REPLENISHMENT STUDY REPORT FOR

RIVER BED MINING PROJECT OF MINOR MINERAL

ORDINARY SAND (BAJRI)

AT
Rivers, Nallah, gair mumkin nadi in
Tehsil – Jhalarapatan of District – Jhalawar and
Tehsil Ramganj Mandi of District – Kota
State – Rajasthan
NAME OF RIVER – BADI KALI SINDH, AHU, CHANDRA BHAGA, REWA NADI & THEIR CONNECTED FLOW NALLAHS
Purpose – Fresh Grant,
Proposed production – 7,50,000 TPA
APPLIED LEASE AREA – 1695.06 Hect. PROJECT COST – 85 LAC.
CATEGORY- 'A'
ToR letter No. – J-11015/328/2013-IA.II (M) dated 22.11.2013
Replenishment Study Period –
Pre – monsoon and Post – monsoon season of year 2017

APPLICANT

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ACCREDITED BY NABET (S.NO. 144) CATEGORY "A" FOR SECTOR 1

CONTENTS

Introduction:

The proposed project is for River Bed mining of ordinary sand (Bajri) from River Badi Kali Sindh, Chandra Bhaga Nadi, Au or Ahu River & Rewa nadi & their connected flow nallahs. The applied lease area is situated in Tehsil – Jhalarapatan of District – Jhalawar and Tehsil Ramganj Mandi of District – Kota, and State – Rajasthan.

Applicant: Mr. Indrajeet Singh Jhala,

Nala Mohalla, Khari Kuiya,

P.O. Jhalawar, Tehsil – Jhalarapatan,

District – Jhalawar, (Rajasthan)

Mob. +91 9414193514

Mining of Ordinary Sand (Bajri) is proposed in the river bed, the applied lease area is 1695.06 ha (Govt. Land). Proposed production is 7, 50,000 Tons per annum of Sand.

The letter of intent was issued by Joint Secretary, Mines (Group-2), Government of Rajasthan, letter no.P.9 (2) Khan/Group-2/2013, Jaipur dated 08.03.2013.

The letter of intent was recommended to be issued by Supdt. Mining Engineer (M III) vide his letter no. Dir /P2 (A8) Jhala/Bajri/2012/278 Dt.18-01-2013, As per RMMCR' 1986, validity period of applied lease is five years.

The mining plan was approved by Suptdg. Mining Engineer, Kota vide letter no. SME/Kota/CC-I/MP/13/11745 dated 13.12.2013.

G.T. Sheet No. – 45P/14, 15, 16, 54D/2, 3, 4, 6, 7, 8.

Type of Land	Area in Ha.
Nadi, Nalla, River, Govt. waste land	**1695.06**

PROJECT DETAIL

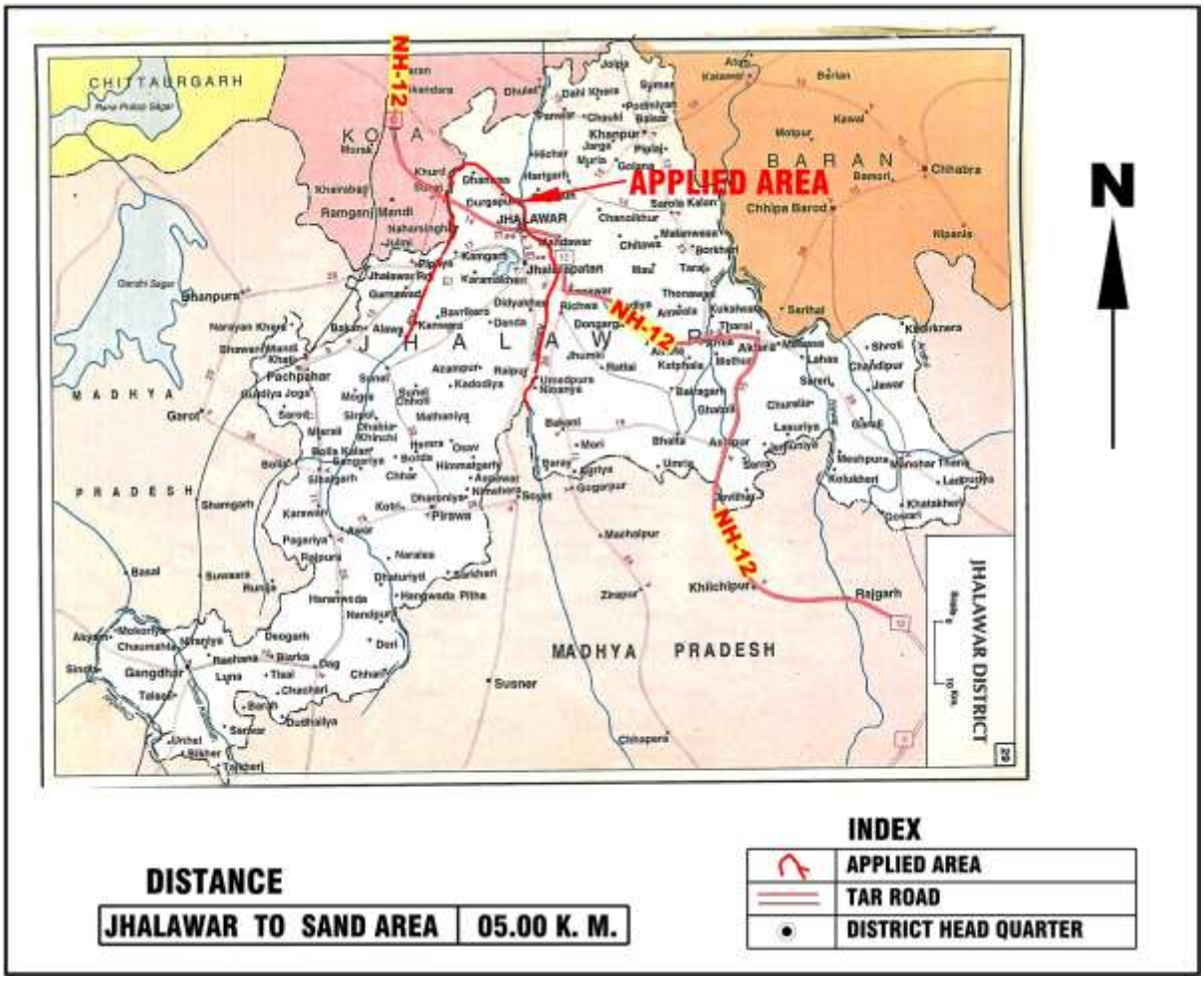
S.No	Particulars	Details
1	Locations	
2	Near Village	Bambori, Bavrikheri, Aroliya, Biriya kheri khurd, Gindora, Jhalara-patan, Bakshpura, Bagdar, Mundalya khera, Chand loi, Sagoriya, Rup pura, Kanwara, Kanwari, Samiya, Gadari, Dhavli, Saranga khera, Narli, Binda, Jatamali, bhumari, Semli bhawani, Chanvali, Gurariya, Asondiya, Khijarpur, Bhaumara, Soyat kalan, Gugal heri, Gunjari, Achravan, Matwasa, Gadarwara nurji, Barana, Ratanpura, Mori, Kans kheri, Kherkhera, Barodiya.
3	Tehsil	Jhalarapatan & Ramganj Mandi
4	District	Jhalawar & Kota
5	State	Rajasthan
6	Latitude	24^0 12′49.56′′ - 24^0 41′24.96′′ N
7	Longitude	75^0 59′34.80′′ - 76^0 14′45.80′′ E
8	Elevation above sea level	338 mRL to 295 mRL
9	Nearest National Highway	NH – 12 (Jhalawar to Kota) crossed the applied ML area at near village – Suket & Ruprel. SH-19A, crossed the applied ML area at near village – Bhilwari,
10	Nearest Railway station & Airport	Railway Station – Jhalawar about 5 km from the nearest point of applied ML area Airport – Indore (224 Km. from Jhalarapatan)
11	Nearest Tourist Place	Gagron Fort at Jhalawar and adjoin to applied ML area.
12	Archeological Place	Gagron Fort – Four Rivers & their connected nallah are flowing in this applied area and their junction point is near Jhalawar Fort in Chambal River.
13	National Park , Wild Life Sanctuary, Wild Life Corridors, Biosphere Reserves, Migratory routes for Birds, Reserved/Protected Forest	• Game Sanctuary – 6.5 Km, from Jhalawar in N direction. • Near Bagher (P.F.), between Latitude $24^0$35’ to $24^0$40’ and Longitude $76^0$15’ to $76^0$20’ • Near Kishanpura (R.F.), between Latitude $24^0$25’ to $24^0$30’ and

		Longitude $76^0$10' to $76^0$15'. • Bakani (R.F.), between Latitude $24^0$25' to $24^0$30' and Longitude $76^0$15' to $76^0$20'.
14	Nearest major city	Jhalawar
15	Nearest Water bodies	Applied Lease area itself is a water body
16	Nearest town	Nearest town – Jhalarapatan between latitude 24^0 30' to 24^0 35' and longitude 76^0 10' to 76^0 15' and Jhalawar between latitude 24^0 35' to 24^0 40' and longitude 76^0 10' to 76^0 15'. District H.Q. – Jhalawar & Kota.

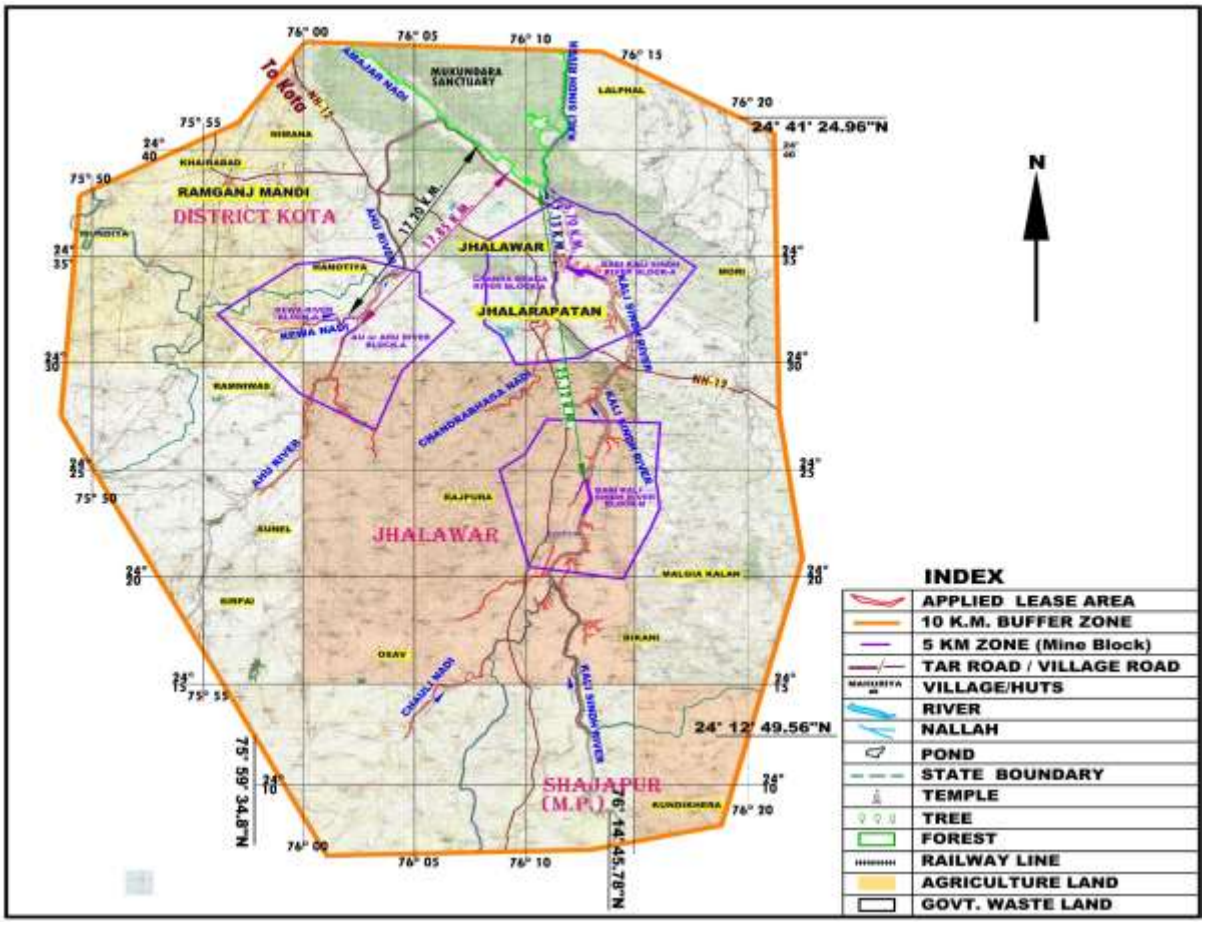
LENGTH AND WIDTH OF THE APPLIED LEASE AREA.

Name of River	Length (mtr.)	Width (mtr)
Badi Kali sindh and its connected flow nallah	54194.0	259.0
Chandra Bhaga Nadi	3844.0	82.0
Au(Ahu) River and its connected nallahs	47159.0	272.0
Rewa Nadi	3698.0	114.0

LOCATION MAP



KEY PLAN


To Kota
MUKUNDARA SANCTUARY
LALPHAL
KHAIRABAD
NIMBAHA
RAMGANJ MANDI
DISTRICT KOTA
MANOTIYA
JHALAWAR
JHALARAPATAN
MORI
RAMNIWAS
RAJPURA
SUNEL
MALOUA KALAN
SIRPAI
OSAV
DIKANI
KUNDIKHERA
SHAJAPUR (M.P.)
24° 41' 24.96"N
24° 12' 49.56"N
75° 59' 34.8"N
76° 14' 45.78"N
N
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APPLIED LEASE AREA
10 K.M. BUFFER ZONE
5 KM ZONE (Mine Block)
TAR ROAD / VILLAGE ROAD
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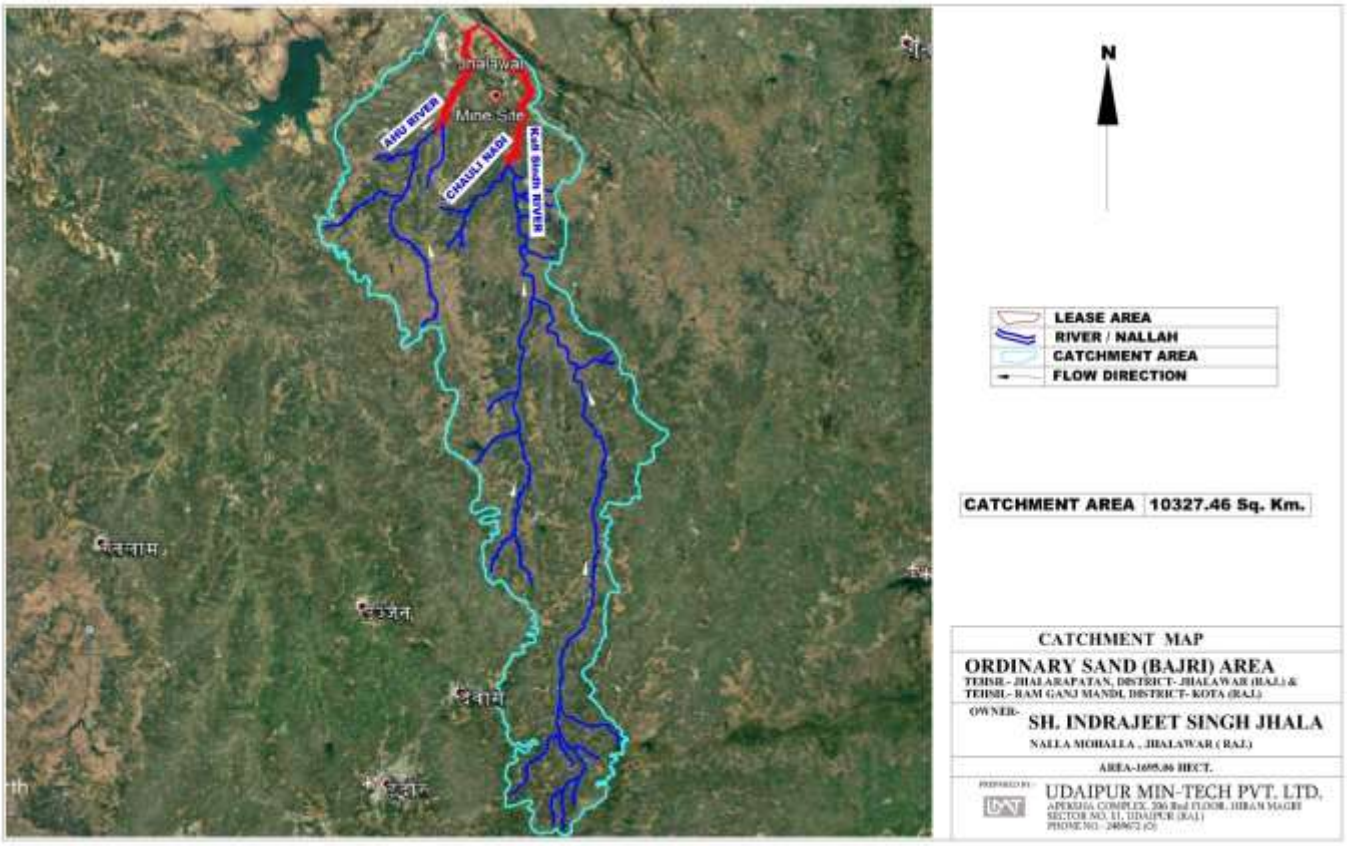
NALLAH
POND
STATE BOUNDARY
TEMPLE
TREE
FOREST
RAILWAY LINE
AGRICULTURE LAND
GOVT. WASTE LAND

CATCHMENT AREA MAP



PHOTOGRAPHS OF APPLIED LEASE AREA

Stages of Environmental Clearance

Application for prior Environmental clearance for the above project was submitted to the Ministry of Environment and Forest (MoEF) on 23.08.2013 for determination of Terms of Reference (ToR) for the preparation of EIA Report.

Proposal for ToR was considered in 16th meeting of EAC held during 31st Oct. – 01st Nov. 2013 and TOR letter was issued by MoEF & CC, New Delhi vide letter No. J-11015/328/2013-IA.II (M) dated 22.11.2013, for preparation of EIA/EMP report.

In accordance with ToR letter Baseline Study was carried out during Dec. 2013 to Feb. 2014 and draft EIA/EMP report submitted to State pollution control Board for conducting Public Hearing.

Public Hearing was conducted on 09.06.2014, at Sub Section office Ramganj Mandi, District – Kota & on 11.06.2014, at Tehsil Headquarter Jhalarapatan, District Jhalawar, Rajasthan, for the purpose of grant of Environmental Clearance (EC) to the River Sand Mining Project, for a production capacity of 7,50,000 tonnes per annum of Sand.

The final EIA/EMP Report was submitted online to Ministry for seeking environment clearance on 30th Oct., 2014.

The proposal for EC was appraised by EAC in its 34th meeting held during May 27-29, 2015. In the minutes of the meeting committee recommended the proposal for the grant of EC.

After that Ministry examined the proposal and informed the PP vide its letter no. J-11015/328/2013-IA.II (M) dt. 04/01/2017 to conduct a scientific replenishment study and submit the report to the Ministry for further consideration before EAC.

After that replenishment study was done for pre-monsoon & post monsoon season of year 2017.

Replenishment Study:

Topography, Drainage pattern, General Geology & Local geology

The topography of the applied area is mainly plain land marked with shallow nallah and undulations. The higher elevation point is 338 mRL near village Bhumaru and lower elevation point is 295 mRL near village Manpura in the applied area. The drainage pattern of this area in general flowing from south towards north direction.

Drainage:

Drainage pattern of the area is dendritic. The applied lease area part of the River Badi kali Sindh, Chandra Bhaga Nadi, Au or Ahu River & Rewa nadi & their connected flow nallahs.

The northern portion of the applied lease area is a rocky terrain and is reflected in the structurally controlled drainage as opposed to the southern portion. The topographically bound meanders can be seen near Baradiya Antri along with water falls near Brijpura indicating sheer drop in gradient.

General Geology & Local Geology

General Geology:-

Jhalawar district comprises of rocks of Vindhayan super group and Deccan traps. About 60 % of the district is covered by Deccan trap flows. The Deccan traps underlie the Vindhayan Super group.

The pretrappean rock formations comprise Lower and Upper Vindhyans represented by Jhalarapatan sandstone, Suket Shales and limestone, Kaimur sandstone, Rewa shale, sandstone and conglomerates, Ganurgarh shales, Lower Bhander sandstone and limestone, Sirbhu shales and limestone.

The Vindhayan sandstone and shales form linear hills trending northwest to southeast and velleys. They are exposed around Jhalawar and to its north east and north west. These rocks have been overlain by twelve basaltic flows between 280 mts. to 481 mts. R. L., around Dag and Chaumahala areas, the flows have undergone widespread lateritisation. Both fossiliferous and imfossiliferous intertrappean clay, chert limestone beds are also present.

The general stratigraphic succession of the district is as under:

Recent	Quaternary Alluvium		River borne alluvium and soil
Upper Vindhayan	Deccan Trap Formation		Twelve Basaltic flows (7 to 45 meters) with intertrappean beds.
		Sirbhu Shales	Shales with siltstone with limestone intercalations.
	Bhander Group	Lower Bhander Sandstone	Sandstone with shale intercalations.
		Bhander Limestone	Impure argillaceous stromatolitic limestone intercalations.
		Ganurgarh Shale	Variegated shale
	Rewa Group	Rewa Sandstone	Sandstone, conglomerate and grit with shale.
	Rewa Shale	Rewa Shale	Brown, purple and green shales.
Lower Vindhayan	Kaimur Group	Kaimur sandstone	Sandstone, grit and conglomerate
		Suket Shale	
	Semri Group	Suket Limestone	Khaki brown and purple coloured shales Limestone
		Jhalarapatan Sandstone	Sandstone with intercalated shales.

The Vindhayan Sandstone and shales form linear hills trending northwest to southeast and valleys. They are exposed around Jhalawar and to its north east and north west. These rocks have been overlain by twelve basaltic flows between 280 mRL to 481 mRL, around Dag and Chaumahala areas, the flows have undergone widespread lateralization. Both fossiliferous and imfossiliferous intertrappean clay, chert limestone beds are also present.

The drainage is part of Chambal and ultimately drains off in Chambal River in the North. Locally the drainage consists of dominantly the Kali Sindh River in the East and Ahu River flowing from West, both flowing and subsequently merging into one main stream in North.

The Upriver portion in the South to Central region, displays a moderate sinuosity and meandering. The sinuosity shows that the beds are shallow and the gradient and depth increases towards North. Both the tributaries (Ahu and Kali Sindh) are third order streams

with limited branching. Catchment consists of mostly first order streams. A small Nallah (Chauli Nadi) merges with Kali Sindh River near village Bhilmera and continues as Kali Sindh flowing northwards. The Ahu River merges with Kali Sindh near Village Gaungeri in North eastern portion. During the survey and mapping of applied lease area gradient of both Kali Sindh & Ahu river found 1:1037.

Local Geology:

In the applied lease area most of part is covered with sand. In the applied lease area vicinity of rocks type consists of sandstones, limestone, and shale's of Vindhayan group as well as Deccan traps.

The sand deposit in the applied lease area is brought in form from the up-river basin in where rock types like sandstones, limestone, which contributes as a source to sand in the river.

The drainage is part of Chambal and ultimately drains off in Chambal River in the North. Locally the drainage consists of dominantly the Kali Sindh River in the East and Ahu River flowing from West, both flowing and subsequently merging into one main stream in North.

Summary of Reserves as per Approved Mining Plan:

A) <u>Geological Assessment / Study:</u>

Resource Quality and Quantity Assessment:

(a) Resources quality assessment:

Bajari will be mined from the river bed to be used as building material.

(b) Resources quantity assessment:

Geological Resources have been estimated as per UNFC guideline.

Summary of resources available in the applied area as below:

Four rivers are situated in this applied area. The dimensions and grid position at the Plan is given below. Their junction is at Chambal River near Jhalawar Fort.

The names of rivers and dimensions are given in the table below:

Name of River	Length m	Width m	Thickness m	Mineral	Remarks
1.Badi Kali sindh and its connected flow nalla	54194	259	3.0	Sand (Bajri)	0.0 S to 53250 S and 0.0 E to 14700 E
2.Chandra bhaga and its connected flow nalla	3844	82	3.0	Sand (Bajri	13000 S to 16300 S and 8500 E to 9300 E.
3.Au(Ahu) and its connected flow nalla	47159	272	3.0	Sand (Bajri	0.0 S to 30000 S and 0.0 W to 11500 W
4.Rewa nadi its connected nalla	3698	114	3.0	Sand (Bajri	17200 S to 17800 S and 6000 E to 9250 E.

SAND RESERVES CALCULATION

MEASURED CATEGORY – 331

Bulk density 1.6

Name of River	Length m	Width m	Thickness m	Volume Cu m	M.T.= (Volume* Bulk density)
1.Badi Kali sindh and its connected flow nalla	49624	122	3.0	18162384	29059814.4
2.Chandra bhaga and its connected flow nalla	3644	68	3.0	743376	1189401.6
3.Au(Ahu) and its connected flow nalla	46388	102	3.0	14194728	22711564.8
4.Rewa nadi its connected nalla	3489	76	3.0	795492	1272787.2
			Total	**33895980**	**54233568**

Measured Reserves	(331)	54233568 MT
Losses along Statutory Barrier zone	(211)	2475480 MT
Losses due to Public Road	(211)	3477120 MT
	TOTAL	5952600 MT
REMAINING RESERVES	**(111)**	**48280968 MT**

Mineable Reserves & Life of Mine;

Recovery:

Recovery of Sand from the ROM is estimated at 100 % of the reserves. Life of mine is calculated based on reserves under UNFC code 111 & 211 only. Life is estimated at the 750000 tonnes of production of ROM per year.

Reserves as per UNFC	Code	In-situ In tonnes	Recoverable	Sub Grade	Rejects
Proved	111+211	54233568	100%	Nil	Nil

Life of mine is estimated at 48280968 tonnes/ 750000 per annum = 64.37 years.

Method of mining:

The method of mining is manual; a loading gang of 4 persons will be deputed to load Bajri with the help of spade and iron pan to the tractor trolley and transported from working site to the different destinations.

Sometimes extra loads which are not booked by the buyers are unloaded at the Stack yard made for temporary storage.

It is proposed that a JCB model 3D loader cum excavator, tyre mounted shall be used for loading in the Stack yard only. The loading will take place in a Truck / Dumper & Tractor Trolley. This will ensure supply to the consumer or buyer directly from the working sites.

The mining is done in five blocks in different sites of the applied lease area. The total applied lease area is 1695.06 hectare and about 130.0 hect. area will be excavated in different five blocks in the operational phase.

Production Detail & Replenishment:

Proposed project is a new Mine & LOI has been issued to PP on 08.03.2013. As per supreme court order dated 25.11.2013 in civil appeal no.(s)9703-9706 of 2013 between Chief Secretary, Govt. of Rajasthan versus National Green Tribunal Bar Association & ORS of SLP @ no. 34811 of 2013, the production was started in Dec. 2013.

As per the approved mining plan, Dt. 13/12/2013 available reserves were **48280968 tonnes.**

Production carried out:

S. No.	Date, Month & Year	Production in tons
1.	24th Dec. 2013 to 31st March 2014	87168
2.	1st April 2014 to 31st March 2015	236033
3.	1st April 2015 to 31st March 2016	146317
4.	1st April 2016 to 31st March 2017	218444
5.	1st April 2017 to 30th Nov. 2017	103507
	Total	791469

***Authenticated production detail is enclosed.**

In the approved mining plan production was proposed in 5 mining blocks and since Dec. 2013 mining was done only in 2 blocks namely Block A Badi Kali Sindh & Block A AU or Ahu River and highest production achieved is 236033 tonnes during the period 1st April 2014 to 31st March 2015.

As per the Ministry's letter dt. 04/01/2017, replenishment study was carried out for the pre-monsoon and post-monsoon season of 2017 in the mining blocks where mining was done.

REPLENISHMENT OF THE AREA

The rate of gross or absolute silt production (erosion) in the watershed and the ability of the stream system to transport the eroded material in a river and then to a reservoir has

the direct relation with the quantity of sediment delivered into a reservoir. The rate of gross erosion is dependent upon many physical factors live climatic conditions, nature of soil, slope of the area, topography and the land use. Hydro-physical conditions of the watershed govern the capability of transporting the eroded material. It has been observed that the average rate of sediment production decreases as the size of drainage area increase and the larger watershed the lesser is the variation between the rates. The larger watershed presents more opportunity for deposition of silt during its traverse from the point of production. The watershed with maximum land use class of forest generate very low rate of production unless the forest are degraded or open forest. The cultivated watersheds with unscientific farming produce very high rate of silt production. The total amount of eroded material, which reaches a particular hydraulic control point, is termed as sediment yield. The sediment control of inflow is governed by Character of run-off; Susceptibility of soils; the extent and density of vegetative cover in the area; and the hydraulic efficiency of the drainage system.

The rotational mining is being adopted to facilitate the replenishment of the excavated pits during rainy season. Thus the mineable area has been divided in five blocks i.e. the upstream block and the downstream block. The Mining of these blocks is suggested on rotation basis in such a way that pit of previous year mining will act as depository for the monsoon season. Sand is extracted from the said lot during one year; more than the extracted quantity of the same are automatically replenished by rainfall in the monsoon by the river/ nallah itself on account of its flow and velocity.

Source of sand in proposed River bed area:-

The Kali Sindh River is the biggest river flowing in the Malwa region of Madhya Pradesh state. The river then joins Chambal River at the downstream of Sawai Madhopur in Rajasthan state.

The river belongs to the Yamuna basin, being one of the perpetual streams of the state, it is fed by Ahu, Niwaj and Parwan Rivers. The origin point of the river is Vindhya Range and then flowing down further to the north direction through Baran and Jhalawar district. The river meets the Chambal River at Nonera village in Baran district.

There are about ten rivers basins in Madhya Pradesh and there are ten major rivers that originate from the state. Because the state is located in the central most part of India, majority of the rivers are interstate rivers. The rivers like Chambal, Betwa, and Ken including Kali Sindh River flows northward and meets Yamuna.

The total catchment area of this river in Madhya Pradesh state is 26698 km and the total length is four hundred and seventy. The 461 lengths of the river fall in Madhya Pradesh and about 9 km in Uttar Pradesh. The major tributaries of Kali Sindh River are Kunwari, Pahuj, Parbati and Mahuar.

Origin of Kali Sindh River

The point of origin of Kali Sindh River of Madhya Pradesh state is the northern most slopes of the hills of Vindhya. The river covers a large portion of the land in Madhya Pradesh before entering the Rajasthan state in India.

The popular place where the Kali Sindh River enters in Rajasthan is in Binda village. The total distance covered by the Kali Sindh River in Rajasthan is 145 kilometers. The river later on merges in Chambal River which is flowing in the Kota district of Nonera Village.

Geography of Kali Sindh River

The geography of the Kali Sindh River shows an extensive aluminum deposits and flood plains. In the monsoon season, it sometimes reaches to the supreme water level. The geology of the Kali Sindh River points out the productive alluvial plains of the river basin.

Average annual rainfall of the district is 883.0 mm.

Method of Replenishment Study:

For the said project replenishment study has been done during the pre-monsoon (May-2017) and post-monsoon season (Oct. - 2017) of 2017- 18 by field survey (volumetric survey) method.

Firstly Volumetric Survey was done in the proposed mining blocks in pre monsoon season from where mining was done. By this method spot RL/level was marked & mapped and sections were drawn.

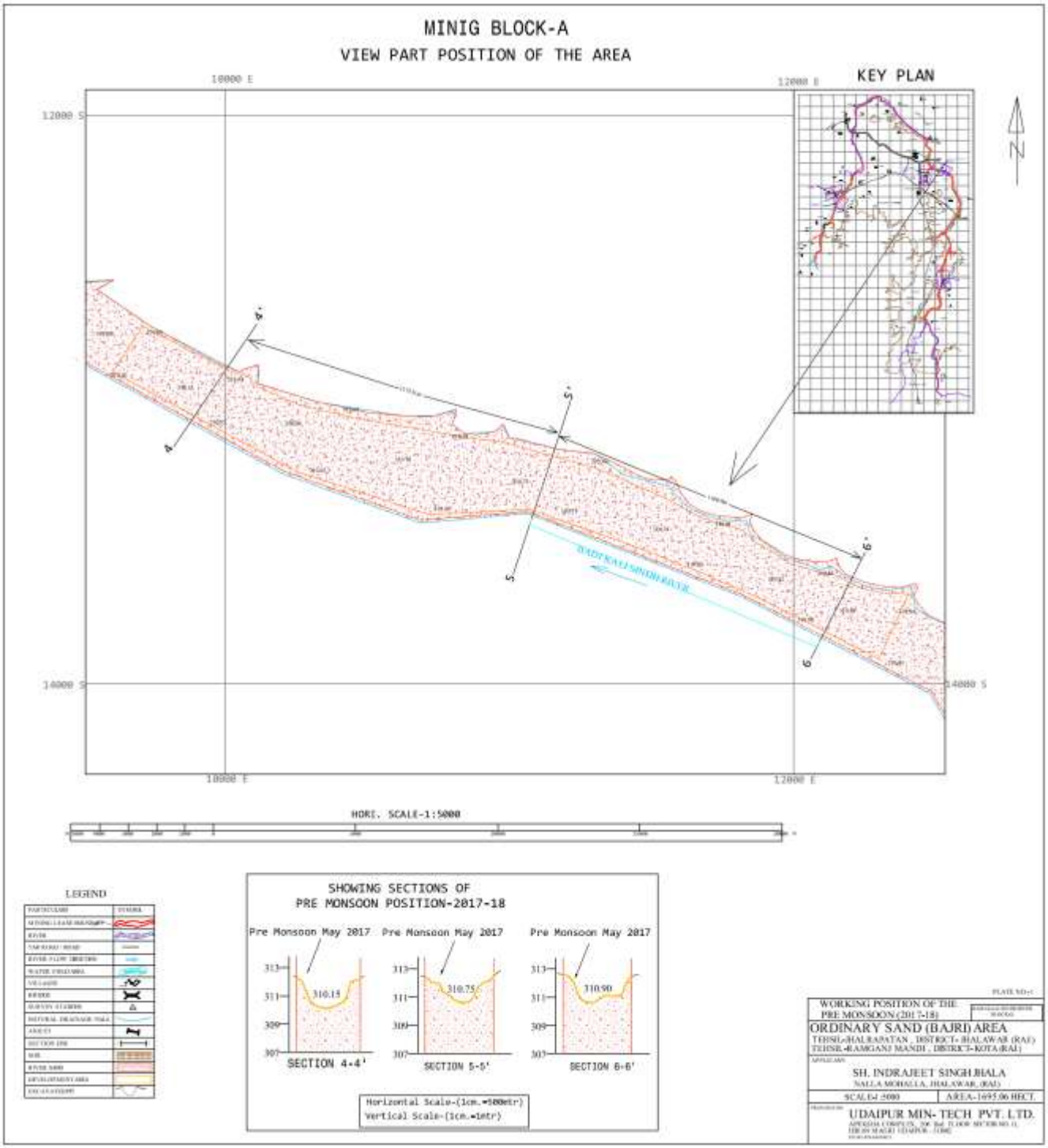
Photographs of volumetric survey - Pre monsoon Season

Block A – Badi Kali Sindh River

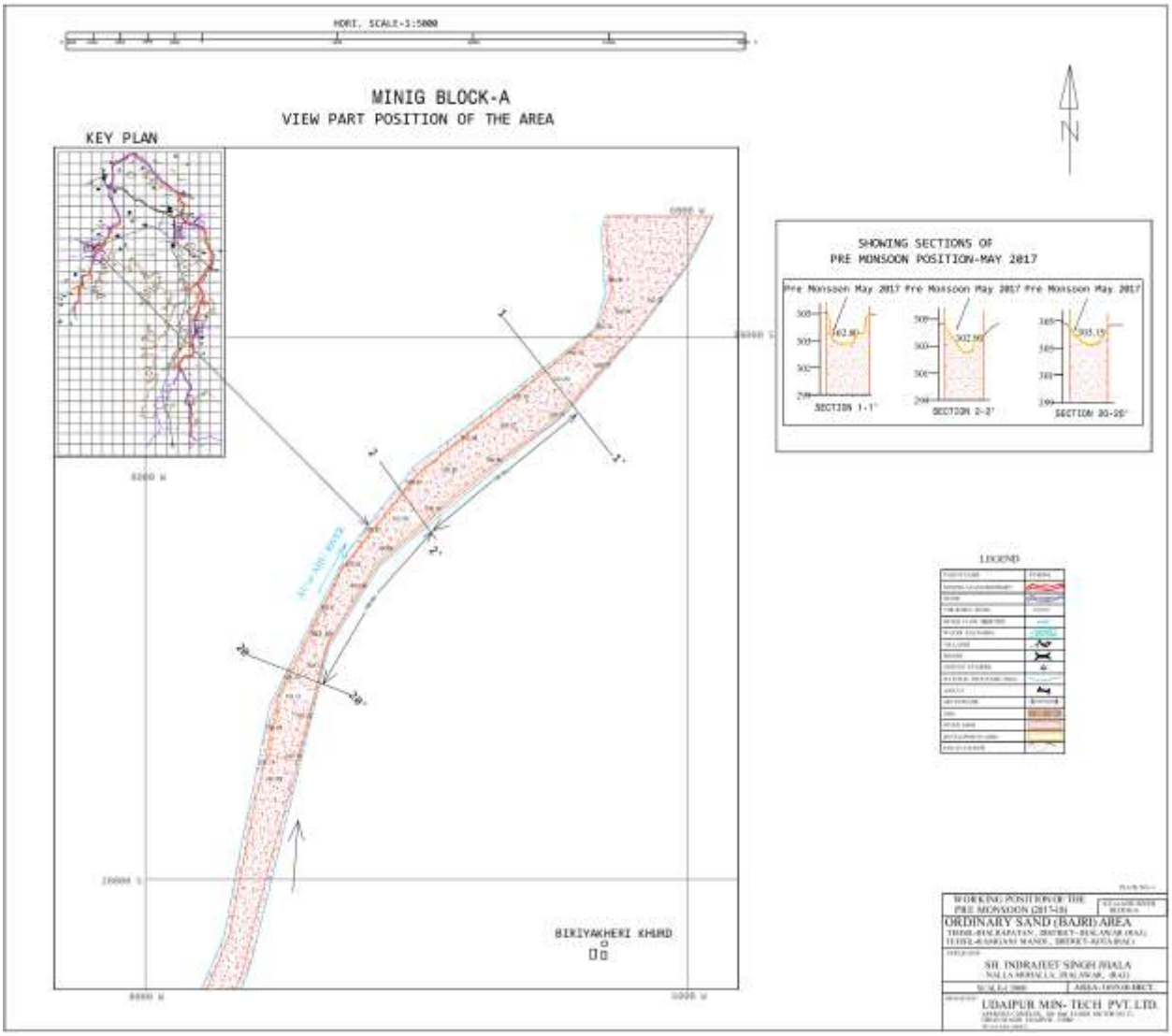
Block A - AU or AHU River

Plan and Sections of the area - Pre monsoon Season

Block A – Badi Kali Sindh River



Block A - AU or AHU River



After that for post-monsoon season again spot RL/level was marked & mapped on the same location and sections were drawn.

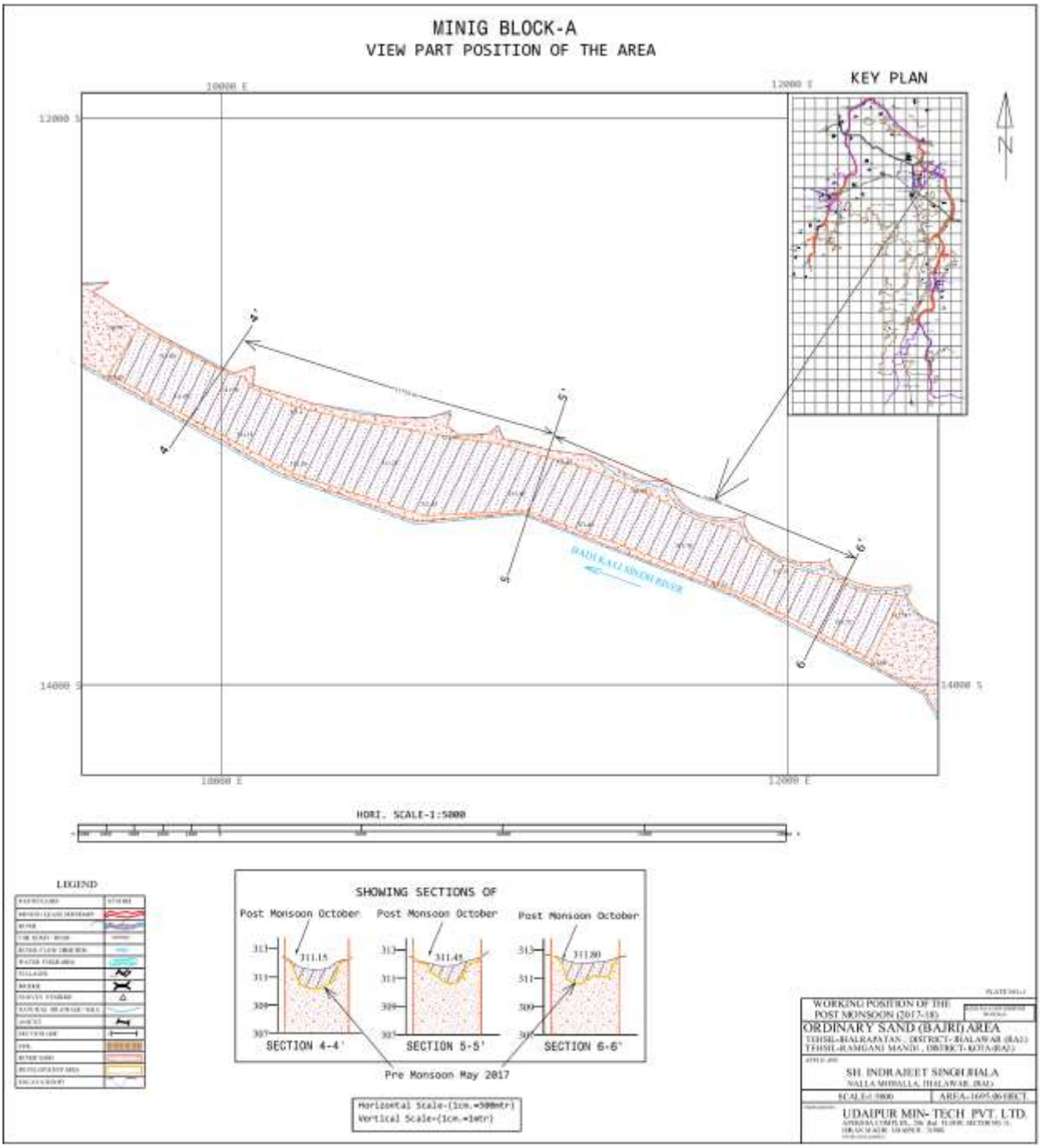
Photographs of volumetric survey - Post monsoon Season

Block A – Badi Kali Sindh River

Block A - AU or AHU River

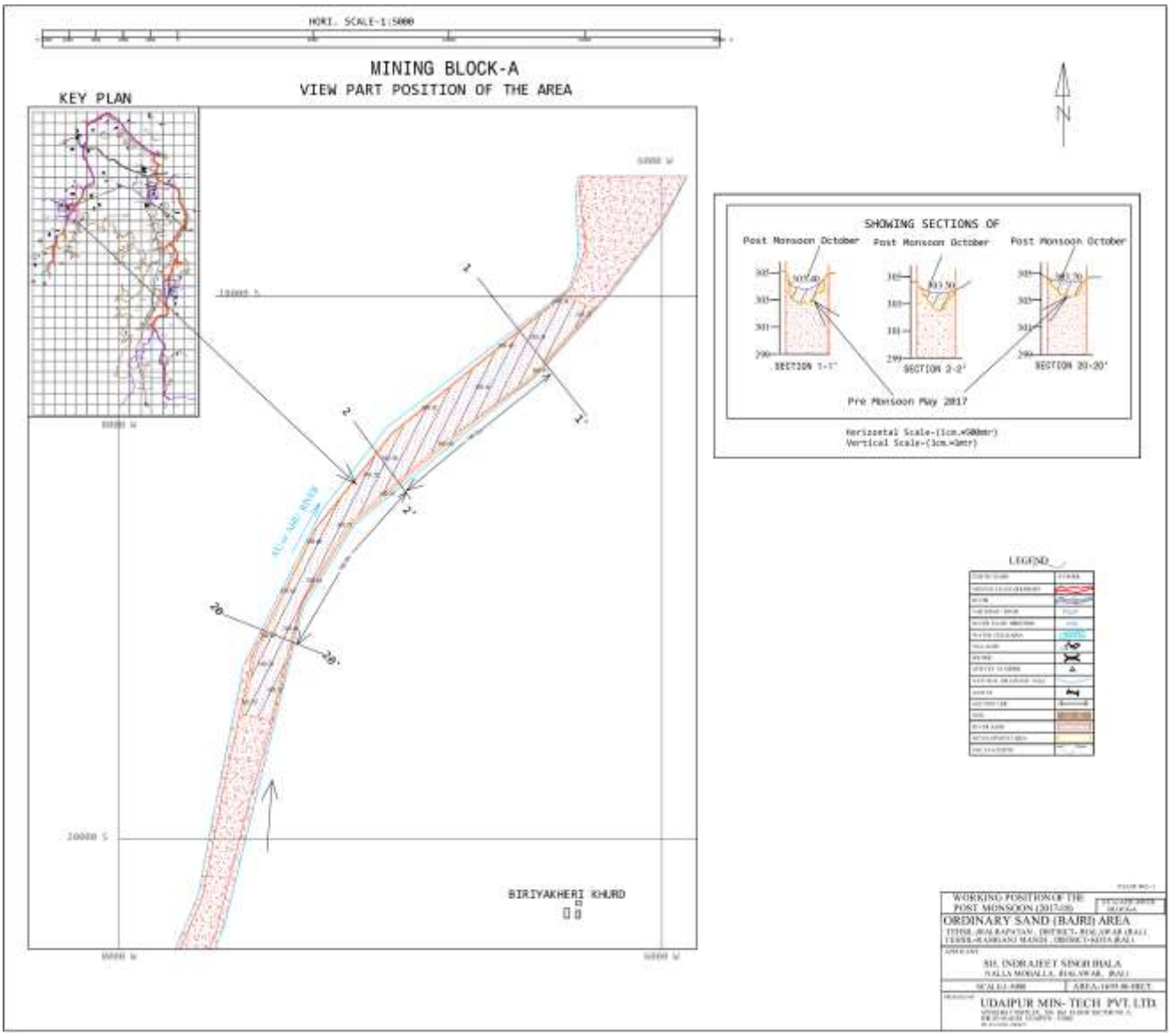
Plan and Sections of the area - Post monsoon Season

Block A – Badi Kali Sindh River



Enclosed in Pocket.

Block A - AU or AHU River



Result:

Both the sections (pre-monsoon and post-monsoon) are superimposed and volume has been calculated & given in below table.

River Block volume calculation

Sr. No.	Area of Mining Block (in Sq. mtr)	Thickness of area Pre monsoon season	Thickness of area Post monsoon season	Volume in cu.m	In tonnes (vol. X bulk density, 1.6)
1	616487 sq.m, Block-A Badi Kali Sindh	0.00 m.	0.30 m.	184946.1 cu.m	295913.76 t
2	232859 sq.m, Block–A AU or Ahu River	0.00 m.	0.28 m.	65200.52 cu.m	104320.832 t
Total				250146.62 cu.m	400234.592 t

Conclusion:

The replenishment of Sand/Bajri has been calculated by volumetric survey method and amount of sand deposited in the post monsoon season was calculated.

In the previous year's mining was done in two block and highest production achieved is 2,36,033 tonnes in the year 2014 – 15 against which, total 400234.6 tonnes sand (in 2 blocks) has deposited in post monsoon season of 2017.

Sr. No.	Lease Area	Estimated Reserves (as per approved mining plan)	Annual Production capacity (as per approved mining plan)	Estimated Annual replenishment	Replenishment Status vis-à-vis planned production
1.	1695.06 ha.	48280968 tonnes	7,50,000 tonnes	4,00,234.6 tonnes	Replenishment less than planned annual production

*Amount of sand deposited is 4,00,234.6 tonnes & proposed production is 7,50,000 tonnes i.e. appox. 53% replenishment has been done.

In the applied lease area replenishment depends upon the rainfall, if adequate amount of sand will not replenish during monsoon then excavation of sand will be limited to the quantity which will be equivalent to the replenished material up to a depth of 3 mtrs. only.

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