EXECUTIVE SUMMARY

MAA RATANGARH MULTI PURPOSE PROJECT

DISTRICT- DATIA,

MADHYA PRADESH

Project proponent

Water Resource Division
Distt. Gwalior, Madhya Pradesh

Environmental Consultant

ENVIRO INFRA SOLUTIONS PVT.LTD
A NABET ACCREDITED CONSULTANT
(CERTIFICATE NO.NABET/EIA/1619/IA/0018

1.1 BACKGROUND

Maa Ratangarh Multipurpose Project lies in Sindh sub basin of Madhya Pradesh. The first and foremost requirement for any sizable water resources project to be implemented is the river basin Planning. River Basin plan of Sind is prepared by in house trained water resources professionals. On the basis of water availability, demand and other socio-economic factors, project is designed to sustain all the possible uses for next decades. The basin plan study reveals that the basin is unharnessed to 65% of its gross yield of 6.1 BCM.

Keeping in view the irrigation potential of the state (10.22 Mha) vis-à-vis the created potential (up to 2013-14) 3.19 Mha which is hardly 31.21% of the irrigation potential and significantly below the national average of 38.75%, more and more identified irrigation projects need to be constructed. Further, this project is located in drought prone and socio-economical backward Bundelkhand region. Creation of such assured storage with high dependable yield is a boon to the region and can mitigate severe droughts.

1.2 NEED FOR THE PROJECT

As per assessment, the total irrigation potential of the state up to 2013-14 is 10.22 million ha against which 3.19 million ha has been created which is 31.21% of the irrigation potential and is significantly below the national average of 38.75%. Project is proposed in district Datia which is under administrative control of Gwalior Division. The agriculture in the district is totally dependent on the rainfall and thus subject to the vagaries of monsoon. Development of irrigation facilities will improve the economic condition of the agrarians and result in efficient utilization of soil and water resources of the region.

1.3 LOCATION AND APPROACH

The Maa Ratangarh Multipurpose Project site is proposed near village Dangdiroli which comes in Teh. Seondha of District Datia (M.P.). Latitude and Longitude at Dam site 26^0 8' 29" and 78^0 44' 20" respectively which is covered in Survey of India toposheet no. 54J/12. The project site falls in block and Tehsil Seondha. The project is located near Dangdiroli village, Seondha and dam site can be approached by traveling approximately 10 km from Seondha via SH-19.

1.4 PROJECT FEATURES

Maa Ratangarh multipurpose project envisage the construction of 31.00 mts high and 1740 mts long including 1162 m earthen dam, 464 m long spillway and 114 m NOF portion on river Sindh, which is a tributary of Yamuna river near village Dangdiroli in Tehsil Seondha of Distt. Datia M.P. which entirely lies in M.P. 1235.25 ha. Govt. land, 1302.79 ha. private land and 799.59 ha forest land i.e. total 3337.63 ha land is required in whole project 75 % dependable yield after upstream use is 2812.76 Mcum. However, a gross storage capacity of 246.95 is created by fixing full reservoir level at 161.0 M after considering submergence constraints to irrigate total available command area i.e. 78484 ha. One balancing reservoir BR 1 is proposed near Village Ratwa with a storage capacity of 5.28 Mcum. Thus the total gross capacity of 252.23 M cum will be available at the end of monsoon out of which total live capacity is 242.87 Mcum. Inflow in non mansoon months is also utilized. 78484 ha.(

CCA) area through a well planned pressurized irrigation on left flank of the river which lies in Gwalior , Bhind and Datia Districts.

The Project also proposed 9.0 M.V power generation from main dam and 30 MCM water for drinking in surrounding area.

1.5 ENVIRONMENT IMPACT ASSESSMENT

M/s Enviro Infra Solutions Private Limited, 301,302 &305, SRBC, Plot No., INS-12, Sector-9, Vasundhara, Ghaziabad (NCR) -201012, has conducted the Environment Impact study, as per TOR issued by MoEFCC, New Delhi, vide letter No. No. J-12011/4/2017-IAI(R), Dated 16.05.2017.

1.6 METHODOLOGY

The methodology and techniques used for studying the various parameters of the environment viz. land, air, noise, water, flora, fauna and socio-economics in the study area are described as follows:

1.7 LAND ENVIRONMENT STUDY

- The Digital Satellite data IRS P6 LISS-III of project area was acquired from NRSA and evaluated on ERDAS Imagine Software.
- Toposheets on 1:50,000 scale of the directly draining catchment area were used for the study.
- Detailed field survey was conducted for study of soil characteristics of erosion prone areas and landslides in the reservoir area.

1.7.1 Air Quality Assessment

To generate, a database on the existing status of the pollutants, the study area was evaluated for setting up six locations to conduct air quality monitoring in respect of PM_{10}, $PM_{2.5}$, SO_2 and NOx.

1.7.2 Sound Level Measurement

The sound level was measured at six locations by sound level meter RS-232 (Digital-Instrument).

1.7.3 Soil Quality Assessment

Physical and chemical characteristics of the soil were studied in respect of six samples taken from the study area.

1.7.4 Water Environment Assessment

For evaluating physical, chemical and biological characteristics of surface and ground water samples were taken from thirty-five locations.

1.7.5 Aquatic Environment

Evaluation of the parameters related to aquatic environment has been done in respect of biological characteristics of river water.

1.7.6 Floral Study

It is based on extensive field survey of the area. Three season study has been conducted. In this the phytosociology of plants and diversity of the forest vegetation was determined.

1.7.7 Faunal Study

Various transects were identified along the villages to carry out faunal studies as the village trails were the best options to cover-up the complete area. Observer walked at a constant pace for their observation.

1.7.8 Socio-economic Study

The data on socio economic and dependency aspects were collected. The process involved assessment of the study area to obtain an overall perspective of the project affected villages that were located in the submergence zone/10 km radius from the dam including command area. In order to gather information on public perception of the proposed project the attitude/psychology survey was carried out which depicts the prevailing awareness and acceptance/no-acceptance about the project. Data collection from secondary sources has also been made to validate some of the information and to supplement the data on demographic aspects.

1.8 EXISTING STATUS OF ENVIRONMENT

1.8.1 Physical Environment

The river sindh has its origin at village Gopi Talai in Lateri Tehsil of Vidsha district in Madhya Pradesh at an elevation of 533.40m above M.S.L. Sindh, a tributary of Yamuna flows mostly through M.P. in the district of Vidisha, Guna, Ashoknagar, Shivpuri, Gwalior, Datia and Bhind. It then joins river Yamuna near village Jagammanpur in Jalaun District of Uttar Pradesh. The total length of the river from its origin to its confluence with Yamuna is 500 kmThe topography of the district is sloping towards north-east with mounds and hillocks seen intermittently on the plain.

1.8.2 Land use/Land Cover

The dominating land use classes are agriculture land (80.44%), open forest (10.20%), dense forest (4.97%), Dry river bed (0.40%) water body (0.47%) and settlement (3.52%)

1.8.3 Total Land Requirement for Construction of the Project

For construction of the Barrage, appurtenant works and main canal and distribution system, about 3337.63 ha land will be required of which 799.59 ha shall be forest land; 1302.79 ha shall be acquired from private owners, 1235.25 ha shall be the Govt. land.

1.8.4 ARCHAEOLOGICAL / HISTORICAL MONUMENTS/SENSITIVE AREA

No archaeological monument of national importance lies either in the project area or in its submergence area. No National Park, Sanctuary or Biosphere Reserve, is situated in the project area. There is no specific barrier and corridor of the wildlife in the project site.

1.8.5 SOIL QUALITY

The results of the soil analysis show that the soil is neutral to slightly alkaline at all the locations having pH varying from 6.8 to 7.7. The texture of the soil varies from clay loam to sandy clay loam. Available nitrogen content in the surface soils ranges between 10.23 to 15.23 mg /kg thereby indicating that soils are low in available nitrogen content. Available phosphorus content ranges between 1.58 to 2.5 mg/kg thereby indicating that soils are having low available phosphorus. Available potassium content in these soils ranges between

41.02 to 57.55 mg/kg. The organic matter content of soil varied from 0.77 to 0.97% (0.44 to 0.56% as organic carbon), thereby implying that soils are low to medium in organic content.

1.8.6 AIR AND NOISE ENVIRONMENT

The pollutants concentration in the air is well below the permissible limit as there are no industries in the area and the density of vehicular traffic is not alarming. The noise monitoring shows that day and night time noise levels are within the prescribed limits.

1.9 WATER ENVIRONMENT

The analysis results have been compared with the Tolerance limits for inland surface waters, Class – C as set forth in IS: 2296-1982. The results indicate that recorded pH values of all analyzed samples ranged between 7.6-8.1 and was within the permissible limit (6.5-8.5). The TDS levels ranged from 244.75 to 382.12 mg/l and were well below the permissible limit of 1500 mg/l. The chlorides level in surface water samples ranged from 20.10 to 32.30 mg/l and were below the permissible limit of 600 mg/l. The sulphates level ranged from 45.5 to 53.6 mg/l and were below the permissible limit of 400 mg/l. The fluorides level was marginally lower than the permissible limit of 0.30 to 0.58 mg/l.

The analysis results for ground water indicate that the pH ranged between 6.70 to 8.0, which is well within the specified standard of 6.5 to 8.5 limit. Total hardness was recorded to range from 150.40 to 285.20 mg/l, which is within the permissible limit 600 mg/l at all locations. The Total Dissolved Solids (TDS) concentration recorded ranged between 322.80 to 462.40mg/l and was within the permissible limits (2000mg/l). Chlorides at all the locations were within the desirable limits (200 mg/l) as it ranged between 19.30 to 45.0. Sulphates at all the locations were within the permissible limits (400 mg/l) as it ranged between19.3– 34.80 mg/l. Fluorides recorded ranged between 0.23 to 0.82 mg/l and were within the desirable limit (1.0 mg/l). Nitrates were recorded to be ranging in between 23.8 to 42.2 mg/l and are found to be within the desirable limit (45mg/l).

1.10 STATUS OF BIOLOGICAL ENVIRONMENT

1.10.1 Flora of the Project Area

During the surveys, an inventory of different plant groups found in the study area was prepared. In the study area, 131 species of plants were recorded. These include 37 trees, 09 shrubs, 20 species of herbs and 05 species of climbers and 21 grass species and 1 species of parasitic angiosperm. Further, 30 species of aquatic plants and 8 species of bryophytes and pteridophytes were found.

- About 20 economically important plant species were recorded from the study area.
- About 6 important medicinal/ethnobotanical importance plant species were recorded
- No RET species falling under IUCN Red List was recorded/reported from study area.

1.10.2 Fauna

The faunal study for the proposed project was carried out in both the submergence and influence zone of both upstream and downstream

- 16 mammalian species were recorded /reported during the survey of which one belongs to Schedule-1 of WPA, 1972.
- 29 bird species were observed /reported during the survey.

- As many as 13 species of herpetofauna were recorded /reported of which 3 species belong to Schedule-1 of WPA, 1972.
- 23 species of fishes were recorded.
- 16 insect species were observed /reported during the survey.

1.11 SOCIAL AND CULTURAL BACKGROUND OF THE AREA

1.11.1 Demography of Project Affected Villages

As per the Census of India 2011, the total population of the project affected villages is 17412 which comprises of male and female population of 9,486 and 7,926 respectively. The overall sex ratio is 835.5 females per thousand males. Total population of the scheduled caste and scheduled tribe is 31.03 (17.8%) and 71 (0.4%) respectively. The male and female literate population is 6406 and 3540 respectively, which implies that the total literacy rate of the project affected villages is 57% of which the literacy rate of male and female is 36.8 % and 20.3 % respectively. The main workers are 4952 (28.44%) and marginal workers are 2038 (11.70%) respectively of the total population while the remaining 59.85 % constitute non-workers.

1.11.2 Village-wise Land Acquired

Table 1.1 : Village -wise Land to be Acquired

Village	Private Land (ha)		
	Irrigated	Un-irrigated	Total
Atreta	54.81	69.75	124.56
Basaimalak	24.44	31.1	55.54
Berchha	43.23	55.01	98.24
Bisor	40.61	43.99	84.6
Dangdiroli	28.69	36.51	65.2
Dhubyai	26.57	33.82	60.39
Dongarpur	6.99	8.89	15.88
Jiginiya	50.72	59.53	110.25
Khamroli	116.95	148.84	265.79
Madikhera	18.04	22.96	41
Marsenibuzurg	37.29	47.47	84.76
Marsenikhurd	26.65	33.91	60.56
Medpura	9.33	11.87	21.2
Pahadi	40.51	53.69	94.2
Naanat	43.16	54.94	98.1
Shikarpura	9.91	12.61	22.52
Total	**577.9**	**724.89**	**1302.79**

1.11.3 Agriculture

Agriculture is the main source of income and employment as more 90% of the population directly derives their livelihood from it.

1.12 IDENTIFICATION, PREDICTION AND EVALUATION OF IMPACTS

1.12.1 Impacts on the Micro-Climate of the Area

Due to construction activities, there shall be temporary and nominal effect on the ambient temperature and humidity. The operation stage project may not create any impact on the meteorology and climatology of the area.

1.12.2 Change in Land use / Land Cover

Construction Phase

The land use class of forest land, agriculture land (private land) and barren land (revenue) falling in submergence shall change into waterbody while for dam seat and other project components it shall change to built-up area. The change shall be permanent and irreversible. The forest land cover within the submergence area shall reduce due to project during construction.

Operational Phase

During the operation phase no change in land use is expected. Many of the redundant areas having no further usage will be brought under plantation.

1.12.3 Soil Erosion and Siltation

Construction Phase

Soil erosion due to excavation of different components of the project, construction of roads will accelerate soil erosion.

Operational Phase

Soil erosion due to project activities will not exist in the operation phase as the construction would be completed and landscape restoration work would also be implemented

1.12.4 Impact on Geology

The intensity of anticipated environmental impact on geology of the area will be weak and extent of anticipated impact will be local. No impact is anticipated on the geology of the area during the operation phase.

1.12.5 Impact on Hydrology

The project has been conceived with a view to harness the monsoon flows for by damming Sindh River. This shall bring a stark change in hydraulic regime of the river particularly during monsoon months.

Since, the water from the river is neither used by the villages along the river, nor is there any significant aquatic flora / faunal population; the reduced flow d/s in sindh is not likely to have any adverse impact more so when on an average during monsoon substantial discharge Thus, no negative impact due to water withdrawal shall be experienced. However, the creation of reservoir shall result in the raised ground water table around the project area The building of water storage in the project will be very beneficial for ground water recharge. This will build up the water levels and will improve the yields in the wells in the area

1.12.6 Environmental Degradation due to Labour Immigration

During the construction phase congregation of approximately 1000 workers is likely to take place in the project area, which will increase pressure on land and water resource. Conflict between the migrants and the local population may occur for employment. Labour engaged in construction activity will also move away once the project work is completed; therefore, no additional impact is expected.

1.12.7 Impacts on Air Environment

Temporary changes in air quality during construction phase are expected due to emission of hydrocarbons from vehicles and gases from blasting operations. The predicted ground level concentration in air for PM_{10} due to fugitive dust emissions from construction activities (excavation involving drilling and blasting) at the Dam complex has been found to be 25.7 µg/m3, while the resultant concentration shall be 71.9 µg/m3, which is within the limits. Due to increased transportation during construction phase at 25 m predicted concentration for PM10 is 12.4 µg/m3 which reduces to 7.7 µg/m3, 3.4 µg/m3 and 1.4 µg/m3 at 50m, 150m and 500m respectively. Thus, the impact on the pollutant level (PM_{10}) due to increased traffic due to transportation of project material shall be minimal. The increased GLC in respect of NOx were insignificant being 0.13 µg/m3 up to 25m and 0.11 µg/m3 up to 50m and 0.10 µg/m3 up to 1km.

1.12.8 Impacts on Noise Environment

Temporary increase in noise levels are expected during construction phase only. The noise level of 91 dB(A) at the construction site gets attenuated to 38 dB(A) and 35 dB(A) about 200m and 400m respectively from the dam site.

1.12.9 Impacts on Water Environment

During the construction phase, the water environment of the river due to proposed project shall be impaired due to increase in silt rate from the discharge coming out open air works, batching and crushing plants and from the foundation works. Due to this minor impact on the water quality and aquatic fauna of temporary nature shall be experienced in the river water. The sewage generated at the labour camps and other residential areas may also bring considerable pollutants to river sections, if disposed in the river section without treatment.

Since the river is ephemeral and flows in monsoon only in direct response to precipitation, it is essential that it must flow on downstream of the dam and carry about 30% of the monthly discharge

1.12.10 Impact due to Change in Hydrological Cycle

The quantity of the water abstracted from the river for consumptive use for irrigation in command area and for domestic, shall reduce the river flow downstream and thus bring change in hydrological cycle in context to the project absolutely.

1.12.11 Impact due to Acidification of Reservoir

There will be no acidification of reservoir due to the alkaline nature of the river water at dam site.

1.12.12 Impacts on Flora

It is evident from the study that from the submergence and influence zone of the proposed project none of tree species, shrub, herb or any climber or grass species are either vulnerable or endangered. Interestingly the vegetation composition of the submergence zone is also widely distributed in the influence zone in abundance and there will be no significant loss to the habitat. However, any loss of riverine vegetation during the project activity period will be restored in the reservoir periphery in due course of time.

The floral abundance of the project area in post construction phase will increase by many folds as the plantation under catchment area treatment, reservoir rim treatment, green belt, restoration and landscaping will be completed.

1.12.13 Impacts on Fauna

As the project activity is not going to submerge all the major habitats, there is little concern for these niche birds. There will be no alteration to the existing habitat of endangered and threatened species. Increase in temporary stress levels of wildlife during construction phase due to noise, human interference and reduction in present habitat. Threat due to poaching might increase. Due to reservoir creation, there will be improvement in the habitat for mainly water birds, reptiles, mammals, amphibians and plankton and Improvement in food chain of some reptiles, birds and carnivorous mammals due to creation of reservoir and increase in humidity level. The butterfly diversity in the area would be enhanced, as scrub habitat around the submergence will receive substantial amount of moisture, which will help in natural regeneration of forest canopy.

1.12.14 Summary of Positive and Negative Impacts

The positive impacts are-

- Irrigation potential shall be created in area (78484 ha).
- Better living Standards for famers of command area.
- Employment opportunities/to locals in project work and fisheries.
- Benefits to economy and commerce.
- Access to improved infrastructure facilities.
- Recreation and tourism potential may boost
- Improvement in environment through implementation of CAT, Compensatory Afforestation, Green belt Development and different other plans.
- Command Area Development.
- Better opportunities for cattle rearing.
- Increase in groundwater level

The negative impacts are -

- Eight villages shall be partially affected due to acquisition of land for project purpose.
- There shall be displacement of 766 families due to submergence.
- The loss of agriculture land (1302.79 ha) and agriculture produce.
- Loss of livelihood and income.
- The change of river status from riverine to lacustrine regime
- The loss of forest due to construction of dam, reservoir and appurtenant works
- Likely decrease in agriculture and horticulture production due to air pollution
- Disturbance to the fauna of the study area during construction

- Pressure on the existing provincial / state road will increase.

1.13 IMPACT MANAGEMENT

To ameliorate the negative effects of the project construction and overall improvement of the environment following management plans are formulated for implementation concurrent to the project construction. The cost of the management plans is shown in **Table 1.2.**

Table 1.2 : Summary of Total Cost Estimate

S. No.	Plans	Cost (Rs. In Lakh)
1.	Catchment Area Treatment Plan	2050.00
2	Command Area Development Plan	137719.00*
3	Compensatory Afforestation Scheme	5810.00
4.	Wildlife and Bio-diversity Management plan	25.00
5.	Fisheries Management Plan	422.00
6.	Resettlement and Rehabilitation Plan	30116.00
7.	Green Belt Development Plan	112.00
8.	Reservoir Rim Treatment Plan	20.00
9	Muck Management Plan	25.00
10.	Landscape and Restoration Plan	4.00
11.	Restoration Plan for Quarry Sites	36.00
12.	Disaster Management Plan	16.00
13.	Water, Air and Noise Management Plan	16.00
14.	Public Health Delivery Plan	79.00
15.	Labour Management Plan	39.00
16.	Sanitation and Solid Waste Management Plan	54.00
17.	Local Area Management Plan	1122.00
18.	Env. Safeguards During Construction Activities Including Road Construction	20.00
19.	Energy Conservation Measures	21.00
20.	Environmental Monitoring Plan	30.00
Grand Total		**40017.00**

***N.B.** The cost of works under CAD Scheme has been excluded, as it will be funded under Central Plan with State share in prescribed proportion*

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