EXECUTIVE SUMMARY

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1.0 INTRODUCTION

JSW Steel Ltd. (JSWSL) at Dolvi is an existing Integrated Steel Plant with present capacity of 10 MTPA. The Environmental Clearance (EC) up to 10 MTPA capacity was granted to JSWSL Dolvi vide letter no J-11011/76/2013-IA II (I) dated 25-08-2015.The EC letter was amended vide letter dated 23-01-2018 to exclude the proposed 1.0 MTPA & 2.5 MTPA coke oven units and transfer the same to Dolvi Coke Projects Limited (A Sister Company) and 10 MTPA Slag and clinker grinding unit to JSW Cement Limited (A Sister Company).

Subsequent to the above, JSWSL, Dolvi approached MoEFCC for obtaining EC under Clause 7(ii) of the EIA Notification, 2006 for revision in production capacities of Sinter plant (8 to 4 MTPA) and Pellet plant (4 to 9 MTPA) which was granted vide letter no. J-11011/76/2013-IA.II(I) dated 16-06-2020. Further, Dolvi Coke Projects Limited partially transferred its EC for 3.5 MTPA Coke oven plant to JSWSL, Dolvi vide letter no. IA-J-11011 /497/2017-1A-II(I) dated 22-11-2021.

The Integrated Steel Plant of 10 MTPA steel production capacity with Captive Power Plants of JSWSL is located at Dolvi Village, Pen Taluk, Raigad District, Maharashtra. The plant currently produces 10 MTPA of liquid steel, sold in the form of billets, slabs, Hot rolled coils and TMT Rebars. The steel production is carried out via Coke oven – sinter/pellet – BF – DRI CONARC/BOF followed by hot rolling of slabs into Hot rolled coils and rolling of billets into rebars. Major units proposed under earlier ECs have been implemented and the present crude steel production achieved is 10 MTPA. Some of the units are under engineering/ construction phases.

Now JSWSL proposes to enhance the capacity of the integrated steel plant at Dolvi from 10 MTPA to 15 MTPA by installing a new Blast furnace and installing a new BOF converter in SMS(BOF) along with additional facilities for refining, casting and rolling as well as auxiliary facilities.

Terms of Reference (ToR) for the EIA/EMP Studies for the proposed expansion project has been issued by MoEFCC, New Delhi vide their letter no. IA-J/11011/76/2013-IA-II(IND-I) dated 16-07-2024.

The project site involves CRZ areas. Proposed 1 No of water pipeline, 4 No of Bridges with galleries for utilities, Cross-country Conveyors with utilities and Wagon tippler facility with Railway Lines are allied activities falling under CRZ area, involving CRZ IA, IB, CRZ III areas. CRZ application has been made vide proposal no. IA/MH/CRZ/45726/2024 dated 04/01/2024 to MoEFCC.

2.0 PROJECT LOCATION

The existing plant is located in an area comprising Jui Bapuji, Kharkaravi and Dolvi villages of Pen Taluka of Raigad district in the State of Maharashtra at around 18°41'26"N latitude and 73°02'31"E longitude and 4.0 m above mean sea level (MSL).The area earmarked for the proposed expansion is non-forest land located on the southern side of the existing plant. The land is being acquired through the Govt. of Maharashtra and is devoid of any habitation. The nearest town is Pen about 15 km north-east of the plant site. River Amba is flowing along the western and south-western boundary of the plant site. The site and study area of 10km radius is covered in the Survey of India Toposheets No. E43G13, E43G14, E43H1 & E43H2.

Nearest Railway station is Pen Railway Station (on Konkan Railway's Mumbai – Madgaon-Mangaluru Broad Gauge main railway line), which is located at about 8 km away.

National Highway no. NH-66 (National Highway from Panvel to Kanyakumari via Ratnagiri, Panaji, Karwar, Mangaluru, Kochi, Kollam &Thiruvananthapuram) passes along the eastern side of the steel plant. NH-166A (a spur of NH-66 leading to Alibag from Vadkhal) is located north of the plant. The steel plant is 50 km from Chhatrapati Shivaji Maharaj International Airport Mumbai (BOM), Mumbai, Maharashtra.

The nearest Major Port is JNPT, which is ~ 28 km NNW of the plant. Mumbai Port is ~33 km NW of the plant. Dharamtar Jetty, operated by JSW Infrastructure Ltd. is 0.8 km NW of the plant on the eastern bank of Amba River (i.e. same as that of the plant). There is another riverine jetty operated by a private operator on the western bank of Amba River almost exactly opposite Dharamtar Jetty.

3.0 PROJECT DESCRIPTION

With the present proposal, JSWSL Dolvi intends to enhance production of hot rolled Coils and Rebars and implement facilities for cold rolled products on as-on-demand basis. The indicative intermediate & final products production capacities of individual units before and after proposed expansion plan are as follows:

Sl. No.	Plant equipment/ Facility	Total Capacity as per EC @ 10 MTPA	As per CTE/CTO at 10 MTPA		Addl. Proposed	Capacity at 15.0 MTPA
			Configuration	Capacity		
1	DRI (Gas based Mega Module)	4.0 MTPA	1 x 2 MTPA	2.0 MTPA	00.0	2.0 MTPA
2	Pellet Plant	13 MTPA [4 MTPA (ARCL) +9 MTPA (JSW)]	4 MTPA (ARCL)+ 9 MTPA (JSW)	13 MTPA	00.0	13 MTPA
3	Coke Ovens including By-product Plant	4.5 MTPA [1 MTPA (ARCL)+3.5 MTPA (JSW)]	1 MTPA (ARCL)+ 3.0 MTPA (JSW)]	4.0 MTPA	00.0	4.0 MTPA
4	Sinter Plant	10 MTPA	1x2.8 MTPA + 1x2.5 MTPA	5.3 MTPA	00.0	10.0 MTPA (4 MTPA from existing EC under implementation)
5	**Blast Furnace including Pig casting**	**8.1 MTPA (3.6 MTPA+4.5 MTPA)**	**1x3.5 MTPA + 1x4.5 MTPA**	**8.0 MTPA**	**5.0 MTPA**	**13. MTPA**
6	**SMS CONARC)-**	**5.2 MTPA**	**1x 5.2 MTPA**	**5.2 MTPA**	**00.0**	**5.2 MTPA**
7	**SMS-BOF**	**6.0 MTPA**	**1x 6.0 MTPA**	**6.0 MTPA**	**3.8 MTPA**	**9.8 MTPA**
8	Ladle Furnace(LF)	2x200T+250 T+ 2x300 T	2x200T+250 T+ 2x300 T	--	1 x 350 T	2x200T+250 T+ 2x300 T + 1x 350 T
9	VD/VOD	1x200T+1x205T +2x300T	1x200T+1x205T +2x300T	--	1 x 350 T	1x200T+1x205T +2x300T + 1 x 350 T
10	**CSP- *Compact Strip Production***	**3.5 MTPA**	**1x 3.5 MTPA**	**3.5 MTPA**	**4.5 MTPA**	**8.0 MTPA**
11	Conventional Slab Caster	9.41 MTPA (3.68 MTPA+5.73 MTPA)	5.73 MTPA	5.73 MTPA	00.0	9.41 MTPA (as per earlier EC, No change)
12	Billet Caster	1.5 MTPA (1x6 strands)	1x 1.5 MTPA	1.5 MTPA	00.0	1.5 MTPA
13	Plate Mill	1.5 MTPA	00.0	00.0	00.0	00.0
14	**Hot rolling Mill**	**8.5 MTPA**	**1x 5.0 MTPA 1x3.5 MTPA**	**8.5 MTPA**	**4.5 MTPA**	**13.0 MTPA**
15	Bar Mill	1.4 MTPA	1x 1.4 MTPA	1.4 MTPA	00.0	1.4 MTPA
16	CRM (Hot rolled	2.5 MTPA	1.2 MTPA	1.2 MTPA	00.0	3.1 MTPA

Sl. No.	Plant equipment/ Facility	Total Capacity as per EC @ 10 MTPA	As per CTE/CTO at 10 MTPA		Addl. Proposed	Capacity at 15.0 MTPA
			Configuration	Capacity		
	Skin pass+Cold Rolled full hard coil +Hot rolled pickled & oiled coil)					[1.2 MTPA Galvanizing Line Under implementation]
17	Galvanizing Line	0.6 MTPA				
18	Electrical Steel CRGO	0.4 MTPA	0	0	00.0	00.0
19	Tin Plate Mill	0.4 MTPA	0	0	00.0	00.0
20	Colour Coating Plant	0.5 MTPA	0	0	00.0	00.0
21	**Lime /Dolo Plant**	**3600 TPD (3x600TPD+ 3x600TPD)**	**3x600 TPD+ 3x600 TPD**	**3600 TPD**	**2x800 TPD**	**5200 TPD**
22	**Oxygen Plant**	**7600 TPD**	**2x2200 TPD+1x1260 TPD+ 1x1000 TPD**	**6660 TPD**	**5000 TPD**	**11,660 TPD**
23	Captive Power Plant (CPP)	600 MW	1x175 MW+ 1x55MW+ 1x70 MW+ 1x49.25MW	Gas based Power Plant: 230 MW CDQ Boiler: 70 MW TRT: 49.25 MW	300 MW + 36.0 MW (TRT)	Gas based Power Plant: 530 MW CDQ Boiler: 70 MW TRT: 85.25 MW
24	Township	150 Acre	150 Acre	127.33 Acre	00.0	127.33 Acre
25	Solid waste incinerator	250 Kg/hr	1x250 Kg/hr	250 Kg/hr	00.0	250 Kg/hr
Source: JSWSL's PFR dated September 2023						

The proposed plant configuration is given in following table.

Sl. No.	Facilities	As per EC 2015 (amendment 2020)	As per present CTO		After expansion		Remarks
			Configuration	Capacity	Configuration	Capacity	
1.	Coke Ovens	4.5 MTPA	1x1.0 + 1x3.0 MTPA	4.0 MTPA	1x1.0 MTPA + 1x3.0 MTPA	4.0 MTPA	No change
2.	Sinter Plant	10 MTPA	1x2.8 + 1x2.5 MTPA	5.3 MTPA	1x2.8 + 1x3.2 + 1x4.0 MTPA	10.0 MTPA	Under implementation. No change proposed.
3.	Pellet Plant	13 MTPA	1x4.0(ARCL) + 1x9.0 MTPA =	13 MTPA	1x4.0(ARCL) + 1x9.0 MTPA	13 MTPA	Implemented
4.	Blast Furnace including Pig casting	8.1 MTPA	1x3.5 + 1x4.5 MTPA	8.0 MTPA	1x3.5 + 1x4.5 + 1x5.0 MTPA	13.0 MTPA	Installation of new BF of 5.0 MTPA proposed.
5.	DRI (Gas based Mega Module)	4 MTPA	1 x 2 MTPA	2.0 MTPA	1 x 2 MTPA	2.0 MTPA	DRI-2 of 2 MTPA dropped.
6.	SMS	11.2 MTPA	SMS1(CONARC) -1x5.2 MTPA SMS2(BOF)-6.0	11.2 MTPA	SMS1 (CONARC)-1x5.2 MTPA SMS2(BOF)-9.8	15 MTPA	Enhancement of existing SMS-2 by addition of a new

Sl. No.	Facilities	As per EC 2015 (amendment 2020)	As per present CTO		After expansion		Remarks
			Configuration	Capacity	Configuration	Capacity	
			MTPA LF–2x200 + 205 + 2x300 T VD-VOD / RH-TP - 1x200 + 1x205 + 2x300 T		MTPA LF–2x200 + 205 + 2x300 + 1x350 T VD-VOD/ RH-TP - 1x200 + 1x205 + 2x300 + 1x350 T		BOF convertor of 350T proposed. Installation of matching capacity twin LF & VD/VOD of 350T proposed.
7.	Casters	9.41 MTPA (Conventional Slab Caster)	1x5.73 MTPA	5.73 MTPA	1x5.73 MTPA 1x3.68 MTPA	9.41 MTPA	9.41 MTPA (as per earlier EC)
		3.5 MTPA (CSP)	1 x 3.5 MTPA	3.5 MTPA	**1x 4.5 MTPA**	8 MTPA	Installation of new CSP (part of CSP-2) of 4.5 MTPA proposed.
		1.5 MTPA (Billet Caster)	1x1.5 MTPA	1.5 MTPA	-	1.5 MTPA	--
8.	Plate Mill	1.5 MTPA	Not implemented	-	-	-	Earlier envisaged, now dropped.
9.	HRM	8.5 MTPA	1x5.0 MTPA 1x3.5 MTPA	8.5 MTPA	**1x 4.5 MTPA**	13 MTPA	Proposed mill (part of CSP-2, 4.5 MTPA)
10.	Bar mill	1.4 MTPA	1x1.4 MTPA	1.4 MTPA	1x1.4 MTPA	1.4 MTPA	No change
11.	CRM (Hot rolled Skin pass+Cold Rolled full hard coil +Hot rolled pickled & oiled coil)	2.5 MTPA	1.2 MTPA	1.2 MTPA	1.2 MTPA HRGO + CRM	3.1 MTPA	Under implementation. No change proposed.
12.	Galvanizing complex (Hot rolled)	0.6 MTPA					
13.	Electrical Steel CRGO line	0.4 MTPA		-	-	-	Earlier envisaged, now dropped.
14.	Tin Plate Mill	0.4 MTPA	Not implemented	-	-	-	Earlier envisaged, now dropped.
15.	Colour Coating Plant	0.5 MTPA	Not implemented	-	-	-	Earlier envisaged, now dropped.
16.	Lime/Dolo Plant	3600 TPD	3x600 + 3x600 TPD	3600 TPD	3x600 + 3x600 + **2x800 TPD**	5200 TPD	Installation of new 1600 TPD Calcining plant proposed.
17.	Oxygen Plant	7600 TPD	2x2200 + 1x1260 + 1000 TPD	6660 TPD	2x2200 + 1x1260 +1x1000+ **1x5000 TPD**	11660 TPD	Installation of new 5000 TPD Oxygen plant proposed.
18.	Captive Power (Gas	600 MW	1x55 MW + 1x175 MW	230 MW	1x55 MW + 1x175 MW +	530 MW	Installation of new 300 MW Gas

Sl. No.	Facilities	As per EC 2015 (amendment 2020)	As per present CTO		After expansion		Remarks
			Configuration	Capacity	Configuration	Capacity	
	based)				**1x300 MW**		based CPP proposed.
19.	Energy recovery based power generation	118 MW	TRT: 1x12 + 1x37.25 MW CDQ: 1x70 MW	118 MW	TRT: 1x12 + 1x37.25 MW + **1x36 MW** CDQ: 1x70 MW	155.25 MW	New TRT of 36 MW proposed along with new BF.
20.	Solid waste incinerator	250 kg/hr	1x250 kg/hr	250 kg/hr	1x250 kg/hr	250 kg/hr	Implemented, No change.
21.	Township	150 acres	-		127.33 acres		No change
Source: JSWSL's PFR dated September 2023							

The major finished products that shall be produced at the expanded steel plant are:

1) Hot Rolled Coils / Plates: 13 MTPA
2) Rebars / slabs: 1.4 MTPA
3) Surplus Billets for sale: 0.07 MTPA
4) Cold rolled products (as on demand) generated by processing HR Coils/Plates: 2.5 MTPA
5) Hot rolled galvanized products (as on demand): 1.2 MTPA

The major finished by-products that shall be produced at the expanded steel plant are:

a) Heavy/Light/Mix oils: 37050 TPA
b) Crude BTX (Benzene, toluene, xylene): 20468 TPA
c) Carbon Black: 57616 TPA
d) Crude Tar: 177787 TPA
e) Sulphur: 8500 TPA
f) Blast Furnace Slag and Steel Slag as by-product

The breakup of raw material requirement for the existing plant at 10 MTPA as well as after the proposed expansion at 15 MTPA is as follows:

The existing plant's total raw material requirement is ~31.94 MTPA which is expected to increase by 11.66 MTPA to 43.60 MTPA. The raw materials are procured from the open market and transported to the plant by roads railways by barge to JSWSL's captive Dharamtar Jetty located a short distance north of the plant on the eastern bank of Amba River. Materials unloaded at Dharamtar Jetty are moved by conveyors to the storage yards inside the plant. The existing material handling facilities shall be augmented to handle the additional raw materials.

Present Makeup water requirement for the plant is 97113 m^3/day which shall increase by 29136 m^3/day to 126249 m^3/day. The water is drawn from Amba River at Nagothane upstream of a weir (which prevents saline tidal water mixing with the river water). JSWSL, Dolvi is presently having agreement with Irrigation department for supplying 160.84 MLD of makeup water, of which 151.86 MLD is allocated for plant operations. Under the proposed expansion programme additional 20694 m^3/day of effluents shall be treated and recycled.

Electricity demand of the existing plant is 1097 MW, which is expected to increase by 340 MW to 1437 MW. The maximum in-plant captive power generation capacity of existing gas based CPPs is 230 MW. Additional power generation capacity of Waste heat recovery in CDQ is 70 MW and of TRTs is 48 MW, totalling to maximum capacity of 348 MW at present. The proposed gas based CPP will additionally generate 300 MW of power and new BF's TRT will generate 36 MW of power, hence total in-plant captive power generation capacity at 15 MTPA will be 684 MW. The balance power demand shall be met from MSEB grid and JSW Energy Ltd.

The total capital cost of the proposed expansion programme is Rs 23,688 Crores and the capital cost for environmental protection measures is proposed as Rs 832.93 Crores.

4.0 BASELINE ENVIRONMENTAL STATUS

Baseline environmental data was generated during Post-monsoon season, 2022 (October-November-December). This includes monitoring of site-specific Micro-meteorology, Ambient Air Quality (09 locations) & Noise Levels Monitoring (09 locations), which were monitored by setting up of monitoring stations at selected locations. Grab samples were collected from selected locations for water and soil. Further, existing ecological and socio-economic features were also studied. Traffic density was also measured on roads which are used by traffic originating from & destined for the plant. These baseline monitoring and analysis for these attributes were carried out by MECON Ltd.

Ambient Air Quality: The results indicate that ambient air quality monitored are well within the norms at all the nine (09) monitoring locations in the study area for PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH_3, CO, O_3, Pb, Ni, As, benzene and Benzo(a)Pyrene (BaP) as prescribed by NAAQS 2009 except marginal exceedance of PM10 at one location. The maximum value of PM_{10} in ambient air were found slightly higher than the norms (109 µg/m^3 against limit of 100 µg/m^3 at one location (A1 Pen Village) out of the nine AAQ locations, whereas the AAQ was within standards at all other locations.

Total hydrocarbon monitoring and analysis were carried out at eleven ambient locations, of which nine (9) were ambient air quality monitoring stations. Two additional locations were selected due to the observed high volume of vehicle traffic on all state and national highways connected near the plant and the ambient air quality stations. The average total hydrocarbon concentration ranged from 11.15 to 13.27 ppm at the 11 ambient air quality locations. Since there are no established norms for hydrocarbons other than benzene in our country, and the reported benzene values in AAQ were below the detection limit, it is evident that the presence of other hydrocarbons is noticeable. The variation in values among the monitored locations is minimal, with vehicle emissions identified as the primary contributors.

The mineralogical composition of PM_{10} in terms of selected metals i.e. heavy metals were carried out in samples for all the ambient air monitoring location for Cd, Cu, Cr, Zn, Fe & Mn. The summarized results of heavy metals are compared to the norms of Ontario Ambient Air Quality Criteria, April 2012 as there are no norms in our country for these metals in Ambient Air. The concentrations of Pb, Ni and As in PM_{10}in all the nine AAQ locations were found below the norms. Pb concentrations ranged from 0.025 to 0.101 µg/m^3. Ni and As were below the detectable limits.

Ambient Noise levels: The ambient mean noise levels at eight locations covering one Commercial Area, one, Industrial area, one Silence Zone and five residential locations are well within the respective norms.

Traffic volume survey: Traffic volume survey (TVS) was recorded hourly continuously at 4 (four) locations on both sides of the identified roads (NH-66 and NH-166A) on 28thDecember 2022. NH-166A is a 2-lane road with undivided carriageway on plain terrain, whereas road with divided carriage-way on plain terrain. The recorded daily traffic volumes at all the surveyed roads were more than their respective design service volumes as per IRC. The present Levels of service (LoS) were found to be "F" i.e. Forced flow & Jammed conditions.

Water quality: Surface water samples were collected from eight locations and analysed for different parameters and compared with IS 2296 1982 and CPCB's Water Quality Criteria for Surface Water.

The pH value of surface water samples is in the range of 7.42 to 7.69 which are well within 6.5-8.5. Total coliform content at one location (Sreegaon Dam) was low enough to be classified as "Class B" i.e. suitable for "Outdoor Bathing". The other 7 classified as" Class C" i.e. surface water which can be used as drinking water source after conventional treatment and disinfection. Water of Amba River both upstream and downstream of the plant during flood tide as well as ebb tide had very high electrical conductivity due to mixing with sea water making it suitable only for "irrigation, industrial cooling and controlled waste disposal" i.e. "Class E".

Six (6) groundwater samples were collected during the post monsoon season 2022. The results have been compared with drinking water norms of IS: 10500 (2012), Amendment No. 1, 2015.

The results indicate that all the ground water quality parameters analysed to assess the ground water quality in study area meets the prescribed norms in all ground water samples. Some parameters exceeded the "Acceptable Limits" but were within the "Permissible Limits". The results of groundwater carried out during post monsoon season, 2022 in the study area are compared with the parameters as monitored by CGWB for Raigad district in different years i.e. 2021, 2020 & 2019. The results shows that the groundwater quality has remained consistent, and the concentrations are in well agreement with the present study.

Soil: Soil quality was determined at eight (08) locations during the monitoring season. Analysis of the soil samples indicate that in the study area, the soil pH varied from 6.21 – 8.34. Levels of Available Phosphorus range from "Low" to Medium"; Available Nitrogen from "Low" to "High" and Available Potassium "Medium" to High". Overall, the fertility varied from "Low" to "Medium" because of lower levels of one or more of these three limiting nutrients. The results for exchangeable cations show that the calcium constitutes the bulk followed by magnesium in the tested soil samples. Calcium aids in translocation of photosynthesis from leaves to fruiting organs and magnesium is the key element of chlorophyll production and activator of many plant enzymes. SAR values are in the range of 0.12 to 0.66 in seven samples; at the 8^{th} sample SAR was high (14.4) since the sample was collected from a salt pan area.in all the soil samples micronutrients levels are fairly high. In all the tested soil samples, iron and copper are moderately high whereas the levels of Zinc and copper are above the critical limits, and it may be detrimental to plant growth. The area is rich in iron and manganese as per the reported data in the district and the same is observed in the tested soil samples.

Ecology-biodiversity: The study area includes parts of the Western Ghats and the Coastal Plain between the Western Ghats and the Arabian Sea. Most of the study area mix of rural and semi-urban areas. The plain areas comprise of agricultural land (paddy is by far the principal crop), grass lands, estuary (of the Amba River), tidal creeks & mangrove swamps, salt pans, settlements and fresh-water ponds. The hills are thickly forested, though at some places bare rocks are exposed. There is no Biosphere Reserve, Ramsar Site, Tiger Reserve, Wildlife Sanctuary, National Park, Elephant Reserve, Animal Migration Corridor, Marine Turtle Nesting Beach or Horseshoe Crab Nesting Beach within 15 km of the project site. The stretch of Amba River within the study area is river is tidal and flows

into the Arabian Sea about 21 km downstream (aerial distance of N 17.6 km NNW) of the plant site. There are several tidal creeks leading to Amba River. The tidal range is about 1 m. The Amba River and the tidal creeks linked to it are lined by mangroves and mangrove associates. The mangroves on the banks of the Amba River are quite dense and comprise of trees. The mangroves on banks of the smaller creeks include small trees, shrubs, grass and sedges.

The Proposed Project Site is located in vacant areas within the existing plant and unused areas adjacent to the existing steel plant. The flora of the project site includes grasses, shrubs, herbs and few scattered trees along the bank of the tidal creek at the Northern boundary. Other than the mangroves on the northern and western boundaries, the vegetation is sparse. None of the plant species reported from the proposed project site are listed in Schedule Ill of "The Wild Life (Protection) Amendment Act, 2022.

Land-use / Land-cover: Existing Land-use/Land cover pattern in the study area as interpreted from RESOURCESAT 2, LISS-IV Satellite imagery (Cloud free) dated 21/01/2023. The study area as per the satellite imagery shows that out of its total area, 8% is built-up areas and industrial areas, 39.9% is agricultural land, 44.5% is forest land & plantations, 3% is wastelands including scrublands, dry and stony areas and quarries and 4.6% is water bodies including river, creeks, ponds, marshy areas and salt pans.

Socio-economic environment: Socio-economic survey was conducted covering representative villages identified in the study area. The demographic characteristics of population like, Literates, illiterates, employed, unemployed, old age, youths, males and females were included in the survey. Also, the needs of the people within the study area were also identified based on a Needs-based socio-economic assessment.

There are about 124383 persons in the 10 km study area as per 2011 Census, which is anticipated to have increased to 144398 as per the decadal growth of the area published by Census of India. There are about 992 females per 1000 males in the study area whereas for Raigad district it is 959 females per 1000 males. Literacy rate in the district is 83.14% whereas in the study area it is 70.72%. As per 2011 census altogether the main workers work out to be 30.54% within 10 km radius area. The marginal workers constitute 15.31% within 10 km radius of the total population. The non-workers constitute about 54.15% within 10 km radius. The distribution of workers by occupation indicates that the non-workers constitute more than half of the population. Some of the needs identified at the village level are Clean Drinking water facilities, Skill development of youth, Support in sports activities, Health Infrastructure, Educational Infrastructure, Network connectivity, Development of Anganwadis, Road and Transportation, Agricultural development and Sanitation facilities.

5.0 ENVIRONMENTAL IMPACTS ASSESSMENT & MITIGATION

Impact of project activities on environmental attributes in study area including ambient air quality, surface & ground water quality, noise level, soil quality, socio-economic profile & flora & fauna and drainage pattern have been assessed.

Impact on Land environment: Presently, out of the total project area of 627.35 ha, 412.28 ha of land is under the existing 10 MTPA steel plant of JSWSL Dolvi and 91.45 ha is unutilized industrial land. Of the remaining 123.62 ha of land in Kharmchela, Kharghat area, 68.24 Ha is unutilised industrial land of JSWSL Dolvi and 55.38 ha is mostly fallow crop land converted to land under industrial use. As the proposed plant facilities will be setup within the procured and converted industrial land of JSWSL Dolvi, all construction activities will be limited within the project boundaries. Thus, no adverse impact on the topography or land use of the surrounding areas is anticipated due to the project.

The proposed project shall also bring positive development to the existing land use by way of greenbelt plantations in 34.5 Ha i.e. 33 % of total plot area (103.50 Ha) required for proposed expansion, from 10 MTPA to 15 MTPA. Additionally, in compliance to existing EC condition for 16 % green belt development in the existing 10 MTPA Integrated steel plant, greenbelt plantation has been completed in 80 Ha land inside and Green belt in another 18.42 Ha land inside is in progress. Further, outside plantation in 51.0 ha of degraded forest land outside the project area along with the Forest department and 197.90 ha of mangrove in consultation with Mangrove department & other plantations have been carried out in nearby villages with consent of local village panchayats and Tehsildar.
Also, a natural sub-creeklet/nala of Amba River is flowing across the existing project site of 10 MPTA plant. Also, two sub-creeklets of Amba River are also present within the unutilized expansion area of JSWSL in Kharamchela & Khargat area. However, diversion of the Nala is not proposed in the project. JSWSL Dolvi has obtained NOC regarding no diversion of the existing sub-creeklets within the proposed project area from Raigad Irrigation Division, Kolad vide letter no. RID/PB-2/4655/2023 dated 01/12/2023. Further, a detailed plan has been prepared for conservation and protection of the existing stream/nala.

Impacts on ambient air quality: The construction of the expansion units shall involve civil works primarily, which will generate fugitive dust. Vehicular emission from trucks etc. is also another contributor to the emissions during construction to ambient air. During operation phase, the stacks of the plant are the major point sources, material handling activities are the major area sources and the tentative road transport for incoming raw material and product despatch is the major line source. Predictive modelling of the air emissions for all the sources cumulatively was done for PMIO, PM2.5, S02, NOX and CO. The Ground Level Concentrations (GLC) for all these parameters were superimposed on the baseline AAQ of the area and the future predicted AAQ for all the parameters were found to be well within the NAAQS norms.
All of the stacks have been envisaged with state-of-the-art pollution control measures, with design emission standards meeting the applicable Industry specific emission standards for steel plants. Fogging systems shall be deployed / installed for suppression of fugitive dust from roads & raw material handling areas. Road sweeping machines shall be deployed for collecting of fugitive dust accumulated on roads. Dust screens shall be erected to attenuate fugitive dust. Emissions PM from all stacks shall be restricted to <30 mg/Nm 3 by use of high-efficiency ESPs. Fume extraction hoods in smelter and Secondary gas collected and treatment system shall also ensure control of secondary emissions from the process. Relatively clean fuel BF Gas, LD Gas and Coke Oven gas have been envisaged as primary fuels in the plant. The storage of majority of the raw materials has been envisaged in covered yards. Also, covered conveyors are used for the road transport from Dharamtar Jetty to the plant.

Impact on ambient noise levels: The noise levels due to the construction of the project may increase due to vehicular traffic, handling of heavy metallic equipment/ items and metal fabrication, operation of diesel-powered construction equipment/ machinery such as excavators, cranes, drills, concrete mixers, etc. During operation phase, noise may be generated due to handling of raw materials, operation of Screens and crushers, high speed blowers of the furnaces, operation of high-speed compressors in oxygen plant, operation of turbines in power plant, operation of high-capacity water pumps, venting of high-pressure steam, in-plant vehicular movement, operation of mills, handling of heavy pieces of semifinished and finished products, operation of emergency DG sets etc.
It is anticipated that the max. noise generated by diesel-powered machinery deployed for excavations shall be 85 dB(A) at N I m distance from the machinery during the construction phase. Predictive modelling for the construction noise shows that increase in noise levels due to construction will be negligible outside the plant boundary and will be limited mostly

within the proposed project site. During operation of the plant, the Source noise levels of the plant equipment and machinery are considered in the range of 90-100 dB(A). The predictive noise levels during operation phase show that the increase in noise levels due to operation of the plant will be negligible outside the plant boundary and will be mostly limited within the proposed site.

Various measures envisaged in the proposed plant include technological measures for reduction of noise at source, provision of acoustic lagging for equipment and suction side silencers, vibration isolators, selection of low noise equipment, isolation of noisy equipment from working personnel. Whenever these measures are not practicable, administrative and personnel protection measures like provision of rotation of workers to minimize exposure time as well as provision of earmuffs to workers exposed to high noise areas are envisaged.

Impact on road and traffic: The incremental traffic during operation of the plant shall include trucks traffic for raw material and product movement and movement of employees by buses, cars and two-wheelers. The analysis of incremental traffic during operation phase on the existing traffic volume indicates that the enhanced traffic on the road after implementation of the proposed project will increase by less than 2% over & above the existing traffic levels which is already in excess of the Design Service Volumes; The Level of Service (LoS) of the Highways, which is already Class F, shall remain unaffected even after the increased traffic from the expanded plant.

Impact of Surface water resources and quality: The plant draws makeup water from Amba River upstream of a weir at Nagothane. The drawal of water from Amba River shall not exceed the amount for which permission has already been obtained from the Sate Govt. for the existing plant. Further, the plant has been designed for Zero effluent discharge with maximum recycling and reuse of treated wastewater and conservation of freshwater resources. Since no wastewater shall be discharged outside the plant premises, no adverse impact on nearby surface water bodies is anticipated.

Impact of Groundwater resources and quality: The existing plant does not abstract any groundwater nor the same has been envisaged for the proposed expansion project. Dry bulk raw materials shall be stacked on masonry platforms with engineered surface run-off collection & treatment systems to prevent leachates percolating down into the soil and ground water. The same shall also be monitored by periodic groundwater quality monitoring around the solid waste storage areas in the post-project monitoring programme.

Impact on terrestrial and aquatic habitat: Expansion of the existing plant shall lead to clearance of existing vegetation in the proposed additional area, which comprises mostly of some shrubs and weeds and few thorny babul trees. The clearance of the vegetation will be compensated by developing a thick green belt along the boundaries of the expansion are which shall contain more trees & vegetation than what will be cleared for the expansion project.

The project site has no Schedule-I fauna species. Hence no loss of habitat of faunal species is expected due to the proposed expansion project. However, presence of Schedule-1 terrestrial and aquatic fauna has been observed within the 10 km radius study area, for which JSWSL has prepared and submitted a Site-Specific Wildlife Conservation Plan (SSWLP) to the State Forest Department for necessary approvals. JSWSL shall implement the Approved SSWLP.

The ecology of the Amba River within the study the area is also expected to remain unaffected due to the proposed expansion programme as no discharges to Amba River are envisaged from the plant.

Impact on Socio-economic environment: JSWSL's proposed expansion of their existing steel plant shall have long-term impacts over the socio-economic condition of the 10 km radius study area. The land for area for the proposed expansion is under acquisition by JSWSL through the State Government. The proposed land does not have any habitation and hence no displacement of any population in anticipated. A need-based social-impact study has been carried out within the study area, wherein the socio-economic condition of the area reflected that the people are interested in strengthening of Clean Drinking water facilities, Skill development of youth, Support in sports activities, Health Infrastructure, Educational Infrastructure, Network connectivity, Development of Anganwadis, Road and Transportation, Agricultural development and Sanitation facilities.

Various developmental activities as part of JSWSL's CSR activities shall be implemented upon setting up and operation of the plant. The same will be further augmented through management measures which will be proposed as part of the Corporate Environmental Responsibility (CER).

6.0 ANALYSIS OF ALTERNATIVES

The proposed project shall be carried out within the premises of the existing steel plant of JSWSL Dolvi as well as within JSWSL owned land near the existing plant. Almost all land (i.e. 564.74 ha) is already under possession of JSWSL Dolvi and remaining 62.61 ha of additional land required is already under allotment to JSWSL by MIDC, Govt. of Maharashtra. Hence, no alternative sites are considered.

A comprehensive technological assessment was carried out for thoroughly examining various technical options for the proposed expansion facilities, focusing on parameters including energy efficiency, productivity, environmental friendliness and keeping in consideration the space as well as logistic constraints for implementation of various technological options. After a thorough analysis, the following technologies selected for the proposed facilities:

Plant unit/ operation	Selected technology	Remarks
Steel production	BF-BOF route	Alternative technologies available. However, as existing BF & BOF has proved to be productive and energy efficient with present raw material and operational practices of JSWSL Dolvi, the same technology has been considered for the additional steel making also.
Casting and rolling	Compact strip plant (CSP)	Alternative technologies available. Continuous casting technology is selected over conventional casting.
Lime calcination	Twin shaft Vertical kilns	Alternative technologies available. Twin shaft Vertical kiln technology selected over convention Rotary shaft kilns

7.0 ENVIRONMENTAL MONITORING PROGRAMME (EMP)

To ensure effective implementation of proposed mitigation measures, elaborate arrangements are envisaged by JSWSL for monitoring of various environmental parameters. Environmental aspects to be monitored include drainage systems, water quality, emissions and air quality, noise pollution, solid/hazardous waste utilization, green belt development, housekeeping & occupational health.

Ambient air, noise, water and solid wastes: One (01) Micro-meteorological station for continuous monitoring of site-specific meteorological parameters shall be setup within the plant. Five Continuous Ambient Air Quality monitoring stations (CAAQMS) have been set up around the plant.

Continuous Emission Monitoring Systems (CEMS) have also been installed for all process stacks of the existing plant. Similar systems shall be installed at the existing units also.

Work zone air quality is being monitored at 48 locations in the existing plant one every month. Additional locations in the expansion area shall be included in the work zone air quality monitoring programme.

Ambient noise levels are being monitored at four locations at the plant boundary on monthly basis. Work zone noise levels are monitored at ten locations once every month. Additional locations in the expansion area shall be included in the work zone noise level monitoring programme.

No effluent shall be discharged from the proposed plant after implementation of the proposed expansion into surface or ground water. All effluents will be treated and reused in the plant. Presently, monitoring of treated wastewater from Sponge iron plant and treated effluent of Sewage treatment plant is being done in consultation with MPCB and the reports are sent to MPCB once every three months, to MoEF&CC once in six months and to CPCB on monthly basis as part of Environmental monitoring reports.

Inventorization of all major solid and hazardous wastes is being done in the existing plant, which will also be done after implementation of the proposed expansion. Maximum re-cycling and utilization of generated waste is being done presently at JSWSL Plant. Major Hazardous wastes are sold to Hazardous waste recyclers or TSDF operators.

Greenbelt: No. of trees planted, species of trees planted, no. of trees survived and locations and area where greenbelt has been developed shall be recorded once every year.

Social parameters: The socio-economic interventions under CSR and CER shall be recorded every year, physical targets achieved and expenditure made for implementation of the social interventions.

8.0 ADDITIONAL STUDIES

Risk Assessment & Disaster Management Plan

Hazard Identification and Risk Assessment (HIRA) was carried out for the proposed expanded integrated steel plant. New storage facilities of hazardous materials are envisaged in the proposed greenfield project. The primary hazardous materials include Blast Furnace Gas, LD Gas and Coke Oven Gas. The primary hazards identified due to handling of these hazardous substances are fire and explosion due to release of these gases and as well as toxic dispersion effects due to release of these gases from respective storages from leaks or rupture of associated pipeline/storage vessels. The results of Maximum Credible Accident (MCA) analysis scenario based quantitative consequence analysis indicates that the maximum fire hazard distances and explosion overpressure distances in case of complete failure of pipelines of these gases and catastrophic rupture of gas storage tanks shall be limited within the plant premises. The proximity analysis of nearby habitations with the identified facilities, that all habitations are beyond the minimum safe distances for no lethal fire, explosion and toxic effects due to the hazardous facilities and thus no severe offsite emergency is anticipated due to the hazardous facilities.

Socio-Economic Study

A need-based socio-economic impact assessment of the study area has been carried out starting with scoping of issues related to potential significance like education, health, drinking water facility, employment and income etc. The major findings of the socio-impact assessment study indicated that the project is not going to cause any damage to the existing agricultural situation. Instead, it is likely to provide the farmers with supplementary income. The project shall have positive impact on pattern of demand and very strong

positive employment and income effects. There is a possibility of increase in industrialization in the vicinity of the plant, which shall bring more skill diversification among local people. The project shall have strong positive impact on raising average consumption and also income through multiplier effect. The CSR activities of the project will have very strong positive impact on the social and economic condition of the people of the study area. The project shall have positive impact on health situation of the local people through development of the area. The project shall also have significant positive impact on community development activities of the project which are likely to bring benefits to the people of the study area.

9.0 PROJECT BENEFITS

The proposed expansion project promises to boost the local economy through direct and indirect employment during construction and operation phases. It aims to create around ~6270 nos. of jobs during construction, 3022 (678 permanent + 2344 temporary) during plant operation, invest in peripheral development and socio-economic initiatives, enhance infrastructure, and generate substantial state and central government revenue by reducing import costs. Also, the expanded plant's proposed environmental pollution mitigation measures shall ensure sustainable and environmentally safe industrial development in the area.

10.0 ENVIRONMENTAL COST BENEFIT ANALYSIS

The proposed expansion project involves initial pollution control investment of ~Rs.833.93 Crores and annual recurring costs of ~Rs. 162.5 Crores. PM control meets already stringent norms. Water measures meet statutory requirements, offering no extra benefits. Waste utilization generates substantial revenue and saves land which would have otherwise been required for waste dumping, all indicating the project's environmental investments to be favourable.

11.0 ENVIRONMENT MANAGEMENT PLAN (ADMINISTRATIVE ASPECTS)

JSWSL is committed, as a responsible corporate entity, towards protection of environment and the community and to employ best environmental management practices, regular maintenance and consistent operation of pollution control systems, recycling of solid & liquid wastes and adoption of cleaner and environment friendly technologies etc. The concerted efforts put forth earlier and proposed through the Environmental Management Plan (EMP) are expected to result in resource conservation, waste reduction as well as cleaner environment.

The primary objective of the EMP is to minimize and address potential environmental impacts associated with the proposed project. This plan focuses on mitigating these impacts in various phases of the project. During the construction phase, covered trucks and conveyors will be employed for materials transportation to minimize environmental effects. Additionally, greenbelt will be developed and maintained to reduce noise disturbances. Construction activities will be restricted to daytime hours to further limit potential disruptions. Water sprinkling will be routinely conducted to reduce particulate matter (PM) concentrations in the atmosphere, contributing to improved air quality. Furthermore, workers will be provided with Personal Protective Equipment (PPE), and designated locations will be equipped with first aid facilities to ensure their safety and well-being.

In the operational phase of the expanded plant, JSWSL will uphold a comprehensive environmental management plan specific to the plant. This plan encompasses a wide range of environmental protection measures to effectively mitigate environmental impacts. Solid and hazardous waste management will strictly adhere to the guidelines outlined in the Hazardous Waste (Management, Handling, and Trans-boundary Movement) Rules of 2016.

Noise levels within the plant premises will undergo regular monitoring to maintain them within permissible limits, thus reducing noise pollution.

An amount of ~Rs. 832.9 Crores is earmarked as capital cost for EMP implementation. Additionally, ~Rs. 162.5 Crores will be budgeted annually for the meeting the operation and maintenance costs of the EMP measures, ensuring their continued effectiveness in environmental protection.

A separate Environment Management Department (EMD) has been setup to look after the environmental activities of the existing steel plant. This EMD will look after the environmental aspects of expanded plant also. The implementation and monitoring of effectiveness of the environmental mitigation measures during the operation phase will be done by the EMD. Also, JSWSL's commitment to protection of the environment is reflected in the Corporate Environmental Policy of JSWSL, which will guide the administrative aspects of EMP implementation in the proposed plant. In summary, the EMP will be a vital component of JSWSL's commitment to minimize environmental impacts and promote responsible environmental stewardship throughout the project's lifecycle.

12.0 SUMMARY AND CONCLUSION

JSWSL's proposal for expansion of the existing Integrated Steel Plant located at Dolvi, Raigad district, Maharashtra shall serve the need for augmenting the overall production capacity of steel in the country.

This EIA study highlights that the judicious implementation of proposed Environmental Management Plan will ensure negligible negative impacts on the environment with direct and indirect positive development to the society due to the proposed project.

In the design of the proposed expansion units, latest state-of-art technology has been envisaged to meet the desired air emissions and noise level standards from plant operations levels. Discharge of effluents beyond plant boundary is not anticipated as the plant facilities have been implemented with "Zero Effluent Discharge" concept. Wastewater generated at the plant will be treated in Effluent Treatment Plant (ETP) and recycled back in the process. A Sewage Treatment plant (STP) shall also be setup to treat and utilize waste domestic wastewater within the plant. All generated solid waste will be either recycled back into the respective plant operations or sold to secondary recyclers.

The environmental impacts associated with the proposed project were found to be manageable. The implementation of environmental mitigation measures recommended in the report will bring the anticipated impacts to minimum. Site specific and practically suitable mitigation measures are recommended to mitigate the impacts. Further, a suitable monitoring plan has been designed to monitor the effectiveness of envisaged mitigation measures during the operation phase.