JSW Steel Limited

JSW Steel

JSWSL/ENVT/MoEF&CC/HYR/2024-25/14
29th May 2024

To
The Director
Regional office
Ministry of Environment Forest and Climate Change
1st Floor, Additional office block for GPOA,
Shastri Bhawan, Haddows Road,
Nungambakkam, Chennai -600006

Dear Sir,

Sub: JSW Steel Ltd., Salem Works - EC- Six Monthly Compliance Status Report submission for the period October 2023 - March 2024 - Reg.

Ref: Environmental Clearances F. No. J-11011/281/2006-IA. II(I) dated 07.07.2017, EC amendment dated 07.08.2019 and EC dated 10.02.2020

With reference to the above subject, we are hereby enclosing the six-monthly condition compliance status report of the Environmental Clearances issued by your good office on 07.07.2017, 07.08.2019, and 10.02.2020 for the period of October 2023 to March 2024.

We kindly request you to acknowledge the receipt of this letter for our records.

Thanking you,

Yours faithfully,

For JSW Steel Limited., Salem Works

Prakash.

B N S Prakash Rao
EVP- Plant Head

Encl: Conditions compliance status report for the period October 2023 to March 2024

Cc:

Regional Directorate, Central Pollution Control Board,
77-A, Padi, Ambattur Industrial Estate Road, Mogappair, Chennai, Tamil Nadu -58

The Member Secretary, Tamil Nadu Pollution Control Board,
100, Anna Salai, Guindy, Chennai – 600 032.

The Joint Chief Environmental Engineer (M), Tamil Nadu Pollution Control Board,
Salem Region, No # 9, 4th Cross Street, Brindhavan road, Fairlands, Salem -16.

Salem Works
P.O. Pottaneri, Mecheri,
Mettur - Tk, Salem - Dt. Pin : 636 453
Tamilnadu, India.
CIN No L27102MH1994PLC152925
T +91 4298 272000
www.jsw.in

Registered Office
JSW Centre
Bandra Kurla Complex
Bandra East, Mumbai 400 051
T +91 22 4286 1000
F +91 22 4286 3000

JINDAL
O P Jindal Group

SIX MONTHLY CONDITION COMPLIANCE REPORT OF ENVIRONMENT CLEARANCE (EC)
for
1.15 MTPA INTEGRATED STEEL PLANT

Reporting Period: October 2023 to March 2024

JSW Steel Limited., Salem Works,

Pottaneri (P.O), Mecheri, Mettur(Tk), Salem(Dt)

Tamil Nadu, India, 636453

Submitted to

REGIONAL OFFICE, MoEF&CC

Shastri Bhawan, Haddows road, Nungambakkam,
Chennai -600006

REGIONAL DIRECTORATE, CPCB,
Ambattur Industrial Estate Road, Mogappair,
Chennai, Tamil Nadu -58

JCEE (M), TNPCB, SALEM REGION,
Fairlands, Salem -16

.Sl. No.	Description
1	Present plant status report with respect to EC dated 07.07.2017 & 10.02.2020
2	Compliance status report to the EC dated.10.02.2020
3	Compliance status report to the EC Amendment dated.07.08.2019
4	Compliance status report to the EC Amendment dated.07.07.2017
5	Annexure – 1: Water Drawl NOC
6	Annexure – 2: Stack emission monitoring report of TNPCB & NABL accredited laboratory
7	Annexure – 3: Online stack emission monitoring & Ambient air quality monitoring report
8	Annexure – 4: Details of APC measures provided in Steel & CPPII
9	Annexure – 5: Compliance status report to the CREP conditions.
10	Annexure – 6: Online effluent monitoring report and effluent & ground water quality manual monitoring report of TNPCB & NABL accredited laboratory.
11	Annexure – 7: Treated sewage quality monitoring report of TNPCB & NABL accredited laboratory.
12	Annexure – 8: Ambient Noise level monitoring report of NABL accredited laboratory
13	Annexure – 9: Details of greenbelt development.
14	Annexure –10: Carbon sequestration report for the financial year 2023.
15	Annexure – 11: Report of CER activities .

JSW STEEL LTD., SALEM WORKS

COMPLIANCE STATUS REPORT TO ENVIRONMENTAL CLEARANCE (EC)

Compliance status report to the EC dated.10.02.2020 as on 31.03.2024

The approved projects in the EC dated 10.02.2020 and the present status is given below

Sl. No	Facilities	Project status	CTO-EXP-II	CTO-EXP-III
1	COP #1 stack replacement by 2 number of stacks	Completed		√
	COP #2 stack replacement by 2 number of stacks	Yet to start		
2	Sinter plant sinter cooler waste heat diversion to GGBFS	Completed		√
3	Emission reduction project in SP#2-WGF	Ist phase completed		
4	GGBFS (0.8 MTPA)	Completed		√
5	LRF#1 stack modification	Completed		√
6	Additional one LRF with VD system (BF gas fired boilers 2 Nos)	Yet to start		
7	Fume exhaust system in CCM#1 & 3	Yet to start		
8	ABGM in CCM#1 & 2	Completed		√
9	Pickling & Annealing Steel	Completed	√	
10	Emission reduction project in CPP#2 coal based boiler	Completed	√	
11	DG set - 8 No's (6 Nos for Steel and 2 Nos for CPII)	Completed		√ (6 No.)
12	Paver block making facility	Completed		√
13	Acid fumes extraction system in Etching lab	Completed		√
14	Slag crushing unit	Completed		√
15	Batching plant	Completed		√
16	Coke cutter dedusting system in COP	Completed		√
17	COP #3 stack modification	Completed		√
18	WHRB#3 stack modification	Completed		√
19	Steam exhaust system#2 in CCM#3	Completed		√
20	Thermic fluid heater for ATFD in pickling plant ETP	Yet to start		

Compliance to EC Conditions of 0.8 MTPA Slag grinding unit, new facilities related to value addition and technological upgradation within the existing 1.3 MTPA integrated steel plant premises. The manufacturing facilities details as per EC dated 10.02.2020 is given below

Sl. No	Manufacturing Units	Existing Capacity (MTPA)	Proposed Expansion (MTPA)	Total Capacity after Expansion (MTPA)	Project execution phase and current status
1	Coke Oven Plant -1 (Non – Recovery Type)	0.50	-	0.5	Nil
2	Sinter Plant – 1 (20 Square Meter)	0.175	-	0	Nil
3	Sinter Plant – 2 (90 Square Meter)	1.06	-	1.06	Nil
4	Sinter Plant – 3 (90 Square Meter)	-	1.06	1.06	Yet to start (Phase #2)
5	Blast Furnace – 1 (402 to 650Cubic Meter)	0.367	0.316	0.683	Yet to start (Phase #2).
6	Blast Furnace – 2 (550 to 650Cubic Meter)	0.578	0.105	0.683	Completed in Phase#1
7	Energy Optimizing Furnace – 1 (65T)	0.41	0.23	0.64	Completed in Phase#1
8	Energy Optimizing Furnace – 2 (65T)	0.62	-	0.62	Nil
9	Ladle Furnace - 1 with Common VD (45 T to 65 T)	45 T/heat	20 T/heat	65 T/heat	Completed in Phase#1
10	Ladle Furnace – 2 (65 T)	65 T/heat	-	65 T/heat	Nil
11	Ladle Furnace - 3 common VD (65 T)	65 T/heat	-	65 T/heat	Nil
12	Ladle Furnace - 4 (65 T)	65 T/heat	-	65 T/heat	Nil
13	Continuous Casting Machine – 1	0.35	-	0.35	Nil
14	Continuous Casting Machine – 2	0.50	-	0.50	Nil
15	Continuous Casting Machine – 3	-	0.45	0.45	Completed in phase#1
16	Bar & Rod Mill Augmentation	0.4	0.08	0.48	Completed in phase#1
17	Blooming Mill Augmentation	0.36	0.12	0.48	Completed in phase#1
18	Pickling and Annealing Steel unit	-	0.06	0.06	Completed in phase#1

19	Peeled and ground	-	0.04	0.04	0.01 MTPA completed in phase #1. Balance yet to start (phase#2)
20	Air Separation Plant 1	150 T/day	-	150 T/day	Nil
21	Air Separation Plant 2	390 T/day	-	390 T/day	Nil
22	Air Separation Plant 3	-	250 T/day	250 T/day	Yet to start (Phase #2)
23	Captive Power Plant -1	7 MW	-	7 MW	Power generation has been stopped from 01.10.2021 and the product withdrawn from the CTO
24	Captive Power Plant -2	2 x 30 MW		2 x30 MW	In operations
25	Captive Power Plant -3 (Unit 3 of CPP#2)	-	1 x 30 MW	1 x 30 MW	Completed in phase#1

A. Specific Conditions		
Sl. No	**Condition**	**Compliance Status**
i.	Particulate emission from the rod mill of slag grinding unit shall be less than 10 mg/Nm^3.	The facility slag grinding (GGBFS) is in operations from 27.05.2022 and bag filter system is installed as APC and latest TNPCB survey result is 9 mg/nm3.
ii.	Green belt shall be developed in an area of 85 ha (210 acres) in and around the plant in a time frame of two years.	We have planted approximately 272,357 trees within the Plant and Township premises by March 2024, covering an area of about 91 hectares, which constitutes roughly 34.07% of the total land area. The survival rate of these trees is about 85-90%.
B. General Conditions		
I. Statutory Compliance		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board / Committee.	Being complied, we have obtained CTO under Water and Act which is valid till 31.03.2026.
ii.	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.	Being complied, we have obtained NOC from concerned department for drawl of ground water (80 KLD) which is only for domestic application. The NOC is annexed as **Annexure -1** of the report
iii.	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.	Complied. We have obtained authorization from TNPCB under the Hazardous and other Waste Management Rules, 2016 and the authorization is valid till 31.03.2026.
II. Air quality monitoring and preservation		
i.	The project proponent should install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards II. Air Quality Monitoring and Preservation prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E)	Being complied, we have installed 39 nos. of dust analyzers & 23 Nos Gaseous emission monitoring systems as per CTO condition and the real time data of SPM, SO_2, NO_x and CO are transmitted to the Care Air Centre of TNPCB and CPCB servers. Air Quality Monitoring is being done by TNPCB biannually and Manual monitoring is conducted by a NABL accredited

	dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	external laboratory (Air quality as applicable to the Integrated iron and steel plant, Thermal power plant) on a monthly basis and the monthly report submitted to SPCB Latest report of TNPCB survey and Monthly Environment monitoring reports are given in ***Annexure – 2 & 3***
ii.	The project proponent shall monitor fugitive emissions in the plant premised at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	Being complied. As per the Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) we are monitoring the fugitive emissions in the plant on monthly basis by a NABL accredited external laboratory and TNPCB by Biannually. The fugitive emission results are well within the standards prescribed
iii.	The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO_2 and NO_x in reference to SO_2 and NO_x emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.	Being complied, Continuous Ambient Air Quality monitoring stations of four numbers are installed in the plant periphery covering upwind & downwind directions. One station is installed to monitor PM10, PM2.5, SO2, NOx and CO and other 3 stations are installed to monitor PM10, PM2.5, SO2 as per the CTO condition. Actions are taken to install NO2 and CO analysers in the other CAAQMS stations. The real time parameters are connected to Care Air Centre of TNPCB.
iv.	The cameras shall be installed at suitable locations for 24x7 recording of battery emissions on the both sides of coke oven batteries and videos shall be preserved for at least one-month recordings.	Complied, there are three coke oven batteries which are installed adjacent to each other. An IP camera has been installed in the top of the COP area to monitor battery emissions on the both sides with recording option and the minimum preservation time is one month.
v.	Sampling facility at process stacks and at quenching towers shall be provided as per CPCB guidelines for manual monitoring of emissions.	Being Complied. Sampling facilities at process stacks and quenching towers are provided for manual monitoring of emissions as per the guidelines issued by CPCB. COP is installed with wet quenching system.
vi.	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack	Being Complied. Monthly summary report of continuous stack emission and ambient air quality monitoring and results of manual stack monitoring and manual monitoring of

	monitoring and manual monitoring of air quality/fugitive emissions to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	air quality/fugitive emissions are being submitted along with six monthly compliance reports to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB. Please refer **Annexure 2 & 3** The last six monthly compliance report submitted to MoEF&CC online dated 01.12.2023.
vii.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.	Complied, adequate Air Pollution Control measures are installed in the respective process and raw material handling areas. Water sprinklers, dry & wet fog systems, GI sheets (as dust barrier) are provided in raw material handling areas to control fugitive emission. The details of APC installed are given in ***Annexure 4***
viii.	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.	Being Complied. We have installed appropriate leakage detection systems like DP meters and mechanized bag cleaning like auto timer based cleaning system facilities are provided in respective bag filter systems.
ix.	Secondary emission control system shall be provided at SMS converters.	Complied. Dedicated secondary de-dusting systems are installed at Energy Optimizing Furnace (EOF) & Ladle Refining Furnace (LRF) processes for control the secondary emission.
x.	Pollution control system in the steel plant shall be provided as per the CREP guidelines of CPCB.	Complied, as per the CREP guidelines of CPCB, Pollution control systems are provided. The details are given in ***Annexure 5***
xi.	Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, and roofs regularly.	Being Complied. 3 No. of road sweeping machines dedicatedly for road cleaning applications and Mobile vacuum cleaners are also provided to clean shop floors, roofs regularly.
xii.	Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/agglomeration.	Being Complied, Sinter Plant is functioning as Wealth from Waste and Iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices are reused in the sinter plant for agglomeration processes which is direct replacement to Iron Ore.
xiii.	The project proponent use leak proof trucks/dumpers carrying coal and other raw materials and cover them with tarpaulin.	Being Complied, Standard Operating Procedure developed to avoid spillage and leakage. Most of the raw materials are transported through conveyor systems and Trucks/dumpers carrying coal and other raw materials are covered with tarpaulin

		based on the need. Leak proof trucks are used for fly ash transportation and other materials.
xiv.	Facilities for spillage collection shall be provided for coal and coke on wharf of coke oven batteries (Chain conveyors, land based industrial vacuum cleaning facility).	Being Complied. We have installed a closed conveyor system for coking coal charging to stamping station. Dedicated coal charging and coke pushing systems are installed to avoid any spillage of coal and coke. There is a periodical cleaning schedule to ensure in case of any minor spillages.
xv.	Land-based APC system shall be installed to control coke pushing emissions.	Our coke oven plant is non-recovery type and installed in the year 2007. These are heat recovery coke ovens which are operating in high negative pressure and no significant visible emission is anticipated/noticed. Hence, it is not expected to install Land-based APC system into the existing non-recovery type coke ovens. However, a dedicated dedusting system is installed in one of the coke pushing car and it is in operation from FY22 and the horizontal deployment has been done in one more pusher car in Fy24 The same has been communicated to MoEF&CC dated 26.09.2020 and 24.05.2022 to exempt the condition.
xvi.	Monitor CO, HC and O_2 in flue gases of the coke oven battery to detect combustion efficiency and cross leakages in the combustion chamber.	Our Coke Oven Plant is Non Recovery and requirement of monitoring of HC, CO and O2 were intended for recovery type of coke ovens where in the cross over leakage anticipated. However, Monitoring of CO and O2 is done in WHRBs where the COP gas is directly coupled for heat recovery. It has been communicated to MoEF&CC via mail dated 26.09.2020 as representation and a letter has been submitted dated 24.05.2022 to exempt the general condition.
xvii.	Vapor absorption system shall be provided in place of vapor compression system for cooling of coke oven gas in case of recovery type coke ovens.	Not Applicable as our Coke oven is non-recovery type.
xviii.	In case concentrated ammonia liquor is incinerated, adopt high temperature incineration to destroy Dioxins and Furans, Suitable NOx control facility	Not Applicable as our Coke oven is non-recovery type.

	shall be provided to meet the prescribed standards.	
xix.	The coke oven gas shall be subjected to desulphurization if the Sulphur content in the coal exceeds 1%.	Being Complied. The coal usage in coke oven contains Sulphur content less than 1%.
xx.	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.	Complied, GI sheets cover (as dust barrier), wind nets, water sprinkler systems and dry/wet fog systems are provided on the raw material stock piles to eliminate/control the fugitive emission.
xxi.	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil cellars.	Being Complied, Ventilation system for adequate air changes for all tunnels, motor houses, Oil cellars are being complied as per the CEIG rules.
xxii.	The project proponent shall install Dry Gas Cleaning Plant with bag filter for Blast Furnace and SMS converter.	The existing steel plant consist of small capacity Blast Furnaces (BF#1 402 m3 with 0.367 MTPA & BF#2 650 m3 with 0.683 MTPA capacity) in Iron Zone and EOFs (EOF#1 with the capacity of 0.64 & EOF#2 with the capacity of 0.62 MTPA) in SMS zone. The BF#1 & EOF#1 were installed in the year 1998 with wet type gas cleaning system and BF#2 & EOF#2 were installed in 2007. BF#2 installed with Dry type gas cleaning system during establishment stage itself and EOF#2 installed with wet type gas cleaning system which is the best available technology at present. The same has been communicated to MoEF&CC dated 26.09.2020 and 24.05.2022 to exempt the condition.
xxiii.	Dry quenching (CDQ) system shall be installed along with power generation facility from waste heat recovery from hot coke.	Not Applicable, the existing coke ovens (Non-recovery type) were installed with wet quenching in line with the EC approved in 2007. There is no modification proposed in the existing coke ovens in the recently approved EC dated 10.02.2020. However, the installation of CDQ matter has been taken up with the OEM and it is reported that installation of CDQ within the existing capacity of 0.5 MTPA Coke Oven is not technically feasible and viable.

		The same has been communicated to MoEF&CC via mail dated 26.09.2020 as representation and a letter has been submitted dated 24.05.2022 to exempt the general condition.

III. Water Quality Monitoring and Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 vide G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories. The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 and NABL accredited laboratories.	Being Complied. We have installed EMFM in various locations to monitor the water consumption. To the continuous monitoring of trade effluent inlet and outlet flow EMFMs are installed at various locations and the real time flow parameters are connected to TNPCB & CPCB server. A dedicated EMFM is installed in the ETP discharge point along with IP camera (with PTZ option) to ensure no overflow of trade effluent from the Guard pond. Analysers are installed with respect to the standards related to Iron & Steel and Thermal Power Plant and EMFM & sensors are calibrated according to equipment supplier specification. Ground water (open well/bore well) quality around the plant area is monitored by TNPCB and NABL accredited laboratory on quarterly/monthly basis respectively. Piezo metric sampling bore wells are installed inside the plant premises and the water quality is monitored on monthly basis by NABL laboratory.
ii.	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.	Complied, monthly summary reports of continuous effluent monitoring, results of manual effluent testing and manual monitoring of ground water quality by TNPCB & NABL accredited laboratory are being submitted to the Regional Office of MoEF&CC, Zonal Office of CPCB and Regional Office of SPCB along with the six-monthly monitoring report. The details are given in ***Annexure 6***
iii.	The project proponent shall provide the ETP for coke oven and by-product to meet the standards prescribed in G.S.R. 277(E) dated 31st March 2012 (Integrated iron & Steel); G.S.R. 414 (E) dated 30th May 2008 (Sponge Iron) as	Not Applicable The Coke Oven plant installed is non-recovery type and hence the condition is not applicable. Sponge iron plant not installed in our plant.

	amended from time to time; S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plant) as amended from time to time.	In the additional 1 x 30 MW CPP (TPP) Air Cooled Condenser has been installed in place of water cooled condenser and the entire quantity (705 KLD) of trade effluent is transferred to steel plant guard pond for treatment and reuse in steel plant.
iv.	Adhere to 'Zero Liquid Discharge'	Being Complied, we have established Zero Liquid Discharge (Zero Wastewater Discharge) system and wastewater generated from the various process of steel plant and Thermal Power Plant is collected in to a Guard Pond at steel plant and after the pretreatment treated wastewater is 100 % reused in steel plant process as per the CTO issued under water Act. To treat the trade effluent arising out of the pickling plant and etching lab a dedicated ETP with the facility of Pretreatment, Ultra filter, Multistage RO, MEE and ATFD systems are installed. The treated wastewater is reused in pickling process and etching lab.
v.	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.	Being complied, Sewage Treatment Plants are provided for treatment of domestic wastewater and treated water is meeting the prescribed standards. Treated water sample is being collected by TNPCB & NABL accredited laboratory on monthly basis and the results are well within the prescribed standards. The details are given in ***Annexure 7***
vi.	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.	Complied, Various collection pits are provided to arrest the run-off and ensure there is no water pollution due to surface run off.
vii.	Tyre washing facilities shall be provided at the entrance of the plant gates.	Being Complied, Tyre washing unit is provided at the entrance of the plant gate to control the fugitive emission from vehicular movement.
viii.	CO_2 injection shall be provided in GCP of SMS to reduce pH in circulating water to ensure optimal recycling of treated water for converter gas cleaning.	Being Complied. We are using treated wastewater as makeup for gas cleaning unit where the pH is about 6.5 -7.0 and hence alkalinity of existing circulating water is under control. Hence addition of CO_2 injection is not anticipated.

ix.	The project proponent shall practice rainwater harvesting to maximum possible extent.	Being Complied. There are four rainwater harvesting ponds constructed and Two are located near the township (East side) with capacities of 17,500 KL and 109,637 KL, respectively. The other two systems are inside the plant: one near the RO plant area with a capacity of 15,000 KL and the other behind the plant guest house with a capacity of 4,870 KL. The total collection capacity of these systems is approximately 147,007 KL. The collected rain water is recharged to mother earth, reused in steel plant wherever applicable for secondary applications. Capacity of the rain water harvesting ponds will be enhanced based on the needs and requirement.
x.	Treated water from ETP of COBP shall not be used for coke quenching.	Not Applicable, Our Coke oven plant is non-recovery type.
xi.	Water meters shall be provided at the inlet to all unit processes in the steel plants.	Being Complied, Water meters are provided at the inlet to all unit processes in our steel plant.
xii.	The project proponent shall make efforts to minimize water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.	Being Complied, maximum efforts are taken to minimize water consumption by installation of RO plant, maximize cooling water COCs and adopting the Best Available Technologies (BAT) like installation of Air Cooled Condenser instead of Water Cooled Condenser. Segregation is being done of the wastewater according to the process and quality characteristics and collecting in a Guard Pond for treatment and reuse 100 %.
IV. Noise Monitoring And Preservation		
Sl. No	**Condition**	**Compliance Status**
i.	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	Being complied, noise level (Ambient) is being monitored on regular basis by a NABL accredited laboratory &TNPCB and the results are well within the standards and reports are being submitted to the Regional Officer of the Ministry as a part of six-monthly compliance report. The details are given in ***Annexure 8***
ii.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz.75 dB(A) during day time and 70 dB(A) during night time.	Complied, the ambient noise levels are being monitored monthly basis and the results are well within the prescribed limit of limits 75 dB(A) during day time and 70 dB(A) during night time and reports are being submitted to the Regional Office of the

		Ministry as a part of six-monthly compliance report. The report details (ROA) are given in ***Annexure 8***
V. Energy Conservation Measures		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall provide TRTs to recover energy from top gases of Blast Furnaces.	The capacity of the existing furnaces is very small and operating at low top pressure (< 1.3 bar). Hence, it is not technically feasible to install TRT in the existing blast furnaces. There is no modification in the existing BFs in the EC approved now. The same has been communicated to MoEF&CC dated 26.09.2020 and 24.05.2022 to exempt the condition. For this we will be approaching MoEF&CC for EC amendment
ii.	Coke Dry quenching (CDQ) shall be provided for coke quenching for both recovery and non-recovery type coke ovens.	The existing coke ovens (Non-recovery type) were installed with wet quenching in line with the EC approved in 2007. There is no modification proposed in the existing coke ovens in the recently approved EC dated 10.02.2020. However, the installation of CDQ matter has been taken up with the OEM and it is reported that installation of CDQ within the existing capacity of 0.5 MTPA Coke Oven is not technically feasible and viable. It has been communicated to MoEF&CC via mail dated 26.09.2020 as representation and a letter has been submitted dated 24.05.2022 to exempt the general condition.
iii.	Waste heat shall be recovered from Sinter Plants coolers and Sinter Machines.	Being Complied. As part of our compliance efforts, waste heat from the Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat.
iv.	Use torpedo ladle for hot metal transfer as far as possible. If ladles not used, provide covers for open top ladles.	Not applicable, as usage of torpedo ladle is mostly applicable to larger capacity of BF. Our BF capacity is smaller, ladle covering is done by means of heat insulating compounds such as dry rice husk.
v.	Use hot charging of slabs and billets/blooms as far as possible.	Being Complied, based on the product specification, hot charging is done for billets/blooms. Slabs are not produced in our facility.
vi.	Waste heat recovery systems shall be provided in all units where the flue gas or process gas exceeds 300°C.	Being Complied, Waste heat recovery boilers are in operation to recover maximum heat from flue gas and produce energy.

		Waste heat from Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat.
vii.	Explore feasibility to install WHRS at Waste Gases from BF stoves; Sinter Machine; Sinter Cooler, and all reheating furnaces and if feasible shall be installed.	Being Complied, we have installed various type of waste heat recovery boilers to recover maximum heat from flue gases. Waste heat from Sinter plant cooler is diverted to the BF Slag grinding unit to recover sensible heat. BF gas is utilized in Mills for Reheating furnaces, BF stoves and CPPs for steam generation. Power generation is maximized up to 70% through waste heat recovery system and rest is balanced through coal based along with grid support.
viii.	Restrict Gas flaring to < 1%	Being Complied, BF waste gas is maximum used in all the shop floors as gaseous fuel where by usage of fossil fuel is optimized. To the effective utilization online monitoring system(SCADA) is installed to maximize the BF gas utilization.
ix.	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly.	Being Complied, Solar panel is installed with the capacity of 60 KW (50 KW at Canteen and 10 KW at R&D building) and the average power generation is in the range of 12 kWh and further installation of 10 KWh installation is under progress.
x.	Provide LED lights in their officers and residential areas.	Being Complied, we have taken action to install LED based lightings in the offices and township area and the replacement of sodium vapour lamp to LED is increased up to 1300 KW.
xi.	Ensure installation of regenerative type burners on all reheating furnaces.	Being Complied, BF gas is used as fuel and regenerative type burners are installed in reheating furnaces (Mills).
VI. Waste Management		
Sl. No	**Condition**	**Compliance Status**
i.	An attrition grinding unit to improve the bulk density of BF granulated slag from 1.0 to 1.5 kg/l shall be installed to use slag as river sand in construction industry.	Complied, BF slag grinding unit is under operations to produce ground granulated BF slag which is directly sold to cement industries and open market as a value addition byproduct.
ii.	In case of Non-Recovery coke ovens, the gas main carrying hot flue gases to the boiler shall be insulated to conserve heat and to maximize heat recovery.	Being Complied, the gas main carrying hot flue gases to the boilers is completely insulated to conserve heat and to maximize heat recovery.

iii.	Tar Sludge and waste oil shall be blended with coal charged in coke ovens (applicable only to recovery coke ovens).	Not applicable, we have installed non-recovery type coke oven and hence the general condition not applicable.
iv.	Carbon recovery plant to recover the elemental carbon present in GCP slurries for use in Sinter plant shall be installed.	Being Complied. The existing facility of BF#1, EOF#1 & EOF#2 are installed with wet gas cleaning plant and after thickener treatment, the unit is treating the GCP slurry in a sludge handling unit and the dried sludge (carbon recovery) is reused in sinter plant.
v.	Waste recycling plant shall be installed to recover scrap, metallic and flux for recycling to sinter plant and SMS.	Being Complied, a slag crushing facility is installed to handle SMS slag to segregate iron bearing materials (scrap) which is reused in SMS process where by certain level of GHG emission is reduced. SMS slag is crushed in to various sizes and used for various processes/application.
vi.	Used refractories shall be recycled as far as possible.	Being Complied, refractories are being selected to withstand high temperature whose shelf-life is longer whereby generations of used refractories are lesser. The used refractories are used in downstream applications within in-house only at maximum extent and partial quantity is sent to recyclers also.
vii.	SMS slag after metal recovery in waste recycling facility shall be conditioned and used for road making, railway track ballast and other applications. The project proponent shall install a waste recycling facility to recover metallic and flux for recycle to sinter plant. The project proponent shall establish linkage for 100% reuse of rejects from Waste Recycling Plant.	Being Complied, we have installed a slag crushing facility to handle SMS slag to segregate iron bearing materials as scrap and reused in SMS process where by certain level of GHG emission is reduced. SMS slag is sent for metal recovery system and the crushed slag with various sizes is reused in internal applications like sinter plant, EOF as hearth layer and cooling media respectively and to GGBGS & cement industries. Portion of crushed slag is used in paver block facility as replacement to the natural aggregate and by this 100% reuse of rejects being ensured.
viii.	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.	Being Complied, a coal-based boiler is installed in 2006 and imported coal with low ash is used as fuel and the boiler is being operated with flexible load to cater the captive power requirement. Fly ash generated from the coal based boilers is 100% sent to local fly ash brick manufacturers. Sale order (MoU) has been issued all the fly ash brick manufactures through Sale audit team.

ix.	Oil collection pits shall be provided in oil cellars to collect and reuse/recycle spilled oil. Oil collection trays shall be provided under coils on saddles in cold rolled coil storage area.	Being complied, oil collection pits are provided in oil cellars to collect and reuse the spilled oil. Cold rolled products are not applicable to our plant.
x.	The waste oil, grease and other hazardous waste like acidic sludge from pickling, galvanizing, chrome plating mills etc. shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016. Coal tar sludge / decanter shall be recycled to coke ovens.	Being Complied. We use to collect the Waste oil, grease and other hazardous waste like acidic sludge from pickling is disposed as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016 as amended. Our coke oven plant is Non Recovery Type. Hence, Coal tar sludge / decanter sludge is not applicable to us.
xi.	Kitchen waste shall be composted or converted to biogas for further use. Being complied.	Being Complied, a Biogas plant is installed at the canteen area and kitchen waste is converted into biogas and the same is used in Canteen as alternative to LPG.
VII. Green Belt		
Sl. No	**Condition**	**Compliance Status**
i.	Green belt shall be developed in an area equal to 33% of the plant area with native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.	We have planted approximately 272,357 trees within the Plant and Township premises by March 2024, covering an area of about 91 hectares, which constitutes roughly 34.07% of the total land area. The survival rate of these trees is about 85-90%. The month wise tree plantation details are given in the ***Annexure 9.***
ii.	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.	Being Complied, GHG emissions inventory for the plant and carbon sequestration including plantation are prepared and being submitted every year. Carbon sequestration study report is attached as ***Annexure 10***
VIII. Public Hearing and Human health issues		
Sl. No	**Condition**	**Compliance Status**
i.	Emergency prepared plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Being Complied, Emergency prepared plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan is being implemented and periodic review is also being conducted.
ii.	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	Being Complied, OHC team periodically conduct Heat stress analyses for the workmen working in high temperature work zone and suitable Personal Protection Equipment (PPE)s and other adequate requirements are provided as per the norms of Factory Act.

iii.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Being Complied, provisions will be made for the expansion project activities and as per the condition temporary structure will be removed after the completion of expansion activities.
iv.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Annual Health Check-ups conducted as per the Factories Act for all employees on yearly basis and records are being maintained in the OHC.
IX. Corporate Environmental Responsibility		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 1st May 2018, as applicable, regarding Corporate Environmental Responsibility.	Being Complied, with respect to the Corporate Environmental Responsibility all the actions are being implemented and progress report is being submitted **Annexure 11** regularly along with the six monthly compliance reports. The changes with respect to the needs of surrounding villages are reviewed and accordingly the ESC revised action plan status was communicated through to the MoEF&CC vide their letter dated 26.09.2020
ii.	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental / forest / wildlife norms / conditions and / or shareholders' / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	Being Complied, We have adopted sustainable development and it goals and Environmental and other polices are duly approved by the Board of Directors is in place. Systems for reporting deviation/violation of environmental norms/conditions exists and are being followed and incase of any deviation is reported along with the six monthly compliance report.
iii.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.	A dedicated Environmental cell is in place with qualified personnel under the control of Senior Executive, who is reporting directly to the head of the organization.

iv.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional office along with the Six Monthly Compliance Report.	Being Complied, EMP implementation with action plan and environmental conditions along with responsibility matrix is implemented and year wise funds (CAPEX) earmarked for environmental protection measures are kept as separate account and not diverted for any other purposes.
v.	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	Being Complied, Self-environmental audit is being conducted monthly/annually. Environment Audit is being carried out by external agencies once in year and confirming with the standard of ISO 14001:2015.
vi.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Iron and Steel plants shall be implemented.	Being Complied, all the recommendations of the Charter on the Corporate Responsibility for the Environmental Protection (CREP) issued for the steel plants are implemented and the compliance status report ***Annexure 5*** is being submitted along with six monthly compliance reports.
X. Miscellaneous		
Sl. No	**Condition**	**Compliance Status**
i.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising in at least in two local newspapers of the District or State of which one shall be in the vernacular language within seven days and in addition, this shall also be displayed in the project proponent's website permanently.	Complied, Environmental Clearance accorded from MoEF&CC dated on 10.02.2020 and the same was advertised in two local newspapers on 14.02.2020 (Dinamani and The New Indian Express) which are widely circulated in the region of which Tamil is the vernacular language of the locality concerned. EC accorded is displayed in our website.
ii.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	Complied, we have submitted the copy of the environmental clearance dated.10.02.2020 to the Heads of local bodies on 30.05.2020 and Panchayats on 20.02.2020
iii.	The project proponent shall upload the status of compliance of the stipulated	Complied, the compliance of the stipulated Environment Clearance conditions including

	environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	results of monitored data is uploaded on our website at half-yearly basis and the latest one uploaded to website on 01.12.2023
iv.	The project proponent shall monitor the criteria pollutants level namely; PM_{10}, SO_2, NO_X (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	Complied, the criteria pollutant levels namely; PM10, PM2.5, SO2, NOX, CO are displayed near the entrance of main gates of our company in the public domain & also uploaded in our website as in the six-monthly compliance report.
v.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest & Climate Change at environmental clearance portal.	Being Complied, Six-monthly reports on the status of the compliance of the stipulated EC are being uploaded to the website of the ministry of Environment, Forest & Climate Change, Parivesh portal.
vi.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	Being Complied, the Environmental Statement as prescribed under the Environment (Protection) Rules, 1986, for each financial year ending 31st March in Form-V is being submitted every year and displayed on the website of the company. To the FY 2022-23 the report has been submitted on 27.09.2023.
vii.	The Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	Complied, date of financial closure and land development work has been informed to the JCEE of TNPCB, Salem dated 25.11.2020 and the same has been communicated through six months' compliance report.
viii.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	Abide by the order
ix.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	Abide by the order
x.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Abide by the order

xi.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Abide by the order
xii.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Abide by the order
xiii.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	Abide by the order
xiv.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports	Abide by the order
xv.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.	Abide by the order
xvi.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010	Abide by the order

Compliance status to the EC (Amendment) dated 07.08.2019

Subject: Expansion of integrated Steel Plant (1.0 MTPA to 1.3 MTPA) of M/s. JSW Steel Ltd., Located at Mecheri, Taluk Mettur, District Salem, Tamil Nadu – Amendment in Environmental Clearance issued dated 07.07.2017 – Reg.

The compliance status for the EC conditions to the EC Amendment dated 07.08.2019 is given in this report.

Sl. No	Condition	Compliance Status
i	The specific condition no. vii given at paragraph no.26 of the EC accorded vide letter dated 7 /07/2017 shall read as below: "No effluent shall be discharged outside the plant premises and 'zero' discharge for the complete steel plant complex including Captive Power Plants (CPPs) shall be adopted.	Complied, There is no discharge of effluent outside the plant premises and Zero Wastewater Discharge (except rainwater along with surface runoff during monsoon) is ensured. To monitor and ensure the same we have installed CCTV & EMFM at the overflow point of Guard pond where process wastewater is collected for treatment. Zero wastewater discharge for the complete steel plant maintained including Captive Power Plant. As per the latest CTO of CPP II the entire wastewater from the CPP II (3 x 30 MW) is being connected with Steel plant guard pond for collection, treatment and reuse in Steel plant for cooling, dust suppression and gardening purpose.

Compliance status to the EC (Expansion) dated 07.07.2017

Subject: Expansion of integrated Steel Plant (1.0 MTPA to 1.3 MTPA) of M/s. JSW Steel Ltd., Located at Mecheri, Taluk Mettur, District Salem, Tamil Nadu – Environmental Clearance under EIA notification, 2006 – Reg.

The compliance status of the EC conditions is given below

A. SPECIFIC CONDITIONS:

Sl. No	Conditions	Compliance
i.	The occupational health survey of the active workmen involved shall be carried as per the ILO guidelines and all the employees shall cover in every 5 years @ 20% every year.	Being complied, Occupational Health Survey (OHS) of the active workmen involved is being carried out as per the ILO guidelines and all the employees are being covered to the health survey @ 100% every year.
ii.	The amount allocated for ESC i.e. Rs 13 Crores shall be provided as CAPEX and the ESC shall be treated as project and monitored annually and the report of same shall be submitted to Regional office of MoEF&CC.	The amount allocated for ESC i.e. Rs.13 Crores is provided as CAPEX and as the action plans are being implemented. The expansion activity has planned in a phased manner (viz Phase-I: 1.0 MTPA to 1.15 MTPA and Phase-II: 1.15 MTPA to 1.3 MTPA) at an estimated cost of Rs. 1025 Cr. Phase-I expansion activities have been completed and the cost involvement is about Rs.650 Crs till 31.03.2024 the amount spent is 7.5 Crores**.**
iii.	The project proponent shall provide for solar light system for all common areas, street lights, villages, parking around project area and maintain the same regularly.	Being Complied, we have installed solar panel systems in Canteen and R&D facilities with of capacity of 60 KW (50 KW at Canteen and 10 KW at R&D building) and the average power generation is in the range of 12 Kwhr. Now, Solar Panel installations at Township STP is under progress with the capacity of 10 KW.
iv.	The project proponent shall provide for LED lights in their offices and residential areas.	Being Complied, we have taken action to install LED based lightings in the offices and township area and the replacement of sodium vapour lamp to LED is increased up to 1300 KW.

		Further, planned to install LED lights all over plant.
v.	The project proponent should install 24X7 air monitoring devices to monitor air emission and submit report to Ministry and its Regional Office.	Being Complied. We have installed 39 nos. of Dust analyzers & 23 Nos Gaseous emission monitoring systems as per CTO condition and the real time data of SPM, SO_2, NO_x and CO are transmitted to the Care Air Centre of TNPCB and CPCB servers. Copy of the report is attached as ***Annexure 2***
vi.	The ETP for Blast furnace effluent should be designed to meet Cyanide standards as notified by the MoEF&CC.	There are two blast furnaces in our plant. BF#1 is having wet type gas cleaning plant and BF#2 is having dry type GCP. Presence of Cyanide level is not detected in Blast Furnace #1 effluent and the same is periodically ensured with external NABL accredited lab analysis SPCB also collecting effluent sample on monthly basis from the guard pond and the results evident that cyanides are not detected.
vii.	No effluent shall be discharged outside the plant premises and 'zero' discharge shall be adopted.	Being Complied, we have established Zero Liquid Discharge system and wastewater generated from the various process of steel plant and Thermal Power Plant is collected in a guard pond at steel plant and after the pretreatment treated wastewater is 100% reused in steel plant process as per the CTO under water Act. To treat the effluent arising out of the pickling plant and etching lab the industry has installed a dedicated ETP with the facility of Pretreatment, Ultra filter, Multistage RO plant, MEE and ATFD. The treated wastewater is reused in pickling process and etching lab.
viii.	The ETP for coke oven by-product should be designed to meet EPA notified standards especially the cyanide and phenol.	The Coke Oven plant installed is non-recovery type and hence the condition is not applicable to our operations.
ix.	Coke oven plant should meet visible emission standards notified by the MoEF&CC.	As per EPA notification 2012 which is applicable to the Integrated Iron & Steel refer the visible emissions to by-product type coke oven. The Coke Oven Plant installed at our site is non recovery type which operated under negative pressure and horizontal

		loading thereby no visible emissions are noticed. However, we have installed a dedicated dedusting system in the coal charging and coke pushing cars.
x.	The standards issued by the Ministry vide G.S.R. 277(E) dated 31st March 2012 shall be strictly adhered to and the standards prescribed for the Coke oven plant shall be monitored and the report should be submitted along with the six-monthly compliance report.	Being Complied. The standards issued by the Ministry vide G.S.R. 277(E) dated 31st March 2012 are related to emission standards of Iron and Steel plant. As per the standard the emission related to coke oven plant is applicable to by product type and our Coke Oven plant is of non-recovery type. Emission standards with respect to stack (COP waste gas is used for steam generation and COP stacks are functioning as emergency stack) and fugitive emissions to the COP are being monitored and the results are submitted along with the six-monthly compliance report. Since, our plant is non-recovery type ETP is not anticipated for COP. All other emissions & effluent parameters related to sinter plant, blast furnace, steel making shop, mills are being monitored monthly and the values are well within the standard prescribed. The six months monitoring results (maximum, minimum and average) by TNPCB and NABL accredited laboratory for stack emissions are given in ***Annexure 2*** and Effluent quality monitoring results are given *in* ***Annexure 6***
xi.	The emission standards specified in the Environmental (Protection) Amendment Rules, 2015 issued by vide S.O. 3305 (E) dated 7th December 2015 for the Thermal Power Plant shall be strictly adhered to.	Air Quality Monitoring is being done by TNPCB biannually and Manual monitoring is conducted by a NABL accredited external laboratory (Air quality Monitoring as applicable to the Thermal power plant with respect to the emission standards specified in the Environmental (Protection) Amendment Rules, 2015 issued by vide S.O. 3305 (E) dated 7th December 2015) on a monthly basis and we are submitting the monthly report to SPCB. Latest report of TNPCB survey and Monthly Environment monitoring reports are given in ***Annexure 2 & 3***

xii.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November 2009 shall be followed.	Being complied, we are strictly adhering to the National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November 2009.
xiii.	On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks shall be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), and bag filters etc. shall be provided.	Being complied, we have installed 4 Nos of Continuous Ambient Air Quality monitoring stations to carry out the ambient air quality monitoring and the real time parameters are connected with CAC, TNPCB, Chennai. Online continuous stack monitoring systems are installed in all process and non-process stacks to monitor SPM, SO_2 & NO_x as per the CTO condition. Further adequate Air Pollution Control measures in the respective process and raw material handling areas like water sprinklers, dry & wet fog systems, GI sheets are provided in raw material handling areas to control fugitive emission. The details of APC installed are given in ***Annexure 4***
xiv.	A statement on carbon budgeting including the quantum of equivalent CO_2 being emitted by the existing plant operations, the amount of carbon sequestered annually by the existing green belt and the proposed green belt and the quantum of equivalent CO_2 that will be emitted due to the proposed expansion shall be prepared by the project proponent and submitted to the Ministry and the Regional Office of the Ministry. This shall be prepared every year by the project proponent. The first such budget shall be prepared within a period of 6 months and subsequently it should be prepared every year.	Being Complied, we have done GHG emissions inventory for the plant and carbon sequestration including plantation are prepared and submitted every year along with the respective half year report. Carbon Sequestration Report for the financial year 2024 is attached herewith as ***Annexure 10***
xv.	For the employees working in high temperature zones falling in the plant operation areas, the total shift duration will be 4 hrs or less per day where the temperature is more than 50°C. Moreover, the jobs of these employees will be	Being Complied. Employees working in high temperature zones are alternated to other jobs and ensured that no employee is subjected to work in high temperature area (greater than 50°C) for more than 1 hr continuously. Enough

	alternated in such a way that no employee is subjected to working in high temperature area for more than 1 hr continuously. Such employees would be invariably provided with proper protective equipment, garments and gears such as head gear, clothing, gloves, eye protection etc. There should also be an arrangement for sufficient drinking water at site to prevent dehydration etc.	ventilation is provided in the hot zone areas and the maximum time exposed (up to 45^{o}C) is about 10-15 minutes only during handling of hot metal/Crude steel as informed. Further, the workmen are provided with proper personnel protective equipment's, Aluminium coat, garments & gears such as head gear, clothing, gloves, eye protection, etc. and arrangements are made for sufficient drinking water, butter milk and lime juice to prevent dehydration.
xvi.	In-plant control measures and dust suppression system shall be provided to control fugitive emissions from all the vulnerable sources. Dust extraction and suppression system shall be provided at all the transfer points, coal handling plant and coke sorting plant of coke oven plant. Bag filters shall be provided to hoods and dust collectors to coal and coke handling to control dust emissions. Water sprinkling system shall be provided to control secondary fugitive dust emissions generated during screening, loading, unloading, handling and storage of raw materials etc.	Complied. Dust suppression systems are provided to control fugitive emissions from all the vulnerable sources like raw material unloading and storage yards. Bag filters and Dry & Wet fog systems are provided in raw material transfer points, coal handling and coke sorting plant of coke oven. To control dust emission bag filters are provided in coal handling area of COP. Water sprinkler systems are provided in various locations to control secondary fugitive dust emissions generated during screening, loading, unloading, handling and storage of raw materials. A tyre washing unit is installed in the main gate entry to control dust emission due to vehicular movement
xvii.	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 and regularly monitored. Guidelines / Code of Practice issued by the CPCB shall be followed.	Not Applicable. The G.S.R. 414(E) dated 30th May, 2008 is related to sponge iron plant. In this connection, a representation is submitted to MoEF&CC dated 22.07.2017
xviii.	Hot gases from DRI Kiln should be passed through dust settling chamber (DSC) to remove coarse solids and After Burning Chamber (ABC) to burn CO completely and used in Waste Heat Recovery (WHRB). The gas then shall be cleaned in ESP before	The existing and expansion of the steel plant is following blast furnace route and there is no Direct Reduced Iron (DRI) process in their operations. Hence, it is not applicable.

	dispersion out into the atmosphere through ID fan and stack. ESP shall be installed to control the particulate emission from WHRB.	In this connection, a representation is submitted to MoEF&CC dated 22.07.2017
xix.	Efforts shall further be made to use maximum water from the rain water harvesting sources. If needed, capacity of the reservoir shall be enhanced to meet the maximum water requirement.	Being complied. We have constructed four numbers of rainwater harvesting ponds. Two are located near the township (East side) with capacities of 17,500 KL and 109,637 KL, respectively. The other two systems are inside the plant: one near the RO plant area with a capacity of 15,000 KL and the other behind the plant guest house with a capacity of 4,870 KL. The total collection capacity of these systems is approximately 147,007 KL. The collected rain water is recharged to mother earth, reused in steel plant wherever applicable for secondary applications. Capacity of the rain water harvesting ponds will be enhanced based on the needs and requirement.
xx.	Risk and Disaster Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office, SPCB and CPCB within 3 months of issue of environment clearance letter.	Completed. Study on Risk and Disaster Management Plan was conducted and the detailed report was submitted on 01.02.2018 and the updated one submitted to local administration on 16.06.2022
xxi.	All the blast furnace (BF) slag shall be granulated and provided to cement manufacturers for further utilization. Flue dust from sinter plant and SMS and sludge from BF shall be re-used in sinter plant. Coke breeze form coke oven plant shall be used in sinter and pellet plant. SMS slag shall be given for metal recovery and properly utilized. All the other solid waste including broken refractory mass shall be properly disposed off in environment-friendly manner.	Being complied. All the Blast Furnace Slag is converted to Granulated slag and now sending to GGBFS unit for value added product. Being Complied. Flue dust from blast furnace, sludge from BF & EOF, Coke breeze from coke oven plant are re-used in sinter plant. Pellet plant is not installed in our process. SMS slag is subjected to magnetic separation for metal recovery and after crushing further reused in internal applications including paver block making facility and sold to cement industries. The refractories are being selected to withstand high temperature whose self-life is longer whereby generations of

		used refractories are lesser. The used refractories are used in downstream applications within in-house only at maximum extent and partial quantity is sent to recyclers also.
xxii.	Coal and coke fines shall be recycled and reused in the process. The breeze coke and dust from the air pollution control system shall be reused in sinter plant. The waste oil shall be properly disposed of as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.	Being Complied: Coal and coke fines are recycled and reused in the Sinter plant and Blast Furnace. Coke breeze and dust from the air pollution control systems are collected and reused in the Sinter Plant. The waste oil generated from the process is being disposed to authorized vendor as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.
xxiii.	Green belt shall be developed in 33 % of plant area. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO.	Being Complied. We have planted approximately 272,357 trees within the Plant and Township premises by March 2024, covering an area of about 91 hectares, which constitutes roughly 34.07% of the total land area. The survival rate of these trees is about 85-90%.
xxiv.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel plants and Coke Oven Plants shall be implemented.	Complied. All the recommendations of the Charter on the Corporate Responsibility for the Environmental Protection (CREP) issued for the steel plants are implemented. Updated Compliance status report of CREP is enclosed vide ***Annexure 5***
xxv.	At least 2.5% of the total cost of the project shall be earmarked towards the Enterprise Social Commitment based on Public Hearing issues, locals need and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office. Implementation of such program shall be ensured by constituting a Committee comprising of the proponent, representatives of village Panchayat and District Administration. Action taken report in this regard shall be submitted to the Ministry's Regional Office.	Being Complied: As per the EC Specific condition ii, Rs.13 Crores is allotted towards ESC have been earmarked. Public Hearing issues, locals need and item-wise details along with time bound action plan is prepared and actions are being taken in a time bound manner. The expansion activity is planned in a phased manner (Viz Phase-I: 1.0 MTPA to 1.15 MTPA and Phase-II: 1.15 MTPA to 1.3 MTPA) at an estimated cost of Rs. 1025 Cr. Phase-I expansion activities were completed and the cost involvement is about Rs.650 Crs and till date the amount spent towards ESC is about 7.50 Crs.

		The phase-II expansion activity will be carried out within the time line of EC validity. Based on the local needs ESC spent heads are slightly modified and the same has been communicated to your good office via mail dated 26.09.2020. JSW assures that the commitments made shall be fulfilled. The details are attached in ***Annexure 11***
xxvi.	The proponent shall prepare a detailed CSR plan for every year for the next 5 years for the existing-cum-expansion project, which includes village-wise, sector-wise (Health, Education, Sanitation, Health, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc.) activities in consultation with the local communities and administration. The CSR plan will include the amount of 2% retain annual profits as provided for in Clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 years towards CSR activities for life of the project. A separate budget head shall be created and the annual capital and revenue expenditure on various activities of the plan shall be submitted as part of the compliance report to RO. The details of the CSR plan shall also be uploaded on the company website and shall also be provided in the Annual Report of the company. The plan so prepared shall be based on SMART (Specific, Measurable, Achievable, Relevant and Time bound) concept. The expenditure should be aimed at sustainable development and direct free distribution and temporary relief should not be included.	Complied: CSR plan for 5 years (from 2017 to 2022) is prepared as per condition and activities are completed. The updated report of CSR for Fy24 is attached as ***Annexure 11***
xxvii	All the commitments made to the public during the Public Hearing /Public Consultation meeting shall be satisfactorily implemented and a separate budget for implementing the same shall be allocated	Complied: Commitments made to the public during the Public Hearing is satisfactorily implemented.

	and information submitted to the Ministry's Regional Office at Chennai	
xxviii.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Being Complied, now there is no expansion activity. Provisions will be made for the expansion project activities and as per the condition temporary structure will be removed after the completion of expansion activities.

B. GENERAL CONDITIONS

Sl. No	CONDITIONS	COMPLIANCE
i.	The project authorities must strictly Adhere to the stipulations made by the concerned State Pollution Control Board and the State Government.	We are adhering to the stipulations made by the SPCB.
ii.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Being Complied: There is no further expansion or modification in the plant is carried out without prior approval of Ministry of Environment, Forests and Climate Change (MoEF&CC)
iii.	At least four ambient air quality monitoring stations (AAQMS) should be established in the downward direction as well as where maximum ground level concentration of PM_{10}, $PM_{2.5}$, SO_2 and NO_X are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Chennai and the SPCB/CPCB once in six months.	Being Complied: With the consultation of TNPCB four numbers of Continuous Ambient Air Quality monitoring stations are installed in the periphery of the plant premises. Data on Ambient Air Quality and Stack emission reports are being submitted to Ministry, MoEF&CC, Regional Office at Chennai and the SPCB/CPCB once in six months.
iv.	Industrial waste water shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time. The treated waste water shall be utilized for plantation purpose.	Being Complied: Industrial wastewater is being collected, treated and reused 100 % in the processes for cooling application and plantation purpose. Quality parameters are conformed to the prescribed standards under GSR 422 (E) dated 19th May, 1993 and 31st December 1993. The treated

		wastewater analysis report given by TNPCB & NABL accredited laboratory is given *in* ***Annexure 6***
v.	The overall noise levels in and around the plant shall be kept well within the standards 85 dB(A) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dB(A) during day time and 70 dB(A) during night time.	Being Complied: Source and Ambient noise levels are measured in and around the plant areas on monthly basis and control measures like acoustic hoods, silencers, and enclosures are provided wherever required. The noise levels of source and ambient are well within the standards prescribed under EPA Rules, 1989. Apart from this visual display boards are displayed to wear earplug, ear muff as PPE wherever required. The noise monitoring results by NABL accredited laboratory is enclosed in ***Annexure 8***
vi.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Being Complied: Health surveillance (Annual Health Check-up) is being conducted for all employees on yearly basis and records are being maintained in the Occupational Health Centre.
vii.	The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	Being Complied. We have constructed four numbers of rainwater harvesting ponds. Two are located near the township (East side) with capacities of 17,500 KL and 109,637 KL, respectively. The other two systems are inside the plant: one near the RO plant area with a capacity of 15,000 KL and the other behind the plant guest house with a capacity of 4,870 KL. The total collection capacity of these systems is approximately 147,007 KL. The collected rain water is recharged to mother earth, reused in steel plant wherever applicable for secondary applications. Capacity of the rain water harvesting ponds will be enhanced based on the needs and requirement.
viii.	The project proponent shall also comply with all the environmental protection measures and safeguards recommend in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like	Being Complied. To comply the environmental protection measures and safeguards as per the recommendation of EIA/EMP report for controlling air emissions including fugitive, water

	community development programmes, educational programmes, drinking water supply and health care etc.	reduction, ZLD, Waste Minimization and maximum waste utilization. Apart from the above we are undertaking socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply, health care and formation of former producer organisation, etc. The details are given ***Annexure 11*** in the six months' report of CSR.
ix.	Requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change (MoEF&CC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Chennai. The funds so provided shall not be diverted for any other purpose.	We have spent capital cost of Rs. 531 Crores (approx. Since Inception) on EMP. Recurring cost to the environment pollution control measures of about Rs.20 crores (approx.) has been spent annually.
x.	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/ Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	Complied: Copy of clearance letter is submitted to local administration on 14.07.2017. The copy of clearance letter is uploaded to our website.
xi.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF&CC at Chennai. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM_{10}, SO_2, NO_X (ambient levels as well as stack emissions) or critical sectoral	Being Complied. The compliance of the stipulated environment clearance conditions including results of monitored data is uploaded on their website once in six months and periodically updated as informed. Simultaneously the compliance reports are being submitted (email) to the Regional Office of the MoEF&CC at

	parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	Chennai and CPCB Regional Office Chennai & TNPCB Chennai. The criteria pollutant levels namely; PM_{10}, SO_2, NO_X and stack emission are displayed near the entrance of both gates of the company in the public domain.
xii.	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Chennai/CPCB/SPCB shall monitor the stipulated conditions.	Complied, Environmental conditions and compliance status report including results of monitored data (both in hard copies as well as by e-mail) are being submitted once in six months to the Regional Office of MoEF&CC, at Chennai and CPCB Regional Office Chennai & TNPCB Chennai.
xiii.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MoEF&CC at Chennai by e-mail.	Complied. Environmental statement for each financial year ending 31st March in Form-V and status of compliance of environmental conditions is being submitted to the Regional Office of the MoEF&CC at Chennai. For the FY 2022-23, the report was submitted on 27.09.2023. The same was uploaded to our website.
xiv	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be sent at website of the Ministry of Environment, Forests, and Climate Change (MoEF&CC) at http:/envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality	Complied: Environmental Clearance accorded from MoEF&CC dated on 07.07.2017 and the details have been advertised in Dinamani and The Indian Express on 14.07.2017. The same was advertised two local newspapers (Dinamani and The Indian Express) which are widely circulated in the region of which Tamil is the vernacular language of the locality concerned. A copy of the same is submitted to the MoEF&CC Regional office at Chennai on 15.07.2017.

	concerned and a copy of the same should be forwarded to the Regional office at Chennai.	
xv	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied: Date of financial closure and land development work is informed to Regional Office vide letter dated 12.10.2017.

ANNEXURE 1

WATER DRAWL NOC

GOVERNMENT OF TAMIL NADU
WATER RESOURCE DEPARTMENT

From:
Er.S.Prabakaran,B.E.,
Chief Engineer, WRD,
State Ground & Surface Water
Resources Data Centre
Tharamani, Chennai 600 113.
Phone : 91-44-22542223 (Direct)
91-44-22541526/27(Board)
Email: cegwchennai@gmail.com
Web site: www.groundwatertnpwd.org

To:
M/s. JSW Steel Limited,,
Salem Works,
Pottaneri (Po), Mecheri,
Mettur Taluk,
Salem District-636453

Lr.No. OT 8 /AG-2/17/2024/Renewal – NOC/SLM/2024 dated:05.01.2024.

Sir,

Sub: "Renewal of No Objection Certificate" for drawal of groundwater to "**M/s. JSW Steel Limited",** Pottaneri & M.Kalipatty Village, Pottaneri Firka, Mechery Block, Mettur Taluk, Salem District – 6th Renewal of NOC issued-Reg.

Ref:
1. This Office Lr.No. OT 8 / AG-2 /759/ Renewal of NOC / SLM / 2022 dated:06.10.2022.
2. The firm Renewal of NOC application date:20.06.2023.
3. This Office Lr.No:233DD(G)/AG-VI/Renewal of NOC/2023 Dt:04.07.2023.
4. SE,GWC,ThanjavurLr.No:234S/AG/T.F44C(SLM)/NOC/GWC/TNJ/2023 Dt:21.12.2023.

Please find the enclosed **"Renewal of No Objection Certificate",** for drawal of groundwater to "**M/s.JSW Steel Limited",** Pottaneri & M.Kalipatty Village, PottaneriFirka, Mechery Block, Mettur Taluk, Salem District. As per the G.O.(Ms).No 142 PW(R2)Department dt:23.07.2014, NOC for water based industries should be renewed every year. You are requested to strictly adhere to the quantity permitted and conditions mentioned in the certificate and apply for renewal of NOC before two months from the date of expiry, i.e., **26.07.2024** without fail. If you fail to apply for renewal of NOC, it will be treated as "illegal" and informed to District Monitoring Committee to seal the bore well in your unit as per Madras High Court Orders in WP.No.28535 of 2014 & WP.No.16299/2018.

Enclosure:

1. **Renewal of No Objection Certificate**

5/1/2024

Chief Engineer (SG&SWRDC)
WRD,Tharamani,Chennai-113

Certificate No. 17/2024(R-6) Dated: 05.01.2024

GOVERNMENT OF TAMIL NADU

WATER RESOURCES DEPARTMENT

STATE GROUND & SURFACE WATER RESOURCES DATA

CENTRE CHENNAI – 113

Renewal of No Objection Certificate

This is to certify that "**M/s. JSW Steel Limited",** Pottaneri & M.Kalipatty Village, Pottaneri Firka, Mechery Block, Mettur Taluk, Salem District is hereby given the **"Renewal of No Objection Certificate"** for the drawal of total quantity of **80,000LPD** (Eighty Thousand litres per day) of groundwater for the purpose of **"Drinking & Domestic"** use from the Groundwater structure listed below with strict adherence of stipulated conditions.

Sl. No	Referred Well / Bore Well & SF. No	Village / Firka	Co-ordinates		Quantity Permittedfor Pumping in LPD
			Latitude	Longitude	
1.	Bore Well-1 / 309	Pottaneri / Pottaneri	$11^0$49'00" N	$77^0$54'59" E	**20,000**
2.	Bore Well-2 / 310	M.Kalipatty / Pottaneri	$11^0$48'34" N	$77^0$55'23" E	**20,000**
3.	Bore Well-3 / 311		$11^0$48'57" N	$77^0$55'13" E	**20,000**
4.	Bore Well-4 / 314		$11^0$48'51" N	$77^0$55'09" E	**20,000**
				Total	**80,000**

This renewal certificate is valid from 27.07.2023 to 26.07.2024 and Renewal of NOC is issued under the conditions laid down.

5/1/2024

Chief Engineer (SG &SWRDC),
WRD, Tharamani, Chennai-113

Renewal of NOC Conditions pertaining to M/s. JSW Steel Limited, Salem District

1. **This No Objection certificate issued for ground water extraction applies to the referred ground water abstraction structure only.**

2. All the **other ground water abstraction structures** (dug wells/bore wells/dug-cum bore wells) other than the permitted one inside the plant area **should not be considered** for this permission.

3. Such structures as said in Condition No.2 should be closed or used only for **Rain water harvesting** purposes.

4. This Certificate is applicable for drawal of permitted Quantity of ground water only and **not for transportation.**

5. The Company should install necessary "flow meters" to the referred well /bore well and monitor the quantity which should not exceed the permitted level. **Proper Records** should be maintained continuously from the date of drawal. Monthly statement of daily drawal of water should be sent to the Executive Engineer, Groundwater Division, Salem as per format enclosed.

6. As and when the officials of Ground Water Wing of WRD inspect the site/premises, perusal of drawal records and water quality observations should be allowed.

7. **Rain water harvesting structure** is to be established as per the direction of this department. Rain water harvesting structures already exist inside the plant premises, it should be maintained properly.

8. **Violation of the above stipulations in any form may lead to cancellation of the permission accorded by the Government.**

9. The Company should be ready to pay the **levy/charges for drawal of ground water** for commercial purposes, if Government / Ground Water Authority imposes any such orders in future.

10. It is also informed that during the renewal of the NOC, depending upon the hydrogeological condition the category of the area and the site conditions, the quantity will be vary from permitted quantity.

11. The handed over Bore Well to this Department for Water Level monitoring purpose should be maintained properly. The firm has to take the water level in the first week of every month & maintain a monthly water level Register and the Assistant Geologist concerned should monitor the water level data and also check whenever required.

12. As per the G.O.(Ms).No 142 PW(R2)Department dt:23.07.2014, NOC for water based industries should be renewed every year

13. This No Objection Certificate is applicable **only for the purpose of "Drinking& Domestic"**, if any deviation in the usage of ground water is found, the NOC accorded is automatically deemed to be cancelled.

14. The **Executive Engineer, Ground Water Division** of the respective District **would inspect** either the rain water harvesting structures established in the premises of the firm or the records maintained or even the drawal of ground water as and when needed and it is the mandatory of the firm to maintain the Rain water harvesting structure/ structures properly and show the records needed.

15. **If any information / Documents submitted by this firm is found to false / in correct or any data provided by the firm is found to be incorrect, the NOC issued to the firm will be cancelled by this department without any prior notice.**

5/7/2024

Chief Engineer, SG &SWRDC,
WRD, Tharamani, Chennai-113.

ANNEXURE 2

STACK EMISSION MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure 2

Stack emission monitoring report of TNPCB & NABL accredited laboratory for the period Oct '23 to Mar '24.

I. Stack emission monitoring results of TNPCB					
Sl. No	Stack attached to	Discharge rate in (Nm^3/Hr)	Pollutants Concentration (mg/Nm^3)		
			PM	SO_2	NO_x
1	Sinter Plant - I - Sinter Machine	76973	68	-	-
2	Sinter Plant – I - Cooling System	72648	72	-	-
3	Sinter Plant – I Dedusting System	96832	24	-	-
4	Sinter Plant – I RMHS	16810	48	-	-
5	Sinter Plant - II - Sinter Machine	345247	58	-	-
6	Sinter Plant - II - Cooling & De-dusting System	436360	46	-	-
7	Sinter Plant - II - RMHS	81169	50	-	-
8	COP - Coke cutter	35620	48	-	-
9	Coke Oven - WHRB -II	49954	42	160	20
10	Coke Oven - WHRB -IV	44178	44	171	18
11	Coke Oven - WHRB -V	54468	37	158	12
12	BF Gas Fired Boiler	28203	43	63	14
13	Blast Furnace - I - Hot stove	41451	33	34	18
14	Blast Furnace - I - Stock House & RMHS	50132	32	-	-
15	Blast Furnace - I - Cast House	196445	62	-	-
16	Blast Furnace - II - Hot stove	75734	32	27	16
17	Blast Furnace - II - Stock House & RMHS	213913	43	-	-
18	Blast Furnace - II - Cast House	241036	68	-	-
19	Blast Furnace - II - PCI	27643	43	27	12
20	CPP - I - Boiler	26737	29	102	52
21	Energy Optimizing Furnace -I	66064	48	-	-
22	Energy Optimizing Furnace -II	64608	59	-	-
23	EOF Secondary dedusting system I & II	306011	79	-	-
24	Ladle Refining Furnace - 1 & 4 primary & LRF 1 to 4 Secondary dedusting	320259	58	-	-
25	Ladle Refining Furnace - 2 & 3	68632	31	-	-
26	VD boiler	12182	38	64	24
27	CCM-I ABGM - 1	16091	44	-	-
28	CCM-II ABGM - 2	37546	54	-	-
29	CCM-III ABGM - 3	15488	48	-	-
30	BLM – Re Heating Furnace -I	28469	40	61	24
31	BLM – Re Heating Furnace -II	28049	42	56	28
32	BRM – Re Heating Furnace	116800	38	46	14
33	Pickling Plant - Acid Fumes Exhaust System Stack	18186	25	-	-
34	Pickling Plant - Acid - Hot Water Generator Stack	1261	42	-	-
35	GGBFS Grinding Mill Stack	89739	9	-	-
36	Batching Plant I Cement Silo vent stack	2880	23	-	-
37	DG Set (625 KVA) COP	518	28	18	10.0
38	DG Set (1250 KVA) Process Boiler.	1031	38	26	12
39	DG Set (1250 KVA) CCM 3	5978	36	22	11
40	DG Set (650 KVA) BRM	1624	47	25	8
41	AFBC Boiler CPP 2	149789	24	235	120
42	COAL CRUSHER CPP 2	4584	81	-	-
43	CPP II COAL SCREENING SECTION	9177	90	-	-
44	DG Set (500 KVA) CPP 2	1048	26	21	12

II. Stack emission monitoring report of NABL accredited Laboratory					
Stack No.	Source name	Stack emission Average (mg/Nm^3)			Discharge (Nm^3/hr)
		SPM	SO_2	NO_x	
1	Sinter Machine (Sinter Plant I)	121.9	60.1	53.6	90573
2	Cooling System (Sinter Plant I)	69.5	-	-	91660
3	Dedusting System (Sinter Plant I)	51.0	-	-	132546
4	Dust Extraction System For RMHS (Sinter Plant I)	34.8	-	-	20739
5	Sinter Machine (Sinter Plant II)	74.0	55.4	52.0	523617
6	Plant Dedusting and Cooling (Sinter Plant II)	63.5	-	-	445141
7	Crushing of Fuel & Raw Materials (Sinter Plant II)	52.2	-	-	109262
8	Coke Oven Chimney 1A & 1B (Coke Oven) -Emergency stack	-	-	-	-
9	Coke Oven Chimney II (Coke Oven) -Emergency stack	-	-	-	-
10	Coke Oven Chimney III (Coke Oven) -Emergency stack	-	-	-	-
11	Coke cutter dedusting system stack (Coke Oven)	39.7	-	-	50309
12	Coke Dryer dedusting system stack (Coke Oven)	27.4	-	-	119778
13	Waste Heat Recovery Boiler I (Coke Oven)	30.5	357.0	276.0	53703
14	Waste Heat Recovery Boiler II (Coke Oven)	27.0	354.5	273.7	54357
15	Waste Heat Recovery Boiler III (Coke Oven)	30.3	352.3	275.1	54091
16	Waste Heat Recovery Boiler IV (Coke Oven)	26.9	346.7	264.0	50724
17	Waste Heat Recovery Boiler V (Coke Oven)	27.2	344.5	266.2	53641
18	Hot Stove (Blast Furnace I)	31.1	54.3	49.3	46357
19	Stock House Dedusting System (Blast Furnace I)	54.5	-	-	84536
20	Cast House Dedusting System (Blast Furnace I)	47.5	-	-	276647
21	GCP Flare (Blast Furnace I) -Emergency stack	-	-	-	-
22	Hot Stove (Blast Furnace II)	30.2	55.2	46.5	64415
23	Stock House Dedusting & RMHS (Blast Furnace II)	63	-	-	264062
24	Cast House Dedusting System (Blast Furnace II)	49	-	-	526624
25	GCP Flare (Blast Furnace II) -Emergency stack	-	-	-	-
26	Pulverized Coal Injection (Blast Furnace)	66.7	-	-	40348
27	Process Boiler (1*25 TPH) and (1*8 TPH) (Common Stack)	28.5	39.8	31.3	19338
28	Energy Optimizing Furnace (Steel Melting Shop I)	52.3	50.2	45.2	43979
29	Energy Optimizing Furnace (Steel Melting Shop II)	53.2	50.1	42.5	44574
30	Secondary Dedusting System EOF I&II (Combined SMS II)	44.6	-	-	418109
31	Ladle Furnaces (Steel Melting Shop I)	39.4	40.6	30.1	22074
32	Ladle Furnaces(Common Stack) (Steel Melting Shop II)	43.4	41.3	36.3	50802
33	Ladle Furnaces -1 & 4(65 T/Heat Each) Primary & 1 to 4 Secondary Dedusting (Steel Melting Shop)	39.4	-	-	403429
34	Vacuum Degasing Unit (Boiler) (Steel Melting Shop II)	32.5	42.2	35.1	20326
35	Continuous Casting Machine (Steel Melting Shop I)	32.2	-	-	27932
36	Billet grinding machine stack - ABGM -1	45.6	-	-	27624
37	CCM#II Steam exhaust system -1	31.2	-	-	25705
38	CCM#II Steam exhaust system -2	29.6	-	-	25717
39	CCM#II Cut fumes Exhaust system	36.0	-	-	59947
40	Billet grinding machine stack -ABGM - 2	47.2	-	-	38523
41	CCM#III Steam exhaust system 1	29.4	-	-	33210
42	CCM#II Steam exhaust system stack #2	30.9	-	-	33405
43	Billet grinding machine stack -ABGM - 3	51.0	-	-	20476
44	Re-heating Furnace - Chimney- 1 (BLM	31.1	46.5	40.3	24351
45	Re-heating Furnace - Chimney- 2 (BLM)	60.2	47	40	27081
46	Reheating Furnace Chimney 1 & 2	70.8	52	45	61793
47	Pickling Plant- Acid - Hot water Generator Stack	32.3	32	48	1750
48	Picklig plant - ARP - Hot water Generator	-	-	-	-
49	Pickling plant - MEE – Thermic fluid Heater	-	-	-	-
50	Pickling Plant- Acid Fumes exhaust system stack	18.1	-	-	20038.8
51	BF Slag Grinding mill stack	8.5	-	-	145833
52	BF Slag Grinding unit- Sinter waste Gas	-	-	-	-
53	BF Slag Grinding unit- Hot Air Generator	-	-	-	-
54	Batching plant#1 Cement silo vent stack	38.2	-	-	2494.9
55	Batching plant#2 Cement silo vent stack	-	-	-	-
56	BF Gas Fired Boiler	30.3	37.0	33.4	47250
57	AFBC Boiler	24.5	497	439	120179
58	Coal crusher	48.7	-	-	5632
59	Coal screening	50.5	-	-	15335
60	Raw Material Transfer and Discharge Point	47.7	-	-	1629

ANNEXURE 3

ONLINE STACK EMISSION MONITORING & AMBIENT AIR QUALITY MONITORING REPORT

Annexure 3

Online stack emission monitoring & Ambient air quality monitoring report for the period Oct'23 to Mar'24

I. Online stack emission monitoring summary report (Oct '23 to Mar'24)

Stack No.	Source name	Parameter	UoM	Month					
		Month		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	Sinter Machine (Sinter Plant I)	SPM	mg/Nm^3	**75.14**	**65.80**	**68.75**	**84.90**	**78.75**	**75.98**
		SO_2	mg/Nm^3	**87.35**	**88.31**	**93.88**	**97.25**	**96.29**	**99.07**
2	Cooling System (Sinter Plant I)	SPM	mg/Nm^3	**32.97**	**33.14**	**33.81**	**35.98**	**34.06**	**49.18**
3	Dedusting System (Sinter Plant I)	SPM	mg/Nm^3	**36.40**	**42.09**	**40.76**	**33.91**	**30.51**	**18.38**
4	Dust Extraction System For RMHS (Sinter Plant I)	SPM	mg/Nm^3	**16.45**	**15.88**	**15.27**	**13.37**	**11.31**	**13.55**
5	Hot Stove (Blast Furnace I)	SPM	mg/Nm^3	**22.18**	**20.85**	**22.99**	**18.52**	**16.70**	**26.25**
		SO_2	mg/Nm^3	**70.38**	**79.28**	**73.95**	**89.13**	**68.16**	**142.41**
		NOx	mg/Nm^3	**41.96**	**43.91**	**41.34**	**42.23**	**35.26**	**72.28**
		CO	ppm	**2946.15**	**2801.40**	**1899.69**	**2738.33**	**1989.54**	**4372.61**
6	GCP Flare (Blast Furnace I) -Emergency stack	NA	NA	**0.20**	**0.13**	**0.00**	**0.00**	**0.02**	**0.02**
		NA	NA	**0.77**	**0.40**	**0.30**	**0.08**	**0.67**	**0.67**
7	Stock House Dedusting System (Blast Furnace I)	SPM	mg/Nm^3	**26.80**	**25.84**	**19.16**	**21.80**	**21.75**	**39.04**
		SO_2	mg/Nm^3	**3.78**	**3.78**	**8.86**	**8.78**	**1.05**	**3.75**
8	Dust Extraction System for RMHS (Blast Furnace I)	SPM	mg/Nm^3	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.51**
		SO_2	mg/Nm^3	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.04**
9	Cast House Dedusting System (Blast Furnace I)	SPM	mg/Nm^3	**35.29**	**40.71**	**21.27**	**24.27**	**15.01**	**24.72**
		SO_2	mg/Nm^3	**4.15**	**4.45**	**4.65**	**5.55**	**5.97**	**5.97**
10	CPP I Boiler 2 Nos of 25 TPH each (Common Stack)	SPM	mg/Nm^3	**18.78**	**23.79**	**29.99**	**33.70**	**34.17**	**35.60**
		SO_2	mg/Nm^3	**29.56**	**28.60**	**27.00**	**31.00**	**33.33**	**76.87**
11	Energy Optimizing Furnace (Steel Melting Shop I)	SPM	mg/Nm^3	**53.86**	**66.00**	**54.00**	**72.00**	**81.37**	**95.53**
12	Ladle Furnaces (Steel Melting Shop I)	SPM	mg/Nm^3	**37.60**	**42.03**	**32.37**	**45.76**	**43.98**	**51.65**
13	Continuous Casting Machine (Steel Melting Shop I)	SPM	mg/Nm^3	**2.00**	**2.00**	**1.98**	**1.95**	**1.97**	**2.67**
14	Energy Optimizing Furnace (Steel Melting Shop II)	SPM	mg/Nm^3	**53.02**	**87.00**	**68.44**	**52.95**	**67.86**	**101.53**
15	Secondary Dedusting System EOF I&II (Combined SMS II)	SPM	mg/Nm^3	**21.93**	**31.82**	**23.47**	**26.05**	**19.91**	**33.28**
16	Sec. Dedusting System of LRF IV(Common) (SMS II)	SPM	mg/Nm^3	**14.88**	**25.34**	**21.10**	**20.65**	**19.80**	**33.81**
17	Ladle Furnaces(Common Stack) (Steel Melting Shop II)	SPM	mg/Nm^3	**2.07**	**3.24**	**9.36**	**10.28**	**11.10**	**13.41**
18	Vacuum Degasing Unit (Boiler) (Steel Melting Shop II)	SPM	mg/Nm^3	**37.10**	**34.89**	**21.82**	**18.20**	**19.53**	**29.18**
19	Steam Exhaust System 1 (Bloom Caster	SPM	mg/Nm^3	**0.70**	**0.69**	**0.55**	**0.47**	**0.62**	**0.62**
19	Steam Exhaust System 2 (Bloom Caster	SPM	mg/Nm^3	**0.40**	**0.39**	**0.28**	**0.23**	**0.34**	**0.34**
20	Cut Fumes Exhaust System (Bloom Caster)	SPM	mg/Nm^3	**0.71**	**0.68**	**0.54**	**0.52**	**0.64**	**0.64**
21	Reheating Furnace (Furnace 1 No2 Chimney) (BLM)	SPM	mg/Nm^3	**16.79**	**14.21**	**18.99**	**14.41**	**14.34**	**20.60**
		SO_2	mg/Nm^3	**15.38**	**18.51**	**11.54**	**19.56**	**17.87**	**25.08**
22	Reheating Furnace (Furnace 1 No1 Chimney) (BLM)	SPM	mg/Nm^3	**60.53**	**62.28**	**58.25**	**46.85**	**58.95**	**57.58**
		SO_2	mg/Nm^3	**37.78**	**33.36**	**33.11**	**29.86**	**38.10**	**46.26**
23	Coke Oven Chimney I (Coke Oven) -Emergency stack	NA	NA	-	-	-	-	-	-
		NA	NA	-	-	-	-	-	-
24	Coke Oven Chimney II (Coke Oven) -Emergency stack	NA	NA	-	-	-	-	-	-
		NA	NA	-	-	-	-	-	-
25	Coke Oven Chimney III (Coke Oven) -Emergency stack	NA	NA	-	-	-	-	-	-
		NA	NA	-	-	-	-	-	-

Stack No.	Source name	Parameter	UoM						
		Month							
26	Waste Heat Recovery Boiler I (Coke Oven)	SPM	mg/Nm^3	**22.98**	**23.32**	**22.20**	**24.16**	**22.14**	**23.33**
		SO_2	mg/Nm^3	**207.60**	**233.23**	**211.40**	**218.01**	**181.41**	**286.05**
27	Waste Heat Recovery Boiler II (Coke Oven)	SPM	mg/Nm^3	**29.17**	**33.25**	**30.48**	**24.74**	**14.21**	**24.34**
		SO_2	mg/Nm^3	**202.36**	**180.12**	**228.17**	**239.59**	**249.20**	**368.29**
28	Waste Heat Recovery Boiler III (Coke Oven)	SPM	mg/Nm^3	**23.66**	**27.15**	**26.66**	**28.42**	**23.59**	**32.52**
		SO_2	mg/Nm^3	**425.29**	**444.92**	**263.40**	**242.29**	**321.61**	**285.00**
29	Waste Heat Recovery Boiler IV (Coke Oven)	SPM	mg/Nm^3	-	-	-	-	-	-
		SO_2	mg/Nm^3	-	-	-	-	-	-
30	Waste Heat Recovery Boiler V (Coke Oven)	SPM	mg/Nm^3	-	-	-	-	-	-
		SO_2	mg/Nm^3	-	-	-	-	-	-
31	BF Gas Fired Boiler	SPM	mg/Nm^3	**21.99**	**23.33**	**22.66**	**19.53**	**20.82**	**20.90**
32	Reheating Furnace (Bar & Rod Mill)	SPM	mg/Nm^3	**48.62**	**74.08**	**66.97**	**69.69**	**70.15**	**77.33**
		SO_2	mg/Nm^3	**35.30**	**41.97**	**43.18**	**44.72**	**43.90**	**61.91**
33	Sinter Machine (Sinter Plant II)	SPM	mg/Nm^3	**53.74**	**69.91**	**53.21**	**56.65**	**55.95**	**74.50**
		SO_2	mg/Nm^3	**110.05**	**136.56**	**140.85**	**148.26**	**112.29**	**149.02**
34	Plant Dedusting and Cooling (Sinter Plant II)	SPM	mg/Nm^3	**42.56**	**31.98**	**40.33**	**55.40**	**58.76**	**54.75**
35	Crushing of Fuel & Raw Materials (Sinter Plant II)	SPM	mg/Nm^3	**43.65**	**42.12**	**31.81**	**36.84**	**39.99**	**30.69**
36	Hot Stove (Blast Furnace II)	SPM	mg/Nm^3	**13.16**	**16.52**	**19.12**	**24.97**	**15.98**	**23.16**
		SO_2	mg/Nm^3	**102.30**	**90.88**	**92.58**	**104.97**	**108.79**	**105.81**
		NOx	mg/Nm^3	**43.02**	**50.72**	**54.46**	**45.78**	**56.61**	**61.60**
		CO	ppm	**2712.94**	**2697.58**	**3618.42**	**1529.74**	**2406.27**	**2427.09**
37	GCP Flare (Blast Furnace II) -Emergency stack	NA	NA	**0.27**	**0.29**	**0.15**	**0.01**	**0.21**	**0.21**
		NA	NA	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
38	Stock House Dedusting & RMHS (Blast Furnace II)	SPM	mg/Nm^3	**21.89**	**21.70**	**17.35**	**19.03**	**18.70**	**21.76**
		SO_2	mg/Nm^3	**7.78**	**3.07**	**1.76**	**2.00**	**4.32**	**3.90**
39	Cast House Dedusting System (Blast Furnace II)	SPM	mg/Nm^3	**28.04**	**23.50**	**19.30**	**17.80**	**21.20**	**22.39**
		SO_2	mg/Nm^3	**2.90**	**2.34**	**2.13**	**2.40**	**3.20**	**3.20**
40	Pulverized Coal Injection (Blast Furnace)	SPM	mg/Nm^3	**42.58**	**34.25**	**48.13**	**52.58**	**56.22**	**59.87**
		SO_2	mg/Nm^3	**18.05**	**16.74**	**15.93**	**15.57**	**20.62**	**35.00**
41	Steam Exhaust System - CCM-III	SPM	mg/Nm^3	-	-	-	-	-	-
		NA	NA	-	-	-	-	-	-
42	CPPII-AFBC Boiler	SPM	mg/Nm^3	**21.96**	**16.01**	**17.87**	**22.39**	**17.00**	**27.93**
		SO_2	mg/Nm^3	**365.00**	**389.00**	**421.00**	**386.91**	**359.10**	**523.14**
		NOx	mg/Nm^3	**283.00**	**217.00**	**255.00**	**295.26**	**247.76**	**344.16**

ANNEXURE 4

DETAILS OF APC MEASURES PROVIDED IN STEEL & CPPII

Annexure -4

Details of Air Pollution Control measures provided in Steel & CPPII

Stack No	Stack attached to	Stack Type	Air Pollution Control Equipment (APC)
1	SP#1 - Sinter machine waste gas fan stack	Process	ESP with stack
2	SP#1 - Cooling system stack	Non- Process	Multicyclone with stack
3	SP#1 - Dedusting system stack	Non- Process	Bag Filters with stack
4	SP#1 - RMHS dust extraction system	Non- Process	Bag Filters with stack
5	BF#1 - Hot stove stack	Process	Stack
6	BF#1 - GCP flare stack (Emergency stack)	Non- Process	Venturi Scrubber with stack
7	BF#1 - Stock house dedusting	Non- Process	Bag Filters with stack
8	BF#1- Dust Extraction system for RMHS	Non- Process	Bag Filters with stack
9	BF#1- Cast house dedusting system stack	Non- Process	Bag Filters with stack
10	Process Boilers (1 x 25 TPH & 1 X 8 TPH)	Process	Common Stack
11	EOF#1- Primary dedusting system stack	Process	Venturi Scrubber with stack
12	CCM#3 -Billet grinding machine stack	Non- Process	Bag Filters with stack
13	CCM#1 Steam exhaust system stack	Non- Process	Stack
14	EOF#2 - Primary dedusting system stack	Process	Venturi Scrubber with stack
15	EOF#1&2 - Secondary dedusting system stack	Non- Process	Bag Filter with stack
16	LRF#1 - Primary & LRF#1 to 4 secondary dedusting system stack	Non- Process	Bag Filter with stack
17	LRF#2,3,4 - Primary dedusting system stack	Process	Bag Filter with stack
18	Vacuum degassing boiler#1 & #2 stack	Process	Stack
19	CCM#2 Steam exhaust system stack #1 & #2	Non- Process	Stack
20	CCM#2 - Cut fumes exhaust system stack	Non- Process	Stack
21	BLM - Reheating furnace stack #1	Process	Stack
22	BLM - Reheating furnace stack #2	Process	Stack
23	Coke Quenching Tower	Non- Process	Grit Arrester stack
24	COP - Coke oven battery #1 emergency stack# 1A & 1B	Process	Stack
25	COP - Coke oven battery#2 emergency stack	Process	Stack
26	COP - Coke oven battery#3 emergency stack	Process	Stack
27	COP - Waste Heat Recovery Boiler # 1 stack	Process	Stack
28	COP - Waste Heat Recovery Boiler # 2 stack	Process	Stack
29	COP - Waste Heat Recovery Boiler # 3 stack	Process	Stack
30	COP - Waste Heat Recovery Boiler # 4 stack	Process	Stack
31	COP - Waste Heat Recovery Boiler # 5 stack	Process	Stack
32	BF Gas Fired Boiler	Process	Stack
33	Limekiln(Not in Operation)	Non- Process	Not in operation
34	BRM- Reheating furnace stack #1 & 2	Process	Stack
35	SP#2 - Sinter machine waste gas fan stack	Process	ESP with stack

Stack No	Stack attached to	Stack Type	Air Pollution Control Equipment (APC)
36	SP#2 - Dedusting and cooling system stack	Non- Process	ESP with stack
37	SP#2 - Crushing of fuel and raw materials dedusting stack	Non- Process	Bag Filters with stack
38	BF#2- Hot stove stack	Process	Stack
39	BF#2 - GCP flare stack (Emergency stack)	Non- Process	Bag Filters with stack
40	BF#2 - Stock house dedusting & RMH system stack	Non- Process	Bag Filters with stack
41	BF#2 - Cast house dedusting system stack	Non- Process	Bag Filters with stack
42	BF - Pulverised Coal Injection unit	Non- Process	Bag Filters with stack
43	COP-DG Set -625 KVA Stack	Non- Process	Acoustic enclosures with Stack
44	EOF#1 - DG Set -625 KVA stack	Non- Process	Acoustic enclosures with Stack
45	EOF#1 - DG Set -625 KVA stack	Non- Process	Acoustic enclosures with Stack
46	CCM#3 - Steam exhaust system stack #1	Non- Process	Stack
47	Process Boilers area - DG set -1250 KVA stack	Non- Process	Acoustic enclosures with Stack
48	Pickling Plant- Acid Fumes exhaust system stack	Non- Process	Wet scrubber with stack
49	Pickling Plant- Acid bath - Hot water Generator Stack	Process	Stack
50	Pickling Plant- ARP - Hot water Generator Stack	Process	Stack
51	Pickling Plant- MEE – Thermic fluid Heater Stack	Process	Stack
52	BF Slag Grinding mill stack	Non- Process	Bag Filters with stack
53	BF Slag Grinding unit-Sinter waste Gas- Emergency stack	Non- Process	Damper with vent stack
54	BF Slag Grinding unit- Hot Air Generator - Emergency stack	Non- Process	Damper with vent stack from HAG
55	CCM#1 -Billet grinding machine stack	Non- Process	Stack
56	CCM#2 -Billet grinding machine stack	Non- Process	Stack
57	EOF#2 - DG Set - 1250 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
58	CCM#3 - DG Set - 1250 KVA stack	Non- Process -Emergency stack	Acoustic enclosures with stack
59	EOF#1 - DG Set -275 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
60	EOF#2 - DG Set - 275 KVA Stack	Non- Process -Emergency stack	Acoustic enclosures with stack
61	BRM - DG set - 650 KVA - stack	Non- Process -Emergency stack	Acoustic enclosures with stack
62	Pickling plant - DG Set - 400 KVA - stack	Non- Process -Emergency stack	Acoustic enclosures with stack
63	Batching plant#1 Cement silo vent stack	Non- Process	Bag Filters with stack
64	Batching plant#2 Cement silo vent stack	Non- Process	Bag Filters with stack
65	COP - Coke cutter dedusting system stack	Non- Process	Bag Filters with stack
66	CCM#3 - Steam exhaust system stack #2	Non- Process	Stack
67	Coal fired boiler (127 T/HR)	Process	ESP with stack
68	Coal crusher house	Non- Process	Bag Filters with stack
69	Coal screening section	Non- Process	Bag Filters with stack
70	Raw material transfer and discharge point	Non- Process	Bag Filters with stack
71	Fly ash storage silo	Non- Process	Bag Filters with stack
72	Bottom ash storage silo	Non- Process	Bag Filters with stack
73	Diesel generator set – 500 KVA	Non- Process -Emergency stack	Stack
74	Diesel generator set – 275 KVA	Non- Process -Emergency stack	stack

ANNEXURE 5

COMPLIANCE STATUS REPORT TO THE CREP CONDITIONS

Annexure 5

Compliance status report for the conditions prescribed in the Corporate Responsibility for Environmental Protection (CREP) to our plant

S.No	Condition	Compliance status/Action taken
1	**Coke Oven Plant:** To meet the parameters PLD (% leaking doors), PLL (% leaking lids), PLO (% leaking off take) of the notified standards under EPA. To rebuild at least 40% of the coke oven batteries* in next 10 years by December 2012.	Our COP Non-recovery type coke oven and this requirement is not applicable.
2	**Steel Melting Shop** **Fugitive Emission Status** To reduce 30% by March 2004 and 100% by March 2008 (including installation of secondary de-dusting facilities).	SMS comprises of an Energy Optimizing Furnace wherein a "wet scrubbing system" comprising of a Down comer, quench chamber, venturi scrubber and cyclone separator and the cleaned gas sent through a chimney. The secondary steel making unit viz. Ladle Furnace is already equipped with a dry scrubbing system comprising of bag filters, belt conveyors and dust silo. The dust is being collected and reused in the Sinter Plant. Dedicated secondary dedusting systems are installed in EOF & LRF and fugitive emissions are significantly reduced. Dedicated dust monitoirng systems are installed in the respective stacks and the real time parameters are connected with CAC,TNPCB
3	**Blast Furnace** - Direct inject of reducing agents in blast furnace.	Pulverized Coal injection system installed and commissioned along with bag filter as an air pollution control measures (bag filter with stack) to reduce emission during direct injection. The rate of pulverised coal injection is increased (upto approx. 137 kg/THM) and the implementation resulted in reduction of coke consumption in BF which leads to energy saving.
4	**Solid Waste/Hazardous Waste Management** Utilization of Steel Melting Shop (SMS) / Blast Furnace (BF) slag as per the following. • By 2004 – 70% • By 2006 – 80% and • By 2007 – 100% **Hazardous Waste:** - Charge of tar sludge/ETP sludge to coke oven by June 2003. - Inventorization of Hazardous waste as per Hazardous waste (M & H) Rules, 1989 as amended in 2000 and implementation of the rules by December 2003. (Tar sludge, acid sludge, waste lubricating oil and type fuel fall in the category of HZ).	All the Blast Furnace Slag is converted to Granulated slag and sold to cement industries. Flue dust from sinter plant, BF, SMS, sludge from BF & EOF and coke breeze from coke oven plant is re-used in sinter plant. Pellet plant is not installed in our operation. SMS slag is sent for metal recovery system and after crushing reused internal applications & sent cement industries. A ready mix concrete unit is installed. A unique initiative, Paver block unit by using crushed EOF slag. Refractories are selected to withstand high temperature whose shelf life is longer and generation of used refractories are lesser. The same will be recycled in downstream applications and also sold to customers involved with recycling and the disposal is in environment friendly manner. Our coke oven plant is non-recovery type and hence Tar sludge & ETP sludge is not applicable. The waste oil and other hazardous wastes generated is being disposed to authorized vendors as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.
5	**Water Conservation / Water Pollution** - To reduce specific water consumption to 5 m3/ t for long products and 8 m^3/ t for flat products by December 2005.	We are presently manufacturing only long products and our specific water consumption is well within the prescribed limit
6	Installation of continuous stack monitoring	There are 26 nos. of Process stacks. Dust & Gaseous emission monitoring systems are installed as per CTO condition and the real time data of SPM, SO2 & NOx are transmitted to the Care Air Centre of TNPCB and CPCB servers. There are 34 nos. of Non-process stacks. Dust emission monitoring systems are installed as per CTO condition and the real time data of SPM are transmitted to the Care Air Centre of TNPCB and CPCB servers. Apart from the above, TNPCB is conducting bi-annual survey and Manual monitoring is being conducted by a NABL accredited external laboratory on monthly basis. The monitoring results are well within the permissible limits.

S.No	Condition	Compliance status/Action taken
7	The unit shall operate the existing pollution control equipment efficiently and to keep proper record of run hours, failure time and efficiency with immediate effect. Compliance report in this regard be submitted to TNPCB every three months.	The pollution control equipments are being operated efficiently and proper records are maintained for running hours, failure time and efficiency. Any failure leads to APC is resulted exceedance alarm from TNPCB server and justification along with corrective action reports are being submitted to TNPCB on monthly basis.
8	To implement the recommendations of Life Cycle Assessment (LCA) Study sponsored by MoEF by December 2003.	Being Complied.
9	The industry will initiate the steps to adopt the following clean technologies/measures to improve the performance of industry towards production, energy and environment.	
	✔ Energy recovery of top blast furnace (BF) gas.	Our BF gas pressure (plant capacity is 0.683 MTPA only) is not adequate to install TRT.
	✔ Use of tar-free runner linings.	Our coke oven plant is non-recovery type and hence not applicable.
	✔ De-dusting of cast house at tap holes, runners, skimmers ladle and charging points.	The de-dusting system commissioned at BF-I & II cast house covering tap holes, runners, skimmers ladles and charging points.
	✔ Suppression of fugitive emissions using nitrogen gas or other inert gas.	Water sprinkling system, Dry & Wet fog systems and the compressed air are used for suppression of fugitive emissions.
	✔ To study the possibility of slag and fly ash transportation back to the abandoned mines, to fill up the cavities through empty railway wagons while they return back to the mines and its implementation.	Since we are purchasing raw materials from outside sources, it is not applicable.
	✔ Processing of the waste containing flux & ferrous wastes through waste recycling plant.	The waste containing flux & ferrous waste is utilized to the maximum extent possible in the sinter plant. 100 % of waste containing flux and ferrous is utilized in the plant.
	✔ To implement rainwater harvesting.	Four rain water harvesting ponds are provided. Two are in the plant premises and two are in township.
	✔ Reduction of green house gases by,	Various initiatives and measures are being taken to reduce the GHG emissions and present level of GHG emission is 2.73 MT of CO2/TCS. Major focus are being given to maximise the waste heat utilisation, Renewable energy and resource conservation.
	• Reduction in power consumption.	To reduce the power consumption VFDs are being installed whereever possible. LED lights are installed to replace the sodium vapor lamps and many Kaizens are implemented to conserve power.
	• Use of by-products gases for power generation.	By product BF gas is being used as fuel in Power Plant for power generation.
	• Promotion of energy optimization technology including energy audit.	All the upcoming projects are wetted to the best energy consumption through selection of equipments. Energy audit is being carried out and implementations are done in phased manner to minimize the energy consumption of GCal.
	• To set targets for resource conservation such as raw material, energy and water consumption to match International Standards.	Raw material, Energy and water consumption targets are being fixed as a key performance indicator with reference to WSA guidelines and actions are being implemented to match the international standards through Best Available Technology.
	• Up-gradation in the monitoring and analysis facilities for air and water pollutants. Also to impact elaborate training to the manpower so that realistic data is obtained in the environmental monitoring laboratories.	A separate Environment cell is already available and full-fledged lab set up and need based training is being imparted to the monitoring personnels as and when required. Presently the monitoring and analysis being done through M/s Nawal Analytal Labs India Pvt Ltd.
	• To improve over all house keeping.	5S system is being followed to maintain and improve housekeeping throughout the plant. Due to the implementation, saving in area, inventory control, retrieval time period and standardization practices are well improved.

ANNEXURE 6

ONLINE EFFLUENT MONITORING REPORT AND EFFLUENT & GROUND WATER QUALITY MANUAL MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure 6

Online effluent monitoring report and effluent & ground water quality manual monitoring report of NABL accredited laboratory

I.Online effluent monitoring report

S.No	Description	UoM	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	Effluent Inlet flow	m^3	81103.1	74373.0	79281.0	81587.0	83952.9	84587.3
2	Treated effluent water reuse in process	m^3	77257.0	69238.8	77583.0	79241.0	81405.9	82993.7
3	ETP outlet discharge flow	m^3	0	0	0	0	0	0

Note; Consented Trade efflunet generation 2935 KLD

II. Treated trade effluent of Steel Guard bond water by NABL accredited laboratory

S.No	Parameter	Unit	CB Tolerance L	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	Temperature	°C	40	27	27	27	27	27	27
2	pH @ 250C	-	5.5 to 9.0	7.12	6.98	7.25	7.52	7.46	7.41
3	Particles size	-	Shall Pass 850 µ IS Sieve	Test pass	Test pass	Test pass	Test Pass	Test Pass	Test Pass
4	Total Suspended Solids	mg/L	100	7	8	6	6	6	6
5	Total Dissolved Solids	mg/L	2100	1365	1206	1326	1240	1621	1549
6	Free Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
7	Sulphate as SO4	mg/L	1000	148.7	138	124.28	132.45	159.27	152.65
8	Sulphide as S	mg/L	2	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	1000	415.69	399.88	406.97	412.78	475.95	458.08
10	Fluoride as F	mg/L	2	0.36	0.47	0.43	0.44	0.42	0.39
11	Chemical Oxygen Demand	mg/L	250	16.3	15.21	28.31	30.39	32.38	29.99
12	BOD, 3 days @27°C	mg/L	30	4.11	3.98	7.9	7.96	6.91	5.97
13	Oil & Grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	50	0.57	0.65	0.72	0.76	0.68	0.65
15	Free Ammonia as NH3	mg/L	30	0.85	0.83	0.88	0.93	0.83	0.8
16	Total Kjeldahl Nitrogen	mg/L	100	6.59	7.58	7.96	6.97	7.23	7.57
17	Dissolved Phosphate as PO4	mg/L	5	0.23	0.18	0.19	0.19	0.18	0.21
18	Phenolics Compound as C6H5OH	mg/L	1	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	0.2	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	-	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	1	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	0.2	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	2	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	0.05	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]

III. Treated trade effluent of CPPII-Cooling tower water by NABL accredited laboratory									
S. No	PARAMETER	UNITS	TNPCB Tolerance Limit	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
				TRADE EFLUENT	TRADE EFLUENT	TRADE EFLUENT	TRADE EFLUENT	TRADE EFLUENT	TRADE EFLUENT
1	Temperature	°C	40	27	27	27	27	27	27
2	pH @ 250C	-	5.5 to 9.0	7.13	7.1	7.42	7.47	7.32	6.78
3	Particles size	-	Shall Pass 850 µ IS Sieve	Test pass	Test Pass	Test pass	Test Pass	Test Pass	Test Pass
4	Total Suspended Solids	mg/L	100	8	12	6	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	6
5	Total Dissolved Solids	mg/L	2100	1388	1282	1418	512	1537	1339
6	Free Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	1000	141.42	462.4	146.52	52.62	182.12	145.6
8	Sulphide as S	mg/L	2	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	1000	338.64	186.71	342.45	171.15	435.99	448.02
10	Fluoride as F	mg/L	2	0.39	0.41	0.43	0.12	0.52	0.43
11	Chemical Oxygen Demand	mg/L	250	22.51	25.22	24.26	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
12	BOD, 3 days @27°C	mg/L	30	5.14	6.04	5.92	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
13	Oil & Grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	50	0.58	0.74	0.62	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
15	Free Ammonia as NH3	mg/L	30	0.71	0.82	0.76	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
16	Total Kjeldahl Nitrogen	mg/L	100	7.52	7.04	7.96	7.8	6.49	4.08
17	Dissolved Phosphate as PO4	mg/L	5	0.31	1.45	0.35	0.07	0.28	0.08
18	Phenolic Compound as C6H5OH	mg/L	1	BLQ[LOQ-0.0001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]	BLQ[LOQ-0.0001]
19	Cyanide as CN	mg/L	0.2	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	-	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	1	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	0.2	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	2	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	0.05	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	0.01	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	0.1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
32	Alpha emitters*	µCi.ml^-1		-	-	BDL	BDL	BDL	BDL
33	Beta emitters*	µCi.ml^-1		-	-	BDL	BDL	BDL	BDL

IV. Result of analysis of steel treated trade effluent by TNPCB									
S.No	**Parameters**	**Unit**	**TNPCB Tolerance Limit**	**Oct-23**	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**
1	pH at $25^{O}C$	Number	5.5-9.0	7.12	6.99	7.10	7.08	7.77	8.24
2	TSS at $103^{O}C$ - at $105^{O}C$	mg/L	100	12	28	156	16	12	16
3	Total Dissolved Solids at $180^{O}C$	mg/L	2100	1288	1428	1668	1520	1340	1248
4	Chloride as Cl	mg/L	1000	379	503	460	450	310	540
5	Sulphate as SO_4	mg/L	1000	44	41	365	170	26	80
6	Oil & Grease	mg/L	10	<3	<3	<3	<3	<3	<3
7	BOD (at $27^{O}C$ for 3 days)	mg/L	30	2.7	3	18	7	3.2	8
8	COD	mg/L	250	40	64	200	80	72	160
9	Phenolic Compounds	mg/L	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
10	Ammonical nitrogen as NH_3. N	mg/L	50	1.12	***	1.12	1.68	1.12	1.12
11	Cyanide	mg/L	0.2	<0.008	***	<0.008	<0.008	<0.008	<0.008
12	Total Kjeldhal Nitrogen	mg/L	100	2.8	***	3.36	5.04	2.24	3.36
13	Sulphide	mg/L	2	<1	<1	<1	<1	<1	<1
14	Total Residual Chlorine	mg/L		<1	<1	<1	<1	<1	<1
15	Dissolved Phosphate	mg/L	5	0.046	0.041	0.25	0.268	0.24	0.61
16	Hexavalent Chromium	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Total Chromium	mg/L	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Fluoride as F	mg/L	2	0.45	1.450	0.483	0.088	0.083	0.083
19	Zinc	mg/L	1	<2.0	<2.0	<0.03	<2	<0.03	<0.03
20	Lead	mg/L	0.1	0.5	<0.05	<0.05	<0.5	<0.3	<0.3
21	Cadmium	mg/L	2	<1.0	<1.0	<0.05	<0.05	<0.05	<0.05
22	Nickel	mg/L	3	<2.0	<2.0	<0.1	<2	<0.1	<0.1
23	Boron	mg/L	2	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002
24	Free Ammonia	mg/L	30	1.37	***	1.36	2.0496	1.3664	1.3664
26	Mercury	mg/L		-	***	***	***	***	***
27	Arsenic	mg/L		-	***	***	***	***	***

IV. Result of analysis of CPPII- treated trade effluent by TNPCB									
S.No	**Parameters**	**Unit**	**TNPCB Tolerance Limit**	**Oct-23**	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**
1	pH at $25^{O}C$	Number	5.5-9.0	6.83	6.7	7.06	6.83	7.25	**7.62**
2	TSS at $103^{O}C$ - at $105^{O}C$	mg/L	100	8	12	12.00	8.00	12.00	**12.00**
3	Total Dissolved Solids at $180^{O}C$	mg/L	2100	1476	1496	1636.00	1456.00	1464.00	**1752.00**
4	Chloride as Cl	mg/L	1000	534	453	370.00	390.00	270.00	**350.00**
5	Sulphate as SO_4	mg/L	1000	52	52	387.00	272.00	43.00	**202.00**
6	Oil & Grease	mg/L	10	<3	<3	<3	<3	<3	<3
7	BOD (at $27^{O}C$ for 3 days)	mg/L	30	<2	2.1	2.70	2.40	2.10	**3.60**
8	COD	mg/L	250	24	24	56.00	40.00	24.00	**56.00**
9	Phenolic Compounds	mg/L	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
10	Ammonical nitrogen as NH_3. N	mg/L	50	0.56	***	0.56	1.12	2.24	**1.12**
11	Cyanide	mg/L	0.2	<0.008	***	<0.008	<0.008	<0.008	<0.008
12	Total Kjeldhal Nitrogen	mg/L	100	1.68	***	2.80	3.36	5.60	3.92
13	Sulphide	mg/L	2	<1	<1	<1	<1	<1	<1
14	Total Residual Chlorine	mg/L		<1	<1	<1	<1	<1	<1
15	Dissolved Phosphate	mg/L	5	0.037	0.06	0.2	0.33	0.265	0.345
16	Hexavalent Chromium	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Total Chromium	mg/L	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Fluoride as F	mg/L	2	0.228	0.361	0.311	0.115	0.089	0.089
19	Zinc	mg/L	1	<2.0	<2.0	<2.0	<0.3	<0.3	<0.03
20	Lead	mg/L	0.1	<0.5	<0.05	<0.05	<0.5	<0.03	<0.3
21	Cadmium	mg/L	2	<1.0	<1.0	<1.0	<1	<0.05	<0.05
22	Nickel	mg/L	3	<2.0	<2.0	<2.0	<2	<0.1	<0.1
23	Boron	mg/L	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
24	Free Ammonia	mg/L	30	68	***	0.6832	1.3664	2.7328	1.3664
26	Mercury	mg/L		-	***	***	***	***	***
27	Arsenic	mg/L		-	***	***	***	***	***

V.Result of analysis of ground water by NABL accredited laboratory

S.No	PARAMETERS	UNIT	Oct-23				Nov-23				Dec-23			
			Govt Borewell Kuttapatti Pudur Water (14.10.2023)	Govt Bore well Moorthipatti (14.10.2023)	Mr. Balan, Pudur Panankadu - Openwell Water (14.10.2023)	Mr. Rajamani, Kuttappatti Pudur -Open Well Water (14.10.2023)	Govt Borewell Kallammal Teacher Water (18.11.2023	Open well Venkatesan pottaneri (18.11.2023)	Mr. Selvam Bore well Karapaatti Pallam (18.11.2023)	Open Well Mr. Vellaiyan Moorthipatti (18.11.2023)	Govt Borewell Ervadi	Govt Borewell Parry Nagar	Open well Mr. Vellaiyen Moorthipatti	Govt Borewell Kavundanoor
1	Temperature	℃	27	27	27	27	27	27	27	27	27	27	27	27
2	pH @25℃	-	7.62	7.25	8.38	7.48	7.62	8.58	8.34	8.04	6.69	7.28	7.32	8
3	Particles size	-	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass	Test pass
4	Total Suspended Solid	mg/L	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
5	Total Dissolved Solids	mg/L	1708	1151	1345	2380	1997	1222	1012	1088	2261	1610	1033	2109
6	Free Residual Chlorine	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	184.9	122.38	215.82	265.08	197.46	137.45	107.72	121.88	197.81	142.34	105.14	302.14
8	Sulphide as S	mg/L	BLQ[LOQ-0.5]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	552.56	329.51	258.54	785.75	534.83	394.88	339.89	314.9	650.15	471.49	314.9	684.89
10	Fluoride as F	mg/L	0.58	0.32	0.42	0.65	0.35	0.43	0..29	0.31	0.76	0.67	0.24	0.53
11	Chemical Oxygen Demand	mg/L	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
12	BOD, 3 days @27°C	mg/L	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
13	Oil & Grease	mg/L	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
15	Free Ammonia as NH3	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
16	Total Kjeldahl Nitrogen	mg/L	7.54	6.98	5.71	BLQ[LOQ-1.0]	7.84	7.12	3.53	4.12	8.81	6.25	3.53	BLQ[LOQ-1.0]
17	Dissolved Phosphate as PO4	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	0.12	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
18	Phenolic Compound as C6H5OH	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]

V.Result of analysis of ground water by NABL accredited laboratory

S.No	PARAMETERS	UNIT	Jan-24				Feb-24				Mar-24			
			Govt Borewell Kuttapatti Pudur Water	Govt Bore well Moorthipatti	Mr. Balan, Pudur Panankadu - Openwell Water	Mr. Rajamani, Kuttappatti Pudur -Open Well Water	Velleiya house open well mourthipatti	Mr. Venkatesan pottaneri - Open	Mr. Selvam Bore well Karapaatti Pallam	Govt Borwell Kuttapatti pudur	Govt Bore well Water – Ervadi village	Govt Bore well Water Parry Nagar	Govt Borewell Kuttapatti Pudur Water	Govt Bore well Water Kavundanoor
1	Temperature	℃	27	27	27	27	27	27	27	27	27	27	27	27
2	pH @25℃	-	7.5	7.18	7.32	7.59	7.42	7.51	7.59	7.42	7.89	7.59	7.85	7.32
3	Particles size	-	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass	Test Pass
4	Total Suspended Solid	mg/L	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
5	Total Dissolved Solids	mg/L	2807	1484	2786	2779	1396	2562	1605	1289	2576	2293	2290	3220
6	Free Residual Chlorine	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.01]	BLQ[LOQ-0.1]
7	Sulphate as SO4	mg/L	298.47	163.54	301.4	308.94	BLQ[LOQ-5.0]	312.42	162.18	128.16	286.52	238.24	245.3	328
8	Sulphide as S	mg/L	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
9	Chloride as Cl	mg/L	936.31	493.32	911.14	906.1	144.68	212.36	475.95	413.71	855.76	649.37	760.12	795
10	Fluoride as F	mg/L	0.82	0.42	0.89	0.91	0.34	0.55	0.47	0.35	0.71	0.47	0.65	0.38
11	Chemical Oxygen Demand	mg/L	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	20.2	25.4	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
12	BOD, 3 days @27°C	mg/L	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	4.98	5.2	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
13	Oil & Grease	mg/L	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
14	Ammoniacal Nitrogen as N	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
15	Free Ammonia as NH3	mg/L	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
16	Total Kjeldahl Nitrogen	mg/L	6.97	6.41	7.8	6.69	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	6.7	5.53	6.41	2.62
17	Dissolved Phosphate as PO4	mg/L	0.17	0.12	0.16	0.2	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	0.14	BLQ[LOQ-0.05]	0.12	BLQ[LOQ-0.05]
18	Phenolic Compound as C6H5OH	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
19	Cyanide as CN	mg/L	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
20	Residual Sodium Carbonate	mg/L	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
21	Copper as Cu	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
22	Nickel as Ni	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
23	T. Chromium as Cr	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
24	Zinc as Zn	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
25	Arsenic as As	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
26	Lead as Pb	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
27	Cadmium as Cd	mg/L	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
28	Selenium as Se	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
29	Boron as B	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
30	Mercury as Hg	mg/L	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]	BLQ[LOQ-0.001]
31	Hex. Chromium as Cr6+	mg/L	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]

VI. Result of analysis of ground water by TNPCB

S.No.	Parameters	Unit	OPEN WELL - Thiru .Balan, Pudur Panankadu	GOVT BORE WELL, ERVADI	GOVT BORE WELL, PARYNAGAR	OPEN WELL - Thiru .Venkatesan, Pottaneri	OPEN WELL - Tmt.Kaliammal teacher , Pottaneri	GOVT. Bore well , Kavundanoor	Mr. Selvam Bore Well Karapattipallam	BORE WELL Thiru Velliyan , Moorthipatti	GOVT BORE WELL - Moorthipatti	OPEN WELL - Thiru .Rajamani, Kuttapatti Pudur	GOVT BORE WELL , Kuttapatti Pudur
1	Conductivity at 25^{o} C	µmhos/cm	2900	4480	3070	2550	3270	3610	1747	1709	1956	3170	4880
2	pH at 25^{o} C	Number	7.29	6.89	7.44	8.15	7.46	6.93	7.24	7.24	7.28	7.36	7.63
3	Total Dissolved Solids at 180^{o} C	mg/L	1832	2556	2088	1980	3140	3108	1336	1268	1592	2076	3684
4	Chloride as Cl	mg/L	460	1000	702	310	600	1000	285	220	340	500	1050
5	Sulphate as SO4	mg/L	398	402	322	330	616	275	s	185	225	314	463
6	BOD (at 27^{o} C for 3 days	mg/L	2.4	2.7	3	2.4	2.7	2.4	2.4	2.7	2.7	2.4	2.7
7	COD	mg/L	48	48	40	56	64	48	48	48	56	48	64
8	Fluoride as F	mg/L	0.127	0.122	0.111	0.250	0.167	0.483	0.167	0.361	0.417	0.239	0.122
9	Total Hardness as CaCO3	mg/L	630	1410	1320	810	1500	1100	560	550	600	630	1080
10	Alkalinity CaCO3	mg/L	404	388	212	520	288	476	224	336	288	536	488
11	Iron Total as Fe	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
12	Calcium as Ca	mg/L	68.00	224.00	160.00	48.00	180.00	104.00	108.00	80.00	96.00	68.00	112.00
13	Magnesium as Mg	mg/L	112.00	207.00	224.00	168.00	255.00	204.00	70.00	85.00	87.00	112.00	194.00
14	Sodium as Na	mg/L	200.00	416.00	109.00	273.00	210.00	282.00	108.00	144.00	125.00	353.00	600.00
15	Potassium as K	mg/L	6.00	22.00	52.00	37.00	6.00	3.00	3.00	2.00	3.00	0.20	28.00

ANNEXURE 7

TREATED SEWAGE QUALITY MONITORING REPORT OF TNPCB & NABL ACCREDITED LABORATORY

Annexure 7

Treated sewage quality monitoring report of TNPCB & NABL accredited laboratory for the period of Oct'23 to Mar '24

Result of analysis of treated sewage by TNPCB (Plant STP)

S.No	Parameter	Unit	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	pH @ 25°C	Number	7.13	7.01	7.31	7.4	7.83	8.59
2	TSS at 103°C - 105°C	mg/l	8	12	12	4	12	16
3	BOD (at 27°C for 3 days)	mg/l	<2	3	3	6.5	3.2	6.6

Result of analysis of treated sewage by TNPCB (Township STP)

S.No	Parameter	Unit	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	pH @ 25°C	Number	7.23	7.04	7.32	7.41	7.86	8.62
2	TSS at 103°C - 105°C	mg/l	8	12	8	4	12	16
3	BOD (at 27°C for 3 days)	mg/l	<2	<2	3	3	4	5

Result of analysis of treated sewage by NABL accredited laboratory (Plant STP)

S.No	Parameter	Unit	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	PH 25 C	--	6.79	6.87	7.18	7.78	7.54	7.46
2	Total Suspended Solids	mg/l	6	7	7	6	8	9
3	BOD (at 27°C for 3 days)	mg/l	8.1	8	8.9	7.4	8.9	9.8

Result of analysis of treated sewage by NABL accredited laboratory (Township STP)

S.No	Parameter	Unit	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
1	PH @ 25oC	--	6.91	6.92	6.68	7.18	6.78	7.62
2	Total Suspended Solids	mg/l	8	6	8	7	8	6
3	BOD (at 27°C for 3 days)	mg/l	8.2	8.1	8.6	8.4	7.9	7.4

ANNEXURE 8

AMBIENT NOISE LEVEL MONITORING REPORT OF NABL ACCREDITED LABORATORY

Annexure -8

Ambient Noise level monitoring report of NABL accredited laboratory for the period of Oct'23 to Mar '24

I. Ambient Noise Monitoring results (Oct'23 to Mar '24)

S.No	Location	Day Time Noise Level in dB(A)									
		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Maximum	Minimum	Average	STD Deviation
1	New Land area JSW Boundary	68.2	67.3	62.4	61.2	62.3	60.3	68.2	60.3	63.6	3.3
2	Open field – Near thangamapuri stores, Malamanoor.	62.6	65.9	61.9	60.4	61.8	62.9	65.9	60.4	62.6	1.8
3	Nearby Mr.Chinnamuthu House, Malamanoor.	67.9	68.5	64.5	61.9	61.3	62.7	68.5	61.3	64.5	3.1
4	Near Madhayen Temple at Coconut Farm.	69.1	67.2	65.3	62.8	62.9	60.6	69.1	60.6	64.7	3.2
5	Eastern Gate of JSW.	63.2	65.7	61.1	58.4	59.3	58.4	65.7	58.4	61.0	2.9
6	Reservoir Premises.	67.4	65.3	63.7	60.5	61.4	60.9	67.4	60.5	63.2	2.8
7	Executive Staff Quarters, JSW.	62.5	66.8	62.4	63.1	62	61.6	66.8	61.6	63.1	1.9
8	Nearby Railway Crossing kuttappatti village.	66.6	68.7	64.9	61.9	62.7	63.9	68.7	61.9	64.8	2.5
9	Residential Area Ervadi Village.	67.8	65.3	59.8	58.5	60.9	59.6	67.8	58.5	62.0	3.7
10	At Coconut Farm, Nearby Railway crossing.	67.2	68.5	62.4	61.1	62.9	60.9	68.5	60.9	63.8	3.2
11	At Parrynagar Residential Area.	68.4	65.6	66.3	62.7	60.1	57.1	68.4	57.1	63.4	4.2
12	Over Head Tank	66.2	68.3	62.9	60.3	59.5	58.6	68.3	58.6	62.6	3.9
13	Opp. To Old Main Gate, Open Agricultural field.	62.3	63.4	58.1	57.5	57.5	54.3	63.4	54.3	58.9	3.4
14	Guest House Premises.	68.5	67.8	64.7	63.9	63.9	62.5	68.5	62.5	65.2	2.4
15	Open Field, Pottaneri Village.	60.3	63.2	65.3	62.5	62.5	60.7	65.3	60.3	62.4	1.8
16	Raw Material Storage Yard (Iron Ore).	68.5	66.3	65.2	66.1	66.1	62.6	68.5	62.6	65.8	1.9
17	In front of Occupational in Health Centre.	69.8	68.7	67.7	65.8	65.8	64.2	69.8	64.2	67.0	2.1
18	Near Pickling & Phosphating Plant 2 KLD ETP	69.3	66.8	64.5	63.2	63.2	61.6	69.3	61.6	64.8	2.8

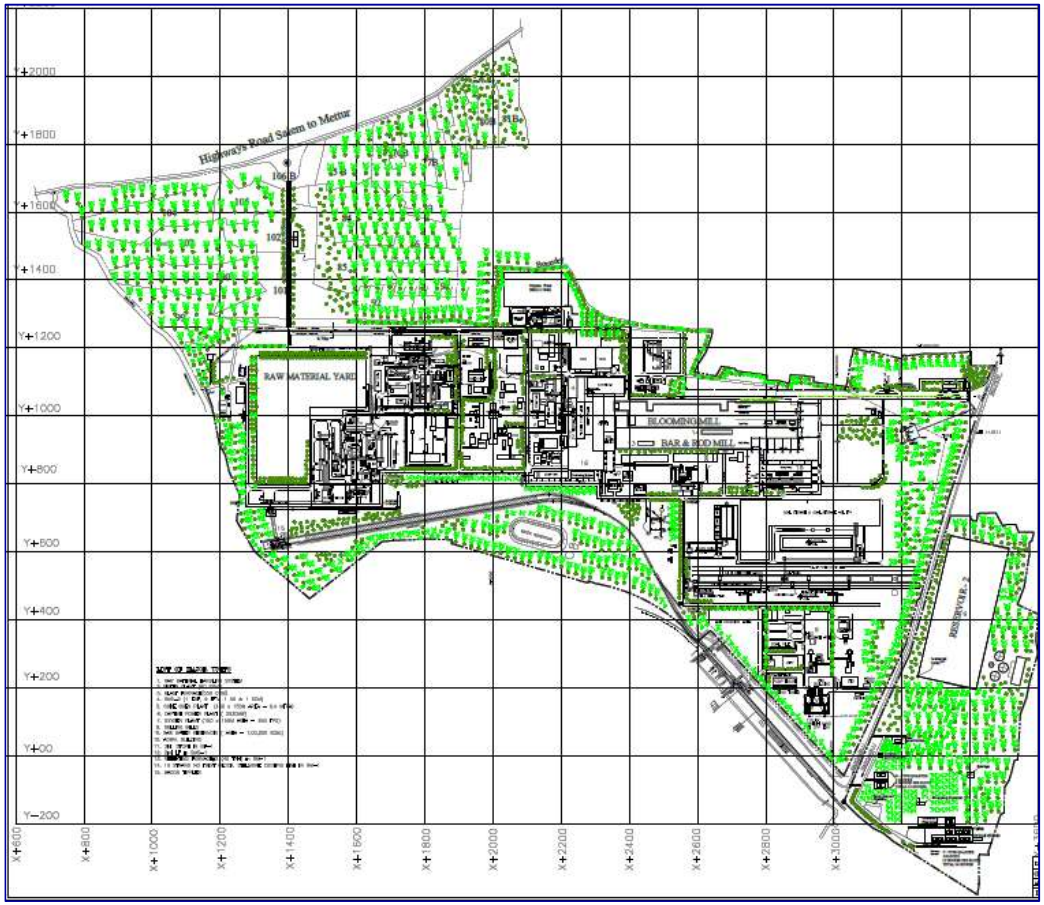
S.No	Location	Night Time Noise Level in dB(A)									
		Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Maximum	Minimum	Average	STD Deviation
1	New Land area JSW Boundary	53.4	54.5	50.8	51.8	50.3	48.6	54.5	48.6	51.6	2.1
2	Open field – Near thangamapuri stores, Malamanoor.	54.8	55.1	53.4	52.4	51.6	50.2	55.1	50.2	52.9	1.9
3	Nearby Mr.Chinnamuthu House, Malamanoor.	50.2	51.3	50.2	48.6	49	47.3	51.3	47.3	49.4	1.4
4	Near Madhayen Temple at Coconut Farm.	53.3	54.8	55.7	53.6	55.7	53.6	55.7	53.3	54.5	1.1
5	Eastern Gate of JSW.	49.8	50.6	52.3	50.1	51	50.4	52.3	49.8	50.7	0.9
6	Reservoir Premises.	51.6	56.2	59.1	55.4	52.6	52.1	59.1	51.6	54.5	2.9
7	Executive Staff Quarters, JSW.	55.2	58.9	55.4	54.7	56.7	54.3	58.9	54.3	55.9	1.7
8	Nearby Railway Crossing kuttappatti village.	54.6	58.6	51.5	52.9	55.3	50.7	58.6	50.7	53.9	2.9
9	Residential Area Ervadi Village.	52.2	55.4	56.3	51.1	52.4	51.9	56.3	51.1	53.2	2.1
10	At Coconut Farm, Nearby Railway crossing.	56.3	57.3	50.3	48.7	49.7	47.2	57.3	47.2	51.6	4.2
11	At Parrynagar Residential Area.	57.1	56.8	53.9	51.6	52.3	50.9	57.1	50.9	53.8	2.7
12	Over Head Tank	48.8	49.3	48.7	47.4	48.6	46.8	49.3	46.8	48.3	1.0
13	Opp. To Old Main Gate, Open Agricultural field.	50.6	52.8	49.6	48.8	48.8	47.2	52.8	47.2	49.6	1.9
14	Guest House Premises.	53.4	55.6	54.9	56.3	56.3	55	56.3	53.4	55.3	1.1
15	Open Field, Pottaneri Village.	49.6	52.7	57.2	55.2	55.2	51.9	57.2	49.6	53.6	2.7
16	Raw Material Storage Yard (Iron Ore).	50.8	53.6	51.3	52.4	52.4	46.8	53.6	46.8	51.2	2.4
17	In front of Occupational in Health Centre.	55.6	56.3	54.4	51.9	51.9	50.1	56.3	50.1	53.4	2.4
18	Near Pickling & Phosphating Plant 2 KLD ETP	57.2	58.1	55.9	53.3	53.3	50.5	58.1	50.5	54.7	2.9

Standard limit for Ambient noise level at Daytime is 75 dB (A), Standard limit for Ambient noise level at Nighttime is 70 dB (A).
The ambient noise level monitoring results are within the CPCB norms.

ANNEXURE 9

DETAILS OF GREENBELT DEVELOPMENT.

Green Belt Development



Tree sapling :

Trees Planted 2009 – 2010	- 05,120 No's
Trees Planted 2010 – 2011	- 14,250 No's
Trees Planted 2011 – 2012	- 07,535 No's
Trees Planted 2012 – 2013	- 10,120 No's
Trees Planted 2013 – 2014	- 06,645 No's
Trees Planted 2014 – 2015	-19065 No's
Trees Planted 2015 – 2016	- 10,000 No's
Trees Planted 2016 – 2017	- 06,050 No's
Trees Planted 2017 – 2018	- 05,000 No's
Trees Planted 2018 – 2019	- 14,165 No's
Trees Planted 2019 – 2020	- 14830 No's
Trees Planted 2020 – 2021	- 18130 No's
Trees Planted 2021 – 2022	- 15.180 No's
Trees Planted 2022 – 2023	- 10286 No's
Trees Planted 2023 – 2024	- 09906 No's
Cumulative till March 24	- 2,72, 357 No's

Survival rate- 85 -90%

ANNEXURE 10

CARBON SEQUESTRATION REPORT FOR THE FINANCIAL YEAR 2024

CARBON SEQUESTRATION STUDY REPORT

March -2024

for

M/s. JSW Steel Ltd,
Salem Works.

Site Location :
Pottaneri P.O.,Mecheri, Mettur Taluk,
Salem District-636 453, Tamil Nadu, India

by

Green Global Safety Systems

43/7b,Senthil Nagar,Chinna Kodungaiyur ,

Chennai -600051, Ph: 91-8248885428

A Lead Environmental Pollution Control and Prevention Consultants.

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PART - A

I.Preface

M/s. JSW Steel Ltd, Salem Works, Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India offered an opportunity to M/s. Green Global Safety Systems, Chennai to conduct the Carbon Sequestration Study to evaluate the Contribution of the trees for carbon Sequestration in their Steel Manufacturing facility. Upon the requirement and the Purchase order issued to us, a Comprehensive study was carried out and the final report is submitted.

Disclaimer

We have performed study on Carbon Sequestration by the Existing Green Belt and the report submitted is not deemed to be any undertaking, warranty or certificate.

Place : Chennai

Date : 23.05.2024

M.MEGANATHAN MIE, DIS, Ph.D Scholar–Safety

ME, Environmental Engineering , Lead Auditor –ISO 14001: 2015 , Accredited Safety Auditor by Govt of Tamilnadu & Kerala Chartered Engineer & International PHA Specialists.

II. Introduction

Carbon sequestration

What is Carbon Sequestration :- Carbon sequestration means capturing carbon dioxide (CO_2) from the atmosphere or capturing anthropogenic (human) CO_2 from large-scale stationary sources like power plants before it is released to the atmosphere. As Per CPCB ,India

Once captured, the CO_2 gas (or the carbon portion of the CO_2) is put into long-term storage. CO_2 sequestration has the potential to significantly reduce the level of carbon that occurs in the atmosphere as CO_2 and to reduce the release of CO_2 to the atmosphere from major stationary human sources, including power plants and refineries. There are two major types of CO_2 sequestration: terrestrial and geologic.

Terrestrial

Terrestrial (or biologic) sequestration means using plants to capture CO_2 from the atmosphere and then storing it as carbon in the stems and roots of the plants as well as in the soil.

Geologic

Geologic sequestration is the method of storage that is generally considered for carbon capture and storage (CCS) projects. CCS is the practice of capturing CO_2 at anthropogenic sources before it is released to the atmosphere and then transporting the CO_2 gas to a site where it can be put into long-term storage. (Pacala & Socolow 2004). The rapid urbanization of cities in India has led to over exploitation of natural resources, exponential increase in pollution, and accumulation of greenhouse gases in the atmosphere.

Carbon emission due to deforestation and use of fossil carbon has brought forests to the center-stage of climate change mitigation strategies. As per MoEF (2014), India has a spatial extent of the urban tree cover on 12,790 Km2 (16.40 %) out of the total urbanized area of 77,997 Km2 as on 2013. The National Forest Policy, 1988 envisions average forest and tree cover of 33 % for the plains and 66.66 % for the hilly areas of the country.

There is an urgent need for the planned development of the urban areas to present the picture of green and clean cities with adequate forest & tree cover, parks, lakes, wetlands, urban biodiversity, nature education centers, etc.

M/s. JSW Steel Ltd,Salem Works, Pottaneri P.O. ,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India have organized for the Carbon Sequestration by Plants and conducted by our team of M/s. Green Global Safety Systems, Chennai.

The detailed report of Carbon Sequestration by Plants is presented in this booklet for M/s. JSW Steel Ltd,Salem Works.

III.Study Team Profile

Lead Environmental Expert

1. NAME AND DESIGNATION:

- Name : M.MEGANATHAN. ME.,MIE.,AMIE.,DCT.,DIS.,BOC.,.
- ME –Environmental Engineering
- Designation : Lead Environment Expert
- ISO 14001:2015 Lead Auditor –Enironmental Management Systems
- Expert in Environment Dispersion Modeling –Internationally approved Software

2. RELEVANT QUALIFICATIONS:

- ME-Master of Environmental Engineering
- AMIE in Chemical Engineering
  Diploma in chemical Technology Diploma in Industrial safety
- Accredited safety auditor – Govt of India and Tamilnadu
- Competent person of Boilers – A CLASS
- Trained HAZOP Leader - Certified by China risk management
- Chartered Engineer by Institution Engineers India

3. WORK EXPERIENCE:

- Total Year of Industrial Experience : 23 years of Industrial Exposure in Various disciplines.

  M/S. Madras Chlor-Alkalis Ltd , Chennai.
  M/S. Southern Chlor-Alkali industries ltd, Manali
  M/S. Tamil Nadu petro Products ltd, TIDCO, Manali.
  M/S. Dalmia Cement Bharat Ltd , Trichy
  M/S. GE – Momentive performance materials India pvt Ltd (MNC)
  M/S. Piramal Pharmaceuiticals ,Ennore,Chennai -68.

4. RESPONSIBILITIES INCLUDED:

Environmental Studies, EIA ,Quantitative Risk Analysis as per the EIA Notification Guidance , Conducted Safety audits, Risk assessments, Training on Safe Handling Chlorine system, Construction safety system, Behavior Based Safety system a modern approach etc.
As Process Safety Specialist we have conducted PHA (Process Hazard Analysis) for two project- Plant erected and commissioned and running with full rated capacity.

4.1 PLANT SAFETY:

- Having Experience in water quality Analysis, Air quality, Confined Vessel Entry, Explosive atmosphere, Ventilation in Lab Hoods analytical equipments and techniques
- Experienced in Hydraulic testing of Chlorine cylinders and conducting physical and internal inspection of the cylinders and clearance for filling / Rejection.
- Hydraulic testing of Pipelines after erection and report preparation.
- Experienced in operation and maintenance of Belt conveyors, Screw convey, Bucket elevators ,Pipe conveyors and Pneumatic conveyors
- Working experience in Thermic fluid Heaters of make Thermax Ltd
- Experienced in Hydrogen fired Boiler of make Thermax Ltd.
- Having experience in Solvent separation unit in pharmaceuticals and specialty chemical plants
- Working Experience Operation and maintenance of Centrifugal machines

4.2 ENVIRONMENT SAFETY:

✈ Activities towards Compliance to the Environmental Statutory Requirements like

1. Consent Order for Existing / Expansion Projects
2. Environmental Clearance from MoEF&CC, CPCB, TNPCB.
3. Environmental Impact Assessment (EIA),
   3.1 It Involves Prefeasibility study
   3.2 Quantitative Environmental Risk assessment
   3.3 Environmental report
   3.4 Socio Economic conditions
   3.5 Air & water quality modeling
   3.5.1 Gaussian Model
   3.5.2 Noise Level reports and mapping
   3.6 Climatic
   3.7 Human Interface study
   3.8 Evaluation of Env Impacts
   3.9 setting an Environment Management Plan
4. Public Hearing
5. Participation in MoEF & CC Meetings
6. Hazardous and Non Hazardous Chemicals Management,
7. Transportation of hazardous Chlor-Alkali substances
8. Waste management of Solid, liquid and gaseous materials.
   8.1 Disposal methods of Haz waste and procedures
   8.2 Compliance requirements

5. SPECIFIC TOOLS AND EQUIPMENT USED:

Toolbox Talk, JSA, HAZOP, ENVID, Incident Investigation System, Gas Testing, PTW-Auditing, SCBA, Scaffolding Appreciation, Safe Journey Management, Safe Defensive Driving, Basic Life Support, Fire Warden on Emergency & Evacuation Drills, Fire Extinguisher, Fire Alarm, Fire Hydrant and Automatic Sprinkler system.

6. SPECIFIC STANDARDS USED:

IS 14489, Fact act -1948,Tamilnadu Factories rules 11950 MOEF, CPCB, TNPCB, OSHAs, EPA.,RCRA ,CERCELA, BIS. National Building Code,Tariff Advisory committee Etc..

7. PROCESS SAFETY MANAGEMENT RESPONSIBILITIES:

In charge of HSE Dept / Process Commissioning for Chlor alkali Plant, LPG, Benzene ,octane, heptane, Methanol, Diesel, and Furnace oil loading and unloading areas, Effluent Treatment Plant, Occupational Health & Training center HSE Achievements. Erection and Commissioning of Automatic Sprinkler system to 100 MT Storage of LPG Bullet (2 Nos) and Fire Hydrant System to petro-chemical and chlor alkali plant at given time schedule on Jan 2002.Basic HSE Induction Training to 2000 Manpower.

8. HSE ACHIEVEMENTS:

- Number accident free man days maintained up to 12 years continuously
- 5 star awards
- national safety awards
- consecutive national safety council awards
- British safety council awards
- ISO-9001 certificate
- ISO-14001 :2015 certificate – Lead Auditor
- Working with ISO 45001: 2018
- No of Internal safety audit conducted is approx 200.

9. HSE CERTIFICATES

- Ist Class Boiler Safety –Insp. Of Boilers-India
- HAZOP Leader – China –RISK MANAGEMENT SOLUTIONS
- DGFASLI – Govt of India Trained Safety auditor
- IRCA accredited LEAD AUDITOR FOR ISO 14001 -2004
- Certified Internal Auditor for ISO 9001
- First aid – St john Ambulance – Cent Govt of India

10. EHS SOFTWARE KNOWLEDGE:

- Process Hazard Analysis : HAZOP ,FMEA,FTA,SOP-Leader Software (ABS USA)
- Environmental Risk Assessments – 3MRA Software – EPA (USA)
- Noise mapping – Custics software –Spain
- Quantitative Risk estimation – ALOHA Software (EPA –USA)
- Piping – Pipe flow Expert Software –UK

11. OTHER CERTIFICATES:

- Safety Training Programme –By Insp.Of. Factories-Tamilnadu-India
- First Aider – St John Ambulance –India
- Ms-Office- 2000 – NIIT – India

12. PROFESSIONAL MEMBERSHIPS

- National Safety Council- Member-India
- Safety Engineers Association – Member-Tamilnadu
- Indian institute of Engineers (India)– Associate – Calcutta
- Safety Auditors Association of India -SAAI – Moderator
- Indian safety Engineers(ISE) – Member
- Chartered Engineer – In progress with IEI-India
- Industrial Waste management Association – Member -2010

Study Team Member ---------- 01

- Name : Mr. Vignesh .S - Environmental Specialist
- Designation : Study Team member of Green Global Safety System

Study team member ---------- 02

G.Balasubrmanian- Environment Assistant

Study Team Member---------- 03

Mr. Prabhakaran p - Environmental Specialist

Study Team Member---------- 04

Mr. Gunasekaran.P -Environmental Specialist

IV .Executive Summary

- ✓ As part of comprehensive Carbon Sequestration by green belt Study Report, M/s. JSW Steel Ltd, Salem Works located at, Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India, have the commitment and attitude towards the Pollution Control and Prevention management system.
- ✓ Total Carbon Sequestration by the Green Belt is 5707 MT during FY 2023-24. There is an increase in quantity of carbon Sequestration when compared with last financial year and there is a considerable Contribution in carbon sequestration by Tree Plantations at JSW, Salem plant. However, scope for improvement in planting trees is existed.
- ✓ Total Carbon dioxide emission by the integrated steel plant operation in the year 2023-24 is about 3035249 MT (Steel Production 11,11,812 MT/year) .
- ✓ Total quantum Carbon Sequestration by the Existing Green Belt in the Year 2023-24 is 5707 MT.
- ✓ Proposed green belt to the FY 2024-25 is 7000 Tree saplings.
- ✓ Organization have been continually striving to control and prevent air pollution by effective implementation of Environmental Management Systems and JSW Salem unit is certified for ISO 14001:2015 standard.
- ✓ Plant have controls over Oxides of nitrogen and sulphur and to a much lesser extent fluorides and chlorides release as they are present in the materials being burnt.
- ✓ Plant have Pollution Prevention system even about 99% of the total fumes and dust generated in steel-making process escape as fugitive emissions whereas slags also lead to release of fumes in the form of iron oxide, kish (graphite), soot and silica.
- ✓ Effective Pollution Control over Coke ovens which are another major source of emissions have been taken care by the organization.

- ✓ Two types of cleaning systems, dry and wet cleaning from hard substances are practiced. In dry cleaning the following control systems are used, viz., inertial dust catchers, cyclones, electro-static precipitators and different types of cloth filters.

- ✓ While in wet cleaning scrubbers, wet cyclones and various kinds of venturis are used. Wet method of gas cleaning is used such production where the cleaning is done from gases containing explosive grade substances.

- ✓ Total Tree plantation as reported by JSW is around 2,72,357 trees since inception till March 2024.

TREES PLANTED DETAILS -Cumulative				
S.No.	**Year**	**Opening (Nos.)**	**Tree planted (Nos.)**	**Cumulative (Nos.)**
1	2004 - 05	94340	100	94440
2	2005 - 06	94440	1100	95540
3	2006 - 07	95540	200	95740
4	2007 - 08	95740	4395	100135
5	2008 - 09	100135	5940	106075
6	2009 - 10	106075	5120	111195
7	2010 -11	111195	14250	125445
8	2011 -12	125445	7535	132980
9	2012 - 13	132980	10120	143100
10	2013 - 14	143100	6645	149745
11	2014-15	149745	19065	168810
12	2015-16	168810	10000	178810
13	2016-17	178810	6050	184860
14	2017-18	184860	5000	189860
15	2018-19	189860	14165	204025
16	2019-20	204025	14830	218855
17	2020-21	218855	18130	236985
18	2021-22	236985	15180	252165
19	2022-23	252165	10286	262451
20	2023-24	262451	9906	272357

Criteria for number of trees:

- ✓ Trees having height greater than 4 feet only is considered for sequestration calculation.

Tree Plantation -From April 2023 to March 2024				
S NO	**Date**	**Location**	**Number of Shadow Trees**	**Types of Trees**
1	6-Apr-23	Sinter Plant& Coke oven	30	Jamun Tree
2	6-Apr-23	BRM Tower Area	2	Idly flower,Guava Tree
3	6-Apr-23	Safety office	8	Nandiyavattam & Arika Paam Tree
4	10-Apr-23	WagonTipprer Road Side	25	Plam tree
5	10-Apr-23	Power Plant -II	40	Guava,Mango,Jack fruit,Nelly Tree
6	14-Apr-23	SINTER PLANT-II ROAD SIDE	13	Guava,Mango,Nelly Tree
7	21-Apr-23	WagonTipprer Road Side	25	Guava,Mango,Nelly Tree
8	22-Apr-23	COKE OVEN AREA	10	Nandiyavattam & Jack fruit Tree
9	29-Apr-23	Main Gate Road side	5	Guava Tree
10	4-May-23	NEW LAND AREA	300	Jamun Tree,Jack fruit,Pongam Tree,Mantharai Tree
11	6-May-23	NEW LAND AREA	400	Jamun Tree,Pongam Tree,Mantharai Tree
12	12-May-23	NEW LAND AREA	170	Jamun Tree,Pongam Tree
13	16-May-23	New Land Area	290	Jamun Tree,Pongam Tree,Pathani Tree
14	20-May-23	Admine	10	Yellow Ribbon,Round Aloe Vera
15	24-May-23	SinterPlant II	17	Croton,Jamun Tree,
16	26-May-23	Coke oven area & BRM	25	Jamun Tree
17	29-May-23	AUDITORIUM Road SIDE	20	Mango,Jack fruit,Nelly Tree
18	1-Jun-23	Sinter Plant-II Road Side	100	Jamun Tree,Jack fruit,Guava,Mango,Pathani Tree,Pipal Tree
19	4-Jun-23	BF2 office Road Side	45	Jamun Tree,Jack fruit,Mango,Pathani,Fig Tree
20	19-Jun-23	New Land	500	Jamun Tree,Pathani,Fig Tree,Pongam Tree
21	27-Jun-23	New R&D	3	Jamun Tree,Nelly Tree
22	29-Jun-23	BF2 Road Side	30	Yellow Ribbon,Jamun Tree,Teak tree
23	11-Jul-23	Coke oven area & Railway crossing	30	Borassus, Yellow Ribben
24	12-Jul-23	Sinter Plant area	20	Jamun Tree,Borassus, Croton
25	14-Jul-23	R.O plant	55	Arali flower,Hibiscus
26	16-Jul-23	BRM	20	Hibiscus,Borassus

27	21-Jul-23	Sinter Plant	50	Jamun Tree,Biscuot Hony Tree
28	14-Jul-23	Scrap Yard Area	20	Borassus
29	15-Jul-23	Power Plant II	50	Borassus,Saraca Indica
30	17-Jul-23	Security Paragon	30	Sembaruthi,Ashoka trees
31	18-Jul-23	BRM Road Side	40	Sembaruthi, Palm trees
32	20-Jul-23	Ro Water to ASP -II Road side	90	Palm trees, Croton,Yellow Ribbon
33	27-Jul-23	Old R&D	15	Yellow Ribbon,mango tree,Sembaruthi,ixora flower
34	5-Aug-23	Sinter Plant II	53	Pathani Tree ,Jack fruit,Jamun Tree,Muntingia calabura Tree,Mango Tree
35	17-Aug-23	Cement Factory	100	Jamun Tree,Pongam Tree,Plam Tree
36	20-Aug-23	Main gate area	45	Croton
37	26-Aug-23	Cement Factory	285	Jamun Tree,Mango,Pala Tree,Biscuit Tree,Malanelli Tree
38	1-Sep-23	BRM	55	Mango Tree ,Jack fruit Tree
39	5-Sep-23	SP-2	75	Plam Tree, Jamun Tree
40	5-Sep-23	security paragon	20	Mango Tree ,Jack fruit Tree
41	12-Sep-23	Main gate to temple gate	100	Plam Tree, Jamun Tree,Arasa Maram,Nelli
42	18-Sep-23	Temple gate area	50	Jamun Tree, mango
43	19-Sep-23	BRM Road side	50	Plam Tree, Jamun Tree,Arasa Maram,Nelli
44	21-Sep-23	SINTER PLANT II	95	PANAM TREE, SEMBARUTHI
45	24-Sep-23	Scrap Yard Area	120	Guva,Mango,Jackfruit, nelli
46	26-Sep-23	Coke oven area	100	SEMBARUTHI& Jamun Tree,Mango Tree
47	3-Oct-23	BF-II & TEMPLE	22	Jamun Tree,Mango,Tree
48	6-Oct-23	CANTEEN	2	Yellow Ribbon & Arasa Maram Tree
49	7-Oct-23	NEW CANTEEN NARTH GATE ROAD SIDE	100	Panam Tree
50	10-Oct-23	Cokeoven	100	Plam Tree,Mango Tree,Ashokan Tree
51	10-Oct-23	BF -II Ground Hopper Road side	100	Plam Tree
52	11-Oct-23	Admin Road Side	50	Plam Tree
53	11-Oct-23	Cokeoven	156	Plam Trees,Yellow Ribbon, Pongamia tree,Neem Tree, Guava Tree, NellieTree, Sapota Tree, Pomegranate Tree
54	13-Oct-23	Ball mill Area	65	Round Aloevera ,Yellow Ribbon, Chibiscus,Idly flower,Arali ,Nandhiyavattam, Plam Tree
55	20-Oct-23	SMS Lad Area	20	Plam Tree,Paper Flower,Basil
56	27-Oct-23	EOF Road Side	12	Areca Palm
57	27-Oct-23	Power Plant -II	5	Jamun Tree

58	27-Oct-23	Power Plant -II	5	Pongamia Tree
59	2-Nov-23	Safety Office	4	Areca Palm Tree
60	4-Nov-23	BF 2	10	Palm Tree
61	8-Nov-23	TOWNSHIP	400	Jamun ,Pongam,Mango,Pathani Tree
62	10-Nov-23	Township	450	Palm Tree,Jamun,Pongam,Mango,Pathani,Lemon Tree
63	11-Nov-23	Township	225	Palm Tree,Jamun,Pongam,Mango,Pathani,Lemon Tree,Mahua Tree
64	14-Nov-23	Town Ship	200	Palm Tree,Jamun,Pongam,Mango Tree,Ashoka Tree
65	14-Nov-23	Cokeoven &Admin	100	Sembaruthi flower& Ashoka,Palm Tree,Lemon,Chaste Tree,
66	15-Nov-23	Ball mill Area & R&D	4	Yellow Ribbon & Chaste Tree
67	16-Nov-23	Ball mill Area	2	Yellow Ribbon,Sembaruthi, Oosi AloeVera,Nanthiya Vattai&Mango Tree
68	16-Nov-23	Town Ship	200	Jamun,Pongam,Pathani Tree
69	25-Nov-23	Temple	10	Sembaruthi flower& Lemon Tree,
70	25-Nov-23	BF 2	3	Croton,Sembaruthi,Allamanda Plant ,Coconut Tree
71	25-Nov-23	NEW LAND AREA	85	Jamun,Pongam,Mango Tree
72	26-Nov-23	Main Gate Road Side	20	Chaste Tree,
73	1-Dec-23	Main Gate &Tample Gate	57	Papaya Tree & Sembaruthi
74	2-Dec-23	Guest House	10	Papaya Tree
75	8-Dec-23	BF-II	150	Bamboo Tree
76	9-Dec-23	Wegon Tippler	65	Bamboo Tree
77	12-Dec-23	Temple Gate	6	Coconut Tree
78	13-Dec-23	Main Gate Pinex Area	102	Bamboo Tree
79	13-Dec-23	BF-II & Sinter Plant -II	53	Hibiscus,Arali,Bamboo Tree
80	19-Dec-23	BRM cooling Tower	58	Coconut Tree+Arali+Nanthiya Vattai+Hibiscus+Yellow Ribbon
81	20-Dec-23	BRM cooling Tower	15	Yellow Ribbon+Hibiscus+Arali+Nanthiya Vattai+Palm Tree
82	27-Dec-23	Power Plant	9	Lemon Tree+Hibiscus+Mango+Fetus+Narcissu mando+Hibiscus
83	29-Dec-23	Old R&D Road & OHC	75	Rose + Plam Tree +Coconut Tree
84	29-Dec-23	Sinter Plant	40	Narcissu mando+Guava Tree+Mango Tree
85	29-Dec-23	Anneling Road Side	130	Gooseberry Tree+Java Plum+Guava+Pathani+Great Fruit Tree
86	28-Dec-23	Main Gate Road Side New Land	150	Guava Tree+Gooseberry Tree+Pathani+Great Fruit Tree+Pongamia Tree

87	29-Dec-23	Town Ship	165	Pathani Tree+Gooseberry Tree+Guava Tree+Guava Tree+Great Fruit
88	02.01.2024	CPP2	150	Guava Tree+Amla+Pathani
89	03.01.2024	Sinter Plant	460	Badam Tree+Jamun+Mahogany
90	06.01.2024	BF	25	Mahogany Tree,Badam Tree,nelli
91	10.01.2024	Temple gate area	50	Pungan,nelli,jamun,
92	12.01.2024	R&D Road side	20	Pungan,nelli,jamun,
93	17.01.2024	Sinter plant II	80	mango,nelli,pungan
94	20.01.2024	Coke oven area	60	Guava Tree
95	23.01.2024	Main Gate	280	Pathani Tree,mango,nelli,jamun
96	25.01.2024	ANNEALING PLANT	55	Jamun Tree
97	27.01.2024	BLM	25	Pungan
98	01.02.2024	Blooming Mill	80	Guva,Sapotta,Gooseberry,Lemon,Mango,Jamun Fruit(Naval)
99	02.02.2024	Civil Office	43	Padam,Jamun Fruit(Naval),Mahogany
100	02.02.2024	Sinter Plant	45	Lemon,Jack Fruit
101	03.02.2024	Blooming Mill	40	PadamPanai (Borassus)
102	06.02.2024	CCM-3	85	Guva,Jamun Fruit(Naval),Panai (Borassus),Coconut
103	07.02.2024	BF-2	285	Bamboo,Guva,Jamun Fruit(Naval),Mahogany
104	08.02.2024	Main Gate	125	Jamun Fruit(Naval),Mahogany,Guva
105	09.02.2024	COP	582	Bamboo
106	17.02.2024	HR Office	30	Lemon,Banana Tree
107	20.02.2024	Blooming Mill	95	Arya Farm,Water Apple,Guva,Jack Fruit,Mango
108	21.02.2024	CPP-1	10	Guva
109	21.02.2024	BRM	35	Jamun Fruit(Naval),Padam,Pongan
110	25.02.2024	Blooming Mill	30	Goosberry
111	01.03.2024	New Land Area	25	Jamun Tree,Gooseberry Tree
112	04.03.2024	Main gate	20	Guava Tree
113	05.03.2024	Yard Area	75	Pathani Tree,Pungam,Mahogany Tree
114	10.03.2024	New HR Office	10	Jackfruit Tree
115	11.03.2024	SPP -II Area	15	Jamun Tree
		Total Tree sapling for FY 24	**9906**	

GREEN BELT DEVELOPMENT WITH RESPECT TO AREA COVERAGE

Green Belt developed area in percentage			
Sl.no	Location	Green belt cover area in Hectares	Sapling in Nos (Approx)
1	JSW canteen beside area	10.96	35984
2	Old Guest House area	6.16	20365
3	Raw material Yard (BF & SP)	7.6	27199
4	Water Reservoir Area	11.72	35628
5	Wagon Tippler area	1.2	4007
6	Coal Yard area (COP)	0.27	1081
7	Coal Yard area	0.32	1431
8	Temple area	3.16	8546
9	Back side of canteen (New land area)	12.9	21586
10	Mills area	7.01	35729
11	Township	10.54	19558
12	Power plant (CPP#II)	7.36	29907
13	Miscellaneous	12.08	31336
	Total Area coverage by Green Belt	91.28	
	Total Area available (Ha)	268.08	
	Total plant area available (Ha) Steel * CPP#2	237.28	
	Greenbelt developed (%) total land area(268.08 ha)	34.05	
	Total planted trees as on March 2024		272357

V. Objective of the Carbon Sequestration by Trees

- To evaluate the amount of carbon sequestrated by the green belt in M/s. JSW Steel Ltd, Salem Works located at, Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India.
- To carry out a study on Carbon Sequestration by Trees

VI. Scope of the Study

Carbon dioxide (CO_2) is the prime cause of global warming. The levels of CO_2 in the earth's atmosphere are rising ever since the industrial revolution begun. Even today in India, most of the industries rely heavily on coal as their source of energy. Most of us are still concerned only with acquiring energy, irrespective of methodology involved. CO_2 produced in the form of flue-gases is released without appropriate treatment which is adversely affecting the environment. A range of actions that need to be undertaken includes Carbon Dioxide Capture and Sequestration (CCS) Technology. CCS is a process of separation of CO_2 from Large Point Sources (LPSs), transport to a storage location, followed by long-term isolation from atmosphere. A portion of desired depletion can be achieved by improving energy efficiency owing to technological advancements, and the remainder might be achieved by moving on to renewable energy resources. In India, along with population explosion, there is rise in temperature due to global warming and to cope with the levels of CO_2, we need to see what kind of technological options we have to solve the problem. The paper brings about the study of CCS, its advantages, cost effectiveness and related drawbacks in India.

Capturing CO_2 : CO_2 finds its way into the atmosphere in numerous ways. In India, most of it is emitted by large stationary sources and rest by mobile sources in comparatively smaller quantities. These emissions are mainly from the combustion of fossil fuels, dominantly coal, used for power generation, industrial processes, and the other fossils fuels used in transportation, residential and commercial buildings. CO_2 is also emitted during certain industrial processes like cement manufacture or hydrogen production and during combustion of biomass. The main purpose of capturing is to produce a concentrated stream of CO_2, so that it can be transported to storage sites at high pressures.

The reason for concentrating the CO_2 stream is to make it economically feasible. Transportation of CO_2 in dilute form would make it unrealistic and impractical in context of the required capital. The main application of CCS is at the large stationary sources as capturing CO_2 directly from small and mobile sources has so far proven to be very complicated and expensive too. The capture directly from atmosphere would not be discussed in the paper as the concentration is less in ambient air (around 380 ppm) by a factor of 100 times as compared to flue gases. Minimization of emissions from these large point sources can have a drastic impact towards lowering the CO_2 levels. Capture from industrial process streams

- Post-combustion capture
- Pre-combustion capture
- Oxy-fuel combustion capture

➢ To conduct the Carbon Sequestration by Plants in the M/s. JSW Steel Ltd,Salem Works located at,Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India and the general List of areas in the factory premises are as follows

➢ Boundaries of the plant

➢ Wagon tippler

➢ Water reservoir area

➢ JSW Power Plant

➢ R&D Blocks

➢ Admin Building

➢ Old Gust House Area

➢ Canteen area

➢ Plant units

- Road sides
- Temple Area
- Non Recovery Type Coke Oven Plant
- Sinter Plant
- Blast Furnace
- Steel Making
- Air Separation Plant
- Steel Refining
- Continuous Casting of Billets and Blooms
- Bar and Rod Mill
- Blooming Mill
- QAD
- Captive Power Plant (3 x 30 MW)
- Utilities – Boilers, Water treatment, ETP, STP, Cooling water, Air compressors etc.
- HR and Admin building
- Purchase and Logistics buildings
- Accounts and Finance building
- Occupational Health Center -building

VII.Methodology

The following sequence of the methodology is adopted to conduct the Carbon Sequestration by Plants

The given study is an amalgamation of the literature review, Site visits, qualitative and Quantitative analysis of the data on spatial coverage of the green cover in the study area and its respective carbon sequestration potential. Based on the above findings, the study recommends percentage achievable area under tree cover through appropriate policies, plans.

1.Pre Study

1.1 On the requests from M/s. JSW Steel Ltd,Salem Works located at, Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India., Our Study team sent a questionnaire.

1.2 Study plan was prepared and sent to the client.

2.Site Visit

2.1 Our team conducted a site visit after the opening meeting with the Environmental Department team.

2.2 Opening meeting happened in the presence of EHS Head

2.3 After the Opening meeting, site Study was conducted by our team at Site

2.4 Site Study of Carbon Sequestration by Plants was done as per the scope of work

3.Post Study

3.1 Closing meeting were conducted and inputs were taken for further Analysis and Study by our team. Report sent to the management

- This is the final report presented to M/s. JSW Steel Ltd,Salem Works located at Salem.

Methodology- Comprehensive

The rate of carbon sequestration depends on the growth characteristics of the tree species, the conditions for growth where the tree is planted, and the density of the tree's wood. It is greatest in the younger stages of tree growth, between 20 to 50 years. Further complicating the issue is the fact that far less research has been done on tropical tree species as compared to temperate tree species.

Nevertheless, we can roughly estimate the amount of CO_2 sequestered in a given tree, and if we divide by the tree's age, get a yearly sequestration rate.

We got this process from two educational websites who had conceived it as a learning activity for their students.

This is the process:

1. Determine the total (green) weight of the tree.
2. Determine the dry weight of the tree.
3. Determine the weight of carbon in the tree.
4. Determine the weight of carbon dioxide sequestered in the tree
5. Determine the weight of CO_2 sequestered in the tree per year

Determine the total (green) weight of the tree

Based on tree species, the algorithm to calculate the weight of a tree is:

W = Above-ground weight of the tree in pounds

D = Diameter of the trunk in inches

H = Height of the tree in feet

For trees with D < 11:

$W = 0.25D^2 H$

For trees with D >= 11:

$W = 0.15 D^2 H$

Depending on the species, the coefficient (e.g. 0.25) could change, and the variables D2 and H could be raised to exponents just above or below 1. However, these two equations could be seen as an “average” of all the species’ equations.

The root system weighs about 20% as much as the above-ground weight of the tree. Therefore, to determine the total green weight of the tree, multiply the above-ground weight of the tree by 120%.

Determine the dry weight of the tree

This is based on an extension publication from the University of Nebraska. This publication has a table with average weights for one cord of wood for different temperate tree species. Taking all species in the table into account, the average tree is 80 % dry matter and 20 % moisture. Therefore, to determine the dry weight of the tree, multiply the weight of the tree by 80%.

Determine the weight of carbon in the tree

The average carbon content is generally 50% of the tree’s total volume. Therefore, to determine the weight of carbon in the tree, multiply the dry weight of the tree by 50%.

Determine the weight of carbon dioxide sequestered in the tree

CO_2 is composed of one molecule of Carbon and 2 molecules of Oxygen.

The atomic weight of Carbon is 12.001115.

The atomic weight of Oxygen is 15.9994.

The weight of CO_2 is C+2*O=43.999915.

The ratio of CO_2 to C is 43.999915/12.001115=3.6663.

Therefore, to determine the weight of carbon dioxide sequestered in the tree, multiply the weight of carbon in the tree by 3.6663

Determine the weight of CO_2 sequestered in the tree per year

Divide the weight of carbon dioxide sequestered in the tree by the age of the tree.

EXAMPLES

Estimated growth rates and sizes of agroforestry trees were taken from the World Agroforestry Centre's "Agrofores tree Database"

Let's see how much a Calliandra calothyrsus might sequester in a year. A 10-year-old Calliandra would probably grow about 15 feet tall with a trunk about 8 inches in diameter. Therefore:

$W = 0.25D^2 H = 0.25(8)^2(15) = 240$ lbs. green weight above ground.

240 lbs. * 120% = 288 lbs. green weight (roots included)

288 lbs. *80 = 230.4 lbs. dry weight

230.4 lbs. * 50% = 115.2 lbs. carbon

115.2 lbs * 3.6663 = 422.4 lbs. CO_2 sequestered

422.4 lbs / 10 years =42.2 lbs. CO_2 sequestered per year

Or consider a 10-year-old Grevillia robusta, 45 feet tall with a trunk 6 inches in diameter. Using the same calculations as above, the amount of CO_2 sequestered would be 71.3 lbs. per year.

Or a newly-planted Acacia angustissima, 2.5 years old, 15 feet tall with a trunk 3 inches in diameter: 23.8lbs. of CO_2 sequestered per year.

Or an Albizzia lebbek, 15 years old, 30 feet tall, with a 12 inch trunk: 76.0lbs. of CO_2 sequestered per year.

Note : Reference from the below site

This research and methodology is based on research papers, university publications, and other information freely available on the Internet. As we stated before, it is difficult to calculate the amount of carbon dioxide sequestered per tree per year due to the complexity of the variables involved, as well as the lack of research on tropical tree

species. If you have any information that could further refine or enhance our calculations, please let us know at info@treesftf.org.

Other methods

Another way to estimate the amount of CO_2 sequestered by a tree in a year is to estimate the amount sequestered in a hectare per year, and divide that amount by the number of trees per hectare. Scanning around on the Internet, it seems that the number of trees per hectare (in agroforestry and/or industrial plantations) ranges from under 500 to over 2,000.According to Myers and Goreau, tropical tree plantations of pine and eucalyptus can sequester an average of 10 tons of carbon per hectare per year. Therefore, the plantation can sequester an average of 20,000 lbs * 3.6663 = 73,326 lbs CO_2/ha/year, or, taking an average of 1,000 trees per hectare, 73.326 lbs CO_2/tree/year.

Of course, we heavily discourage the planting of pine and/or eucalyptus in our agroforestry systems. Our trees may not grow as fast or as straight as eucalyptus, but they are not invasive, and they do not destroy the water table and the soil!

Disclaimer

This research and methodology is based on research papers, university publications, and other information freely available on the Internet. As we stated before, it is difficult to calculate the amount of carbon dioxide sequestered per tree per year due to the complexity of the variables involved, as well as the lack of research on tropical tree species.

VIII.Standards

- As per the CPCB Guidelines, Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant.
- The project proponent shall prepare GHG emissions for the plant and shall submit the programme for the reduction of the same including carbon sequestration including plantation. The guideline is attached as **Annexure –II** of the report.

IX.Industry Profile

Manufacturing Process

1.0 Introduction

JSW Steel Limited, Salem Works is a continuous process industry. The Production capacity of finished products at present is 1.15 million TPA special alloy steel.

Iron complex consist of 2 nos of Blast Furnaces with the production capacity of 1.05 MTPA,1 no of 2 strand Pig Casting Machines and 2 nos of Sinter Plants with production capacity of 1.235MTPA and Coke Oven Plant of 0.5 MTPA capacity.

Steel Melting shop consisting of 2 nos of Energy Optimizing Furnaces (each 65 T/ladle), 4 nos of Ladle Furnaces (each 65 T/ladle), 2 no of Vacuum Degassing Unit, 2 nos. of 3 strand Continuous Billet Casters, 1 no of 3 strand Continuous Bloom casters. Steel finishing shop consisting of Bar and Rod Mill (BRM) with the capacity of 0.48 MTPA and Blooming Mill capacity of 0.48 MTPA. and wire rod block. BRM has downstream operations of Annealing, pickling and peeled & ground unit. The downstream operations are based on supplier needs.

In addition to the above plants, there are 2 nos of Air Separation Plants, 1 no 7 MW and 3 Nos of 30 MW (97 MW) Captive Power Plants , 1 no Pulverizing Coal Injection Plant, 1 no Lime Calcining Plant and MRSS, utilities are installed as support functions. The main products of the plants are pig iron, steel billets/steel blooms, steel bars rods and coil.

Raw Materials Storage

The raw materials, namely, iron ore, coke, manganese, limestone, dolomite and quartzite will come from different sources such as Bellary-Hospet area, Salem area, Sandur belt of Bellary-Hospet area by rail/road. Some raw materials are imported from Australia and /or china. They will be stacked in the raw material storage yard, transported by conveyor system to the storage bunkers. These materials shall be fed in required proportion for Sinter Making, Iron Making and Steel Making etc.

Wagon tippler

JSW Salem has installed a unique design of Wagon tippler first of its kind in Indian, which has the facility to form empty rake parallel to the loaded rake, with a uniquely designed Traverser which shifts empty wagon from inhaul to outhaul line.

The JSW Wagon tippler is designed by M/s Metso minerals India pvt.ltd. Wagon tippler is designed for handling 140 MT (includes wagon weight) with cycle time of 144 seconds per wagon. The installed capacity can evacuate material up to 1600MT per hour.

Wagon Tippler also has a specially designed side pad with articulated movement by which even the bulged wagons also can be handled.

Non Recovery Type Coke Oven Plant

The Coke Oven Plant will use stamp-charging technique to increase the bulk density of the coal, which will be charged to the oven. This will increase the yield and increase the strength of coke. The Coke Oven operation completely automatic and the process of carbonization of coal being controlled.

Carbonization of coal shall be completed in 65 hrs at temperature range of 1100-1300 C. On completion of the process the coke shall be discharged from the oven into the quenching car which will be quenched in the quenching tower. Subsequently the coke will be cut to the specified size, screened and transferred to Blast Furnace. The fines i.e. coke breeze shall be used in Sinter Plant for Sintering Making. The small amount of solid waste generation from the Coke Oven is being reused in the Sinter Plant. The waste heat of the flue gas will be fully utilized by Waste Heat Recovery Boilers for power generation.

Sinter Plant

The iron ore fines, coke fines, lime stone fines and other raw material fines dusts which cannot be used in the Blast Furnace are processed in the plant at a temperature of about 1200 C, by burning fuel. Sintering is a process of agglomeration of fines by incipient fusion in to porous lumps called Sinter which is an ideal input for Blast Furnace.

The sinter plant is essentially an assembly of pallets with grates moving with the help of sprocket wheel and chain table. The hearth layer passes through an ignition hood where

it gets ignited by burning furnace oil/Blast Furnace Gas. Wind boxes are provided below the sinter bed for suction of air to effect uniform burning of sinter bed along the cross section. The suction is maintained by fans. The strand is provided with necessary sealing to prevent air leakage between pallets and the machine.

The hot sinter cakes are broken by a sinter breaker and passed through sinter cooler strand where the hot sinter is subjected to cold air below. This cold sinter is crushed in roll crusher and screened in three stages. The sinter having size less than 5mm is conveyed to the sinter return bin in the stock house of sinter plant. Sinter of size 20-50mm is taken to the stock house of the blast furnace. Sinter of intermediate size of 10-20mm is taken to the sinter machine to serve as a bed layer.

Blast Furnace

In this furnace sintered iron ore, lump iron ore along with fluxes are reduced with metallurgical coke at a temperature of around 1400 C to produce hot metal and slag. The slag gets granulated while tapping. The hot metal tapped is ready for either steel making or making pig iron in a pig casting machine.

The blast is heated up by high-pressure air through hot blast stoves. As the burden descends, the hot gases rise upwards. During the process operation, chemical reactions take place at different levels, specific temperature and gas composition. The reactions are confined mainly to the oxides of iron and carbon wherein deposition begins at 250 C.

The product (hot metal) from the Blast Furnace is then transported to Steel Melting Shop to purification and if any downstream operations down then hot metal will be transferred to pig casting machine. The cold pig iron from the pig casting machine will be sent to the storage yard.

Steel Melting Shop

The Energy Optimizing Furnace (EOF) process is essentially oxygen steel making process in which oxygen is injected into the furnace both above and below the surface of the molten bath.

The oxygen that reacts with the carbon present in the hot metal produces carbon monoxide, which again gets oxidized to carbon dioxide with the liberation of heat by

burning with oxygen above the bath. The temperature in the bath will be maintained within 1650 -1700 C. Fuel heating provision is provided in case the bath gets cooled.

The hot metal from Blast Furnace will be transported to EOF in ladle by diesel loco operated hot metal transfer car. The hot metal will be received at the hot metal bay and then poured in the EOF with help of hot metal charging crane.

Processed scrap will be brought from scrap yard to EOF in scrap charging box (15-20 %) and then will be charged to EOF. Other fluxes and additives will be stored in over storage bunkers and will be added in EOF as per the process requirement.

The steel making operation, two other supporting plant facilities will be needed

(I) Lime Calcimining Plant – for providing burnt lime

(II) Air Separation Plant – for providing oxygen to the steel making furnace

Air Separation Plant

An air separation plants have been installed to provide oxygen for steel making furnace. The air separation plants have the provision to produce argon and nitrogen required for steel making/refining operation.

Steel Refining

From EOF, liquid steel will be tapped into steel teeming ladle placed on a self-propelled steel transfer car and the liquid steel in the ladle will be placed on steel vessel for processing in LRF.

Crude steel obtained from EOF will be taken to the Ladle Refining Furnace (LRF) for adjustment of steel chemistry by addition of Ferro-alloys. The LF has been provided with water-cooled hood and electric arc heating devices for the adjustment of steel chemistry in the LRF.

An online argon rinsing stand is provided in the secondary refining aisle and it is envisaged that all the plain C-steels (i.e. re-bars etc.) will be burged in the argon rinsing stand and then moved to the Continuous Casting Machine (CCM) for making billets. In the Ladle Furnace necessary secondary metallurgical treatments will be carried out to

take care of proper temperature and composition of steel required for the casting of different grades of steel as per product-mix. The LF has been equipped with a fume

extraction system consisting of ducts bag filters, chain conveyor and silo for necessary de-dusting.

Continuous Casting of Billets and Blooms

The refined steel is brought from Ladle Furnace in steel teeming ladle to continuous casting machine to make steel billets and blooms. The casters are provided with three strand casters with secondary water cooling system, auto-touch cut off unit, bottom bed dummy bar system, cooling bed, tundish, mould, and segment preparation facilities.

Bar and Rod Mill

The billets will be transported to rolling mill billet transfer car/crane to billet storage and conditioning Bay of bar and rod mill. Mild steel billets will be stored and the alloy steel billets will be conditioned (i.e. ground and inspected).

Billets will than be loaded in to billet charging grid of the bar and rod mill. From there, billets will proceed to 2 nos. of 45t/hr. rapid re-heating furnaces. After discharge from the furnace at a temperature of 1200-1300 C, the billets will be descaled in a descaler and will be rolled in a 3-high mill strand. After this, the billets will further rolled in 18-strands of bar mill for production of bars of 13-55mm diameter going to cooling bed and for rods 12-34mm diameter going to garret coilers.

With the help of another 4 strands, rods 5.5 -16 mm diameter will be produced and will be cooled in Eden borne coilers. From cooling bed, the rolled bars will proceed to a cold shear where these will be cut to commercial lengths and then collected for bundling and tying.

From coilers, the rod coils will proceed via flat conveyor and hook conveyor to coil collecting capstan. Finishing facilities like straightening, annealing, bright bar grinding, shot blasting, inspection benches etc. are provided for further treatment of rolled bars.

Blooming Mill

The Reversible Blooming Mill is designed to produce heavy rounds and square in the range of 60 - 180 mm as finished/semi-finished product for re-rolling.

The raw material as input to the mill shall be continuously cast blooms from Steel Melt Shop. The bloom sizes available will be:

i) 250 x 250 mm

ii) 340 x 400 mm

Depending on quality requirement of the customer, appropriate size of bloom shall be selected for each size of the product. The manufacturing process flow sheet is enclosed.

Captive Power Plant (1 x 7 MW and 3 x 30 MW)

The heat energy of the fuel on combustion used to generate super heat steam in the boilers. The steam is made to run the steam turbine, which coupled, to turbo generator. The rotation of the shaft of turbo generator, produces the current in the coil of the generator, which drawn out as energy.

As the whole, CPP have energy converting systems in series; starting with heat energy into electrical energy, as final end product and the CPP is for a total power generation capacity of 90 MW; will have five parallel units, each having 30 MW capacity.

The CPP (3x30 MW) have necessary utilities like Cooling Tower, Power house, Compressor, water treatment and transportation systems, transformer bay etc., as common for both the power generation units.

To generate 90 MW power, steam is getting through one number of AFBC boiler (127 TPH) using coal as fuel, Five numbers of WHRB (45 TPH 2 Nos,31.5 TPH 2 Nos and 25 TPH 1 No) using COP gas (sensible heat) and One number BFG boiler (32 TPH) using BF gas for combustion.

Coal Based boiler

Coal based (AFBC) boiler make use of imported coal for the reasons off low ash and content; If imported coal is not available, happen at times, then the coal is essentially a washed one at the source of mine, namely, beneficiated coal drawn from the mines of JSW, one of the major shareholder of JSW. The beneficiated coal is less in ash and having low sulphur (< 1 %) content.

The major unit operations are:

1. Atmospheric Fluidized Bed Combustion (AFBC) boiler.
2. Coal storage and handling system

The major, specific utility for this coal – based CPP is the coal handling mechanical systems for storage and transportation and closed Mechanical Conveyor systems for coal transfer to prevent fugitive dust emission during coal transfer had been installed.

The Fly ash handling systems are specifically designed for better collection of fly ash from ESP and bottom ash from furnace, to destinations, through dense phase Pneumatic conveying systems. The ash collection point has been provided with closed mechanical transfer system to load the ash in trucks for transportation.

AFBC Boiler

The atmospheric fluidized bed combustion is state of the art Clean-Coal combustion technology for ensuring the complete combustion of the coal.

The AFBC boiler for CPP has the following processes and characteristics

a) It is Bubbling Bed type
b) Gas temperature in the boiler is 820 to 840 deg C
c) Provision is available to project limestone into the furnace to capture sulphur and remove it as a dry by-product.
d) Reduces the level of NOx emission by 90-95 %

Steam generation will be 127 TPH at 88 bar atmospheric pressure and at 520 C of super heat temperature and provided with a tall RCC stack for 80m height with ID fan and Electrostatic Precipitator for emission control. Ash collection systems are provided at the bottom of the ESP facility.

Coke Oven Gas/Blast Furnace gas fired boilers

In gas based system the waste heat from coke oven flue gases (COFG) from the Coke Oven Plant and the excess Blast Furnace Gas (BFG) is utilized for power generation. The non-recovery type of coke ovens are environmentally safe and waste heat recovery from these coke oven is inherently uncertain and is not prevalent. In this project activity 243,277 Nm3/hr of coke oven flue gases generated from coke oven batteries at 1050 deg C is utilized for power generation by sensing/recovering the waste heat through the boilers natural circulation single drum Waste Heat Recovery Boilers having a main stream

pressure at 94 kg/cm2. In this Boiler there are three Economizers which help to recover the waste heat from the flue gas which in turn increase the efficiency of Boilers.

Also the Blast Furnace at Steel Plant, having a hot metal production capacity of 1.05 Million TPA will generate 36000 Nm3/hr of BF gas in excess, after in-house consumption. This excess BF gas which otherwise would have been flared will be utilized for power generation by installing a 32TPH single drum Blast furnace gas fired boiler having a main stream pressure at 94 kg/cm2.

The gas is burnt in the furnace of the boiler. The walls of this furnace are water tubes welded to each other. The water circulated through the water wall tubes absorb the heat and converted in to steam. The water – steam mixture goes to the steam drum where the steam is separated. The process of passing through super heater tubes arranged within the furnace leads to the super heating of the steam. This high pressure and high temperature steam is rooted to a steam turbine. The thermal energy is converted in to mechanical energy by expansion of steam (through reduction in its temp & press) in the turbine. This rotational energy is used drive the generator which produces electricity.

The combined steam from WHRB (5 nos.) and BF Gas fired boiler are taken through a main steam line and admitted to Steam turbine for power generation. A steam common header is provided (AFBC and other boilers steam is connected) before entering to steam turbines where is a flexibility to utilize steam to at both turbines invariable with steam generation at any boiler. In view of environmental prospective to minimize fossil fuel consumption power is being generated about 70 % through gas based by maximizing the utilization of COP, BF.

X.Study Team Selection

Our Study team is selected in such way that the competency level in hands on expertise in Carbon Sequestration Study of Iron and steel manufacturing operations and presenting suitable recommendations.

Our team comprises of

Mr.M.Meganathan	-	Lead Environment Expert
Mr. Kamalakannan	-	Team member
Mr. Vignesh	-	Team member
Mr. Sivnesh Mani	-	Team member
Mr. Desingraja	-	Team member

Lead Environmental Specialist have hands on Experience more than 15 years in Various Kinds of Industries in Environmental Pollution control departments .

We are recognized Auditors by the Central Government of India and notified accredited Safety Auditors under the Provisions of Manufacture storage, Import of Hazardous chemicals Rule 2000 (Mother Act - Environmental Protection Act 1986) by the Director of Industrial Health and Safety –Tamilnadu .

PART – B

XI. Site Visit

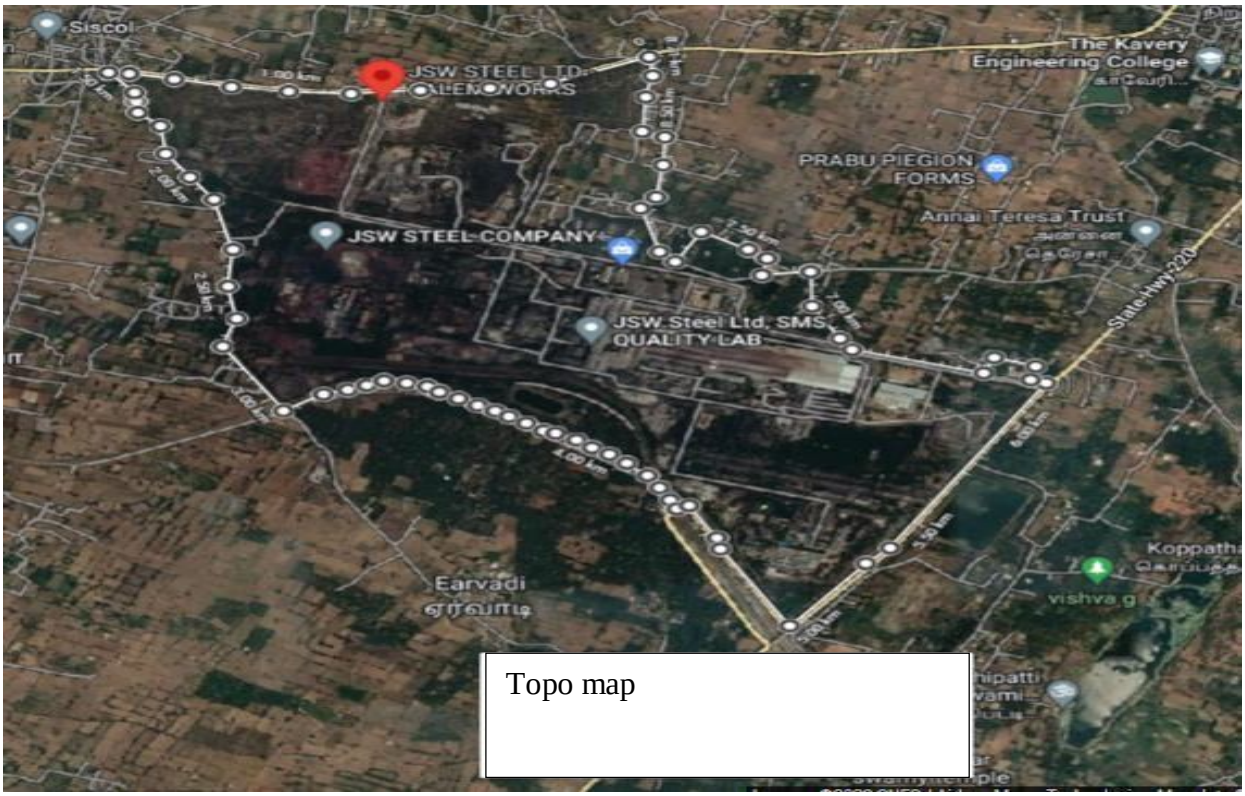
We performed Carbon Sequestration Study for the following areas

- Boundary's of plant
- Old gust house
- New gust house
- New plant area
- Temple area
- Wagon tippler
- Non Recovery Type Coke Oven Plant
- Sinter Plant
- Blast Furnace
- Steel Making
- Air Separation Plant
- Steel Refining
- Continuous Casting of Billets and Blooms
- Bar and Rod Mill
- Blooming Mill
- QAD
- Captive Power Plant (1 X 7 MW & 3 x 30 MW)
- Utilities – Boilers, Water treatment ,ETP ,STP ,Cooling water , Air compressors Etc.
- HR and Admin
- Purchase and Logistics
- Accounts and Finance office buildings
- Occupational Health Center

- New Land area

XII- GREEN BELT TOPO MAP

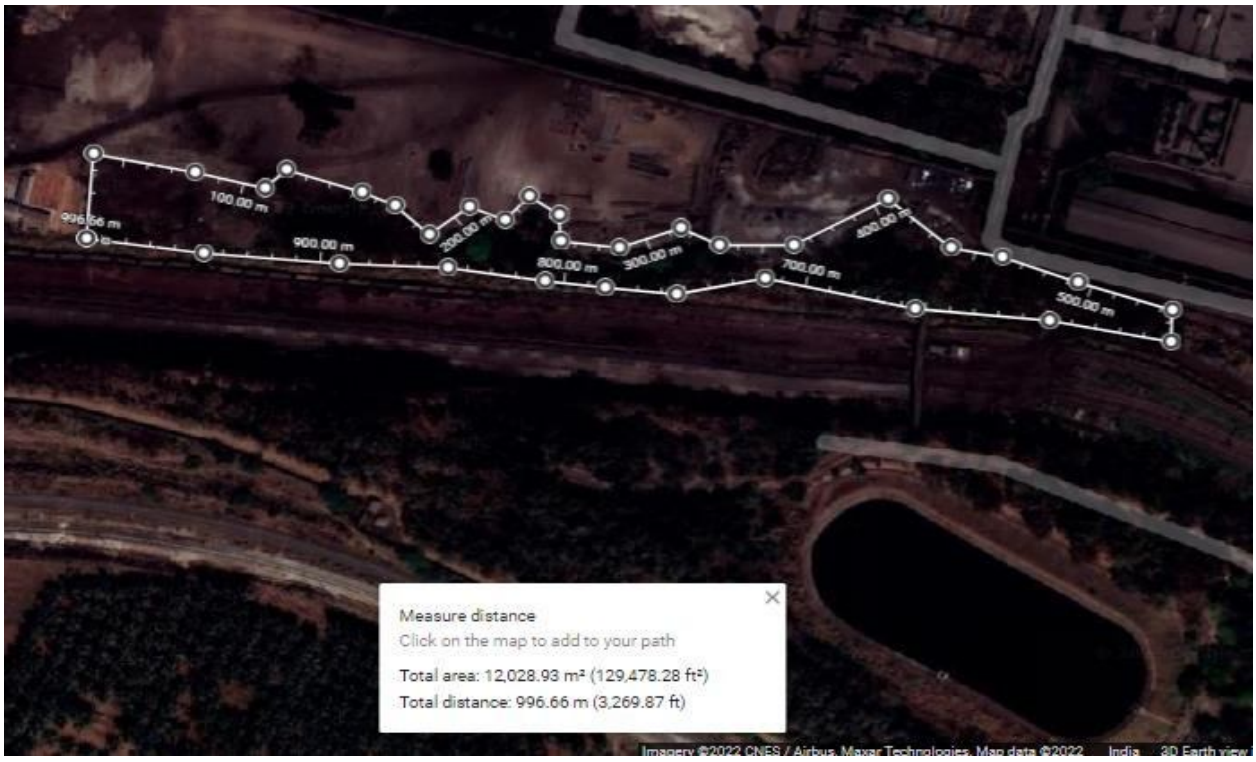
Topo Map:



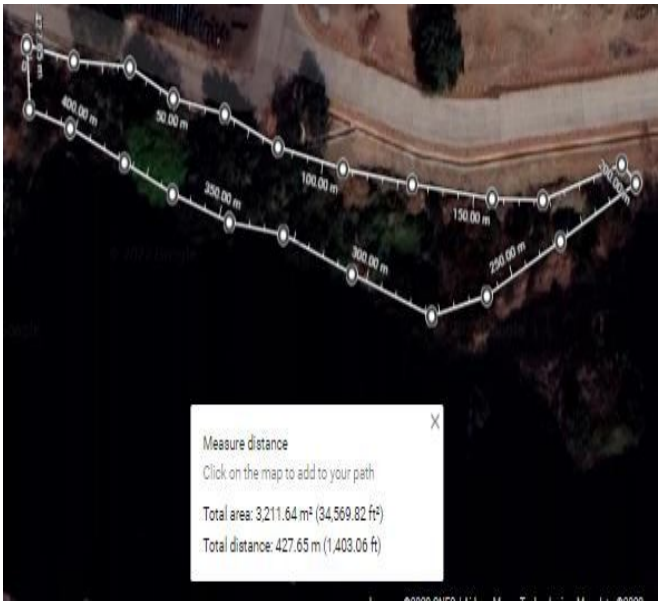
Topo map

Water Reservoir

Wagon to near by Water reservoir:



Coal storage area



Temple Area:

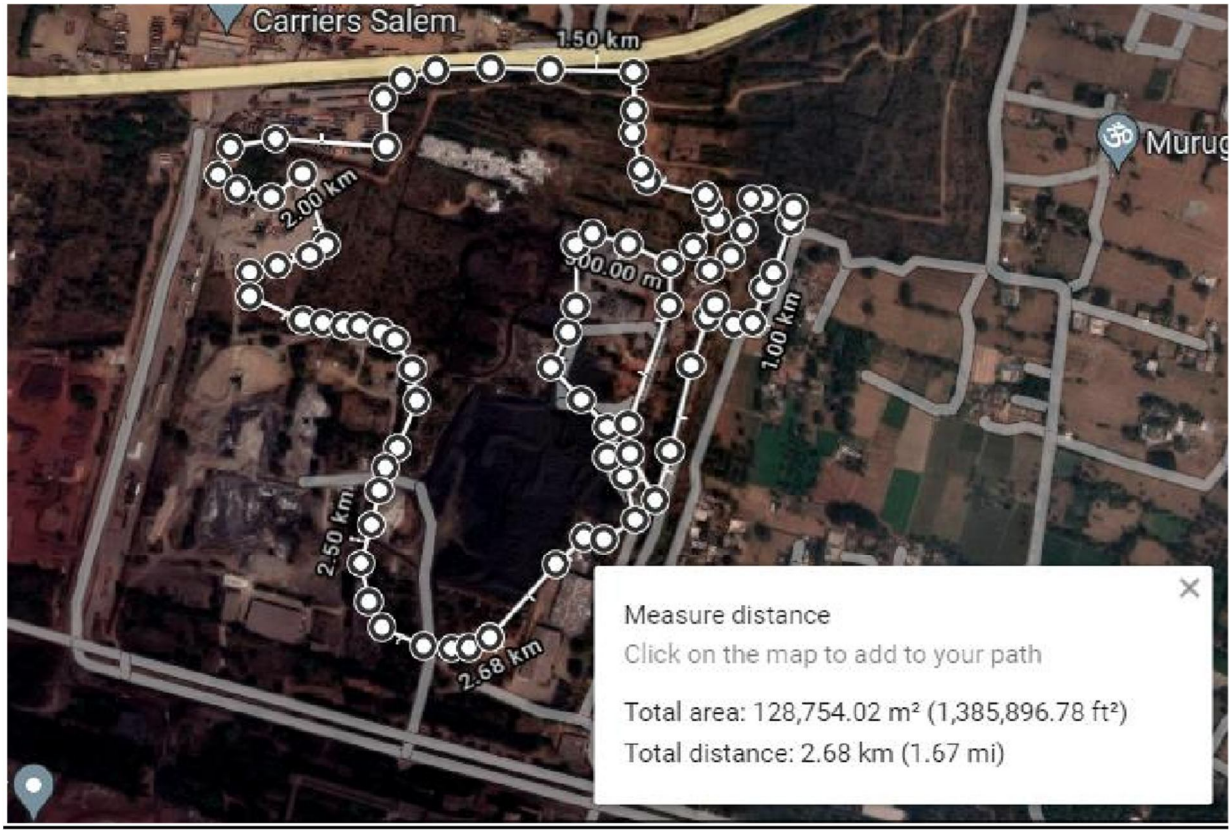
JSW Power plant Area:

Raw Material Yard (Admin Building)

Old Guest House Surrounding Area:

JSW Canteen:

JSW Canteen Back Side:



Mill Area:


JSW Occupational Health Center
JSW Work
1.0 m
3.0 km
Measure distance
Click on the map to add to your path
Total area: 70,118.46 m² (754,748.82 ft²)
Total distance: 3.46 km (2.15 mi)

Green Belt Development management

Carbon Sequestration Team - 2023

Carbon Sequestration study by GGSS team - 2023

XIII. Recommendations:

- ✓ **Scientific Long Term Planning**

  Plant green and tree cover should form an integral part of the development of the master plans of the plant and its successive long term management. Resource assessment with respect to water availability, soil type, existing tree species, their density & health, growth conditions, etc. should be done to minimize stressful conditions and ensure long term survival of the selected species. Use of modern scientific tool like GIS wherein the given area can be divided into 1 Km2 x 1 Km2 or 5 Km2 x 5 Km2 uniform grids for planning of afforestation schemes should be done to attain the uniform results.

- ✓ **Industrial Green Agglomerations**

  High quality clonal or tissue culture seedlings should be supplied to Gardeners for plantation e.g., Neem (Azadirachta indica), Ardusa (Ailenthus sp.), Mango (Mangifera indica), etc. Inclusion of trees in farming systems of inside the plant and periphery landscape can enhance productivity, profitability, diversity, and ecosystem sustainability.

- ✓ **Biodiversity Parks and Tree Tourism**

  Tree tourism has the potential to attract nature enthusiast and biodiversity lovers to map the biodiversity in the Industrial agglomerations of the plants for their ecological, educational and aesthetics purpose.

- ✓ **Raising of Tall Seedlings**

  Tall seedlings of ecologically and economically important species should be raised so that plantations grow fast within three years and the success rate of plantation is also improved.

- ✓ **Tree Plantation Campaign**

- ✓ Green JSW campaign should be undertaken by involving Workers society, schools, colleges, institutions, NGOs, tree lovers, and farmers to create mass movement for tree planting and their subsequent care.
- ✓ **Guidelines for Tree Felling, Looping, and Pruning in the plant Areas** Tree cutting should be strictly regulated , Prior permission from the top management is mandatory while planning for tree cutting .
- ✓ Land requirement for planting of trees is to be planned and marked in the plant layout as per the CPCB guidelines.
- ✓ **Suggestions f**or Air Pollution control and Prevention which will supplement for carbon Sequestration before polluting atmosphere

Operations Control to Prevent Air Pollution

- ✓ **Transport / Handling of Raw Materials:**
- ✓ Raw material transport by rail, road and water, loading/unloading; belt transport; coal washing.
- ✓ **Suggested Treatment:**
- ✓ If material is received in moist condition, no precaution needed; For dry material, use water curtain or de-dusting by evacuation to a bag filter while unloading; Extensive enclosure of receiving hopper necessary;
- ✓ Minimum height of fall to avoid wind entrainment; Mobile equipment to be avoided, tired vehicle cause (salt and cement) may get contaminated. For proper care use bucket conveyor unloaders with water sprays; Chemical sealing if found suitable.
- ✓ 2. **Bedding and Blending of Ore:**
- ✓ Large beds for greater homogenization of composition; Blend recovered and placed on belt for storage; it aids in further blending.
- ✓ Suggested Treatment:
- ✓ Binding agent in the water may be necessary; Ensure proper wetting and use detergents, if need be; Large enclosures and evacuation at high rates at transfer points; Bag filters for cleaning gas; Spray installation at transfer points; Recovery of particulate – laden waters for treatment if necessary. Plantation in and around to arrest dust emission.

- ✓ 3. **Sintering/Pelletizing of Iron and Steel:**
- ✓ Suitability of fine ore in Blast Furnace; Pelletising with binder and rolled in drums/pans, Indurated at high temperature and cooled; for sintering blending of fines with coarser granular ores, flux mixed with coke breeze and heated; sizing.
- ✓ Important Consideration:
- ✓ Fines generated –
- ✓ (a) Crushing/grinding,
- ✓ (b) Grinding for pelletisation,
- ✓ (c) Cooling/crushing/screening sinter,
- ✓ (d) Cooling and screening pellets;
- ✓ Fugitive dust in pellet plant; Emission of gaseous and liquid fluorine compounds and oil as fuel, SO2/SO3; while fumes due to K2SO4/Na2SO4; Stack emissions may contain upto 1% CO and difficult to remove by incineration; If sintering materials contain lubricants/soluble oils (rolling mill waste), emissions will be visible and may contain hydrocarbon; Large fans create noise.
- ✓ Suggested Treatment:
- ✓ Fugitive dust (a) Recovery by suction hood installation and bag filters/electrostatic precipitation for dry material only, (b) Wet material requires no such precautions, (c) Energy saving by recycling clean heated air to ignition hood on sinter strand.
- ✓ Stack Emissions:
- ✓ (a) Normally not necessary to treat stack gases than to remove dust,
- ✓ (b) CaO/SiO2 ratio important. Low ratio may require desulphurisation of gases,
- ✓ (c) CaO/SiO2 > 2, difficult to apply electrostatic precipitators for fame removal,
- ✓ (d) High SOx – scrubbing with alkaline liquids (milk of lime). Expensive, fouling and disposal may create environmental problems. SO2 converted to gypsum (saleable),
- ✓ (e) High fluorine – wet scrubbing or contact with alumina/lime. High basicity leads to low emission,
- ✓ (f) NOx removal – catalytic converter (expensive),
- ✓ (g) Particulate removal by water scrubbing or electrostatic precipitators,
- ✓ (h) Cyclones for coarse grit removal,
- ✓ (i) Alkalies can cause problems with precipitators and tend to clog riddles and other mechanisms,

- ✓ (j) Dust to be dumped if recycles not possible,
- ✓ (k) Oily scale from rolling mills to be treated and not recycled to sinter plant.

PART C

XIV . Acknowledgments

We thank M/s. JSW Steel Ltd, Salem Works, Pottaneri P.O.,Mecheri, Mettur Taluk, Salem District-636 453, Tamil Nadu, India for offering an opportunity to carry out Carbon Sequestration by Plants Study at their facility. We extend our sincere thanks to Managing director / Occupier of the factory , Factory Manager , Dy.Manager- Environment , AM-Environment , Executive Environment ,Environment Assistants , all Employees and all Contract employees who contributed their Support to complete the Carbon Sequestration by Plants Study effectively.

The courtesy and cordiality extended to the carbon Sequestration Study team of Green Global Safety Systems is highly appreciated.

Lead Environment Expert

For Green Global Safety Systems

XV – Reference

- Central Pollution control board Guidelines
- State pollution control board Guidelines
- Ministry of Environment and Forest Departmental Guidance
- EPA-US Guidelines
- Environmental Protection act 1986 - for Iron and steel Industries
- Air (Pollution Prevention and Control) 1981
- Water Pollution (Pollution Prevention and Control) 1974
- The Forest Act
- Tropical forest and the greenhouse Effect :A Management response, "Norman Myers and Thomas J. Goreau, Discovery Bay Marine Laboratory, University of the West Indies, Discovery Bay, Jamaica, 1991.
- http://www.ciesin.columbia.edu/docs/002-163/002-163.html

XVI. Annexure-I

Comprehensive study Report

M/s. JSW Steels Ltd , Salem Works

Carbon Sequestration by the Green Belt -April 23-March 2024

Calculation formula : 0.25 x (Dia)^2 x (Height) x (1.2 Wet weitht)x (0.8 dry weight) x (50% carbon content) x (3.6663 Co2 in Carbon) x 0.454 (Pounds to Kg) / 1000 (Kg to Ton)

Sl.no	Botonical Name	No of Trees	Location	Diameter in inches	Height in feet	^weight of Carbon in Kg	CO2 Sequestrn in MT	Age setted for calculation	CO2 Sequestrn in MT per Annum
1	Terminalia Catappa	19	5 S Red zone	9	21	1667.22	6.11	10	0.6
2	Fabaceae	26	5 S Red zone	11	21	3445.56	12.63	11	1.1
3	Melia azadirachta	18	5 S Red zone	11	21	2349.24	8.61	11	0.8
4	Fabaceae	98	5 S Red zone	11	23	15523.83	56.92	11	5.2
5	Bambusa arundinacea	1870	AAQMS-2	4	13	18267.00	66.97	2	32.7
6	Fabaceae	86	AAQMS-2	9	18	6452.82	23.66	11	2.1
7	Fabaceae	218	AAQMS-4 North	9	19	17230.04	63.17	8	7.8
8	Melia azadirachta	202	AAQMS-4 North	11	21	26311.54	96.47	11	8.7
9	Borassus flabellifer	12	AAQMS-4 North	14	49	6782.24	24.87	19	1.3
10	Tectona grandis	326	AAQMS-4 North	16	34	151934.09	557.04	19	29.2
11	Tectona grandis	2700	AAQMS-4 North	17	35	1429849.14	5242.26	19	275.2
12	Tectona grandis	1920	AAQMS-4 North	17	36	1046037.99	3835.09	19	201.3
13	Fabaceae	484	AAQMS-4 West	4	13	4725.03	17.32	2	8.5
14	Fabaceae	677	Admin Block East	11	22	92866.02	340.47	11	30.8
15	Fabaceae	216	Admin Block East	14	26	61817.60	226.64	12	18.8
16	Melia azadirachta	79	Admin Block East	14	30	27318.29	100.16	19	5.3
17	Eucalyptus	106	Admin Block East	22	36	103603.92	379.84	19	19.9
18	Pithecellobium dulce	55	Admin Block North	12	24	10013.96	36.71	11	3.3
19	Pithecellobium dulce	90	Admin Block North	14	26	26870.18	98.51	19	5.2
20	Saraca asoca	10	Admin Block North	14	35	3867.75	14.18	19	0.7
21	Eucalyptus	30	Admin Block North	23	45	40328.17	147.86	19	7.8
22	Fabaceae	37	Admin office Entrance	18	33	21376.58	78.37	19	4.1
23	Fabaceae	438	Admin office Entrance -East	9	14	26079.21	95.61	10	9.5
24	Fabaceae	840	Admin office Entrance -North	7	14	29530.87	108.27	4.6	23.8

25	Saraca asoca	91	Admin office Entrance -North	8	31	10471.98	38.39	8	4.8
26	Fabaceae	395	Admin office Entrance -North	14	20	85616.02	313.89	17	18.4
27	Fabaceae	1063	Admin office Entrance -South	5	15	19594.95	71.84	2.6	28.2
28	Fabaceae	895	Admin office Entrance -South	6	15	23526.94	86.26	3.6	24.3
29	Melia azadirachta	498	Admin office Entrance -South	7	15	18806.35	68.95	4.6	15.2
30	Fabaceae	440	Admin office Entrance -South	7	15	16631.16	60.97	4.6	13.4
31	Fabaceae	840	Admin office Entrance -South	9	14	50014.91	183.37	10	18.2
32	Mangifera indica	190	Admin office Entrance -south	9	16	12565.21	46.07	10	4.6
33	Acacia nilotica	467	Admin office Entrance -South	9	21	40754.15	149.42	10	14.9
34	Mangifera indica	175	Admin office Entrance -South	9	16	11610.89	42.57	11	3.9
35	Melia azadirachta	390	Admin office Entrance -South	9	21	34049.10	124.83	11	11.3
36	Albizia lebbeck	562	Admin office Entrance -South	9	21	49030.70	179.76	11	16.3
37	Tectona grandis	54	Admin office Entrance -South	14	33	20504.11	75.17	19	3.9
38	Fabaceae	46	Admin office Entrance -south	17	21	14212.37	52.11	19	2.7
39	Casuarina Tree	24	ANNEALING AREA	1	10	**12.153**	**0.045**	**2**	0.0217
40	Casuarina Tree	12	ANNEALING PLANT	1	10	**6.076**	**0.022**	**2**	0.0109
41	Casuarina Tree	60	ANNEALING PLANT	1	10	**30.382**	**0.111**	**2**	0.0543
42	Casuarina Tree	2	ANNEALING PLANT BACK SIDE	1	10	**1.207**	**0.004**	**2**	0.0022
43	Casuarina Tree	192	ANNEALING PLANT ROAD SIDE	1	10	**97.223**	**0.356**	**2**	0.1739
44	Casuarina Tree	120	ANNEALING PLANT ROAD SIDE	1	10	**60.764**	**0.223**	**2**	0.1087
45	Bambusa arundinacea	226	AQMS North	5	15	4157.84	15.24	2.6	6.0
46	Bambusa arundinacea	60	AQMS North	5	14	1263.49	4.63	3.6	1.3
47	Fabaceae	265	AQMS South	7	13	8631.69	31.65	4.6	7.0
48	Fabaceae	42	AQMS South	14	16	7394.82	27.11	17	1.6
49	Fabaceae	43	AQMS South	17	19	12081.98	44.30	19	2.3
50	Fabaceae	35	AQMS South	18	21	12487.92	45.78	19	2.4

51	Casuarina Tree	60	ASP AREA	1	10	**30.382**	**0.111**	**2**	0.0543
52	Casuarina Tree	84	ASP AREA	1	10	**42.535**	**0.156**	**2**	0.0761
53	Casuarina Tree	132	ASP AREA	1	10	**66.841**	**0.245**	**2**	0.1195
54	Casuarina Tree	367	ASP AREA	1	10	**185.939**	**0.682**	**2**	0.3325
55	Casuarina Tree	72	ASP AREA	1	10	**36.459**	**0.134**	**2**	0.0652
56	Casuarina Tree	120	ASP AREA	1	10	**60.764**	**0.223**	**2**	0.1087
57	Casuarina Tree	120	ASP AREA	1	10	**60.764**	**0.223**	**2**	0.1087
58	Casuarina Tree	144	ASP II AREA ROAD SIDE	1	10	**72.917**	**0.267**	**2**	0.1304
59	Casuarina Tree	36	ASP ROAD SIDE	1	10	**18.229**	**0.067**	**2**	0.0326
60	Casuarina Tree	72	ASP ROAD SIDE	1	10	**36.459**	**0.134**	**2**	0.0652
61	Fabaceae	34	ASP-1	9	14	2000.60	7.33	10	0.7
62	Melia azadirachta	30	ASP-1	9	20	2492.96	9.14	11	0.8
63	Eucalyptus	10	ASP-1	16	22	2846.90	10.44	19	0.5
64	Melia azadirachta	18	ASP-1 Back side	10	16	1485.17	5.45	11	0.5
65	Roystonea regia	32	ASP-1 Back side	11	14	2926.20	10.73	11	1.0
66	Albizia lebbeck	18	ASP-1 Back side	12	20	2667.44	9.78	11	0.9
67	Terminalia Catappa	24	ASP-1 Entrance	9	14	1429.00	5.24	10	0.5
68	Derris indica	18	ASP-1 Entrance	10	22	2050.80	7.52	11	0.7
69	Melia azadirachta	12	ASP-1 Entrance	14	22	2839.24	10.41	12	0.9
70	Fabaceae	6	ASP-1 Entrance	14	21	1391.68	5.10	17	0.3
71	Eucalyptus	5	ASP-1 Entrance	16	30	1969.55	7.22	19	0.4
72	Melia azadirachta	42	ASP-2 south	9	18	3136.79	11.50	11	1.0
73	Albizia lebbeck	38	ASP-2 south	10	22	4375.03	16.04	11	1.5
74	Fabaceae	47	ASP-2 south	11	21	6197.62	22.72	11	2.1
75	Melia azadirachta	19	ASP-2 south	11	21	2505.86	9.19	11	0.8
76	Melia azadirachta	36	Assembly point-1	18	35	21950.18	80.48	19	4.2
77	Tamarindus indica	14	Assembly point-2	14	36	5968.56	21.88	19	1.1
78	Albizia lebbeck	66	Assembly point-3	14	31	23530.35	86.27	19	4.5
79	Cocos nucifera	24	Assembly point-4	16	39	12826.47	47.03	19	2.5
80	Borassus flabellifer	12	Assembly point-5	13	38	4243.31	15.56	11	1.4
81	Fabaceae	426	ASV-2 North	5	16	10301.74	37.77	3.6	10.6
82	Fabaceae	306	ASV-2 North	5	14	6443.80	23.62	3.6	6.7
83	Fabaceae	300	ASV-2 North	7	14	10546.74	38.67	4.6	8.5

84	Fabaceae	122	ASV-2 North	7	15	4622.28	16.95	4.6	3.7
85	Fabaceae	144	ASV-2 North	10	16	11881.35	43.56	11	3.9
86	Albizia lebbeck	18	Bar and rod mill entrance-east	8	25	1663.61	6.10	8	0.8
87	Derris indica	66	Bar and rod mill entrance-east	17	34	33946.18	124.46	19	6.5
88	Derris indica	66	Bar and rod mill entrance-South	5	14	1389.84	5.10	3.6	1.4
89	Fabaceae	12	Bar and rod mill entrance-South	9	18	896.23	3.29	10	0.3
90	Melia azadirachta	12	Bar and rod mill entrance-South	9	19	946.71	3.47	10	0.3
91	Albizia lebbeck	20	Bar and rod mill entrance-South	9	21	1781.03	6.53	11	0.6
92	Fabaceae	18	Bar and rod mill entrance-South	10	20	1862.25	6.83	11	0.6
93	Derris indica	18	Bar and rod mill entrance-South	10	22	2050.80	7.52	11	0.7
94	Albizia lebbeck	12	Bar and rod mill entrance-South	11	21	1566.16	5.74	11	0.5
95	Casuarina Tree	30	BF II	1	10	**15.191**	**0.056**	**2**	0.0272
96	Casuarina Tree	84	BF II AREA	1	10	**42.535**	**0.156**	**2**	0.0761
97	Casuarina Tree	120	BF II AREA	1	10	**60.764**	**0.223**	**2**	0.1087
98	Casuarina Tree	36	BF II GROUND OFFER	1	10	**18.229**	**0.067**	**2**	0.0326
99	Casuarina Tree	66	BF II GROUND OFFER	1	10	**33.420**	**0.123**	**2**	0.0598
100	Musa paradisiaca	120	BF North	5	11	1600.68	5.87	2.6	2.3
101	Albizia lebbeck	53	BF North	8	22	4239.23	15.54	8	1.9
102	Melia azadirachta	290	BF North	9	21	25353.48	92.95	11	8.4
103	Albizia lebbeck	18	BF North	11	21	2349.24	8.61	11	0.8
104	Roystonea regia	26	BF North	14	25	7575.88	27.78	19	1.5
105	Cocos nucifera	14	BF North	14	36	5968.56	21.88	19	1.1
106	Fabaceae	30	BF-1 Pump house	6	16	842.89	3.09	3.6	0.9
107	Terminalia Catappa	66	BF-1 Pump house	7	13	2148.16	7.88	4.6	1.7
108	Roystonea regia	66	Blast Furnace -1	5	14	1389.84	5.10	3.6	1.4
109	Terminalia Catappa	60	Blast Furnace -1	7	15	2265.83	8.31	4.6	1.8
110	Melia azedarach	12	Blast Furnace -1	9	19	946.71	3.47	10	0.3
111	Fabaceae	24	Blast Furnace -1	9	20	1994.37	7.31	11	0.7
112	Melia azadirachta	60	Blast Furnace -1	11	23	8634.79	31.66	11	2.9

113	Fabaceae	18	Blast Furnace Near to AIR compr	5	14	379.05	1.39	3.6	0.4
114	Terminalia Catappa	18	Blast Furnace Near to AIR compr	7	14	632.80	2.32	4.6	0.5
115	Melia azadirachta	18	Blast Furnace Near to AIR compr	9	20	1469.28	5.39	10	0.5
116	Fabaceae	96	BLM North	9	14	5715.99	20.96	10	2.1
117	Fabaceae	208	BLM North	9	21	18124.60	66.45	11	6.0
118	Swietenia Mahagoni	50	BLM North	10	20	5214.31	19.12	11	1.7
119	Fabaceae	18	BRM	9	19	1420.06	5.21	10	0.5
120	Melia azadirachta	18	BRM	11	22	2469.84	9.06	11	0.8
121	Casuarina Tree	60	BRM AREA	1	10	**30.382**	**0.111**	**2**	0.0543
122	Fabaceae	306	BRM Charge West	9	19	24140.98	88.51	10	8.8
123	Albizia lebbeck	18	BRM Pump house entrance East	11	23	2839.72	10.41	11	0.9
124	Derris indica	30	BRM Pump house entrance North	7	15	1132.91	4.15	4.6	0.9
125	Couroupita Guianensis	18	BRM Pump house entrance North	11	23	2839.72	10.41	11	0.9
126	Albizia lebbeck	12	BRM Pump house entrance North	14	24	3167.61	11.61	12	1.0
127	Cocos nucifera	12	BRM Pump house entrance North	14	49	6782.24	24.87	19	1.3
128	Fabaceae	12	BRM Pump house entrance West	9	19	946.71	3.47	10	0.3
129	Casuarina Tree	36	CANTEEN AREA	1	10	**18.229**	**0.067**	**2**	0.0326
130	Melia azadirachta	60	Canteen road view	9	21	5162.60	18.93	10	1.9
131	Fabaceae	24	Canteen road view	13	31	6913.11	25.35	11	2.3
132	Fabaceae	18	CC-1	9	18	1344.34	4.93	8	0.6
133	Casuarina Tree	12	CCM III	1	10	**6.076**	**0.022**	**2**	0.0109
134	Casuarina Tree	138	CCM III SCRAP YARD	1	10	**69.879**	**0.256**	**2**	0.1250

135	Casuarina Tree	18	CEMENT FACTORY	1	10	**9.115**	**0.033**	**2**	0.0163
136	Pithecellobium dulce	18	Center plant 1 Assembly point	7	15	679.75	2.49	4.6	0.5
137	Fabaceae	24	Center plant 1 Assembly point	8	21	1832.83	6.72	8	0.8
138	Terminalia Catappa	12	Center plant 1 Assembly point	9	19	946.71	3.47	10	0.3
139	Melia azadirachta	18	Center plant 1 Assembly point	11	23	2590.44	9.50	11	0.9
140	Cocos nucifera	12	Center plant 1 Assembly point	14	48	6386.16	23.41	17	1.4
141	Tectona grandis	20	Center plant 1 Assembly point	17	35	10803.30	39.61	19	2.1
142	Fabaceae	175	Chimney area	7	14	6159.30	22.58	4.6	5.0
143	Fabaceae	6600	Chimney area	2	11	10711.36	39.27	5.6	7.1
144	Melia azadirachta	276	Chimney area	8	22	22159.60	81.24	8	10.1
145	Cocos nucifera	67	Chimney area	14	34	26295.24	96.41	19	5.1
146	Cocos nucifera	288	Chimney area	14	36	119371.23	437.65	19	23.0
147	Tamarindus indica	60	Chimney area	19	36	43664.86	160.09	19	8.4
148	Cocos nucifera	12	Coal yard East	14	45	6225.80	22.83	19	1.2
149	Fabaceae	336	Coal yard north	7	14	11812.35	43.31	4.6	9.5
150	Fabaceae	312	Coil yard north	5	12	5595.36	20.51	3.6	5.8
151	Fabaceae	310	Coil yard north	6	15	8136.66	29.83	3.6	8.4
152	Fabaceae	98	Coil yard north	7	14	3459.33	12.68	4.6	2.8
153	Melia azadirachta	13	Coil yard north	9	21	1152.43	4.23	10	0.4
154	Melia azadirachta	13	Coil yard north	11	21	1722.78	6.32	11	0.6
155	Ficus religiosa	7	Coil yard north	14	26	2149.61	7.88	19	0.4
156	Casuarina Tree	60	COKE OVEN AREA	1	10	**30.382**	**0.111**	**2**	0.0543
157	Casuarina Tree	60	COKE OVEN AREA	1	10	**30.382**	**0.111**	**2**	0.0543
158	Casuarina Tree	120	COKE OVEN AREA	1	10	**60.764**	**0.223**	**2**	0.1087
159	Casuarina Tree	120	COKE OVEN NEAR LEMS SHED	1	10	**60.764**	**0.223**	**2**	0.1087
160	Fabaceae	1080	cook oven hopper	6	16	30343.88	111.25	3.6	31.3
161	Fabaceae	360	cook oven hopper	6	16	10114.63	37.08	3.6	10.4
162	Fabaceae	118	cook oven hopper	9	16	7793.61	28.57	10	2.8
163	Melia azadirachta	38	cook oven hopper	9	14	2286.40	8.38	11	0.8

164	Melia azadirachta	106	cook oven hopper	9	16	6998.34	25.66	11	2.3
165	Albizia lebbeck	36	cook oven plant East	5	15	814.33	2.99	3.6	0.8
166	Fabaceae	202	cook oven plant East	5	13	3930.40	14.41	3.6	4.1
167	Fabaceae	348	cook oven plant East	6	15	9145.86	33.53	3.6	9.4
168	Fabaceae	120	cook oven plant East	6	16	3371.54	12.36	3.6	3.5
169	Bambusa arundinacea	1380	cook oven plant East	6	16	38772.74	142.15	3.6	40.0
170	Bambusa arundinacea	432	cook oven plant East	7	15	16313.94	59.81	4.6	13.1
171	Melia azadirachta	180	cook oven plant East	7	15	6797.48	24.92	4.6	5.5
172	Fabaceae	173	cook oven plant East	7	15	6525.58	23.92	4.6	5.3
173	Tamarindus indica	17	cook oven plant East	9	14	1000.30	3.67	10	0.4
174	Albizia lebbeck	19	cook oven plant East	9	21	1676.26	6.15	10	0.6
175	Fabaceae	18	cook oven plant East	10	20	1862.25	6.83	11	0.6
176	Cassia tora	31	cook oven plant East	10	22	3554.72	13.03	11	1.2
177	Borassus flabellifer	14	cook oven plant East	13	48	6440.69	23.61	11	2.1
178	Fabaceae	66	cook oven plant East	14	22	15615.82	57.25	12	4.8
179	Melia azadirachta	58	cook oven plant East	14	16	10141.47	37.18	17	2.2
180	Bambusa arundinacea	864	cook oven plant West	5	15	19543.96	71.65	3.6	20.2
181	Bambusa arundinacea	794	cook oven plant West	7	13	25856.00	94.80	4.6	20.8
182	Fabaceae	348	cook oven plant West	7	14	12234.22	44.85	4.6	9.9
183	Bambusa arundinacea	792	cook oven plant West	7	15	29908.90	109.65	4.6	24.1
184	Derris indica	106	cook oven plant West	9	13	5821.16	21.34	10	2.1
185	Fabaceae	466	cook oven plant West	9	14	27722.55	101.64	10	10.1
186	Fabaceae	314	cook oven plant West	9	14	18719.87	68.63	11	6.2
187	Fabaceae	26	cook oven plant West	10	13	1811.85	6.64	11	0.6

188	Bauhinia purpurea	22	cook oven plant West	10	20	2234.71	8.19	11	0.7
189	Melia azadirachta	26	cook oven plant West	11	20	3327.64	12.20	11	1.1
190	Melia azadirachta	46	cook oven plant West	11	22	6329.67	23.21	11	2.1
191	Melia azadirachta	180	cook oven plant West	11	23	28397.25	104.11	11	9.4
192	Couroupita Guianensis	24	cook oven plant West	14	14	3785.68	13.88	17	0.8
193	Melia azadirachta	34	cook oven plant West	14	14	5299.95	19.43	17	1.1
194	Derris indica	36	cook oven plant West	14	16	6338.42	23.24	17	1.4
195	Tectona grandis	79	cook oven plant West	14	34	30990.82	113.62	19	6.0
196	Fabaceae	30	cookoven north	9	21	2581.30	9.46	10	0.9
197	Fabaceae	186	CPP 2 & AAQMS	7	15	7024.06	25.75	4.6	5.7
198	Fabaceae	32	CPP 2 & AAQMS	8	16	1732.00	6.35	6	1.0
199	Fabaceae	88	CPP 2 & AAQMS	10	20	9062.97	33.23	11	3.0
200	Fabaceae	29	CPP 2 & AAQMS	18	21	10334.83	37.89	19	2.0
201	Fabaceae	31	CPP 2 & AAQMS	21	24	18499.17	67.82	19	3.6
202	Casuarina Tree	180	CPP II AREA	1	10	**91.147**	**0.334**	**2**	0.1630
203	Casuarina Tree	120	CPP II AREA	1	10	**60.764**	**0.223**	**2**	0.1087
204	Casuarina Tree	60	CPP III AREA	1	10	**30.382**	**0.111**	**2**	0.0543
205	Melia azadirachta	25	CPP New	9	14	1500.45	5.50	10	0.5
206	Melia azadirachta	14	CPP New	10	18	1338.97	4.91	11	0.4
207	Melia azadirachta	22	CPP New	14	22	5110.63	18.74	12	1.6
208	Melia azadirachta	19	CPP New	17	24	6949.61	25.48	19	1.3
209	Terminalia Catappa	30	CPP-1 Entrance east	7	14	1054.67	3.87	4.6	0.8
210	Derris indica	18	CPP-1 Entrance east	9	20	1469.28	5.39	11	0.5
211	Melia azadirachta	30	CPP-1 Entrance east	11	23	4317.40	15.83	11	1.4
212	Eucalyptus	5	CPP-1 Entrance east	14	26	1433.08	5.25	19	0.3
213	Terminalia Catappa	120	CPP-1 Entrance North	7	15	4531.65	16.61	4.6	3.7
214	Eucalyptus	2	CPP-1 Entrance North	14	22	561.32	2.06	12	0.2
215	Fabaceae	4	CPP-1 Entrance North	14	24	930.08	3.41	12	0.3

216	Tectona grandis	67	CPP-1 Entrance North	14	52	39538.61	144.96	19	7.6
217	Tectona grandis	122	CPP-1 Entrance North	17	49	90931.14	333.38	19	17.5
218	Albizia lebbeck	72	CPP-1 Entrance North	18	21	25837.07	94.73	19	5.0
219	Fabaceae	150	CPP2 Transformer	5	15	2764.52	10.14	2.6	4.0
220	Fabaceae	22	CPP2 Transformer	9	18	1613.21	5.91	10	0.6
221	Melia azadirachta	14	CPP2 Transformer	9	16	954.32	3.50	11	0.3
222	Melia azadirachta	46	CPP2 Transformer - North	9	18	3405.66	12.49	10	1.2
223	Fabaceae	24	CPP2 Transformer - North	9	18	1792.45	6.57	11	0.6
224	Fabaceae	78	CPP2 Transformer - North	9	20	6481.70	23.76	11	2.2
225	Melia azadirachta	34	CPP2 Transformer - North	14	20	7286.47	26.71	17	1.6
226	Melia azadirachta	26	CPP2 Transformer - North	16	22	7828.97	28.70	19	1.5
227	Roystonea regia	60	CPP2 Transformer - North	16	45	37030.74	135.77	19	7.1
228	Fabaceae	146	Crusher way Bridge area	10	19	14379.60	52.72	11	4.8
229	Melia azadirachta	47	Crusher way Bridge area	10	22	5332.07	19.55	11	1.8
230	Terminalia Catappa	18	DM plant entrance	5	14	379.05	1.39	3.6	0.4
231	Melia azadirachta	30	DM plant entrance	12	22	4984.15	18.27	11	1.7
232	Ficus religiosa	12	DM plant entrance	17	28	5074.92	18.61	19	1.0
233	Albizia lebbeck	84	Entrance Gate Right side	6	14	2055.16	7.53	3.6	2.1
234	Bambusa arundinacea	66	Entrance Gate Right side	6	15	1734.56	6.36	3.6	1.8
235	Carica Papaya	18	Entrance Gate Right side	8	16	932.62	3.42	6	0.6
236	Albizia lebbeck	12	Entrance Gate Right side	9	16	795.27	2.92	10	0.3

237	Melia azadirachta	138	Entrance Gate Right side	9	21	12048.14	44.17	11	4.0
238	Albizia lebbeck	24	Entrance Gate Right side	10	20	2483.01	9.10	11	0.8
239	Albizia lebbeck	18	Entrance Gate Right side	11	21	2349.24	8.61	11	0.8
240	Albizia lebbeck	583	Entrance Gate Right side	11	28	103280.77	378.66	11	34.3
241	Melia azadirachta	60	Entrance Gate Right side	11	23	9465.75	34.70	11	3.1
242	Borassus flabellifer	30	Entrance Gate Right side	14	48	16607.83	60.89	19	3.2
243	Borassus flabellifer	94	Entrance Gate Right side	16	38	48732.47	178.67	19	9.4
244	Derris indica	24	EOF - 1	8	22	1926.92	7.06	8	0.9
245	Terminalia Catappa	18	EOF - 1	9	21	1571.50	5.76	10	0.6
246	Roystonea regia	34	EOF - 1	11	28	5950.33	21.82	11	2.0
247	Melia azadirachta	12	EOF - 1	14	24	3304.47	12.12	19	0.6
248	Eucalyptus	30	EOF - 1	16	39	16033.09	58.78	19	3.1
249	Terminalia Catappa	18	EOF - 2 & MCC-5 entrance	6	16	505.73	1.85	3.6	0.5
250	Melia azadirachta	18	EOF - 2 & MCC-5 entrance	9	16	1192.90	4.37	11	0.4
251	Roystonea regia	18	EOF - 2 & MCC-5 entrance	10	18	1673.71	6.14	11	0.6
252	Fabaceae	19	EOF - 2 & MCC-5 entrance	11	22	2665.12	9.77	11	0.9
253	Eucalyptus	4	EOF - 2 & MCC-5 entrance	14	24	930.08	3.41	12	0.3
254	Melia azadirachta	12	Fuel/Flux west	9	16	795.27	2.92	10	0.3
255	Thespesia populnea	23	Fuel/Flux west	9	19	1798.74	6.59	10	0.7
256	Fabaceae	588	Fuel/Flux west	9	20	47996.34	175.97	11	15.9
257	Terminalia Catappa	18	Furnace oil storage tank	8	16	962.22	3.53	6	0.6
258	Fabaceae	18	Furnace oil storage tank	9	16	1192.90	4.37	11	0.4
259	Fabaceae	26	Furnace oil storage tank	10	20	2731.31	10.01	11	0.9
260	Albizia lebbeck	216	Generator North	8	25	19963.29	73.19	8	9.1
261	Saraca asoca	12	Generator North	8	31	1377.89	5.05	8	0.6
262	Melia azadirachta	54	Generator North	9	25	5623.12	20.62	11	1.9
263	Ficus Religiosa	30	Generator North	11	22	4116.40	15.09	11	1.4
264	Albizia lebbeck	48	Generator North	11	28	8500.47	31.17	11	2.8
265	Albizia lebbeck	77	Generator North	14	30	25393.34	93.10	13	7.1

266	Albizia lebbeck	48	Generator North	14	31	17112.98	62.74	19	3.3
267	Eucalyptus	98	Generator North	14	34	38503.75	141.17	19	7.4
268	Fabaceae	12	Generator North	18	33	6895.67	25.28	19	1.3
269	Pithecellobium dulce	106	Generator North	21	38	99514.54	364.85	19	19.2
270	Casuarina Tree	12	GIVEN TO METTUR	1	10	**6.076**	**0.022**	**2**	0.0109
271	Casuarina Tree	24	HR OFFICE BACK SIDE	1	10	**12.153**	**0.045**	**2**	0.0217
272	Carica Papaya	101	Jsw Canteen to gate compound boundry	4	13	984.87	3.61	2	1.8
273	Acacia nilotica	60	Jsw Canteen to gate compound boundry	4	13	586.23	2.15	2	1.0
274	Musa paradisiaca	187	Jsw Canteen to gate compound boundry	5	13	2973.60	10.90	2.6	4.3
275	Bambusa arundinacea	2304	Jsw Canteen to gate compound boundry	5	13	36598.10	134.18	2.6	52.6
276	Albizia lebbeck	24	Jsw Canteen to gate compound boundry	6	15	630.75	2.31	3.6	0.7
277	Melia azadirachta	430	Jsw Canteen to gate compound boundry	8	16	22258.58	81.61	6	13.5
278	Melia azadirachta	382	Jsw Canteen to gate compound boundry	8	21	29142.06	106.84	8	13.3
279	Melia azadirachta	780	Jsw Canteen to gate compound boundry	8	21	59567.11	218.39	8	27.1
280	Albizia lebbeck	54	Jsw Canteen to gate compound boundry	9	18	4033.02	14.79	8	1.8
281	Albizia lebbeck	416	Jsw Canteen to gate compound boundry	9	16	27595.74	101.17	10	10.1
282	Fabaceae	324	Jsw Canteen to gate compound boundry	9	16	21472.19	78.72	10	7.8
283	Fabaceae	100	Jsw Canteen to gate compound boundry	9	16	6600.71	24.20	10	2.4

284	Melia azadirachta	432	Jsw Canteen to gate compound boundry	9	21	37715.93	138.28	10	13.8
285	Syzygium cumini	53	Jsw Canteen to gate compound boundry	9	21	4609.72	16.90	10	1.7
286	Melia azadirachta	146	Jsw Canteen to gate compound boundry	9	21	12596.75	46.18	10	4.6
287	Albizia lebbeck	720	Jsw Canteen to gate compound boundry	9	14	42869.93	157.17	11	14.2
288	Albizia lebbeck	348	Jsw Canteen to gate compound boundry	9	18	25990.54	95.29	11	8.6
289	Albizia lebbeck	185	Jsw Canteen to gate compound boundry	9	18	13801.87	50.60	11	4.6
290	Albizia lebbeck	78	Jsw Canteen to gate compound boundry	9	20	6366.86	23.34	11	2.1
291	Melia azadirachta	330	Jsw Canteen to gate compound boundry	10	22	37597.95	137.85	11	12.5
292	Melia azadirachta	540	Jsw Canteen to gate compound boundry	11	21	70477.33	258.39	11	23.4
293	Fabaceae	316	Jsw Canteen to gate compound boundry	11	21	41190.08	151.02	11	13.7
294	Fabaceae	173	Jsw Canteen to gate compound boundry	11	22	23710.47	86.93	11	7.9
295	Melia azadirachta	804	Jsw Canteen to gate compound boundry	11	22	120936.00	443.39	11	40.1
296	Borassus flabellifer	118	Jsw Canteen to gate compound boundry	13	45	49294.57	180.73	11	16.4
297	Borassus flabellifer	468	Jsw Canteen to gate compound boundry	14	48	249060.39	913.13	17	53.6
298	Cocos nucifera	84	Jsw Canteen to gate compound boundry	14	48	46501.93	170.49	19	8.9
299	Borassus flabellifer	138	Jsw Canteen to gate compound boundry	14	48	76396.04	280.09	19	14.7

300	Borassus flabellifer	114	Jsw Canteen to gate compound boundry	14	49	64431.32	236.22	19	12.4
301	Cocos nucifera	100	Jsw Canteen to gate compound boundry	14	49	56292.63	206.39	19	10.8
302	Borassus flabellifer	86	Jsw Canteen to gate compound boundry	17	48	62870.15	230.50	19	12.1
303	Ficus benghalensis	119	Jsw Canteen to gate compound boundry	17	30	53862.17	197.47	19	10.4
304	Cocos nucifera	103	Jsw Canteen to gate compound boundry	17	48	75094.90	275.32	19	14.5
305	Tectona grandis	103	Jsw Canteen to gate compound boundry	17	49	76667.44	281.09	19	14.8
306	Tamarindus indica	1800	Jsw Canteen to gate compound boundry	18	24	750138.05	2750.23	19	144.4
307	Fabaceae	709	JSW Power Plant East Boundry	5	14	14934.45	54.75	3.6	15.4
308	Albizia lebbeck	185	JSW Power Plant East Boundry	8	21	14112.82	51.74	6	8.6
309	Derris indica	187	JSW Power Plant East Boundry	9	18	13981.12	51.26	10	5.1
310	Melia azadirachta	508	JSW Power Plant East Boundry	9	19	40045.63	146.82	10	14.6
311	Fabaceae	12	JSW Power Plant East Boundry	9	14	714.50	2.62	11	0.2
312	Melia azadirachta	12	JSW Power Plant East Boundry	11	22	1665.70	6.11	11	0.6
313	Saraca asoca	58	JSW Power Plant East Boundry	13	33	17670.44	64.79	11	5.9
314	Borassus flabellifer	34	JSW Power Plant East Boundry	13	42	13140.06	48.18	11	4.4
315	Tectona grandis	312	JSW Power Plant East Boundry	14	35	125701.95	460.86	19	24.2
316	Tectona grandis	307	JSW Power Plant East Boundry	14	36	127329.31	466.83	19	24.5
317	Eccoliptics	43	JSW Power Plant East Boundry	16	30	17725.94	64.99	19	3.4
318	Bambusa arundinacea	5050	JSW Power Plant South Boundry	4	13	49337.32	180.89	2	88.2
319	Bambusa arundinacea	600	JSW Power Plant South Boundry	4	11	4922.86	18.05	2	8.8
320	Fabaceae	745	JSW Power Plant South Boundry	5	15	13734.16	50.35	2.6	19.7

321	Bambusa arundinacea	11400	JSW Power Plant South Boundry	5	14	240063.11	880.14	3.6	247.9
322	Melia azadirachta	780	JSW Power Plant South Boundry	7	14	27421.52	100.54	4.6	22.1
323	Melia azadirachta	304	JSW Power Plant South Boundry	7	15	11465.08	42.03	4.6	9.2
324	Fabaceae	720	JSW Power Plant South Boundry	9	16	47715.98	174.94	10	17.4
325	Albizia lebbeck	720	JSW Power Plant South Boundry	9	18	53773.54	197.15	10	19.6
326	Melia azadirachta	238	JSW Power Plant South Boundry	9	21	20743.76	76.05	11	6.9
327	Pithecellobium dulce	323	JSW Power Plant South Boundry	10	21	35087.03	128.64	11	11.6
328	Pithecellobium dulce	151	JSW Power Plant South Boundry	11	20	18720.64	68.64	11	6.2
329	Albizia lebbeck	292	JSW Power Plant South Boundry	11	20	36104.09	132.37	11	12.0
330	Saraca asoca	151	JSW Power Plant South Boundry	11	28	26776.50	98.17	11	8.9
331	Ficus religiosa	223	JSW Power Plant South Boundry	12	24	40491.24	148.45	11	13.4
332	Tectona grandis	307	JSW Power Plant South Boundry	13	33	94242.36	345.52	11	31.3
333	Fabaceae	461	JSW Power Plant South Boundry	14	22	107773.85	395.13	12	32.8
334	Cocos nucifera	190	JSW Power Plant South Boundry	14	35	76388.11	280.06	19	14.7
335	Tectona grandis	187	JSW Power Plant South Boundry	14	38	81931.56	300.39	19	15.8
336	Fabaceae	12	Lime Storage sheed south	9	14	714.50	2.62	10	0.3
337	Eucalyptus	12	Lime Storage sheed south	14	36	4973.80	18.24	19	1.0
338	Terminalia Catappa	120	load center substation-4	4	11	984.57	3.61	2	1.8
339	Pongamia pinnata	180	load center substation-4	5	12	3228.09	11.84	3.6	3.3
340	Eucalyptus	14	load center substation-4	14	16	2535.37	9.30	17	0.5
341	Pithecellobium dulce	32	load center substation-4	23	25	24090.58	88.32	19	4.6
342	Casuarina Tree	7	Main Canteen	1	10	**3.646**	**0.013**	**2**	0.0065
343	Casuarina Tree	23	MAIN GATE	1	10	**11.545**	**0.042**	**2**	0.0206
344	Casuarina Tree	150	MAIN GATE AREA	1	10	**75.956**	**0.278**	**2**	0.1358

345	Casuarina Tree	120	MAIN GATE AREA	1	10	**60.764**	**0.223**	**2**	0.1087
346	Casuarina Tree	48	MAIN GATE AREA	1	10	**24.306**	**0.089**	**2**	0.0435
347	Casuarina Tree	16	MAIN GATE AREA	1	10	**7.899**	**0.029**	**2**	0.0141
348	Casuarina Tree	156	MAIN GATE AREA	1	10	**78.994**	**0.290**	**2**	0.1413
349	Casuarina Tree	50	MAIN GATE ROAD SIDE	1	10	**25.521**	**0.094**	**2**	0.0456
350	Fabaceae	547	MRSS EAST	6	16	15374.23	56.37	3.6	15.9
351	Fabaceae	175	MRSS EAST	7	13	5702.38	20.91	4.6	4.6
352	Fabaceae	34	MRSS EAST	9	16	2226.75	8.16	10	0.8
353	Melia azadirachta	54	MRSS EAST	10	18	5021.13	18.41	11	1.7
354	Cocos nucifera	10	MRSS EAST	14	44	4869.35	17.85	19	0.9
355	Casuarina Tree	8	NEW CANTEEN AREA	1	10	**4.254**	**0.016**	**2**	0.0076
356	Casuarina Tree	204	New Land	1	10	**103.299**	**0.379**	**2**	0.1847
357	Casuarina Tree	396	New Land area	1	10	**200.523**	**0.735**	**2**	0.3586
358	Casuarina Tree	210	New Land area	1	10	**106.338**	**0.390**	**2**	0.1902
359	Casuarina Tree	618	New Land area	1	10	**312.937**	**1.147**	**2**	0.5597
360	Melia azadirachta	1800	New land deep inside	3	12	8643.23	31.69	2	15.5
361	Fabaceae	1080	New land deep inside	3	12	5101.30	18.70	2	9.1
362	Fabaceae	5400	New land deep inside	2	12	9823.24	36.01	3	11.8
363	Acacia nilotica	190	New land deep inside	5	13	3696.44	13.55	3.6	3.8
364	Musa paradisiaca	43	New land deep inside	7	14	1518.73	5.57	4.6	1.2
365	Bambusa arundinacea	77	New land deep inside	9	14	4572.79	16.77	10	1.7
366	Albizia lebbeck	170	New land deep inside	9	21	14876.84	54.54	10	5.4
367	Melia azadirachta	79	New land deep inside	9	21	6914.59	25.35	10	2.5
368	Melia azadirachta	50	New land deep inside	9	21	4336.59	15.90	10	1.6
369	Albizia lebbeck	18	New land deep inside	10	20	1862.25	6.83	11	0.6
370	Melia azadirachta	106	New land deep inside	11	21	13782.23	50.53	11	4.6
371	neam	3778	New land deep inside	1	12	3230.27	11.84	10	1.2

372	Melia azadirachta	148	New land deep inside	11	21	19263.80	70.63	11	6.4
373	Cocos nucifera	18	New land deep inside	13	33	5522.01	20.25	11	1.8
374	Cocos nucifera	19	New land deep inside	14	34	7201.77	26.40	15	1.8
375	Cocos nucifera	40	New land deep inside	14	39	17790.74	65.23	19	3.4
376	Ficus benghalensis	22	New land deep inside	17	26	8476.58	31.08	19	1.6
377	Cocos nucifera	96	New land deep inside	17	39	56690.36	207.84	19	10.9
378	Fabaceae	67	New R&D entrance	6	15	1766.10	6.48	3.6	1.8
379	Fabaceae	22	New R&D entrance	9	16	1431.48	5.25	11	0.5
380	Derris indica	23	New R&D entrance	10	16	1881.21	6.90	11	0.6
381	Melia azadirachta	20	New R&D entrance	12	21	3186.68	11.68	11	1.1
382	Roystonea regia	192	New R&D entrance	14	13	27364.61	100.33	11	9.1
383	Fabaceae	212	New R&D North	5	14	4472.75	16.40	3.6	4.6
384	Derris indica	98	New R&D North	9	16	6521.18	23.91	11	2.2
385	Melia azadirachta	113	New R&D North	11	20	13966.19	51.20	11	4.6
386	Cocos nucifera	19	New R&D North	16	48	12644.16	46.36	19	2.4
387	Tectona grandis	76	New R&D North	17	48	55011.38	201.69	19	10.6
388	Casuarina Tree	60	New RESERVOIR	1	10	**30.382**	**0.111**	**2**	0.0543
389	Casuarina Tree	180	New Reservoir	1	10	**91.147**	**0.334**	**2**	0.1630
390	Fabaceae	150	Newland opposite	5	14	2573.61	9.44	2.6	3.7
391	Albizia lebbeck	170	Newland opposite	9	22	15414.45	56.51	10	5.6
392	Borassus flabellifer	74	Newland opposite	14	36	29560.41	108.38	16	6.8
393	Albizia lebbeck	672	Newland opposite	14	22	161500.81	592.11	19	31.1
394	Melia azadirachta	114	Newland opposite	14	24	31392.46	115.09	19	6.0
395	Borassus flabellifer	110	Newland opposite	14	35	44479.15	163.07	19	8.6
396	Casuarina Tree	68	OHC AREA	1	10	**34.636**	**0.127**	**2**	0.0619
397	Terminalia Catappa	18	OHC Entrance	11	20	2228.65	8.17	11	0.7

398	Fabaceae	12	OHC Entrance	14	25	3300.96	12.10	12	1.0
399	Saraca asoca	18	OHC Entrance	16	48	11853.90	43.46	19	2.3
400	Melia azadirachta	6	OHC Entrance south	16	26	2130.97	7.81	19	0.4
401	Fabaceae	2	OHC Entrance south	18	35	1463.35	5.37	19	0.3
402	Saraca asoca	19	Old guest house	13	48	8587.58	31.48	11	2.8
403	Saraca asoca	12	Old guest house	14	49	6519.89	23.90	17	1.4
404	Cocos nucifera	43	Old guest house	14	39	19408.08	71.16	19	3.7
405	Fabaceae	1279	Old gust house East	5	13	24939.30	91.43	3.6	25.8
406	Melia azadirachta	194	Old gust house East	9	18	14518.85	53.23	10	5.3
407	Saraca asoca	79	Old gust house East	11	25	13713.57	50.28	11	4.6
408	Eucalyptus	54	Old gust house East	13	33	16566.04	60.74	11	5.5
409	Carica Papaya	31	Old gust house Front	7	23	1747.81	6.41	4.6	1.4
410	Mangifera indica	720	Old gust house Front	8	35	93426.34	342.53	8	42.6
411	Melia azadirachta	180	Old gust house Front	11	31	35322.40	129.50	11	11.7
412	Saraca asoca	180	Old gust house Front	11	44	50253.41	184.24	11	16.7
413	Saraca asoca	54	Old gust house Front	11	23	8519.17	31.23	11	2.8
414	Saraca asoca	41	Old gust house Front	14	38	17166.14	62.94	16	3.9
415	Fabaceae	56	Old gust house Front	14	26	16838.65	61.74	19	3.2
416	Cocos nucifera	86	Old gust house Front	14	42	41820.97	153.33	19	8.0
417	Fabaceae	4200	Old gust house North	4	11	34460.04	126.34	2	61.6
418	Fabaceae	2866	Old gust house North	5	13	55867.76	204.83	3.6	57.7
419	Derris indica	186	Old gust house North	5	13	3626.26	13.29	3.6	3.7
420	Albizia lebbeck	1800	Old gust house North	9	20	149577.74	548.40	11	49.6
421	Tamarindus indica	180	Old gust house North	10	19	17679.83	64.82	11	5.9
422	Fabaceae	211	Old gust house North	12	22	35088.39	128.64	11	11.6
423	Cocos nucifera	48	Old gust house North	14	35	18537.83	67.97	15	4.5

424	Saraca asoca	113	Old gust house North	14	38	47324.36	173.51	16	10.8
425	Melia azadirachta	190	Old gust house North	14	16	33382.34	122.39	17	7.2
426	Fabaceae	2074	Old gust house West Boundry line	5	13	40426.93	148.22	3.6	41.8
427	Albizia lebbeck	734	Old gust house West Boundry line	9	18	54849.01	201.09	10	20.0
428	Fabaceae	504	Old gust house West Boundry line	9	20	41881.77	153.55	11	13.9
429	Melia azadirachta	220	Old gust house West Boundry line	10	20	22719.50	83.30	11	7.5
430	Ficus religiosa	14	Old gust house West Boundry line	11	22	1998.84	7.33	11	0.7
431	Cocos nucifera	101	Old gust house West Boundry line	14	35	40611.40	148.89	19	7.8
432	Roystonea regia	30	P 2 belt conveyor west	9	18	2240.56	8.21	11	0.7
433	Fabaceae	103	PCTL Entrance	6	15	2712.22	9.94	3.6	2.8
434	Melia azadirachta	20	PCTL Entrance	7	14	717.18	2.63	4.6	0.6
435	Fabaceae	336	PCTL Entrance	7	16	13147.62	48.20	4.6	10.6
436	Fabaceae	18	PF -1 East	9	16	1192.90	4.37	10	0.4
437	Melia azadirachta	30	PF -1 East	11	22	4164.26	15.27	11	1.4
438	Tectona grandis	60	PF -1 East	17	39	35431.47	129.90	19	6.8
439	Tectona grandis	18	PF -1 south	16	38	9371.63	34.36	19	1.8
440	Ficus religiosa	1	PF -1 south	25	19	783.70	2.87	19	0.2
441	Fabaceae	456	PF -1 West	5	12	8177.84	29.98	3.6	8.4
442	Fabaceae	97	PF -1 West	9	16	6441.66	23.62	11	2.1
443	Melia azadirachta	53	PF -1 West	10	22	6015.67	22.06	11	2.0
444	Casuarina	246	PF 2 ground hopper	4	11	2018.37	7.40	2	3.6
445	Fabaceae	180	PF 2 ground hopper	6	15	4730.62	17.34	3.6	4.9
446	Fabaceae	518	PF 2 ground hopper	8	16	26859.52	98.48	6	16.3
447	Melia azadirachta	30	PF 2 ground hopper	8	21	2291.04	8.40	8	1.0
448	Fabaceae	120	PF 2 hopper east	5	13	1906.15	6.99	2.6	2.7
449	Pithecellobium dulce	300	PF 2 hopper east	5	13	5848.80	21.44	3.6	6.0
450	Fabaceae	62	PF 2 hopper east	6	15	1639.95	6.01	3.6	1.7
451	Saraca asoca	24	PF 2 hopper east	11	42	7009.51	25.70	11	2.3

452	Fabaceae	2702	plant south side compount	5	14	56907.59	208.64	3.6	58.8
453	Ficus benghalensis	1	plant south side compount	36	39	3271.75	12.00	19	0.6
454	Fabaceae	25	PM - 2 Hopper south	9	19	1988.08	7.29	10	0.7
455	Pithecellobium dulce	40	PM - 2 Hopper south	9	20	3290.71	12.06	11	1.1
456	Fabaceae	20	PM - 2 Hopper south	9	20	1665.18	6.11	11	0.6
457	Saraca asoca	19	PM - 2 Hopper south	16	34	8937.30	32.77	19	1.7
458	Fabaceae	456	PTCL Office	5	13	7243.37	26.56	2.6	10.4
459	Manilkara Zapota	31	PTCL Office	5	13	608.28	2.23	3.6	0.6
460	Terminalia Catappa	65	PTCL Office	5	13	1263.34	4.63	3.6	1.3
461	Terminalia Catappa	22	PTCL Office	6	14	528.47	1.94	3.6	0.5
462	Albizia lebbeck	480	PTCL Office	6	14	11743.79	43.06	3.6	12.1
463	Fabaceae	420	PTCL Office	6	15	11038.11	40.47	3.6	11.4
464	Albizia lebbeck	720	PTCL Office	8	16	37304.88	136.77	6	22.6
465	Fabaceae	551	PTCL Office	8	16	28538.24	104.63	6	17.3
466	Fabaceae	420	PTCL Office	8	16	21761.18	79.78	6	13.2
467	Melia azadirachta	60	PTCL Office	8	21	4582.09	16.80	8	2.1
468	Melia azadirachta	306	PTCL Office	9	19	24140.98	88.51	10	8.8
469	Melia azadirachta	79	PTCL Office	9	19	6248.25	22.91	10	2.3
470	Albizia lebbeck	82	PTCL Office	9	14	4858.59	17.81	10	1.8
471	Fabaceae	430	PTCL Office	9	20	35699.22	130.88	10	13.0
472	Albizia lebbeck	480	PTCL Office	9	20	39887.40	146.24	10	14.6
473	Albizia lebbeck	36	PTCL Office	9	21	3142.99	11.52	10	1.1
474	Albizia lebbeck	240	PTCL Office	9	20	19943.70	73.12	11	6.6
475	Melia azadirachta	460	PTCL Office	11	21	59984.04	219.92	11	19.9
476	Tectona grandis	60	PTCL Office	11	22	8232.80	30.18	11	2.7
477	Albizia lebbeck	34	PTCL Office	11	22	4610.37	16.90	11	1.5
478	Fabaceae	301	PTCL Office	11	33	69007.82	253.00	11	22.9
479	Cocos nucifera	587	PTCL Office	14	38	256823.94	941.59	19	49.4
480	Cocos nucifera	816	PTCL Office	14	38	357137.59	1309.37	19	68.7
481	Ficus benghalensis	23	PTCL Office	17	30	10337.18	37.90	19	2.0

482	Ficus benghalensis	120	PTCL Office	18	31	64746.16	237.38	19	12.5
483	Casuarina Tree	12	PTCL OFFICE	1	10	**6.076**	**0.022**	**2**	0.0109
484	Casuarina Tree	24	PTCL OFFICE	1	10	**12.153**	**0.045**	**2**	0.0217
485	Casuarina Tree	180	PTCL OFFICE	1	10	**91.147**	**0.334**	**2**	0.1630
486	Casuarina Tree	240	PTCL OFFICE	1	10	**121.529**	**0.446**	**2**	0.2173
487	Casuarina Tree	144	PTCL OFFICE	1	10	**72.917**	**0.267**	**2**	0.1304
488	Casuarina Tree	60	PTCL OFFICE	1	10	**30.382**	**0.111**	**2**	0.0543
489	Casuarina Tree	102	PTCL OFFICE	1	10	**51.650**	**0.189**	**2**	0.0924
490	Casuarina Tree	120	PTCL OFFICE	1	10	**60.764**	**0.223**	**2**	0.1087
491	Casuarina Tree	162	PTCL OFFICE	1	10	**82.032**	**0.301**	**2**	0.1467
492	Casuarina Tree	72	PTCL ROAD SIDE	1	10	**36.459**	**0.134**	**2**	0.0652
493	Fabaceae	458	QAD south	5	13	8936.97	32.77	3.6	9.2
494	Fabaceae	34	QAD West	9	19	2650.77	9.72	10	1.0
495	Melia azadirachta	12	QAD West	11	21	1566.16	5.74	11	0.5
496	Casuarina Tree	74	R O Plant, Guard Pond	1	10	**37.674**	**0.138**	**2**	0.0674
497	Terminalia Catappa	18	Railway gate opposite site	8	16	932.62	3.42	6	0.6
498	Albizia lebbeck	66	Railway gate opposite site	9	20	5484.52	20.11	10	2.0
499	Pithecellobium dulce	50	Railway gate opposite site	9	20	4188.18	15.36	10	1.5
500	Albizia lebbeck	18	Railway gate opposite site	9	21	1571.50	5.76	10	0.6
501	Albizia lebbeck	25	Railway gate opposite site	11	22	3497.98	12.82	11	1.2
502	Saraca asoca	18	Railway gate opposite site	11	45	5140.20	18.85	11	1.7
503	Melia azadirachta	12	Railway gate opposite site	11	23	1893.15	6.94	11	0.6
504	Cocos nucifera	18	Railway gate opposite site	14	36	7151.71	26.22	15	1.7
505	Cocos nucifera	12	Railway gate opposite site	14	39	5391.13	19.77	19	1.0
506	Cocos nucifera	18	Railway gate opposite site	14	42	8712.70	31.94	19	1.7
507	Tamarindus indica	60	Railway gate opposite site	17	24	21717.55	79.62	19	4.2

508	Ficus benghalensis	12	Railway gate opposite site	17	30	5440.62	19.95	19	1.0
509	Tectona grandis	132	Railway gate opposite site	17	35	69903.74	256.29	19	13.5
510	Tectona grandis	60	Railway gate opposite site	17	35	31774.43	116.49	19	6.1
511	Tamarindus indica	36	Railway gate opposite site	18	24	15002.76	55.00	19	2.9
512	Fabaceae	595	Raw Material Yard North	5	15	10969.63	40.22	2.6	15.8
513	Melia azadirachta	720	Raw Material Yard North	9	19	56802.32	208.25	10	20.7
514	Albizia lebbeck	344	Raw Material Yard North	10	20	35631.13	130.63	11	11.8
515	Saraca asoca	222	Raw Material Yard North	14	31	75869.60	278.16	13	21.3
516	Tectona grandis	211	Raw Material Yard North	14	38	92435.61	338.90	19	17.8
517	Eucalyptus	175	Raw Material Yard North	16	35	83968.94	307.86	19	16.2
518	Fabaceae	1068	Raw Material Yard South	5	15	19683.41	72.17	2.6	28.3
519	Pithecellobium dulce	499	Raw Material Yard South	5	15	9200.34	33.73	2.6	13.2
520	Fabaceae	811	Raw Material Yard South	5	13	15815.16	57.98	3.6	16.3
521	Derris indica	319	Raw Material Yard South	6	15	8388.96	30.76	3.6	8.7
522	Terminalia Catappa	264	Raw Material Yard South	7	13	8592.63	31.50	4.6	6.9
523	Melia azadirachta	551	Raw Material Yard South	7	15	20800.28	76.26	4.6	16.8
524	Melia azadirachta	576	Raw Material Yard South	7	15	21751.92	79.75	4.6	17.5
525	Ficus religiosa	223	Raw Material Yard South	9	21	19486.56	71.44	10	7.1
526	Saraca asoca	67	Raw Material Yard South	12	28	14243.75	52.22	11	4.7
527	Cocos nucifera	106	Raw Material Yard South	14	33	38436.28	140.92	13	10.8
528	Tectona grandis	144	Raw Material Yard South	14	33	54677.62	200.46	19	10.5
529	Saraca asoca	104	Raw Material Yard West	9	25	10871.37	39.86	11	3.6
530	Fabaceae	598	Raw Material Yard West	10	18	55567.23	203.73	11	18.4
531	Tectona grandis	26	Raw Material Yard West	11	31	5180.62	18.99	11	1.7

532	Saraca asoca	67	Raw Material Yard West	11	31	13187.03	48.35	11	4.4
533	Melia azadirachta	395	Raw Material Yard West	14	19	82748.06	303.38	17	17.8
534	Tectona grandis	54	Raw Material Yard West	14	34	21130.11	77.47	19	4.1
535	Casuarina Tree	108	RO PLANT AREA	1	10	**54.688**	**0.201**	**2**	0.0978
536	Casuarina Tree	78	RO PLANT AREA	1	10	**39.497**	**0.145**	**2**	0.0706
537	Casuarina Tree	13	RO PLANT ROAD SIDE	1	10	**6.684**	**0.025**	**2**	0.0120
538	Casuarina Tree	72	RO PLANT ROAD SIDE	1	10	**36.459**	**0.134**	**2**	0.0652
539	Fabaceae	14	Safety & environment entrance	9	16	954.32	3.50	10	0.3
540	Mangifera indica	18	Safety & environment entrance	10	22	2050.80	7.52	11	0.7
541	Tectona grandis	19	Safety & environment entrance	14	24	5097.11	18.69	19	1.0
542	Cocos nucifera	8	Safety & environment entrance	14	39	3773.79	13.84	19	0.7
543	Terminalia Catappa	12	Safety & environment south	7	15	453.17	1.66	4.6	0.4
544	Fabaceae	30	Safety & environment south	9	18	2240.56	8.21	10	0.8
545	Fabaceae	18	Safety & environment south	11	21	2349.24	8.61	11	0.8
546	Melia azadirachta	24	Safety & environment south	11	23	3786.30	13.88	11	1.3
547	Roystonea regia	60	Safety & environment south	14	16	10280.76	37.69	11	3.4
548	Melia azadirachta	7	Safety & environment south	14	24	1860.16	6.82	12	0.6
549	Fabaceae	17	Safety & environment south	14	26	5015.77	18.39	19	1.0

550	Tectona grandis	10	Safety & environment south	14	39	4312.91	15.81	19	0.8
551	Cocos nucifera	12	Safety & environment south	14	49	6782.24	24.87	19	1.3
552	Terminalia Catappa	24	Scrap yard cooling tower	9	16	1641.01	6.02	8	0.7
553	Albizia lebbeck	8	Scrap yard cooling tower	14	22	1964.63	7.20	12	0.6
554	Albizia lebbeck	10	Scrap yard cooling tower	14	26	2866.15	10.51	19	0.6
555	Terminalia Catappa	34	sinter Machine North	9	19	2650.77	9.72	10	1.0
556	Melia azadirachta	12	sinter Machine North	9	21	1047.66	3.84	10	0.4
557	Fabaceae	31	sinter Machine North	9	20	2546.74	9.34	11	0.8
558	Fabaceae	36	sinter Machine North	11	21	4698.49	17.23	11	1.6
559	Fabaceae	49	Sinter Machine plant 2 North	7	15	1857.98	6.81	4.6	1.5
560	Melia azadirachta	18	Sinter Machine plant 2 North	8	21	1374.63	5.04	6	0.8
561	Fabaceae	52	Sinter Machine plant 2 south	14	21	11968.45	43.88	17	2.6
562	Terminalia Catappa	18	Sinter plant	9	21	1548.78	5.68	10	0.6
563	Fabaceae	30	Sinter plant	9	21	2619.16	9.60	11	0.9
564	Casuarina Tree	240	SINTER PLANT	1	10	**121.529**	**0.446**	**2**	0.2173
565	Casuarina Tree	78	SINTER PLANT	1	10	**39.497**	**0.145**	**2**	0.0706
566	Casuarina Tree	84	Sinter Plant-II	1	10	**42.535**	**0.156**	**2**	0.1
567	Bambusa arundinacea	864	Slag Crushing mining plant	4	10	6412.51	23.51	2	11.5
568	Fabaceae	18	Slag Crushing mining plant	11	22	2498.55	9.16	11	0.8
569	Melia azadirachta	18	Slag Crushing mining plant	12	21	2811.78	10.31	11	0.9
570	Fabaceae	22	SP East	10	22	2460.96	9.02	11	0.8
571	Fabaceae	37	SP south	11	22	5104.34	18.71	11	1.7
572	Melia azadirachta	18	SP south	11	21	2349.24	8.61	11	0.8
573	Casuarina Tree	240	TEMPLE	1	10	**121.529**	**0.446**	**2**	0.2173
574	Casuarina Tree	180	TEMPLE	1	10	**91.147**	**0.334**	**2**	0.1630
575	Casuarina Tree	552	TEMPLE AREA COMPUND SIDE	1	10	**279.516**	**1.025**	**2**	0.4999

576	Casuarina Tree	420	TEMPLE AREA COMPUND SIDE	1	10	**212.675**	**0.780**	**2**	0.3804
577	Fabaceae	511	Temple East	5	16	12362.09	45.32	3.6	12.8
578	Fabaceae	462	Temple East	7	14	16241.98	59.55	4.6	13.1
579	Terminalia Catappa	410	Temple East	7	15	15498.25	56.82	4.6	12.5
580	Melia azadirachta	353	Temple East	9	16	24122.88	88.44	8	11.0
581	Bauhinia purpurea	18	Temple East	9	14	1071.75	3.93	10	0.4
582	Tectona grandis	54	Temple East	9	19	4260.17	15.62	10	1.6
583	Albizia lebbeck	182	Temple East	9	18	13622.63	49.94	11	4.5
584	Melia azadirachta	218	Temple East	9	18	16311.31	59.80	11	5.4
585	Pithecellobium dulce	61	Temple East	10	20	6331.66	23.21	11	2.1
586	Fabaceae	191	Temple East	10	22	21738.45	79.70	11	7.2
587	Albizia lebbeck	170	Temple East	10	22	19414.21	71.18	11	6.4
588	Tectona grandis	108	Temple East	11	33	22571.69	82.75	11	7.5
589	Tectona grandis	106	Temple East	11	38	27887.24	102.24	11	9.3
590	Melia azadirachta	330	Temple East	12	22	54825.61	201.01	11	18.2
591	Saraca asoca	347	Temple East	14	34	130082.03	476.92	13	36.5
592	Tectona grandis	720	Temple East	14	42	335027.06	1228.31	16	76.5
593	Ficus religiosa	34	Temple East	14	24	8919.94	32.70	19	1.7
594	Cocos nucifera	194	Temple East	14	38	85082.78	311.94	19	16.4
595	Tectona grandis	366	Temple East	17	45	249593.96	915.09	19	48.0
596	Fabaceae	548	Temple South	4	12	4928.83	18.07	2	8.8
597	Fabaceae	443	Temple South	5	16	10708.00	39.26	3.6	11.1
598	Terminalia Catappa	163	Temple South	5	12	2926.80	10.73	3.6	3.0
599	Derris indica	233	Temple South	5	12	4175.00	15.31	3.6	4.3
600	Roystonea regia	89	Temple South	5	14	1869.97	6.86	3.6	1.9
601	Tectona grandis	288	Temple South	5	14	6064.75	22.24	3.6	6.3
602	Fabaceae	577	Temple South	9	18	43108.45	158.05	10	15.7
603	Melia azadirachta	474	Temple South	9	18	35400.91	129.79	10	12.9
604	Albizia lebbeck	240	Temple South	9	18	17924.51	65.72	10	6.5
605	Bauhinia purpurea	55	Temple South	9	18	4122.64	15.11	11	1.4

606	Melia azadirachta	338	Temple South	12	22	55575.08	203.75	11	18.4
607	Albizia lebbeck	54	Temple South	14	24	13951.21	51.15	12	4.2
608	Tectona grandis	139	Temple South	14	33	50666.00	185.76	13	14.2
609	Eucalyptus	58	Temple South	14	36	23874.25	87.53	19	4.6
610	Tectona grandis	47	Temple South	16	39	25011.62	91.70	19	4.8
611	Ficus religiosa	18	Temple South	19	45	16396.84	60.12	19	3.2
612	Casuarina Tree	336	TOWNSHIP AREA	1	10	**170.140**	**0.624**	**2**	0.3043
613	Casuarina Tree	300	TOWNSHIP AREA	1	10	**151.911**	**0.557**	**2**	0.2717
614	Casuarina Tree	204	TOWNSHIP AREA	1	10	**103.299**	**0.379**	**2**	0.1847
615	Casuarina Tree	120	TOWNSHIP AREA	1	10	**60.764**	**0.223**	**2**	0.1087
616	Casuarina Tree	120	TOWNSHIP AREA	1	10	**60.764**	**0.223**	**2**	0.1087
617	Casuarina Tree	180	TOWNSHIP AREA	1	10	**91.147**	**0.334**	**2**	0.1630
618	Casuarina Tree	120	TOWNSHIP RESERVIOR	1	10	**60.764**	**0.223**	**2**	0.1087
619	Terminalia Catappa	120	wagon loco office	5	13	2339.52	8.58	3.6	2.4
620	Fabaceae	18	wagon loco office	10	22	2050.80	7.52	11	0.7
621	Albizia lebbeck	26	wagon loco office	11	21	3445.56	12.63	11	1.1
622	Melia azadirachta	30	wagon loco office	12	16	3609.47	13.23	11	1.2
623	Fabaceae	30	wagon loco office	14	22	7098.10	26.02	12	2.2
624	Cocos nucifera	12	wagon loco office	14	35	4634.46	16.99	15	1.1
625	Roystonea regia	14	wagon loco office	14	14	2277.87	8.35	17	0.5
626	Albizia lebbeck	22	wagon loco office	14	22	5191.10	19.03	19	1.0
627	Casuarina Tree	120	WAGON TIPPLER	1	10	**60.764**	**0.223**	**2**	3.6
628	Fabaceae	415	Water Reservoir south Boundary	5	13	6595.28	24.18	2.6	9.5
629	Bambusa arundinacea	4200	Water Reservoir south Boundary	5	12	75322.18	276.15	3.6	77.8
630	Fabaceae	1080	Water Reservoir south Boundary	5	14	22742.82	83.38	3.6	23.5

631	Fabaceae	631	Water Reservoir south Boundary	5	14	13291.92	48.73	3.6	13.7
632	Fabaceae	499	Water Reservoir south Boundary	6	16	14025.62	51.42	3.6	14.5
633	Fabaceae	295	Water Reservoir south Boundary	8	16	15295.00	56.08	6	9.3
634	Fabaceae	3600	Water Reservoir south Boundary	8	16	186524.41	683.85	6	113.0
635	Fabaceae	938	Water Reservoir south Boundary	9	14	55873.80	204.85	10	20.4
636	Fabaceae	830	Water Reservoir south Boundary	9	18	62018.81	227.38	10	22.6
637	Fabaceae	180	Water Reservoir south Boundary	9	20	14957.77	54.84	10	5.5
638	Cassia fistula	18	Water Reservoir south Boundary	9	20	1495.78	5.48	10	0.5
639	Fabaceae	300	Water Reservoir south Boundary	9	20	24487.93	89.78	10	8.9
640	Melia azadirachta	227	Water Reservoir south Boundary	9	20	18846.80	69.10	11	6.3
641	Melia azadirachta	90	Water Reservoir south Boundary	10	22	10253.99	37.59	11	3.4
642	Melia azadirachta	180	Water Reservoir south Boundary	11	21	23492.44	86.13	11	7.8
643	Fabaceae	295	Water Reservoir south Boundary	11	21	38527.61	141.25	11	12.8
644	Melia azadirachta	226	Water Reservoir south Boundary	11	21	29443.86	107.95	11	9.8
645	Fabaceae	370	Water Reservoir south Boundary	11	22	51303.65	188.09	11	17.0
646	Melia azadirachta	182	Water Reservoir south Boundary	11	22	25318.68	92.83	11	8.4
647	Melia azadirachta	342	Water Reservoir south Boundary	11	20	42344.30	155.25	11	14.0
648	Melia azadirachta	52	Water Reservoir south Boundary	11	21	6734.50	24.69	11	2.2
649	Neolamarckia cadamba	52	Water Reservoir south Boundary	11	21	6734.50	24.69	11	2.2
650	Tamarindus indica	107	Water Reservoir south Boundary	14	30	35312.62	129.47	13	9.9
651	Fabaceae	301	Water Reservoir south Boundary	14	34	112977.82	414.21	15	27.5
652	Saraca asoca	67	Water Reservoir south Boundary	14	42	31269.19	114.64	16	7.1
653	Borassus flabellifer	48	Water Reservoir south Boundary	14	45	23939.90	87.77	17	5.1
654	Borassus flabellifer	30	Water Reservoir south Boundary	14	48	15965.41	58.53	17	3.4

655	Borassus flabellifer	40	Water Reservoir south Boundary	14	48	21074.34	77.26	17	4.5
656	Tectona grandis	343	Water Reservoir south Boundary	14	42	166122.17	609.05	19	32.0
657	Cocos nucifera	31	Water Reservoir south Boundary	14	45	16187.08	59.35	19	3.1
658	Borassus flabellifer	8	Water Reservoir south Boundary	14	49	4747.57	17.41	19	2.9
659	Saraca asoca	101	Water Reservoir south Boundary	14	49	56970.85	208.87	19	12.0
660	Cocos nucifera	55	Water Reservoir south Boundary	14	49	31198.32	114.38	19	6.0
661	Cocos nucifera	396	Water Reservoir south Boundary	16	44	238941.85	876.03	19	46.0
662	Tectona grandis	288	Water Reservoir south Boundary	16	44	173775.89	637.11	19	33.4
663	Tectona grandis	102	Water Reservoir south Boundary	16	45	62952.25	230.80	19	12.1
664	Ficus religiosa	94	Water Reservoir south Boundary	17	30	42436.86	155.59	19	8.2
665	Tectona grandis	144	Water Reservoir south Boundary	18	33	82748.06	303.38	19	15.9
666	Tectona grandis	828	Water Reservoir south Boundary	18	45	650118.50	2383.53	19	125.1
667	Tectona grandis	696	Water Reservoir south Boundary	18	35	424370.21	1555.87	19	81.7
		185259		Existing trees carbon sequestration per annum					**5699**
	Planted 2023-2024	9906		Last year trees carbon sequestration					-
	Total	**185348**		Total Carbon Sequestered per annum					**5707**

Annexure- II

CPCB guidelines for Green Belt development

VII. Green Belt

i. Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant

ii. The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.

Ref : Annexure II III and IV.

F. No. 22-34/2018-IA.III
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

Annexure- III

Environment Celebration Activities by M/s.JSW

Tree Sapling 2023-2024

Tree Sapling -2023-2024

Annexure-IV

List of Recommended species for further improvement **

1. Acacia albida
2. Acacia aunculiformis
3. Acacta catechu
4. Acacia holosericea
5. Acacia nilottca
6. Acacia senegal
7. Albizia amara
8. Albizra lebbeck
9. Azadirachta rndtca
10. Oalberg1a SISSOO
11. Eucalyptus hybrid
12. Erythrina vanegata
13. Gliricidia sepium
14. Grewia tenax
15. Hardwickia binata
16. Leucaena latisiliqua
17. Pithecellobium dulce
18. Ztzyphus nummulan

** **Ref :** PAOBES/75/1999-2000
CENTRAL POLLUTION CONTROL BOARD
(Ministry of Environment & Forests, Govt. of India) Parivesh Bhawan, East Arjun Nagar Delhi -110 032,India.

ANNEXURE 11

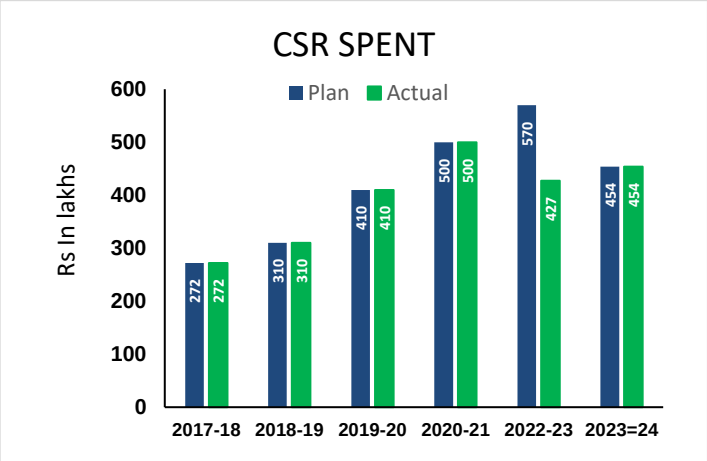
REPORT OF CER ACTIVITIES

CSR REPORT FOR THE PERIOD OF APRIL 2023 TO MARCH 2024

Background

JSW is deeply conscious of its vision and responsibilities to the community around the plant. Empowering citizen with better health, education and employment opportunities is JSW's mission.JSW is committed to improve the quality of life of surrounding community through Corporate Social Responsibility (CSR) programmes. We have well laid down community development program under CSR.Our focus is on

- Health
- Education
- Environment
- Women Empowerment
- Sports and
- Rural Infrastructure Development.



People in Pottaneri, M.Kalipatti, Kuttapatti, Viruthasampatti, Gonur Panchayats and Mecheri Town are covered under CSR projects. Our commitment towards CSR spending for the financial year 2023-24 is Rs. 4.54 Crores.

AGRI-LIVELIHOOD – JSWF inked MoU with TNAU

JSW – CSR in a significant move aligning with Schedule VII of the Companies Act, 2013. JSW Foundation has entered into a pioneering Memorandum of Understanding (MoU) with Tamil Nadu Agricultural University (TNAU) in Coimbatore. This collaboration signifies a shared commitment to uplift the farmer's livelihoods through an Integrated Farming System Project. Under this ground breaking pact, the focus is on empowering farmers in the region through various transformative initiatives. Farmer producer groups are being sensitized and equipped with knowledge in diverse agricultural interventions and allied practices tailored to local farming systems. Moreover, lead resource persons are being trained to act as catalysts for change and workshops, discussions and seminars are being conducted to facilitate knowledge exchange. Crucially, the partnership provides need-based technical support to farmers, ensuring that they receive assistance tailored to their unique challenges and requirements. Furthermore, the collaboration is committed to fostering innovation in the agriculture sector, introducing novel inventions and cutting-edge technologies that will revolutionize farming practices.

EDUCATION – Inaugurated Mettur ITI Civil Work

JSW – CSR handed over renovated bore well to the Government Mettur Industrial Training Institute (ITI). In this ITI 540 students are pursuing their professional courses, and those who are admitted in this institution are students who come from socio-economically backward conditions from the interior parts of Mettur region. In order to create good learning atmosphere to students, we have contributed in possible ways to develop the institution's infrastructure. This year we have renovated bore well and motor room to ensure sufficient and regular drinking water to the students. The worth of this intervention is Rs.412000/-

SANITATION - Inaugurated Sanitation Block at GOVT High School, Malligundam

JSW – CSR has supported to construct school sanitation blocks in nearby surrounding government schools in order to ensure hygienic practices among students in this school. Through this intervention 450 students are availing the benefits. The project value is Rs.1200000/-

SANITATION - INNAGURATED SANITATION BLOCK, PUTHUSAMPALLI

JSW – CSR has supported to construct school sanitation blocks in nearby surrounding government schools in order to ensure hygienic practices among students in this school. Through this intervention 450 students are availing the benefits. The project value is Rs.1400000/-

EDUCATION – Renovated Science Lab

JSW – CSR renovated the science lab at Kullamudayanoor Government Higher Secondary School. Though the school had science equipment there were no adequate laboratory space for the students to access and utilize the equipment. Through our intervention we have developed a good adequate space and atmosphere for the enhancement of scientific skillsets of the students in this school. The project value is Rs.900000/-

RURAL DEVELOPMENT- DRAINAGE CONSTRUCTION

JSW - CSR constructed drainage and graveyard compound wall at Pottaneri Panchayat for the benefit of community members. In this panchayat 2000 families are residing, and there is no sufficient and proper place for the community members to bury. Also there are no drainage facilities in main panchayat to access, especially during the rainy seasons. To avoid conditions of overflowing and stagnation of water, we have constructed drainage adjacent to the graveyard compound wall. Through this intervention nearly 2000 families are getting benefit and the project value is Rs.2600000/-

EDUCATION – JSW ASPIRE PROGRAM

In order to improve life skills among young generation. We have initiated life skill training program, through this initiatives targeted 1500 students from 7 government schools within radiation of 5 km. Through this initiative enhancing skills of children's life skills, carrier counsiling, problem solving & critical thinking. This initiative is not only targeted schools children but also educating their parents on importance of education and conducting activities to create awarness among parents. Also established Community Learning Center (CLC) at community level to reach children as well their parents.

Also encouraged children to participate National days such as National Girl child day, Children's Day, Ocean Day, Nutrition day and so on.

SPORTS – SILAMBAM ART

JSW – CSR initiated Silambam art activity in surrounding 5 government schools. We have trained 200 students on Silambam art, and also these students participated in World Record Event and showcased their potential in Silambam art.

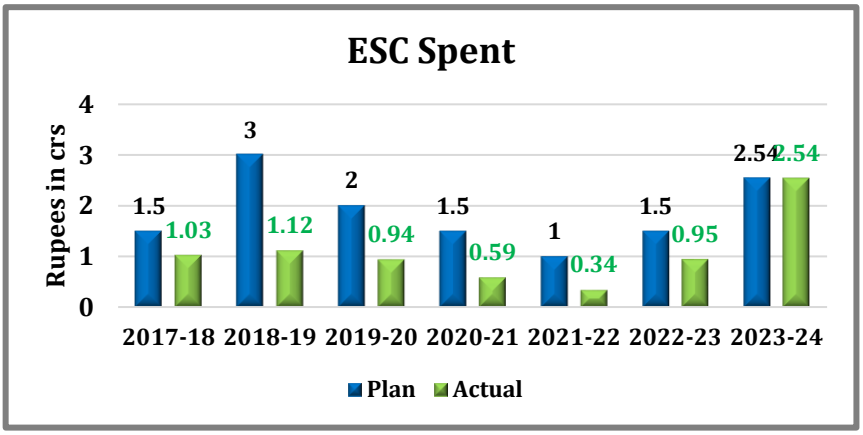
Table 1 : CSR committed & spent details for the period April 2023 – March 2024 (FY24)

Sl.No.	Activitiy	Committed in lakhs(INR) for FY 24	Spent in lakhs(INR) till Sep 2023	Remarks
1	Climate resilient agri program	70.00	70.00	Completed
2	Support to JSW Shakti BPO	10.00	10.00	Completed
3	Water body rejuvenation	15.00	15.00	Completed
4	Community Development initiatives	25.00	25.00	Completed
5	Increasing Green Cover	30.00	30.00	Completed
6	JSW Aspire Project	44.00	44.00	Completed
7	JSW Udaan Scholarship	75.00	75.00	Completed
8	School Infrastructure Project	104.00	104.00	Completed
9	Health Outreach Activities	47.00	47.00	Completed
10	Rural infrastructure	25.00	25.00	Completed
11	Environment Education	3.67	3.67	Completed
12	Program Support-Sports	5.00	5.00	Completed
	Total	**453.67**	**453.67**	

ENVIRONMENT SOCIAL COMMITMENT : HYR FOR APRIL 23 TO MARCH 2024

JSW steel Ltd., Salem works is the only Integrated steel plant in Tamil Nadu and presently operating with production capacity of 1.15 MTPA. JSW Steel Limited, Salem works is highly committed to protect the environment with distinctive focus on Triple bottom growth for sustainable development. The organization has always maintained Statutory and Regulatory compliances and believes in maintaining harmony with all the stake holders and contributes to societal support activities like:

- Water shed programmes
- Supplying drinking water
- Sanitation facilities
- Road repair/constructions
- Health camps
- Education activities, etc.



EARLY CHILDHOOD CARE & EDUCATION - DISTRIBUTED ALMIRAHS

We have given 10 Almirahs to nearby 10 Anganwadi Centres based on their need. With nearly 195 students attending these Anganwadis, teachers find the almirahs very useful to store the teaching materials and other records.

ENVIRONMENT - CLOTH BAGS

We have distributed cloth bags to the surrounding communities in order to arrest the usage of plastics. Distributed 20000 cloth bags to 4 panchayats and 20 villages. Along with that we have educated the community members about disadvantages in using plastics and advantage of using the cloth bags.

We have taken effort to reduce the usage of plastics by providing the eco - friendly bags to the community (DIZ) to protect the surrounding environment. Through this intervention we have reduced unhealthy practices among communities and have promoted safe environment.

SPORTS – ZONAL SPORTS

We have provided support for conducting the Zonal Sports meet at Omalur. After COVID – 19, this is the initial zonal sports meet. Hence the organizers were requested to support food facilities to 700 students for two days.

RURAL DEVELOPMENT- LAKE DEEPENING

As part of JSW – CSR's water initiatives, a massive clean-up drive was organized to get rid of weeds and trashes in the Water body at Vellakkalpatti in Salem district. Currently, there are no proper bund, inlet, and outlet channel facilities in this lake. During the rainy season, the rainwater stagnates on the road. The public and school children find it difficult to pass this area. We have cleaned and deepened the channel while renovating the waterbody. The renovated area is 2.69 Hec. Through this intervention, we've supported to increase the groundwater levels at this location for the benefit of surrounding farmers. It helped canal to enhance its storage capacity of recharging the groundwater level. The project value is Rs. 2500000/-

HEALTH – PERMANENT COVID CARE CENTER

Salem district is reporting more number of Covid cases and the district administration is taking all efforts to control the spread and treat every COVID affected patient with utmost care. To tackle the present scenario, we have supported district administration for setting up of permanent 1000 bedded Covid Care Center at Salem District. This intervention is immensely supportive to treat Covid affected patients equally regardless of their economic status. Also this center is helping to mitigate COVID-19 spread.

Enterprise Social Commitment (ESC) comitmemt submitted during Environment Impact Assessment(EIA) Study 2017 to MoEF&CC is given in Table 2

Table 2 : Fund Allocation for Enterprise Social Commitment (ESC) as per EC dated 07.07.2017 (Rs. In Crs)

Sl.No	Description of activities	No's of facility	Amount committed in five years (Rs. In Crs)					Total Rs in Crs
			Year I	Year II	Year III	Year IV	Year V	
1	Toilets	2000	0.5	0.75	0.75	0.5	0.5	**3**
2	Health center	1	0.25	0.25	0.25	0.25	0	**1**
3	Community hall	2	0	0.5	0.5	0	0	**1**
4	Hospital	1	0.5	0.5	0.5	0.25	0.25	**2**
5	Modern school New with GYM and Play ground	1	0	0	1	0.5	0.5	**2**
6	Watershed program	1	0	0.25	0.25	0.25	0.25	**1**
7	Water body strengthening/ Drinking water bore well drilling		0	0.25	0.25	0.25	0.25	**1**
8	Drainage		0.25	0.25	0.25	0.25	0	**1**
9	Government school improvement	1	0	0.25	0.25	0.25	0.25	**1**
Total			**1.5**	**3**	**4**	**2.5**	**2**	**13**

The actual amount spent on ESC till June 2020 is given in Table 3

Table 3 : The actual amount spent on ESC till June 2020 (Rs. In Crs)

Sl. No	Description of activities	No's	Year I (Jul'17 to Dec'17)		Year II (Jan'18 to Dec'18)		Year III (Jan'19 to Dec'19)		Year IV (Jan'20 to Jun'20)		Total Rs . (in Crs)	
			Committed	Spent	Committed	Spent	Committed	Spent	Committed	Spent	Committed	Spent
1	Toilets	2000	0.5	0.32	0.75	0.19	0.75	0.04	0.5	0	3	0.55
2	Health center	1	0.25	0	0.25	0	0.25	0.22	0.25	0.21	1	0.43
3	Community hall	2	0	0	0.5	0	0.5	0	0	0	1	0
4	Hospital	1	0.5	0	0.5	0	0.5	0	0.25	0.25	2	0.25
5	Modern school New with GYM and Play ground	1	0	0	0	0	1	0	0.5	0	2	0
6	Watershed program	1	0	0.24	0.25	0	0.25	0.21	0.25	0	1	0.45
7	Water body strengthening/ Drinking water bore well drilling		0	0	0.25	0.2	0.25	0.2	0.25	0.11	1	0.51
8	Drainage		0.25	0	0.25	0.39	0.25	0.1	0.25	0	1	0.49
9	Government school improvement	1	0	0.47	0.25	0.34	0.25	0.17	0.25	0.02	1	1
Total			**1.5**	**1.03**	**3.0**	**1.12**	**4.0**	**0.94**	**2.5**	**0.593**	**13.0**	**3.68**

Enterprise Social Commitment (ESC) revised comitmemt submitted to MoEF&CC dated 26.09.2020 is given in Table 4

Table 4 : Revised Fund Allocation for ESC as per letter submitted to MoEFCC (Rs. In Crs)

Sl.No	Sectors	Details	Total Rs in Cr Commitment
1	Health	Health & Eye Camps to public and school students , Hospital improvement	1.22
2	Education	School library support , career guidance , sports support , Anganvadi support , class toppers prize to school students, School Technology improvement	1.22
3	Infrastructure Development	School and Educational institution infrastructure improvement , village infrastructure improvement , toilet construction in schools and villages , village library support , Drainage improvement , road improvement , water body improvement , desilting of channels, pond and reservoir	4.7
4	Livelihood support	Need based training (Eg Tailoring , ARI , Zardoshi) to women , Spoken English training to unemployed youth to increase their employability level, organic training to farmers , agricultural inputs to Farmers , exposures trips to farmers , sponsorship to farmers for various training	1.18
5	Others	Waste Management support , sports related support in schools and Villages, awareness creation programs in schools and villages and other need based activities	1
Total in Rs. Crs (shall be spent)			**9.32**
Total spent Crs. Till June 2020			**3.68**
Total in Rs. Crs (as the commitment made)			**13.00**

Total Amount spent on Enterprise Social Commitment (ESC) from July 2020 to March 2022 is given in Table 5

Table 5 ESC spent from July 2020 to March 2022

Sl. No.	Description of activities	ESC fund Rs. in Crs	
		Committed	Spent
1	Health	0.13	0.14
2	Education	0.23	0.01
3	Infrastructure Development	0.63	0.19
4	Livelihood support	0.00	0.00
5	Others	0.00	0.00
	Total in Crs.	**0.99**	**0.34**

Total Amount spent on Enterprise Social Commitment (ESC) from April 2022 to March 2024 is given in Table 6

Table 6: ESC spent details from April 22 to March 24

Sl. No.	Description of activities	April – September 22		October – March 23		April – March 24		Total spent in Crs from July 2017 onwards to till March 24
		Committed (Rs in Crs)	Spent (Rs in Crs)	Committed (Rs in Crs)	Spent (Rs in Crs)	Committed (Rs in Crs)	Spent (Rs in Crs)	(Rs. in Crs)
1	Health	0	0	0.25	0.08	0.43	0.43	0.51
2	Education	0.5	0.5	0.15	0.01	0.48	0.48	0.99
3	Infrastructure Development	0	0	0.15	0.08	1.13	1.13	1.21
4	Livelihood support	0	0	0.2	0	0.00	0.00	0
5	Others	0	0	0.25	0.28	0.5	0.5	0.78
	Total in Crs	**0.5**	**0.5**	**1**	**0.45**	**2.54**	**2.54**	**3.49**
	ESC spent from 2017 onwards to till March 23	**Total ESC spent Rs. in Crs till March 24 (3.68+0.34+3.49)**						**7.50**