O/C

TSL/SEIAA/TS-30/2025-03/558
May 29, 2025

The Member Secretary
State Environment Impact Assessment Authority, Odisha,
Qr No.5RF-2/1, Unit-IX
Bhubaneswar – 751022

Subject: Submission of Half yearly EC compliance reports of Residential Township of Tata Steel Limited Meramandali for the period October' 24 to March' 2025

Reference: EC vide letter no. 2882/SEIAA, dated 28.09.2021

Dear Sir,

This has reference to the captioned subject and cited references. It is to inform you that we are herewith submitting six monthly Compliance reports for the conditions stipulated in the Environment Clearance of Residential Township of Tata Steel Ltd. Meramandali for the period from October 2024 to March 2025 along with monitoring report for your kind consideration.

The copy of above compliance report is also being sent in soft format through email roez.bsr-mef@nic.in and seiaaodisha@gmail.com for your kind perusal. Also copy of EC compliance is being uploaded on MoEF&CC website on portal http://environmental clearance.nic.in

Hope the above are in line with the statutory requirements.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Chief Environment, TSM

Encl : As Above
Copy to :

I. Deputy Director General, Ministry of Environment, Forests and Climate Change, Integrated Regional Office (EZ), A/3, Chandrasekharpur, Bhubaneswar-751023
II. The Zonal Officer, Central Pollution Control Board, Southern Conclave Block 502 5th & 6th Floors, 1582 Rajdanga Main Road, Kolkata - 700107.
III. The Member Secretary, SPCB, Parivesh Bhawan, A/118, Nilakahanta Nagar, Unit-VIII, Odisha Bhubaneswar-751012.
IV. The Regional Officer, State Pollution Control Board, Odisha. Angul

TATA STEEL LIMITED
Narendrapur Kusupanga Meramandali Dhenkanal 759 121 Odisha India Tel 91 [illegible] 352000
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India Tel 91 22 [illegible] 282 Fax 91 22 [illegible]
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

S.N.	Description	Compliance Status
	Specific Condition	
1	This Environmental Clearance shall not be operational till such time as the Project proponent complies with all the statutory requirements and Judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors as applicable to this project.	Agreed and noted.
2	As per MoEF&CC Notification dated 14.03.2017, followed by MoEF&CC letter F. No. 23-128/2018-IA.III dated 18.09.2020, the project proponent is required to submit a bank guarantee for the cost of implementing (a) the approved remediation plan and (b) natural and community resource augmentation plan with the SPCB. The cost of implementing these plans has been worked out by the PP Rs.2.60 Crores as per projection furnished by them. The bank guarantee of the above amount will be released after successful implementation of the respective plans and the EMP. The project proponent shall be required to fully implement the remediation plan and natural and community resource augmentation plan in a time bound manner within a period of three years.	The bank guarantee of Rs. 2,60,00,000/- (Rupees Two Crore Sixty Lakh) towards cost of implementing remediation plan, natural and community resource augmentation plan have been submitted to SPCB, Odisha vide letter no. TSL/OSPCB/BS-30/2021-10/134 dtd. 29.11.2021. The approved remediation plan and natural & community resource augmentation plan along with the EMP have been implemented. SEAC recommended the release of the Bank Guarantee (BG), which was subsequently approved by SEIAA during the 192nd meeting held on March 20, 2025, and communicated to the State Pollution Control Board accordingly. A request letter in this regard has also been submitted to OSPCB via letter No. TSL/SPCB/BS-30/2025-02/550, dated May 6, 2025.The acknowledged copy of this letter is attached as an Annexure - I.
3	The PP is liable to pay penalty at the rate prescribed vide clause 12(ii) of the MoEF&CC, OM No. F.No.22-21/2020/IA.III dated 07.07.2021. The PP is required to furnish the relevant information for computation of the amount payable.	In compliance to the letter No. 2695/SEIAA Dt. 15/09/2021 and clause 12(ii) of the MoEF&CC, OM No. F.No.2221/2020/1A.III dated 07.07.2021 Natural and Community Resource Augmentation Plan has been submitted at SEIAA on 22/09/2021. This plan has also been implemented successfully.

4	After takeover of BSL by Tata Steel during year 2017 and re-naming of the company as Tata Steel BSL Ltd., revised building plan and area development plan was obtained from TAMDA during 2017 by revising the original approval of 2008. A comparative statement of building construction envisaged during 2008 and revised in 2017 with detailed remarks thereon has to be furnished by PP within 2 months of date of issue of Environmental Clearance.	No change in building construction plan was envisaged after taken over. Layout of building construction and area development plan was submitted vide letter no. TSL/SEIAA/BS-30/2021-12/142 dated 22.12.2021.
5	Since this township project over approx.50-acres land has been delinked from the Steel Plant & CPP, the township shall be developed as a gated colony with proper boundary wall having linkage to road, water supply and power supply, meant for the industrial plant.	Township has been developed as a gated colony with a proper boundary wall having linkage to the NH, water and power supply are being sourced from Steel Plant.
6	The proponent shall obtain Fire Safety Certificate under Odisha Fire Prevention and Fire Safety Rules,2017 (with amendments) and the Structural Stability (safety) certificate from competent authority for the buildings constructed in the township	Fire Safety certificate was obtained under Odisha Fire Prevention and Fire Safety Rules, 2017 (with amendments) attached as **Annexure – II A.** The Structural Stability (safety) Certificate has been obtained from competent authority and as attached as **Annexure – II B.**
7	Notwithstanding the cost projected by PP for CSR activities of entire Steel Plant Complex, the CER and CSR schemes for the Standalone Township project shall be furnished to SEIAA within one month of the issue of the Environmental Clearance.	CER and CSR schemes for standalone township project have been submitted to SEIAA vide letter no. TSL/SEIAA/BS-30/2021-12/142, dated 22/12/2021.
8	Preparation of a disaster management plan (DMP) under the provision of Disaster Management Act. 2005 through an expert Organization like OSDMA including Onsite emergency plan for the township with linkage to similar plan of Dhenkanal district has to be kept ready within six months.	Disaster Management Plan (DMP) has been incorporated in the EIA/EMP report as chapter 7. The same has been submitted along with last half yearly EC compliance vide letter no. TSM/MoEF&CC/BS-30/2022-01/211 dated 31.05.2022.
	Natural Drainage	
9	No construction shall be allowed to obstruct the natural drainage pattern at the site. Check dams are allowed for harvesting rainwater. Cutting and filling	Care has been taken to avoid disturbing the natural landscape during construction activities.

	of the land should be kept to the minimum, and artificial land shaping has to be avoided.	The cutting and filling of the land has been kept to a minimum, with no artificial land shaping undertaken.
	Water Conservation and Rainwater Harvesting	
10	No ground water shall be extracted for the project work at any stage during the construction phase or operation phase without obtaining permission from the Water Resources Department, Govt. of Odisha/ CGWB.	The water requirement for the residential complex (township) is being met from Steel Plant. Groundwater was not extracted for construction and operation.
11	The Project's total fresh water requirement is reportedly met from TSBSL's water reservoir, which is replenished by drawal from Brahmani River. Regular permission from competent authority (WR Dept.) for such drawal of river water has to be obtained immediately. Water meter be installed forthwith to measure the quantum of drawl of water from the river.	Permission for drawal of water was obtained on 19.04.2007 from Department of Water resources Govt. of Odisha. Agreement has been made with Irrigation department, Odisha vide letter no. 2251/WE dated 29.08.2023 Water meter has been installed to measure the quantity of drawal of water from the river.
12	The Project Proponent shall strive to achieve zero discharge of used water from the township project area, and no treated water from STP shall be discharged to any natural stream/river nearby. STP of 1000KLD capacity has to be set up and all waste water has to be treated, and recycling of treated waste for all usages other than for domestic cooking, bathing and cleaning shall be maximized. In fact, all water used for gardens, lawns plantation, air conditioning, flushing of exterior areas, washing of vehicles, etc. shall be recycled water.	Zero effluent discharge is being maintained at Township. Treated water from STP is being reused for landscaping and in steel plant (low-end application).
13	The quantity of freshwater usage, water recycling and rainwater harvesting shall be measured and recorded to monitor the water balance of the project. The record shall be submitted along with the six-monthly Monitoring reports.	The quantity of freshwater usage for the period Oct'24 to Mar'25 is 60 m3/hr. 100% of STP water is reused in horticulture, land scaping and low-end application of Plant.
14	Installation of dual pipe plumbing for supplying fresh water for drinking, cooking and bathing and internal cleaning and mopping, and separately for supply of recycled water for flushing, landscape irrigation, car washing, air conditioning, etc. shall be done.	Separate freshwater line has been laid for drinking, cooking, and bathing etc. Treated water is being used in landscaping, horticulture, and low-end application in steel plant.

15	Use of water saving devices/ fixtures (viz. low flow flushing systems; use of low flow faucets tap aerators etc.) for water conservation shall be incorporated in the building plan.	Consumption of fresh water has been minimized by a combination of water saving devices and other domestic water conservation measures. Further, to ensure ongoing water conservation, awareness session is being organized periodically. Water saving devices like fixtures for showers, aerators, low flow toilet flushing have been installed for water conservation purpose.
16	Any ground water drawl should be properly managed and shall conform to the approvals and the guidelines of the CGWA in the matter. Formal approval shall be taken from the CGWA for any ground water abstraction. The proponent shall also obtain permission from Water Resources Department, Govt. of Odisha for drawal of river water.	No ground water is being withdrawal for any purpose.
17	The proponent shall provide for adequate rain water harvesting with necessary structures based on the norm of CGWA on the use of fresh water from underground sources. A complete plan for rainwater harvesting at the project site shall be drawn up and implemented forthwith. The complete rainwater harvesting plan shall be submitted to SEIAA within one month from this day. Rain water harvesting pits for ground water recharge shall be installed as per CGWB guidelines.	Rainwater harvesting pond of capacity 2500 m^3 has been constructed to collect rainwater from A1 and A2 High Rise Building as per plan submitted to SEIAA vide letter number TSL/SEIAA/BS-30/2021/12/142 dated 22.12.2021.
18	STP of 1000 KLD capacity shall be installed before start of the operation phase of the building. The treated waste water from STP shall be recycled/reused to the maximum extent possible as recycling is a means of reducing depletion of water resources. Flushing, Washing, watering of the lawns and gardening, low end applications in steel plant facilities are to be met by recycled water. Discharge of unused treated wastewater shall conform to the norms and standards of the Odisha State Pollution Control Board. Necessary measures should be taken to mitigate the odor problem from STP. The sewage treatment plant shall be made	Sewage Treatment Plant (1000 KLD) has been provided for treatment of domestic wastewater. The treated water meets the prescribed standards of OSPCB. Zero effluent discharge is being achieved and sustained and treated water is being used for watering of the lawns and gardening, low end applications in steel plant.

<table>
<tr><td></td><td>functional before the operation of the housing complex.</td><td></td></tr>
<tr><td>19</td><td>The installation of the Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the SEIAA, Odisha before the project is commissioned for operation. Periodical monitoring of water quality of treated sewage shall be conducted.</td><td>The sewage Treatment Plant (STP) has been retrofitted and certified by an independent expert M/s Voltas Limited. The certificate and test report were submitted to SPCB and SEIAA vide letter no. TSM/SPCB/BS-30/2022-02/195 dated 29.04.2022.

STP outlet water quality monitoring report for the period Oct'24 to Mar'25 is given in the following table.

<table><tr><th rowspan="2">Location</th><th colspan="3">Parameters in Range</th></tr><tr><th>pH</th><th>Suspended Solid in mg/l</th><th>BOD (3days at 27°C) in mg/l</th></tr><tr><td>Colony STP O/L</td><td>6.50-7.38</td><td>32-53</td><td>23-32</td></tr></table></td></tr>
<tr><td>20</td><td>The treated water is understood to be discharged to "Kisinda Nala" which is a natural stream. Necessary permission and "NOC" shall be obtained from the concerned authority for the 'Nala' to take additional load of the above wastewater.</td><td rowspan="2">Sewage Treatment Plant (1000 KLD) has been provided for treatment of domestic wastewater. The treated water meets the prescribed standards of OSPCB.

Zero effluent discharge is being achieved and sustained and treated water is being used for watering of the lawns and gardening, low end applications in steel plant.</td></tr>
<tr><td>21</td><td>Excess treated water shall be discharged to any outside drain only after getting permission from the competent authority. The proponent shall renovate the existing drain to accommodate the discharge and maintain it properly. To this effect the proponent has to give a legal affidavit before going for construction activity.</td></tr>
<tr><td>22</td><td>The proponent shall provide open drain network of RCC with cover slab and camouflaged with potted plants to take care of wastewater and storm water drainage in the township.</td><td>RCC drain network has been constructed with cover slabs to take care of storm water drainage in the township.</td></tr>
<tr><td>23</td><td>Comprehensive individual and integrated water management/ water balance, both for township and plant be submitted, taking into consideration fresh water/ surface runoff/ storm water/ wastewater/ treated wastewater, etc. within 2 months of date of issue of Environmental Clearance.</td><td>Comprehensive individual and integrated water management/ water balance, both for township and plant have been submitted vide letter no. TSL/SEIAA/BS-30/2021-12/142 dated 22.12.2021.</td></tr>
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24	A certificate from the competent authority shall be obtained for discharging treated effluent/ untreated effluents into the public sewer/ disposal/ drainage systems along with the final disposal point.	Not applicable as Zero effluent discharge is being achieved and sustained and treated water is being used for watering of the lawns and gardening, low end applications in steel plant.
25	Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.	Sludge generated from STP is being reused in horticulture.
	Solid Waste	
26	The provisions of the Solid Waste (Management) Rules, 2016, E-Waste (Management) Rules, 2016, and the Plastics Waste (Management) Rules, 2016 shall be followed. Management and handling of various wastes like solid waste, hazardous waste, bio-medical waste, battery waste, e-waste and construction & demolition wastes including linkage with authorized agencies for disposal and reuse shall conform to the prescriptions of the above Rules and related guidelines.	Solid wastes, E-wastes and plastic wastes generated are being properly collected, segregated, and disposed of as per the provision in Solid Waste (Management) Rules, 2016, E-Waste (Management) Rules, 2016, and Plastics Waste (Management) Rules, 2016. Management and handling of various wastes like solid waste, hazardous waste, bio-medical waste, battery waste, e-waste and construction & demolition wastes are ensured to conform to the rules.
27	Separate wet and dry bins must be provided in each housing unit at the ground level for facilitating segregation of waste into wet garbage and inert materials. Wet garbage shall be composted in Organic Waste Converter. Adequate area shall be provided for solid waste management within the premises which will include area for segregation, composting. The inert waste will be stored at a dumping site, and disposed of to authorised vendors of the NAC.	The solid wastes generated are being properly collected and segregated. Separate bins have been provided in each housing unit for facilitating the segregation of waste into wet garbage and inert materials. The organic composter was commissioned and in operation.
28	A certificate from the competent authority handling municipal solid wastes, indicating the existing civic capacities and their adequacy to cater to the Solid Waste generated from project shall be obtained.	Not Applicable, as the residential township of Tata Steel Limited, Meramandali coming under village panchayat, Narendrapur.

29	The project proponent shall provide compost pits so that leaf litter from green belt is converted into compost. Under no circumstances, leaf litter shall be burnt.	Compost pits have been provided for leaf litter.
30	Any wastewater generated from the premises shall not be allowed to mix with rainfall/storm water. The Project Proponent shall ensure separate approved drainage lines for discharge of wastewater and that of storm water. Storm water drain shall be passed through guard pond.	Storm water drains and wastewater drains have been constructed separately to avoid intermix. Proper outlet for storm water has been provided. All the wastewater of the township is being treated in STP and reused. No wastewater is being discharged to drain.

Energy Conservation		
31	The proponent shall provide provision of LED based lighting; energy saving devices, like fans, refrigeration, air conditioning, pumps, and lifts shall be adopted. All street lights and all other exterior lighting shall be solar power based.	Energy-saving devices have been installed in the township. LEDs have been installed for lighting indoor, outdoor, and common areas. Solar power-based streetlights are being installed in a phase wise manner. 15 nos. of 30W LED solar streetlights have been installed at parking areas. 5 Nos. of Solar Off grid system has been installed in common areas of high rise building with capacity of 3KVA each. 36 Nos. of solar base streetlights have been installed in service road of NH55, through Off Grid Solar system of 6 KW.
32	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Outdoor and common area lighting shall be LED.	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency is being ensured. LEDs have been installed for lighting the outdoor and common areas.
33	Energy conservation measures like installation of CFLs / LED for the lighting the area outside the building should be integral part of the project design and should be in place before project commissioning. Used CFLs, TFL and LED shall be	LEDs have been installed for lighting inside and outside of the building as a part of energy conservation measures. Used CFLs, TFL, LED and other e-waste are being properly collected, segregated,

	properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination.	and disposed of to authorized recycler/disposer.
34	The proponent shall use renewable energy/ solar power of at least 5% of projected power requirement for the township.	Necessary steps had already taken to harvest solar power in a phase wise manner. Following Renewable Energy/Solar power system Installed: 1) Highrise building Common area – 3 KVA Off-grid system – 5 no. 2) Colony Street Light system – 5 KVA Off-grid system – 1 no. 3) NH road Service area streetlight – 7.5 KVA Off-grid system – 1 no. 4) 5KLD Solar Geyser capacity installed– Guest house & Canteen – 1 no.
35	The proponent shall provide provision of lighting arrester, earthing for all buildings, under-ground cable network instead of overhead pool cabling for safety of dwellers.	Provision of lighting arresters, earthing for all buildings, and underground cable networks have been provided.
36	Solar power shall be used for lighting in the apartment to reduce the power load on grid. Separate electric meter shall be installed for solar power. Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local building bye-laws, whichever is higher. Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.	• Solar power-based lighting installation in the apartment is in progress to reduce the power load. • Installed 12 no. of solar electric meter which help us monitor our energy consumption and efficiency. • 5 KLD solar based water heater installed. Average Solar Energy generated on monthly basis 13115 units.
37	Use of environment friendly construction materials like bricks, blocks, etc. shall be required to make up at least 20% of the total construction material. These include Fly Ash bricks, hollow bricks, AACs, Fly Ash Lime Gypsum blocks, compressed earth blocks, etc. Fly ash should be used as building material in the construction as per the provision of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003 and 25th	In compliance with the provision of fly Ash Notification of September 1999 and its amendments, environmentally friendly construction materials like fly ash bricks and paver blocks are used for the construction of buildings and roads.

	January, 2016. Ready mixed concrete shall be preferred in building construction.	
38	A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project shall be submitted.	Not applicable as the captive power plant of Tata Steel Limited Meramandali is supplying power to the township.
	Air Quality Management and Noise Management	
39	Regular water sprinkling shall be done at construction area, material transport road through mobile water tanker to reduce fugitive dust. Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, morrum and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust. The premises of the township should be paved pucca road and vacant areas shall be covered with grasses, herbs and shrubs.	Regular water sprinkling is being done at construction area, material transport road through mobile water tanker to reduce fugitive dust. Vehicles carrying construction materials are having a top cover to avoid the spreading of dust. Internal roads have been concreted and vacant areas are covered with grasses, herbs, and shrubs.
40	All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules, 2016. All workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area with dust pollution shall be provided with dust mask.	The generation of C&D waste is less than 20 MT per day.The insignificant quantity of waste generated has been utilized in construction activities.
41	Notification GSR 94(E) dated 25.01.2018 of MoEF&CC regarding Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance shall be complied with.	Dust Mitigation measures have been followed as per submitted EMP (Environment Management Plan) by Water sprinklers for dust suppression wherever required, however, the construction work has now been completed.
42	The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Low sulphur diesel shall be used. The location of the DG set and exhaust pipe height shall	Construction of stack of adequate height attached to 250KVA DG set has been completed. Low Sulphur diesel for running the DG sets and all diesel power generating sets

<table>
<tr><td></td><td>be as per the Central Pollution Control Board (CPCB) norms. For indoor air quality the ventilation provisions as per National Building Code of India shall be provided.</td><td>are being used and have acoustic enclosure to prevent noise. Ventilation provision to control indoor air quality in the building.</td></tr>
<tr><td>43</td><td>Ambient noise levels shall conform to residential standard both during day and night as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase. Adequate measures shall be taken to reduce noise level during construction phase, so as to conform to the stipulated standards by CPCB / SPCB.</td><td>The ambient noise levels recorded in the township are well within the prescribed standard as per Noise Pollution (Control and Regulation) Rules, 2000.

A CAAQMS station has been established in consultation with SPCB in the township to monitor ambient air quality.

Every care has been taken to reduce the noise level during the construction phase.

Noise monitoring report for the period Oct’24- Mar’25 is given in below table:

<table><tr><th>Location</th><th>Colony</th></tr><tr><td>Noise level in dB(A) Leq (Day Time Range)</td><td>52.8-55.4</td></tr><tr><td>Standard dB(A) Leq (Day Time)</td><td>55</td></tr><tr><td>Noise level in dB(A) Leq (Night Time Range)</td><td>43.1-44.5</td></tr><tr><td>Standard dB(A) Leq (Night Time)</td><td>45</td></tr></table></td></tr>
<tr><td colspan="3">Green Cover</td></tr>
<tr><td>44</td><td>Green-belt & avenue plantation of trees over the area of 60,589.2 m2 (30 % of plot area) shall be done using native tree species/shrubs improving greenery & keeping in view considerations of aesthetics of the whole complex. The species with evergreen foliage. broad leaves and wide canopy cover are desirable. Professional landscape architects should be engaged to design the green layout to provide for multi-tier plantation and green fencing all around, mitigating various environmental pollutants like dust, noise, emissions etc. The proponent shall provide multi-layer green belt coverage as per the norm excluding landscape</td><td>Approx. 22000 Nos. of evergreen species like Jamun, Bela, Ashoka, Baula, Champa, mahogany and amla etc have been planted in the entire township, which is more than 1000 Nos. of trees /ha. Annual maintenance of landscape and green belt in and around township is being carried out.</td></tr>
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	around the periphery of the premises. The PP shall get at least 10trees/ha fully established and uniformly spread out (trees=30cm dbh or more) to cover the entire township area.	
45	The proponent shall encourage composting of organic waste, vermiculture, bee-culture, flori-culture and ornamental horticulture for beautification of the township.	Leaf litter and other horticulture wastes are converted into compost.
46	Roof top rain water harvesting shall be adopted for each proposed Building as part of the rainwater harvesting at the whole site.	Rooftop rainwater has been adopted for Type-A high rise buildings.

	Parking	
47	Parking shall be prohibited on the access road to the project site.	Designated parking has been allocated. Signage has been provided along all internal roads like road markings for pedestrian pathways, speed limits, etc. for smooth movement of traffic.
48	The proponent shall provide signage road markings for pedestrian pathway and cycle track, speed limits marking and corner mirrors in all internal roads for smooth movement of traffic within township.	
49	The proponent shall provide adequate parking area for four wheelers, two wheelers and cycles in the township for the inhabitants and visitors.	Adequate parking area for four wheelers, two wheelers and cycles have been provided.
	Top Soil Preservation and Reuse	
50	Topsoil may be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services. It should be stockpiled appropriately in designated areas and re-laid at plantation and such other sites.	Topsoil was used for gardening and plantation purpose.
	Traffic & Transportation	
51	Traffic management/Traffic density and Traffic decongestion study at entry and exit to township and at NH shall be undertaken and study report shall be submitted within 06 months of date of issue of Environmental Clearance.	Traffic management/ traffic density and traffic congestion study at entry and exit to the township and NH have been carried out and the recommendations have been implemented.

52	A comprehensive mobility plan, as per Ministry of Urban Development best practices guidelines (URDPFI), shall be prepared to include motorized, non-motorized, public and private networks. Road should be designed with due consideration for environment, and safety of users. The road system can be designed with these basic criteria. • Hierarchy of roads with proper segregation of vehicular and pedestrian traffic. • Traffic calming measures • Proper design of entry and exit points. • Parking norms as per local regulation	
53	A detailed traffic management and traffic decongestion plan shall be drawn up to ensure that the current level of service of the roads within a 01 km radius of the project is maintained and improved upon after the implementation of the project. This plan should be based on cumulative impact of all development and increased habitation being carried out or proposed to be carried out by the project or other agencies in this 01 km radius of the site and the traffic management plan shall be duly validated and certified by the State Urban Development department and the P.W.D./ competent authority for road augmentation and shall also have their consent to the implementation of components of the plan which involve the participation of these departments.	
54	Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards be operated only during non-peak hours.	Only vehicles having valid PUC are being engaged in transportation activity.
55	A dedicated entry/exit and parking shall be provided for commercial activities.	Entry/ exit and parking has been provided.
56	Barricades shall be provided around project boundary.	Boundary wall has been provided around the colony.
57	Speed of the vehicles shall be restricted upto 15 kmph by erecting speed bumps at regular intervals at project site and proper signage shall be provided for guided vehicular movement and speed restrictions.	Speed bumps have been provided along with signage.

58	Footpath shall be seamless with sufficient width.	Footpaths with sufficient width have been provided.
59	No vehicles shall be allowed to stop and stand in front of the gate on main access.	No vehicles are allowed to stop and stand in front of the gate on main access.
60	A buffer of minimum 10 m shall be maintained between the entry/exit gate and the road to avoid traffic congestion.	A buffer of minimum 10 m has been maintained between the entry/exit gate and the road to avoid traffic congestion.
61	The Traffic Management Plan prepared by the proponent shall be duly validated and certified by the Competent Authority of the State and shall have also their consent before implementation.	Traffic Management Plan have been certified by IIT Bhubaneswar. Certificate of traffic management study is attached as Annexure - III
	Environment Management Plan	
62	An Environmental Management Plan (EMP) shall be implemented to ensure compliance with the environmental conditions specified above. A dedicated Environment Monitoring Cell with defined functions and responsibility shall be put in place to implement the EMP. The environmental cell shall ensure that the environment infrastructure like Sewage Treatment Plant, tree planting, Rain Water Harvesting. Energy efficiency measures water use efficiency and conservation, solid waste management, renewable energy etc. are kept operational and meet the required standards. The environmental cell shall also keep the record of environment monitoring and those related to the environment infrastructure.	Compliance with environmental protection measures as recommended in the EMP report is being ensured. A dedicated Environment Monitoring Cell with defined functions and responsibilities have been put in place to implement the EMP.
63	It shall be mandatory for the project management to submit six (06) monthly compliance reports on environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance to the State Environment Impact Assessment Authority (SEIAA), Odisha, SPCB & Regional Office of the Ministry of Environment & Forest, Odisha in hard and soft copies on 1st June and 1st December of each calendar year.	Half-yearly compliance reports on environmental monitoring in respect of the stipulated conditions in the Environmental Clearance is being submitted regularly. Latest compliance for the period April 2024 to September 2024 has been submitted to SEIAA Odisha, SPCB & Regional Office of the MoEF&CC, Odisha vide letter no. TSM/SEIAA/TS-30/2024-03/505 dated 25.11.2024.

General Condition		
1	The project proponent shall ensure that the guidelines for building and construction projects issued vide MoEF&CC's OM No.19-2/2013-IA.III dated 9th June 2015, are followed to ensure sustainable environmental management.	Noted and the same is complied.
2	The approval of the Competent Authority shall be obtained in regard to structural safety of buildings against earthquake, adequacy of firefighting equipment as per National Building Code including protection measures from lightning.	The approval for the structural safety of the building as per the National Building Code of India, 2005 has been obtained.
3	The project proponent shall obtain all necessary clearance/ permission from all relevant agencies including town planning authority before commencement of work. All the construction shall be done in accordance with the local building byelaws.	Complied and noted.
4	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board.	Consent to Establish and Consent to Operate from Odisha State Pollution Control Board has been obtained vide letter no. 19511/IND-II-CTE-5518 (pt.) dated 06/12/2021 and no. 5425/IND-I-CON-6826 dated 31.03.2022 respectively. The validity of CTO is up to 31.03.2026.
5	Provisions 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, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Necessary infrastructure and housing facilities were provided for workers during construction phase of the township. Safe drinking water, toilets etc. facilities were provided during construction activities. First aid and medical facilities are available in the township health center and steel plant OHC.
6	A First Aid Room shall be provided in the project both during construction and operations of the project.	A full-fledged health center is operational in the township.
7	The company shall draw up and implement corporate social Responsibility plan as per the Companies Act of 2013.	Noted and complied.

8	As per the MoEF&CC. Govt. of India Office Memorandum dated 30.09.2020, the project proponent is required to prepare and implement Corporate Environment Responsibility (CER) Plan. Appropriate funds shall be earmarked for the activities such as infrastructure creation for drinking water supply, sanitation, health, skill development. cross drains, solid waste management facilities, rain water harvesting, soil moisture conservation works, avenue plantation. etc. The activities proposed under CER shall be focused on the project impacted area around the project. The activities proposed for CER shall be implemented and completed within three years and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement and to the District Collector. It should be posted on the website of the project proponent.	CER/CSR scheme has been implemented in conjunction with the Tata Steel foundation CSR initiative. The implemented CSR scheme has also been uploaded on go-care website Govt. of Odisha and company portal. The detail CSR scheme implemented was submitted along with half yearly compliance report vide letter No. TSM/SEIAA/TS-30/2024-03/505 dated 25.11.2024.
9	A copy of this Environmental Clearance letter shall be displayed on the website of the Odisha State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.	The EC letter was displayed at the Regional Office, District Industries center and Collector's Office/ Tehsildar's office for 30 days.
10	Officials from the Regional Office of MoEF&CC, Bhubaneswar/SPCB, Odisha who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents/data by the project proponents during their inspection.	Noted.
11	In the case of any change(s) in the scope of the project, the project would require a fresh clearance by the SEIAA, Odisha.	Noted.
12	The SEIAA, Odisha reserves the right to add additional conditions and safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure	Agreed,.

	effective implementation of the conditions, and safeguard measures in a time bound and satisfactory manner.	
13	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department. Civil Aviation Department, the Forest Conservation Act. 1980 and the Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	Applicable clearance has been obtained.
14	The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the SEIAA. Odisha. The advertisement shall be made within Seven days from the date of receipt of the Clearance letter and a copy of the same shall be forwarded to the Regional Office of MoEF&CC. Bhubaneswar.	The advertisement was published in both Odia & English newspapers named "Pragatibadi" and "The New Indian Express" respectively on the date 02.10.2021.
15	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/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.	The clearance letter was sent to all concerned and also uploaded to our company website, which can be viewed at http://www.tatasteel.com.
16	The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental 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 MoEF&CC, Govt. of India. the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, S02, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location	Compliance status has been uploaded on the Company's website at http://www.tatasteel.com. The compliance report including results of monitored data is being submitted to the Regional Office of MoEF&CC, CPCB and SPCB, Odisha. Last compliance report has been submitted vide letter no. TSM/SEIAA/TS-30/2024-03/505 dated 25.11.2024

	near the main gate of the company in the public domain.	
17	The environmental statement for each financial year ending 31st March in Form-V as is mandated be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently. This shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF & CC, Govt. of India by E-mail.	Environmental Statement for the financial year 2023-24 in Form-V has been submitted vide letter no. TSL/SPCB/TS-30/2024-03/494 dated 27.09.2024 to all concerned authorities as prescribed under the Environment (Protection) Rules 1986, and its amendments. This shall has been put on the website of the company along with the status of compliance of EC conditions and has been sent to the respective Regional Offices of MoEF & CC, Govt. of India by E-mail.

O/C

TSL/SPCB/BS-30/2025-02/550
May 06, 2025

The Chief Environment Engineer
State Pollution Control Board, Odisha
Parivesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII
Bhubaneswar-751 012

Subject: Request to release the Bank Guarantee for Residential Township of Tata Steel Limited, Meramandali – Regarding.

References:

1. SEIAA, Odisha vide letter no.6365/ SEIAA dated March 28, 2025
2. Our letter no. TSL/SPCB/BS-30/2023-08/391 dated November 17, 2023
3. Our letter no. TSL/OSPCB/BS-30/2021-10/134 dated Nov 29, 2021
4. EC granted by SEIAA, Odisha vide letter no. 2882/ SEIAA dated Sep 28, 2021

Dear Sir,

This has reference to the captioned subject and cited references. We would like to inform that Environmental Clearance (EC) was granted to Tata Steel Limited for the construction of Residential Quarters (Township) for staff at Meramandali, as per SEIAA Odisha's letter no. 2882/SEIAA dated September 28, 2021.

In compliance with specific condition no. 2 of the above referred EC, we deposited a Bank Guarantee (BG) worth ₹ 2.6 Crores with the Odisha State Pollution Control Board, as documented in our letter no. TSL/OSPCB/BS-30/2021-10/134 dated November 29, 2021. We have diligently ensured compliance with the relevant conditions outlined in the EC and have been submitting the six-monthly compliance reports to your esteemed office.

We are pleased to inform you that, following our request for the release of the BG, a committee visited the TSM residential colony to verify the compliance status and based on their findings, SEAC, Odisha recommended the release of the BG, which was subsequently approved by SEIAA, Odisha during the 192nd meeting held on March 20, 2025. Please find the approval from SEIAA, Odisha vide letter no.6365/ SEIAA dated March 28, 2025, along with a copy to the Member Secretary of the State Pollution Control Board, Odisha attached as Annexure-1 for your kind reference.

In light of this, we kindly request your prompt consideration of our request to release the Bank Guarantee at your earliest convenience.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Chief Environment, TSM

Encl: As above

No.....Dt.....
RECEIVED
09 MAY 2025
ODISHA S.P.C. BOARD BHUBANESWAR

ODISHA FIRE & EMERGENCY SERVICE

FIRE SAFETY CERTIFICATE

FORM-V

[Under rule-13(3) of the Odisha Fire Prevention and Fire Safety Rules, 2017]

Certificate No:	FIRCER1305150052023003398	**Application No:**	FSC1305150052023000007
Date of Issue:	05-09-2023	**Date of Receipt of Application:**	08-08-2023
Valid Up to:	04-09-2028 (midnight)		
(Apply for Renewal of Fire Safety Certificate at least three months before its expiry)			

Certified that the — Block - C1, Tata Steel Meramandali township

Situated at — Plot No-683(P), 753(P), 754(P), 755(P), 712(P), Khata No.-14, 29, 29, 59, 131, Street-Kusupanga, Meramandali, Mouza-Narendrapur, Tahasil- Odapada, Police Station-Kantabania Police Station , District-Dhenkanal, Fire Station-Hindol Road,

Consisting of total — 1 Number of Towers/Blocks, was inspected by officers of the Fire Service on — 29-08-2023

In presence of — Authorized person of the premises

34261431698135

and it has been found to comply with the fire prevention and safety requirements in accordance with the Odisha Fire Prevention and Fire Safety Rules, 2017 read with Odisha Fire Prevention and Fire Safety(Amendment) Rules,2019 and that its various floors are fit for occupancy or usage as noted hereunder against each subject to compliance to the conditions as prescribed herein below:

1. * Name of the Building(s)/Tower(s)/Block(s):- B+G+12 floors (Block-C1)

*** Floor wise occupancy:-**

Sl.No.	Floors in Tower/Block	Usage
1	Basement	Parking & Services
2	Ground floor to 12th floor	Residential

CONDITIONS:-

1. Fire prevention and safety measures and appliances, availability of water supplies and means of access thereto etc provided in the building or premises, should be maintained by the occupier(s) in best repairs and efficient working condition at all times for use by the occupants or the members of the Fire Service or both in the event of outbreak of fire.
2. The set-backs, driveways, entrance gates, exits, staircases, corridors and escape way should not be changed, obstructed or modified in any way.
3. The occupiers(s) shall train all staff and occupants periodically to make them well conversant in use and operation of the fire prevention and safety measures.
4. Fire drills/rehearsals should be organised at least once in six months by involving Local Fire Station.
5. The occupier(s) shall appoint Fire Safety Supervisor exclusively for this building or premises.
6. Photocopies of this Certificate should be framed and displayed at all conspicuous places in all lobbies/corridors in all floors of all Towers/Blocks of building/premises.
7. The maintenance of fire safety installation in the building / premise shall be owner's / occupier's liability as per Rule-16 of OFP & FS Rules, 2017. He shall maintain the same in good repairs and working condition at all times. Any lapses in fire safety installation during fire incident if any shall end with owner's / occupier's responsibility.

By order of the Director of Fire Service

Signature Not Verified
Signed by : SHRI DEBENDRA KUMAR SWAIN
Date : 05-09-2023 19:08:00
Shri Debendra Kumar Swain

Chief Fire Officer (SAG) FPW,Odisha

NOTE

(i) It is a digitally signed electronically generated certificate and therefore needs no ink-signed signature.
(ii) This Certificate is issued as per section 4, 5,& 6 of Information Technology Act 2000 and its subsequent amendments in 2008.
(iii)For any Query or Verification , Agency /Department / Office may visit https://agnishamaseva.odisha.gov.in
(iv)Tampering of this Certificate will attract penal action.

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FORM-VII

[(See Regulation 52(1) (v)]

STRUCTURAL STABILITY CERTIFICATE

(To be furnished by the registered Structural Engineer/Architect)

This is to certify that I/~~We/M/s~~ PANKAJ KUMAR,

has/have prepared the structural design of the building over Plot No. 683(P), 753(P), 754(P), 755(P), 712(P) Khata No. 14, 29, 59, 131 Mouza Narendrapur

For construction of ..... storey building as per the provisions of National Building Code. I undertake the responsibility with regard to supervision of the work at each stage of construction, (after lying of foundation & after casting of each floor) and submit the report to TAMDA to the effect that the building is being constructed confirming to the approved plan and as per the structural design prepared be me/firm as per the provisions of NBC taking into account the safety factors like cyclone & earth quake etc. I/We will be responsible and liable for action by TAMDA / Govt. if the plan / design submitted contain misrepresentation or fraud and construction is made in deviation of approved plan or if there is structural failure & fire endangering the inmates & the public.

Pankaj Kumar

(i) Signature and Seal
Registered Structural Engineer

ER. PANKAJ KUMAR
INDIAN INSTITUTE OF ENGINEERS
CHARTERED ENGINEER (INDIA)
REGN No.- AA-187578

(i) Present and Permanent Address
D1/25 Kharkai Enclave,
West Layout Sonari, Jamshedpur,
Dist: East Singhbhum. Jharkhand:
PIN: 831011

(ii) Present and Permanent Address
- do -

For Tata Steel Ltd.
Mohit Das
Chief Corporate Services, TSM

(iii) Signature of the Plot Owner/
Owner & Developer/Builder.

FORM-VI

CERTIFICATE OF COMPLETION

[(See Regulation 18(1) & 67]

(To be given by the Owner and Countersigned by the Registered Architect / Registered Structural Engineer. To be submitted in triplicate.)

(Office Use)

Date of Receipt.....

Amount of fee deposited.....

Receipt No. & Date.....

From :

.....

.....

.....

(Name & address block letters)

To

THE VICE-CHAIRMAN,
TALCHER ANGUL MERAMANDALI DEVELOPMENT AUTHORITY,
ANGUL.

Sir,

I/We hereby certify that the erection of building as per the schedule below Plot No. 683(P), 753(P), 754(P), 755(P), 712(P) Khata No 14, 29, 59, 131 Mouza Narendrapur Ward No Tahsil: Odapada has been supervised by me/us and has been completed on 01/08/2023 Date..... Strictly according to the plan sanctioned vide letter No..... dated ..... The work has been completed to my/our best satisfaction. All the material (type of grade) have been used strictly in accordance with the general and detail specification. The structural safety with respect to cyclone & earthquake has been taken care as per the provisions of the NBC. The fire safety measures have also been adopted as per the clearance of the fire officer.

No provision of the Orissa Development Authority Act. 1982 & Orissa Development Authority Rule 1983 and the Relevant Building Regulation has been violated. No requision made, conditions imposed or orders issued with respect to the above quoted sanctioned plan have been transgressed in the course of the work. The building is fit for use for which it has been erected.

For Tata Steel Ltd.
Signature of the
Owner(s) & Developer
Mohit Das
Chief, Corporate Services, TSM

Yours faithfully
Sumana Basack
MRS. SUMANA BASACK
COUNCIL OF ARCHITECTURE
REGN. NO.-CA/2006/38842
Signature of Regd. Architect

Pankaj Kumar
ER. PANKAJ KUMAR
INDIAN INSTITUTE OF ENGINEERS
CHARTERED ENGINEER (INDIA)
REGN No.- AM1872578
Signature of Regd. Str. Engr.

Photos : C1 Tower

Address : Plot No. – 683 (P), 753 (P), 754 (P), 755 (P), 712 (P),
Khata No. – 14, 29, 59, 131
Mouza – Narendrapur, Tahasil – Odapada

For Tata Steel Ltd.

Mohit Das
Chief, Corporate Services, TSM

MRS. SUMANA BASACK
COUNCIL OF ARCHITECTURE
REGN. NO.-CA/2006/38842

TRAFFIC STUDY

Traffic congestion Study at TSBSL Township

Project By:

TATA BSL

At: Meramandli, Dhenkanal ,Odisha.

JANUARY-2021

vetted by us as per the primary and secondary data provided by CEMC Pvt Ltd.

8/1/21

PPDey 08/Jan/2021

8/1/2021

डॉ. राजेश रोशन दाश/ Dr. Rajesh Roshan Dash
सह प्राध्यापक / Associate Professor
आधारिक संरचना विद्यापीठ
School of Infrastructure
भा.प्रौ.सं.भुवनेश्वर/ IIT Bhubaneswar
भुवनेश्वर/ Bhubaneswar-752050,ओडिशा

डॉ. पार्थ प्रतिम दे/ Dr. Partha Pratim Dey
सहायक प्राध्यापक / Assistant Professor
आधारिक संरचना विद्यापीठ
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भुवनेश्वर/ Bhubaneswar-752050,ओडिशा/Odisha

डॉ. मनस्विनी बेहेरा/ Dr. Manaswini Behera
सहायक प्राध्यापक/ Assistant Professor
आधारिक संरचना विद्यापीठ
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भुवनेश्वर/ Bhubaneswar-752050,ओडिशा

CENTRE FOR ENVOTECH AND MANAGEMENT CONSULTANCY PVT. LTD.

An ISO 9001-2015, OHSAS 18001:2007 & ISO 14001-2015 Certified Company, Empanelled with OCCL, ORSAC and SPCB of Govt. of Odisha
Accredited by NABET, QCI for EIA Studies as 'A' Category Consultant Organization. Empanelled with PCCF(Wildlife) &CWLW,Odisha
Enlisted in CIDC (established by the Planning Commission Govt. of India), NABLMoEF&CC, Govt. of India,
Recognised Environment Laboratory under Environment (Protection) Act, 1986.
Environmental Studies (EIA & EMP),Monitoring, Forest Diversion Planning, DPR, Wildlife Management Plan, Hazardous & Safety Studies, RS& GIS, Baseline Survey, Hydrological & Geological Studies, Socio-economic Studies, DGPS & ETS Survey.
Regd. Office: 1st Floor, N-5/305, IRC village, Nayapalli, Bhubaneswar-751015, Odisha, India,Mobile: 9861032826
E-mail- cemc_consultancy@yahoo.co.in, cemc122@gmail.com, Website: www.cemc.in, Landline: 0674-2360344.
Laboratory At: Plot No. 800/1274, Jahal, Pahal, Bhubaneswar-752101,
E-mail: cemclab@yahoo.in, Mobile: 9937631956, 8895177314

INTRODUCTION

GENERAL

In the post liberalization era, the Indian steel industry has grown through greenfield capacity addition in the private sector, brown field expansion cum modernization of old plants both in the public & private sector, acquisition of steel capacities globally as well as backward integration into global raw material sources. With crude steel production of 78 Mt in 2012-13, India has emerged as the 4th largest steel producer in the world lagging behind only China, Japan and USA. As per some forecasts, India is likely to become the 2nd largest steel producer in the world by 2020 surpassing Japan and USA.

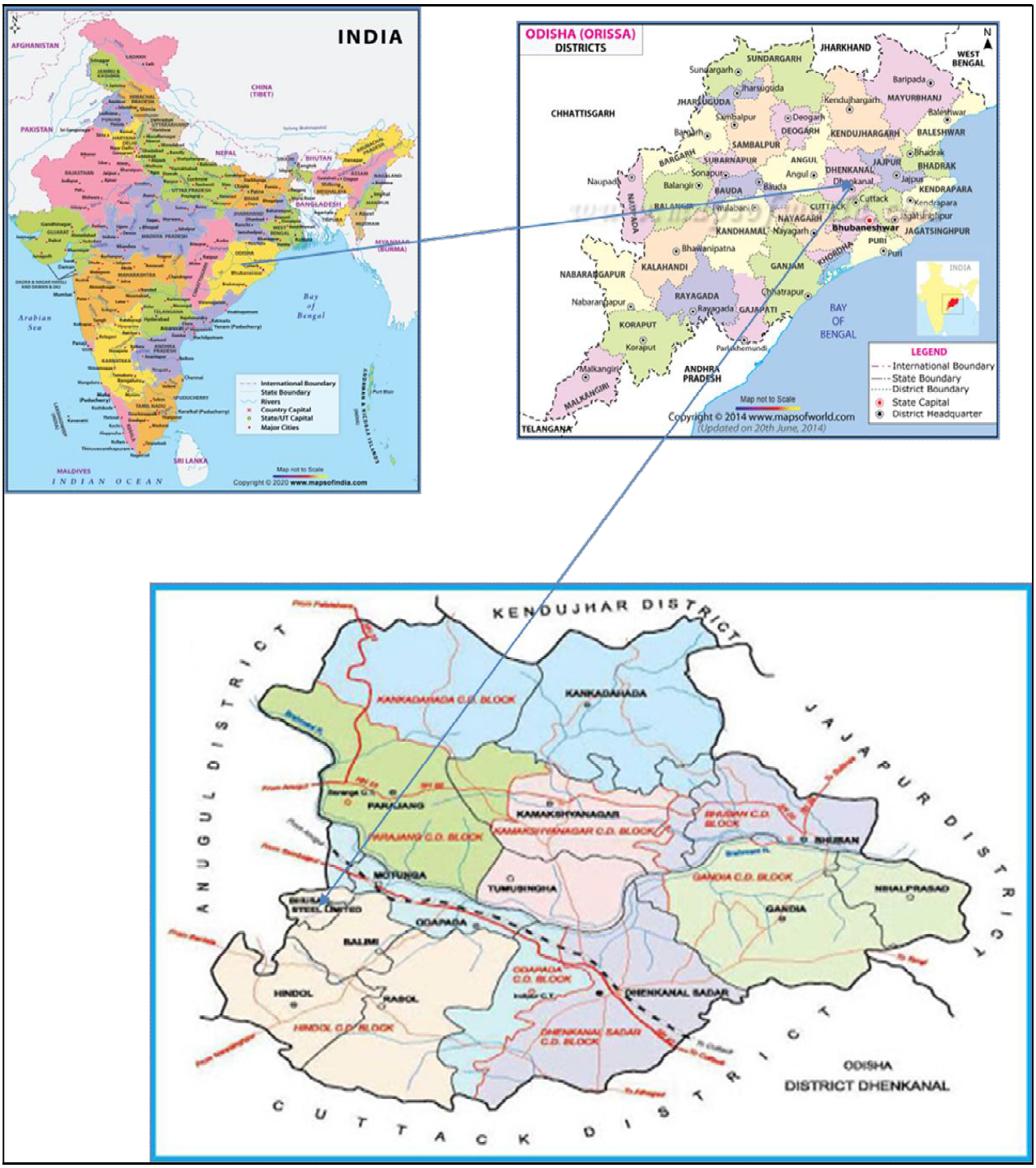
M/s TATA BSL Drafting a detail report on Traffic congestion study at TATA BSL Township Covering 50 acres of area approximately consisting of 30% greenery approx and accommodating around 3700 residents. The township comprises of 8 high-rise buildings, 21 mid-rise buildings, 6 low-rise buildings, 35 bungalows, 4 hostel blocks, 1 market complex, 1 utility block & 1hotel/club block & 1 km surrounding the whole township .

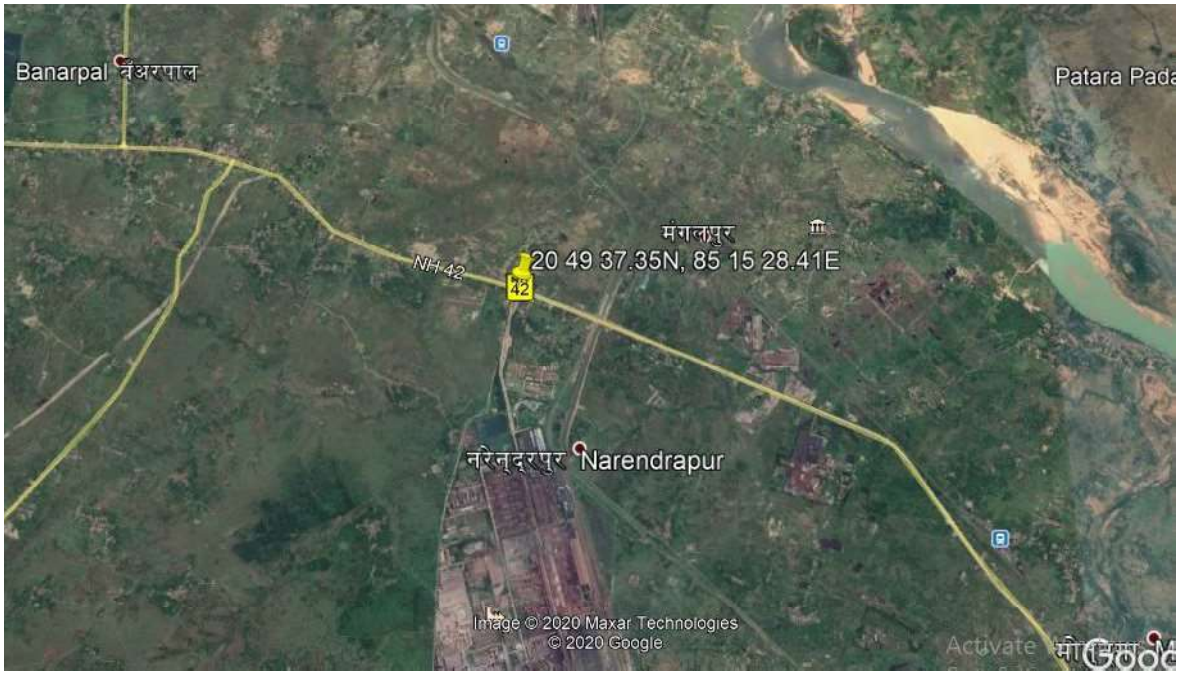
Recognizing the need for traffic engineering advice, M/s TATABSL, appointed M/s Center for Envotech and Management Consultancy to undertake the preparation of traffic study. This report presents the results and findings of the traffic study. The index map showing location of plant site in Meramandli, Dhenkanal district is attached.

BSL's existing integrated steel plant is located about 5 km from Meramandli Railway Stations(Angul – Cuttack broad gauge main railway line of East Coast Railway). National Highway 55 touches the northern side of plant site. The plant site is 113 km from Cuttack and 208 km from Sambalpur. The nearest port is Paradeep, which is more than 215 km away. There is no national park/wildlife sanctuary/reserve forest within 10 km radius of the plant.

The site is located between latitudes 20°46'41" to 20°49'20" N and longitudes 85°15'22" to 85°16'21" E at Meramandli block of Dhenkanal district of Orissa.The entry and exit of TATA BSL plant connected to NH-55 (1 km towards Sambalpur & 1 km towards Cuttack) which was falling under villages Joragadia, Itapa, and Asanabania in district of Dhenkanal ,Odisha .

Location of Plant site





This report is prepared into the following four sections:

Section 1: PCU values

Section 2: Traffic survey

Section 3: Estimation of traffic growth factor

Section 4: Assessment of traffic impact on NH (both the directions)

Section 1: PCU values:

Passenger Car Units for different category of vehicles have been referred from the Indo-HCM, 2017 as shown below. The median values for each category of vehicles have been considered.

Table 3.4: Range and Median of PCU Values for various Vehicle Types

S. No.	Vehicle Type	Four Lane Divided Highway Segments		Six Lane Divided Highway Segments	
		Range	Median	Range	Median
1.	Standard Car *(SC)*	-	1.00	-	1.00
2.	Big Car *(BC)*	1.4 - 1.5	1.45	1.4 - 1.6	1.50
3.	Motorized Two-Wheeler *(TW)*	0.3 - 0.5	0.40	0.3 - 0.4	0.35
4.	Auto-rickshaw *(AUTO)*	1.1 - 1.3	1.20	1.2 - 1.4	1.40
5.	Light Commercial Vehicles *(LCV)*	2.7 - 3.3	3.10	3.0 - 3.6	3.40
6.	Two / Three Axle Trucks *(TAT)*	3.5 - 4.6	4.40	4.3 - 5.5	5.00
7.	Multi-Axle Trucks *(MAT)*	6.3 - 7.0	6.60	8.1 - 9.6	8.60
8.	Bus *(B)*	4.4 - 5.3	5.00	4.3 - 5.6	5.10
9.	Tractors including Trailers *(TT)*	3.9 -7.0	6.20	4.5 - 6.6	6.30

The PCU values considered for the present study is tabulated in Table 1.

Table No. 1: PCU values for different category of vehicles

Category of vehicles	PCU values
Two Wheeler	0.40
Three Wheeler (Auto rickshaw)	1.20
Light Motor Vehicle	1.225
Heavy Motor Vehicle	5.55
For **Light Motor Vehicle**: The average of SC and BC has been considered (Table 3.4 of Indo-HCM). For **Heavy Motor Vehicle**: The average of TAT, MAT, B, and TT has been considered (Table 3.4 of Indo-HCM).	

Section 2: Traffic survey:

Traffic study (classified traffic volume count) was carried out for main road & local road to estimate the traffic adequacy of the township as well as 1 km radius of the project site.

Existing traffic volume was measured in the main road and was carried out from 6:00 AM to 6.00 PM for 7 days from 07.12.2020 to 13.12.2020. The predominant category of vehicles plying on the roads i.e.2 Wheelers, 3 Wheelers, Light Motor Vehicle & Heavy Motor Vehicles were counted and recorded for each hour. The traffic volume is recorded for 12 hours and then it is converted to PCU values.

The hourly traffic flows for 7 days (dated 07.12.2020 to 13.12.2020) were counted on the NH for both the directions i. e. towards Cuttack and towards Sambalpur and reported in Tables 2 through 5. This hourly traffic volume has been considered as the existing traffic in the base year 2020. This hourly traffic has been converted as PCU/hr by using the PCU values as mentioned in Table 1.

Table No.2: Hourly traffic volume (NH-55 towards Cuttack):Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	231	221	209	217	213	187	196	186	185	178	171	168	197
		3W	87	91	82	89	82	86	92	79	75	73	71	79	82
		LMV	94	106	109	107	109	105	107	109	110	107	110	113	107
		HMV	135	141	152	145	143	148	157	165	173	180	214	233	166
08.12.20	NH-55	2W	208	233	214	223	214	195	207	189	187	185	178	170	200
		3W	83	88	85	90	83	80	89	77	79	76	77	75	82
		LMV	97	92	104	91	86	101	107	109	113	106	110	113	102
		HMV	137	139	157	152	145	161	172	178	186	225	215	233	175
09.12.20	NH-55	2W	211	208	206	221	224	192	205	196	189	181	178	169	198
		3W	85	94	80	77	83	88	91	78	77	82	76	74	82
		LMV	92	101	103	92	87	92	101	112	114	110	113	107	102
		HMV	139	147	143	154	143	149	154	172	192	209	221	238	172
10.12.20	NH-55	2W	225	215	224	220	235	196	214	217	186	155	167	169	202
		3W	92	83	86	88	83	91	86	73	82	74	76	73	82
		LMV	97	105	101	92	98	103	101	100	109	101	104	107	102
		HMV	148	152	142	172	167	153	166	142	186	215	224	236	175
11.12.20	NH-55	2W	233	214	224	214	205	202	193	186	185	179	171	169	198
		3W	89	88	81	86	82	85	82	72	77	79	74	71	81
		LMV	104	101	95	88	98	91	100	85	112	107	106	112	100
		HMV	143	154	142	178	181	155	164	168	194	227	209	233	179
12.12.20	NH-55	2W	233	233	225	229	220	224	217	187	178	164	168	170	204
		3W	91	82	83	84	83	81	79	74	76	81	74	72	80
		LMV	94	94	98	101	95	98	103	101	103	112	113	115	102
		HMV	145	157	161	149	176	149	158	178	187	209	233	241	179
13.12.20	NH-55	2W	239	227	217	209	231	217	217	206	192	178	170	168	206
		3W	86	83	76	82	76	79	74	76	72	76	73	72	77
		LMV	97	107	85	97	101	95	104	97	89	101	111	115	100
		HMV	152	164	142	152	149	158	165	173	226	221	208	237	179

Table No. 3: The average hourly traffic count (towards Cuttack)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	201	0.40	80
Three Wheeler	81	1.20	97
Light Motor Vehicle	102	1.225	125
Heavy Motor Vehicle	175	5.55	971
Total	**559**		**1273**

Table No. 4: Hourly traffic volume (NH-55 towards Sambalpur): Traffic survey done from 7th Dec to 13th Dec 2020.

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	224	215	203	220	205	179	189	192	178	169	164	163	192
		3W	80	85	76	93	74	78	85	85	67	64	65	74	77
		LMV	87	100	103	111	100	97	101	115	103	99	103	107	102
		HMV	128	135	147	148	135	140	151	171	166	172	207	228	161
08.12.20	NH-55	2W	201	227	208	227	205	187	200	195	179	177	171	164	195
		3W	77	82	79	94	75	72	83	83	71	67	70	70	77
		LMV	91	86	99	95	77	94	100	115	106	97	103	108	98
		HMV	131	133	151	155	136	154	165	184	178	217	209	227	170
09.12.20	NH-55	2W	205	202	201	225	216	184	199	202	181	173	171	163	194
		3W	78	88	75	81	74	80	84	84	69	74	69	68	77
		LMV	85	95	98	95	79	84	94	118	106	102	107	101	97
		HMV	132	141	138	157	135	141	147	178	184	200	215	232	167
10.12.20	NH-55	2W	218	209	219	223	226	188	208	223	178	146	161	163	197
		3W	85	77	81	91	74	83	79	79	74	65	70	68	77
		LMV	90	99	96	95	89	95	95	106	101	93	97	102	97
		HMV	141	146	136	175	159	145	159	148	178	207	218	231	170
11.12.20	NH-55	2W	227	208	219	217	196	194	186	192	177	170	164	163	193
		3W	83	82	76	89	73	77	75	78	70	70	67	66	76
		LMV	98	95	89	92	89	83	93	91	104	99	99	107	95
		HMV	137	148	137	181	172	148	158	174	186	218	203	228	174
12.12.20	NH-55	2W	226	227	220	232	211	217	211	193	170	156	161	164	199
		3W	85	76	78	88	74	73	73	80	68	73	68	67	75
		LMV	87	88	92	105	86	90	97	107	95	103	107	109	97
		HMV	138	151	155	153	167	142	151	184	179	201	227	235	174
13.12.20	NH-55	2W	232	221	212	213	223	209	211	212	184	169	164	163	201
		3W	79	77	71	85	68	71	68	82	64	68	67	67	72
		LMV	91	101	80	101	92	88	98	103	81	93	104	110	95
		HMV	145	158	136	155	140	150	158	179	218	213	202	232	174

Table No.5: The average hourly traffic count (towards Sambalpur)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	196	0.40	78
Three Wheeler	76	1.20	91
Light Motor Vehicle	97	1.225	119
Heavy Motor Vehicle	170	5.55	944
Total	**539**		**1232**

Table No.6: Hourly traffic volume estimation (Vehicles entering to the plant premises through TATA BSL main gate): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	COLLECTOR ROAD	2W	74	84	77	98	95	87	96	101	97	101	87	89	91
		3W	25	21	26	24	23	31	35	34	31	32	26	23	28
		LMV	85	78	96	101	89	98	101	103	112	98	96	103	97
		HMV	115	121	117	123	114	119	113	108	118	120	124	128	118
08.12.20	COLLECTOR ROAD	2W	71	81	74	95	92	84	93	98	94	98	84	86	88
		3W	26	22	27	25	24	32	36	35	32	33	27	24	29
		LMV	88	81	99	104	92	101	104	106	115	101	99	106	100
		HMV	118	124	120	126	117	122	116	111	121	123	127	131	121
09.12.20	COLLECTOR ROAD	2W	73	83	76	97	94	86	95	100	96	100	86	88	90
		3W	29	25	30	28	27	35	39	38	35	36	30	27	32
		LMV	92	85	103	108	96	105	108	110	119	105	103	110	104
		HMV	113	119	115	121	112	117	111	106	116	118	122	126	116
10.12.20	COLLECTOR ROAD	2W	77	87	80	101	98	90	99	104	100	104	90	92	94
		3W	22	23	31	25	24	26	27	22	23	25	23	20	24
		LMV	97	90	108	113	101	110	113	115	124	110	108	115	109
		HMV	121	127	123	129	120	125	119	114	124	126	130	134	124
11.12.20	COLLECTOR ROAD	2W	80	90	83	104	101	93	102	107	103	107	93	95	97
		3W	27	28	36	30	29	31	32	27	28	30	28	25	29
		LMV	91	84	102	107	95	104	107	109	118	104	102	109	103
		HMV	125	131	127	133	124	129	123	118	128	130	134	138	128
12.12.20	COLLECTOR ROAD	2W	73	83	76	97	94	86	95	100	96	100	86	88	90
		3W	30	31	39	33	32	34	35	30	31	33	31	28	32
		LMV	85	78	96	101	89	98	101	103	112	98	96	103	97
		HMV	132	138	134	140	131	136	130	125	135	137	141	145	135
13.12.20	COLLECTOR ROAD	2W	76	86	79	100	97	89	98	103	99	103	89	91	93
		3W	29	30	38	32	31	33	34	29	30	32	30	27	31
		LMV	76	69	87	92	80	89	92	94	103	89	87	94	88
		HMV	141	147	143	149	140	145	139	134	144	146	150	154	144

Table No.7: The average hourly traffic count (Vehicles entering to the plant premises through TATA BSL main gate)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	92	0.4	37
Three Wheeler	29	1.2	35
Light Motor Vehicle	100	1.225	123
Heavy Motor Vehicle	127	5.55	705
Total	**348**		**900**

Table No.8: Hourly traffic volume estimation (Vehicles outgoing from TATA BSL township to plant premises): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	LOCAL ROAD	2W	46	43	36	37	35	41	46	40	41	43	38	40	41
		3W	15	16	23	20	21	24	31	22	21	15	13	12	19
		LMV	60	65	67	55	64	75	66	63	58	52	49	42	60
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
08.12.20	LOCAL ROAD	2W	48	45	38	39	37	43	48	42	43	45	40	42	43
		3W	16	17	24	21	22	25	32	23	22	16	14	13	20
		LMV	63	68	70	58	67	78	69	66	61	55	52	45	63
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
09.12.20	LOCAL ROAD	2W	51	48	41	42	40	46	51	45	46	48	43	45	46
		3W	22	15	24	26	20	23	25	23	19	21	22	20	22
		LMV	69	74	76	64	73	84	75	72	67	61	58	51	69
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
10.12.20	LOCAL ROAD	2W	56	53	46	47	45	51	56	50	51	53	48	50	51
		3W	19	12	21	23	17	20	22	20	16	18	19	17	19
		LMV	66	71	73	61	70	81	72	69	64	58	55	48	66
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
11.12.20	LOCAL ROAD	2W	50	47	40	41	39	45	50	44	45	47	42	44	45
		3W	12	5	14	16	10	13	15	13	9	11	12	10	12
		LMV	69	74	76	64	73	84	75	72	67	61	58	51	69
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
12.12.20	LOCAL ROAD	2W	56	53	46	47	45	51	56	50	51	53	48	50	51
		3W	15	8	17	19	13	16	18	16	12	14	15	13	15
		LMV	67	72	74	62	71	82	73	70	65	59	56	49	67
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
13.12.20	LOCAL ROAD	2W	48	45	38	39	37	43	48	42	43	45	40	42	43
		3W	24	17	26	28	22	25	27	25	21	23	24	22	24
		LMV	71	76	78	66	75	86	77	74	69	63	60	53	71
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0

Table No.9: The average hourly traffic count (vehicles outgoing from TATA BSL township to plant premises)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	46	0.4	18
Three Wheeler	19	1.2	23
Light Motor Vehicle	66	1.225	81
Heavy Motor Vehicle	0	5.55	0
Total	**131**		**122**

Table No.10: Hourly traffic volume estimation (Incoming vehicles from TATA BSL main gate & township meeting at junction within the plant premises): Traffic survey done from Traffic survey done from 7th Dec to 13th Dec 2020.

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	LOCAL ROAD	2W	120	127	113	135	130	128	142	141	138	144	125	129	131
		3W	40	37	49	44	44	55	66	56	52	47	39	35	47
		LMV	145	143	163	156	153	173	167	166	170	150	145	145	156
		HMV	115	121	117	123	114	119	113	108	118	120	124	128	118
08.12.20	LOCAL ROAD	2W	119	126	112	134	129	127	141	140	137	143	124	128	130
		3W	42	39	51	46	46	57	68	58	54	49	41	37	49
		LMV	151	149	169	162	159	179	173	172	176	156	151	151	162
		HMV	118	124	120	126	117	122	116	111	121	123	127	131	121
09.12.20	LOCAL ROAD	2W	124	131	117	139	134	132	146	145	142	148	129	133	135
		3W	51	40	54	54	47	58	64	61	54	57	52	47	53
		LMV	161	159	179	172	169	189	183	182	186	166	161	161	172
		HMV	113	119	115	121	112	117	111	106	116	118	122	126	116
10.12.20	LOCAL ROAD	2W	133	140	126	148	143	141	155	154	151	157	138	142	144
		3W	41	35	52	48	41	46	49	42	39	43	42	37	43
		LMV	163	161	181	174	171	191	185	184	188	168	163	163	174
		HMV	121	127	123	129	120	125	119	114	124	126	130	134	124
11.12.20	LOCAL ROAD	2W	130	137	123	145	140	138	152	151	148	154	135	139	141
		3W	39	33	50	46	39	44	47	40	37	41	40	35	41
		LMV	160	158	178	171	168	188	182	181	185	165	160	160	171
		HMV	125	131	127	133	124	129	123	118	128	130	134	138	128
12.12.20	LOCAL ROAD	2W	129	136	122	144	139	137	151	150	147	153	134	138	140
		3W	45	39	56	52	45	50	53	46	43	47	46	41	47
		LMV	152	150	170	163	160	180	174	173	177	157	152	152	163
		HMV	132	138	134	140	131	136	130	125	135	137	141	145	135
13.12.20	LOCAL ROAD	2W	124	131	117	139	134	132	146	145	142	148	129	133	135
		3W	53	47	64	60	53	58	61	54	51	55	54	49	55
		LMV	147	145	165	158	155	175	169	168	172	152	147	147	158
		HMV	141	147	143	149	140	145	139	134	144	146	150	154	144

Table No.11: The average hourly traffic count (Incoming vehicles from TATA BSL main gate & township meeting at junction within the plant premises)

Types of vehicles	No. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	137	0.40	55
Three Wheeler	48	1.20	58
Light Motor Vehicle	165	1.225	202
Heavy Motor Vehicle	127	5.55	705
Total	**476**		**1020**

Table No.12: Hourly traffic volume estimation (outgoing of vehicles from TATA BSL main gate meeting at NH): Traffic survey done from 7th Dec to 13thDec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	75	89	101	123	105	114	108	111	106	110	105	107	105
		3W	26	22	27	25	24	32	36	35	32	33	27	24	29
		LMV	86	87	89	79	101	98	87	88	91	97	84	83	89
		HMV	112	105	134	108	125	132	133	126	114	128	126	131	123
08.12.20	NH-55	2W	68	82	94	116	98	107	101	104	99	103	98	100	98
		3W	28	24	29	27	26	34	38	37	34	35	29	26	31
		LMV	94	95	97	87	109	106	95	96	99	105	92	91	97
		HMV	118	111	140	114	131	138	139	132	120	134	132	137	129
09.12.20	NH-55	2W	58	72	84	106	88	97	91	94	89	93	88	90	88
		3W	27	23	28	26	25	33	37	36	33	34	28	25	30
		LMV	98	99	101	91	113	110	99	100	103	109	96	95	101
		HMV	115	108	137	111	128	135	136	129	117	131	129	134	126
10.12.20	NH-55	2W	54	68	80	102	84	93	87	90	85	89	84	86	84
		3W	24	25	33	27	26	28	29	24	25	27	25	22	26
		LMV	83	84	86	76	98	95	84	85	88	94	81	80	86
		HMV	122	115	144	118	135	142	143	136	124	138	136	141	133
11.12.20	NH-55	2W	48	62	74	96	78	87	81	84	79	83	78	80	78
		3W	30	31	39	33	32	34	35	30	31	33	31	28	32
		LMV	94	95	97	87	109	106	95	96	99	105	92	91	97
		HMV	129	122	151	125	142	149	150	143	131	145	143	148	140
12.12.20	NH- 55	2W	53	67	79	101	83	92	86	89	84	88	83	85	83
		3W	26	27	35	29	28	30	31	26	27	29	27	24	28
		LMV	103	104	106	96	118	115	104	105	108	114	101	100	106
		HMV	124	117	146	120	137	144	145	138	126	140	138	143	135
13.12.20	NH-55	2W	50	64	76	98	80	89	83	86	81	85	80	82	80
		3W	31	32	40	34	33	35	36	31	32	34	32	29	33
		LMV	96	97	99	89	111	108	97	98	101	107	94	93	99
		HMV	127	120	149	123	140	147	148	141	129	143	141	146	138

Table No.13: The average hourly traffic count (outgoing of vehicles from TATA BSL main gate meeting at NH)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	88	0.4	35
Three Wheeler	30	1.2	36
Light Motor Vehicle	96	1.225	118
Heavy Motor Vehicle	132	5.55	733
Total	**346**		**922**

Table no. 14: Hourly traffic volume estimation (outgoing of vehicles from TATA BSL township meeting at NH): Traffic survey done from 7th Dec to 13th Dec 2020

Date↓	Source	Time→	600 700 HRS	700 800 HRS	800 900 HRS	900 1000 HRS	1000 1100 HRS	1100 1200 HRS	1200 1300 HRS	1300 1400 HRS	1400 1500 HRS	1500 1600 HRS	1600 1700 HRS	1700 1800 HRS	Average
07.12.20	NH-55	2W	21	36	31	26	29	34	35	41	37	34	33	25	32
		3W	10	12	10	11	13	14	9	10	13	14	15	11	12
		LMV	32	35	41	46	41	47	42	40	39	35	37	33	39
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
08.12.20	NH-55	2W	23	38	33	28	31	36	37	43	39	36	35	27	34
		3W	11	13	11	12	14	15	10	11	14	15	16	12	13
		LMV	35	38	44	49	44	50	45	43	42	38	40	36	42
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
09.12.20	NH-55	2W	26	41	36	31	34	39	40	46	42	39	38	30	37
		3W	22	15	24	26	20	23	25	23	19	21	22	20	22
		LMV	39	42	48	53	48	54	49	47	46	42	44	40	46
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
10.12.20	NH-55	2W	31	46	41	36	39	44	45	51	47	44	43	35	42
		3W	19	12	21	23	17	20	22	20	16	18	19	17	19
		LMV	36	39	45	50	45	51	46	44	43	39	41	37	43
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
11.12.20	NH-55	2W	25	40	35	30	33	38	39	45	41	38	37	29	36
		3W	12	5	14	16	10	13	15	13	9	11	12	10	12
		LMV	41	44	50	55	50	56	51	49	48	44	46	42	48
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
12.12.20	NH- 55	2W	31	46	41	36	39	44	45	51	47	44	43	35	42
		3W	15	8	17	19	13	16	18	16	12	14	15	13	15
		LMV	34	37	43	48	43	49	44	42	41	37	39	35	41
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0
13.12.20	NH-55	2W	23	38	33	28	31	36	37	43	39	36	35	27	34
		3W	24	17	26	28	22	25	27	25	21	23	24	22	24
		LMV	27	30	36	41	36	42	37	35	34	30	32	28	34
		HMV	0	0	0	0	0	0	0	0	0	0	0	0	0

Table No.15: The average hourly traffic count (outgoing of vehicles from TATA BSL township meeting at NH)

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	37	0.4	15
Three Wheeler	17	1.2	20
Light Motor Vehicle	42	1.225	51
Heavy Motor Vehicle	0	5.55	0
Total	**96**		**86**

Table 16: Total traffic coming out of the TATA BSL plant & township and merging with NH traffic

Types of vehicles	Nos. of vehicles/Hr	Passenger Car Unit (PCU) factor	PCU/Hr
Two Wheeler	125	0.4	50
Three Wheeler	47	1.2	56
Light Motor Vehicle	138	1.225	169
HeavyMotor Vehicle	132	5.55	733
Total	**442**		**1008**

Out of these 1008 PCU/hr, 60% traffic is moving towards Cuttack and rest 40% is moving towards Sambalpur. Therefore, 605 PCU/h traffic from the plant & township is meeting with NH traffic and moving towards Cuttack. Similarly, 403 PCU/h traffic which is coming out from the plant & township is meeting with NH traffic and moving towards Sambalpur.

Section 3: Estimation of traffic growth factor:

For establishing reliable growth rate, the data should be for a number of years. The analysis has been carried out for the entire period as explained below. The best way to arrive at the rate of growth is through regression analysis. The formula for expressing for the compound rate of growth of traffic is

$$P_n = P_0(1 + r)^n$$

Where,

P_n = Traffic in the n^{th} year

P_0 = Traffic flow in the base year, n = number of years

r = annual rate of growth of traffic, expressed in decimal. Taking logs on both sides,

$$Log_e(P_n) = Log_e(P_0) + n \times Log_e(1 + r)$$

$$Y = A_0 + A_1 \times n$$

Where,

Y $= Log_e(P_n)$

A_0 $= Log_e(P_0)$

A_1 $= Log_e(1+ r)$

The above equation can be established from the data set of n values. This procedure has been used to estimate the annual rate of growth of traffic. The data for 2-Wheeler, 3-wheeler, LMV, and HMV are tabulated.

Table No. 17: Traffic volume from 2012-13 to 2014-15 per year

Year	2 Wheeler Including Total Motorcycles, Scooters and Mopeds on Road	3 Wheeler Including Total Three Wheelers and Auto rickshaw on Road	Light Motor Vehicle (LMV) Including Total Jeeps, station wagons, Private cars and Taxies on Road	Heavy Motor Vehicle (HMV) Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road
2012-13	98413	1894	3841	12085
2013-14	105156	2163	5496	12690
2014-15	114072	2382	5772	13247
Total Average	**105880**	**2146**	**5036**	**12674**

(Reference-District Statistical Handbook, Dhenkanal) Attached in Annexure-1

Estimation of Traffic Growth

Table No. 18: Annual rate of growth of 2-wheeler

Year	n	2 Wheeler, Including TotalMotorcycles, Scooters and Mopeds on Road (P)	Y =Log_e(P)
2012-13	**0**	98413	11.49693
2013-14	**1**	105156	11.5632
2014-15	**2**	114072	11.64459

Table No. 19: Annual rate of growth of 3-wheeler

Year	n	3 Wheeler, Including Total Motorcycles, Scooters and Mopedson Road (P)	Y =Loge(P)
2012-13	**0**	1894	7.546446
2013-14	**1**	2163	7.679251
2014-15	**2**	2382	7.775696

Table No. 20: Annual rate of growth of LMV

Year	n	Light Motor Vehicle (LMV)Including Total Jeeps, station wagons, Private cars and Taxies on Road	Y =Log_e(P)
2012-13	**0**	3841	8.253488
2013-14	**1**	5496	8.611776
2014-15	**2**	5772	8.660774

Table No. 21: Annual rate of growth of HMV

Year	n	Heavy Motor Vehicle (HMV)Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road.	Y =Log_e(P)
2012-13	**0**	12085	9.39972
2013-14	**1**	12690	9.44857
2014-15	**2**	13247	9.491526

Table No. 22: Five year Annual rate of growth for each category of vehicles

Year	2 Wheeler Including Total Motorcycles, Scooters and Mopeds on Road	3 Wheeler Including Total Three Wheelers and Auto rickshaw on Road	Light Motor Vehicle (LMV) Including Total Jeeps, station wagons, Private cars and Taxies on Road	Heavy Motor Vehicle (HMV) Including Total Buses, Trucks, Lorries, Tractors and Trailors on Road
Annual rate of growth	0.075731	0.120752	0.225072	0.046028

Section 4: Assessment of traffic impact on NH (both the directions):

The base capacity of the NH depends on the operating speed. For the present study, analyses have been carries out for operating speed 70, 80, and 90 km/h. The variation in V/C ratio and level of services (LOS) have also been studied for all the three possible cases and the capacity for the NH is considered as follows (Indo-HCM, 2017).

Table 3.6: Base Capacity Values for varying Operating Speed

Operating Speed (Km/h)	Capacity (PCU/h/direction) for Four Lane Divided Highway Segments	Capacity (PCU/h/direction) for Six Lane Divided Highway Segments
70	3640	5500
80	3940	5930
90	4240	6360
100	4540	6790

Table 23: Capacity of NH road section

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways
70	3640
80	3940
90	4240

Now, the impact of project i. e. traffic generated from the TATA BSL on the existing traffic flow of the adjacent NH is assessed. In order to assess this effect, the total traffic (PCU/hr) from the TATA BSL plant and township are calculated and added with the existing traffic flow of the NH. The detailed analysis is shown in Tables 24 through 33. Tables 24 to 28 represent the analysis of the traffic in NH moving towards Cuttack whereas Tables 29 to 33 represents for the direction towards Sambalpur. The impact has been studied for the base year (2020) as well as for the year 2025-2026. The volume to capacity ratio for base year and 2025-2026 have also been calculated and presented in the following tables.

Table No. 24: The projected traffic in NH in 2025-2026 (towards Cuttack) without any traffic from the TATA BSL plant and township

Types of vehicles	Nos. of vehicles/Hr	Annual growth rate	Projected traffic in 2025-2026 (vehicles/hr)	Projected traffic in 2025-2026 (PCU/hr)
Two Wheeler	201	0.07573	290	116
Three Wheeler	81	0.12075	143	172
Light Motor Vehicle	102	0.22507	281	344
Heavy Motor Vehicle	175	0.04603	219	1215
Total	**559**		**933**	**1847**

Table No. 25: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Cuttack) without any traffic from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.349	0.507
80	3940	0.322	0.469
90	4240	0.300	0.436

Table No. 26: The total traffic in NH in the base year (2020) (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2020)	Merging traffic (PCU/Hr) *60% of the merging traffic from TATA BSL plant and main gate* (2020)	Total traffic in NH (Towards Cuttack) (2020)
Two Wheeler	80	30	110
Three Wheeler	97	34	131
Light Motor Vehicle	125	101	226
Heavy Motor Vehicle	971	440	1411
Total	**1273**	**605**	**1878**

Table No. 27: The projected traffic in NH in 2025-2026 (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2025-2026)	Merging traffic (PCU/Hr) *60% of the merging traffic from TATA BSL plant and main gate* (2025-2026)	Total traffic in NH (Towards Cuttack) (2025-2026)
Two Wheeler	116	33	149
Three Wheeler	172	37	209
Light Motor Vehicle	344	111	455
Heavy Motor Vehicle	1215	484	1699
Total	**1847**	**665 (10% increase has been considered)**	**2512**

Table No. 28: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Cuttack) with the traffic merging from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.516	0.690
80	3940	0.477	0.638
90	4240	0.443	0.592

Table No. 29: The projected traffic in NH in 2025-2026 (towards Sambalpur) without any traffic from the TATA BSL plant and township

Types of vehicles	Nos. of vehicles/Hr	Annual growth rate	Projected traffic in 2025-2026 (vehicles/hr)	Projected traffic in 2025-2026 (PCU/hr)
Two Wheeler	196	0.07573	282	113
Three Wheeler	76	0.12075	134	161
Light Motor Vehicle	97	0.22507	268	328
Heavy Motor Vehicle	170	0.04603	213	1182
Total	**539**		**897**	**1784**

Table No. 30: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Sambalpur) without any traffic from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.338	0.490
80	3940	0.313	0.453
90	4240	0.291	0.421

Table No. 31: The total traffic in NH in the base year (2020) (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2020)	Merging traffic (PCU/Hr) *40% of the merging traffic from TATA BSL plant and main gate* (2020)	Total traffic in NH (Towards Sambalpur) (2020)
Two Wheeler	78	20	98
Three Wheeler	91	23	114
Light Motor Vehicle	119	67	186
Heavy Motor Vehicle	944	293	1237
Total	**1232**	**403**	**1635**

Table No. 32: The projected traffic in NH in 2025-2026 (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Types of vehicles	Vehicles in NH (PCU/Hr) (2025-2026)	Merging traffic (PCU/Hr) *40% of the merging traffic from TATA BSL plant and main gate* (2025-2026)	Total traffic in NH (Towards Sambalpur) (2025-2026)
Two Wheeler	113	22	135
Three Wheeler	161	25	186
Light Motor Vehicle	328	74	402
Heavy Motor Vehicle	1182	322	1504
Total	**1784**	**443 (10% increase has been considered)**	**2227**

Table No. 33: The volume to capacity ratio in the base year (2020) and in 2025-2026 (towards Sambalpur) with the traffic merging from the TATA BSL plant and township

Operating speed (km/hr)	Capacity (PCU/hr/direction) for four lane divided highways	V/C ratio in 2020	V/C ratio in 2025-2026
70	3640	0.449	0.612
80	3940	0.415	0.565
90	4240	0.386	0.525

Assessment of Level of Service (LOS)

LOS is the qualitative measure of any roadway which depends mainly on the operating traffic volume. There are 6 Levels of Service (A to F) based on volume to capacity (V/C) ratio. LOS-A represents best operating condition for driving whereas LOS-F represents the worst condition.

Capacity is the maximum number of vehicles that can pass a given point on a lane or roadway during one hour, under the most nearly ideal roadway and traffic conditions, which can possibly be attained. For the estimation of base capacity, the table suggested by Indo-HCM has been referred in this report and is provided below for reference.

The LOS have been calculated for base year (2020) and for the year 2025-2026. This exercise has been carried out for both the directions (i. e. towards Cuttack and towards Sambalpur) separately. The volume to capacity ratio (towards Cuttack) without any traffic from the TATA BSL plant and township are presented in Table 25. Similarly, the volume to capacity ratio (towards Cuttack) with the traffic merging from the TATA BSL plant and township are presented in Table 28. It can be clearly seen that, the increase in V/C ratio in the NH (towards Cuttack), due to addition of traffic from the TATA BSL plant and township is shown in the Table 34. The same exercise has been carried out for the other direction of NH (i. e. towards Sambalpur) and shown in Table 35.

[Reference:IndoHCM,2017]

Table 3.8: LOS Thresholds for Four Lane Divided Interurban Highway Segments

LOS	Density (PCU/km/ direction)	Volume-to-Capacity ratio (v/c)	Service Volumes (PCU/day)	Recommended DSV Value for Upgradation (PCU/day)
A	≤ 18	0.00 - 0.20	≤18000	22500@ **LOS-B:** Suggested threshold flow for conversion from **four lane to six lane divided road** to ensure **enhanced safety** in traffic operations.
B	19 - 27	0.21 - 0.30	18001 - 27000	
C	28 - 45	0.31 - 0.50	27001 - 45000	
D	46 - 64	0.51 - 0.70	45001 - 63000	
E	65 - 90	0.71 - 1.00	63001 - 90000	
F	> 90	> 1.00	> 90000	

Table No. 34: Change in V/C ratio and LOS in NH (towards Cuttack), Year 2025-2026

Operating speed (km/hr)	Without any traffic from the TATA BSL plant and township (2025-2026)		With the traffic from the TATA BSL plant and township (2025-2026)	
	V/C	LOS	V/C	LOS
70	0.507	D	0.690	D
80	0.469	C	0.638	D
90	0.436	C	0.592	D

Table No. 35: Change in V/C ratio and LOS in NH (towards Sambalpur), Year 2025-2026

Operating speed (km/hr)	Without any traffic from the TATA BSL plant and township (2025-2026)		With the traffic from the TATA BSL plant and township (2025-2026)	
	V/C	LOS	V/C	LOS
70	0.490	C	0.612	D
80	0.453	C	0.565	D
90	0.421	C	0.525	D

Conclusion

A detailed traffic study was carried out at TATA BSL main gate & township. The traffic data were collected for continuous 7 days for a period of 12 hours every day The average annual growth rate for individual category of vehicles have been determined from the information collected from transport department, Dhenkanal. Finally, the expected future traffic in the NH (both the directions) have been estimated for the Year 2025-2026. The change in V/C ratio and LOS are also estimated and reported for both the directions. It is obvious that there is an increase in V/C values due to the addition of traffic from TATA BSL township & plant and this increases are approximately 35% and 25% for the traffic moving towards Cuttack and Sambalpur respectively. From this study, it can be concluded that, in the year 2025-2026, the approximate V/C values are expected to be 0.6 and 0.55 for the traffic stream moving towards Cuttack and Sambalpur respectively and most likely the NH will operate in LOS -D.

XI. TRANSPORT AND COMMUNICATION

11.04. Motor Vehicles Registered & M.V on Road in Dhenkanal district

(In Number)

Sl. No.	Vehicles	Number Registered during			Motor Vehicles on road		
		2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
1	2	3	4	5	6	7	8
1	Motor Cycles, Scooters and Mopeds	6743	7959	8916	98413	105156	114072
2	Three Wheelers & Auto Rickshaws	33	264	267	1894	2163	2382
3	Jeeps and Station Wagons	167	91	43	726	2133	2176
4	Private Cars	246	176	225	1727	1909	2134
5	Taxies	2	22	8	1388	1454	1462
6	Buses (Contract Carriages & Stage carriages)	21	20	15	659	680	695
7	Trucks and Lorries	541	276	190	7197	7502	7740
8	Tractors and Trailors	279	389	304	4229	4508	4812
9	Miscellaneous Vehicles	0	0	20	1371	131	151
	Total	**8032**	**9197**	**9988**	**117604**	**125636**	**135624**

Source : *State Transport Authority, Odisha, Cuttack*

ACCREDITATION AND EMPANELMENT

Centre for Envotech and Management Consultancy Pvt. Ltd.

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