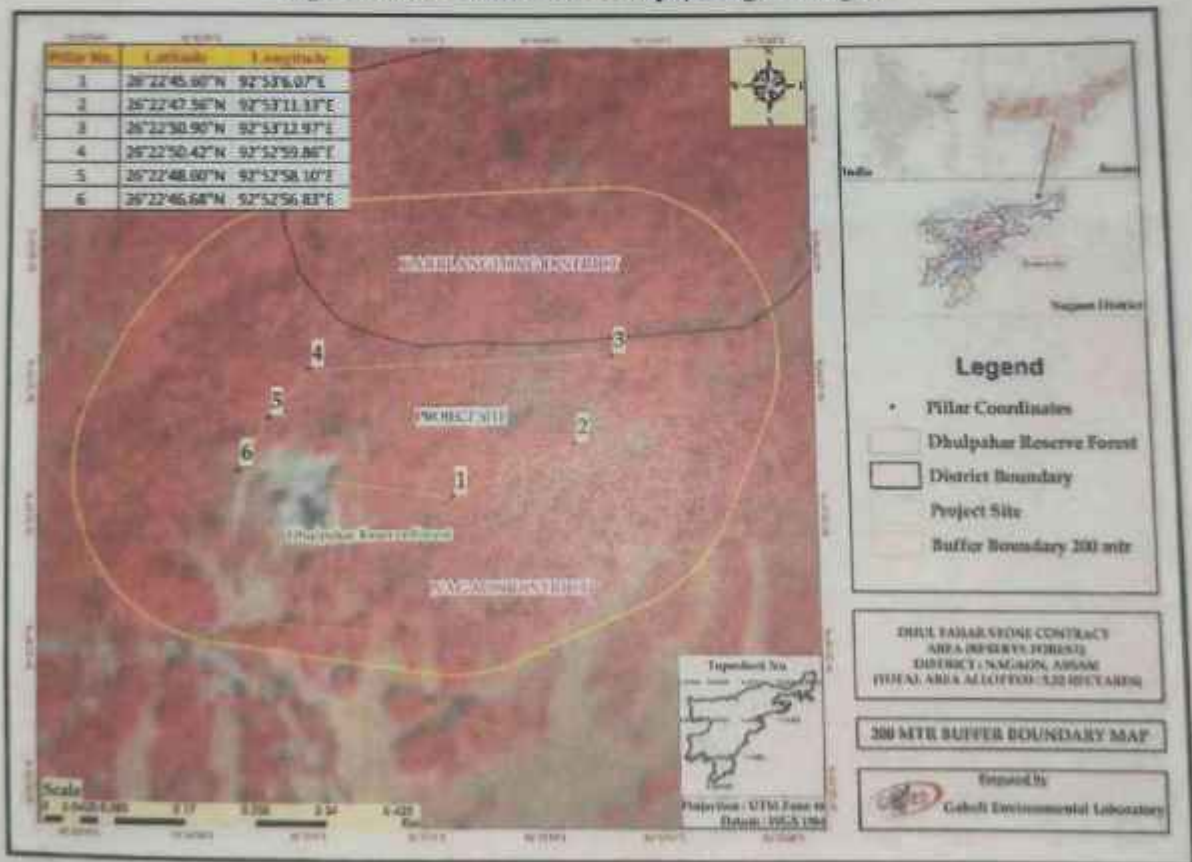


Figure 27.10: 200m Buffer Map (Satellite Image)

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 11/05/2018
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 11/05/2018



Figure 27.11: 100m Buffer Map (Google Image)



Figure 27.12: 100m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth





Figure 27.13: 100m Buffer Map (Google Image)

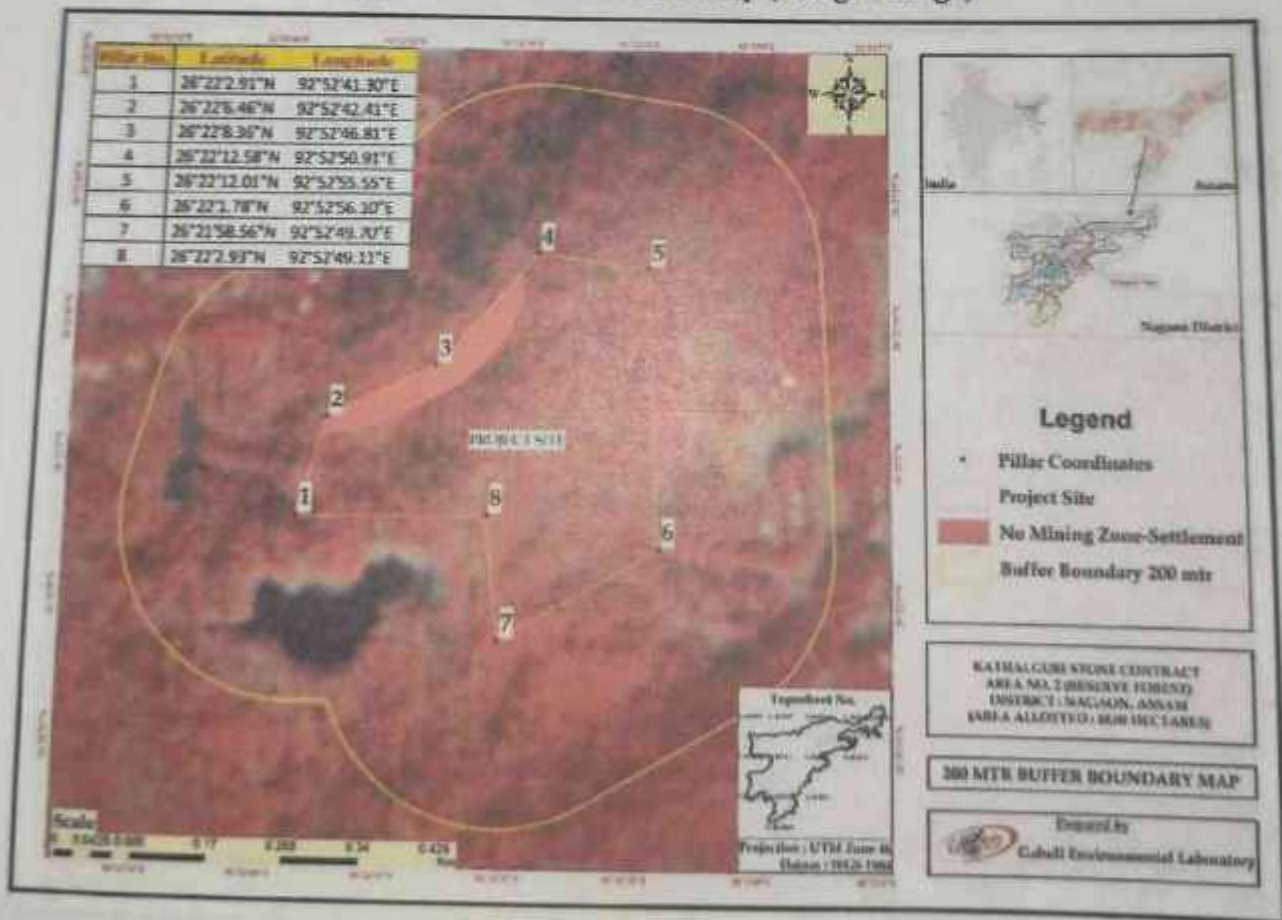


Figure 27.14: 100m Buffer Map (Satellite Image)



Figure 27.15: 200m Buffer Map (Google Image)

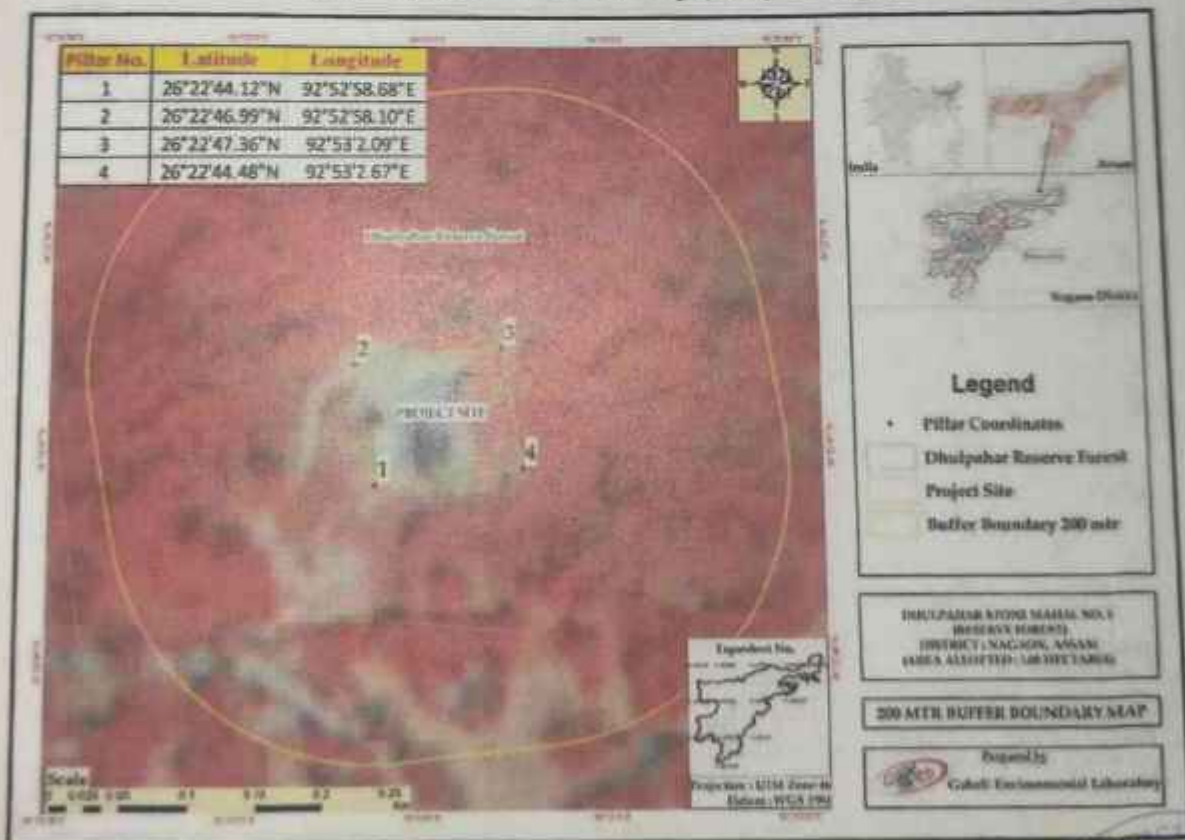


Figure 27.16: 200m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth





Figure 27.17: 200m Buffer Map (Google Image)

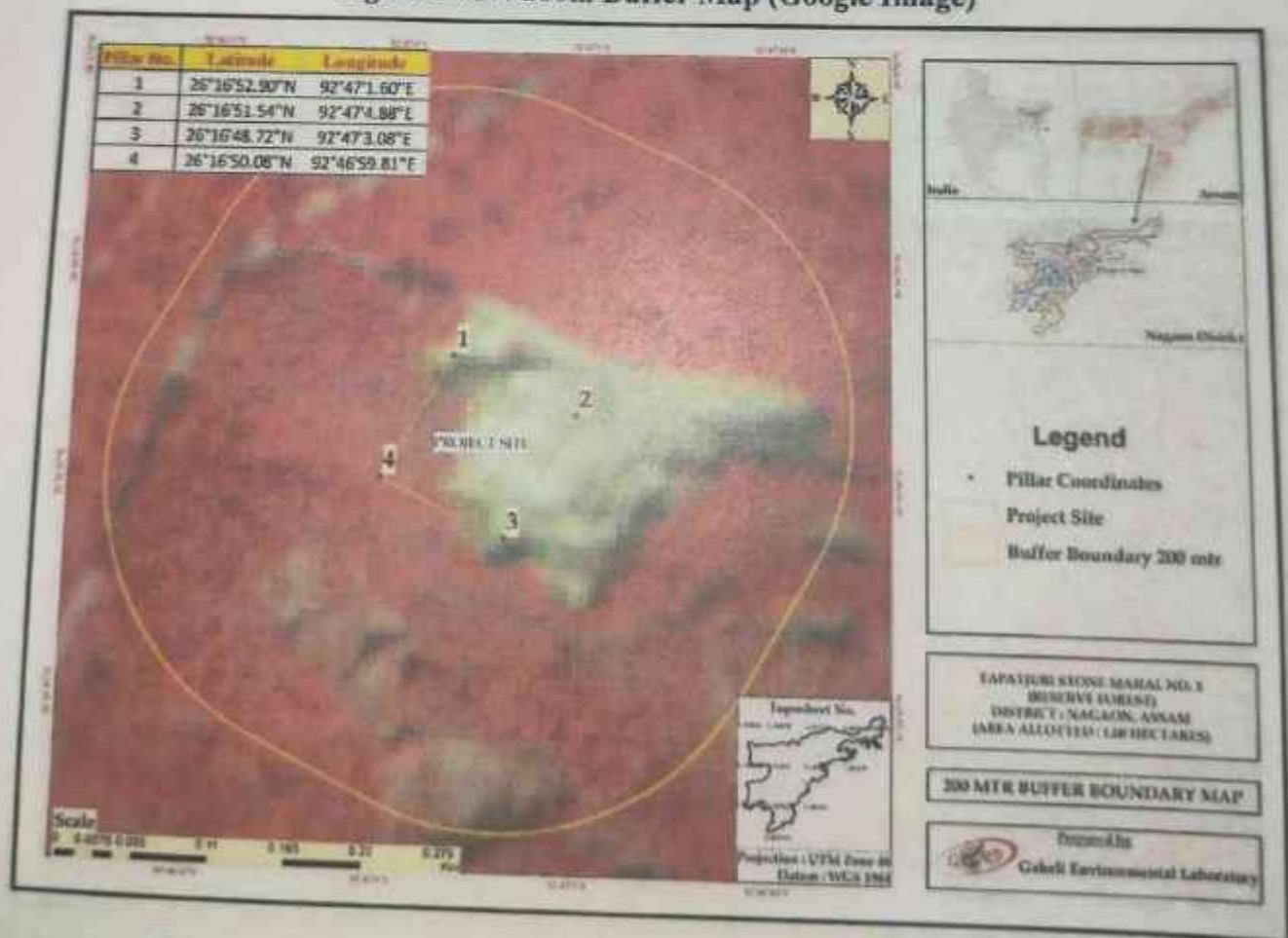


Figure 27.18: 200m Buffer Map (Satellite Image)



Figure 27.19: 200m Buffer Map (Google Image)

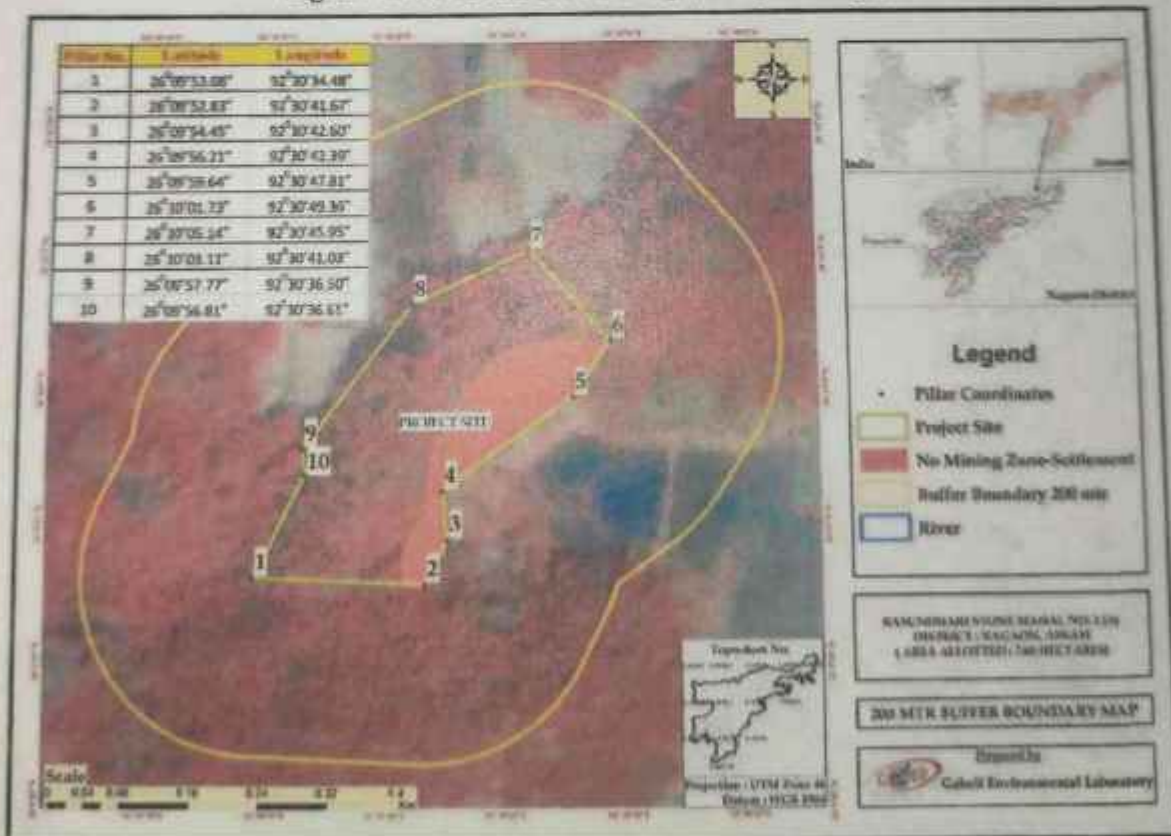


Figure 27.20: 200m Buffer Map (Satellite Image)

Minerals: Sand, Stone and Brick Earth





Figure 27.21: 200m Buffer Map (Google Image)

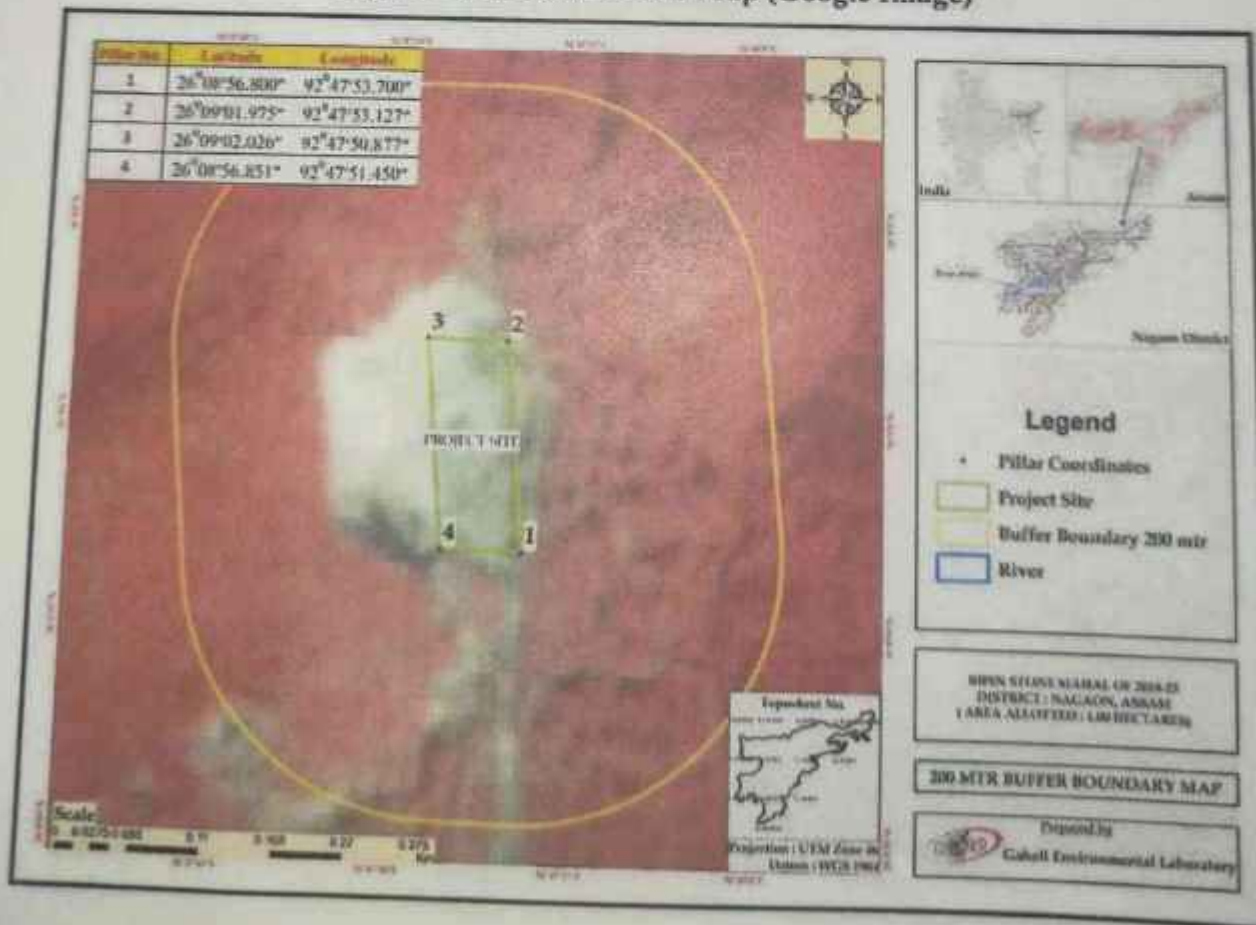


Figure 27.22: 200m Buffer Map (Satellite Image)



Figure 27.25: 100m Buffer Map (Google Image)

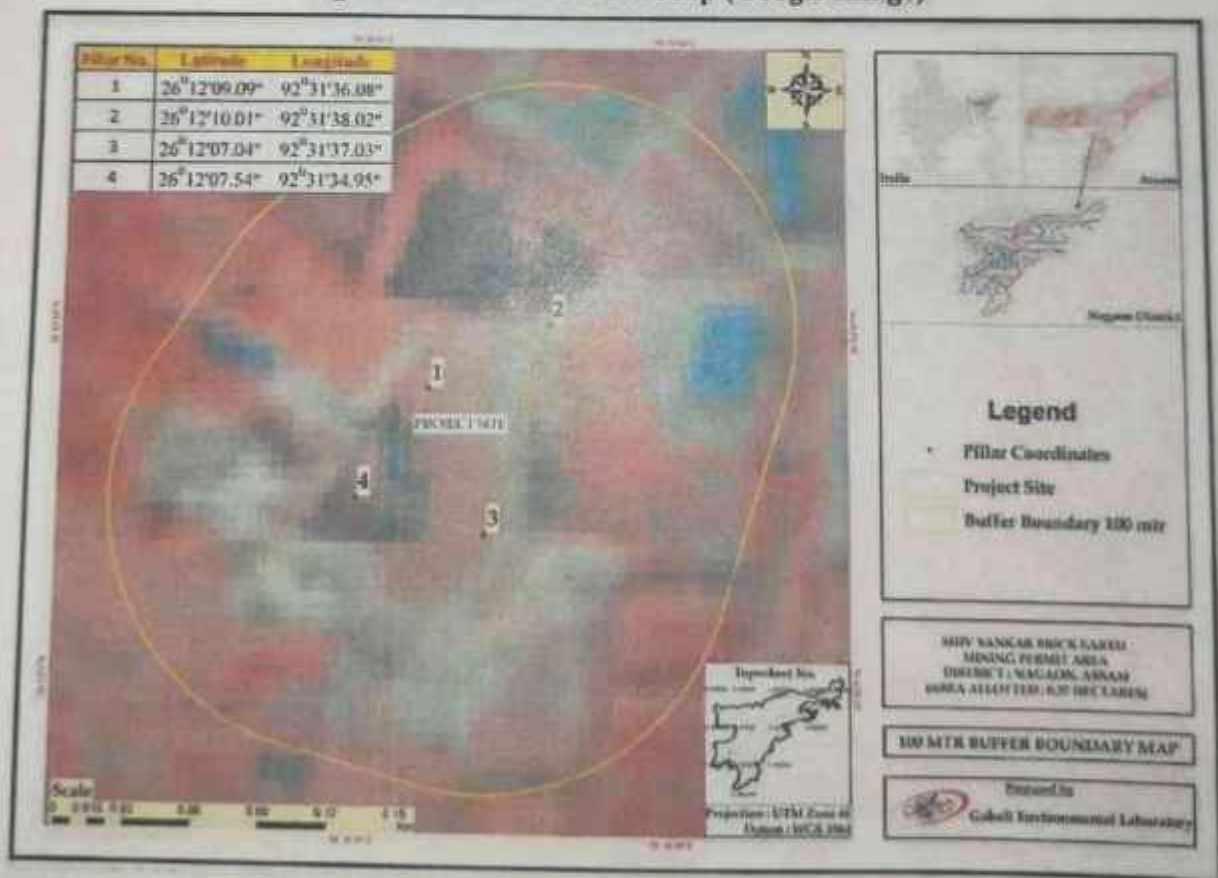


Figure 27.26: 100m Buffer Map (Satellite Image)



Figure 27.27: 100m Buffer Map (Google Image)

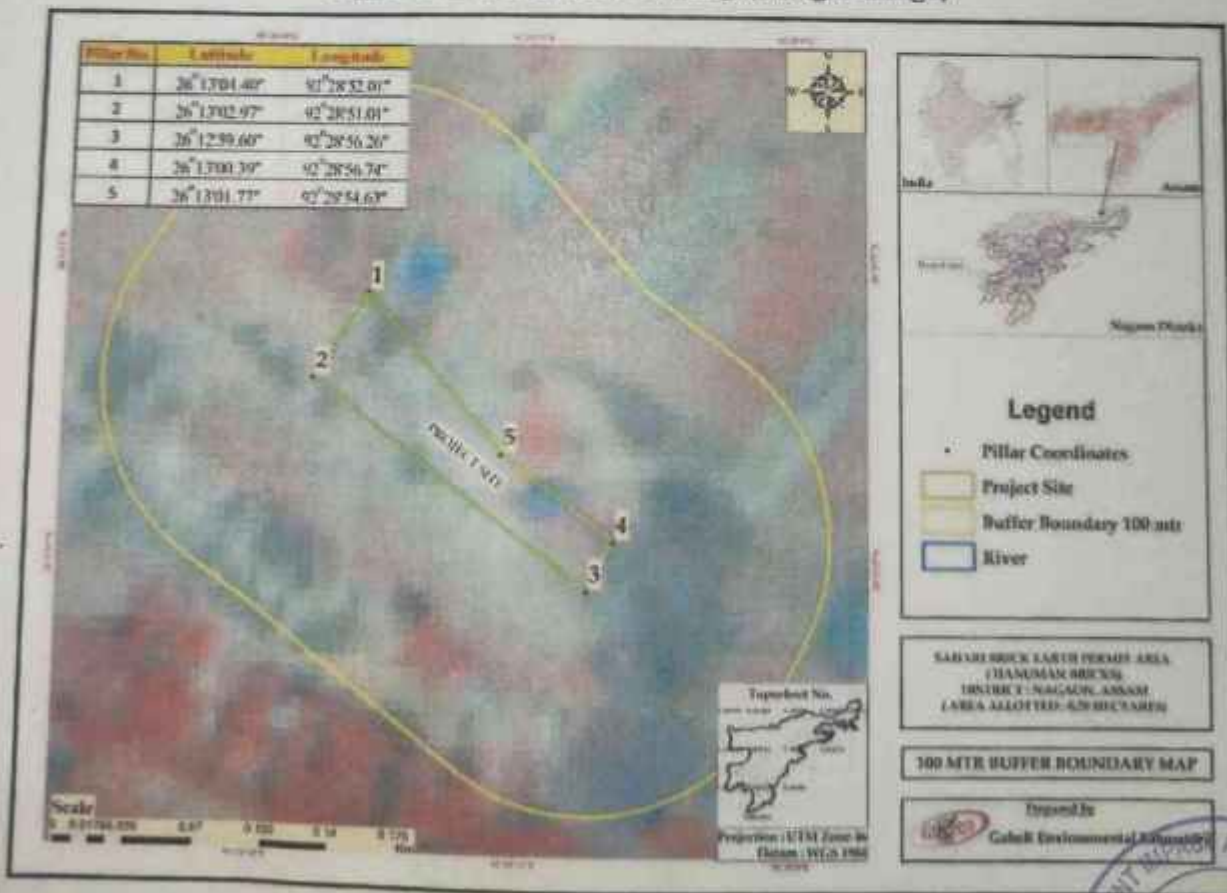


Figure 27.28: 100m Buffer Map (Satellite Image)