Reply/Rejoinder by Applicant

BEFORE THE NATIONAL GREEN TRIBUNAL,
SITTING AT KOLKATTA
ORIGINAL APPLICATION NO. 04/2026/EZ

(Under Section 14 of the National Green Tribunal Act, 2010)

INTHEMATTEROF:

PARMOD KUMAR SWAIN **.....APPLICANT**

VERSUS

THE STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY (SEIAA), ODISHA& OTHERS

.....RESPONDENTS

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DRAWN AND FILED BY

DT. 11.05.2026
BHUBANESWAR

PRAVA RANJAN MISHRA
PLOT NO. 652, EKAMRAVILLA
NAYAPALLY, BBSR-21
ODISHA
earth_environment2008@yahoo.com

BEFORE THE NATIONAL GREEN TRIBUNAL,
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.....RESPONDENTS

REPLY TO THE COUNTER BY RESPONDENT NO. 6

MOST RESPECTFULLY STATE AS FOLLOWS:- 11 MAY 2026

1. That in reference to para no. 1 to 3, this Applicant has no comment.
2. That in reference to para no. 4, the alleged inspection Dt. 20.03.2026 is not conducted and the Applicant has been assured by the authority that due to March 26th workload, the inspection will be made in the 2nd week of April
3. That in reference to para no. 5, 6 & 7 has no comment.
4. **Site visit observation by the Respondent.**
   The conditions are copied from the E.C. documents but no field deviation has been reported. And the approval with regards to use of embankment is admitted and no action has been taken for unauthorized use. Further the mechanized illegal mining in violation to E.C. condition is not reported.

NOTARY PRATAP KUMAR DALAPATHERA BHUBANESWAR Regd. No. ON-46/2009 Expiry Date-02.03.29 ODISHA

Even though the E.C. compliance has been filed that, the mining is being carried out through local laborer only. The copy of the E.C. compliance submitted by the proponent is annexed herewith as **annexure-M**

5. That, it is also recorded that, 22,000 Cum. replacement is possible as per the mined out void. The copy of the replacement report is annexed herewith as **Annexure-N.**

DRAWN AND FILED BY

DT. 11.05.2026
BHUBANESWAR

PRAVA RANJAN MISHRA
PLOT NO. 652, EKAMRAVILLA
NAYAPALLY, BBSR-21
ODISHA
earth_environment2008@yahoo.com

REJOINDER AFFIDAVIT ON BEHALF THE APPELLANT

1. I, Sri Pramod Kumar Swain, aged about 67 Years, S/o Late Pranakrushna Swain At- Pratap Nagari, Po- Bhanapur, PS-Cuttack Sadar, Dist- Cuttack, Odisha-753011, do hereby solemnly affirm and say as follows:-
2. I am the applicant of the above noted O.A
3. That the above statements are true to my knowledge.

Prepared in my office

Advocate

THE ABOVE NAMED DEPONENT HAS IDENTIFIED BY ADV. BBSR APPEARS BEFORE ME AND STATE AN OATH ON 11/5/26 AM/PM THAT THE CONTAINTS OF THIS AFFIDAVIT ARE TRUE TO HIS KNOWLEDGE AND NOTHING SUPPRESSED

Pramod Kumar Swain
Deponent

NOTARY PRATAP KUMAR DALABEHERA BHUBANESWAR Regd. No. ON-46/2009 Expiry Date-02.03.28 GOVT. OF ODISHA

P K DALABEHERA
Notary, Bhubaneswar
Regd. No. ON-46/09

VERIFICATION

I, Sri Pramod Kumar Swain, aged about 67 Years, S/o Late Pranakrushna Swain At- Pratap Nagari, Po- Bhanapur, PS-Cuttack Sadar, Dist- Cuttack, Odisha-753011, do hereby humbly verified that, the statement made in paragraphs 1 to 5 are true and correct to the best of my knowledge, information and belief.

I sign this verification on this the 11th day of May 2026.

IDENTIFIED BY

ADVOCATE

Pramod Kumar Swain

VERIFICANT

Before me

Compliance Report of the Conditions laid down in the Environment Clearance vide File no. 54874/195-MINB1/02-2022 Dated 03.06.2022 Bhubaneswar in respect of Pratapnagari Sand Quarry over an area of 13.00 Acres of 5.26 Ha. In village Pratapnagari under Cuttack SadarTahasil, Cuttack district, Odisha.

Sl. No.	Conditions of Environment Clearance	Compliance status of EC
7.1	This Environmental Clearance is given with a condition that "maximum depth of digging of sand shall be 1.5m and maximum permissible quantity of sand is 15780 cum in the 1st year; pending submission of rate of replenishment study at site. The rate of replenishment study at the site shall be conducted and report shall be submitted by November, 2022 as per the prescribed method (enclosed as Annexure)". In the Granted Amendment EC, the Annual rate of Replenishment study report (ARRS) through ORSAC empanel vide Amendment EC Granted File No. 54874/195-MINB1/02-2022, dated: 21.11.2024.	The sairat source has been non-operational since the execution of the lease deed i.e. 23.08.2022 to 02.01. 2026. The Production excavated quantity certified from Mining Officer, Cuttack is enclosed as **Annexure-I.** only post-monsoon survey report is submitted during the year 2025. The Pre-Monsoon survey could not be carried out before monsoon due to legal issues i.e a case was pending before Hon'ble High Court of Orissa, Cuttack [WP(C) No. 32830 of 2024]. In obedience to the order of Hon'ble High Court of Orissa, in W.P.(C) No. 32830 of 2024 encroachments in the approach road to the said area was removed on 02.12.25. The Geotagged Photographs are Enclosed as Annexure-4.
7.2	In view of the likely revision of DSR for Cuttack District in future the details of this minor mineral reserve to be ascertained in the revised DSR.	the revised DSR of minor minerals is approved by SEIAA, Odisha. The DSR Copy is uploaded.
7.3	In view of the difference commonly found is sand deposits, the determination of mining lease by local Tahasildar considering the dimensions like average length, breadth and height of the deposits to be re-ascertained by the Revenue Department and RQP for final. exploitation of sand and higher revenue for the state of Odisha.	The lease area has been surveyed, demarcated through pillar posting and the extraction is confined to the Quarry Level area. The future quantity will be as per the replenishment report.
7.4	All the provisions of Sand Po Govt. Of Odisha dated 02.09.2021 to be followed for this sand mining project.	All provisions of Sand Policy of Govt. of Odisha dated 02.09.202'1 have been followed for this sand mining project.
7.5	Revised mining plan shall be prepared based on essential physical criteria as per Enforcement and Monitoring Guidelines for Sand Mining, January 2020 of MoEF& CC, Govt. of India enclosed in Annexure. Lay out of Progressive Mine Closure Plan shall also be incorporated in the revised mining plan.	The present mining plan is as per the format of OMMCR 2016 and shall be modified if the quantity of extraction as per replenishment report exceeds the presently planned quantity and revised EC would also be obtained.
7.6	Adequate measures shall be taken to prevent unauthorized mining.	Adequate measures including penalizing unauthorized excavation have been undertaken by the competent authority.

Prakash Ch. Rautaray.

7.7	Sedimentation flow shall be determined through a study during per-monsoon & post-monsoon period.	The path of flow of sediments along with the river water has not been affected due to the quarrying or related operations.
7.8	Permission to use public road including Ring road, Cuttack from the appropriate authority shall be obtained by PP including its maintenance shall be done.	The transportation of sand through public road including the ring road has been done in the knowledge of the Mining Officer, Cuttack and the PP has deposited the fund towards DMF from which the maintenance of the roads can be made by the district administration.
7.9	A site visit to be planned by SEAC in 3 months' time to ensure implementation of agreed measures.	Noted
7.10	All the individual quarry lessee holders coming under the Tahasil, Cuttack Sadar jurisdiction shall create a common forum in coordination with the Tahsildar and contribute funds to it for grading, compaction and maintenance of haulage road used for transportation of mineral, plantation of saplings of native tree species along the approach roads, river banks and in community areas in consultation with the Gram Panchayat, etc for Prevention of environmental pollution and damage during mining activity. All mining activity shall be done in scientific manner to safeguard degradation of environment. All the individual lease holders of the Tahasil shall implement the EMP as proposed for the project. The Tahasildar shall ensure the compliance of this condition along with all lease holders of his jurisdiction.	Noted. All mining activities have been done in scientific manner to safeguard degradation of environment.
7.11	The project proponent has to carry out by engaging appropriate consultant, a study of the annual replenishment rate of sand by collecting pre monsoon & post monsoon data from the field to know the quantum of volume of sand deposited/replenished & extracted in the mining lease area. The detailed comparison of both pre-monsoon and post-monsoon elevation data shall be included in the study report. The detailed methodology for finding the rate of replenishment study of sand is laid down in the Enforcement & Monitoring Guidelines for Sand Mining, 2020 issued by the MoEF& CC, Govt. of India. The finding of the study shall be submitted to SEIAA to assess the actual rate of replenishment of mined out sand in the lease area. Pending carrying out of the study & submission of the report, this clearance is being granted in an adhoc manner and is liable to be revoked after one year if satisfactory replenishment study report is not submitted. The submission of study report of rate of annual replenishment of sand within one year is obligatory for the project proponent.	The replenishment Report has been prepared by collecting post-monsoon data from the field as laid down in the Enforcement & Monitoring Guidelines for Sand Mining, 2020 issued by the MoEF& CC, Govt. of India and submitted.

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7.12	The project proponent should carry out River bed sand mining manually by engaging local laborers in force to check over exploitation of sand at the source.	The project proponent has carried out River bed sand mining manually by engaging local laborer.
7.13	Any change in the plan or quantity to be produced shall require prior approval of SEIAA.	Noted and complied (Necessary permission/approval will be taken from SEIAA, Odisha if there is any changes in mining related work).
7.14	The Tahasildar has submitted the cluster certificate of the mines located within 500 meters from the periphery of the proposed mine lease area. This EC is liable to be cancelled/revoked if the submission on cluster is found to be incorrect/false in future.	Noted and abide the conditions (The Quarry does not come under any sand mining cluster).
7.15	There shall be a 'no working zone' to protect the embankment on both sides, road or rail bridge in the vicinity, if any, dam, weir, water intake structure of irrigation or drinking water project, or any cross-drainage structure. 10 % of the width of river shall be left intact along the embankments on both sides as 'no mining zone'. Further, no mining shall be allowed within 200 m of any existing structures dam, weir, water intake structure of irrigation or drinking water project, or any cross-drainage structure. In case of River Bridge, this no mining zone shall extend upto a minimum stretch of 200 meters from the said bridge and it may extend upto 500 meters in sensitive locations. The lease area shall be accordingly curtailed to carve out the actual sand mining area within the leasehold. Exact map of the lease area, and the 'no mining zone' shall be drawn to scale, showing the DGPS coordinates of all corner points, and the location of the bridge, embankment, extraction route & other structures; and such map has to be submitted to SEIAA by the project proponent through the Tahasildar within three months of the date of issue of the EC. The quantum of sand allowed to be extracted will be worked out on the basis of the actual working area.	Noted (Mining has not been undertaken in any 'no working zone'. There are no existing structures such as bridge, dam, weirs, intake structure either for irrigation or drinking water purposes, or any other cross drainage structure within 500m of sand quarry).
7.16	The lease area and the actual working area shall be demarcated on the ground by erecting durable masonry /concrete pillars by the project proponent and photographs of proof of the same shall be submitted along with six monthly compliance report.	Complied (Concrete Pillars are already posted in the lease area).
7.17	The project proponent shall take prior statutory and regulatory clearance as required from the concerned authorities in respect of the project, before carrying out any operation.	Complied (All statutory clearance has been obtained from competent authority before quarry operation)

Ramesh Ch. Rautaray

7.18	Mining is not permissible within the water channel or stream flow area. No stream shall be diverted for the purpose of mining and no natural water course shall be obstructed. The mining or any ancillary activity shall not in any way disturb the flow pattern of the river water during the non-monsoon period. There shall be no sand mining in the river during the rainy season or when there is flow of water in the river.	Mining has not been made within the water channel or stream flow area. No stream has been diverted for the purpose of mining and no natural water course has also been obstructed. The mining and related ancillary activities have not disturbed the flow pattern of the river water during the non-monsoon Period. There has been no sand mining in the river during the rainy season or when there is flow of water in the river.
7.19	Sand mining operations shall not affect the existing sources for irrigation / drinking water/industrial purpose.	The mining activity has not affected the existing source for irrigation or drinking water or industrial use.
7.20	The natural sand dunes, if any, near or surrounding the lease area shall not be disturbed.	No such natural sand dunes near or surrounding the lease area.
7.21	No transportation of the minerals shall ordinarily be allowed on any road passing through villages/habitations/forest land without prior explicit permission. Transportation of minerals through existing rural roads can be allowed only by the concerned Govt. Department/Gram Panchayat/BDO and only after required strengthening, such that the carrying capacity of road is increased to handle the sand truck traffic. The project proponent shall bear the cost towards the widening and strengthening of existing public roads in case the same is proposed to be used for the project. No movement on any road is allowed on existing village road network without appropriately increasing the carrying capacity of such roads. Project proponent shall ensure that the road may not be damaged due to transportation of the mineral and transport of minerals will be as per IRC Guidelines with respect to complying with traffic congestion and traffic density. Plying of sand extraction trucks may be allowed on roads / path ways passing close to schools, temples, hospitals and such other public places only with prior written permission of competent authority.	Noted and follow/abide the condition (As the approach road not passing through the villages, so no such deviation is envisaged. Permission was obtained from appropriate authorities for strengthening, such that the carrying capacity of road is increased to handle the sand truck traffic. The project proponent is ensured to transport of mineral as per IRC guidelines).
7.22	Vehicles hired for transportation of sand from the site should be in good condition and should have pollution check certificate and should confirm to applicable air and noise emission standards and should be operated only during non-peak hours.	The vehicle used for transportation have PUC certificate.
7.23	The vehicles shall not be overloaded and shall be covered with Tarpaulin. The Tahasildar may collect an appropriate road maintenance levy from the lessee as part of the lease conditions on the basis of quantum of sand transported, and utilize the proceeds of the levy for proper maintenance of the extraction paths and roads to prevent their degradation on account of plying of sand trucks.	No overloading is permitted and the sand is being transported through covered vehicle.

Prakash Ch. Panigrahy

7.24	The project proponent shall take all precautionary measures against causing damage to flora and fauna of the locality. The PP shall plant and nurse to full establishment a minimum of 100 number of saplings of native tree species along the approach roads, river banks and in community areas in consultation with the Gram Panchayat. Photographs of proof showing the plantation shall be submitted along with compliance report.	All precautionary measures have been taken for protection and conservation of flora and fauna and plantation has been carried out along the approach road and river bank.
7.25	Water spray should be made on the road/extraction paths to control dust emission during transportation of sand.	Sprinkling of water being carried out in village road while transportation of sand.
7.26	Bio-toilet provision of shall be made by the project proponent.	Noted and it will be done as and when required.
7.27	The Project Proponent shall undertake phased restoration, reclamation and rehabilitation of land affected by mining and completes this work before abandonment of mine.	Noted and abide the conditions (Phased restoration, reclamation and rehabilitation of land is not required as this is mining within the river course).
7.28	Environmental Management Plan (EMP) shall be implemented by PP to ensure compliance with the environmental conditions specified above. The year wise funds earmarked for environmental protection measures shall be kept in separate account and shall be spent according to the plan proposed. Year wise progress of implementation of EMP shall be reported to the SEIAA, Odisha and OSPCB along with the compliance report.	Provisions of EMP has been implemented. Fund towards EMF has been deposited to appropriate authority on demand for which an undertaking has been submitted by the PP in the mining Plan.
7.29	The proponent shall take necessary measures to ensure that there is no adverse impact of the mining operations on the human habitation if any, existing nearby.	No human habitation existing nearby the lease area.
7.30	It shall be mandatory for the project management to submit quarterly compliance reports on the status of implementation of the above stipulated environmental safeguards to the SEIAA, Odisha / SPCB, Odisha/ Regional Office of the MoEF& CC, Bhubaneswar, in hard and soft copies on 1st day of January, April, July, October of each calendar year, failing which EC is liable to be revoked. The proponent shall upload the compliance report including results of monitored data. as applicable in the website of the Ministry for monitoring of EC Conditions.	This is the first compliance report submitted. Henceforth, quarterly report shall be prepared and uploaded in the portal before stipulated dates.
7.31	River Bank stabilization shall be made through stone patching. Plantation of adequate number native species on river banks and both sides of haulage roads shall be made.	We will carry out various precautionary measures for stabilization of river bank like stone packing, mulching of grass and plantation of trees along the river embankment.

Prakash Ch. Rautray

7.32	The activities proposed in action plan prepared for addressing the issues raised during the Public Hearing shall be completed as Per the budgetary provisions mentioned in the action plan and within a stipulated time frame. The Status Report on implementation of action plan shall be submitted to the concerned Regional Office of the Ministry along with District Administration.	Noted and complied
7.33	The project Proponent shall comply in true sprit all the issues raised and recorded in Proceedings of Public hearing w.r.t. environment /pollution/ CER shall be complied by the Mining Authority as per OM F. No.22-6512017-IA.III, dated 30.09.2020 of MoEF&CC, Govt. of India.	The project proponent is complying all issues raised and recorded in proceedings of public hearing w.r.t. environment / pollution.
7.34	Stone patching on river bank with plantation in between and the ramp construction shall be done in consultation with and advice of concerned Water Resource Department, Government of Odisha.	precautionary measures for stabilization of river bank like stone packing, mulching of grass and plantation of trees along the river embankment.
7.35	At the end of mine closure, the proponent shall immediately remove all the sheds put up in the quarry and all the equipment in the area before closure of the quarry.	Noted and abide the condition (Removal of all the sheds put up in the quarry and all the equipment in the area before closure of the quarry.
7.36	The conditions stipulated in the environmental clearance will be closely monitored on the ground by the lease granting authority, i.e. the Tahasildar, who shall ensure that the project proponent submits quarterly compliance reports.	All the stipulated condition in the environmental clearance has been closely monitored on the ground by the lease granting authority.
7.37	The concerned Regional Office of the MoEF&CC/ SPCB, Odisha shall periodically monitor compliance of the stipulated conditions as applicable for this project. The project authorities should extend full cooperation to the MoEF&CC officer(s)/SPCB officer(s) by furnishing the requisite data/information/monitoring reports.	The PP would extend all cooperations to the MoEF&CC office(s)/ SPCB office(s) by furnishing the requisite data I information / monitoring reports.
7.38	A copy of this Environmental Clearance letter shall be displayed on the website of the Odisha State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries center and Collector's Office/ Tehsildar's office for 30 days.	Noted & complied
7.39	The project proponent shall advertise in at least two local newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry. The advertisement shall be made within seven days from the date of receipt of the Clearance letter and a copy of the same shall be forwarded to the Regional Office of MoEF & CC, Bhubaneswar.	Noted & complied

Prakash Ch. Rautray

7.40	A copy of the clearance letter shall be sent by the proponent to concerned Gram Panchayat /Panchayat Samiti /Zila Parisad /Municipal Corporation / Urban Local Body as the case may be A Copy of the environmental clearance letter can be downloaded from the Ministry portal (www.parivesh.nic.in).	A copy of Environment Clearance letter has been given to Sarpanch, Gram Panchayat/ Zila parisad.
7.41	Project proponent shall obtain Consent to Operate from the OSPCB and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the State Pollution Control Board.	Necessary approval for CTO has been obtained from OSPCB and Mining Operation has been carried out as per the CTO.
7.42	The SEIAA, Odisha may revoke or suspend this EC, if implementation of any of the above conditions is not satisfactory. The SEIAA, Odisha reserves the right to alter /modify the above conditions or stipulate any further condition in the interest of environment protection.	Agreed. Necessary implementation for stipulated conditions has been done.
7.43	The Project Proponent (lease holder) shall inform the SEIAA of any change in ownership of the mining lease. In case, there is any change in ownership or mining lease is transferred, then mining operation can be carried out only after transfer of EC as per provisions of the para 11 of EIA Notification, 2006, as amended from time to time.	Noted and abide the condition.
7.44	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this environment clearance besides attracting penal provisions in the Environment (Protection) Act, 1986.	No factual information has been concealed.
7.45	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.	Noted and necessary separate orders are obtained which are applicable for the project during mining.
7.46	This Environmental Clearance (EC) is subject to orders/judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.	Noted and abide the condition.
7.47	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under section 16 of the National Green Tribunal Act, 2010.	Noted but not required.

(Signature of Lessee)
Name: Prakash Chandra Rautaray

Prakash Ch. Rautaray

AUTHORIZATION

Sir,

I do hereby undertake that, I Sri Prakash Chandra Rautaray, S/o- Late Pramod Kumar Rautaray at- Durgapur, po- Bajapur, P.s- Khordha Sadar, Dist-, Khordha,Pin-752060,Odisha. The successful bidder of Kuakhai River Sand, Pratapnagari over an area 13.00 Acre or 5.26 Hectares in village Pratapnagari under, Sadar Cuttack Tahasil of Cuttack District, Odisha. I am the successful bidder and will sign the entire document as and when required.

Prakash Ch. Rautaray.

(Sri Prakash Chandra Rautaray)
Lessee of Kuakhai River Sand, Pratapnagari
Date: 03.01.2026

REPLENISHMENT STUDY REPORT (POST-MONSOON)

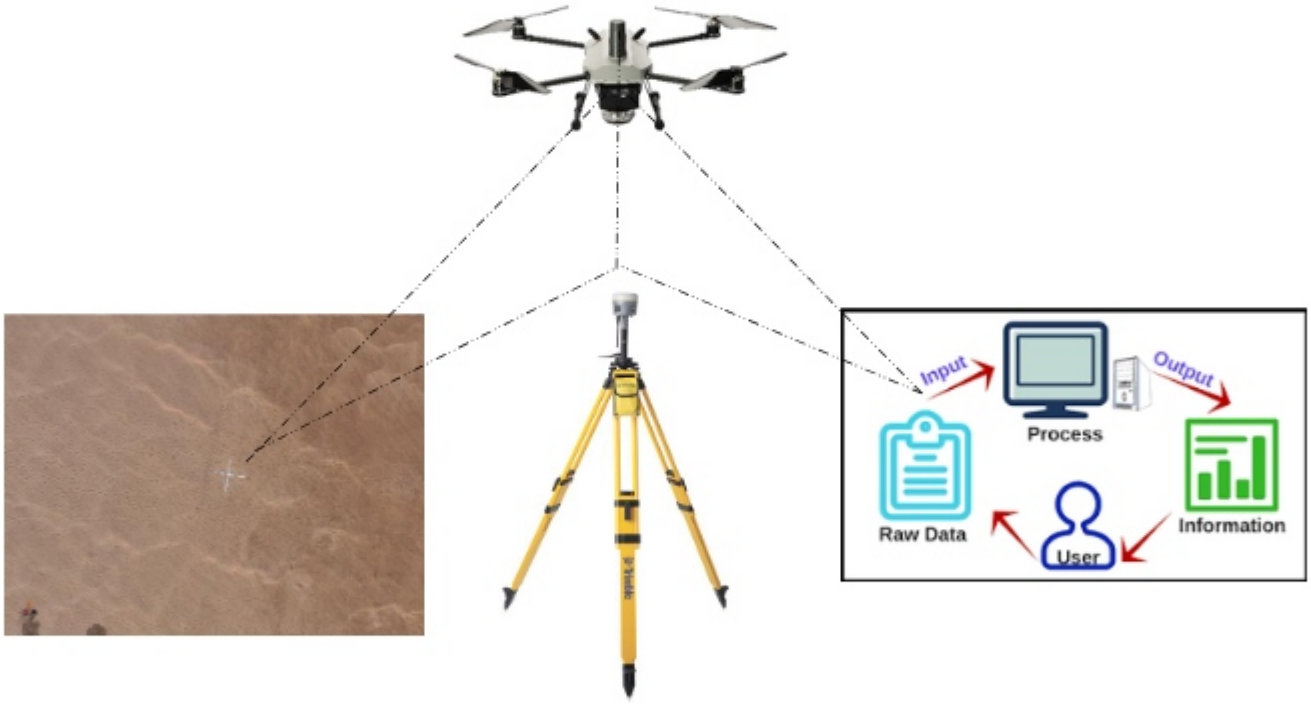
KUAKHAI RIVER SAND, PRATAPNAGARI

OVER 13.00 ACRES OR 5.26 HECTARES IN VILLAGE PRATAPNAGARI UNDER SADAR CUTTACK TAHASIL OF CUTTACK DISTRICT, ODISHA

Prepared on behalf of

SRI. PRAKASH CHANDRA RAUTARAY

(Lessee)



Survey & Report Prepared By:

M/s. TKS Consultancy Services,

(ORSAC Empaneled Agency)

Plot No-4482/12068, Pandara, Near Puri N.H, GGP Colony, Rasulgarh, BBSR, Khordha, Odisha-751025

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CONTENTS

1.1 Preamble

The sand is a valuable and essential natural resource required for development of infrastructure. Sand is available in river beds, beaches. Mainly river sand is being used as a building material. The demand for sand has grown manifold in recent past for construction of Roads, Railway lines, Industries, Ports and buildings etc.

Odisha is rich with natural minor mineral resources. Sand deposits are found in river systems, sand dunes, and beaches in Odisha. However, all sand deposits are not suitable for construction work. Mainly river sand is being used for construction of road, railway, industry and buildings in Odisha. Odisha has many river systems with sand deposits. Almost all districts have rivers with sand deposits. Mahanadi, Bramhani, Baitarani, Budhabalang, Subarnarekha, Rushikulya, Bansadhara, Nagabali, Indravati, Ong, Tel etc. River networks provide rich source of sand deposits.

Sand deposits along the river courses occur as sand bars/ channel bars and levees. All sand deposits in rivers are not suitable for construction purposes. Haphazard mining from river channels may cause channel instability and river geometry and damage the embankments and bridges.

A scientific and engineering study is essential for finding suitable locations for sand mining and excavation for use as construction material. Remote sensing and GIS can be used for mapping of all rivers, river flow channels, sand deposit bars, existing sand mining areas and embankments along the river channels considering the morphology of the river from temporal data. The spatial distribution of sand deposits along with information on their temporal seasonal variations, geo-environmental status, river morphology and the criteria for its mining as stipulated by the water resources department (the engineering perspective) and by the SPCB for environmental aspects are required to be studied in an integrated manner.

The suitable areas identified for sand mining can be overlain with georeferenced cadastral maps for identification of plots/mouzas. The approachability to mining site is also important.

While finalizing the areas for sand mining the connectivity for transportation and requirement of land should also be considered. The areas proposed for mining should then be demarcated by posting of pillars and individual areas should be earmarked by DGPS survey after finalization by Revenue and Mining Department. The demarcation pillars near

flow channels may be damaged due to flood/ change in stream flow. But the DGPS surveyed coordinates would be helpful for restoration/demarcation of lease boundaries.

The mining activities can be taken up in accordance with mining laws. The mining activities can be monitored for encroachment, illegal mining, volume of excavation using advanced technologies like drone survey, terrestrial lidar, High-resolution satellite stereo images along with Artificial Intelligence (AI)/ Machine learning (ML)/ Mobile technologies (Mobile apps). The vehicle tracking systems (VTS) can also be implemented/used for the vehicles transporting the materials.

The annual rate of replenishment study report has been carried out as per MoEF & CC Guideline the project proponent has to carry out by engaging appropriate consultant, a study of the annual replenishment rate of sand by collecting only post -monsoon data from the field to know the quantum of volume of sand deposited & extracted in the mining lease area. The detailed post-monsoon elevation data shall be included in the study report. The replenishment rate of sand may be calculated by using the volumetric survey method or any other methods as laid down by the MoEF & CC, Govt. of India. Sri Prakash Chandra Rautaray has engaged M/s. TKS Consultancy Services, Bhubaneswar to carry out the Replenishment Study and to submit the report with recommendation.

Since accuracy of UAV data for volume measurement compared to conventional techniques such as a Total Station has been evaluated and proven better than the conventional method, So TKS Consultancy studied the requirement and understood that using Drone survey the accurate estimation of replenishment, which is also comply the methodology as detailed in Enforcement & Monitoring Guidelines for Sand Mining, 2020. So, TKS Consultancy Services which is an ORSAC empanelled vendor for Drone and DGPS survey, who have carried out the Drone/DGPS survey for this purpose.

1.2 Purpose of the Study

The need for replenishment study for river bed sand is required in order to nullify the adverse impacts arising due to excess sand extraction. Mining within or near river bed 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 river line 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.

1.3 Scope of the Study

An Unmanned Aerial Vehicle (UAV), commonly known as drone, was used to carry out survey of the area. Drone is an aircraft without a human pilot on board. The main objective of this survey in the present project was to obtain the Digital Elevation Models (DEM) of the area by getting the elevations at all points of the study area and access elevation of points/grids wherever required. DEM is the digital representation of topographic and manmade features located on the surface of the earth. Drone consist mainly a vehicle itself, a ground-based controller, and a system of communications between the two. The report aims to quantify the amount of replenishment of sand on the basis of survey done with UAV/Drone during Post monsoon '2025. The scope of the study are;

- Identification of lease boundary from the approved mining plan
- Study of post monsoon status of the lease area on the topographical survey.
- Prepare Digital Elevation Model (DEM) and Digital Terrain Model (DTM) of the lease area.
- Estimation of the replenishment by comparing both post monsoon survey data.
- Actual workable deposit as on date & Recommendations.

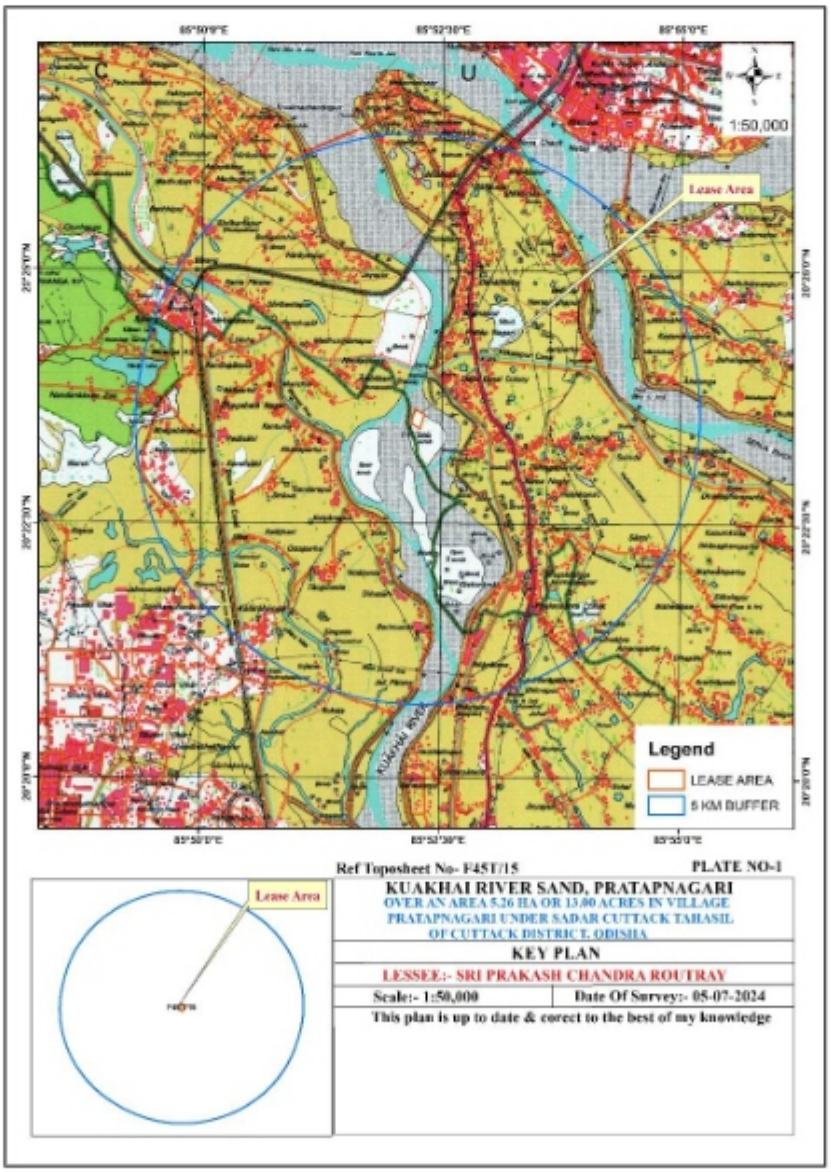
CHAPTER-2

LOCATION AND PROJECT DESCRIPTION

2.1 Location of the Survey Site:

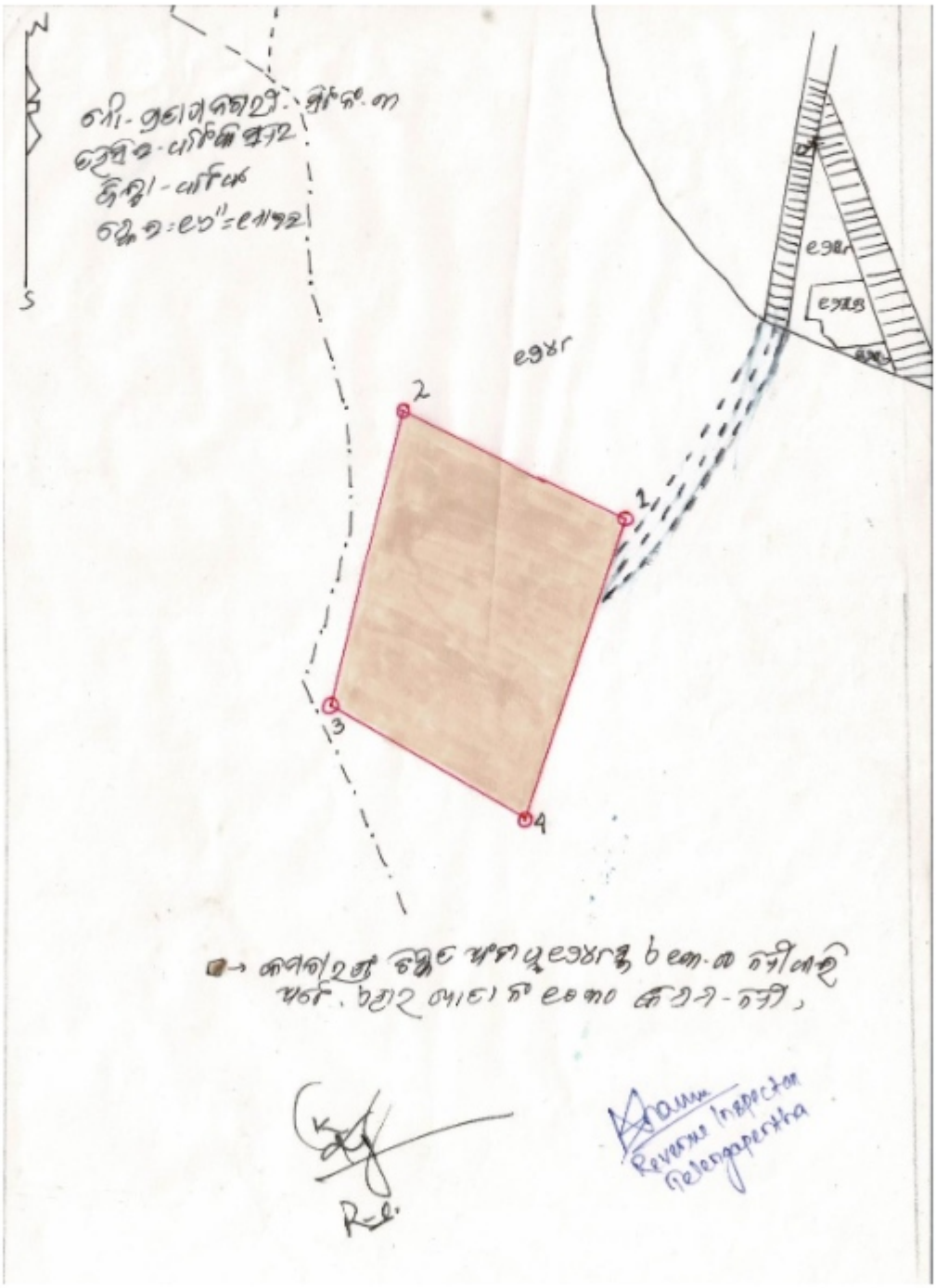
The lease area of Kuakhai River Sand, Pratapnagari over an area of 13.00 acres (5.260 ha.) is located in Village- Pratapnagari under Cuttack Sadar Tahasil, of Cuttack district of Odisha. The lease area is located in the Survey of India Top sheet no. F45T/15 and the area bounded between the latitudes of 20° 23' 26.619" N to 20° 23' 38.304" N and Longitudes 85° 52' 11.120" E to 85° 52' 19.583" E. The Bed area is accessible from NH- 16 covering 01.10 kms and from Cuttack Town is 7.78 Kms. The location of the lease has been shown in the following image with red colour lease boundary.

Location map/Key plan



Land schedule of the lease area

Mouza	Khata No	Plot No	Area in Ac	Kissam
Pratapnagari	1030	1248(P)	13.00	Nadi
Total			**13.00**	



2.2 Approved mining plan

The Modification of Mining plan of Kuakhai River Sand, Pratapnagari under Pratapnagari Mouza of Cuttack Sadar Tahasil of Cuttack District has been approved by Deputy Director Geology, authorised officer, Directorate of mines & Geology, Bhubaneswar Odisha, on dated 30-07-2024 in favour of Sri Prakash Chandra Rautaray, Lessee.

GEOLOGICAL RESORCE CALCULATION OF SAND AS PER APPROVED MODIFICATION OF MINING PLAN

Surface area (m^2)	Thickness of Sand (m)	Volume of Sand (m^3)	Category
A	B	C = A X B	D
52611	1.5	78916.5	Probable

MINEABLE RESERVE CALCULATION OF SAND AS PER APPROVED MODIFICATION OF MINING PLAN

Surface area (m^2)	Thickness of Sand (m)	Volume of Sand (m^3)	Extractable Mineable Reserve (m^3)	Category
A	B	C= A X B	D = C X 0.6	E
45820	1.5	68730	41238	Probable

2.3 Environment Clearance

The environmental clearance of Kuakhai River Sand, Pratapnagari has been obtained in favour of the Lessee Sri. Prakash Chandra Rautaray vide file No. 54874/195-MINB1/02-2022on dated 03.06.2022. The SEIAA, Odisha has allowed to extract only 15780 cum/annum. Hence the Amendment EC has been granted in favour of Sri. Prakash Chandra Rautaray, Lessee Vide File No.- 54874/195-MIN/02-2022, dated 21.11.2024. The SEIAA, Odisha has allowed to extract only 9900 cum/annum of sand from the lease area. (Copy attached as Annexure -1).

CHAPTER-3

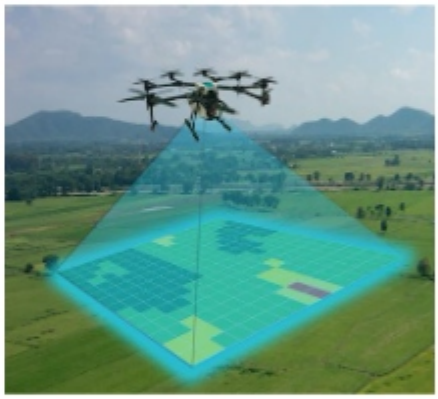
REPLENISHMENT SURVEY

3.1 Methodology

To carry out the volume assessment, replenishment study has done by UAV/Drone survey & DGPS survey.

It requires three-time survey in different time period. The first survey should be carried out during the month of May/June to record quantity excavated before monsoon. The second survey has to be carried out after monsoon during the month of Sept/Oct to know the quantum of material deposited in the mining lease. The third survey at the end of the march to know the quantity of material excavated during the financial year. For the subsequent years, same practice will be continued. Presently, for the purpose of replenishment study, two surveys were carried out for data acquisition, the first one for post monsoon data by using UAV/ Drone.

3.2 Drone Survey



A drone survey refers to the use of a drone, or unmanned aerial vehicle (UAV), to capture aerial data with downward-facing sensors, such as RGB or multispectral cameras, and LIDAR payloads. With a drone, it is possible to carry out topographic surveys of the same quality as the highly accurate measurements collected by traditional methods, but in a fraction of the time. This substantially reduces the cost of a site survey and the workload of specialists in the field. This technology has promising potential in the survey of sand mining zones due to its fast and reliable output deliveries. During a drone survey with an RGB camera, the ground is photographed several times from different angles, and each image is tagged with coordinates. From this data, photogrammetry software can create geo-referenced orthomosaics, elevation models or 3D models of the project area. These maps can also be used to extract information such as highly-accurate distances or volumetric measurements. Unlike manned aircraft or satellite.

3.3 Survey Procedure

- **Preparation:** Planning is a major role before executing any type of job, so in-house planning has been made for data acquisitions like finalization AOI, well distribution of Ground Control Points, preferable location for establishing control point for triangulation.

- **Observation of Reference Point:** The reference point observed in static mode 4 hours of observation near the study area using Survey of India (SOI) CORS (Continuously Operating Stations) network. The static observed data uploaded and processed by the SOI. The GNSS (Global Navigation Satellite System) proceed report of reference co-ordinate point is eclosed as Annexure-III.

Reference point co-ordinate processed by SOI:

Ref. Point Id	WGS84 Latitude	WGS84 Longitude	WGS84 Ellip. Height [m]	Easting	Northing	Elevation (m)
P.NAGARI-BASE	20° 23' 40.7626" N	85° 52' 22.3193" E	-42.1786 m	382386.785	2255558.133	22.59

- **GCP Observation:** Five numbers of GCP have been established in post processing kinematic method by using DGPS (Differential Global Positioning System) for 4 hours of observation near to the lease boundary. Again, reference to the known point five numbers of GCP has been marked through RTK method in distributed manner.
- **Flight Planning:** The lease co-ordinates and the flight plan has been made to capture the front and side overlap percentages for in each flight in reference to global coordinates. Flight path being created in KML format and imported into the controller to capture the imagery with specified parameter like stereo forward overlap 70% & side overlap 70%, mission time, flight path and Grid Sampling Distance etc.
- **Data Acquisition:** Once mission planning has completed, it will be uploaded in Flight controller. Then acquisition has been completed automatically fallowed by the pre-programmed way points.
- **Aerial Triangulation & Bundle Block Adjustment:** The Pix4D software has been used for bundle block adjustment. This operation concerned the selection of the sensor model and the definition of block properties, the image added into the block file, generated tie points and refining of the model. The interior orientation of drone imagery generated automatically in geo-tagged image, which has bundled the images with the scenes. For exterior orientation, ground control points have been used, which are collected from the DGPS survey.
- **Final Output:** Ortho: After running the above steps, ortho rectified imagery has been automatically generated by the software.
- **DTM Generation:** Point cloud data generated automatically in which software the data processed. Final DTM surface generated by point cloud using Global mapper application.

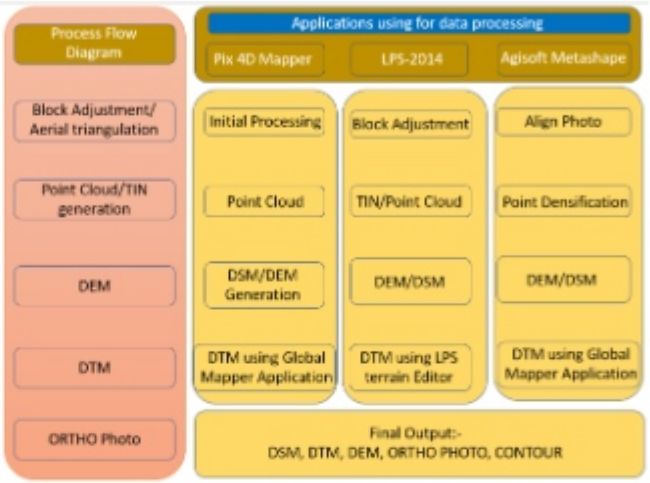
Accuracy Assessment of Aerial Data:

To check the accuracy of generated by drone image, ground truthing has been done at some points across the lease area by DGPS.

Details of instruments/software used:

Instruments	Drone	Camera	DGPS	Laptop
Model/Type	Crystal Ball	RGB	Trimble R12	HP
Software	Pix 4D, Global Mapper, Arc Desktop, Autodesk		TBC	

Output	Ortho, DEM, DTM		GCP	



3.4 Data Processing

The Digital Photogrammetric is a process in which geo-tagged photos are stitched together and produce quality outputs of the site. For example, visual representation, elevation values throughout the site, or analysis for any particular application of the data set. Processing of images with Pix4D included the following main steps:

- Inspecting images & removing unnecessary images.
- Add images into Pix4D;
- Running the initialize process or align camera parameter (Roll, Yaw & Pitch);
- building dense point cloud;
- building digital elevation model (DEM);
- building orthomosaic;

There are 3 major steps the data is processed in Pix4D mapper.

- Initial Processing
- Point Cloud & mesh
- DSM, Ortho Mosaic & index

In the initial processing the results are visualized in the form of a tie point cloud and a set of camera positions. The tie point cloud represents the results of image alignment and will not be directly used in further processing (except for the tie point cloud-based surface reconstruction method, which is suitable only for quick estimates, e.g., of completeness of a data set). But the tie point cloud is necessary for the determination of depth maps (based on

the common tie points camera pairs for the depth maps calculation are selected). However, it can be exported for further usage in external programs. For instance, a tie point cloud model can be used in a 3D editor as a reference. On the contrary, the set of camera positions is required for further 3D surface reconstruction.

The second step is generation of a surface in 3D (mesh) and/or 2D (DEM). Polygonal model (mesh) can be textured for photorealistic digital representation of the object/scene and exported in numerous formats compatible with post- processing software, both for CAD and 3D-modeling workflows.

Dense point cloud can be built by any photogrammetry supported applications based on the estimated camera positions and images themselves (dense stereo matching). Generated photogrammetric point cloud can be merged with LIDAR data or automatically divided into several semantic classes following the project tasks.The digital elevation model (DEM) will be generated based on the dense point cloud data, it can include either both terrain and all the objects above the ground, like trees, buildings and other man-made structures (digital surface model, DSM), or in interpolating method with reference to the GCP it can be created the landscape of the territory (digital terrain model, DTM).

The third step is creating of Orthomosaic, which can be geo-referenced and used as a base layer for various types of maps and further post processing analysis and vectorization. Orthomosaic is generated by projecting the images according to their EO/IO data on a surface of the user's choice: DEM or mesh.

Drone and 3D modeling software has been used to provide highly accurate volumetric measurements of the mining area. The safety barriers were demarcated as restricted in consensus with norms. A clear identification was made between mineable and non-minable area. The data were then stimulated with the help of Pix4D and Global Mapper software to derive at the replenishment.

3.5 Survey output (Pre-monsoon)

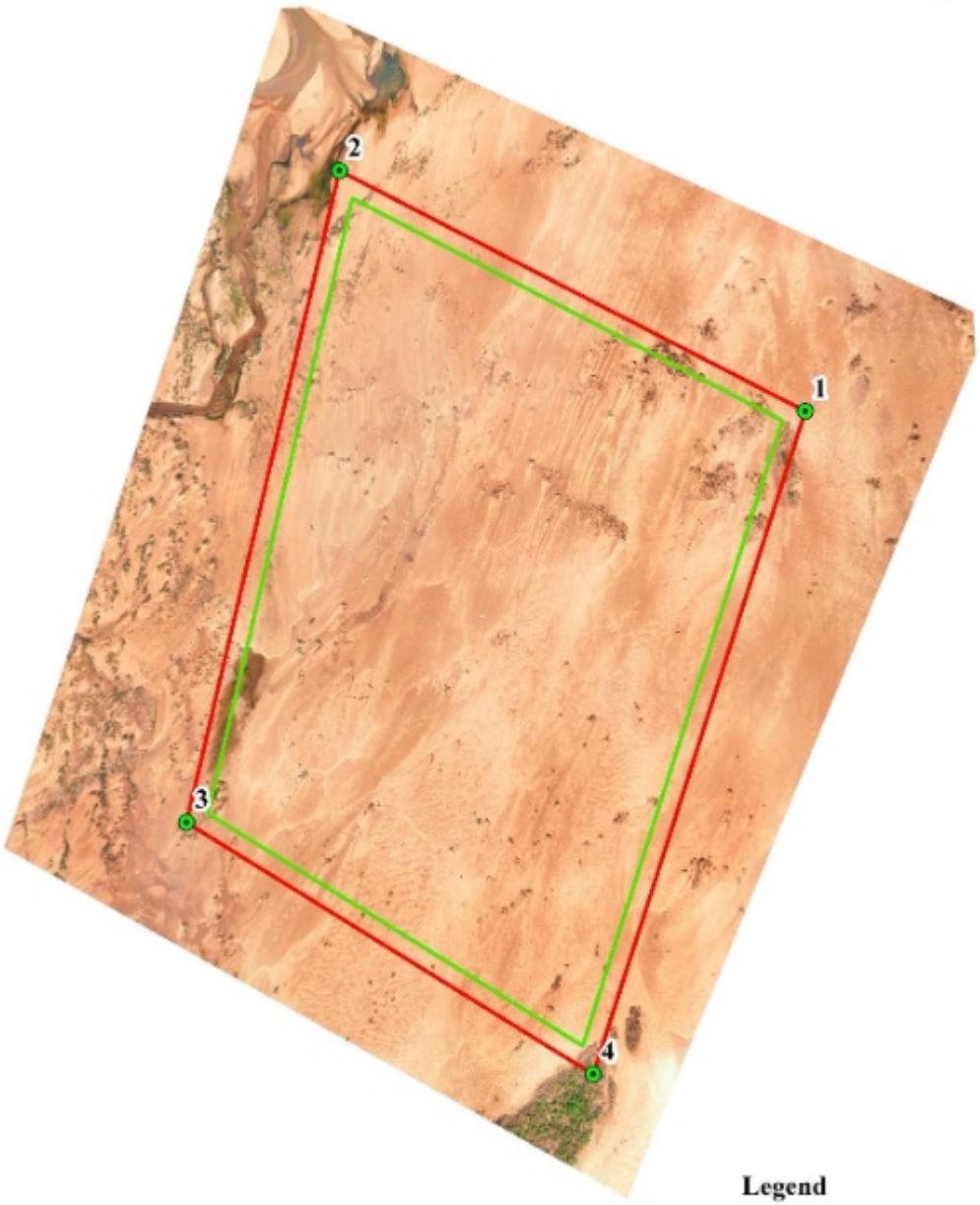
Pre-Monsoon survey could not be carried out before monsoon due to legal issues i.e a case was pending before Hon'ble High Court of Orissa, Cuttack [WP(C) No. 32830 of 2024]. In obedience to the order of Hon'ble High Court of Orissa, in W.P.(C) No. 32830 of 2024 encroachments in the approach road to the said area was removed on 02.12.2025. The Geotagged Photographs are Enclosed as Annexure-4.

3.6 Survey output (post-monsoon)

Post- monsoon Survey was carried out on 14.12.2025 after the monsoon before starting of mining operation. For the data acquisition, the Drone was again used to fly covering the river stretch in the lease area. Details of flights are given in Appendix-1. The major outputs from photogrammetric processing include Ortho- mosaic, Digital Surface Model and Digital Terrain Model. All Photogrammetric outputs have been shown is as follows;

POST- MONSOON

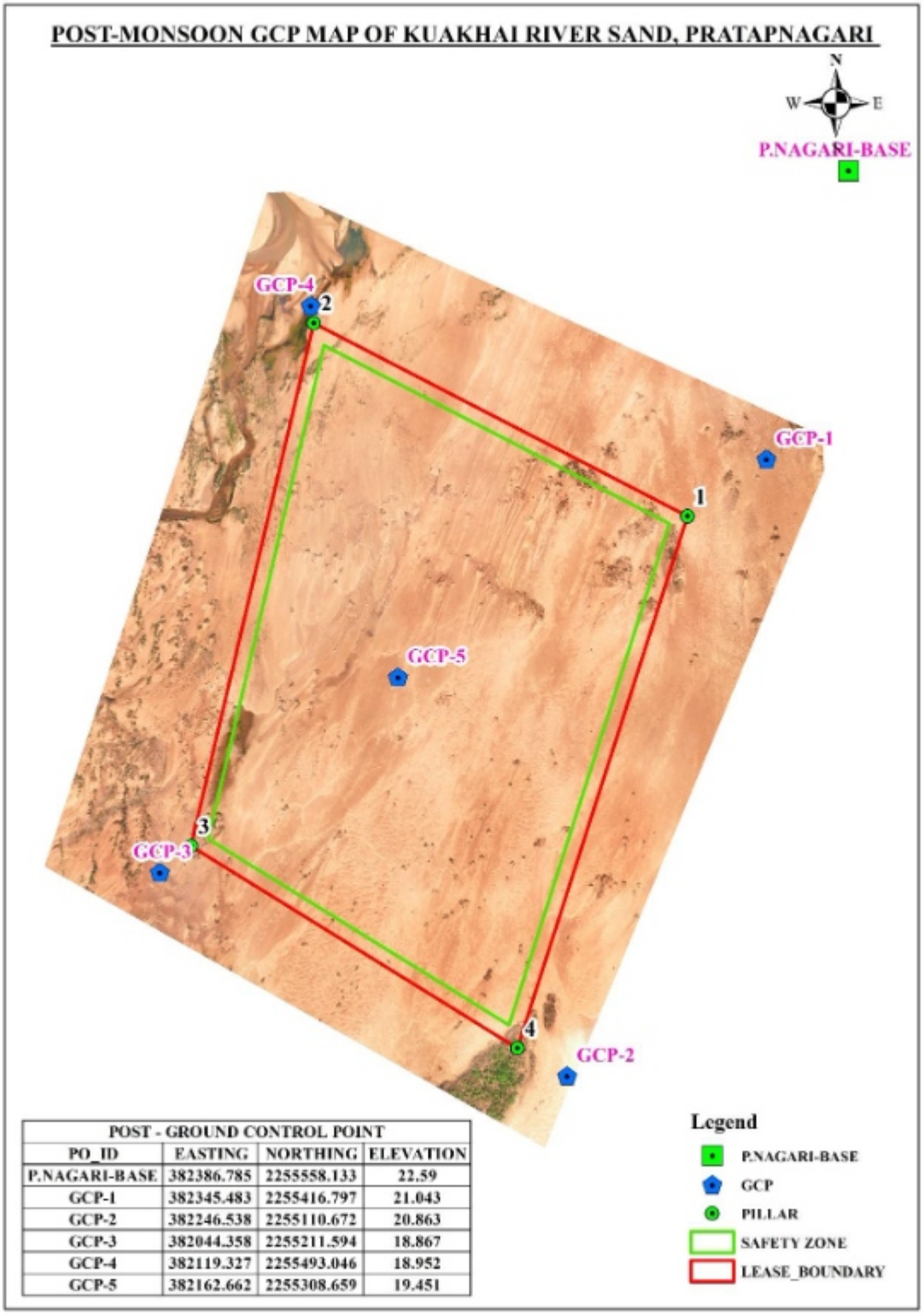
POST-MONSOON ORTHO MAP OF KUAKHAI RIVER SAND, PRATAPNAGARI



(Ortho-mosaic Images of the lease area)

POST-MONSOON

POST-MONSOON GCP MAP OF KUAKHAI RIVER SAND, PRATAPNAGARI

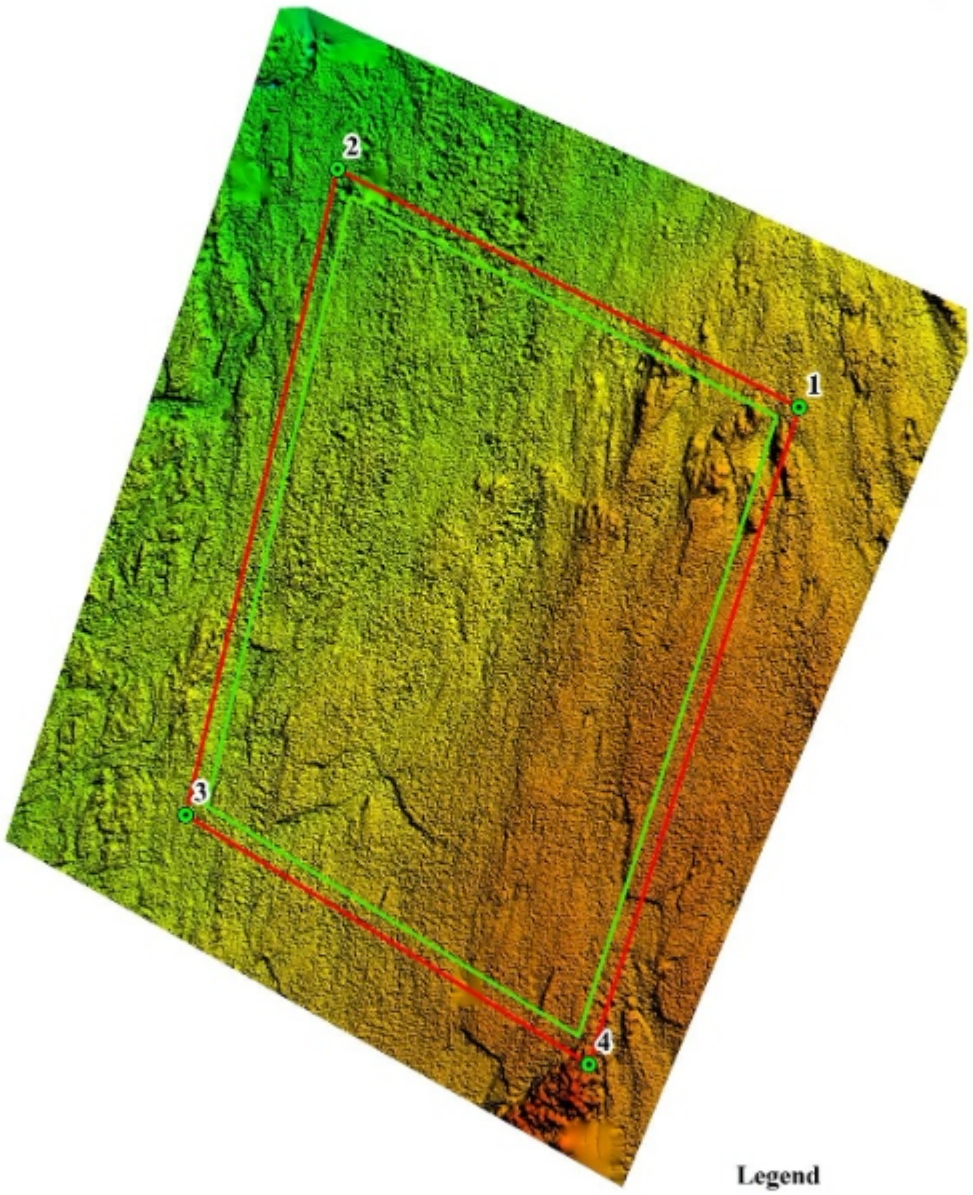


POST - GROUND CONTROL POINT			
PO_ID	EASTING	NORTHING	ELEVATION
P.NAGARI-BASE	382386.785	2255558.133	22.59
GCP-1	382345.483	2255416.797	21.043
GCP-2	382246.538	2255110.672	20.863
GCP-3	382044.358	2255211.594	18.867
GCP-4	382119.327	2255493.046	18.952
GCP-5	382162.662	2255308.659	19.451

(GCP POINT OBSERVED AT KUAKHAI RIVER SAND, PRATAPNAGARI POST-MONSOON)

POST-MONSOON

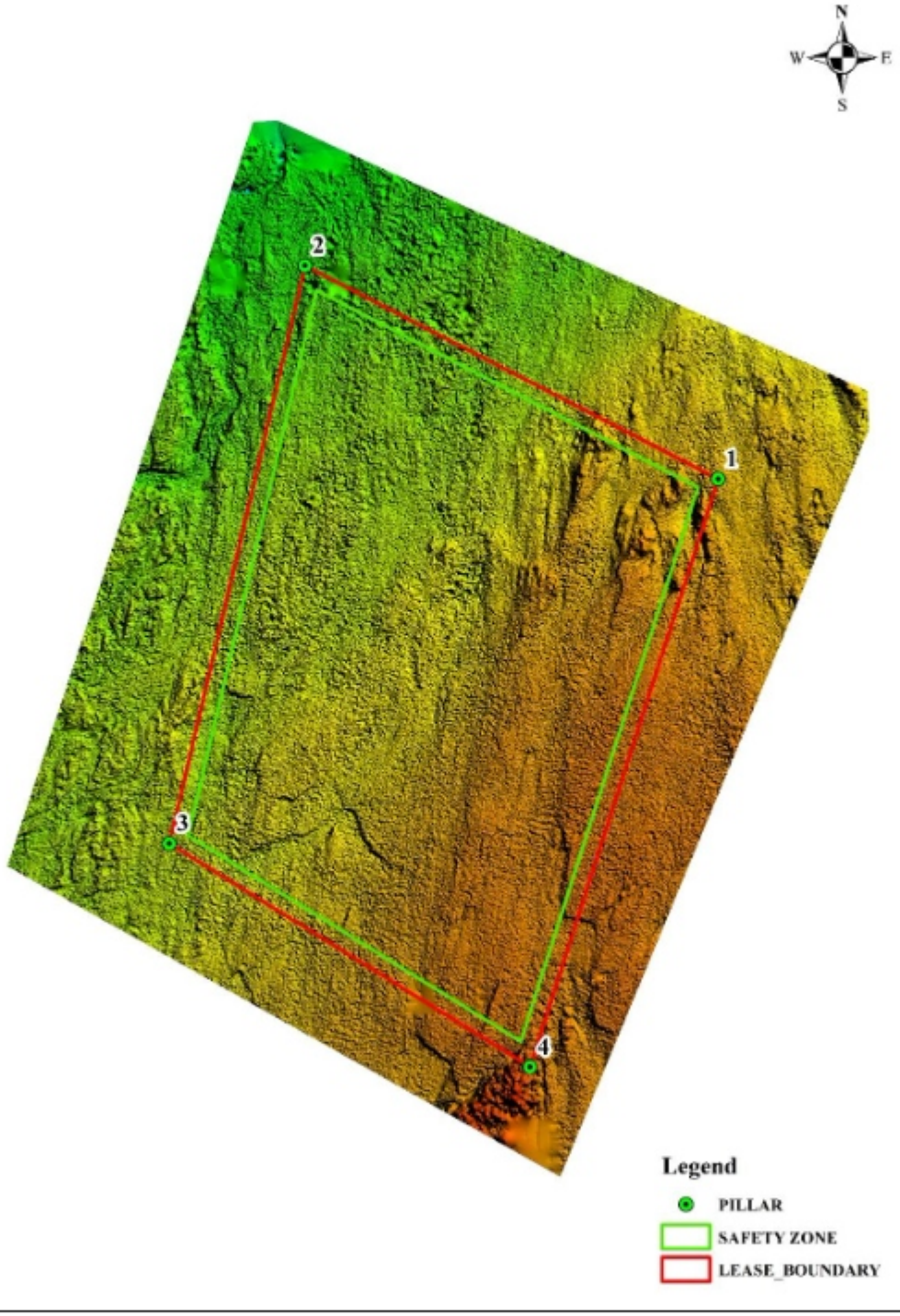
POST-MONSOON DTM MAP OF KUAKHAI RIVER SAND, PRATAPNAGARI



(Digital Surface Model of the lease area)

POST-MONSOON

POST-MONSOON DTM MAP OF KUAKHAI RIVER SAND, PRATAPNAGARI

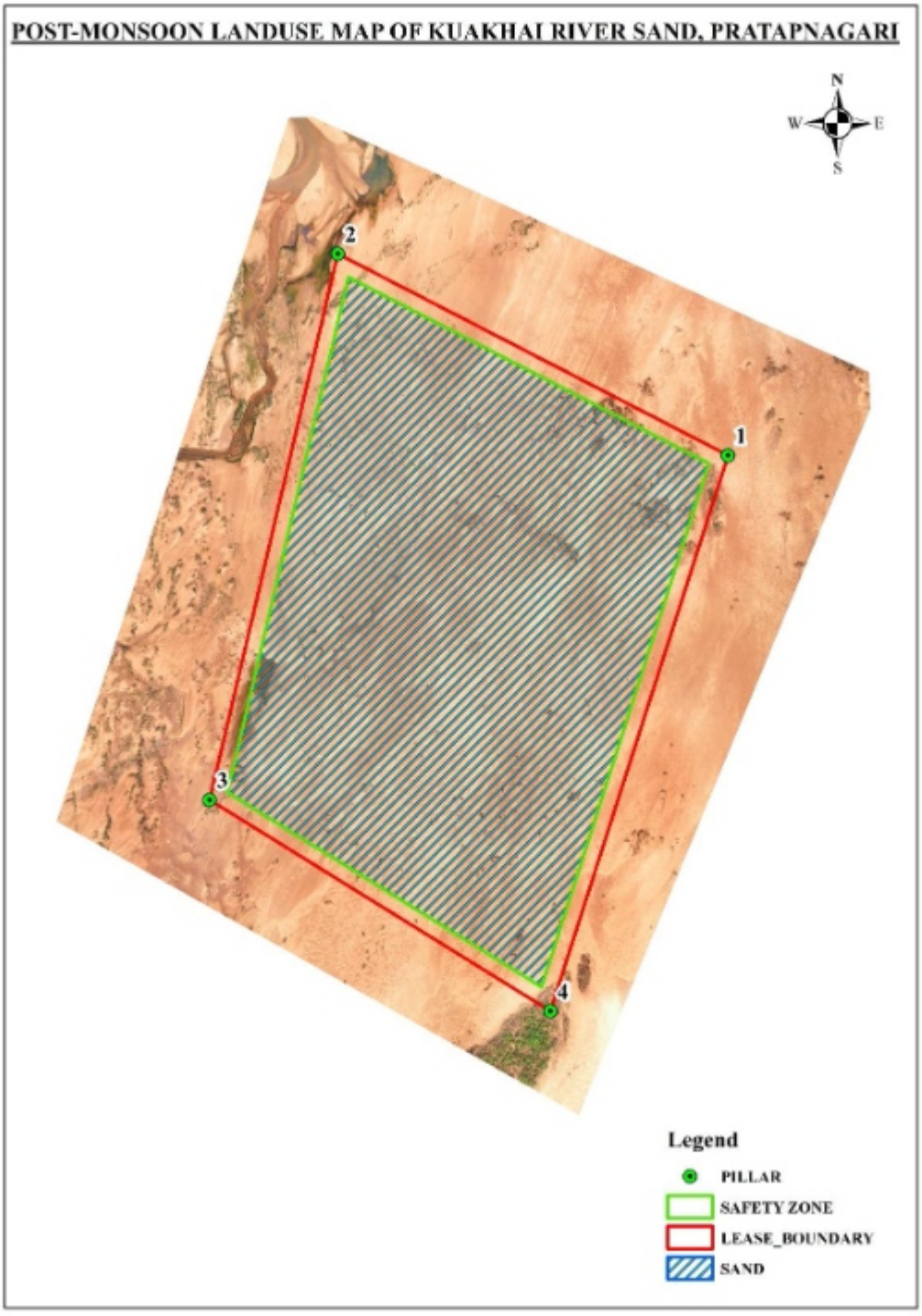


(Digital Terrain Model of the lease area)

POST-MONSOON

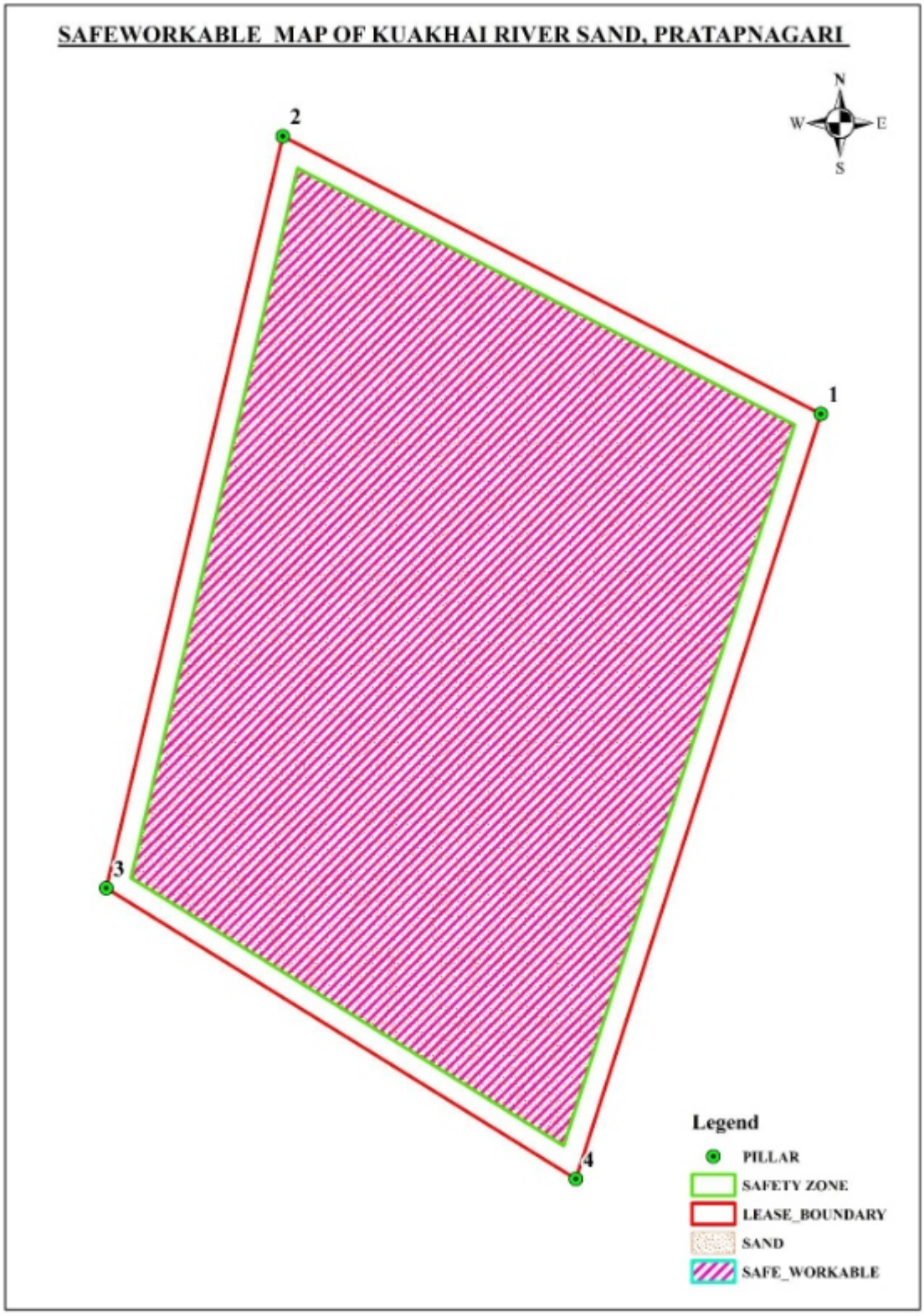
(Contour – Ortho mosaic Images of the Lease Area)

POST-MONSOON



(Land use of post-monsoon)

SAFEWORKABLE MAP OF KUAKHAI RIVER SAND, PRATAPNAGARI



(Safe Workable Area Post monsoon of the Lease Area)

CHAPTER-4

VOLUME ESTIMATION

4.1 Estimation of Reserve / Replenishment

In order to estimate the replenished volumes of sand, both the surveyed data were merged / superimposed, the data obtained in post monsoon. The digital method using DEM to DEM comparison has been used for estimating the amount of sand deposition or erosion. The difference in elevation within safe common workable area shows the amount of river erosion (if negative) and deposition (if positive). The area calculation was done using virtual surveyor software. The volume reports for the post –monsoon survey are given in.

4.2 Safe Workable Area

The safe workable area due to various statutory mining restrictions as per the Sand Mining Guideline, 2020 has been considered for calculations of reserve estimation using software as below;

River bed sand mining shall be restricted within the central 3/4th width of the river/rivulet or 7.5 meters (inward) from river banks but up to 10% of the width of the river, which needs to be protected. In this lease area, the bank of river is aligned with the lease boundary and the effective width of the river in the lease area varies from 300 to 500m. The river width variation is in sync with the variation of SBZ.

Considering the above restriction, it is found that, the sand available within the safe workable area for post-monsoon survey is 45820 m^2.

4.3 Calculation of Replenished Volume

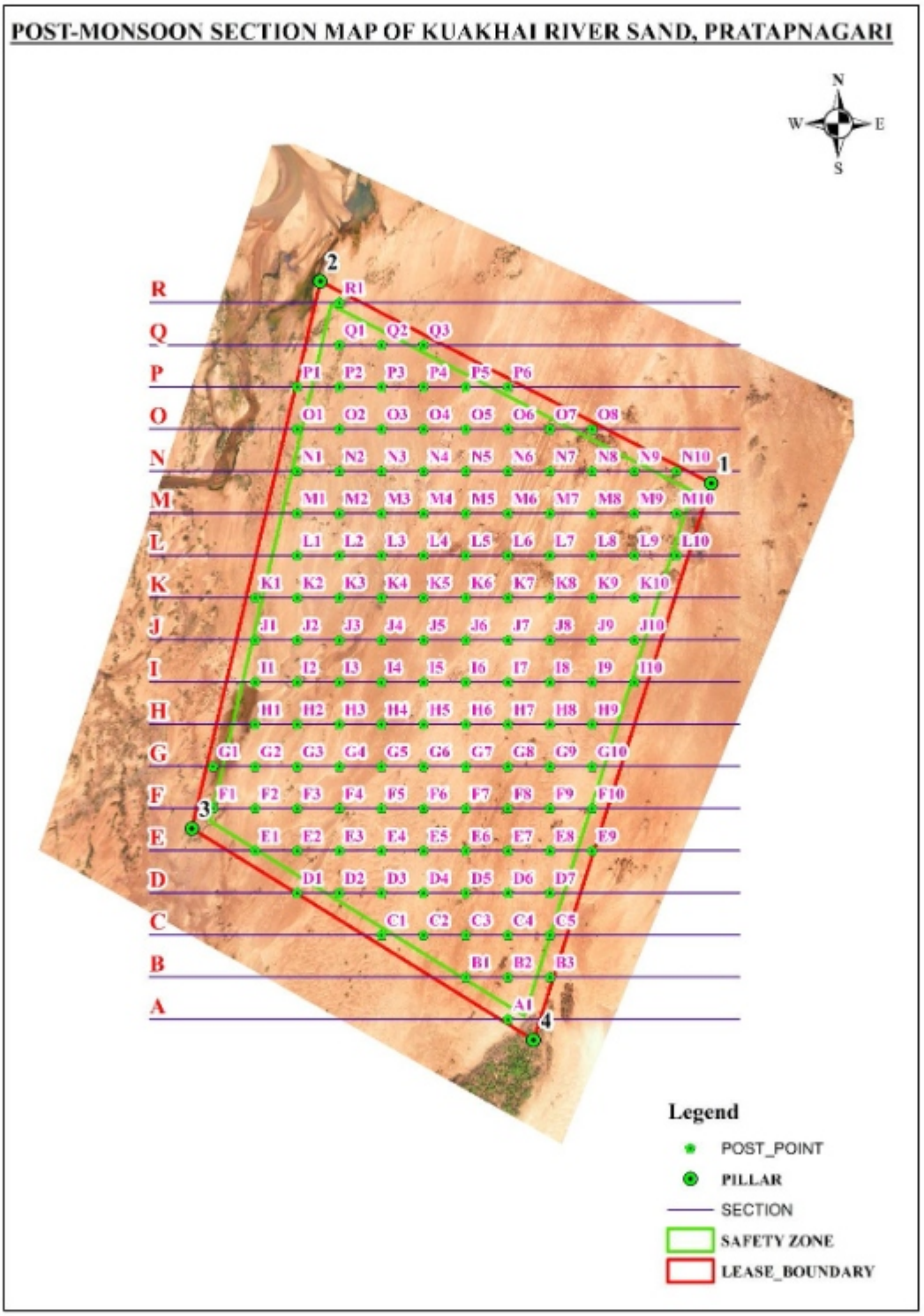
5 Replenished (post-monsoon) volume by cross-sectional method in the entire lease

The classical method of cross-sections has been used for estimating the amount of sand erosion / depositions are given in Table no - 1. The difference in elevation along a cross-section shows the amount of river erosion (if negative) and deposition (if positive). The area calculation was done using virtual surveyor software.

A typical sample cross-sections profile showing the erosion & deposition at all the section has been shown.

Details of Section profile drawn at 20m x 20 m interval

POST-MONSOON



(SECTION PROFILE OF POST-MONSOON)

Table No.- 1

ELEVATION DURING POST-MONSOON			
POINT ID	EASTING	NORTHING	ELEVATION(M)
A1	382209.83	2255134.404	20.668
B1	382189.83	2255154.404	20.322
B2	382209.83	2255154.404	20.626
B3	382229.83	2255154.404	20.69
C1	382149.83	2255174.404	19.83
C2	382169.83	2255174.404	20.31
C3	382189.83	2255174.404	20.423
C4	382209.83	2255174.404	20.508
C5	382229.83	2255174.404	20.503
D1	382109.83	2255194.404	19.45
D2	382129.83	2255194.404	19.604
D3	382149.83	2255194.404	19.548
D4	382169.83	2255194.404	20.305
D5	382189.83	2255194.404	20.219
D6	382209.83	2255194.404	20.602
D7	382229.83	2255194.404	20.519
E1	382089.83	2255214.404	19.323
E2	382109.83	2255214.404	19.295
E3	382129.83	2255214.404	19.359
E4	382149.83	2255214.404	19.417
E5	382169.83	2255214.404	19.989
E6	382189.83	2255214.404	20.091
E7	382209.83	2255214.404	20.504
E8	382229.83	2255214.404	20.516
E9	382249.83	2255214.404	20.625
F1	382069.83	2255234.404	17.836
F2	382089.83	2255234.404	18.558
F3	382109.83	2255234.404	18.991
F4	382129.83	2255234.404	19.295
F5	382149.83	2255234.404	19.291
F6	382169.83	2255234.404	19.776
F7	382189.83	2255234.404	20.039
F8	382209.83	2255234.404	20.579
F9	382229.83	2255234.404	20.69
F10	382249.83	2255234.404	20.739
G1	382069.83	2255254.404	18.424
G2	382089.83	2255254.404	18.324
G3	382109.83	2255254.404	19.181
G4	382129.83	2255254.404	19.381
G5	382149.83	2255254.404	19.048
G6	382169.83	2255254.404	19.696
G7	382189.83	2255254.404	20.027
G8	382209.83	2255254.404	20.37

G9	382229.83	2255254.404	20.596
G10	382249.83	2255254.404	20.781
H1	382089.83	2255274.404	18.404
H2	382109.83	2255274.404	18.504
H3	382129.83	2255274.404	18.938
H4	382149.83	2255274.404	19.18
H5	382169.83	2255274.404	19.198
H6	382189.83	2255274.404	19.973
H7	382209.83	2255274.404	20.385
H8	382229.83	2255274.404	20.295
H9	382249.83	2255274.404	20.711
I1	382089.83	2255294.404	18.621
I2	382109.83	2255294.404	18.451
I3	382129.83	2255294.404	18.799
I4	382149.83	2255294.404	19.05
I5	382169.83	2255294.404	19.223
I6	382189.83	2255294.404	19.706
I7	382209.83	2255294.404	20.331
I8	382229.83	2255294.404	20.362
I9	382249.83	2255294.404	20.688
I10	382269.83	2255294.404	20.963
J1	382089.83	2255314.404	18.763
J2	382109.83	2255314.404	18.64
J3	382129.83	2255314.404	18.666
J4	382149.83	2255314.404	18.695
J5	382169.83	2255314.404	19.189
J6	382189.83	2255314.404	19.605
J7	382209.83	2255314.404	19.887
J8	382229.83	2255314.404	20.254
J9	382249.83	2255314.404	20.374
J10	382269.83	2255314.404	20.725
K1	382089.83	2255334.404	18.642
K2	382109.83	2255334.404	18.894
K3	382129.83	2255334.404	18.756
K4	382149.83	2255334.404	18.61
K5	382169.83	2255334.404	18.981
K6	382189.83	2255334.404	19.202
K7	382209.83	2255334.404	19.687
K8	382229.83	2255334.404	20.537
K9	382249.83	2255334.404	20.168
K10	382269.83	2255334.404	20.644
L1	382109.83	2255354.404	18.823
L2	382129.83	2255354.404	19.041
L3	382149.83	2255354.404	18.444
L4	382169.83	2255354.404	18.651
L5	382189.83	2255354.404	18.878
L6	382209.83	2255354.404	19.382
L7	382229.83	2255354.404	20.088

L8	382249.83	2255354.404	20.017
L9	382269.83	2255354.404	20.809
L10	382289.83	2255354.404	21.031
M1	382109.83	2255374.404	18.547
M2	382129.83	2255374.404	18.945
M3	382149.83	2255374.404	19.123
M4	382169.83	2255374.404	18.85
M5	382189.83	2255374.404	18.681
M6	382209.83	2255374.404	19.202
M7	382229.83	2255374.404	19.671
M8	382249.83	2255374.404	20.285
M9	382269.83	2255374.404	20.185
M10	382289.83	2255374.404	20.761
N1	382109.83	2255394.404	18.511
N2	382129.83	2255394.404	18.896
N3	382149.83	2255394.404	18.874
N4	382169.83	2255394.404	19.084
N5	382189.83	2255394.404	18.804
N6	382209.83	2255394.404	18.918
N7	382229.83	2255394.404	19.183
N8	382249.83	2255394.404	20.409
N9	382269.83	2255394.404	20.044
N10	382289.83	2255394.404	20.415
O1	382109.83	2255414.404	18.293
O2	382129.83	2255414.404	18.691
O3	382149.83	2255414.404	18.777
O4	382169.83	2255414.404	18.985
O5	382189.83	2255414.404	18.998
O6	382209.83	2255414.404	18.63
O7	382229.83	2255414.404	18.992
O8	382249.83	2255414.404	19.266
P1	382109.83	2255434.404	18.224
P2	382129.83	2255434.404	18.37
P3	382149.83	2255434.404	18.725
P4	382169.83	2255434.404	18.733
P5	382189.83	2255434.404	18.874
P6	382209.83	2255434.404	19.077
Q1	382129.83	2255454.404	18.251
Q2	382149.83	2255454.404	18.481
Q3	382169.83	2255454.404	18.662
R1	382129.83	2255474.404	18.379
AVERAGE HEIGHT			19.504

(b) **Volume of sand available in surface area during post-monsoon:**

For the said project replenishment study has been carried out during the post-monsoon by using drone & DGPS. But kindly notice that, Pre-Monsoon survey was not carried out before monsoon due to case pending at High Court of Orissa, Cuttack WP(C) No. 32830 of 2024. The Case is finalised the Hon'ble High Court of Odisha on 10.12.2025 order No. 4. The copy of WP(C) No. 32830 of 2024 is enclosed. only survey post-monsoon to know the availability of sand deposit. By this method spot RL/level has been marked & mapped and plans has been drawn. The post-monsoon Survey has been carried out on 14.12.2025. During survey, it was observed that the total area is covered with sand. The lease area has been surveyed carried out by using Drone/DGPS to define the topography, Contours, RLs and offsets of the lease area and measuring Scale/tape. The contour and the elevation benchmarks will provide the baseline data for assessing the post monsoon study period scenario. The post-monsoon period mineable area of sand considering excluding safety zone area of 7.5m barrier all along the lease boundary. The safe mineable area of sand during post-monsoon period are given below:

Mining Area	Area in (m^2)
Post-Monsoon Safe Mineable Area	45820
Safe Workable Area	45820

a) Replenished volume in Common safe workable area

The safe workable area or minable area (45820 m^2) where sand deposit has done. The volume calculations have been done from photogrammetric software and results are as follow;

Approx. thickness of sand deposit= 0.5 mtr.

Safe workable area x Approx. thickness = Volume of sand deposit

45820 sqm x 0.5 m = 22910 cum

Volume of Sand deposit during post-monsoon = 22910 cum.

CHAPTER -5

CONCLUSION:

5.1 Conclusion

Drone survey was conducted for post-monsoon period. The post-monsoon survey has been depicted in the report to know the volume of sand deposit. However, it has been concluded that the sand deposit in safe workable area is 45820 sqm. The calculation of deposits was made based on the post-monsoon survey data cross section area method and digital elevation method (DEM). It has been concluded that 22910 cum of sand as permissible for safe mining in the lease area.

5.2 Recommendation

Based on this estimation, quantum of further permits may be decided by Hon'ble SEIAA, Odisha.

Note: kindly notice that, the Pre-Monsoon survey could not be carried out before monsoon due to legal issues i.e. a case was pending before Hon'ble High Court of Orissa, Cuttack [W.P.(C) No. 32830 of 2024]. In obedience to the order of Hon'ble High Court of Orissa, in W.P.(C) No. 32830 of 2024 encroachments in the approach road to the said area was removed (Geotagged Photo Enclosed) on Dt. 02.12.2025. Hence only post-monsoon survey report is submitted for grant of Amendment EC. **The above sairat source has been non-operational since the execution of the lease deed i.e. 23.08.2022 to 02.01.2026.**

Prakash Ch. Rautaray.

(Sri Prakash Chandra Rautaray)
Lessee

For TKS Consultancy Services
(Authorised Signatory)

As proposed by the Lessee

Mining Officer, Cuttack

MINING OFFICER & C.A. * MINOR MINERALS, CUTTACK DIST.

Quality Report

Generated with Pix4Denterprise version 4.4.12

Important: Click on the different icons for:

- Help to analyze the results in the Quality Report
- Additional information about the sections

Click here for additional tips to analyze the Quality Report

Summary

Project	POST_PROCESS
Processed	2025-12-16 18:08:26
Camera Model Name(s)	FC8282_6.7_8064x4536 (RGB)
Average Ground Sampling Distance (GSD)	1.67 cm / 0.66 in
Area Covered	0.222 km^2 / 22.1864 ha / 0.09 sq. mi. / 54.8521 acres

Quality Check

Images	median of 9217 keypoints per image	✓
Dataset	121 out of 121 images calibrated (100%), all images enabled	✓
Camera Optimization	1.45% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 5151.58 matches per calibrated image	✓
Georeferencing	yes, 5 GCPs (5 3D), mean RMS error = 0.014 m	✓

Preview

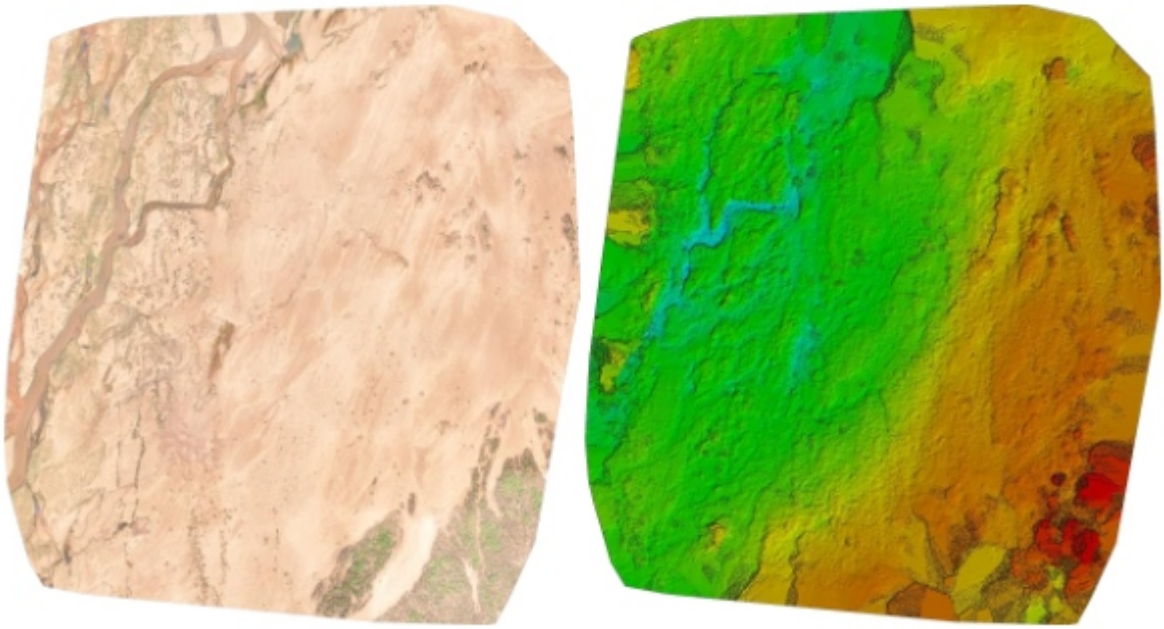


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	121 out of 121
Number of Geolocated Images	121 out of 121

Initial Image Positions

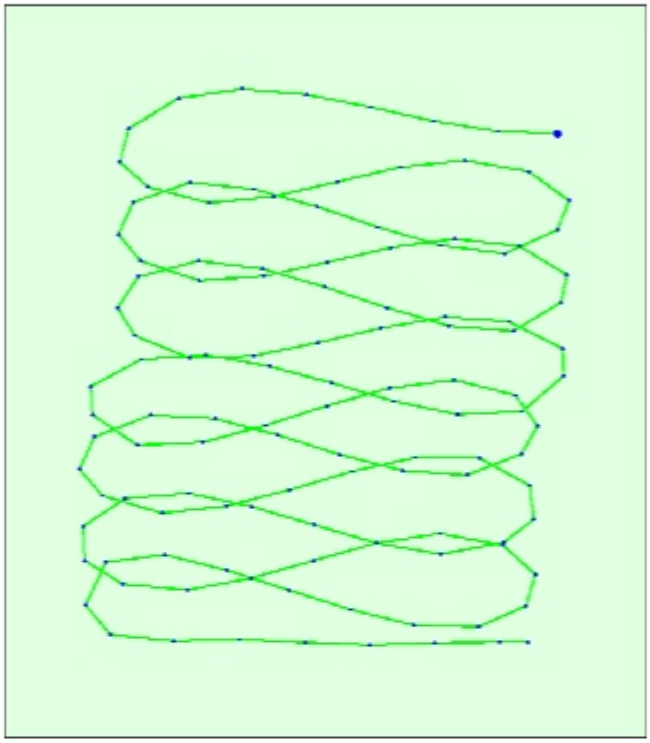


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions

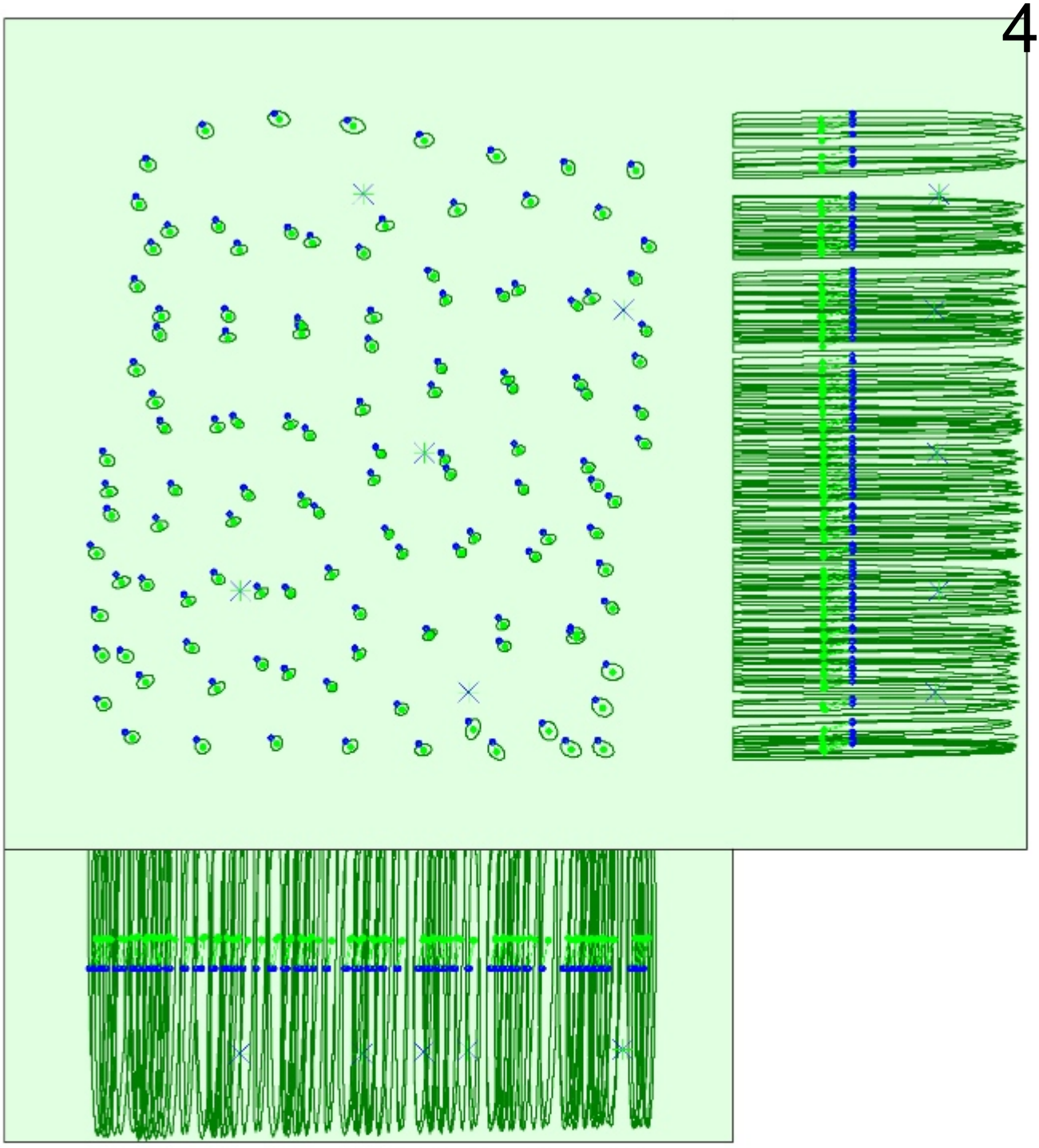


Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

Absolute camera position and orientation uncertainties

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.056	0.045	1.458	0.024	0.029	0.005
Sigma	0.010	0.008	0.035	0.006	0.007	0.003

Overlap

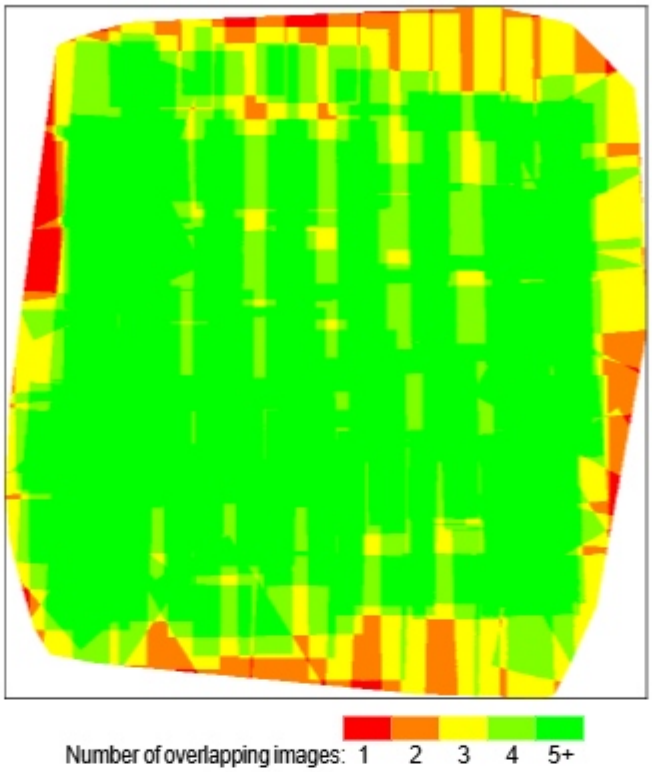


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).

Bundle Block Adjustment Details

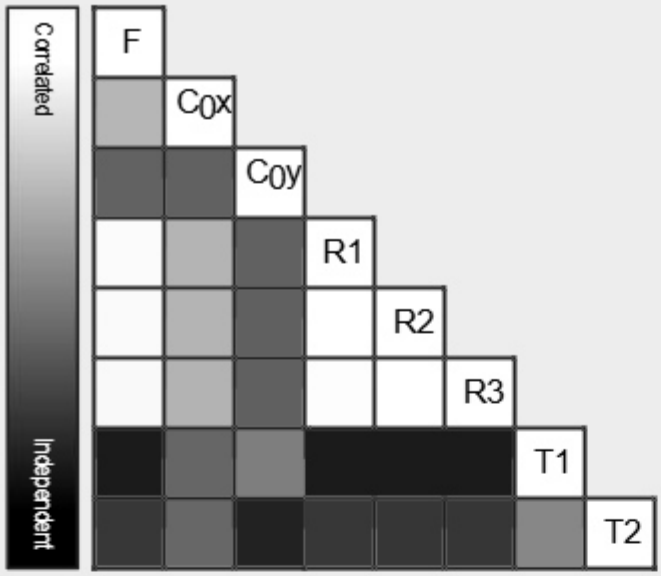
Number of 2D Keypoint Observations for Bundle Block Adjustment	583582
Number of 3D Points for Bundle Block Adjustment	224867
Mean Reprojection Error [pixels]	0.120

Internal Camera Parameters

FC8282_6.7_8064x4536 (RGB). Sensor Dimensions: 9.800 [mm] x 5.513 [mm]

EXIF ID: FC8282_6.7_8064x4536

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	5529.599 [pixel] 6.720 [mm]	4031.999 [pixel] 4.900 [mm]	2268.000 [pixel] 2.756 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	5006.710 [pixel] 6.085 [mm]	3995.190 [pixel] 4.855 [mm]	2278.007 [pixel] 2.768 [mm]	0.066	-0.081	0.041	-0.000	-0.000
Uncertainties (Sigma)	85.906 [pixel] 0.104 [mm]	2.532 [pixel] 0.003 [mm]	1.798 [pixel] 0.002 [mm]	0.002	0.006	0.004	0.000	0.000



The correlation between camera internal parameters determined bythe bundle adjustment. White indicates a full correlation between the parameters, ie. anychange in one can be fully compensated bythe other. Black indicates that the parameter is completelyindependent, and is not affected by other parameters.

The number of Automatic Tie Points (ATPs) per pixel, averaged over all images of the camera model, is color coded between black and white. White indicates that, on average, more than 16 ATPs have been extracted at the pixel location. Black indicates that, on average, 0 ATPs have been extracted at the pixel location. Click on the image to the see the average direction and magnitude of the re-projection error for each pixel. Note that the vectors are scaled for better visualization. The scale bar indicates the magnitude of 1 pixel error.

2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	9217	5152
Min	6775	1560
Max	12285	7346
Mean	9145	4823

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	156372
In 3 Images	34147
In 4 Images	17021
In 5 Images	8922
In 6 Images	4912
In 7 Images	2214
In 8 Images	890
In 9 Images	287
In 10 Images	92
In 11 Images	10

2D Keypoint Matches

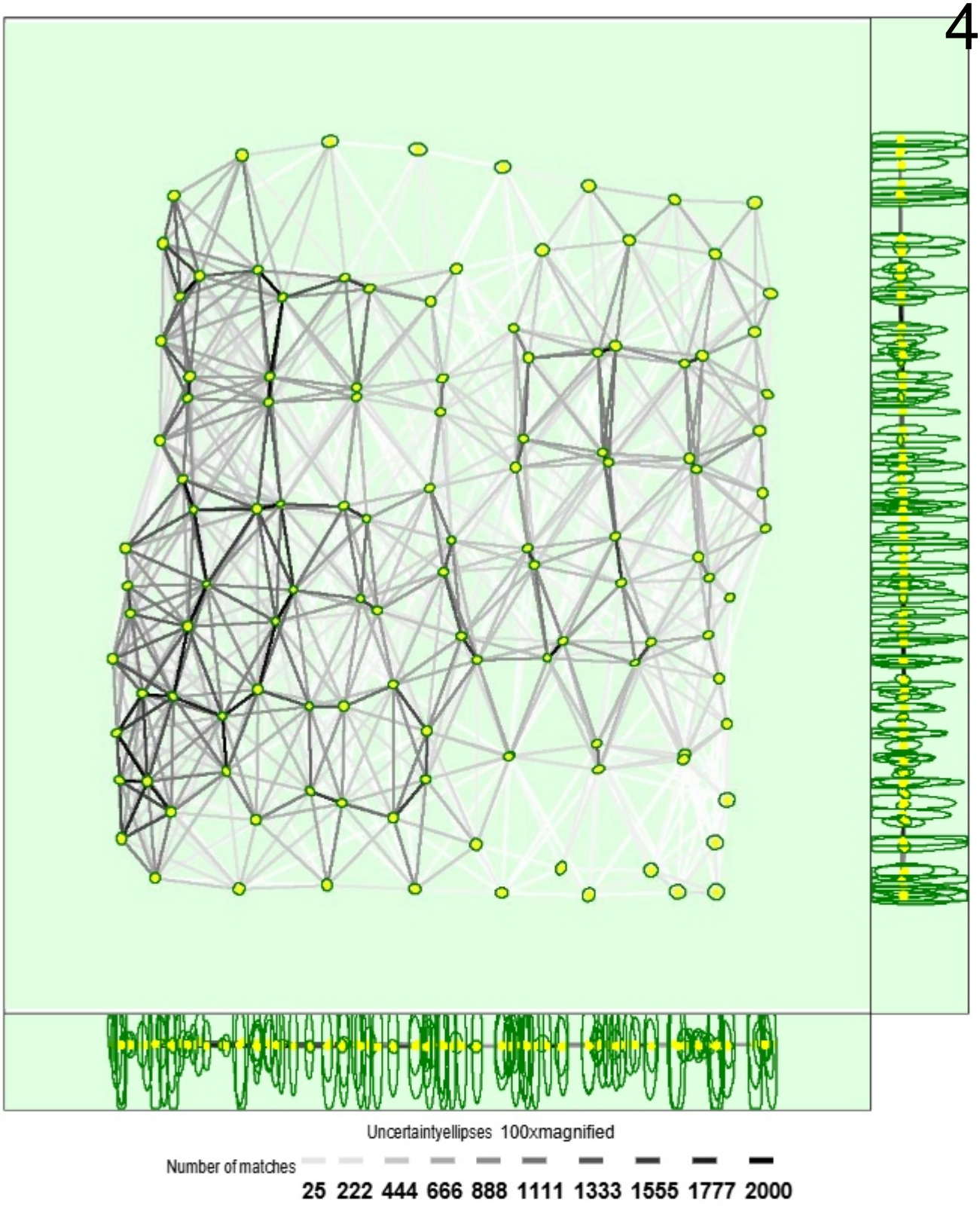


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

Relative camera position and orientation uncertainties

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.034	0.031	0.235	0.174	0.170	0.007
Sigma	0.006	0.005	0.152	0.105	0.096	0.003

Geolocation Details

Ground Control Points

GCP Name	Accuracy XY/Z [m]	Error X[m]	Error Y[m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
PRATAPNAGARI-GCP1 (3D)	0.020/ 0.020	-0.014	0.008	-0.002	0.819	8 / 8
PRATAPNAGARI-GCP-2 (3D)	0.020/ 0.020	0.024	0.020	0.003	0.303	3 / 3
PRATAPNAGARI-GCP-3 (3D)	0.020/ 0.020	0.040	-0.011	0.003	0.791	6 / 6
PRATAPNAGARI-GCP-4 (3D)	0.020/ 0.020	-0.020	-0.024	-0.001	1.166	7 / 7
PRATAPNAGARI-GCP-5 (3D)	0.020/ 0.020	-0.021	0.008	0.000	0.859	6 / 6
Mean [m]		0.001985	0.000395	0.000811		
Sigma [m]		0.025372	0.015685	0.001896		
RMS Error [m]		0.025450	0.015690	0.002062		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified vs. manually marked.

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z [%]
-	-15.00	0.00	0.00	0.00
-15.00	-12.00	0.00	0.00	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	0.00	0.00
-3.00	0.00	50.41	48.76	46.28
0.00	3.00	49.59	51.24	53.72
3.00	6.00	0.00	0.00	0.00
6.00	9.00	0.00	0.00	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		-3.684010	5.503400	-22.232654
Sigma [m]		0.883106	0.702009	0.767532
RMS Error [m]		3.788378	5.547994	22.245899

Min Error and Max Error represent geolocation error intervals between -1.5 and 1.5 times the maximum accuracy of all the images. Columns X, Y, Z show the percentage of images with geolocation errors within the predefined error intervals. The geolocation error is the difference between the initial and computed image positions. Note that the image geolocation errors do not correspond to the accuracy of the observed 3D points.

Geolocation Bias	X	Y	Z
Translation [m]	-3.684010	5.503400	-22.232654

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance

Relative Geolocation Error	Images X[%]	Images Y[%]	Images Z [%]
[-1.00, 1.00]	100.00	100.00	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	5.000000	5.000000	10.000000
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.000000

Images X, Y, Z represent the percentage of images with a relative geolocation error in X, Y, Z.

Geolocation Orientational Variance	RMS [degree]
Omega	0.982
Phi	0.582
Kappa	31.604

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

Initial Processing Details

System Information

Hardware	CPU: Intel(R) Core(TM) i9-14900K RAM: 128GB GPU: NVIDIA GeForce RTX 4080 SUPER (Driver: 32.0.15.6094), Intel(R) UHD Graphics 770 (Driver: 32.0.101.6129)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM2008 Geoid)
Ground Control Point (GCP) Coordinate System	WGS 84 / UTM zone 45N (EGM2008 Geoid)
Output Coordinate System	WGS 84 / UTM zone 45N (EGM2008 Geoid)

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Rapid, Image Scale: 0.25
Advanced: Matching Image Pairs	Aerial Grid or Corridor
Advanced: Matching Strategy	Use Geometrically Verified Matching: no
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Standard Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, yes

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 1/4 (Quarter image size, Fast)
Point Density	Low (Fast)
Minimum Number of Matches	3
3D Textured Mesh Generation	yes
3D Textured Mesh Settings:	Resolution: Medium Resolution (default) Color Balancing: no
LOD	Generated: no
Advanced: 3D Textured Mesh Settings	Sample Density Divider: 1
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	02m:06s
Time for Point Cloud Classification	06s
Time for 3D Textured Mesh Generation	01m:56s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	2730422
Average Density(per m^3)	57.85

DSM, Orthomosaic and Index Details

Processing Options

DSMand Orthomosaic Resolution	1 x GSD (1.67 [cm/pixel])
DSMFilters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Inverse Distance Weighting Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Raster DTM	Generated: yes Merge Tiles: yes
DTMResolution	5 x GSD (1.67 [cm/pixel])
Time for DSMGeneration	03m:16s
Time for Orthomosaic Generation	11m:49s
Time for DTMGeneration	08m:37s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA

5RF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail,com

(A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act, 1986)

File No. 54874/195-MINB1/02-2022

Dated 21st November, 2024

Bhubaneswar

To

Sri Prakash Chandra Rautaray
S/o-Late Prakash Chandra Rautray
At-Durgapur, Po-Bajapur, Ps-Khordha Sadar
Dist-Khordha, Odisha, Pin-752060

Sub: Proposal for Amendment of Environmental Clearance (EC) of Pratapnagari Sand Quarry over an area 5.26 ha or 13.00 acres village PratapnagariCuttack Sadar Tahasil Cuttack District Odisha-reg.

Ref: (i) EC identification no. EC22B001OR162187 dated 03.06.2022
(ii) Letter of Tahasildar, Sadar Cuttack vide letter no. 3056 dt. 26.04.2023
(iii) Online Application no. SIA/OR/MIN/302244/2023 dtd.14.07.2023

Sir/Madam,

This has reference to your online application no. SIA/OR/MIN/302244/2023 dated 14.07.2023, wherein you have requested for amendment (i.e. amendment of EC in regard to annual production of sand as per Annual Rate of Replenishment Study (ARRS) report) of Environmental Clearance (EC) granted by SEIAA, Odisha vide letter no./EC identification No. EC22B001OR162187 dt. 03.06.2022 in favour of Sri Prakash Chandra Rautaray, the lessee/successful bidder.

2. The application was examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 177th meeting held on 28.10.2024 & 29.10.2024 in accordance with the EIA Notification, 2006 as amended from time to time and the following points are noted;

(i) This is a proposal for amendment of EC of Pratapnagari Sand Quarry over an area 5.26 ha. or 13.00 acres Village Pratapnagari Cuttack sadarTahasil Cuttack District of Sri Prakash Chandra Rautaray as per the Replenishment Study Report.
(ii) Environmental Clearance for the proposal was granted vide EC identification no. EC22B001OR162187 dt. 03.06.2022.
(iii) In Approved Mining Plan, the mineable reserve was 137520 cum with depth of sand deposition 3.0 meter and the annual production capacity is 16500 cum/year.
(iv) The SEIAA has permitted for 15780 cum/year for 1st year for sand extraction, followed by submission of Replenishment Study Report by November 2022.
(v) The SEAC in its meeting held on dated 28th, 29th and 30th December 2023 decided that decision will be taken after site visit by sub-committee of SEAC in respect to availability of sand in the proposed quarry.

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(vi) The proposed site was visited by Sub-Committee of SEAC on dated 30.03.2023 and following observations has been made as mentioned below:

Following observations are made from KML file

a) Size of the lease area: 154m x 90m.
b) 54m. towards south west is sand covered.
c) Top 100m. looks as bank of river with levels varying from 39 m. to 44m.
d) PHED water treatment plant is 90m. towards north east of the lease area.
e) One playground at RL 47m. is located at 50m. towards north of lease area.
f) A bridge and Puri canal syphon crossing Kuakhai river is about 250m. Northward (Upstream) of lease area.

The observations at during site visit are as follows: -

a) The lease area is completely free from water.
b) Pillars were not seen in lease area.
c) Access road to the quarry is not clear

(vii) The KML file photo shows vast area beyond lease area covers with sand and the site condition also reveals that only 20% of lease area is sand and balance is stabilized bank and not advisable for consideration of mining. Sand mining of the area may risk the flood protection facility of the river at the location

(viii) he entire lease area appears to be within 500 m of Downstream of existing Bridge and Syphon. As per annexure -2 of EC (03.06.2022), no mining should be done at 500m. D/S of bridge/ public civil structure. But para 7.15 of EC states "In case river bridge, no mining zone shall extend up to 200m. from the bridge and it may extend up to 500m in sensitive locations."

(ix) Observations: As per the guidelines 2020, the lease area may not be suitable for sand extraction as within distance of 500m from bridge and syphon. It is suggested to shift the location downward with adequate safety distance from vulnerable EC22B001OR162187 dt. 03.06.2022 constructions and areas.

(x) The PP has deposited the amount of Rs. 3,15,029/- to City DFO, Bhubaneswar vide A/c. No. 1160104000062754 dated 22.02.2023 for plantation.

(xi) Documents submitted for amendment of EC;

a. Form No. 4 for amendment of Environmental Clearance,

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b. Replenishment study report

3. The proposal was placed in SEAC meeting held on 16.05.2024 and after detailed discussion; the SEAC recommended that the lease area may not be suitable for sand extraction as within distance of 500m from bridge and syphon. It is suggested to shift the location downward with adequate safety distance from vulnerable constructions and areas.
4. The proposal was placed in 173rd SEIAA meeting held on 06.08.2024 & 08.08.2024 and the Authority decided seek clarification of the above-mentioned point of SEAC. Accordingly, ADS raised by SEIAA, Odisha to PP dated 27.08.2024.
5. The PP has submitted the clarification on 23.09.2024 with mentioned that the KML file submitted during EC application was wrong one and as per SEAC suggestion the lease area is shifted downward with adequate safety distance from vulnerable constructions and area. As per the SEAC observation, a field visit was conducted by the Mining Officer, Cuttack with in presence of undersigns. It was found that the lease area comes within 500 m of the Biju Setu Bridge (Kuakhai River Bridge). Then, the mining officer, Cuttack has issued a letter to lessee for modification of Mining Plan vide letter no. 1952/Mines dated 07.06.2024. Accordingly, the mining plan has been modified based on the sand reserve and suitable location without changing the khata no. and plot number in the same mouza. The revised KML file as per modified mining plan is sent to SEIAA, Odisha email dated 23.09.2024. The PP also mentioned that the source is not operation since obtaining the EC from SEIAA, Odisha. The ADM, Cuttack has already issued a letter vide letter no. 793 dated 26.06.2023 with direction that those minor mineral sources whose co-ordinate points are not matching during joint demarcation of quarry lease area as stated by the Mining Officer, Cuttack in the District Revenue Meeting held on 23.06.2023 is required to prepare the fresh Mining Plan through the concerned RQP and get it approved by Deputy Director of Mines to get accuracy of quarry lease area and take steps for smooth transfer of the same to Steel & Mines Department.
6. Amendment of Environmental Clearance (EC) of Pratapnagari Sand Quarry issued vides SEIAA, Odisha EC identification no. EC22B001OR162187 dt. 03.06.2022 in favour of Sri Prakash Chandra Rautaray is **allowed** for extraction quantity of sand **9900 cum** (i.e.60% of 16500 cum was approved in the approved modified mining plan dated 30.07.2024) **for one year period** in adhoc manner due to absence of ARRS report. Also, it is allowed the modification of co-ordinate point from Lattitude-20°23'40.87"N to 20°23'53.84"N and Longitude-85°52'09.60"E to 85°52'19.81"E **to** ***Lattitude-20°23'26.61"N to 20°23'38.30"N*** *and* ***Longitude-85°52'11.12"E to 85°52'19.58"E*** as per approved modified mining plan. The other stipulated terms and conditions of the original EC initially granted remains same

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subject to satisfactory compliance to all the stipulated terms and conditions of EC along with following additional stipulation:

Additional stipulation

(i) This Amendment of EC is being granted in adhoc manner and is liable to be revoked after one year i.e. after 31st March 2026 if satisfactory ARRS report is not submitted.

(ii) The PP is required to submit Annual Rate of Replenishment Study (ARRS) report of revised lease area as per modified mining plan by **31st March, 2026** through ORSAC empanel agency or through NABET consultant.

(iii) The Project proponent shall follow Enforcement & Monitoring Guideline for sand mining-2020 before and during operation of quarry.

(iv) The PP shall implement the EMP with a budgetary allocation as proposed in the EMP report during EC application.

(v) The PP shall plant some tree species like Banyan, Peepal, Neem, Jamun, Mango, Karanj, Arjun etc. as part of tree plantation campaign ***"Ek Ped Ma Ke Naam"*** and the details of the same shall be uploaded in the MeriLiFE Portal (https://merilife.nic.in).

In case, there is a change in the scope of the project, fresh Environment Clearance shall be obtained.

Yours faithfully,

Member Secretary

Copy to

1. Principal Secretary, Forest, Environment & Climate Change Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. The Director of Mines, Steel & Mines Dept, Govt. of Odisha Bhubaneswar for information.
4. Additional Principal Conservator of Forests, Integrated Regional Office (IRO), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi-110032 for information
6. Chairman/Member/Member Secretary, SEIAA for information

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7. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
8. Collector & DM, Cuttack, Sub-Collector, Cuttack, DFO, Cuttack, Tahasildar, Cuttack Sadar /Mining Officer, Cuttack for Information and necessary action.
9. Guard file for record/Website/Parivesh Portal

Member Secretary

ENVIRONMENTAL CLEARANCE

PARIVESH

(Pro-Active and Responsive Facilitation by Interactive, and Virtuous Environmental Single-Window Hub)

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

To,

The Lessee
PRAKASH RAUTARAY
AT-GURUJANGA, PS-KHORDHA, DIST-KHORDHA -752060

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/OR/MIN/54874/2020 dated 05 Feb 2022. The particulars of the environmental clearance granted to the project are as below.

1.	**EC Identification No.**	**EC22B001OR162187**
2.	**File No.**	54874/195-MINB1/02-2022
3.	**Project Type**	New
4.	**Category**	B1
5.	**Project/Activity including Schedule No.**	1(a) Mining of minerals
6.	**Name of Project**	Pratapnagari Sand Bed mines on river Kuakhai over an area of 5.26 Ha/ 13 Acre in village Pratapnagari, under Cuttack Sadar Tahasil of Cuttack district of Tahasildar, Sadar Cuttack
7.	**Name of Company/Organization**	PRAKASH RAUTARAY
8.	**Location of Project**	Orissa
9.	**TOR Date**	01 Jan 1900

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 03/06/2022

(e-signed)
Sri Susanta Nanda
Member Secretary
SEIAA - (Orissa)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH.Please quote identification number in all future correspondence.

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STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY
ODISHA, BHUBANESWAR

(Constituted under the EP Act, 1986 and EIA Notification, 2006 by the MoEF & CC, Govt. of India)
5RF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, E-mail-seiaaorissa@gmail.com

SEIAA File No: 54874/195-MINB1/02-2022

Project: Application of Sri.Prakash Chandra Rautaray for mining of Sand from Kuakhai River sand, Pratapnagari over an area of 13.00 Acres or 5.26Ha in Village-Pratapnagari, Tahasil- Sadar Cuttack, District- Cuttack - Environmental Clearance reg.

Ref: Your online application dated 05.02.2022 for issue of EC vide File No: SIA/OR/MIN/54874/2020

Sir,

This has reference to your online application seeking environmental clearance of the mining project for mining of Sand from Kuakhai River sand, Pratapnagari over an area of 13.00 Acres or 5.26Ha in Village-Pratapnagari, Tahasil- Sadar Cuttack, District - Cuttack. The proposal falls in the category 1(a)- 'Mining of minerals' in the schedule of EIA Notification, 2006 as amended from time to time. The proposal has been appraised on the basis of the documents enclosed with the application, such as Form-2,Final EIA/EMP Report, Public Hearing Proceedings, Form-1,PFR, Approved Mining Plan, etc and clarifications furnished to SEAC in response to their observations.

2. **The proposed activities in a nut shell as observed are as follows: -**

a. This is a proposal for mining of sand from Kuakhai River sand, Pratapnagari lying in the Kuakhai River bed located at village– Pratapnagari, Tahasil- Sadar Cuttack, District - Cuttack, over lease area of 13.00 Acres or 5.26Ha.
b. The mining lease is an identified sairat source in the DSR. The Kuakhai River sand, Pratapnagari sairat source will be leased out under the OMMC Rules,2016 by Tahasildar, Cuttack Sadar to the successful bidder on the basis of public auction for a lease period of 5 years.
c. The mining plan of the mining project prepared has been approved by Deputy Director of Geology, Directorate of Geology, Bhubaneswar on 21.05.2020.

d. The cluster certificate has been furnished by the Tahasildar certifying that there is no other mine located within 500 meters from the periphery of the proposed mine lease area. As reported by the Tahasildar, this sairat source is not a part of any cluster.
e. The Term of Reference (TOR) was issued for this project vide letter No. 9646/SEIAA on dated 19.11.2020.
f. The Public Hearing meeting was held on 10.11.2021 at 11:30 A.M. at Dhakulei Nodal Bidyapitha, Pratapnagari, under Cuttack Sadar- Tahasil of Cuttack district. The major issues raised during public hearing were on dust pollution, water sprinkling arrangements, tarpaulin cover on sand loaded vehicles, plantations, increase of traffic movement, damage of road, humps on road, employment.
g. The baseline data has been collected from October'2020 to December'2020 (Post - monsoon) for the project.
h. **Location and Connectivity** - The mine area is a part of the Survey of India Toposheet No. 73 H/3 bounded by Latitude: 20°23'40.87"N to 20°23'53.84"N Longitudes: 85°52'09.60"E to 85°52'19.81"E. The mining of sand will be over Khata No.1030, Plot No- 1248 and the Kisam is 'Nadi'. Nearest Town is Cuttack, nearest road is Puri- Canal Road (0.5 Km), nearest railway station is Baranga Railway station (4.5 Km) from the mine.
i. **Total Reserves and Production Details:** – The project proponent has submitted that the total geological reserve has been estimated as 189396 cum with depth of sand 3.0m. Similarly, the mineable reserve of river bed sand has been estimated to be 137520 cum with depth of sand 3.0m. The project proponent has proposed a total production of 82500 cum of sand with depth of sand 3.0m from this quarry during the valid lease period of 5 years with a maximum production of 16500 cum per annum by open cast semi mechanized method. Excavation & loading of sand will be done through dumpers and trucks/tractors manually and transportation will be carried out by haiwa/ truck/ tractors.
j. **Replenishment Study Report:** The project proponent has submitted that replenishment study has been done during the pre-monsoon (May-2021) and post-monsoon season (Oct-2021). Replenishment Study Report has been submitted by project proponent and it shows that 100% replenishment can be done and the proposed production from the lease is 82500 cum for 5 years and replenishment quantity of sand is 145600 cum per year which is more than proposed mining capacity of sand i.e. 16500 cum per year.
k. **Water Requirement:** – The total water requirement will be 3.0 KLD for different purposes like Domestic, Dust suppression, plantation purposes.
l. **Power Requirement:** - No use of electric power as the operation will be done in the day time.DG set will be used as source of power.

m. **Green Belt Development**: Greenbelt plantation will be done by planting 250 saplings of suitable species per annum by the lessee in vicinity of the river bank, haulage roads and near village.

n. **Employment Potential:** - A total of 30 nos. of manpower are to be employed in the sand quarry.

o. The project cost is estimated to be Rs. 10.0 lakhs and environment management cost allocated for the project is Rs. 4.00 lakhs per annum and social development cost will be 8.40 lakhs for compliance to public hearing demand.

p. The Environment consultant M/s Kalyani Laboratories Pvt. Ltd. Bhubaneswar along with the project proponent has made a detailed presentation on the EIA/EMP report on 18.02.2022.

3. This proposal conforms to the item no. 1(a) in the schedule of EIA Notification, 2006 as amended time to time, and the minor mineral extraction project falls under Category B1 as the mining lease area is more than 5ha and less than 100ha.

4. The proposal is duly appraised by the SEAC in its meeting held on 18.02.2022.The SEAC has submitted the appraisal report and recommended for grant of EC for the proposal valid upto lease period with stipulated conditions.

5. The State Environment Impact Assessment Authority (SEIAA) after considering the proposal and recommendations of SEAC, Odisha hereby accords Environmental Clearance in favour of the project valid upto lease period under the provisions of EIA Notification 2006 and subsequent amendments thereto subject to strict compliance of all stipulated conditions. This EC shall take effect from the date of registration of duly executed lease deed in this regard by the Tahasildar and shall be coterminous with the expiry of lease period.

6. The Tahasildar, Cuttack Sadar who is the lease granting authority in this case is responsible for monitoring strict compliance of the following conditions of grant of environment clearance, by the project proponent(lessee).

7. Stipulated Conditions:

7.1 This Environmental Clearance is given with a condition that "maximum depth of extraction shall be 1.5m, and maximum permissible quantity of sand is 15780Cum in the 1st year, pending submission of rate of replenishment study at site. Rate of replenishment study at the site shall be conducted and report shall be submitted by November, 2022 as per prescribed method(enclosed as Annexure)."

7.2 In view of the likely revision of DSR for Cuttack District in future the details of this minor mineral reserve to be ascertained in the revised DSR.

7.3 In view of the difference commonly found in sand deposits, the determination of mining lease by local Tahasildar considering the dimensions like average length, breadth and height of the deposit to be re-accertained by the Revenue Department and RQP for final exploitation of sand and higher revenue for the state of Odisha.

7.4 All the provisions of Sand Policy of Govt. Of Odisha dated 02.09.2021 to be followed for this sand mining project.

7.5 Revised mining plan shall be prepared based on essential physical criteria as per Enforcement and Monitoring Guidelines for Sand Mining, January 2020 of MoEF & CC, Govt. of India enclosed in Annexure. Lay out of Progressive Mine Closure Plan shall also be incorporated in the revised mining plan.

7.6 Adequate measures shall be taken to prevent unauthorised mining.

7.7 Sedimentation flow shall be determined through a study during pre-monsoon, monsoon & post-monsoon period.

7.8 Permission to use public road including Ring road, Cuttack from the appropriate authority shall be obtained by PP including its maintenance shall be done.

7.9 A site visit to be planned by SEAC in 3 months' time to ensure implementation of agreed measures.

7.10 All the individual quarry lessee holders coming under the Tahasil, Cuttack Sadar jurisdiction shall create a common forum in coordination with the Tahsildar and contribute funds to it for grading, compaction and maintenance of haulage road used for transportation of mineral, plantation of saplings of native tree species along the approach roads, river banks and in community areas in consultation with the Gram Panchayat, etc for prevention of environmental pollution and damage during mining activity. All mining activity shall be done in scientific manner to safeguard degradation of environment. All the individual lease holders of the Tahasil shall implement the EMP as proposed for the project. The Tahasildar shall ensure the compliance of this condition along with all lease holders of his jurisdiction.

7.11 The project proponent has to carry out by engaging appropriate consultant, a study of the annual replenishment rate of sand by collecting pre monsoon & post monsoon data from the field to know the quantum of volume of sand deposited/replenished & extracted in the mining lease area. The detailed comparison of both pre-monsoon and post-monsoon elevation data shall be included in the study report. The detailed methodology for finding the rate of replenishment study of sand is laid down in the Enforcement & Monitoring Guidelines for Sand Mining, 2020 issued by the MoEF & CC, Govt. of India. The finding of the study shall be submitted to SEIAA to assess the rate of

replenishment of mined out sand in the lease area. Pending carrying out of the study & submission of the report, this clearance is being granted in an adhoc manner and is liable to be revoked after one year if satisfactory replenishment study report is not submitted. The submission of study report of rate of annual replenishment of sand within one year is obligatory for the project proponent.

7.12 The project proponent should carry out River bed sand mining manually by engaging local laborers in force to check over exploitation of sand at the source.

7.13 Any change in the plan or quantity to be produced shall require prior approval of SEIAA.

7.14 The Tahasildar has submitted the cluster certificate of the mines located within 500 meters from the periphery of the proposed mine lease area. This EC is liable to be cancelled/revoked if the submission on cluster is found to be incorrect/false in future.

7.15 There shall be a 'no working zone' to protect the embankment on both sides, road or rail bridge in the vicinity, if any, dam, weir, water intake structure of irrigation or drinking water project, or any cross drainage structure. 10 % of the width of river shall be left intact along the embankments on both sides as 'no mining zone'. Further, no mining shall be allowed within 200 m of any existing structures dam, weir, water intake structure of irrigation or drinking water project, or any cross drainage structure. In case of River Bridge, this no mining zone shall extend upto a minimum stretch of 200 meters from the bridge and it may extend upto 500 meters in sensitive locations. The lease area shall be accordingly curtailed to carve out the actual sand mining area within the leasehold. Exact map of the lease area, and the 'no mining zone' shall be drawn to scale, showing the DGPS coordinates of all corner points, and the location of the bridge, embankment, extraction route & other structures; and such map has to be submitted to SEIAA by the project proponent through the Tahasildar within three months of the date of issue of the EC. The quantum of sand allowed to be extracted will be worked out on the basis of the actual working area.

7.16 The lease area and the actual working area shall be demarcated on the ground by erecting durable masonry /concrete pillars by the project proponent and photographs of proof of the same shall be submitted along with six monthly compliance report.

7.17 The project proponent shall take prior statutory and regulatory clearance as required from the concerned authorities in respect of the project, before carrying out any operation.

7.18 Mining is not permissible within the water channel or stream flow area. No stream shall be diverted for the purpose of mining and no natural water course shall be obstructed. The mining or any ancillary activity shall not in any way disturb the flow

pattern of the river water during the non monsoon period. There shall be no sand mining in the river during the rainy season or when there is flow of water in the river.

7.19 Sand mining operations shall not affect the existing sources for irrigation / drinking water / industrial purpose.

7.20 The natural sand dunes, if any, near or surrounding the lease area shall not be disturbed.

7.21 No transportation of the minerals shall ordinarily be allowed on any road passing through villages/habitations/forest land without prior explicit permission. Transportation of minerals through existing rural roads can be allowed only by the concerned Govt. Department/Gram Panchayat/BDO and only after required strengthening, such that the carrying capacity of road is increased to handle the sand truck traffic. The project proponent shall bear the cost towards the widening and strengthening of existing public roads in case the same is proposed to be used for the project. No movement on any road is allowed on existing village road network without appropriately increasing the carrying capacity of such roads. Project proponent shall ensure that the road may not be damaged due to transportation of the mineral and transport of minerals will be as per IRC Guidelines with respect to complying with traffic congestion and traffic density. Plying of sand extraction trucks may be allowed on roads / path ways passing close to schools, temples, hospitals and such other public places only with prior written permission of competent authority.

7.22 Vehicles hired for transportation of sand from the site should be in good condition and should have pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.

7.23 The vehicles shall not be overloaded and shall be covered with Tarpaulin. The Tahasildar may collect an appropriate road maintenance levy from the lessee as part of the lease conditions on the basis of quantum of sand transported, and utilize the proceeds of the levy for proper maintenance of the extraction paths and roads to prevent their degradation on account of plying of sand trucks.

7.24 The project proponent shall take all precautionary measures against causing damage to flora and fauna of the locality. Necessary sprinkling of water on Haulage Road and avenue plantation shall be done. The PP shall plant and nurse to full establishment a minimum of 100 number of saplings of native tree species along the approach roads, river banks and in community areas in consultation with the Gram Panchayat. Photographs of proof showing the plantation shall be submitted along with compliance report.

7.25 Water spray should be made on the road/extraction paths to control dust emission during transportation of sand.

7.26 Bio - toilet provision shall be made by the project proponent.

7.27 The Project Proponent shall undertake phased restoration, reclamation and rehabilitation of land affected by mining and completes this work before abandonment of mine.

7.28 Environmental Management Plan (EMP) shall be implemented by PP to ensure compliance with the environmental conditions specified above. The year wise funds earmarked for environmental protection measures shall be kept in separate account and shall be spent according to the plan proposed in coordination with the Tahasildar. Year wise progress of implementation of EMP shall be reported to the SEIAA, Odisha, OSPCB and Regional Office of MoEF & CC, Bhubaneswar along with the six monthly compliance report.

7.29 The proponent shall take necessary measures to ensure that there is no adverse impact of the mining operations on the human habitation if any, existing nearby.

7.30 It shall be mandatory for the project management to submit quarterly compliance reports on the status of implementation of the above stipulated environmental safeguards to the SEIAA, Odisha / SPCB, Odisha/ Regional Office of the MoEF& CC, Bhubaneswar, in hard and soft copies on 1st day of January, April, July, October of each calendar year, failing which EC is liable to be revoked. The proponent shall upload the compliance report including results of monitored data, as applicable in the website of the Ministry for monitoring of EC Conditions. The concerned Tahasildar shall ensure the uploading of EC compliance report in the parivesh portal by the project proponent.

7.31 River Bank stabilization shall be made through stone patching. Plantation of adequate number native species on river banks and both sides of haulage roads shall be made.

7.32 The activities proposed in action plan prepared for addressing the issues raised during the Public Hearing shall be completed as per the budgetary provisions mentioned in the action plan and within a stipulated time frame. The Status Report on implementation of action plan shall be submitted to the concerned Regional Office of the Ministry along with District Administration.

7.33 The project proponent shall comply in true sprit all the issues raised and recorded in proceedings of public hearing w.r.t. environment / pollution / CER shall be complied by the Mining Authority as per OM F. No. 22-65/2017-IA.III, dated 30.09.2020 of MoEF&CC, Govt. of India.

7.34 Stone patching on river bank with plantation in-between and the ramp construction shall be done in consultation with and advice of concerned Water Resource Department, Government of Odisha.

7.35 At the end of mine closure, the proponent shall immediately remove all the sheds put up in the quarry and all the equipment in the area before closure of the quarry.

7.36 The conditions stipulated in the environmental clearance will be closely monitored on the ground by the lease granting authority, i.e. the Tahasildar, who shall ensure that the project proponent submits quarterly compliance reports.

7.37 The concerned Regional Office of the MoEF&CC/ SPCB, Odisha shall periodically monitor compliance of the stipulated conditions as applicable for this project. The project authorities should extend full cooperation to the MoEF&CC officer(s)/SPCB officer(s) by furnishing the requisite data / information / monitoring reports.

7.38 A copy of this Environmental Clearance letter shall be displayed on the website of the Odisha State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.

7.39 The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry. The advertisement shall be made within seven days from the date of receipt of the Clearance letter and a copy of the same shall be forwarded to the Regional Office of MoEF&CC, Bhubaneswar.

7.40 A copy of the clearance letter shall be sent by the proponent to concerned Gram Panchayat /Panchayat Samiti /ZilaParisad /Municipal Corporation / Urban Local Body as the case may be. A copy of the environmental clearance letter can be downloaded from the Ministry portal (www.parivesh.nic.in).

7.41 Project proponent shall obtain Consent to Operate from the OSPCB and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the State Pollution Control Board.

7.42 The SEIAA, Odisha may revoke or suspend this EC, if implementation of any of the above conditions is not satisfactory. The SEIAA, Odisha reserves the right to alter /modify the above conditions or stipulate any further condition in the interest of environment protection.

7.43 The Project Proponent (lease holder) shall inform the SEIAA of any change in ownership of the mining lease. In case, there is any change in ownership or mining lease is transferred, then mining operation can be carried out only after transfer of EC as per provisions of the para 11 of EIA Notification, 2006, as amended from time to time.

7.44 Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in

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withdrawal of this environment clearance besides attracting penal provisions in the Environment (Protection) Act, 1986.

7.45 The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act,1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.

7.46 This Environmental Clearance (EC) is subject to orders/judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.

7.47 Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under section 16 of the National Green Tribunal Act, 2010.

Yours Faithfully,

Member Secretary

Copy to

1. Additional Chief Secretary, Forests & Environment Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
4. Deputy D.G.Forest., Regional Office (EZ), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Principal Secretary, Revenue and DM Department, Govt. of Odisha Bhubaneswar for information.
6. Collector & DM, Cuttack/ Sub Collector, Cuttack/ Tahasildar, Cuttack Sadar for Information and necessary action.
7. Guard file for record/Website/Parivesh Portal.

Member Secretary

Annexure-1

The replenishment study for river bed sand is very essential in order to have a check on possible over exploitation. It is assumed that the riparian habitat disturbance is minimum if the replenishment is equal to excavation for a given stretch. It is imperative to have a study of replenishment of sand material during a defined period for sustainable sand mining. As per the MOEF&CC, Govt. of India's Enforcement and Monitoring Guideline for Sand Mining, 2020, there are two methods prescribed for the study of rate of replenishment of sand on a stretch of river bed. These are (1) physical survey of the field by the conventional method and (2) use of UAV / Drone and other image data processing techniques. The second method UAV/ Drone method is the one which has been found suitable for the above purpose, and recommended by the ORSAC, Bhubaneswar.

The UAV / Drone method briefly is as follows:

The Drone /UAV is fitted with the advanced camera used for survey purposes. The survey is conducted using a set of instruments and compatible software to depict the topography of the study area (the lease area) by utilizing the properly referenced data.

After running the prescribed steps, the software shall automatically generate orthorectified imagery. Ground truthing is done at minimum 5 locations spread evenly across the lease area by using DGPS instruments. The readings from DGPS instruments are compared with the Drone Data for accuracy assessment.

The study shall have the details of establishment of bench mark by putting a number of pillar points and various Ground Control Points (GCP) at the site, observing by DGPS the various GCPs for permanent bench marks and control points. The summary of the elevation data from each session's profile based on the post monsoon survey is mentioned in the tabular form. A detailed comparison sheet of both pre-monsoon and post-monsoon elevation data is prepared. Cross sectional depiction of deposition and erosion for each section in pre and post deposition seasons shall be given.

Drone images are used to recreate highly accurate orthomosaic maps of mining sites and quarries. Each pixel contains 2D geo tagged information (X, Y), and can be used for distance and surface measurements. A densified point cloud can be generated from Drone images and data. Each point contains geospatial (X,Y,Z) information. It provides an accurate model of a site for precise volume measurements and visual insights. The drone data is processed to generate Digital Terrain Model (DTM) and assessment of progressive volumetric change.

Adequate number of geomatic grade ground control bench marks (X,Y,Z), depending on the size of the lease area, are to be maintained permanently around the lease area within a maximum distance of 500 meters from the lease area for the entire study period. There should be pre and post monsoon survey to assess the sand replenishment within the study area.

There are some organizations in Odisha state who are empaneled by ORSAC to conduct such survey.

Annexure-2

Essential Physical Criteria As Per Enforcement And Monitoring Guidelines For Sand Mining, January 2020 Of MoEF&CC, Govt. Of India

Sl. No.	Essential Criteria	Reference
1.	"No Mining Zone": 1/4the part of the river width (excluding 3/4the central part of the river width) on both sides of the river towards the river bank	4.1.1 (Para - e) Page - 16
2.	a) Distance between two clusters: ≥2.5 km b) Area of mining lease area is a cluster: ≤10 ha. c)	4.1.1 (Para - k) Page - 19
3.	Concave River Bank: No extraction of sand	
4.	No mining if a) Upstream: Lease is 1 km from major Bridge and high ways or 5(x) of the Bridge / public civil structure / water intakes point subject to lease is located at a minimum 250 meters distance. Where x = Span of the bridge. b) Downstream side: Lease is 1 km from the major bridge and Highways Or 10x of the bridge / public civil structure /water intake point Subject to lease is located at a minimum distance of 500 meter where x = span of the bridge	4.3 (Para - h) Page - 23
5.	Mining depth: ≤ 3 meter (maximum 3 meter)	4.3 (Para - m) Page - 24
6.	Mining distance from river bank: 1/4th of the river width, But subject to not less than 7.5 meter	4.31 (Para - m) Page - 24
7.	Area for removal of minerals: ≤60% of mine lease area	4.3 (Para - s) Page - 25
8.	Minable sand per ha. Available for actual mining: ≤60,000 MT/Annum	
9.	Regular replenishment study and replenishment rate	

Signature Not Verified
Digitally signed by Sri Susanta Nanda
Member Secretary
Date: 6/3/2022 12:10:12 PM

ODISHA SPACE APPLICATIONS CENTRE (ORSAC)

Department of Science & Technology, Govt. of Odisha

CONSOLIDATED LIST OF EMPANELMENT VENDORS TO UNDERTAKE DRONE/UAV/UAS GEOSPATIAL SURVEY WITHIN ODISHA AS PER ORSAC DEFINED SOP OF GEOSPATYIAL SURVEY UPTO 20/04/2027

SL. NO.	NAME OF FIRM	ADDRESS, PHONE NO & Email ID	VALIDITY
1	M/s Areal Constructions & Geo India Services	Plot no: 229, Kanan Vihar, Ph-2, Patia, Bhubaneswar, Odisha, Ph no: 7008305561/ 7008385968, Email: arcgisconsultancy@gmail.com	Upto 30.04.2027
2	M/s Consultancy for Engineering & Enviorment Planning(CEEP)	Plot no: G.A. 58, Gayatri Vihar, Chandrasekharpur, Bhubaneswar-751024, Odisha Ph. No: 8917442494 Email:contact.ceep@gmail.com	
3	M/s Digital Cartography and Services Pvt.Ltd	Plot no1015, Bhagabat Sandhan, GGP Cenal road, Rasulgarh, Bhubaneswar-751025, Odisha, Ph. No.-9437033041, Email- dcsbbsr@gmail.com	
4	M/s Ecometrix Consultance Pvt. Ltd.	Plot no. DCB-119, Idco info park, DLF Cyber City ,Chandaka Industrial Estate, Patia,Bhubaneswar-751024 Ph. No:0674-2973849 Email:info@ecometrix.co.in	
5	M/s Edall Systems & Services Pvt. Ltd.	Plot No-1112/584A, konena, Agrahara, Mes Colony, Bengaluru, Karnataka-560017, Ph. No:8880546607 Email:admin@edallsystems.com	
6	M/S Geo Consultants	Plot No-853,Govinda Prasad,Mahavir nagar,Opposite Reliance fresh,Cuttack Puri Road,Laxmi Sagar,Bbubaneswar,751006,Odisha,0674-2575702,email id-consultants_geo@yahoo.co.in	
7	M/s Geo-Enviromental Services	Plot no: HIG-407, K-5, Kalinga Vihar, near Siva Temple, Bhubaneswar-751019, Odisha Ph no:7978772448 Email: geo.enviromentalservices2018@gmail.com	
8	M/s Geoid Resources Pvt. Ltd	At-Plot no-38/1918,House no-5,Binayak Enclave,Kolathia,Khandagiri,Bhubaneswar-751030, Ph No.-9437665170, E-mail- geoidresources@gmail.com	
9	M/s Gram Tarang Inclusive Development Services Pvt. Ltd.	HIG-4, 2nd Floor, Jaydev Vihar, Opposite Pal Height, Bhubaneswar-751013 Ph No: 738209235, Email: venket@gramtarang.org	
10	M/s IIC Technologies Pvt. Ltd	Plot no: 8-2-350/5/B-22, road no. 3 Banjara Hills, Hyderabad, Telegana-500034 Ph. No:4067914444, Email: ravi.dharmavarapu@iictechnologies.com	
11	M/s Invent Grid India Pvt. Ltd.	Plot no: S14, 2nd floor ,Devsha Bussiness park, D-215, D Block Sector:63 , Noida, Delhi-201301 Ph. No: 9990500337, Email: info@igdrones.com	
12	M/s Landpoint Survey LLP	Plot no: 1522, Sri Pranavi, near ullalu lake, Ulla Upa Nagar, Sri M vishweshwaraya Layout, 6th floor, Bangaluru-560110 Ph. No:9880038546 Email: info@landpoint.in	
13	M/s My World Consultancy Services Pvt Ltd.	Plot no: 380, Bomikhal near Durga Mandap, Bhubaneswar-751010 Ph. No.8895564171 Email:rabi@theworld.co.in,wcs@theworld.co.in	

ODISHA SPACE APPLICATIONS CENTRE (ORSAC)
Department of Science & Technology, Govt. of Odisha

14	M/s Naven Survey & Construction LLP	Plot no: 11/157, Tulasi Nagar, 1st Cross Behind Time Hospital Road ,Pantakaluva Road, Vijayawada, Andhra Pradesh-720007, Ph. No:8008430439, Email:infonac@yahoo.com	
15	M/s Neno Technical Services	Plot No-576/4502 ,Ananta Niwas,Jagannath Vihar,Airfield,Sundarpada,Bhubaneswar,Odisha-751002 Mob:-9178145817, Email:-nenoindia5@gmail.com	
16	M/s ODRA Associate Pvt. Ltd.	4th floor, NSIC Building, Dharmpada Bhawan, Manchswar Railway Station Road, Block-D, Mancheswar Industrial Estate, Bhubaneswar-751007, Ph No.-0674-2952715/9439068176, Email- odraassociates@gmail.com	Upto 30.04.2027
17	M/s Oxbow Intellect Pvt. Ltd.	Sukantapally, Gobardanga, North 24 Paragas, West Bengel-743252 Ph:9732984480, Email: info@oxbowintllect.com	
18	M/s Soham Fero Magnese Pvt. Ltd	Block no: 16,17 Ground floor ,M.K.Y Tower, Ajni square Wardha roadf, Nagpur-440015, Ph. No: 9890489828, Email: soham.feromagnese@gmail.com	
19	M/s Spacetex Infoways Pvt Ltd	C-15, Sector- -7,,CDA, Cuttack- 753014, Odisha, Email:spacetexinfoways@gmail.com	
20	M/S TKS Consultancy Services	Plot No.4482/12068,Pandra Puri Bypass,GGP Colony,Rasulgarh,Bhubaneswar,Phone No-9937023977,Email-tkscsbbs@gmail.com	
21	M/s Vahanix Technologies Pvt. Ltd.	Glaze House, D-64,65 , Lane 2, Metro Satalite city, Bhubaneswar-751005, Odisha Ph. No-9078884538, Email: vahanixtechology@gmail.com	
22	M/s Visiontek Consultancy Services Pvt. Ltd.	Plot no: M22 & 23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Odisha Ph. No: 0674-3511721 Email:visiontek@visiontek.org	
23	M/s Zeotek Mining Solution	Plot No-JC-2, Jagamara Traffic, Bhubaneswar, Odisha-751030, Phn No-9439553684,9078233663 Email-zeotekmining@gmail.com	
24	M/s Arowana Corporation Pvt. Ltd.	1st & 2nd Floor , Beside SBI Bank, Murli Nagar, Vishakapatanam-530037, Andhra Pradesh Ph. No: 8374925568 email: ravipekala@arowanasoft.com	
25	M/s Indrones Solutions Pvt. Ltd.	Unit no: 3039, L- Wing, 3rd Floor, Akshar Bussiness park, Plot no: 03, Vashi kopar, khairane Road, Sec:25, Vashi, Navi Mumbai-400703 Ph. No:8655366231 Email: sales@indrones.com	
26	M/s Marvel Geospatial solution Pvt. Ltd.	D.No: 5-9-22/1/B , Ground Floor, shapoor hall, Shapoorwady, Opp. New MLA Quarters, Adarsh Nagar, Hyderabed, Telengana-500063 Ph no: 04066413226, Email: info@marvelgeospatial.com	
27	M/s Precision Airbornt Systems Pvt. Ltd.	Plot no: DCB-321, DLF Cyber City, Bhubaneswar-751024, Ph. No:9937082332 Email: precisionairborne9@gmail.com	
28	M/s Secon Pvt. Ltd.	Plot no:147, 7B Road, EPIP, White Field, Bangalore-560066 Ph. No: 080-41197778 Email:feedback@secon.in	

Survey of India

Annexure -3

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GNSS Processing Report - Summary

Request Details

General

Processed at: 2025-12-14 12:49:45
SBC version: 7.11.0.115

User Details

User name: tkscsbbs
Name: TAPAN KUMAR MALIK
Company: TKS CONSULTANCY SERVICES, BHUBANESWAR, ODISHA
E-Mail: tkscsbbs@gmail.com

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1. Point Results

Point-ID	Solution Type	Occupations / Baselines	WGS84 Latitude	WGS84 Longitude	WGS84 Ellip. Height [m]	SD Latitude	SD Longitude	SD Height
P.NAGARI-BASE	Phase Fixed	2/3	20° 23' 40.7626" N	85° 52' 22.3193" E	-42.1786 m	0.0012 m	0.0009 m	0.0091 m

Point-ID	Solution Type	Occupations / Baselines	WGS84 Cartesian X	WGS84 Cartesian Y	WGS84 Cartesian Z	SD X	SD Y	SD Z
P.NAGARI-BASE	Phase Fixed	2/3	430430.6314 m	5965203.2144 m	2208686.5223 m	0.0011 m	0.0085 m	0.0034 m

2.1. P.NAGARI-BASE - 2025-12-14 07:40:01

Point Occupation Results

Marker Name:	P.NAGARI-BASE	Receiver Type / SN:	TRIMBLE R12 / 6309F00062
		Antenna Type / SN:	TRMR12 NONE / -
Occupation Start:	2025-12-14 07:40:01	Occupation End:	2025-12-14 11:25:42

Averaged Point Summary: P.NAGARI-BASE

Weighted Average:	Yes		
WGS84 Latitude:	20° 23' 40.7624" N	SD Latitude:	0.0043 m
WGS84 Longitude:	85° 52' 22.3191" E	SD Longitude:	0.0061 m
WGS84 Ellip.Height:	-42.2027 m	SD Height:	0.0118 m
WGS84 Cartesian X:	430430.6367 m	SD X:	0.0062 m
WGS84 Cartesian Y:	5965203.1939 m	SD Y:	0.0111 m
WGS84 Cartesian Z:	2208686.5068 m	SD Z:	0.0058 m
Easting:	-	SD Easting:	-
Northing:	-	SD Northing:	-
Ellip. Height:	-	SD Height:	-
Ortho. Height:	-		

Baseline Summary P.NAGARI-BASE

Point-ID	Reference	Baseline Length [m]	3D CQ [m]	ΔX	ΔY	ΔZ	X	Y	Z
P.NAGARI-BASE							430430.6367 m	5965203.1939 m	2208686.5068 m
	DARP	40844.1542 m	0.0017 m	-0.0088 m	0.0176 m	0.0136 m	430430.6455 m	5965203.1764 m	2208686.4932 m
	DHAL	40690.4653 m	0.0010 m	0.0033 m	-0.0056 m	-0.0049 m	430430.6334 m	5965203.1996 m	2208686.5117 m

Baseline Results

2.1.1. Baseline: DARP - P.NAGARI-BASE

Used Processing Parameters

Cut-Off Angle:	10°
Frequency:	L1, L2, L5, E5b, E5ab
Sampling Rate:	10 sec
Satellite System:	GPS, GLONASS, Galileo, BeiDou, QZSS
Disabled Satellites:	
Solution Type:	Phase Fixed
Solution Optimization:	Iono minimized
Frequency to use in Iono Minimized:	L1, L2, L5, E5ab

Tropospheric Model:	Computed
Ionospheric Model:	Computed
Ephemeris type	Broadcast
Allow Widelane Fix:	Yes
Min. Distance for Iono Minimized:	15 km
Possible Ambiguities Fix up to:	300 km
Min. Duration for Float Solution (static):	5 min

Antennas and Receivers

	Reference - DARP	Rover - P.NAGARI-BASE
Receiver Type / SN:	LEICA GR50 / -	TRIMBLE R12 / 6309F00062
Antenna Type / SN:	LEIAR20 LEIM / -	TRMR12 NONE / -

Coordinates

	Reference - DARP	Rover - P.NAGARI-BASE
WGS84 Latitude:	20° 41' 08.9896" N	20° 23' 40.7621" N
WGS84 Longitude:	86° 06' 48.1584" E	85° 52' 22.3188" E
WGS84 Ellip.Height:	-28.328 m	-42.2233 m
WGS84 Cartesian X:	404620.969 m	430430.6455 m
WGS84 Cartesian Y:	5955685.937 m	5965203.1764 m
WGS84 Cartesian Z:	2238878.010 m	2208686.4932 m

Baseline Vector and Quality

ΔLatitude:	0° 17' 28.2274" S	SD ΔLatitude:	0.0002 m	M0: 0.42917818		
ΔLongitude:	0° 14' 25.8397" W	SD ΔLongitude:	0.0003 m	Q11: 0.00000030	Q12: -0.00000001	Q13: 0.00000048
ΔHeight:	-13.8952 m	SD ΔHeight:	0.0017 m	Q22: 0.00000041	Q23: 0.00000005	
				Q33: 0.00001591		
ΔX:	25809.6765 m	SD ΔX:	0.0003 m	M0: 0.42917818		
ΔY:	9517.2394 m	SD ΔY:	0.0016 m	Q11: 0.00000047	Q12: 0.00000091	Q13: 0.00000038
ΔZ:	-30191.5168 m	SD ΔZ:	0.0007 m	Q22: 0.00001364	Q23: 0.00000545	
Baseline Length:	40844.1542 m	SD Baseline Length:	0.0017 m	Q33: 0.00000252		
		CQ 1D:	0.0007 m			
		CQ 2D:	0.0016 m			
		CQ 3D:	0.0017 m			

GDOP:	2.0 - 1.3
PDOP:	1.2 - 0.8
HDOP:	0.8 - 0.4
VDOP:	1.0 - 0.6

2.1.2. Baseline: DHAL - P.NAGARI-BASE

Used Processing Parameters

Cut-Off Angle:	10°
Frequency:	L1, L2, L5, E5b, E5ab
Sampling Rate:	10 sec

Satellite System:	GPS, GLONASS, Galileo, BeiDou, QZSS
Disabled Satellites:	
Solution Type:	Phase Fixed
Solution Optimization:	Iono minimized
Frequency to use in Iono Minimized:	L1, L2, L5, E5ab
Tropospheric Model:	Computed
Ionospheric Model:	Computed
Ephemeris type	Broadcast
Allow Widelane Fix:	Yes
Min. Distance for Iono Minimized:	15 km
Possible Ambiguities Fix up to:	300 km
Min. Duration for Float Solution (static):	5 min

Antennas and Receivers

	Reference - DHAL	Rover - P.NAGARI-BASE
Receiver Type / SN:	LEICA GR50 / -	TRIMBLE R12 / 6309F00062
Antenna Type / SN:	LEIAR20 LEIM / -	TRMR12 NONE / -

Coordinates

	Reference - DHAL	Rover - P.NAGARI-BASE
WGS84 Latitude:	20° 39' 20.8379" N	20° 23' 40.7624" N
WGS84 Longitude:	85° 35' 53.9397" E	85° 52' 22.3192" E
WGS84 Ellip.Height:	19.584 m	-42.1960 m
WGS84 Cartesian X:	458236.122 m	430430.6334 m
WGS84 Cartesian Y:	5953023.322 m	5965203.1996 m
WGS84 Cartesian Z:	2235782.994 m	2208686.5117 m

Baseline Vector and Quality

ΔLatitude:	0° 15' 40.0755" S	SD ΔLatitude:	0.0001 m	M0: 0.24990675		
ΔLongitude:	0° 16' 28.3795" E	SD ΔLongitude:	0.0002 m	Q11: 0.00000035	Q12: -0.00000003	Q13: 0.00000054
ΔHeight:	-61.7797 m	SD ΔHeight:	0.0010 m	Q22: 0.00000044	Q23: -0.00000000	
				Q33: 0.00001537		
ΔX:	-27805.4886 m	SD ΔX:	0.0002 m	M0: 0.24990675		
ΔY:	12179.8776 m	SD ΔY:	0.0009 m	Q11: 0.00000051	Q12: 0.00000091	Q13: 0.00000041
ΔZ:	-27096.4823 m	SD ΔZ:	0.0004 m	Q22: 0.00001312	Q23: 0.00000530	
Baseline Length:	40690.4653 m	SD Baseline Length:	0.0010 m	Q33: 0.00000253		
		CQ 1D:	0.0004 m			
		CQ 2D:	0.0009 m			
		CQ 3D:	0.0010 m			

GDOP:	2.2 - 1.3
PDOP:	1.2 - 0.8
HDOP:	0.8 - 0.4
VDOP:	0.9 - 0.6

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2.2. P.NAGARI-BASE - 2025-12-14 07:44:01

Point Occupation Results

Marker Name:	P.NAGARI-BASE	Receiver Type / SN:	TRIMBLE R12 / 6309F00062
		Antenna Type / SN:	TRMR12 NONE / -
Occupation Start:	2025-12-14 07:44:01	Occupation End:	2025-12-14 11:25:42

Averaged Point Summary: P.NAGARI-BASE

Weighted Average:	Yes		
WGS84 Latitude:	20° 23' 40.7626" N	SD Latitude:	0.0007 m
WGS84 Longitude:	85° 52' 22.3193" E	SD Longitude:	0.0008 m
WGS84 Ellip.Height:	-42.1752 m	SD Height:	0.0044 m
WGS84 Cartesian X:	430430.6315 m	SD X:	0.0009 m
WGS84 Cartesian Y:	5965203.2175 m	SD Y:	0.0041 m
WGS84 Cartesian Z:	2208686.5236 m	SD Z:	0.0018 m
Easting:	-	SD Easting:	-
Northing:	-	SD Northing:	-
Ellip. Height:	-	SD Height:	-
Ortho. Height:	-		

Baseline Summary P.NAGARI-BASE

Point-ID	Reference	Baseline Length [m]	3D CQ [m]	ΔX	ΔY	ΔZ	X	Y	Z
P.NAGARI-BASE							430430.6315 m	5965203.2175 m	2208686.5236 m
	BHUW	19072.9935 m	0.0046 m	0.0000 m	0.0000 m	-0.0000 m	430430.6315 m	5965203.2175 m	2208686.5236 m

Baseline Results

2.2.1. Baseline: BHUW - P.NAGARI-BASE

Used Processing Parameters

Cut-Off Angle:	10°
Frequency:	L1, L2, L5, E5b, E5ab
Sampling Rate:	10 sec
Satellite System:	GPS, GLONASS, Galileo, BeiDou, QZSS
Disabled Satellites:	
Solution Type:	Phase Fixed
Solution Optimization:	Iono minimized
Frequency to use in Iono Minimized:	L1, L2, L5, E5ab
Tropospheric Model:	Computed
Ionospheric Model:	Computed
Ephemeris type	Broadcast

Allow Widelane Fix:	Yes
Min. Distance for Iono Minimized:	15 km
Possible Ambiguities Fix up to:	300 km
Min. Duration for Float Solution (static):	5 min

Antennas and Receivers

	Reference - BHUW	Rover - P.NAGARI-BASE
Receiver Type / SN:	LEICA GR50 / -	TRIMBLE R12 / 6309F00062
Antenna Type / SN:	LEIAR20 LEIM / -	TRMR12 NONE / -

Coordinates

	Reference - BHUW	Rover - P.NAGARI-BASE
WGS84 Latitude:	20° 17' 15.2973" N	20° 23' 40.7626" N
WGS84 Longitude:	85° 43' 47.1859" E	85° 52' 22.3193" E
WGS84 Ellip.Height:	46.741 m	-42.1752 m
WGS84 Cartesian X:	445640.021 m	430430.6315 m
WGS84 Cartesian Y:	5968301.889 m	5965203.2175 m
WGS84 Cartesian Z:	2197602.671 m	2208686.5236 m

Baseline Vector and Quality

ΔLatitude:	0° 06' 25.4653" N	SD ΔLatitude:	0.0007 m	M0: 0.63303667		
ΔLongitude:	0° 08' 35.1334" E	SD ΔLongitude:	0.0008 m	Q11: 0.00000116	Q12: -0.00000017	Q13: 0.00000107
ΔHeight:	-88.9166 m	SD ΔHeight:	0.0044 m	Q22: 0.00000158	Q23: -0.00000085	
				Q33: 0.00004896		
ΔX:	-15209.3895 m	SD ΔX:	0.0009 m	M0: 0.63303667		
ΔY:	-3098.6715 m	SD ΔY:	0.0041 m	Q11: 0.00000190	Q12: 0.00000367	Q13: 0.00000164
ΔZ:	11083.8526 m	SD ΔZ:	0.0018 m	Q22: 0.00004214	Q23: 0.00001635	
Baseline Length:	19072.9935 m	SD Baseline Length:	0.0046 m	Q33: 0.00000766		
		CQ 1D:	0.0018 m			
		CQ 2D:	0.0042 m			
		CQ 3D:	0.0046 m			

GDOP:	2.6 - 1.3
PDOP:	1.5 - 0.8
HDOP:	0.7 - 0.4
VDOP:	1.4 - 0.6

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Geotagged Photographs of Encroachments in the approach road to the Sand Area

Geotagged Photographs of Encroachments in the approach road to the Sand Area