

Prepared for JKPCCL,
Srinagar, Govt. of J&K

Environmental Assessment & Preparation of Environmental Management Plan for Lalded Hospital, Srinagar under JTFR Project

Section-1 Draft EIA & EMP



List of Abbreviations

BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
DPR	Detailed Project Report
EA	Environmental Assessment
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
ESMF	Environment and Social Management Framework
Gol	Government of India
GRC	Grievance Redress Cell
GRIHA	Green Rating for Integrated Habitat Assessment
ICT	Information, Communication and Technology
IGBC	Indian Green Building Council
INR	Indian National Rupee
J&K	Jammu and Kashmir
JKPCCL	Jammu and Kashmir Project Construction Corporation Ltd.
JTFRP	Jhelum and Tawi Flood Recovery Project
NBC	National Building Codes
NGO	Non-Government Organization
OBC	Other Backward Castes
OP	Operational Policies
PAP	Project Affected Persons
PIU	Project Implementation Unit
RAP	Resettlement Action Plan
SC	Scheduled Caste
SIA	Social Impact Assessment
SMP	Social Management Plan
SPMU	State Project Management Unit
ST	Scheduled Tribe
STP	Sewage Treatment Plant
TSS	Total Suspended Solids
WB	World Bank

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EXCECUTIVE SUMMARY

1. Lalla Ded (Lalded) hospital is an apex institution in the state of Gynaecology and Obstetrics in the Kashmir valley providing tertiary care facilities. This is a more than six hundred bed facility and most of the valley population depends on this hospital. However, in the devastating floods of 2014, the water level was above the ground floor slab level causing huge loss to infrastructure and services of existing hospital. Given the increasing pressure and demand for improved facilities, including the needs of present and future and to create a more resilient infrastructure, a new building/block of hospital has been felt.
2. The Government of Jammu and Kashmir (J&K) state, through Jammu and Kashmir Project Construction Corporation Ltd. (JKPCCL) is preparing and implementing various subprojects and components under the Jhelum and Tawi Flood Recovery Project (JTFRP) with financial assistance from the World Bank. The construction of a new building/block of Hospital in Lalded at Srinagar is one the subproject identified and being prepared in World Bank financing under JTFRP.
3. The proposed new building/block site is geographically located at 34.0669° N, 74.8081° E within the premises of Lalded Hospital at village Wazir Bagh, District- Srinagar, Jammu and Kashmir. The subproject is proposing Construction of Additional Block with total plot area of 30631 Sq.m. The subproject mainly involved hospital building development on land in urban area in a systematic and planned way with no additional requirement of land acquisition or purchase of land property.
4. In view of above and to fulfil the World Bank Safeguard requirements, JKPCCL engaged M/s. GSI planning and management, New Delhi to undertake an Environmental Assessment (EA), Social Assessment and prepare appropriate Environment and Social Management Plans as per the safeguard polices of World bank and ESMF prepared under Jhelum and Tawi Flood Recovery Project. The overall objective of carrying out Environmental Assessment (EA) and Social Impact Assessment (SIA) study is to help the JKPCCL in identifying environment and social impacts; prepare commensurate management plans to determine the specific measures to reduce, mitigate and/or offset potential adverse impacts during pre-construction, construction and operation phases of the proposed sub-project. Architectural review of drawing and designs of the project and suggest sustainability measures was also the major part this assignment.
5. Standard Methodology was adopted for Environmental Assessment which include reconnaissance survey, review of review of safeguard policies and regulations, sub-project screening, establishment of baseline and environmental utilities assessment, stakeholder consultations, identification and assessment of the environmental impacts then preparation of environmental management plan.
6. The Proposed block of LD hospital is to be constructed within the confined area of existing hospital which is having area approximately 30631 Sq.m. Maximum height of proposed 5 floors block is considered 25 meters and total constructed is estimated 8394 sq.m. Detailed assessment of site plan, design consideration, assessment of

functional elements, sustainability assessment etc. already conducted in Architectural Assessment Report which is provided with this report as a separate section.

7. Existing Lalded Hospital details and its Facilities were assessed as a part of Baseline status of project. Several physical and environmental aspects viz. water, wastewater, biomedical and solid waste management etc. were examined under condition and architectural assessment. Several observations and suggestions are made to improvements. However, present project is confined to develop facilities for proposed new block only but recommendations to improve existing infrastructure and to reduce environmental foot prints are also screened out and communicated to project proponent and hospital administration for improvement to create overall sustainable infrastructure and facilities of whole LD hospital.
8. It is expected that certain permission, clearances and authorizations viz. Building Permission, tree shifting/cutting, Permission for Establishment & operation of STP, Disposal of Biomedical wastes etc. need to be obtained from competent authorities during the design, planning and implementation phase of this project.
9. Water balance exercise has been done to estimate hospital water demand of proposed block. NBC norms @340 litres per day per bed supply is used to estimate water demand. Several other factors such as visitors, staff population and attendant population are also consider to calculate total water demand. Total water requirement is estimated 50.4 KLD which include fresh water requirement of 35.6 KLD while 14.8 KLD recycled water will be used to satisfy total daily water requirement. Water will be supplied by existing treatment plant operated by Public health engineering department. Dual plumbing system is also proposed in this new building to promote recycling and reuse of treated water.
10. In the operational phase of the proposed hospital block, total 36 KLD wastewater will be generated which include 24.5 KLD domestic wastewater and 11.5 KLD flushed wastewater. Considering 20% more capacity than the wastewater generated, capacity of proposed STP 43.2 KLD is estimated. Therefore, a Sewage treatment plan for 50 KLD capacity is proposed for this block. Small amount (3.9 KLD) of laundry and laboratory effluent will also be generated from this block. Ideally there should be an ETP of 5 KLD to treat this effluent. However, looking to small volume of effluent and smooth operation, it is advisable to treat this effluent in proposed STP based on SBR or MBR technology having equalization unit, phosphorus and nitrogen removal units.
11. In the proposed block of LD hospital, total 62 kg of biomedical wastes/day will be generated from 82 beds considering 770 gm wastes per bed per day. In this block also as per the regulatory requirement, biomedical wastes will be managed as per BMW Rules 2016. A detailed assessment on prevailing biomedical waste management system has been carried out for existing blocks of LD hospital and several suggestions and recommendation made.
12. All necessary information and applicable information required for study were collected through survey conducted by environmental and social survey team, secondary data sources and community consultations in the study area for the different segments of the environment. Environmental monitoring data collected by JKERA in between July-

September 2018 is used to set ambient Environmental Baseline for Air, water, Noise etc. Secondary data and information on various aspects (like hydrogeology, hydrology, drainage pattern, ecology etc.), meteorology and socio-economic aspects were collected from Census of India, IMD, and Survey of Indian etc.

13. Stakeholder consultation (Meetings, Focused Group Discussion, Individual discussion, Public participation) was conducted by the subject area experts on 24th to 26th October 2018 and in between 27-30th November 2018.
14. Environmental impacts during construction and operational phase of the project on Land & Soil, Water, Air, Noise, Biological and Socio-economic environment were assessed and overall significance of the impacts were found minor. Effective control and mitigation measures were also suggested in EMP to avoid, minimise and mitigate the adverse impacts.
15. The geographical extent of the potential impact on land cover is anticipated to be local; impact duration is expected to be permanent as the land cover will get changed from its current status to build type. Overall impact significance of the change in land cover is assessed to be minor. During the construction phase, soil erosion and loss top soil will be susceptible to erosion to some extent due to site clearance activities. The scale of site clearance activities would be limited to construction footprints of LD Hospital. For the mitigation, Areas for top soil utilization should be identified before start of construction activities and excavated top soil shall be utilized for plantations and landscaping within the project site and the disturbed areas and soil stock piles should be kept moist to avoid wind erosion of soil.
16. The operational phase of the Project will have limited impacts on soil in form of waste and waste water generation and soil contamination due to accidental spillages/ leakages and improper disposal of hazardous and biomedical wastes. In the operational phase of the project wastewater will be treated in 50KLD capacity treatment plant while only 62 kg of Bio-medical waste will be generated daily from this newly constructed block which would be collected, transported and disposed as per BMW Rules 2016. A small volume of solid waste will also be generated from this new block which will be managed as per SWM Rules 2016.
17. Water will be required for civil works during the construction of the foundation for both buildings and utility structures, dust prevention, curing etc. and for consumption and use by workers. It is advisable to use recycled water, if available nearby or to use river water (after permission) for construction purpose. For labour camp it is estimated that 4.5 KLD water will be required to supply at labour camp considering 90 LPCD for peak labour force of 50 persons. For tanker water supply of labour camp from PHED or other authorized source will be ensured by the Contractor during construction phase. Proposed project is not going to use ground water resource, thus there will not be any impact envisaged on ground water resources.
18. Total water requirement for New LD Hospital block is estimated 50.4 KLD which will continue to be met through already approved water supply scheme of PHED and reuse of 14.8 KLD treated water. Total sewage generation during operation phase of the

proposed project is estimated 36 KLD while 3.9 KLD effluent will be generated from laundry and laboratory. Total wastewater generated from proposed Hospital block will be treated through proposed STP of 50 KLD capacity. The treated wastewater from STP will be reused in flushing and landscaping development within hospital Campus.

19. Certain amount of dust and gaseous emissions will generate during the construction phase from excavation machine and road construction machines. Pollutants of primary concern include particulate matters i.e. PM10 and PM2.5. However, suspended dust particles matter may be coarse and will be settled within a short distance of construction area. Therefore, impact will be temporary and restricted within the closed vicinity of the construction activities only. Some of the mitigation measures were suggested for control over dust and gaseous emission viz. Proper maintenance of engines and use of vehicles with "Pollution Under Control Certificate, emissions from diesel generators (meant for emergency power suppression of fugitive dust emissions by spraying water, wetting of the stockpile and to providing adequate stack height of DG sets for construction activities from ground level for wider dispersion of gaseous emissions.
20. During the construction phase of Proposed LD hospital Block, the major sources of noise pollution are vehicles transporting the construction material to the construction yard and the noise generating activities at the yard itself. Mixing, casting and material movement are primary noise generating activities in the yard and will be uniformly distributed over the entire construction period. Construction activities are anticipated to produce noise levels in the range of 80 - 95 dB(A). Use of proper Personal Protective Equipment (PPE) such as earmuffs will mitigate any adverse impact of the noise generated by such equipment. Noisy equipment if any will be provided in separate enclosures and noise barriers near to the receptor need to be considered.
21. Proposed LD hospital block site is a located within a confined area and there is no ecologically sensitive areas like national parks or wildlife sanctuaries and reserved forests located nearby. Even on site also, no major tree cover is exist except one small Chinar tree which will try to be relocated and grafted at other location with prior permission of forests department.
22. To avoid disruption and inconvenience to hospital services during constructional phase of the project, control measures shall contain details of temporary diversions of traffic, separate entry and parking of construction vehicles and visitors vehicles and ambulance, traffic safety arrangements, ensure proper signs, temporary barriers and/or danger tape and flagmen to prevent unwanted labour entry to the hospital and to exposed construction work to warn the public and ensure smooth traffic flow and safety of the hospital visitors.
23. The extent of the impact of labor influx is local and regional, as the labourers will be domicile of the local area also perhaps migrant workers from other states. However, proponent should put in place a contractor management plan and labour management plan to incorporate aspects such as contractor selection and evaluation, labour compliance with respect to the legal specifications and ensuring good labour working conditions, timely payment of wages and other benefits etc. As part of the contract

agreements, the contractor will be required to ensure provision of basic amenities of drinking water, adequate number of toilets, wash rooms, sanitation and cleanliness, lighting, availability of provisions and groceries and recreational facilities, at the labour camp site. The proponent should develop a systematic monitoring and auditing mechanism for monitoring the contractors and sub-contractors in terms of resources, migrant workers, child labour and forced labour, health and safety, payment of wages, grievance redressal etc.

24. To evaluate the effectiveness of environmental management programme, regular monitoring of the important environmental parameters will be taken up. Environmental Monitoring Plan, schedule, duration and parameters etc. are also mentioned in Environmental Assessment Report.
25. The budget for the implementation of various mitigation measures is estimated Rs.74.14 Lacs.
26. Analysis of alternatives exercise is also done for the project which include with and without project scenario, Green Vs Conventional Building and use of alternative building materials.
27. Emergency and disaster prevention through good design, operation, maintenance and inspection are essential to reduce the probability of occurrence and consequential effect of such eventualities in the proposed LD hospital. A well-defined Emergency and disaster management plan are prepared for fire hazard, Flood Emergency response plan, earthquake and Bomb threats and evacuation plan.

Chapter-1: INTRODUCTION

1.0. Introduction

1. Lalla Ded (Lalded) hospital is an apex institution in the state of Gynaecology and Obstetrics in the Kashmir valley providing tertiary care facilities. Most of the valley population depends on this hospital. However, in the devastating floods of 2014, water level was above the ground floor slab of the building caused huge loss to infrastructure and services of existing hospital. Given the increasing pressure and demand for improved facilities, including the needs of present and future and to create a more resilient infrastructure, a new building/block of hospital has been felt necessary to construct.
2. The Government of Jammu and Kashmir (J&K) state, through Jammu and Kashmir Project Construction Corporation Ltd. (JKPCCL) is preparing and implementing various subprojects and components under the Jhelum and Tawi Flood Recovery Project (JTFRP) with financial assistance from the World Bank. The construction of a new building/block of Hospital in Lalded at Srinagar is one the subproject identified and being prepared in World Bank financing under JTFRP.
3. The proposed new building/block site is geographically located at 34°03'56.68"N, 74°48'28.42"E within the premises of Lalded Hospital at village Wazir Bagh, District-Srinagar, Jammu and Kashmir. The subproject is proposing Construction of Additional Block with total plot area of 30631.5 Sq.m The subproject mainly involved hospital building development on land in urban area in a systematic and planned way with no additional requirement of land acquisition or purchase of land property. Geographical Location and corner coordinates of the proposed project site is shown in Fig.1.1.
4. In view of above and to fulfil the World Bank Safeguard requirements, JKPCCL engaged M/s. GSI planning and management, New Delhi to undertake an Environmental Assessment (EA), Social Assessment and prepare appropriate Environment and Social Management Plans as per the safeguard polices of World bank and ESMF prepared under Jhelum and Tawi Flood Recovery Project.



Fig.1. 1: Geographical Location of Proposed Project site within Srinagar, J&K (India)

1.1. Broad Scope of the Assignment

- The overall objective of carrying out Environmental Assessment (EA) and Social Impact Assessment (SIA) study is to help the JKPCCL in identifying environment and social impacts; prepare commensurate management plans to determine the specific measures to reduce, mitigate and/or offset potential adverse impacts during pre-construction, construction and operation phases of the proposed sub-project.

The broad scope of the assignment is divided into three following tasks depicted in the Fig. 1.2.



Fig.1. 2: Broad Scope of the Assignment

1.2. Scope of this Report

6. Scope of this report is to provide overall environmental assessment of proposed LD hospital Project and to prepare environmental management plan for design, construction and operational phases of the project. Architectural, sustainability and condition assessment of existing and proposed facilities were also done to cover holistic assessment.

For better understanding and presentation, overall report has divided in 2 sections-

- Section 1-Environmental Assessment & Management Plan
- Section 2-Architectural Assessment

7. This section of the report is mainly dealt with Environmental Assessment and Preparation of Environmental Management Plan for Propose LD hospital Project. Other section "Architectural Assessment" is also attached as Section 2 of this Report.

CHAPTER-2: APPROACH AND METHODOLOGY

8. Environmental Assessment (EA) is a systematic process that identifies and evaluates the potential impacts that may have by any project on the biophysical and socio-economic environment, and identifies mitigation measures. These measures need to be implemented in order to avoid, minimize and mitigate negative impacts of the proposed project. Based on the project components and in compliance with the Environmental and Social Management Framework of the JTFRP, following steps were taken in to account during preparation of Environmental Assessment and Environmental Management Plan for Lalded Hospital Project.

i. Reconnaissance survey and Field Visit:

Reconnaissance survey was conducted by the subject area experts on 24-26th October 2018 at the project site of proposed component and activity areas including existing blocks of LD hospital. Subsequent field visit by the subject area experts was also conducted in the month of November 2018. Prime objectives of these visits was to assess the ground situations, data collection, key environmental issues and problems that need to be addressed and highlighted in environmental assessment report.

ii. Review of World Bank Safeguard Policies, Govt. of India and State Regulations

During preparation of Environmental Assessment report, World Bank Safeguard Policies, ESMF prepared for JTFRP, **Govt. of India and State Regulations** were taken into consideration to fulfil the regulatory requirements of the proposed sub project.

iii. Sub-Project Screening

According to World Bank OP 4.01, the Bank screens each proposed project to determine the appropriate extent and type of Environmental Assessment required. It classifies the proposed project into one of four categories, depending on the type, location, sensitivity, scale of the project and the nature and magnitude of its potential environmental impacts. Screening of JTFRP was done at initial stages of the project and it was categorized A category project (World Bank Category). However, sub project screening for Lalded Hospital was also done to identify and screened out significant environmental issues specifically for this project.

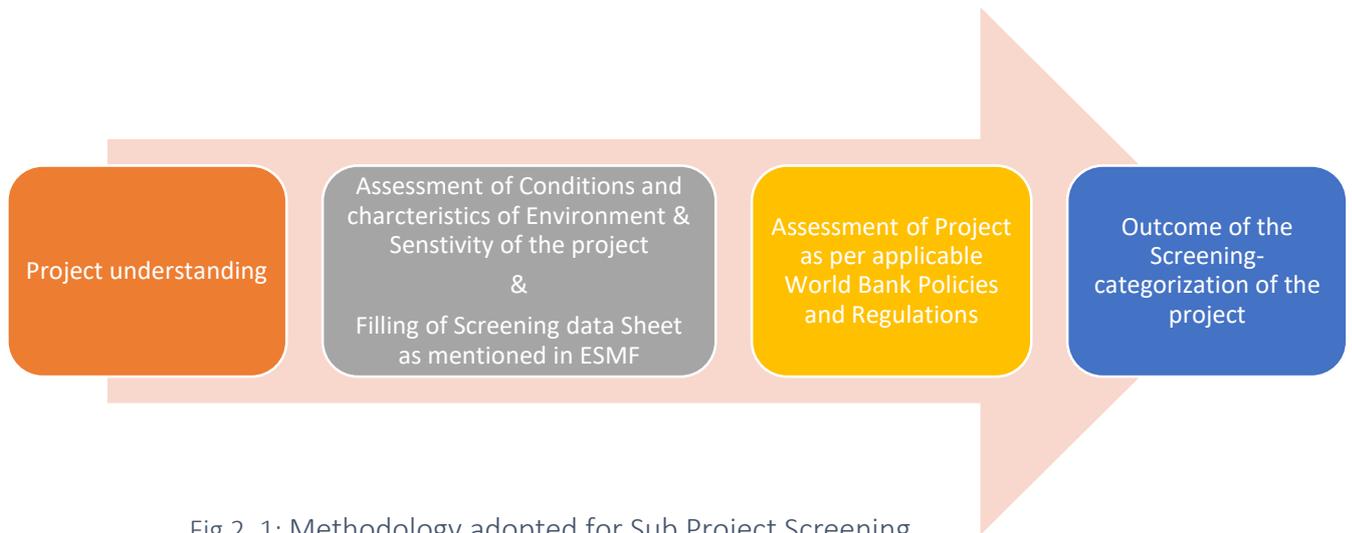


Fig.2. 1: Methodology adopted for Sub Project Screening

9. Screening was done by well-defined methodology and by following the steps depicted in the figure 2.1 and a screening data sheet given in the Environment and Social Management Framework of the JTFRP was filled. Comprehensive and detailed information about sub project location, scale and nature and magnitude of its potential environmental impact were used to fill the screening data sheet which is mentioned in annexure-1.

10. Proposed project location is within the existing campus of Hospital which made this project critical and sensitive because lot of efforts need to be made for prevention and mitigation of environmental impacts during design, construction and operational phase of the project. As an outcome of the screening process, environmental impacts of Lalded Hospital sub-project is categorized to A category because of its location which require conducting a comprehensive Environmental Assessment (EA) and preparation of an Environmental Management Plan (EMP) by Independent Consultants prior to preparation of DPR for appraisal by PMU. Prepared Environmental Assessment and Environmental Management Plan need to be disclosed before the start of execution of the sub-project.

iv. Data Collection, Establishment of Baseline and Environmental Utilities Assessment for Existing & Proposed Hospital

All available information and data (quantitative and qualitative) regarding the proposed sub project have been collected from JKPCCL, LD hospital administration and other stakeholders departments. A detailed list of required data for existing and proposed facilities was prepared and shared with each concerned department. Available details of Environmental Utilities viz. water, wastewater, storm water, solid and biomedical wastes were also requested with hospital administration and concerned PHED officials. Based on

secondary information and data, a description and analysis of the sub-project activities and a creditable baseline is established.

- a) **Establishment of environmental Baseline:** The baseline environmental data was collected to determine the existing status of various environmental attributes viz., climate and atmospheric conditions, air, water, noise, soil, hydro geological, ecological and socio-economic environment, prior to setting up of the proposed sub project. This study helped to undertake corrective mitigation measures for protection of the environment on account of any change deviation of attributes due to activities of the proposed project. As shown in the Fig.2.2, study area for baseline- divided in two parts as follows:
- **Project Area/Core Area-** Lalded Hospital campus is considered as core area and Project site.
 - **Influence Area-**as per the EIA notification, 10 Km radius from the project site could be considered for identifying and assessing impacts. However, looking to the nature of the project which is confined to boundary of the LD hospital, would have very limited impacts on the area located few kilo meters away from LD hospital. Thus, areas surrounded to the LD hospital may considered as project influence. However, ecological sensitive areas/features, flora and fauna were studied for 10 km radius from the project site by using secondary data sources. Baseline data and their Sources for Lalded Hospital Project is summarized in the Table 2.1.

Table 2. 1: Baseline data and their Sources for the project

S.No	Baseline Data	Source of data	Remarks
1.	Environmental Baseline Data for Air, water, Noise etc.	Environmental Monitoring conducted at various locations by JKERA Lab under different projects of JTFRP during 2017-2018	Parameters considered PM2.5, PM10, SO2, NO2 and Ambient Noise,
2.	Details of existing hospital environment	Hospital Administration & Concerned Stakeholders Govt. Departments	-
3.	Details/description of Natural/Physical Environment	Secondary data sources such as Reports, Research articles & publications etc. 1-Ground water information booklet of Srinagar district, J&K, March 2013 2-District survey report 2017, Directorate of geology and mining, J&K 3- Socio- economic profile of Jammu and kashmir-2008, Directorate of economics & statistics, J & K	Data was used to establish baseline data for Natural/Physical Environment Exact source of data is mentioned in the text.

4.	Details/description of Biological Environment	Secondary data sources	Study conducted by previous EIA consultant was used for this section of baseline data
5.	Details/description of Socio-cultural Environment	Primary Source-Sample Survey Secondary Source-Socio- economic profile of Jammu and Kashmir-2008, Directorate of economics & statistics, J&K	Representative Primary survey was conducted to describe Socio-cultural Environment under SIA of this assignment. Study conducted by previous EIA consultant was also used for this section of baseline data.

Note- Referencing of data given at relevant pages of chapter.

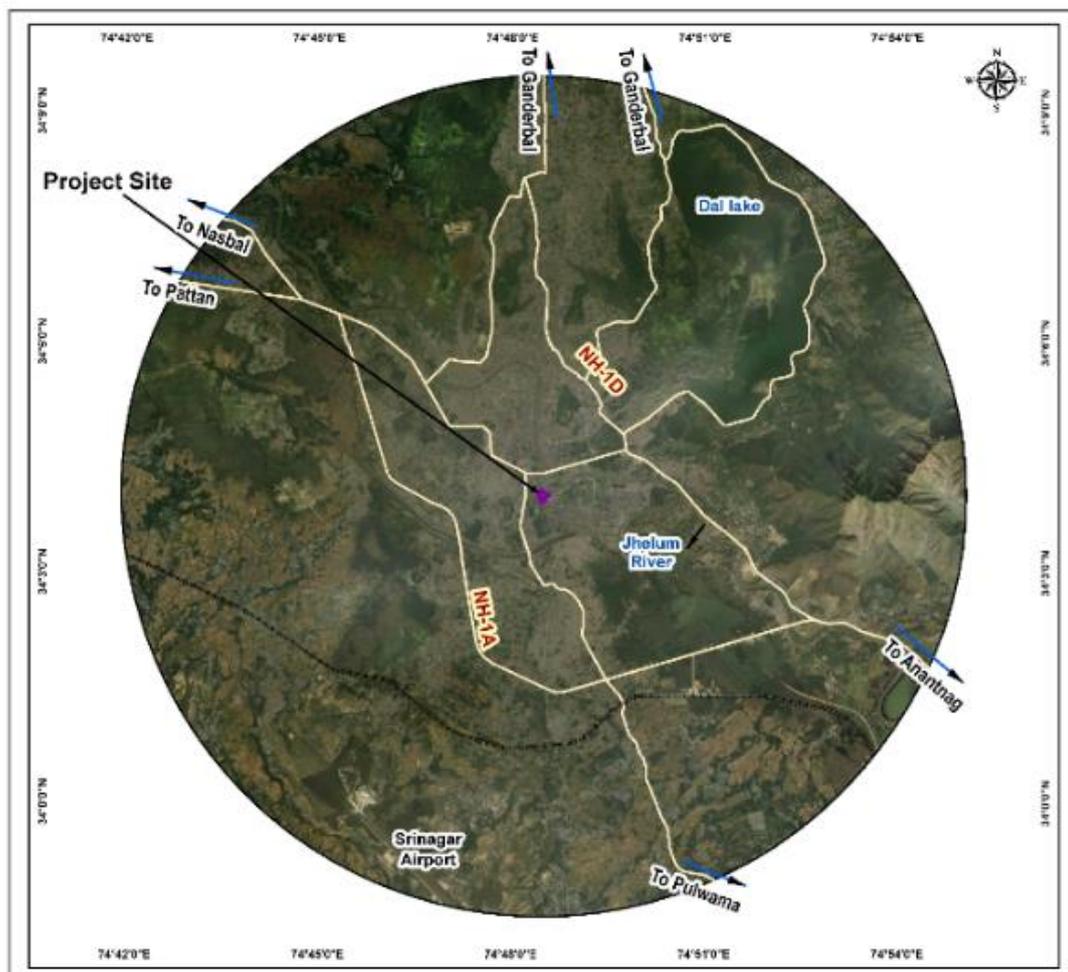


Fig.2. 2: Study Area showing Project and buffer Area

Limitation/s or constraints in the primary or secondary data collection-

Consultants have made sincere efforts to collect relevant, updated and accurate data from various sources and respondents. However, a single and comprehensive document or Detailed

Project Report of the sub-project was badly missed by the consultants as very limited information/data was available for physical, biological, socio-economic environment of sub project location and construction and operational detailing of the subproject. To deal with this situation, information and data were collected separately from various stakeholder departments which received in pieces and consumed lot of time to get factual and desired information.

In the absence of primary data for baseline environment, available secondary data of JK ERA report for the monitoring conducted in July & Sept. 2018 was used to describe environmental baseline of the Project which has its own limitation as it was conducted for some other project.

b) Environmental Utilities Assessment: Environmental Utilities Assessment of the existing blocks and proposed new block have been conducted under environmental assessment. The deficiencies in the existing and in the proposed new block were identified in this exercise and recommendations have been given to overcome these deficiencies.

As shown in the Fig. 2.3-Fig. 2.6, Four matrix for the assessment environmental utilities viz. water supply and demand, sewage and wastewater management, solid and hospital waste management and storm water Management were developed (depicted below) which contain different valuation parameters and assessment tools were used for utility assessment.

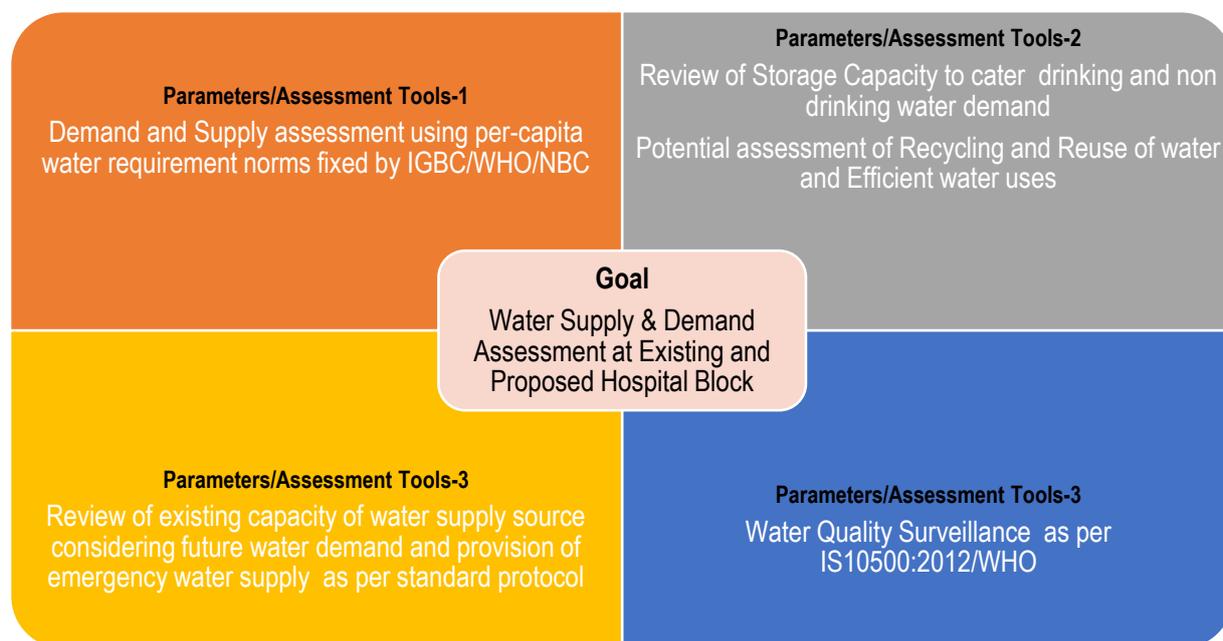


Fig.2. 3: Matrix for Water Supply & Demand Assessment & Management

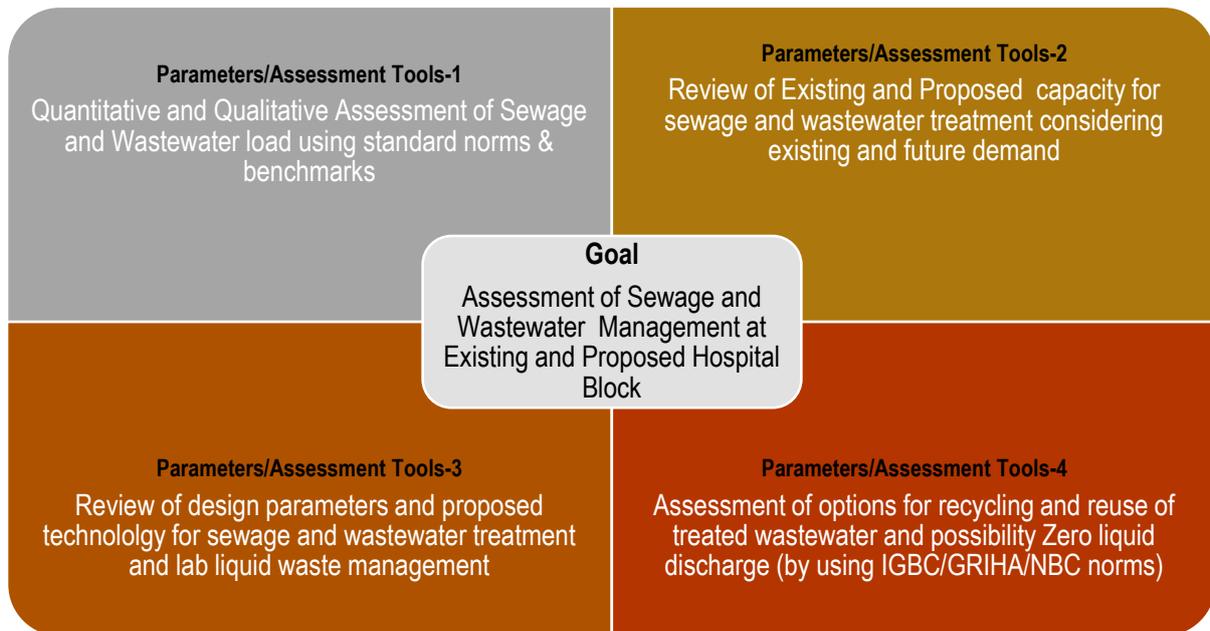


Fig.2. 4: Matrix for Assessment of Sewage and Wastewater Management at Existing and Proposed Hospital Block

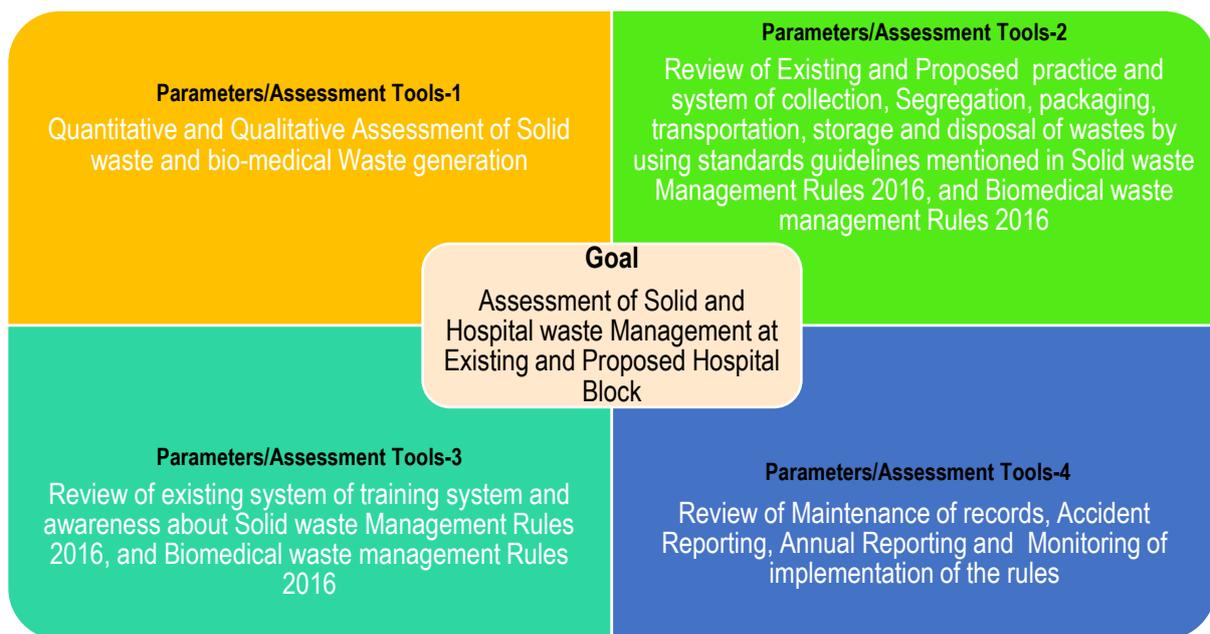


Fig.2. 5: Matrix for Assessment of Solid and Hospital Waste Management at Existing and Proposed Hospital Block

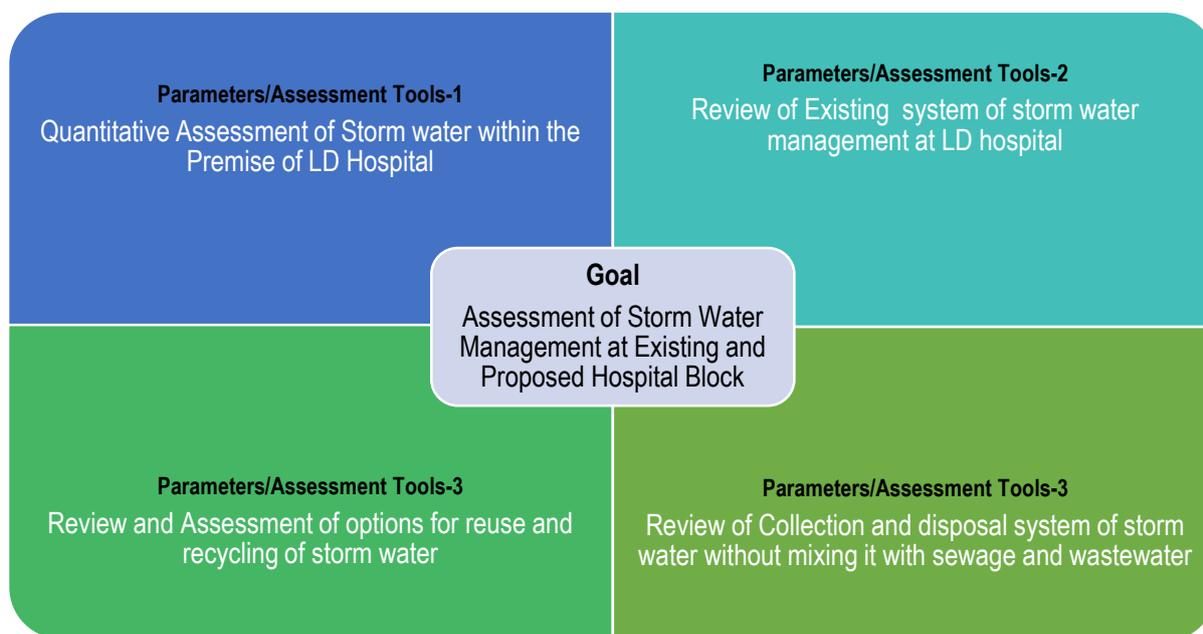


Fig.2. 6: Matrix for Assessment of Storm Water Management at Existing and Proposed Hospital Block

- v. **Stakeholder Consultations:** Stakeholder consultation was carried out during preparing Social and Environmental Assessment report. Concerned stakeholder departments, hospital administration, patients, visitors, local vendors, service providers and surrounding community were interviewed in groups or in individual. The interviewees were asked about their awareness of the LD hospital project and their response to it and were made aware of how the project will affect them during construction phase and after completion phase. They were also be informed about the management plan and taken their views and suggestions for improvement and public grievances, if any towards the project.
- vi. **Identification and Assessment of the Environmental Impacts of sub project Activities:** Based on the analysis of the data that gathered from field survey, secondary sources and primary sources, issues and impacts related to the environmental sector had been identified for the project activities (construction and operational phase of the project) in the form of environment impact assessment report. The identified impacts were also be compared with the existing environmental settings and condition of the project area.
- vii. **Development of an Environmental Management Plan:** Based on the identified environmental issues, the EMP recommends measures required to prevent, minimize, mitigate, or compensate for identified impacts and to improve environmental performance of the project activities. The EMP also suggests for setting up an agency for management measures that need to be taken at various stages of implementation (construction and operational phase) along with Cost of EMP. Flowchart describing the steps adopted for preparation of EMP is depicted in Fig. 2.7.

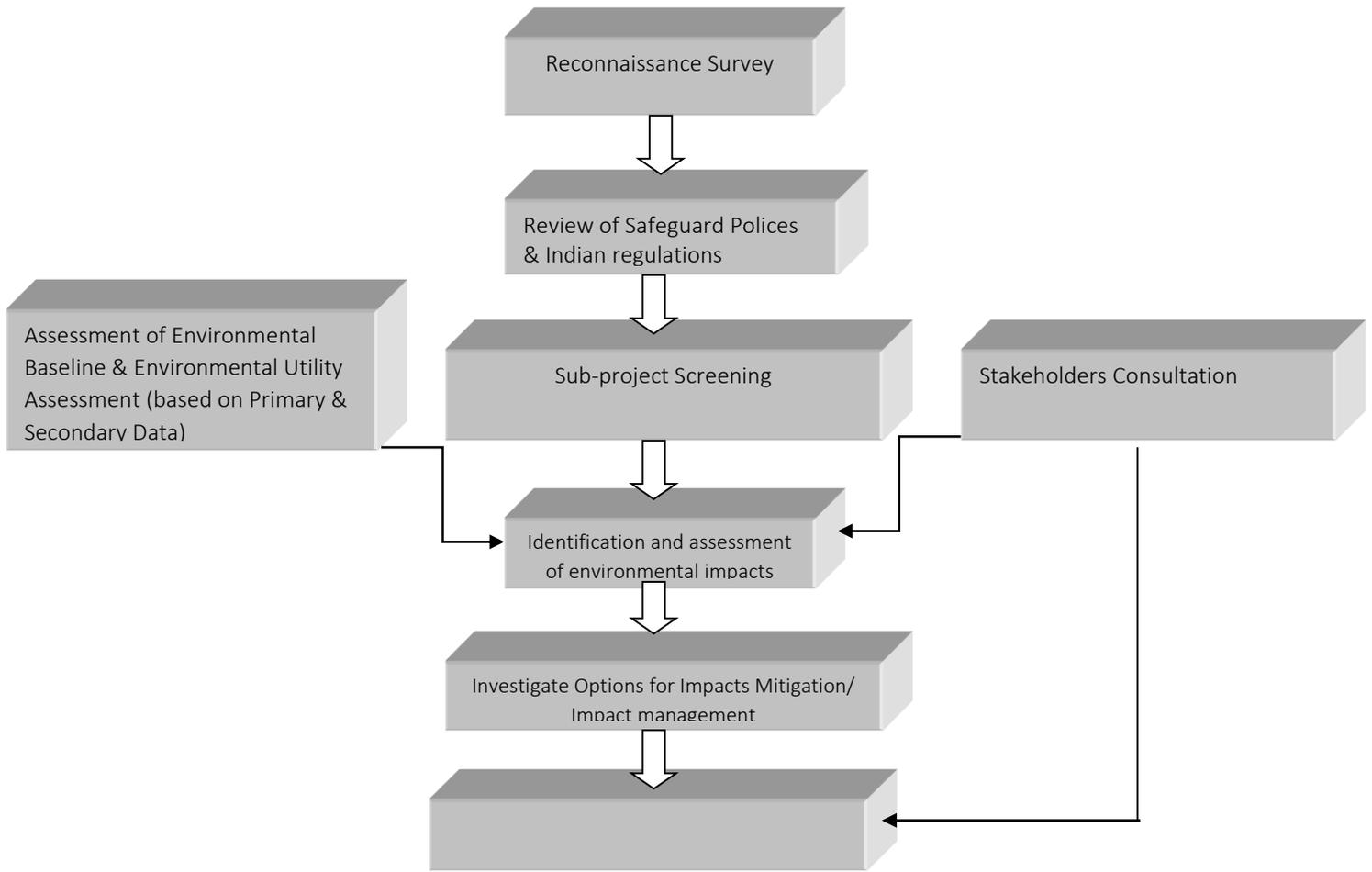


Fig.2. 7: Flowchart Describing the Steps Adopted for Preparation for Environmental Assessment Report

Chapter – 3: DESCRIPTION OF THE ENVIRONMENTAL BASELINE

Part A- Details of Existing Hospital and its Facilities

11. Existing Lalded Hospital details and its Facilities were assessed as a part of Baseline status of project. Several physical and environmental aspects viz. water, wastewater, biomedical and solid waste management etc. were examined under condition and architectural assessment. Several observations and suggestions are made to improvements. However, present project is confined to develop facilities for proposed new block only but recommendations to improve existing infrastructure and to reduce environmental foot prints are also screened out and will be communicated to project proponent and hospital administration for improvement to create overall sustainable infrastructure and facilities of whole LD hospital.

3.1 Overview of Lalded Hospital and its Facilities

12. The hospital provides exclusive services, emergency and interventional care for Obstetrics and Gynaecology besides providing for facilities of Antenatal and Post natal care for women from all over the Kashmir. The hospital has a full-fledged faculty of Obstetrics and Gynaecology as well as some Faculty from the Department of Anaesthesia & Critical Care and Department of Paediatrics.

13. The total plot area of the LD hospital is approximately 30631 Sq.m. As far as built-up area is concern, which is estimated approx. 34225 Sq.m. There are 13 existing blocks in addition to one

Key Salient Features of Existing LD Hospital	
Key Features	Data/Numbers
Total Site Area	30631 Sq.m.
Total Built Up Area	34225 Sq.m
Total Ground Coverage Area	7678 Sq.m.
No. of Blocks	13
Total No. Of Beds	625Beds
Annual Patient Inflow (2017-18)	1.94 lacs
Parks	4 small green areas

proposed block which is going to be constructed under JTFRP. Salient features of existing hospital are given in block adjacent to this text while layout plan is depicted in Fig.3.1. Floor and block wise area details are also summarized in Fig.3.2.

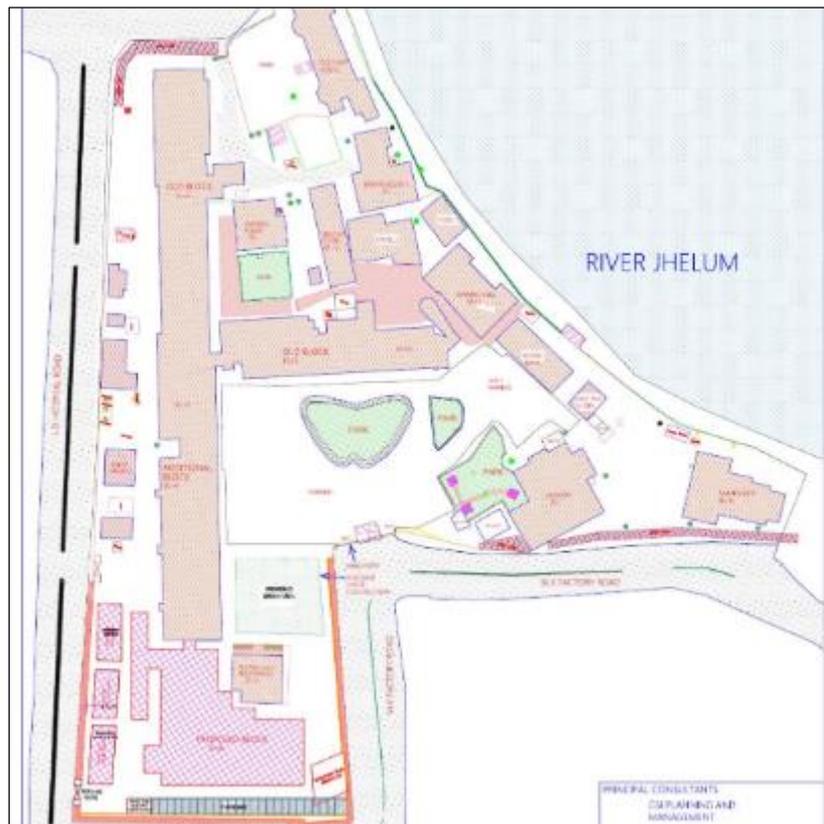


Fig.3. 1: Layout map of LD hospital (if possible area of major existing blocks)

14. The hospital has the pride of proclaiming the lowest maternal and neonatal mortality rate in spite of the colossal IPD and OPD patients

I. Infrastructure Facilities available in the Hospital:

✓ **Old Hospital Building**

- Regular Patient Wards
- Side rooms
- Post-Operative Wards
- Neo Natal Intensive Care Unit (NICU)
- Radio-diagnosis (X-Ray/ECG/Ultrasound IPD)
- Supportive Services

✓ **New Hospital Building**

- Faculty
- Labor Room
- Operation Theatres
- Auditorium

✓ **Additional Block**

- Diagnostics (Laboratory /Blood Bank)
- Modular Operation Theatres
- Out Patient Department

- Wards

II. Area Details of Existing Blocks:

EXISTING BLOCKS

EXISTING CLINICAL BLOCKS AREA (IN SQM)		
EXISTING CLINICAL BLOCKS		
	OLD BLOCK	ADDITIONAL BLOCK
GROUND FLOOR	3156.22	1114.00
FIRST FLOOR	3156.22	1099.60
SECOND FLOOR	3156.22	1138.75
THIRD FLOOR	807.62	1138.75
FOURTH FLOOR	NIL	1138.75
TOTAL B.U.A.	10276.28	6768.60

1A. TOTAL BUILT UP AREA FOR EXISTING CLINICAL BLOCKS = 25457.96 SQM

1B. TOTAL GROUND COVERAGE FOR EXISTING CLINICAL BLOCKS = 4270.22 SQM

EXISTING SUPPORT BLOCKS AREA (IN SQM)					
EXISTING SUPPORT BLOCKS					
	HOSPITAL ADMIN BLOCK	RECEPTION/ REGISTRATION	SARAI BLOCK	OLD WAITING HALL	DOCTORS' HOSTEL
GROUND FLOOR	249.00	235.00	483.00	410.00	543.00
FIRST FLOOR	249.00	235.00	483.00	410.00	543.00
SECOND FLOOR			483.00		450.00
THIRD FLOOR			483.00		375.00
FOURTH FLOOR			483.00		250.00
TOTAL B.U.A.	498.00	470.00	2415.00	820.00	2961.00

2A. TOTAL BUILT UP AREA FOR SUPPORT BLOCKS = 6364 SQM

2B. TOTAL GROUND COVERAGE FOR SUPPORT BLOCKS = 1920 SQM

EXISTING SERVICES BLOCKS AREA (IN SQM)								
	LAUNDRY	HEATING STORE	STORE 1	STORE 2	BOILER HOUSE 1	BOILER HOUSE 2	KITCHEN/ STORE	OXYGEN PLANT
GROUND FLOOR	643.00	78.00	122.00	298.00	371.00	111.00	273.00	235.00
FIRST FLOOR							273.00	
TOTAL B.U.A.	643.00	78.00	122.00	298.00	371.00	111.00	546.00	235.00

3A. TOTAL BUILT UP AREA FOR EXISTING SERVICE BLOCKS = 2404 SQM

3B. TOTAL GROUND COVERAGE FOR EXISTING SERVICE BLOCKS = 1488 SQM

Fig.3. 2: Floor and block wise area details

3.2 Details of the Existing Facilities Available In the Hospital

15. Details of existing facilities available at present in the LD hospital are summarized below:

- Waiting hall & registration counter: There are 2 Waiting rooms available in the hospital for providing shelter and assistance to the patient's relative as being a referral Hospital, beneficiaries from all over the Valley avail the hospital facility. The waiting room facility is free of cost and is well-equipped.

- Out Patient Department (OPD): The cabins of OPD are
 - Antenatal clinic (4 cabins)
 - Gyne clinic (1)
 - Colposcopy cabin
 - family planning clinic
 - Cancer detection clinic
 - Menopause and geriatrics
 - Gynae endocrinology
 - Arsh clinic
 - Post natal cabins
 - Pac (pre anaesthetic check up) cabin
 - High risk pregnancy (2 cabins)
 - Demonstration room
 - Emergency delivery
 - Staff room
 - Integrated counselling testing centre

- Labour Room at LD Hospital caters to approximately 40-50 Normal deliveries over 24 hours. It has six birthing beds with added monitor facility. Baby Corner for immediate resuscitation, active Labour ward, Cardio topography (CTG) facility to monitor successful labour and Fourth stage ward for observation before shifting to post natal ward.

- Post-Operative Ward: Post Op Ward caters to all the patients of operative nature who had been delivered in the O.T. by LSCS & other surgeries. There are 54 beds in two (2) wards of recovery and are always occupied. Wall mount monitors are available for immediate monitoring. Round the clock staff and doctors are available. Patients are on IV fluids and are shifted only after oral intake to their respective unit wards.

- Neonatal Intensive Care Unit (NICU): NICU at LD hospital was created to provide immediate Neonatal resuscitation care to new born a gradually turned into full-fledged 50 bedded Neo- Natal Intensive Care. The HR for NICU is mostly from NHM under JSSK. The Department of Pediatrics extends few PGs intermittently although a separate unit



for LD Hospital was on cards and the file has been sent to higher authorities as well. NICU has exceptional work done stories of treatment of New Born babies who have been admitted even with rare conditions have gone home after treatment. The section is run under JSSK (NHM) therefore all the Medicines/Disposables/Ventilator & C-Pap Accessories etc. are provided free of cost.

- Operation Theatres at Govt. L.D. Hospital: There are six Operation Theatres located at 3rd floor Old Hospital Block.
- Blood Bank: Lal Ded hospital Blood Bank is the only licensed blood bank for Human Whole blood and Blood Components in Associated Hospital GMC Srinagar.
- Central Sterile Supply Department (CSSD): it is a crucial function in hospital that helps in automating the workflow in sterilization of hospital equipment viz., surgical tools and instruments, syringes, catheters/tubes/other rubber goods, lab equipment in various departments and procedure sets. Central unit of Sterilization is equipped with four high end sterilization units.
- Pharmacy: 24x7 Pharmacy is working in the hospital that provides medicines to the patient free of cost. Proper records are maintained of the medicines available in the hospital also with their manufacture and expiry date is recorded. All the equipment's and items/disposables that are used for better patient care are managed in General Store under Medical Officer Stores.
- Canteen Facility: Canteen facility in the hospital is operated by the outsource agency. There are two canteens working in the hospital one for the Doctors and other staff members and other is general canteen for patient and their relatives which charges very minimal. The canteen is on Yearly contract basis which is renewed annually. The total staff working in the in the Canteen includes 11 Staff members and 2 Chefs.

16. Existing facilities in the LD hospital are overloaded due to number of patients reporting for health services. There is urgent need for construction of additional building block (which is now being proposed under JTFRP) to overcome space limitation to create more advance medical facilities.

3.3 Patient inflow and Trends:

17. Number of OPD and IPD patient trends recorded over the last 12 years for LD hospital are depicted in the Fig.3.3- 3.4. In 2017-18, Total number of OPD patient recorded 194675 while IPD patients were recorded 35131.

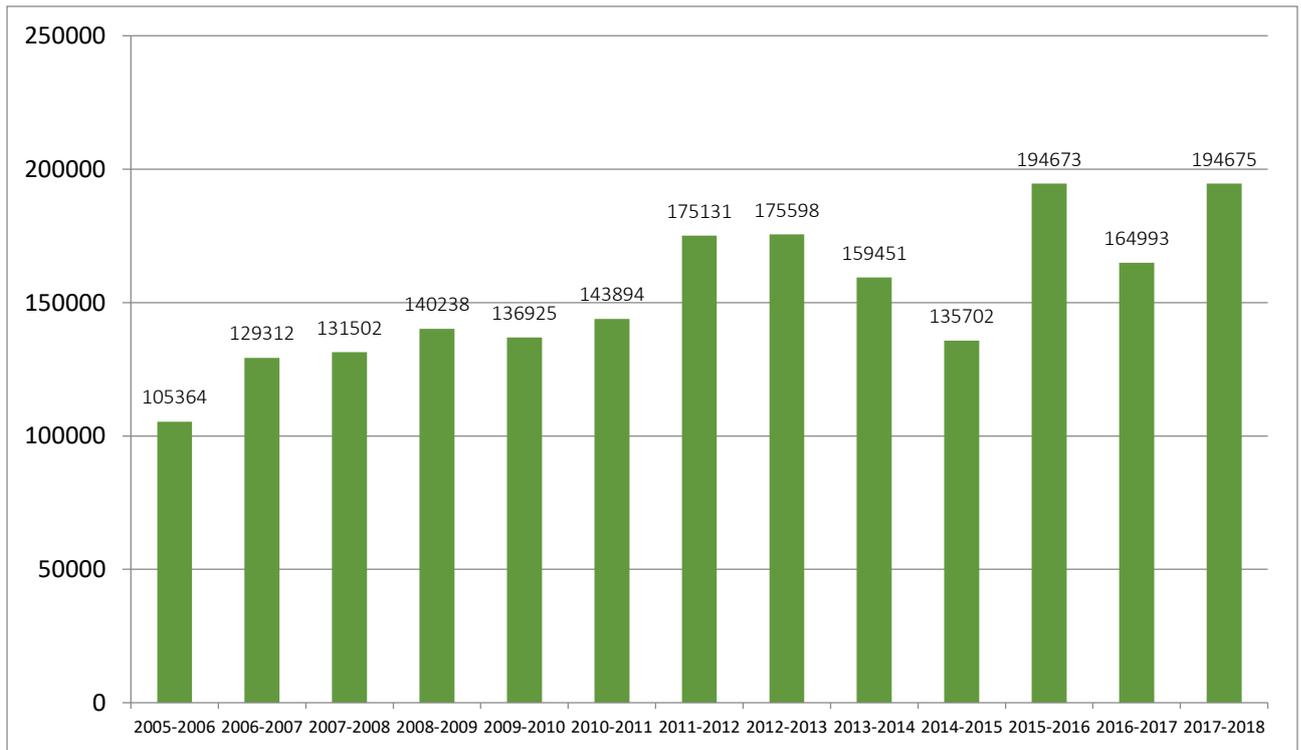


Fig.3. 3: Patient Inflow trends in OPD for last 12 years

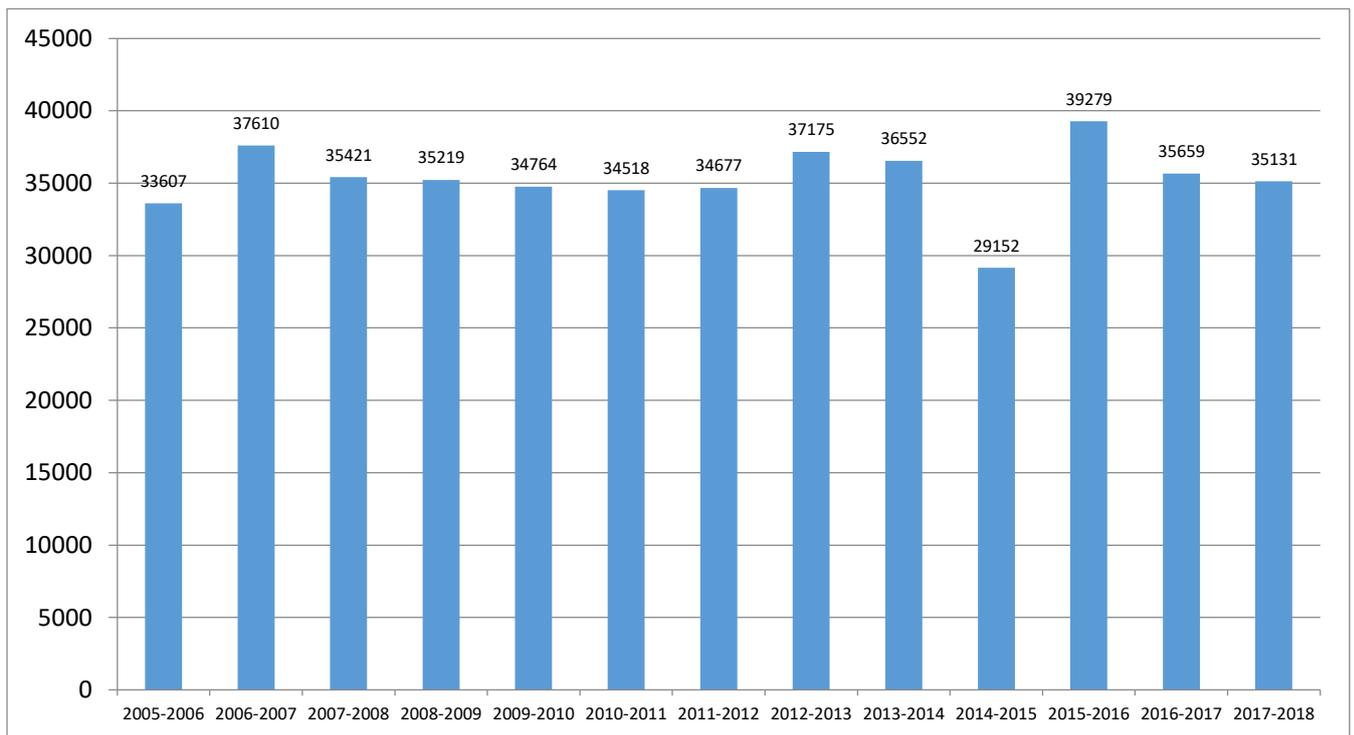


Fig.3. 4: Patient Inflow trends in IPD for last 12 years

3.4. Key milestones in the development of the facility:

- Initially Department of Gynecology and Obstetrics was started in a ward in the Shri Maharaja Hari Singh Hospital (SMHS) and with the increasing number of patients and

dearth in the space, it was provided the space in the Wazir Bagh area of Srinagar and started as and famously known “Hundred Bed” Hospital.

- It was then decided that the structure would be dedicated to be the extension of the Gynae/Obst. hospital and hence came into existence the current 500 bedded hospital
- The hospital has a full-fledged faculty of Obstetrics and Gynecology as well as some Faculty from the Department of Anesthesia & Critical Care, Dept of Peadriatics. The hospital has since then gained a lot of High End Supportive departments like; Blood Bank inaugurated in 1997, Oxygen Concentrator Plant inaugurated in September 2000. A separate Pantry Block in order to provide area for self-help attendants of patients arriving from far off places
- In the phased manner and with the support and pro-activeness of the current administration the hospital has been able to tug additional 200 bedded block to the existing hospital which was inaugurated on 6th August 2014, thereby creating a 700 bedded LALLA DED Hospital.
- The additional block is also endowed with latest High End Laboratory, Blood Bank facility of the highest standard, A Modular Operating Theater with the latest operating gadgets. The hospital has also incorporated Surgical Intensive Care Unit (SICU) and Neonatal Intensive Care Unit (NICU 65 Bedded) catering to neonatal patients.
- Govt. Lalla Ded Associated Hospital being a Lone Tertiary Care Maternity hospital is also funded for Janani Shushu Suraksha Karikaram (JSSK) by NHM Central Sponsored Scheme Providing Zero Expense
- The hospital administration ensures availability of all the above and almost 98% drugs and disposables are available all the time for better patient care.

3.5. Accreditations and/or Environment Management System

18. Lalded Hospital (LD Hospital) is associated with Srinagar Govt. Medical College (SGMC). At present, there is no accreditation taken by LD hospital. However, in the discussion, hospital administration informed that hospital is keen to take accreditation from National Board of Accreditation of Hospitals and Healthcare Providers (NABH) in the direction of SGMC. As far as environment management system is concerned, Hospital is complying all the environmental rules and regulations implies on hospital and health care services including Biomedical Waste Management rules 2016. However, ISO 14001 (EMS) is not obtained by the hospital.
19. **Out sourcing of Services:** At present hospital is taking out sourcing services only for Sanitation and Security. A help desk to communicate sick patients also voluntary offered by Help Poor Voluntary trust.

3.6. Details of existing hospital environment

3.6.1. Water supply

20. In present Water supply scheme of Lalded hospital, treated water other than drinking purpose is lifted from River Jhelum through 15000GPH, 35 meter head and 15 HP open well submersible pumping unit installed inside jack well to 15000 GPH pre settling tank in first stage. The water is being lifted to 1 lakh gallon OHT by 15000 GPH, 35 meter, 15 HP open well submersible pumping unit installed in liner through 15000 GPH pressure filter in second stage. This treated water is being supplied to old and new hospital block. Apart from this 30000 gallon of drink water is being provided to hospital through gravity by Nishat filtration plant.



Design Parameters used by PHED for Water Supply:

- Total Capacity of Hospital-500 beds (Old+ New Block)
- Water Requirements- 500X450: 225000 litres/day or 49559 Gallons/day (say 50000 gallons/day)

Water Supplied to Hospital:

Non-Drinking Water (A)	Drinking Water (B)	Total Water supplied to Hospital (A+B)
Running of pumping unit of 15000 GPH capacity for 10hr/day- 150000 gallons/day	Drinking water through gravity from Nishat filtration plant- 30000 gallons/day	1,80000 gallons/day

Source; PHED, Mechanical division, Srinagar

As per the data provided by PHED department, it is clear that present water supply to existing hospital blocks seems much more than the demand. Therefore, urgent need of optimization of water uses through promotion of dual plumbing system, recycling and reuse of treated water.

3.6.2. Sewage System

21. As per the data provided by the concerned department, 0.7 MLD sewage treatment plant is being constructed to treat existing sewage discharge including laundry waste of LD hospital. In this sewage treatment scheme, design population was considered 9218 while per-capita water supply was considered 70 litres for OPD population and 135 litres for IPD and hostel population.

22. In the absence of any treatment plant, presently sewage and laundry waste is being directly discharged in to river Jhelum without any treatment. However, it is expected with the commission of proposed sewerage scheme condition will improve. Brief about Existing Sewerage Scheme of LD hospital is summarized below:

- STP capacity- 0.70 MLD
- Treatment Technology- MBBR
- Disposal: Treated effluent will discharge to River Jhelum
- Inlet and Outlet Characteristics (Design consideration)

Parameter	Inlet	Effluent
pH	8.0	7.5-8.0
BOD	200 ppm	<20 ppm
COD	300 ppm	<50 ppm
TSS	350 ppm	<50 ppm
Fecal Coliforms	2.4X10 ⁵ MPN/100 ml	<1X10 ³ MPN/100 ml

23. Observation-Looking to current water demand and condition assessed at site, estimated capacity of proposed STP is seems less. In the proposed scheme, no provision of reuse and recycling of treated water is envisaged which should have been considered to reduce the current water foot prints of LD hospital. It is also doubtful whether laundry waste (having phosphorous contents) and sewage can be treated together in MBBR technology. Details study should have been done before proposing MBBR instead of other better treatment technologies viz. SBR/MBR which performed better on stringent design parameters of treated water (<5-10 BOD ppm) and also allow better reuse and recycling of treated water but at this stage where construction of STP is going on and change in technology is not possible thus it is recommended to add tertiary treatment/filtration unit to get BOD <10 mg/l which allow hospital administration to use recycled water for non-drinking purpose.

3.6.3 Storm water drainage

24. In the existing premises, storm water channels are provided at the periphery which collect rain and melted snow water and discharge it in to the Jhelum River through gravity.

3.6.4 Solid Waste Management

25. A small quantity of solid waste is generated @ 300kg/day which mainly generated from canteen and hostel areas of LD hospital. Separate bins are provided at different hospital blocks as per SWM Rules 2016. Outsourced sanitation staff emptied these small bin wastes in to the large bins provided by the municipal authority. Municipal staff collect all the waste on regular intervals and disposed it at dump yard. However, to reduce the environmental foot prints, it is better to establish a small mechanical compost plant to produce compost from generated solid wastes which can easily be used in horticulture/plantation at small parks located within hospital premises.

3.6.5 Energy – Sources and footprint

26. Total electric load of the hospital is estimated 1648 kVA. The peak load is in winter while least load is observed in summer. Currently there are two feeders of 11 kVA each from Raj Bagh and Silk Factory Stations. There are 2 numbers of transformers are installed of 630 kVA while 400 kVA transformer installed for laundry and 400 kVA installed for Boiler House.
27. As far as DG sets are concern, 3 DG sets are there with the capacity of 275 kVA for Old Block, 250 kVA for new block and 500 kVA for laundry and boiler house.
28. Details on energy source, observation and findings are given in Chapter-8 of Architectural Assessment Report. Finding and suggestions on Energy conservation practices have also been dealt with in Chapter 5 (Sustainable Architecture) of the Architecture Assessment Report.

3.6.6 HVAC Arrangements/conditions

29. The hospital building have a great deal of infections and bacteria in the air, especially in the patient areas. Therefore, air handing system of any hospital must counter these hazards and provide comfortable healing environments. The detailed HVAC design must follow NABH and ASHRE standards for hospital.
30. The existing status of HVAC services in the hospital are summarized below:
- There are 3 chillers of 25 T each
 - 4 AHUs of 1700 cfm each (approx. 4.25 T Each)
 - Existing OTs have been provided with HEPA filters
 - Existing ICU and Neo-natal units have been air conditioned with split units
 - Patient units rooms have been provided with split units.
 - 3 hot water generators of with capacity of 16 lakh kcal/hr, 15 lakh kcal/hr, 20 lakh kcal/hr each.
31. Details on HVAC and findings are given in Chapter-8 of Architectural Assessment Report. Finding and suggestions on Energy conservation practices have also been dealt with in Chapter 5 (Sustainable Architecture) of the Architecture Assessment Report

3.6.7 Fire safety arrangements/Emergency/evacuation plan and arrangements

32. Existing blocks of LD hospital are provided with Fire Hose, Fire Exits and fire extinguisher (ABC, CO2 and Foam types). However, as per NBC 2016, smoke detectors should be provided at all the new and old blocks which are currently not provided in all the areas of old blocks.
33. Details of Fire safety arrangements/Emergency/evacuation plan and arrangements and recommendations are described in Chapter 6 of Architectural Assessment Report.

3.6.8 Canteen facilities and Laundry Services

34. Existing kitchen is insufficient to meet the requirements of patient and visitors load. Existing cooking area measures just 25.5 Sq.M. The existing kitchen is inadequate to serve the projected hospital population and it is located in a structurally dilapidated building. It has been recommended to replace this existing building with a new kitchen block having all modern catering facilities. However, laundry facilities are found sufficient which can cater existing and proposed block demand but some improvements are required in building and finishing.



The existing kitchen is insufficient for a hospital of this size. The cooking conditions are unhygienic and very basic.

35. An assessment of the Kitchen, Laundry and the CSSD has been made in Chapter 3 of the Architectural Assessment Report. The suggestions for improvement to the Laundry and the CSSD have also been given in Chapter 3.



View of the laundry



Flat bed presses and calender machines

3.6.9 Traffic circulation and management within the existing hospital

36. Hospital traffic assessment done in Chapter 4 of Architectural Assessment Report which has projected total project population 6588 counts for existing and proposed blocks. However, Chapter 3 deals exclusively with the circulation issues of the new and the proposed block. The linkages between the existing and the proposed blocks have been analyzed and relevant drawings have been made to highlight the issues. Recommendations have also been given to overcome the identified gaps. Parking area requirements and assessment have also been done Chapter 2 of the same report. In accordance with the NBC codes/regulations, parking

space has been calculated provided at suitable locations at Lalded Hospital. Details are summarized below:

Parking

The present site of the proposed new block is used for open air parking. This will be displaced once the new development takes shape.

Existing parking strength-As per the Hospital parking contractor, the existing parking strength of the plot is as follows:

a) Paid parking beyond the barrier on site	=	100 nos.
b) Parking in the front courtyard	=	90 nos.
c) Staff parking in the front courtyard	=	50 nos.
d) Ambulances	=	6 nos.

Total existing cars Parking Space	=	246 nos.
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The peak time for parking is 10 am to 1 pm. The parking lot is full at that time.

Parking strength after the proposed new block is in operation

As per the Hospital parking contractor, the existing parking strength of the plot is as follows:

a) Stilted parking in the proposed new block	=	18 nos. (for staff)
b) Angled parking along the boundary near the new block	=	11 nos.
c) Total parking area in the front courtyard (3100 sqm) Assuming 23sqm/ car, the total parking spaces =	$2800 / 23 = 121$ nos. (50 for staff and 71 for general public)	
d) Ambulances	=	6 nos.

Total cars after new block is built= 156 nos.

A layout map for the proposed parking area is shown in Fig. 3.5.



Fig.3. 5: Parking layout Plan of LD hospital Project

3.6.10 Trees/Plantation and landscaping, if any-

37. Some small trees are existed within the Hospital area. However, total landscaped areas need to be increased which is currently only 8.25% of the total site area. The amount of landscaped areas including newly proposed park in front of reception block is only 2530 Sq.m Landscaping are plantation need to be done to increase the green cover. Recommendations for the same are provided in Chapter 2 of Architectural Assessment Report.

Part B- Biomedical Waste Management at LD hospital

38. In recent times, there has been a rapid growth of hospitals and other healthcare facilities resulting out of the expanding population, the epidemiological profile and the modern medical practice fuelling this demand. The advent of new technology, drugs / chemicals and the culture of 'disposables' etc. have brought into focus the issue of tackling the increased generation of Bio-Medical Waste. The fall outs of Poor Hospital Waste Management are affecting all constituents of our Environment and humans.

39. In view of the above, the systematic handling & management of Bio medical waste is extremely important. The same becomes more critical to Lal Ded Hospital, being a very important hospital of Kashmir Valley & aspiring to be a premier institution of India.

3.7. Site Assessment

40. Keeping in mind the fact that BMW generated due to proposed expansion shall contribute only about 10-15% of the total waste of the expanded hospital, the understanding of adequacy / management of present practices is much more important since the deficiencies in the present set up, if any, need immediate removal / redressed so that the overall expanded capacity is able to meet with the desired standards / guidelines / parameters, when the expanded portion of hospital merges with the present capacity & becomes a single unit from all regulatory angles. All parameters required to study for a new hospital were applied to the existing hospital so that their present status could be evaluated with a goal of their merger with the expanded hospital

3.7.1. Present Statistics / Data

41. Some of the basic data of Bio Medical waste generated from the LD hospital are given in Table 3.1 and their composition is summarized in Table 3.2.

Table 3. 1: Composition of Bio-Medical waste generated at LD hospital

Particulars	Existing Hospital
No. of beds	625
Total Biomedical waste generation per day (Avg.)	480 Kg/day
Per capita bio medical waste generation	About 770 Grams /capita/day
No of red bags (average)	50
No of yellow bags (average)	60
No of blue bags (average)	5
Hazardous waste	2 litres /month

Table 3. 2: Composition of Biomedical waste generated from Existing facilities

S. No.	Color coding of bags /bins	% composition	Type of waste	Ultimate disposal arrangement
1	Yellow	55- 60%	Human anatomical Waste, Soiled waste Discarded linen mattress, Microbiology & biotechnology waste, Blood bags etc.	Being sent to Common Bio medical waste treatment & disposal facility
2	Red	35-40 %	All recyclable plastics	Being sent to Common Bio medical waste treatment & disposal facility
3	Blue	5-10%	All glassware, metallic body implants	Being sent to Common Bio medical waste treatment & disposal facility

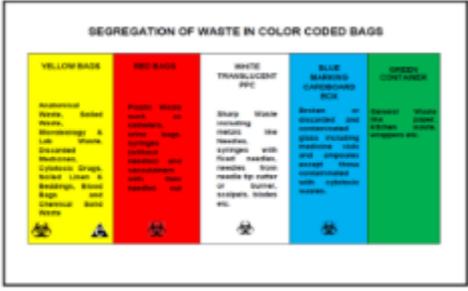
4	Others (Black) (To be discontinued)	2-5%	To be discontinued	Being sent to Common Bio medical waste treatment & disposal facility
5	White	Nil	Sharp waste excluding broken glass	To be sent to Common Bio medical waste treatment & disposal facility

The LD hospital was visited by the team twice, once in Oct '18 & again in Nov '18. A lot of interaction was done with all the stake holders including the Dean, Medical Supdt, Deputy MS, Staff nurses, workers and the sanitation staff. While discussing, it was concluded that there is an awareness about the new rules at most of levels but still there are many gaps in full understanding of new rules & their amendments.

3.7.2. Condition Assessment

42. Condition assessment for biomedical waste management system was conducted as a part of the assignment. Detailed findings of the condition assessment are described in Table 3.3.

Table 3. 3: Condition Assessment of Existing System of Biomedical Waste Management at LD Hospital

Particulars	Norms as per BMW rules 2016 as amended in 2018	Existing Situation/findings at LD hospital
<p>1.BMW Segregation</p>	<p>The BMW segregation protocol has been totally modified in the new rules as under :</p>	<p>The Assessment was carried out by visiting various wards of hospitals, discussing with various staff nurses and workers involved in segregation.</p>
		<p>A thorough inspection of the existing hospital waste management was done during both the visits in Oct'18 & Nov'18</p>
		<p>1.1 Findings : Some of the deficiencies in the hospital needs to implement for existing block as well incorporated in the expansion block are as under :</p>
		<p>a) At few places / wards, it was found that the general waste is mixed with BMW or BMW in not in the right bin as per the segregation code</p>  
		<p>b) As seen from sample manifests at Sr No 10 below (Record keeping), the waste is also being given to the common Bio medical treatment facility in black colored bags, which is against</p>

		<p>the color coding scheme of BMW rules.</p> <p>Conclusions : The reasons of this can be all or any of following :</p> <ul style="list-style-type: none"> a) Lack of awareness among patients & attendants. b) Lack of training / casualness of staff nurses. c) Lack of adequate no of bins for storage of the waste. d) Lack of supervision/administration.
<p>2. BMW Management Committee</p>	<p>The formation of such a committee is essential from regulatory point of view as well better administration of rules.</p>	<p>During the site visits to the hospital, it was found that this committee was not formed yet.</p> <p>When the issue was discussed in detail & its importance from regulatory as well functional angle was explained to Management, the same was fully supported by management and a committee formed with immediate effect.</p> <p>The details of notification of this committee are as under :</p> 
<p>3. Health Check-up of Staff nurses & Workers</p>	<p>This is a regulatory requirement & is also very important in view of the various risks associated with handling of this waste.</p>	<p>During visits to hospital, it was found that the hospital is waste conducting the health check-up of staff but not maintaining any record of this check-up of staff nurses & workers, which is a regulatory violation also.</p>

		<p>In addition, it is the risk for the individual as well his/her co-workers, in case of contracting any disease during the waste handling</p> <p>The authorities should start maintaining the same for the existing hospital forthwith as well plan for the expanded hospital.</p>
<p>4.BMW Management Trainings</p>	<p>Regular training of various staff & workers involved in BMW management is very essential for efficient management of waste as well to comply the regulatory requirement</p>	<p>Apparently, though most of the staff in existing hospital has a good understanding of segregation but the training records have not been maintained. In addition, some of the new staff nurses / workers need refreshing their knowledge of BMW management.</p>
<p>5.Assessment of overall Infrastructure , facilities & materials for efficient BMW Management</p>	<p>This assessment helped to understand the likely risk of any health hazard due to any deficiency in any of materials, infrastructure & facilities for efficient handling of BMW.</p> <p>The whole of hospital was extensively visited to understand the overall infrastructure / facilities / materials available for BMW management so that the same, if required, can be upgraded / improved in the existing hospital as well incorporated in the expanded block.</p>	<p>Findings :</p> <p>Over all, infrastructure was assessed to be deficient in respect of the following points :</p> <p>a) The no of bins provided are inadequate. At places, some make shift covers have been provided while at some locations, they are without any lids.</p> <div style="display: flex; flex-direction: column; align-items: center;">   </div>



- b) At some locations, the bins provided are oversized while at some places they are under sized.
- c) The no of needle blasters provided is quite deficient. A total of 6 Nos needle blasters have been provided for the full hospital.



- d) The trolleys for transportation of waste from various wards to waste storage room (common collection point) are quite deficient & are in depilated condition.

		
<p>6.Assessment of Personal Protective Equipment (PPEs) Usage</p>	<p>This assessment was carried out to understand the likely risk of any health hazard due to any deficiency or improper use of PPEs</p> <p>One of the major methods of infection control in the hospital is the proper & adequate use of PPEs.</p> <p>This helps to reduce the hospital acquired infections to a greater extent.</p> <p>The proposed assessment helped to understand the likely risk of any health hazard due to any deficiency or improper use of PPEs in the present block and the same shall be implemented for the expanded block</p> <p>The whole hospital was visited to understand the use of PPEs and other related items.</p>	<p>Findings :</p> <p>It was found to be inadequate at some places, particularly the use of gloves , masks was not up to the mark in a few wards. In addition, the sweepers engaged in bathrooms were not wearing any gum boots.</p> 

<p>7.Waste Storage Room (Common Collection Point)</p>	<p>Assessment of waste storage room was done to understand the practices adopted and risks involved before handing over the waste to centralised facility for its final disposal at this common collection point.</p> <p>The same collection point is to be used by the hospital for its full expanded capacity.</p> <p>The area was visited by team twice to understand the present status, practices & deficiencies, if any.</p>	<p>Findings :</p> <p>a) The waste storage room (which shall be common for the existing block & expanded block) is in quite a depilated condition and needs immediate repair and proper ventilation as well secured shutter / lock up in order to avoid any unwanted person /animal coming in contact with waste</p>    <p>b) The area outside the waste storage room (which is again common area for expanded capacity of hospital) needs improvement / pucca floorings since it</p>
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		<p>is infested with rats & other rodents who are likely to interfere with waste and can spread the diseases. In addition, it should be fenced / secured to avoid the entry of any rag pickers / animals in that area.</p> 
<p>8.Liquid Waste (blood, urine & other liquid samples) Management</p>	<p>Again, this aspect is an important regulatory requirement</p> <p>The labs and other portions of waste generating liquid waste were visited during both the visits.</p>	<p>Findings :</p> <p>It was found that the liquid waste is being disposed-off in the drain without any prior treatment being given. This is a regulatory violation and can put the adverse impact on environment The dealing staff was educated about the same. The hospital needs to take appropriate measures to handle the liquid waste (by its pre-treatment) of present system and then implement it for the expanded capacity</p>
<p>9.Health Safety Measures</p>	<p>Assessment of any risk (despite taking various safety measures adopted by hospital) while handling the waste for the existing hospital & the using the same for expanded portions also was studied.</p> <p>The whole of hospital was extensively visited to understand the overall safety measures available while handling BMW,</p>	<p>Findings:</p>

its deficiency, if any so that the same, if required, can be upgraded / improved in the existing hospital as well incorporated in the expanded block.

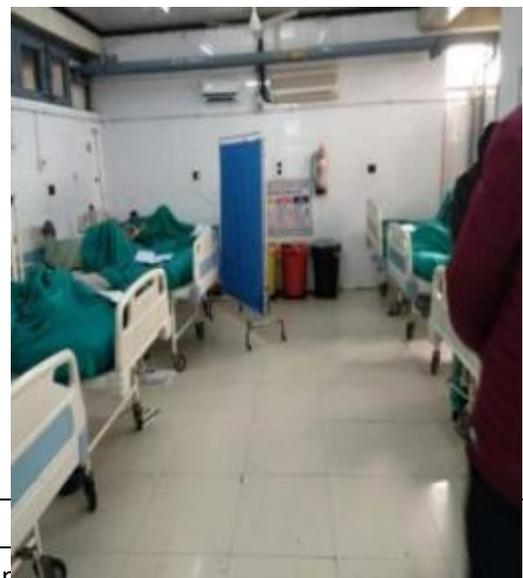
I. The needles found near storage



area and can be a serious health hazard to any one coming in contact with the same.



II. The placing of bins containing waste at few places in very near to patient beds & not desirable. It should be placed secluded from sight in wards.



Sister's trolleys being used by staff nurses are containing small bins on the lower



portion while on the upper portion, they are placing the useable items like syringes, vials etc. These small bins are being used for storing BMW and many are without proper covers.



III. Some of bigger bins containing waste are without any proper covers.



IV. Some of the bins are even placed in urinals / toilets being used by patients / attendants, which should be avoided.



V. Waste storage room needs to be immediately made ready with proper ventilation & locking arrangement, since this can be misused by rag pickers /stray animals

		<p>VI. The no of bins used is quite insufficient. Instead of providing bins station wise, there is a provision of one set of bins only at one point in a ward at places. The waste is being transported within the ward to a large distance by the staff within ward amongst the patients</p> <p>VII. The area outside the storage room need proper cleaning since a some BMW is scattered there and can cause damage to any human /animal in addition to spreading diseases. This needs a proper PCC platform since presently, it is infested with rats /rodents, who can carry the waste to other places.</p> <p>VIII. The isolation (HIV Infected patients) ward should be totally isolated and entry should be highly restricted. The waste from this ward not shall be handled with other waste & properly recorded.</p> <p>IX. The entry in neo-natology ward should be highly restricted and the waste of this ward should be stored in a secluded & safe place.</p>
<p>10.Record Keeping</p>	<p>Assessment of various record keeping practices helps to protect against any regulatory violations as well risks of pilferage while waste handling.</p> <p>A thorough inspection of all records of BMW management was done.</p> <p>Some of the random records of daily collection of waste from the hospital is shown below. Also, the random record of waste (Manifests) handed over to common BMW treatment facility is produced below</p>	<p>Findings :</p> <p>(i) The ward wise records of waste collected not available</p> <p>(ii) Records of annual reports not available</p> <p>(iii) The records of BMW trainings not available</p> <p>(iv) Records of health check ups of staff nurses & workers not available</p> <p>(v) Records of dead foetus not being maintained</p> <p>(vi) Separate records of isolation (HIV affected) ward not being maintained</p>

STOCK / DAILY DRUG CONSUMPTION REGISTER

No.	Name of the Drug	Current Balance	Entry Date	Total Balance	MRP No.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

STOCK / DAILY DRUG CONSUMPTION REGISTER

No.	Name of the Drug	Current Balance	Entry Date	Total Balance	MRP No.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40

- (vii) No records of discarded medicines /expired drugs being maintained
- (viii) No records of major accidents being maintained
- (ix) As seen from sample manifests , the waste is also being given to the common Bio medical treatment facility in black colored bags, which is against the color coding scheme of BMW rules.

MEDICAL RECORD DEPARTMENT
Govt. Lalla Ded Hospital, Srinagar
STOCK / DAILY DRUG CONSUMPTION REGISTER

Date: _____

S. No.	Name of the Drug	Current Balance	Initial Stock	Total Balance	MRD No. (Lot No.)
21	22-8-110				50 7
22	23-8-110				50 8
23	24-8-110				50 9
24	25-8-110				50 10
25	26-8-110				50 11
26	27-8-110				50 12
27	28-8-110				50 13
28	29-8-110				50 14
29	30-8-110				50 15
30	31-8-110				50 16

MEDICAL RECORD DEPARTMENT
Govt. Lalla Ded Hospital, Srinagar
STOCK / DAILY DRUG CONSUMPTION REGISTER

Date: _____

S. No.	Drug Name	Quantity	Unit	Price	Total	MRD No. (Lot No.)
1	22-8-110					50 7
2	23-8-110					50 8
3	24-8-110					50 9
4	25-8-110					50 10
5	26-8-110					50 11
6	27-8-110					50 12
7	28-8-110					50 13
8	29-8-110					50 14
9	30-8-110					50 15
10	31-8-110					50 16

 L.D.D. Srinagar

STOCK / DAILY DRUG CONSUMPTION REGISTER

Dr. Medical Waste For The Month of Nov 2018

S. No.	Name of the Drug	Current Balance	Initial Amt. Stock	Total Balance	Waste (kg)
1	Amoxicillin	100	100	100	100
2	Amoxicillin	100	100	100	100
3	Amoxicillin	100	100	100	100
4	Amoxicillin	100	100	100	100
5	Amoxicillin	100	100	100	100
6	Amoxicillin	100	100	100	100
7	Amoxicillin	100	100	100	100
8	Amoxicillin	100	100	100	100
9	Amoxicillin	100	100	100	100
10	Amoxicillin	100	100	100	100
11	Amoxicillin	100	100	100	100
12	Amoxicillin	100	100	100	100
13	Amoxicillin	100	100	100	100
14	Amoxicillin	100	100	100	100
15	Amoxicillin	100	100	100	100
16	Amoxicillin	100	100	100	100
17	Amoxicillin	100	100	100	100
18	Amoxicillin	100	100	100	100
19	Amoxicillin	100	100	100	100
20	Amoxicillin	100	100	100	100

KASHMIR HEALTH CARE SYSTEMS
SCHEDULE-II
COLLECTION FORM

No. 13885 Name of Generator L.O. Hospital

Name Dr. Daniel Address Category B-1712

Waste Quantity 435 kg

Red	Blue	Yellow	Black	White	Total
50	2	60	1		113 kg
350	14	200	14		564 kg

Authorized Medical Director: Dr. Daniel Signature: [Signature]

Signature: [Signature] Name: Dr. Daniel

Designation: Dr. Daniel Designation: Dr. Daniel

Phone No. 9796173065 Phone No. 9625822771

Note: In case of expiry / Complaint Contact: 8888888881, 8794840112

KASHMIR HEALTH CARE SYSTEMS
SCHEDULE-II
COLLECTION FORM

No. 13888 Name of Generator L.O. Hospital

Name Dr. Daniel Address Category B-1712

Waste Quantity 460 kg

Red	Blue	Yellow	Black	White	Total
50	2	60	1		113 kg
350	14	200	14		564 kg

Authorized Medical Director: Dr. Daniel Signature: [Signature]

Signature: [Signature] Name: Dr. Daniel

Designation: Dr. Daniel Designation: Dr. Daniel

Phone No. 9796173065 Phone No. 9625822771

Note: In case of expiry / Complaint Contact: 8888888881, 8794840112

KASHMIR HEALTH CARE SYSTEMS

Common Bio Medical Waste Treatment & Disposal Facility
KVIC, LG-0-G Lalded Hospital, Srinagar, Kashmir

SCHEDULE-II

See Part A (1)

COLLECTION FORM

S.No. 13898
 Date 20 Name of Generator L.D. Hospital
 Ward 7A Waste Category B-1(a)

Waste	Box	Yellow	Black	White	Total
50	02	60	07		119
150	25	200	00		375

Waste Quantity 580 kgs
 (Waste Weight) (kg)

The Medical Waste has been used by the service provider from the generator as per the Medical Waste (Management & Handling) Rule-2011

Authorized Waste Generator: Jagjit Signature: [Signature]
 Name: En. Rishi Designation: [Signature]
 Phone No. 999612006 Phone No. 999612006

Note: In case of expiry / Complaint
 Contact :- 800000001, 8796640103

KASHMIR HEALTH CARE SYSTEMS

Common Bio Medical Waste Treatment & Disposal Facility
KVIC, LG-0-G Lalded Hospital, Srinagar, Kashmir

SCHEDULE-II

See Part A (1)

COLLECTION FORM

S.No. 15494
 Date 20 Name of Generator L.D. Hospital
 Ward 7A Waste Category B-1(a)

Waste	Box	Yellow	Black	White	Total
15	10	25	12	-	62
45	25	125	72	-	267

Waste Quantity 327 kgs
 (Waste Weight) (kg)

The Medical Waste has been used by the service provider from the generator as per the Medical Waste (Management & Handling) Rule-2011

Authorized Waste Generator: [Signature] Signature: [Signature]
 Name: [Signature] Designation: [Signature]
 Phone No. 9622803277 Phone No. 9622803277

Note: In case of expiry / Complaint
 Contact :- 800000001, 8796640103

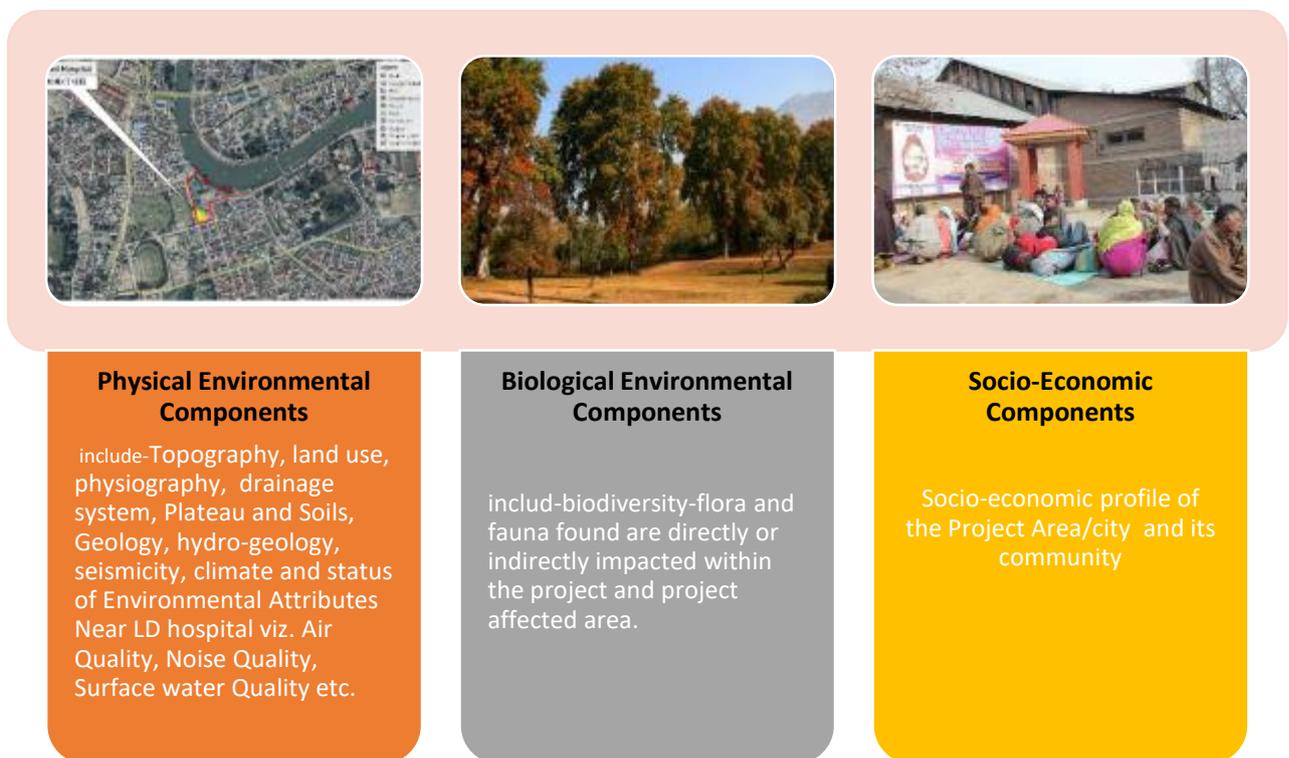
	<p>KASHMIR HEALTH CARE SYSTEMS Common Bio Medical Waste Treatment & Disposal Facility 4186, I.O.E.C. Lassipora, Pulwama, Kashmir</p> <p>SCHEDULE-04 Form no- 3 (A)</p> <p>COLLECTION FORM</p> <p>S. No. <u>15751</u> Date <u>08</u> Name of Generator <u>LD Hospital</u> Month <u>11</u> Waste Category <u>Bio Med</u> Year <u>2019</u></p> <table border="1"> <thead> <tr> <th>Red</th> <th>Blue</th> <th>Yellow</th> <th>Black</th> <th>White</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>60</td> <td>82</td> <td>52</td> <td>02</td> <td>-</td> <td>196kg</td> </tr> <tr> <td>040</td> <td>15</td> <td>210</td> <td>14</td> <td>-</td> <td>279kg</td> </tr> </tbody> </table> <p>Waste Quantity Whether Waste Shred or Otherwise</p> <p>Bio Medical Waste has been filled by the service provider from the generator as per Bio Medical Waste (Management & Handling) Rule-2017</p> <p>Authorized Waste Collector Service Provider Signature <u>J.P. P</u> Signature <u>J.S. 28</u> Name <u>En. Rasool</u> Name _____ Designation <u>Inspector</u> Designation _____ Phone No. <u>9796173065</u> Phone No. <u>9622063277</u></p> <p>Note: In case of expiry / Completion Contact :- 9889809951, 879842122</p>	Red	Blue	Yellow	Black	White	Total	60	82	52	02	-	196kg	040	15	210	14	-	279kg	
Red	Blue	Yellow	Black	White	Total															
60	82	52	02	-	196kg															
040	15	210	14	-	279kg															
<p>11. Final disposal of Bio Medical waste</p>	<p>The total Bio medical waste from the common collection point is handed over to common Bio Medical waste treatment facility (CBWTF)</p>	<p>Findings /Observations :</p> <ol style="list-style-type: none"> The CBWTF collects the waste from the common collection point on daily basis. A manifest (as shown in para 10 above)is issued by the CBWTF against receipt of the waste. The CBWTF is located at Lassipora, Pulwama about 40 Km from the LD Hospital 																		

		 <p>d) During the site visit of CBWTF, the segregation of waste was found to be a major issue for all hospitals of Srinagar including LD Hospital</p> <p>e) The hospital is handing over some waste in black bags, which is against the rules</p>
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Part C- Details/description of Natural/Physical Environment

3.8. Background

43. This section presents the existing environmental and socio-economic baseline status of the study and buffer area in which Physical, Biological and Socio-economic environmental conditions described for the immediate vicinity/influence zone of the site (1 km) and also discussed features of 10 km radius buffer zone.
44. Establishment of environmental baseline helps in understanding the prevailing environmental and socio-economic statues of the area. It provides requisite information of the environment to decision makers to take appropriate measures regarding its surrounding environment. Apart from this, it also helps to compare post project changes in the environmental conditions.
45. All necessary information and applicable information required for study were collected through survey conducted by environmental and social survey team, secondary data sources and community consultations in the study area for the different segments of the environment. Environmental monitoring data collected by JKERA in between July-September (considerably dry months for Srinagar) 2018 is used to set ambient Environmental Baseline for Air, water, Noise etc. Secondary data and information on various aspects (like hydrogeology, hydrology, drainage pattern, ecology etc.), meteorology and socio-economic aspects were collected from Census of India, IMD, and Survey of Indian etc. appropriate referencing of data has been done in the text. The entire baseline is broadly structured in the following pattern:



3.9. Physical Environmental Components

3.9.1. Topography & Physiography

46. The proposed new hospital block is geographically located at 34.0669° N, 74.8081° E with an average elevation of 1587 meters AMSL. Average elevation for the 10 km Buffer area is also found in between 1552 -1848 meter AMSL. Topography of the proposed project site is almost flat terrain. Location of project site on District elevation map of Srinagar is shown in Fig. 3.6.

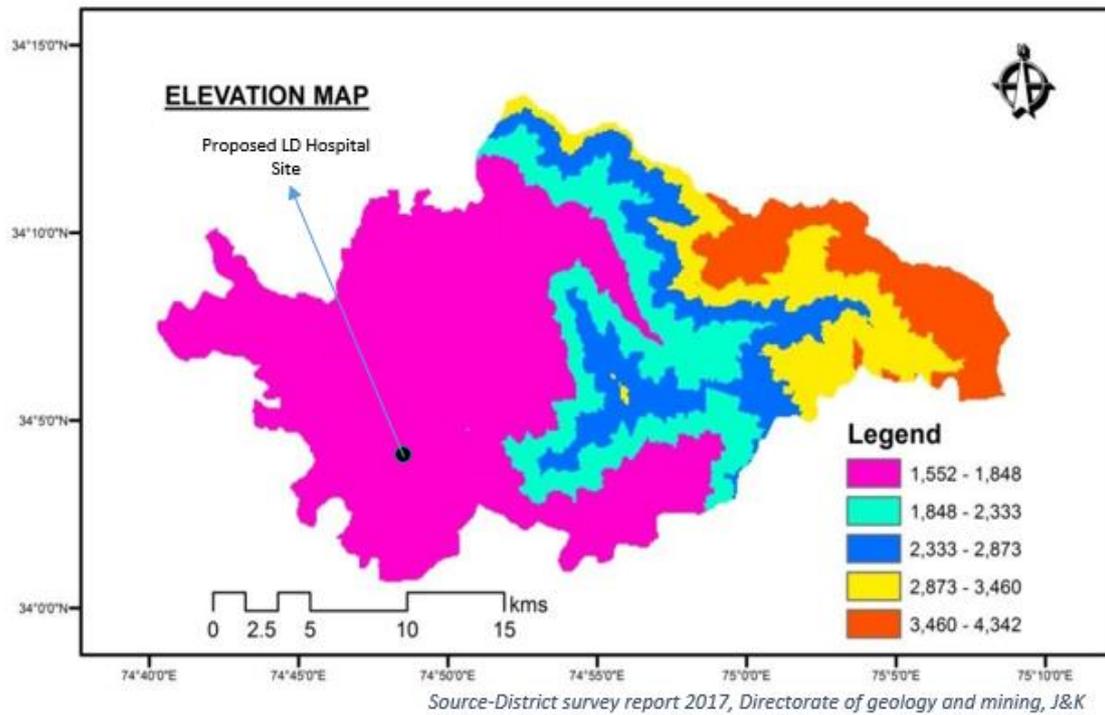


Fig.3. 6: Elevation Map of District srinagar

3.9.2. Land Use Pattern in 10 Km buffer Area

47. Land use map of 10 km buffer area is shown in Fig. 3.7 and land use categories are summarized in the Table 3.4. It can be seen in land use figures, that predominant land use in the study area is human settlement and built up area is around 33% of total buffer area land followed by open vegetation and agriculture land. Regarding the project site where proposed tower will be built, is an open land without any major permanent and semi-permanent structure.

Table 3. 4: Land use pattern in 10 Km buffer Area

S.No.	Land use Category	Area in Hectare	Area in %
1.	Built up Area	10688	33.2
2.	Airport	1122	3.5
3.	Agriculture land	8212	25.5

S.No.	Land use Category	Area in Hectare	Area in %
4.	Open Vegetation	9025	28
5.	Waste land	1099	3.4
6.	Water bodies	2080	6.4

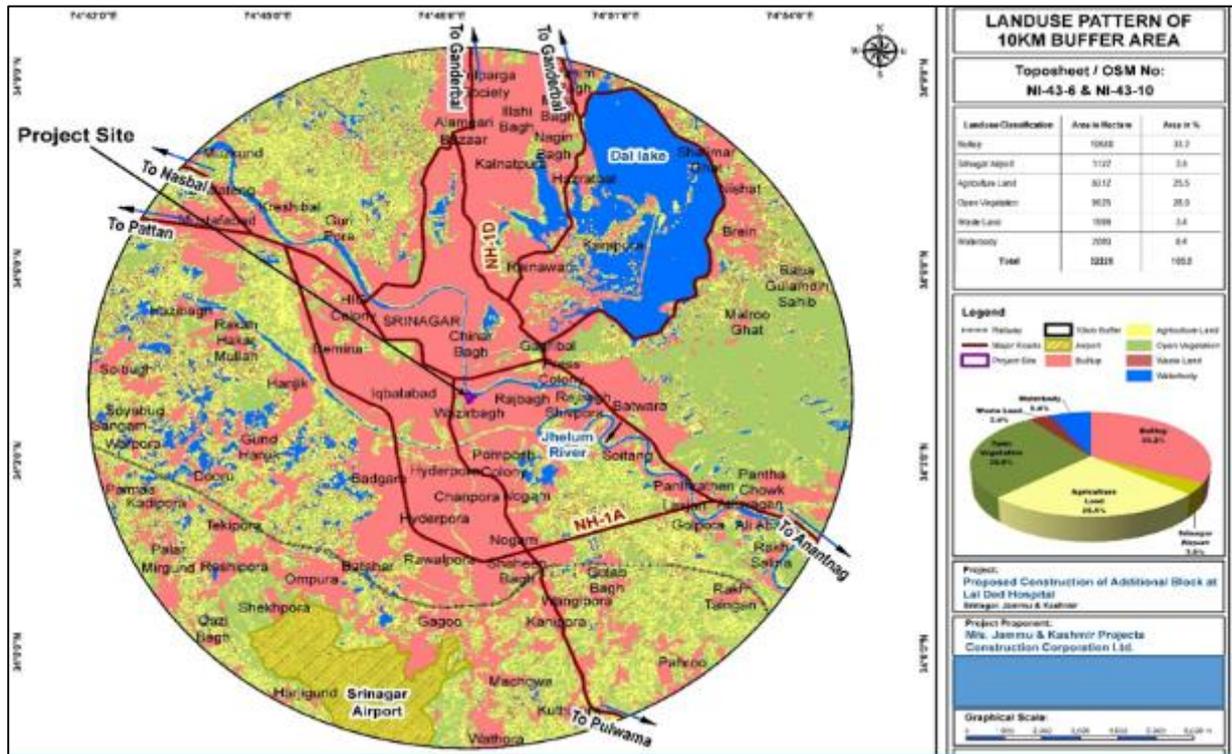


Fig.3. 7: Land use map of 10 km buffer area from LD hospital

3.9.3. Drainage system

48. The drainage system within the buffer area is characterised by Jhelum River having an open dendritic antecedent type drainage. Project site is located in the immediate vicinity of River Jhelum which originates from Verinag spring at the foothill of the Pir Panjal in the south-eastern part of the Kashmir Valley at an altitude of 1890 m. It flows in loops through the valley in northwest direction till it enters the Wular Lake. The river in general flows in north-westerly direction in district Srinagar. River Jhelum represents one of the main sources of well sorted river borne sand. The replenishment of the Jhelum load with minor mineral occurs naturally with the high speed water flowing into the river during rainy season and post melting season. Location of project site on drainage map of Srinagar district is shown at Fig. 3.8.

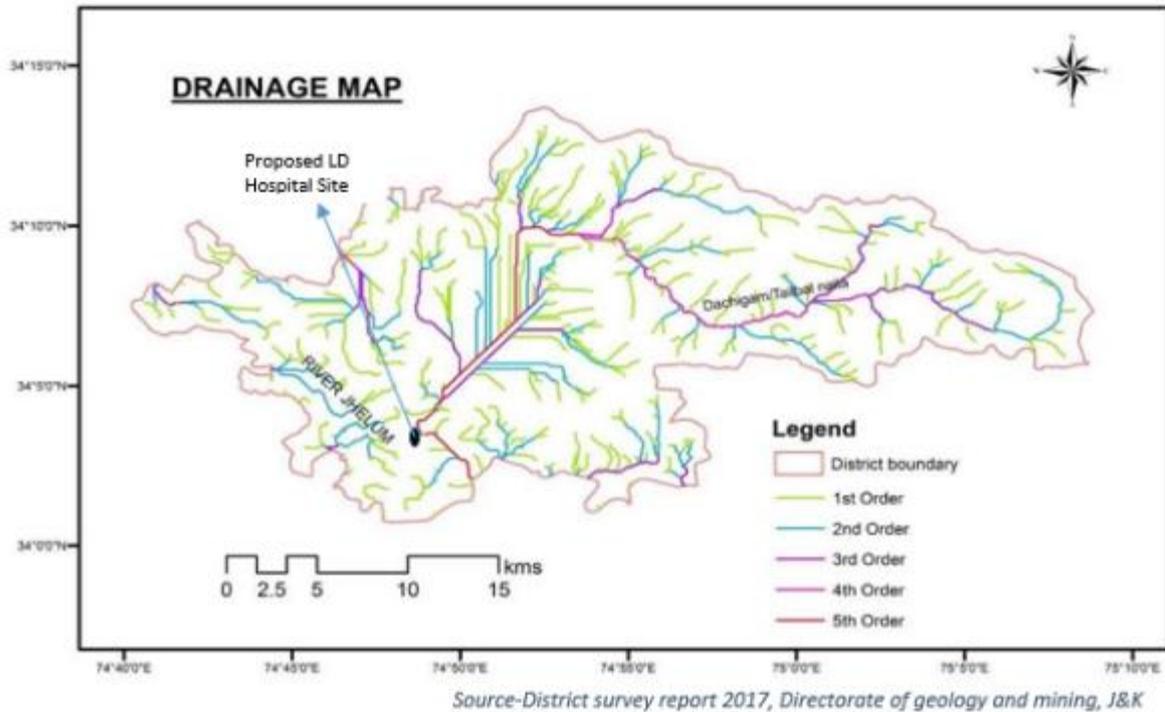


Fig.3. 8: Drainage Map of District Srinagar

3.9.4. Lake

49. The most distinctive feature of the Srinagar is Dal Lake having an area of about 15 sq.km. Dal Lake is situated approx. 7 km from the Proposed Lal Ded Hospital Block. This lake has unique life of its own with floating vegetable gardens, fields of lotus blossom and communities depended upon Dal living in house boats. Another lake Anchar lies in north western part of the district.

3.9.5. Geology & Soils

50. Proposed project site and 10 km buffer area is having Alluvium geological formation. Recent Alluvium, in the low-lying areas adjoining the Jhelum river and its tributaries consist of finely compacted detrital sediments such as loam, clay, silt and sand with occasional gravel. Location of project site on geological map of District Srinagar is given in Fig.3.9.

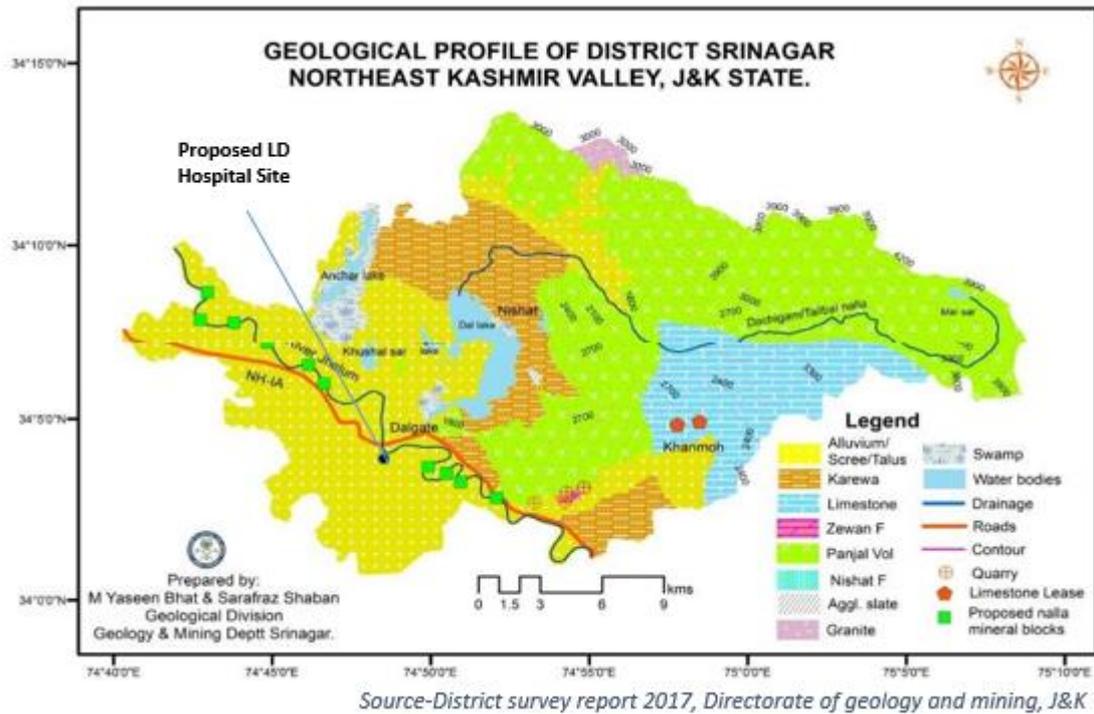


Fig.3. 9: Geological Map of District Srinagar

3.9.6. Hydrogeology

51. The hydrogeological conditions of the district are dependent on the lithology, structure and geomorphic set up. Groundwater in the area occurs both under water table and confined conditions in Soft Rock Aquifers. Depth to water table varies widely in different hydro geomorphic depending upon rainfall, the draft and the topography of the area. The depth to summer water levels in the ranges from 1.5 to 4.00 m bgl while winter water levels vary from 1.75 to 6.00 m bgl. It is important to mention here that water level behaviour in the Kashmir Valley is entirely different from the other parts of the country. This is mainly because of the fact that about 60 to 70% of the precipitation is received in the form of snow during December to February while March to April are the months of heavy rainfall. May to September are relatively dry months. Hence recharge to the ground water takes place in the valley in the months of April to June with the melting of snow and with the onset of rainfall. Therefore water level shows trends of rising from April onwards and falling from August onwards.

3.9.7. Seismicity of the Area

52. The site area is located in a seismically active part of Kashmir valley. Keeping in view the maximum credible earthquake magnitudes in the region the site area as per BIS Code of practice IS-1893-2002 is classified in zone fifth, Earthquake of 1905 (Mw 7.8) & in 1885 (Mw 7.5). According to the seismic zonation map for India, the region falls in seismic zone V. Most of the earthquakes are generated by the fault movements and in Jammu & Kashmir region, there are parallel faults trending northwest to south east.

Seismic hazard map for Jammu & Kashmir State and location of project site on that map is shown in Fig.3.10.

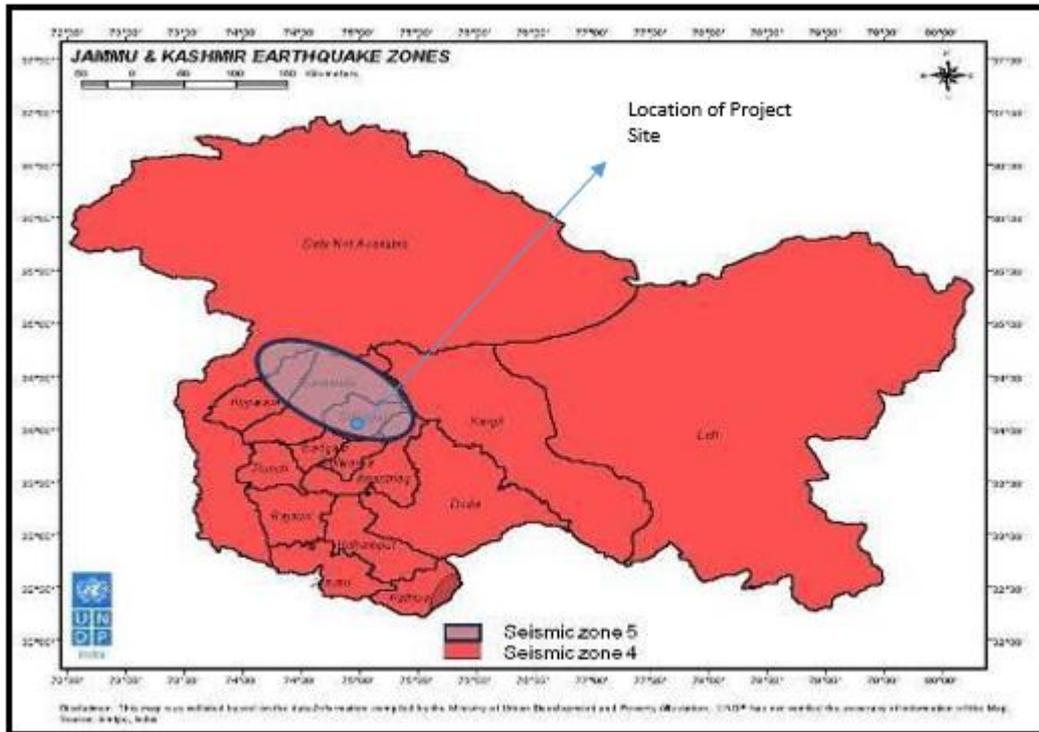


Fig.3.10 : Seismic hazard map for Jammu & Kashmir State

3.9.8. Climate

53. Srinagar district falls under the Temperate to Mediterranean type of climate and is characterized by mild summers and chilling winters. Due to latitudinal variation from 1,600 meters to 5,000 meters above mean sea level there is a wide variation in climatic conditions in different parts of the district experiencing a typical temperate climate in high altitude which experience snowfall and severe cold in the winter and tropical climate at low altitude. The winter commences from early November and lasts till end of March. Most of the precipitation received during this period is in the form of snow & the temperature, at times falls as low as -13°C . In December-January the minimum temperature is generally below freezing point. The period from March to June constitutes warm summers with temperature rising upto 33°C .
54. Precipitation takes place in the form of rainfall as well as snow with occasional hailstorms. The average rainfall in the district is about 680 mm. About 60 to 70% of the precipitation is received in the form of snow during December to February. March to April are the months of heavy rainfall. May to September are relatively dry months. The humidity is very low in the morning throughout the year. It is 40 per cent during December to February which is said to be maximum. The highest humidity 90 per cent is recorded during May-June. Monthly Temperature and Rainfall of Srinagar (based on over the Period of 98 Years weather data) is summarized in Table 3.5.

Table 3.5: Monthly Temperature and Rainfall of Srinagar (based on over the Period of 98 Years weather data)

Month	Duration of Data	No. of Years	Mean Max Tem. °C	Mean Min Temp. °C	Rainfall (mm)
January	1901-2000	98	5.0	-2.3	62.2
February	1901-2000	98	7.6	-0.8	71.4
March	1901-2000	98	13.5	3.4	101.1
April	1901-2000	98	19.3	7.4	90.7
May	1901-2000	98	24.2	10.9	68.2
June	1901-2000	98	28.9	14.5	26.3
July	1901-2000	98	30.3	18.2	54.3
August	1901-2000	98	29.7	17.7	64.6
September	1901-2000	98	27.6	12.5	35.4
October	1901-2000	98	22.1	5.6	30.9
November	1901-2000	98	15.4	0.3	19.7
December	1901-2000	98	8.5	-2.0	41.4

Source: <http://www.imd.gov.in/section/climate/climateimp.pdf>

Meteorological variations during Year 2011 to Year 2015

55. Monthly mean meteorological data for the Srinagar town has been collected from IMD for the period of Jan 2011 to March 2015. July and August are the hottest months while December and January are the coldest. The temperature varies from freezing cold in winter with minimum temperature touching -3.1°C to mild hot in summers when the temperature shoots up to 30°C . The mean maximum and minimum temperature ($^{\circ}\text{C}$) recorded at meteorological observatory (Rambagh, Srinagar) during 2011 – March 2015 are summarized in Table 3.6.

Table 3.6: Mean maximum and minimum temperature recorded during 2011 – March 2015 of Srinagar city

Months/ Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 2011												
Max Temp. ($^{\circ}\text{C}$)	07.9	09.5	17.1	18.6	27.7	30.3	29.8	30.1	27.8	22.3	15.7	10.4
Max Temp. ($^{\circ}\text{C}$)	-02.7	01.5	03.9	07.0	12.6	16.7	18.3	18.1	14.1	06.9	02.8	-01.9
Year 2012												
Max Temp. ($^{\circ}\text{C}$)	04.8	09.7	16.2	19.9	23.8	27.4	30.9	29.9	26.3	21.2	16.8	09.0
Max Temp. ($^{\circ}\text{C}$)	-03.1	00.2	04.3	08.2	10.1	14.1	18.6	19.1	14.5	05.8	01.6	-00.4
Year 2013												

Max Temp. (°C)	07.8	10.8	18.3	20.0	24.9	29.4	31.1	28.8	27.6	24.4	15.9	10.7
Max Temp. (°C)	-02.2	00.9	05.4	08.3	11.4	16.9	19.3	19.1	13.9	09.7	0.6	-01.4
Year 2014												
Max Temp. (°C)	05.5	09.9	12.3	19.0	23.9	29.4	30.4	29.3	24.8	21.8	14.8	10.7
Max Temp. (°C)	-0.1.4	00.5	03.4	07.7	11.3	15.2	19.2	16.9	13.7	8.7	2.0	-2.6
Year 2015												
Max Temp. (°C)	11.2	10.3	12.5	-	-	-	-	-	-	-	-	-
Max Temp. (°C)	-2.0	1.4	3.7	-	-	-	-	-	-	-	-	-

Source: Indian Meteorological Department, Srinagar

56. **Rainfall:** The area experiences rainfall in all seasons in Kashmir Valley however, most of the precipitation in form of Snow is received in winter followed by rainfall in spring season generated from western disturbances. The month's total rainfall recorded at meteorological observatory at Rambagh; Srinagar during 2011 to May 2015 is shown in Table 3.7. Wherein, the 2014 has received 892.9 mm of rainfall and in 2015 upto May received a total rainfall of 780.4 mm. In September 2014, Kashmir Valley witnessed devastated floods and Srinagar was worst affected.

Table 3.7: Rainfall data of Srinagar (Month's Total Rainfall in mm)

Months / Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2011	54.2	100.9	100.8	105.8	20.1	27.0	37.1	68.4	46.5	29.1	24.1	33.1	647.1
2012	60.2	78.7	58.0	82.7	39.8	24.3	12.1	26.6	111.5	10.8	11.7	27.1	543.5
2013	58.7	111.9	69.4	102.0	51.8	54.1	79.8	88.8	34.2	18.5	04.1	16.6	689.9
2014	86.9	39.1	220.1	113.7	50.9	18.6	55.8	72.2	184.8	35.7	15.1	0.0	892.9
2015	5.6	164.9	294.6	NA	NA	NA	NA	NA	NA	-	-	-	465.1 till March

Source: Indian Meteorological Department, Srinagar

57. **Humidity:** The mean relative humidity (MRH %) recorded at meteorological observatory at Rambagh, Srinagar during Jan 2011 to March 2015 at 0830 hours and 1730 hours Indian Standard Time (IST) are presented in Table 3.8.

Table 3.8: Monthly Relative Humidity Data of Srinagar City

Months		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
2011	Max	084	087	075	075	066	065	073	076	077	081	087	088
	Min	060	066	052	058	044	047	051	050	054	057	064	064
2012	Max	088	086	070	073	071	066	070	078	081	081	083	089
	Min	070	061	043	055	049	043	045	056	060	054	056	071
2013	Max	087	088	074	074	069	071	072	080	078	078	082	086
	Min	063	058	043	053	045	046	047	060	051	055	054	065
2014	Max	088	087	084	073	073	063	073	077	086	084	090	090
	Min	069	060	064	053	058	041	052	054	060	060	066	065
2015	Max	086	088	082	NA	NA	NA	NA	NA	NA	-	-	-
	Min	053	063	062	NA	NA	NA	NA	NA	NA	-	-	-

Source: Indian Meteorological Department, Srinagar

58. Apart from above climate data, detailed climatic condition of Srinagar has been presented in the form of figures that produced from a weather model Meteoblue which has compiled global historical weather data from 1985 onwards and generated a continuous 30-year global history with hourly weather data.

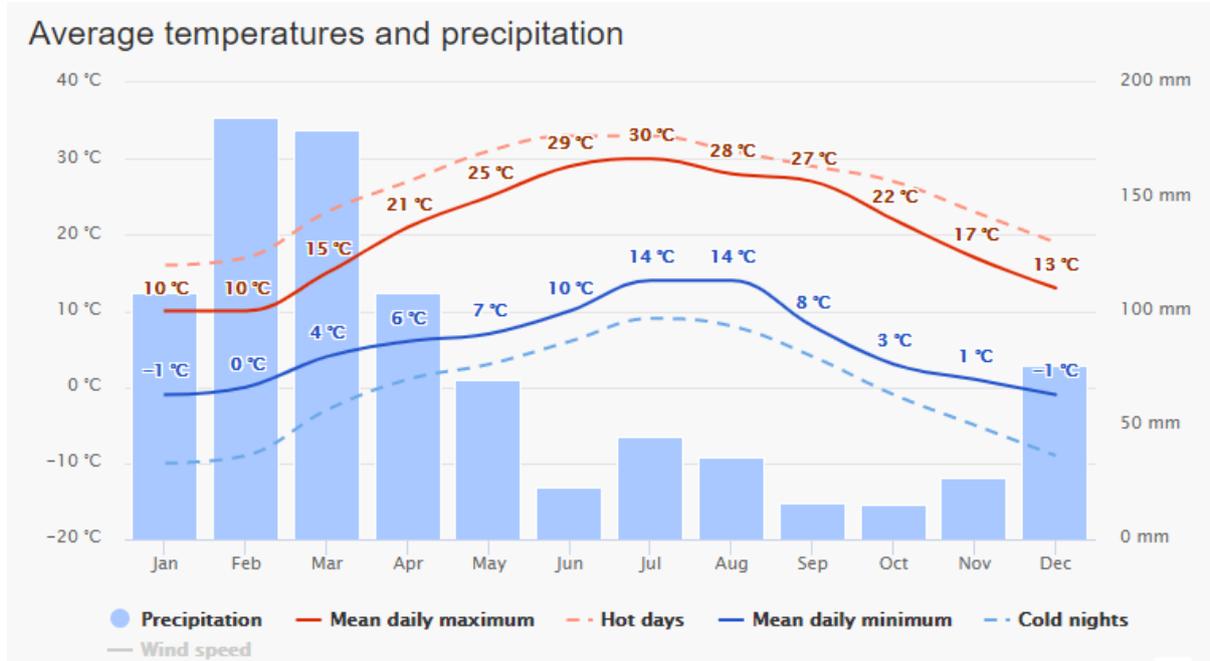


Fig.3.11: Variation in Average Temperature & Precipitation of Srinagar

59. In Figure 3.11 "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Varanasi. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.

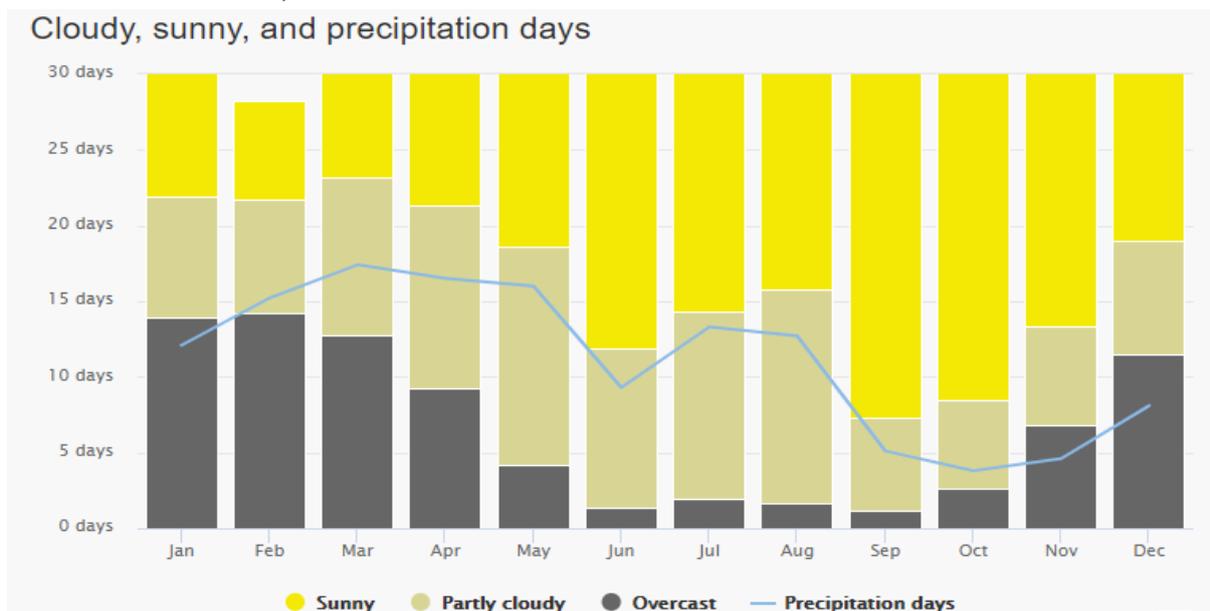


Fig.3. 12: Variation in Average Cloudy Sunny and Precipitation Days

60. Figure 3.12 shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

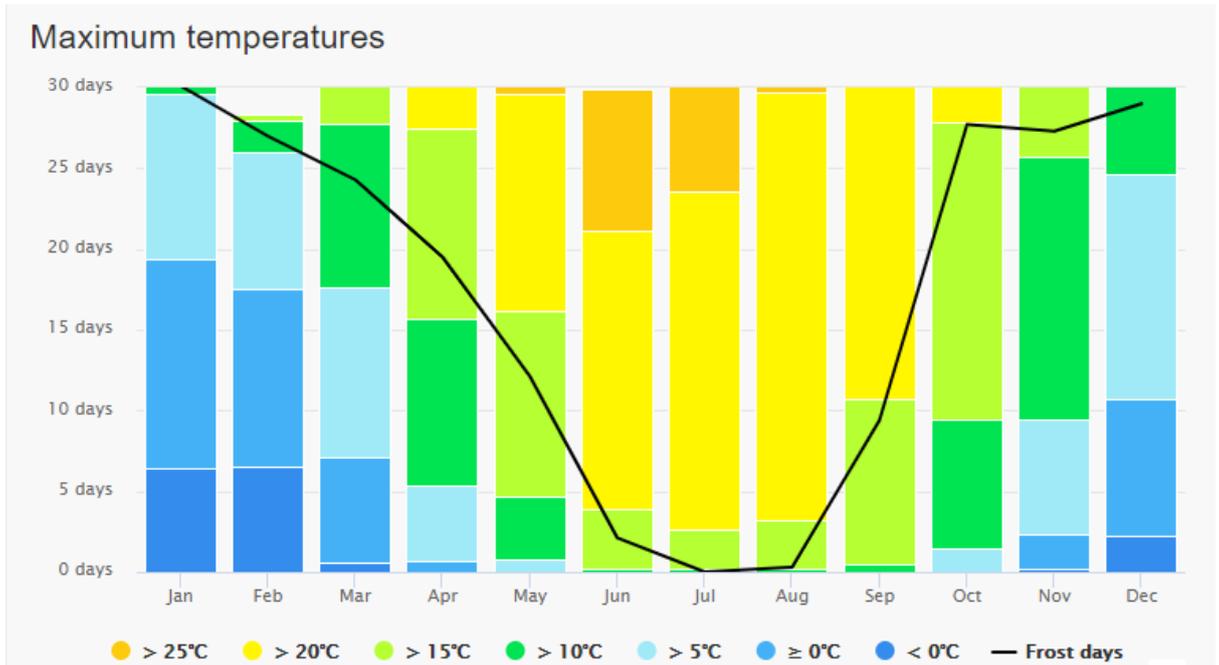


Fig.3.13: Variation in Maximum Temperature

61. Figure 3.13 shows; the maximum temperature diagram for Srinagar displays how many days per month reach certain temperatures while Fig.3.14 shows the variation in precipitation amount in the City.

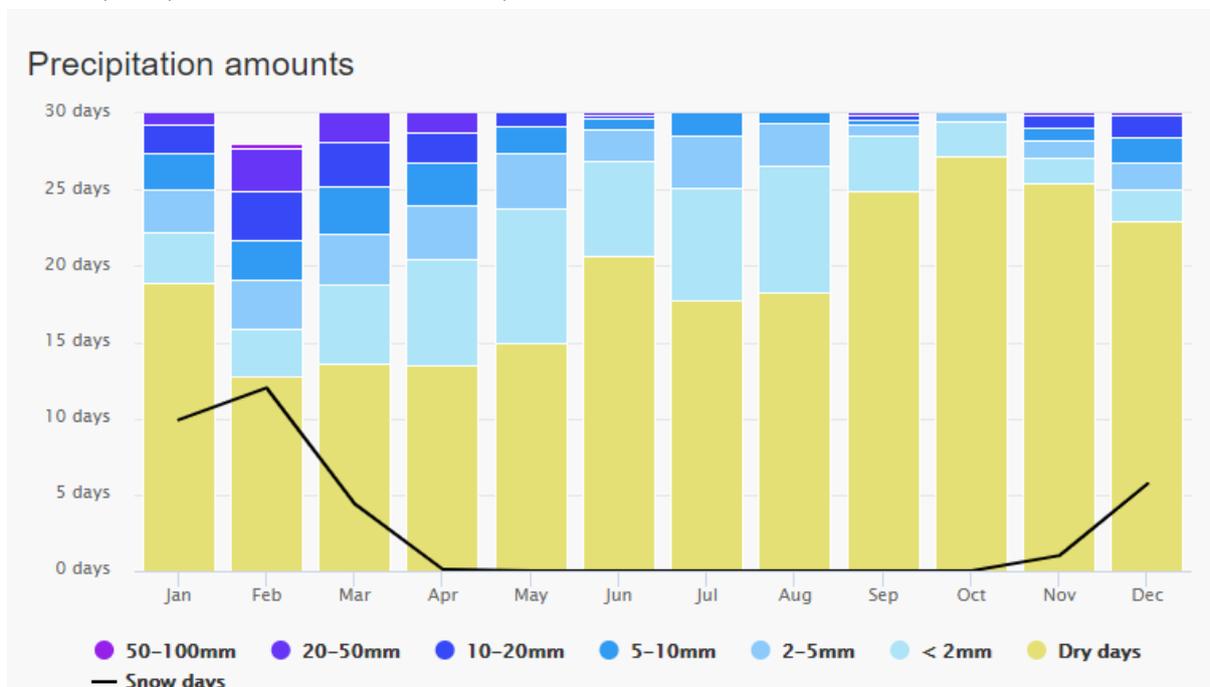
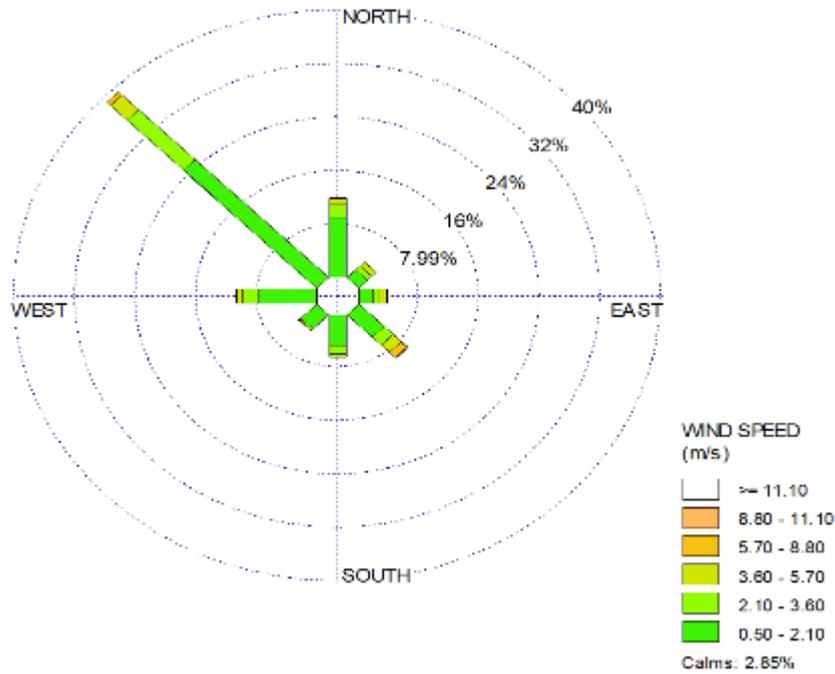


Fig.3.14: Variation in Precipitation Amount in the Srinagar



Source-Data received from JKPCCL

Fig.3.15: Wind Rose Diagram of Srinagar

62. A "wind rose" diagram based on IMD data of March- May 2017 is prepared. Figure 3.15 represent the wind rose diagram of Srinagar city that indicates wind blows mostly from NW direction.

3.10. Status of Environmental Attributes Near Lalded Project Site

3.10.1. Ambient Air Quality

63. The ambient air quality with respect to the project site forms the baseline information. The prime objective of the baseline air quality study was to assess the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the implementation and operation of the proposed project.
64. Data Used- Air Quality Monitoring conducted in the year 2017 & 2018 by JKERA under various projects of JTFRP is used here to describe baseline status of ambient air quality in and around LD hospital. Two sampling locations situated near LD hospital were chosen to establish baseline ambient data. Sampling was carried out as per the standard protocol prescribed by Central Pollution Control Board, GoI. The monitoring locations and parameters monitored are shown in Table 3.9.

Table 3. 9: Ambient Air Quality Sampling Locations and Parameters analyzed

Sampling Location	Type of Area	Monitoring parameters
Near Iqbal Park (Near LD Hospital)	Commercial	PM2.5, PM10, SO ₂ , NO ₂ , Noise
Jehangir chowk (<1 km from LD Hospital)	Commercial	

3.10.2. Observations based on Ambient Air Quality Data near LD Hospital Area:

I- Ambient Air Quality Data near LD Hospital Area (Core Area)

65. As mentioned above, data has been collected and analyzed for four parameters viz. Particulate matter size $\leq 2.5\mu\text{m}$ (PM2.5), Particulate matter size $\leq 10 \mu\text{m}$ (PM10), Sulphur Dioxide (SO₂), Nitrogen dioxide (NO₂) during year 2017 and 2018. Monitoring results compared with the standards laid down by Central Pollution Control Board. During the monitoring period PM10 and PM2.5 concentration in different air quality monitoring stations were varied in between from 112.9-156.4 $\mu\text{g}/\text{m}^3$ and 28.9-64.5 $\mu\text{g}/\text{m}^3$ respectively. PM10 concentrations were mostly found above to NAAQ standard except once while PM2.5 concentration was mostly recorded lower to NAAQ standard except one at all locations. SO₂ and NO₂ concentration in different air quality monitoring station was found to vary from 15.1-41.2 $\mu\text{g}/\text{m}^3$ and 16.5-36.7 $\mu\text{g}/\text{m}^3$ respectively. Both of these parameters were recorded well below to NAAQ standards prescribed by CPCB. Summary results of air quality data are shown in Figure 3.16 depicted below.

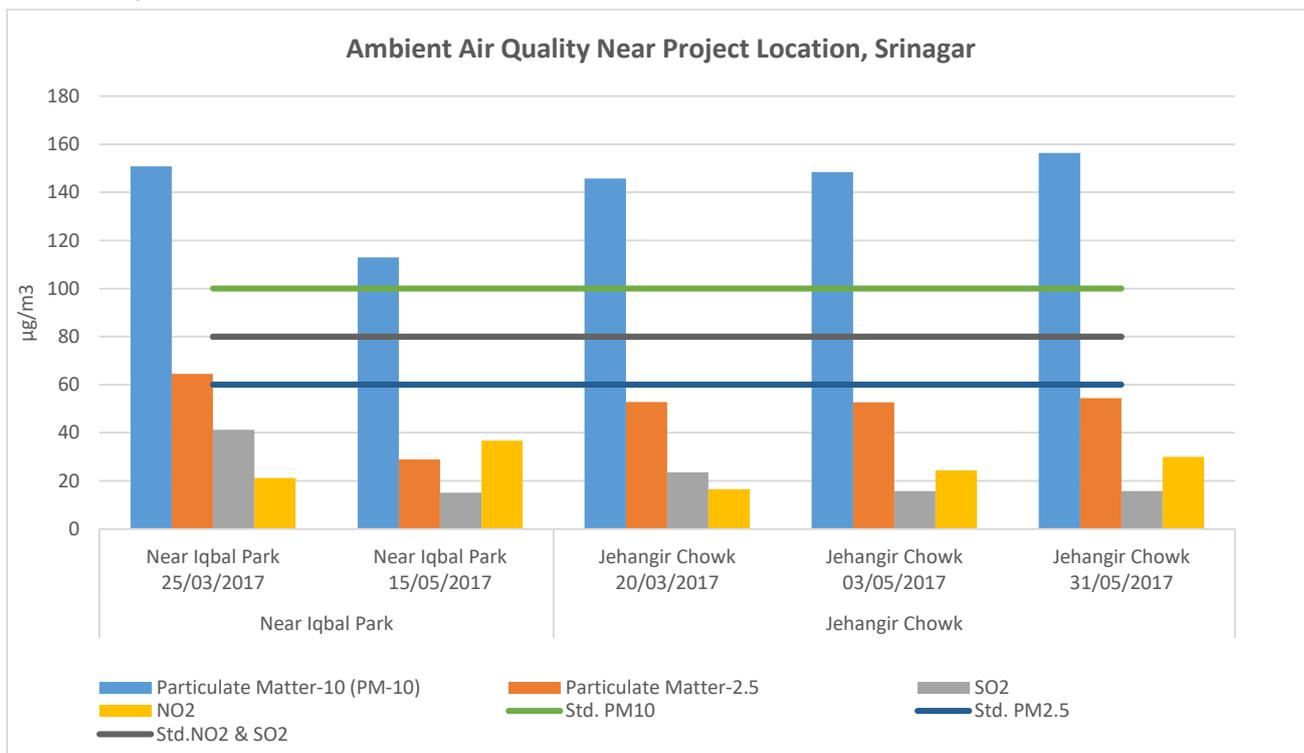


Fig.3.16: Ambient Air Quality Near Project Location, Srinagar

II- Ambient Air Quality in Buffer Area (within 10 Km from LD Hospital)

66. Air Quality Monitoring conducted in by JKERA under various projects of JTFRP on 8 different location situated within 10 Km from LD Hospital is used here to describe baseline status of ambient air quality of project buffer area. During the monitoring, PM10 and PM2.5 concentration in different air quality monitoring stations were varied in between from 77.3-194.8 $\mu\text{g}/\text{m}^3$ and 28.1-79.3 $\mu\text{g}/\text{m}^3$ respectively. PM10 concentrations were found above to NAAQ standard except while PM2.5 concentration was mostly found lower to NAAQ standard except one. SO2 and NO2 concentration in different air quality monitoring station was found well below to NAAQ standards prescribed by CPCB. Summary of Ambient Air Quality monitoring results conducted in the year 2018 at 8 different locations are depicted in the Fig.3.17.

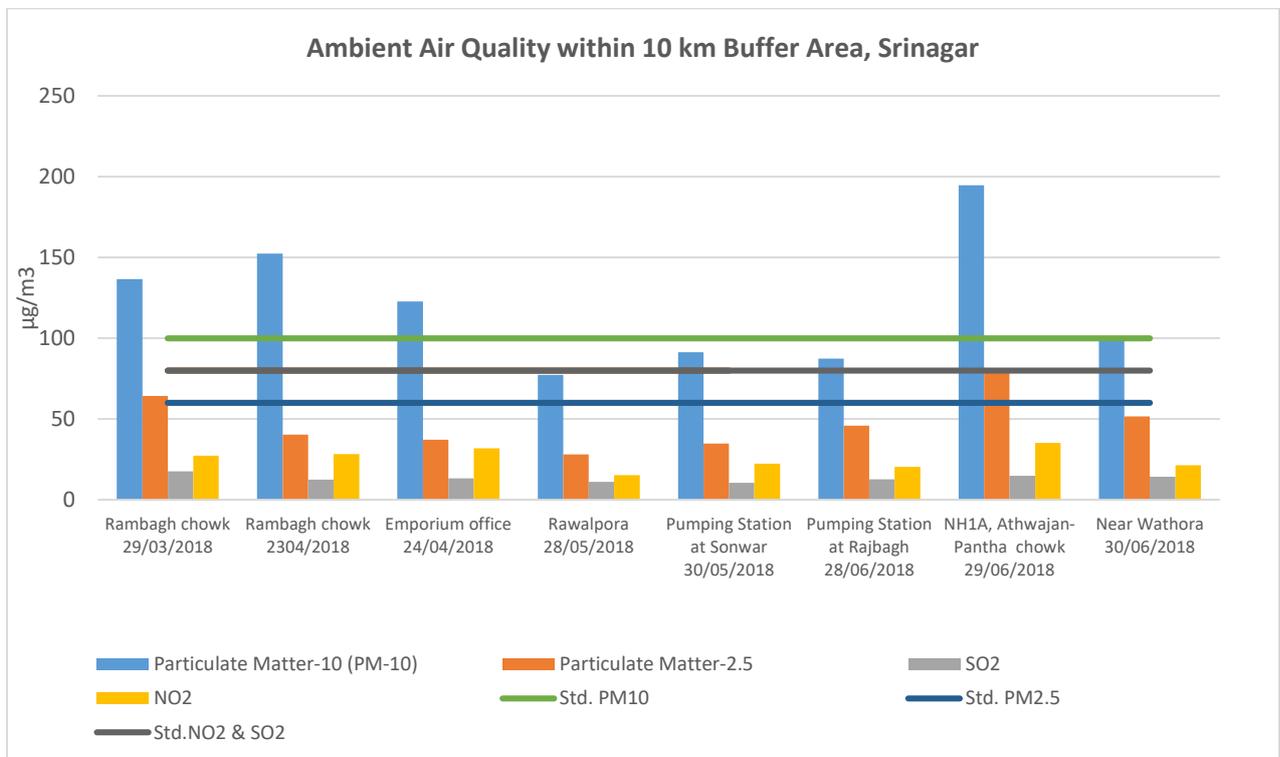


Fig.3.17: Ambient Air Quality at Buffer Area within 10 km from project location

67. Based on the air quality data recorded in core and buffer area during Year 2017-2018, following are concentration range fixed as baseline values for different Air Quality parameters.

Location	Setting of Baseline Ambient Air Quality (Range)			
	RSPM (PM10) ($\mu\text{g}/\text{m}^3$)	RSPM (PM2.5) ($\mu\text{g}/\text{m}^3$)	SO2 ($\mu\text{g}/\text{m}^3$)	NO2 ($\mu\text{g}/\text{m}^3$)
Core Area	112.9-156.4	28.9-64.5	15.1-41.2	16.5-36.7

Location	Setting of Baseline Ambient Air Quality (Range)			
	RSPM (PM10) (µg/m3)	RSPM (PM2.5) (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)
Within 10 km Buffer Area	77.3-194.8	28.1-79.3	10.4-17.6	15.3-35.2

3.10.3. Ambient Noise Levels

I- Ambient Noise Levels near LD Hospital Area (Core Area)

68. Noise can be defined as any sound that is undesirable because it interferes with speech and hearing, and is intense enough to damage hearing or is otherwise annoying. Noise impacts can be of concern during construction and operational phases of the project. Factors those are important in determining noise levels include distance from the noise source, natural or manmade barriers between the source and the receptors, whether conditions, etc. The environment/ health impacts of noise can vary from noise induced hearing loss (NIHL) to annoyance depending on loudness of noise levels and tolerance levels of individuals.
69. **Sampling Locations & Observation:** A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the study area. Noise at different noise generation sources based on the activities in the project area, ambient noise due to commercial activities, traffic and noise at sensitive areas like LD hospital. The noise monitoring has been conducted for determination of noise levels at same locations in which air quality monitored. The monitoring was done as per prescribed method laid down by CPCB. Results as shown in Fig.3.18 reveals that most of the noise level recorded at Iqbal Park and Near Jahangir Chowk were very close to the permissible limits. However, some exceed to the permissible standard may be due to traffic movement, commercial activities and public gathering.

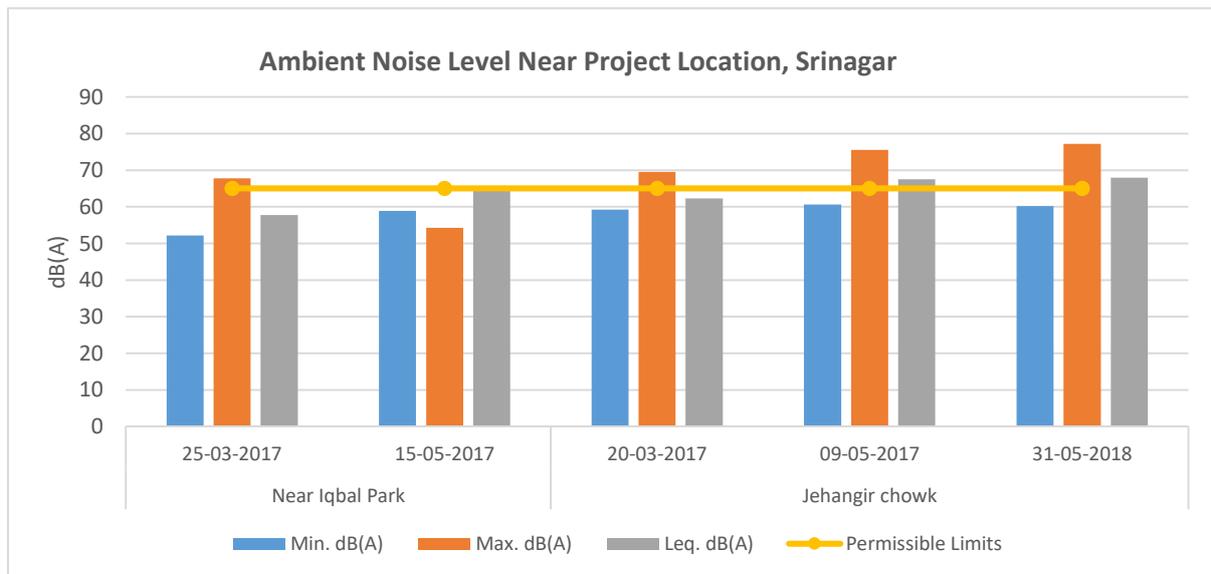


Fig.3.18: Ambient Noise Levels Near Project Location

II- Ambient Noise Level Collected at Various locations In the Buffer Area (within 10 Km from LD Hospital)

70. Ambient Noise Level Collected at Various locations In the Buffer Area (within 10 Km from LD Hospital) are depicted in Fig.3.19.

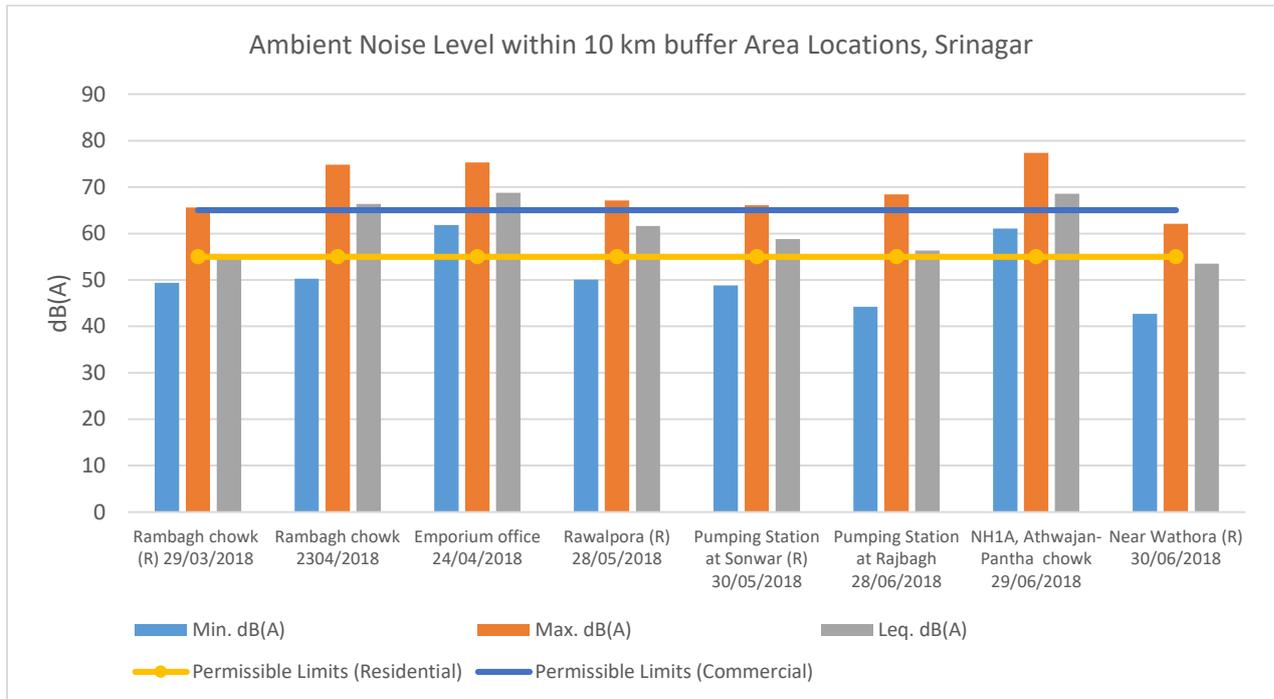


Fig.3.19: Ambient Noise Levels at Buffer Area locations within 10 km from project site

71. Based on the noise levels collected in core and buffer area during Year 2017-2018, following range is fixed as baseline noise levels core core and buffer area.

Location	Setting of Baseline Ambient Noise Level (Range)			
	Type	Min. dB(A)	Max. dB(A)	Leq. dB(A)
Core Area	Commercial	52.2-60.6	54.3-77.2	57.8-68
Within 10 km Buffer Area	Residential	42.7-50.1	62.1-67.1	53.5-61.6
	Commercial	44.2-61.8	68.4-77.4	56.3-68.8

3.10.4. Water quality of River Jhelum

72. River Jhelum is important lotic ecosystem and key water source for meeting increasing water demand. It has significant economic values including supplying water for drinking and irrigation, providing food via fish and aquatic products, and preserving the health and biodiversity of important life support ecosystem. However, all these functions depend on the water quality which is based on a well-balanced environment in terms of its physical, chemical and biological variables. Water quality also plays a very important role to ascertain the quantum of pollution load and health of the ecosystem. The qualitative and quantitative data of various physico-chemical and biological parameters are significant for characterization of river water quality and any changes and alterations due to any unsystematic development processes influence the water quality. In the view of this and to understand the status of baseline values, central pollution control data for year 2016 (annual average) is used to understand water quality status of river. Results reveals that all the physico-chemical parameters chosen for analysis were found well within the permissible limits of Class C water. Summary of results are shown in Fig.3.20-3.22.

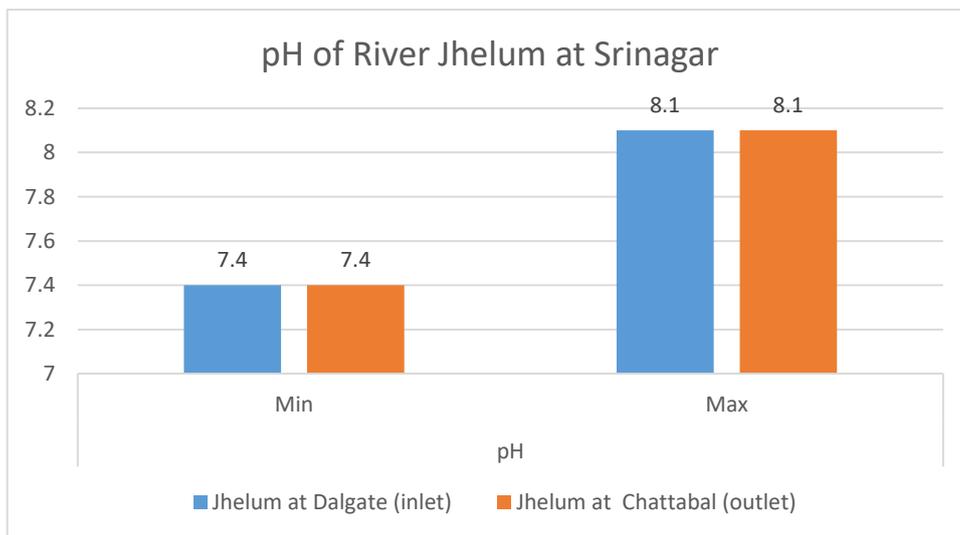


Fig.3.20: pH of River Jhelum water Sample

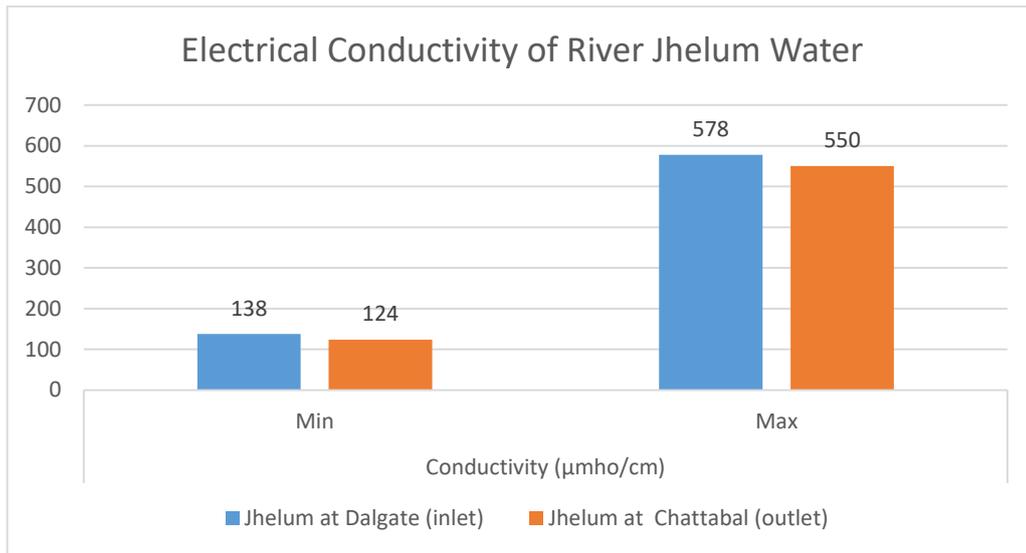


Fig.3.21: EC of River Jhelum Water at Srinagar

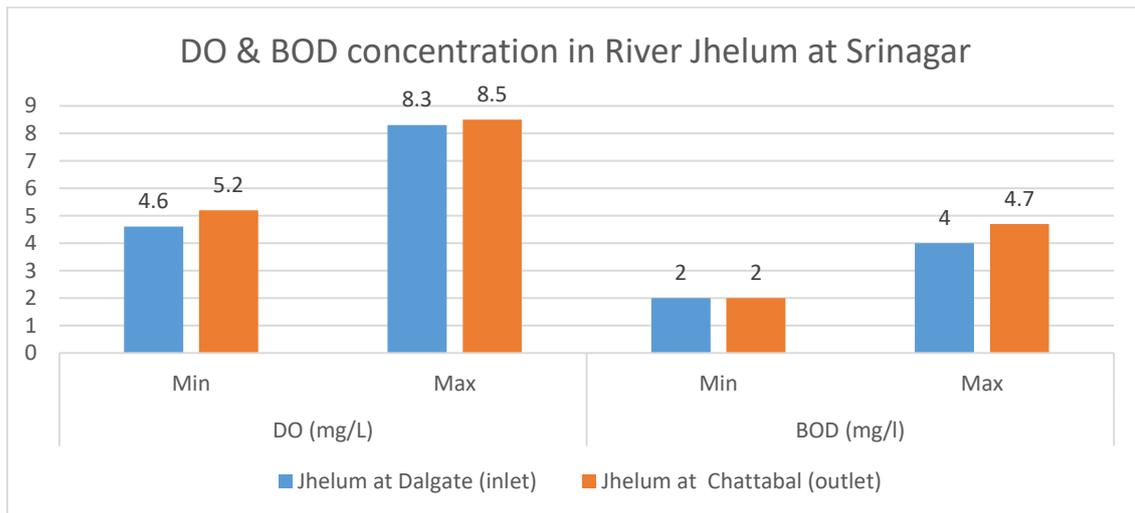


Fig.3.22: Water quality of River Jhelum-DO & BOD concentration

3.11. Biological Environment

73. Study of biological environment is one of the important aspects for the Environmental Impact Assessment, in view of the need for conservation of Environmental quality and biodiversity of particular geographical area. Generally, biological communities are the good indicators of climatic and edaphic factors. Studies on biological aspects of ecosystems are important in Environmental Impact Assessment for safety of natural flora and fauna. Biological environment includes mainly terrestrial and aquatic flora and fauna. Data presented here is based on secondary information and primary survey conducted by the previous environmental consultant appointed by JKPCCL. Mode of

data collection and parameters considered during the Survey is summarized in Table 3.16.

3.11.1. Objectives of Biological Study

74. The main objectives of biological study were:
- To collect the baseline data for the study along with a description of the existing terrestrial, wetland and aquatic biodiversity.
 - To assess the scheduled species in the proposed site (rare, endangered, critically endangered, endemic and vulnerable).
 - To identify the locations and features of ecological significance.
 - To identify the Impacts of proposed project before, after and during development phase.

3.11.2. Study Area

75. The study area is divided into two parts-
- a) **Core Zone:** Project Site i.e. LalDED Hospital Campus
 - b) **Buffer Zone:** Area with angular distance of 1 km surrounding the site (for environment screening). A 10 km radius from the project site could be considered for identifying and assessing impacts, if any on ecological sensitive areas/features or the limits as defined through official notification by GoJK and MoEFCC, Gol.

Table 3. 16: Mode of data collection and parameters considered during the Survey

Sr. No.	Aspect	Mode of Data collection	Parameters monitored	Remarks
1.	Terrestrial Biodiversity	By field survey	Floral and Faunal diversity	For Floral Diversity: Random survey, sapling survey/forest inventory, walking transect, collection and identification with the help of relevant literature. For Faunal Diversity: direct and indirect sampling, walking transect, point sampling and nest sampling etc.
2.		From authentic sources like Forests department of Haryana and available published literatures from ZSI, BSI etc.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	Data collected from the working plan of the region, forest types from the authentic literature of Champion & Seth.

3.	Aquatic Biodiversity	By field survey	Floral and Faunal diversity	For Plankton Study- Lackey's drops method and light microscope For other aquatic- Random survey, opportunistic observations
4.		From authentic sources like Forests department of Haryana.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	Desktop literature review to identify the representative spectrum of threatened species, population and ecological communities.

Table 3. 17: Environmental data sheet of the sensitive features in the region

Particulars	Yes / No	Aerial Distance and Details
1. Is the sub-project located in whole or part within a distance of 1 km from the nearest edge of any of the following environmentally sensitive areas?		
a. Biosphere Reserve	No	
b. National Park	No	Dachigam National Park is 22 Kms far from the sub-project site
c. Wildlife/Bird Sanctuary	No	
d. Game Reserve	No	
e. Tiger Reserve/Elephant Reserve	No	Tigers and Elephants do not exist in J&K
f. Wetland	No	Dal lake is 7 Kms far from subproject site. Hokersar wetland is 10 Kms far from sub-project site
g. Natural Lake	No	
h. Swamps/Mudflats	No	
i. World Heritage Sites	No	
j. Archaeological monuments/sites under ASI's central/state list)	No	
k. Reservoirs/Dams	No	
2. Is the sub-project located in whole or part within a radius of 500 m from the following features?		
a. Reserved/Protected Forest	No	
b. Migratory Route of Wild Animals/Birds	No	

Particulars	Yes / No	Aerial Distance and Details
c. Area with threatened/rare/ endangered fauna (outside protected areas)	No	
d. Area with threatened/rare/ endangered flora (outside protected areas)	No	
e. Habitat of migratory birds (outside protected areas)	No	
f. Historic Places (not listed under ASI – central or state list)	No	<ul style="list-style-type: none"> ▪ Shrine of Hazrat Sheikh Abdul Qadir Jeelani (RA) is located 2 Kms far from sub-project site. ▪ Hanuman Temple is located 2Kms far from sub-project site. ▪ Silk factory at Raj-bagh is located 1.5 (approx.) far from sub-project site
g. Regionally Important Religious Places	No	<ul style="list-style-type: none"> ▪ Shrine of Hazrat Sheikh Abdul Qadir Jeelani (RA) is located 2 Kms far from sub-project site. ▪ Hanuman Temple is located 2Kms far from sub-project site.

3.11.3. Outcomes of Flora Biodiversity Survey

3.11.3.1. Terrestrial flora:

76. **Core Area:** There is no major vegetation on the proposed project site except a chinar tree (*Platanus*) located on the site.
77. **Buffer Area:** The prominent vegetation types in buffer zone of the proposed LD hospital project comprised evergreen scherophyll forests (*Pinus wallichiana* and *Abies pindrow*), deciduous forests communities of *Platanus occidentalis*, *Robinia pseudoacacia*, *Salix*, spp., *Quercus rober*, *Fraxinus hookeri*, *Ulmus villosa*, *Ivforus alba*, *Juglans regia*, *Ailanthus altissima* and stands or isolated patches of *Betula utilis* at higher elevations), deciduous scrub (*Parroptopsis jacquemontiana*, *Corylus colurna*, *Isodonplectranthoides*, *Rosa webbiana*, *Berberis* spp., *Vibernum foetens*, *Lonicera* spp.), evergreen scrub (*Dephneolesides*, *Contan Easterna muullaria* and *Rhododendron* spp, and *Juniperus recurva* at higher elevations), Savanna (mid grasses like *Therneda anathera*, *Stipa siberica*, *Daetylis glometrata*, *Phraginitis conimunis* with scattered trees or scrub plants), grasslands (*Chrysopogone hinulatus*, *Cynodon dactylon*, *Themeda anathera*, *Bothriocloa pertusa*, *Pennisetum* spp. etc) and broad-leaved herbs (*Anemone biflora*, *Germanium* spp. *Fritillaria imperialis*, *Sambucus wightiana*, *Ferula jaeschkaina* etc). The conspicuous absence of such higher sub alpines and alpines as *Betula utilis*, *Rhododendron*, spp., and *Juniper usrecurve* is attributable to the difference in altitude and climate which is a noteworthy feature of the Kashmir Valley.

3.11.3.2. Agricultural and Horticulture Crops

78. The State is predominantly agricultural and 81.4 percent of the total population still lives in rural area whose main occupation and means of livelihood is agriculture. It contributes nearly 60 percent of the State revenue which adequately explains the over dependence of the State on agriculture. The main crops of Srinagar are Rice, Jowar, Bajra, Maize, Ragi, Wheat, Barley, Gram, Arhar, Condiments etc. Major horticulture crops of temperate zone of i.e. entire Kashmir valley are apple, pears, cherry, walnut, almond, chestnut, strawberry, stone fruits, grapes etc.

3.11.3.3. Grasslands

79. No prominent grass land ecosystem has been found in core and buffer zone of the project. However the grass lands were mixed with natural vegetation in low lands and cultivable waste lands are now being utilized as grazing grounds to the livestock species. The grass species and sedges of core and buffer zone are listed below with the natural vegetation of buffer zone.

3.11.3.4. Endemic/Endangered Flora

80. No endangered and endemic flora was recorded from core and buffer zone of the project area.

3.11.3.5. National Park/Sanctuaries

81. There is no Bio-sphere Reserve, National Parks, Wildlife Sanctuary, Tiger Reserve and Elephant Reserve within 10 km radius of the project site.

3.11.3.6. Macrophytes Diversity in Lake

82. Dal Lake, a shallow eutrophic lake, (Dar and Romshoo, 2008), located on the North Eastern side of Srinagar city. Fresh water lakes are usually rich in aquatic vegetation and constitute one of the important components of biodiversity. The team has recorded a total of 31- species of plants from the Dal. Among the Emergents, *Typha angustata* and *Phragmites australis* covered vast expanses of the Lake. While among the rooted floating leaf type, *Nelumbo nucifera*, *Nymphaea mexicana*, *Nymphoides peltatum* & *Trapa natans* dominated the lake. The water zone has been colonized by submerged species, mainly *Ceratophyllum demersum*.

3.11.4. Faunal Diversity:

83. To prepare a detailed report on the status of wildlife biodiversity within 10 km radial area along the existing pipeline to assess the impacts due to the project activity and evolve suitable mitigation measures to protect and conserve wildlife biodiversity following components were studied:

- a) Wildlife Survey (Diversity)
- b) Habitat Study (Feeding, Breeding and Roosting areas)
- c) Distribution/Status of Birds
- d) Rare & Endangered species of Fauna
- e) Specific local characteristics of biodiversity in the study area.

3.11.4.1. Methodology for Faunal Diversity

84. The assessment of fauna has been done by extensive field survey of the area and referring secondary data. During survey, the presence of wildlife was also inhabitants depending on animal sightings and the frequency of their visits in the project area which was later confirmed from Forest and Wildlife Department etc.

3.11.4.2. Outcome of Fauna Diversity Survey:

85. Majority of the buffer area is completely covered with human habitations thus no major faunal diversity exist in this area. Apart from this, there is no migratory route passing through proposed project location because it is confined to a small location. Therefore, there will not be any disturbance envisage for migratory birds of Dal lake and Wular lake of Kashmir. A complete list of fauna along with their relative abundance, global and national conservation priority status recorded during the survey is given in Table 3.18.

Table 3. 18: Faunal Diversity from Study Area

A. Mammals

Sr. No.	Common Name	Scientific Name	Schedule
1.	Jungle Cat	<i>Felis chaus</i>	Schedule-II
2.	Red Fox	<i>Vulpes vulpes</i>	Schedule-II
3.	Jackal	<i>Canis aureus</i>	Schedule-II
4.	Indian porcupine	<i>Hystrix indica</i>	Schedule-IV
5.	Himalayan Mouse Hare	<i>Ochotona roylei</i>	Schedule-IV
6.	Common langur	<i>Semnopithecus ajex</i>	Schedule-II
7.	Rhesus macaque	<i>Macaca mullata</i>	Schedule-II

B. Aves

Family	Common Name	Scientific Name	Status
1. Accipitridae	1. Black kite	<i>Milvus migrans</i>	S-IV
	2. Sparrow Hawk	<i>Hieratus nisus nisosimilis</i>	
	3. Booted Eagle	<i>Hieratus pennatus</i>	
	4. Golden Eagle	<i>Aquila chrysaetos</i>	
	5. Lammergier	<i>Gypaetus barbatus</i>	
	6. Eurasian Griffon	<i>Gyps fulvus</i>	
	7. White Rumped vulture	<i>Gyps bengalensis</i>	
2. Falconidae	8. Common kestrel	<i>Falco tinnunculus</i>	S-IV
3. Phasianidae	9. Snow Partridge	<i>Lerwa lerwa</i>	S-IV
	10. Himalayan Monal	<i>Lophophorus impejanus</i>	
	11. Himalayan Snowcock	<i>Tetraogallus himalayensis</i>	
	12. Western Tragopan	<i>Tragopan melanocephalus</i>	
	13. Chukar	<i>Alectoris chukar</i>	

4. Columbidae	14. Snow Pigeon	<i>Columba leuconota</i>	S-IV
	15. Rock Pigeon	<i>Columba livia</i>	
	16. Oriental Turtle Dove	<i>Streptopelia orientalis</i>	
	17. Eurasian Collared Dove	<i>Streptopelia decaocta</i>	
	18. Spotted Dove	<i>Streptopelia chinensis</i>	
5. Psittacidae	19. Rose Ringed Parakeet	<i>Psittacula krameri</i>	S-IV
	20. Slaty Headed Parakeet	<i>Psittacula himalayana</i>	
	21. Indian Cuckoo	<i>Cuculus micropterus</i>	
	22. Eurasian Cuckoo	<i>Cuculus conorus</i>	
6. Strigidae	23. Eurasian Eagle Owl	<i>Bubo bubo</i>	S-IV
	24. Little Owl	<i>Athene noctua</i>	
7. Aodidae	25. Himalayan Swiftlet	<i>Collocalia brevirostris</i>	S-IV
	26. Alpine Swift	<i>Tachymarptis melba</i>	
	27. Common Swift	<i>Apus apus</i>	
	28. House Swift	<i>Apus affinis</i>	
8. Alcedinidae	29. Pied Kingfisher	<i>Ceryle rudis</i>	S-IV
	30. Common Kingfisher	<i>Alceodo atthis</i>	
	31. White-Throated Kingfisher	<i>Halcyon smyrnensis</i>	
9. Coraciidae	32. European roller	<i>Coracias garrulous</i>	S-IV
10. Upupidae	33. Common hoopoe	<i>Upupa epops</i>	S-IV
11. Picidae	34. Scaly Bellied Woodpecker	<i>Picus squamatus</i>	S-IV
	35. Grey-Headed Woodpecker	<i>Picus canus</i>	
	36. Himalayan Woodpecker	<i>Dendrocopos himalayensis</i>	
12. Alaudidae	37. Crested lark	<i>Melanocorypha bimaculata</i>	NA
13. Hirundinidae	38. Dusky crag martin	<i>Hirundo concolor</i>	S-IV
	39. Barn swallow	<i>Hirundo rustica</i>	
	40. Striated swallow	<i>Hirundo daurica</i>	
14. Oriolidae	41. Eurasian Golden Oriole	<i>Oriolus oriolus</i>	S-IV
15. Surnidae	42. Common Starling	<i>Sturnus vulgaris</i>	S-IV
	43. Common Myna	<i>Acridotheres tristis</i>	
	44. Jungle Myna	<i>Acridotheres fuscus</i>	

16. Corvidae	45. House Crow	<i>Corvus splendens</i>	S-IV
	46. Alpine Chough	<i>Pyrrhocorax graculus</i>	
	47. Jungle Crow	<i>Corvus macrorhynchos</i>	

C. Butterflies

Family	Common Name	Scientific Name	Status
Papilionidae	1. Common Yellow Swallow tail	<i>Papilio machaon</i>	Common
Pieridae	2. Indian Cabbage White	<i>Pieris canidia</i>	Common
	3. Large Cabbage White	<i>Pieris canidia</i>	Common
	4. Common Gull	<i>Cepora nerissa</i>	Common
	5. Dark Clouded Yellow	<i>Colias fieldii</i>	Common
	6. Pale Clouded Yellow	<i>Colias erate</i>	Common
	7. Bath White	<i>Pontia daplidice</i>	Common
	Lycaenidae	8. Common Copper	<i>Lycaena phaeas</i>
9. Dark Grass Blue		<i>Zizeeria karsandra</i>	Common
10. Indian Cupid		<i>Everres lacturnus</i>	Common
11. Plains Cupid		<i>Chilades pandava</i>	Common
12. Lime Blue		<i>Chilades lajus</i>	Common
13. Red Pierrot		<i>Talicauda nyseus</i>	Common
14. White Bordered Copper		<i>Lycaena pavana</i>	Common
15. Dusky Hedge Blue		<i>Oreolyce vardhana</i>	Common
16. White Hedge Blue		<i>Udara akasa</i>	Common
17. Lime blue		<i>Chilades lajus</i>	Common
Nymphalidae	18. Common Beak	<i>Libythea lepita</i>	Common
	19. Club beak	<i>Libythea myrrha</i>	Common
	20. Striped Tiger	<i>Danaus genutia</i>	Common
	21. Plain Tiger	<i>Danaus chrysippus</i>	Common
	22. Indian fritillary	<i>Argyreus hyperbius</i>	Common
	23. Small leopard	<i>Phalantha alcippe</i>	Common
	24. Great Satyr	<i>Aulocera padma</i>	Common
	25. Common fourring	<i>Ypthima baldus</i>	Common
	26. Indian fritillary	<i>Argyreus hyperbius</i>	Common
	27. Large silver stripe	<i>Childrena children</i>	Common
	28. Common leopard	<i>Phalantha phalantha</i>	Common
	29. Himalayan Sergeant	<i>Athyma opalina</i>	Common
	30. Common sailer	<i>Neptis hylas</i>	Common
	31. Short banded sailer	<i>Phaedyma columella</i>	Common
	32. Painted Lady	<i>Vanessa cardui</i>	Common
	33. Mountain tortoiseshell	<i>Aglaia casmiriensis</i>	Rare

3.12. Socio-Economic Profile

Srinagar Town:

86. Srinagar is the summer capital of Jammu and Kashmir. It is a hub of all sorts of activities particularly relating to trade, business and tourism and affecting Kashmir valley. It is an ancient historic city, a holiday resort, a venue for conference, seminars, workshops and similar other gatherings of National and State level importance. As shown in Table 3.19, The total population of the district as per 2011 Census is 1236829 persons. It consists of 651124 males and 585705 females. The rural sector of the district is inhabited by 17313 persons comprising of 8916 males and 8397 females spread over the 11 inhabited villages and two tehsils. The urban areas are inhabited by 1219516 persons comprising 642208 males and 577308 females spread over two statutory towns and two Census Towns, Srinagar Municipal Corporation, Badamibagh Cantonment and Kralpora (CT), Khonmoh (CT) respectively.

Table 3. 19: Srinagar District Population as per 2011 Census

Population	Total	Persons	1236829
		Males	651124
		Females	585705
	Rural	Persons	17313
		Males	8916
		Females	8397
	Urban	Persons	1219516
		Males	642208
		Females	577308

87. **Population Growth:** The district Srinagar growth rate of population between 2001-2011 is 20.35 per cent i.e. an increase of 209159 persons which is at par with State's average of 23.64 per cent. The district ranks number 2 in terms of population, as it constitutes 9.86 per cent of the total population of the State after Jammu. Srinagar district with 30.79 per cent urbanisation stands at the top in Jammu and Kashmir. The highest population was recorded in Srinagar tahsil viz. 9905 among all tahsils of 22 districts of the State.
88. **Density:** Srinagar district is the second largest populated after Jammu. The density of population is 625 persons per square kilometer as against 124 persons per square kilometer for State, as it ranks 6th after Jammu among districts of the State.
89. **Sex Ratio:** The sex ratio of the district as a whole stands at 900 i.e. the number of females per thousand males as against the State average of 889.
90. **Child Population:** Population of children in the age group (0-6) years accounts for 158300 or 12.80 per cent of the total population of the district. A comparison of rural/urban of child population as well as sex wise total population revealed that the percentage of child population in rural and urban sector was 15.40 and 9.49 respectively. The sex wise proportion shows that male rural is 14.63 and urban 9.07 per cent. However, the percentage of female shows a tilt towards a rural population (viz. 10.00 to 16.23).

91. **Work participation rate:** Out of a total working population of the Srinagar district 330547 persons consisting of 81.2 per cent are the main worker which is 20 per cent higher than the main workers of the State. 76641 persons constituting 18.8 per cent are marginal workers, which is lower by 20 per cent than the marginal workers of the State. The percentage of non-workers stands at 67.08 per cent, which is 1.55 per cent higher than the percentage level of the total non-workers of the State. 32.9 per cent of total population of the district is workers. Of these 12228 persons constituting 3 per cent are engaged in cultivation while as 10408 persons constituting 2.6 per cent do not own any cultivable land and are employed as agricultural labourers. 89.5 per cent workers are engaged in other services. The remaining 4.9 per cent remain busy in household activities.
92. **Literacy:** The literacy percentage in the Srinagar district is recorded as 69.41 which is higher by 2.24 per cent than the State literacy rate and this has ranked the district at 6th in the literacy in the State.
93. **Agriculture:** Agriculture is the main source of livelihood in the rural areas of the district. The district has a total area of 0.51 lakh hectares of which 0.46 lakh hectares of land is used for agricultural purposes excluding 0.04 lakh hectares which are sown more than once in a year.
94. **Horticulture:** Apples, walnuts, almonds, pears, cherry, grapes and apricots are the main fruits of the district. The Horticulture department is striving to improve the quality plant material and production of the fruit grown in the district. Orchardists were provided plants and fencing material on subsidized rates. Many departmental nurseries were developed. A Fruit Preservation and Utilization Extension Centre is functioning at Lal Mandi where people are trained in converting fruit and vegetables into various by-products.
95. **Animal husbandry:** Livestock rearing is an important occupation of the village folks in general and migratory population in the district. The Government is giving special attention in animal husbandry and sheep breeding. According to Livestock Census the total number of animals recorded in the district in 2007 is 1.02 lakh livestock heads out of a total 2.82 lakh heads in the State.
96. **Fisheries:** Srinagar region abounds in different water bodies, like river Jehlum, lakes, wetlands and streams, springs etc. These resources have been utilized for providing quality of fish proteins to common people for this area. The most important sources of fish are spring fed, snow fed river Jehlum and the Dal Lake.
97. **Industry:** Small Scale Sector enjoys a place of pride in Srinagar. The sector has made a considerable contribution to economic advancement of the district. There are 193 units in the field of food products, hosiery, carving wood products, paper machine, leather products, metallic and non-metallic products and electronic products etc. are flourishing under the medium sector.

Socio-economic Profile of Buffer Area:

98. To understand of socio-economic profile of the project buffer area, a socio-economic survey (SES) was undertaken during November 2018. The survey was conducted among the stakeholder’s at Lal Ded Hospital. Both external and internal stakeholders of the subproject are covered in the survey, with a sample size of 70 nos. of stakeholder. The findings are being given in subsequent paragraphs while detailed can be referred from SIA report.

Classification of Respondents Participated in Survey

99. The survey conducted by SIA team revealed that no acquisition of private land and structure would be required for proposed subproject construction. Since, the local community and existing staff will be benefitted from subproject implementation. The socio-economic survey conducted in Lal Ded Hospital Complex and nearby areas (road and streets) including community (patients & attendants), staff (doctors, nurses & technician), pharmacists, street vendors, taxi and auto service providers. The Classification of respondents is depicted in Fig.3.23.

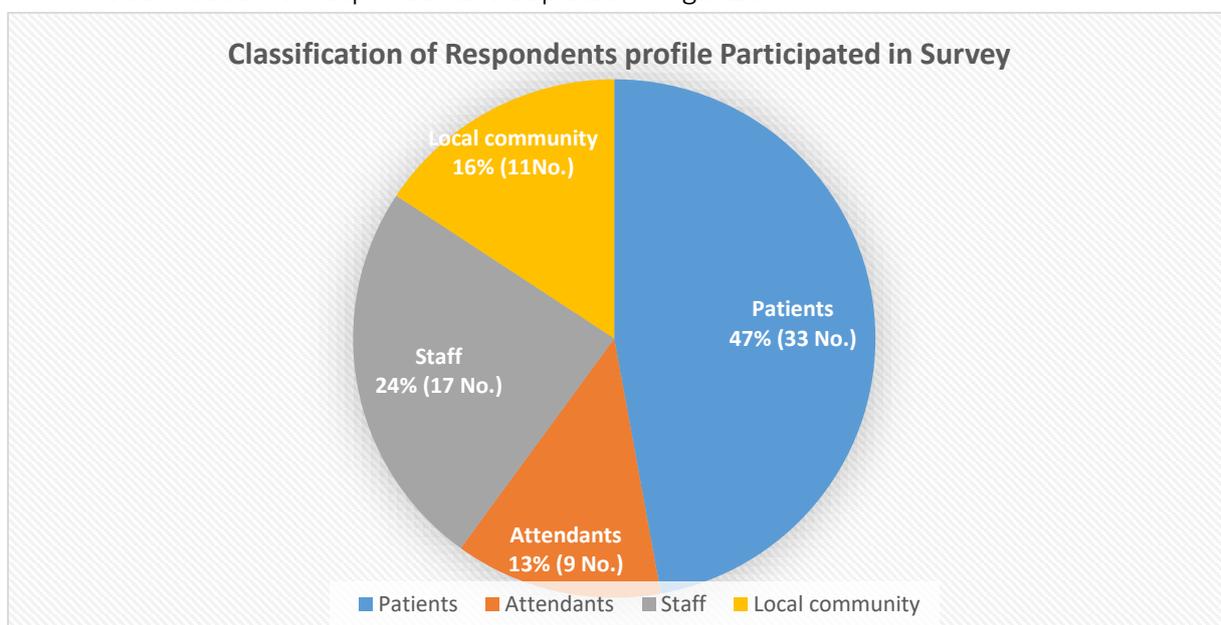


Fig.3.23: Respondents Profile Participated in Survey

Source: Census & Socio-Economic Survey, November 2018

Gender

100. Lal Ded hospital facility is mainly related female gender and has impact on whole family including male during pregnancy and childbirth. The sex wise distribution of affected/respondents indicates 54.6 % males and 45.4 % females.

101. The survey also revealed that 100 % of respondents were Muslim by religion. The distribution of respondents according to their age suggests that majority of them are young (40% in the age group 0-30 years) specifically patients. Only older age (above 50 years) respondents were found in the local community and working staff at hospital. Among all the respondents, 100% are married. The educational profile of the patients indicates that majority of housewife are illiterate indicating further the poverty and

deprived conditions of the respondents. Around 20-25% of female respondents have attained education up to middle school level.

102. Distributing respondent by their occupational categories, it was found that a maximum of 41 % of patients are housewife working at home. Rest of them is engaged in govt. service, business and agriculture activities. Around 11% of total respondents are working as labour.
103. The annual income of respondents was calculated broadly on various available economic sources. It was found that average annual income between Rs. 2 to 6 lakh. Economic profile of Respondents are summarized below in Fig. 3.24.

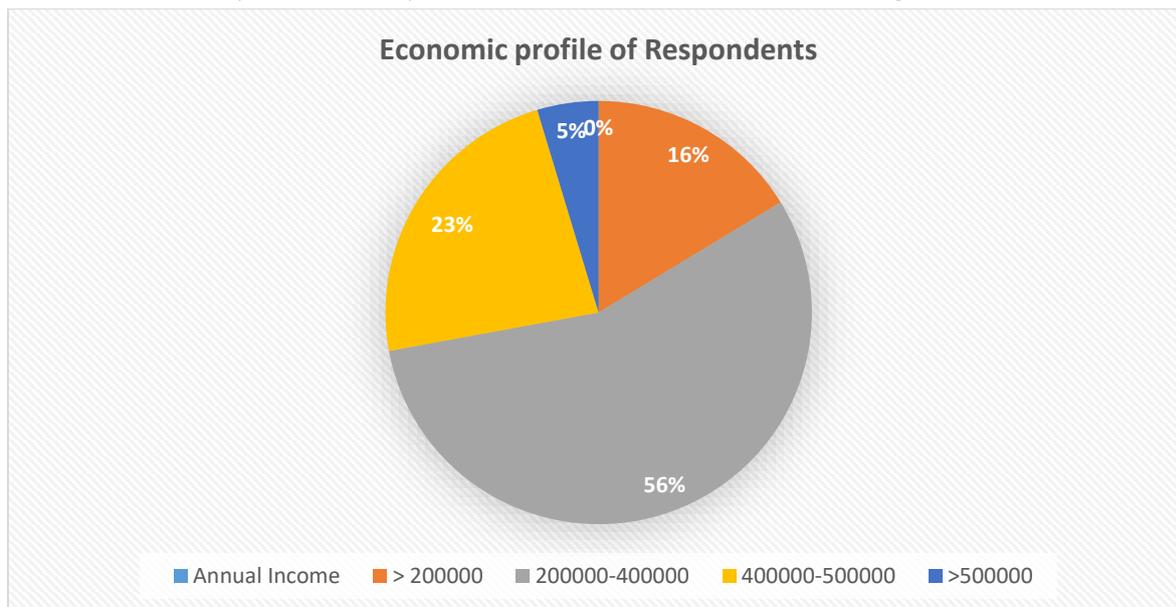


Fig.3.24: Economic Profile of Respondents Participated in Survey

104. Most of the consulted community respondents earning their livelihood from govt. services and labour activities. The community respondents depending on labour activities for livelihood are found vulnerable as all of them are making a living on subsidized food provided by the government to families below poverty line.

Access to Social Services and Civic Amenities

105. Social services are defined as benefits and facilities provided by a government to improve life and living condition of the children, elderly persons, the disabled, the poor and other disadvantaged sector of the society in order to develop them into productive and self-reliant community. The social services include education, food subsidies, health care facilities, subsidized housing, self-employment assistance and skill development assistance, among others.
106. In the subproject area the respondents or the members of their families were not found migrating from their places to other city for health care services. Besides outside individuals from other districts from valley migrate to Srinagar city for health check-up and pregnancy related health services at Lal Ded Hospital.

Health Status in Project Influence Area

107. During the survey, it was found that anemia, hypothyroidism, hyperthyroidism, hepatitis E, and common fever are common diseases in the project area. However, occurrence of anemia, hypothyroidism, hyperthyroidism and common fever is found high.
108. On the adequacy of health care facilities, all the respondents replied that in Lal Ded hospital have good facilities and treatment is done by experts comparative other PHC and district hospitals in the region. The facilities are often found insufficient due to overloaded doctors and staff and limited space. According to respondents' lack of infrastructure, specialized doctors and staff are major gaps in health care facilities. Further, they said that regular visits of doctors in the village and availability of medicines can improve the general health care conditions in the village.
109. There is high demand of local community and working staff for expansion of existing hospital capacity to easy the way of health services for pregnant women and newly born child. All the respondents i.e. 100 % are in favor of new building construction. With increase in capacity of existing infrastructure and strength of doctors at Lal Ded Hospital will able to serve more efficiently to the peoples of Srinagar and other district as well.
110. On prevalence of HIV/AIDs all the respondents are with the view that no such incidences have been recorded so far. All the respondents replied positively that hospital expansion will help in improvement of the health status.

Chapter - 4: DESCRIPTION OF PROJECT

4.0. About Jehlum Tawi Flood Recovery Project

111. In September 2014, the State of Jammu & Kashmir experienced torrential monsoon rains causing major flooding and landslides. The continuous spell of rains from September 2– 6, 2014, caused Jhelum and Chenab Rivers as well as many other streams/tributaries to flow above the danger mark. The Jhelum River also breached its banks flooding many low-lying areas in Anantnag, Srinagar and adjoining districts. In many districts, the rainfall exceeded the normal by over 600 per cent. The Indian Meteorological Department (IMD) records precipitation above 244.4mm as extremely heavy rainfall, and the region received 558mm of rain in the June-September period, as against the normal 477.4 mm. Due to the unprecedented heavy rainfall the catchment areas particularly the low lying areas were flooded for more than two weeks. Some areas in urban Srinagar stayed flooded for 28 days.
112. Water levels were as high as 27 feet in many parts of Srinagar. The areas from the main tributaries of river Jhelum vis-à-vis Brenginallah, Vishavnallah, Lidernallah and Sandrannallah started overflowing due to the heavy rainfall causing water levels in Jhelum River to rise. Water levels also increased in the rivers of Chenab and Tawi, both of which were flowing above normal levels. Due to the rivers overflowing nearly 20 districts were impacted.
113. In the aftermath of the devastating floods the Government of India requested assistance from the World Bank and an emergency project figured by the Natural Disaster was started, the Project is named as Jehlum Tawi Flood Recovery Project.
114. The project is focusing on restoring critical infrastructure using international best practice on resilient infrastructure. Given the region's vulnerability to both floods and earthquakes, the infrastructure will be designed with upgraded resilient features, and will include contingency planning for future disaster events. Therefore, the project aims at both restoring essential services disrupted by the floods and improving the design standard and practices to increase resilience.

4.1. Proposed Lal Ded (LD) hospital Project

115. Lalla Ded (Lalded) hospital is a main institution for Gynaecology and Obstetrics in Kashmir valley. With having more than six hundred beds, LD hospital is serving majority of the valley's population. In the devastating floods of 2014, the water level was above the ground floor slab level causing huge loss to infrastructure and services. Given the increasing pressure and demand for improved facilities, including the needs of present and future and to create a more resilient infrastructure, a new building/block has been proposed under Jhelum Tawi Flood Recovery Project.

116. The proposed new building/block site is geographically located at 34°03'56.68"N, 74°48'28.42"E within the premises of LalDED Hospital at village Wazir Bagh, District-Srinagar, Jammu and Kashmir. The subproject is proposing construction of additional Block on the plot area of 30631.5 Sq.m. Maximum height of proposed 5 floor block is considered 25 meters and total constructed area is estimated 8394 Sq.m. A summary of proposed project is depicted in Fig.4.1.



Fig.4. 1: Summary of Proposed Project Features

4.2. Details of Proposed Block of LD hospital:

117. The Proposed block of LD hospital is to be constructed within the confined area of existing hospital which is having area approximately 30631 Sq.m. Maximum height of proposed 5 floor block is considered 25 meters and total constructed is estimated 8394 sq.m. A layout plan of proposed block is depicted in Fig.4.2.

118. Detailed assessment of site plan, design consideration, assessment of functional elements, sustainability assessment etc. already conducted in Architectural Assessment Report which is attached with this report as a Separate Section (See Section No.2)

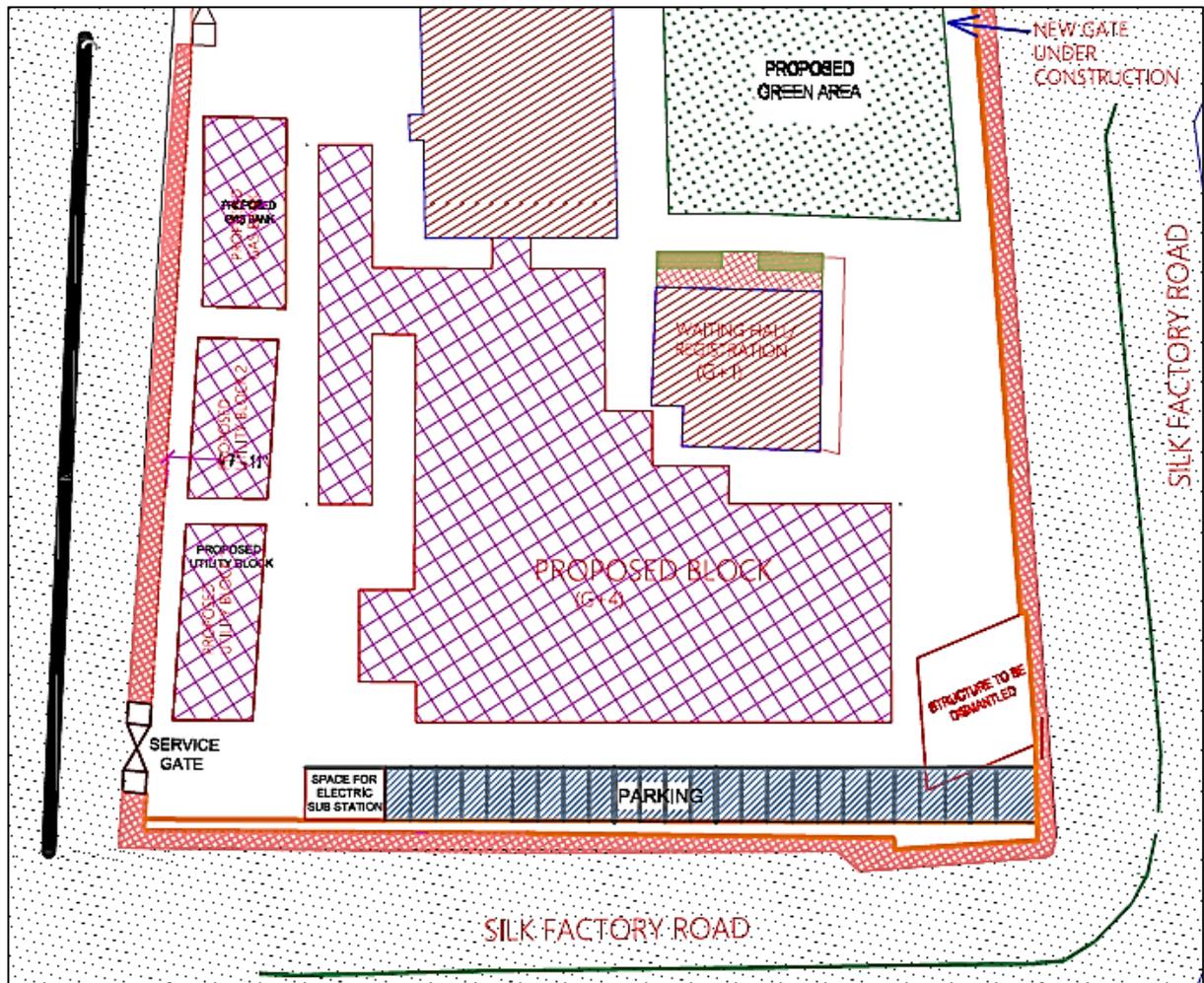


Fig.4.2: Layout of Proposed Block of LD Hospital

4.2.1. Key design considerations

119. Sustainable design practices were adhered as per the norms of Green Building and National Building Code, 2018. During designing of the project, several consideration have been adopted to create flood resilient physical infrastructures. Application of dual plumbing, rainwater harvesting and advanced wastewater treatment system to increase reuse and recycling for treated water were also proposed for this new medical facility. Energy conservation measures including solar energy for lighting and water heating will be adopted in the proposed building as per Energy Conservation Building Code (ECBC) 2017 to reduce the energy foot prints of the project. National and international best practices and codes to provide fire safety and tackle emergency situations were also considered in the designing to provide better safety features in the proposed building.

Detailed design consideration, their assessment and recommendation have been dealt with in Chapter 2 (Site Plan Assessment) and Chapter 3 (Building Plans Assessment) of the Architectural Assessment Report.

4.2.2. Codes and standards followed/adopted

120. As listed below, Codes and standard were adopted during design part of the project and dealt with throughout the Architectural Report, wherever applicable. The Building standards of the National Building Code, 2018 and National Accreditation Board (NABH) norms have been found lacking at several places and recommendations for these have been given in the Architectural Assessment Report. Codes and standards followed under project are listed below:

Codes & Standards Followed

- National Building Code, 2018
- SMC Building Bye-laws
- Energy Conservation Building Code, 2017
- Automatic Sprinkler System- IS: 15105
- Fire Extinguishing system-NFPA 13
- automatic fire detection and alarm system-IS 15908
- External Hydrant Systems- IS 13039
- Specification for Coarse and Fine aggregate for use in mass concrete- IS 383
- Code of practice for construction of reinforced concrete shell roof-IS-2204
- Code of practice for plain and reinforced concrete (fourth revision)-IS 456:2000
- Criteria for earthquake resistant design of structures (fourth revision)-IS 1893

4.2.3. Lay-out of the new block and main functional elements

121. These have been dealt with in Chapter 2 (Site Plan Assessment) and Chapter 3 (Building Plans Assessment) of the Architectural Assessment Report. The layout and the main elements of the proposed block have been analysed and recommendations have been given, wherever required.

4.2.4. Service (Kitchen, Laundry etc.)

122. An assessment of the Kitchen, Laundry and the CSSD has been made in Chapter 3 of the Architectural Assessment Report. The existing kitchen is inadequate to serve the projected hospital population and it is located in a structurally dilapidated building. It has been recommended to replace this existing building with a new kitchen block having all modern catering facilities. The suggestions for improvement to the Laundry and the CSSD have also been given.

4.2.5. Management of Environmental Exposure Conditions

123. Chapter 5 of the Architectural Assessment Report deals exclusively with the green building aspects and Management of Environmental Exposure Conditions. As per NABH recommendation for OTs, the minimum total air exchanges should be should be 20. Out of these, a minimum of 4 air changes should be fresh air changes. The air face velocity of 25-35 feet per minute from non-aspirating unidirectional laminar flow diffuser is recommended. Minimum positive pressure of 2.5 Pascal should be maintained in OTs with respect to surrounding areas. This prevent outside air entry into the OT. Laminar floor should be 75-150 mm above to the ground floor level. The temperature should be 21 degree (plus minus 3 degree) and humidity should be maximum 60%. Central air condition for requisite air changes must be provided. In Neo Natal ICU, temperature should be 26 degree and humidity should be 50-60%.

4.2.6. Building materials

124. The Chapter 7 of the Architectural Assessment Report deals exclusively with the finishing and building materials.

4.2.7. Facilities/services

125. The Chapter 8 of the Architectural Assessment Report deals exclusively with the Building engineering services. The flow of functional services have been dealt with in Chapter 4.

4.2.8. Flow of services

126. The Chapter 4 of the Architectural Assessment Report deals exclusively with Hospital population analysis and the services circulation.

4.2.9. Access/circulation arrangements

127. The Chapter 3 of the Architectural Assessment Report deals exclusively with the circulation issues of the new and the proposed block. The linkages between the existing and the proposed blocks have been analyzed and relevant drawings have been made to highlight the issues. Recommendations have also been given to overcome the identified gaps.

4.2.10. Communication facilities/points/control room

128. The recommendations for these have been given in the Chapters 6 and 8 of the Architectural Assessment Report.

4.2.11. HVAC arrangements, Indoor air quality (including ventilation; infection control) and Energy Demand

129. The stale air quality of the hospital is a pressing issue. Ducted fresh air supply with adequate number of air changes per hour is needed to all parts of the hospital to ensure that the air quality remains fresh and bacteria free. HVAC arrangements, Indoor air quality improvement, and energy related information are intensively covered in Chapter 5 (sustainability Assessment) and Chapter 8 (Engineering service Assessment) of the Architectural Assessment Report.

4.2.12. Acoustics

130. The recommendations for these have been given in the Chapters 5 (Green Building Aspects) of the Architectural Assessment Report. Due to extremely high noise levels in the surrounding busy roads, double panel glass with inert gas infill in cavity should be used on the facades.

4.2.13. Water heating arrangements

131. The recommendations for these have been given in the Chapters 5 (Green Building Aspects) of the Architectural Assessment Report.

4.2.14. Fire safety, Emergency/disaster response arrangements/plan

132. The recommendations for these have been given in the Chapters 6 (Disaster Management) of the Architectural Assessment Report. Several serious drawbacks have been observed in the emergency evacuation arrangements. Recommendations for overcoming these gaps have been given.

4.2.15. Water Supply arrangements – source, supply, distribution and plumbing systems

133. As shown in Fig.4.3, Water balance exercise has been done to estimate hospital water demand of proposed block. NBC norms @340 litres per day per bed supply is used to estimate water demand. Several other factors such as visitors, staff population and attendant population are also consider to calculate total water demand. As indicated in the Table 4.1, total water requirement is estimated 50.4 KLD which include fresh water requirement of 35.6 KLD while 14.8 KLD recycled water will be used to satisfy total daily water requirement. Water will be supplied by existing treatment plant operated by Public health engineering department. Dual plumbing system is also proposed in this new building to promote recycling and reuse of treated water.

Table 4. 1: Total Water Demand of Proposed Hospital Building Block

S. No.	Unit Type	Particulars	Rate of Water Demand (lpcd)	Water Requirement (KLD)		Total Water Requirement	Total Wastewater Generated (KLD)
				Domestic (Fresh) (a)	Flushing (Treated) (b)		
A	Per Bed demand for different use						
1(i)	Beds Multipurpose Use	82 beds	230	18.9		18.9	15.1
(ii)	Laboratories		10	0.8		0.8	0.7
(iii)	Laundry		50	4.1		4.1	3.3
(iv)	Flushing		50		4.1	4.1	4.1
B	Working Population						
1	Doctors (1 doctor/ 5 beds)	16 No.	45 (30+15)	0.5	0.2	0.7	0.6
2	Attendant @1 person per bed	82 No.	135 (90+45)	7.4	3.7	11.1	9.6
3	Non-residential Population (Working Staff)	100 No.	45 (30+15)	3.0	1.5	4.5	3.9
C.	Visitor						
2	Visitors considered 200 per day	200 No.	15 (5+10)	1.0	2.0	3.0	2.8
D	Horticulture	656.82 Sq.m	5 litres/sq.m			3.3	
Demand of Water & Wastewater Generation (KLD)				35.64	11.5	50.45	40.04
				KLD	KLD	KLD	KLD

4.2.16. Sewage and Effluent Management:

134. In the operational phase of the proposed hospital block, total 36 KLD wastewater will be generated which include 24.5 KLD domestic wastewater and 11.5 KLD flushed wastewater. Considering 20% more capacity than the wastewater generated, capacity of proposed STP 43.2 KLD is estimated. Therefore, a Sewage treatment plan for 50 KLD capacity is proposed for this block.
135. Small amount (3.9 KLD) of laundry and laboratory effluent will also be generated from this block. Ideally there should be an ETP of 5 KLD to treat this effluent. However, looking to small volume of effluent and smooth operation, it is advisable to treat this effluent in proposed STP based on SBR technology having equalization unit, phosphorus and nitrogen removal units.

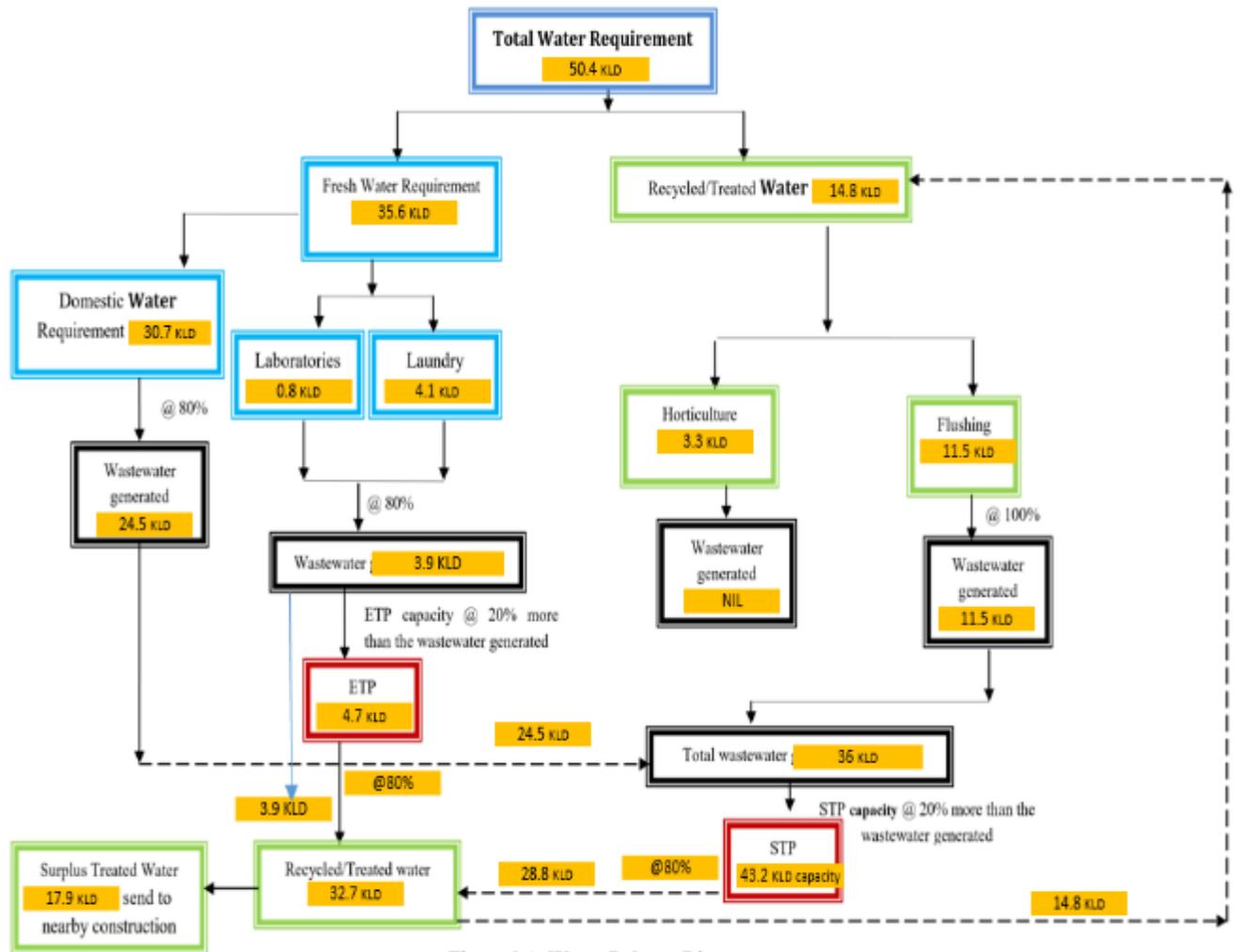


Fig.4.3: Water Balance Chart for Operational Phase of Proposed Block

4.2.17. Proposal for Treatment of sewage and effluent:

- Proposed Capacity of Treatment Plan – 50 KLD
- Technology- SBR
- Additional Features to treat effluent- equalization unit, phosphorus and nitrogen removal units
- Treated Water Standard Proposed to promote reuse and recycling of water

- BOD <10 mg/l
- COD <50 mg/l
- TSS <10 mg/l
- Total Phosphorous <10 mg/l
- Total Nitrogen < 10 mg/l

4.2.18. Solid Waste Management:

136. It is expected less than 400 kg of solid waste will be generated from proposed block which will mostly comprised by organic fraction (40-45%) followed by inert fraction (20-30%) rest beings will be plastics, papers, rags and other components. Estimation of solid waste generation is summarized below in the Table 4.2. Generated solid Waste from the New Block will be managed as per solid waste management rules 2016. Different colour coded bins will be provided to collected organic and recyclable wastes. Efforts will be made to avoid any mixing of solid wastes to bio medical wastes.

Table 4. 2: Solid waste Generation at New LD Block

S.No	Population	Per capita Waste Generation (gm)	Total Solid Waste Generation (Kg)
1	Attendants- 82 No	100 gm	82
2	Non-residential Population (Working Staff) 100 No	100 gm	100
3	Visitors considered 200 per day 200	100 gm	200
	Total wastes Generation		382 per day

4.2.19. Bio-medical Waste Management:

137. In the proposed block of LD hospital, total 62 kg of biomedical wastes/day will be generated from 82 beds considering 770 gm wastes per bed per day. In this block also as per the regulatory requirement, biomedical wastes will be managed as per BMW Rules 2016. Bio Medical Waste Management Rules, 2016 categorises the bio-medical waste generated from the health care facility into four categories based on the segregation pathway and colour code. Various types of bio medical waste are further assigned to each one of the categories viz. Yellow, Red, white, Blue Category and Green Category which are mentioned below and depicted in the Fig.4.4.

SEGREGATION OF WASTE IN COLOR CODED BAGS

YELLOW BAGS	RED BAGS	WHITE TRANSLUCENT PPC	BLUE MARKING CARDBOARD BOX	GREEN CONTAINER
Anatomical Waste, Soiled Waste, Microbiology & Lab Waste, Discarded Medicines, Cytotoxic Drugs, Soiled Linen & Beddings, Blood Bags and Chemical Solid Waste	Plastic Waste such as catheters, urine bags, syringes (without needles) and vacutainers with their needles cut	Sharp Waste including metals like Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades etc.	Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.	General Waste like paper, kitchen waste, wrappers etc.
 				

Fig.4.4: Segregation of Bio-medical waste as per BMW Rules 2016

138. A detailed assessment on prevailing biomedical waste management system has been carried out for existing blocks of LD hospital and several suggestions and recommendation made in the Baseline environment chapter of this Report. Similarly all the provisions and best management practices mentioned in that chapter for existing LD hospital will be applicable here. A summary of biomedical wastes of existing and proposed hospital block is summarized below in Table 4.3.

Table 4. 3: Summary of Bio-medical waste at Lal Ded Hospital

Particulars	Existing Hospital	For Proposed Block
No. of beds	625	82
Total Biomedical waste generation per day (Avg.)	480 Kg/day	63 Kg /day
Per capita bio medical waste generation (as per LD hospital data record)	About 770 Grams /capita/day	About 770 Grams /capita/day
No of red bags (average)	50	10
No of yellow bags (average)	60	10
No of blue bags (average)	5	4
Hazardous waste	2 litres /month	Nil
Management Practices	As Per Bio-Medical waste Management Rules 2016 & its amendments as applicable	

4.3. Construction activities and inputs

Construction activities will entail:

139. a) Pre- construction stage

This involves:

- Design and drawing of specific architectural plans for proposed LD block hospital project and applying for the various permits and NOC from concerned departments and municipal administration of J&K.
- Environmental and Social Impact Assessment for construction and operational phase of the project
- Getting into collaborative agreements with key stakeholders including project manager, architects, quantity surveyors, engineers/contractors (structural, mechanical, electrical), material suppliers, landscapers, and project financiers.

140. b) Establishment of Site Office Materials, storage and handling

141. With the prior permission of JKPCCL, the contractor shall construct temporary site offices to run and manage all activities at different phases. This will also include connection of the utility services such as water, electricity which will be crucial for the construction activities.

- **Non-hazardous materials:** Materials to be stored in the site store shall include samples for review / testing by consultants and or inspectors.

- **Hazardous materials:** These shall include paints, oil, grease, vehicle fuel etc. The store for these materials shall be handled, transported and stored as per the regulatory requirements and measures suggested in EMP drafted for construction stage.
- **Bulk construction materials:** These include: sand, cement, stones, cement, quarry chips, steel and timber. It is recommended that the project contractors should plan for material to be delivered in optimum quantities in order to avoid any form of deposit, which will impede site activities, induce safety hazards and create a nuisance to the neighbourhood.

142. **c) Site clearance and fencing:** The proposed project site shall be fenced to help control right of entry to the site for purposes of safety and security. No disturbance of existing hospital facilities, patients and attendants shall also be ensured by the contractor. Proper enclosures will also aid to reducing the amount of dust, noise and other solid waste that have a potential of getting into and out of the site. Site clearance will include removal of top soil, vegetation and debris.

143. **d) Excavations:** This involves excavating for the various unit foundation works. The bulk of the excavated material will be carried away from site by the contractor(s) to approved dumpsite in accordance with the C&D waste management Rules 2016.

144. **e) Civil works activities-** Includes:

- Masonry, concrete work and related activities
- Superstructure- include construction of support pillars and walls
- Structural reinforcement
- Plumbing and drainage
- Electrical works
- Roofing work
- Other internal installations
- Security feature

4.4. Construction Materials and Equipment's to be used:

145. The details of various construction materials to be used and their tentative source are summarized below:

S.N	Material	Source
1	Soil	Govt. Approved local borrow areas/other construction sites
2	Aggregates (Sand in concrete)	Govt. Approved local supplier

3	Aggregates (Stone in concrete)	Govt. Approved local quarry
4	Cement	Local suppliers
5	Re-bar steel	Local suppliers
6	Structural Steel	Local supplier

Construction Equipment's:

146. Most of the major construction equipment used for the construction of building is available locally. List of possible major construction equipment's are summarized below:

- Excavator
- Dumper/Truck
- Tractor
- JCB
- Cranes
- Crawler Crane
- Concrete Mixer
- Bull Dozer
- Generator sets

4.5. Project Budget, Time Line and Manpower Requirement:

147. The estimated project cost is Rs.79 Cr which will be constructed in two year period. The workforce required for the project has not been calculated in detail. However, from the records of similar previous project done by JKPCCL, it is estimated that 50 manpower's would be required depending on the methodology of construction employed. The contractor is required to employ the unskilled and semi-skilled manpower from the local communities as far as possible.

4.6. Justification and Benefits of the Proposed Project:

148. The LALLA DED Hospital Srinagar has been exclusively established for gynae care and it is an associate hospital of Govt. Medical College Srinagar. Lot of damages and casualties were reported during 2014 flood event in the absence of resilient infrastructure and proper planning. Therefore, it has been decided by the authorities to construct an extension block which will ease the increasing pressure and demand for improved facilities, including the needs of present and future and to create a more resilient infrastructure. The proposed project will not only provide advance medical

treatment facilities in gynae and natal care but also provide employment opportunities both during construction and operation phase thereby enhancing the socio-economic and of living standard the locality. Detailed benefits of the proposed project are summarized below:

149. **Proposed Project Benefits:**

- Development of Flood resilient physical infrastructures and precedent for sustainable building designs in the region
- Development of advanced medical facilities to fulfil valley's medical needs and to reduce mortality of new born & pregnant women
- Development of sustainable hospital building designs and practices to reduce environmental foot prints
- Promotion of water optimization, wastewater treatment and rainwater harvesting for water conservation
- Application of dual plumbing and advanced wastewater treatment system to increase reuse and recycling of water
- Application of solar energy for lighting and water heating to reduce energy demand
- Application of national and international best practices and codes to provide fire safety and tackle emergency situations and disasters
- Application of alternate building materials to achieve green building targets
- Development of a well-defined Emergency and disaster management plan for fire hazard, Flood Emergency response, earthquake and Bomb threats
- Development of necessary facilities viz. parking place, waiting and sitting arrangements for visitors, drinking water points etc.
- Application of landscaping and peripheral plantation
- Direct and indirect employment to during construction and operational phase of the project.
- Opportunities and exposure to medical research and vocational skills by training

Chapter – 5: POLICY, LEGAL AND REGULATORY FRAMEWORK

5.0. Introduction

150. This chapter deals with the laws, regulations and policies, of Government of India, the State Government and the World Bank, related to environment and social issues. The Government of India procedures on externally aided projects entail that all projects must be prepared and implemented in full compliance with the national legislation, regulations and standards governing protection and management of the cultural and natural heritage, social development, and environmental management. In line with that, the Environment and Social Management Framework prepared for Jhelum and Tawi Flood Recovery Project (JTFRP) includes the National and State level environmental laws and the operational policies of the World Bank. Pertaining to current subproject, some of the Operational Policies and Directive of the World Bank and key national legislations and regulations related to environment that may apply for this project are summarized in this Chapter.

5.1. Safeguard Operational Policies and Directive of the World Bank

151. Safeguard policies are cornerstone of its support to sustainable growth, environment conservation, poverty reduction and shared prosperity. The core objective of these policies is to prevent and mitigate undue harm to people, their environment and cultural assets in the development process. Safeguard policies have often not only increased the effectiveness and development impact of projects and programs supported by the World Bank, but also provided a platform for the participation of stakeholders in project design, thus have been an important instrument for building ownership among local populations, government agencies and partner organizations.

152. For the present sub project relevant and applicable safeguards policies of the World Bank are reviewed. Out of the several World Bank safeguard policies which were discussed in the ESMF of JTFRP, following policies as highlighted in Table 5.1 will be triggered during project implementation of proposed project:

Table 5. 1: Relevant World Bank Safeguard Policies

World Bank Safeguard Policies	Objective	Applicability	Safeguard Requirements
OP 4.01 Environmental Assessment	The objective of this policy is to ensure that Bank financed projects are environmentally sound and sustainable.	The environmental issues will be addressed adequately in advance. An integrated Environmental Screening and Environmental Assessment (EA) with Environmental Management Plan (EMP) will be developed to manage environmental risks and maximize environmental and social benefits wherever it is applicable	EAs and mitigation plans required for Proposed Hospital project
OP/BP 4.11	This policy aims at assisting in the reservation	This policy may be triggered by sub-project where cultural property,	Application has to be prepared and submitted

World Bank Safeguard Policies	Objective	Applicability	Safeguard Requirements
Physical Cultural Resources	of cultural property, historical, religious and unique natural value-this includes remains left by previous human inhabitants and unique environment features, as well as in the protection and enhancement of cultural properties encountered in WB financed project	historical, religious and unique natural value-this includes remains left by previous human inhabitants and unique environment features may be affected due to project.	to Archaeological department in case any impact is envisaged due to the project or any chance finds during the implementation of subproject activities.

5.2. Environmental Policy and Regulatory Framework of Govt. of India and the State

153. As per the Government of India procedure on externally added projects and its subprojects also must be prepared and implemented in full compliance with national legislation, regulation and standards governing protection and management of cultural and natural heritage of the country, social development and environmental management. Specific state and local level standards and regulations also apply based on the project location and nature of proposed interventions. Pertaining to current subproject, some of the key national legislations and regulations related to environment that may apply for this project are summarized in Table 5.2.

Table 5. 2: Environmental Policy and Regulatory Framework of Govt. of India and the State that may apply to this Project

Act/ Policy	Objective & Scope of the Act	Implication of Act in proposed sub project	consent/permission required	Entities responsible
Environmental				
Environmental (Protection) Act, 1986	To protect and improve the overall environment. Prevention, control, and abatement of environmental pollution. Gives rights central and state government authorities to monitor and test for environmental pollution, and if necessary penalize for infringements.	Applicable- Environment (Protection) Act, popularly known as an umbrella legislation that supplements existing environmental regulations which may be applicable at the time of implementation Provisions of the Act may applicable on Preservation of air and water quality, Control dust pollution due to quarrying, which might harm the vegetation	Compliance to environmental (Air, Water, Noise) Standards issued under EPR	Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration
Water (Prevention and Control of Pollution) Act, 1974	To control water pollution by controlling discharge of pollutants as per the prescribed standards. Provides for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water; creates Boards and assigns functions and powers for the prevention and control of water pollution.	Applicable- the Water Act is applicable to LalDED Hospital/new hospital block. Relevant provisions of the act will be applicable during construction and operational phase of the project.	Obtaining Consent to Establish (NOC) for establishing and Consent to Operate (CTO) for activities causing water pollution from JKPCB	Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration/ operator of the treatment plant

<p>Air (Prevention and Control of Pollution) Act,1981</p>	<p>To control air pollution by controlling emission of air pollutants as per the prescribed standards. Act provides for prevention, control and abatement of air pollution and establishment of Boards for planning a comprehensive program for this task. Collect and disseminate information relating to air pollution, lay down standards for emission of air pollutants into the atmosphere from industrial plants, automobiles or other sources.</p>	<p>Applicable- Consent to Establish and Consent to Operate (CTO) for activities causing air pollution viz. DG set installation shall be required to obtain from SPCB</p>	<p>Consent to Operate (CTO) for DG set</p>	<p>Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration</p>
<p>The Noise Pollution (Regulation And Control) Rules, 2000</p>	<p>To control noise pollution by controlling noise at sources. Rules provides statutory norms to regulate and control noise levels to prevent their adverse effects on human health and psychological well-being of the people. statutory norms to regulate and control noise levels to prevent their adverse effects on human health and psychological wellbeing of the people</p>	<p>Applicable- involves generation of noise due to operation of DG sets, vehicular movement and use of machinery during construction phase</p>	<p>Compliance with Ambient Noise Standards in accordance to land use of the area</p>	<p>Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration</p>

<p>Solid Waste Management Rules, 2016</p>	<p>Waste generator shall segregate and store the waste generated by them in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.</p> <p>No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.</p> <p>All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.</p>	<p>Applicable-provisions of Solid waste management rules shall be applicable during its segregation, collection, transportation and disposal of solid wastes.</p>	<p>Compliance with SWM rules for its proper management</p>	<p>Construction phase- Contractor/ JKPCCL</p> <p>Operational phase- Hospital Administration</p>
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<p>Construction And Demolition Waste Management Rules, 2016</p>	<p>The rules shall apply to every waste resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organization or authority who generates construction and demolition waste such as building materials, debris, rubble. Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules. (b) The generator shall ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately .</p>	<p>Applicable-Guidelines in compliance to this act are summarized in Annexure 2</p>	<p>Permission for collection & disposal of Construction And Demolition Waste</p>	<p>Construction phase- Contractor/ JKPCCL</p>
<p>Hazardous and Other Wastes (Management and Trans. boundary Movement) Rules, 2016.</p>	<p>Protection to the general public against improper handling and disposal of hazardous wastes. Hazardous Waste Management Rules are notified to ensure safe handling , generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste.</p>	<p>Applicable-Provisions of act shall be applicable and Authorization from SPCB is to be required for handling and Storing of hazardous waste like waste oil/lubricants.</p>	<p>Consent for handling and Storing of hazardous waste like waste oil/lubricants</p>	<p>Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration</p>

<p>Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 (as amended)</p>	<p>To provide provisions & necessary precautions to prevent major accidents and limit their consequences to humans and the environment</p>	<p>Applicable-Notifying regulatory authority (in this case, State Pollution Control Board) of storage of hazardous substances like lab chemicals, LPG etc. Occupier shall comply all the directions and procedures with respect to isolated storage of hazardous chemicals, regarding- (i) activities and quantity of isolated storage of a hazardous chemicals listed in schedule 1 and schedule 2. (ii) Notification of major accidents as per Rules 5(1) and 5(2) (iii) Notification of sites as per Rules 7 to 9. (iv) Safety reports in respect of isolated storages as per Rule 10 to 12. (v) Preparation of on-site emergency plans as per Rule 13.</p>	<p>Consent for storage & import of hazardous chemicals</p>	<p>Operational phase- Hospital Administration</p>
<p>Bio-medical Waste (Management & Handling) Rules, 2016</p>	<p>To improve the collection, segregation, processing, treatment and disposal of these bio-medical wastes in an environmentally sound management thereby, reducing the bio- medical waste generation and its impact on the environment, the Central Government reviewed the existing rule.</p>	<p>Applicable- these rules shall be applicable for proper collection, segregation, processing, treatment and disposal of bio-medical wastes generated during day to day functioning of Lalded Hospital. Details of the rules mention in subsequent section of this chapter.</p>	<p>Compliance with BMW rules for its proper management</p>	<p>Operational phase- Hospital Administration</p>

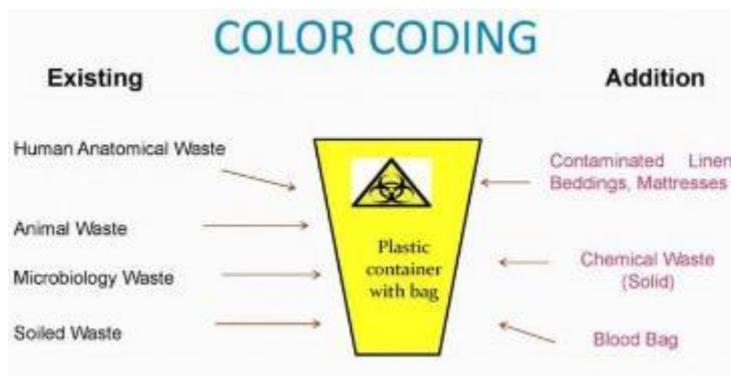
Central Motor Vehicle Act, 1988 Central Motor Vehicle Rules and (Amendment), 1989	To check vehicular air and noise pollution. Vehicles to be used for construction and other purposes need to meet the standards and certificates prescribed as per the Rules, 1989 to control noise, pollution, etc.	Applicable- All vehicles used at project construction should have of valid 'Pollution under Control' (PUC) Certificates issued as per Central Motor Vehicle Act	Obtaining Pollution under Control' (PUC) Certificates	Construction phase- Contractor/ JKPCCL Operational phase- Hospital Administration
Jammu & Kashmir Preservation of Specified Trees Act of 1969 and Rules of 1969	To prevent cutting of specified trees listed in the Act	Applicable- Tree relocation/shifting/cutting permission is required under the proposed project.	Obtaining NOC for relocation/shifting or cutting permission of Chinar Tree located on site	Construction phase- JKPCCL
The J&K Building Operation Control Act 1988	An Act to amend and consolidate the law relating to control of building operations in the State	Applicable- Prior to construction, permission need to be obtained from Srinagar Municipal Corporation	Obtaining Building Permission	Construction phase- JKPCCL

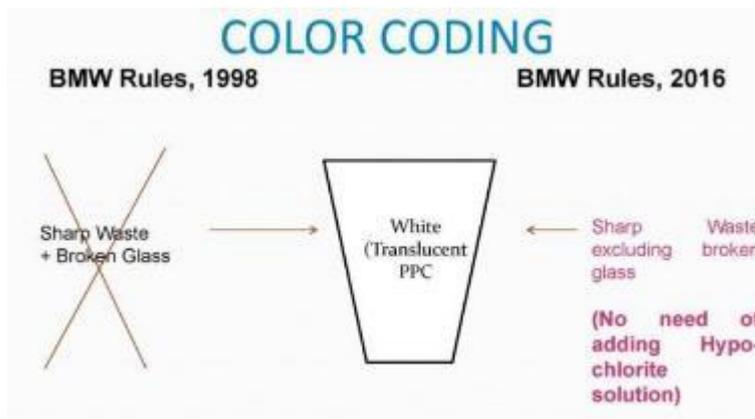
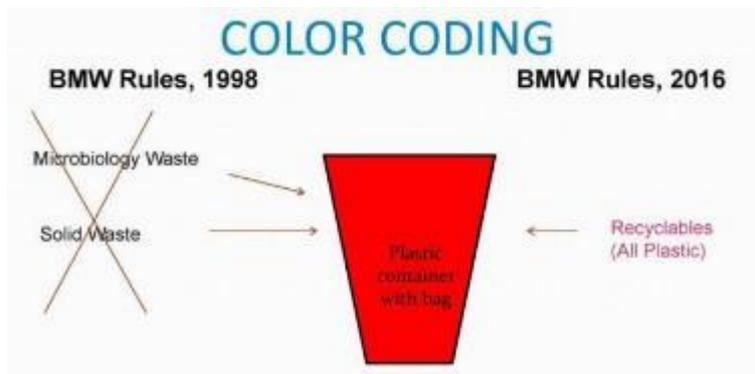
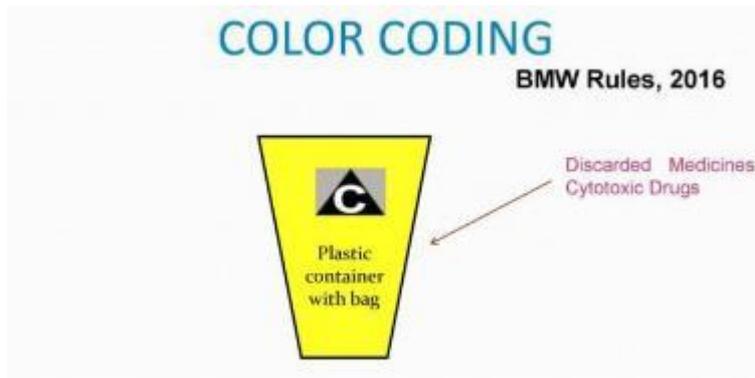
5.3. Biomedical Waste Management Rules 2016 & their subsequent amendments 2018

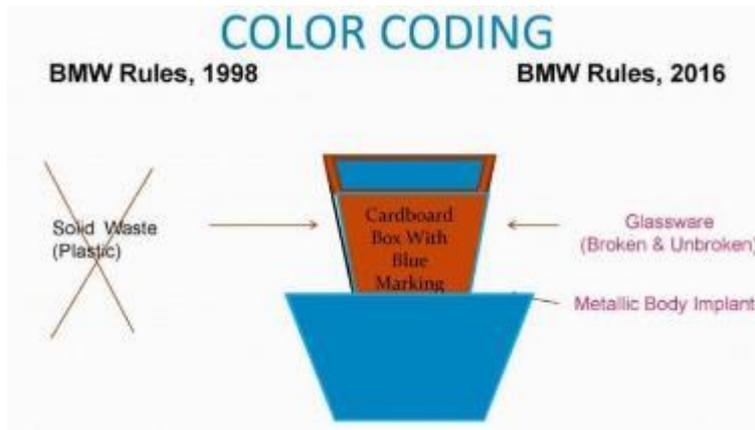
154. Considering a hospital project, new biomedical waste management rules is summarized in this section for better understanding so proper implementation and compliance of the rule shall be ensured. Since a large no of modifications & amendments in BMW rules have been done by regulatory authority during 2016 & subsequent years. Some of the important applicable changes have been described as under:

a) CHANGES IN COLOR CODING SCHEME FOR BMW :

A drastic change in color coding has been done with the implementation of new Rules & their subsequent amendments:







b) **Segregation of waste** in colour coded bags has to be follow. The following protocol as per the New rules, 2016 & their subsequent amendments.

SEGREGATION OF WASTE IN COLOR CODED BAGS				
YELLOW BAGS Anatomical Waste, Soiled Waste, Microbiology & Lab Waste, Discarded Medicines, Cytotoxic Drugs, Soiled Linen & Beddings, Blood Bags and Chemical Solid Waste	RED BAGS Toxic Waste such as cytotoxic, chemotherapy drugs, syringes without needles and scalpels with their needles etc.	WHITE TRANSLUCENT PPC Sharp Waste including metals like Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades etc.	BLUE MARKING CARDBOARD BOX Broken or discarded and contaminated glass including medicine vial and ampoules except those contaminated with cytotoxic wastes.	GREEN CONTAINER General Waste like paper, kitchen waste etc.

The LD hospital was visited by the team twice, once in Oct '18 & again in Nov '18.

A lot of interaction was done with all the stake holders including the Dean, Medical Supdt, Deputy MS, Staff nurses, workers and the sanitation staff.

While discussing, it was concluded that there is an awareness about the new rules at most of levels but still there are many gaps in full understanding of new rules & their amendments.

5.4. List of Statutory Clearances and Authorizations Required

155. According to World Bank OP 4.01, the Bank screens each proposed project to determine the appropriate extent and type of Environmental Assessment required. It classifies the proposed project into one of four categories, depending on the type, location, sensitivity, scale of the project and the nature and magnitude of its potential environmental impacts. Screening of JTFRP was done at initial stages of the project and it was categorized 'Category A' project (World Bank Category).

The Government of India procedures on externally aided projects entail that all projects must be prepared and implemented in full compliance with the national legislation, regulations and standards governing protection and management of the cultural and natural heritage, social development, and environmental management. It is expected that certain permission, clearances and authorizations need to be obtained from competent authorities during the design, planning and implementation of the Lalded Hospital sub-project. These applicable statutory clearances and authorization/permission/NOC required for Lalded Hospital sub-project are listed in the Table 5.3.

Table 5. 3: List of Statutory Clearances and Authorization Requirement

S.No	Clearance/ Authorization/Permission	Relevant Act	Competent Authority	Responsibility
1.	Tree Cutting/ Relocation Permission	Forest Conservation Act, 1980/ Jammu & Kashmir Preservation of Specified Trees Act of 1969 and Rules of 1969	State Forests Dept.	JKPCCL (Tree cutting permission is already obtained. However, efforts would be made to relocated and transplant the existing tree to nearby suitable location.
2.	Building Permission	The J&K Building Operation Control Act 1988	Srinagar Municipal Corporation	JKPCCL
3.	Fire NOC	Building Byelaws- J&K Municipal Corporation Act 2000	Govt. of J&K, Directorate of Fire & Emergency Services, J&K Srinagar	JKPCCL
4.	Disposal of Bio-medical Wastes	Bio-medical Waste (Management & Handling) Rules, 2016	State Pollution Control Board	LD Hospital Administration
5.	Pollution Under Control Certificate	Central Motor Vehicle Act 1989/JK Motor Vehicle Act 1991	Transport Department, Govt. of J&K	Contractor
6.	Disposal of Construction And Demolition Waste	Construction And Demolition Waste Management Rules,2016	Municipal Authority	Contractor
7.	Storage, handling and transport of hazardous materials (such as oil/lubricants and lab chemicals and gases	1-Hazardous and Other Wastes (Management and Trans. boundary Movement) Rules, 2016. 2-Manufacture, Storage and Import of Hazardous Chemicals	State Pollution Control Board	LD Hospital Administration

S.No	Clearance/ Authorization/Permission	Relevant Act	Competent Authority	Responsibility
		Rules, 2000 (as amended)		
8.	Discharges from Labor Camp and construction & operation of Sewage/Effluent Treatment Plant	Water (Prevention and Control of Pollution) Act, 1974 & its amendments	State Pollution Control Board	1-Contractor during construction phase 2- occupier/ operator of treatment plant during operational phase of the project
9.	Compliance of Employee/Labour Acts related to service and their welfare measure as per the provisions of government of India	1-Minimum Wages Act 1948, 2-Contract Labour (Regulation & Abolition) Act1970 3-Inter-State Migrant Workmen (Regulation of Employment & Conditions of Services) Act 1979 4-The Building and other construction workers (Regulation and Employment of Service) Act, 1996 5- The Building and other construction workers Welfare Cess Act 1996	Chief Labour Commissioner Chief Inspector of Inspection of Building and Construction	Contractor

Chapter – 6: POTENTIAL ENVIRONMENTAL IMPACTS

6.0. Potential Environmental Impacts

156. Based on the baseline environmental features of the project area and the proposed engineering works, this section assesses the impacts of the proposed activities on various environmental attributes of the project area. The assessment has been done for nature, types and magnitude of the potential impacts likely to be caused by various project activities which may affect various environmental components. A wide variety of direct and indirect impacts have been identified for the project life cycle to understand the risks and impacts associated with the activities to be performed during preconstruction/design phase, construction phase and operational phase of the LD hospital project.

Based on the Potential Interactions between project activities and environmental component over all impacts are divided in three phases

- Impacts during designing and preconstruction phase
- Impacts during Construction Phase
- Impacts during Operational phase

6.1. Impacts during designing and pre-construction phase

157. Impacts/issues were identified during designing and pre construction phase of the project are summarized below in Table 6.1

Table 6. 1: Impacts during designing and Preconstruction Phase

Activities During designing and preconstruction phase	impacts
1. Location of the Project Site	Inundation and loss of resources created under the project during future flood event, if any
2. Architectural and structural Designing of Proposed hospital block	If not properly designed, it may enhance the environmental foot prints of the project, reduce sustainability and efficiency
3. Consents, Permits, clearances, No Objection Certificate (NOCs)	Failure to obtain necessary consents, Permits, NOCs, etc. may result to design revisions and/or stoppage of works
4. Sources of Materials	Material from unauthorized/illegal sources may disrupt natural environment. Construction quality may also be affected by using substandard materials
5. Shifting of utilities viz. (electric lines, poles, telephone lines, water pipes and DG set area	Disruption of essential and emergency services.

158. Detailed exercise for Architectural and structural design assessment of proposed hospital block has been done and suggestions have been given and incorporated in the project designing to reduce the environmental foot prints of the project and to create

sustainable and resilient structure. List of design issues identified in the proposed project is summarized in the Table 6.2.

Table 6. 2: Issues identified in the Design phase of the proposed project

S.No	Aspects	Issue Identified
1.	Sustainable Building Design Fire and Safety Disaster Management, Building Material & Energy Utilization	<p>There were several issues linked to sustainable building designs, Fire and Safety, Disaster Management, Building Material & Energy Utilization identified during designing phase of the project. Some of them are listed below for which recommendation and suggestions have been made and finally adopted for implementation:</p> <ul style="list-style-type: none"> • Noise and pollution from the Silk Factory Road. • Soil Binding measures need to be taken along the Jhelum riverfront • Electrical Room and the AHU were located on the Ground Floor Level (i.e. under the previously recorded flood levels). • The main staircase was not separated from the corridor. Any fire on the floor will leak smoke in the main exit staircase and will make it unusable for escape • A dead end of almost 50 meters was forming due to absence of a fire staircase. • The AHU door was opening directly into the staircase • There was no sterile storage near the OT's • There were several issues were identified pertaining to • Solar heat gain • Indoor heat comfort • Noise Control • Alternative Building Material • Use of Solar Energy • Recycling and Reuse of water • Efficient Equipment's <p>Detailed list of Issues identified and suggestions made for rectification during Design phase of the Project are given in Annexure-7</p>

6.2. Impacts due to Construction and Operation of the Project

159. For the construction and operational phase of the project, several activities and pollution sources as depicted in Fig. 6.1 were identified which may have the potential impacts on the environmental components during the construction and operation phase of the project. These activities and probable potential environmental impacts on different environmental components are discussed in the following sections:



Construction phase

- Air pollution due to movement/operation of construction equipment's
- Fugitive emissions from construction material loading and unloading
- Spillage of oil, chemicals and hazardous wastes from storage area
- Soil contamination & Disposal of debris
- Discharge of wastewater from labour camps
- Ambient Air and Noise pollution due to operation of DG sets
- Noise/Vibration due Excavation Mixing, casting, cutting and movement of machinery



Operational phase

- Biomedical waste generation from hospital
- Solid waste and hazardous waste generation from hospital
- Wastewater generation (sewage/laundry waste)
- Sewage sludge generation from STP
- Release of odour gases from STP
- Ambient Air and Noise pollution due to operation of DG sets
- Spillage of oil, chemicals & hazardous wastes from storage area

Fig.6.1: Possible sources/activities of pollution during construction and Operational Phase of the Project

6.2.1. Land Environment (land use/Land Cover/Soil)

Construction phase

160. The proposed expansion Project will not lead into any change in land use; however, there will be change in land cover of the Project site during construction of Buildings and associated utility structures.
161. During the construction phase, soil erosion and loss top soil will be susceptible to erosion to some extent due to site clearance activities. The scale of site clearance activities would be limited to construction footprints of LD Hospital.
162. General construction waste generation at proposed LD block site will comprise of surplus or off-specification materials and solid wastes generated by the construction workforce. A small proportion of the waste generated during construction phase will be hazardous and may include used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags.

Operational Phase

163. The operational phase of the Project will have limited impacts on soil in form of waste and waste water generation and soil contamination due to accidental spillages/

leakages of chemical and improper disposal of hazardous and biomedical wastes. In the operational phase of the project wastewater will be treated in 50 KLD capacity treatment plant while only 62 kg of Bio-medical waste will be generated daily from this newly constructed block. If improperly managed, it could also create adverse impacts on land and soil environment.

Summary of proposed project impact on Land Environment is mentioned in Table 6.3.

Table 6. 3: Impact on Land Environment due to Proposed Project

Impact	Land Environment				
Impact Nature	Negative		Positive	Neutral	
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short term	Long term	Permanent	
Impact Extent	Local	Regional	National	International	
Impact Scale	Limited to Project Site near LD Hospital New block area				
Frequency	Construction & Operational phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Impact Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered minor				

6.2.2. Water Environment

Impact on water, including its usage, sources and quality-

Construction Phase

164. Water will be required for civil works during the construction of the foundation for both buildings and utility structures, dust prevention, curing etc. and for consumption and use by workers. It is advisable to use recycled water, if available nearby or to use river water (after permission) for construction purpose. For labour camp it is estimated that 4.5 KLD water will be required to supply at labour camp considering 90 LPCD for peak labour force of 50 persons. For tanker water supply of labour camp from PHED or other authorized source will be ensured by the Contractor during construction phase.
165. Proposed project is not going to use ground water resource, thus there will not be any impact envisaged on ground water resources.

Operational Phase

166. Total water requirement for New LD Hospital block is estimated 50.4 KLD which will continue to be met through already approved water supply scheme of PHED and reuse of 14.8 KLD treated water. Total sewage generation during operation phase of the proposed project is estimated 36 KLD while 3.9 KLD effluent will be generated from laundry and laboratory. There will be potential chances for pollution of surface and groundwater resources resulting from improper management of sewage and wastewater generated during construction and operation phase of the project.
167. Improper handling and management of solid and biomedical wastes may lead to contamination of surface water source during rains.

Impact on Drainage

168. No major impact on drainage will be envisaged during construction and operational phase of proposed new block. However, during construction phase, there may be slightly disturbance in drainage pattern due to excavation and stock piling near the drainage or drain which can be easily managed by proper planning and applying best construction practices.
169. Summary of proposed project impact on Water Environment is mentioned in Table 6.4.

Table 6. 4: Impact on Water Environment due to Proposed Project

Impact	<i>Impact on Water Environment</i>				
Impact Nature	Negative		Positive	Neutral	
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short term	Long term	Permanent	
Impact Extent	Local	Regional	National	International	
Impact Scale	Limited to LD hospital Area				
Frequency	Construction & Operational phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Impact Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered minor				

6.2.3. Air Environment

Impact on Air quality

Construction Phase

170. During the construction of proposed block, generation of dust, fugitive and exhaust gases may trigger the air pollution. Certain amount of dust and gaseous emissions will generate during the construction phase from excavation and construction equipment's. The dust and fugitive emissions from construction material loading and unloading areas are likely to remain highly localised and confined to the Project area, but would require adequate mitigation measures to prevent their spread to existing hospital block and outside the project area.
171. Pollutants of primary concern include particulate matters i.e. PM10 and PM2.5. Generation of exhaust gases (NOx, CO) is likely due to movement and operation of heavy machinery and operation of DG sets for construction. Although the impact will be much localized, it can spread downwind direction depending upon the wind speeds. Increase in air pollution level from mobile and stationary sources during construction phase will be short-term impact on the air quality which is not expected to be significant.

Operational phase

172. Air emission from DG sets is only source of air pollution during operational phase.

Summary of proposed project impact on Land Environment is mentioned in Table 6.5.

Table 6. 5: Impact on Air Environment due to Proposed Project

Impact	<i>Impact on Air Environment</i>				
Impact Nature	Negative		Positive	Neutral	
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short term	Long term	Permanent	
Impact Extent	Local	Regional	National	International	
Impact Scale	Limited to LD hospital Area				
Frequency	Construction & Operational Phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large

Impact Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered minor				

6.2.4. Impact on noise level & Vibration

Construction Phase

173. Proposed block is to be constructed within the existing premises of LD hospital which make it very sensitive and susceptible to noise pollution. Noise generated from construction site may hinder communication among staff, causing annoyance, irritation and can also impact patients' ability to rest, heal and recover.
174. During the construction phase of proposed LD hospital Block, the major sources of noise and vibration would be excavation, drilling, cutting, mixing, casting, operation of DG sets and material movements. These primary noise generating activities will be uniformly distributed over the entire construction period. Construction activities are anticipated to produce noise levels in the range of 75-85 dB(A). However, during deep excavation and drilling it may goes up to 90 to 105 dB(A) and this will occur only when all the equipment operates together and simultaneously.
175. As per regulatory requirements, threshold noise level around the sensitive areas like hospitals should not be more than 50 dB(A) in day time and at night 40 dB(A). For the construction site, maximum noise levels should be limited to 75 dB(A) Leq (5 min.)
176. The workers in general are likely to be exposed to an equivalent noise level of 80 to 90 dB (A) in an 8-hour shift, for which all statutory precautions should be taken into consideration. However, careful planning of machinery selection, operations and scheduling of operations can reduce these levels.

Operational Phase

177. Noise from DG sets is only source of noise pollution during operational phase.

Summary of proposed project impact on Noise and Vibration is mentioned in Table 6.6.

Table 6. 6: Impact on ambient Noise due to Proposed Project

Impact	<i>Impact on ambient Noise</i>				
Impact Nature	Negative		Positive	Neutral	
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short term	Long term	Permanent	
Impact Extent	Local	Regional	National	International	
Impact Scale	Limited to LD hospital Area				
Frequency	Construction & Operational Phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Impact Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered minor				

6.2.5. Biological Environment

Impact on terrestrial and aquatic flora and fauna

Construction Phase

178. Proposed LD hospital block site is a located within a confined area and there is no ecologically sensitive areas like national parks or wildlife sanctuaries and reserved forests located nearby. Even on site also, no major tree cover is exist except one small Chinar tree which will try to be relocated and transplanted at other location with prior permission of forests department. Following are the impacts that may arise on Terrestrial & Aquatic Flora and Fauna due to proposed LD hospital project;

- Relocation/shifting/cutting of a Chinar Tree located at Construction Site
- Vegetal cover loss at the time of dumping of debris and construction wastes
- Noise & vibration disturbances of native fauna during construction activities

Operational Phase

179. Discharge of untreated wastewater/spillage in to river (during accidental & power supply failure of STPs) may harm lotic ecology and aquatic fauna

Summary of proposed project impact on Biological Environment is mentioned in Table 6.7.

Table 6. 7 Impact on Biological Environment due to Proposed Project

Impact	<i>Impact on Terrestrial & Aquatic Flora and Fauna</i>				
Impact Nature	Negative		Positive	Neutral	
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short term	Long term	Permanent	
Impact Extent	Local	Regional	National	International	
Impact Scale	Limited to LD hospital Area				
Frequency	Construction & Operational Phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Impact Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered minor				

6.2.6. Other construction stage impacts

Impact on properties & utilities including disruption to services that may specifically occur During construction

180. Proposed construction site is an open area and confined in to a boundary wall and there is no major structures exists on the construction site except a DG set area and an over ground tank. Over ground tank which is currently being used as storage of water for fire emergency will be dismantled prior to work execution and alternative arrangement need to be given. During construction, there are some small utility structures like poles and water pump line require shifting and alternative arrangements.
181. For DG sets area which is proposed to be shifted to above grade level. Therefore, it is extremely important to provide alternative arrangement of power supply during the shifting/construction of new DG set area. Prior permission should also be ensured by contractor from Hospital administration and other associated departments to start construction activities without disrupting any associated service.

Impact on permanent or temporary use of spaces and facilities

Due construction of proposed block, existing open area will be changed permanently to constructed area. Apart from this, temporary material storage sites and labour camp would also be constructed during the constructional phase of the project. There is also possibility of street parking along the outer hospital boundary to cater increased parking load.

Occupational Health and safety issues during construction phase

182. The engagement with various construction activities will involve a range of occupational health and safety risks and hazards mainly for the contractors and workers who are involved in the construction works. Major occupational health and safety issues viz. falls (from heights); collapse of uncompleted structure, electric shock, hearing loss, injuries due to failure to use proper personal protective equipment etc. cannot be ignored and should be taken in to account for proper management to ensure complete safety of workers.
183. The scale of construction activities would be limited to only a section of the project footprint area where construction activities will be undertaken but utmost care should also be taken to prevent any safety and health hazards to patients, visitors and doctors.

Disruption/inconvenience to hospital services during construction phase

184. Proposed site is located within the confined area of existing hospital thus there may be some disruption/inconvenience to hospital services such as
- Shifting and transfer of electric wires during shifting of DG set Area (by giving alternate arrangement)
 - Limited parking spaces
 - Excavation and digging of exiting surface/paved area for laying of pipes
 - Noise pollution
 - Unwanted entry of people/labours in hospital area
 - Inconvenience due to alternate route arrangements

Disruption/inconvenience to traffic/pedestrian movement during construction phase

185. Hospital complex is surrounded by commercial establishments, government offices and residential colonies. However, proposed construction site is within the confined area but during material transport and haphazard parking of construction vehicles possibility of traffic congestion and pedestrian movement on the nearby roads cannot be ruled out. The scale of construction activities and use of machinery and vehicles is very limited and affect existing traffic load relatively low.

Disposal of excess excavated earth and waste

186. The scale of construction activities would be limited. However, one structure an over ground water tank need to be dismantled/demolish which need to reused or disposed of properly. Debris and excavated earth from other construction activities if not reused

or managed properly it may flow into the surface water bodies or form mud puddles in the area. It can also harm to plant and vegetation and affect the drainage.

Establishment of Labour Camps

187. There would be a small labour camp for 50 labours will be establish within the project site which may have following impacts on environment

- Discharge of wastewater
- Littering and sanitation issues
- Health and hygiene
- Generation of solid wastes
- Spread of communicable diseases
- Security concerns

6.2.7. Other Operational Stage Issues/Impacts:

188. **Some of the major issues in the operational phase of the LD hospital would may be due to**

- Improper collection, transportation, storage and disposal of Biomedical wastes, hazardous/radioactive and general wastes (solid waste)
- Health and hygiene issues and Odour from waste collection points including temporary storage areas and STP sites
- Storage of flammables viz. LPG, other lab gases and Chemicals
- Risk of damages due to fire, flood, natural disaster and other emergency situations

6.3. Opportunities for enhancement of Positive Impacts and Reduce the Environmental Footprints

189. There are several opportunities were identified to enhance the positive impacts and various alternatives, technologies considered to avoid or minimize impacts. Various environmental measures were also considered to ensure optimum use of natural and manmade resources in sustainable manner with minimal depletion, degradation and destruction of environment. Under the proposed LD hospital project, following opportunities were identified for enhancement of Positive Impacts and reduce the environmental footprints of the project:

Architectural rearrangement & Provisions for sustainable building design

Minimize the demand on non-renewable resources

Maximize the utilization efficiency of non-renewable resources

Maximize the reuse, recycling and utilization of renewable resources

Uses minimum energy to power itself; uses efficient equipment to meet its lightening, air-conditioning, and other needs

Optimization of Water use & Adoption of Recycling and Reuse of wastewater

Use of alternative building material

Indoor Air Quality for Human Safety and Comfort

Effective Controls on Building Management Systems & Disaster Management

Chapter-7: ANALYSIS OF ALTERNATIVES

7.0. With” and “Without project" Scenario

190. Proposed Project is extension of LALLA DED Hospital Srinagar which was exclusively established for gynaecology and natal care. Lot of damages and casualties were reported during 2014 flood event in the absence of flood resilient infrastructure and proper planning. Thus it has been decided by the authorities to construct an extension block of the hospital by investing Rs.79 Cr through World Bank supported JTFR project. Proposed LD hospital block will ease the increasing pressure and demand for improved facilities, including the needs of present and future and to create a more resilient infrastructure. The proposed project will not only provide advance medical treatment facilities in gynae and natal care but also provide employment opportunities both during construction and operational phase of the project which ultimately enhance socio-economic status.
191. With the No Project Scenario, the state will not only lose the investment but also not be able to meet increasing demand of improved medical facilities. Apart from this, there is also absolute need for resilient infrastructure for this hospital to combat future flood incident if any. This opportunity will also be lost if proposed project will not be implemented.

7.1. Alternative Analysis with respect to Geographical Location

192. Proposed project is extension block of existing LD hospital which could only be constructed within the LD hospital campus. Thus, no alternative location is applicable

7.2. Alternative Analysis with respect Green vs. Conventional Building Design

193. Proposed LD hospital building is propose to e develop on green building concept. Project proponent will also try to take green building rating for this extension block of LD hospital.
194. Green Building is one which utilizes fewer water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier space for occupants as compared to conventional buildings. If we will compare the conventional buildings with green buildings then these are more energy efficient, have lower functioning and maintenance costs, provide improved comfort and wellbeing for occupants, have lower risk possible and reduce harmful impact on the atmosphere. Green buildings use key assets like energy, water, materials, and land more economically than conventional buildings, thus reducing the widespread impact created upon environment by conventional construction. Conventional buildings don't integrate these efficient strategies to decrease the impact upon environment. So sometimes, the conventional methods of design and construction leads to utilization of natural resources, increased wastage, increased operational and maintenance costs and increased overall environmental foot prints. Looking to several benefits over conventional building

designs, proposed project is considered to develop on green building designs. Details of proposed consideration are summarized below:

I. Features proposed for LD hospital Green Building Designs:

195. Creation of environment friendly and energy efficient buildings is increasingly becoming imperative considering the relentless expansion of cities. The increasing urban expansion has placed tremendous pressure on the natural resources. Significant public buildings of national importance such as Lal Ded Hospital must set an example to people by adopting sustainable building principals. Therefore, an integrated approach to sustainable building design have been adopted.
196. The Solar chart of Srinagar overlaid on the site plan of Lal Ded Hospital is shown in Drawing 5A of Architectural assessment report. From the solar chart it is clear that the long rear facade of the building has a very good exposure to the south side (approximately 45 meters).

II. Direct Solar Gain through South façade

197. In a cold climate, maximum advantage must be taken of the 45 meters long south façade through following ways:

III. Large windows with double pane glasses should be placed on the southern façade to maximize the heat gain in winters.

198. These large windows must be energy efficient and must not have any leakages. The U value of these buildings must be minimized to conserve energy.
- The use of Double pane glazing (6mm glass + 12mm gap + 6mm glass) with silicon sealed joint prevents the heat and infiltration losses. The glass panes Solar Control low emissivity types with metallic oxide coating to prevent heat transfer from warm to cool environment. The air gap in these windows is filled with inert gases such as argon, krypton or xenon to maximize efficiency and prevent condensation inside. These gases are very poor conductors of heat and therefore provide an insulated blanket of air between interior and exterior. Currently the Hospital is using double glass windows which develop condensation and spider webs in the cavity due to non sealing of the glass and frame junction.
199. For the glass panes, following specifications may be followed:
- U value - less than 2 Wsqm / K
 - Acoustic comfort: 40 – 45 db noise reduction. As per WHO guidelines, the ideal level inside a hospital is 35 db. The crowded roads surrounding the hospital generate peak noise at about 80 dB.
- The junction of the glass panel with the frame must be sealed with silicon sealant to prevent any outlets for heat.

- The metallic hollow window frame is a good conductor of heat. One of the most common causes of heat leakage despite these advanced features is the non insulated frame. Therefore, the frame must also have built in insulation with Thermal Brake Polyamide Strips.



Image: A window frame with double pane glass and Insulated frame. The sealing of windows with polythene is the current practice in the hospital. This is only moderately effective.

The building required thermal masses to store the incoming heat and emit it during evening and night time, thereby keeping the inside conditions climatically comfortable.

- The south façade of the building has three spaces which can have solariums (sun spaces). These solariums must have dark coloured walls and floors so that the heat is absorbed in these.
 - The Cafeteria at the ground floor level.
 - The Open area in the service floor (if it is used as a functional area).
 - The Day space and the ward area on the fourth floor ward.
- The entire south façade can have curtain glazing with a thermal mass such as a Trombe wall (it's a wall which is thermally massive with vents provided on top or bottom) behind the large glazed façade (say about 150mm behind the glazed area) which can absorb and store heat. The Trombe wall can be provided in all the non-window areas. This heat is then dissipated inside the building area after the sunset. The mass of the Trombe wall needs to be designed to affect the appropriate time gap between absorption and dissipation of the heat. Trombe wall should be dark coloured to absorb more heat. Movable shutters or thick curtains inside the rooms can be used at the night time for covering the façade windows to preserve heat inside.
- The delivery room suite on the first floor and OT suite on the second floor can also utilize the solar heat gain in winters, although no Trombe walls may be possible here due to space considerations.

IV. Treatment of other Facades and Roof

200. **Treatment of East, South and West facades:** The East, South and the West walls are net losers of heat. Rest of the facades need to have insulated walls with either air cavity or

expanded polystyrene insulation from inside and drywall panelled finish over the insulation.

- In case the air cavity is provided, the external wall can be 230mm. The cavity can be 115mm and the internal wall can be 115mm. assuming plaster on both sides, the U value of this wall is 1.169 W/ sqm K.
- In case the wall is insulated from inside, the configuration can be external plaster, 230 thk wall, 25mm polystyrene insulation and drywall panelling. The U value for such a wall is 0.85 W/ sqm K. This is the preferred option due to its lower U value.

201. **Treatment of Main Entrance Openings:** Hospitals are extremely busy buildings. The peak population of Lal Ded Hospital in a two hour peak time period is 3000. The entrance doors of the Hospital open several times in a minute. Great heat losses take place during opening and closing of the doors. Apart from the heat losses, these openings also bring in polluted air and atmospheric germs inside the lobbies.

It is therefore recommended to follow a two layered approach to tackle this issue:

- Air lock lobbies should be provided at every entrance. This involves providing 2 entrance doors separated by a distance of 2.4 to 3 meters. This ensures an air gap between the external air and the inside air of the hospital. This helps in preventing heat losses to outside and also prevents pollution and air borne germs.
- These air lock lobbies should be provided with air curtains on the inside of the internal door. This further prevents heat losses.

202. **Treatment of Roof:** The roof must be thermally insulated. Following approach may be adapted:

- The top floor ward, corridors and other area must be provided with underdeck rock-wool (asbestos free) or equivalent insulation which should not have any adverse health effects on patients. This must be installed and fixed firmly to the underside of the RCC slab and not over the removable panels of false ceiling.
- The underside of the sloping roof should also be provided insulation from underside as the roof is one of the major losers of heat.

203. **Separation of Staircase core from corridor:** it has been recommended to separate the staircase from the corridor by a 230mm thick wall and a fire check door. This also helps in preventing warm air leakages from the corridor into the stairwell and helps in reducing heating requirements.

204. **Glazed Atrium in the top floor ward:** The skylight provided in the fourth floor ward helps in natural lighting. However, it is also a source of heat losses as the hot air rises and will easily escape to the top surface of atrium. As the skylight will not have a good insulation value, it will become a source of heat losses. It is therefore recommended that an additional insulated polycarbonate skylight may be provided on the fourth floor roof RCC slab so that the escape of hot air to the attic may be prevented. Alternatively,

movable insulated panels must cover this glazed roofing from underneath to avoid heat losses. This will also let the natural light in the ward.

In general, natural light must be maximized in the Hospital by providing large windows up to 25% of the total external wall area.

205. **Shading of the building envelope:** In the Architectural drawings issued for assessment, it has been observed that no weather shades over the windows has been provided. This can cause rain water to fall on the window sills and in future may cause serious water proofing problems. Therefore, sunshades of appropriate width may be provided based upon study of the solar angles during the winter months. The width of the sunshades on the south facade should not be optimized so that they do not interrupt the winter sun from entering the building.

V. Use of Renewable Energy Systems

206. Use of Solar photovoltaic panels on the south façade.

- The entire south sloping roof can be used for solar photovoltaic panels. The roof angle as per the drawings is 25 degrees to horizontal. This gives an area of approximately 400 sqm (calculated from drawings). This entire area can be used for solar photovoltaic panels for electricity generation. Assuming the prevalent thumb rule of 1 kW per 8 sqm, the entire roof can produce 50 kW of electricity. This is a substantial amount and can reduce the burden on the conventional energy systems.

The angle of the solar photovoltaic panel in winter months should be 11.6 degrees in peak summers and 49.8 degrees in peak winters. Having a flexibility of tilting the solar panels can greatly enhance its efficiency. The tilting is generally done 4 times in a year (April, August, October and March).

- **Use of Solar water heating panels :** The south tilting roofs of other buildings such as Sarai and Laundry blocks can also be used to place either the solar photovoltaic panels or solar water heating panels.

VI. Design of Energy Efficient Lighting, Electrical and HVAC systems

207. Energy efficient lighting

- LED's are the most energy efficient lighting option available. The electricity consumption is 50% lesser than the CFL and tube lights for the same amount of light. The LED lights also have a much longer life span.
- As a comparison, a 100 Watt bulb gives 1600 lumens of light. A 23 Watt CFL gives 1400 lumens and LED tube light (28 watt T5) gives about 2600 lumens. Therefore, it is recommended that the general lighting in the Hospital must be LED fixtures. These consume much less energy and therefore reduce the energy consumption of the building.

- To further reduce the energy consumption, smart building systems such as automated building controls should be used. These light controls can be timed to switch off certain lights in the corridors, lobbies and lift waiting areas at off peak hours to reduce energy consumption. The lighting controls can also be occupancy sensing to increase or decrease the amount of lighting in a space based upon the presence or absence of people in the area. These can also be automated to adjust in intensity based upon the daylight levels available in the space.
- Exterior lighting fixtures should have inbuilt photosensors which allows them to turn off automatically when the daylight levels are sufficient.
- As per the ECBC (Energy Conservation Building Code, 2017), the lighting load consumption for a Hospital building should not exceed 12.9 Watts per sqm.
- In the existing hospital building, it has been observed that the lighting levels are much below the standard levels. These range from 60 lux to 120 lux in various areas. These are much below the standard lux requirements. It is therefore recommended that the entire existing hospital lighting is changed to LED lights for better lighting quality in the same energy consumption.

208. **Energy efficient Electrical systems:** The engineering team of the hospital informed us that the ground and the first floor of the Old Block of Lal Ded Hospital is using aluminium wiring which consumes far more energy. Copper has higher conductivity and can withstand load surges more effectively. Therefore, the aluminium wiring must be replaced with copper wiring everywhere.

209. **Energy efficient HVAC systems:** It has been observed that the air quality in the Old Block is quite stale. Due to lack of fresh air supply and air changes, there is a continuous odour in most spaces. Treated ducted fresh air supply needs to be supplied to the entire Old Block. The air supply volume and number of air changes required vary for each space and these must be calculated. Adequate provisions must be made for fresh air supply.

- In the proposed block, VAV (Variable Air Volume) are recommended. These match air supply continuously to cooling and ventilation loads. These provide good efficiency in HVAC design. All AHU's must be planned with VFD's (Variable Frequency Drives) for fan speed adjustments.
- The cooling or heating load of the system should be minimized using the passive solar techniques described earlier in this chapter.
- Insulated return air ducts should be provided for return air to minimize temperature losses. Return air should not be taken through false ceiling plenum.
- Ducted and treated fresh air supply must be provided to all parts of the Hospital as per ASHRAE guidelines.
- The AHU for each OT must be a dedicated one.
- The Operation Theatres must provide a minimum of 20 air changes per hours, out of which minimum 4 air changes must be of fresh air.

- Positive air pressure of minimum 1 Pascal should be maintained in the OT to prevent entry of any outside air.
- For the Gynae OT's 2 levels of filtration (pre and micro vee filters should be provided). The air quality at the grill should be Class 1000.
- Temperature in OT's should be 21 deg plus or minus 3 degrees and relative humidity must not exceed 60%. OT's must have thermostats and temperature and humidity displays in them.
- During the times when the OT is not functioning, VFD may be used to reduce energy. Air changes can be reduced to 25% through VFD. However, pressure in the OT should be positive.

VII. Waste Water, Water Supply and Sewage

- Solar water heating must be provided.
- PPR water supply piping must be used for water supply. These have a smoother internal surface which reduces pumping power and saves energy. These are also resistant to corrosion. Insulation must be provided as per IS standards.
- Low flow flushes in WC's and washbasins with auto sensors must be installed all toilets.
- STP treated water must be recycled for flushing WC's, washing of roads and horticulture.
- Only energy efficient pumps must be used for water supply from underground to overhead tanks.
- Rainwater harvesting must be done to maintain the water level of the site.
- Sewage treatment plant will be incorporated to treat all wastewater generated onsite;
- Treated water will be used for horticulture and landscaping, this will reduce daily freshwater requirement;
- Flow rates for fixtures will be benchmarked as per requirements of USGBC/IGBC-LEED Rating system. This will result in water savings to a tune of approx. 20%.

VIII. Equipment

- Energy efficiency rated medical/ general equipment should be used as far as possible.
- Sleep mode must be enabled on all equipment, wherever possible. In case the equipment (such as computers) are not used for a particular time, they must stop consuming energy automatically.

Indoor Air Quality Improvement:

210. Fresh air is also critical to optimal health. Most homes in cold climates are sealed up so tightly that the air is heated and recirculated constantly with only the air that leaks through the envelope providing fresh air. Intentional mechanical ventilation provides control over ventilation rates and helps prevent mold etc. Heat recovery ventilation is a good insurance policy against build-up of indoor air problems without paying an energy penalty for direct fresh air ventilation. It exhausts stale indoor air while

providing fresh air with only a small energy cost. Many of these units help to pressurize the house slightly reducing infiltration and resisting radon and car exhaust intrusion from nearby parking.

211. Green buildings reduce IAQ problems by providing good ventilation to allow fresh air to flow through the house, installing an exhaust system for radon gas, avoiding wood products which contain formaldehyde and sealing those which do, using low or no VOC interior paint, solvent-free finishes, and solvent-free construction adhesives.
212. Details of sustainable designs and consideration proposed for LD hospital (proposed extension block) including earth quake resilience is described in Architectural Assessment Report.

7.3. Alternative Building Material

213. The proposed project has been planned in a manner to achieve environment friendly sustainable development. The construction material to be used will include renewable and non-renewable resources including stones, aggregates, sand, steel, concrete, fly ash mix cement, and clay and fly ash bricks. Aerocon blocks (Autoclaved Aerated Concrete Blocks) may also be taken for wall constructions. Wood alternatives will be used in the project with minimal use of timber for the proposed construction.
214. The materials will be procured from reputed manufacturers with test certificates as per BIS specifications. Low VOC and non-toxic paints and adhesives to be used as per LEED standards. List of alternative building materials for green buildings is summarized in Table 7.1.

Table 7. 1: Alternative building materials for Green building

S.No	Material	Conventional Material	Green & Alternative Building Materials
1-	Window and openings	Aluminium Panelled plain glasses	Insulated Glass (IG units)
2-	Lighting and fixtures	Tube lights & CFLs	Low watt LED tube lights & bulbs
3-	Plumbing Fixtures	Conventional Fixtures	Green water saving fixtures
4-	Flooring	Vitrified & Glazed Tiles , China Mosaic	PVC Flooring ,
5-	Doors	Pine Wood	Engineering Wood
6-	Paints	Plastic VOC	Plastic Non VOC
7-	Bricks	Clay Bricks	Fly-ash Bricks
8-	Cement	OPC	PPC

7.4. Option analysis for sewage treatment/effluent treatment technologies

215. To assess the most suitable wastewater treatment technology for LD hospital various sewage/wastewater treatment technologies have been reviewed for their merits and demerits. There are many technologies in today's practice to treat the sewage

aerobically or anaerobically or in combination. The conventional sewage treatment technologies such as Activated Sludge Process (ASP), Waste Stabilization pond (WSP), Upflow Anaerobic Sludge Blanket (UASB) Reactor etc., are commonly adopted in sewerage system to treat wastewater up to secondary level as per the effluent standards. There are a number of newer treatment technologies that have come into practice in recent times and they do merit attention in their own way. Treatment Technologies such as Sequencing Batch Reactor(SBR) and Moving Bed Biofilm Reactor (MBBR)/ Fluidized Aerobic Bioreactor have been approved under several government schemes due to their advantages such as less requirement of land, high effluent quality etc.

216. Study conducted by CPCB on Cost Comparison for various technologies for sewage treatment plant and Assessment of Technology options for Sewage Treatment plant reveals that Land requirement for MBR and SBR plant is least among all treatment process whereas energy requirement is highest. Treated effluent quality with respect to BOD, COD, SS, Coliform reduction is better in SBR and MBR plant among other treatment technologies. Detailed cost comparison for various technologies for sewage treatment plant done by CPCB is summarized in the Table 7.2.

Table 7.2: Cost Comparison for various technologies for sewage treatment plant

S.No	Assessment Parameters	Treatment Technologies					
		ASP	MBBR	SBR	UASB+EA	MBR	WSP
1	Performance after secondary treatment						
A	Effluent BOD (mg/l)	<20	<30	<10	<20	<5	<40
B	Effluent SS (mg/l)	<30	<30	<10	<30	<5	<100
C	TN removal %	10-20	10-20	70-80	10-20	70-80	10-20
2	Performance after Tertiary treatment						
A	Effluent BOD (mg/l)	<10	<10	<10	<10	<10	<10
B	Effluent SS (mg/l)	<5	<5	<5	<5	<5	<5
3	Avg. Capital Cost (lacs/MLD) including tertiary treatment	108	108	115	108	300	63
4	Area Requirement (m ² /MLD)	1000	550	550	1100	450`	6100
5	Yearly Power Cost (Lacs/MLD)	4.07	4.90	3.37	2.75	6.65	0.49

6	Total O&M Cost (Lacs/MLD) upto Secondary Treatment	353	372	288	290	>300	116
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Source: CPCB, Govt. of India

Recommendation for the Proposed Project:

217. Looking to degree of treatment required, considering Capital and O&M cost, availability of limited land at the project site, SBR technology will be most suited treatment option for wastewater treatment for the proposed Block.

Chapter – 8: STAKEHOLDERS ENGAGEMENT & PUBLIC CONSULTATION

8.0. Introduction

218. Stakeholder engagement is a key element of project planning, development and implementation. Effective stakeholder engagement assists good design, builds relationships with local communities, and reduces the potential for delays through the early identification of risks and issues. JKPCCL and Hospital Administration are committed to a transparent and respectful dialogue with stakeholders throughout the life of the Project. The engagement approach for the Project includes a range of activities designed to consult stakeholders, using methods which take into account the varied interests that stakeholders may have in the Project as well as their location, language, culture, their access to information and the different opportunities to participate.
219. The Project's approach to stakeholder engagement includes making best efforts to ensure stakeholders are provided with adequate, timely and culturally appropriate information about the proposed LD hospital Project. Opportunities for stakeholders were also provided to ask questions, make comments and suggestions and raise any concerns that they may have.
220. Stakeholder consultation (Meetings, Focused Group Discussion, Individual discussion, Public participation) was conducted by the subject area experts on 24th to 26th October 2018 and in between 27-30th November 2018. During the initial visit, meeting with stakeholder departments were conducted to understand and communicate them about their roles and responsibilities for success of this project. Their views and suggestions were also recorded. The list of required data were shared with each concerned stakeholder departments. A walk through with the concerned department members and staff were also conducted at existing LD hospital blocks and at the site where an additional hospital block is proposed.
221. During consultation process, several urban, architectural, environmental and social issues and prevailing practices of hospital system were noted. Apart from this, vulnerable environmental and social components are identified that which may be affected by the proposed sub project. Efforts were also made to identify the larger public issues that may be arise on existing hospital utilities and services during construction of proposed hospital block.

8.1. Stakeholders Consultation

222. During the site visit, introductory meeting was held on 24th October with JKPCCL officials, Hospital Administration and meeting with other concerned stakeholder departments who are directly and indirectly linked in facilitating smooth functioning of

hospital services was held on 25th & 26th October 2018. After introductory meeting concerned department were approached for data required to prepare environmental assessment report. A detail list of required data was also shared with all the departments. However, limited information and data was received til the finalization of this inception report. During the reconnaissance visit and other subsequent visits, following (as shown in Table 8.1) are the stakeholder departments were approached for data collection and their suggestions:

Table 8. 1: Details of Stakeholders Consultation

Stakeholder Department/Concerned Individual	Key Point of discussion
- JKPCCL	<ul style="list-style-type: none"> - Being an appointing agency JKPCCL was approached for necessary and reasonable support to collect secondary data and issuing data requisition letter to concerned department. - Project related all the data/information/reports including DPR, detailed drawing designs were also requested by subject area experts of GSIPM.
- World Bank officials/SPMU	<ul style="list-style-type: none"> - Discussion with the World Bank officials were mainly on their expectations and requirements in EA report. Help of local SPMU office was also requested by the consultant in speedy collection of required secondary data and information from concerned department.
- LD Hospital administration	<ul style="list-style-type: none"> - A brief overview of the Hospital campus and the Hospital facilities was given by the Hospital Administration - -Average footfall in the hospital per day was discussed - -During the visit to the existing Hospital Blocks, an overview of the planning and facilities of the existing clinical and support areas were taken with the Hospital administration - A detailed list of data including Bio-medical waste was shared and discussed with Hospital administration.
- Electrical Engineering Department	<ul style="list-style-type: none"> - Data related to electricity demand and supply, and HT supply system was discussed. The existing and proposed transformer capacities were also reviewed. Apart from this, DG sets and UPS backup's requirement were also covered in the discussion. List of data related to energy and electricity was shared with the Electrical Engineering Department for collection.
- Urban Environmental Engineering Department	<ul style="list-style-type: none"> - Detailed design parameters and DPR of under constructed STP for existing hospital block was requested with UEED.

Stakeholder Department/Concerned Individual	Key Point of discussion
- Public Health Engineering Department	- Information related to water demand and supply were discussed with concerned PHED officials and data related to Water sources, consumption Per day (KL), supply & storage arrangements and exiting system used for recycling of water were requested from PHED department. - Existing WTP adjacent to LD hospital was also visited by subject area experts.
- Irrigation and Flood Control Department (IFCD)	- Protection and Preventive measures for future flood situation were discussed with IFCD. A new flood spill channel and enhancement of water carrying capacity of river Jhelum was explained by the Irrigation department officials.
Common Bio-Medical Waste Treatment Facilities Operators	- M/s Kashmir Health Care System, Industrial Growth Centre (IGC) at Lassipora, has been visited by subject area experts and issues related to collection, transportation and disposal of bio-medical wastes were discussed.

The attendance sheet of the stakeholder departments meeting are present in Annexure-4 of this report.

8.2. Discussion Points Related to Architectural Components & Biomedical Waste Management

223. During the reconnaissance survey following (as shown in Table 8.2) are the points were discussed during client and stakeholders meeting:

Table 8. 2: Points discussed during reconnaissance site visit

Discussion Points related to Architectural components & sustainability Assessment	Discussion Points related to Biomedical Waste Management
<p>The First on site meeting of the Consultants, JKPCCL and the Hospital Administration was held at Lal Ded Hospital, Srinagar on 24th and 25th October, 2018. Another meeting was held with the Hospital Architects on 26th October, 2018. On 25th October, the meeting was also attended by the Principal, Medical College. A detailed round of Hospital was taken by the consultants with the Hospital Administrators. Following points were discussed in the meeting:</p> <ul style="list-style-type: none"> • A brief overview of the Hospital campus and the Hospital facilities was given by the Hospital Administration. 	<p>A detailed round of Hospital was taken by the consultants with the Hospital Administrators on 25th October. Following points were discussed in the meeting :</p> <ul style="list-style-type: none"> • The segregation of waste • The safety issues including use of PPEs • The appropriate provision of waste bins • Bar coded scanning & collection of waste

Discussion Points related to Architectural components & sustainability Assessment	Discussion Points related to Biomedical Waste Management
<ul style="list-style-type: none"> • Average footfall in the hospital per day was discussed. Hospital authorities also gave their figures for the most crowded times of the day. • Parking provisions for general public and staff were discussed. • The under construction Sarai building was discussed. • During the visit to the existing Hospital Blocks, an overview of the planning and facilities of the existing clinical and support areas were taken with the Hospital administration. • Lighting levels at various places in the Hospital were measured with a Lux Meter. • An overview of the situation during the floods was taken. The Flood levels of the 2014 floods were observed on the site. • The sizes and capacities of the service areas such as CSSD, Kitchen and the Laundry were discussed. • An overview of the existing services was given by the Hospital Engineering Team. ▪ Public Health Services: UG and OH water tanks were discussed. ▪ Fire Fighting: The engineering team listed the pumps installed on site for fire fighting. Fire Fighting and detection measures were reviewed in the new and the old blocks. ▪ Irrigation Department: The new flood spill channel and its capacity were explained by the Irrigation department. ▪ HVAC and heating: An overview of the Hot water generators was given. The central HVAC for the OT's were also explained. ▪ Electrical Services: The existing HT supply system was discussed. The existing and proposed transformer capacities were also discussed. The DG sets and UPS back ups were also discussed. <p>On 26th October, 2018, a meeting was held with the Project Architects at their office in Jawahar Nagar. Following points were discussed in the meeting:</p>	<ul style="list-style-type: none"> • BMW management committee of the hospital • Health check up of workers • Transportation of BMW within hospital • Transportation of waste within wards • Waste storage room • Web site of hospital • Major accidents • Record of dead foetus • Treatment of liquid waste • Status of Sharp blasters • Use of Non chlorinated bags

Discussion Points related to Architectural components & sustainability Assessment	Discussion Points related to Biomedical Waste Management
<ul style="list-style-type: none"> • The Project Architects were requested to send following drawings and information to the Consultants: <ul style="list-style-type: none"> ▪ All plans of the new block submitted to the SMC. ▪ Site Development Plans ▪ All plans of the existing additional block. ▪ All HVAC calculations. ▪ Water consumption calculations. ▪ Fire fighting, fire detection and electrical layouts. ▪ Calculations of the electrical loads for the new block. 	

Photos: Glimpse of Initial Stakeholders Meetings & Site Visit





8.3. Public Consultation & Socio Economic Survey

224. Public consultations were held with the impacted persons to understand their perceptions and apprehensions of the project and to elicit suggestions from them, if any, on improvement to project design. Before the survey, the administrative staff/team has shared data/information regarding working staff, services provided, nos. of patients treated, and available facilities, working NGO within premises, gaps in management, problem faced, and improvement in services. Social formats were discussed with Dy. MS to conduct socio-economic survey under this project.
225. With the support of JKPCCL, social team conducted and collected data in pre-formatted survey format. The response has been collected from patients, attendants, taxi drivers, ambulance drivers, parking contractor, volunteer NGO, nursing staff, doctors, and technical staff and security personnel. The nearby general shopkeepers, fruit hawkers, auto stand, pharmacy and restaurants were also consulted and their responses on proposed hospital expansion project were recorded.

Photo: Public Consultation (FGD) in Lal Ded, Hospital



The nearby resident and people engaged in commercial activities in and around the hospital were fully briefed about project development objectives, components and were then consulted individually to understand their perceptions about the project. They were asked to give their perception on the anticipated positive and negative impacts of the project. All of them perceived reduction in sufferings during construction phase due to movement of vehicles. All of them (100%) expect improvement in quality of health facility due to the project. However, some apprehensions were also raised by the respondents in the form of business and livelihood and undue delays for project completion. The details are presented in Table 8.3.

Table 8. 3: Project Impacts Perceived by the Community

S.N.	Social Impacts	Response Yes (Nos)	%age
Positive Impacts Perceived			
1	Increase in bed/facility/medicines	40	57
2	Increase in staff/doctors	24	34
3	Increase in business opportunity	6	9
4	Increase in employment	0	0
5	Others	0	
Negative Impacts Perceived			
1	Loss of business	0	0
2	Pressure on existing infrastructure	0	0
3	More visitors/population	0	0
4	Conflict with outsiders	0	0
5	Others (increase in incidents of HIV/AIDS and Trafficking etc.)	0	0

Source: Census & Socio-Economic Survey, conducted for LD hospital during November 2018

Further, public consultation meeting (FGD) was held with the community in the waiting area at the Lal Ded Hospital on 29 November 2018. Information was disseminated about the subproject i.e. expansion of hospital capacity, its benefits and possible impacts. The FGD was attended by 44 persons. The detail of participants is given in Table 8.4 below.

Table 8. 4: Details of Participants during FGD at Lal Ded Hospital

S.N.	Category of Participants	Number of People	%age
Occupation			
1	Farmers	6	14%
	Business	5	11%
2	Labour	2	5%
	Service	7	16%
3	Housewife	16	36%
	Other (Driver, student)	8	18%
Sex			
1	Male	28	64%
2	Female	16	36%
Source: Census & Socio-Economic Survey, November 2018			

9. The apprehensions and suggestions received at community level consultations are presented below in Table 8.5.

Table 8. 5: Key Issues Raised in Community Level Consultations

Key Issues		
Place of Meetings	Aprehensions raised by the community	Sugestionoes from community
Date: 29/November/2018 Lal Ded Hospital, Srinagar	Govt. will delay implementation of project	Timeline should be fixed for project implementation.
	Facilities are need to improvised with latest technology for women and child health care.	All facilities including latest technology on treatment will be provided.
	Increase in strength of doctors, technical staff and nurses is required in the existing facility and in new proposed building as well.	More staff and doctors should be recruited to attend patients timely and to avoid risk associated with delays in treatment.
	Basic facilities like toilets, waiting and resting areas for attendants, food and drinking water supply points are not available to fulfill the numbers of visitors.	In new hospital building take care of basic services will be provided for overall community development and a new building for attendants to wait and rest with all basic utilities has already constructed, it will be open for community soon.
	Separate entry and services for physically disabled persons.	Proper arrangement for registration and priority on services should be given to physically disabled persons.
	Parking facility and traffic movement in the area is problem for patients and community.	Auto and taxi stand near to hospital area need to provide as solution.
	Un-employment in local community is high	The local people (labour) should be given priority in labour work and petty jobs during construction

Photos: Glimpse of Stakeholders Meetings & Site Visit





8.4. Consultation with NGO

226. NGO named Help Poor Voluntary Trust is working in the hospital to provide support to patients and staff in providing trolley, wheel chair, awareness and guidance for sample collection and even provide sample collection kit. There are four staff member of NGO are working at daytime in the hospital. A consultation with NGO staff was also conducted to note concerns in working and shortcoming in the present system. The main concerns as per the working staff are lack of beds and other related facilities at Labour rooms of the hospital. There is urgent need for capacity expansion as well as trained support staff to share workload on present infrastructure and staff.

Photo: Consultation (NGO staff) in Lal Ded, Hospital



Chapter 9. Environmental Management Plan

8.0. Environmental Management Plan

227. In order to address the impacts predicted in the earlier section mitigative measures are discussed in this section and an Environmental Management Plan (EMP) is recommended. The Environmental Management Plan (EMP) is required to minimize impact of adverse environmental impacts by implementing suggested mitigation measures with suggested timelines and responsibilities during construction and operational phase of the proposed LD hospital project. The EMP also identifies the role of various agencies in the implementation of these measures. Since the site is not an ecologically or environmentally sensitive area, no major environmental issues are anticipated. However, utmost care would be required as proposed work will be done within the existing hospital area which may affect the patient health care and convenience. The critical issues mainly noise and air pollution during construction phase and issues pertaining to improper management of biomedical waste and discharge of wastewater need to be taken care.
228. The EMP covers management program for mitigation measures suggested to counter likely impact from construction and operation phases of the proposed project activities. Monitoring measures are also suggested for effective implementation of the mitigation measures. As shown in the Fig. 9.1, proposed EMP would have four major elements viz. Commitment and Policy, Planning, Implementation and Monitoring & evaluation.

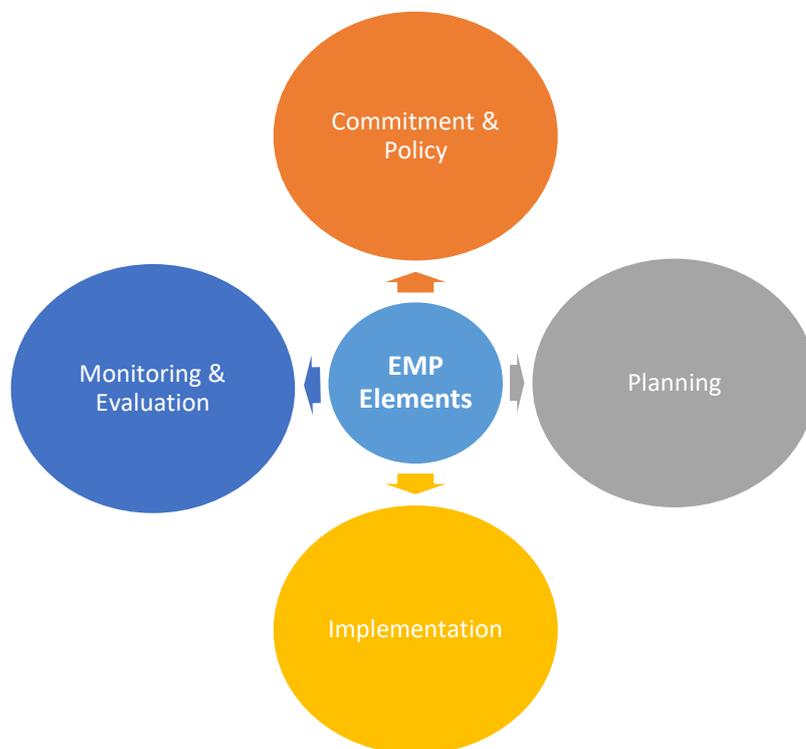


Fig.9.1: Element of Environment Management Plan

A-Commitment Policy- Project Proponent will strive to provide and implement the Environmental Management Plan.

B-Planning- This includes identification of environmental impacts, legal requirements and setting environmental objectives. Various components of planning for the proposed Project will include following subjections

Organization, Roles and Responsibilities

229. **Role of JKPCCL-** JKPCCL will have ultimate responsibility for implementing the provisions of EMP especially during construction stage of the Project. This role will include the ongoing management of environmental impacts, monitoring of contractor performance as well as development of mechanisms for dealing with environmental problems. JKPCCL will also ensure that the activities of its sub-contractors are conducted in accordance with 'good practice' measures, implementation of which will be required through contractual documentation. In order to facilitate this, and to demonstrate commitment to the EMP, JKPCCL /Contractor will conduct regular internal site inspections, the results of which will be documented.
230. **Role of Contractors-** JKPCCL Management will be responsible for the performance of all its contractors and ensuring that all commitments in the EIA are translated into contractors' requirements and that these requirements are implemented to the full intent and extent of JKPCCL commitment.
231. Contractors will be responsible for implementation of, or adherence to, all the mitigation measures outlined in the EMP.

Inspection and monitoring and Audit

232. Inspection and monitoring of the environmental impacts of the Project activities will increase the effectiveness of EMP. Through the process of inspection and auditing, JKPCCL will ensure that the conditions stipulated in Prior Environmental Clearance(s), Consent for Establishment, Consent to Operate, other approvals are complied with.

Monitoring, Reporting and Documentation

233. JKPCCL will hire an external agency to conduct monitoring for air emissions and wastewater quality. It will also ensure record keeping system of commitments is implemented including on compliance of the requirements specified in EMP.

EMP Review & Amendments

234. The EMP would be reviewed periodically to update it addressing any changes in the organization, process or regulatory requirements

C- Implementation

235. This comprises of resources available for the project, accountability of contractors, documentation of measures to be taken. It is proposed to create Environment Management Cell under Facility Manager for effective implementation of EMP.

D- Measurement & evaluation

236. This include monitoring corrective actions and record keeping both by contractor and project proponent.

8.1. EMP for Design and Preconstruction Phase

237. Table 9.1 provide environmental management plan to be followed up during Design and Pre-construction phases of the proposed LD hospital project.

8.2. EMP for Construction Phase

238. Table 9.2 provide environmental management plan to be followed up construction phase of the proposed LD hospital project.

8.3. EMP for Operational Phase

239. Table 9.3 provide environmental management plan to be followed up during operational phases of the proposed LD hospital project.

Table 9.1:EMP for Design and Preconstruction Phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
1.	Location of the Project Site	Inundation and loss of resources created under the project during future flood event	Structural (physically engineered interventions), shifting of critical utilities and emergency requirements from basement to above floors, tree planting, storm water management plan considered in the project. Several other measures such as control of water source and reconstruction of the defense/bund to the Jhelum river along with desilting at upstream stretch of the river is being carried out by the Irrigation & Flood Control Department to reduce the impacts of future flood, if any	Review of Project Designs	JKPCC/Design Consultant	PIU/PMU
2.	Design of proposed hospital block	If not properly designed, it may Enhance the Environmental foot prints of the project, Source sustainability and efficiency.	Sustainable design practices were adhered as per the norms of Green Building and Energy conservation measures were be adopted in the proposed building as per Energy Conservation Building Code (ECBC) 2017 of the Bureau of Energy to reduce the environmental foot prints of the project. Detailed list of Issues identified and suggestions made for rectification during Design phase of the Project are given in Annexure-3.	Review of Project Designs	JKPCC/Design Consultant	PIU/PMU
3.	Consents, Permits, clearances, No	Failure to obtain necessary consents, Permits, NOCs, etc.	- All necessary consents, permits, clearance, NOCs, etc. prior to award of civil works. - Necessary Approvals for construction to be obtained by contractor is in place before start of construction	Status of Clearances and NOCs	JKPCC/Contractor	JKPCC/PIU

Table 9.1:EMP for Design and Preconstruction Phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
	Objection Certificates (NOCs)	can result to design revisions and/or stoppage of works	<ul style="list-style-type: none"> - Compliance of consents, permits, clearance, NOCs, etc. - Obtained all Design drawings and documents if necessary 			
4.	Sources of Materials	<p>Material from unauthorized/illegal sources may disrupt natural environment.</p> <p>Construction quality may also be affected by using substandard materials</p>	<p>Construction materials only from Government approved source with prior approval of PIU.</p> <p>Permissions in place prior to approval contractor to submit to PIU on a monthly basis documentation on material obtained from each source for the project.</p>	Review and Checking of Material source and quality Checking	Contractor	JKPCC/PIU
5.	Shifting of utilities viz. (electric lines, poles, telephone lines, water pipes and DG set area	Disruption of essential and emergency services	<ul style="list-style-type: none"> • During construction by any chance, any utility (electric poles, telephone lines, water pipes etc.) require shifting, prior permission & assistance shall be obtained from regional offices of Electricity, Telecommunications, and Water works dept. • For DG set area which shall be shifted (by giving alternative) or guard with the permission of Hospital administration prior to start construction activities without disrupting any associated service 	Progress Review	Contractor	JKPCC

Table 9.2: EMP for Construction phase

Table 9.2:EMP for Construction phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
1.	Land Acquisition	No land acquisition is involved in this proposed				
2.	Site Clearing & Preparation					
i.	Topography and Drainage	Change of topography and disturbance to drainage pattern	<ul style="list-style-type: none"> - Disturbance to land surface contours to be kept to minimum. - Maintaining natural drainage pattern. - Adequate drains and slopes to be laid across the proposed expansion Project - prior to start of excavation work to ensure adequate cross drainage for quick evacuation of catchment water; - All necessary measures will be taken while working close to cross drainage channels to prevent earthwork, stonework, materials and appendage as well as the method of operation from impeding cross-drainage at existing drainage systems such as natural drains and River 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on monthly basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			- Construction footprint to be well defined and construction work to be carried out within the footprints only			
ii.	Land use, vegetation and landscaping	- Land use will change open land to contracted area - Relocation/shifting /cutting of a Chinar Tree	- Vegetation clearance or tree cutting should be restricted to the project activity area - Existing Chinar tree located at construction site shall be relocated and grafted, if possible (to avoid cutting) at other location with prior permission of forests department - Dumping and disposal of construction wastes should be done as per C&D waste Management Rules 2016 - to avoid habitat and vegetative cover loss - Follow up overall architectural and landscaping designs	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on monthly basis
3.	Establishment of Labour Camp					
i.	Social Issue	- Conflict of cultural and regional bias - Women’s safety	- Maximum number of unskilled labours to be employed from local areas having their residences in the nearby areas; - Establishment of labour camps by construction contractor will be outside the project site. - The camps will be managed by construction contractor Campsite activities to be monitored.	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on monthly basis
	Health risks	Potential sanitation and hygiene issues due to unplanned	- the contractor will be required to ensure provision of basic amenities of drinking water, adequate number of toilets/mobile or portable toilets, wash	Review of implementation of	Contractor	JKPCC & Construction

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
		waste dumping and disposal Chances of spread of Sexually transmittable diseases	rooms, sanitation and cleanliness, lighting, availability of provisions and groceries and recreational facilities, at the labour camp site - provision of septic tanks to treat wastewater discharged from labour camp - Garbage bins must be provided in the camps and shall be emptied and disposed off in a hygienic manner - Awareness programmes on HIV/AIDS Malaria, Tuberculosis - The workforce shall also be sensitized about the general health issues	mitigation measures		contractor on monthly basis
3.	Construction activity					
A.	Concrete Batching Plant	- Dust emission - Noise emission - Surface runoff	- Stock piling shall be carried out at designated place located away from drainage or drain. - Make provision of periodic water sprinkling and covering to prevent wind erosion (fugitive dust generation) - Make provision of temporary perimeter sediment barrier (such as berms, silt fence or sandbag barriers) to prevent spread of construction material. - Dust Suppression measures such as sprinkling of water (to moist the dust prone area/construction site) will be taken at regular intervals to control	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on monthly basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<p>supply to be optimally operated and regularly maintained so as to ensure that emissions from fuel combustion remain at design levels. Also to ensure stack height of 3 m above the roof level of the shed meant for diesel generators to meet the stack height requirement specified by CPCB</p> <ul style="list-style-type: none"> - Paints, polishes, building fittings and flooring material to be procured carefully to ensure that these have low VOC generation potential - Machinery to be turned off when not in use - Monitoring of the exhaust gases and noise levels will be carried out by an NABL/MoEFCC accredited Environmental Monitoring agency during the construction phase. Results shall be compared with the regulatory standards/ threshold limits as mentioned in annexure-10. 	per monitoring plan		
ii.	Surface Water Quality	Sewage Generated by workers Surface runoff to downstream area	<ul style="list-style-type: none"> - No cleaning, washing or maintenance activity shall be undertaken in park and near any water body. All equipment and vehicle shall be services in its designated workshops only. - Proper water and sanitation (mobile toilets with anaerobic treatment facility) facilities will be provided to the construction labours at construction sites. 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - Proper collection and disposal of wastes will be ensured. All waste shall be managed complying with Solid Waste Demolition Waste Management Rules, 2016 & Solid Waste Management Rules 2015 and guidelines annexure-2 to this report. - All debris waste shall be reused in at site itself to the extent feasible before outside disposal. - Proper passage channel should be provided(if needed) - Waste and construction activities shall be managed such that no waste material slips away to existing drainage 	Periodic water quality monitoring for surface water/ ground water/drinking water as per monitoring plan		
iii.	Water availability and drainage	-Increased water demand -Water wastage Drainage Blockage	<ul style="list-style-type: none"> - Construction labour deputed onsite shall be sensitised about water conservation and encouraged for optimal use of water - Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers - Optimum use of water during sprinkling on roads for dust settlement, washing of vehicles, concrete mixing for foundation etc. - Waste and construction activities shall be managed so that Stock piling shall be carried out at designated place located away from drainage or drain. 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - Proper Slope gradient and screened channels shall be provided for storm water and drainage management. - Recycling/reusing to the extent possible. 			
iv.	Land & Soil	Loss of top soil, Soil contamination Disposal of debris	<ul style="list-style-type: none"> - Areas for top soil utilization should be identified before start of construction activities and excavated top soil shall be utilized for plantations and landscaping within the project site - Disposal of Construction and demolition wastes should be done as per Construction and Demolition Waste Management Rules, 2016 (applicable provision of C&D waste Rules and guidelines is summarized in annexure 2). Debris generated due to the excavation shall be suitably reused in the proposed construction to the maximum extent feasible and with technical approval from the Project Manager. Following Measures shall be considered for better debris management - The sub-grade of the existing pavement may be used as embankment filling material. - The existing sub base material may be recycled as sub base of any haul road or access road. - The Contractor shall identify disposal sites with help of concern authority. This location will be checked on site and accordingly approved prior to any disposal of waste materials. 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - No fuels / lubricants shall be stored in the park area. Any oils/lubricants storage shall be made outside the park on hard concreted surface sloping towards a small spillage collection pit. Any bitumen waste shall be disposed as per rules. - Construction vehicles should be well maintained with periodic check of probable leak points to avoid any oil spillage. - All arrangement for transportation during construction including provision, maintenance, dismantling and clearing debris will be considered incidental to the works and will be planned and implemented by the Contactor. - Debris generated from other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. No debris will be staged on the road or culvert/bridges locations. 			
v.	Solid Waste & Hazardous Waste	Unhygienic issue, littering of solid wastes Waste oil from machinery	<ul style="list-style-type: none"> - Construction contractor shall ensure daily collection and periodic (weekly) disposal of construction waste generated debris, concrete, metal cuttings wastes, waste/used oil etc. - During servicing/repair of equipment or vehicles, a suitable drip tray shall be used to prevent oil/grease spills onto the soil, especially in case of emergency repairs 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - The municipal waste from the labour camp will only be routed through proper collection and handover to local municipal body for further disposal - Littering should be strictly prohibited and labours trained towards the same - Solid wastes will be managed as per the Solid Waste Management Rules, 2016 - Municipal domestic waste generated at site to be segregated onsite and recyclables sold off to vendors - Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system as per in accordance to Hazardous Wastes Other Waste (Management and Trans boundary Movement) Rules, 2016 (HW Rules, 2016); 			
vi.	Traffic Congestion and Parking issues & inconvenience to hospital services	Create traffic and parking issue and hospital during material transport and movement of vehicles involved during construction inconvenience to hospital services and utilities	<ul style="list-style-type: none"> - Traffic/parking management Plan will be prepared by the Contractor and approved by the Project Manager/Supervision consultant prior to commencement to works - To avoid disruption and inconvenience to public , visitors and patients during constructional phase of the project, control measures shall contain separate entry and parking of construction vehicles and visitors vehicles, ambulance, traffic safety arrangements, ensure proper signs, temporary 	Review of implementation of traffic /parking management & mitigation measures	Contractor	JKPCC & Construction contractor on daily basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			barriers and flagman to ensure smooth traffic and Parking management			
vii.	Safety	Issues related to safety of visitors and patients during construction	<ul style="list-style-type: none"> - To avoid inconvenience and ensure safety of general public, visitors and patients during constructional phase of the project several control measures shall be taken viz. separate entry, ensure proper signage, temporary danger tape and flagmen to prevent unwanted labour entry to exposed construction works and to warn public for their safety 	Review of safety measures	Contractor	JKPCC & Construction contractor on daily basis
viii.	Utility Services	Impact on utility services during construction phase	<ul style="list-style-type: none"> - There is no major public utility exist on the construction site except a DG set area and an over ground tank. DG sets shall be shifted (by giving alternative) or guard with the permission of Hospital administration prior to start construction activities without disrupting any associated service. - Over ground tank which is currently being used as storage of water for fire emergency shall be dismantled prior to work execution and alternative arrangement shall be ensured by the contractor. - During construction by any chance, any utility (electric poles, telephone lines, water pipes etc.) require shifting, prior permission & assistance will be obtained from regional offices of Electricity, Telecommunications, and Water works dept. 	Review of mitigation measure and alternative arrangement	Contractor	JKPCC & Construction contractor on daily basis till then permanent arrangement not been ensured

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
ix.	Ambient Noise and Vibration		<ul style="list-style-type: none"> - Noisy equipment if any will be provided in separate enclosures - Use of rubber padding underneath high noise and vibration generating machines - Regular maintenance of inverters and transformers and other equipment to be used - Use of proper Personal Protective Equipment (PPE) such as earmuffs will mitigate any adverse impact of the noise - Periodic monitoring of noise near to the sources of generation to ensure compliance with design specification - In case of complaints of higher noise levels and uncomfortable received from the inhabitants of nearby settlements or by the patients, possibility of putting noise barriers near to the receptor need to be considered. 	<p>Review of implementation of mitigation measures</p> <p>Noise monitoring as per monitoring plan</p>	Contractor	JKPCC & Construction contractor on daily
viii.	Energy	Utilisation of non-renewable resources Energy efficiency	<ul style="list-style-type: none"> - All buildings to be constructed with up- to date standards for energy efficient design; Provision of renewable energy to be used wherever possible - Adoption of measures such as low embedded energy building materials passive heating and ventilation systems, site layout and building orientation to minimise energy requirement 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - Proper ventilation system to be provided to all part of the building Energy Conservation Building Code to be followed 			
ix.	Socio-economic aspects	<ul style="list-style-type: none"> • Labour influx • Occupational and Community Health and safety • Livelihood & Economic & Employment 	<ul style="list-style-type: none"> - The proponent should put in place a contractor management plan and labour management plan to incorporate aspects such as contractor selection and evaluation, labour compliance with respect to the legal specifications and ensuring good labour working conditions, timely payment of wages and other benefits etc. - As part of the contract agreements, the contractor will be required to ensure provision of basic amenities of drinking water, adequate number of toilets, wash rooms, sanitation and cleanliness, lighting, availability of provisions and groceries and recreational facilities, at the labour camp site - The proponent should develop a systematic monitoring and auditing mechanism for monitoring the contractors and sub-contractors in terms of resources, migrant workers, child labour and forced labour, health and safety, payment of wages etc. - Establish a grievance redresal mechanism in place, to allow for the employees and workers to report any concern or grievance related to work activities. 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			<ul style="list-style-type: none"> - Checking of structural integrity and equipment before undertaking work - Use of PPEs and fall protection equipment - JCB/Cranes and other lifting equipment are operated by trained and authorised persons; - Lifting operations are carried out with proper plans and with equipment of adequate capacity - The proponent should develop a systematic monitoring and auditing mechanism for monitoring the contractors and sub-contractors in terms of resources, migrant workers, child labour and forced labour, health and safety, payment of wages etc. - Excavated areas should be temporarily fenced to avoid access of outsiders. Security is to be deputed 24 x 7 to restrict entry of unauthorized personnel; - The sourcing of local labour and staff wherever possible should be made obligatory for the sub-contractors and in all major procurement activities 			
x.	Demobilisation	Demobilisation of construction materials and equipment's	<ul style="list-style-type: none"> - To prepare site restoration prior to demobilization - Remove all demobilisation waste from the construction site and dispose of non-hazardous civil waste in low lying area within the site, while any 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily basis

Table 9.2:EMP for Construction phase

S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
			hazardous waste is to be disposed as the requirement of pollution control board			
xi.	Commissioning of the Project	Environmental Pollution	<ul style="list-style-type: none"> - Commissioning to be done only after implementation of all the recommended measures as specified in the Project design and conditions - Obtain permit like CTO (Consent to Operate) prior to the project commissioning from SPCB (by applying for it at least 90 days in advance of project commissioning) 	Review of implementation of mitigation measures	Contractor	JKPCC & Construction contractor on daily basis

Table 9.3: EMP for Operation & Maintenance Phase

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
1.	Water Demand for hospital and utilities requirement	Water requirement for various uses	<ul style="list-style-type: none"> - New hospital Block will use of PHE water supply to fulfil the fresh water demand - The proposed project to be designed for higher water efficiency through a careful combination of design and water saving technology - Design of Low flow toilets, like urinals flushing capacity should to be kept around 6 litres per use to conserve water - Infrared sensors to be installed in urinals to control wastage of water Provision of rainwater harvesting - Majority of the non-drinking water (flushing, landscaping etc.) requirement will be done through usage of recycled water for the project during operations - Dual plumbing system has been planned to further reduce fresh water usage 	Review of status of implementation suggested for mitigations	Concerned Dept. of LD Hospital	Quarterly monitoring

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
2.	Wastewater generation & disposal	Issues related Sewage and laundry wastewater management	<ul style="list-style-type: none"> - STP/CETP is proposed for treatment of wastewater that to be discharged from new LD hospital Block - The sewerage system will be designed for connecting to the STP. No wastewater discharge on open land will be practiced and all wastewater outlets will be connected to the STP for treatment and reuse - Treated effluent quality monitoring will be carried out to ensure reuse/ discharge wastewater compliance requirements. - Accidental discharge of biomedical and solid waste shall be prevented by application of regulatory requirements mentioned in waste management rules. 	<p>Review of status of implementation suggested for mitigations</p> <p>Periodic Water and waste water monitoring as suggested in monitoring plan</p>	Concerned Dept. of LD Hospital	<p>Annual renewable of CTO</p> <p>Quarterly monitoring of Water and wastewater</p>

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
3.	Air Emission from DG set	Air Pollution	<ul style="list-style-type: none"> - The DG set will have to be regularly maintained to match emissions with design output. - Adequate stack height of 30 m will be provided as per the CPCB guideline Low sulphur diesel to be used for DG sets 	Review of status of implementation suggested for mitigations Periodic Air monitoring as suggested in monitoring plan	Concerned Dept. of LD Hospital	Quarterly monitoring

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
4.	Bio medical, Solid Waste and Hazardous waste Generation & management	Issues related to Bio medical, Solid Waste and Hazardous waste Generation & Management	<ul style="list-style-type: none"> - Biomedical waste shall be managed accordance to Biomedical Waste Management Rules 2016. Details measures and standard practices are discussed in relevant section of this report. - Solid waste shall be managed accordance to Solid Waste Management Rules 2016 - Employees should be continue educated on segregation of waste with demarcated bins for recyclables and perishables placed in common areas - Hazardous wastes should be kept isolated place away from active working zone - Consent to Operate should be obtained from Pollution Control Board for hazardous waste handling and conditions should be strictly complied with in line with ongoing operational buildings - Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system as per in accordance to Hazardous and Other Waste (Management and Trans boundary Movement) Rules, 2016 (HW Rules, 2016) 	Review of status of implementation suggested for mitigations	Concerned Dept. of LD Hospital	Daily Inspection and record checking and compliance to conditions as per Rules and regulations

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
5	Heath, Hygiene and Odour Problem	Issues related to heath, hygiene and Odour from waste collection points including temporary storage areas and STP sites	<p>-Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time. There can be multiple collections from wards during the day. Health Care Facility shall ensure collection, transportation, treatment and disposal of bio-medical waste as per BMWM Rules, 2016.</p> <p>-Healthcare facility shall also ensure designated central waste collection room situated within its premises for storage of bio-medical waste, till the waste is picked and transported for treatment and disposal at CBWTF.</p> <p>STP operator shall ensure:</p> <ul style="list-style-type: none"> -Proper functioning of all STP units including digestion of sludge unit and dewatering unit of STP -Tree plantation and landscaping along the periphery of the STP site to prevent spread of bad odour -Accumulated sludge and solid waste to be cleared within 24 hours <p>Regular clearance of sludge and solid waste to minimize odor nuisance</p> <p>Spraying of herbicides like Maple and Gtech on accumulated sludge/solid to reduce odour.</p> <p>Details measures and standard practices for Heath, Hygiene and Odour from waste collection points including temporary storage areas and STP sites are discussed in relevant section of this report.</p>	Review of status of implementation suggested for mitigations	Concerned Dept. of LD Hospital /STP operator	Daily Inspection and record checking and compliance to conditions as per Rules and regulations

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
5.	Storage of flammables and Chemicals	Storage of flammables viz. LPG, other lab gases and Chemicals	<ul style="list-style-type: none"> - Proper marking to be made for identification of locations of flammable sand chemical storages; - Proper system for collection and disposal of chemicals and flammable items - Follow up of all the required safety measures (working guideline, use of personal protective equipment like gloves, helmets, ear muffs, safety belts for any repair and maintenance work within the proposed facility - For safety of people occupying the building, regulations concerning fire safety to be followed. Some of the requirements are- <ul style="list-style-type: none"> - Installation of fire extinguishers all over the building Provision of water hydrants in operative conditions - Emergency exit; Proper labelling of exit and place of the protective system installation; Conducting mock drills - Trained personnel to use the fire control systems - Display of emergency evacuation maps in each floor 	Review of status of implementation suggested for mitigations	Concerned Dept. of LD Hospital	Daily Inspection and record checking Compliance to conditions as per Rules and regulations

Table 9.3: EMP for Operation & Maintenance Phase						
S. No	Aspects	Impacts	Mitigation Measures	Monitoring/ Action	Responsibility	Frequency of Monitoring/ inspection/ audit
7.	Disaster Management	Risk of damages due to fire, flood, natural disaster and other emergency situations	<ul style="list-style-type: none"> - During operation phase, potential risks will be mainly related to accidental fire from leaks of flammable materials like LPG and HSD storage. - Ensure adequate Fire Fighting system established onsite prior to commissioning of the Project as per the Fire Fighting Plan covering following aspects: <ul style="list-style-type: none"> - Fire Prevention Measure and System - Fire Detection & alarm System - Fire Fighting System and devices - Natural disasters and - Related risks shall be managed by design improvements and standard practices mentioned in DMP. - Responsibilities of Emergency Response Co-ordination Team members to be provided in the DMP 	Review of status of implementation suggested for mitigations	Concerned Dept. of LD Hospital	Once Month

8.4. Technical Details of Mitigation Measures proposed under Environment Management Plan of Proposed Hospital Project

8.4.1. Storm Water Management- Operational action plan for Storm Water Management

Storm water collection system

240. Rain water and melted snow from roof top, paved and unpaved area will be collect by storm water drainage system. Landscaped areas where necessary will be drained through 150mm dia perforated pipes running 250mm below the surface at 1 in 200 slopes. Perimeter drainage channels will be provided where necessary. Concealed drain with Gully Pit will be provide along the periphery. Most of the storm water produced on site will be harvested for ground water recharge.

Best management practices for storm water management at Lalded Hospital

- Regular inspection and cleaning of storm drains
- Execution of oil spill response plans, particularly for fuel and oil storage areas
- To avoid ponding, slope gradient should be toward storm water drain
- Cover waste storage areas
- Avoid application of pesticides and herbicides before wet season
- Conducting routine inspections to ensure cleanliness
- Provision of slit traps in storm water drains
- Provide biological cover on loose soil wherever possible

Rainwater Harvesting

241. The storm water disposal system for the hospital premises will be self-sufficient to avoid any collection/stagnation and flooding of water. The amount of storm water run-off depends upon many factors such as intensity and duration of precipitation/snow, characteristics of the tributary area and the time required for such flow to reach the drains. In the proposed hospital building, Storm water from various blocks shall be connected to adjacent drain by a pipe through catch basins. It is estimated that total 5 No. of recharge pits of 16 KL capacity would be require and feasible for rainwater harvesting.

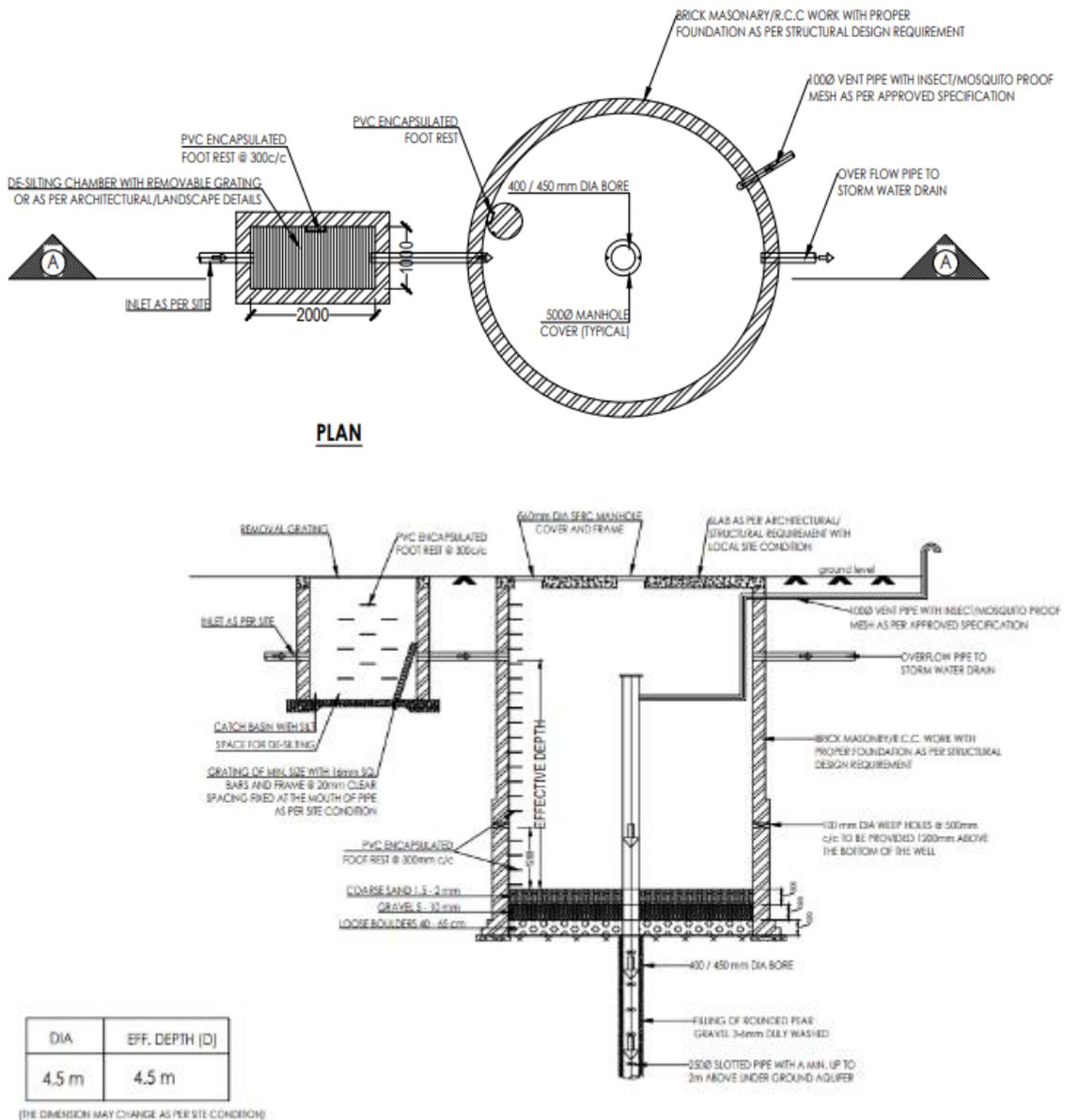
242. Design of the recharge pit is depicted in Figure 9.2 of recharge pits are normally excavated pits, which are sufficiently deep to penetrate the low permeability layers overlying the unconfined aquifers. These pits are similar to recharge basins in principle, with the only difference being that they are deeper and have restricted bottom area.

Design specifications of the rain water harvesting plan for Lalded hospital are as follows:

- The roof will have smooth, hard and dense surface which is less likely to be

Damaged allowing release of material into the water. Roof painting has been avoided since most paints contain toxic substances and may peel off.

- All gutter ends will be fitted with a wire mesh screen and a first flush device would be installed. Most of the debris carried by the water from the rooftop like leaves, plastic bags and paper pieces will get arrested by the mesh at the terrace outlet and to prevent contamination by ensuring that the runoff from the first 10-20 minutes of rainfall is flushed off.
- No sewage or wastewater would be admitted into the system.
- No wastewater from areas likely to have oil, grease, or other pollutants has been connected to the system



Source: JKPCCL

Fig. 9.2- Design Details of Rainwater Harvesting pit proposed under Lalded Hospital Project (Plan & Section)

8.4.2. Solid Waste Management Plan

Construction Phase

243. During construction phase small amount of solid wastes will be generated from labour camps consisting of food waste, plastic, glass, aluminium cans and waste paper etc. this waste will be collected as per the provision of Solid Waste Management Rules 2016 and Construction contractor shall ensure daily collection of Solid wastes and periodic (weekly) disposal of construction waste generated debris, concrete, metal cuttings wastes, waste/used oil etc.
244. The municipal waste from the labour camp will only be routed through proper collection and handover to local municipal body for further disposal. Apart from this, littering should be strictly prohibited and labours trained towards the same.

During Operation

245. The proposed Hospital block will generate solid waste in form of food waste from kitchen/ canteen and other general waste. The waste will be generated from the hospital area about 200 Kg of Municipal waste which will be collected, transported and disposed of as per Solid Waste Management Rules 2016. The generated Solid Waste (MSW) will be finally collected and disposed by Srinagar Municipal Corporation. No indiscriminate disposal of garbage should be allowed within the complex. A proper waste collection system will be implemented in Lalded Hospital Complex and waste will be segregated at source. To facilitate this, a multi-bin system will be provided and for each ward, floor to floor garbage collection system will be adopted.
246. General waste generated from the healthcare facility must be disposed of in accordance with the provisions of Solid Waste Management Rules, 2016 and following are the guidelines which shall be adopted Solid waste management from Lalded Hospital.
- Health care facilities must ensure that the general solid waste generated from the facility is segregated and collected in a separate bins filled in with non-chlorinated bags and shall not be mixed up with the BMW generated in the facility. Requirements of HCFs in management of solid waste are given below;
 - Collect segregate waste in two separate streams namely bio-degradable waste and dry-waste. Green bins shall be provided for bio-degradable wastes and blue bin for dry wastes. Colour coded bins may be either painted or labelled with particular colour.
 - Plastic sheets provided inside the bins shall be of minimum 50mm thick as required under plastic waste management Rules, 2016. In case of bio-degradable waste collection bins, it is recommended to use compostable plastic bags of any thickness.

- Waste collected in bins shall be handed over to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;
- Hospital will set-up on-site compost plants as far as possible.
- Used sanitary waste like diapers, sanitary pads etc. generated from hospitals should preferably be wrapped in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material and disposed along with soiled waste (yellow c) category waste for incineration.
- To store horticulture waste and garden waste generated from his premises separately in their own premises and dispose of as per the directions of the local body (local authorities) from time to time.
- General waste shall not be throw or burnt on streets, open public spaces outside the premises or in the drain or water bodies.
- HCFs shall pay user fee for solid waste management, as may be specified in the byelaws of the local body. • HCFs shall handover segregated waste to authorized waste collector or agency as specified by the local body. Guidelines for Implementation of Bio-medical Waste Management Rules by Healthcare Facilities.
- General waste should not be stored in central waste storage area meant for Bio Medical Waste generated for the facility, but is stored separately, till it is handed over to authorised waste picker of local bodies
- Any BMW generated should not be mixed with the general waste. To ensure the same, health care facilities have to train all the staff of HCF to segregate general wastes and they shall also caution or advise the visitors in HCFs to follow the same.
- General waste should not be stored in central waste storage area meant for Bio Medical Waste generated for the facility, but is stored separately, till it is handed over to authorised waste picker of local bodies
- Any BMW generated should not be mixed with the general waste. To ensure the same, health care facilities have to train all the staff of HCF to segregate general wastes and they shall also caution or advise the visitors in HCFs to follow the same.

8.4.3. Green Belt and Plantation

247. Greenbelt development is the most efficient mitigation measure for control/prevention for air pollution & noise pollution. In addition to augmenting green cover and adding to the aesthetic beauty of the surrounding, greenbelt development checks the soil erosion, provides noise abatement and helps in prevention of carryover of the particulate matter beyond the plant premises. Thus, an effective greenbelt cover serves for barricading the potential pollution parameters within the plant premises. Green belt/plantation with the following objectives is also envisaged to be developed for the proposed project:
- Reduce air pollution.

- Attenuate noise generated
- Reduce the effect of fire and explosion
- Improve the general environment and aesthetics of the area
- Provide suitable habitat for fauna
- Control soil erosion

248. As per the CPCB guidelines 33 % area of total project area is earmarked for development of Green Belt. However, in the present case, it will be difficult to achieve this but it is proposed to develop 661 Sq.m area for new landscaping and 1000 trees shall be planted as Green belt which will be developed all along the project boundary with spacing of 2m between the trees. Drawing for green belt and plantation development is given as annexure-5. Public land and parks located adjacent to hospital shall also be taken for green cover development and after permission from land owner agency, suitable plant species will be planted.

Guidelines for Green Belt and Plantation

249. It was decided to retain the existing vegetation along the boundary. In addition more trees will be planted according to the landscape plan. Thus, the landscaping and plantation programme within the project site will improve the aesthetic quality of the project site as well as of the surrounding environment. The general considerations involved while proposing the green area plan are:

- Broad leaf trees growing above 10 m in height should be planted along the approach roads and project boundary. Plantation of trees should be undertaken in appropriate encircling rows.
- Generally local/indigenous fast growing trees, evergreen habit, large crown volume and shrubs should be planted.
- The trees should be protected by plantation of shrub species to avoid browsing by animals and human activities.
- Placement of Iron tree guards should be provided to save the plant saplings.

Landscape and plantation management (during operational Phase)

- Sufficient number of trees will be planted inside the campus. Mostly native with less water consuming species will be planted.
- Open spaces should be covered with grass.
- No bare open space should be allowed to be left as it may lead to soil erosion.
- Proper care should be taken to maintain the trees and plants.



Species Suitable For Plantation

Common Name	Botanical Name
Walnut (Akharot)	<i>Juglans regia.</i>
Chinar	<i>Platanus orientalis</i>
Robinia	<i>Robinia pseudoacacia</i>
Toon	<i>Toona ciliata</i>
Brimji	<i>Celtis caucasica</i>
Himalayan blue pine(Kai)	<i>Pinus wallichiana Jacks.</i>
Himalayan poplar(Panjeeb/ Parim phras)	<i>Populus ciliata Wal</i>
White Mulberry(Tul)	<i>Morus alba Linn</i>
Himalayan Silver Fir(Badul, kauch-badul)	<i>Pinus spectabilis D.Don.</i>
Western Himalayan Silver Fir(Badul)	<i>Abies pindrow Royle</i>
Chestnut(Handun)	<i>Pavia indica Wall.</i>
Italian Poplar(Kashur phras)	<i>Populus nigra Linn</i>
Kashmiri Cypress(Sarva)	<i>Cupressus torulosa D. Don.</i>

8.4.4. Sewage and Wastewater collection, treatment and Disposal plan

Construction phase

250. The major source of wastewater will be from the labour usage at the construction site and labour camp which will be sent to septic tanks/soak pits. Use of onsite treatment (septic tank, etc.) and disposal of sewage, thereby minimizing the impacts of wastewater discharge from labour camp.

Operational Phase

251. Sewage treatment is a process of removing contaminants from sewage water to produce liquid and solids suitable for discharge to the environment or for reuse. Sewage treatment includes physical, chemical and biological treatments to remove these contaminants. In the operational phase of the proposed LD hospital block, total 36 KLD wastewater will be generated which include 24.5 KLD domestic wastewater and 11.5 KLD flushed wastewater. Considering 20% more capacity than the wastewater generated, capacity of proposed STP 43.2 KLD is estimated. Small amount (3.9 KLD) of laundry and laboratory effluent will also be generated from this block. Ideally there should be an ETP of 5 KLD to treat this effluent. However, looking to small volume of effluent and smooth operation. Therefore, a common Sewage treatment plan of 50 KLD capacity based on SBR technology is proposed for newly proposed block. Hydraulic flow diagram of 50 KLD treatment plant is shown in the Fig. 9.3.

Proposal for Treatment of sewage and effluent:

- Proposed Capacity of Common Effluent Treatment Plant – 50KLD
- Technology- SBR

- Additional Features to treat effluent- Equalization unit, Sand Filter and provision of phosphorus and nitrogen removal chambers
- Treated Water Standard Proposed to promote reuse and recycling of water

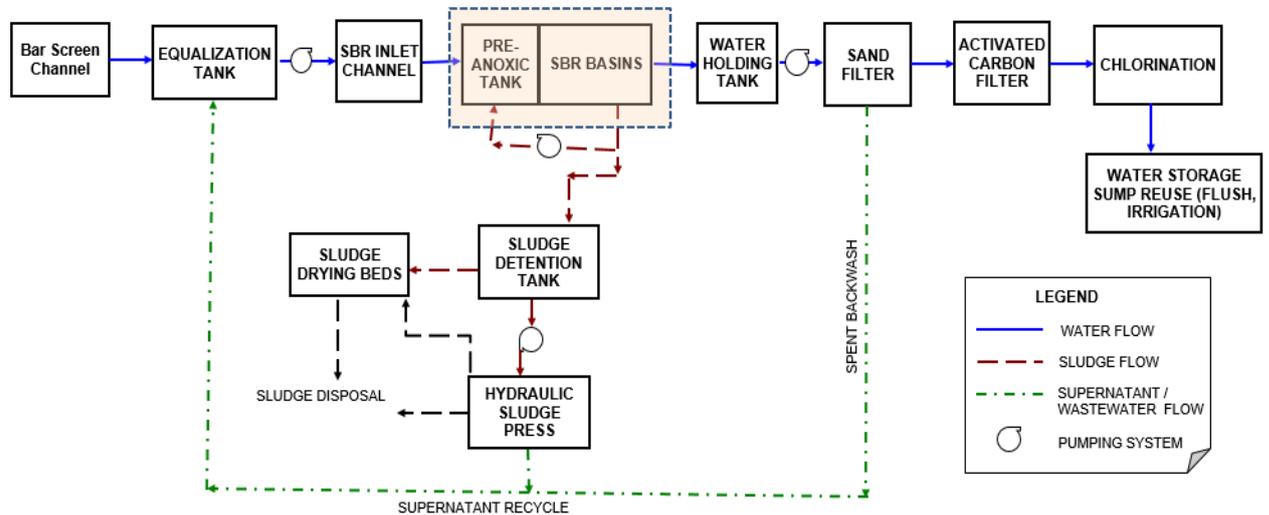


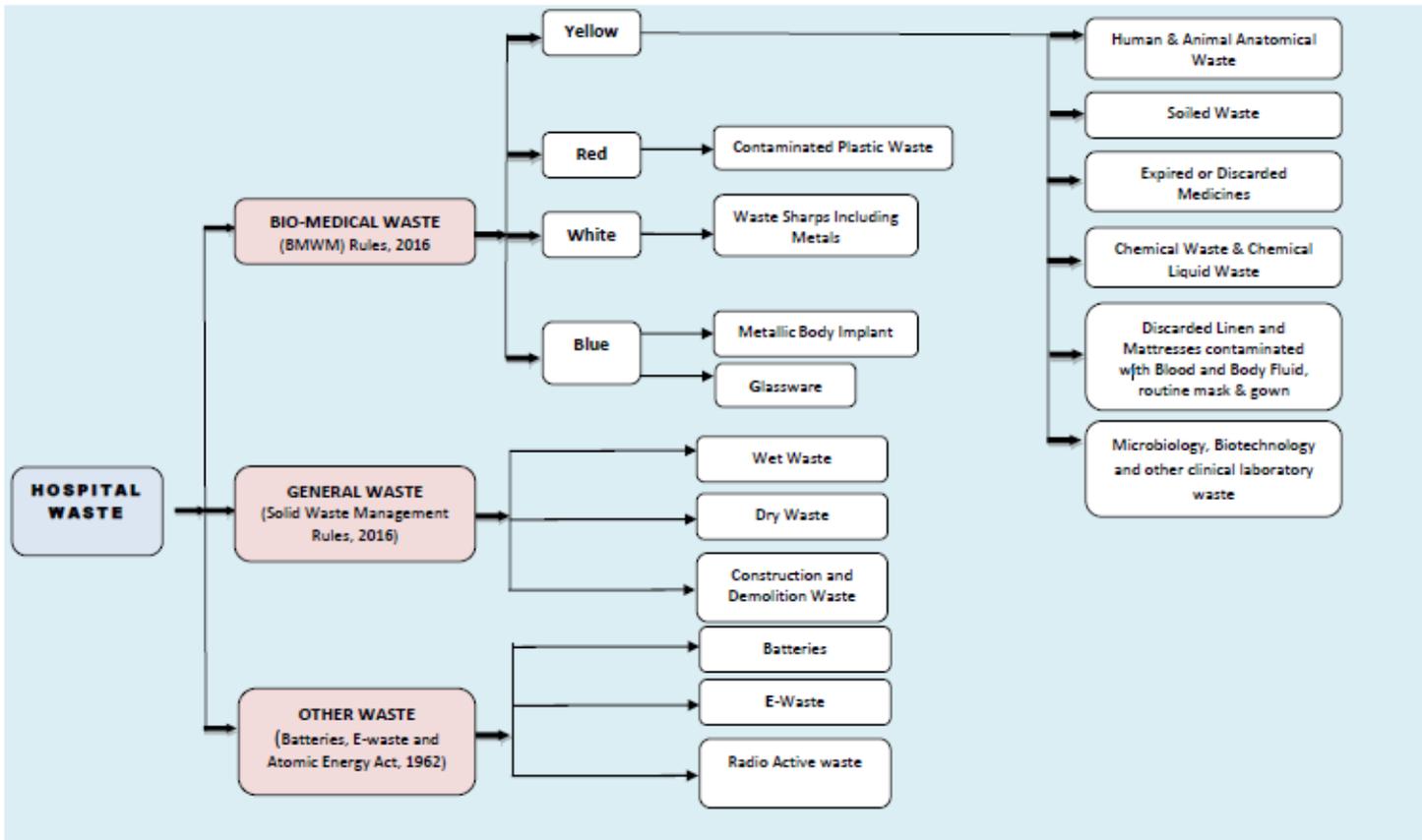
Fig. 9.3-Process Flow diagram- SBR Wastewater Treatment Plant

Proposed Treatment Standards to achieve:

Expected Effluent Characteristics before Treatment	Desired Treated effluent characteristics after tertiary treatment based on SBR
pH- 6.5-8.5	pH- 6.5-8.5
BOD ^{5days} -300-400 mg/l	BOD ^{5days} - <10 mg/l
COD-600-800 mg/l	COD- <80 mg/l
TSS-200-450 mg/l	TSS- <10mg/l
Oil and Grease- 50 mg/l	Oil and Grease- <5 mg/l

8.4.5. Biomedical waste collection, handling and disposal plan

252. Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. Bio-Medical waste includes all the waste generated from the Health Care Facility which can have any adverse effect to the health of a person or to the environment in general if not disposed properly. All such waste which can adversely harm the environment or health of a person is considered as infectious and such waste has to be managed as per BMW Rules, 2016. As shown in the figure 9.4. Hospital wastes can be divided in three types of wastes which should be managed as per applicable waste management rules.



Source: CPCB 2018

Fig. 9.4 Categorization & Classification of Wastes in Health Care Facilities

253. In the proposed block of LD hospital, total 62 kg of biomedical wastes/day will be generated from 82 beds considering 770 gm wastes per bed per day. Like the existing hospital system, all the biomedical wastes from proposed block would be collected as per the provisions of the Biomedical waste management rules 2016 and given to Common Bio medical waste treatment & disposal facility namely Kashmir Health care system which is operating from Lassipora, Pulwama about 40 Km from the LD Hospital.

Recommendations regarding Bio Medical Waste Management for Existing & Proposed Hospital:

254. The following are recommendations to be implemented in the existing block to improve / update its BMW management. The updated system shall then be adopted by the expanded hospital & get synergized for obtaining regulatory approvals for the increased capacity.

- (i) **Segregation of waste** in colour coded bags has to done as per the New rules, 2016 & their subsequent amendments.

(ii) Recommendations related to Pending Regulatory compliances subsequent to enactment of BMW rules ,2016 & their amendments of 2018

• Phase-out use of chlorinated plastic bags, gloves and blood bags by 31 March 19

255. The hospital should identify such suppliers who can provide non-chlorinated bags, gloves, blood bags etc for the present as well expanded capacity.

• Establish bar-code based software system by 31 March19

The extended date for establishing a bar code based software system for collection, transportation and handling of BMW is 31 March'19. The hospital should take steps for its implementation for old as well expanded blocks together. The establishment of such software based collection system shall also help in reducing the chance of any pilferage during handling of waste from generation to its final disposal in addition to reducing the handling time of waste and making it very efficient as well reducing the exposure time of people with waste

• Display waste management monthly record on the hospital website

• Every occupier/operator to upload the annual returns on its website

The LD hospital should set up its own website very soon. Subsequent to the setting up of this web site, it will be possible for hospital to upload its monthly data as well annual reports as per regulatory requirements. The same web site shall be used by hospital for its expanded capacity.

• The hospital shall obtain authorization under BMW Rules, consent under Air Act & Water Act for the expanded capacity.

Presently, the hospital has authorization for the present capacity but consents under Water & Air act are still to be obtained from SPCB. The hospital should obtain consents under Water & Air Act(s) from SPCB & then plan to get the revised authorization & consents for the expanded hospital after complying with the above mentioned points.

(iii) Recommendations related to BMW segregation :

- Regular training of staff nurses & workers for BMW segregation.
- Creating awareness for segregation by putting segregation posters at all appropriate places.
- Provision of adequate no of bins at all places.
- Proper supervision by the BMW committee and follow up for segregation.
- Use of black coloured bags be discontinued with immediate effect & use only bags as per color coding scheme.

(iv) Recommendations related to BMW Management Committee :

256. The same committee shall work for the existing hospital and then for the expanded hospital.

The committee should be assigned the following functions:

- To oversee the overall BMW management of hospital
- To organise the training programs for BMW handling & disposal in the hospital.
- To ensure the Immunization of Health workers with Tetanus and Hepatitis-B vaccine
- To inspect the common BMW facility from time to time
- To inspect the segregation of BMW within the hospital complex
- To ensure the adequate & proper use of PPEs
- To foresee the overall requirement of BMW bins, bags, PPEs and other infrastructure
- To coordinate for setting up hospital website as well Bar coded software based collection system
- To get the monthly data as well annual reports uploaded on hospital web site
- To coordinate the Health check-up of all staff nurses /workers involved in BMW handling

(v) Recommendations related to Health Check of Staff nurses & workers :

257. The hospital should do the following for existing hospital & then continue to do it for expanded capacity:
- Set up a committee of hospital doctors for health check-up of staff nurses & workers. If required, the doctors from other nearby Govt. hospitals can be involved.
 - A proper format of various tests be prepared
 - A fixed schedule of check-up (preferably half yearly) be decided
 - A proper record of all staff examined be maintained
 - The records be scrutinised regularly to find any adverse impact on health of any nurse & staff handling BMW
 - In addition, all the staff nurses & health workers be immunized with Tetanus and Hepatitis-B vaccine on regular basis as per the guidelines of these injections.

(vi) Recommendations related to BMW Management Trainings :

- The hospital should get 2 or 3 senior doctors & nurses fully trained in all aspects of BMW management (These persons can preferably be a part of the BMW committee) and they become the master trainers.
- A monthly training program be organised by these master trainers in such a way that all nurses / workers involved in the BMW management of hospital get a chance to be trained / re-trained once in every six months
- Proper record of such trainings be maintained
- The persons having been trained be evaluated for their understanding at their working stations by the BMW committee from time to time
- BMW management be part of assessment of performance evaluation of such employees

(vii) Recommendations related to BMW infrastructure, materials etc :

- Provide new & adequate no of trollies for the existing block as well for expanded capacity. The bad conditioned trolleys can be a big risk while transporting waste from various wards to storage point due to any spillage or overturning or any accident

- Provide adequate no of bins at all the wards /points at appropriate places
- Provide bins of adequate size at appropriate places. Too much over size or undersize of bins should be avoided. Unlike, in the present system, when all the bins for whole of hospital are of same size of 60 litres
- Provide adequate no of needle blasters, preferably one per nursing station.

(viii) **Recommendations related to Personal Protective Equipment (PPEs) :**

258. The following points are suggested for the existing hospital as well the expanded capacity:

- Procurement of adequate no of PPEs like gloves, masks, head covers, gum boots etc
- Proper training of all staff about the hazards for not using the protective measures
- Proper training of all staff about the use of PPEs
- Regular inspection by the BMW committee / hospital administration
- Rewards to the employees following full protocol in use of PPEs.

(ix) **Recommendations related to Common Collection Point (Waste Storage Room) :**

- The waste storage room (which shall be common for the existing block & expanded block) be immediately repaired and proper ventilation as well secured shutter / lock up be provided in order to avoid any unwanted person /animal coming in contact with waste
- The area outside the waste storage room (which is again common area for expanded capacity of hospital) be cleaned & improved with pucca floorings since it is infested with rats & other rodents who are likely to interfere with waste and can spread the diseases.
- In addition, this area should be fenced / secured to avoid the entry of any rag pickers / animals in that area

(x) **Recommendations related to Liquid Waste Management:**

- The hospital authorities should make arrangements for treatment of all liquid wastes (with Sodium hypo chlorite) before it is allowed to be mixed with drain water for its further treatment in ETP / STP for the present set up & then for the expanded capacity.

(xi) **Recommendations related to Health Safety Measures :**

- The open area outside of waste storage room should be cleared of all waste lying over it (including syringes , needles etc.)
- The placing of bins containing waste at few places in very near to patient beds should be reviewed and be placed at secluded locations in wards.
- The small bins being used for storing BMW on sister's trolley must have proper cover.
- Covers must be provided to all bins containing waste.

- No BMW bins be placed in urinals / toilets being used by patients / attendants.
- Waste storage room needs to be immediately made ready with proper ventilation & locking arrangement, since this can be misused by rag pickers /stray animals
- Sufficient no of BMW bins be provided at all places. Preferably, there should be one set of bins per nursing station in each ward.
- The area outside the storage room need proper cleaning since a some BMW is scattered there and a proper PCC platform since presently, it is infested with rats /rodents, who can carry the waste to other places.
- The isolation (HIV Infected patients) ward should be totally isolated and entry should be highly restricted. The waste from this ward shall be handled with special care & properly recorded.
- The entry in neo-natology ward should be highly restricted and the waste of this ward should be stored in a secluded & safe place.

(xii) Recommendations related to Record Keeping :

259. The record keeping of hospital need to be improved as detailed below. The improved records to be implemented for the expanded capacity.

- Presently, a cumulative quantity of total waste produced from whole of the hospital is found out & entered in the register with total no of bags /day. This record needs to be collected ward wise along with bags and then added to arrive at the total quantity of waste /bags/day. This needs to be done for existing block and then expanded block to be included in the same.
- The records of BMW trainings to be maintained for the existing block & then expanded block to be merged with it
- The records of health check-ups of staff nurses /workers to be maintained for existing blocks & then expanded block to be merged with it.
- Dead Foetus below viability period shall be considered anatomical waste. Medical officer to issue MTP certificate before disposal to CBWTF and a proper record of the same be maintained
- A proper record of authorisation and consents (both air & water) obtained from SPCB be maintained now for the present block & then again get it for the expanded hospital.
- Separate record of Isolation ward (HIV) waste should be maintained
- Separate records of major accidents should be maintained
- The records of annual returns of at least last 3 years filed with SPCB should be kept in a proper file for comparison of various components of waste & other issues

- The records of BMW committee meetings to be maintained regularly for the existing block & then including the expanded block
- Separate records of expired drugs /discarded medicines be maintained

8.4.6. Recommendations related other Wastes

Management of Radioactive Wastes

260. The Atomic Energy Regulatory Board (AERB) has been mandated by the Central Government, as the Competent Authority as per Atomic Energy (safe Disposal of Radioactive Wastes) Rules, 1987 notified under the Atomic Energy Act 1962. It exercises regulatory control over nuclear installations and the use of radioactive substances and radiation generating plants outside such installations. AERB also empowered to perform the functions as stipulated under sections 10(1) (powers of entry) and 11(1) (powers to take samples) of Environmental (Protection) Act, 1986 and Rule 12 (agency to which information on excess discharge of pollutants to be given) of the Environmental (Protection) Amendment Rules, 1987 with respect to radioactive substances.
261. As per provisions of Atomic Energy (safe Disposal of Radioactive Wastes) Rules, 1987, no person shall dispose of radioactive waste (a) unless he has obtained an authorization from the competent authority under these rules; (b) in any manner other than in accordance with the terms and conditions specified in the authorization issued under these rules; (c) in any location different from those specified in the authorization; and (d) in quantities exceeding those specified in the authorization.
262. Health Care Facilities generating radionuclides waste from treatment of Cancer patients and end-of-life equipment containing radio radionuclides shall obtain authorization from AERB for its disposal. As per the policy of AERB, radionuclides wastes are required to be re-exported back to the manufacturer. It was recommended that such generators shall ensure arrangement with manufacturer at the time of purchase of such equipment. Waste disposal facilities of AERB are regulated by Waste Disposal Agency (Division) of AERB.
263. As per information collected from hospital, about 2 litres /month of Hazardous waste is generating from X –ray facility. This waste after dilution is being drained, which is a regulatory violation. This should be stored and handed over to a person /party authorised by SPCB exclusively for this purpose.

Management of Used Batteries

264. As per the provisions under Batteries (Management & Handling) Rules, 2001, used lead acid batteries generated from health care facilities (HCFs) should be sold/auctioned/sent only to the authorised dealers, designated collection centres or authorised recyclers or any authorised agency. In no case the used batteries be handed over to an unauthorised person. Hospital having purchased more than 100 batteries should maintain records of number of batteries purchased, and number of used batteries sent to registered recyclers/authorised dealers/designated collection centres/any other agency as per Form-VIII of Batteries Rules, 2001 and the returns shall be filed half yearly i.e. by 30th June and 31st December of every year to the concerned State Pollution Control board.

Management of E-Wastes

265. As per provisions under E-Waste (Management) Rules, 2016, as amended every generators of end of life electrical and electronic equipment (EEE) listed under Schedule-I are required to ensure that such E-Waste is sent to an authorized E-Waste dismantling or recycling facility or an authorised collection centre of the Producer of EEE or through designated take back service providers of Producers or registered Producer Responsibility Organization (PRO) of a Producer. E-waste can be auctioned only to authorised E-Waste Recyclers/ Dismantlers/ PRO of a Producer. Records of E-Waste transfer/sale should be maintained records in Form -2 for verification of the SPCBs/PCCs and Annual returns as per Form-3 of E-Waste (Management) Rules, 2016, as amended should be submitted to SPCBs/PCCs by June 30th of every year. E-Waste generated from hospital equipment not listed in Schedule-I should also be sold/ transferred to only the authorized E-Waste Recyclers/Dismantlers.

8.4.7. [Heath, Hygiene and Odour control plan from waste collection including temporary storage areas and STP sites](#)

266. Following are the precautions and measures should be adopted to maintain the health hygiene and control odour from waste collection including temporary storage areas and STP site

Heath, Hygiene and Odour control plan from waste collection including temporary storage areas-

267. Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time. There can be multiple collections from wards during the day.
- HCF should ensure collection, transportation, treatment and disposal of bio-medical waste as per BMW Rules, 2016 and HCF should also ensure disposal

of human anatomical waste, animal anatomical waste, soiled waste and biotechnology waste within 48 hours

- Collection times should be fixed and appropriate to the quantity of waste produced in each area of the health-care facility.
- General waste should not be collected at the same time or in the same trolley in which bio-medical waste is collected.
- Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day. For example, in an IPD ward where the morning routine begins with the changing of dressings, infectious waste could be collected mid-morning to prevent soiled bandages remaining in the area for longer than necessary
- Bio-medical waste bags and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection
- Interim storage of bio medical waste is discouraged in the wards / different departments of HCF.
- If waste is needed to be stored on interim basis in the departments it must be stored in the dirty utility/sections.
- No waste should be stored in patient care area and procedures areas such as Operation Theatre. All infectious waste should be immediately removed from such areas.
- In absence of dirty utilities/ sections such BMW must be stored in designated place away from patient and visitor traffic or low traffic area
- In house transportation of Bio Medical Waste from site of waste generation/ interim storage to central waste collection centre, within the premises of the hospital must be done in closed trolleys / containers preferably fitted with wheels for easy manoeuvrability.
- **Central Waste Collection Room for Bio-medical Waste** Each Healthcare facility should ensure that there is a designated central waste collection room situated within its premises for storage of bio-medical waste, till the waste is picked and transported for treatment and disposal at CBWTF. Such room should be under the responsibility of a designated person and should be under lock & key. The following points may be considered for construction of central waste collection room
 - The location of central waste collection room must be away from the public/ visitors access.
 - The space allocation for this room must be as per the quantity of waste generated from the hospital.
 - The planned space must be sufficient so as to store at least two days generation of waste.
 - Central waste collection room must be roofed and manned and should be under lock and key under the responsibility of designated person.

- The entrance of this centre must be accessible through a concrete ramp for easy transportation of waste collection trolleys.
- Flooring should be of tiles or any other glazed material with slope so as to ease the cleaning of the area.
- Exhaust fans should be provided in the waste collection room for ventilation.
- It is to be ensured by the health care facility that such central storage room is safety inspected for potential fire hazard and based on such inspection preventive measure has to be taken by the health care facility like installation of fire extinguisher, smoke detector etc.
- There should also be provision for water supply adjacent to central waste storage area for cleaning and washing of this station and the containers. The drainage from the storage and washing area should be routed to the Effluent Treatment Plant.
- Sign boards indicating relevant details such as contact person and the telephone number should be provided.
- The entrance of this station must be labelled with “Entry for Authorized Personal Only” and Logo of Bio Medical Waste Hazard.
- It is to be ensured that no general waste is stored in the central waste collection area

Odour Control Plan for STP-

- Ensure proper functioning of all the units of STP for digestion of sludge and ensure adequate functioning of dewatering units for efficient functioning of system
- Tree plantation and landscaping along the periphery of the STP site to prevent spread of bad odour
- Accumulated sludge and solid waste to be cleared within 24 hours
- Regular clearance of sludge and solid waste to minimize odor nuisance.
- Spraying of herbicides like Maple and Gtech on accumulated sludge/solid to reduce odour.

8.4.8. Occupational Health and Safety issues and its management

268. There is a chance of adverse effect on the workers at site during construction as some of the activities involve risk and occupational health hazard, which can be minimised by taking the following mitigatory measures during construction.
- The construction works generates respirable dusts, so in some cases the workers must use mask.
 - If handling of hazardous chemicals required at any stages of construction the workers must use the hand gloves.
 - The workers must be provided with earplugs and earmuffs for any job, which will generate excessive noise.
 - As the workers will have to work at height, they must be trained and caution about the possible danger.

- While working at height the tools and other heavy materials can fall down causing accidents, so the adequate PPE like helmets, safety shoes must be made available to the workers.
- The workers must use safety goggles during gas cutting or welding.
- Proper training and awareness programme can be carried out so that the worker can understand the risk involved in any construction process and also the importance of use of personal protective equipment's.
- The electrical equipment's and fittings to be used must be having ISI mark to avoid short-circuiting.
- There must be adequate fire fighting arrangements during both construction and operation stages.

Sanitation and Healthcare at Workers Camps

269. The following measures will be taken to ensure health aspects of workers.

- The contractor shall install adequate lavatories and baths at the construction camp.
- The contractor shall treat the waste in package type treatment system at the worker colony and construction yard.
- All organic waste generated at construction yard and worker camp should be composted in trench
- Periodic health check-ups of construction workers should be organized
- Adequate provision of water supply should be made at workers
- The living space at workers camp should meet the norms of Indian Labour Law.

Operational Phase

270. It is the responsibility of the in charge of the healthcare facility to ensure the occupational safety of the healthcare workers and other staff involved in handling of Bio medical waste in the healthcare facility.

As per Bio Medical Waste Management Rules, 2016 occupational safety of the staff has to be ensured in following methods:

1. Providing adequate and appropriate Personal Protective Equipment (PPE) to the staff handling Bio Medical Waste. Use of PPE while handling of Bio Medical Waste must be encouraged and must be monitored regularly to ensure occupational safety of staff. Personal Protective Equipment (PPE) includes:
 - Heavy Duty Gloves (Workman's Gloves)
 - Gum Boots or safety shoes for waste collectors
 - Face mask
 - Head Cap
 - Splash Proof Gowns or aprons etc.
 - Disposal gloves for waste handlers
2. Conducting health check-up of all the employees at the time of induction and also at least once in a year.

3. Ensuring that all the staff of the health care facility involved in handling of BMW is immunized at least against the Hepatitis B and Tetanus.
4. Taking remedial steps in accordance to any accident occurred, leading to any harm to the employee, during the handling of Bio medical waste

8.4.9. Energy conservation measures to be adopted in the proposed LD hospital block

271. As per Energy Conservation Building Code (ECBC) 2017 of the Bureau of Energy, following energy conservation measures would be adopted.

A-Use of Solar photovoltaic panels on the south façade.

- The entire south sloping roof can be used for solar photovoltaic panels. The roof angle as per the drawings is 25 degrees to horizontal. This gives an area of approximately 400 sqm (calculated from drawings). This entire area can be used for solar photovoltaic panels for electricity generation. Assuming the prevalent thumb rule of 1 kW per 8 sqm, the entire roof can produce 50 kW of electricity. This is a substantial amount and can reduce the burden on the conventional energy systems.

The angle of the solar photovoltaic panel in winter months should be 11.6 degrees in peak summers and 49.8 degrees in peak winters. Having a flexibility of tilting the solar panels can greatly enhance its efficiency. The tilting is generally done 4 times in a year (April, August, October and March).

- **Use of Solar water heating panels:** The south tilting roofs of other buildings such as Sarai and Laundry blocks can also be used to place either the solar photovoltaic panels or solar water heating panels.

B- Design of Energy Efficient Lighting, Electrical and HVAC systems

- **Energy efficient lighting**
 - LED's are the most energy efficient lighting option available. The electricity consumption is 50% lesser than the CFL and tube lights for the same amount of light. The LED lights also have a much longer life span.
 - As a comparison, a 100 Watt bulb gives 1600 lumens of light. A 23 Watt CFL gives 1400 lumens and LED tube light (28 watt T5) gives about 2600 lumens. Therefore, it is recommended that the general lighting in the Hospital must be LED fixtures. These consume much less energy and therefore reduce the energy consumption of the building.
 - To further reduce the energy consumption, smart building systems such as automated building controls should be used. These light controls can be timed to switch off certain lights in the corridors, lobbies and lift waiting areas at off peak hours to reduce energy consumption. The lighting controls can also be occupancy sensing to increase or decrease the amount of lighting in a space based upon the presence or absence of

people in the area. These can also be automated to adjust in intensity based upon the daylight levels available in the space.

- Exterior lighting fixtures should have inbuilt photosensors which allows them to turn off automatically when the daylight levels are sufficient.
 - As per the ECBC (Energy Conservation Building Code, 2017), the lighting load consumption for a Hospital building should not exceed 12.9 Watts per sqm.
 - In the existing hospital building, it has been observed that the lighting levels are much below the standard levels. These range from 60 lux to 120 lux in various areas. These are much below the standard lux requirements. It is therefore recommended that the entire existing hospital lighting is changed to LED lights for better lighting quality in the same energy consumption.
- **Energy efficient Electrical systems:** The engineering team of the hospital informed us that the ground and the first floor of the Old Block of Lal Ded Hospital is using aluminium wiring which consumes far more energy. Copper has higher conductivity and can withstand load surges more effectively. Therefore, the aluminium wiring must be replaced with copper wiring everywhere.
 - **Energy efficient HVAC systems:** It has been observed that the air quality in the Old Block is quite stale. Due to lack of fresh air supply and air changes, there is a continuous odour in most spaces. Treated ducted fresh air supply needs to be supplied to the entire Old Block. The air supply volume and number of air changes required vary for each space and these must be calculated. Adequate provisions must be made for fresh air supply.
 - In the proposed block, VAV (Variable Air Volume) are recommended. These match air supply continuously to cooling and ventilation loads. These provide good efficiency in HVAC design. All AHU's must be planned with VFD's (Variable Frequency Drives) for fan speed adjustments.
 - The cooling or heating load of the system should be minimized using the passive solar techniques described earlier in this chapter.
 - Insulated return air ducts should be provided for return air to minimize temperature losses. Return air should not be taken through false ceiling plenum.
 - Ducted and treated fresh air supply must be provided to all parts of the Hospital as per ASHRAE guidelines.
 - The AHU for each OT must be a dedicated one.
 - The Operation Theatres must provide a minimum of 20 air changes per hours, out of which minimum 4 air changes must be of fresh air.
 - Positive air pressure of minimum 1 Pascal should be maintained in the OT to prevent entry of any outside air.
 - For the Gynae OT's 2 levels of filtration (pre and micro vee filters should be provided). The air quality at the grill should be Class 1000.

- Temperature in OT's should be 21 deg plus or minus 3 degrees and relative humidity must not exceed 60%. OT's must have thermostats and temperature and humidity displays in them.
- During the times when the OT is not functioning, VFD may be used to reduce energy. Air changes can be reduced to 25% through VFD. However, pressure in the OT should be positive.

C- Waste Water, Water Supply and Sewage

- Solar water heating must be provided.
- PPR water supply piping must be used for water supply. These have a smoother internal surface which reduces pumping power and saves energy. These are also resistant to corrosion. Insulation must be provided as per IS standards.
- Low flow flushes in WC's and washbasins with auto sensors must be installed all toilets.
- STP treated water must be recycled for flushing WC's, washing of roads and horticulture.
- Only energy efficient pumps must be used for water supply from underground to overhead tanks.
- Rainwater harvesting must be done to maintain the water level of the site.
- Sewage treatment plant will be incorporated to treat all wastewater generated onsite;
- Treated water will be used for horticulture and landscaping, this will reduce daily freshwater requirement;
- Flow rates for fixtures will be benchmarked as per requirements of USGBC/IGBC-LEED Rating system. This will result in water savings to a tune of approx. 20%.

D- Equipment

- Energy efficiency rated medical/ general equipment should be used as far as possible.
- Sleep mode must be enabled on all equipment, wherever possible. In case the equipment (such as computers) are not used for a particular time, they must stop consuming energy automatically.

E- Indoor Air Quality Improvement: Fresh air is also critical to optimal health. Most homes in cold climates are sealed up so tightly that the air is heated and recirculated constantly with only the air that leaks through the envelope providing fresh air. Intentional mechanical ventilation provides control over ventilation rates and helps prevent mold etc. Heat recovery ventilation is a good insurance policy against build-up of indoor air problems without paying an energy penalty for direct fresh air ventilation. It exhausts stale indoor air while providing fresh air with only a small energy cost. Many of these units help to pressurize the house slightly reducing infiltration and resisting radon and car exhaust intrusion from nearby parking.

Green buildings reduce IAQ problems by providing good ventilation to allow fresh air to flow through the house, installing an exhaust system for radon gas, avoiding wood

products which contain formaldehyde and sealing those which do, using low or no VOC interior paint, solvent-free finishes, and solvent-free construction adhesives.

8.4.10. Alternative Building Material

272. The proposed project has been planned in a manner to achieve environment friendly sustainable development. The construction material to be used will include renewable and non-renewable resources including stones, aggregates, sand, steel, concrete, fly ash mix cement, and clay and fly ash bricks. Aerocon blocks (Autoclaved Aerated Concrete Blocks) may also be taken for wall constructions. Wood alternatives will be used in the project with minimal use of timber for the proposed construction.
273. The materials will be procured from reputed manufacturers with test certificates as per BIS specifications. Low VOC and non-toxic paints and adhesives to be used as per LEED standards. List of alternative building materials for green buildings is summarized in Table 9.4.

Table 9.4: Alternative building materials for Green building

S.No	Material	Conventional Material	Green & Alternative Building Materials
1-	Window and openings	Aluminium Panelled plain glasses	Insulated Glass (IG units)
2-	Lighting and fixtures	Tube lights & CFLs	Low watt LED tube lights & bulbs
3-	Plumbing Fixtures	Conventional Fixtures	Green water saving fixtures
4-	Flooring	Vitrified & Glazed Tiles , China Mosaic	PVC Flooring ,
5-	Doors	Pine Wood	Engineering Wood
6-	Paints	Plastic VOC	Plastic Non VOC
7-	Bricks	Clay Bricks	Fly-ash Bricks
8-	Cement	OPC	PPC

8.4.11. Parking Area and Traffic movement plan

274. In accordance with the NBC codes/regulations, parking space has been calculated provided at suitable locations at Lalded Hospital. Details are summarized below:

Parking

The present site of the proposed new block is used for open air parking. This will be displaced once the new development takes shape.

Existing parking strength-As per the Hospital parking contractor, the existing parking strength of the plot is as follows:

- | | | |
|--|---|----------|
| e) Paid parking beyond the barrier on site | = | 100 nos. |
| f) Parking in the front courtyard | = | 90 nos. |
| g) Staff parking in the front courtyard | = | 50 nos. |
| h) Ambulances | = | 6 nos. |

Total existing cars Parking Space = 246 nos.

The peak time for parking is 10 am to 1 pm. The parking lot is full at that time.

Parking strength after the proposed new block is in operation

As per the Hospital parking contractor, the existing parking strength of the plot is as follows:

- e) Stilted parking in the proposed new block = 18 nos. (for staff)
- f) Angled parking along the boundary near the new block = 11 nos.
- g) Total parking area in the front courtyard (3100 sqm) Assuming 23sqm/ car, the total parking spaces = $2800/23 = 121$ nos. (50 for staff and 71 for general public)
- h) Ambulances = 6 nos.

Total cars after new block is built= 156 nos.

275. Recommendations for Parking and Traffic Management-

- This shortfall in the public parking spaces needs to be met by providing offsite parking. It must be noted that the parking requirements are likely to increase in future. The hospital site is limited in size and it cannot accommodate increase in the parking area. Dedicated shuttle minibuses (with low boarding steps for patients) or dedicated taxis/ autos need to connect this offsite parking area with the hospital premises. The reduction in parking spaces will reduce noise and air pollution on the site.
- Over speeding and careless driving of vehicles causes danger to the patients, attendants and other pedestrians. Therefore, speed retarding pavers and speed brakers for speed control are recommended.
- Currently the parking is chaotic due to lack of well-defined parking bays. The parking bays needs to be defined by paints or dividers. These must be enforced strongly by the parking attendants for discipline and avoiding traffic jams.
- This shortfall in the public parking spaces needs to be met by providing offsite parking. It must be noted that the parking requirements are likely to increase in future. The hospital site is limited in size and it cannot accommodate increase in the parking area. Dedicated shuttle minibuses (with low boarding steps for patients) or dedicated taxis/ autos need to connect this offsite parking area with the hospital premises. The reduction in parking spaces will reduce noise and air pollution on the site.
 - Well defined entry and exit points will be provided for safe route to the visitors/patients.
 - To avoid disruption and inconvenience to hospital services during constructional phase of the project, control measures shall contain details of temporary diversions of traffic, separate entry and parking of construction vehicles and visitors vehicles and ambulance, traffic safety arrangements, ensure proper signs, temporary barriers and/or danger tape and flagmen to prevent unwanted labour entry to the hospital and to exposed construction work to warn the public and ensure smooth traffic flow and safety of the hospital visitors.

- To control the speed of vehicular movement, speed breakers will be provided at strategic location
- Existing Emergency access routes will be maintained to permit emergency vehicles to attend the premises at all times.
- Safety of all road users including pedestrians, cyclists and disabled will be ensured during construction period.

8.4.12. Fire-fighting plan and facilities

276. The fire protection system for the proposed Hospital complex building is to be designed as per the provisions of National Building Code - 2005 and taking consent from local administration including fire service authority. The following provisions will be made available as required in the building which, it is expected, would provide a reasonable degree of protection from fire hazards and at the same time satisfy the local fire authority, if any:
- Wet risers with hose reels at each floor
 - Yard hydrants on the periphery of the building
 - Manual call alarm system on each floor
 - Automatic fire detection & alarm system
 - Public Address and Communication System
 - Good Housekeeping & Maintenance and training of staff
277. **Hydrant System:** Hydrant system will be provided at each floor and also on the periphery of the building (Yard hydrants). The water supply to hydrants would be by means of wet riser piping system connected to the static storage in the underground reservoir through a set of automatic pumps installed in the pump room. The system is also fitted with inlet connection (fire brigade breaching inlet) at ground level for charging with water by pumping from the fire service appliances and an air release valve at roof level to release trapped air. The Fire Hose Cabinets would be placed at conspicuous locations preferably near staircase and lift lobby, ensuring that no part on the floor is more than 30 m away from it.
278. **Automatic Sprinkler System:** The entire building except electric substation and plant room is to be provided with automatic sprinkler system. The system will be designed as per IS: 15105 – design and Installation of fixed automatic sprinkler Fire Extinguishing system/NFPA 13 – standard for the Installation of Sprinkler System. Sprinkler system shall incorporate an alarm system also. The Sprinkler Annunciation Panel located in the fire control room will indicate the operation of the sprinklers on the particular floor with an audio visual alarm.
279. **Fire Pumping System:** Water sumps are provided in the pump room in the underground reservoir so that always Immersed suction is available for the pumps. The pumps are designed to cater for the Flow and pressure requirement at any point of the fire fighting system. The system will comprise of following pumps:

- Electric Fire Hydrant pump
- Electric Sprinkler pump
- Electric Jockey Pump
- Diesel Standby pump

280. **Portable Fire Extinguishers:** ISI marked portable fire extinguishers of specified type and capacities shall be provided at all levels including all the hospital wards, electric substations, meter rooms and lift machine rooms etc. as per the provisions of IS : 2190 – 1979.

281. **Where there is a fire alarm:**

- Fire Alarm will be acknowledged by main fire control panel at Security Control Room
- Security Supervisor will inform the main Security Control Room, Safety Officer and send Security Guards along with Fire Extinguishers to the location of fire
- Security Supervisor attending call at Security Control Room will obtain following information from the caller
 - a). Caller's name (b) Location of fire (c) Type of fire

Security Supervisor will also inform relevant safety personnel responsible for making call to Fire Brigade to deal with the problem.

282. **Action Plan during Evacuation:** Whenever there is a fire alarm, the supervisor, on duty in security/ fire Control room will make announcement regarding the incident directing People and personnel to take the proper course of action.

For Engineering Staff during Fire Evacuation Drill-

- Ensure un-interrupted power supply and make sure that inverters and emergency lights are functional
- Ensure smoke extractors are on AUTO;
- Make sure that there is sufficient quantity of water in UG tank and Oh fire tanks
- Ensure that the main sprinkler/ hydrant and diesel pumps are functional and that there is sufficient water pressure in fire line to deal with the situation;
- Ensure the clarity of announcement voice and that the emergency and exit signs are glowing
- Monitor the D.G. Sets and ensure that tripping does not happen, when the fire pumps

283. **For Security Staff during Fire Evacuation Drill**

- Security Supervisor will take over Security Control Room operation
- He will sound alarm and make announcement for evacuation, if required
- Security staff will ensure that each elevator is grounded. They must also help in the safe removal of trapped passenger(s), if any;

- Ensure that security guards deployed at main staircases, ramps for fast and safe evacuation;
- Open the exit doors for easy movements of occupants and ensure that all the doors are kept fully opened;
- Ensure that no crowd is gathered near the door and area has to be kept free from all the obstacles at that time
- Ensure that nobody is permitted to re-enter through the exit doors for any reasons, so that ejecting people are not obstructed
- A search team having a torch should look for unconscious people/ burnt/ disabled/ old/ children/ injured and keep informing the rescue party and
- Depute security guards as per requirement, such as one security guard for receiving fire brigade and ensure that fire tender route is FREE

Chapter 10- ENVIRONMENTAL MONITORING PLAN

10.0. Environmental Monitoring

284. Monitoring is an important tool in establishing the success or failure of a project with regard to compliance to environmental safeguards. The purpose of the monitoring programme is to ensure that the intended environmental measures are achieved and result in desired benefits to the target population. To ensure proper implementation of the Environment Monitoring Plan, it is essential that an effective monitoring programme is designed and carried out.

The broad objectives of the environment monitoring plan designed for LD hospital project are summarized below:

- To monitor impacts on the surrounding environment and the effectiveness of mitigation measures during the construction and operation.
- To ensure that the environmental control systems installed at the plant are operating satisfactorily.
- To suggest ongoing improvements in management plan, if required, for subsequent effective monitoring
- To satisfy the requirements of environmental regulatory framework and community obligations

10.1. Framework for Monitoring and Evaluation

285. The project authority will be responsible for carrying out monitoring and evaluation. Internal monitoring will be carried out by the JKPCCL. This will help monitor project activities closely. Regular monitoring by undertaking site visits will help identify potential difficulties and problems faced in the project implementation and subsequently help take timely corrective measures including deviations, if needed.

286. Total project implementation period is considered 2 years and for the post project monitoring 3 years are taken. Monitoring will start as soon as the project implementation begins, PMC officials if any and local representatives are appointed / nominated at site for implementation of EMP. Components of monitoring will include performance monitoring i.e., physical progress of the work and impact monitoring and external evaluation. Indicators that would be monitored related to performance as per monitoring plan. However, if during the project implementation some other indicators are found relevant then those shall be included. NGO with appropriate expertise will be hired for external evaluation of EMP implementation or the DPR components. The monitoring will also provide feedback on community concerns, grievances and requests. Monitoring will focus on and ensure the following:

- Verification that there are no outstanding or unresolved issues with respect to the project

- Information campaign, discrimination and consultation with affected people,
- Effective operation of the Grievance Redress Committees detailing out number of complaints received and those resolved; reasons for not being able to resolve the grievance and status of unresolved grievances.

10.2. Institutional Arrangements for implementation and Safeguards Monitoring:

287. Following are and institutional arrangement and their responsibilities have been decided up for implementation and Safeguards Monitoring of the project:

Institutional agency/Individual	Roles and responsibilities
Project Management Unit	<p>The PMU will be responsible for:</p> <ul style="list-style-type: none"> • Overall project management and reporting. • Coordination with PIUs and line departments in approval of designs, assisting the PIUs in preparation of: DPRs, bidding documents, tendering schedules, etc. • Quality Assurance through third party audits. • Maintaining MIS and Quarterly reporting • Progress reporting, financial management, monitoring and reporting. • Implementation of Components • Ensuring compliance with agreed implementation procedures and other Bank • Grievance redress.
Project Implementation Units (PIU)	<ul style="list-style-type: none"> • Monitoring of Specific sub-project activities planned and carried out by Implementing Agencies (IA) • Preparation of Detailed Project Reports including technical designs, surveys and investigations, etc. • Tendering, bid evaluation, contract award, contract management, etc. • Financial Management and safeguards compliance. • Progress and expense reporting to the PMU. • Coordination with line departments for design, implementation, and hand-over arrangements. • Grievance redress
Project Implementation Agency (PIA)/ Contractor	<ul style="list-style-type: none"> • Project implementation at the ground as per the Drawing/designs/DPR of the sub project • Designate an Environmental Safeguard Specialist within team to ensure implementation of EMP • Submit monthly EMP compliance report to PIU & PMU
Third Party Evaluation agency/NGO	<p>External Evaluation of implementation of EMP – Evaluation needs to done carried out by an independent agency engaged by JKPCCL/PIU</p>

10.3. Environmental Monitoring Plan & Schedule

288. To evaluate the effectiveness of environmental management programme, regular monitoring of the important environmental parameters will be taken up. Environmental Monitoring Plan, schedule, duration and parameters to be monitored are shown in Table 10.1 and Table 10.2.

Table 10.1: Environmental Monitoring Plan –Pre Construction and Construction Phase

Type of Monitoring	Parameters	Frequency	Responsibility	Monitoring Location
Pre-Construction Phase				
Emergency Response Plan	Preparation for Emergency Plan for situations such as Medical emergency, terrorist attack, Bomb threats Accidents, , Flash floods or inundation Earthquake Handling Flammable of Substances	Prepare during Design Stage and implement through the construction phase	Concerned officials of JKPCCL	Project Site
Training Plan	Preparation of training plan for aspects such as health and safety fire, emergency evacuation, communication with external agencies	Prepare during Design Stage and implement through the construction phase	Concerned officials of JKPCCL	Project Site
Construction Phase				
Air Quality (24 No. samples in two Years)	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO	Once in Quarter	Contractor through third party NABL accredited lab	3 locations in and around construction site
Dust generation	Adequacy of dust suppression techniques	Daily	Contactore	At Construction site
Noise (72 No. samples in two Years)	Ambient and occupational exposure	Once in a month	Contractor	3 location including hospital premises
Water Quality (24 No. samples in two Years)	Drinking water parameters as per IS 10500:2012	Quarterly	Contractor through third party NABL accredited lab	3 Samples- Drinking water, Surface water and ground water one sample each
Waste generation	Record of C&D wastes, solid waste, Hazardous waste, if any	Daily	Contractor	Construction site and labor camp
Drainage	Check clogging of drains, ensure no logging of water , ensure contours	Monthly	Contractor	Construction site

Type of Monitoring	Parameters	Frequency	Responsibility	Monitoring Location
	levels are restored			
Sanitation and Hygiene	General Cleanliness, Periodic removal of garbage, inspection of toilets and other	Weekly	Contractor	Construction site and labor camp
Health	General health check-up , identification of water logged areas having disease vector carrier like mosquitos	Monthly	Contractor	Project site and labour camp
Occupational Health and safety	Usage of PPEs,	Daily	Contractor	Project Site
Security	General Security Prevent unwanted access to site, night security	Daily	Contractor	Project Site/storage area
Traffic & Parking management	Ensure traffic & Parking management plan	Daily	Contractor	Project Site, parking area and access road
Photography and record keeping of construction progress	Match implementation schedule, ensure record keeping of materials and photography of construction update	Weekly	Contractor	Project Site

Table 10.2: Environmental Monitoring Plan-Operational Phase

Type of Monitoring	Parameters	Frequency	Responsibility	Monitoring Location
Ambient Air Quality monitoring (18 samples in 3 Years)	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO	Once in six months (for 3 years)	Project proponent through third party NABL accredited lab	3 locations in and around LD hospital site
Stack emission monitoring (DG set) (12 samples in 3 Years)	PM, SO ₂ , HC, NO ₂ , CO	Once in six months (for 3 years)	Project proponent through third party NABL accredited lab	For DG sets emission from 2 Sets

Type of Monitoring	Parameters	Frequency	Responsibility	Monitoring Location
Indoor Air Quality Monitoring (24 samples in 3 Years)	Temp, Humidity, PM2.5, CO, radon, Bio-aerosols for bacteriological & fungi monitoring	Once in six months (for 3 years)	Project proponent through third party NABL accredited lab	Inside hospital 4 sites, General ward, Emergency ward, ICU, & canteen
Noise (18 samples in 3 Years)	Ambient and occupational exposure	Once in six months (for 3 years)	Project proponent through third party NABL accredited lab	3 locations in and around LD hospital site
Water Quality & treated wastewater quality 18 samples for water quality and 12 samples of wastewater in 3 Years)	<ul style="list-style-type: none"> • Drinking water parameters as per IS 10500:2012 • For Wastewater pH, BOD, COD, TSS, Oil & Grease and coliform. 	Quarterly Once in six months (for 3 years)	Project proponent through third party NABL accredited lab	<ul style="list-style-type: none"> • Drinking water, Surface water and ground water one sample each (3 No.) • Inlet and outlet of treatment plant one sample each (2 No)
Bio-medical/Solid/Hazardous Waste	Record keeping and management of Biomedical waste, C&D wastes, solid waste, Hazardous waste, and wastewater	Daily	By project proponent as per regulatory requirements	At LD hospital
Storm water drains	Check clogging of drains, ensure no storm water drain should not have untreated wastewater	Monthly	By project proponent/hospital administration	At LD hospital
Sanitation and Hygiene	General Cleanliness, Periodic removal of garbage,	Weekly	By project proponent/hospital administration	At LD hospital

Type of Monitoring	Parameters	Frequency	Responsibility	Monitoring Location
	inspection of toilets etc.			
Health	General health check-up , identification of water logged areas having disease vector carrier like mosquitos	Monthly	By project proponent/hospital administration	At LD hospital
Landscaping	Park and greenery development	Six monthly	By project proponent/hospital administration	At LD hospital
Occupational Health and safety	Usage of PPEs, Alarm system, Fire fighting system,	Daily inspection, Quarterly mock drills	By project proponent/hospital administration	At LD hospital
Emergency Response Plan	Fire preventive measures, Signage, Fire Alarm, Fire Fighting Systems, evacuation plan, for situations emergency, terrorist attack, Bomb threats Accidents, , Flash floods or inundation, Earthquake	Once in 6 months, Quarterly mock drill	By project proponent/hospital administration	At LD hospital

10.4. Grievance Redressal Mechanism Cell (GRC)

289. An Integrated Grievance Redressal Mechanism (IGRM) shall be established, with necessary officials and systems, at subproject levels. Grievances if any, may be submitted through various mediums, including in person, in written form to a noted address, through direct calls to concerned officials, and online. All local contact information and options for complaint submission will be available on site on local information boards. The project will have a communication strategy focusing on efficient and effective usage of print and electronic media, bill boards, posters, wall writing, and adoption of any other method suiting local context, logistics, human and financial resources. The project however will have a project level Grievance Redressal Cell (GRC) to address the grievances of the stakeholders related to project

implementation and project impacts if any. A sample grievance registration form is given in annexure 6.

Members of GRC: as suggested by PMU, JTFRP/ JKPCCL, members listed below will be part of the GRC constituted for Local, District and Regional level.

Local Level	<ol style="list-style-type: none"> 1. Tehsildar/Naib Tehsildar (Chairman) 2. Concerned engineer/Representative from PMU, JTFRP (Member Secretary) 3. Site Engineer/Representative of PIU 4. Ward Member/Halqa Panchayat member 5. Women representative (Retired officer/Academician/Development professional) 6. A representative of SC/ST community or from elected Panchayat
District Level	<ol style="list-style-type: none"> 1. District Collector 2. Director /Head PIU 3. Nodal Officer of the Project Component in PMU, JTFRP 4. Social Safeguard Specialist, PMU, JTFRP (Member Secretary) 5. Ward Member/Halqa Panchayat member 6. Women representative (Retired officer/Academician/Development professional) 7. A representative of SC/ST community or from elected Panchayat
Divisional Level	<ol style="list-style-type: none"> 1. Divisional Commissioner (Chairman) 2. CEO, JKERA/JTFRP 3. HOD of line Departments (PIU) 4. Director Technical (PMU/JTFRP) (Member Secretary) 5. A representative, one each from backward classes & Economically Backward classes and SC/ST welfare board/dept. 6. Concern Revenue Officer of Area (not below the rank of ACR/SDM) 7. A senior representative of Disaster Management Dept. 8. Ward Member/Halqa Panchayat member 9. Women representative (Retired officer/Academician/Development professional) 10. A representative from PAPs

Source: PMU, JTFRP/ JKPCCL

290. **Functions of the Cell:** The local GRC will conduct a meeting in the first week of every month to hear the grievances (if any) from the stakeholders. All the complaints will be forwarded to the concerned department/officials within 15 days from the date of receiving the complaints. The issues will be resolved/addressed by concerned officials within 45 days from the receipt of the complaints. All the grievances received shall be discussed at appropriate level of GRC for the necessary action.

10.5. Information Disclosure

291. The EMP will be translated into local language and will be shared with the affected community, if any. The English and translated version of EMP will be disclosed on the website of JKPCCL. Through public meetings, attempts would be made to ensure that vulnerable groups understand the process of project preparation and their needs are addressed in the best manner possible.

10.6. Capacity Building and Technical Support

292. Project implementing agency/JKPCCL project staff and hospital administration will require training in the management of environment and social safeguards issues. The training program is to be coordinated and anchored by the JKPCCL with support from agencies/individuals experienced in safeguard aspects for developing courses on conducting training programs. The course contents will focus on EIA/EMP and safeguards reporting and biomedical waste management. Proposed training and capacity building plan is given in Table 10.3.

Table 10.3: Capacity Strengthening Plan

MODULES	CONTENT	DURATION
Environmental Assessment-EIA/EMP and safeguards reporting	<ul style="list-style-type: none"> • Environmental Regulations & Safeguard Policies • EIA & EMP • Implementation and safeguards Monitoring and Reporting as per standard protocols and best management practices 	<p>Full day class room training.</p> <p>Half a day field training.</p>
Capacity Building on implementation of Biomedical Waste management Rules 2016	<ul style="list-style-type: none"> • Understanding and application of BMW Rules 2106 & amendments • Understanding of duties of occupiers & operators • Biomedical waste collection, in house transportation & Handing over to Common Biomedical waste treatment facility (CBMWTF) • Barcoding & Record keeping • Management of General Wastes • Management of radioactive/hazardous wastes • Do's and Don't for Health care facility 	<p>Two full days class room training.</p> <p>One day field training.</p>

10.7. Environment Reporting Plan and Schedule

293. The contractor will submit compliance report to above management and monitoring requirements to PMU every month. The monitoring results of the different environmental components will be analyzed and compiled quarterly during the construction phase and every six months during the operation phase. The report will also list the project activities along with the environmental mitigation measures and will evaluate the efficacy of the Environmental Management Plan. Safeguard monitoring report format is given in annexure 7. Check list use to assess EMP implementation (used by Contractor at field) is provided in annexure 8 while Environmental Monitoring Report format is given in annexure 9.

10.8. Emergency Procedures/ Corrective Measures

294. Corrective measures will be adopted if the review of the monitoring report reveals that the environmental management plan is inadequate or has not been implemented

properly. A detailed review will be carried out by the interdisciplinary team of experts for assessing the gaps in the EMP and the addressal of EMP. A corrective action plan will be worked out for the environmental component and a rigorous follow up of environmental monitoring plan will be carried out.

10.9. EMP Budget- for the Implementation of Safeguard Mitigation Measures

295. The budget for the implementation of various mitigation measures is an important aspect of the safeguard management activities of the project. Table 10.4, outlines the budget which is estimated **Rs.74.14 Lacs** for implementation of the safeguard mitigation measures based on the proposed actions.

Table 10.4: Budget for EMP implementation

Sr No.	Description	Particulars of EMP Cost				
		Quantity	Unit	Rate (Rs.)	Amount (Rs.)	Remarks
1	Sprinkling of water For Dust Control					
A	Sprinkling of water For Dust Control at all the construction points including sites of material storage at every 2hr interval as dust suppression measures during construction activities. Rate include labour cost, transportation, materials, equipment's and works required to execute the job.	520	KL	1000	520000	Considering 5 tanks (1KL capacity) per week for 24 months' construction period
2	Development of Material Storage Sites 2 in. No.					
A	Separate storage areas with three side covering with temporary barricading of 2 m Hight is provided for course and fine aggregate material to minimize dust expansion. Land of material storage (base of storage sites) sites shall be protected with high thickness plastic sheets. Loose course and fine aggregate Material should also be covered by high thickness plastic sheets to prevent dust expansion. Rate include labour cost, transportation, materials, equipment's and works required to execute the job during entire construction period	2.0	No.	100000	2,00,000	Market Rate
3	Provision of Sanitation facilities at Labour camp					

Sr No.	Description	Particulars of EMP Cost				
		Quantity	Unit	Rate (Rs.)	Amount (Rs.)	Remarks
	A-Water Supply Considering 90 LPCD for 50 labours	3285	KL	500	1638000	Considering 90 LPCD for 50 labours for 24 months construction period
	B-Solid wastes management by providing bins of 100 Litres capacity at 15 points	10	No.	1500	15000	Market Rate
	C-Mobile Toilet with anaerobic treatment facility (10 seated) for 24 months on rental basis	24	month	10000	240000	Market Rate
	D-Wastewater Management-Septic/Soak Pit	-	-	LS	200000	LS
	E-- Health Check-up and Medicines	-	-	LS	100000	LS
4	Security and Parking Management during construction					
	A- appointment of two marshals for 24 months	48	Month	10000	480000	-
	B-Diversion materials & Safety Signage cost	LS	-	-	100000	-
5	Noise Control Measures by Providing barriers or sheets					
A	Noise Control Measures by providing acoustic barriers or sheets that to be used at high noise producing construction activities such as cutting of stones, drilling etc.	100.0	Sheets	3000.00	300000	Market Rate
6	Provision of PPEs (Personal Protective Equipment) i.e. Helmet, Mask, gum boots, gloves, Ear plugs etc.), first-aid kits and safety signage's					
	A- Providing 100 Sets of PPEs (Personal Protective Equipment) i.e. Helmet, Mask, gum boots, gloves, Ear plugs etc),	100	No.	4000	400000	Market Rate
	B- 10 Sets fo First Aid kits for 25 People that includes following items Kit Includes: (10) Alcohol Wipes (1) Scissors (1) Tweezers (1) First Aid Guide (4) Nitrile Exam Gloves (1) Triangular Sling/Bandage, 40" x 40" x 56"	10	No.	10000	100000	Market Rate

Sr No.	Description	Particulars of EMP Cost				
		Quantity	Unit	Rate (Rs.)	Amount (Rs.)	Remarks
	(1) Cold Compress, 4" x 5" (1) Conforming Gauze Roll, 4" x 5 m (6) Gauze Dressing Pads, 4" x 4" (1) First Aid Tape, ½" x 5m (60) Plastic Bandages, 1" x 3" (2) Sunscreen Lotion Packets, SPF 30 (2) Trauma Pad, 5" x 9" (5) 2 Eyewash, 1oz, with 2 Eye Pads and 2 Strips (1) CPR Mask with One Way Valve (1) Burn Dressing, 4" x 4" (6) Hand Sanitizer Packets, 0.9g (4) Insect Sting Relief Wipes (10) First Aid/Burn Cream Packets, 0.9g (10) Triple Antibiotic Ointment Packets					
	C- Safety Signage 10 in No. to use for construction sites, diversion and for other safety message- Manufacturing, supplying and fixing retro reflective sign boards made up 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same in following sizes at suitable sites or decided by the Engineer-in charge	10	No	10000	100000	Market Rate

Sr No.	Description	Particulars of EMP Cost				
		Quantity	Unit	Rate (Rs.)	Amount (Rs.)	Remarks
7	Environment Monitoring					
	A- Ambient Air Quality - PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO	24 (Construction Phase)	No.	5000	120000	Unit rates based on CPCB notified Charges for sampling and Analysis & Prevailing Market Rates
		18 (Operational Phase)	No.	5000	90000	
	B -Water Quality Monitoring - Parameters as per IS 10500;2012	24 (Construction Phase)	No.	7200	172000	
		18 (Operational Phase)	No.	7200	129600	
	• C-Wastewater/treated water Monitoring- pH, BOD, COD, TSS, Oil & Grease and coliform	12 (Operational Phase)	No.	2200	26400	
	D- Noise Monitoring (24 Hr)	72 (Construction Phase)	No.	1200	86400	
		18 (Operational Phase)	No.	1200	21600	
	E-Indoor Air Quality Monitoring- Temp, Humidity, PM _{2.5} , CO, radon, Bio-aerosols for bacteriological & fungi monitoring	24 (Operational Phase)	No.	5800	139200	
	F-Stack Emission from DG sets- PM, SO ₂ , HC, NO ₂ , CO	- 12 (Operational Phase)	No.	3000	36000	
8	Training & Capacity Building					
A	Training & Capacity Building on EIA/EMP, Reporting and Monitoring	LS	-	-	10,00,000/-	
9	Relocation/cutting of one Chinar Tree from the Site and development of green belt/plantation of trees along the periphery including	1000 trees	-	500	5,00,000/-	Market Rate

Sr No.	Description	Particulars of EMP Cost				
		Quantity	Unit	Rate (Rs.)	Amount (Rs.)	Remarks
	protection measures & watering etc.					
10	Purchase of Mechanical Composting Machine	LS			300000/-	
11	Rising of DG Sets Area to above grade complete in all respect to minimise future flood impacts on alternate electric supply and shifting of utilities and provide alternative arrangements during rising and shifting				Cost already included in DPR	
12	External Evaluation of EMP Implementation					
A	External Evaluation of implementation of EMP – Evaluation needs to done carried out by an independent agency engaged by JKPCCL/PIU	LS	-	-	10,00,000/-	ToR for evaluation will be prepared by the subject expert. Cost of ToR preparation is considered Rs. 1,00,000/-. Apart from above cost, Rs. 9 lacs will also be estimated for external evaluation of EMP implementation
Grand Total of EMP Cost:					Rs. 79,14,200/-	
Grand Total (in Words): Seventy Nine Lacs Fourteen Thousand Two Hundred Only						

Note-

- 1- Cost of STP and Rainwater Harvesting Units are not considered in the EMP considering these items are covered in DPR
- 2- Period for Environmental Monitoring during operational phase is considered 3 Years only, post 3 years, it should be carried by project proponent /Hospital Administration.
- 3- Landscaping is also not covered under EMP cost

10.10. EMP implementation timeline

296. The timeline of the EMP implementation is presented in the Table 10.5 given below. The overall implementation of the EMP would require two years considering construction period. However, post project monitoring will be done for next three years.

Table 10.5: Timeline of the ESMP

Activity	Year 1				Year 2				Year-3-5		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Year 3	Year 4	Year 5
Disclosure and dissemination of the EMP	■										
Disbursement of EMP budget	■										
Formation of EMP implementation unit	■										
Capacity Building of the Implementation Team		■									
Implementation of measures suggested in EMP during entire construction Period			■	■	■	■	■				
External Evaluation									■		
Post Project Monitoring									■	■	■

Chapter - 11: DISASTER MANAGEMENT PLAN

11.0. Background

297. Emergency and disaster prevention through good design, operation, maintenance and inspection are essential to reduce the probability of occurrence and consequential effect of such eventualities in the proposed LD hospital. Disaster is an unexpected event due to sudden failure of the system, external threats, internal disturbances, flood, earthquakes, fire and accidents. The overall objective of the Emergency Response Plan and DMP is to make use of the combine resources at the site and outside services to achieve the following:-

- Localize the emergency
- Minimize effects on property and people
- Effective rescue and medical treatment
- Evacuation

11.1. Emergency Action Response Committee

298. To ensure coordinated action, an Emergency Action Committee shall be constituted. An Emergency evacuation plan based on local needs and facilities available shall be prepared. The broad content of plan shall include following:

- Demarcation of the areas to be evacuated with priorities,
- Safe area and shelters,
- Security of property left behind in the evacuated areas,
- Functions and responsibilities of various members, and Setting up of joint control action.

11.2. Communication System

299. An efficient communication system is absolutely essential for the success of any disaster management plan. This has to be worked out in consultation with local authorities involving police, fire department and hospital department considering the following points:

- Identify the relevant officials and institutions to be involved for the first, second and third level of information;
- Preparation of the telephone directory of these officials and making available to all concerned;
- Allotment of toll free number to a central communication centre;
- Provide wireless communication tools to safety and security and communication officers;
- Empowering central communication centre with latest communication equipment and tools.

11.3. Setting up of Emergency Infrastructure

300. To enable the key persons to implement the DMP, the following infrastructure will require to be set up: Site
- Map with Escape Routes and Safe Assembly Points Marked on it. Site layouts have to be put up at key areas where assembly is to be done. These points could vary depending upon the atmospheric stability and location and intensity of the emergency.
 - With the onset of emergency, all non-essential workers (those workers not assigned emergency duty) shall evacuate the area and report to the specified emergency assembly point.
301. Emergency Control Center- An Emergency Control Centre (ECC) is the primary area from where emergencies are handled. The Main Control Centre, or any structure on the site, at sufficient distance from the affected area, and that is designed to withstand overpressure and radiation stress should be designated as the ECC.
An ECC should contain various items as listed:
For communication:
- Siren, or other suitable alarm system
 - Public address system
 - Intercom sets
 - External phone sets
 - Telephone directory
 - Company Telephone Directory
 - List of Important phone numbers required in emergency like Ambulance, Police etc.
 - Intrinsically safe Mobile phones
302. Document for ready reference:
- Site Plan Layout plan, assembly points marked and location of siren,
 - safety/fire system shown (Display)
 - Stock list of fire extinguisher
 - Fire-water system and additional sources of water
 - Emergency Response Plan
 - Copy of First Aid
 - List of employees their addresses and phone numbers.
 - Site plan
303. All equipment should be regularly inspected and tested for adequacy. Personnel should be trained in the use of the same, where special training is required. Records of the same are to be maintained.

11.4. Disaster and Emergencies

11.4.1. Emergency/Disaster Management Plan for Fire Hazard

304. The fire protection system for the proposed Hospital complex building is to be designed as per the provisions of National Building Code – 2005/2018 and taking consent from local administration including fire service authority.
305. The following provisions will be made available as required in the building which, it is expected, would provide a reasonable degree of protection from fire hazards and at the same time satisfy the local fire authority, if any:
- Wet risers with hose reels at each floor
 - Yard hydrants on the periphery of the building
 - Manual call alarm system on each floor
 - Automatic fire detection & alarm system
 - Public Address and Communication System
 - Good Housekeeping & Maintenance and training of staff
306. **Hydrant System:** Hydrant system will be provided at each floor and also on the periphery of the building (Yard hydrants). The water supply to hydrants would be by means of wet riser piping system connected to the static storage in the underground reservoir through a set of automatic pumps installed in the pump room. The system is also fitted with inlet connection (fire brigade breaching inlet) at ground level for charging with water by pumping from the fire service appliances and an air release valve at roof level to release trapped air. The Fire Hose Cabinets would be placed at conspicuous locations preferably near staircase and lift lobby, ensuring that no part on the floor is more than 30 m away from it.
307. **Automatic Sprinkler System:** The entire building except electric substation and plant room is to be provided with automatic sprinkler system. The system will be designed as per IS: 15105 – design and Installation of fixed automatic sprinkler Fire Extinguishing system/NFPA 13 – standard for the Installation of Sprinkler System. Sprinkler system shall incorporate an alarm system also. The Sprinkler Annunciation Panel located in the fire control room will indicate the operation of the sprinklers on the particular floor with an audio visual alarm.
308. **Fire Pumping System:** Water sumps are provided in the pump room in the underground reservoir so that always Immersed suction is available for the pumps. The pumps are designed to cater for the Flow and pressure requirement at any point of the fire fighting system. The system will Comprise of following pumps:
- Electric Fire Hydrant pump
 - Electric Sprinkler pump
 - Electric Jockey Pump
 - Diesel Standby pump

309. **Portable Fire Extinguishers:** ISI marked portable fire extinguishers of specified type and capacities shall be provided at all levels including all the hospital wards, electric substations, meter rooms and lift machine rooms etc. as per the provisions of IS : 2190 – 1979.

9. Where there is a fire alarm:

- Fire Alarm will be acknowledged by main fire control panel at Security Control Room
 - Security Supervisor will inform the main Security Control Room, Safety Officer and send Security Guards along with Fire Extinguishers to the location of fire
 - Security Supervisor attending call at Security Control Room will obtain following information from the caller
 - a). Caller's name (b) Location of fire (c) Type of fire
310. Security Supervisor will also inform relevant safety personnel responsible for making call to Fire Brigade to deal with the problem.
311. **Action Plan during Evacuation:** Whenever there is a fire alarm, the supervisor, on duty in security/ fire Control room will make announcement regarding the incident directing People and personnel to take the proper course of action.
312. For Engineering Staff during Fire Evacuation Drill-
- Ensure un-interrupted power supply and make sure that inverters and emergency lights are functional
 - Ensure smoke extractors are on AUTO;
 - Make sure that there is sufficient quantity of water in UG tank and Oh fire tanks
 - Ensure that the main sprinkler/ hydrant and diesel pumps are functional and that there is sufficient water pressure in fire line to deal with the situation;
 - Ensure the clarity of announcement voice and that the emergency and exit signs are glowing
 - Monitor the D.G. Sets and ensure that tripping does not happen, when the fire pumps
313. **For Security Staff during Fire Evacuation Drill**
- Security Supervisor will take over Security Control Room operation
 - He will sound alarm and make announcement for evacuation, if required
 - Security staff will ensure that each elevator is grounded. They must also help in the safe removal of trapped passenger(s), if any;
 - Ensure that security guards deployed at main staircases, ramps for fast and safe evacuation;
 - Open the exit doors for easy movements of occupants and ensure that all the doors are kept fully opened;

- Ensure that no crowd is gathered near the door and area has to be kept free from all the obstacles at that time
- Ensure that nobody is permitted to re-enter through the exit doors for any reasons, so that ejecting people are not obstructed
- A search team having a torch should look for unconscious people/ burnt/ disabled/ old/ children/ injured and keep informing the rescue party and
- A rescue party having two persons with a stretcher should be employed in case of presence of any casualty/ unconsciousness/ helpless person, to bring them out to the fire refuse area promptly
- Depute security guards as per requirement, such as one security guard for receiving fire brigade and ensure that fire tender route is FREE

314. **Do's & Don'ts in Case of Fire:** Proper display of a tabulated list which broadly indicates Do's and Don'ts for everybody to assist in combating fire.

Do's in Case of Fire	Don'ts in Case of Fire
<ul style="list-style-type: none"> - When you notice a fire, raise alarm "Fire" at the top of your voice. Activate the break unit - Fire-fighting team should approach the scene as soon as possible - As far as possible, try to attract others attention on your way to the scene of fire - Try to put off small fire with the nearest appropriate type of fire extinguishers - CO2 fire extinguisher for electrical fire, water type extinguisher for general fire and foam type extinguisher for liquid fires; - As others rush to the scene, inform them about the type of fir and fire extinguisher to be used - Do arrange to switch off the supply in case of electrical fire; - Use staircase only to reach refuge area/ ground floor - Use maximum exits for evacuation; 	<ul style="list-style-type: none"> - Don't run in panic - Don't take undue risk - Don't tamper with any machinery during fire- fighting - Don't use water on oil and electrical fire - Don't flood the affected area with water unless required - Don't use lift/ elevator and escalators; - Don't crowd the scene of fire - Don't continue to use LPG cylinder for cooking etc. in near vicinity - Do not speak anything to Media, direct them to head of operations - Do not walk, keep low and escape in a crawling posture

Do's in Case of Fire	Don'ts in Case of Fire
<ul style="list-style-type: none"> - In case of injury, rush the victims to nearest hospital; - Use torches/ emergency lights; and - In smoke filled place, put wet handkerchief on your mouth for easy breathing. 	

315. **Precautions/ Fire Prevention Measures to be followed:**

- Keep all fire-fighting appliances clear from any obstruction
- Don't store anything in fire escape route, staircase and fire refuse area, entrance and exit door should not be locked/ bolted
- Good housekeeping, periodical maintenance of electrical equipment's
- Keep total load below the design capacity
- Don't store inflammable material, gas cylinder in large quantity
- Put- off all lighted cigarette, bidi, match-stick, candle, lamp or any naked light, before leaving the place
- Switch off all electrical equipments and gas cylinder, when not in use
- Don't store any material up to ceiling height and material should be stored three feet away from electrical points
- Don't use sub-standard material/ equipments and get installed fixtures and fittings from qualified licensed technician only.

11.4.2. **Flood Emergency Response Plan**

316. In the devastating floods of 2014, the water level was above the ground floor slab level of LD hospital causing huge loss to infrastructure and services Flooding can either damage hospital facilities directly or disrupt access to them. Damage may be direct costs such as losses in infrastructure, expensive medical equipment, hospital furniture, lifeline installations and medical supplies. Indirect costs are unforeseen expenses after emergencies such as increased risk of outbreaks due to loss of laboratory and diagnostic support, temporary solutions like field hospitals and the loss income normally generated by health care service.

a) **Preventive Measures & emergency Response:**

Primary Preventive Measures	Structural (physically engineered interventions), shifting of critical utilities and emergency requirements from basement to
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	above floors, tree planting, control of water source and reconstruction of the defense/bund to the Jhelum river
Secondary Preventive Measures	Flood forecasting, warning system, moving belongings and assets, Evacuation shelters and temporary and mobile structures, maintaining critical health services
Tertiary Preventive Measures	Include ensuring clean water and food supplies, close relationship with another agency (military, fire and rescue, police, water organizations, human resources)

b) Emergency Response:

- Integration with district and local authorities National/state disaster management authority
- While evacuation, use of lift or elevator will be prohibited
- Electrical supply will be cut to the area, which is flooded
- Portable pumps will be in- ready condition to pump out water from the lower areas
- Station duty officer will be continuously briefed about the situation
- During working hours, the Disaster Management Officer and during off working hours duty officers will personally supervise the disaster management

c) Details of Multi Method Flood Mitigation Strategy for LD Hospital based on best practices:

- Hospital must be designed and built to prevent potential disruption of function caused by flooding
- Floods can also cause damage to the equipment or drugs. Previously, hospital design focused on the optimum use of space to prepare the most effective interaction and action among difference department. Thus, heavy equipment such as the telephone lines, electric generators, heavy medical equipment and medical supply storage are usually placed in basement. Therefore, when occur flooding, emergency response is interrupted immediately. Several measures can prevent this damage, such as regular inspections of the drainage system and sewage system, relocating the important medical equipment to above grade and convenient maintenance of the equipment to keep it in best working order. In proposed hospital, medical equipment, ICU, transformer, emergency generator, Oxygen supply equipment's and electrical room must be relocated above grade.
- Features Administration also needs to be considered in preparation for the floods. This includes preparation and training is not limited the emergency staff only, but also involves the management of hospital staff. Besides, the effective communication through top-down management is needed. This ensures the flood information flow can

be channelled properly. Effective communications from other parties that cooperated with hospitals to help flood victims are also required

- The information chain in communication system should be monitored every moment. Effective human resource management is important to ensure that the hospital staff is required during flooding sufficient to ensure continuity of operation. The list of contact numbers of hospital staff should be updated.
- Increasing the number of patients caused the beds care inadequate. Sufficient number of critical care beds must be available for the transfer of patients from disaster impacted hospitals or mass casualties.
- Hospitals often rely on electric generators during electric supply disruption. However, inadequate fuel supply and cause an electric generator are not operating. Therefore, adequate the fuel supply should be available during disaster and the fuel storage is needed
- Hospital should be ensuring that they can prepare water and food for the first 72 hours of the flood.
- Hospital should be having backup equipment to support their communication such as radios, battery-run speakerphones and walkie-talkie.
- The main reasons for evacuation are the presence of water in building and loss of power. Critical patients should be transferred to other hospital for further treatment.
- Rafts and boats should be used as alternative method for patient evacuation. Same also with supplies such as fuel, food and water were brought to hospital.

11.4.3. Earthquake

317. Project impact area comes under seismic zone-IV, the probability of occurrence of earthquake in future is not ruled out. In the case earthquake occur, following management plan will be adopted.

- Structural design of the building will follow guidelines of IS 1893 (Part 1) :2002 Criteria for Earthquake Resistant Design of Structures: Part 1 General provisions and Buildings.
- Suitable seismic coefficients in vertical and horizontal directions during designing of structures.
- On getting the message of earthquake, main gate guard shall announce the nature of emergency through Public Address system and order for evacuation of entire area.
- Protect yourself by staying under the rental of an inner door, in the corner of a room, under a table or even under a bed.
- The Power & Utility In-charge shall carryout the following activities:
 - If emergency is declared, isolate the power supply from all the lines & shut down the whole power system.
 - In the event of power shutdown, ensure that all non-essential loads are cutoff from UPS power supply so that emergency UPS power is available for emergency lighting and emergency systems.

11.4.4. Bomb Threats & Evacuation Plan

318. In case of any Call of Threat
- Check the details of the caller or informer (was the person male/ female, tone on the phone etc.);
 - Check if the call was made from nearby or from far off place (local / STD call) with help of Caller ID facility in the telephone instrument;
 - Inform the station duty officer who will inform higher officials; and
 - Inform the police/bomb squad/experts for further action.
319. **Evacuation Procedure:** The floor/ area for which, the threat has been received will be evacuated in an orderly and organized manner. Under no circumstances panic has to be allowed. For evacuation priority would be given to patient, female employees, disabled persons followed by visitors and staff.
320. **Budgetary provision of DMP-** The main cost for creating necessary infrastructure as Fire fighting including related equipment, water tanks etc. are covered in the project cost..

ANNEXURES

Annexure-1-Environmental Data Sheet & Sub Project Screening Form

Construction of New Extension Block at Lalla Ded Hospital Srinagar

A. Environmental Screening

Part a: General Information

1. Location of the sub-project	L.D Hospital Wazir Bagh Srinagar Kashmir
● Name of Sub-Project	Construction Of New Extension Block for Infertility / Gynae Oncology Facility at Lalla Ded Hospital Srinagar.
● Name of the State	Jammu And Kashmir
● District	Srinagar
● Block	Srinagar
● Village	Wazir Bagh
2. Implementing Agency Details (Sub-project level)	
● Name of the Department/Agency	J&K Project Construction Corporation Ltd.
● Name of the designated contact person	Mr Harkewal Singh
● Designation	Deputy General Manager
● Contact Number	0194 - 2311763
● E-mail Id	info@jkpcc.com

Part b: Environment Screening

Question	Yes / No	Details
1. Is the sub-project located in whole or part within a distance of 1 km from the nearest edge of any of the following e Environmentally sensitive areas?		
a. Biosphere Reserve	No	-
b. National Park	No	Dachigam National Park is 22 km away from the sub-project site

c. Wildlife/Bird Sanctuary	No	
d. Game Reserve	No	
e. Tiger Reserve/Elephant Reserve	No	There is no Tiger Reserve/Elephant Reserve in the State
f. Wetland	No	Hokersar wetland is 9 Kms far from sub-project site
g. Natural Lake	No	Dal lake is 7 Kms far from subproject site
h. Swamps/Mudflats	No	
i. World Heritage Sites	No	
j. Archaeological monuments/sites under ASI's central/state list)	No	
k. Reservoirs/Dams	No	
2. Is the sub-project located in whole or part within a radius of 500 m from the following features?		
a. Reserved/Protected Forest	No	
Migratory Route of Wild Animals/Birds	No	
c. Area with threatened/rare/ endangered fauna (outside protected areas)	No	
d. Area with threatened/rare/ endangered flora (outside protected areas)	No	
e. Habitat of migratory birds (outside protected areas)	No	

f. Historic Places (not listed under ASI – central or state list)	No	-Shrine of Hazrat Sheikh Abdul Qadir Jeelani (RA) is located 2 Kms away from sub-project site. -Hanuman Temple is located 2Kms away from sub-project site. -Silk factory at Rajbagh is located 1.5 (appox.) far from sub-project site
g. Regionally Important Religious Places	No	-Shrine of Hazrat Sheikh Abdul Qadir Jeelani (RA) is located 2 Kms away from sub-project site. -Hanuman Temple is located 2Kms away from sub-project site.
h. Public Water Supply Areas from Rivers/Surface Water Bodies/ Ground Water Sources	yes	LD hospital Project site is located adjacent to River Jhelum.
3. Information related to sub-project impacts: Will the construction, operation or decommissioning of this sub-project cause changes to or has impacts on the following?		
1. Land Use	No	Proposed sub-project site is located with the confined complex of LD hospital. Thus no, land use change envisage due to proposed project. However, land cover will change to open land to constructed land.
2. Water	Yes	There would be very minor impacts on water resource and quality will be envisage by the proposed project during construction and operational phase of the project which will be taken care through effective implementation of EMP. No ground water abstraction is proposed under the project.

3. Air	Yes	Proposed activities has no significant impact on Air environment, however Construction activity is likely to increase the dust and noise levels temporary which will be taken care through effective implementation of EMP and specific fugitive and gaseous air pollution control measures.
Will the construction, operation or decommissioning of this sub-project produce, cause or release any of the following?		
4. Solid waste	Yes	Small quantum of solid waste will be generated during construction and operational phase of the project which will be managed by effective implementation of SWM Rule 2016. Apart from this, C&D waste also will be managed through C&D waste management Rules 2016. As present project is an extension of existing hospital facility for extra 82 beds. Therefore, biomedical waste generation would certainly be there. Specific measures will be suggested in EMP for collection, segregation and disposal of biomedical wastes as per BMW Rules 2016. Currently Biomedical waste disposal had been out sourced to M/s Kashmir Health Care System at Lassipora, Pulwama and general solid waste disposal is carried out by Srinagar Municipal Corporation (SMC).
5. Noise/ vibration/ light/ heat energy/ electromagnetic radiation	Yes (only noise and vibration)	During the construction phase of Proposed LD hospital Block, the major sources of noise pollution are vehicles transporting the construction material to the construction yard and the noise generating activities at the yard itself. Mixing, casting and material movement are primary noise generating activities in the yard and will be uniformly distributed over the entire construction period. Construction activities are anticipated to produce noise levels in the range of 80 - 95 dB(A). The construction equipment will have high noise levels, which can

		affect the personnel operating the machines. Use of proper Personal Protective Equipment (PPE), Noise barriers, rubber padding and separate enclosures will mitigate any adverse impact of the noise generated by such equipment.
		It shall be reduced by oiling and greasing. Proper mitigation measures like use of Personal Protection Equipment (PPE) by workers etc shall be ensured. Noise barriers will be erected to restrict noise so that patients are not affected in the other blocks of the hospital.
6. Accidents	No	Subproject is a small building construction project. Thus, there may not be any chance of accident. Further safeguards and precautions viz. work area demarcation, placing of signage and safety barriers, and controlled access would be taken. Use of Personal Protection Equipment (PPE) by workers and staff will also be ensured to reduce the chance of any accident.
Other		
7. Are there any areas around the project location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the sub-project?	No	Proposed LD hospital block site is a located within a confined area and there is no ecologically sensitive areas like national parks or wildlife sanctuaries and reserved forests located nearby. Even on site also, no major tree cover is exist except one small Chinar tree which will try to be relocated and grafted at other location with prior permission of forests department.
8. Any other impacts?	No	

Part d: Result/outcome of Environmental Screening Exercise

1	No EIA Required	NO
2	EIA Required	Yes (considering as Category B sub-project)
3	Regulatory Clearance Required	<ul style="list-style-type: none"> • Building Permission • Tree Cutting/ Relocation Permission • Authorisation from J&KPCB for biomedical collection, handling and disposal • Disposal of Construction And Demolition Waste • Storage, handling and transport of hazardous materials • Discharges from Labor Camp and construction & operation of Sewage Treatment Plant

Annexure-2-Guidelines for Construction and Demolition Waste Management (as per Demolition Waste Management Rules, 2016)

- (i) Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities
- (ii) Waste generator shall ensure that there is no littering or deposition of waste so as to prevent obstruction to the traffic or the public or drains.
- (iii) Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work,
- (iv) Large generators shall have Environmental Management Plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal / reuse of C & D Waste.
- (v) Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar,
- (vi) Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;
- (vii) Segregate and store the waste generated in three separate streams namely bio-degradable, non biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;
- (viii) Wrap securely the used sanitary waste like diapers, sanitary pads etc., in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and shall place the same in the bin meant for dry waste or non- bio-degradable waste;
- (ix) Store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and
- (x) Store horticulture waste and garden waste generated from his premises separately at site and dispose of as per the directions of the local body from time to time.
- (xi) No waste generator shall throw, burn or burry the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.
- (xii) All waste generators shall pay such user fee for solid waste management, as specified in the bye-laws of the local bodies.
- (xiii) No person shall organize an event or gathering of more than one hundred persons at any unlicensed place without intimating the local body, at least three working days in advance and such person or the organizer of such events shall ensure segregation of waste at source and handing over of segregated waste to waste collector or agency as specified by the local body.

Annexure-3-Issues Identified & Mitigated During Design Phase Of The Project- Architectural Assessment Of The Designs

Note: All the points described below have been explained on drawings in the Part 2 of this Report.

For details please refer to Part 2: Review of Building Design from EHS Perspective.

A. Site Plan

S.No.	Design Issues identified	Recommended Solutions	Status of Recommendation
1	Peripheral road of 6m width was not provided in initial plans. This is needed for fire tender access.	It was recommended that it needs to be provided as per the National Building Code. Peripheral parking should be reconfigured to leave 6 meters clear.	This has been integrated in the revised design.
2	The Entrance of the new block was not visible from the main public area and the main parking lot.	It was recommended that the entrance should be shifted to the existing Reception Block so that the entrance is visible from the public parking lot and the main front courtyard of the hospital	This has been integrated in the revised design.
3	There is a great deal of noise and pollution from the Silk Factory Road.	It was recommended that tree plantations have been provided all along the site periphery.	This has been integrated in the revised design.
4	It was observed that the proposed landscaped garden in front of the Reception Block cuts off vehicular link between the front parking lot and the new building.	As a clear vehicular access of 6 meter width is required as per the NBC, it was recommended that the garden should be redesigned to leave vehicular access.	This has been integrated in the revised design.
5	Mobility impaired patients experience great difficulty in reaching the hospital entrance due to intermixing of vehicular and pedestrian traffic in the main parking lot.	A clear, uninterrupted mobility impaired corridor needs to be provided all along the periphery of the existing Hospital blocks. This corridor will link all the entry points of the Hospital. This corridor will also help in	This has not been integrated in the revised design. In the meeting held on 11.2.2019 at the World Bank, it was agreed that an external uninterrupted, clear and protected pedestrian corridor will be provided all

		separating pedestrian and vehicular traffic.	along the external hospital periphery on the front side. It will link all the entries and will be covered with a pergola.
6	It was observed that in the rear courtyard, which is surrounded by service buildings such as the Kitchen, Boiler House and the Manifold Room, there is no access to the fire engine.	It was recommended that fire engine access should be provided in this area.	This has not been integrated in the revised design.
7	Soil Binding measures need to be taken along the Jhelum riverfront.	It was recommended that tree plantation should be provided to bind the soil to prevent erosion during a flood.	This was agreed upon in the meeting held at the World Bank on 11.2.2019.
8	There was no covered link between the Reception Block and the new block	It was recommended that a link should be created to provide seamless circulation of patients between the Reception Block and the new block.	This has been integrated in the revised design.
9	It was observed that the patients need to walk long distance from the parking lot till the Hospital entrance.	It was recommended that a covered patient drop off porch should be provided where the cars can drop off patients.	This has been integrated in the revised design.
10	It was observed that the existing ramp from the parking lot to the Reception Block entrance was too steep.	It was recommended that this should be redesigned.	-

B. Building Plans: Ground Floor Plan

S.No.	Ground Floor Plan Design Issues identified	Recommended Solutions	Status of Recommendation
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1	Electrical Room and the AHU were located on the Ground Floor Level (i.e. under the previously recorded flood levels).	It was recommended that these should be moved to the first floor to avoid flooding threat.	This has been integrated in the revised design.
2	The Reception Block did not have any linkage with the new block.	It was recommended that a corridor link should be created between the two for continuous connectivity and movement.	This has been integrated in the revised design.
3	The main staircase was not separated from the corridor. Any fire on the floor will leak smoke in the main exit staircase and will make it unusable for escape.	It was recommended that as per the NBC, the staircase should be separated from the corridor with a fire proof door.	This has been integrated in the revised design.
4	There was no direct access to outside from the staircase at ground level.	It was recommended that this should be provided to provide an escape route in case of emergency. This is an NBC requirement.	This has been integrated in the revised design.
5	In the Ground floor lobby, only a common toilet was provided.	It was recommended that separate male and female toilets should be provided as per general practice.	This has been integrated in the revised design.
6	It was observed that the kitchen and the stores in the staff cafeteria were undersized.	It was recommended that should be increased in size as per standards.	This has been integrated in the revised design.
7	There was no separate service entrance for the cafeteria kitchen.	It was recommended that a separate service entry should be provided from outside.	This has been integrated in the revised design.
8	It was observed that the width, tread and riser dimensions were not as per the NBC norms.	It was recommended that the staircase should have a minimum of 2000mm width, 300mm tread and 150mm riser as per the NBC norm.	This has been integrated in the revised design.

C. Building Plans: First Floor Plan

S.No.	First Floor Plan Design Issues identified	Recommended Solutions	Status of Recommendation
1	A dead end of almost 50 meters was forming due to absence of a fire staircase.	It was recommended to provide a fire staircase to provide a safe exit in case of emergency. This is also an NBC requirement.	This has been integrated in the revised design.
2	The depth of the labor room (only 10'-0") was found to be too less.	It was recommended to increase this length to make this area functional.	This has been integrated in the revised design.
3	Cross circulation was observed through the labor rooms	It was recommended that there should be no cross circulation through the labor rooms for better functionality.	This has been integrated in the revised design.
4	There was no attached patient toilet in the Recovery Room.	It was recommended that an attached patient toilet should be provided.	This has been integrated in the revised design.
5	A feeding room was not provided in the Nursery.	It was recommended that this room is essential for functioning of Nursery and it should be provided in the Nursery.	This has been integrated in the revised design.
6	The AHU door was opening directly into the staircase.	It was recommended that this should not happen as any fire in AHU can lead to smoke leaking into the escape staircase. This is not permitted as per the NBC.	This has been integrated in the revised design.
7	Separate change rooms were not provided for Doctors, Nurses and Staff.	It was recommended that separate change rooms are required for Doctors, Nurses and Staff as per prevalent practice.	This has been partially integrated in the revised design. Separate change rooms for doctors and staff have been provided.

8	A sluice room with an automatic bedpan washer was not provided near the labor rooms.	It was recommended that should be provided as this is essential.	-
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D. Building Plans: Second Floor Plan

S.No.	Second Floor Plan Design Issues identified	Recommended Solutions	Status of Recommendation
1	A dead end of almost 50 meters was forming due to absence of a fire staircase.	It was recommended to provide a fire staircase to provide a safe exit in case of emergency. This is also an NBC requirement.	This has been integrated in the revised design.
2	There was no sterile storage near the OT's.	It was recommended to provide a sterile for all essential sterile supplies which are needed by the OT's	-
3	Separation of sterile and clean zone was not provided.	It was recommended to provide a door separating these two zones.	This has been integrated in the revised design.
4	The AHU door was opening directly into the staircase.	It was recommended that this should not happen as any fire in AHU can lead to smoke leaking into the escape staircase. This is not permitted as per the NBC.	This has been integrated in the revised design.

E. Building Plans: Fourth Floor Plan

S.No.	Fourth Floor Plan Design Issues identified	Recommended Solutions	Status of Recommendation
1	A dead end of almost 50 meters was forming due to absence of a fire staircase.	It was recommended to provide a fire staircase to provide a safe exit in case of	This has been integrated in the revised design.

		emergency. This is also an NBC requirement.	
2	In the large ward, dedicated linen and medicine storage areas were missing.	It was recommended to provide linen and medicine stores for this large ward.	As per the recommendation, a medicine store has been provided in the updated drawings.
3	There were some minor circulation issues in the large ward.	It was recommended to provide adequate circulation area and clearances.	This has been integrated in the revised design.
4	It was observed that the access to the Fire Escape Staircase is passing through the Post Operative ward.	It was recommended that this should not happen as access to the fire exit should be clear. This is also not allowed as per NBC.	-
5	In the Post Operative Ward, the number of WC's was insufficient.	It was recommended that this the WC provision should be as per NBC (1 WC/ 6 patients).	-
6	The AHU door was opening directly into the staircase.	It was recommended that this should not happen as any fire in AHU can lead to smoke leaking into the escape staircase. This is not permitted as per the NBC.	This has been integrated in the revised design.

Annexure-4 Stakeholders Meeting Attendance Sheets

EIA MEETING LALDED HOSPITAL		
1.	Abad Mohammad Shah P.H.E W.W Sgr.	
2.	RASHID DAROZE PHE Mechanical Sgr.	
3.	Ashu Bhat (MHECHD Sgr) J&K MOB: 9796582849	
4.	Danish Magboo (971678966) Deputy Manager JKPCCL	
5.	Qazi Sajid ur Rehman PHE water works Sgr. J&K 7889809302	
6.	MUHAMMAD ISMAIL KIRMANI PHE Mechanical Director Sgr	
7.	NANAZ AHMAD BHAT (Assistant Executive Engineer)	
8.	Manish Saini, Architect	
9.	En. Sajad Habib Wani (9419007463) Manager JKPCCL Ltd.	
10.	Dr Vinod Kumar Singh (EIA consultant)	
11.	RISHI PUNIA (social safeguards consultant)	
12.	ARUN KUMAR JASSI (Environmental consultant (Waste mgmt))	
13.	DR. FARAH SHAFIQ (Dy Medical Superintendent Govt. LD Hospital)	
14.	En SAJAD HOSSAIN (Junior Engineer I of FC)	
15.	En ASIF AHMED (Junior Engineer II of FC)	
16.	Toufiq Ahmad (Assistant Manager KHCs) 9149725309	
17.	M. Shafi Khan (Jr. Engineer U.E.D)	

Prepared for JKPCCL,
Srinagar, Govt. of J&K

[Environment Assessment & Social Assessment and Preparation of Environment
Management Plan for Lalla ded Hospital, Srinagar Under JTFR Project]

Attendance Sheet-Focus Group Discussion

Location- _____ Date- _____

S.No.	Name	Profession	Sign
1	Shameel Ahmad Mir	Business	[Signature]
2	Qasim Ah Hakeem	Business	[Signature]
3	Shahid Ah Mir	Carpet weaver	[Signature]
4	Fareed Ah Karama	Cont. Sector	[Signature]
5	Yasir Ah Mir	Student	[Signature]
6	Mr. Iqbal Jahan	Farmer	[Signature]
7	Gulam Mustafa Karama	Farmer	[Signature]
8	Mr. Amir Roshan	Farmer	[Signature]
9	Rafiq Ah Malik	Farmer	[Signature]
10	Mr. Saad Mir	Farmer	[Signature]
11	Zoya Mir		[Signature]
12	Farooq Ah	Labourer	[Signature]
13	JAVID Ah	Service	[Signature]
14	Farooq Ah	Labourer	[Signature]
15	Shameel Ahmad	Business	[Signature]
16	Jamil Ahmad	Business man.	[Signature]
17	Bligh Haseeb	Student	[Signature]
18	Mahmud. Mir	Student	[Signature]
19	M. Mir, Karama	Business	[Signature]
20	Farooq		[Signature]
21	[Signature]		[Signature]

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Srinagar, Govt. of J&K

[Environment Assessment & Social Assessment and Preparation of Environment
Management Plan for Lalla ded Hospital, Srinagar Under JTFR Project]

22.	Farooq Ahmed		Farooq
23.	Sumaira	Housewife	Sumaira
24.	Mubeena	"	Mubeena
25.	Ruksana	"	Ruksana
26.	Shaziyah	"	Shaziyah
27.	Tabish	"	Tabish
28.	Nuskat	"	Nuskat
30.	Kulsoma	"	Kulsoma
31.	Ahmed	"	Ahmed
32.	Rubya	"	Rubya
33.	Aafya	Teacher	Aafya
34.	Sahira	Housewife	Sahira
35.	Musrat	"	Musrat
36.	Sumay	"	Sumay
37.	Muhammad	"	Muhammad
38.	Mehnaz	"	Mehnaz
39.	Mehgul - Risa	Teacher	Mehgul
40.	Samina Beigh	House-wife	Samina
41.	Gulshan Manzoor	Teacher	Gulshan
42.	Shameena	house & wife	Shameena
43.	jozy	service	jozy
44.	Shahida		Shahida

Annexure 6: Sample Grievance Registration Form

The _____ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name.

Date	Place of registration	Project Town			
		Project:			
Contact information/personal details					
Name		Gender	* Male	Age	
			* Female		
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)
Mode of communication:
Note/letter
E-mail
Verbal/telephonic
Reviewed by: (Names/positions of officials reviewing grievance)
Action taken:

Annexure-7-Safeguard Monitoring Report Format

1- Project Overview & Progress

Project Number & Title		
Safeguard Category	Environment	Construction stage
		Operational Stage
Reporting Period		
Last Report Date		
Key Sub project activities since last report		
Project Progress	Contract Awarding Date	
	Progress of Work (% physical Completion)	
	Status of Safeguard Approvals / Permits / Consents 1. 2. 3. (add/delete numbers)	
Report Prepared By		

2- Safeguard Implementation Arrangement (Existing/Revised)

Institutional Arrangement	
Role & Responsibilities	<ul style="list-style-type: none"> • Contractor • PIU • PMU • Internal & External Monitoring agency (if any) • Construction Supervision

3- Environmental Performance Monitoring

I- Status of Compliance of EMP implementation (mitigation measures)

Table-Compliance with EMP Requirements (Environmental Performance)

EMP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
<p>Example-Air Pollution Control</p> <ul style="list-style-type: none"> - all vehicles used at project shall have of valid ‘Pollution under Control’ (PUC) Certificates. - Dust Suppression measures such as Sprinkling of water (to moist the dust prone area/construction site) will be taken at regular intervals to control fugitive dust emissions during construction activities. - Stock piling shall be carried out at designated place located away from drainage or drain. - Make provision of periodic water sprinkling and covering of trucks/dumper by tarpaulin sheets to prevent wind erosion (fugitive dust generation) - It is to be ensured that construction equipment are properly maintained to minimise smoke in the exhaust emissions - Make provision of temporary perimeter sediment barrier (such as berms, silt fence or sandbag barriers) to prevent spread of construction material - Diesel generators meant for emergency power supply to be optimally operated and regularly maintained so as to ensure that emissions from fuel combustion remain at design levels. Also to ensure stack height of 3 m above the roof level of the shed meant for diesel generators to meet the stack height requirement specified by CPCB - Paints, polishes, building fittings and flooring material to be procured carefully to ensure that these have low VOC generation potential - Machinery to be turned off when not in use - Monitoring of the exhaust gases and 			

noise levels will be carried out by an NABL/MoEFCC accredited Environmental Monitoring agency			
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II- Health & Safety

Provide narrative of occupational and community health and safety issues that occurred during the reporting period. Any accident involving injury or death of workers or community members must be reported.

III- Issues for further Action

Issue	Required Action	Responsibility and Timing	Resolution
List of EMP measures or activities not completed (from previous table)			

4- Environment Effect Monitoring

Monitoring plan-

Present the environment effect monitoring plan as defined in the EMP or the updated monitoring plan. Describe the environment effect monitoring activities in the reporting period, including number of monitoring, number of samples, etc.

Table: Environment Effect Monitoring Results

Location	Parameter	Date	Monitoring Value	Regulatory/threshold limits
				As mentioned in Annexure-10

Assessment

Compare monitoring results with baseline conditions (if baseline data is available) and relevant government standards in qualitative terms. Additional explanatory comments should be provided as necessary. Possible reasons for non-compliance should be identified

5- Public consultation, Information Disclosure, Capability Building

Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the EMP. Present planned consultation activities in next reporting period.

- Field Visits (sites visited, dates, persons met)
- Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)
- Information disclosure

6- Grievance Redress Mechanism

Describe mechanisms established to address and redress public complaints and grievances related to social and environment safeguards. Summarize grievances received, if any, and measures implemented to redress them.}

- Number of new grievances, if any, since last monitoring period
- Number of grievances resolved
- Number of outstanding grievances

7- Conclusion

Highlight important results from the implementation of EMP; recommendations to improve EMP, implementation, and monitoring; key activities planned in next reporting period

8- Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Inspection checklists
- Photographs
- Others

Annexure-8-Construction Site Checklist for EMP Monitoring

Project Name: Lalded Hospital Project

Contractor:

Filled by:

S.No	Action/Activities	Status (Yes/No)	Additional Measures required as per EMP	Remarks
1.	EHS supervisor appointed by contractor and available on site			
2.	Site management plan (spoils, safety, material, schedule, equipment etc.,) prepared			
3.	Is material sourcing being done from authorized sources?			
4.	Traffic/Parking management plan prepared			
5.	Air and Dust under control plan is in place			
6.	PUC of construction vehicle checked			
7.	Excavated soil properly placed within minimum space			
8.	Construction area is confined; no traffic/pedestrian entry observed			
9.	Surplus soil/debris/waste is disposed without delay as per provisions mentioned in EMP			
10.	Tarpaulins used to cover sand & other loose material when transported by vehicles After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site			
11.	Noise Control Measures taken			
12.	Drainage & Storm Water Management measures are in place			
13.	Hazardous waste viz. lubricant/Oil management is being done by EMP measures			
14.	Any discharge of wastewater from construction site/labour camp?			
15.	Is there any oil spillages/leakages?			
16.	No pipes disturbed/removed during excavation			

S.No	Action/Activities	Status (Yes/No)	Additional Measures required as per EMP	Remarks
17.	No chance finds encountered during excavation			
18.	Work is planned in consultation with Hospital administration			
19.	Work at a stretch is completed within a day (excavation, pipe laying & backfilling)			
20.	Pipe trenches are not kept open unduly			
21.	alternative route provided & public is informed, information board provided			
22.	Pedestrian access to hospital is not blocked due to construction			
23.	No public/unauthorized entry observed in work site			
24.	safety measures (barricades, security) in place at work sites in residential areas			
25.	Prior public information provided about the work, schedule and disturbances			
26.	Caution/warning board provided on site Guards with red flag provided			
27.	Workers using appropriate PPE (boots, masks, gloves, helmets, ear muffs etc)			
28.	Workers conducting or near heavy noise work is provided with ear muffs			
29.	Is contractor following standard & safe construction practices?			
30.	First aid facilities are available on site			
31.	Drinking water provided at the site			
32.	Toilet facility provided at the site Separate toilet facility is provided for women workers			
33.	Workers camps are maintained cleanly Adequate toilet & bath facilities provided			
34.	Contractor employed local workers as far as possible			
35.	Workers camp set up with the permission of PIU Adequate			

S.No	Action/Activities	Status (Yes/No)	Additional Measures required as per EMP	Remarks
	housing provided Sufficient water provided for drinking/washing/bath			

Filled By:

Checked By:

Annexure-9-Environmental Monitoring Report Format

MONITORING PLAN							
Phase	What <small>(Is the parameter to be monitored?)</small>	Where <small>(Is the parameter to be monitored?)</small>	How <small>(Is the parameter to be monitored?)</small>	When <small>(Define the frequency / or continuous?)</small>	Why <small>(Is the parameter being monitored?)</small>	Cost <small>(if not included in project budget)</small>	Who <small>(Is responsible for monitoring?)</small>
During activity preparation							
During activity implementation							
During activity supervision							

Annexure-10-Regulatory Standards & Threshold Limits

1- National Ambient Air Quality Standards- CPCB 2009 (For parameters proposed for monitoring)

S.No.	Pollutant	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)
1-	Sulphur Dioxide (SO ₂), µg/m ³	Annual* 24 hours**	50 80	20 80
2-	Nitrogen Dioxide (NO ₂), µg/m ³	Annual* 24 hours**	40 80	30 80
3-	Particulate Matter (size less than 10 µm) or PM ₁₀ µg/m ³	Annual* 24 hours**	60 100	60 100
4-	Particulate Matter (size less than 2.5 µm) or PM _{2.5} µg/m ³	Annual* 24 hours**	40 60	40 60
5-	Carbon Monoxide (CO) µg/m ³	8 hours* 1 hour**	02 04	02 04

2- Ambient Noise Standards- as per Noise Pollution (Regulation & Control) Rules 2000

Area code	Category of area/zone	Limits in dB(A) leq*	
		Day time	Night time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zones	50	40

*dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing. Source: Central Pollution Control Board, India

3- Emission limits for new diesel engine

Emission limits for new diesel engine up to 800 kW for generator set (Genset) application

Power Category	Emission Limits (g/kW-hr)			Smoke Limit (light absorption coefficient, m ⁻¹)
	NOx+HC	CO	PM	
Upto 19 KW	≤ 7.5	≤ 3.5	≤ 0.3	≤ 0.7
More than 19 KW upto 75 KW	≤ 4.7	≤ 3.5	≤ 0.3	≤ 0.7
More than 75 KW upto 800 KW	≤ 4.0	≤ 3.5	≤ 0.2	≤ 0.7

Emission limits for new diesel engine for > 800 kW for generator set (Genset) application

Parameters	PM (mg/Nm ³)	SO ₂ (mg/Nm ³)	NO _x as NO ₂ (ppmv)	CO (mg/Nm ³)	NMHC (as C) (mg/Nm ³)
Method References	IS 11255(Part1):1999	IS 11255(Part2):1999	IS 11255 (Part7):2005	IS 13270:1999	IS 5182(part21):2001
Emission Norms (>800 K W)	75	--	710	150 mg/Nm ³	100 mg/Nm ³

4- CPCB Guidelines for DG Set Noise- under EPA 1986

Noise Limit for Generator Sets run with Diesel

Noise limit for diesel generator sets (upto 1000 KVA) manufactured on or after the 1st January, 2005
The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st January, 2005 shall be 75 dB(A) at 1 metre from the enclosure surface. The diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself.

5- STP Effluent Discharge Standards (MoEFCC under Environment (Protection) Amendment Rules, 2017- For State of J&K

S.No	Parameter	Standard
1.	pH	6.5-9.0
2.	BOD	30 mg/l
3.	TSS	<100 mg/l
4.	Faecal Coliforms	< 1000 MPN/100 ml

6-Drinking Water Standards – IS 10500:2012 and WHO Drinking water quality (4th Edition)

S. No	Parameters	Drinking water specification IS 10500:2012		WHO Drinking water quality (4th Edition)
		Requirement (Acceptable limit)	Permissible limit in the absence of alternate source	Guideline value
A	Physico-chemical Parameters			
1.	pH (pH Scale)	6.5 – 8.5	No relaxation	-
2.	Electrical Conductivity (μ mho/cm)	-	-	-
3.	TDS (mg/L)	500	2000	-
4.	True Color (Hazen Scale)	5	15	-
5.	Turbidity (NTU)	1	5	-
6.	TSS (mg/L)	-	-	-
7.	BOD ⁵ at 20 °C (mg/L)	-	-	-
8.	COD (mg/L)	-	-	-
9.	Dissolved Oxygen (mg/L)	-	-	-
10.	Total Hardness (mg/L)	200	600	-
11.	Calcium Hardness (mg/L)	-	-	-
12.	Magnesium Hardness (mg/L)	-	-	-
13.	Calcium (mg/L)	-	-	-
14.	Magnesium (mg/L)	-	-	-
15.	Total Alkalinity (mg/L)	200	600	-
16.	Sodium (mg/L)	-	-	50
17.	Sulphate (mg/L)	200	400	-
18.	Sulphide (mg/L)	0.05	No relaxation	-
19.	Sulphite (mg/L)	-	-	-
20.	Orthophosphate (mg/L)	-	-	-
21.	Total Phosphorus (mg/L)	-	-	-
22.	Nitrate (mg/L)	45	No relaxation	50

S. No	Parameters	Drinking water specification IS 10500:2012		WHO Drinking water quality (4th Edition)
		Requirement (Acceptable limit)	Permissible limit in the absence of alternate source	Guideline value
23.	Ammonical Nitrogen (mg/L)	0.5	No relaxation	-
24.	Free Ammonia (mg/L)	-	-	-
25.	Total Nitrogen (mg/L)	-	-	
26.	Fluoride (mg/L)	1.0	1.5	1.5
27.	Chloride (mg/L)	250	1000	-
Bacteriological Parameters				
28.	Total Coliform (MPN/100 ml)	Shall not be detectable in 100 mL		
29.	Faecal Coliform (MPN/100 ml)	Shall not be detectable in 100 mL		
Heavy Metals				
30.	Iron (mg/L)	0.3	No relaxation	-
31.	Zinc (mg/L)	5	15	
32.	Copper (mg/L)	0.05	1.5	2.0
33.	Arsenic (mg/L)	0.01	0.05	0.01
34.	Lead (mg/L)	0.01	No relaxation	0.01
35.	Nickel (mg/L)	0.02	No relaxation	-
36.	Boron (mg/L)	0.5	1.0	2.4
37.	Manganese (mg/L)	0.1	0.3	-
38.	Mercury (mg/L)	0.001	No relaxation	0.006
39.	Chromium (Hexavalent) (mg/L)	0.05	No relaxation	0.05

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