1. Executive Summary of the Project

CHAPTER-1

EXECUTIVE SUMMARY

1.1 Background

MMRDA has decided to take up water resources development projects and water supply systems to meet the growing demand of drinking water supply in the Region. The Project includes water supply scheme to bring water from Surya source in order to augment the water supply of western sub-region of MMR. The Surya dam is owned by the Irrigation Department of Govt. of Maharashtra and is situated at about 54 km beyond the boundary line of MMR on north side. Tailrace water released from the hydro power project at the base of the dam is available as a source for proposed 403 MLD Water Supply Scheme to be developed to augment the water supply of western sub-region of MMR. An integrated water supply scheme has to be designed and implemented to Supply Bulk Water to two ULBs, VVCMC & MBMC and MMRDA's proposed Rental Housing projects in the same area.

Water from Surya Reservoir will be released through power house located at the base of the Dam at Dhamni. Tailrace water of the power house flows further into the Kawadas Weir and will be used for the proposed water supply scheme. It is further necessary to lift this water, convey it to the location where it can be treated and further transported by appropriate system to the various ULB's and groups of villages. The MMRDA has accorded an administrative approval for revised estimated cost of Rs. 1977.29 Crores towards expenditure of proposed 403 Mld Surya Integrated Water Supply Scheme. Government of Maharashtra has allocated 67.18 Mm3 of water in Surya project as per GR (Water Resources Department) dated 07.12.2011.

1.2 PROPOSED WATER SUPPLY SCHEME

The western sub-region of MMR comprising VVCMC, MBMC & adjoining villages are facing shortage of water to the extent of 45%.MMRDA therefore proposed Surya Integrated Water Supply Scheme to meet shortage of water in sub-region. MMRDA will take all precautions to protect environment and project affected people as a single agency in execution of this project. If both MBMC and VVCMC were to bring water from this source separately, duplication of pipeline, Operation & Maintenance work and multiple agencies would have disturbed the environment to greater extent.

The Service Area of Project –

The western subregion of MMR comprises of VVCMC, MBMC, and adjoining villages. This scheme is to supply bulk water to –

A. **Mira – Bhyandar Municipal Corporation Area and 5 adjoining villages**

B. Vasai -Virar Municipal Corporation Area and 27 villages not included in corporation area

Fig b: Proposed location plan

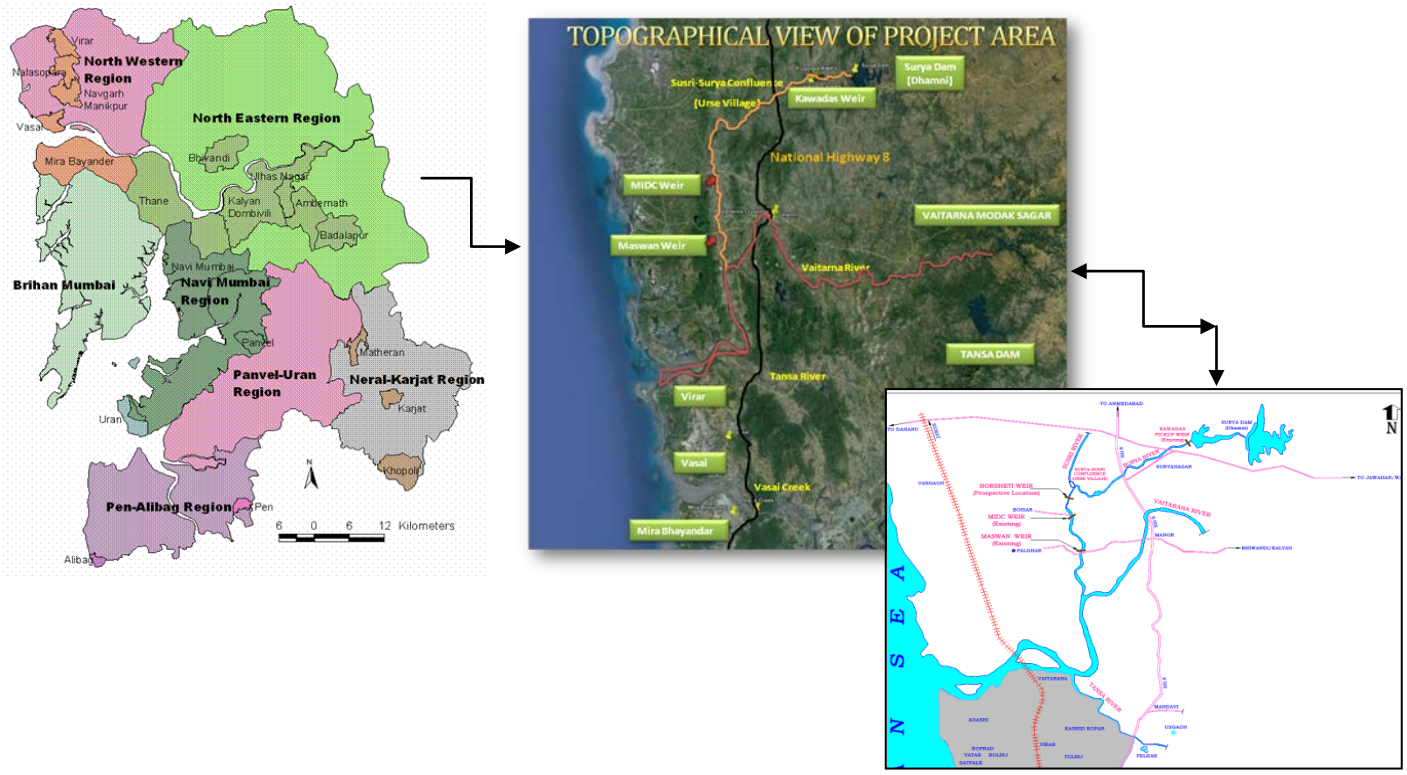


Table 1. Proposed Allocation of Bulk Water Supply

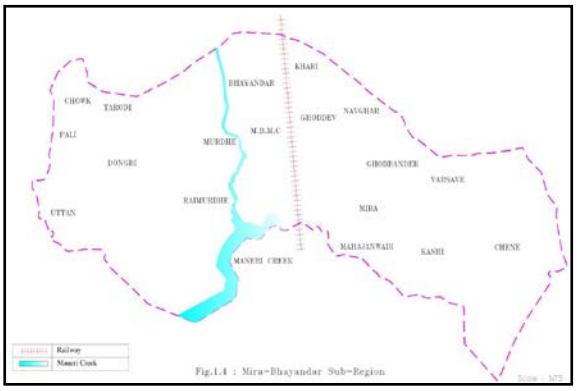
Sr.No	Name	Qty. allocated
1	Vasai-Virar Municipal Corporation area including 49 Villages merged in VVMC	170 MLD
2	MMRDA's proposed Rental Housing Project in Vasai– Virar Sub-region	
3	27 villages in Vasai - Virar Sub-region not merged in VVMC	15 MLD
4	Mira – Bhayandar Municipal Corporation including MMRDA's special planning areas at Uttan and other 5 Villages	218 MLD
5	MMRDA's Proposed Rental Housing Project in Mira – Bhayander Sub-region	
	Total	**403 MLD**

Surya Project area falls in Palghar (earlier Thane) District which forms a part of North Konkan Region which lies between the Sahyadri hills in the east and the Arabian Sea in the West. It has coastal line of about 113 Kms. It lies Between 18°42' and 20°20' North latitudes and 72°45' to 73°48' East longitudes in eastern part of the state Its East-West spread is maximum at the South which is about 100 Kms.

MIRA-BHAYANDAR SUB REGION

Mira-Bhayandar city is located on Northern boundary of Mumbai and on Western side of Mumbai-Ahmedabad National Highway (NH-8). The city includes two important towns i.e. Mira and Bhayandar.

Fig d: Map shows expanse Mira-Bhayandar Sub-region.



Mira Bhayandar Municipal Corporation (MBMC) is the civic body that governs the city and was established in the year 2002. Total area of the corporation limit is 89 sq. km. As per 2001 census, population of Mira-Bhayandar is 5.20 Lakhs and the population as per 2011 Census is 8.15 Lakhs. Thus the growth rate per annum 4.6%.Mira developed only in the East part, while the West part, on the other side of the railway line is covered with salt pans and mangroves. Mira Road (East) is a predominantly residential area. It is calm, quiet surroundings and low pollution is a boon for residents. Bhayandar is divided into two parts by the Mumbai suburban rail line – East and West. The West was traditionally residential, and the East was predominantly commercial and an industrial area. Recent population growth and a flurry of construction has blurred the boundaries between Bhayandar and neighbouring Mira on the East side of the rail tracks, turning it into a populous suburb.

EXISTING WATER TO MIRA-BHAYANDAR IS AS FOLLOWS:

- STEM (Shahad Temghar) : 86 MLd
- MIDC : 5 MLd

Mira Bhayander Municipal Corporation

Mumbai metropolitan region covers an area of about 4350 Sq. Km. comprising of Municipal Corporation of greater Mumbai, 13 municipal town and 1500 villages with a 1970 census population of 7.793 million people. For the purpose of planning water resources and hydrometric study, the Mumbai metropolitan region is divided into six zones. Mira Bhayander comes under zone one. Fast increase in urban population in Mira Bhayander has lead to tremendous scarcity of drinking water in this area. Most population is dependent on tanker fed water supply.

Mira Bhayander Municipal Corporation (MBMC) is one of the fastest growing Corporations areas near Mumbai. Mira Bhayander sub region on the fringes of Mumbai falls under the Mumbai Metropolitan Region. The Mira Bhayander region is fast developing considering its nearness to the megacity Mumbai and improvement in its connectivity to Mumbai through

many projects proposed for this region. It has been facing the problems of unsustainable urban growth and unplanned development over the years more particularly in Water Sector.

Population of Mira Bhayandar according to 1991 census was 1, 75,400. The decadal growth rate of 1971-81 and 1981-91 are 103 and 161 respectively. The rate of growth of population of Mira Bhayandar 1981-91 is phenomenal as compared to Brihan Mumbai which was 33.43. This was mainly due to the large housing complexes developed privately on lands permitted to be developed by government. According to census 2001 the decadal growth rate of Mira Bhayandar is 196.

The population of the Mira-Bhayandar Municipal Corporation has grown to 5,20,000 as per 2001 census of which 2,86,391 males and 2,33,997 females . This shows a decadal growth rate of 196% or an annual growth rate of 19.6%. The population of Mira Bhayandar in the year 2006 is 7, 28,000 (Source –Urban Health Survey, Mira Bhayandar Municipal Corporation).

Table 2: Population Projection – 2006-2041

Year	Population (Lakhs)	Decadal Growth Rate
2001	5.20	------
2006	7.28	80%
2011	8.15	57%
2021	13.05	60%
2031	19.55	50%
2041	24.43	25%

Table 3: Projected water demand 2006-2031

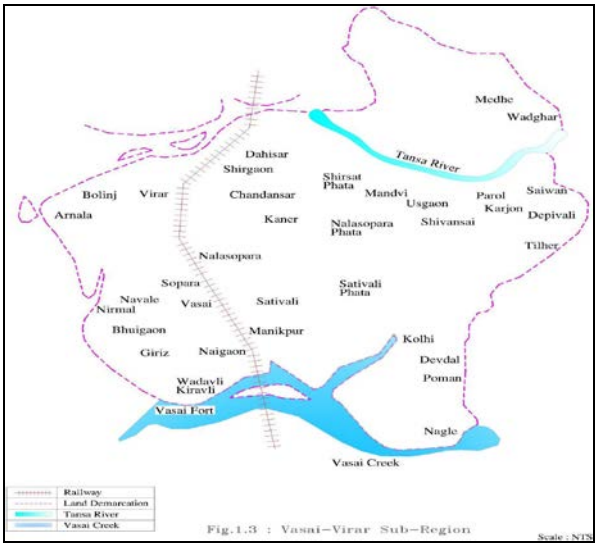
Year	Population (Lakhs)	Present Water Supply (MLD)	Water demand in MLD
2001	5.20	86	78
2006	7.28	86	109
2011	8.15	86	122
2021	13.05		195
2031	19.55		293

As the population is assumed not to go beyond 20 lakhs due to land constraint, the water demand is calculated 293 MLD.

A. Vasai-Virar Sub-Region

Vasai-Virar Sub-region is located on northern boundary of Mira-Bhyandar and on Western side of Mumbai-Ahmedabad National Highway (NH-8).

Fig e : Map shows expanse of Vasai-Virar sub-region



The Sub-region includes Vasai–Virar Municipal Corporation (VVMC) and other 27 villages. The Corporation was formed in the year 2010 by merging following 4 towns:
(1) Nallasopara
(2) Vasai
(3) Virar
(4) Navghar Manikpur

In addition above 4 towns, 49 urbanised villages (Out of total 76 villages in Sub-region) were included in the city Corporation. Villages not merged in corporation are, thus 27 numbers.

The Sub-region has very high growth rate. Annual composite growth rate for the decade 1951 – 2001 for 4 towns stated above was 10.92%. The growth rate has further increased in the decade 2001 – 2011. The population of VVMC as per Census 2011 is 12.21 Lakhs.

Vasai-Virar Municipal Corporation (VVMC) is the civic body that governs the city and was established in the year 2010. Total area of corporation limit is 105 sq. km. The existing water supply to Vasai-Virar is as follows:

- Pelhar (Old Scheme) : 14 MLd
- Maswan : 100 MLd
- Usgaon : 24.5 MLd
- Papadkhind : 1.5 MLd

Vasai Virar City Municipal Corporation

Mumbai metropolitan region covers an area of about 4350 Sq. Km. comprising of Municipal Corporation of greater Mumbai, 13 municipal town and 1500 villages with a 1970 census population of 7.793 million people. For the purpose of planning water resources and hydrometric study, the Mumbai metropolitan region is divided into six zones. Vasai Virar comes under zone two. Fast increase in urban population in Vasai

Virar has lead to tremendous scarcity of drinking water in this area. Most population is dependent on tanker fed water supply.

Vasai Virar City Municipal Corporation (VVCMC) is one of the fastest growing Corporations areas near Mumbai. Vasai Virar sub region on the fringes of Mumbai falls under the Mumbai Metropolitan Region. The Vasai Virar region is fast developing considering its nearness to the megacity Mumbai and improvement in its connectivity to Mumbai through many projects proposed for this region. The low cost housing project is also proposed for the urban poor in this area. The VVCMC is proposing to develop the Heritage installations and also create Recreational hubs in the area for Tourism development. This area has good shoreline suitable for water sports development. It has been facing the problems of unsustainable urban growth and unplanned development over the years more particularly in Water Sector. VVCMC has come forward to resolve these issues and bring about reforms.

As per provisional reports of Census India, population of Vasai Virar in 2011 is 1,221,233; of which male and female are 649,535 and 571,698 respectively. The sex ratio of Vasai Virar city is 880 per 1000 males. The decadal growth rate in population has been 58% and 70% during the last two decades i.e., 1981-1991 and 1991-2001. As per census 2001, the population of Vasai Virar was 702723. The projected population is 22.23 lakhs during 2021.

TABLE 4: PRESENT SOURCE OF WATER SUPPLY

Area	Usgaon Scheme	Pelhar Dam	PapadKhind Dam	Surya Dam	Well/Tanker Water Supply.
Vasai Town.	2.50 mld	-	-	10	-
Navghar-Manikpur Municipal Area.	4.00 mld	3.50 mld	-	25	6.00 mld
Nallasopara Municipal Area	4.00 mld	3.50 mld	-	35	9.00 mld
Virar Municipal Area.	14.00 mld	-	1.50 mld	30 mld	-
Green Zone (East) (Rural)	-	7.00 mld	-		2.00 mld
Green Zone (West) (rural)	-	-	-		13.00 mld
Total existing water supply	24.50 mld	14.00 mld	1.50 mld	100 mld	30.0 ld.

source: development plan of vvsr approved by g.o.m. 2007.

TABLE 5 : PROJECTED WATER DEMAND 2001-2041

Year	Population (Lakhs)	Present water supply(MLD)	Water demand in MLD	Demand Supply Gap	Water Scheme suggested
2001	7.02	130			
2011	12.21	130	235	105	Surya
2021	22.23		400	270	Wandri, Ghateghar

2031	33.34		600	470	Kaman, Kholsapada, Rajiwali– Sativali
2041	41.67		750	620	Pinjal

The water supply is 130MLD and hence, for present population of 12.21 lakhs, rate of water supply per capita (lpcd) works out to 106 which is lower than CPHEEO norms of 150 LPCD for metropolitan city. All the adjoining Corporation areas like Thane, Kalyan-Dombivali, Navi Mumbai, Mira-Bhayandar, and Ulhasnagar are also facing the same situation. All the existing sources of water are exhausted and the Corporations are required to find new source of water supply. Thus acute water shortage is being faced by the Corporation and surrounding area and it is likely to grow enormously if timely measures are not taken for developing new sources.

B. MMRDA's Rental Housing Project

The Govt. of Maharashtra has appointed MMRDA as the Implementing Agency for Rental Housing Projects in the MMR in 2008. The Rental Housing Projects undertaken by the MMRDA are of 'Vital Public Purpose' and is first of its kind as "Slum Prevention Programme". The MMRDA has undertaken an ambitious project of constructing or procuring 5 Lakh self contained Rental Housing units of minimum 160 sq. ft. carpet area within the Mumbai Metropolitan Region in 5 years. MMRA intends to procure residential complexes of self-contained tenements from the interested developers / land owners / any other agencies approved by MMRDA against incentive of FSI or TDR in Mumbai Metropolitan Region.

The complex will have all basic required infrastructures such as internal roads, storm water drain, sewer lines, water supply lines, electricity etc. MMRDA till date has granted local clearance to 39 Rental Housing Proposal at various locations in MMR which will generate Rental Housing stock of about 2.58 Lakh Rental housing units in next 3 to 4 years. Some rental housing projects are located in Vasai-Virar sub-region and Mira – Bhayander Sub-region.

2.5 Source

Surya river is source for the 403 MLD regional water supply scheme for bulk water supply to the two ULBs viz. Vasai-Virar Municipal Corporation and Mira-Bhayandar Municipal Corporation.

2.5.1 Proposed Location

The Surya River is the basic source of water for this project. The Surya Dam at Dhamni located at 19^0 55' N latitude and 73^0 03' E longitude is the mother source for the development of several technically feasible options for this project. The river originates from Sahyadri mountain in Mokhada Tehsil of Thane District. The river flows south west and joins Vaitarna in Palghar Tehsil. The river travel is about 55 Km. Initial 8 – 9 km travel is through very High Mountain with levels varying from 90 m RL to 60 m RL. Next

course for about 20 km is on steep slope with levels falling from 60 m to 17 m. Last phase of travel for 20 km up to Maswan is with moderate slope with level falling from 17 m to 4 m. Maswan is extreme point on the river course upto which tidal effect are encountered. Important tributary of the river is Susri river which joins at 27 km from origin of Surya River. One dam and three numbers of pick up weirs are constructed on Surya river as discussed below.

2.5 .2 Physical Infrastructure Components

The water supply system envisages abstracting raw water from the river Surya at suitable location, treating the water by adopting appropriate process in water treatment plant and transmitting to master balancing reservoirs to be located at outskirts of the two ULBs. The MBRs shall be bulk supply points and destinations for the water supply system.

The integrated water supply scheme shall include following components:

i) Intake and raw water pumping station at Kawadas
ii) Raw water pumping main
iii) Water treatment plant at **Surya Nagar**
iv) Clear water pumping station at WTP at **Surya Nagar**
v) Clear water pumping main to break pressure tank (BPT)
vi) Break pressure tank
vii) Clear water transmission main
viii) Enroute crossing of NH by tunnel
ix) Tansa & Vaitarna River and Vasai creek crossings
x) Master balancing reservoirs

2.6 Surya Dam

The Surya Dam located at Dhamni on Surya River is owned by the Irrigation Department of Government of Maharashtra and is located about 54 km beyond the boundary line of MMR to the North. Water from the dam is released through the tail race of the hydroelectric power house located at the foot of the dam. A pick-up weir at Kawadas about 5.5 km downstream of dam is constructed. Two canals namely Left bank canal and Right bank canal originate from Kawadas. Two intakes for Tarapur Atomic Power Station and Reliance are located at Kawadas and together draw 36 MLD.

On downstream of Kawadas two weirs are constructed.

i) At 29.7 km from Kawadas at which MIDC's intake is also located.
ii) At Maswan about 40.4 km from Kawadas at which Intake for 100 MLD existing water supply scheme for Vasai-Virar is located.

It is proposed to lift water at **Kawadas** location, downstream of the Surya Dam and convey it to Surya Nagar where it will be treated in Water treatment Plant. Thereafter it will be taken by appropriate transmission system to Master Balancing Reservoirs (MBRs) for bulk supply to above ULBs and groups of villages. Further transmission from MBRs and distribution shall be responsibility of ULBs and village Panchayats as applicable.

Table 6: The salient features of the Surya Dam at Dhamni are given below

Sr. No.	Features	Details
1	Basin	Vaitarna
2	River	Surya
3	Dam	Dhamni Dam
4	Pick up Weir	Kawadas Pickup Weir
5	Dam Type	Stone Masonry Dam
6	Village	Dhamni
7	Taluka	Total 4, Dahanu, Jawhar, Vikramgad, Palghar
8	Total Dam Storage	299.01 MCM
9	Dead Storage	12.69 MCM
10	Useful Storage	286.32 MCM
11	Average Rainfall	2216 mm
12	Total Irrigation Capacity	14696 Ha
13	Submergence Area	355.60 Sq. Km
14	Total water Reserved for irrigation	215.84.MCM
15	Existing Use for irrigation	62.856MCM
16	Total water Reserved for Drinking	24.557 MCM
17	Surya Dhamni Existing Live Storage--year 2010	176.48 MCM
18	Total water Reserved for Industry	47.835MCM
19	Electricity Generation	6.75 MV

At present there is a 6 MW hydropower project in operation at the foot of the Dhamni Dam on Surya River. The water from the tail race of the power plant is released into the river downstream of the dam.

2.6 Kawadas Pick up Weir on Surya

There is weir across the Surya River about 5 km downstream of the Dhamni Dam. This is the Kawadas Pick up Weir.

Table 7

Sr. No.	Features	Details
1	Total Dam Storage	13.70MCM
2	Dead Storage	3.74 MCM
3	Useful Storage	9.96 MCM
4	Kawadas Existing live storage -year2010	9.83 MCM
5	Right Bank Canal	28.5 Km
6	Discharge Release in RBC	21.81 m3/Sec
7	Left bank canal	47 km
8	Discharge Release in LBC	10.78 m3/Sec

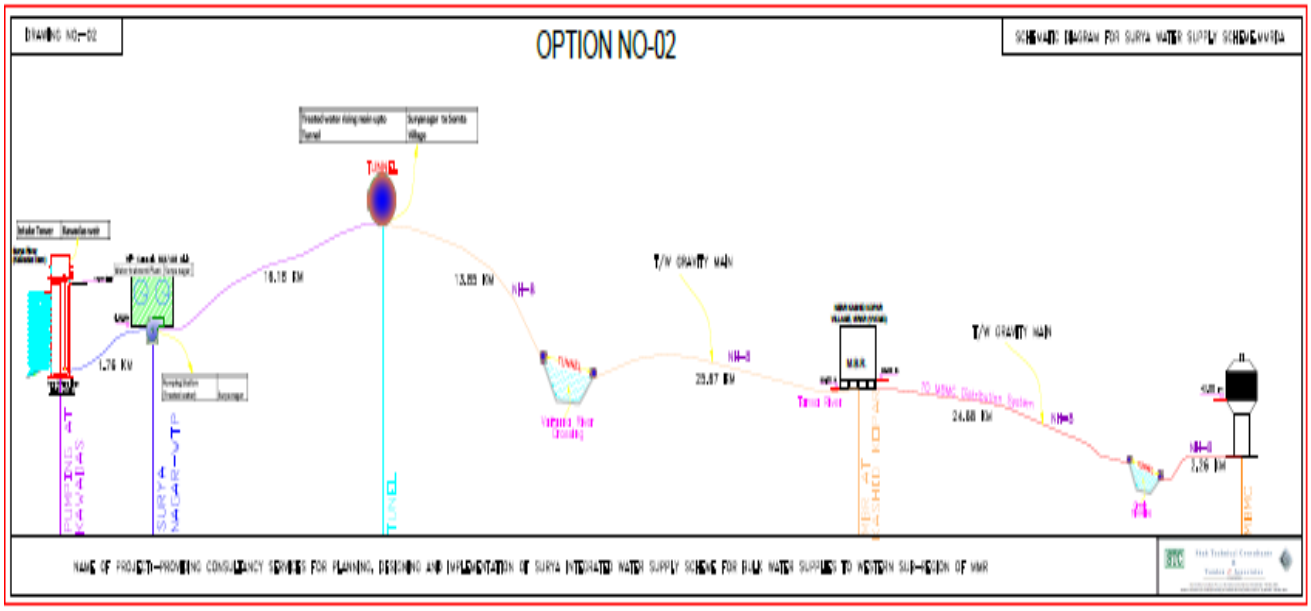
2.6.1. Kawadas Pick-up Weir as the Source

The Kawadas Pick-up Weir is located about 5.6 km downstream of the Surya Dhamni Reservoir. There are three existing intake wells belonging to the MJP and Reliance Industries abstracting about 36 MLD water from this source. The bed level of the reservoir is 60.

There is adequate area available on the upstream side of the weir to design and develop another intake well for abstracting 303/403 MLD water from this weir without affecting other daily abstractions. The width of Dam is 648.93 m and height is approximately3.5 m. Intake location is proposed 140 m inside river. The abstracted water is proposed to be pumped to the likely WTP site at Suryanagar for treatment.

After treatment the treated water shall be pumped to the highest point along the route about 16 km from the WTP site of Suryanagar. Thereafter the water will flow by gravity to the VVCMC MBR proposed at Kashid Kopar. The quantity allocated for the MBMC shall be conveyed by gravity main to the proposed MBMC MBR at Ghodbandar.

The schematic diagram of the project with Kawadas Weir as the source is attached.



2.7 Water Treatment Plant

The water abstracted from any of the above sources has to be treated before it reaches the consumers. It is therefore necessary to design and construct a water treatment plant for the defined capacity of 403 MLD. It is anticipated that the plant shall require about 12 to 15 Hectares land depending on the treatment process alternatives available. These alternatives were studied in detail during the feasibility stage. The possible location alternatives studied are described below.

2.7.1 Surya Nagar Colony Site

The Surya Nagar Colony located about 5.54 km from the Village Kasa Khurd and about 2 km from the Kawadas weir at an average level of about 80 m. The colony covers an area of about 20 Ha. The colony is inhabited by a few employees of the Irrigation Department, Govt. of Maharashtra and houses some offices as well.

Most of the old quarters of temporary specifications in the colony are in a very poor state of repairs. It should be possible demolish the part of the colony which is not in use and make the area available for the construction of a 403 MLD water treatment plant even with the provision for future expansion. Since the land belongs to the Govt. it was considered as the best option to avoid land acquisition. This site was therefore selected as the best alternative for source at the Kawadas weir.

2.8 MBR Sites

The Kashid Kopar MBR of 25 ML supplies water to the VVCMC. The land availability at this location and in possession of the VVCMC has been selected for locating the 403 MLD WTP. This has the advantage of the fact that the raw water is being brought very close to the consumer distribution locations as compared to the other locations which are comparatively very remote. Better control over the water treatment plant is therefore more likely. The Ghodbunder MBR of 25 ML supplies water to MBMC.

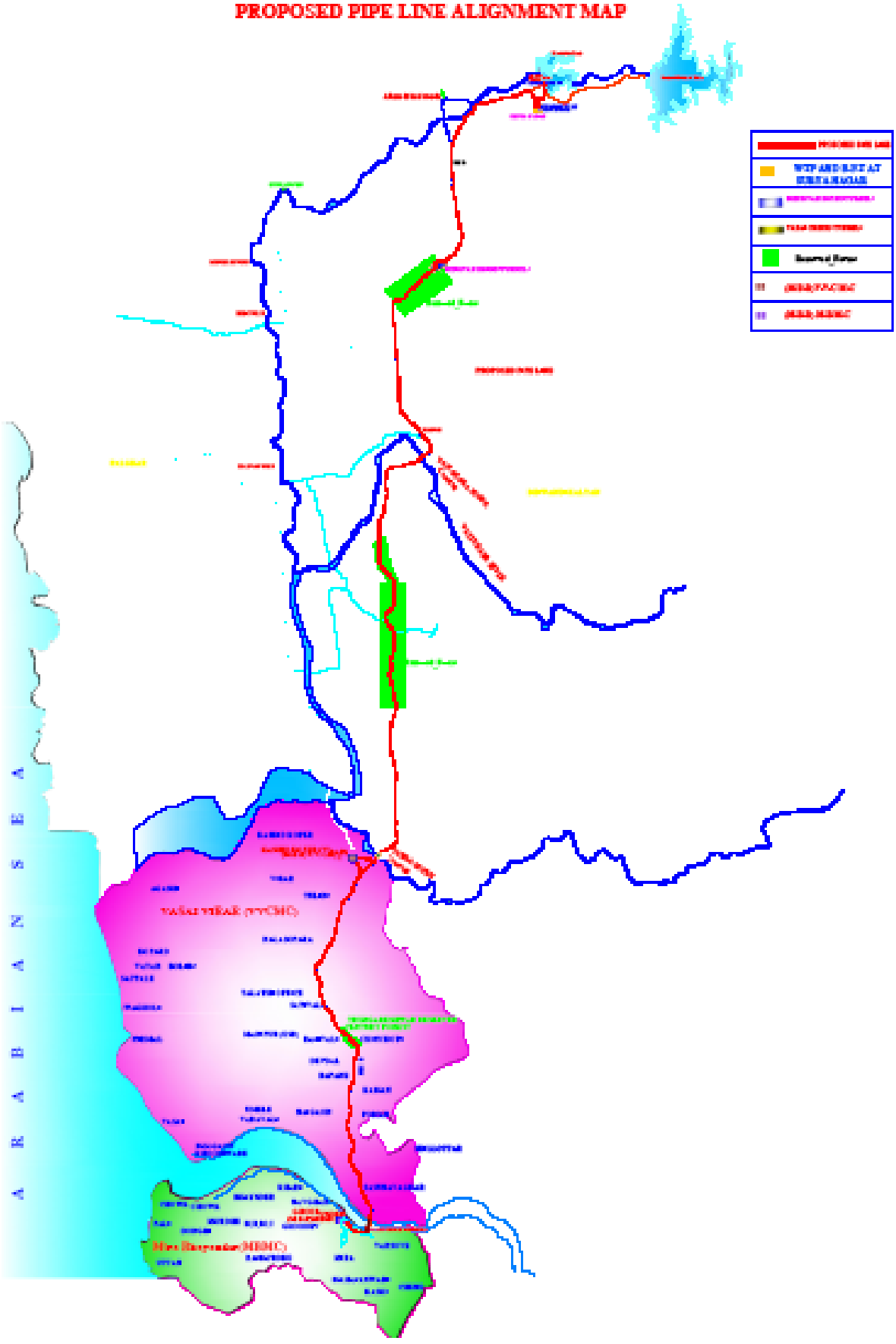
2.9 Land Requirement for the Scheme

The land requirement for the scheme for all the alternatives has been indicated below for each alternative. This indication covers the project execution as well as the operations and maintenance phases. The requirement may vary significantly depending on the final alternative / alternatives selected. The same shall be refined in the subsequent reports. In the planning of the project and location of components all due care shall be taken to ensure that the land and property belonging to the indigenous and tribal population shall not be proposed for the development of project.

Table 8: Land Requirement for all Project Components

S. No.	Project Component	Location	Land Requirement
1	Intake Works and Pumping Station For 440 MLD	Surya Dhamni Dam/ Kawadas Weir/ Maswan Weir	1 Ha
2	Raw Water Rising Main about 2500 mm dia.	From the Pumping station to WTP site with 3.6 m wide service road	12 m wide strip for the full length of the rising main
3	Water Treatment Plant for 420 MLD output	Suryanagar	10 -12 Ha
4	Treated Water Rising / Gravity Main about 2500 mm dia.	From the WTP to BPT/Tunnel at 115 m on NH8 and beyond up to VVCMC MBR at Kashid Kopar	12 m wide strip for the full length including 3.6 m wide service road
5	MBR for VVCMC of 25 ML capacity	Kashid Kopar	5 -6 Ha
6	Gravity Main of about 1500 mm dia for MBMC	Kashid Kopar to Chene/ Ghodbandar MBR site	10 m wide strip including 3.6 m wide road for full length
7	MBR for MBMC of 25 ML capacity	Chene/ Ghodbandar at about 40 m RL	5-6 Ha

PROPOSED PIPE LINE ALIGNMENT MAP



3.0 Environmental Impact

3.1 Land Environment

There is no land use change due to this project. But the impact is expected during construction phase of the project. During construction the area required for the project will be cleared which may result in

- Area of Intake & pumping station, WTP, BPT, MBR etc where construction activity will be undertaken
- Tunnels / bridges to be constructed
- Water bodies required to be crossed
- Effect on Forest area along the route
- Villages nearby

Permission required from following Agencies will be taken

- NHAI for taking pipeline through their RoW along NH 8
- Irrigation dept for WTP location at Surya Nagar is in their possession
- MCZMA for crossing the Vasai Creek, Kaman River
- Forest department for clearing of trees coming in pipeline route. Compensatory Tree Plantation Plan shall be submitted to them

3.1.1 Identification & Mitigation of hurdles

During the construction, the residential and commercial land use activity near market area of villages along the route might be impacted adversely as they are located very close to the project road. The RAP studies planned for the project will address the R&R issues adequately and mitigate the impact to large extent. Hence the adverse impact will be of short duration. Induced impacts during operation stage on land use pattern are expected to occur within the beneficiary ULBs, VVCMC & MBMC & 27 villages where water is proposed to be supplied through this project. With increase in water supply, the land values are bound to go up in short duration. This will lead to exploitation of vacant land area/ space available in the ULBs.

In the development of the alternatives the identification and mitigation of the hurdles of various types becomes vital for early realization of the project. The various hurdles in the project are primarily forest land, human habitats, water bodies and streams, canals and highways. As a general project planning philosophy, the consultants shall endeavor to locate the project critical components on lands and areas currently in physical possession of the government departments, VVCMC and MBMC. All possible efforts will be made to align the transmission lines along the Major District Roads and National Highways within their ROW. During pre-construction and construction phase of the project, construction related activities shall be preferably restricted within project RoW.

All possible efforts shall be made to avoid intrusion into existing habitats and communities and options will be explored to avoid such locations and properties. From the developed preliminary alignment drawings and routes and the use of satellite and Google images, there

seems to be very little chance of such intrusions. However the details of the structure affected during construction falling within 8m from road boundary line have been listed.

There are however well identified major hurdles like the Vaitarana River, Tansa River, Ulhas River (Vasai Creek), Kaman Creek and other seasonal streams and National Highway 8. The relevant owner departments are being approached for required clearances and permissions to cross / overcome these hurdles. CRZ clearance has been obtained from MCZMA for Vasai Creek, Tansa & Vaitarna river crossings. Application is being made for Kaman Creek crossing.

Mitigation Strategy

- The strategy for the mitigation of the hurdles listed above is fairly straightforward. It aims at deciding the locations of the critical project structures like the intake works, pumping stations, water treatment plants, break pressure tanks, master balancing reservoirs and other ancillary structures on lands and areas owned by the state / central government departments and agencies. It is comparatively easier and expeditious to obtain clearances and permissions from these agencies.
- The strategy also aims to avoid any intrusions into forest/reserved forest land. This is more relevant in selection of the route for the water transmission lines as the distance involved from the source to the farthest balancing reservoir is about 90 km.
- Similarly the locations of other balancing tanks are also being planned to avoid forests and other eco-sensitive areas.
- The strategy focuses on trouble free execution of the water transmission lines by aligning them along the existing roads and highways. Much of the proposed alignment is likely to run parallel to the NH8, Mumbai – Ahmedabad Highway. This is an existing 6 lane highway. The ROW of this highway is proposed to be used for laying the pipeline. Necessary permission will be sought and obtained from the NHAI and other utility departments of the GoM and GoI. The strategy also aims at reducing/eliminating land acquisition for the project to the extent possible.

- During pre-construction and construction phase of the project, construction related activities shall be preferably restricted within project RoW.

There is three Tunnels & 91 Underpasses (including small bridges/ nallas) proposed to be constructed during the pipeline installation. The details are as under. The excavated material generated in the above construction will be reused to maximum extent and remaining will be disposed off in consultation with Authorities.

i) Tunnel on NH crossing

Size of gravity main crossing NH is 2235 mm diameter. It is proposed to provide tunnel of suitable size such that the pipeline can be laid in the tunnel. Considering 2235 mm diameter of pipeline, 450 mm saddle at bottom of pipe and requirement of about 800 mm for air valve, minimum size of tunnel required works out 3282 mm. Considering margin, size of tunnel is proposed 3500 mm. The tunnel shall be horse-shoe shaped.

Tunnel boring at the NH8 Medhwan Khind will be carried out by a tunnel boring machine of make Herinchnekt or equivalent for a diameter of about 3.6m, with average length of the bore of 12 to 15m / day. The Noise level generated at the tunnel face and inside the tunnel is of the order of 40 to 50db. Since the machine is likely to operate within the permissible limits of the noise generation, noise prevention and reduction measures may not apply. Mechanism of removal of the excavated material the excavated material is removed using small wagons and locomotive. Similar method shall be used in the Surya Project. The mitigation measures required are proposed in EMP.

ii) Railway Crossing

Vasai - Panvel railway crossing will be done by jacking and pushing method through embankment.

iii) Minor Crossing

It is proposed to lay pipeline below the bed level / ground level by doing open excavation which will be feasible and economical. The pipe sections shall be encased in rich concrete.

iv) River & Creek Crossings

Following river & creek crossings were considered by MCZMA followed by Ministry of Environment & Forests

Vasai Creek Crossing

Tansa Crossing

Vaitarna Crossing

CRZ clearance was received from MCZMA subject to clearance from MoEF vide letter no CRZ -2013/CR 336 /TC -4 dated 23/4/2014 and MoEF approved proposal in its 141st EAC meeting held on 26 to 28 November 2014.

The proposal of Kaman creek crossing of Surya pipeline is submitted herewith for grant of CRZ clearance

Kaman Creek Crossing

The location of Kaman Creek crossing will be at 19°20'48" N and 72°53' 30" E. on west side of the bridge of NH 8 on Kaman Creek. It is proposed to provide pipeline 5 m below the bed level / scour level of river by micro tunneling.


Inlet
Towards Ghatkopar
(Latitude 19 20'49.19"N ,Longitude 72°53'30.64"E)
(Latitude 19 20'44.49"N ,Longitude 72°53'28.82"E)
Service Rd
Outlet
Towards Ghatkopar
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129 m