ENGLISH EXECUTIVE SUMMARY
FOR RIVER SAND QUARRY (BLOCK)
SEIAA NO. 105 MIN 2020 DT. 01.09.2020

EXECUTIVE SUMMARY

- Smt. Jyoti Chauhan, a resident of 439/1, Shri Sai Nivas, 12th Cross, Bhuvaneshwari nagara, Hebbal, Kempapura, Bangalore-24, was granted a River Sand Block, through E-Auction for extraction of River Sand, over an extent of 10-00 Acres (4.04 Hectares), located in Thungabhadra River Bed, Sy. No. 74, 77, 78, 79 & Ura Jaga 03ofNagasamudra Village, Bhadravathi Taluk & Shivamogga District, Karnataka, for a period of 05 years, by the Senior Geologist, Department of Mines & Geology, Shivamogga, vide Intimation Letter No.: GaBhuE/HiBhuShi/SaMaGaGu/2019-20/1263 dated 13/09/2019.
- The above River Sand Block is near Nagasamudra (0.25 km) Village, Bhadravathi Taluk & Shivamogga District, Karnataka, and is part of Thungabhadra River bed. The proposed sand block has been notified in favour of the Proponent.
- The proposed sand block area is surrounded by one (01) more River Sand Block, having an extent of 10-00 Acres (4.05 Hectares), and this one block has obtained the Environmental Clearance (EC) from District level Environment Impact Assessment Authority (DEIAA), Shivamogga District, Karnataka, on 11th October 2018. Hence, as per MoEFCC Notification No. S.O. 2269 (E), dated 01st July 2016, they become part of the cluster, for preparation of the cluster EMP. The total extent of the cluster, including the present lease area, will be 20-00 Acres i.e. 8.09 Ha. > 5 Ha. and classified under B1 category.
- There is no agriculture on the proposed mining land.
- The Proponent had applied for Environmental Clearance to State Environment Impact Assessment Authority (SEIAA), Karnataka and they have issued the Terms of Reference (ToR), for carrying-out Environment Impact Assessment (EIA) studies and preparation of an EIA/ EMP (Environmental Management Plan), for the present River Sand Block, vide Lr No. SEIAA 105 MIN 2020, dated 01.09.2020.
- The baseline data collection (environmental monitoring) was conducted as per MOEF & CC norms for Post-Monsoon Season (Jan. 2021 to Mar. 2021), for preparation of EIA/EMP report
- Present summary is of the EIA report as per TOR and has been prepared as per generic structure given in Appendix III of EIA notification 2006 by MOEF & CC.
- It is proposed to mine at a uniform rate of about 9,861 Tons / Annum of River Sand, during the plan period of Five (05) years. The anticipated recovery is 100% of the mined mineral and resulting in ZERO Waste. As per the approved quarry plan, the rate of replenishment is about 14,701 Tons per Annum, which is more than the annual mining rate.
- The method of mining is by semi-mechanized open cast mining method, with-out any kind of blasting. Mining will be carried-out by using simple excavators, front end loaders, tractors/ tippers for transportation etc.
- River Sand is an important material for the Construction Industry, both in building construction (houses, apartments, commercial buildings etc.) and also various infrastructure works (bridges, roads, irrigation tanks etc.).

- This is a New Proposal & RQP has prepared the mining plan for mining of River Sand, by maintaining proper safety standards.
- The Estimated Geological and Mineable Reserves, are as under:

Description	Geological Reserves (Tons)	Mineable Reserves (Tons)
River Sand (incl. Waste)	1,40,868	19,721
River Sand (Saleable)	1,40,868	19,721

- The lease period granted, is about Five (05) years. Unlike other minerals, river sand has a tendency to get replenished, after each monsoon (every year). The estimated annual replenishment in the proposed sand block area is about 14,701 Tons per annum and the river sand proposed to be mined is at a uniform rate of 9,861 Tons per Annum.
- Regional Geology: Shivamogga District is covered with granite/ gneiss and green schist assemblage of Archean age with younger acid and basic intrusive and laterite. Granitoids/ Gneisses and migmatites of Peninsular Gneissic Complex constitute the basement rocks for the greenstone belts which are termed as Dharwar Supergroup. Typical and good exposures of peninsular Gneissic complex are seen as large massifs around Shivamogga Town, Honnali, Bhadravathi and Saulanga. Enclaves of ultramafic and mafic rocks, probably older than 3000 million years are recorded within these gneisses at several places
- In this segment volcano - sedimentary sequences of Dharwar Supergroup is classified in to lower Bababudan Group and Upper Chitradurga Group. Bababudan Group comprises metabasalt / amphibolite, garnet-chlorite-biotite-schist, intercalated with bands of ferruginous quartzite, garnet-grunerite schist and acid volcanics in the order of importance. These lithounits of Bababudan is confined to the eastern part of Shivamogga Shivamogga District, as thin bands bordering the basement gneiss. Constituting the eastern segment of Shivamogga belts, lithosequence of Chitradurga Group exposed in the central part of the Shivamogga District are: basal conglomerate, banded iron formation, limestone, manganeferous phyllite with acid and basic volcanic rocks. Further in the north vast expanse of greywacks- argillite sequence with BIF bands are developed and they form the upper units of Chitradurga Group.
- Small plugs of younger granitic bodies intruding both the basement gneisses and schistose rocks are far and a few. Besides that long linear basic dykes and quartz veins occur as younger intrusive and cut across the gneiss and schist. Thick zones of laterite can be seen throughout the Shivamogga District extensive capping of laterite is seen between Anandapuram and north of Chandragutti hill along the western periphery of the area. Small capping of laterite occurs around Jade, Kumsi, Muguru and Soraba.
- The Shivamogga schist belt is characterized by broad open folds on a regional scale. The major folds are governed by the shape of granite and gneissic domes. These folds have NNW-SSE trending axial plane and the regional schistosity is parallel to this trend. Anticlinal folds around the granitic / gneissic masses can be seen in Honnali, Saulanga and Chennagiri, Refolded folds are also common, among which, the outcrop near Shikaripura is prominent. All these major geological events seen to have taken place

prior to 2500 million years and since then this segment remained stable to be called part of Peninsular Shield area.

- **Geomorphology and Geohydrology:** A major part of the area in the east and the center is occupied by denudational uplands/ plateau on gneiss. The schist belt rocks trending N-S to NNW-SSE form long linear/ curved structural ridges. There are isolated denudational hills of granite in the eastern part of the Shivamogga District. Based on the groundwater potential and yield the Shivamogga District is divisible into two zones. A large area to the east is plain with a thick weathered zone with relatively good groundwater potential. The western part is a hilly terrain, hence unsuitable for groundwater development.

- Soils and Land use: form west to east, the Shivamogga District can be broadly categorized into hilly area soils, laterite soil, red loamy soil and red sandy soil. In the northeast patches of laterite gravelly soil and deep black soils are noticed. The westerns part of the Shivamogga District is suitable for crops like coffee, tea and cardamom. A large part of the Shivamogga District is covered by forest with isolated stretches of arable, fallow and pasture lands.

- **Topography of the site:** The area is located on Toposheet No. 48 N/12. The river sand block area is topographically plain gradually sloping area. The maximum elevation (top of the sand block) is 557 m and the minimum elevation is 556 m, within the block area. The river is sloping gradually from West to East. The length of the river sand block is 630 m and the width is about 65m (average). The average width of the river in the sand block area is about 354 meters.

- The surrounding of the proposed sand block area is covered with modest vegetation, while the sand block area doesn't have any kind of vegetation.

- The approach road, connecting the proposed sand block to the nearest road is about 250m and is passing through government revenue land.

- There are no ecologically sensitive areas within the core zone.

- Nearest Village Nagasamudra is at 0.25 km, from the proposed sand block area.

- There are no major industries within this area.

Proposed Mining

- The mining shall be done manually/semi-mechanized method. The working period for mining will be restricted to 150 to 180 days (5 to 6 months) & rest of the period including rainy season no mining shall be undertaken.

- The mining operations in the lease area would be confined to day light hours from 6.00 am to 6.00 pm. Mining of sand shall also take cognizance of the location of the active channel bank.

- It shall be located sufficiently away preferably more than 3 m away (inwards) or the $1/8^{th}$ width of the river, whichever is more, as safety zone from the bank to minimize effects on river bank erosion and avoid consequent channel migration.

- There after a haul road, 4 mtrs wide will be made along the side. Trucks / Tractor, Trolleys will be used for the mineral transportation. There is no generation of O/B & Waste. It shall also be ensured that mining will not be carried out below the dry weather flow level.
- The average thickness of the mineable sand is 0.28 meters as no mining will be allowed greater than that & after working out the safety zones as per guidelines. Most of the methodologies & guidelines undertaken for other quarries are applicable to river bed mining.
- The Ordinary Sand in the River / Nala is well exposed right on the surface; Quarrying will be continued from the downstream of the block towards the up- stream of the block i.e. from Eastern side to Western side in the subject Block. Only the semi-mechanized method of mining operations will be continued for extraction of ordinary sand. Screening and stacking will be at a separate yard, and is not in the proposed river sand block area.
- There will not be any kind of blasting in the proposed river sand mining.

Proposed Production Plan:

- The details □□year wise excavation during the plan period, are as under:

Year	Area (In Sq. m)	Depth (In m)	Volume (In m3)	Specific Gravity (In Ton/CuM)	Total In Tonnes	Recovery of sand @ 100% in Tonnes
I	20,475	0.28	5,733	1.72	9,861	9,861
II	20,475	0.28	5,733	1.72	9,861	9,861
III	20,475	0.28	5,733	1.72	9,861	9,861
IV	20,475	0.28	5,733	1.72	9,861	9,861
V	20,475	0.28	5,733	1.72	9,861	9,861
Total					49,305	49,305
Average					9,861	9,861
Expected Sediment Yield, based on Dandy & Bolton (Empirical) Formula					14,701 TPA > 9,861 TPA	

- The Conceptual Mining Plan: Not applicable in the present case.

Base line environmental quality:

Air:

- There are no major industrial gaseous emission sources. Predominant wind directions, during the study period (January. 2021 to Mar. 2021) are from ESE Quadrant (22.73%), followed by from E (22.59%) and ESE (12.31%). Average wind speed is 2.0 meters /sec.
- Atmospheric stability class at Bhadravathi Taluk area is "moderately unstable to slightly unstable" during the day. Area has rural setting.
- Concentrations of criteria pollutants were found to be well below National air quality criteria viz. PM_{10}, $PM_{2.5}$, SO_2 and NOx which are respectively 100, 60, 80 and 80 $\mu g/m^3$.
- Predominant emissions during open cast mining operations would be generation of particulate matter during excavation, loading and transportation activities.

Noise: Ld, Ln & Ldn values were typical of rural background.

	Lease (Core) dB(A)	Buffer (Min.) dB(A)	Buffer (Max.) dB(A)
Ld	39.80	42.50	47.70
Ln	36.50	37.50	39.70
Ldn	56.11	57.19	59.30

Sources of noise would be the moving mining equipment.

Water: The proposed sand block itself is located in Tungabhadra River Bed and is meant for extraction of river sand, during non-flood period. The average annual rainfall in Shivamogga District 1795 mm per year and that of Bhadravathi Taluk is about 874 mm per year. As per the Ground Water Brochure prepared by Central Ground Water Board, GoI, the average ground water levels in Bhadravathi Taluk is about 2-5m BGL (Pre-Monsoon) and it remains the same during the Post-Monsoon season also. There is no appreciable change in ground water levels, during pre-monsoon and post-monsoon seasons.

The ground water quality in and around the proposed lease area is slightly alkaline, with the pH levels ranging from 6.94 to 8.45. The total hardness is ranging from 32 to 60 mg/liter as $CaCO_3$, whereas the Total Dissolved Solids content is varying between 45 to 110 mg/liter. The fluoride levels are ranging from 0.11 to 0.30 mg/liter and the nitrate levels are varying between 1.4 to 3.5 mg/liter. The sulphate levels are ranging from 3.2 to 8.5 mg/liter and the chloride levels are varying between 8.0 to 24.0 mg/liter. In general, the ground water quality in the study area, confirms to the permissible limits of IS:10500-2012 RA 2018(Drinking Water Specification).

Solid waste:
As per the approved Quarry Plan, there is no waste generation of any kind. i.e. all the mined-out mineral will be sold, for various purposes.

Impacts:

Land: There is no top soil, in the proposed lease area. No agriculture is being carried-out in the proposed lease area. There are no existing quarry pits. Based on site conditions, annual replenishment of sediments etc. a single pit of shallow depth will be made during the operational phase of the quarry. It will get replenished after every monsoon and based on the accumulation, the sand mining in the subsequent years will be taken-up. Since, the mined-out area will be replenished with fresh accumulation after every monsoon, there would not be any major adverse impact on topography/drainage or on land use or agriculture. The external appearance will continue to be as it is. Hence backfilling or reclamation of the mined out area is not proposed.

The Landuse details, in lease area, are as under:

Land Use Details		
Sl. No.	Description	Land use at the end of Scheme Period (In Hectares)
1.	Quarry working	4.04
Total		4.04

Air:
Ground level concentrations as per the model for dispersion of air pollutants for lease area source show that there would not be any major adverse impact on ambient air quality.

Water:
There would not be any impact on aquatic environment including hydrology, drainage or quality because a) mining will be to a shallow depth only, b) mined-out area will be replenished after every monsoon, c) ground water table will not be intercepted, d) dewatering of pits will not be required and e) River Sand pit water is suitable for irrigation. Regular monitoring for fluoride content is required.

Noise:
Sources during mine operation would be excavation and loading. Workers would be exposed to noise levels of about 65-70 dB(A). In this case, there is no blasting. Hence, there will not be much noise and vibration. There are no structures over the lease area, as well as within 1 km radius of the quarry lease area.

Biological:
There is no sensitive fauna and flora or endangered species within 10 km radius of the lease. Lease is a part of Non-Forest area. Also, this area is not known for any special kind of biodiversity. Project proponent will carry out plantation in scientific way. He will choose locally suitable species in consultation with local forest department.

Socioeconomic & health:
There will not be any displacement on account of this project because land has already been notified in favour of the Project Proponent. It is proposed to a) prefer employment to deserving local persons in mining related trades like loading/unloading of River Sand, dust suppression, transportation etc., b) train residents of nearby villages for harvesting rain water, and sanitation practices etc., c) employment of local people for works related to development & maintenance of greenbelt and afforestation.

Monitoring schedule:

Env. segment	Parameter	Frequency
Water quality	IS 10500	Quarterly
G.W. table	Fluctuation in monsoon & post monsoon period	May & October
AAQ	Particulate matter (PM10 & PM2.5)	during excavation and loading: Quarterly
Noise	Equi. noise levels	

Health	Pulmonary function, eye sight, audiometry, B.P., etc.	Annual record
Plantation	Survival	annual survival rate
Data analyses	Efficiency of mitigation measures	Half-Yearly

Plantation:
The proposed sand block area, is part of the river bed. Hence, it is proposed to take-up plantation, on the river bank and also on both sides of the proposed approach road from Sand Block to the nearest black top road. It is proposed to plant about 500 locally suitable species, as part of green belt development. One cubic meter pits will be made on either side of the approach road and in the vacant govt. land. These pits will be filled with top soil from lease area. Refuse or garbage will be added as per availability. Growth in the first year will be observed. Species will be chosen depending on availability and suitability to local soil conditions.

Occupational Health & Safety Measures:
The employees working in the sand extraction activity will be provided with suitable personnel protective equipment (PPE) like safety shoes, dust masks, helmets, etc. Also, they will be subjected to annual health check-up, particularly for hearing related illness and respiratory disorders. Protective shelters for workers with treated R.O. Water, First Aid facilities, Dining facility etc. will be provided.

Corporate Social Responsibility:
As part of Corporate Social Responsibility (CSR), it is proposed to provide a Drinking Water unit to the nearby Nadasamudra Village, at a cost of Rs. 2.50 Lakhs.

Economics of project:
River Sand deposits in the proposed sand block area, are suitable for civil construction works. It has high demand in the nearby areas. The proposed sand block area has a reasonably good accumulation of sand. Therefore mining will be in the interest of State revenue and also from the point of river training works, which otherwise, will obstruct the flow of water, resulting in flooding of the adjoining agricultural lands/ plantations. Also, direct and indirect employment to locals is assured.

Lease is part of the river bed and is Non-Forest Govt. Revenue Land. It doesn't have any kind of vegetation. River sand extraction, will be to a limited depth only from top, and there will not be any significant change in the river hydrology. Hence, there would not any damage to environmental quality.

Initiation of mining by Smt Jyoti Chauhan, will improve revenue to the state without deterioration in environmental quality. On the contrary population in nearby villages will become aware of importance of potable water quality and sanitation.

Openings for indirect employment to locals in plantation, loading/ unloading operations etc. are possible.