

# Semi-Annual Environmental Monitoring Report

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Project number: 41116-043

Period: July – December 2016

## IND: Jammu and Kashmir Urban Sector Development Investment Program – Tranche 3

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**Loan Number: 3132 IND**

**Period: July 2016 to December 2016**

## **IND: Jammu and Kashmir Urban Sector Development Investment Program**

**Submitted By:**

**Economic Reconstruction Agency, Government of Jammu and Kashmir**

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## 1. INTRODUCTION

### 1.1. Overall Project Description:

1. The State of Jammu and Kashmir lies in the northernmost part of the country and shares international border with Pakistan and China. This physiographic situation attaches strategic importance to the region as well as the infrastructural development in the state. The state has three main geographical regions namely Jammu, Kashmir valley and highlands of Ladakh. As per details from Census 2011, Jammu and Kashmir has population of 1.25 Crores, an increase from figure of 1.01 Crore in 2001 census. The population forms 1.04% of India in 2011, compared to 0.99% in 2001. As per census 2011, the Sex Ratio of female is 889 per 1000 male, which is below national average of 940. While in 2001 the sex ratio of female was 900 per 1000 males. The literacy rate has seen an upward trend at 67.16% as per 2011 census as compared to the national literacy rate of 64.80%, while in 2001 literacy rate stood at 55.52%.
2. Jammu and Srinagar are the two major cities where majority of urban population is concentrated while other smaller towns share the rest. Urban infrastructure in these places for long has been neglected and hence, is subject to severe urban infrastructure problems. Although, at least, majority of population in Jammu and Srinagar cities have been provided with piped water supplies, the other urban amenities remain neglected. This is mainly due to meager investments made in the urban infrastructure either by private or by public sector.
3. The Government of Jammu and Kashmir (GoJK), apart from the ADB financed Multi-Sector Project for Infrastructure Rehabilitation (MPIR) in Jammu and Kashmir, again approached ADB for assistance in urban sector development for more development works and studies so as to implement comprehensively the urban sector reforms. The GoJK through Jammu and Kashmir Economic Reconstruction Agency has conceived the Jammu and Kashmir Urban Sector Development Investment Program (JKUSDIP) in its effort to boost economic growth in Jammu and Kashmir State. The primary objective of JKUSDIP is to promote economic development in Jammu and Kashmir State through expansion of basic services such as water supply, sewerage, sanitation, drainage, solid waste management, urban transport and other municipal functions in Jammu, Srinagar and other important urban centers of the State. JKUSDIP will also strengthen the service delivery capacity of the responsible state urban agencies and urban local bodies through management reforms, capacity building and training.

### 1.2. Project Objectives:

4. The proposed JKUSDIP will foster the economic growth in Jammu and Kashmir State. The long term Project objectives are to contribute to the economic development of Jammu and Kashmir through enhanced and sustainable growth in the main urban areas with emphasis on promoting commerce and on improvement of livelihood for the poor.
5. The urban sector sub-projects are aimed at expansion of basic services such as water supply, sanitation, waste management, urban transport and other municipal functions in Jammu and Srinagar cities and other urban centers in order to cater to the demands and

requirements of the increasing population. The overall program envisages the following broad benefits:

- i. Improved water supply system
- ii. Improved drainage waste management systems
- iii. Improved road and traffic (urban transport) conditions
- iv. Other municipal facilities.
- v. Adequate Mechanized Parking.

### 1.3. Environmental Category:

6. The Project 3 (Tranche-3) under JKUSDIP was categorized as Environmental Category "B", according to ADB's Safeguard Policy Statement (2009). All the subprojects under execution in Srinagar and Jammu have been categorized as Category "B".

### 1.4. Environmental Performance Indicators, if any:

7. For effective monitoring, selected environmental parameters have been identified as indicators which may be qualitatively and quantitatively measured and compared over a period of time in order to assess/ensure the compliance to environmental management plans (EMPs). The environmental performance indicators selected are physical, biological and social characteristics identified as most important in affecting the environment at critical locations all along the sub-project corridors. The parameters identified as performance indicators are:
  - i. Compliance with environmental management and monitoring plan.
  - ii. Compliance to State/National environmental regulations.
  - iii. Monitoring of ambient air quality, water quality and noise levels and comparison with baseline environmental quality and State/National standards.

### 1.5. Overall project progress, agreed milestones and implementation schedules:

8. In **Srinagar**, following three (3) subprojects are under execution:
  - i. Construction of Surface water Drainage System for Rawalpura-Chanapora area (Overall progress of the contract is about 56.28%)
  - ii. Providing and laying of Raw Water main from higher reaches of Doodhganga Nallah to Kralpora Treatment plant at Srinagar (Overall progress of the contract is about 56.05%)
  - iii. Construction of New Mehjoor Bridge at Jawahar Nagar and Two Grade Separators in Srinagar city". (Overall progress of the contract is about 33.05%)
9. In **Jammu**, following three (3) sub-projects are under execution
  - i. Rehabilitation of Water Supply Network in Identified Areas within Zone 2, 3, 4 and 5 in Jammu City. Contract Package No: JKUSDIP/Jammu/WS 05. (Overall progress of the contract is about 55.35%)
  - ii. Providing, Laying, Jointing, Testing and commissioning of Sewerage Network in Bakshi Nagar, Shakti Nagar, Shiv Nagar and Janipur Areas in Division A Phase II at

Jammu. Contract Package No: JKUSDIP/WWW/07. (Overall progress of the contract is about 35.42%).

- iii. Multi-Level mechanized Parking at City Chowk Jammu (Overall progress of the contract is about 33.25%).

**1.6. Any other information useful for assessing environmental performance of the project:**

**Public consultation and grievance redressal:**

10. Public consultation has evolved as a useful tool in addressing the issues and rectification of the same wherever possible. The public consultation is the ongoing and continuous process, which is conducted on regular basis in Srinagar and Jammu subprojects under execution, with local residents to ensure that they are fully engaged in the project and have the opportunity to participate in its implementation. Formal consultations as well as adhoc regular discussions with the local residents both form part of the public consultation process (signature sheets and photographs of the public consultations attached as Appendix-1-4).
11. Communication with the local residents is always open and views of the residents are taken into consideration during planning of the work programs under JKUSDIP so that the people suffer least disturbance and inconvenience as the work is executed.
12. Various issues were discussed during formal consultation which includes:-
- a) Removal of surplus and waste material
  - b) Restoration of damaged water supply connection
  - c) Restoration of roads and lanes
  - d) Inconvenience with regard to access disruption
  - e) Dust and noise problems faced during execution of work
  - f) Use of proper barricading to ensure the safety of public and workers.
13. Mitigation measures discussed during formal consultation includes:
- i. Clearing passageways and roads of surplus waste material on priority
  - ii. Speedy restoration of all the utilities
  - iii. Simultaneous road restorations after execution of work
  - iv. Provision of alternate access routes till restoration is achieved
  - v. Using appropriate dust suppression measures and environmental monitoring. Frequent water sprinkling and removal of left over soil arising due to the excavation activities.
  - vi. Barricading of the site under construction to ensure safety of pedestrians etc

Refer section 6.4 under Air, Noise and Water Quality data, which shows primary pollutants of SO<sub>2</sub> and NO<sub>2</sub> in all circumstances well within the permissible limits as per NAAQ Standards and mostly corresponding baseline characteristics. This is mainly credited to effective mitigation measures to control dust generation at active construction sites in that aspect RSPM values were moderately overlapping than the baseline monitoring. Since these impacts are site/ time specific and temporary in nature. Similarly, Water quality results shows in-line with standards and baseline monitoring data which shows the effective implementation of various mitigation measures as per Environmental Management Plan (EMP) of each subprojects under execution.

## 2. COMPLIANCE STATUS WITH NATIONAL /STATE /LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

14. **Table-1:** Status of statutory environmental requirements is shown in the following table:

S #.	Name of Sub-project	Statutory Environmental Requirements	Status of Compliance	Actions Required
<b>Srinagar</b>				
1.	Construction of Surface water drainage system for Rawalpura-Chanapora area (Package: JKUSDIP Srinagar/SWD/02).	Environmental clearance under EIA Notification, 2006.	Not applicable	During this period Contractor submitted all the required statutory consents pertaining to different plants. Certain amount of IPC bill no: 35 <sup>th</sup> was withheld (refer Table 4 for details). In order to achieve the compliance to statutory requirement like consents pertaining to plants. This exercise has helped in achieving the task of submission above consents and thereby compliance to EMP.
		Approval for tree cutting	Not required	
		Consent to establish/operate for stone crusher.	Obtained and submitted by Contractor. Consent No: 559 of 2016 <b>Valid upto March 2017</b>	
		Consent to establish & operate Hot Mix Plant	Contractor submitted consent of HMM Plant. Consent No: 914 of 2016 <b>Valid upto July 2019</b>	
		Consent to establish & operate Batching Plant	Obtained and Submitted by Contractor. Consent No. 619 of 2017 Dated: 19/01/2017 <b>Valid upto 19/01/2019</b>	
		Consent to establish and operate DG Sets	Obtained and Submitted by Contractor. Consent No. 1674 of 2015 Dated: 29/12/2016 <b>valid upto Dec 2016</b>	
		PUC certificates for contractor's vehicles.	Obtained and submitted by contractor	
2.	Providing and Laying of Raw water main from	Environmental clearance under EIA	Not applicable	

	higher reaches of Doodhganga Stream to Kralpora Water Treatment Plant. (Package: JKUSDIP Srinagar/WS/02).	Notification (MoEF), 2006.		
		Approval for tree cutting	Not required	
		Consent to establish/ operate Stone Crusher Plant from SPCB	Contractor procuring Stone Aggregate material from outsourced agency. Consent to operate: Consent No of 36 of 2016, dated: 09-04-2016. Valid upto March 2017.	
		Consent to establish/ operate DG Set from SPCB (If required).	Not required for the present works	
		PUC certificates for contractor's vehicles.	Obtained and Submitted	
3.	Construction of New Mehjoor Bridge at Jawahar Nagar and Two Grade Separators in Srinagar city.	Environmental clearance under EIA Notification, 2006.	Not Applicable	D.G set consent required from contractor.  Contractor has initiated the renewal process for the expired consents vide application no. 1256 Dated: 20/12/2016
		Approval for tree cutting	NOC (DS/Plan/2014-15/537-38) dated: 28.5.2015 obtained from Dept. of Sericulture for cutting 11 trees. All trees (11 no.) of Mulberry trees were and stand cleared. 9 trees require to be cut down at Grade separator at Radio Kashmir TRC crossing for which permission is being procured and action initiated by the parent department from the district commissioner to whom the property belongs	
		Consent to establish/operate for stone crusher.	Stone Crusher Plant Consent no.136 RDK of 2015 Dated: 28.07.2015 and Valid for the period of 2 years i.e. July 2017	



		Consent to establish/ operate Batching Plant	Batching Plant Consent to Operate: Consent No. of 138 RD/C of 2015 Dated: 28/07/2015 <b>Valid for 2 years (July 2017)</b>	
		Consent to establish & operate Hot Mix Plant	HMM Plant Consent to Operate: Consent No.1117 of 2015 Dated: 28/07/2015 Valid upto October 2016. However, HMM not required presently.	
		Consent to establish and operate DG Sets	DG Set (2 No's) Consent to Operate: Consent No. 136 RDK of 2015 Dated: 28-07-2015. <b>Valid upto July 2017</b> Consent No. 180RD/C of 2015 Dated: 23-12-2015. <b>Valid for one year.</b>	
		PUC certificates for contractor's vehicles.	Obtained and submitted by the Contractor.	
<b>Jammu.</b>				
4	Rehabilitation of Water Supply Network in Identified Areas within Zone 2, 3, 4 and 5 in Jammu City. Package No: JKUSDIP/Jammu/WS-05	Approval for tree cutting	Cutting of Forest tree or any other schedule tree not required	
		Consent to establish and operate stone crusher.	Not required yet	
		PUC certificates for contractor's vehicles.	Obtained and submitted by the Contractor	
6.	Providing, Laying, Jointing, Testing and Commissioning of Sewerage network in Bakshi Nagar, Ranbir Collector, Janipur, Shiv Nagar and Shakti Nagar of division 'A' Phase-II at Jammu."	Approval for tree cutting	Cutting of Forest tree or any other schedule tree not required.	
		Consent to establish and operate stone crusher.	Stone aggregate material is being procured from approved Stone Crusher Plant having following consent details:	

(Balance works of WW-01 & WW-02). Package No. JKUSDIP/Jammu/WW-07.		Consent to Operate: Consent No: 14 of 2016, Dated: 04/04/2016 <b>Valid up to March 2017.</b> Obtained and submitted by the Contractor	
	PUC certificates for contractor's vehicles.		
Mechanized Semi-Automatic Parking facility at Super Bazaar City Chowk Jammu. Package No.: JKUSDIP/Jammu /UT 02	Approval for tree cutting	Cutting of Forest tree or any other schedule tree not required	Contractor already applied to State Pollution Control Board for DG Set consents.  Contractor instructed to follow-up the process and collects the required consents and submits the same at earliest.
	Consent to establish and operate stone crusher	Stone aggregate material is being procured from approved Stone Crusher Plant. Copy of consent letter from utility owner obtained and submitted by contractor. Consents to operate: Consent No. 212 of 2016, Dated: 30/04/2016 <b>Valid up to November 2016</b>	
	Consent to establish and operate of concrete batching plant	Contractor has not established his own batching plant, but is obtaining material from the approved plant. The consent to operate certificate from utility owner obtained and submitted by Contractor.  Batching plant Consent No: 721 of 2015 Dated: 11-07-2015 <b>Valid up to: February, 2018.</b>	
	Consent of DG Set	Contractor is using 1 No. DG for which he has already applied for the consents at SPCB which is under process.	
	PUC certificates for contractor's vehicles.	Obtained and submitted by the Contractor.	

### 3. Compliance Status with the Environmental Covenants as Stipulated In the Loan Agreement

15. **Table-2:** Status of compliance with environmental loan covenants of Tranche-3 is presented below:

Loan Covenants	Compliance status
<b>The Borrower shall ensure, or cause the EA to ensure that;</b>	
the preparation, design, construction, implementation, operation and decommissioning of the project, and all subproject facilities comply with; (i) all applicable laws and regulations of the Borrower and the State relating to environment, health, safety; (ii) the Environmental Safeguards; (iii) EARF; and (iv) all measures and requirements set forth in the respective IEE and EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	Being complied with.
All bidding documents and contracts for Works contain provisions that require contractors to:- - Comply with the measures and requirements relevant to the contractor set forth in the IEE and EMP; and any corrective or preventive actions set out in a Safeguards Monitoring Report.	The bidding documents and contract agreements for work are incorporated with provisions set forth in the IEE and EMP and are being complied with.
- Make available a budget for all such environmental measures.	Environmental monitoring and mitigation costs allocated/ incorporated in contract agreements.
- Provide the EA with a written notice of any unanticipated environmental impacts that arise during construction, implementation or operation of the project that were not considered in the IEE and in the EMP.	Being complied with
- Adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction.	The existing condition of roads and other infrastructure has been recorded in the form of photographs and video recording as well.
- Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	All the areas that if disturbed by construction activities will be cleared and restored to pre-project condition.
- Submit semi-annual Safeguards Monitoring to ADB and disclose relevant information from such reports to affected persons promptly upon submission;	Semi-annual report prepared and submitted to ADB as per the guidelines.
- If any unanticipated environmental risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEE and EMP as applicable, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and	In case of any unanticipated environmental risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEE and EMP as applicable that shall be immediately informed to ADB with detailed description of the event and proposed corrective action plan.
- Report any breach of compliance with the measures and requirements set forth in the EMP, promptly after becoming aware of the breach.	Breach will be reported to ADB immediately after becoming aware of it.

#### 4. COMPLIANCE STATUS WITH ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS AS STIPULATED IN THE ENVIRONMENTAL DOCUMENTATION AS AGREED WITH ADB.

16. **Table-3:** The compliance status with environmental management and monitoring plan is shown in the following table:

S. No	Sub-project Name	EMP Part of Contract Documents (Yes/No)	EMP Being Implemented (Yes/No)	Status of EMP Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfaction)	Actions Proposed/ Additional Corrective Measures Required
1.	Construction of Storm water drainage system for Rawalpota-Chanapora area (Package: JKUSDIP Srinagar/ SWD/02).	Yes	Yes	Satisfactory	Contractor has been instructed to increase the availability of caution boards at construction site.
2.	Providing and Laying of Raw water main from higher reaches of Doodhganga Nallah to Kralpora Water Treatment Plant. (Package: JKUSDIP Srinagar/ WS/02).	Yes	Yes	Satisfactory	Contractor has been instructed to remove surplus material from the construction site, along the road to facilitate the safe and free movement of traffic.
3.	Construction of New Mehjoor Bridge at Jawahar Nagar and Two Grade Separators in Srinagar city	Yes	Yes	Satisfactory	Contractor has been instructed to expedite the work to accomplish the time deadline but without any compromise on environment and safety of the stakeholders.
<b>Jammu.</b>					
4.	Rehabilitation of Water Supply Network in Identified Areas within Zone 2, 3, 4 and 5 in Jammu City. Package No.: JKUSDIP/Jammu/WS 05	Yes	Yes	Satisfactory	Contractor to further ensure workers safety measures are met properly.



5.	Mechanized Semi-Automatic Parking facility at Super Bazaar City Chowk Jammu. Package No.: JKUSDIP/Jammu/UT 02	Yes	Yes	Satisfactory	Contractor is further instructed to ensure workers safety is implemented strictly with required personnel protective gears keeping in view type of works at parking lot.
6.	Providing, Laying, Jointing, Testing and Commissioning of Sewerage network in Bakshi Nagar, Ranbir Collector, Janipur, Shiv Nagar and Shakti Nagar of division 'A' Phase-II at Jammu." (Balance works of WW-01 & WW-02). Package No. JKUSDIP/Jammu/WW-07.	No (Separate EMP copy issued to the Contractor)	Yes	Satisfactory	Contractor instructed for additional measures to keep dust suppression measures under control.

17. Details of amount withheld/deducted from the IPC's for Non-compliance of various components of EMP, in accordance with ERA Circular No.: ERA/CEO/1038/ADM/9629-42, DATED 10/01/2013, during the period July 2016 – December 2016.

18. **Table-4:**

S. No.	Contract Package	Bill No.	Total Recommended Deduction (In Rs)
<b>Srinagar</b>			
1	Construction of Surface water drainage system for Rawalpura-Channapora area (Package: JKUSDIP Srinagar/SWD/02)	IPC 35 <sup>th</sup>	5,03,595
<b>Jammu</b>			
2	No amount withheld/deducted from the IPC's during this period.	-	-

#### 5. APPROACH AND METHODOLOGY ENGAGED FOR ENVIRONMENTAL MONITORING OF THE PROJECT

19. Construction works of 3 subprojects are under execution in Srinagar and 3 subprojects in Jammu. Monitoring schedules and reporting formats were issued to each contractor for compliance and implementation of EMP of each site. However, for the Sewerage Network Package (WW-07), separate copy of EMP was issued to the contractor for implementation. The contracting firms of all subprojects have nominated/ mobilized Environmental Safety Officers and are submitting site environmental reports at the end of each month.
20. Site visit/ inspections are being carried out on regular basis to assess the EMP implementation of Tranche-3 subprojects under execution.
21. Public consultation was conducted for the subprojects. During consultation with different stakeholders, issue of "dust generation" and "Public safety measures" were mainly discussed and addressed. Apart from that, other issues like temporary disruption and timely rectification of water pipe connection and timely restoration measures were also part of the consultation. Each such issue was addressed accordingly with the stakeholders. Since, ongoing works have a limited construction period and hence have only temporary and short-term impact within the impact corridor. Contracting firms are being instructed for strict follow-up of mitigation measures as devised in EMP of Contract Agreement. Refer Appendix 1-3 for Public Consultation (participant details).
22. Public consultation is a regular process throughout the construction and operation phases of the subprojects to solve any issues arising out of the ongoing works.
23. The safeguards staff conducts frequent site visits to monitor the implementation of safeguard measures on sites and report to concerned official about issues/problems related to environmental non-compliance. Necessary directions in the form of corrective action measures,

in case of non-compliances, are being issued to the contractors on the site and through letters about the procedures to resolve problems/issues or requirements.

## **6. MONITORING OF ENVIRONMENTAL RECEPTORS/ ATTRIBUTES**

### **6.1. Monitoring basis**

24. Air quality, water quality and noise levels are required to be monitored to check if any adverse impact is being caused by the construction activities. The monitoring of these variables is to be carried out in construction areas at sensitive locations within 100 m impact zone of the subproject. The monitoring of environmental variables is to be carried out as per the agreed Environmental Monitoring Plan.

### **6.2. Type of environmental receptor/attribute monitored (for each type)**

25. The environmental attributes monitored include the air, noise and water quality parameters at the construction sites in sub-project corridors. The air quality parameters monitored include RSPM (PM<sub>10</sub>), PM (PM<sub>2.5</sub>), SO<sub>2</sub> and NO<sub>2</sub>. The water quality parameters include temperature, pH, electrical conductivity (EC), dissolved oxygen (DO), biochemical oxygen demand (BOD<sub>5</sub>), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), turbidity (NTU), total alkalinity, total hardness, calcium hardness and magnesium hardness. In case of noise quality, the day time dB L<sub>eq</sub> values are monitored.

### **6.3. Methodology, Regulatory Standards of monitoring and equipment's adopted for Environmental Monitoring Laboratory (EML):**

26. The following standard methods and equipment's are being used for monitoring.

27. **Table-5:** List of Assessment Methodology, Acceptable Standards and equipment's adopted.

S #.	Parameters	Assessment Methodology	<sup>1</sup> Acceptable Standards	Cause for rejection	Equipment's in Use
<b>A. Ambient Air Quality (<sup>2</sup>NAAQ Standards, 2009)- Time weighted average</b>					
1.	RSPM- particulate matter PM <sub>10</sub>	Gravimetric High Volume Sampler method (attached with cyclone).	100 $\mu\text{g}/\text{m}^3$ 60 $\mu\text{g}/\text{m}^3$		Respirable Dust Sampler, Envirotech - APM 460 BL Digital Balance, Schimadzu – BL-220H
2	Fine particulate matter PM <sub>2.5</sub> ,	Gravimetric method.	60 $\mu\text{g}/\text{m}^3$ 40 $\mu\text{g}/\text{m}^3$		Ambient Fine Dust Sampler, Instrumex.
3.	SO <sub>2</sub>	Modified West and Gaeke Method.	80 $\mu\text{g}/\text{m}^3$		High Volume Air Sampler, Envirotech – APM 460BL. Thermo-electrically cooled gaseous sampling attachment, Envirotech – APM 411TE Digital Spectrophotometer, EI- 305.
4.	NO <sub>2</sub>	Modified Jacob & Hochheiser Method.	80 $\mu\text{g}/\text{m}^3$		High Volume Air Sampler, Envirotech – APM 460BL. Thermo-electrically cooled gaseous sampling attachment, Envirotech – APM 411TE Digital Spectrophotometer, EI- 305.
<b>B. <sup>3</sup>Ambient Noise Level</b>					
1.	Residential Area	Direct Reading in Decibel Sound Level Meter.	55dB(A) L <sub>eq</sub> (Day time)		Digital Sound Level Meter, AZ-8928
2.	Commercial Area	Direct Reading in Decibel Sound Level Meter.	65 dB(A) L <sub>eq</sub> (Day time))		Digital Sound Level Meter, AZ-8928

<sup>1</sup> CPHEEO Manual, MoUD, GOI, May 1999; and MoEF, Act and Rules, 1986 & Amendments 2000

<sup>2</sup> National Ambient Air Quality Standards (NAAQS)

<sup>3</sup> Standards specified in the schedule of Noise Pollution (Regulation And Control) Rules, 2000 of Government of India. The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.



<b>C. <sup>4</sup>Ambient Water Quality (For Drinking / Ground Water)</b>					
1.	Temp (in °C)	Digital/Mercury Thermometer Method.	>20 °C		Digital/Mercury Thermometer
2.	Color (Hazen units)	Hazen Method	5 Platinum cobalt scale	25	-
3.	Taste and Odour		Unobjectiona ble	Objection able	-
4.	pH value	Electrometric Method.	6.5-8.5	>8.5	Digital pH Meter, HANNA – HI98127,
5.	Electrical Conductivity (EC) µs/cm	Electrometric Method.	≤ 500 µs/cm	1000 µs/cm	Digital TDS/EC Meter, HANNA – HI- 96311
6.	Dissolved Oxygen (DO) mg/l	Winkler's Method Using Azide Modification	> 6 mg/l		Winkler's Method
7.	Total Suspended Solids (TSS) mg/l	Gravimetric (Filtration and Drying at 105°C)	<120 mg/L		Hot Air Oven, Digital Balance, Schimadzu-BL-220H
8.	Total Dissolved Solids (TDS) mg/l	Digital Meter Method.	≤ 500 mg/l	2000 mg/l	BOD Incubator
9.	Turbidity (NTU)	Nephelo Turbidity Method.	1mg/l	10 mg/l	Nephelo Turbidity Meter, Systronics – 132
10.	Total Hardness (as CaCO <sub>3</sub> ) mg/l	EDTA Titrimetric	300 mg/l	600 mg/l	-
11.	Total Alkalinity (as CaCO <sub>3</sub> ) mg/l	Titrimetric (Methyl Orange)	200 mg/l	600 mg/l	-
12.	Calcium Hardness (Ca) mg/l	EDTA Titrimetric	75 mg/l	200 mg/l	-
13.	Magnesium Hardness (Mg) mg/l	Calculation from total Hardness and Calcium	30 mg/l	150 mg/l	-
<b>D. <sup>5</sup>Waste Water Quality (Storm/ drain water, dry weather flow)</b>					
1.	Temp (in °C)	Digital/Mercury Thermometer Method.	Shall not exceed 5°C above the receiving water temperature		Digital/ Mercury Thermometer
2.	Color (Hazen)	-	5	25	-

<sup>4</sup> Drinking water Specifications, IS-10500

<sup>5</sup> Standards for Discharge of Environmental Pollutants, IS-10500

	units) Platinum cobalt scale				
3.	Odour	Objectionable/ Non- objectionable	Non- objectionable		-
4.	pH value	Electrometric Method.	5.5-9.2		Digital pH Meter, HANNA – HI98127,
5.	Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$	Electrometric Method.	< 2000		Digital TDS/EC Meter, HANNA – HI-96311
6.	Dissolved Oxygen (DO) mg/l	Winkler's Method Using Azide Modification	> 6 mg/L		Winkler's Method
7.	Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/l	Five Days BOD as per APHA 2005	30 mg/l		BOD Incubator
8.	Chemical Oxygen Demand (COD) m/l	Dichromate Method (APHA 2005)	250 mg/l		
9.	Total Dissolved Solids (TDS) mg/l	Digital Meter Method.	$\leq 500$ mg/L	2100 mg/L	Digital TDS/EC Meter, HANNA – HI-96311
10.	Total Suspended Solids (TSS) mg/l	Gravimetric (Filtration and Drying at 105°C)	<120 mg/L		Hot Air Oven, Digital Balance, Schimadzu-BL-220H
11.	Turbidity (NTU)	Nephelo Turbidity Method.	5 mg/L	10 mg/L	Nephelo Turbidity Meter, Systronics – 132
12.	Total Alkalinity (as CaCO <sub>3</sub> ) mg/l	Titrimetric (Methyl Orange)	200	600	

Annotation: BOD= biochemical oxygen demand; DO= dissolved oxygen; EC= electrical conductivity; NO<sub>2</sub>= nitrogen dioxide; PM<sub>10</sub>= particulate matter with particle size less than 10 $\mu$ ; RSPM= respirable suspended particulate matter; SO<sub>2</sub>= Sulphur dioxide; TDS= total dissolved solids; TSS= total suspended solids.

#### 6.4. Monitoring results and comparison with statutory requirements at National levels.

28. The environmental monitoring for air quality, water quality and noise levels for subprojects under Tranche-3 in both Srinagar and Jammu. Monitoring was conducted during the reporting period of July-December 2016 by Environmental Monitoring Laboratory of J&K ERA (Under supervision of PMC-JKUSDIP). Results of the environmental monitoring report is tabulated below;

### A. Air Quality<sup>6</sup>

29. The results of air quality monitoring conducted on various sampling locations of different subprojects in Jammu are represented below;

30. **Table-8.** Air quality monitoring at different locations of subprojects in Jammu

AIR QUALITY DATA								
Site Code	Quarter	Month of Sampling with date	Sampling Site/ Location	Site Type	RSPM <sub>10</sub> (µg/m <sup>3</sup> )	RSPM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )
					Permissible Limits			
					100	60	80	80
<b>1. Rehabilitation of Water Supply pipe network in identified areas with zone 2, 3, 4 and 5 in Jammu City</b>								
	Baseline Monitoring	17-06-2015	Site corridor	Residential area	132.93	185.64	44.79	86.38
S-1	Q3	30-08-16	Upper Laxmi Nagar, Tallimorh	Residential , Rural and other areas	126.9	62.4	8.3	29.2
S-2	Q3	29-09-16	Puran Nagar, Pacca Talab Sarwal	Residential , Rural and other areas	186	112.4	8.3	27.9
S-3	Q4	13-10-16	Resham Ghar colony	Residential , Rural and other areas	136.2	112.4	19.7	34.2
S-S3	Q4	08-12-16	High Court Complex, Janipur	Residential , Rural and other areas	146	88.6	18.7	30.4
S-S4	Q4	24-12-16	Bakshi Nagar Near Police station	Residential , Rural and other areas	190.8	87.4	20.8	34.2
<b>2. <sup>7</sup>Sewerage network Package WW-07</b>								
	Baseline Monitoring	30-11-2015	Vikas Nagar Sarwal	Residential area	152.6	99.92	33.3	35.5
S4	Q3	29-08-16	Subash Nagar	Residential , Rural and other areas	202.9	149.9	14.5	36.8
<b>3. Construction of Multi-Level Parking System at Super Bazaar, City Chowk Jammu</b>								
	Baseline Monitoring	06-10-2016	Near Parking Lot (Rehari)	Residential Area	155.76	-	13.70	28.08
S-8	Q3	13-08-16	City Chowk	Residential , Rural and other areas	67.7	62.4	18.7	31.7
S-9	Q4	28-11-16	City Chowk	Residential , Rural and other areas	167.8	74.9	22.9	35.5
<b>4. Upgradation of Water Supply Network for Reduction of Non-Revenue Water (NRW) in Zone 1 of Old City Jammu.</b>								

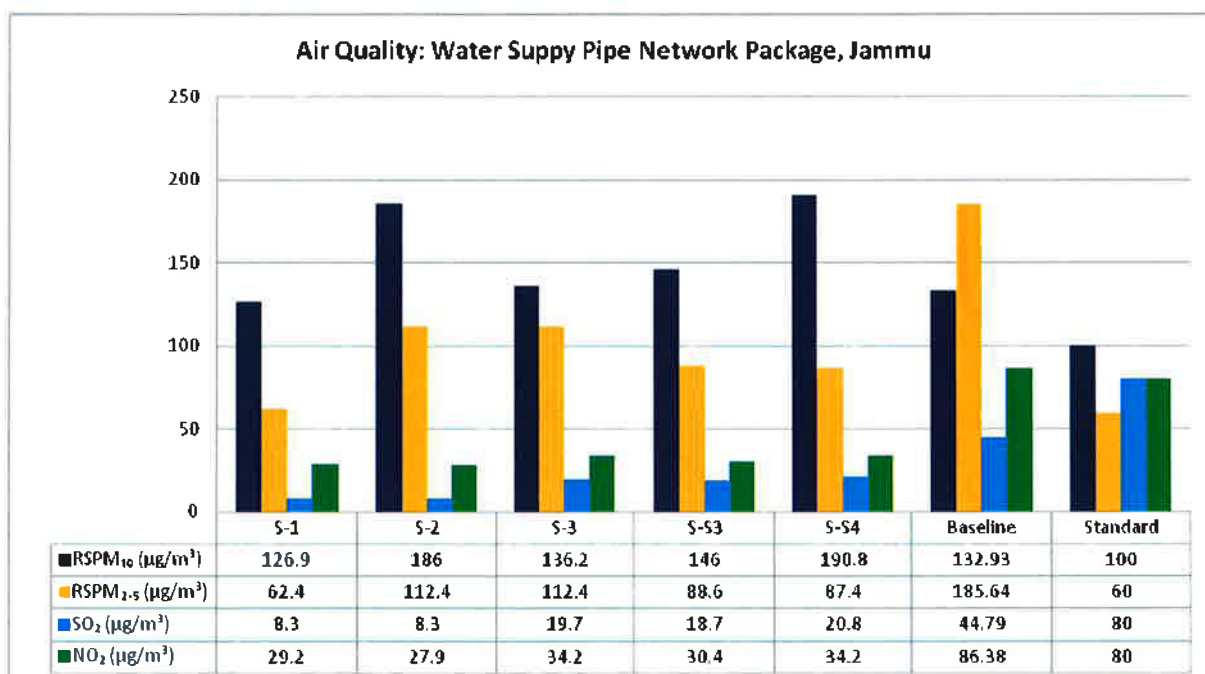
<sup>6</sup> Ambient Air Quality monitoring was not possible during the reporting period for the subprojects in Kashmir region due to the continuous turmoil and unavoidable situation.

<sup>7</sup> Air Quality monitoring conducted under Package no. WW-07 on 30-11-2015 being used as a baseline data for corresponding reports.

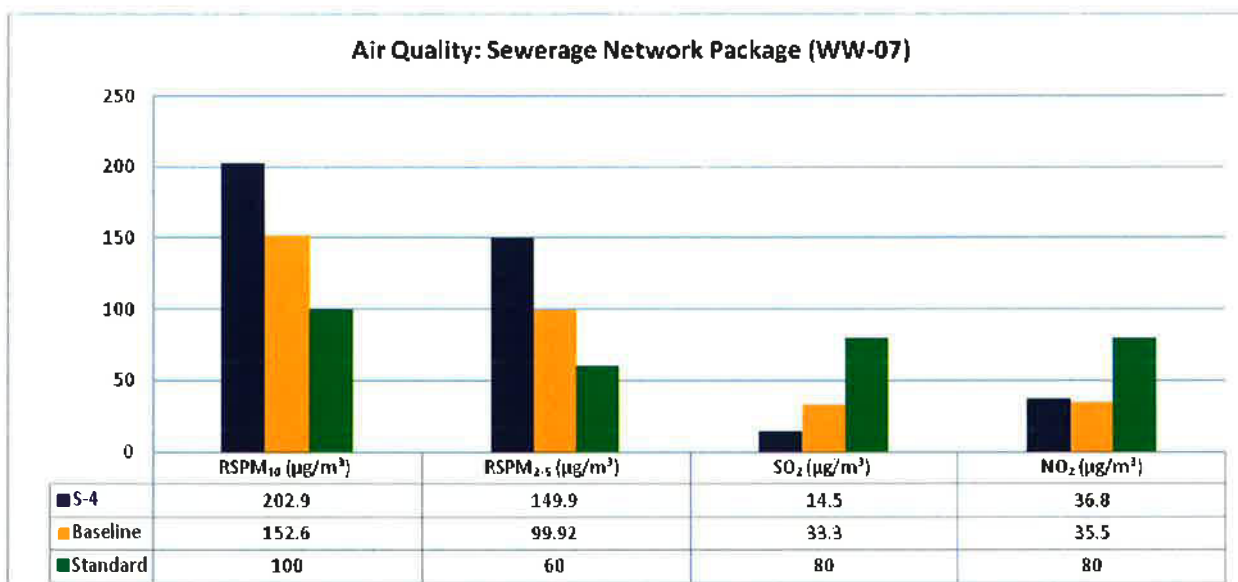
NR-1	Q4	10-12-16	Panama Chowk	Residential, Rural and other areas	196.7	107.9	21.8	38.1
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31. Ambient air quality monitoring conducted during Q3 and Q4 period shows particulate matter on higher side at all sites of Water Supply package. Site S-2 and S-S4 recorded maximum at 186 and 190.8  $\mu\text{g}/\text{m}^3$  which were also exceeding the baseline values as well. Whereas, site S-1 shows minimum values at 126.9  $\mu\text{g}/\text{m}^3$  but within baseline characteristics. Oxide pollutants of  $\text{SO}_2$  and  $\text{NO}_2$  were observed within the permissible level of NAAQ standards
32. Monitoring results at site S-4 of Sewerage Package (WW-07) shows higher values at 202.9 and 149.9  $\mu\text{g}/\text{m}^3$  for  $\text{RSPM}_{10}$  and  $\text{PM}_{2.5}$  respectively. At S-8 and S-9 of Parking Lot, both  $\text{RSPM}$  values were recorded within the permissible level of NAAQ standards with just 2.4  $\mu\text{g}/\text{m}^3$  increase. At site NR-1,  $\text{RSPM}_{10}$  &  $\text{PM}_{2.5}$  values were observed at 196.7 and 107.9  $\mu\text{g}/\text{m}^3$  respectively. Oxide pollutants were observed within the permissible level at all instances.
33. Increase in particulate values is mainly attributed to continuous traffic influx and also ongoing construction activities, which lead to increase in the values since its impact is short term/ temporary and site specific only. Such short term impact was anticipated and is suitably mitigated like proper dust suppression measures.
34. Contractor has been instructed to ensure frequent water sprinkling and removal of spill over excavated material from sensitive construction areas. This will reduce the source of dust generating medium and decrease in fugitive dust.
35. The primary gaseous pollutants of  $\text{SO}_2$  and  $\text{NO}_2$  were within the permissible limit and baseline monitoring throughout the monitoring phase at all sites. Comparative analysis is illustrated in Figure 1 to 4 below;

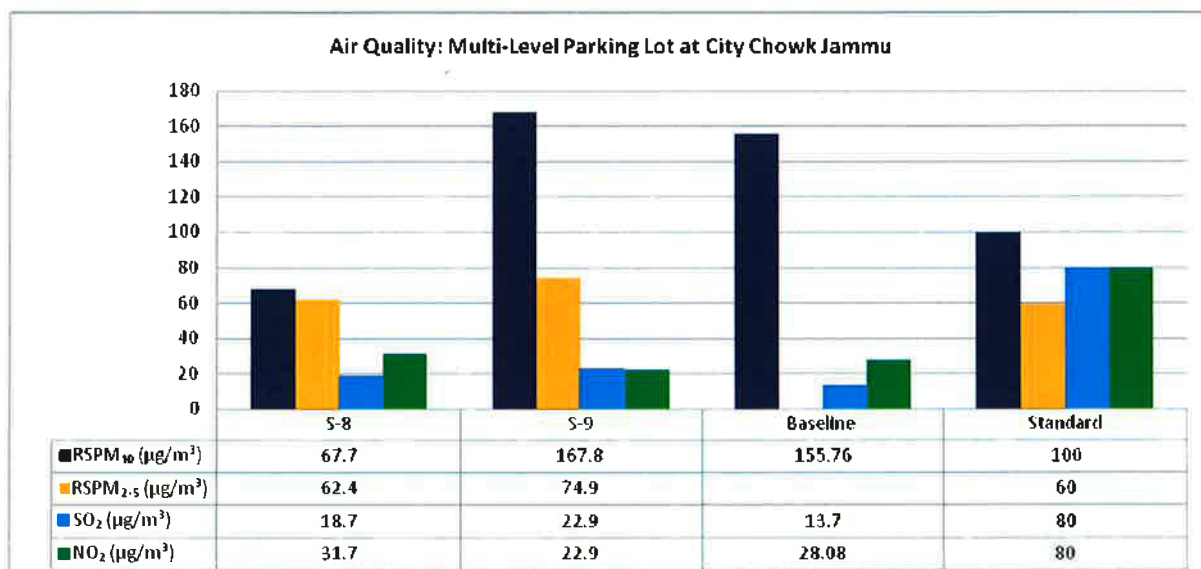




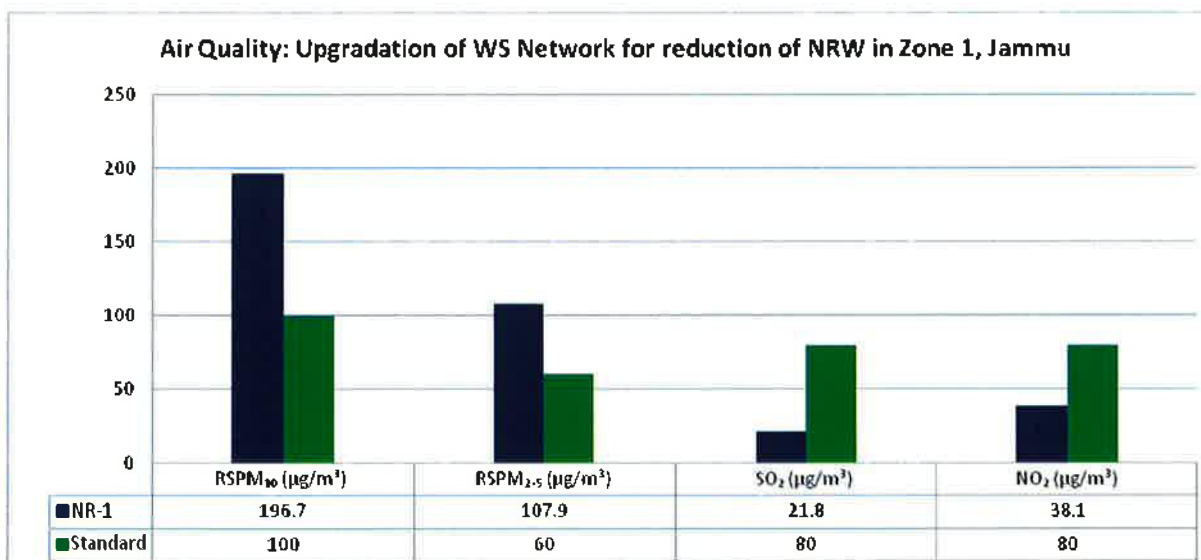
**Figure 1:** Comparative analysis of Air Quality parameters observed at site S-1 to S-S4 of Water Supply subproject with NAAQ standards and baseline monitoring in Jammu.



**Figure 2:** Comparative analysis of Air Quality parameters observed at site S-4 of Sewerage subproject (WW-07) with NAAQ standards and baseline monitoring in Jammu.



**Figure 3:** Comparative analysis of Air Quality parameters observed at site S-8 to S-9 of Multi-Level Parking Lot with NAAQ standards and baseline monitoring in Jammu.



**Figure 4:** Comparative analysis of Air Quality parameters observed at site NR-1 with NAAQ standards in Jammu.

## B. Noise Quality<sup>8</sup>

36. The measured noise quality data at various locations is given below:

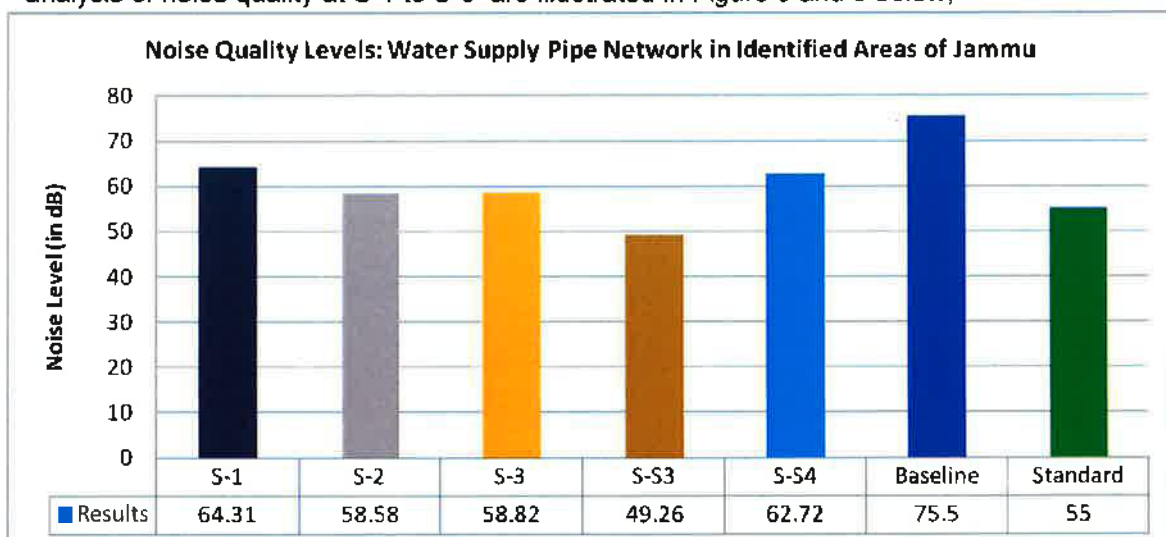
37. **Table-11:** Noise Quality measured in different location of subprojects in Jammu City.

Jammu Subprojects						
Site Code	Quarter	Month of Sampling with date	Sampling Site/ Location	Site Type	Noise Levels (dB Leq)	Standards
<b>1. Rehabilitation of Water Supply Pipe Network in identified areas with zone 2, 3, 4 and 5 in Jammu city</b>						
	Baseline Monitoring	June 17-06-2015	At University Road	Residential	75.5	55
S-1	Q3	30-08-16	Upper Laxmi Nagar, Tallimorh	Residential, Rural and other areas	64.31	55
S-2	Q3	29-09-16	Puran Nagar, Pacca Talab Sarwal	Residential, Rural and other areas	58.58	55
S-3	Q4	13-10-16	Resham Ghar colony	Residential, Rural and other areas	58.82	55
S-S3	Q4	08-12-16	High Court Complex, Janipur	Residential, Rural and other areas	49.26	55
S-S4	Q4	24-12-16	Bakshi Nagar Near Police station	Residential, Rural and other areas	62.72	55
<b>2. <sup>9</sup>Sewerage network Package WW-07</b>						
	Baseline Monitoring	30-11-2015	Vikas Nagar Sarwal	Residential	65.3	55
S4	Q3	29-08-16	Subash Nagar	Residential, Rural and other areas	66.63	55
<b>3. Construction of Multi-parking system at Super Bazar, City Chowk</b>						
	Baseline Monitoring	06-10-2012	Near Parking Lot (Rehari)	Residential Area	69.2	55
S8	Q3	13-08-16	City Chowk	Residential, Rural and other areas	60.39	55
S9	Q4	28-11-16	City Chowk	Residential, Rural and other areas	61.75	55
<b>Upgradation of water supply network for reduction of Non revenue water (NRW) in Zone 1 Old city Jammu</b>						
NR1	Q4	10-12-16	Panama Chowk	Residential, Rural and other areas	63.62	55

<sup>8</sup> Monitoring of Noise Quality was not possible for the subprojects in Kashmir Region due to the continuous turmoil and unavoidable situation.

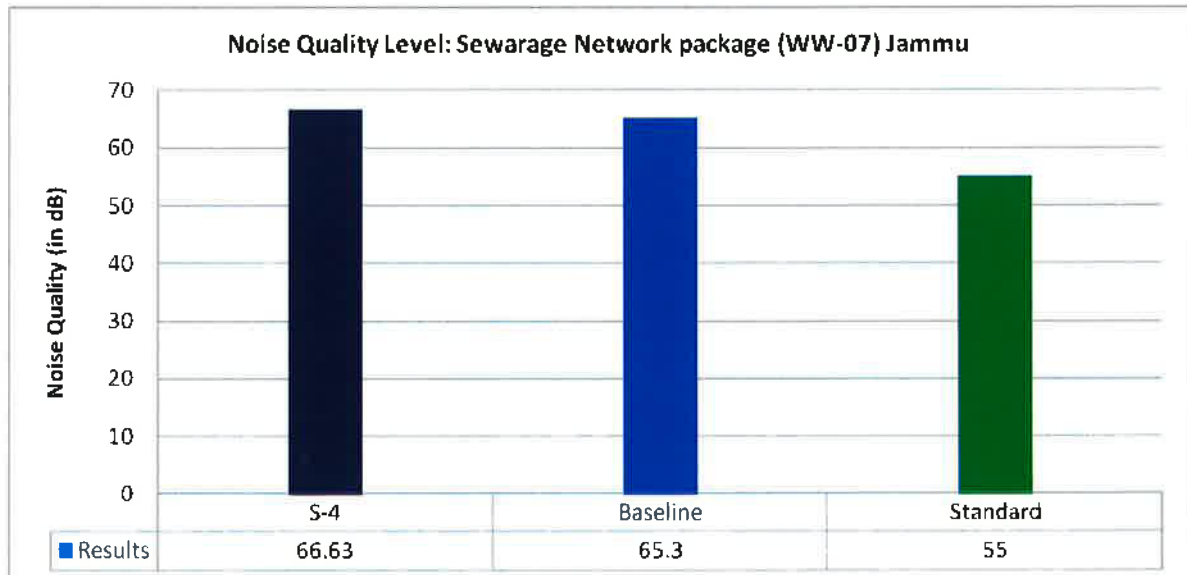
<sup>9</sup> The noise quality monitoring conducted in November 2015, will serve as a baseline monitoring for comparative analysis with all corresponding reports

38. Monitoring of Noise quality levels was conducted at different locations in Jammu. At S-S3 of the Water Supply subproject, noise level was recorded at an average 49.2 dB and within the permissible level. At other sites like S-1, S-2 S-S3 and S-S4; noise level was recorded at average min of 58.58 dB with max. at 64.31 dB that is moderate level for the residential areas with maximum increase at 9.31 dB. All results observed within the baseline values of the above package.
39. Similarly, Sewerage package (WW-07), Parking lot and Water Supply (NRW) sites were recorded at moderate levels. Maximum reading was observed at site S-4 at 66.63 dB and minimum recording of 60.39 dB at site S-8.
40. The moderately higher values are coinciding with the frequent traffic movement on the subproject corridor and partly by machinery engaged by the contractor. Such noise impact is site/ time specific and is temporary in nature. Corrective measures were instructed to ensure measures so that the present values are not exceeding the baseline monitoring. Comparative analysis of noise quality at S-1 to S-8 are illustrated in Figure 5 and 8 below;

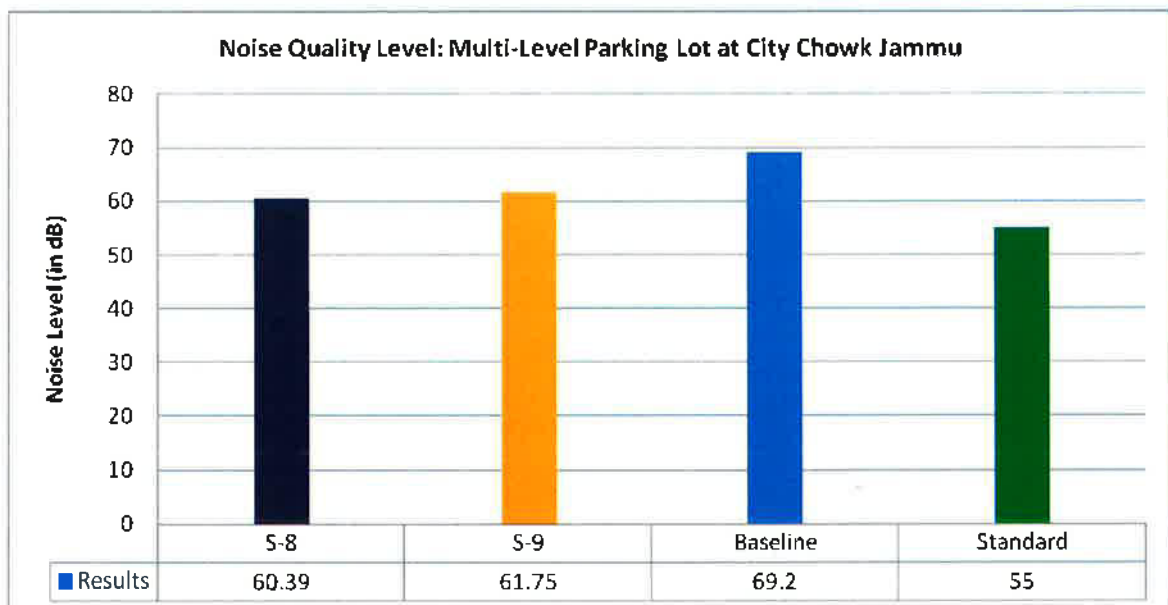


**Figure 5:** Comparison of day time noise levels observed at S-1 to S-S4 of Water Supply subproject with NAAQ standards and Baseline monitoring in Jammu.

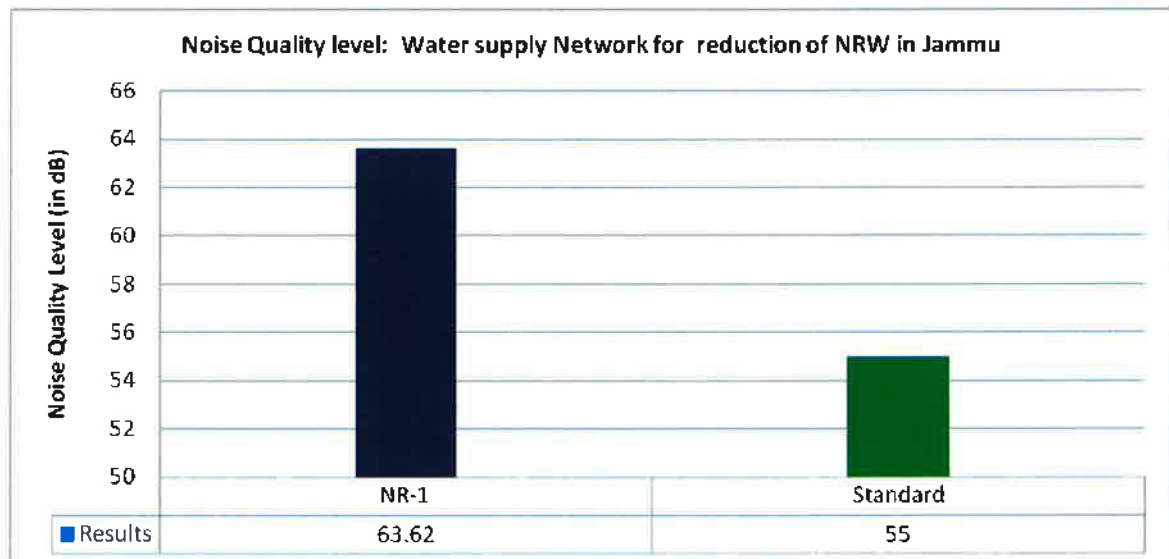




**Figure 6:** Comparison of day time noise levels observed at S-4 of Sewerage Network (WW-07) subproject with NAAQ standards and Baseline monitoring in Jammu.



**Figure 7:** Comparison of day time noise levels observed at S-8 and S-9 of Multi-Level Parking subproject with NAAQ standards and Baseline monitoring



**Figure 8:** Comparison of day time noise levels observed at NR-1 site of subproject Upgradation of water supply network for reduction of non-revenue water (NRW) in Zone 1 old city, Jammu.

### C. Water Quality

41. The results of water quality analysis conducted at sites in Srinagar are presented below:

42. **Table-13: Construction of New Mehjoor Bridge and Grade Separator in Srinagar City.**

WATER QUALITY DATA																			
Site Code	Quarter	Month of Sampling with date	Sampling Site	Location	Temp °C	pH	E.C. µs/cm	D.O mg/l	B.O.D mg/l	TDS mg/l	TSS mg/l	Turbidity NTU	T.A				T.H	C.H	M.H
					Permissible Limits										200-600	300-600	75-200	30-75	
						6.5-8.5	≤500	>6	5	≤500	≤120	5-10							
New Mehjoor Bridge near Jawahar Nagar																			
	Baseline Monitoring	July 06.07.2013	Near Mehjoor Bridge Site	Upstream	24	8	436	1.6	11	270	85	4.2	The above 4 parameters were not part of the baseline monitoring. These additional parameters included into monitoring from July-Dec, 2015						
				Downstream	24	8	441	1.6	12	274	85	4.5							
S-W6	Q4 (Oct-Dec)	October 02-10-2016	Near Mehjoor Bridge Site	Upstream	20	7.8	698	7.8	ND	349	270	59.0	240	292	243.6	11.7			
				Downstream	21	7.9	705	7.9	ND	353	275	59.2	236	298	250.2	11.6			
Grade Separator At TRC/ Radio Kashmir Crossing																			
	Baseline Monitoring	July 06-07-2013	Jhelum River Near Zero Bridge	Upstream	19	8.0	260	7.0	2.0	158	138	2.1	The above 4 parameters were not part of the baseline monitoring. These additional parameters included into monitoring from March 2016						
				Downstream	20	8.0	267	6.6	2.0	160	140	2.2							
S-W7	Q4 (Oct-Dec)	Oct-Dec 29-11-2016	Jhelum River Near Radio Kashmir	Upstream	8	7.5	333	8.6	ND	168	135	2.0	126	237	162	18.2			
				Downstream	9	7.7	340	8.4	ND	171	140	2.2	129	240	164	18.4			

43. Monitoring of Water quality at S-W6 site was conducted and water samples were taken from the upstream and downstream of River Jhelum Flood Spill Channel near Mehjoor Bridge during during Q4 period. Minimum flow was recorded in a flood spill channel with high suspended matter visible. Green algal growth was also noticed may help in enhancing the DO level in the water body. Further, this flood spill channel also receives number of sewer from various dewatering pumping stations of city drainage. Water was found turbid with fishy odour emanating.

44. The analysis of the Water samples shows good dissolved oxygen content due to the high algal growth. TSS and Turbidity was on higher side owing to stagnant nature of the spill channel and high organic load due to the low flow as such the main source of

water is mainly from these number of dewatering stations and coinciding with winter period and low precipitation. Conductivity was found to be high due to the discharge of sewage from the pumping stations. pH and TDS were found in permissible limits as recorded in previous report as well. In reference to above results and previous reports, no impact is seen due to the ongoing construction works on the spill channel.

45. At Grade Separator site, water samples were collected from the River Jhelum at Abdullah Bridge downstream and upstream. Water quality results were in healthy state as most of the parameters were within the standards. TSS was moderately on higher side due to the suspended substances which the river brings along its course and effect of erosion/ edge effect. DO was also observed at optimum level due to the flow regime and volume of water. Comparative analysis of the Floodspill Channel (of Jhelum) and River Jhelum is illustrated in Figure 9 to 10 below;

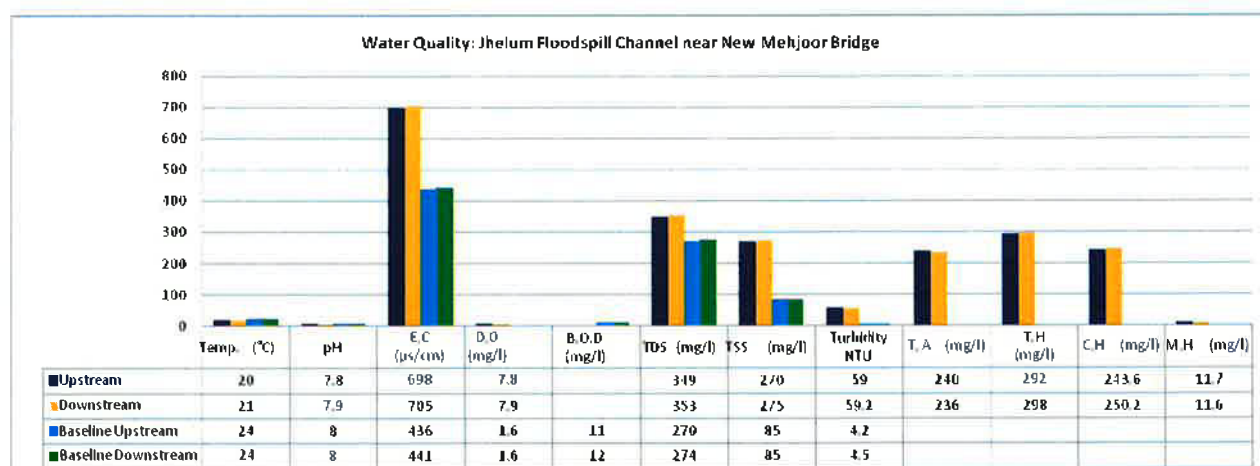
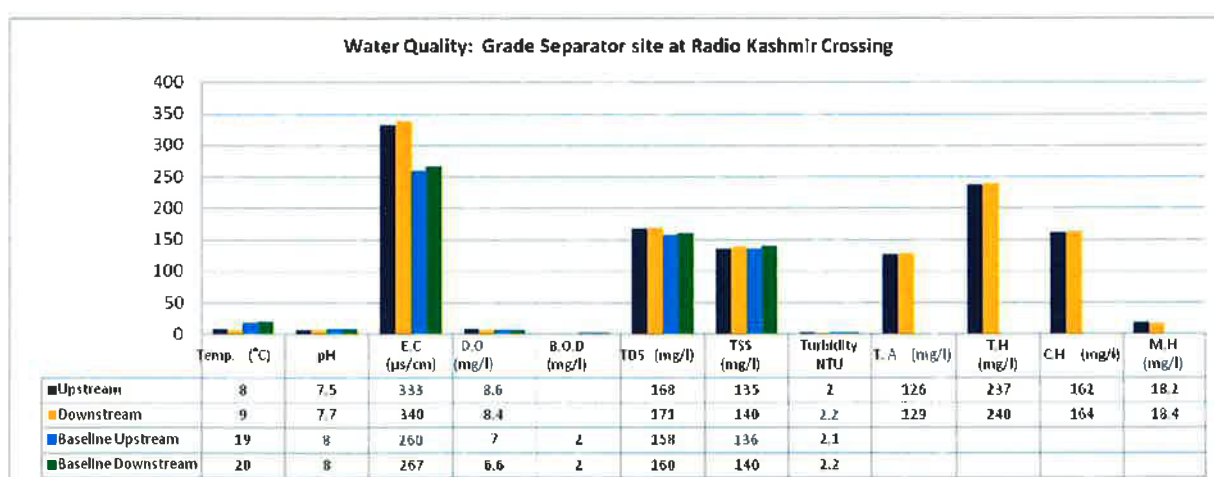


Figure 9: Water quality characteristics of Floodspill Channel of River Jhelum Site near New Mehjoor Bridge at S-W5 Srinagar.



**Figure 10:** Water quality characteristics during of River Jhelum at Zero Bridge near Grade Separator site in Srinagar.

**7. ANY OTHER ENVIRONMENTAL ASPECTS, IMPACTS OBSERVED DURING IMPLEMENTATION WHICH WERE NOT COVERED EARLIER**

46. During this reporting period no such impact was envisaged.

**8. DETAILS OF COMPLAINTS RECEIVED FROM PUBLIC AND ACTIONS TAKEN THEREOF TO RESOLVE**

47. No complaint received during the reporting period.

**9. FOLLOW-UP ACTIONS AND CONCLUSIONS**

48. During both Q3 and Q4 periods of 2016, site supervision of above sub-projects under execution is being carried out regularly to ensure that environmental impacts are adequately mitigated and to ensure continuation of compliance with statutory regulations as required by laws and agreed upon EMP. The contractor is being regularly guided and instructed to adhere to the provisions of EMP under contractual conditions.



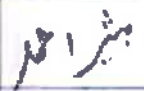
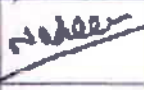
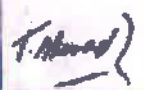
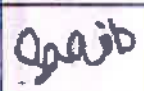
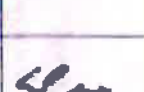
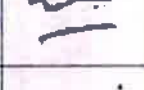
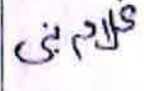
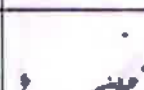
**Signed by:**

Authorized signatory from Implementing Agency/ Executing Agency.

  
EE(s)

  
(P N Bali)  
Director Safeguards  
J&K ERA

## Appendix-1: Public Consultation (Participants) Details of WS Raw Water Main- Doodhganga.

Sub-project Name: Providing & Laying of Raw water main - Doodhganga Nallah				
Date: 16 / 11 / 2016				
Time: 11:00 a.m. – 3:00 p.m.				
Location: Kralpora, Chadoora, Doodhganga Nallah				
S.No	Name	Occupation	Address	Signature
1	Mohammad Sultan	Businessman	Kralpora	
2	Adil Nani	Student	Kralpora	
3	Bashir Ahmad	Carpenter	Mochao	
4	Nadeem Sheikh	Student	Channapora	
5	Tauveer Ahmad	Driver	Chopalpora	
6	Sagib Lone	Student	H.M.T.	
7	Abdul Gaffar	Shopkeeper	Chadoora	
8	Ghulam Nabi	Labour	Chadoora	
9	Zaona Begum	Housewife	Chadoora	
10	Neelafar Malik	Student	Budgam	

## Appendix-2: Public Consultation (Participants) Details of Sewerage/ WS Subproject Jammu.

### LIST OF PARTICIPANTS IN PUBLIC CONSULTATION WITH SIGNATURES

SUB-PROJECT NAME: SEWERAGE PACKAGE NO: NW-07 (T-3)  
 LOCATION OF MEETING/ CONSULTATION: SUBASH NAGAR  
 DATE AND TIME: 10:30 AM / 06-10-2016

S. NO	Name	Age/ Sex	Occupation	Address	Signature
1	Ajay Sharma	44 M	Student	Subash Nagar	
2	Ashwani Sharma	46 M	"	"	
3	Sandeep Kumar	44 M	"	"	
4	B M Bhatt	48 M	"	"	
5	T P Sharma	29 M	"	"	
6	Nitin	29 M	"	"	
7	Ashwani	38 M	"	"	
8	Pan Singh	52 M	"	"	
9	Shakul Ali	49	Student	"	
10					

Attach additional sheets if required



## Appendix 2: Continues.....

## LIST OF PARTICIPANTS IN PUBLIC CONSULTATION WITH SIGNATURES

SUB-PROJECT NAME: Sewerage & water supply package (Kathmandu)  
 LOCATION OF MEETING/CONSULTATION: Behari  
 DATE AND TIME: 6-10-2016 / 11:00 am

S NO	Name	Age/ Sex	Occupation	Address	Signature
1	Satish Saini	67/M	Medic Rapt	300 Behari Lohary, New	
2	Rekha	80/F	Housewife	Behari Dhara	Rekha
3	Lej Kumar Sharma	38/M	Govt Officer	Behari Dhara	Rekha
4	Hemant	20/M	Engineer	Behari	
5	Sankar Kumar	40/M	Franchise Vendor	Behari Lohary	
6	Sankar Gupta	59/M	Master Stone	Behari Lohary	
7	Sankar Gupta	31/F	Housewife	Behari Lohary	
8	Sunil Saini	60/M	Shopkeeper	Saini Kirtan 87m, Behari	
9	Vijay Gupta	38/M	Shopkeeper	Gupta Trading Behari	
10	Rajesh Vijay	46/M	Govt Employee	House no - 129 behind JCB 6250 from Behari	

Attach additional sheets if required

\* 7298107363 (Sunil Saini)











### Appendix -3: Public Consultation (Participation) details of Multi-Level Parking in Jammu.

#### LIST OF PARTICIPANTS IN PUBLIC CONSULTATION WITH SIGNATURES

SUB-PROJECT NAME: MULTILEVEL CAR PARKING PARKING UT-02

LOCATION OF MEETING/CONSULTATION: CITY CHOKK

DATE AND TIME: 02-10-2016 / 12:30 PM

S.NO	Name	Age/ Sex	Occupation	Address	Signature
1	Mohamed Ahmed	21 M	Shopkeeper	City Chokk	
2	Sanjay	24 M	"	"	
3	Ramesh	31 M	"	"	
4	Anil	52 M	"	"	
5	Govind Singh	50 M	"	"	
6	R.K. Malhotra	54 M	"	"	
7	Rajesh	35 M	"	"	
8	Ramprasad Singh	55 M	"	"	
9	R.K. Singh	45 M	"	"	
10	Vijay	54 M	"	"	

Attach additional sheets if required

#### Appendix-4: Photos of Public Consultation of Tranche-3 Subprojects





**Appendix-5: Sampling Site location of Storm Water Drainage in Rawalpore Srinagar**



**Appendix- 8: Sampling site location map of New Mehjoor Bridge and Grade Separator, Srinagar**



**Appendix-7: Sampling site location map of Doodhganga Water Supply Subproject Srinagar**





Appendix-8: Sampling site location map of Multilevel parking and Rehabilitation of Water Supply Network in Jammu.

