Action Plan

for

Abatement of Pollution in the

Critically Polluted Area of Ludhiana City

July 2020

PUNJAB POLLUTION CONTROL BOARD,

VATAVARAN BHAWAN,

NABHA ROAD, PATIALA - 147001

Table Contents

Chapter 1 - Introduction

1.0 Introduction

After analyzing the Environmental Status of Industrial Cluster of the country, Central Pollution Control Board in consultation with the Ministry of Environment & Forests has identified 88 Polluted Industrial Areas / clusters (PIAs). These Polluted Industrial clusters have been further categorized as 'Critically Polluted Area' (CPA), 'Severely Polluted Area' (SPA) and 'Other Polluted Areas' (OPAs) based on Environmental Pollution Index score. Ludhiana is one of such critically polluted cluster in the State of Punjab. In 2009 CPCB evaluated CEPI score reflecting the Environmental Quality of Ludhiana town and categorized Ludhiana as Critically polluted area having CEPI score 81.66.

The Ministry of Environment & Forests vide office memorandum J-11013/5/2010-IA.II(I) dated 13/1/2010 had imposed a temporary restriction of 8 months for establishment of the industrial units in the said critically polluted industrial clusters, which are covered in Schedule-I appended to the EIA notification dated 14/9/2006. It was felt to assess the environmental degradation of the identified industrial clusters and to formulate a remedial action plan for abatement of pollution and restoration of the environmental quality of these clusters. As such, the Action Plan for Abatement of Pollution in Critically Polluted Area of Ludhiana City was prepared in June, 2010. With the efforts of Punjab Pollution Control Board and other stakeholder departments, the CEPI score came down. CPCB carried out monitoring in the year 2017-2018 and the CEPI Score for Industrial Areas/Clusters in Ludhiana was calculated as 73.48.

Vide order dated 13.12.2018 in O.A. No. 1038/2018, the Hon'ble NGT directed all the State Pollution Control Boards/Committees to finalize time bound Action Plan within 03 months so as to bring all polluted industrial clusters within the safe parameters under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and Water (Prevention & Control of Pollution) Act, 1974. Accordingly, CPCB vide its letter dated 30.12.2019 requested Punjab Pollution Control Board to expedite preparation of Action Plan of CPAs/SPAs. So, revised Action Plan of Critically Polluted Area of Ludhiana City is hereby prepared.

1.1 About CEPI

The Comprehensive Environmental Pollution Index (CEPI) includes weightage on nature of pollutants, ambient pollutant concentrations, receptors (number of people affected) and additional high risk element.

CEPI Comprising of following components:-

Component A	Scale of Industrial Activity	20 marks
Component B	Status of Ambient Env. Quality (Air/SW/GW)	50 marks
Component C	Health related statistics	10 marks
Component D	Compliance status of industries	20 marks

On the basis of the study jointly carried out by the CPCB and State PCBS in 2009-10, 88 industrial clusters were notified as Polluted Industrial Areas (PIAS). These PIAS were ranked as 'critically polluted area' (CPA), 'severely polluted area' (SPA) and 'other polluted areas' (OPAS), depending upon the CEPI scores of each of these industrial areas. Where the CEPI score crossed 70, the areas are designated as CPAS, where the index was between 60-70, they are designated as SPAS and those below 60 as OPAS.

1.2 About Ludhiana

1.2.1 History

Geographically, Ludhiana is the most centrally located district which falls in the Malwa region of the State of Punjab. It lies between North Latitude 30°-34' and 31°-01' and East longitude 75°-18' and 76°-20'. It is bounded on the north by River Sutlej which separates it from Jalandhar district. The River also forms its northern boundary with Hoshiarpur district. On other sides it shares common boundaries with Roop Nagar district in the East, Moga District in the West and Sangrur, Fatehgarh Sahib & Patiala districts in the South and South east.

1.2.2 Area and Population

Ludhiana, the first metropolitan city of the State of Punjab, located on National Highway-I, has emerged as the most vibrant and important business centre of Punjab. It is the largest city in Punjab, both in terms of area and population. The City is spread over an area of 159.37 sq km and accommodates approx. 16,18,879 population as per 2011 census. The projected present population of Ludhiana city is about 17.5 Lacs. Being the hub of Indian small scale Industry especially hosiery & Cycle parts, it is popularly known as “Manchester of India.” The Ludhiana is also an important education centre with famous Punjab Agricultural University, two Medical Colleges and an Engineering College.

1.2.3 Topography

The topography of the District is typical representative of an Alluvial plain, it owes its origin to the aggravation work of the Sutlej River. The alluvium deposited by the river has been worked over by the wind which gave rise to a number of small dunes and sand mounds. Most of these dunes have been leveled by the brave hard working agriculturists of the district. The District can be divided into the flood plains of the Sutlej and the Upland plains.

1.2.4 Climate

The climate of the district is characterized by dryness except a brief spell of monsoon season in a very hot summer and a bracing winter. The winter season is from middle of November to the early part of March. The succeeding period up-to the end of June is the hot season. July, August and half of September constitute the south west of monsoon, the period of mid-September to about the middle of November may be termed as post monsoon or transitional period. June is generally the hottest month. Hot and scorching dust laden winds blow during summer season. December & January are the coldest months. The mean daily temperature varies in the range of 5.8^{O} C to 41.2^{O} C.

1.2.5 Rainfall

The rainfall in the district increases from south west towards the north east. About 70% of the rainfall is received during the period July to September. The rainfall during the December to March accounts for 16% of the rainfall. The remaining 14% rainfall is received in the other months of the year. The average annual rainfall is 681mm.

1.2.6 Industry and Trade

City of Ludhiana is famous for Hosiery & Cycle industry. As such, dyeing/washing units, electroplating/pickling units are established in Ludhiana. Also, there are induction furnaces, Rolling Mills, Milk Plant, Paper Mill etc. established within the City Limits. Following industrial clusters have been established within the City Limits:

Cluster No.	**Cluster No.**
I	Focal point along with NH-1 Total Eight Phase
II	Industrial Area-B from SherpurChowk to Gill Road and Gill Road to Malerkotla Road (left side of the road)
III	Mixed Industrial Area-Right side of Gill Road
IV	Industrial Area-C (near Jugiana Village)
V	Industrial Area-A and Extension: Area between old G.T. Road and Ludhiana bye pass road
VI	Industrial Estate : Near DholewalChowk
VII	Mixed Industrial Area (MIA) Miller Ganj
VIII	Mixed Industrial Area (MIA) Bye Pass road
IX	Bahadurke Industrial Area
X	Tajpur Industrial Complex

1.3 Government's Past efforts to reduce CEPI score.

The environment of Ludhiana has degraded a lot during the last few years due to rapid urbanization, industrialization increase in population, vehicles and commercialization of land available within the city.

As already mentioned in 1.0, the Punjab Pollution Control Board had prepared an Action Plan with regard to Abatement of Pollution in Critically Polluted Area of Ludhiana involving various

District level stake holder departments wherein the activities of these departments were clearly mentioned. Various meetings to review the activities and achieving the target lines were held between 2013 to 2017 at district level under Chairmanship of Deputy Commissioner, Ludhianaand at state level under chairmanship of Chief Secretary, Punjab/PSSTE,Punjab. Following Major Activities proposed to be undertaken in the Action plan:

1. Installation/Augmentation of Sewage Treatment Plants (STPs).
2. Installation of 3 Common Effluent Treatment Plants (CETPs) for dyeing industries.
3. Development of Engineered Municipal Solid Waste Facility.
4. Shifting of industries from Non designated areas.
5. Construction of bypass along Sidhwan Canal.
6. Control of water pollution from dairy complex located at Tajpur and Humbran Road.
7. Provision of Green cover within industrial areas along with development of buffer zone separating the residential areas from industrial areas.

Installation of new STPs and up-gradation of existing STPs is still under progress. Out of proposed 3 CETPs for dyeing industries, 1 CETP as Bahadurke Road has been installed & commissioned and construction of remaining 2 CETPs is under progress. Construction of Bye-pass along Sidhwan Canal has been completed. All other activitiesDevelopment of Engineered Municipal Solid Waste Facility, Green buffer zone, water pollution from dairy complexes and shifting of industries from non-designated areas are yet to be completed. Hence, the need for updation of Action Plan.

1.3.1 Directions issued by Central Pollution Control Board and Compliance Statusalongwith Remedial Measures Required to be taken by Stakeholder Departments.

Part A: Environmental quality monitoring in all CPAs.

CPCB Directions	Present Compliance Status alongwith Remedial Measures Required To Be Taken By Stakeholders
SPCB/PCC shall undertake environmental quality monitoring in the critically polluted area falling under their jurisdiction through an outside third party agency (laboratory) recognized under Environment (Protection) Act, 1986 and accredited under NABL. The frequency of the monitoring shall be twice in a year i.e. Post-monsoon season and Pre-monsoon season	As a part of Action Plan, PPCB will engage services of third-party agency (laboratory) recognized under Environment (Protection) Act, 1986 and accredited under NABL, to carry out monitoring
SPCB/PCC shall ensure that the existing sampling locations where monitoring was undertaken in 2013 are retained and additional monitoring	PPCB has retained existing sampling locations where monitoring was undertaken in 2013. Additional

locations, if any required, can be included in the monitoring programme in consultation with concerned Zonal Offices of CPCB and (or) Head Office, CPCB	monitoring locations, if any required, will be included in the monitoring programme in consultation with CPCB.
SPCB/PCC shall ensure that the sampling stations are provided at strategic locations across the industrial clusters so as to obtain a truly representative environmental quality of the critically polluted area. Moreover, the concerned SPCBs /PCC shall ensure that there is at least one Ambient Air Quality monitoring station each in the predominant upwind and downwind directions at each of the CPA.	In Ludhiana City, ambient air monitoring stations have been placed strategically at 4 different locations within the city covering industrial, residential and commercial area. Out of these, 2 no. ambient monitoring stations have been placed in Commercial Areas.
SPCBs/PCC shall collect 3 samples with a gap of one or two days at each location during each round of monitoring in all the CPAs.	Noted and shall be complied by PPCB.
At each of the CPA, 24 hourly ambient air quality monitoring shall be carried out for parameters as prescribed by CPCB. Also, representative samples for surface water quality and ground water quality shall be collected from prominent surface and ground water bodies located in and around the CPAs.	A Continuous air quality monitoring station has been installed at Punjab Agricultural University, Ludhiana which is operational for 24 Hourly. Apart from this 4 no. manual stations have been installed within the city to procure ambient air quality data of those locations. PPCB is already collecting surface water samples from BudhaNallah, which carry sewage and storm water of part of the Ludhiana City.

Part B: Installation of Continuous Ambient Air Quality Monitoring stations:-

CPCB Directions	**Present Compliance Status alongwith Remedial Measures Required To Be Taken By Stakeholders**
SPCB/PCC shall coordinate with the 'Association(s) or any appropriate agency of the Industries of the concerned CPAs and direct them for installation of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at strategic locations of identified Critically Polluted Areas. For this purpose, 'Polluter Pays Principle' shall be applied and the data so acquired be displayed on the website of State Board for transparency in law-enforcement.	PPCB has already installed Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at Punjab Agricultural University in Ludhiana City. PPCB is in the process for installation of 04 additional Continuous Ambient Air Quality Monitoring Stations (CAAQMS).

In those Critically Polluted Areas, where no CAAQMS is so far installed, at-least 2 CAAQAMS be installed to start with, one each in the windward and leeward direction within a year.	Apart from one CAAQMS station which has been already installed in Ludhiana City, PPCB will install Four more CAAQMS station at representative and strategic location as per CPCB criteria of population based.
Existing network of continuous ambient air quality monitoring stations (CAAQMS) in CPAs established by 17 Category of highly polluting industries shall be redesigned if necessary, by shifting/ relocating some stations to cover the entire city/area. This will reduce duplicity in monitoring and ensure optimum utilization of the available monitoring facilities and resources.	PPCB is in the process for installation of 04 additional Continuous Ambient Air Quality Monitoring Stations (CAAQMS) covering entire City of Ludhiana.
Existing manual monitoring under NAMP, will be continued. In case, there is no NAMP station in the area, then manual monitoring will also be conducted atleast once in a month on 24 hourly basis	Manual ambient air monitoring stations under NAMP have been placed strategically at 01 location at Focal Point, 01 at Residential Area and 02 at Commercial Areas.

Part C: Installation of Continuous Water Quality Monitoring Stations:

CPCB Directions	**Present Compliance Status alongwith Remedial Measures Required To Be Taken By Stakeholders**
SPCBs/PCC shall ensure installation of Real Time Water Quality Monitoring Stations at various locations of identified Critically Polluted Areas in conformity with the CPCB guidelines for water quality monitoring (MINARS/27/2007-08). The SPCBs / PCC shall adopt Polluter Pays Principle' for achieving these objects.	Real Time Water Quality Monitoring Station has not been installed. PPCB will ensure installation of the same in conformity with the CPCB guidelines in Budha Nallah as well as River Sutlej.
In those Critically Polluted Areas, where no CWQMS are yet installed, at- least 2 CWQMS be installed to start with, one each in the upstream and downstream locations of the major receiving water body of the area within a year	PPCB will ensure installation of at least 2 CWQMS one each in the upstream and downstream locations of the major receiving water body of the area within a short period.
The existing manual monitoring under MINAR (Monitoring of Indian National Aquatic Resources) programme will also be continued. In case, there is no MINAR station in the area, then manual monitoring will also be conducted at least once in a month. Ground Water Quality Monitoring should be carried out at existing locations (i. e. bore-wells, tube wells,	For this CPA area, no such MINAR programme is applicable as there is no river. Ground water sampling is being carried out under NWMP from 15 no. locations on six monthly basis. PPCB shall start monitoring of VOCs in addition to regular parameters.

deep hand pumps etc.) and as per national monitoring protocol. Monitoring of heavy metals, VOCs and Pesticides should also be undertaken in addition to regular parameters of MINAR programme	

Part D: Application of revised CEPI version 2016.

CPCB Directions	**Present Compliance Status alongwith Remedial Measures Required To Be Taken By Stakeholders**
Since 'Revised CEPI 2016'has been evolved, henceforth, all future CEPI score evaluations shall be made on the basis of revised formula.	CEPI score calculated by CPCB in the year 2018 and forecasted CEPI score after implementation of Action Plan is on the basis of revised CEPI formula.
All the polluting sources identified in the area shall be notified and brought in the public domain through respective websites alongwith the details of their pollution control compliance status	PPCB will notify and make public all the polluting sources identified in Ludhiana city, which have already been incorporated in Action Plan.
The environmental quality data including CEPI score of the industrial area as per revised concept shall also be placed in public domain through website and also to be published by the State Government periodically.	Environment quality data for air pollution is being displayed at Punjab Agriculture University, Ludhiana. PPCB will display CEPI score alongwith all other environment quality data related with air, water and land, through website and also get the same published from State Government periodically
The concerned State Government shall notify the area on a properly scaled map and also issue public advisories that such an area will be exclusively meant for industrialization as per the State land.	Master Plan of Ludhiana City has already been notified (2008-2021) by the State Government, in which the area meant for industrialization has been demarcated
The revised CEPI shall be used by the State Governments, SPCBs and others concerned to understand the severity of pollution existing in the area and formulate appropriate action plan. Further, sufficient time shall be given for effective implementation of the action plan before imposition of moratorium. Thus, the revised concept shall be an early warning tool to ensure the successful implementation of Action Plan.	Action Plan for abatement of pollution in Ludhiana city has been framed to reduce pollution and bring down CEPI score below 50 by 31.12.2021.
CEPI shall not be used by the Bankers / Money Lending Institutions for financial decisions	Necessary directions will be given by State Government in this regard.

Any moratorium on expansion on setting up of new industries shall be imposed on a particular CPA only after a notice period of one year from the initial announcement of CEPI assessment, However decision on any directions already in force in a CPA shall be taken as per correct practice in vogue. High CEPI score shall also be used as early warning tool to require preparation of pollution management plans to reduce pollution levels before it reaches critical levels.	The Punjab Pollution Control Board vide its office order no. 593 dated 11.10.2019 has decided as under:- "For the time being Consent to Establish to the new water polluting industrial units having trade effluent proposed to discharged into sewerage system/varied consent to operate to the existing industrial units leading to increase in industrial effluent and discharge into sewerage system shall not be granted till further orders under the provisions of Water (Prevention & Control of Pollution) Act, 1974" Action Plan for abatement of pollution incorporates pollution management plans to reduce pollution levels.
For any industry in a critically polluted area, the changes which make it less polluting shall be permitted. These changes may include expansion of production capacity / change of product / change of raw materials / change of manufacturing process or a combination of these changes and shall be examined and assed by respective SPCBs/PCC	PPCB is promoting the change to be incorporated by industry which makes it less polluting which includes up-gradation of pollution control systems, use of cleaner fuel etc.

Part E: Action Plan and Monitoring

CPCB Directions	**Present Compliance Status alongwith Remedial Measures Required To Be Taken By Stakeholders**
SPCBs/PCC shall also continue the regular exercise of water and air quality monitoring work at different locations including those stations currently in operation under NAMP and MINAR.	PPCB is carrying out monitoring of surface water locations on monthly basis under NAMP and on daily basis for ambient air quality monitoring stations.
SPCB/ PCC shall take necessary measures to ensure regular maintenance and operation of the online systems with tamper proof mechanism including having facilities for online calibration;	PPCB is regularly keeping a check through CPCB portal on Online monitoring systems installed by various industries, common treatment facilities etc.
SPCBs / PCC shall install the necessary software and hardware in their headquarter for centralized data collection, analysis and	Adequate arrangements have been made at Head office, PPCB to collect, analyze data received through online monitoring

corrective action	systems installed in various industries/CETP through CPCB server.
SPCBs/PCC shall take necessary measures to connect and upload the online air quality and water quality monitoring data on the Servers of respective SPCB/PCC and CPCB in a time bound manner but not later by June 30, 2016;	Air quality monitoring data of CAAQMS is already connected with CPCB portal. PPCB will connect data with respect to water quality monitoring with CPCB portal once the same have been installed.
SPCBs/PCC shall upload on its websites the consent conditions of all industrial units alongwith their compliance status (updated half-yearly) with respect to prescribed norms.	PPCB has already established Online Consent Management Portal to process applications of the industries. However, PPCB uploads the consent conditions of all industrial units on its websites alongwith their compliance status (updated half-yearly) with respect to prescribed norms
Action plan categorized into short, medium and long term basis shall be brought into public domain and the progress of implementation shall be reviewed by District and State level through Monitoring Committees	PPCB shall make Action Plan public and progress of which to be reviewed in District level Environment Committee meetings.

1.4 About National Green Tribunal Directions:

The National Green Tribunal in its order dated 14.11.2019 has ordered State Pollution Control Board to furnish action taken report showing the number of identified polluters in polluted industrial areas, the extent of closure of polluting activities, the extent of environmental compensation recovered, the cost of restoration of the damage to the environment of the areas.

The National Green Tribunal also ordered on 14.11.2019 that the CPCB may prepare a tabulated analysis of the same and file a consolidated report before this Tribunal before February 15, 2020.

Chapter 2 - Vision, Mission and Strategy

2.1 Vision for Abatement of Pollution, Ludhiana

To restore the quality of water and air in Ludhiana to the prescribed standards to ensure health of the people, ecological balance and socio-economic well-being of the people and bring down CEPI scores.

2.2 Mission Abatement of Pollution, Ludhiana

To prepare and implement a comprehensive action plan for clean Ludhiana:

i) Creating awareness about the adverse impact of pollution

ii) Identifying the sources of pollution, their apportionment

iii) Identifying action steps related to Awareness, Enforcement, Infrastructure or Policy for control of various sources of Pollution

iv) Designing effective systems for monitoring the progress of the implementation of action steps.

v) Ensuring effective monitoring of the quality of water, air and land.

vi) Mitigating adverse impact on health of the people due to pollution

2.3 Strategy for bringing down CEPI Scores.

The key elements of strategy to bring down CEPI scores campaign for Ludhiana will include:

i) Identification of Government Stakeholders

ii) Nodal Department

iii) Integration of Departmental plans – Creating synergies

iv) Monitoring the mechanism for effective compliance through self-regulatory mechanism.

v) Governance

2.4 Identification of Government Stakeholders

2.4.1 Identification of Government Stakeholders- for implementation of Water Action Plan

The State of Punjab envisages a comprehensive plan for cleaning of River Sutlej by involving all the Stakeholders namely:

i) Department of Science, Technology and Environment

The Directorate of Environment and Climate Change and Punjab Pollution Control Board will be responsible for the following:

a) Overall coordination of the Action Plan and ensuring its successful implementation

b) Setting up comprehensive online monitoring portal connecting all the executing and monitoring agencies

c) Setting up of Infrastructure to monitor the quality of water

d) Monitoring of quality of water of River Sutlej & groundwater

e) Monitoring of discharge from Industries including ETPs and CETPs

f) Monitoring of discharge from STPs and other disposal facilities

g) Monitoring of management of solid waste and other waste

ii) Department of Local Government

As per the policy decision of the Department of Local Government, all Municipal Corporations are responsible for execution of their water supply and sewerage works including setting up of STPs while all Municipal Council will get the works executed through Punjab Water Supply and Sewerage Board. The policy is yet to be fully implemented as some Corporations are still relying on PWSSB for execution of works, on the other hand, some Municipal Councils are executing works on their own instead of PWSSB.

Design

a) Design projects to cover entire population with sewerage network system and its connection with STP.

b) Design Sewage Treatment Plants of adequate capacity

c) Design as per the prescribed standards

Construction

a) Monitor land acquisition closely as it is pre-requisite for setting up of STPs.

b) Ensure reputed professional contractors

c) Construction of STPs as per timelines mentioned in the action plan

d) Ensuring regular flow of funds during construction

Operation and Maintenance

a) Arranging funds for operation and maintenance of STPs to ensuring regular operation and maintenance of STPs in a professional manner

b) Providing proper in-house laboratory facilities at each STP for maintaining record of characteristics of analysis of untreated as well as treated wastewater

c) Installation, operation & maintenance of online continuous effluent monitoring system as well as CCTV cameras for the existing STPs as well as new STPs to be installed

Solid Waste

a) Proper management & handling of municipal solid waste so as not to be thrown in river

iii) Department of Housing and Urban Development

The Department and all the Development authorities under its control will be responsible for various Urban Estates developed by them. In addition, the Government has entrusted construction and subsequent operation and maintenance of Sewerage network and Sewage Treatment Plants in some of the cities to various Urban Development Authorities.

iv) Department of Industries and Commerce

Department of Industries and Commerce through Punjab Small Industries & Export Corporation is responsible for management of Industrial Focal Points set up by it or transferred to it.

v) Department of Agriculture

The Department of Agriculture through the Directorate of Soil and Water conservation will be responsible for implementation of various schemes for utilizing the treated wastewater from urban and rural treatment facilities for irrigation by the farmers. It has the following responsibilities:

a) Design the project as per the standards

b) Follow up with various funding agencies to arrange funds

c) Executing the schemes as per the timelines provided in the plan

vi) Department of Health and Family Welfare

The Department of Health and Family Welfare has the following responsibilities:

a) Checking of health indices of the in-habitants & maintaining database.

b) Holding awareness camps in the catchment area of River Sutlej to make the public aware regarding water borne diseases

vii) Department of Water Resources

The Department of Water Resources through the Chief Engineer, Drainage has the following responsibilities:

a) Measurement of flow at different locations.

b) To stop unauthorised discharge in the drains

viii) District Administration

District Administration will be responsible for monitoring of activities of the action plan at district level.

ix) Department of Soil conservation

The Department of Soil Conservation will be responsible for laying of pipeline for disposal of treated industrial/domestic effluent.

x) Punjab Energy Development Authority

Punjab Energy Development Authority will be responsible for the installation of treatment plants for dairy waste as well as bio gas plants for different dairy clusters.

xi) Department of water Resources

Department of Water Resources will be responsible for use of treated effluent of Budha Nallah for irrigation purposes. The department will also be responsible to regulate fresh water supply at the upstream of Budha Nallah so as to maintain the quality of River Sutlej.

2.4.2 Identification of Government Stakeholders-for implementation of Air Action Plan

In order to combat the challenges of pollution, all the Stakeholders will have to make concerted efforts. Following Departments and agencies have been identified along with their responsibilities:

i. Punjab Pollution Control Board

a) Monitoring of air pollution control devices installed by industries
b) Up-gradation of existing air pollution control devices
c) Monitoring of ambient air quality and stack emissions
d) Provision of canopies on the existing D.G sets

ii. Department of Local Government

a) Development of engineered municipal solid waste dumpsite
b) Improvement of road infrastructure for smooth traffic movement
c) Regular and mechanical cleaning of roads
d) Sprinkling of in the parks and maintenance of fountains
e) Increasing green cover in city
f) Upgrading traffic lights for smooth traffic movement
g) Provide canopies on the existing D.G sets

iii. Department of Transport

a) Plan for effective traffic management
b) Plan for phasing out old polluting vehicles
c) Shift to cleaner fuels viz. CNG etc.
d) Monitoring of vehicles without PUC certificate
e) Banning of pressure horns

iv. Department of Police

a) Planning and enforcement of traffic management plan
b) Checking of vehicles running without PUC certificate

c) Impounding and challan of vehicles running without permission/ registration.

d) Noise Pollution.

v. Department of Forests

a) Preparation of forestation plan

b) Organizing awareness camps for Greener City

c) Providing green belt around the industrial areas

vi. Department of Industries and Commerce / Punjab Small Industries & Export Corporation

a) Shifting of industries from non-designated areas

b) Provision of environment infrastructure in Industrial Areas

vii. PWD (B&R)

a) Improving road conditions for smooth movement of traffic

b) Increasing green cover on roadside under their jurisdiction

viii. Punjab State Council for Science and Technology

a) Evolving cost-effective cleaner technologies

ix. Department of Agriculture

a) Promotion of bio-methanization and compost facilities for agri-waste

b) To provide Machinery for in-situ management

c) To create awareness about ill-effects of stubble burning

d) To create awareness regarding alternative crops to break wheat- Rice cycle.

x. District Administration

a) Coordination with all the Stakeholders promoting collaboration and resolving local issues Public Awareness Campaign

2.4.3 Identification of Government Stakeholders- for implementation of Action Plan for Solid Waste Management Rules 2016

Following Stakeholders have been identified and their roles as per Solid Waste Management Rules 2016, the State Policy, NGT's directions and overall requirement for effective monitoring are as under:

i) Department of Environment

The Department of Environment through Punjab Pollution Control Board shall mainly be responsible for:

a) Enforcement of SWM Rules 2016 through ULBs and review of implementation of Rules.

b) Monitor environmental standards and conditions for waste processing and disposal sites.

c) Authorization for Waste processing and disposal sites and Monitoring thereof.

d) Standards for new technologies through CPCB.

e) Directions to ULBs for safe handling and disposal of domestic hazardous waste.

ii) Department of Local Government

The Department of Local Government shall be responsible for the following activities:

a) Preparation of a state policy and solid waste management strategy.

b) Inclusion of informal sector of waste pickers, waste collectors and recycling industry.

c) Ensure implementation of SWM Rules 2016 by all ULBs.

d) Ensure suitable land to the local bodies for setting up of processing and disposal facilities.

e) Ensure separate space for segregation, storage, decentralized processing of solid waste in the development plan for group housing or commercial, institutional or any other non-residential complex exceeding 200 dwelling or having a plot area exceeding 5,000 square meters.

f) Direct the developers of Special Economic Zone, Industrial Estate, Industrial Park to earmark at least five percent of the total area of the plot or minimum five plots or sheds for recovery and recycling facility.

g) Facilitate establishment of common regional sanitary land fill for a group of cities and towns falling within a distance of 50 km (or more) from regional facility.

h) Notification of cities/towns as model cities/towns, which are fully compliant to prevailing Waste Management Rules.

i) Develop system for ranking of cities, towns & villages in the State based on compliance of Rules.

j) Arrange for capacity building of local bodies.

k) Notify buffer zone for the solid waste processing and disposal facilities.

iii) Deputy Commissioner

The Deputy Commissioner shall be responsible for the following activities:

a) Facilitate allocation of suitable land for solid waste processing and disposal facilities

b) Review the performance ULBs on waste segregation, processing, treatment and disposal.

2.4.4 Identification of Government Stakeholders- for implementation of Action Plan for Bio-Medical Waste Management Rules 2016

i) Department of Environment and Punjab Pollution Control Board

a) Making Policies concerning Bio-medical Waste Management in the State.

b) Inventorization of Health-Care Facilities.

c) Compilation of data and submission of the same in annual report to Central Pollution Control Board within the stipulated time period.

d) Grant and renewal, suspension or refusal of authorization.

e) Monitoring of compliance of Rules.

f) Action against health care facilities or common biomedical waste treatment facilities for violation of these rules.

g) Organizing training programmes to staff of health-care facilities and common biomedical waste treatment facilities on management of bio-medical waste

h) Hearing Appeals and give decision against order passed by the prescribed authority.

i) Providing necessary technical and financial support in order to implement the action plan

ii) Department of Health and Family Welfare and Punjab Health System Corporation

a) To ensure implementation of Rules in all Health Care Facilities or occupier.

b) Grant of license to health care facilities with a condition to obtain authorization from PPCB for bio-medical waste management.

c) Monitoring, Refusal or Cancellation of license for health care facilities for violations of conditions of authorization or provisions under these Rules.

d) Publication of list of registered health care facilities with regard to bio-medical waste generation, treatment and disposal.

e) Undertake or support operational research and assessment with reference to risks to environment and health due to bio-medical waste and previously unknown disposables and wastes from new types of equipment.

f) Coordinate with State Pollution Control Board for organizing training programmes to staff of health care facilities on bio-medical waste.

g) Organizing or Sponsoring of trainings for the health care facilities on bio-medical waste management related activities.

h) Sponsoring of mass awareness campaigns in electronic media and print media.

i) Allocation of adequate funds to Government health care facilities for bio-medical waste management

j) Procurement and allocation of treatment equipments and make provision for consumables for bio-medical waste management in Government health care facilities.

k) Constitute State or District Level Advisory Committees under the District Magistrate or Additional District Magistrate to oversee the biomedical waste management in the Districts

l) Implementation of recommendations of the Advisory Committee in all the health care facilities

m) Installation of Effluent Treatment Plants in all the Government bedded Health Care Facilities in concurrence with the timeline given in the action plan.

iii) Department of Animal Husbandry

a) Ensuring that all the Govt. Veterinary Institutions make agreement with the CBWTF operators for scientific disposal of bio-medical waste and obtain authorization from PPCB in concurrence with the timeline given in the action plan.

b) Grant of license to veterinary establishments with a condition to obtain authorization from PPCB for bio-medical waste management.

c) Monitoring, Refusal or Cancellation of license for veterinary establishments for violations of conditions of authorization or provisions under these Rules.

d) Publication of list of registered veterinary health care facilities with regard to biomedical waste generation, treatment and disposal.

e) Coordinate with State Pollution Control Board for organizing training programmes to staff of veterinary health care facilities on bio-medical waste.

f) Allocation of adequate funds to Government veterinary health care facilities for biomedical waste management

g) Procurement and allocation of treatment equipment's and make provision for consumables for bio-medical waste management.

h) Implementation of recommendations of the Advisory Committee.

iv) Department of Medical Education & Research

a) Installation of Effluent Treatment Plants in all the Government Medical Colleges & Hospitals.

b) Organizing or Sponsoring of trainings for the Medical Colleges & Hospitals on biomedical waste management in coordination with PPCB.

c) Allocation of adequate funds to Government health care facilities for bio-medical waste management

d) Procurement and allocation of treatment equipment's and make provision for consumables for bio-medical waste management in Government health care facilities.

e) Implementation of recommendations of the Advisory Committee.

v) Department of Rural Development and Panchayat

a) Ensuring that all the Govt. Rural Dispensaries make agreement with the CBWTF operators for scientific disposal of bio-medical waste and obtain authorization from PPCB in concurrence with the timeline given in the action plan.

b) Allocation of adequate funds to Government Rural Dispensaries for bio-medical waste management

c) Procurement and allocation of treatment equipment's and make provision for consumables for bio-medical waste management in Government Rural Dispensaries.

d) Organizing or Sponsoring of trainings for the Govt. Rural Dispensaries on bio-medical waste management in coordination with PPCB.

vi) Department of Local Government

a) Ensuring collection of bio-medical waste generated in house-holds and disposing it to nearest common bio-medical waste treatment facility.

b) Collection of solid waste (other than the biomedical waste) from the health care facilities as per the Solid Waste (Management) Rules, 2016.

c) Coordinate with NGOs for organizing/imparting training programmes to house-holds for segregation of bio-medical waste.

d) Implementation of recommendations of the Advisory Committee.

vii) District Administration

a) Ensuring Regular meetings of the District Level Monitoring Committee (DLMC) to monitor and review the implementation of the Rules in the District.

b) Submit report of the DLMC once in six months to the State Advisory Committee with a copy to State Pollution Control Board for taking further necessary action.

c) Coordinate with State Pollution Control Board for organizing training programmes for house-holds on segregation of bio-medical waste.

d) Organizing mass awareness campaigns in electronic media and print media.

e) Implementation of recommendations of the Advisory Committee.

2.4.5 Identification of Government Stakeholders- for implementation of Action Plan for Plastic Waste Management Rules 2016

Role/responsibilities of various stakeholder departments in light of the Rules is given below:

i) Department of Environment through Punjab Pollution Control Board

Enforcement of the provisions of PWM Rules, 2016, relating to registration, manufacture of plastic products and multi-layered packaging, processing and disposal of plastic wastes.

ii) Department of Local Government and ULBs

a) Ensure segregation, collection, storage, transportation, processing and disposal of plastic waste.

b) Ensuring channelization of recyclable plastic waste fraction to registered recyclers.

c) Ensuring processing and disposal of non-recyclable fraction of plastic waste.

d) Creating awareness among all stake holders about their responsibilities.

e) Ensuring no open burning of plastic waste.

f) Framing of bye-laws incorporating the provisions of Rules.

g) Setting up system for plastic waste management within one year.

2.4.6 Identification of Government Stakeholders- for implementation of Action Plan for Hazardous Waste Management Rules 2016

i) Department of Environment through Punjab Pollution Control Board

a) Preparation of integrated plan for effective implementation of provisions of these rules.

b) Inventorisation of Hazardous Wastes generating industrial units.

c) Grant and Renewal of authorization to Hazardous waste generating industrial units.

d) Monitoring of compliance of Rules.

e) Implementation of programs to prevent or reduce or minimize the generation of hazardous and other wastes.

ii) Department of Industries

Allocation of industrial space or shed for recycling, pre-processing and other modes of utilization of wastes in the existing and up-coming industrial parks, estates and industrial clusters.

iii) Department of Labour

a) Ensure recognition and registration of workers involved in recycling, pre-processing and other utilization activities.

b) Assist in formation of groups of such workers to facilitate setting up of such facility.

c) Undertake industrial skill development activities for the workers.

d) Undertake annual monitoring and to ensure safety and health of workers.

2.4.7 Identification of Government Stakeholders- for implementation of Action Plan for Construction & Demolition Rules 2016

Various stakeholders and their role as per the C&D Waste Management Rules 2016 are as under:

i) Department of Environment

The Department of Environment through Punjab Pollution Control Board shall mainly be responsible for:

a) Enforcement and review of Implementation of C&D Waste Management Rules, 2016.

b) Monitoring of environmental standards and waste processing and disposal sites.

c) Grant of authorization to construction and demolition waste processing facilities.

d) Monitoring of the work zone air quality at processing or recycling site.

e) Compilation of the annual report sent by Local Bodies.

ii) Department of Local Government

a) Preparation of C&D Waste Management Policy and Plans.

b) Seek detailed plans from generator of C&D waste.

c) Chalk out stages, methodology, equipment, material involved for management of C&D waste.

d) Place containers for C&D waste at appropriate places and remove at regular intervals.

e) Transportation of collected waste to appropriate sites for processing and disposal.

f) Appropriate incentives to generator for salvaging, processing and or recycling.

g) Sanction of C&D waste management plan of the generators after approval of building plans.

h) Tracking generation of C&D waste and establish a data base and update once in a year.

i) Management of C&D waste including processing facility and promote recycled products.

j) Undertake IEC activities.

k) Appropriate incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.

l) Submission of Annual report in Form-2 to the Punjab Pollution Control Board.

2.4.8 Identification of Government Stakeholders- for implementation of Action Plan for E-Waste Rules 2016 under CEPI

Various stakeholders and their role as per the E-Waste Management Rules 2016 are as under:

i) Department of Environment through Punjab Pollution Control Board

a) Identification of bulk consumers, manufacturer, producer, refurbisher, recycler, dismantler

b) Inventorisation / quantification of E-Waste:

- Outsourcing/ involving students of reputed institutes for the Inventorisation of bulk consumers.
- CPCB website for producers / manufacturer / refurbishers

c) Monitoring and compliance of Extended Producer Responsibility

- PPCB shall ensure the monitoring & compliance of EPR – Authorization as per the provisions laid down under the E-Waste (Management) Rules, 2016 amended from time to time.

d) Grant of Authorization to manufacturers, dismantlers, recyclers and refurbishers

- As per the time lines prescribed under E-Waste (Management) Rules, 2016 or as prescribed under the Punjab Transparency and Accountability in Delivery of Public Service Act, 2018, whichever is earlier.

e) Conduct random inspection of dismantler or recycler or refurbishers

- At least two visits in a year to the dismantling / recycler facilities / refurbishers by the concerned Regional Office of the Board and special surprise checks by the teams constituted by the Head Office.

f) Maintaining online information regarding authorization granted

- PPCB shall upload the information regarding authorization granted to manufacturers, dismantlers, recyclers and refurbishers for placing the same in the public domain.

g) Submission of Annual Report to the CPCB

- The annual return submitted by the manufacturer, dismantler, recycler and refurbisher in Form-3 before 30th June of every year, shall be complied by the PPCB for further sending to CPCB by 30th September of every year in Form-5.

h) Organizing awareness camps for the bulk consumers

- Regional Office of PPCB shall organize at least two awareness camps for Educational Institutions, Major Hospitals, Govt. Organizations, Large Scale Industrial Units etc. to make them aware about their responsibilities under the E-Waste Management Rules, 2016 for channelization of the such type of waste in an environmentally sound manner.

ii) Department of Local Government (ULBs)

a) To ensure proper segregation/collection of e-waste mixed in MSW and its channelization to authorised dismantler or recyclers.

b) To ensure that e-waste pertaining to orphan products is collected and channelized to authorised dismantler or recycler.

c) Department of Local Bodies to issue instructions to all the municipal Corporations/ municipal councils regarding sound management of E-waste.

d) Department of Local Bodies to make agreement/ sign MoU with the authorized dismantler/ recycler for channelizing the E-waste segregated from MSW.

e) Concerned municipalities to maintain such records of the E- waste, transferred to the recycler/ dismantler.

iii) Department of Industries & Commerce / Housing & Urban Development / any other Development Authority

To ensure earmarking or allocation of industrial space or shed for E-waste dismantling and recycling in the existing and upcoming industrial park, estate and industrial cluster. For compliance of above, the concerned authority / department shall identify at least 10 cities where space or shed for e-waste dismantling and recycling shall have to be reserved. Preferably, the towns shall be selected on the basis of potential bulk consumers, like

a) Industrial predominance (e.g Ludhiana & Jalandhar)

b) Educational predominance (Patiala, Ludhiana, Jalandhar, Amritsar)

c) Commercial/ Govt. Office dominance (Ludhiana, Jalandhar, Patiala, Mohali)

d) Geographical Connectivity (Amritsar, Faridkot, Bathinda, Ludhiana, Mohali)

e) IT Hub (Mohali)

2.5 Nodal Agency

The Directorate of Environment and Climate Change will be the nodal department for coordinating and monitoring of all the activities of above said Action Plan.

2.6 Integration of Departmental plans

The Nodal Department will integrate plans of individual departments for control of pollution from various sources and prepare a comprehensive plan.

2.7 Monitoring the mechanism for effective compliance through self-regulatory mechanism

2.7.1 Design of Monitoring System

Various measures envisaged under the action plan for control of pollution can be classified in the following categories:

i. Public Awareness

ii. Effective Enforcement

iii. Creation of new Infrastructure

iv. Maintenance related activities

v. Policy Advocacy

vi. Technology Support

2.7.2 Monitoring system for various activities

Monitoring of various activities of the Action Plan will be a key to achieve the outcome envisaged under the Action Plan. Different kind of monitoring systems will be required for different categories of activities:

i) Design of effective online platform including social media to disseminate air pollution related information and seek citizen feedback and participation in the campaign. It will have a monitoring mechanism to see the level of participation and measures to increase the same.

ii) Design of effective online system to capture various enforcement activities by various agencies to monitor them, evaluate them and provide feedback and enforce accountability.

iii) Design of an effective monitoring system to monitor the progress of various infrastructure related activities as envisaged under the plan.

iv) Design of an effective monitoring system for policy advocacy within the Government for expediting formulation of various policies.

v) Design of an effective monitoring system for various technological interventions to reduce the air pollution.

2.8 Mechanism

Mechanism evolved after consultation with stakeholders for new activities expansion by Red & Orange Category of industries in Critically/Severely Polluted areas.

i) Environmental Management of CPAs and SPAs

Protocol to be followed by the State Pollution Control Boards (SPCBS)/ Pollution Control Committees (PCCs) For improvement of environmental quality in the Critically Polluted Areas (CPAS) and Severely Polluted areas(SPAs)

a) The CEPI score assessment done by CPCB will be used as warning tool State Governments, SPCBS and other concerned to understand the severity of pollution existing in the area and to formulate appropriate action plan.

b) The State Govts/ SPCBs will finalize the time bound action plans within three months for the identified CPAS and SPAS to restore environment quality within norms. Short term and long term action points have to be formulated with time frames of up to one year and more than one year, as may be required, respectively.

c) The action plan will be prepared by a committee constituted by Chief Secretary. Representative of industries association may be included in the committee constituted. The final preparation of action plan including its execution shall be overseen by the Chief Secretary of the concerned state. The same shall be submitted to CPCB for consideration & approval.

d) While preparing action plans, the committee constituted by the Chief Secretary shall follow the directions, issued by CPCB under section 18(1) (b) of the Water (Prevention & Control of pollution) Act, 4974 and the Air (Prevention & Control of pollution) Act,1981 on 26.04.2016, which include (1) environmental quality monitoring in all CPAS, (ii) installation of continuous ambient air quality monitoring stations/Strengthening of manual monitoring stations (iii) installation of continuous water quality monitoring stations, (iv) application of revised CEPI version and (v) action plan & monitoring. Long term and short term action plans, along with sector and region wise action points, should be defined clearly with time lines and responsible implementing agencies. Additionally, Source

apportionment Studies shall be conducted to ascertain contribution from sources including industries for planning actions.

e) The progress of implementation of action points will be reviewed by district and State Level Monitoring Committees, quarterly. It would be ensured that there is no slippage either in terms of time frame or the activities to be completed relating to the action plan. In case of delay/inefficiency in implementation of action plan, the concerned State Government will take appropriate action against the responsible authorities, implementing agencies, industries, etc. under the provisions of relevant acts/laws.

f) The SPCB will undertake environmental quality monitoring for evaluating CEPI in the critically and severely polluted areas falling under their jurisdiction through an outside third party recognized agency (laboratory) under Environment (Protection) Act 1986 and accredited under NABL. The frequency of monitoring shall be twice in a year i.e pre-monsoon season and post-monsoon season.

g) The action plans prepared for the CPAS/SPAS, environmental quality monitoring data, evaluated CEPI scores (as per revised CEPI-2016 concept) and progress reports of committee meetings to be placed in public domain through their respective State Govts. / UTs / SPCBS /PCC website's. CPCB will also review the progress of implementation of action plans of CPAS/ SPAS on a quarterly basis.

h) In case CEPI scores of a particular CPA continue to be in critical category for a year, MoEF& CC will review the action plans with the concerned State Govt. / Union territory and impose additional safeguards such as revising the time limits for implementation of action points, supplementary action points and will recommend penal action against the authorities responsible for implementation of action plan for environmental management of CPAs/SPAs.

i) CPCB will also carry out re-assessment of CEPI scores in CPAs, with concurrence of MOEF&CC and report outcome for further consideration and decision by MoEF& CC.

j) Carrying capacity study of the each of the area will be carried out by State Govts./Union Territories /SPCBs/PCCs based on the protocols prepared by CPCB.

ii) Consideration of proposals for grant of Environmental clearance for new and expansion activities listed in Red' and 'Orange' Categories located in Critically Polluted Areas and Severely Polluted areas:

a) Any project or activity specified in Category B1 will be appraised at the Central Level, if located in whole or in part within 5 km from the boundary of Critically Polluted Areas or Severely Polluted Areas. However, Category B2 projects shall be considered at state level

stipulating Environmental Clearance conditions as applicable for the Category 'B1' project/activities.

b) Proposals located in CPAs and SPAs will be examined by the sectoral Expert Appraisal Committee (EAC) during scoping/appraisal based on the CEPI scores of Air/Water/ Land Environment as published by CPCB from time to time. In such proposals, appropriate mitigation measures for the environment possessing higher CEPI score may be made by EAC in the form of recommendations/decision. These recommendations will be explicitly mentioned in the Terms of Reference/Environmental Clearance letter and to be ensured by the member secretary concerned.

c) SPCBs/PCCs will prescribe following additional conditions, deemed fit for grant Consent to establish (CTE)/Consent to Operate (CTO) to those projects/activities of Red/Orange Categories located in CPAs/SPAs which are not covered under the provisions of the ELA Notification, 2006.

Environment	**Mitigation Measures**
Air (Prevention & Control of Pollution) Act, 1981	**Stipulation of conditions such as:** i. Stack emission levels should be stringent than the existing standards in terms of the identified critical pollutants. ii. CEMS should be installed in all large/medium red category industries (air polluting) and connected to SPCB and CPCB server. iii. Effective fugitive emission control measures should be imposed in the process, transportation, packing etc. iv. Transportation of materials by rail/conveyor belt, wherever feasible. v. Encourage use of cleaner fuels (pet coke/ furnace oil/LSHS may be avoided). vi. Best Available Technology be used. For example, usage of EAF/SAF/IF in place of Cupola furnace. Usage of Supercritical technology in place of sub-critical technology. vii. Increase of green belt cover by 40% of the total land area beyond the permissible requirement of 33%, wherever feasible. viii. Stipulation of greenbelt outside the project premises such as avenue plantation, plantation in vacant areas, social forestry, etc. ix. Assessment of carrying capacity of transportation load on roads inside the industrial premises. If the roads required to be widened, shall be prescribed as a condition.
Water	**Stipulation of conditions such as:** i. Reuse/recycle of treated wastewater, wherever feasible. ii. Continuous monitoring of effluent quality/quantity in large

	and medium Red Category Industry (Water Polluting). iii. A detailed water harvesting plan be submitted by the project proponent. iv. Zero liquid discharge wherever techno-economically feasible.
Land	**Stipulation of conditions such as:** i. Increase of green belt cover by 40% of the total land area beyond the permissible requirement of 33%, wherever, feasible for new projects. ii. Stipulation of greenbelt outside the project premises such as avenue plantation, plantation in vacant areas, social forestry, etc. iii. Dumping of waste (fly ash, slag, red mud, etc.) may be permitted only at designated locations approved by SPCBs/ PCCs. **iv.** More stringent norms for management of hazardous waste. The waste generated should be preferably utilized in co-processing.
Other Conditions (Additional)	i. Monitoring of compliance of EC conditions be submitted with third party audit every year. ii. The % of the CER should be at least 1.5 times the slabs given for CPA in case of Environmental Clearance, the dated 01.05.2018 for SPA and 2 times for CPA in case of Environmental Clearance.

2.9 Governance

The monitoring of progress, coordination of various activities, corrective measures required and fixing of accountability will be done by District Environment Committee at the District level under Deputy Commissioner, State Level under Principal Secretary, Environment and Apex Committee under Chief Secretary.

Chapter 3 : Sources of Pollution, Current Status and Trends of pollution level in Ludhiana

3.1 Water Pollution

The Ludhiana City is an industrial town and has mainly two types of effluent i.e. domestic effluent and industrial effluent. The domestic and industrial effluents of the city are discharged into sewerage system laid by Municipal Corporation, Ludhiana. In addition, two dairy complexes located at Tajpur Road and at Haibowal discharges their effluent directly into Budha Nallah. Major part of the effluent of the city is discharged into Budha Nallah leading to River Sutlej near village Walipur and from the outlet of the Bhattian, a part of the effluent is discharged directly into River Sutlej near village Kasabaad.

Budha Nallah, a non-perennial natural drain, originates from confluence of Kumlink drain and Neelon drain near Vill. Kum Kalan, traverses across Ludhiana city (20 kms) from east to west finally meeting the river Sutlej in the outskirts of the city. Earlier, the Budha Nallah acted as a drain for the water logged area of river Sutlej and carried good quality of water. With the growing urbanization and industrialization in Ludhiana, it becomes a recipient body for domestic and industrial effluents of the Ludhiana city.

When the Budha Nallah enters Ludhiana City, it carries effluent of about 13 MLD. Water logging, effluent of habitation and some dairies on the upstream of the limits of Municipal Corporation, Ludhiana contribute to this discharge.

Outlets of 48 MLD STP, 152 MLD STP, 105 MLD STP, Dairy Complex Tajpur Road, Dairy Complex Haibowal and other unauthorized outlets as discussed above, contribute to the discharge in Budha Nallah. Disposal of effluent into Budha Nallah within the MC limits of Ludhiana city is through the following disposal points:

1. Outlet of STP of 48 MLD capacity installed at Jamalpur, opposite Central Jail. Major part of effluent at this location is industrial.
2. Disposal near Amrit Dharam Kanda Bridge at Tajpur Road. This outlet contains industrial and domestic effluent.
3. Disposal of EWS Colony near Geeta Nagar Bridge along Tajpur Road. This outlet contains mainly domestic effluent.
4. Multiple outlets from various Dairies at Tajpur Road with dairy waste.
5. Individual disposal points of slum area near Tibba Road disposal. This outlet contains domestic effluent.
6. MC Tibba Road Disposal on G.T. Road bye-pass. Major part of effluent at this disposal is domestic.

7. MC Disposal of Transport Nagar (near Cremation Ground). This outlet contains industrial and domestic effluent.
8. MC Disposal near Atam Nagar/ Sunder Nagar. Major part of effluent at this disposal is domestic.
9. MC Disposal near New Shivpuri (Opp. ShaniMandir). This outlet contains domestic effluent.
10. MC Disposal near Chand Cinema, G.T. Road. This outlet contains domestic effluent.
11. MC Disposal near ChhauniMohalla and Manna Singh Nagar. This outlet contains domestic effluent.
12. MC Disposal near Upkar Nagar. This outlet contains domestic effluent.
13. MC Disposal backside of Life line Hospital (DMC Culvert). This outlet contains domestic effluent.
14. MC disposal at the backside of Lord MahaviraAyurvedic Hospital. This outlet contains domestic effluent.
15. MC Disposal at the backside of Ram SharnamSatsangBhawan. This outlet contains domestic effluent.
16. Multiple outlets from various dairies located at Haibowal dairy complex with dairy waste.
17. Outlet of two modules of STPs of 152MLD & 105MLD capacities installed at Balloke. Major part of the effluent at this disposal is domestic. At the downstream of this point there is no outlet of MCL.

Further, outlet of two modules of STPs of 111MLD & 50MLD (total 161 MLD) capacities installed at Bhattian is directly into River Sutlej. This outlet contains industrial and domestic effluent.

Thus, the total effluent generated from the City is about 761 MLD (600 + 161). No separate sewerage system is provided in the City to carry the segregated industrial and domestic effluent. Thus, the sewerage system of the city carries the combined industrial and domestic effluent.

3.1.1 Industrial Water pollution

There are two major types of water polluting industries i.e. Dyeing and Electroplating/ Pickling industries in Ludhiana City. Besides this, there are also other types of water polluting industries in Ludhiana City like milk plants, garment washing units, service stations etc.

There are 229 dyeing industries in Ludhiana, out of which 12 industries are in large scale and 217 industries are Medium & Small Scale sector. All the dyeing industries have installed Captive effluent treatment plants. However, to monitor the quality of treated effluent of these industries under Medium and small scale sector, three Common Effluent Treatment Plants (CETPs) are being installed in Ludhiana for the dyeing clusters of Bahadurke Road (capacity 15

MLD), Focal Point (40 MLD) and Tajpur Road & Rahon Road (capacity 50 MLD). The CETP of 15 MLD capacity has been completed and is under stabilization. The other two CETPs of 40 MLD & 50 MLD capacities are under advance stage of construction and are likely to be commissioned soon.

There are 1521 small scale and 19 large/ medium scale electroplating & allied industries in Ludhiana City. The effluent of these industries contain heavy metals such as zinc, nickel, chrome, copper, iron etc. in different concentrations. For the treatment of effluent of such small scale industries, a Common Effluent Treatment Plant (CETP) is installed in Focal Point, Ludhiana on Zero Liquid Discharge (ZLD) Technology. After treatment, the effluent (RO Permeate) is reused in the nearby dyeing industries as their raw material and the reject water of the ETP is evaporated in the Multiple Effect Evaporator (MEE). The performance of the ZLD system adopted by the CETP is being monitored by the Board regularly and the results are as under:-

M/s J.B.R. Tech Pvt Ltd. (CETP for electroplating)										
Date of Sampling		**4.4.19**	**27.5.19**	**14.6.19**	**2.7.19**	**7.9.19**	**9.10.19**	**7.11.19**	**6.12.19**	**8.1.20**
S.N.	**Parameters in mg/l except pH**	**RO Permeate**								
1	pH	8.9	7.56	7.52	7.42	6.8	8.1	8.2	8.5	7.2
2	TSS	BDL	BDL	BDL	12	BDL	BDL	BDL	BDL	BDL
3	TDS	926	1109	1036	836	823	1466	1050	1628	1740
4	Oil & Grease	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	Iron	0.91	BDL	0.17	0.3	0.97	0.08	0.17	0.97	0.14
6	Zn	0.27	BDL	0.11	BDL	0.053	0.08	BDL	BDL	0.17
7	Ni	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	T.Cr	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	H. Cr	BDL	BDL	BDL	BDL	-	BDL	BDL	BDL	BDL
10	Total metal	1.18	BDL	0.28	0.3	1.02	-	-	-	0.31

From the above, it is evident that no heavy metals like zinc, nickel and chrome is detected in the RO Permeate being used by the nearby dyeing industries as their raw material. Thus, the CETP is achieving the prescribed standards of the Board.

All the large and medium scale industries have installed their Captive ETPs based on ZLD.

The other Sulphuric Acid (H2SO4) based pickling units have joined a Common Facility for the recovery of Ferrous Sulphate. This facility is also based on ZLD technology.

No effluent of electroplating/pickling industries of the City is discharged into Budha Nallah/ River Sutlej.

Other water polluting industries have also installed Captive Effluent Treatment Plants. After treatment, the effluent is discharged into sewer leading to the inlets of Sewage Treatment Plants (STPs) installed in the respective catchment areas for final disposal. No industrial effluent is allowed by the Board for disposal directly into Budha Nallah.

The total industrial effluent of the city has been estimated about 120 MLD.

3.1.2 Domestic Water pollution

For the treatment of effluent of the city, five STPs of 48 MLD (Jamalpur), 111 MLD (Bhattian), 50 MLD (Bhattian), 152 MLD (Balloke) & 105 MLD (Balloke) capacities are installed at Ludhiana. The effluent from STP Jamalpur and Balloke are discharged into Budha Nallah while the effluent from STPs Bhattian is discharged directly into River Sutlej. The capacity of these STPs is 466 MLD and the excess effluent is discharged directly into Budha Nallah as detailed in Chapter 3.1.

The five STPs installed at Ludhiana are as under:-

S. no.	Name of STP	STP Installed Capacity (in MLD)	Technology (UASB/ASP/OP/SBR/MBR/FAB Etc.)	Disposal (land, river sea or any other)	Operational status
1.	Balloke	152	UASB	Into Budha Nallah	Operational
2.	Balloke	105	SBR	Into Budha Nallah	Operational
3.	Bhattian	111	UASB	Into Sutlej River	Operational
4.	Bhattian	50	SBR	Into Sutlej River	Operational
5.	Jamalpur	48	UASB	Into Budha Nallah	Non-operational

The STP of 48 MLD installed at Jamalpur is lying defunct while the other 4 STPs are operational. The performance of these STPs is being monitored by the Board regularly and is tabulated as under:-

STP Bhattian, 50 MLD

Sr. no.	Parameters	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019		Dec. 2019		Jan, 2020		Permissible limits
		Board's Lab	Board's Lab	Board's Lab	Board's Lab	SAI Lab	Board Lab	SAI Lab	Board's Lab	SAI Lab	
1.	pH	7.35	7.4	7.9	7	7	7.2	7.1	8	7.26	6.5-9.0
2.	BOD mg/l	18	**43**	**43**	10	11	7	<5.0	6	28	<30 mg/l
3.	COD mg/l	75	132	152	80	71	52	43	44	100	-
4.	TSS mg/l	19	49	23	20	50	17	18	20	47	<100 mg/l
5.	F. ColiMPN /100 ml	280	460	110	940	<1.8	<1.8	<1.8	45	20	<1000

This module of STP has achieved the prescribed limits in the last 6 months except for the month of Sept & October, 2019.

STP Bhattian, 111 MLD

Sr. no.	Parameter	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019		Dec. 2019		Jan, 2020		Permissible limits
		Board's Lab	Board's Lab	Board's Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	
1.	pH	**7.13**	**7.3**	**7.6**	**6.8**	**6.7**	**7**	**6.9**	**7.6**	**6.85**	**6.5-9.0**
2.	BOD mg/l	**38**	**80**	**88**	**33**	**55**	**42**	**38**	**50**	**227**	**<30 mg/l**
3.	COD mg/l	**135**	**248**	**284**	**192**	**261**	**200**	**170**	**224**	**296**	**-**
4.	TSS mg/l	**42**	**188**	**114**	**69**	**144**	**153**	**160**	**188**	**182**	**<100 mg/l**
5.	F. Coli MPN/ 100ml	**11000**	**79000**	**1700**	**15000**	**240**	**120000**	**<1.8**	**3500000**	**172000**	**<1000**

This module of STP has not achieved the prescribed limits in the last 6 months.

STP Balloke, 105 MLD

Sr. no.	Parameters	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019		Dec. 2019		Jan, 2020		Permissible limits
		Board's Lab	Board's Lab	Board's Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	
1.	pH	7.1	6.6	7.8	6.9	6.9	6.9	6.8	7.8	7.31	6.5-9.0
2.	BOD mg/l	**182**	**120**	**32**	12	20	12	15	25	26	<30 mg/l
3.	COD mg/l	560	336	108	76	67	68	64	96	104	--
4.	TSS mg/l	**196**	94	31	16	<10	48	56	78	16	<100 mg/l
5.	F.Coli MPN/ 100 ml	**2200**	220	**3800**	45	<1.8	940	<1.8	830	490	<1000

This module of STP is achieving the prescribed limits for the last three months.

STP Balloke, 152 MLD

Sr. no.	Parameters	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019		Dec. 2019		Jan, 2020		Permissible limits
		Board's Lab	Board's Lab	Board's Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	Board's Lab	SAI Lab	
1.	pH	7	7.1	5.3	6.8	6.4	7.2	7.2	7.4	6.74	6.5-9.0
2.	BOD mg/l	**65**	**65**	**88**	**35**	**49**	27	25	30	24	<30 mg/l
3.	COD mg/l	196	208	320	164	209	132	136	152	228	-
4.	TSS mg/l	82	63	72	58	88	38	18	56	27	<100 mg/l
5.	F.Coli MPN/ 100 ml	**28000**	**79000**	ND	**430000**	**17000000**	920	<1.8	<1.8	<1	<1000

This module of STP is achieving the prescribed limits for the last two months.

STP Jamalpur, 48 MLD

Sr. no.	Parameters	Aug. 2019	Sept. 2019	Oct. 2019	Nov. 2019	Dec. 2019	Jan, 2020	Permissible limits
		Board's Lab	Board's Lab	Board's Lab	Board's Lab	Board's Lab	Board's Lab	
1.	pH	7.37	7.1	7.04	7.27	7.8	7.82	6.5-9.0
2.	BOD mg/l	185	130	190	210	85	320	<30 mg/l
3.	COD mg/l	540	398	438	613	240	922	-
4.	TSS mg/l	250	134	136	242	-	336	<100 mg/l
5.	Fecal Coliform MPN/100 ml	170000	49000	150000	70000	94000	120000	<1000

This module of STP is not operational and is lying defunct. It is acting as a pumping station for disposal of untreated effluent into Budha Nallah.

3.1.3 Other major sources of water pollution

Besides above, there are two dairy complexes located at Tajpur Road and Humbran Road and one slaughter house in city. The slaughter house, which is run by the Municipal Corporation, Ludhiana has installed captive ETP. There is a proposal to install two CETPs of 5 MLD and 10 MLD capacities, to treat the effluents from diary complexes located at Tajpur Road and Humbran

Road, Ludhiana, respectively. Presently the untreated effluent from these dairy complexes is discharged into Budha Nallah.

3.1.3.1 Tajpur Dairy Complex, Ludhiana

The Municipal Corporation, Ludhiana had developed a dairy complex at Tajpur Road, Ludhiana. Untreated trade effluent and solid waste from this dairy complex is discharged into Budha Nallah without any treatment. There is a proposal to install a CETP of 5 MLD capacity for the treatment of liquid waste from this dairy complex. As per the Comprehensive plan for rejuvenation of Budha Nallah submitted by Municipal Corporation, Ludhiana, the target date for completion and commissioning of the project is 30.04.2022.

3.1.3.2 Haibowal Dairy Complex, Ludhiana

The Municipal Corporation, Ludhiana had developed a dairy complex at Humbran Road, Haibowal Ludhiana. Untreated trade effluent and solid waste from this dairy complex is discharged into Budha Nallah without any treatment. There is a proposal to install a CETP of 10 MLD capacity for the treatment of liquid waste from this dairy complex. As per the Comprehensive plan for rejuvenation of Budha Nallah submitted by Municipal Corporation, Ludhiana, the target date for completion and commissioning of the project is 30.04.2022.

3.1.3.3 Slaughter House, Haibowal, Ludhiana

One slaughter house is established at Haibowal, Ludhiana by Municipal Corporation, Ludhiana for slaughtering of sheeps, goats, pigs and poultry birds. For the treatment of trade effluent generated, the Municipal Corporation, Ludhiana has recently upgraded the existing Effluent Treatment Plant (ETP), which is likely to be commissioned shortly. Its performance will be checked by the Board after its commissioning.

3.1.4 Ground Water Pollution

Under the National Water Quality Monitoring Programme (NWMP), the Punjab Pollution Control Board is monitoring the quality of ground water in the pre-monsoon & Post monsoon seasons of the years. During the year 2017, 2018 & 2019 the effluent samples were collected and the analysis reports are annexed as **Annexure-3-A, 3-B, 3-C, 3-D, 3-E & 3-F.**

A perusal of ground water analysis report reveals that the concentration of various parameters is within the permissible limits. The ground water/drinking water standards are prescribed by the Bureau of Indian Standards (BIS), for the entire country. These standards/ limits do not take into account the geographical/ geological conditions of the different areas of the country which could contribute to the levels being more or less than the prescribed limits. In the months of

April, 2017, October, 2018, levels of Fe have been found beyond the permissible limits. It may be pertinent to mention that the cause for these higher levels may due to natural geographical/geological conditions rather than due to pollution as the results of the samples collected in the vicinity of Budha Nallah are within the permissible limits. Thus, it is evident that the ground water quality is not effected by the effluent generated by the city.

3.1.5 Discharge and Water Quality of Budha Nallah

3.1.5.1 Average discharge in Budha Nallah

The Executive Engineer, Discharge Division, Department of Water Resources, vide his letter no. 207-209 dt 02.04.2019 has informed that the discharge in Budha Nallah (at a particular time of measurement of flow) is as under:

Date	**Bhammian Pully**	**Tajpur central Jail Pully**	**Vijay Nagar Pully**	**Baba Ghori Shah Pully**	**Balloke Bridge**	**Baranhara Pully**
27.3.2019	Discharge in MLD					
	12.52	121.22	197.13	352.77	429.61	636.63

From the above, it is evident that the Ludhiana City is contributing about 624 MLD of effluent in Budha Nallah, which leads to River Sutlej. In addition, two STPs of capacity 111 MLD & 50 MLD (161 MLD) are installed at Bhattian, which discharge effluent directly into River Sutlej.

The discharge of Budha Nallah was measured at various locations, jointly by a team of officers from Municipal Corporation Ludhiana, Punjab Pollution Control Board and Department of Water Resources on hourly basis for 72 hours from 27.3.2019 to 30.3.2019, at six locations.

The Minimum, Maximum and Average discharges from the various six locations as calculated by the MCL are as under:

Date	**Bhammian Pully**	**Tajpur central Jail Pully**	**Vijay Nagar Pully**	**Baba Ghori Shah Pully**	**Balloke Bridge**	**Baranhara Pully**
27.3.2019 to 30.3.2019	**Discharge in MLD**					
Average	13	125	218	342	414	610
Max	14	131	232	369	450	691
Min	12	116	192	303	362	525

Average discharge into Budha Nallah at the exit point of MCL is about 597 MLD (610-13), say 600 MLD.

Further, the Discharge Division, Water Resources has informed that the average discharge of Budha Nallah into River Sutlej is as under:

Discharge data of Gauge at Budha Nallah (Sutlej River) for the period 01.04.2019 to 30.04.2020		
Month	**Avg. Discharge in Cusecs**	**Avg. discharge in MLD**
April	190.22	465.40
May	192.49	470.95
June	203.28	497.35
July	294.67	720.95
August	282.02	690.00
September	286.19	700.20
October	261.67	640.20
November	220.30	539.00
December	265.73	650.15
January	255.56	625.25
February	249.49	610.40
March	216.73	530.25
April	192.45	470.85
Average discharge of the year	239.2923077	585.4576923

3.1.5.2 Water quality of Budha Nallah

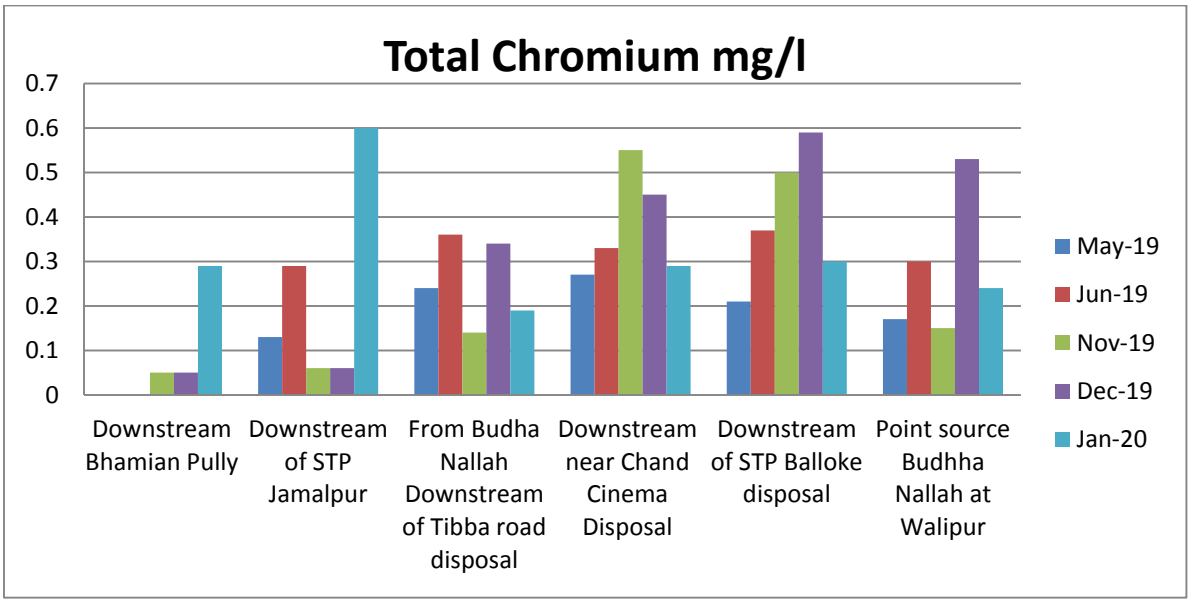
Monitoring of the water quality of Budha Nallah for various pollutants is being carried by the Board from the followings six locations.

S. No.	**Name of the location**
1.	Downstream BhamianPully
2.	Downstream of STP Jamalpur
3.	From Budha Nallah Downstream of Tibba road disposal
4.	Downstream near Chand Cinema Disposal
5.	Downstream of STP Balloke disposal
6.	Point source Budha Nallah at Walipur

The levels of various pollutants since May, 2019 is as under:

3.1.5.2.1 Total Chromium

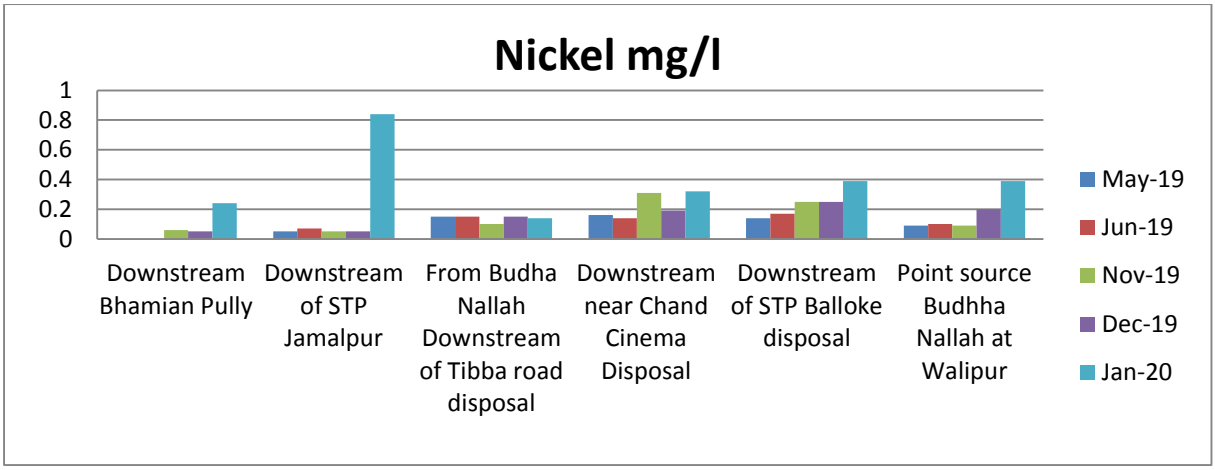
Sr. No.	Point of Sample Collection	Total Chromium mg/l				
		May-19	Jun 19	Nov-19	Dec-19	Jan-20
1	Downstream BhamianPully	-	-	0.05	0.05	0.29
2	Downstream of STP Jamalpur	0.13	0.29	0.06	0.06	0.6
3	From Budha Nallah Downstream of Tibba road disposal	0.24	0.36	0.14	0.34	0.19
4	Downstream near Chand Cinema Disposal	0.27	0.33	0.55	0.45	0.29
5	Downstream of STP Balloke disposal	0.21	0.37	0.5	0.59	0.3
6	Point source Budha Nallah at Walipur	0.17	0.3	0.15	0.53	0.24



It has been observed that the concentration of Total Chromium has increased at the downstream of STP Jamalpur, downstream of Chand Cinema disposal & STP Balloke.

3.1.5.2.2 Nickel

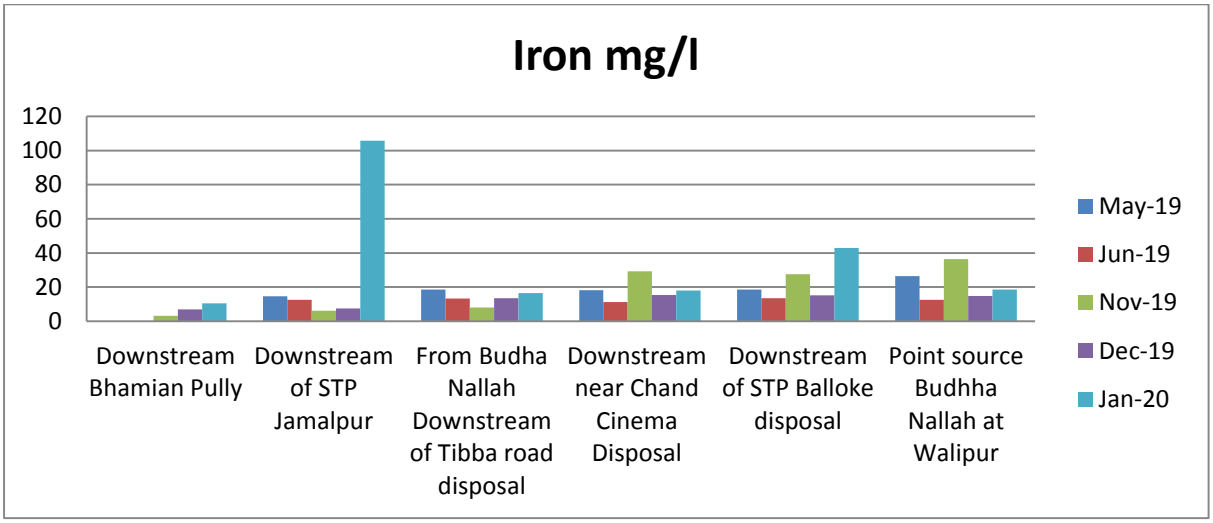
Sr. No.	Point of Sample Collection	Nickel mg/l				
		May-19	Jun-19	Nov-19	Dec-19	Jan-20
1	Downstream Bhamian Pully	-	-	0.06	0.05	0.24
2	Downstream of STP Jamalpur	0.05	0.07	0.05	0.05	0.84
3	From Budha Nallah Downstream of Tibba road disposal	0.15	0.15	0.1	0.15	0.14
4	Downstream near Chand Cinema Disposal	0.16	0.14	0.31	0.19	0.32
5	Downstream of STP Balloke disposal	0.14	0.17	0.25	0.25	0.39
6	Point source Budha Nallah at Walipur	0.09	0.1	0.09	0.2	0.39



It has been observed that the concentration of Nickle has increased at the downstream of STP Jamalpur, downstream of Chand Cinema disposal & STP Balloke.

3.1.5.2.3 Iron

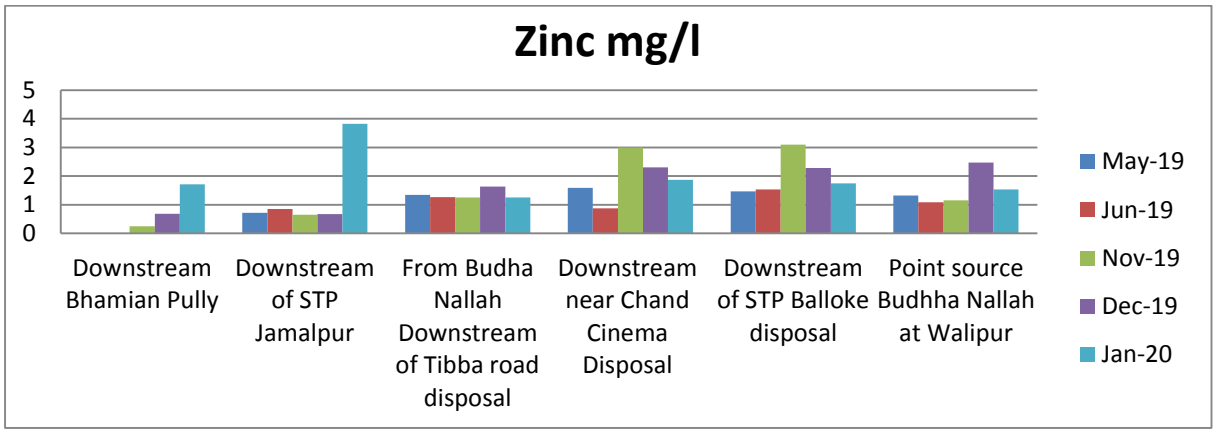
Sr. No.	Point of Sample Collection	Iron mg/l				
		May-19	Jun-19	Nov-19	Dec-19	Jan-20
1	Downstream Bhamian Pully	-	-	3.19	6.84	10.5
2	Downstream of STP Jamalpur	14.6	12.6	6.23	7.42	105.7
3	From Budha Nallah Downstream of Tibba road disposal	18.6	13.2	7.97	13.38	16.5
4	Downstream near Chand Cinema Disposal	18.2	11.2	29.28	15.32	18
5	Downstream of STP Balloke disposal	18.6	13.5	27.53	15.11	43
6	Point source Budha Nallah at Walipur	26.4	12.5	36.3	14.81	18.6



It has been observed that the concentration of Iron has increased at the downstream of STP Jamalpur& STP Balloke.

3.1.5.2.4 Zinc

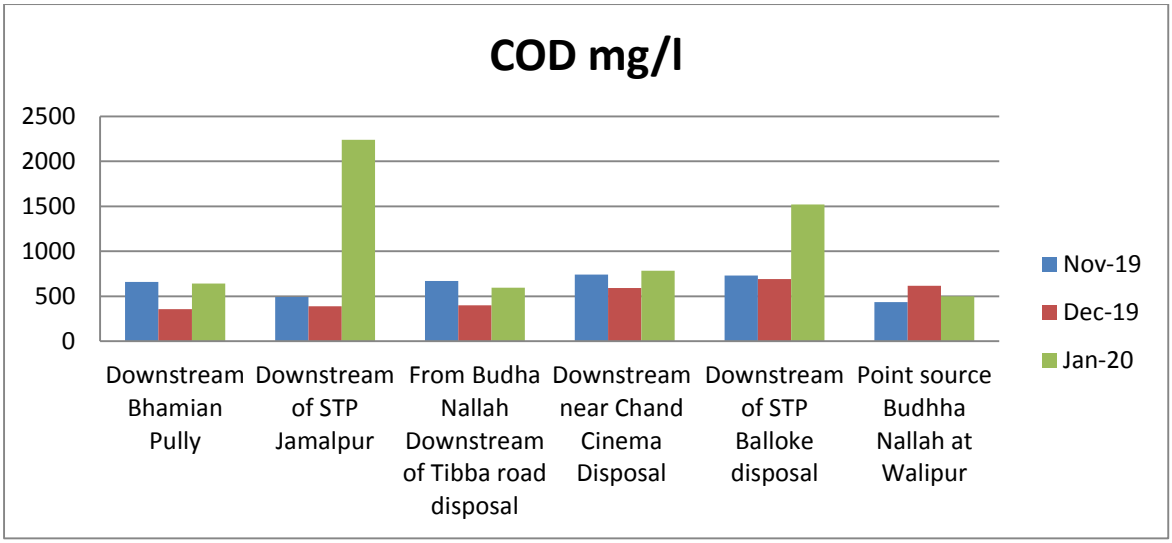
Sr. No.	Point of Sample Collection	Zinc mg/l				
		May-19	Jun-19	Nov-19	Dec-19	Jan-20
1	Downstream Bhamian Pully	-	-	0.25	0.68	1.71
2	Downstream of STP Jamalpur	0.72	0.85	0.65	0.67	3.83
3	From Budha Nallah Downstream of Tibba road disposal	1.34	1.27	1.25	1.64	1.26
4	Downstream near Chand Cinema Disposal	1.59	0.87	3	2.3	1.87
5	Downstream of STP Balloke disposal	1.47	1.54	3.1	2.28	1.75
6	Point source Budha Nallah at Walipur	1.32	1.09	1.15	2.47	1.53



It has been observed that the concentration of Zinc has increased at the downstream of STP Jamalpur& downstream of Chand Cinema disposal.

3.1.5.2.5 COD

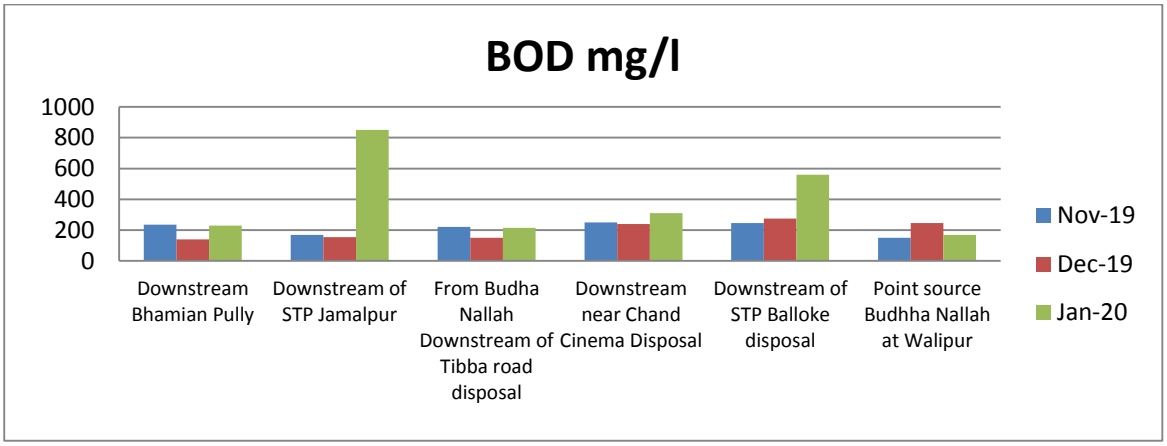
S. no.	Point of Sample Collection	COD mg/l		
		Nov-19	Dec-19	Jan-20
1.	Downstream Bhamian Pully	660	356	640
2.	Downstream of STP Jamalpur	492	388	2240
3.	From Budha Nallah Downstream of Tibba road disposal	670	400	596
4.	Downstream near Chand Cinema Disposal	740	592	784
5.	Downstream of STP Balloke disposal	730	692	1520
6.	Point source Budha Nallah at Walipur	436	616	500



It has been observed that the concentration of COD has increased at the downstream of STP Jamalpur, downstream of Chand Cinema disposal & STP Balloke.

3.1.5.2.6 BOD

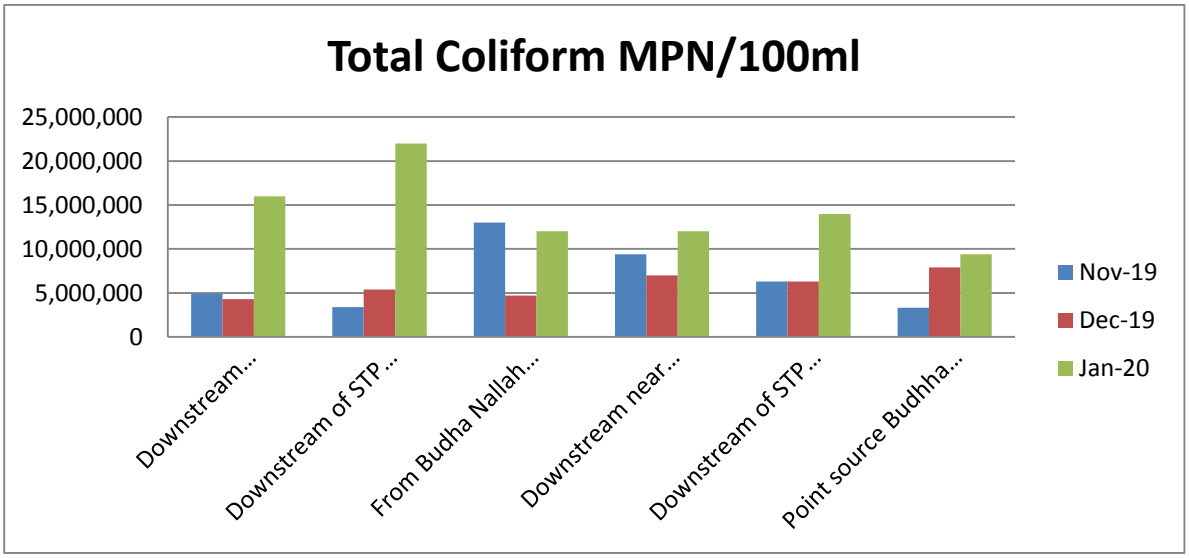
Point of Sample Collection	**BOD mg/l**		
	Nov-19	**Dec-19**	**Jan-20**
Downstream Bhamian Pully	235	140	230
Downstream of STP Jamalpur	170	155	850
From Budha Nallah Downstream of Tibba road disposal	220	150	215
Downstream near Chand Cinema Disposal	250	240	310
Downstream of STP Balloke disposal	245	275	560
Point source Budha Nallah at Walipur	150	245	170



It has been observed that the concentration of BOD has increased at the downstream of STP Jamalpur, downstream of Chand Cinema disposal & STP Balloke.

3.1.5.2.7 T.Coli

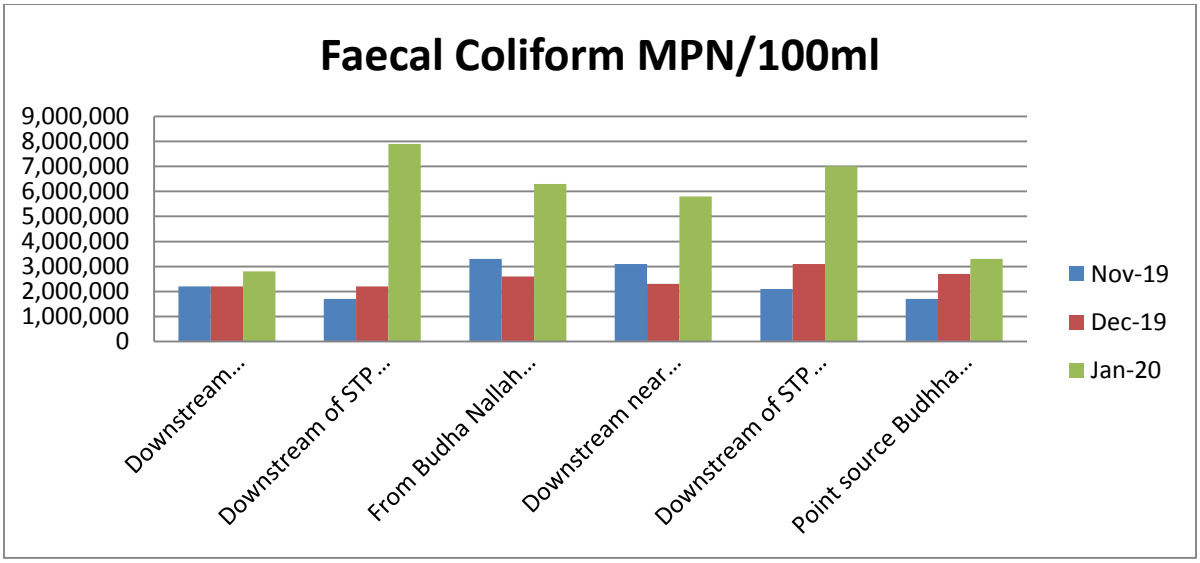
S. No.	Point of Sample Collection	T.Coli MPN/100ml		
		Nov-19	Dec-19	Jan-20
1.	Downstream Bhamian Pully	4,900,000	4,300,000	16,000,000
2.	Downstream of STP Jamalpur	3,400,000	5,400,000	22,000,000
3.	From Budha Nallah Downstream of Tibba road disposal	13,000,000	4,700,000	12,000,000
4.	Downstream near Chand Cinema Disposal	9,400,000	7,000,000	12,000,000
5.	Downstream of STP Balloke disposal	6,300,000	6,300,000	14,000,000
6.	Point source Budha Nallah at Walipur	3,300,000	7,900,000	9,400,000



It has been observed that the concentration of T. Coli is already high at the downstream of Bhamian Pully and has further increased at the downstream of STP Jamalpur. Increased trend of T. Coli has also been observed at the downstream of STP Balloke.

3.1.5.2.8 F.Coli

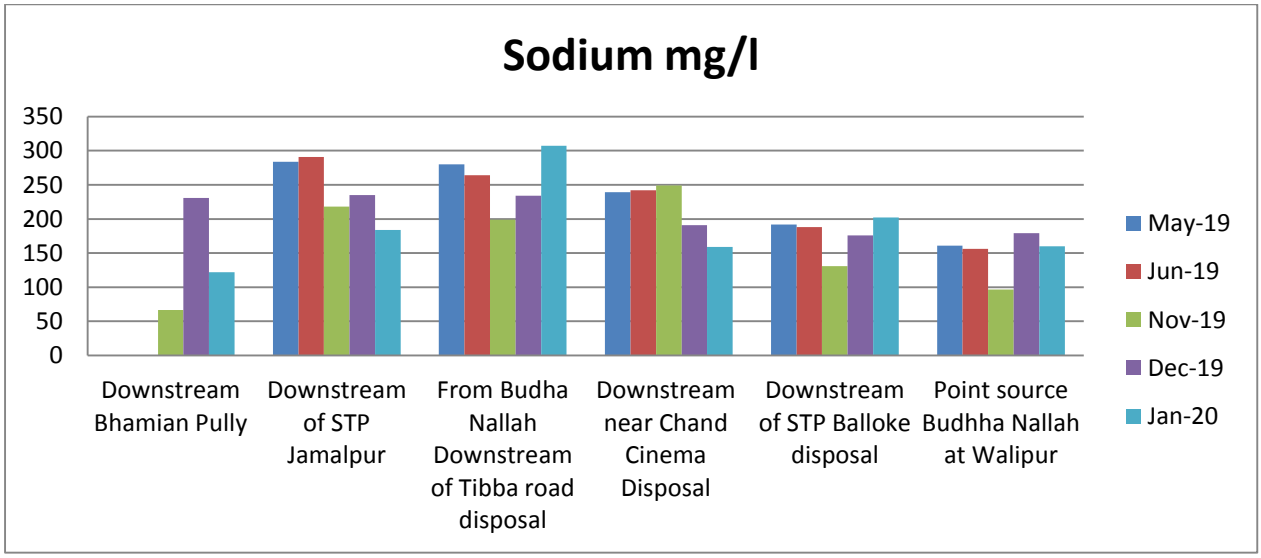
S. No.	Point of Sample Collection	F.Coli MPN/100ml		
		Nov-19	Dec-19	Jan-20
1.	Downstream Bhamian Pully	2,200,000	2,200,000	2,800,000
2.	Downstream of STP Jamalpur	1,700,000	2,200,000	7,900,000
3.	From Budha Nallah Downstream of Tibba road disposal	3,300,000	2,600,000	6,300,000
4.	Downstream near Chand Cinema Disposal	3,100,000	2,300,000	5,800,000
5.	Downstream of STP Balloke disposal	2,100,000	3,100,000	7,000,000
6.	Point source Budha Nallah at Walipur	1,700,000	2,700,000	3,300,000



It has been observed that the concentration of F. Coli has increased at the downstream of STP Jamalpur and at the downstream of STP Balloke, which is mainly due to the disposal of untreated dairy waste into Budha Nallah.

3.1.5.2.9 Sodium

Sr. No.	Point of Sample Collection	Sodium mg/l				
		May-19	Jun-19	Nov-19	Dec-19	Jan-20
1	Downstream Bhamian Pully	-	-	66.7	231	122
2	Downstream of STP Jamalpur	284	291	218	235	184
3	From Budha Nallah Downstream of Tibba road disposal	280	264	199	234	307
4	Downstream near Chand Cinema Disposal	239	242	249	191	159
5	Downstream of STP Balloke disposal	192	188	131	176	202
6	Point source Budha Nallah at Walipur	161	156	96.5	179	160



From above, it is clear that there is slight reduction of Sodium at the point source Budha Nallah at Walipur.

3.1.6 Water quality of River Sutlej

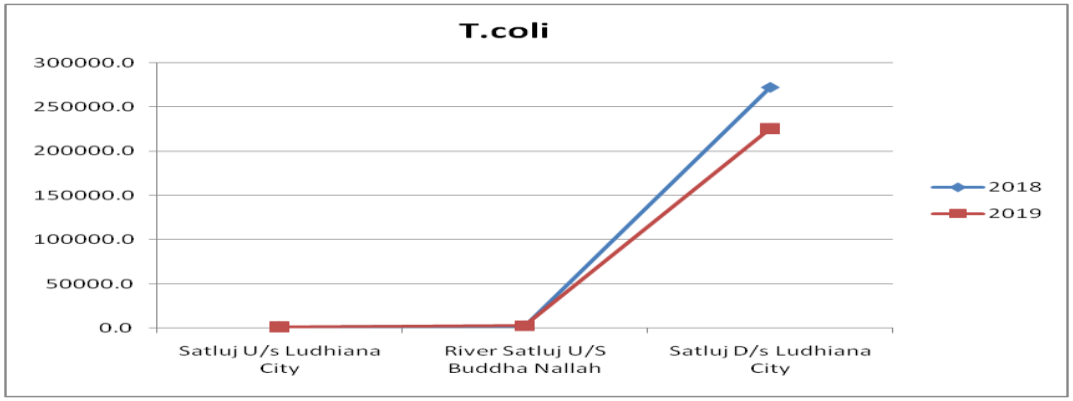
The Budha Nallah meets River Sutlej near Village Walipur, which is located the downstream of Ludhiana City. There is another point source of water pollution in River Sutlej contributed by Ludhiana City, which is in village Kaasabaad and is a common disposal point of 111 MLD & 50 MLD capacity STPs installed at Bhattian. The water quality of the River Sutlej is being monitored by the Board regularly at the following points :

1. Upstream of Ludhiana City (point source of Village Kaasabaad)
2. Upstream of point source of Budha Nallah near Village Walipur.
3. Downstream of Ludhiana City

The average values of the various parameters for the last 2 years are as under:-

3.1.6.1 T. Coli

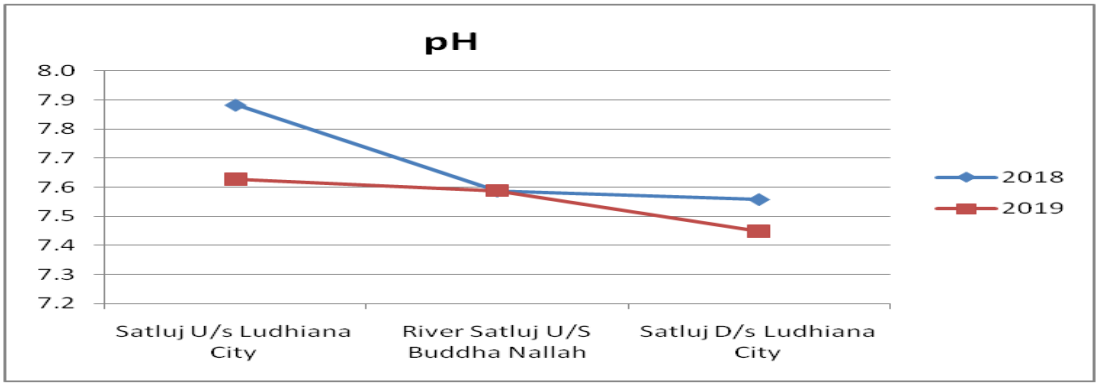
Name of Location	Average 2018 (MPN/100ml)	Average 2019 (MPN/100ml)
Satluj U/s Ludhiana City	1783.0	1463.0
River Satluj U/S Budha Nallah	2550.0	2754.0
Satluj D/s Ludhiana City	272000.0	225500.0



From above, it is clear that there is a decline in the level of T. Coli after point source of Budha Nallah.

3.1.6.2 pH

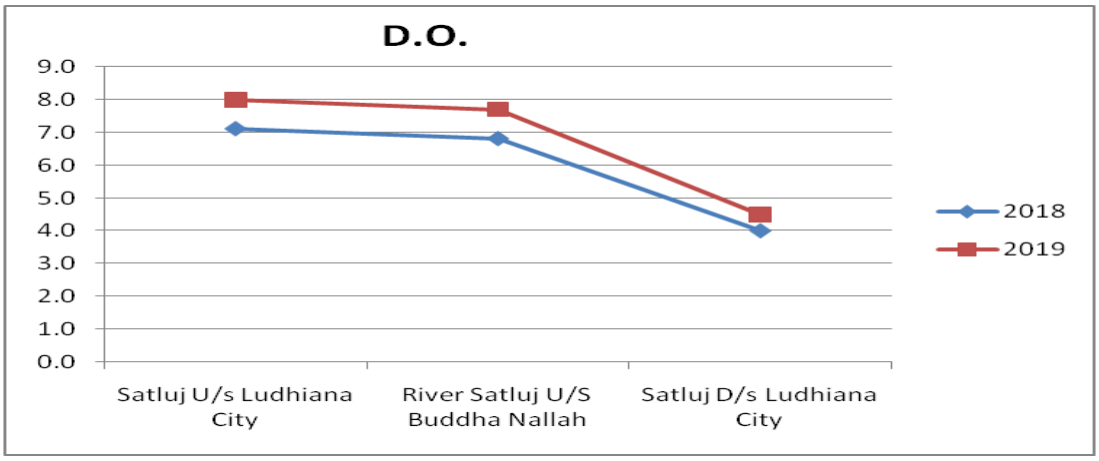
Name of Location	Average 2018	Average 2019
Satluj U/s Ludhiana City	7.9	7.6
River Satluj U/S Budha Nallah	7.6	7.6
Satluj D/s Ludhiana City	7.6	7.4



From above, it is clear that there is a decline in the level of pH and is approaching the neutral value of 7.

3.1.6.3 D.O.

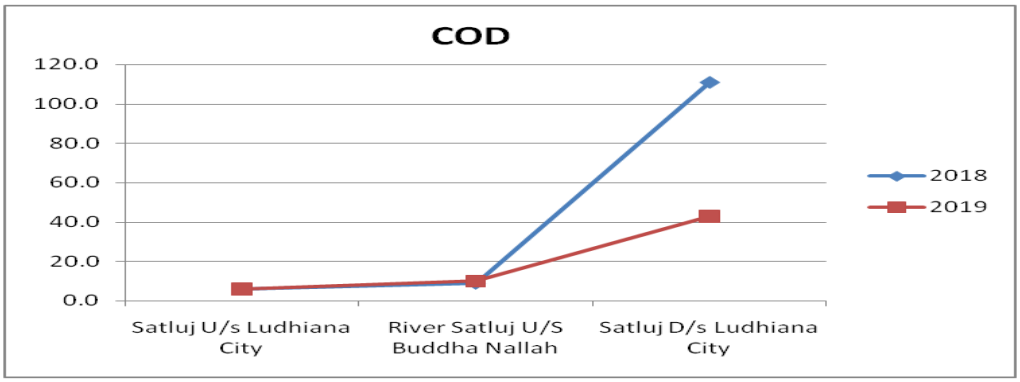
Name of Location	Average 2018 (mg/l)	Average 2019 (mg/l)
Satluj U/s Ludhiana City	7.1	8.0
River Satluj U/S Budha Nallah	6.8	7.7
Satluj D/s Ludhiana City	4.0	4.5



From above, it is clear that there is an increase in the level of D.O.

3.1.6.4 COD

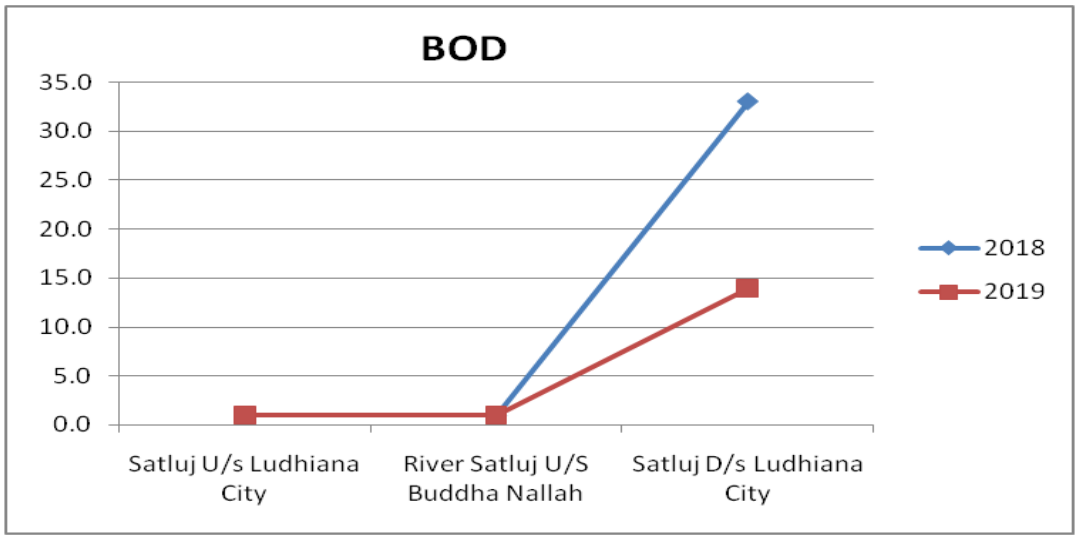
Name of Location	Average 2018 (mg/l)	Average 2019 (mg/l)
Satluj U/s Ludhiana City	6.0	6.0
River Satluj U/S Budha Nallah	9.0	10.0
Satluj D/s Ludhiana City	111.0	43.0



From above, it is clear that there is a decline in the level of COD.

3.1.6.5 BOD

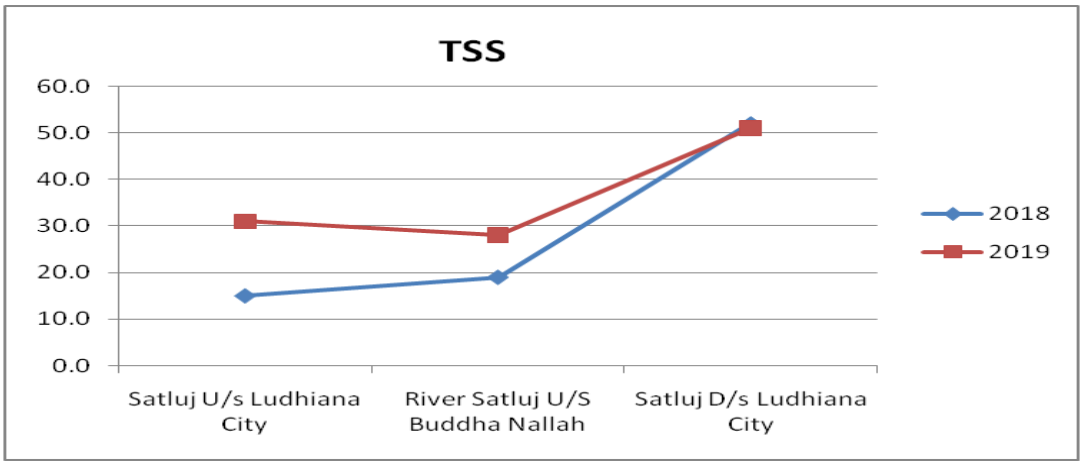
Name of Location	Average 2018 (mg/l)	Average 2019 (mg/l)
Satluj U/s Ludhiana City	1.0	1.0
River Satluj U/S Budha Nallah	1.0	1.0
Satluj D/s Ludhiana City	33.0	14.0



From above, it is clear that there is a decline in the level of BOD.

3.1.6.6 TSS

Name of Location	Average 2018 (mg/l)	Average 2019 (mg/l)
Satluj U/s Ludhiana City	15.0	31.0
River Satluj U/S Budha Nallah	19.0	28.0
Satluj D/s Ludhiana City	52.0	51.0



From above, it is clear that there is no significant change in the level of TSS.

As per the Designated Best Use (DBU), the classification of the water quality of the River Sutlej for the following points is as under:

S. No.	Name of Location	Classification
1	Satluj U/s Ludhiana City	"C"
2	River Satluj U/S Budha Nallah	"C"
3	Satluj D/s Ludhiana City	"D"

It is concluded that the quality of River Sutlej has improved as compare to the last year.

3.2 Air Pollution

3.2.1 Industrial Air Pollution

The main stationary sources of air pollution are the industrial units, which are emitting particulate matter, hydrocarbon, sulphur dioxide, oxides of nitrogen, VOCs and acid mist. As per inventory of the Punjab Pollution Control Board, there are 736air polluting industries in Ludhiana city, which are emitting the aforesaid pollutants, besides, emitting process/ fugitive emissions. Besides above, non-agricultural activities are going on within the MC limits of Ludhiana city but the city is surrounded by agricultural fields, as such, the burning of rice and wheat straw by the farmers is affecting the ambient air quality of the town. Furthermore, due to erratic supply of power, most of the establishment, residential houses and industries have installed D.G set of various capacities to cater to their power needs, which are emitting uncontrolled emissions into the Atmosphere within the city limits. Due to all these sources, the quality of ambient air of the city is being effected. The air polluting industries located in the jurisdiction of Ludhiana city are as under:

Sr. No.	Category	Number of air polluting units
1.	Casting/ Cupola/ Kothali	100
2.	Induction	64
3.	Forging	110
4.	Lead Smelting	4
5.	Rolling Mills	15
6.	Arc Furnace	4
7.	Tyre& Tubes	15
8.	Dyeing / Textile	226
9.	Milk Plant	2
10.	Misc.	196
Total		**736**

All the air polluting industries of the city have installed Air Pollution Control Devices, which are being monitored by the Board regularly.

3.2.2. Other Sources of Air Pollution

3.2.2.1 Mobile sources (Major)

In Ludhiana city, the main mobile sources of air pollution are various motor vehicles i.e. auto rickshaw, buses, mini & large trucks, car and 2 wheelers etc. which are emitting air/vehicle emissions into the atmosphere within the city limits

3.2.2.2 Stationary Point Sources

Due to erratic supply of power, most of the establishment, residential houses and industries have installed D.G. set of various capacities to cater to their power needs, which are emitting uncontrolled emissions into the atmosphere within the city limits.

3.2.2.3 Non-Point Sources

Ludhiana city is surrounded by agricultural fields. As such, the burning of rice and wheat straw by the farmers during the harvesting season, is also affecting the ambient air quality of the town. Also, anaerobic digestion of biomass and garbage stored and frequent fires at the Municipal Solid Waste Dump site is affecting the quality of ambient air quality of the city to a great extent & addition to above the climate conditions of the area also increase the level s of the particulate matter especially during day weather.

3.2.2.4 Noise Pollution

Various sources of noise pollution are as under

1. Road Traffic Noise:

In the city, the main sources of traffic noise are the motors and exhaust system of autos, smaller trucks, buses, and motorcycles. This type of noise can be augmented by narrow streets and tall buildings, which produce a canyon in which traffic noise reverberates.

2. Noise from railroads:

The noise from locomotive engines, horns and whistles, and switching and shunting operation in rail yards can impact neighboring communities and railroad workers. For example, rail car retarders can produce a high frequency, high level screech that can reach peak levels of 120 dB at a distance of 100 feet, which translates to levels as high as 138, or 140 dB at the railroad worker's ear.

3. Construction Noise:

The noise from the construction of highways, city streets, and buildings is a major contributor to the urban scene. Construction noise sources include pneumatic hammers, air compressors, bulldozers, loaders, dump trucks (and their back-up signals), and pavement breakers.

4. Noise in Industry:

Although industrial noise is one of the less prevalent community noise problems, neighbors of noisy manufacturing plants can be disturbed by sources such as fans, motors, and compressors mounted on the outside of buildings Interior noise can also be transmitted to the community through open windows and doors, and even through building walls. These interior noise sources have significant impacts on industrial workers, among whom noise- induced hearing loss is unfortunately.

5. Noise from Consumer products:

Certain household equipment, such as vacuum cleaners and some kitchen appliances have been and continue to be noisemakers, although their contribution to the daily noise dose is usually not very large.

3.2.3 Air Quality of Ludhiana City

The Board is monitoring Ambient Air Quality of Ludhiana city and have installed 4 Monitoring Stations at the following locations:-

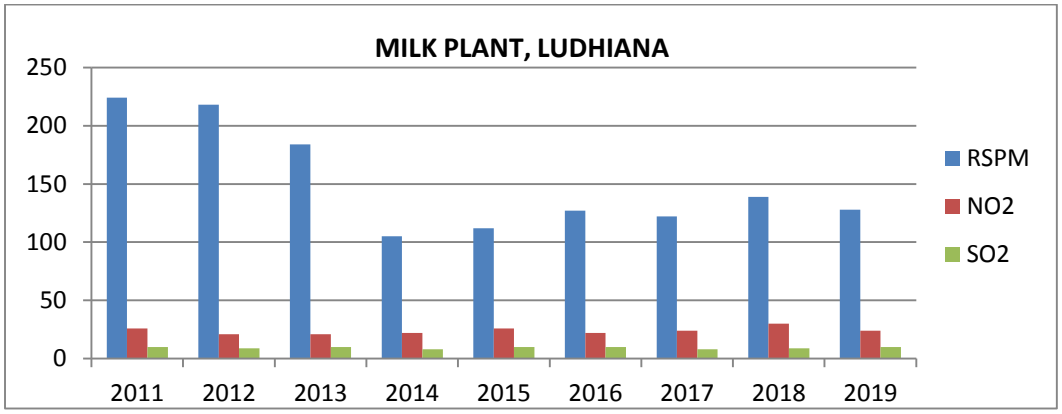
1. Milk Plant, Ferozepur Road, Ludhiana
2. United Cycle Parts Building, Gill Road, Ludhiana (Earlier Punjab Pollution Control Board Office, Gill Road, Ludhiana)
3. Nahar Industrial Enterprises Ltd, Industrial Area – A, Ludhiana (Earlier Rita Sewing Machine, Industrial Area-A, Ludhiana)
4. Vishvakarma Chowk, Ludhiana

These stations have been installed under National Ambient Air Quality Scheme and the data alongwith graphical representation pertaining to each station is as below:-

3.2.3.1 Milk Plant, Ferozepur Road, Ludhiana

Comparative Values of RSPM, SO_2 & NO2 µg/m^3 for the years 2011-2019

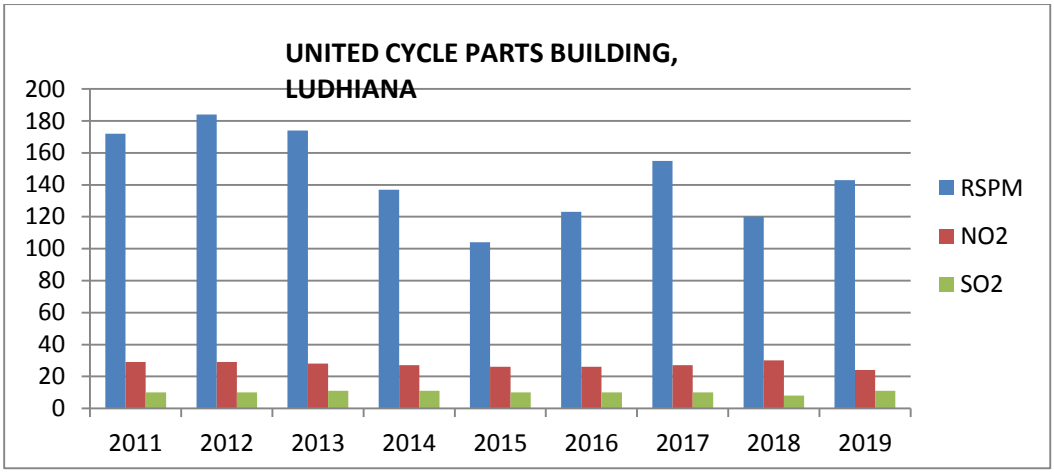
Year	RSPM (µg/m^3)	NO2(µg/m^3)	SO2 (µg/m^3)
2011	224	26	10
2012	218	21	9
2013	184	21	10
2014	105	22	8
2015	112	26	10
2016	127	22	10
2017	122	24	8
2018	139	30	9
2019	128	24	10



From the above, it is evident that air quality of the area has improved w.r.t. RSPM from year 2011 to 2019, while there is no significant change in the levels of NO_2& SO_2.

3.2.3.2 United Cycle Parts Building, Gill Road, Ludhiana (Earlier Punjab Pollution Control Board Office, Gill Road, Ludhiana)

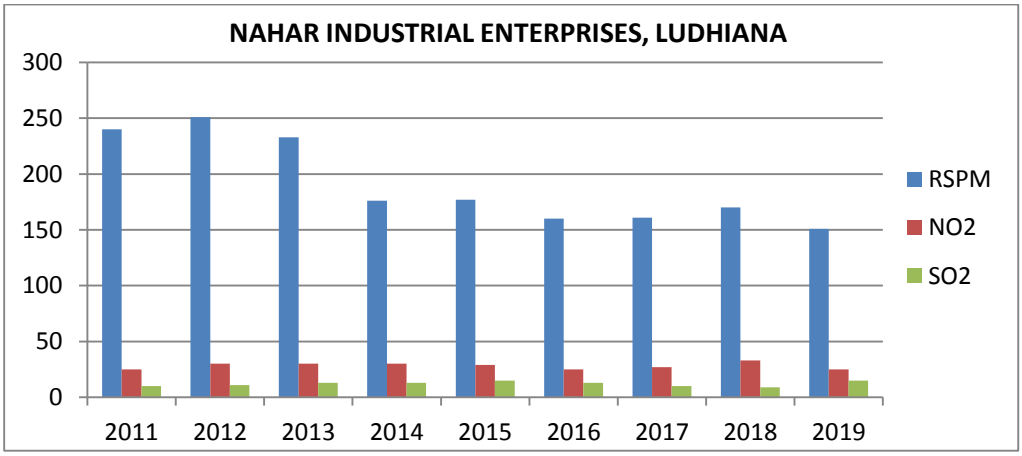
Year	RSPM (µg/m^3)	NO2(µg/m^3)	SO2 (µg/m^3)
2011	172	29	10
2012	184	29	10
2013	174	28	11
2014	137	27	11
2015	104	26	10
2016	123	26	10
2017	155	27	10
2018	120	30	8
2019	143	24	11



From the above, it is evident that air quality of the area has improved w.r.t. RSPM from year 2011 to 2019, while there is no significant change in the levels of NO_2& SO_2.

3.2.3.3 Nahar Industrial Enterprises Ltd, Industrial Area – A, Ludhiana (Earlier Rita Sewing Machine, Industrial Area-A, Ludhiana

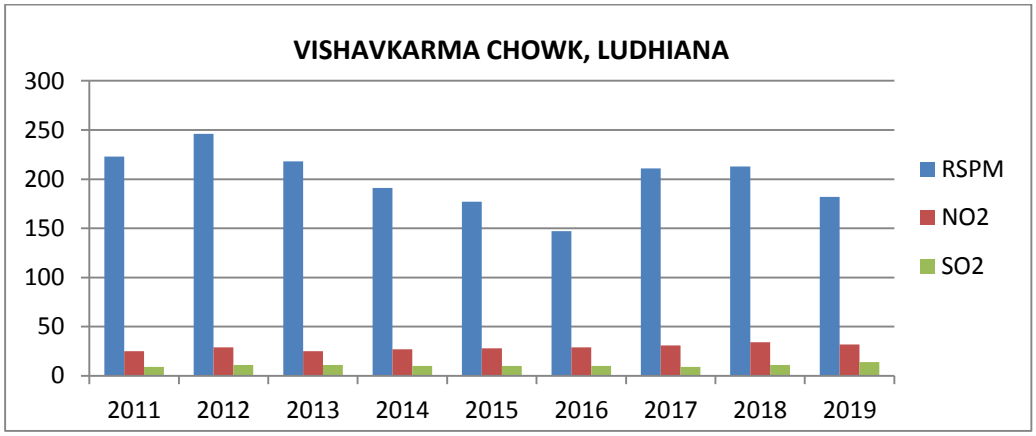
Year	RSPM (µg/m^3)	NO2(µg/m^3)	SO2 (µg/m^3)
2011	240	25	10
2012	251	30	11
2013	233	30	13
2014	176	30	13
2015	177	29	15
2016	160	25	13
2017	161	27	10
2018	170	33	9
2019	151	25	15



From the above, it is evident that air quality of the area has improved w.r.t. RSPM, while there is no significant change in the levels of NO_2& SO_2.

3.2.3.4 Vishwakarma Chowk, Ludhiana

Year	RSPM (µg/m^3)	NO_2(µg/m^3)	SO_2 (µg/m^3)
2011	223	25	9
2012	246	29	11
2013	218	25	11
2014	191	27	10
2015	177	28	10
2016	147	29	10
2017	211	31	9
2018	213	34	11
2019	182	32	14

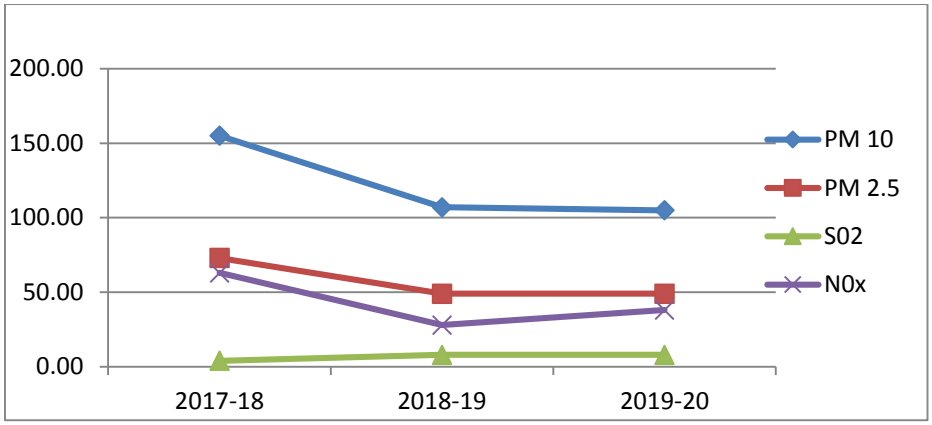


From the above, it is evident that air quality of the area has improved w.r.t. RSPM, while there is a slight increase in the levels of NO_2& SO_2.

The Board has also installed one Continuous Ambient Air Quality Monitoring Station (CAAQMS) at Ludhiana. And its real time data is being displayed at Gate No - 2, PAU, Ferozepur Road, Ludhiana. This real time data is also available on the website of the PPCB & CPCB. Data of the various parameters is as under:

3.2.3.5 Data of CAAQMS, Ludhiana for year 2017-2020

Year	PM 10	PM 2.5	S02	N0x
2017-18	155	73	4	63
2018-19	107	49	8	28
2019-20	105	49	8	38



From the above, it is evident that there is decrease in the level of PM10, PM 2.5 and NOX, while there is an increase in the level of SO_2.

3.3. Sources of Land Pollution

3.3.1 Municipal Solid Waste

About 1150 MTD of Municipal Solid Waste is generated in the jurisdiction of Municipal Corporation, Ludhiana. As per the census of 2011, the population of the city is 16,13,878. Municipal Solid Waste @ 520 gm/day/capita is generated in the city. The Municipal Corporation, Ludhiana has provided a Solid waste treatment facility at Tajpur Road, Ludhiana, where about 600 TPD of municipal solid waste is processed. About 150 TPD of RDF is produced by the Municipal Corporation, Ludhiana. This facility is established in about 19.84 hectares. At site, about 24 lac MT of legacy waste is stored in an unscientific way.

The present status w.r.t compliance of Solid Waste Management Rules, 2016 for Ludhiana city w.e.f. 01.04.2019 to 31.12.2019 is as under:

3.3.1.1 Door to Door Collection and segregation of Solid Waste

Total wards	Wards with d2d collection	Total households	Hh with d2d collection	Hh percent covered
95	95	349642	337395	96.5

3.3.1.2 Source Segregation

Wet waste collected	Dry waste collected	Total waste collected	Total wards	Wards with ss	Total households	Hh with source segregation	Hh percent covered ss
8087.8	12132	20220	95	95	349642	326121	93.27

3.3.1.3 Collection and Transportation Vehicles

Tricycle compartmentized	Tricycle owned by pvt.	e-riksha total	e-riksha with GPS	Tata ACE total	Tata ACE with GPS	Tipper total	Tipper GPS	Tractor trolley total
500	1500	0	0	50	50	29	29	11

3.3.1.4 Waste Processing Facility

total pits constructed	pits with shed	pits without shed	total wet waste feeded in pits	total compost generated	hh with home composting
0	0	0	0	0	170

3.3.1.5 Horticulture waste Management

Parks with horticulture waste	Parks with onsite composting	Parks total pits constructed
922	148	278

3.3.1.6 MRF and Bulk waste generators

MRF sites constructed	BWG above100 kg identified	BWG above100 composting	BWG 50 to 100 kg identified	BWG 50 100 composting
1	31	22	0	0

3.3.1.7 MRF and Bulk waste generators

Total wards	Residential wards	Residential wards with sweeping	Commercial wards	Commercial wards with sweeping	Commercial wards with night sweeping	Public places	Public places with sweeping
95	60	60	35	35	0	18	18

3.3.1.8 MRF and Bulk waste generators

Rag pickers identified	Rag pickers integrated swm	Waste pickers identified	Waste pickers integrated swm	Kabadis identified	Safai sewaks regular	Safai sewaks contract outsourced	Ngo identified
104	104	1360	1360	0	2895	2447	0

3.3.1.9 Legacy waste, Garbage Vulnerable Points

Legacy waste sites identified	Legacy waste sites cleared	Gvp (garbage vulnerable points)identified	Gvp cleared	No. Of points waste entering in water body	No of water body sites with arrangement
2	0	494	210	29	8

3.3.1.10 Awareness Programs

No of complaints received	No of complaints resolved	Awareness activities	Workshops training programs conducted	Workshop participants	No of advertisements news
2425	2375	2022	2	450	99

3.3.1.11 Violations observed

No of violation littering / burning plastic	No of challans issued	Amount collected
8161	2728	182700

3.3.2. Bio-Medical Waste

The Board has identified 400 health care establishments having total bed capacity of 9040 and 447 non-bedded health care establishments in Ludhiana city, which are generating about 3.3 TPD of bio-medical waste of different categories as specified in Schedule-1 appended to the Biomedical Waste (Management & Handling) Rules 2016. The segregation of the bio-medical waste is being done by all these health care establishments at source. Furthermore, the liquid waste being generated by all these health care establishments is being disinfected as per the procedure prescribed in the said rules. Moreover, 15 nos. of health care establishments have additionally installed ETP for treatment of effluent generated from their premises. The bio-medical waste generated is not allowed to mix with the municipal solid waste and it is handled by a common Bio-medical Waste Treatment Facility of bio-medical waste of different categories. The Punjab Pollution Control Board vide its letter no. 4813 dated 11.10.2019 has decided that, as an interim measure, all the Health Care Facilities (Govt. as well as Pvt.) has been given time to install ETP by 30.06.2020.

3.3.3 Hazardous Waste

There are 1291 hazardous waste generating industries in Distt. Ludhiana. The main industries are dyeing, washing, electroplating, induction furnaces, casting units, etc. Presently, these industries are generating total hazardous waste of 19424.96 MTA. Out of which 13508.2 MTA is land fillable, 869.86 MTA incinerable, 3411.904 MTA is recyclable and 1635 MTA is incinerable. All these industries are storing their hazardous waste temporarily in their premises. A common Treatment, Storage & Disposal Facility has been developed by M/s Nimbuan Greenfield (Punjab) Ltd., at Vill. Nimbuan, Tehsil DeraBassi, Distt. Mohali for environmentally sound disposal of the hazardous waste, which came in operation in the month of October 2007 and its life span is about 15-years. The Common TSDF is collecting, transporting, treating &disposing hazardous

waste after lifting from industrial premises of various industries to be disposed at village Nimbuan.

3.3.4 Plastic Waste Management.

The current compliance status of Plastic Waste Management Rules, 2016 w.e.f 01.04.2019 to 31.12.2019 is as under:

Setting up of Material Recovery Facilities

Name of ULB	No. of MRFs required	No. of MRF constructed	No. of MRF operational	No. of MRF under construction
Ludhiana	39	1	1	5

Monitoring of MRFs for segregation and channelization of plastic waste

Name of ULB	Segregation of Plastic Waste into Recyclable & Non-Recyclable Plastic Waste started(Yes/No)	Whether segregated recyclable plastic waste disposed to authorized recycler (Yes/No)	Whether non-recyclable plastic waste used in road construction / cement kiln / RDF (Yes/No)
Ludhiana	No	No	No

Monitoring of littering/open burning of plastic waste:

Sr. No	Name of ULB	No. of violations regarding littering/open burning of plastic waste observed	Action taken against violators	
			No. of challans issued	Amount of fine collected in Rs
1.	Ludhiana	389	389	47200

Monitoring of the ban on plastic carry bags in the State:

14. Plastic Carry Bags Violations			
Plastic bag violations observed	Qty of plastic bags confiscated	No of plastic carry bag challans issued	Plastic fine amount (Rs.)
5920	5551	2684	Rs. 7,07,000/-

Monitoring of Registration under Plastic Waste Management Rules,2016:

Category	No. of units identified	No. of units obtained registration	Remaining no. of units yet to obtain registration	Action taken against the violator
Producer	3	1	2	Notices issued
Brand Owner	0	0	0	
Recycler	8	0	8	
Manufacturer	29	2	27	

3.3.5 E-Waste

The e-waste is generally generated from dismantling activities of various electrical / electronics appliances / gadgets such as audiovisual components, televisions, VCRs, stereo equipment, mobile phones and computer components. For proper disposal of E-waste, the Ministry of Environment & Forest has separately notified E-Waste (Management) Rules, 2016.

3.3.6 Construction & Demolition Waste.

The status of current compliance Construction & Demolition Waste Rules, 2016 w.e.f 01.04.2019 to 31.12.2019 is as under:

Construction and Demolition Waste Facility

CnD waste sites identified	CnD waste sites notified	Qty of cnd waste collected	No of cnd recycling units	Total cnd waste processed
6	6	1196.4	1	0

C & D waste violations monitoring

No of C&D waste violations observed	No of C&D waste challans issued	C&D waste fine amount	C&D waste bwg identified	C&D bwg action plan approved	Bwg managing C&D waste	Bwg C&D violations identified	Bwg C&D action taken
3537	596	17500	0	0	0	0	0

Chapter 4 : Pollution Control Action Plan for CPA- Ludhiana City

4.1 Water Pollution Control Action Plan for CPA- Ludhiana City

A) Comprehensive plan for Rejuvenation of Budha Nallah

The Municipal Corporation, Ludhiana has prepared Comprehensive plan for Rejuvenation of Budha Nallah. The tentative cost of the project is Rs. 650 Crores and almost new capacity of 300 MLD is to be built alongwith rehabilitation of 466 MLD of STPs. The project envisages the interception of various drains and their diversion to STPs in an economical manner. It includes segregation of industrial and domestic effluents and a complex challenge to treat dairy effluent from 2 big dairy complexes of Ludhiana i.e. Haibowal Dairy Complex and Tajpur Dairy Complex. The bids for the project are proposed to be invited on Engineering procurement and construction mode with 10 years operation and maintenance. The brief break up of the total cost to be spent on the commissioning of new STPs and augmentation/enhancement of existing STPs is as below:-

Sr. No.	Description	Capital Cost (In Rs. Crores)
1.	Jamalpur STP	366 Cr.
2.	Bhattian STP	74 Cr.
3.	Balloke STP	150 Cr.
4.	Construction of 2 CETPs for Dairy Waste	38 Cr.
5.	Provisional Sum for enhancement of electric load and other allied works like Hot line and DG sets, site development, tree plantation and shifting of utility services	22 Cr.
	Total	**650 Cr.**

The Broad PERT chart for execution of various components of the project has already been submitted to the NGT by MCL. As per the past experience, the commissioning of STPs of such magnitude generally takes around 30 months. Accordingly, the execution period for the project has been kept as 30 months after award of tender in which design period shall be 3 months.

Timelines for setting up of new STPs

Sr. No.	Name of STP/ETP	Cap. (MLD)	Tech.	Status of Funds	Preparation of DPR	Current Status i.e. Date of completion or likely date of completion			
						Tendering	Commencement of work	Completion & Commissioning as per Action Plan for Clean River Satluj	Completion & Commissioning
1	2	3	4	5	6	7	8	9	10
1	Jamalpur	225 MLD (Including 48 MLD rehabilitation)	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.03.2021	31.10.2022
2	Balloke	50 MLD(new)	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.03.2021	30.04.2022
3	Balloke	152 MLD rehabilitation	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.03.2021	31.07.2021
4	Bhattian	111 MLD rehabilitation	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.03.2021	31.10.2021
5	Haibowal Diary Complex	10 MLD	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.12.2020	30.04.2022
6	Tajpur Road dairy complex	5 MLD	Open	Tied Up	Feasibility report prepared and submitted to PMIDC.	Tender Floated	30.06.2020	31.12.2020	30.04.2022

B) Timelines for setting up of CETPs for dyeing cluster of Ludhiana

1) Name of the Project: 15 MLD CETP Bahadurke Road Cluster, Ludhiana.			
Brief Scope of Work		Scope : 1 No. CETP of 15 MLD	
Sr. No	Stage	Start Date	Completion Date
1	Preparation of DPR	Already Prepared	Approved
2	Financial Closure	Already done.	
3	Tendering of the work including allotment	Already done.	
4	Commencement of Work	Already done.	
5	Quarterly milestones during the construction stage	Completed and under stabilization	
6	Completion and Commissioning	Completed and under stabilization	

2) **Name of the Project: 40 MLD CETP Focal Point Cluster, Ludhiana.**			
Brief Scope of Work		**Scope : 1 No. CETP of 40 MLD**	
Sr.No	**Stage**	**Start Date**	**Completion Date**
1	Preparation of DPR	Already Prepared	Approved
2	Financial Closure	Already done.	
3	Tendering of the work including allotment	Already done.	
4	Commencement of work	Already done.	
5	Quarterly milestones during the construction stage	95 % civil work completed, overall 76% completed.	
6	Completion and Commissioning	T + 6 months (T= Date of release of balance Central and State Share)	

3) Name of the Project: 50 MLD CETP Tajpur-Rahon Road Cluster, Ludhiana.			
Brief Scope of Work		**Scope : 1 No. CETP of 50 MLD**	
Sr.No	**Stage**	**Start Date**	**Completion Date**
1	Preparation of DPR	Already Prepared	Approved
2	Financial Closure	Already done.	
3	Tendering of the work including allotment	Already done.	
4	Commencement of Work	Already done.	
5	Quarterly milestones during the construction stage	80 % civil work completed, overall 50% completed.	
6	Completion and Commissioning	T + 6 months (T= Date of release of balance Central and State Share)	

C) Timelines for ETP for Dairy Complex, Ludhiana

(i) Name of the Project: Treatment of Effluent generated from dairy complex located at Tajpur and Haibowal, Ludhiana			
Brief Scope of Work		**Scope: 2 No. ETPs of 05MLD capacity and10 MLD Capacity**	
1	Preparation of DPR	Prepared	Approved
2	Financial Closure	Funds of Rs. 43.30 crores approved by SLTC	
3	Tendering of the work including allotment	DNIT under preparation	
4	Commencement Of Work	-	-
5	Quarterly Milestones during the construction Stage	-	-
6	Completion and Commissioning	-	31.12.2020

D) Timelines for modernization of slaughter house

(i) Name of the Project: Modernization of existing slaughter house located at Ludhiana			
1	Preparation of DPR	Prepared	Already approved
2	Financial Closure	Funds of Rs. 17.65 allotted to the third party.	
3	Tendering of the work including allotment	Started.	07.09.2018
4	Commencement of Work	08.09.2018	Ongoing
5	Quarterly Milestones during the construction stage	40% work completed as on 15.01.2019	100% civil work completed as on 30.06.2019. 100% commissioning completed as on 30.09.2019.
6	Completion and Commissioning	-	Already completed

E) PROJECT FOR RELEASING 200 CUSECS WATER IN BUDHA NAALAH THROUGH NEELON DRAIN FROM SIRHIND CANAL RD :-

This project which amounts to Rs. 575.31 lacs aims at rejuvenating Budha Nallah into old BudhaDariya by releasing fresh water to Budha Nallahfor cleaning the water flowing through it. The fresh water will be supplied from Sirhind Canal RD 145700 in Neelon Drain which falls in Budha Nallahat village Kum Kalan. The fresh water discharged in Budha Nallah will help in increasing the flow of water thereby improving the water quality and reducing the pungent smell. It will provide a relief to people living in Ludhiana city. The funding of this project is to be done by Municipal Corporation, Ludhiana and Punjab Pollution Control Board on 50- 50 basis. DPR for this project is under preparation. Completion of this project at the earliest will certainly help in improving Water Quality in Budha Nallah which ultimately leads to River Sutlej.

4.2 Action Plan for Clean Air for CPA- Ludhiana City

A source apportionment study of Air Pollution for the Critically Polluted Area of Ludhiana City has been carried out by PSCST and a draft study report has been submitted. This study carried out baseline source apportionment of $PM_{2.5}$and PM_{10}concentrations in Ludhiana city using two modeling-based approaches. The first approach relied upon monitoring and chemical characterization of $PM_{10}$and $PM2_{.5}$ samples. These samples of PM_{10} and $PM_{2.5}$ along with source profiles of possible contributing sources acted as inputs to the receptor model to derive source apportionment. In parallel, sectoral emissions inventory of different pollutants and meteorological inputs are fed into a chemical transport dispersion model to predict PM10 and

PM2.5 concentrations. The simulated concentrations were compared with actual observations for validation. The model once validated has been used to carry out source sensitivity to derive source contributions in PM10 andPM2.5 concentrations at various locations within and outside the Ludhiana city. The key conclusions that may be derived from the study are as follows:

Air pollution levels violate the prescribed standards in Ludhiana city. The levels were highest during winters and post-monsoon seasons. While in winters, the adverse meteorological conditions lead to accumulation of pollutants, high concentrations during post monsoon season may be attributed to agricultural residue burning which acts as an additional stressor over the already existing year-round sources of pollution such as industries, transport etc.

The two techniques used for assessment reveal that industries, transport, and biomass burning, are the major contributors to PM2.5 concentrations in Ludhiana. Industrial and biomass burning contributions are not only from within the city but also from outside the city-limits. There is a significant share of dust from local as well as far-off sources.

The assessment for PM shows that other than transport, biomass burning, and industries, road dust also contributes significantly to PM10 concentrations. There is also a significant share of dust from far-off sources.

The study also projected the future in a BAU scenario based on prevailing sectorial growth rates and current plans and policies. The scenario shows a decline in share of transport sector contributions due to penetration of BS-VI vehicles from 2020 onwards, while the industrial shares are expected to increase with growth in industrial productions. With greater number of vehicles, road dust re-suspension is expected to increase further. Enhanced LPG penetration is expected to reduce the share of the domestic sector in PM concentrations. Despite, reductions due to these measures, air quality simulations for BAU scenario show that the average modelled concentrations of PM2.5 (3-season avg.) will increase slightly from 103 mg/m^3 to 106 mg/m3 in 2025 and 116 mg/m3 in 2030. Similarly, the average modelled concentrations of PM10 (3-season avg.) will increase slightly from 137 mg/m3 to 151 mg/m3 in 2025 and 171 mg/m3 in 2030. This also emphasize on the fact that more stringent interventions will be required for further control of air quality in Ludhiana.

For this purpose, the study analyzed various interventions and estimated their possible impacts over PM2.5 and PM10 concentrations in Ludhiana city. An alternative scenario has been developed considering the interventions which can provide maximum air quality benefits. The alternative scenario results in a reduction of 73% in PM2.5 and 77% in PM10 in 2030, with respect to the BAU scenario, and achieves ambient air quality standards for PM10 and PM2.5.

The interventions have identified those that have the highest impact on PM concentrations in 2030.

Based on the assessment of PM sources and their future growth potentials, the broad interventions which can be identified for PM pollution control should be focused on industries, transport, road dust and biomass burning sectors. These recommendations are classified into short term, medium, and long term as follows:

Short term measures

- Vacuum cleaning of roads for control of road dust.
- Enforcement of full ban on refuse burning.
- Introduction of congestion pricing scheme in specific congested zones in Ludhiana city and use its revenues for enforcement of public transport system.
- Pollution tax on pre BS IV commercial vehicles for entering the city of Ludhiana.
- Introduction of odd-even schemes for 1 to 2 weeks during high air pollution episodes for both cars and two-wheelers.
- Ensuring 24 × 7 power supply to completely arrest the use of DG Sets.
- (The study has estimated that these short-term measures can reduce the PM2.5 and PM10 concentrations by 15% and *23% respectively)*

Medium and Long term measures

- Introduction of gaseous fuels and enforcement of new and stringent SO2/NOx/PM2.5 standards for industries using solid fuels
- Complete phase out of biomass use by enhanced LPG penetration in rural households
- Complete ban on agricultural residues burning and accelerating their use in power plants and other industries to replace high ash coal.
- Strict implementation of BS-VI norms and introduction of gaseous fuels in the transport sector.
- Improvement and strengthening of inspection and maintenance (PUC) systems of vehicles.
- Designing and introduction of fleet modernization and retro-fitment programs.
- Introducing policies for higher penetration of electric and hybrid vehicles and creation of infrastructure for charging. To start with, new public vehicles may be bought on electric modes.
- Congestion taxation and management at specific congested locations.
- Monitoring of road dust and its control using wall to wall paving and vacuum cleaning.

In light of the recommendations of Source Apportionment Study, the various activities to be under-taken with time lines have been tabulated in Annexure-**4A to 4G**.

4.3 Solid Waste Management Action Plan for CPA-Ludhiana City

4.3.1 Action Plan for regular monitoring of the progress of solid waste management: -

i) Source Segregation of Waste

Municipal Corporation, Ludhiana to ensure source segregation of waste into biodegradable, non-biodegradable, domestic hazardous. This is the most essential part of the action plan and needs behavioural changes and provision of necessary infrastructure.

ii) Door to Door Collection

Municipal Corporation, Ludhiana to ensure 100% Door to Door Collection of Segregated Solid Waste.

iii) Tracking of Collection and Transportation Vehicles

Municipal Corporation, Ludhiana to ensure GPS Monitoring in case of mechanized collection and transportation vehicles.

iv) Sweeping of Public Areas

Municipal Corporation, Ludhiana to ensure sweeping of public areas such as Residential, Public and Commercial areas.

v) Demarcation of Space for Waste Processing

Municipal Corporation, Ludhiana to ensure Demarcation of separate space for segregation, storage, decentralized waste processing for establishment of systems for home/ decentralized and centralized composting of Wet Waste and setting up of MRF Facility for Dry Waste.

vi) Compliance by Bulk Waste Generators

Identification and compliance by Bulk Waste Generators through decentralized waste processing.

vii) Green/Horticulture Waste Management

Municipal Corporation, Ludhiana will ensure onsite green waste management for parks, gardens, green belts, institutions, organizations

viii) Inclusion of Rag Pickers/ Waste Collectors & Kabadis/ Safai Sewaks

Municipal Corporation, Ludhiana will ensure inclusion of rag pickers, waste collectors & Kabadis and Safai Sewaks into solid waste management system. Efforts to be made to make their SHG and provide them other benefits such as health check-up, etc

ix) Treatment of Legacy Waste

Municipal Corporation, Ludhiana to ensure Setting up of systems for treatment of legacy waste and clean drives to remove waste from the roadsides, vacant plots, parks and public places, water bodies etc.

x) Citizen Grievance Redressal through Swachh App

Setting up of Citizen Grievance Redressal system set up along with the Name, mobile No. Email Id of Nodal Officer.

xi) Mechanism for stopping entry of solid waste intro water bodies/ drains/ rivers etc.

xii) Awareness mechanism for behaviour change.

xiii) Monitoring of the processing sites of solid waste.

4.3.2. Action Plan for regular management of Dairy Waste (Animal Dung): -

(I) Installation of Bio-Gas Plant for Tajpur Road Dairy Complex:-

Around 275 dairies are running in Tajpur Road Dairy Complex. As per Action Plan for Clean River Sutlej, around 2.5 Acres of land has been allotted to PEDA by GLADA at Tajpur Dairy Complex, Ludhiana for setting up of 12000 cubic meter raw biogas per day Bio-CNG project based on cattle dung and other agro-waste. The project will be capable to handle about 300 metric ton of cattle dung per day. The purpose of the project is to avoid animal excreta from Tajpur Dairy Complex falling into Budha Nallah for which National Green Tribunal (NGT) is pressing hard for scientific disposal of the animal waste. PEDA/ Punjab Genco Limited (PGL) being the Nodal Agency for such projects has been entrusted this responsibility for setting up of this project. The project is being implemented by PEDA / PGL with its own investment as approved by the Government. The project is scheduled for commissioning within 30-months from this date i.e. by July 2022 which includes 6-months pre-construction activities and 24 months' execution time as reported to the NGT. The process of selection of technology and preconstruction activities are in progress. Early Set up and commissioning of the Project will significantly lead to decrease in Pollution Load in Budha Nallah.

(II) Efficient Working and augmentation/upgradation of Haibowal Dairy Complex Bio-Gas plant :-

Around 700 dairies are running in Haibowal Dairy. Presently, The Punjab Energy Development Association has installed one Bio-Gas Plant at Haibowal for handling cow/buffalo dung of the dairy complex of said area. The CO2 generated in the anaerobic digester alongwith bio gas is separated in the scrubber and is further compressed in the bottling plant for its further industrial use. Around 100-125 tonnes cattle dung is being fed only daily basis. Efficient Working of this plant and its augmentation and upgradation as per latest technology will significantly lead to decrease in Pollution Load in Budha Nallah.

4.4 Plastic Waste Management Action Plan for CPA- Ludhiana City

(i) Setting up of Material Recovery Facilities

Adequate number of Material Recovery Facilities (MRFs) shall be established by Municipal Corporation, Ludhiana for sorting of the waste.

(ii) Monitoring of MRFs for segregation and channelization of plastic waste

Collection and utilization of the segregated fraction of the recyclable as well as non-recyclable component shall be reported by Municipal Corporation, Ludhiana on monthly basis.

(iii) Monitoring of the awareness programmes to discourage use of single use plastic etc.

The awareness programs which shall be conducted by Municipal Corporation, Ludhiana through interpersonal communication and print media on monthly basis.

(iv) Monitoring of littering/open burning of plastic waste

The violators carrying out the open burning and littering of the plastic waste shall be challaned by Municipal Corporation, Ludhiana and the same will be reported by Department of Local Govt. on monthly basis.

(v) Monitoring of Registration under Plastic Waste Management Rules,2016

Progress regarding the registration granted under the PWM rules to the producer's/ brand owners/recycler/manufacturer shall be reported by PPCB on quarterly basis.

(vi) Monitoring of random inspection of Recyclers, Producers, Importers, Manufacturers and Brand-Owners

Progress regarding inspections conducted and action taken report will be taken by PPCB on six monthly basis.

(vii) Monitoring of Annual Return to be filed by ULBs.

Annual reports are required to be submitted before 30th June of every year by each ULB. The progress regarding the submission of the same shall be reported by Department of Local Govt. on yearly basis.

(viii) Monitoring of Extended Producer Responsibility

Progressregardingtheobtainingofregistrationandsubmissionofactionplanby Brand-Owner/Producer/ Importer shall be reported by PPCB on every six monthly basis.

(ix) Monitoring of the ban on plastic carry bags in the State

Progress regarding the no of violators engaged in manufacturing and usage of plastic carry bags in each ULB & district and no of challans issued shall be reported by Department of Local Govt. and PPCB on quarterly basis.

4.5 Bio-Medical Waste Management Action Plan for CPA- Ludhiana City

Punjab Pollution Control Board (PPCB) has devised a detailed plan for managing bio-medical waste. About 3.3 tons per day of bio-medical waste is generated in Ludhiana city, which is collected, transported, treated and disposed through Common Bio-Medical Waste Treatment Facilities (CBWTF) located at Ludhiana.

4.5.1 Following measures will be undertaken to meet the challenges of pollution due to bio-medical waste:

(i) Creating awareness about the adverse impacts of bio-medical waste

(ii) Identifying and covering the unidentified HCFs under the Rules

(iii) Setting up additional CBWTFs for treating the bio-medical waste as per requirement

(iv) Ensuring effective operations of the CBWTFs

(v) Installation of effluent treatment plants by all the HCFs

4.5.2 Setting up of effluent treatment plants by all the HCFs

The liquid waste being generated by all the health care establishments is being disinfected as per the procedure prescribed in the said rules. Moreover,15 nos. of health care establishments have additionally installed ETP for treatment of effluent generated from their premises. The bio-medical waste generated is not allowed to mix with the municipal solid waste and it is handled by a common Bio-medical Waste Treatment Facility of bio-medical waste of different categories. The Punjab Pollution Control Board vide its letter no. 4813 dated 11.10.2019 has decided that, as an interim measure, all the Health Care Facilities (Govt. as well as Pvt.) has been given time to install ETP by 30.06.2020.

4.5.3 Monitoring of the installation of the ETPs by Govt. HCFs

On the basis of timeline given by Department of Health regarding installation of ETP/STP in Govt. HCFs, progress will be reported by Department of Health on quarterly basis for monitoring.

4.5.4 Monitoring of HCFs and CBWTF

The regular monitoring of the HCFs/CBWTF will be carried out by the Punjab Pollution Control Board on regular basis so as to ensure the compliance of the Biomedical Rules, 2016.

4.5.5 Ensuring effective operations of the CBWTFs

For ensuring effective operations of the CBWTF, PPCB has already taken many steps in this regard. All the collection vehicles of the CBWTF are installed with Bar-code Based Software system and GPS system to track the collection of bio-medical waste and to track the movement of the vehicles. The stack of the Incinerator is equipped with Online Continuous Emission Monitoring System (OCEMS) to monitor the concentration of pollutants in the emissions online. Further, CCTV cameras have been installed in the processing areas of the CBWTF which are connected with PPCB.

4.6 Construction& Demolition Waste Management Action Plan for CPA- Ludhiana City

i) Identification & Notification of Sites for Construction and Demolition Waste

The Municipal Corporation, Ludhiana shall identify the suitable sites for setting up of storage, processing and recycling sites for C & D waste and shall notify the same.

ii) Monitoring of awareness

The Municipal Corporation, Ludhiana shall create public awareness through information, education and communication campaign and educate the waste generators for management of C&D waste.

iii) Monitoring of Collection, Segregation and channelization of C&D Waste on monthly basis

The Municipal Corporation, Ludhiana shall make arrangements for collection, segregation and channelization of C&D Waste either through their own resources or by appointing private operators.

iv) Monitoring of processing/ recycling of C&D waste

The Municipal Corporation, Ludhiana shall set up processing/recycling facilities for proper management of C&D waste within its jurisdiction.

v) Monitoring of Penalties by Municipal Corporation, Ludhiana

The Municipal Corporation, Ludhiana shall impose penalties on the violators of the C&D waste Rules and shall submit the details of levying of penalties along with amount of fine recovered.

vi) Issuance of directions for proper management of C&D waste

The Municipal Corporation, Ludhiana shall issue detailed directions with regard to proper management of C&D waste within its jurisdiction in accordance with the provisions of the Rules.

vii) Sanctioning of waste management plans of generators.

The Municipal Corporation, Ludhiana shall examine and sanction the waste management plan of the generators within a period of one month or from the date of approval of the building plan whichever is earlier from the date of its submission.

viii) Monitoring of the Processing Sites by PPCB

Monitoring of the Storage/Processing sites set up by the Municipal Corporation, Ludhiana shall be done by PPCB through its Regional Offices on quarterly basis.

4.7 Hazardous Waste Management Action Plan for CPA- Ludhiana City

There are 1291 hazardous waste generating industries in Distt. Ludhiana. The main industries are dyeing, washing, electroplating, induction furnaces, casting units, etc. Presently, these industries are generating total hazardous waste of 19424.96 MTA. Out of which 13508.2 MTA is land fillable, 869.86 MTA incinerable, 3411.904 MTA is recyclable and 1635 MTA is incinerable. All these industries are storing their hazardous waste temporarily in their premises. A common Treatment, Storage & Disposal Facility has been developed by M/s Nimbuan Greenfield (Punjab) Ltd., at Vill. Nimbuan, Tehsil DeraBassi, Distt. Mohali for environmentally sound disposal of the hazardous waste, which came in operation in the month of October 2007 and its life span is about 15-years. The Common TSDF is collecting, transporting, treating & disposing hazardous waste after lifting from industrial premises of various industries to be disposed at village Nimbuan.

The Compliance of the HWM Rules, will be Checked by the PPCB by monitoring the following quarters:

i. Monitoring of Identification of hazardous waste generating units (monthly basis)
ii. Monitoring of Hazardous Waste generating units (monthly basis)
iii. Monitoring of Common Hazardous Waste Treatment, Storage & Disposal Facility (quarterly basis).
iv. Monitoring of Installation of Incinerator at Common TSDF (quarterly basis).
v. Monitoring of quantum of hazardous waste generated by occupier (quarterly basis).

vi. Monitoring of interstate movement of hazardous waste for recycling/ reutilization / disposal (quarterly basis).

vii. Monitoring of quantum of hazardous wastes recycled and utilized (quarterly basis).

viii. Monitoring of quantum of hazardous waste disposed of (quarterly basis).

ix. Monitoring of submission of annual return.

4.8 E- Waste Management Action Plan for CPA- Ludhiana City

E-waste is generally generated from dismantling activities of various electrical / electronics appliances / gadgets such as audiovisual components, televisions, VCRs, stereo equipment, mobile phones and computer components. For proper disposal of E-waste, the Ministry of Environment & Forest has separately notified E-Waste (Management) Rules, 2016. There is a E-waste recycling unit in Ludhiana namely M/s Spreco Recycling, D-45, Industrial Focal Point, Ludhiana.

The Compliance of the E-Waste Rules, will be Checked by the PPCB by monitoring the following quarters:

i) Monitoring of Identification / inventorisation of bulk consumers and quantification of Ewaste (monthly basis)

ii) Monitoring of compliance of Extended Producer Responsibility (quarterly basis)

iii) Monitoring of Grant of Authorization to Manufacturers, Dismantlers, Recyclers and Refurbishers and its online updation (monthly basis)

iv) Monitoring of random inspection of Dismantler, Recycler, Refurbisher (half yearly basis)

v) Monitoring of Annual Return to be filed by Bulk Consumers, Manufacturer, Refurbisher, Recycler, Dismantler (yearly basis)

vi) Monitoring of Segregation and channelization of E-waste from the MSW by the Deptt. of Local Bodies (quarterly basis)

vii) Monitoring of allocation of industrial space for industrial sheds / plots by the Deptt. of Industries/ other development agencies (quarterly basis).

4.9 Action Plan for surveillance and monitoring of Polluting Units – Ludhiana City.

Punjab Pollution Control Board will visit the industries located in the Polluted Industrial Area of Ludhiana & its impact Area (within radius of 5 km) as per protocol regarding frequency of visit to the industries to carry out inspection & monitoring of APCD/ Effluent Treatment Plants and maintain proper record of all these visits. PPCB will submit report as per the proforma attached in **Annexure-4H.**

Chapter 5 : Expected impact on the Comprehensive Environment Pollution Index

The present action plan for abatement of pollution in the critically polluted area of Ludhiana City has been prepared keeping in view the present environmental quality based on the Comprehensive Environment Pollution Index (CEPI). The CEPI Score for Ludhiana City for the year 2018 as calculated by CPCB has been observed to be 73.48, which is cumulative Score of the environment pollution index calculated for the Air (53.50), Water (71.00) and Ground Water (16.00), separately. The calculation of CEPI score are annexed are **Annexure 5**. While calculating the score for Comprehensive Environment Pollution Index for Air Environment Quality for Ludhiana, pollutants like PM_{10}, $PM_{2.5}$ and CO have been taken as the critical pollutants. These critical pollutants belong to Group-B of pollutants, which are known organics/pollutants/chemicals that are probable carcinogens (USEPA class 2 & 3) or with some systemic toxicity. The Exceedance Factor in regard to PM10, PM2.5 and CO has been observed to be 1.36, 0.85 and 0.59 respectively. The whole of the population residing in Ludhiana City has been observed to be potentially affected and the level of exposure has been observed to be critical. The additional high risk element has been assigned to the lack of common action plan for control of the pollutants. The presence of these critical pollutants is basically related with the pollution caused mainly due to the vehicular traffic, road dust& to some extent to the industries.

The Comprehensive Environment Pollution Index calculation for Water Environment Quality has considered BOD, TP and TNH_4-N as the critical pollutants. These critical pollutants belong to Group-A & B of the pollutants. The Exceedance Factor with regard to BOD, TP and TNH_4-N has been observed to be 2.19, 9.34 and 3.76 respectively. The presence of these critical pollutants is basically related with the pollution caused mainly due to discharge of un-treated domestic effluent and inefficient operation of STPs.

While calculating the score for Comprehensive Environment Pollution Index for Ground Water Quality for Ludhiana, pollutants like TDS, Total Hardness and Fe have been taken as the critical pollutants. The Exceedance Factor with regard to TDS, Total Hardness and Fe has been observed to be 0.21, 0.45 and 0.22 respectively. These critical pollutants belong to Group-A & C of the pollutants.

On perusal of the above discussion, it has been observed that the air, water and land environment of the Ludhiana City has been impacted mainly due to improper treatment of domestic sewage, lack of common effluent treatment plant for dyeing units, lack of facility for management of liquid and solid waste of dairy complexes, industrial emissions, lack of engineered common municipal solid waste disposal site and improper traffic management. The Action Plan has been prepared keeping in view

all the above factors impacting the environment. The Action Plan includes installation of new sewage treatment plants and capacity enhancement of the existing sewage treatment plants for the domestic effluent, installation of the common effluent treatment facilities for dyeing industries, development of engineered common municipal solid waste treatment and disposal site, improvement/ up-gradation in the pollution control devices installed by the various industries and management of the vehicular traffic. With the implementation of the Action Plan, majority of the pollutants including PM_{10}, $PM_{2.5}$, BOD, TP, TNH_4-Nwill reduce significantly, resulting in the overall improvement of the environment in the area.

ACKNOWLEDGEMENT

The action plan for the Critically polluted Area of Ludhiana has been prepared by obtaining requisite data/information and valuable inputs from the various departments as listed below :-

(a). Zonal Offices and Regional Offices of PPCB

(b). Municipal Corporation, Ludhiana

(c). Irrigation Deptt. (Drainage Division).

(d). Punjab State Council for Science and Technology(PSCST)

(e). Punjab Energy Development Agency (PEDA)

(f). Punjab Water Supply and Sewerage Board (PWSSB)

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Annexure-3-A – Analysis results of ground water sample – April 2017

Sr. no.	Point of Collection	pH	Cond (µs/cm)	TDS (mg/l)	TFS(mg/l)	T.H(mg/l)	Ca (mg/l)	Mg(mg/l)	F (mg/l)	NO3 as N (mg/l)	Cl (mg/l)	SO4 (mg/l)	PO4 (mg/l)	T.Alk(mg/l)	Na(mg/l)	K(mg/l)	SAR	%NA	B (mg/l)	Fe (mg/l)	Zn (mg/l)
1	Bawa Oil Company (H.P Petrol Pump), G.T Road, Sherpur, Ludhiana	7.1	1164	715	572	278	50.4	37.1	0.5	4.4	70	84	BDL	343	140	44.1	3.6	47.6	**5.5**	0.23	0.36
2	Bhagwan Singh , Dashmesh Nagar, Ludhiana	7.8	770	510	464	269	60.8	28.5	1.3	2.37	38	28	BDL	242	30	4.5	0.8	19.1	0.11	0.11	BDL
3	Haibowal, Dairy Complex, Near Jagga de dairy, Ludhiana	7.8	753	490	439	310	60.8	38.4	0.7	1.29	32	26	BDL	281	32	6.6	0.8	17.9	0.11	0.18	BDL
4	Submersible installed near Dusshera Ground, Industrial Estate, Ludhiana	8	744	460	410	280	53.6	35.6	0.8	6	31	18	BDL	223	57	15.9	1.5	29.2	BDL	0.18	0.46
5	Police Station, Focal Point Ph-3, Ludhiana,	6.4	1455	800	710	507	95.6	65.4	1.2	0.3	80	110	BDL	227	71	16.9	1.4	22.59	0.71	0.17	BDL
6	PAU Research Fields, Ludhiana	7.5	810	510	450	303	60	37.3	0.8	1.6	40	38	1.4	289	32	6.6	0.8	18.2	0.14	0.19	0.11
7	Dashmesh Nagar Gali no.12, Gurdwara, Ludhiana	7.5	649	363	308	284	64.4	30	0.8	1.15	30	28	BDL	231	23	4.9	0.6	14.7	0.14	0.13	BDL
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	7.8	726	436	370	275	51.2	35.9	0.5	4.74	39	32	BDL	164	45	4.3	1.2	25.84	0.18	**0.63**	2.22
9	Dairy Complex, Tajpur Road, Ludhiana opp. Satish Dairy near AmritDharam Kanda.	7.8	627	380	320	261	55.2	30	0.6	1.24	14	32	BDL	203	32	6	0.9	20.5	0.15	0.19	0.19
10	Submersible installed in area on Sua Road near DhandariKalan, Ludhiana	7.2	1268	720	640	339	44.8	55.4	1.8	3	115	36	BDL	270	98	20	2.3	36.85	BDL	**0.76**	BDL
11	Submerssible installed in the area on Janta Nagar, Ludhiana	7.8	758	459	350	289	51.6	39	0.9	4.83	30	28	BDL	177	37	10.5	0.9	21.01	BDL	**0.31**	0.41
Standards(Permissible Limit)		**6.5-8.5**	-	**2000**	-	**600**	**200**	**100**	**1.5**	-	**1000**	**400**	-	**600**	-	-	-	-	**1.0**	**0.3**	**15**

Note: BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, Turbidity, COD, TSS, Pb, Cu, Ni, Cr, Cd, As, Hg were BDL in all the samples.

Annexure-3-B – Analysis results of ground water sample – October, 2017

Sr. No.	Point of Collection	pH	Cond (µs/cm)	TDS (mg/l)	TFS (mg/l)	T.H (mg/l)	Ca (mg/l)	Mg (mg/l)	F (mg/l)	NO3 as N (mg/l)	Cl (mg/l)	SO4 (mg/l)	T.Alk (mg/l)	Na (mg/l)	K (mg/l)	SAR	%NA	B (mg/l)q	Fe (mg/l)	Zn (mg/l)	Cu (mg/l)	Ni (mg/l)	Cr (mg/l)	Cd (mg/l)	As (mg/l)
1	Bawa Oil Company (H.P Petrol Pump), G.T Road, Sherpur, Ludhiana	7.5	1115	683	608	285	52	37	0.4	12.6	77	27	380	115	31	3	43.7	**4**	**0.32**	0.27	BDL	BDL	0.01	0.002	BDL
2	Bhagwan Singh , Dashmesh Nagar, Ludhiana	7.3	736	413	334	322	62	41	0.6	13.2	49	44	212	18	6.2	0.4	10.6	0.1	BDL	BDL	0.01	BDL	BDL	BDL	BDL
3	Haibowal, Dairy Complex, Near Jagga de dairy, Ludhiana	7.2	741	429	367	304	64	35	0.5	3	37	13	296	61	8.1	1.5	29.7	0.1	BDL	BDL	BDL	BDL	BDL	BDL	0.01
4	Submersible installed near Dusshera Ground, Industrial Estate, Ludhiana	7.7	789	445	392	336	64	43	0.4	13.7	43	16	316	47	9.5	1.1	22.7	0.1	0.14	0.19	BDL	BDL	0.01	0.0006	BDL
5	Police Station, Focal Point Ph-3, Ludhiana,	6.9	1411	794	636	592	136	61	0.3	7.2	215	51	336	70	11	1.3	20.1	0.4	BDL	0.18	BDL	BDL	0.01	BDL	BDL
6	PAU Research Fields, Ludhiana	7.4	645	381	332	268	59	29	0.4	6.2	16	21	300	39	7.6	1	23.4	0.1	BDL	BDL	BDL	BDL	0.01	BDL	BDL
7	Dashmesh Nagar Gali no.12, Gurdwara, Ludhiana	7.3	800	442	394	340	82	33	0.5	14.9	57	43	218	31	6.9	0.7	16.2	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	7.5	798	490	441	349	76	38	0.2	18.5	42	31	270	36	6.8	0.8	18.1	0.2	0.12	0.81	BDL	BDL	BDL	0.0006	BDL
9	Dairy Complex, Tajpur Road, Ludhiana opp. Satish Dairy near AmritDharam Kanda.	7.2	737	427	359	300	66	33	0.5	3	48	19	256	61	8.2	1.5	30	0.1	BDL	BDL	BDL	BDL	BDL	BDL	0.01
10	Submersible installed in area on Sua Road near DhandariKalan, Ludhiana	7.4	795	437	380	370	66	50	0.4	2.2	41	13	308	46	9.2	1	20.8	0.1	0.17	0.17	BDL	BDL	0.01	BDL	BDL
11	Submerssible installed in the area on Janta Nagar, Ludhiana	7.7	753	476	418	350	76	39	0.6	12.6	40	40	242	29	7	0.7	14.9	0.1	0.2	0.12	BDL	0.01	0.01	BDL	BDL
Standards(Permissible Limit)		**6.5-8.5**	**-**	**2000**		**600**	**200**	**100**	**1.5**	**10.2**	**1000**	**400**	**600**					**1**	**0.3**	**15**	**1.5**	**0.02**	**0.05**	**0.003**	**0.01**

Note : BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, COD, TSS, Turbidity, Pb,PO4, Hg were BDL in all the samples.

Annexure-3-C – Analysis results of ground water sample – April, 2018

Point of Collection		pH	Cond (µs/cm)	TDS (mg/l)	TFS (mg/l)	T.H (mg/l)	Ca (mg/l)	Mg (mg/l)	F (mg/l)	NO3 as N (mg/l)	Cl (mg/l)	SO4 (mg/l)	T.Alk (mg/l)	Na (mg/l)	K (mg/l)	SAR	%Na	B (mg/l)	Fe (mg/l)	Zn (mg/l)	Ni (mg/l)	Cr (mg/l)
1	Bawa Oil Company (H.P Petrol Pump), G.T Road, Sherpur, Ludhiana	7.2	1206	723	514	294	44	44.5	0.3	14.7	84	16	378	172	25	4.36	55.5	**2**	0.18	BDL	BDL	0.03
2	Bhagwan Singh , Dashmesh Nagar, Ludhiana	7.5	586	348	247	202	30	30.9	0.3	0.94	8	5	296	64	6.7	1.95	40.5	0.1	BDL	0.2	BDL	BDL
3	Haibowal, Dairy Complex, Near Jagga de dairy, Ludhiana	7.3	664	360	266	238	40	33.8	0.3	2.34	18	6	300	54	6.9	1.52	32.8	0.1	BDL	BDL	BDL	BDL
4	Submersible installed near Dusshera Ground, Industrial Estate, Ludhiana	7.4	840	483	353	339	59	46	0.4	13.8	41	8	308	57	8.4	1.35	26.8	0.1	BDL	0.15	BDL	BDL
5	Police Station, Focal Point Ph-3, Ludhiana,	7	1373	800	590	532	84	78.2	0.3	7.48	180	40	322	80	9.2	1.51	24.6	0.2	0.15	BDL	BDL	0.02
6	PAU Research Fields, Ludhiana	7.3	542	309	225	230	37	33.3	0.4	2.77	8	7	248	26	5.7	0.75	19.7	0.1	BDL	BDL	BDL	BDL
7	Dashmesh Nagar Gali no.12, Gurdwara, Ludhiana	7.5	620	347	253	272	49	36.2	0.5	11.82	41	14	178	25	5.8	0.66	16.6	0.1	BDL	BDL	BDL	BDL
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	7.3	878	495	352	343	57	48.6	0.2	18.32	38	13	296	56	6.3	1.31	26.1	0.1	BDL	0.84	BDL	BDL
9	Dairy Complex, Tajpur Road, Ludhiana opp. Satish Dairy near AmritDharam Kanda.	7	1272	692	548	371	57	55.6	0.2	21.73	94	25	352	108	8.8	2.44	38.6	0.1	BDL	BDL	BDL	BDL
10	Submersible installed in area on Sua Road near DhandariKalan, Ludhiana	6.8	1392	773	547	533	45	**102**	0.4	10.9	138	20	440	86	9	1.62	25.9	0.2	BDL	BDL	0.01	BDL
11	Submerssible installed in the area on Janta Nagar, Ludhiana	7.6	802	450	347	340	64	44	0.5	13.7	43	30	226	41	6.3	0.96	20.7	0.1	BDL	BDL	BDL	BDL
Standards(Permissible Limit)		**6.5-8.5**	-	**2000**	-	**600**	**200**	**100**	**1.5**	-	**1000**	**400**	**600**	-	-	-	-	**1**	**0.3**	**15**	**0.02**	**0.05**

Note: BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, Turbidity, COD, TSS, Pb, Cu, Ni, Cr, Cd, As, Hg were BDL in all the samples.

Annexure-3-D – Analysis results of ground water sample – October, 2018

Sr. No	Point of Collection	pH	Turbidity	Cond (µs/cm)	TDS (mg/l)	TFS (mg/l)	T.H (mg/l)	Ca (mg/l)	Mg (mg/l)	F (mg/l)	NO3 as N (mg/l)	Cl (mg/l)	SO4 (mg/l)	T.Alk (mg/l)	Na (mg/l)	K (mg/l)	SAR	%Na	B (mg/l)	Fe (mg/l)	Zn (mg/l)	Cu (mg/l)	Ni (mg/l)	Cr (mg/l)	Pb (mg/l)
1	Bawa Oil Company (HP Petrol Pump), GT road, Sherpur, Ludhiana	6.4	BDL	1224	922	738	486	66	78	0.2	24.1	65	278	233	82	8	1.62	26.4	**3.2**	BDL	BDL	BDL	BDL	BDL	BDL
2	Bhagwan Singh, Dashmesh Nagar, Ludhiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Haibowal, Dairy Complex, Near Jagga Di Diary, Ludhiana	7.1	BDL	907	489	430	329	63.6	41.3	0.3	12.7	59	18	291	68	8.1	1.63	30.4	0.1	BDL	0.2	BDL	BDL	BDL	BDL
4	Submersible installed near Dushera Ground, Industrial Estate, Ludhiana	6.6	BDL	808	565	446	351	76	39.1	0.5	14.9.	42	156	153	39	6.6	0.91	19	0.1	0.1	0.3	BDL	BDL	BDL	BDL
5	Police Station, Phase-3, Focal Point, Ludhiana	6.8	BDL	1381	911	748	534	39.6	**106**	0.3	9.26	193	108	314	76	9.4	1.43	23.2	0.4	0.2	BDL	BDL	BDL	BDL	BDL
6	PAU Research fields, Ludhiana	7.3	BDL	528	272	210	180	49.2	13.9	0.4	4.1	8	23	193	24	5.9	0.78	21.8	0.1	0.3	0.2	BDL	BDL	BDL	BDL
7	Dashmesh Nagar,	6.2	BDL	747	423	368	314	70	33.8	0.4	17	48	60	215	31	6.1	0.76	17.3	0.1	BDL	0.2	0.01	BDL	BDL	BDL

	GaliNo. 12, Gurdhwara, Ludhiana																							
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	6.5	BDL	809	531	435	329	98.4	20.2	0.1	17.7	33	132	207	51	6.2	1.22	24	0.1	BDL	1.1	0.012	BDL	0.014	BDL
9	Dairy Complex, Tajpur Road, Ludhiana	6.8	BDL	1967	1230	1119	545	95.6	74.4	0.2	11.8	31.8	93	482	192	11	3.58	42.7	0.3	BDL	0.2	BDL	BDL	BDL	BDL
10	Submersible installed in area on Sua Road near DhandariKalan, Ludhiana	6.8	BDL	851	525	425	362	68	46.7	0.4	17.4	47	77	267	54	8.9	1.23	23	0.1	BDL	0.3	BDL	BDL	BDL	BDL
11	Submersible installed in the area on Janta Nagar, Ludhiana	6.6	BDL	1248	769	669	515	115	55.2	0.4	13.9	97	112	388	79	8.9	1.51	24	0.2	BDL	0.1	BDL	BDL	0.026	BDL
12	Submersible at RSSB, Tibba Road, Ludhiana, Indl. Area	7.5	BDL	563	357	320	230	45	29	0.3	0.21	4	10	274	53	7.1	1.52	32.5	0.2	0.4	BDL	BDL	BDL	BDL	BDL
13	MSW Dumping Site, Jamalpur, Ludhiana	7.3	BDL	573	368	312	236	42	32	0.3	0.11	5	6	287	57	6.5	1.62	33.7	0.1	BDL	0.2	0.08	0.015	BDL	BDL
14	STP, Jamalpur, Ludhiana	6.9	BDL	1756	935	813	571	99	75	0.2	7.24	243	124	270	119	12	2.2	31.2	0.2	BDL	0.1	BDL	BDL	0.011	BDL
15	HP Park adjoining M/s National	6.4	BDL	1224	877	692	299	60	36	0.3	21	81	276	209	115	33	2.89	42.3	**4.2**	BDL	BDL	BDL	BDL	BDL	0.01

	Industries, E-128, Phase-IV, Focal Point, Ludhiana																							
16	H.P. in SahotaBaghabni Farm, Village Harian, Machhiwara	7.8	4	1393	883	698	423	84	53	0.2	BDL	236	33	292	87	11	1.83	30	0.1	**1.3**	BDL	BDL	BDL	BDL	BDL
	Standards (Permissible Limit)	**6.5-8.5**	**5**	**-**	**2000**	**-**	**600**	**200**	**100**	**1.5**	**-**	**1000**	**400**	**600**	**-**	**-**	**-**	**-**	**1**	**0.3**	**15**	**1.5**	**0.02**	**0.05**	**0.01**

Note :- BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, PO4, TSS, COD, Cd, As & Hg were BDL in all the samples.

Annexure-3-E – Analysis results of ground water sample – April, 2019

April, 2019																						
Sr. No	**Point of Collection**	**pH**	**Cond (µs/cm)**	**TDS (mg/l)**	**TFS (mg/l)**	**COD (mg/l)**	**T.H (mg/l)**	**Ca (mg/l)**	**Mg (mg/l)**	**F (mg/l)**	**NO3 as N (mg/l)**	**Cl (mg/l)**	**SO4 (mg/l)**	**T.Alk (mg/l)**	**Na (mg/l)**	**K (mg/l)**	**SAR**	**%Na**	**B (mg/l)**	**Fe (mg/l)**	**Zn (mg/l)**	**Cd (mg/l)**
1	Bawa Oil Company (HP Petrol Pump), GT road, Sherpur, Ludhiana	7.4	1062	634	526	BDL	309	64.8	35.7	0.3	25.3	87	34	302	116	33	2.87	41.83	**3.1**	BDL	BDL	BDL
2	Bhagwan Singh , Dashmesh Nagar, Ludhiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Haibowal, Dairy Complex, Near Jagga Di Diary, Ludhiana	7	785	474	403	BDL	336	78.8	35	0.3	5.6	61	16	268	65	8.3	1.53	28.67	0.1	BDL	BDL	0.002
4	Submersible installed near Dushera Ground, Industrial Estate, Ludhiana	7.4	757	460	382	7	359	80.4	38.4	0.3	20.5	50	13	236	56	9	1.29	24.73	0.1	BDL	BDL	BDL
5	Police Station, Phase-3, Focal Point, Ludhiana	6.8	1295	766	659	BDL	**615**	200	27.9	0.2	14.2	72	56	250	73	9.6	1.28	20.2	0.4	BDL	BDL	0.001
6	PAU Research fields, Ludhiana	7.3	469	292	260	BDL	237	47.2	28.9	0.3	5.1	9	26	206	25	5.9	0.71	18.19	0.1	BDL	BDL	BDL
7	Dashmesh Nagar, Gali No. 12, Gurdhwara, Ludhiana	7.4	658	396	344	BDL	325	71.6	35.5	0.3	22	54	40	148	28	6	0.68	15.46	0.1	0.3	BDL	BDL
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	7.4	852	514	447	BDL	365	90	34	0.1	32.3	48	15	236	66	7.1	1.5	27.73	0.1	0.2	0.2	0.0006
9	Dairy Complex, Tajpur Road, Ludhiana	6.8	1688	1010	898	BDL	441	130	27.9	0.2	8.9	300	25	300	208	12	4.31	49.8	0.3	BDL	BDL	0.001
10	Submersible installed in area on Sua Road near DhandariKalan, Ludhiana	7	1061	628	554	BDL	408	58.8	63.4	0.3	18.8	86	18	316	78	9	1.68	28.79	0.1	0.3	BDL	0.001
11	Submersible installed in the area on Janta Nagar, Ludhiana	7.7	700	421	366	BDL	329	73.6	35.2	0.4	18	46	35	168	39	6.5	0.94	20.09	BDL	BDL	BDL	0.0007
12	Submersible at RSSB, Tibba Road, Ludhiana, Indl. Area	7.4	509	325	269	BDL	236	48.8	27.7	0.3	0.5	9	11	250	53	7.1	1.5	31.98	0.1	BDL	BDL	BDL
13	MSW Dumping Site, Jamalpur, Ludhiana	7.3	525	326	264	BDL	234	45.2	29.4	0.2	0.5	7	10	252	58	6.7	1.65	34.2	0.1	BDL	BDL	0.002

14	STP, Jamalpur, Ludhiana	6.9	1376	832	723	BDL	544	179	24.8	0.2	6.9	175	38	304	103	11	1.91	28.49	0.2	BDL	BDL	0.0006
15	HP Park adjoining M/s National Industries, E-128, Phase-IV, Focal Point, Ludhiana	7	1208	714	635	BDL	455	148	20.4	0.2	30.5	73	50	258	79	8.6	1.61	26.93	**3**	BDL	BDL	BDL
16	H.P. in SahotaBaghabni Farm, Village Harian, Machhiwara	7	2151	1308	1072	11	567	178	29.4	0.2	2.4	380	68	374	368	12	6.72	57.87	0.3	0.1	BDL	BDL
Standards(Permissible Limit)		**6.5-8.5**	**-**	**2000**	**-**	**-**	**600**	**200**	**100**	**1.5**	**-**	**1000**	**400**	**600**	**-**	**-**	**-**	**-**	**1**	**0.3**	**15**	**0.003**

Note :- BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, Turbidity, COD, PO4, Pb, Ni, Cr, As, Hg & Cu were BDL in all the samples.

Annexure-3-F – Analysis results of ground water sample – October, 2019

Sr. No.	Point of Collection	pH	Cond (µs/cm)	TDS (mg/l)	TFS (mg/l)	T.H (mg/l)	Ca (mg/l)	Mg (mg/l)	F (mg/l)	NO3 as N (mg/l)	Cl (mg/l)	SO4 (mg/l)	T.Alk (mg/l)	Na (mg/l)	K (mg/l)	SAR	%Na	B (mg/l)	Fe (mg/l)	Zn (mg/l)	Cu (mg/l)	Ni (mg/l)	Cr (mg/l)
1	Bawa Oil Company (HP Petrol Pump), GT road, Sherpur, Ludhiana	7	1084	672	558	318	66.4	36.9	0.3	25.8	92	38	296	120	33	2.93	42.03	0.2	0.2	0.1	BDL	BDL	BDL
2	Bhagwan Singh , Dashmesh Nagar, Ludhiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Haibowal, Dairy Complex, Near Jagga Di Diary, Ludhiana	7.7	693	430	362	298	69.6	30.1	0.2	5.1	28	16	272	61	8	1.54	30.11	0.3	0.1	0.2	BDL	BDL	BDL
4	Submersible installed near Dushera Ground, Industrial Estate, Ludhiana	7.6	770	470	396	376	84.8	39.9	0.4	22.2	65	14	316	60	9.8	1.35	25.15	0.2	0.2	0.3	BDL	BDL	BDL
5	Police Station, Phase-3, Focal Point, Ludhiana	7.1	1316	804	684	611	205	24	0.2	14.8	80	58	268	78	10	1.37	21.4	0.2	0.2	0.1	BDL	BDL	BDL
6	PAU Research fields, Ludhiana	7.6	694	434	382	302	70.4	30.6	0.4	5.8	12	28	216	64	8.6	1.6	30.8	0.2	0.3	0.2	BDL	BDL	BDL
7	Dashmesh Nagar, Gali No. 12, Gurdhwara, Ludhiana	7.8	533	326	277	236	49.6	27.2	0.3	21.2	48	36	136	22	5.4	0.62	16.47	0.1	0.2	0.2	0.01	BDL	BDL
8	TSSM Sr. Sec School Shimlapuri, Ludhiana	7.6	802	496	432	352	87.2	32.6	0.1	24.6	63	18	328	64	6.9	1.48	27.84	0.2	0.2	1	0.01	BDL	0.01
9	Dairy Complex, Tajpur Road, Ludhiana	7.6	759	478	411	336	99.2	21.4	0.2	8.2	56	24	232	72	9.4	0.71	31.05	0.2	BDL	0.2	BDL	BDL	BDL
10	Submersible installed in area on Sua Road near	7.2	1102	684	596	416	60.8	64.2	0.4	25.4	105	20	436	82	9.5	1.75	29.4	0.2	BDL	0.3	BDL	BDL	BDL

	DhandariKalan, Ludhiana																						
11	Submersible installed in the area on Janta Nagar, Ludhiana	7.7	743	454	394	340	76.8	35.9	0.5	18.8	60	38	224	44	7.1	1.04	21.54	0.2	BDL	0.2	BDL	BDL	0.02
12	Submersible at RSSB, Tibba Road, Ludhiana, Indl. Area	7.8	538	344	286	244	51.2	28.2	0.3	0.7	12	14	266	58	7.6	1.62	33.22	0.2	BDL	0.3	0.01	BDL	BDL
13	MSW Dumping Site, Jamalpur, Ludhiana	7.9	553	354	288	268	52.8	33	0.3	0.8	9	12	260	60	6.9	1.6	33.6	0.2	BDL	0.2	BDL	BDL	0.01
14	STP, Jamalpur, Ludhiana	7.6	554	338	294	272	55.2	32.6	0.3	0.9	10	14	264	64	7.2	1.69	33.11	0.2	0.1	0.1	BDL	0.01	BDL
15	HP Park adjoining M/s National Industries, E-128, Phase-IV, Focal Point, Ludhiana	7	1100	682	608	386	14.2	16.5	0.2	31.2	68	44	244	84	8.9	3.59	61.42	0.2	0.2	0.1	0.03	BDL	BDL
16	H.P. in SahotaBaghabni Farm, Village Harian, Machhiwara	7	480	298	244	258	51.2	31.6	0.1	1.8	10	28	228	48	6.8	1.3	28.14	0.1	BDL	BDL	BDL	BDL	BDL
	Standards(Permissible Limit)	6.5-8.5	-	2000	-	600	200	100	1.5	-	1000	400	600	-	-	-	-	1	0.3	15	1.5	0.02	0.05

Note : BOD, T. Coli, F. Coli, TKN, Amm. N., P. alk, Turbidity, COD,TSS, PO4, Pb, Cd, As, Hg were BDL in all the samples.

Annexure 4A – Action Plan for Control on Vehicular Emissions

Sr. No.	Activity	Implementation period (Short Medium/ Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	CVE 1 - Public awareness campaign for control of vehicular emissions	Short Term	Deptt. of Transport	Presently, awareness is being created in Educational Institutes under Sadak Surakhya Abhiyan	The public to be educated & motivated to actively play their role in curbing the vehicular pollution.	Regular Activity	1. Public awareness campaign in print and electronic media-Twice a month 2. Use of Social Media Facebook, twitter, Instagram-Regular 3. Jingles on air pollution on local radio and TV-Local FM Radio will be hired 4. Awareness drives in educational Institutions-Monthly 5. Public meetings-Monthly 6. Nukar nataks-Quarterly	Nil
-		Short Term	Traffic Police.	Organised1,221 awareness camps during year 2018and 212 upto Feb 2019 by Traffic Education Cell	Public awareness campaigns to be continued	Regular activity	--	Nil
2	CVE 2 - Remote	Medium Term	Department	Manual checking	All Pollution Check	31.12.2020	1. Preparation of RFP	Nil

	sensor based PUC system		of Transport	At Pollution Check Centre (PCC) exists	Centres will be linked with VAHAN 4.0 software of the Transport deptt.		for selection of vendors by committee- Under Process 2. Allotment of work after selection of vendors – 2 Months 3. Development of software solution to link all PUC centres – 9 months 4. Linking of software to VAHAN 4.0 software of the transport Deptt.- 1 Month	
3	CVE 3 - Extensive drive against polluting vehicles	Short Term	Traffic Police.	11,315 Challans were issued against polluting vehicles in 2018 and 994 challans issued upto Feb, 2019	Regular inspection to be continued and violators to be challaned.	Regular Activity	--	Nil
4	CVE 4 (a) – Prevent parking of vehicles in non-designated areas by creating parking infrastructure	Long Term	Municipal Corporation	• Designated parking lots : 23Nos • Multi-storey parkings :2 Multilevel parking already exists. • Parking for trucks/ commercial vehicles : 1	• Designated parking lots being identified. • Multi storey parkings to be made : Following 3 nos. of multi- storey car parking's are proposed: i) Feroze Gandhi Market. ii) Books Market iii) Ghumar Mandi. • Need based additional	- 31.03.2022 -	- DPR—6month Tendering – 3 months Work allotment— 1 month -	 Rs 96.51 Crore -

				no. transport nagar exists.	Parking areas for trucks/commercial vehicles being identified.			
-		Short Term	Municipal Corporation	• Roadside parking earmarked by yellow line :18No. • "No Parking" sign Boards installed -16	• Roadside parking for earmarking being identified. • Additional "No Parking" sign Boards being installed in non designated areas – 40 No. Under smart city.	NA 30.09.2020	-	- Rs. 1.5 lacs
	CVE 4b – Enforcement	Short Term	Traffic Police.	59,151 challans were issued in 2018 and 7734 challans issued upto Feb, 2019	Regular inspection to be continued and violators to be challaned.	Regular Activity	-	Nil
5	CVE 5 - Check fuel adulteration	Short Term	Department of Food and Civil Supplies/Oil Industry	As informed by Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.	State Level Coordinator, Oil Companies will conduct inspections on annual, quarterly & random basis. - In case of complaint, Department of Food & Civil Supplies in coordination with local oil company officials shall check fuel adulteration & if any discrepancy is noticed	Regular activity	-	Nil

					then action against the violator shall be taken by State Level Coordinator of Oil Company.			
6	CVE 6 (a) - Widening of roads and improvement of infrastructure for decongestion of roads	Short Term	Municipal Corporation	Roads identified for widening 1) Sua road i.e. from Canal to Passi Chowk– 4.2 Km 2. Kanganwal Road 2.0 Km 3) Gen. Mohan Singh Road 1.0 Km 4)Dhandari Kalan to Surjit Palace 0.8 Km	Total 08 Km of road length to be widening.	31.12.2020	Estimate —Completed Tendering -- Completed Work allotment— Completed Completion—06 Month	Rs 11.09 Crore
		Medium Term	GLADA	21.14 Km of road length has been identified for widening in Sector 32 A	Identified road length will be widened.	31.03.2021	1. DPR—Completed 2. Tendering – Under process	Rs. 25 Crore
	CVE 6(b) - Road design improvement	Long Term	Municipal Corporation	40 Km road has been constructed as concrete road after proper road designing.	New roads identified for redesigning: • Malhar Road (1.1 Km) • Rotary Club Road (600 meters) & • Ghumar Mandi roads (1.0 Km) are being redesigned under Smart City Mission. 14 nos. chowks and	31.03.2021	Work allotted Completion -Dec 2019. DPR- Completed Tender- 2 months' Work Allotment-1 month DPR- 6 months Tender- 2 months' Work Allotment-1 month	Rs. Crore 39.60

					junctions in the city are to be realigned and redesigned under smart city mission: • 6 nos. of chowks • 8 nos. of junctions			
7	CVE 7 - Introduce intelligent traffic systems	NA	Municipal Corporation	Already installed 42 nos. Of conventional traffic signals at different intersections in the City.	No. intelligent traffic system to be installed- NIL	-	-	NIL
8	CVE 8 - Construction of expressways/ bypasses to avoid congestion	Long Term	Municipal Corporation	Level crossing at Pakhowal Road railway line cause traffic congestion .	Flyover at Pakhowal Road railway crossing identified for construction Under Smart City to avoid congestion (length of Railway under Bridge portion is 600 meters and the length of Railway Over Bridge is 800meters.)	30.06.2021	1. DPR-1month 2. Tendering- 6 months, 3. Work Allotment- 1 month, 4. Completion- June 2021	Rs. 79 Crore
		Medium Term	GLADA	1.635 Km of road length has been identified (Malerkotla Road ToDugri Road.)	200’ wide bye pass of length 1.635 Km to be constructed.	31.12.2020	1. Work allotted 2. Completion by 31.12.2020	Rs.5.25 Crore
		Medium Term	NHAI	Identified Laddowal bypass to divert the NH-	Laddowal bypass is under construction which would divert the NH-1	31.12.2020	Work in progress	Rs. 1148 Crore

				1 bound traffic coming from Ferozepur side &Doraha. Elevated corridor on Ferozepur road identified to be congest traffic.	bound traffic coming from Ferozepur side &Doraha. Elevated corridor is also under construction in stretch from chungi on Ferozepur road to Chandigarh road.			
9	CVE 09 – Phasing out of commercial diesel vehicles more than 15 years old	Long Term	Department of Transport.	New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.	Matter of fixing the age of commercial diesel vehicle is being examined legally.	-	-	Nil
10	CVE10– Promotion Of E- vehicles	Medium Term	Deptt. of Transport	Presently, most of the vehicles are running on diesel and petrol. Framing of the E-vehicle policy is in the final stages.	After approval from Competent Authority E-Vehicle policy will Be notified.	31.12.2020	1. Framing & notification of E-vehicle policy – 9 months 2. Providing public charging points for E-vehicles as per Govt. policy.	NIL
11	CVE 11 (a) – Introduction of CNG based public transport (Infrastructure development)	Long Term	Deptt. of food & civil supplies Ludhiana	• 03 nos. of CNG Stations exist • Work being executed M/ Jay Madhok Co.	• To upgrade 01 no. conventional filling stations to CNG filling stations. • 01 no. new CNG station to be setup	31.03.2021	Upgradation & commissioning of CNG filling stations	Nil
	CVE 11 (b) – Introduction of CNG based city bus service	Long Term	Municipal Corporation	At present no CNG based city bus service exits.	To take measures to introduce CNG based city bus service.	-	-	Nil
	CVE 11 (c) –	Long Term	Deptt. of	At present, no	To take measures to	-	Implementation of	Nil

	Introduction of CNG based autos / taxis		Transport	CNG based auto/ taxis exits. PPCB has issued direction vide letter no 05 dated 03.01.2019 under section31- A of Air Act 1981 to stop registrationof new diesel/ petrol driven auto rickshaw(s), in5districts including Ludhiana,w.e.f01.02.2019.	introduce CNG based auto/ taxis.		PPCB orders dated 03.01.2019.	
12	CVE 12 – Retrofitting of particulate filters in diesel vehicles for BS-IV fuels	Long Term	Department of Transport.	Presently, India is implementing BS-IV standards for diesel vehicles	India is going to skip adopting BS-5 norms and shift directly to adopting BS-6 norms by 2020	-	The steps for retrofitting of particulate filters in diesel vehicles is to be undertaken by Automotive industry	Nil

Annexure 4B – Action Plan for Control on Road Dust

Sr. No.	Activity	Implementation period (Short/ Medium/Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	CRD 1 – Maintain pothole free roads for free-flow of traffic	Medium Term	Municipal Corporation	All major roads measuring 167 km of total length identified to make pothole free	Repair of 167km of identified road length	30.11.2020	1. Estimate Completed 2. Tendering under process.	Rs. 4.15 crore
		N A	GLADA	No repair work required in area under GLADA	NA	-	-	-
2	CRD 2 (a) – Water sprinkling	Short Term	Municipal Corporation	41.5 km of Road length Identified for water sprinkling .	Regular Water sprinkling on identified road	Regular Activity	-	Nil
	CRD 2 (b) – Procurement of Water sprinkler	Medium Term	Municipal Corporation	2 Nos water sprinklers-exists.	2 more sprinklers to be procured.	31.12.2020	1. Estimation-Completed 2. Tendering-Under process.	Rs.46 lacs
3	CRD 3 – Mechanical sweeping	Medium Term	Municipal Corporation	-Presently manual sweeping being done. -120 km of Road length identified for mechanical sweeping.	4 no. mechanical sweepers to be procured.	31.12.2020	1. Estimation-Completed 2. Tendering – Under process.	Rs.5 Crore

4	CRD 4 - Creation of green buffers along road side	Short term	Municipal Corporation	7.8 Km of Road length identified for green buffer: 1. Jeewan ngrchk to Phase VII 2. Metro Road to Vishkarma Colony 3. Viahawnath Mandir (U/E Ph-1 & 2) &Rly Colony 4. From phase- VI-B,121 to228 5. Focal Point D-210 to 228 Ph-VII 6. Subash Nagar	12000 plants to be planted in industrial & residential and along road sides.	Regular activity	1. Identification – Completed 2. Demand of plants send to forest department for procurement 3. Plantation- 30.09.2019 4. Maintenance – Regular	Rs.74 lacs
5	CRD 5 - Greening of parks, open areas, community places, schools and housing societies	Medium Term	Municipal Corporation	665 nos of parks out of total 870 nos in Ludhiana city are being maintained by MC and Park Management Committees.	To ensure all public parkshave adequate green cover/ plantation.	Regular Activity	1. All public parks will be provided adequate green cover/plantation. 2. Schools & housing societies to be motivated for plantation.	
		Medium Term	DFO	Vacant land available for plantation.	1) 5000 plants will be planted on Kasabad Forest under NPV scheme.	31.12.2020	1. Ist Quarter 2019: Earth work will be done	Rs 20.57 lacs
					2) 5000 plants will be planted on		2. IInd Quarter: Plantation will be	

					Tajpur Road, Central Jail to Khasi Kalan under NPV scheme. 3) 10,000 plants will be planted on PF Laddowal under NPV Scheme. 4) 2000 Plants will be planted on RF Ludhiana Compartment No. 7 & 8 under NPV Scheme. 5) 2000 plants will be planted along Budha Nallah from Central Jail to Khasi Kalan under MGNREGA		done 3. IIIrd and IVth Quarter: Maintenance of plantation will be done	
6	CRD 6 - Water fountains at major traffic intersections	N A	Municipal Corporation	Water Installed at fountains a) Fountain chowk on Mall road near Guru Nanak Dev Stadium b) Vishavkarma Chowk. c) Sherpur Chowk intersections.	No immediate proposal to install any fountain.	NA	No further proposal for fountains due to non-availability of space at chowks.	NA

7	CRD 7 (a) Kacha/Brick Paved Roads to be made Pucca road	Short Term	MC	Identified 10.06 Km of Kacha roads for making pucca roads.	Blacktopping of identified Kacha roads to be done for control of road dust emissions.	31.12.2020	i) Estimation-Complete. ii) Tendering – Under process.	Rs 65 Crore
	CRD 7 (b) Existing roads requiring recarpeting	Short Term	MC	93.55 km of existing road within MC limit requiring re-carpeting identified	93.55 km of existing road to be re- carpeted	30.09.2020		
		Short Term	PWD	6.62 km of existing road within MC limit requiring re-carpeting identified	6.62 km of existing road to be re- carpeted	30.09.2020	1. Estimation-Under Process. 2. Tendering -Under process. . Work Allotment-After tendering 4. Completion : 6months	Rs.2.97 Crore
		Short Term	GLADA	5.24 km of existing road requires re carpeting	5.24 km of existing road to be re carpeted	30.09.2020	Tendering completed & Work Allotted	Rs 44 Lacs
	CRD 7 (c) Pavement of road side using interlocking tiles/Greening to prevent road dust emissions	Short Term	MC	0.8 km main road identified for pavement of road side (Gill road)	Identified road to be completed	30.09.2020	-	Rs. 88.5 lacs

Annexure 4C – Action Plan for Control on Burning of Garbage and Biomass

Sr. No.	Activity	Implementation period (Short/Medium/ Long Term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	CBGB 1 – Control on open burning of bio-mass in City	Medium Term	Municipal Corporation	140 Kacha pits have been made in different parks for collection of horticulture waste to avoid burning of Bio Mass.	126 nos. of Pucca compost pits are to be constructed in parks and green belts	31.03.2021	i) Estimate : Completed ii) Tender : Under process	Rs. 45 Lacs
2	CBGB 2 – Control on burning of municipal solid wastes	Medium Term	Municipal Corporation	No. Of inspections made – 85 No. No. Of challans issued – 50 No. No. Of awareness camps – 60 No. Burning of municipal solid wastes stands prohibited. Awareness among MC staff/Safai Sewak is being created	Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.	Regular Activity	-	Nil
3	CBGB 3 – Control	Short Term	District Administrat	• Identification of sites byPRSC(PAU)	Enforcement by Team	During rice/ wheat	1. To create awareness among farmers regarding health	Rs. 3 Lacs

	on burning of agriculture waste and crop residue		ion, Department of Agriculture, Police, PSPCL, Revenue Department & PPCB	• Regular monitoring under supervision of DC • In District Ludhiana, 150 challans issued imposing Rs5,25,000/- as Environmental compensation in year 2018 by PPCB • Rs.1,00,000/- Environmental compensation recovered upto Dec 2018.		harvesting season	effects of residue burning 2. Deptt. of Agriculture to provide subsidy for equipment/ machinery as per Govt.policy 3. Teams will be constituted one month prior to start of each harvesting season. 4. Identification of no. of fire incidents by PRSC. 5. Visit to identified sites 6. Imposing Environmental compensation on defaulters 7. PSPCL shall ensure electricity for in-situ management 8. Progress review in District Level Air Quality Monitoring Committee meeting 9. Recovery of Environmental compensation	

Annexure 4D – Action Plan for Control on Industrial pollution

Sr. No.	Activity	Implementation period (Short/Medium/ Long term)	ResponsibleAgencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1.	CIE 1 – Conversion to side hood suction in induction furnaces	Short Term	PPCB	Total 31 units are having induction furnace of capacity more than 1 Ton/heat (within M.C. and outside M.C. within 05 Km). No units have adopted side hood suction facility.	All 31 units having induction furnace of capacity more than 1 Ton/heat (within M.C. and outside M.C. limit within 05 Km) to be converted to side hood suction facility.	31.03.2021	Monthly review meetings. Steps:- 1) Taking design 2) Commissioning	Nil
2.	CIE 2 – Conversion to CNG/PNG from pet coke/coal.	Long Term	PPCB/Jay Madhok Energy Pvt Ltd.	-500 no. of industry are yet to converted. -M/s Jai Madhok Energy Pvt Ltd. is awaiting approval from NHAI for laying of pipeline to supply PNG	-500 no. units to be converted to CNG/PNG.	31.03.2021	1. Providing pipeline for transportation of PNG 2. Procurement of instruments 3. Installation 4. Commissioning	Nil
3.	CIE 3 – Conversion of natural draft brick kilns to induced draft	Short Term	PPCB	One unit out of 8 (within 5 km of M.C. limits) have adopted induced draft technology.	7 units yet to be converted	31.03.2021	Work under process	Nil
4	CIE 4 – Action against non-complying industrial units	Short Term	PPCB	Regular inspection as per policy of the Board	• Action against defaulting industries. • Checking the	Regular activity	-Identification of industries in which ETP/APCD is installed. - Checking the	Nil

					adequacy of ETP/APCD installed by the industries		adequacy of ETP/APCD already installed. - Issuing show cause notice to the industries violating norms. -Facilitating industry to get set right the inadequate ETP/APCD.	
5	CIE 5 – Shifting of industries from non-Designated areas to industrial areas	Long Term	Local Govt. / Distt. Town Planner / Deptt of Industries.	Industries located in non-designated need to be identified for shifting. PSIEC has developed 15 acre pocket at Tajpur Road & developing HiTech Cycle Valley Dhanansu.	Identified Industries required to be shifted to the designated areas.	Upto 2023	As per the provisions of notified Master Plan	Nil

Annexure 4E – Action Plan for Control on Construction and Demolition Activities

Sr. No.	Activity	Implementation period (Short/Medium/ Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	CCDA 1 (a) – Enforcement of Construction & Demolition Rules.	Short Term	Municipal Corporation	Inspection is being carried out as per needs for bigger/commercial& road projects. No. Of inspections made– 120 No. No. Of challans issued – 95 No.	-Regular inspection will be made for Control of Construction &Demolition waste. -Counter verification to be done by ATP/EO.	Regular Activity	--	Nil
	CCDA 1 (b) – Infrastructure of Construction & Demolition waste	Long Term	Municipal Corporation	MC Ludhiana has notified 6 no. of secondary points for collection of C&D waste under MC limits vide house resolution No. 37 dated 04.09.2018.	-MC Ludhiana is going to install a C&D plant under Smart City Mission. -Installation of CCTV cameras at major construction sites.	31.3.2021	DPR- Approved for setting up of processing/ recycling plant for C&D waste Tendering under process.	Rs 14.18 cr
2	CCDA 2 – Control measure for fugitive measures	Short Term	Municipal Corporation	At present, minimal measures being taken by the building contractors.	Proper curtains / sheets on the construction sites to be provided &the construction material be kept in covered conditions. Regular inspection to be made and challan issued to violators	Regular activity	Regular inspections	Nil
3	CCDA 3 – Ensure carriage of construction material in closed/covered vessels.	Short Term	Municipal Corporation	MC has already directed all contractors to carry building materials and malba in enclosed/ covered vessels.	Regular inspection will be made to ensure implementation of directions given to contractors to carry the building materials and malba in enclosed/ covered vessels.	Regular Activity	-	Nil

Annexure 4F – Action Plan for Control through Other steps

Sr. No.	Activity	Implementation period (Short/ Medium/ Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	COS 1 – Dissemination of Air Quality Index	Medium Term	PPCB	1No.CAAQMS Installed	3 more CAAQMS to be installed	30.06.2021	1. Expected Allotment of Station by CPCB on50:50 sharing basis-31.03.2019. Finalization of specifications by CPCB 31.05.2019. Tendering-31.07.2019Identification of site and its approval from CPCB (Simultaneouslywithtendering-31.07.2019). Procurement & installation of CAAQMS-31.01.2020 Calibration, Commissioning &data procurement - 31.03.2020.	Rs 3 crores
2	COS 2-Establish an Air Quality Management Division at SPCB HQ	Medium Term	PPCB	No such division exists	One required	31.03.2020 (Air quality management division at HQ has already been established)	a. Develop methodology-Three months b. Providing infrastructure-Six months c. Implementation- Three months	Rs 2.0 lacs
3	COS 3 – Setup helpline in each	Medium Term	PPCB	No helpline exists	One help line number	31.03.2021	Develop Methodology-Three months 1. Providing Infrastructure-Six months	Rs 0.5 lacs

	city/town as well as SPCB HQ Policy				required		2. Implementation- Three months	
4	COS 4 - Monitoring of DG sets and action against violations	Short Term	Punjab Pollution Control Board	Manual monitoring exists	No non-complying DG set to be operated	Regular Activity	1. Identification – Four months 2. Implementation-Two Months	Nil
5	COS 5-Source Apportionment Study	Short Term	PPCB	Source Apportionment Study have been conducted through PSCST & TERI	Not required	--	--	Rs.1.10 Cr.

Annexure 4G– Action Plan for Training & Capacity Building Programmes

Sr. No.	Activity	Implementation period (Short/ Medium/ Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications, if any (Estimated Cost)
1	TCB1 – Training &Capacity Building Programmes	Short Term	PPCB	Officers get trainings under various programmes organized by the concerned departments	• District/City level training programme – 1 Nos. • State level training programme – 1 Nos.	31.03.2021	Selecting agencies/ experts for organizing theme specific trainings. Organization of programmes at City/District and level.	Rs.2.00 lacs

Annexure 4H – Action Plan for control by surveillance of polluting industries

Sr. No.	Activity	Implementation period (Short/ Medium/ Long term)	Responsible Agencies	Base Line	Target to be achieved	Target Date	Milestones (Monthly / Quarterly)	Financial Implications , if any (Estimated Cost)
1.	CSPI-1 – Monitoring of 17 category highly polluting units	Long Term	PPCB	One 17 category highly polluted industry is located in the critically polluted area of Ludhiana.	Mandatory Quarterly inspection of this units and collection of effluent as well as air emission samples.	Regular activity	Monthly review meetings. Steps: - 1) Improvising design and technology of APCDs/ETPs 2) Compliance towards Punjab Pollution Control Board norms	Nil
2.	CSPI- 2 – Surveillance of water intensive dyeing units.	Long Term	PPCB	Total 229water intensive dyeing units are located in the critically polluted area of Ludhiana.	Large& Medium scale dyeing units- Mandatory Quarterly inspection of these units and collection of effluent as well as air emission samples Small Scale units- Mandatory inspection of these units and collection of effluent as well as air emission samples after every 6 months.	Regular activity	Quarterly review meetings. Steps: - 1. Improvising design and technology of APCDs/ETPs 2. Compliance towards Punjab Pollution Control Board norms	Nil
3.	CSPI-3- Surveillance of electroplating/ phosphating/ pickling/ surface coating units.	Long term	PPCB	Total 1553electroplating/ phosphating/ pickling/ surface coating units are located in the critically polluted area of Ludhiana.	Large & Medium scale dyeing units- Mandatory Quarterly inspection of these units. Extensive surveillance of ZLD systems. Small Scale units-	Regular activity	Half yearly meetings. Steps: - 1. Adopting technologies for reducing water consumption.	Nil

					Mandatory inspection of these units and verification of the records for effluent generation and lifting every 6 months.		2. Compliance towards Punjab Pollution Control Board norms	
3.	CSPI- 4 –Shifting of scattered dyeing units to CETP compatible area	Short Term	PPCB	Total 37scattered dyeing units are located in the critically polluted area of Ludhiana.	All these units are required to be shifted to the CETP compatible area	31-12-2020	Compliance to the directions issued by the Board to the scattered units	Nil
4	CSPI-5 – Action against non-complying industrial units	Long term	PPCB	Regular inspection as per policy of the Board	Action against defaulting industries. Checking the adequacy of ETP/APCD installed by the industries	Regular activity	• Identification of industries in which ETP/APCD is not installed. • Checking the adequacy of ETP/APCD already installed. • Issuing show cause notice to the industries violating norms. • Facilitating industry to • Get set right the inadequate ETP/APCD.	Nil
5	CSPI-6 – Connecting the water polluting dyeing/washing/printing units to 15 MLD, 40 MLD and 50 MLD CETP and successful	Short Term	Punjab Pollution Control Board/Respective SPVs	15 MLD CETP member units-34 40 MLD CETP member units- 67 50 MLD CETP member units-130	Connecting all the member units to the CETPs and making 15, 40 and 50 MLD CETPs operational	T+6 months T is the date of actual release of Central/	All the CETPs are to be made successfully functional within 6 months from the release of Central/State Grant-in-Aid	Funds required to be released by Central/State Govt. 1) 40 MLD CETP- Rs. 12.12 Cr. by

	operation of CETPs					State Grant-in-Aid		Central Govt. and 5.76 Cr. by State Govt. 2) 50 MLD CETP- Rs. 12 Cr. by Central Govt. and Rs. 6.0 Cr. by State Govt.

Note 1: 'Short Term' refers to activities to be carried out during next 6 months, 'Medium Term' refers to activities to be carried out during next 2 years and 'Long Term' refers to activities to be carried out in more than 2 years' times period.

Annexure-5

Calculation of CEPI score for 2018 of Ludhiana City by CPCB

As per calculations by Central Pollution Control Board for the year 2018

Water Quality Analysis Report

Pollutants	Group	A1	A2	
TP	B	2	Large	A (A1 X A2)
TNH4-N	A	0.25		
BOD	B	0.5		
		2.75	4	11

Pollutants	Avg (1)	Std (2)	EF [(3)= 1/2]	No. of Samples Exceeding (4)	Total No. of Samples	SNLF Value [(6) = 4/5 x3]	SNLF Score	
TP	2.80	0.30	9.34	39	45	8.10	C	30
TNH4-N	5.64	1.50	3.76	29	45	2.42	C	10
BOD	17.51	8.00	2.19	21	45	1.02	C	10
B Value = (B1 + B2 + B3)						B	50	

C	0	< 5%
D	10	A-A-IA

WATER EPI	(A+B+C+D)	71.00

Air Quality Analysis Report

Pollutants	Group	A1	A2	
PM10	B	2	Large	A (A1 X A2)
PM2.5	B	0.5		
CO	B	0.5		
		3	4	12

Pollutants	Avg (1)	Std (2)	EF [(3)= 1/2]	No. of Samples Exceeding (4)	Total No. of Samples	SNLF Value [(6) = 4/5 x3]	SNLF Score	
PM10	136.18	100	1.36	45	45	1.35	C	30
PM2.5	51.29	60	0.85	0	45	0	L	1.5
CO	1.18	2	0.59	0	45	0.00	L	0
B Value = (B1 + B2 + B3)								31.5

C	0	< 5%
D	10	A-A-IA
AIR EPI	(A+B+C+D)	53.50

GROUND WATER Quality Analysis Report

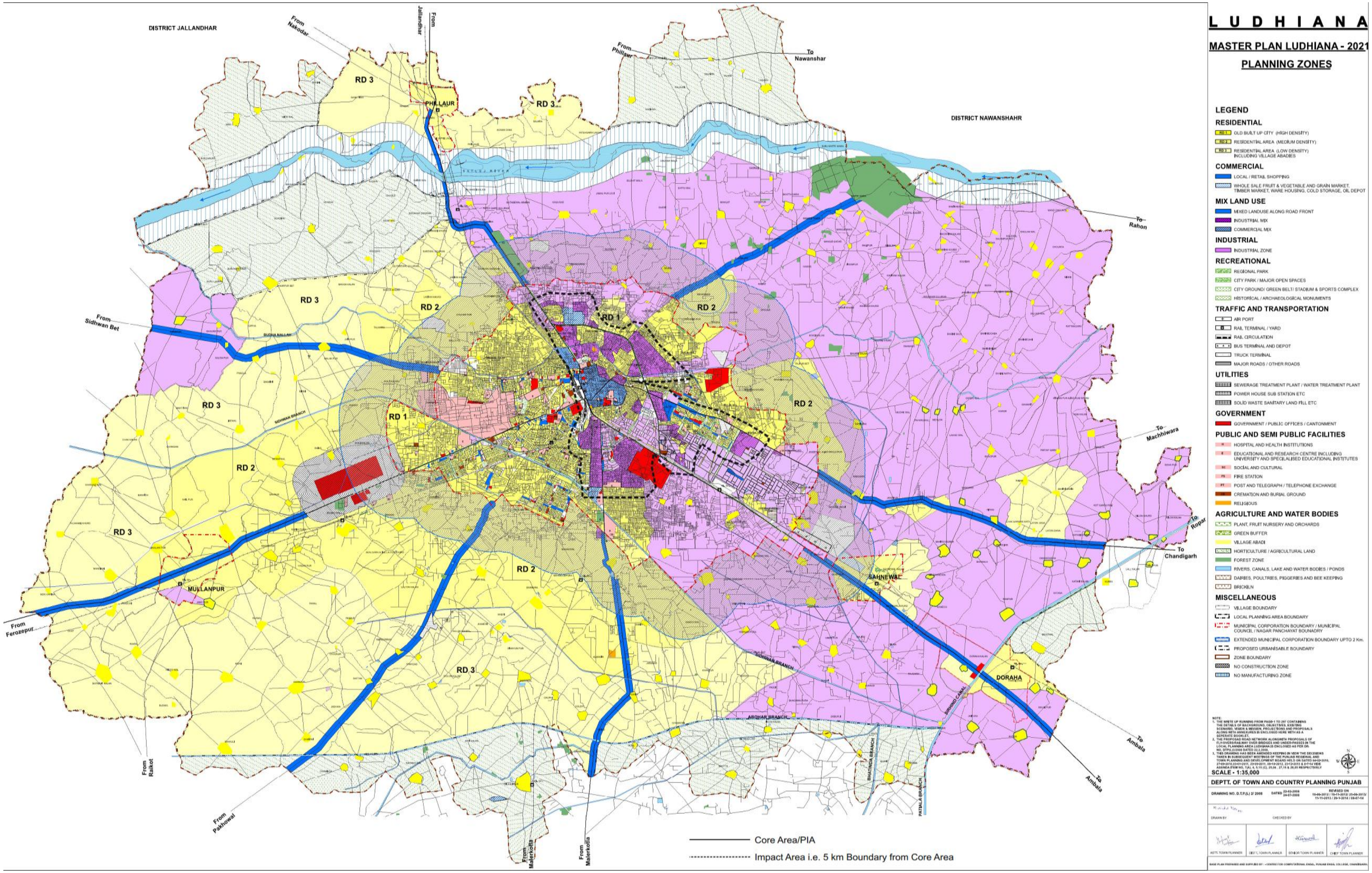
Pollutants	Group	A1	A2	
TDS	A	1	Large	A (A1 X A2)
T. hard	A	0.25		
Fe	C	0.25		
		1.5	4	6

Pollutants	Avg (1)	Std (2)	EF [(3)= 1/2]	No. of Samples Exceeding (4)	Total No. of Samples	SNLF Value [(6) = 4/5 x3]	SNLF Score	
TDS	428.71	2000	0.21	0	45	0	L	0
T.Hard	270.44	600	0.45	0	45	0	L	0
Fe	0.07	0.3	0.22	0	45	0	L	0
B Value = (B1 + B2 + B3)								**0**

C	0	< 5%
D	10	A-A-IA
GROUND WATER EPI	(A+B+C+D)	16

Air= 53.50, Water= 71.00 and ground water= 16.00

Hence overall CEPI score calculated by CPCB for the year 2018 = 73.48


L U D H I A N A
MASTER PLAN LUDHIANA - 2021
PLANNING ZONES
LEGEND
RESIDENTIAL
OLD BUILT UP CITY (HIGH DENSITY)
RESIDENTIAL AREA (MEDIUM DENSITY)
RESIDENTIAL AREA (LOW DENSITY) INCLUDING VILLAGE ABADIES
COMMERCIAL
LOCAL / RETAIL SHOPPING
WHOLE SALE FRUIT & VEGETABLE AND GRAIN MARKET, TIMBER MARKET, WARE HOUSING, COLD STORAGE, OIL DEPOT
MIX LAND USE
MIXED LANDUSE ALONG ROAD FRONT
INDUSTRIAL MIX
COMMERCIAL MIX
INDUSTRIAL
INDUSTRIAL ZONE
RECREATIONAL
REGIONAL PARK
CITY PARK / MAJOR OPEN SPACES
CITY GROUND/ GREEN BELT/ STADIUM & SPORTS COMPLEX
HISTORICAL / ARCHAEOLOGICAL MONUMENTS
TRAFFIC AND TRANSPORTATION
AIR PORT
RAIL TERMINAL / YARD
RAIL CIRCULATION
BUS TERMINAL AND DEPOT
TRUCK TERMINAL
MAJOR ROADS / OTHER ROADS
UTILITIES
SEWERAGE TREATMENT PLANT / WATER TREATMENT PLANT
POWER HOUSE SUB STATION ETC
SOLID WASTE SANITARY LAND FILL ETC
GOVERNMENT
GOVERNMENT / PUBLIC OFFICES / CANTONMENT
PUBLIC AND SEMI PUBLIC FACILITIES
HOSPITAL AND HEALTH INSTITUTIONS
EDUCATIONAL AND RESEARCH CENTRE INCLUDING UNIVERSITY AND SPECILALISED EDUCATIONAL INSTITUTES
SOCIAL AND CULTURAL
FIRE STATION
POST AND TELEGRAPH / TELEPHONE EXCHANGE
CREMATION AND BURIAL GROUND
RELIGIOUS
AGRICULTURE AND WATER BODIES
PLANT, FRUIT NURSERY AND ORCHARDS
GREEN BUFFER
VILLAGE ABADI
HORTICULTURE / AGRICULTURAL LAND
FOREST ZONE
RIVERS, CANALS, LAKE AND WATER BODIES / PONDS
DAIRIES, POULTRIES, PIGGERIES AND BEE KEEPING
BRICKILN
MISCELLANEOUS
VILLAGE BOUNDARY
LOCAL PLANNING AREA BOUNDARY
MUNICIPAL CORPORATION BOUNDARY / MUNICIPAL COUNCIL / NAGAR PANCHAYAT BOUNADRY
EXTENDED MUNICIPAL CORPORATION BOUNDARY UPTO 2 Km.
PROPOSED URBANISABLE BOUNDARY
ZONE BOUNDARY
NO CONSTRUCTION ZONE
NO MANUFACTURING ZONE
SCALE - 1:35,000
DEPTT. OF TOWN AND COUNTRY PLANNING PUNJAB
DISTRICT JALLANDHAR
DISTRICT NAWANSHAHR
From Nakodar
From Jallandhar
From Phillaur
To Nawanshar
To Rahon
To Machhiwara
To Ropar
To Chandigarh
To Ambala
To Ambala
From Sidhwan Bet
From Ferozepur
From Raikot
From Pakhowal
From Malerkotla
From Malerkotla
PHILLAUR
MULLANPUR
SAHNEWAL
DORAHA
RD 1
RD 1
RD 2
RD 2
RD 2
RD 2
RD 2
RD 3
RD 3
RD 3
RD 3
RD 3
RD 3
Core Area/PIA
Impact Area i.e. 5 km Boundary from Core Area