UTTARAKHAND PEY JAL SANSADHAN VIKAS EVAM NIRMAN NIGAM

Environmental and Social Assessment with Management Plan for Sewerage Works of MUNI KI RETI - DHALWALA

REVISED AFTER INCORPORATING NMCG OBSERVATIONS

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Project Manager
Construction & Maintenance Unit (Ganga)
Uttarakhand Peyjal Nigam
Haridwar (Uttarakhand)

Programme Director
State Program Management Group
National Ganga River Basin Authority
117, Indira Nagar, Dehradun
(Uttarakhand)

AECOM

AECOM India Pvt. Ltd.
9th Floor, Infinity Tower C,
DLF Cyber City, DLF Phase – II,
Gurgaon, Haryana

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Introduction

As a major first step in achieving the Ganga Clean up Initiatives, the Government of India (GoI) constituted the National Ganga River Basin Authority (NGRBA), on 20th February 2009, for the comprehensive management of the river. In regards to this initiative, the World Bank has been formally requested by GOI to provide long-term support to NGRBA through several phases of substantive financing and knowledge support. The first project of several phases of support aims at:

- Establishing and operationalizing central and state level NGRBA institutions capable of planning and implementing a multi sectoral river water quality improvement program

- Reducing pollution loads into the river through selected investments.

Project Area

In continuance with the pollution abatement programs by NGRBA, sewerage works for Muni ki Reti – Dhalwala in Himalayan State Uttarakhand has been recently proposed, as this area is partially un-sewered and waste water finds its way into the river through open drains. As per the Environmental and Social Management Framework (NGRBA, 2011), the implementation of such river pollution mitigation projects under the NGRBA is anticipated to encounter a variety of environmental and social issues/problems. Therefore the study of environment and social sector is required for analyzing the impacts of proposed project, and suggesting the management plans to handle any negative impacts.

Project Description

Muni-ki-Reti and Dhalwala lies in the foothills of Himalayas, at the confluence of River Ganga from North & Chandrabhaga River from south. Located in Tehri- Garhwal region of Uttarakhand on the national highway NH-58 at a distance of about 45 km from Dehradun, the Capital City of Uttarakhand, Muni Ki Reti is one of the river side town and important tourist place in Uttarakhand State. It is one of the beginning points for Char Dham Yatra.

The towns are currently deprived of well planned and designed sewerage facilities. Existing sewerage infrastructure is not covering the entire population, thus considerable quantum of wastewater is being discharged in nearby drains, which are ultimately joining river Ganga. Many sections of the existing infrastructure are in dilapidated condition and needs immediate rehabilitation to serve their purpose. Apart from these, there are a number of other issues including quality of infrastructure, public awareness, institutional role clarity, financial aspects and human resources etc. that are affecting the status of urban sanitation in the towns. Being towns of religious significance, the towns are visited by number of tourists round the year. Poor sanitation facilities are deterrent for the economy of these towns which thrive on Tourism as one of the main business industry.

The project is aimed to strengthen the existing sewerage infrastructure of the towns by providing new sewer lines in unsewered areas, replacement of hydraulically

insufficient/damaged sewer lines and provision of treatment facilities to treat the wastewater to design standards before its final discharge. The project also involves capacity building and HRD in ULB's to enhance their technical and financial capability in the implementation and O&M of the project works.

Existing Situation

Most of the households (about 95%) in Muni ki Reti have their individual toilets and the wastewater is either discharged to sewer or to septic tank. About 5% households do not have personal toilet arrangements, and therefore depends upon community toilets. As per secondary information, there are rare incidences of open defecation in the town.

The existing sewerage network in Muni ki Reti was laid under GAP –I, for an approximate length of 10,219 m, with diameter ranging from 150 mm to 500 mm.

In Dhalwala, there exists a sewerage network for an approximate length of 9367 meters laid during 2009-11, under State Sector programme.

The existing sewer network in Muni Ki Reti is reportedly suffering from frequent blockage and overflow problems in many of the stretches especially the peripheral sewers. The possible reasons might be excessive sewage load due to increase in population and also chocking of sewers due to disposal of solid waste resulting in reduction of its carrying capacity. Also, existing pipes are reported to be broken at some locations, causing continuous flow over ground in the nearby area. Storm water ingress into the sewerage system is another major problem in the town.

Sewerage network in Dhalwala is relatively new and yet not put in operation. The effluent from septic tanks is either seeped into the ground or being discharged to nearby drains.

Sewage Pumping Station

There is only one Sewage pumping station (SPS) in Muni Ki Reti and none in Dhalwala. The existing SPS was built in year 1986. The SPS is located within municipal boundary of Rishikesh. The SPS is of 8.0 m diameter with approximately 1.4 m of liquid depth with horizontal centrifugal pumps sets installed. The SPS has a wet well to collect sewage and a dry well wherein the pumps sets are installed.

Sewage Treatment Plant

There is no Sewage treatment plant in Muni Ki reti or Dhalwala towns at present. The sewage from Muni Ki Reti (i/c contributory wards of Rishikesh) is conveyed to existing SPS and thereafter pumped to STP at Lakkar Ghat area in Rishikesh.

Need of the project

Muni Ki Reti – Dhalwala are river side towns and important tourist place in Uttarakhand State. The population of Muni Ki Reti and Dhalwala towns has increased considerably in past few

years. Moreover, being one of the beginning points of "Char Dham Yatra" and an important tourist place, the towns have considerable influx of pilgrims. This has resulted in increase in wastewater generation in these towns. The existing sewerage network in Muni ki Reti was laid during GAP I, around year 1986. Thereafter, there is no planned extension of sewerage network in the town. The sewerage network for Dhalwala town is although recently laid (during year 2009 -11), but the household are not yet given access, reportedly due to absence of well defined outfall. Moreover, even in areas having sewer network, not all the population is connected to the network. A segment of population is depending upon community toilets or defecating in open. Therefore, a substantial quantum of wastewater generated in towns is being discharged in open or nearby drains, which ultimately joins river Ganga. Since the wastewater remains untreated till final disposal in river, it is adversely impacting the river water quality.

Apart from the deterioration of water quality of river (although the impact is very minimal), it is pertinent to mention that project towns are important tourist place and numbers of tourists mostly pilgrimage visits the towns round the year. In the present scenario, nalas discharging untreated wastewater into river Ganga could be observed adjacent to places of tourist attraction especially those having religious significance.

Therefore, there is an urgent need to upgrade the existing sewerage infrastructure and community sanitation in the towns. The entire town area shall be covered under well planned and designed sewerage collection and conveyance network, with 100% population connected to the system. This wastewater shall be treated to the design effluent standards before final disposal in river, so as to maintain the river water quality.

Proposed Works

The entire area of Muni ki Reti – Dhalwala can be considered as single drainage area, as general slope of towns is towards confluence of river Chandrabhaga and Ganga. However, considering the town limits and proposed scheme, the area can be broadly divided into two sewerage districts viz.

Sewerage District A – covering Muni ki Reti and contributing wards of Rishikesh and
Sewerage District B – covering entire Dhalwala town and part of Muni Ki Reti.

Sewer Network

Summary of proposed sewer network is presented in table below:

Summary of Proposed Sewer Network for Sewerage District A

S. No.	Diameter of Pipe (mm)	MOC	Length (meters)
1	200	DI (K-7)	7364
2	250	DI (K-7)	307
3	500	DI (K-7)	824
		TOTAL	**8495**

Summary of Proposed Sewer Network for Sewerage District B

S No	Diameter of Pipe (mm)	MOC	Length (meters)
1	150	DI (K-7)	11013
2	200	DI (K-7)	9983
3	500	DI (K-7)	33
		TOTAL	**21029**

Sewage Pumping Station

a) New Sewage Pumping Station near Chandreshwar Nala– Sewerage District A

Part of Rishikesh lying between existing SPS and Dhalwala nala towards east and Chandreshwar Nala towards south is comparatively at lower level than existing SPS. The invert level of proposed trunk sewer for this area is calculated to be below the inlet chamber at existing SPS. Therefore, it is proposed to construct a small SPS, which will collect the sewage generated for this small area and pump it to existing SPS.

b) New Sewage Pumping Station at 14 Bigha area at Dhalwala– Sewerage District B

New SPS is proposed in Dhalwala town at "14 Bigha Area" along Chandrabhaga river. This SPS shall receive wastewater of Dhalwala town through a gravity trunk sewer and Muni ki Reti+ Rishikesh towns through rising main.

Sewage Treatment Plants

It is proposed to construct a new STP under this scheme for sewage generated in Muni ki Reti and Dhalwala towns. Sewage of four wards of Rishikesh has also been included in this scheme. The STP is proposed to be constructed at "14 Bigah Area" location in Dhalwala town. The land for the proposed STP has been identified in consultation with ULB officials.

Approach and Methodology

The methodology adopted for the environmental and social assessment included secondary data analysis, carrying out scoping in the field, survey of the host population and discussion with key stakeholders including government officials and local residents. Based on these outcomes, a screening activity was conducted with the help of the screening checklist format provided in Environmental and Social Management Framework of NGRBA. Thereafter, environmental and social impacts were identified and assessed and a mitigation plan was developed based on the aforementioned.

The screening checklist included criteria that detailed out the impact level of various activities during the construction and operation phases. These criteria included environmental factors such as the presence of eco-sensitive region in and around the project area, clearance of tree cover, improper storage of excavation spoils, flooding of adjacent areas, elevated noise and dust

levels, damage to existing utilities. Social criteria included factors such as requirement for land acquisition, loss of livelihood and gender issues.

Based on the criteria-wise screening activity and the categorization of potential sub-projects of the NGRBA, the present project of Sewerage work in Muni ki Reti - Dhalwala falls under High impact category.

Baseline Status

As a part of ESAMP, baseline study of the Muni ki Reti - Dhalwala was prepared to understand the regions existing physical and biological characteristics along with cultural and social status of the residing community. The baseline information forms the basis to analyse the probable impacts of the proposed project vis-à-vis the present background environmental quality of the core study area. In environmental scenario it reflects the status of environmental entities like status of climate, geological features, air quality, water quality, waste management and existing green cover in the study area. As per the study, wastewater generated from Muni ki Reti - Dhalwala is observed to be mostly from residential with limited commercial and no industrial wastes. As mentioned earlier, most of Muni ki Reti - Dhalwala area has no sewer system and wastewater flows in all natural drains and finds its way to river Ganga.

Discharge in existing Nalas carrying untreated wastewater

S. No.	Name of Drain / Nala	Discharge (LPM)
1	Khara Sroat Nala	100
2	Bus Stand Nala	150
3	Shamshan Ghat Nala	200
4	Ganga resort Nala	100
5	Chandreshwar Nala	100

While in baseline status of social section, it brings out the status of demographic composition of the population, general land-use feature of the wards and also details of the social survey outcomes at various consultations held in different wards of the sewerage district.

Environmental and Social Impacts

Although the project falls near to the Rajaji National park but there would not be any permanent negative or adverse environmental or social impacts, but will have temporary impacts on water quality, air quality (impact on health), traffic blockages, safety hazards for pedestrians, possible damage to private property, possible interruption in commercial activity, and accidental breakage of other public infrastructure such as water pipes.

Social assessment clearly defines that no issue of private land acquisition and livelihood loss is foreseen in the project. Hence, no compensation provision is required. However, if any loss of livelihood would be noticed during implementation of this project, then the affected party will be compensated according to Environment and Social Management Framework (ESMF)

guidelines set by the NGRBA. A public grievance mechanism (as prescribed by ESMF of NGRBA) is to be followed. There is a clear mention and highlighting if the social development issues and outcomes in this report. A section chalking out institutional mechanism, capacity building requirements and monitoring and evaluation mechanism is also present.

Social Development Outcome and Issues

Social assessment clearly defines that no issue of private land acquisition and livelihood loss is foreseen in the project. Hence, no compensation provision is required. However, if any loss of livelihood would be noticed during implementation of this project, then the affected party will be compensated according to Environment and Social Management Framework (ESMF) guidelines set by the NGRBA. One strong suggestion which was identified from consultations was execution of construction work within a scheduled time frame with provision of prior notice to residents, shop-owners. A public grievance mechanism (as prescribed by ESMF of NGRBA) is to be followed. There is a clear mention and highlighting if the social development issues and outcomes in this report. A section chalking out institutional mechanism, capacity building requirements and monitoring and evaluation mechanism is also present

Environment management Plan

These temporary impacts can be mitigated with appropriate mitigation plans, which have been suggested as well, along with monitoring and evaluation of future projects. A cost of probable environmental management plans, which is a part of DPR, was estimated to be approximately INR 53,00,000/-.

Conclusion

However, keeping in view, the temporary disruptions and impacts, it was concluded that the larger environmental value of the project greatly outweighs them. The project is expected to benefit the Muni ki Reti - Dhalwala, as the wastewater that currently flows untreated into the Ganga River will be captured, treated and the remainder of the treated effluent will be allowed to flow into the river. The total project cost is 95.60 Crore and breakup of cost is provide below.

Break up of Project Cost

S. No.	Description	(Rs. In Lakhs)
A	**Sewer Line**	
1	Sewerage District A	1187.88
2	Sewerage District B	2367.48
B	**Sewage Pumping Station**	
1	Muni ki Reti Rehabilitation	310.47
2	DhaIwala —New	677.77
3	New SPS	65

S. No.	Description	(Rs. In Lakhs)
C	**Rising Main**	
1	Muri Kl Reti, existing SPS	102.67
2	Dhalwala, new SPS	411.5
3	Muni-ki-Reti New SPS	8
D	**Sewage Treatment Plant with Disinfection**	**1125**
E	**Cost of approach road works and protection wall at proposed STP**	**172**
F	**House Connections**	**314.96**
G	**Staff Quarters**	**61**
	Sub-Total	**6803.73**
H	Charges	
1	Cost of Project preparation @ 4% as per the NGRBA guidelines (maximum)	272.15
2	Cost of supervision of project @ 4% as per NGRBA guidelines (maximum)	272.15
	Sub-Total (H)	**544.3**
I	Cost of Work on which no charges will be admissible	
1	Communication & Public Outreach	25
2	GAAP	5
3	ESAMP	50
4	Cost of Power Connection	65
5	Land Acquisition	33
	Sub-Total (I)	**178**
J	**Operation and Maintenance Cost**	
1	Five Years O&M cost	2034.24
	Sub Total of (J)	**2034.24**
	Grand Total (A+B+C+DE+F+G+H+l+J)	9560.27
	Total Estimated Cost	**95.60 Crore**

1. Introduction

The river Ganga has significant economic, environmental and cultural value in India. Rising in the Himalayas and flowing in to the Bay of Bengal, the river traverses a course of more than 2,500 km through the plains of north and eastern India. The Ganga main stem – which also extends into parts of Nepal, China and Bangladesh – accounts for 26 per cent of India's landmass, 30 per cent of its water resources and more than 40 per cent of its population. The Ganga also serves as one of India's holiest rivers whose cultural and spiritual significance transcends the boundaries of the basin.

Despite its importance, extreme pollution pressures from increasing population and industrialization pose a great threat to the biodiversity and environmental sustainability of the Ganga, with detrimental effects on both the quantity and quality of its flows. Discharge of untreated sewage and industrial wastewater, non-point pollution sources from religious activities along the river, agriculture and livestock as well as poor solid waste management are the main causes for pollution in river Ganga.

1.1 Ganga Clean up Initiatives

The Government of India (GoI) has undertaken clean-up initiatives in the past. The most prominent of such efforts was the Ganga Action Plan, launched in 1985 later complemented by a similar plan for the Yamuna, the biggest tributary of the Ganga. These programmes have faced significant public scrutiny and, despite some gains made in slowing the rate of water quality degradation, they have been widely perceived as failure. The main shortcomings of these initiatives were: (1) inadequate attention to institutional dimensions, including the absence of a long-tem-basin planning and implementation framework; (2) little effort made in addressing systemic weakness in the critical sectors of urban wastewater, solid waste management, environmental monitoring, regulation and water resources management; and (3) inadequate scale, coordination and prioritization of investments, with little emphasis on ensuring their sustainability. These programs also did not pay sufficient attention to the social dimensions of river clean-up, failing to recognize the importance of consultation, participation and awareness-raising. The lessons drawn from these prior experiences indicate that improving water quality in the Ganga cannot be achieved by plugging the infrastructure gap alone. Rather, any effective initiative will have to adopt a three-pronged approach:

- Establishing a basin-level, multi - sectoral framework for addressing pollution in the river (including national/state policies and river basin management institutions);
- Making relevant institutions operational and effective (e.g. with the capacity to plan, implement and manage investments and enforce regulations); and,
- Implementing a phased program of prioritized infrastructure investments (with emphasis on sustainable operations and mobilization of community support)

1.2 The Ganga River Basin Project

As a major first step in achieving the above, the Government of India (GoI) constituted the National Ganga River Basin Authority (NGRBA), on 20th February 2009, for the comprehensive

management of the river. The NGRBA will adopt a river-basin approach and has been given a multi-sector mandate to address both water quantity and quality aspects. The NGRBA has resolved that by year 2020, no untreated municipal sewage or industrial effluents will be discharged into River Ganga.

The NGRBA program will finance infrastructure investments to reduce pollution loads at priority on the river. The investments are intended to exemplify, among other attributes, the high standards of technical preparation and implementation, sustainability of operations and public participation. The majority of investments in the NGRBA program are expected to be in the wastewater sector, particularly in wastewater treatment plants and sewerage networks. Investments will also be supported in industrial pollution control and prevention (e.g. common effluent treatment plants), and river front management (e.g. improvement of the built environment along river stretches, improvements of small Ghats and electric crematoria and the conservation and preservation of ecologically sensitive sites). Many investments are likely to combine elements of more than one of these sectors. An investment framework has been finalized for the selection of program investments.

The objectives of this investments framework are to:

- Provide a filter for all the NGRBA investments, for ensuring that the selected investments are well-prepared and amongst the most effective in reducing the pollution loads
- Make transparent the decision making process on investment selection; and,
- Ensure that the investments are implemented in a sustainable manner.

1.3 World Bank Assistance

The Government of India has sought programmatic assistance from the World Bank to support the NGRBA in the long term. This assistance aims to support the NGRBA in establishing its operational-level institutions and implementing priority infrastructure investments.

1.4 Existing Situation

Most of the households (about 95%) in Muni ki Reti have their individual toilets and the wastewater is either discharged to sewer or to septic tank. However, the current practice is to discharge only the black water i.e. toilet wastewater into the sewer or septic tank and the grey water i.e. wastewater from kitchen, bathing etc is mostly discharged in nearby areas or drains. About 5% households depend upon community toilets. As per secondary information, there are rare incidences of open defecation in the town.

The existing sewerage network in Muni Ki Reti was laid under GAP –I, for an approximate length of 10,219 m, with diameter ranging from 150 mm to 500 mm. Pipes used in network were mostly RCC pipes (NP2/NP3 class). Since then, there are no major new network / rehabilitation in the town, except laying of short stretches (200 – 600 meters) in different parts of city.

In Dhalwala, there exists a sewerage network for an approximate length of 9367 meters laid during 2006-11, under State Sector programme. However, till now none of the household has been connected to the network. The reason as reported is absence of well-defined outfall. Approximately 80% household have their individual toilets and septic tanks for sewage disposal. There are no community toilets in Dhalwala town. Therefore, nearly 20% of population has to defecate in open.

The existing sewer network in Muni Ki Reti & contributing wards of Rishikesh, is reportedly suffering from frequent blockage and overflow problems in many of the stretches especially the peripheral sewers for three important reason viz. 1) Excessive sewage load due to increase in population 2) Reduction in carrying capacity of existing sewers due to disposal of solid waste and 3) Storm water ingress. Also, existing pipes are reported to be broken at some locations, causing continuous flow over ground in the nearby area.

Sewerage network in Dhalwala is relatively new and yet not put in operation. The effluent from septic tanks is either seeped into the ground or being discharged to nearby drains.

As reported by Muni ki Reti nagar Panchayat , there are no liquid waste producing industries in town, therefore no industrial waste is being discharged in sewers or open drains. Hence, isolation / treatment of industrial waste are not an issue for Muni Ki Reti – Dhalwala.

There is only one Sewage Pumping Station (SPS) in Muni Ki Reti. The SPS was built in year 1986. The SPS is located within municipal boundary of neighbouring town Rishikesh. The SPS is of 8.0 m diameter with approximately 1.4 m of liquid depth with horizontal centrifugal pumps sets installed. The SPS has a wet well to collect sewage and a dry well wherein the pumps sets are installed. It receives sewage generated and collected in network from Muni Ki Reti town and four wards of Rishikesh town.

There is no Sewage treatment plant in Muni Ki Reti or Dhalwala towns at present. The sewage from Muni Ki Reti and contributory wards of Rishikesh is collected and conveyed to existing SPS and thereafter pumped to STP at Rishikesh.

1.5 Proposed Project Components

It is proposed to cover the entire town area under sewerage network, with 100% population connected to the network. The new networks are integrated with existing network to make full use of existing assets wherever feasible.

The proposed scheme includes:

a) Laying of sewers in unsewered area and replacement of hydraulically insufficient/damaged existing sewers

b) Rehabilitation of existing SPS with complete replacement of E&M equipment and associated Civil Works

c) Construction of new SPS near Chandreshwar Nala

d) Construction of new SPS at 14 Bigha Area, Dhalwala

e) Construction of STP of 7.5 MLD capacity at Chor-Pani area, Dhalwala

The entire area of Muni ki Reti – Dhalwala can be considered as single drainage area, as general slope of towns is towards confluence of river Chandrabhaga and Ganga. However, considering the town limits and proposed scheme, the area can be broadly divided into two sewerage districts viz.

Sewerage District A – covering Muni ki Reti and contributing wards of Rishikesh and

Sewerage District B – covering entire Dhalwala town and part of Muni Ki Reti.

Sewerage District A:

This district covers Muni ki Reti town and part of Rishikesh town (ward no 1, 5, 10 & 11). The levels in the area are in general varying from RL 370.00 to RL 340.00. The existing SPS is located at a RL of about 339.00 m; hence wastewater generated can be collected under gravity in the existing SPS.

A small area between existing SPS and Dhalwala nala is comparatively at lower level than existing SPS. A small SPS (IPS) is proposed to collect wastewater generated in this area. The location of proposed SPS is near Chandreshwar Nala. The waste water collected in new SPS will be pumped to existing SPS and thereafter pumped to new SPS at Dhalwala.

The capacity of wet well at existing SPS is sufficient for design flow requirements for ultimate year. The E&M equipment have outlived their design life and also their capacity is insufficient for design flow for intermediate year (year 2030). Therefore, the E&M equipment are proposed to be replaced and provisions of automated operation with SCADA system have also been made. Existing civil structures would require rehabilitation works associated with replacement of E&M equipment besides minor repair works in the wet well.

Sewerage District B:

The area covered under this district is entire Dhalwala town and part (25% of ward no 2) of Muni Ki Reti. The levels in the area are in general varying from RL 385.00 to RL 350.00. The proposed SPS is located at an altitude of about 346.58 m; hence entire wastewater can be collected under gravity.

The wastewater of this area combined with wastewater pumped from existing SPS shall be pumped to new STP proposed at “Chor Pani area” in Dhalwala. The average ground level at proposed STP location is about 381.00 m.

The estimated cost of work will be 95.60 Crore . The detail of Each Project Component is given in Chapter – 2.

1.6 The Framework Approach

In lieu of defining and appraising specific investments, the project preparation has focused on developing investments framework covering all four key sectors of intervention under the NGRBA program. This single framework will apply to all investments under the NGRBA program.

The objectives of the investments framework are to:

a. Provide a filter for all the NGRBA investments, for ensuring that the selected investments are well-prepared and amongst the most effective in reducing the pollution loads;
b. Make transparent the decision-making process on investments selection; and
c. Ensure that the investments are implemented in a sustainable manner

The investments framework prescribes the criteria and quality assurance standards covering various aspects including eligibility, prioritization, planning, technical preparation, financial and economic analyses, environmental and social management, long term O&M sustainability, community participation, and local institutional capacity[1].

1.7 Investment Execution

The investments program will be planned and managed by the NGRBA level PMG and state level PMGs, while the execution of specific infrastructure investments will be done by the selected existing and qualified state-level technical agencies. To foster competition and tap private sector efficiencies, the state governments with significant infrastructure investments are also setting up a public-private joint venture infrastructure company, to execute NGRBA and other similar investments in the respective states in the medium to long term.

1.8 Structure of Report

Chapter 1: Provides an introduction about the programme to clean up River Ganga and various mechanisms to implement the project. This chapter outlines the roles and function of various institutions involved in the project

Chapter 2: Provides description of various component of the proposed sewerage project in Muni Ki Reti – Dhalwala.

Chapter 3: Details out the methodology adopted for conducting environmental and social assessment for the present sewage project in Muni Ki Reti.

Chapter 4: Presents the applicable laws and guidelines related to such kind of projects.

Chapter 5: Presents detailed baseline scenario based of Muni Ki Reti – Dhalwala and the sewerage zones.

Chapter 6: Provides assessment of Environmental and Social Impacts.

[1] For more details refer "Environmental and Social Management Framework for World Bank Assisted National Ganga River Basin Project, 2011". PMG, National Ganga River Basin Authority, MoEF.

Chapter 7: Presents social development outcomes of the proposed project and related issues.

Chapter 8: Presents proposed mitigation measures for identified impacts.

Chapter 9: Conclusion of the study which also concludes that it is a High impact project.

2. Project Description

2.1 About the City

Muni Ki Reti– Dhalwala is in Tehri Garhwal district in the Indian state of Uttarakhand. Muni ki Reti was declared an Urban Local Body (ULB) in year 1949. The town's Local Body us known as Muni ki Reti Nagar Panchayat and Dhalwala Gram Panchayat. The towns lies close to pilgrimage town of Rishikesh, and is most known for a host of ashrams in the area.

Being holy and ancient, lakhs of pilgrims visit the Muni ki Reti during Kumbh/ Ardhkumbh, Kanwar Yatras during Shivratri and many holy occasions like Somvati Amavasya, Purnima, Makar Sankranti etc. Very famous pedestrian bridge "Ram – Jhula" connecting both the banks of river Ganga is in Muni ki Reti. It is said that a bridge was constructed by Lord Rama in his time. There are large number of Ashrams, Temples & hotels located at Muni Ki Reti. During Shivratri lakhs of pilgrims cross the river Ganga by Ram Jhula to Pour Ganga Jal to Lord Shiva at - Neelkanth Mahadev temple.

Muni Ki Reti-Dhalwala town are fast developing town of the state of Uttarakhand along Haridwar - Shri Badrinath road (NH -58). These are growing as a transition towns and works as central place for tourist purpose. Location of Muni ki Reti within Ganga Basin is provided in Figure 2.1.

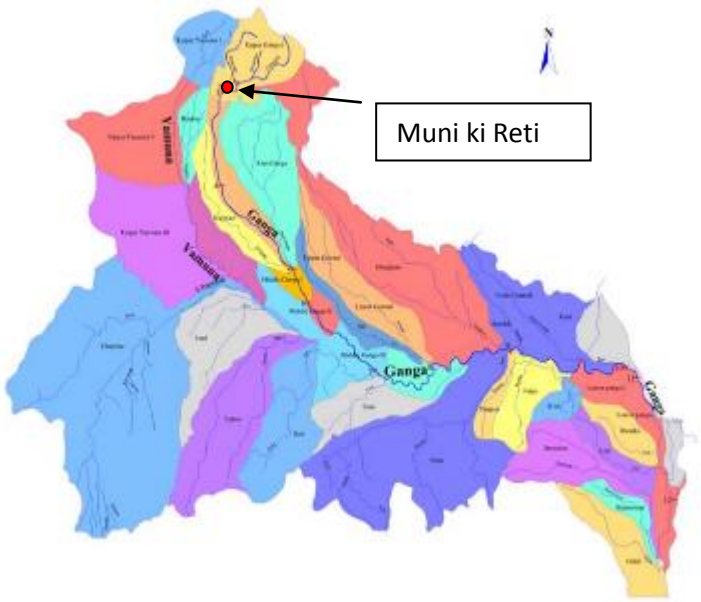


Figure 2.1: Location of Project Area within Ganga Basin

Average dry weather flow in river Ganga and tributaries is mentioned in table 2.1 below:

Table 2.1: Data of River Ganga and Tributaries in Project Area

Sl. No.	Name of River	Max Discharge	Lean Discharge	Catchment Area (sq.km)	High Flood Level	Notes
1.	Holy Ganga River	12,000 cumec	458 cumec	1750.00	341.72M	At Triveni ghat Rishikesh, Uttrakhand
2.	Chandrabhaga River	683 cumec	50 cusec	180.00	347.56M	

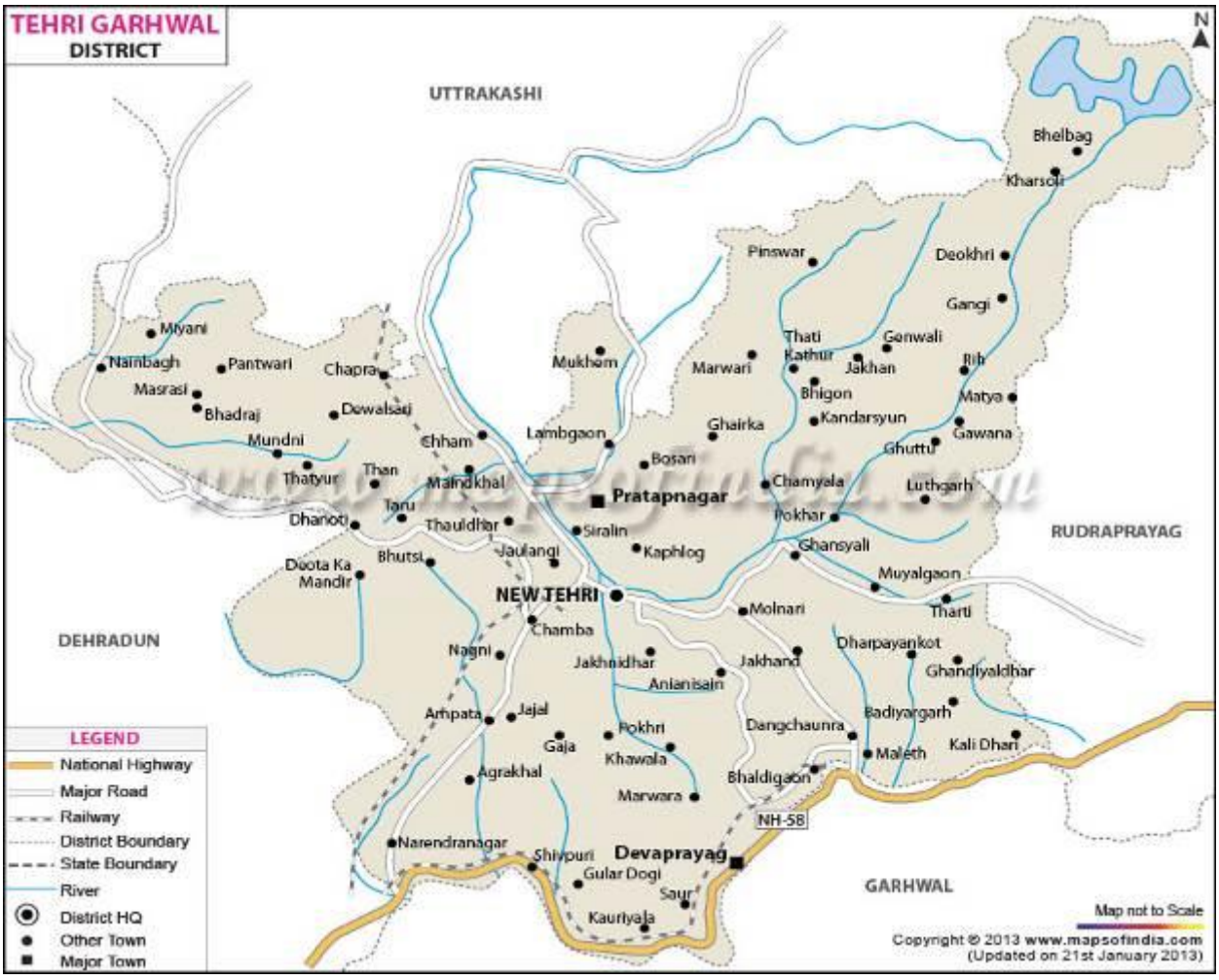


Figure 2.2: Map of Tehri Garhwal

Geographical Location: Muni-ki-Reti Dhalwala lies at the confluence of River Ganga from North & Chandrabhaga River from south. Located in Tehri- Garhwal region of Uttaranchal on the national highway NH-58 at a distance of about 45 km from Dehradun, the Capital City of Uttarakhand, Muni Ki Reti is one of the river side town and important tourist place in Uttarakhand State. The holy city; Rishikesh and Haridwar are located at about 2 km and 27 km respectively away from the town through which holy river Ganga passes.

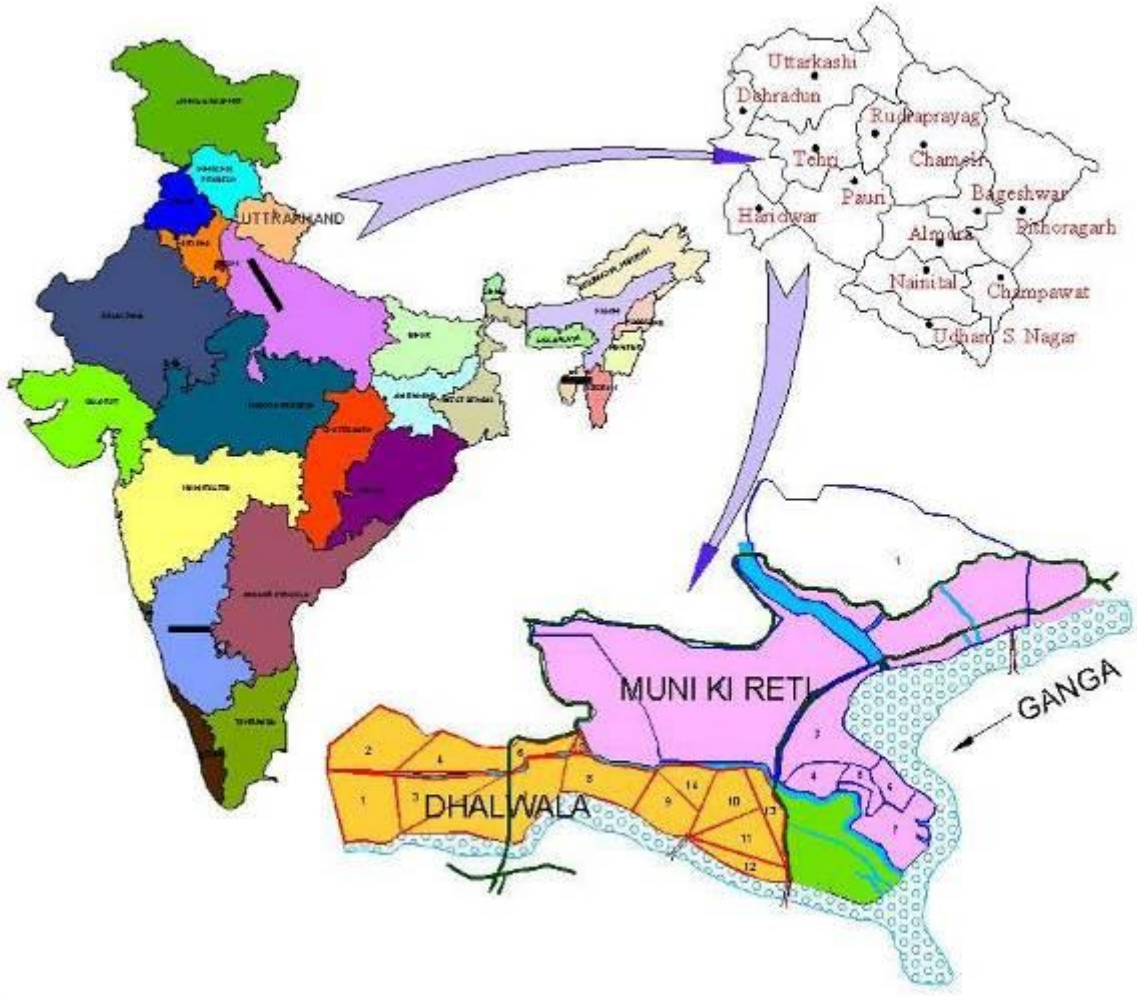


Figure 2.3: Location of Muni ki Reti & Dhalwala

Climate: The town experiences cold winters during November – February, with temperatures ranging from 5-8°C and summers from May – June with temperatures varying from 20-30°C. The monsoon period extends from June to September with average rainfall recorded is 435 mm.

Topography: The Muni Ki Reti-Dhalwala town is at a latitude and longitude of 30°04'N & 78°10'E respectively with hilly terrain slopping towards river Chandrabhaga on the right side of the town and River Ganga along the National Highway. The sacred Ganga River passes through the said town. On average, the town's altitude is 356 meters above mean sea level. However there is a wide variation in the town's elevation ranging with a difference of 50 m between the highest and lowest point in the town. The city is surrounded by seven prominent Shivalik hills and a main tourist destination with respect to the sacred river Ganges.

Flood level in rivers

Both the SPS and STP are located along Chandrabhaga river. As per details available with irrigation department (Narendra Nagar, Tehri) Highest Flood Level (HFL) of river Chandrabhaga is 347.56 m. Since the average ground level at proposed SPS is below HFL, finished grade level is proposed to be kept as equal to HFL. Moreover, following flood protection measures are considered:

a) Provision of Protection wall around proposed SPS. Top of protection wall is considered at 1.0 m above HFL.
b) Top of structure for inlet arrangements and wet well is considered at 2.0 m above HFL.
c) Stilt floor level of all ancillary buildings e.g. metering room; HT/LT Panel room, office etc are considered at 1.5 m above HFL.

The average ground level at proposed STP location is higher than HFL; therefore, no impact is envisaged on account of flood in river.

2.2 Status of existing Waste water disposal works

2.2.1 Sewerage Network

Most of the households (about 95%) in Muni ki Reti have their individual toilets and the wastewater is either discharged to sewer or to septic tank. About 5% households do not have personal toilet arrangements, and therefore depends upon community toilets. As per secondary information, there are rare incidences of open defecation in the town.

The existing sewerage network in Muni ki Reti was laid under GAP – I, for an approximate length of 10,219 m, with diameter ranging from 150 mm to 500 mm. Pipes used in network were mostly RCC pipes (NP2/NP3 class). Since then, there are no major new network / rehabilitation in the town, except laying of lateral sewers (150 – 200 mm dia) in short stretches (200 – 600 meters) in different parts of city. No details were available on number of houses connected to sewerage network.

In Dhalwala, there exists a sewerage network for an approximate length of 9367 meters laid during 2009-11, under State Sector programme. However, till now none of the household has been connected to the network. The reason as reported is absence of well-defined outfall. Approximately 80% household have their individual toilets and septic tanks for sewage collection and disposal. There are no community toilets in Dhalwala town. Therefore, nearly 20% of population has to defecate in open.

The existing sewer network in Muni Ki Reti is reportedly suffering from frequent blockage and overflow problems in many of the stretches especially the peripheral sewers. The possible reasons might be excessive sewage load due to increase in population and also chocking of sewers due to disposal of solid waste resulting in reduction of its carrying capacity. Also, existing pipes are reported to be broken at some locations, causing continuous flow over ground in the nearby area. Storm water ingress into the sewerage system is another major problem in the town.

Sewerage network in Dhalwala is relatively new and yet not put in operation. The effluent from septic tanks is either seeped into the ground or being discharged to nearby drains.

Even though, 10 km of sewer network (approx 50% of existing Road length) exists in Muni ki Reti, still a substantial quantum of wastewater is observed to be flowing in drains. During site visits and discussions with locals and departmental officials, it was reported that most of the households (more than 90%) connected to sewerage network, are actually discharging only the black water (i.e. toilet waste) into the network and Grey water (i.e. wastewater from Kitchen, washing etc) is discharged either in open or to nearby roadside/natural drain (refer photograph). It is important here to mention that the quantum of all this grey water is quite substantial, which is presently reaching river Ganga, without any treatment.

The other important issue is ingress of storm water in sewerage network. As per secondary data and observation during filed visit, storm water is entering the system primarily through Manholes, causing overloading of network as well as pumping stations. This is the main reason behind overflow from manholes during rains.

In general, following key issues are of importance for sewerage network in these towns :

i. Most of the household are either connected to sewerage network (*relevant for only Muni Ki Reti*) or have their own on site disposal system.

ii. The current practice is to discharge only the Black water i.e. waste from toilets to the available disposal system. Grey water founds its way through existing drains ultimately joining river Ganga.

iii. Existing network in Muni Ki Reti is reportedly suffering from problems especially in peripheral sewers and need augmentation / replacement. Also in certain stretches pipelines are damaged, causing continuous flow over ground in nearby area and joining nearest drain.

iv. Ingress of storm water during rains is major threat to the system causing overloading of sewers and resulting in overflow from Manholes.

v. Regular cleaning and de-silting of sewers is not done, causing chocking of pipes and decrease in efficiency of the system as a whole.

vi. As per information provided by ULB, septic tanks are cleaned by using suction machine, solely on request from owner. However, there are no official records on septage management and frequency of cleaning. However, as per discussion with locals, the septic tanks are generally cleaned once in 5-7 years.

No industrial waste is being discharged in sewers or open drains. Hence, isolation / treatment of industrial waste are not an issue for Muni Ki Reti – Dhalwala.

2.2.2 Sewage Pumping Station

There is only one Sewage pumping station (SPS) in Muni Ki Reti and none in Dhalwala. The existing SPS was built in year 1986. The SPS is located within municipal boundary of Rishikesh. The SPS is of 8.0 m diameter with approximately 1.4 m of liquid depth with horizontal centrifugal pumps sets installed. The SPS has a wet well to collect sewage and a dry well wherein the pumps sets are installed. It receives sewage generated and collected in network

from Muni Ki Reti town *(i/c contributory wards of Rishikesh).*

Table 2.2: Details of Pumps at Existing SPS

S. No.	Type	Nos.	Discharge LPM	Head M	Motor HP
1	Centrifugal	3	1625	45	40
2	Centrifugal	2	750	45	10

As per log records at SPS and discussions with UKPJN/UKPJS officials, during dry weather two pumps of 1st set run for about 5 hrs a day during peak flows and during lean flow 2nd set of pumps (1 no) used for approximate 15 hrs a day. During rains, depending upon the inflow, pump running combination is varied. During excessive rains, 2 nos, 1st set of pumps are run continuously.

There are three incoming pipes/trunk mains into the SPS, one of 500 mm diameter from Muni Ki Reti town and other two of 150 mm diameter each from two different wards of Rishikesh.

Figure 2.4: Existing Muni ki Reti SPS

The raw sewage from the SPS is pumped through a 250 mm dia Cast Iron rising main to the existing Sewage Treatment Plant (STP) located at Lakkar ghat in Rishikesh. The existing STP is spread over an area of approximately 14 ha. The existing Sewage Treatment Plant is based on Oxidation pond technology. The treated effluent has BOD in the range of 30-35 mg/l. Also there is no nutrient removal from the wastewater though existing treatment system.

2.2.3 Sewage Treatment Plant

There is no Sewage treatment plant in Muni Ki reti or Dhalwala towns at present. The sewage from Muni Ki Reti (i/c contributory wards of Rishikesh) is conveyed to existing SPS and thereafter pumped to STP at Lakkar Ghat area in Rishikesh.

2.3 Details of Drainage channels

There are 15 nos. of Nala/Natural Drainage in the town that are carriers of sewage and storm water that finally discharge the same into river Ganga. Further, of these Fifteen drains, Ten (10) are pure storm water carrying channel and are elaborated below:

1. Dhalwala Nala
2. Darshan mahavidhyala Nala
3. Old Hanuman Temple Nala
4. Police Guest house Nala
5. PWD Guest house Nala
6. Omkarnand Public Ghat Nala
7. Public Toilet Nala
8. Asian Gems & Handicraft Nala
9. Shivanand Bhawan Nala
10. Naw Ghat Nala

All above Nala used to carry untreated sewage, but with increased coverage of sewerage network and on-site disposal system and also due to efforts made by Uttarakhand irrigation department, discharge of untreated wastewater is stopped in these drains.

Rest five drains viz. Bus Stand Nala, Ganga Resort Nala, Shamshan Ghta Nala, Chandreshwar Nala & Khara Sroat Nala are carrying untreated wastewater in addition to storm water. The current status of these drains is discussed below:

A. Bus Stand Nala

This nala originates from Bus parking area in Muni Ki Reti, near Purnanand Inter College and joins Ganga Resort Nala just before final discharge to river Ganga. Wastewater flow is observed during dry weather. The wastewater of this nala is proposed to be intercepted at downstream of its confluence with Ganga Resort Nala.

B. Ganga Resort Nala

This nala originates near 14 Bigha area and finally joins River Ganga near Ganga Resort. This nala is carrying untreated wastewater of nearby areas. It is proposed to tap the wastewater flowing in this nala in the existing 500 mm sewer line. The locating of tapping is just upstream of its final discharge pint in River Ganga.

C. Shamshan Ghat Nala

This nala originates from down side of Muni ki Reti and joins Chandreshwar nala near Chandreshwar nagar shamshan ghat. The wastewater of this nala will be intercepted at proposed tapping location at Chandreshwar nagar nala.

D. Chandreshwar Nagar Nala

This nala originates from upside of 14 Bigha area and travels through Shisham Jhadi ward of Rishikesh and finally discharges into Dhalwala nala. Considerable quantum of wastewater is observed in this nala. It is proposed to intercept the wastewater in this nala by providing tapping arrangements just upstream of its confluence with Dhalwala Nala and convey it to the proposed SPS near Chandreshwar Nala.

E. Khara Sroat Nala

This nala is basically a non perennial stream; however flow is observed during rains only.

Wastewater from habitation on its left bank is being discharged in this nala. A new sewer main is proposed under present scheme to collect the wastewater generated of the habitations on the banks of this nala. It is expected that after commissioning of proposed network, there will not be any discharge of untreated wastewater in this nala.

Khara Sroat Nala

Bus Stand Nala

Shamshan Ghat Nala

Chandreshwar Nala


2.4 Justification of the project for pollution abatement of the river

Population

Being on the route of Char Dham Yatra and having number of temples, the towns are being visited by tourists, round the year. Therefore, it is imperative to consider appropriate tourist population while designing the sewerage infrastructure facilities. As per statistical data provided by Executive Officer (MNP), about 5000- 6000 people visit the town daily. The facilities (Hotels/Ashrams) for the tourists are mainly located in Muni Ki Reti and only small fraction of tourist stay in Dhalwala, mainly in the localities close to National Highway. Considering this, the floating population for Muni Ki Reti is considered as 50% of permanent residential population and for Dhalwala the corresponding value is 10%. Further this floating population is judiciously distributed while designing the sewerage network.

Year	Permanent Residential Population	Floating Population	Total Population
MUNI KI RETI			
2015	11,619	5,810	17,429
2020	12,954	6,477	19,431
2025	14,289	7,145	21,434
2030	15,624	7,812	23,436
2035	16,959	8,480	25,439
2040	18,294	9,147	27,441
2045	19,629	9,815	29,444
DHALWALA			
2015	20,508	2,051	22,559
2020	23,634	2,363	25,997

Year	Permanent Residential Population	Floating Population	Total Population
2025	26,760	2,676	29,436
2030	29,886	2,989	32,875
2035	33,012	3,301	36,313
2040	36,138	3,614	39,752
2045	39,264	3,926	43,190

महोदय,

उपरोक्त विषयक आपके कार्यालय पत्राँक संख्याः–3498/2–9–1/2014–15/देहरादून /दिनाँकः–26 /12/2013 के अनुपालन में जनपद टिहरी की वर्ष 2014 (माह जनवरी 2014 से दिसम्बर 2014) की वार्षिक पर्यटक साख्यिंकी निम्न प्रकार से आपकी सेवामें प्रेषित है –

वार्षिक पर्यटक सांख्यिकी – 2014

क्रसं	पर्यटक स्थल	देशी पर्यटक	विदेशी पर्यटक	योग
1	धनोल्टी	74416	1861	**76277**
2	चम्बा	20493	375	**20868**
3	नई टिहरी	43331	415	**43746**
4	देवप्रयाग	13736	319	**14055**
5	मुनिकीरेती	341704	9051	**350755**
6	नरेन्द्रनगर	59649	5697	**65346**
योग		**553329**	**17718**	**571047**

अतः महोदय की सेवामें उपरोक्तानुसार सूचनार्थ प्रेषित।

भवदीय

जिला पर्यटन विकास अधिकरी
टिहरी गढ़वाल

Certificate from District tourism development officer, Tehri Garhwal certifying for floating population for Muni Ki Reti is 350755 in 2014. From the above data per day average floating population is 960 & during peak season it becomes ten times of average population i.e 9600.

Muni Ki Reti – Dhalwala are river side towns and important tourist place in Uttarakhand State. The population of Muni Ki Reti and Dhalwala towns has increased considerably in past few years. Moreover, being one of the beginning points of "Char Dham Yatra" and an important

tourist place, the towns have considerable influx of pilgrims. This has resulted in increase in wastewater generation in these towns. The existing sewerage network in Muni ki Reti was laid during GAP I, around year 1986. Thereafter, there is no planned extension of sewerage network in the town. The sewerage network for Dhalwala town is although recently laid (during year 2009 -11), but the household are not yet given access, reportedly due to absence of well-defined outfall. Moreover, even in areas having sewer network, not all the population is connected to the network. A segment of population is depending upon community toilets or defecating in open. Therefore, a substantial quantum of wastewater generated in towns is being discharged in open or nearby drains, which ultimately joins river Ganga. Since the wastewater remains untreated till final disposal in river, it is adversely impacting the river water quality.

Apart from the deterioration of water quality of river (although the impact is very minimal), it is pertinent to mention that project towns are important tourist place and numbers of tourists mostly pilgrimage visits the towns round the year. In the present scenario, nalas discharging untreated wastewater into river Ganga could be observed adjacent to places of tourist attraction especially those having religious significance.

Therefore, there is an urgent need to upgrade the existing sewerage infrastructure and community sanitation in the towns.. The entire town area shall be covered under well planned and designed sewerage collection and conveyance network, with 100% population connected to the system. This wastewater shall be treated to the design effluent standards before final disposal in river, so as to maintain the river water quality.

2.5 Details of Proposed Works

The entire area of Muni ki Reti – Dhalwala can be considered as single drainage area, as general slope of towns is towards confluence of river Chandrabhaga and Ganga. However, considering the town limits and proposed scheme, the area can be broadly divided into two sewerage districts viz.

Sewerage District A – covering Muni ki Reti and contributing wards of Rishikesh and
Sewerage District B – covering entire Dhalwala town and part of Muni Ki Reti.

Sewerage District A:

This district covers Muni ki Reti town and part of Rishikesh town (ward no 1, 5, 10 & 11). The levels in the area are in general varying from RL 370.00 to RL 340.00. The existing SPS is located at a RL of about 339.00 m; hence wastewater generated can be collected under gravity in the existing SPS.

A small area between existing SPS and Dhalwala nala is comparatively at lower level than existing SPS. A small SPS (IPS) is proposed to collect wastewater generated in this area. The location of proposed SPS is near Chandreshwar Nala. The waste water collected in IPS will be pumped to existing SPS and thereafter pumped to new SPS at Dhalwala.

Sewerage District B:

The area covered under this district is entire Dhalwala town and part (25% of ward no 2) of Muni Ki Reti. The levels in the area are in general varying from RL 385.00 to RL 350.00. The proposed SPS is located at an altitude of about 346.58 m; hence entire wastewater can be collected under gravity. The wastewater of this area combined with wastewater pumped from existing SPS shall be pumped to new STP proposed at "Chor Pani area" in Dhalwala. The average ground level at proposed STP location is about 381.00 m.

Both the SPS and STP are located along Chandrabhaga river. As per details available with irrigation department (Narendra Nagar, Tehri) Highest Flood Level (HFL) of river Chandrabhaga is 347.56 m. Since the average ground level at proposed SPS is below HFL, finished grade level is proposed to be kept as equal to HFL. Moreover, following flood protection measures are considered:

a. Provision of Protection wall around proposed SPS. Top of protection wall is considered at 1.0 m above HFL.

b. Top of structure for inlet arrangements and wet well is considered at 2.0 m above HFL.

c. Stilt floor level of all ancillary buildings e.g. metering room; HT/LT Panel room, office etc are considered at 1.5 m above HFL.

The average ground level at proposed STP location is higher than HFL; therefore, no impact is envisaged on account of flood in river

2.5.1 Sewer Network

Sewer networks are designed to collect & convey the wastewater generated in properties across the town to its treatment/disposal site. Sewer networks are planned & designed to achieve its intended objective throughout its lifetime without any risk to public health, public safety & environment.

Propose scheme for sewer network includes following:

1) Laying of new sewerage network in unsewered areas.

2) Replacement of sewers whose hydraulic capacity is insufficient to carry design flow.

3) Replacement of damaged sections of sewers.

4) Integration of the new network with existing network

5) Ensure 100% sewerage connection for entire wastewater generated in town.

6) It is considered that storm water network shall be separated from sewerage network. All interconnections of storm water network with sewerage network shall be cut off. Existing storm water drainage network shall be rehabilitated.

7) Desilting of existing sewers.

Summary of proposed sewer network is presented in table below:

Table 2.3: Summary of Proposed Sewer Network for Sewerage District A

S No	Diameter of Pipe (mm)	MOC	Length (meters)
1	200	DI (K-7)	7364
2	250	DI (K-7)	307
3	500	DI (K-7)	824
		TOTAL	**8495**

Table 2.4: Summary of Proposed Sewer Network for Sewerage District B

S No	Diameter of Pipe (mm)	MOC	Length (meters)
1	150	DI (K-7)	11013
2	200	DI (K-7)	9983
3	500	DI (K-7)	33
		TOTAL	**21029**

2.5.2 Sewage Pumping Station

Pumping station are required to lift the sewage so as to discharge the collected sewage:

a) To another gravity sewer, whenever the depth of sewers are excessive leading to difficulty in construction and /or uneconomical.

b) For treatment of wastewater

c) For disposal of wastewater

There is one existing SPS, which is located within municipal area of Rishikesh. The details of this SPS are provided in section 1.5.1.2 of this report. The SPS was built in year 1986. In the proposed scheme the existing SPS shall be used with required civil rehabilitation and complete replacement of existing E&M equipments. The SPS will collect the sewage generated in Muni ki Reti town and part of Rishikesh. Two new SPS are proposed, one in Sewerage District A - to collect the sewage generated in low lying area of Muni ki Reti and other in Dhalwala town – to collect sewage of entire Sewerage District B by gravity and sewage of Sewerage District A by pumping. The proposed works are discussed in detail in following sections.

A) Existing Sewage Pumping Station – Sewerage District A

The SPS will require civil renovation / rehabilitation works associated with provision of new pumps, replacement of screens, sluice gates, lifting mechanism and ancillary works. Existing E&M equipments are proposed to be replaced suiting the design flow requirements of year 2030.

The works proposed for existing SPS are summarized below:

1) Replacement of entire E&M equipments
2) Replacement of existing Manual Screen by Mechanical Screen (20 mm)
3) Replacement of existing Gates by Electrically actuated Sluice Gates
4) All valves within pump house premises are proposed to be electrically actuated.
5) Provision of Pressure Transmitter, Level Meter and Flow meter
6) Complete automation of operation of SPS with SCADA system.
7) Associated civil works

B) New Sewage Pumping Station near Chandreshwar Nala– Sewerage District A

Part of Rishikesh lying between existing SPS and Dhalwala nala towards east and Chandreshwar Nala towards south is comparatively at lower level than existing SPS. The invert level of proposed trunk sewer for this area is calculated to be below the inlet chamber at existing SPS. Therefore, it is proposed to construct a small SPS, which will collect the sewage generated for this small area and pump it to existing SPS.

Considering a liquid depth of 2.0 m(required to have proper submergence for submersible pumps), diameter of sump is calculated to be around 1.0 m. However, it is proposed to keep the diameter as 2.0 m so that at least 2nos of pumps can be adequately accommodated.

C) New Sewage Pumping Station at 14 Bigha area at Dhalwala– Sewerage District B

New SPS is proposed in Dhalwala town at "14 Bigha Area" along Chandrabhaga river. This SPS shall receive wastewater of Dhalwala town through a gravity trunk sewer and Muni ki Reti+ Rishikesh towns through rising main.

The works proposed for this new SPS are summarized below:

1) Inlet Chamber
2) Two nos of Screen Channel (1W + 1S), each designed for design flow for ultimate year
3) Provision of two nos. Mechanical Screen (20 mm)
4) Provision of Electrically actuated Sluice Gates (4 nos) at inlet and outlet of screen channels
5) Submersible pumps of required duty and head
6) All valves within pump house premises are proposed to be electrically actuated.
7) Provision of Pressure Transmitter, Level Meter and Flow meter
8) Complete automation of operation of SPS with SCADA system.

Volume of sump required = 55 cum

Consider liquid depth	=	2.5 meter
Area of Sump required	=	21.8 sqm
Diameter of sump required	=	5.3 m

Diameter of sump is kept as 5.5 m so that the proposed pumps can be adequately accommodated.

2.5.3 Sewage Treatment Plants

There is no existing sewage treatment plant in Muni ki Reti & Dhalwala towns at present. The sewage collected from Muni ki Reti and part of Rishikesh area is collected in SPS at Muni ki Reti and pumped to STP at "Lakkar Ghat" area in Rishikesh.

It is proposed to construct a new STP under this scheme for sewage generated in Muni ki Reti and Dhalwala towns. Sewage of four wards of Rishikesh has also been included in this scheme. The STP is proposed to be constructed at "14 Bigah Area" location in Dhalwala town. The land for the proposed STP has been identified in consultation with ULB officials.

Estimated capacity of new STP for different design years is presented in table 2.5 below:

Table 2.5: Capacity of STP

	2015	2030	2045
Total Wastewater Flow reaching STP (MLD)	4.74	7.26	9.26
Infiltration Flow (Considering @ 5000 litres/km/d)	0.28	0.28	0.28
Total Flow to STP (MLD)	5.02	7.54	9.54
Proposed Design Capacity of STP(MLD)	**5.00**	**7.50**	**9.50**
Average hourly flow (cum/hr)	209	313.00	396.00
Peak Factor	2.50	2.25	2.25
Hourly Peak Flow (cum/hr)	505	692	880

As per NGRBA guidelines, STP shall be designed for design period of 10 years. However, as discussed in the meeting held in NMCG office on August 2, 2013, it was agreed to construct STP for 15 years design capacity. Therefore, it is proposed to construct a STP of 7.5 MLD capacity. The available treatment technologies and their comparison are discussed in subsequent sections of this report.

It is proposed to construct a new STP under this scheme for sewage generated in Muni ki Reti and Dhalwala towns. Sewage of four wards of Rishikesh has also been included in this scheme.

The STP is proposed to be constructed at "Chor Pani Area" location in Dhalwala town. The land for the proposed STP has been identified in consultation with ULB officials. Copy of NOC from Gram Panchayat Dhalwala is attached as **Annexure -1.**

Table 2.6: Option Analysis for STP site at Muni Ki Reti

Alternative	Pros	Cons	Remark
1 - New STP in place of existing SPS	- Wastewater for Muni Ki Reti and Rishikesh (part) could be collected under gravity, eliminating need of one SPS. - Energy cost could be minimized as the proposed STP is located at lower altitude (RL : 339 m)	- Densely populated Area - Adequate land not available	This option is ruled out since land for construction of STP is not available.
2 - New STP at "14 Bigah Area" in Dhalwala	- Wastewater for Dhalwala could be collected under gravity, eliminating need of one SPS. - Pumping Cost from Muni ki Reti SPS could be reduced	- Resistance from locals against construction of STP	This option is ruled out since land for construction of STP cannot be acquired
3 - New STP at "Chor Pani" area and new SPS at " 14 Bigah Area"	- Existing SPS (RL : 339 m)can be utilized after rehabilitation. - Adequate land available (with consent from gram Pradhan) for construction of new SPS at "14 Bigah Area (RL : 352 m)"	- Cost will increase as proposed STP is located at higher altitude (RL : 381 m).	This seems the only feasible solution as adequate land is available for STP construction.

2.6 Implementation Schedule

It is anticipated that construction duration for the contractor is estimated to be 24 months for proposed sewerage system and 18 months for construction of STP and SPS, after award of work to contractor which will include construction activities and commission of the system. The construction will be not allowed during pilgrims movement (Kawad Movement) simultaneously monsoon seasons (mid - July to mid - August period). The operation and maintenance of proposed sewerage system is also considered for ten years after commission of the system. Implementation / Construction schedule proposed for various project activities in Muni ki Reti is shown in **Figure-2.5.**

Figure 2.5 - Implementation / Construction schedule proposed for various project activities in Muni ki Reti

S No	DETAIL OF WORK	IMMEDIATE	WORK DURATION							
			QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8
A	Land Acquisition									
B	Preparation of Tender Documents and award of Work									
1	Preparation of Tender document									
2	Received of bids and Tender Evaluation									
3	Award of Work and Commencement of works									
C	Construction Works									
1	Sewer Newtork									
2	Sewage Pumping Station									
3	Sewage Treatment Plant									
D	Trial Run & Commissioning									

Status of Land transfer / NOC from department is under progress are presented in following table

Table 2.7: Status of Land Required for Different project components as on July 2014

S. No	Component	Area required	Ownership	Status
1	STP	0.99 Ha	Forest land	Land Acquisition completed
2	SPS, Muni ki Reti	0.8 Ha	Jal Sansthan	Land Acquisition completed
3	SPS, Chandreshware Nala	0.01 Ha	Rishikesh Nagar Palika	Land Acquisition completed
4	SPS, Dhalwala	0.6 Ha	Forest Land	Land Acquisition completed

The total project cost is 95.60 Crore and breakup of cost is provide below.

Table2.8: Break up of Project Cost

S. No.	Description	(Rs. In Lakhs)
A	**Sewer Line**	
1	Sewerage District A	1187.88
2	Sewerage District B	2367.48
B	**Sewage Pumping Station**	
1	Muni ki Reti Rehabilitation	310.47
2	DhaIwala —New	677.77
3	New SPS	65
C	**Rising Main**	
1	Muri Kl Reti, existing SPS	102.67
2	Dhalwala, new SPS	411.5
3	Muni-ki-Reti New SPS	8
D	**Sewage Treatment Plant with Disinfection**	**1125**
E	**Cost of approach road works and protection wall at proposed STP**	**172**
F	**House Connections**	**314.96**
G	**Staff Quarters**	**61**
	Sub-Total	**6803.73**
H	Charges	
1	Cost of Project preparation @ 4% as per the NGRBA guidelines (maximum)	272.15
2	Cost of supervision of project @ 4% as per NGRBA guidelines (maximum)	272.15
	Sub-Total (H)	**544.3**

S. No.	Description	(Rs. In Lakhs)
I	Cost of Work on which no charges will be admissible	
1	Communication & Public Outreach	25
2	GAAP	5
3	ESAMP	50
4	Cost of Power Connection	65
5	Land Acquisition	33
	Sub-Total (I)	**178**
J	**Operation and Maintenance Cost**	
1	Five Years O&M cost	2034.24
	Sub Total of (J)	**2034.24**
	Grand Total (A+B+C+DE+F+G+H+l+J)	9560.27
	Total Estimated Cost	**95.60 Crore**

3. Approach and Methodology

3.1 Methodology

As per Environmental and Social Management Frame work (NGRBA, 2011), the river pollution mitigation projects under the NGRBA is anticipated to encounter a variety of environmental and social problems. Hence, an environmental and social assessment with corresponding management plans for the proposed project of sewerage works in Muni ki Reti - Dhalwala has been conducted using the following methodology:

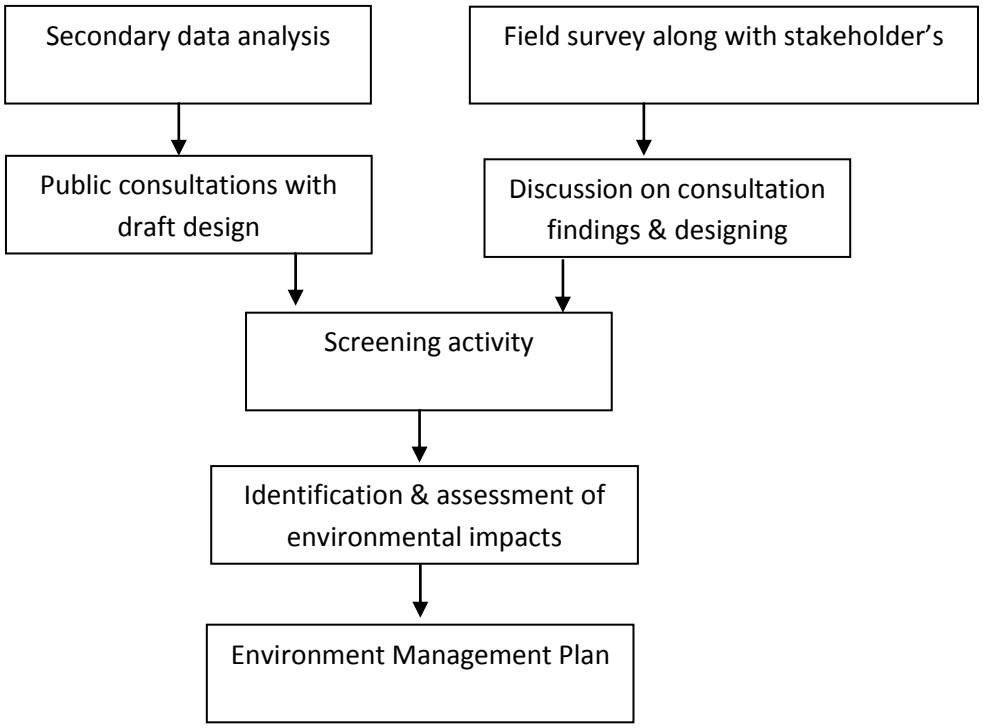


Figure 3.1: Flowchart describing the steps adopted for project impact assessment

a. **Defining the project area and carrying out scoping in the field:** Team undertook the field survey and transect walk of the Muni ki Reti – Dhalwala area to develop the understanding of the proposed project. Field visits helped to understand the local knowledge and were valuable in finding alternatives that help avoid or at least reduce the magnitude and severity of adverse impacts.

b. **Survey of the host population:** With the help of questionnaires, local people were interviewed in groups. A wide range of potentially affected people were interviewed in Muni ki Reti including street vendors, residents of households, residents of temporary settlements, shop keepers, hospital patients, hospital staff, etc. Both men and women were interviewed from different sections of the society. Team undertook three field visits to carry out the survey and understand the ground situation. The interviewees were asked about their awareness of the project, their response to it and the project is affecting them (during construction phase) and how it will affect them (after completion

phase). Also they were asked about the mitigation plans they have adopted or are planning to adopt, suggestions for improvement and any public grievances. Surveys were conducted along the path of construction site.

c. **Discussion with the key stakeholders:** Most of the important key stakeholders were interacted during informal and formal discussions with them. All the associated government departments were visited to collect the relevant data and their feedback on the project activities.

d. **Screening:** Screening is undertaken in the feasibility stages of project development. The purpose of screening is to screen out "no significant impacts" from those with significant impacts and get a broad picture of the nature, scale and magnitude of the issues. Team conducted screening process using the screening checklist format provided in ESMF report of NGRBA, which is described in subsequent section.

e. **Identify and assess the impacts:** Based on the analysis of the data gathered from field survey, stakeholder interaction/ consultation and secondary sources, issues related to the environmental and social sectors were been identified. The impacts so identified were compared with the existing baseline environmental and social condition of the study region. The impacts of the activities are mostly positive with few adverse impacts.

f. **Environment mitigation plan:** Based on the environmental and social issues identified, and recommend any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The mitigation plans is suggested in all three stages: designing phase, construction phase and, operation and maintenance phase.

3.2 Project screening

Assessment of Environment and Social impacts to identify the project impact category was carried out in Feasibility Report. The same is revised in view of observations of NMCG. The revised screening criterion is provided below.

Environment and Social Information Format (Revised)for Screening of Feasibility Report

Project Title:- Feasibility report of sewerage for Muni Ki Reti - Dhalwala
Implementing agency:- NP/GP of Muni Ki Reti and Dhalwala)
Project components:- Collection, conveyance, treatment and disposal of sewage.

- Cost: 7755.8 Lakhs
- Length of sewer: 46,800 Meters
- STP site size: 1.25 Ha

Project location (Area/ district) :- Muni ki Reti and Dhalwala town in district Tehri Garhwal, Uttarakhand

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
1	Is the project in an eco-sensitive area or adjoining an eco-sensitive area?	**High**	Land identified for STP Site is government forest land (*Type:*

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
	(Yes/No) If Yes, which is the area? Elaborate impact accordingly		*Protected Forest, kindly refer figure 1 of Annexure A*), on bank of a seasonal river viz. Chandrabhaga. The proposed STP site is close to Rajaji National Park (about 2.5 km aerial distance) which is a protected area. Further there are areas of Elephant corridor near the Chandrabhaga river side. Thus, it will require Forest Clearance from forest department. The neighbouring features of the proposed site marked on SOI toposheet are attached as **Annexure A**.
2	Will the project create significant/ limited/ no social impacts?		
	• Land acquisition resulting in loss of income from agricultural land, plantation or other existing land-use.	**High**	The proposed project site is a forest land with some bushes (*Zizyphus Mauritian, Lantana camara, Parthenium hysterophorus, Woodfordia fruticosa, Colebrookea oppositifoila)*. Thus, the change in its land use will not result in loss of income from agricultural land, plantation or other existing land-use. To support this further NOC from Local Panchayat is attached as **Annexure B**. Further the loss of bushes shall be compensated by developing green belt around STP.-
	• Land acquisition resulting in relocation of households.	**Low**	No private land acquisition or relocation of any household is required for any project component as proposed STP is located on Government forest land and networks of sewer will be laid within ROW of existing Roads.

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
	• Any reduction of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood).	**Low**	The proposed project is not located on the bank of River Ganga but is located on the bank of a rain fed seasonal drain Chandrabhaga and constructing this STP will not cause any loss of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood). To support this further kindly refer the location map in **Annexure C**.
	• Any displacement or adverse impact on tribal settlement(s).	**Low**	The proposed project will not displace any tribal settlement(s). Moreover, there is no tribal settlement in or around project area.
	• Any specific gender issues.	**Low**	No gender specific issue directly related to the project is envisaged. However, better sanitation facility will improve health status of women in the area. There are no designated slums in the project area as per ULB and district administration records.
3	Will the project create significant / limited / no environmental impacts during the construction stage? (Significant / limited / no impacts)		
	• Clearance of vegetation/ tree-cover	**Low**	As per present site conditions only small shrubs and herbs need to be removed for construction of STP. None of these shrubs and herbs is endangered or rare. There scientific names of shrubs and herbs present at site 1. *Zizyphus mauritiana* 2. *Lantana camara* 3. *Parthenium hysterophorus* 4. *Woodfordia fruticosa*

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			5. *Colebrookea oppositifoila* Photograph of Shrubs and herbs are annexed as **Annexure D**
	• Direct discharge of construction run-off, improper storage and disposal of excavation spoils, wastes and other construction materials adversely affecting water quality and flow regimes.	**Low**	Direct discharge of construction run-off, improper storage and disposal of excavation spoils, wastes and other construction materials shall not be allowed at the construction site. For this best construction practice will be adopted at the site. Further the ESMP shall be framed with suggestive mitigation measures to counter any such issue.
	• Flooding of adjacent areas	**Low**	Construction of the proposed project will not obstruct the natural drainage of the project site. Moreover, the actual foot print of the proposed works that may result in increased runoff is negligible. Also, the proposed project boundary shall have its internal drains that will collect the project area runoff and dispose suitably. The level of the proposed site is 386 m while the HFL of the nearest water bodies is as mentioned below: Ganga: 341.722 m Chandrabhaga: 347.56 m Kharshroot: 344.12 m. Thus, flooding of proposed site is not anticipated.
	• Improper storage and handling of substances leading to contamination of soil and water	**Low**	Improper storage and handling of substances leading to contamination of soil and water will not be allowed at the proposed project site during its construction and operation. The construction works in the proposed project will be in accordance with best construction practices.

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			Moreover, mitigation measures toward handling and storage of materials will be an integral part of the ESMP. Example of the suggested mitigation measures are as following: • Place storage areas for fuels and lubricants away from any drainage leading to water bodies • Dispose any wastes generated by construction activities at designated sites
	• Elevated noise and dust emission	**Low**	The proposed works may result in elevated noise and dust emission but this will be restricted only during construction phase, and will be within standard permissible limits of CPCB by acoustic enclosure, water sprinkling on loose earth etc. Mitigation measures shall be suggested within the ESMP to further reduce these.
	• Disruption to traffic movements	**Low**	Traffic disruption due to laying of sewer will be negligible as the laying of sewer in the internal roads shall be done in small stretches to avoid traffic diversion. Moreover, the internals routes are interconnected well. The major road passing through the area is Rishikesh Narenderanagar Road. Sewer laying on this road shall need no traffic diversion as: • Sewer is already laid in major portion of Rishikesh Narenderanagar Road thus laying works need to be carried out over a smaller portion. • The side burns of the road are too wide (3-4 m) and

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			the sewer diameter to be laid comparatively very small so sufficient space will be available on the road side for laying of sewer without needing traffic diversion.
	• Damage to existing infrastructure, public utilities, amenities etc.	Low	During laying of network cutting of roads will be required which will be restored to pre-project conditions once laying of sewer in the stretch is completed. Other utilities like telephone lines, electric poles or street lights etc. if needed shall be shifted temporarily or relocated (only if needed) after taking due permission from the concerned department.
	• Failure to restore temporary construction sites	Low	All temporary construction sites shall be restored to the preconstruction conditions or better than that. Mitigation measures towards restoration of temporary construction sites will be part of ESMP of contractor's bid document.
	• Possible conflicts with and/or disruption to local community	Low	All possible conflicts with and/or disruption to local community shall be avoided by hiring local labour. Wherever it is not possible to hire local labour due to shortage of skill or unavailability outside labour will be hired. All facilities for such labourers shall be provided within labour camp so that interaction with local people is minimal.
	• Health risks due to unhygienic conditions at workers‟ camps	Low	At the workers camps sanitation care shall be provided as per best health and

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			safety practices in construction industry. This will be done to reduce any health risks due to unhygienic conditions. The ESMP Document will have additional mitigation measures to provide all basic sanitation facilities to labour camp by the contractor. The Contractors will need comply with ESMP of contract document.
	• Safety hazards during construction	Low	To avoid any hazards during construction all labours should be provided with Personal Protective Equipment (PPE) and first aid box. Further the entire construction works should be properly screened to avoid hazards to nearby residents. These sites shall have signage's with warning written in local language is needed. The contractor will abide the Public Liability Insurance Act of 1991, Rule of 1991 and its following amendments. This law provides public liability insurance for the purpose of immediate relief to the persons affected by any accidents occurring while handling any hazardous substance and for matters connected therewith or incidental thereto.
4	Will the project create significant / limited / no environmental impacts during the operational stage? (Significant / limited / no impacts)	Low	During the operation phase this project will create significant positive impact by reducing pollutants load of river Ganga. It will also improve the town aesthetically. In the sewer H_2S gas will be produced. For this the gas vents will be provided in the design of

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			sewer system as per CPHEEO Manual Moreover, the sewer of bigger diameter will be designed for 80% flow capacity so that gas collection and escape is allowed. The STP designed is based on SBR technology which is an aerobic process. The aeration provided is extended type and thus, will not need sludge digestion. So, generation of methane is not anticipated. Therefore, no adverse environmental impact is anticipated during project operation stage.
	• Flooding of adjacent areas	Low	Operation of the treatment plant will not obstruct the natural drainage of the project site. Moreover, the STP site will have well designed and constructed Storm water drainage network to collect and discharge storm water during monsoon season. Thus, flooding of neighbouring area is not expected. The sewer laid will be below the ground level and so will also not obstruct natural drainage.
	• Impacts to water quality due to effluent discharge	Low	Presently untreated sewage is following to the River Ganga. In the proposed project it is suggested to treated effluent to meet the effluent standards before discharging it into the river. This will result in reduced pollution load of the River.
	• Gas emissions		The STP designed is based on SBR technology which is an aerobic process. The aeration provided is extended type and

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
			thus, will not need sludge digestion. So, generation of methane is not anticipated. However, there will be some emission of H_2S in the stilling chamber but this will be minimal as the wastewater is received at the STP site will be in a mixed condition due to pumping. It is proposed to install odour control system at the STP for further reduction is any smell.
	• Safety hazards		The proposed project will be placed within a compound wall. No unauthorised entry shall be permitted within the project area. Moreover the ESMP shall have mitigation measures to reduce and safety hazard during operation of the project. Example use of PPE during maintenance works.
5	Do projects of this nature / type require prior environmental clearance either from the MOEF or from a relevant state Government department? (MOEF/ relevant State Government department/ No clearance at all)	Low	Projects of this nature / type do not require prior environmental clearance under EIA notification, 2009. However, the proposed project needs Consent to Establish (CTE) prior to start of construction of STP and Consent to Operate (CTO) prior to start operation of STP. These permissions are required from State Environment Protection and Pollution Control Board (EPPCB) under Air and Water act.
6	Does the project involve any prior clearance from the MOEF or State Forest department for either the conversion of forest land or for tree-	Low	Yes, this project will require forest land diversion permission from state/regional forest department.

S. No.	Screening Criteria	Assessment of category (High/ low)	Explanatory note for categorisation
	cutting? (Yes/ No). If yes, which?		The proposed project will not have any impact on wildlife sanctuary or National park or protected area and so will not require clearance from MoEF. If any tree cutting is required due to sewer alignment, tree cutting permission will be required form State/regional forest department. The construction of STP will not require cutting of any trees.
7	Please attach photographs and location maps along with this completed Environmental Information Format For Screening.	-	Photographs are attached as **Annexure E** and location map is attached as **Annexure C.**
	Overall Assessment	**High**	

Conclusion:

From the screening format it is concluded that the proposed project falls under "High Impact' category, as the STP site is near to National Park, Wildlife Sanctuary (Rajaji National Park), and Wildlife movement is reported in the area. Additional forest diversion would be required for the land for approach road to the STP site. Considering these the project may be considered as a high impact category environmental and social impacts. These impacts shall be further reduced by site specific Environmental and Social Management Plan (ESMP) implementation.

The land identified for STP Site is forest land (Protected Forest). It is a forest land and it is about 2.5 km aerial distance from Rajaji national Park an. However, to use it for construction of STP it will require Forest Clearance as per Forest (Conservation) Act, 1980 (With Amendments made in 1988) and Forest (Conservation) Rules, 2003 (With Amendments made in 2004).

The proposed project site is a forest land with some bushes only and will not result in loss of income from agricultural land, plantation or other existing land-use. The construction of proposed project will not require relocation of households or displace any tribal settlement.

Project shall not result in reduction of access to traditional and river dependent communities (s). Moreover, there is no tribal settlement in or around the project area. Thus, there will be minimal adverse social impacts due to the project.

SBR is capable to handle higher loading fluctuation, easy operation, compact layout, and most importantly, its capability to consistently producing high quality effluent. SBR is a cost effective, space saving biological treatment alternative in both Municipal and Industrial Waste Water

Treatment. The Sequential Batch Reactor (SBR) is a modification of the conventional activated sludge process. In the SBR process all steps of biological treatment and solid/liquid separation are performed in a single reactor during a defined process cycle. The main advantages of SBR technology includes consistent, stable, high quality supernatant, smaller land area requirements, better aesthetics, and better suited to handling diurnal flow and strength variations, operational simplicity and automation and process flexibility. Moreover, the aeration provided is extended type and thus, will not need sludge digestion and so, no methane generation. Thus, no environmental impact of methane emission is expected from the project.

Public consultation was held with the people of Muni Ki Reti - Dhalwala and it was generally found that they had no objection regarding present location of STP. However, they were of the opinion that they will not accept any STP within the main town area. They were generally satisfied that the project will result in improved sanitation facility of the town in general. The details of Public consultations area attached as **Annexure – 8.**

Thus, it is concluded that the proposed project can be categorised as a High Impact Category project in view of its vicinity to Rajaji National Park and wildlife movement. However, it is likely to cause minimal or no adverse environmental impacts on human populations or physical environment.

The proposed project will not have any significant environmental impact but will rather improve health and sanitation facility of the town. In addition to project will also enhance the aesthetics of the entire town and lead to reduced pollution loading in the River Ganga.

Annexure A

Surrounding Features of proposed STP Site within a radius of 10 km

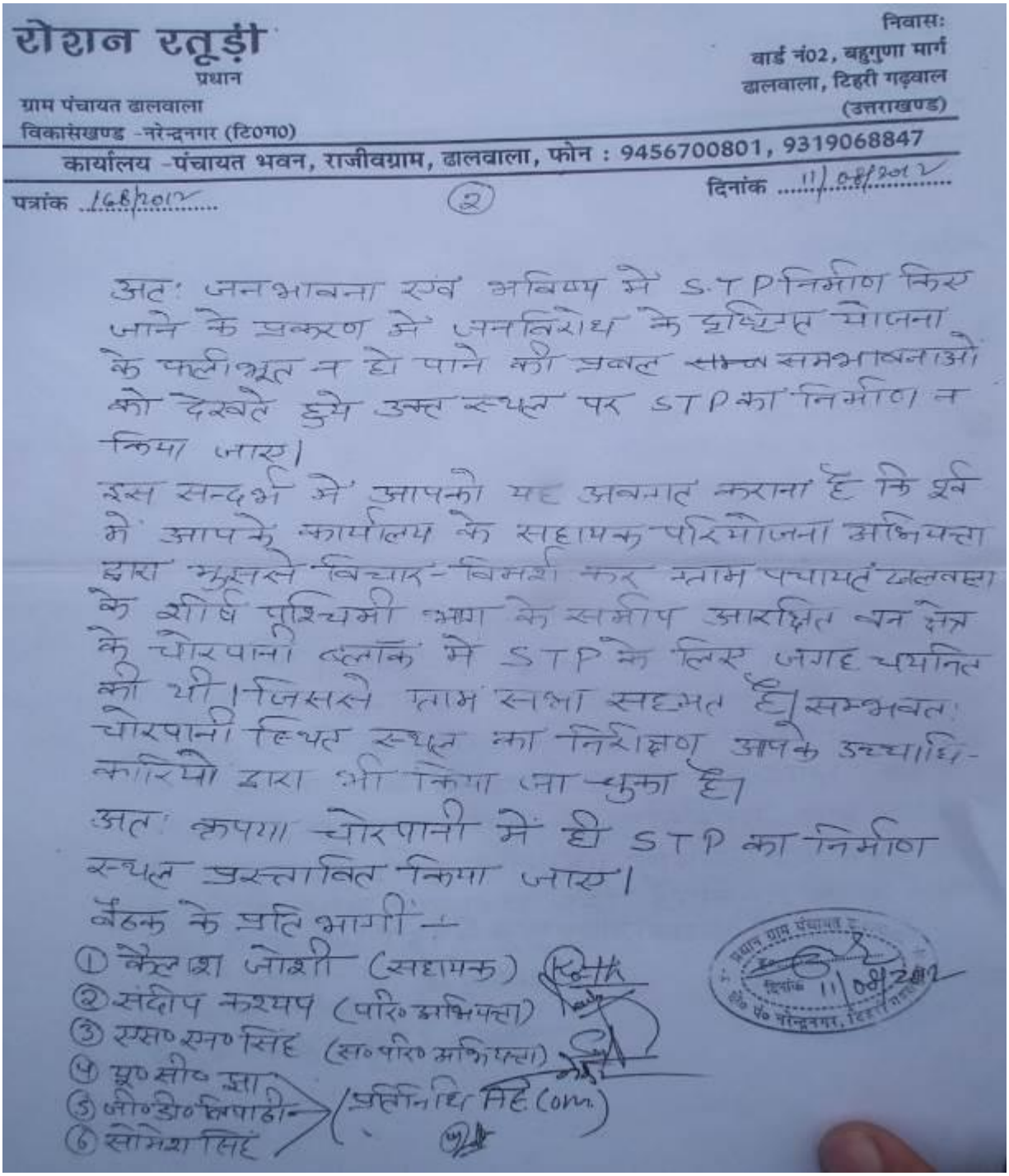
Feature	Aerial Distance	Direction wrt proposed site
Tirsat Reserved Forest	2.1 Km	South West
Protected Forest (Dhalwala)	0.0 km	-
Raidaspur – Residential	1.4 km	South
Ashutoshnagar	1.3 km	South
Brahmanada Ashram	1.4 km	South East
Kailash Ashram	1.7 km	South East

Feature	Aerial Distance	Direction wrt proposed site
Muni Ki Reti	2.6 km	South
Rishikesh	1.8 km	South West
Barkot Reserve Forest	2.0 Km	West
Chandra Bhaga River	50 mts	South
Narendra nagar	4.2 km	North
River Ganga	South	3.5 km

Figure 3.2: Site Surroundings from Toposheet – 500 m and 10 km circles

Annexure B

NOC from local Dhalwala Gram Panchayat



रोशन रतूड़ी
प्रधान
ग्राम पंचायत ढालवाला
विकासखण्ड -नरेन्द्रनगर (टि0ग0)

निवासः
वार्ड नं02, बहुगुणा मार्ग
ढालवाला, टिहरी गढ़वाल
(उत्तराखण्ड)

कार्यालय -पंचायत भवन, राजीवग्राम, ढालवाला, फोन : 9456700801, 9319068847

पत्रांक 168/2017 (2) दिनांक 11/08/2017

अतः जनभावना एवं भविष्य में S.T.P निर्माण किए जाने के प्रकरण में जनविरोध के दृष्टिगत योजना के फलीभूत न हो पाने की प्रबल सम्भावनाओं को देखते हुये उक्त स्थल पर STP का निर्माण न किया जाए।

इस सन्दर्भ में आपको यह अवगत कराना है कि पूर्व में आपके कार्यालय के सहायक परियोजना अभियन्ता द्वारा मुझसे विचार-विमर्श कर ग्राम पंचायत ढालवाला के दक्षिण पश्चिमी भाग के समीप आरक्षित वन क्षेत्र के चोरपानी ब्लॉक में STP के लिए जगह चयनित की थी। जिससे ग्राम सभा सहमत है। सम्भवतः चोरपानी स्थित स्थल का निरीक्षण आपके उच्चाधिकारियों द्वारा भी किया जा चुका है।

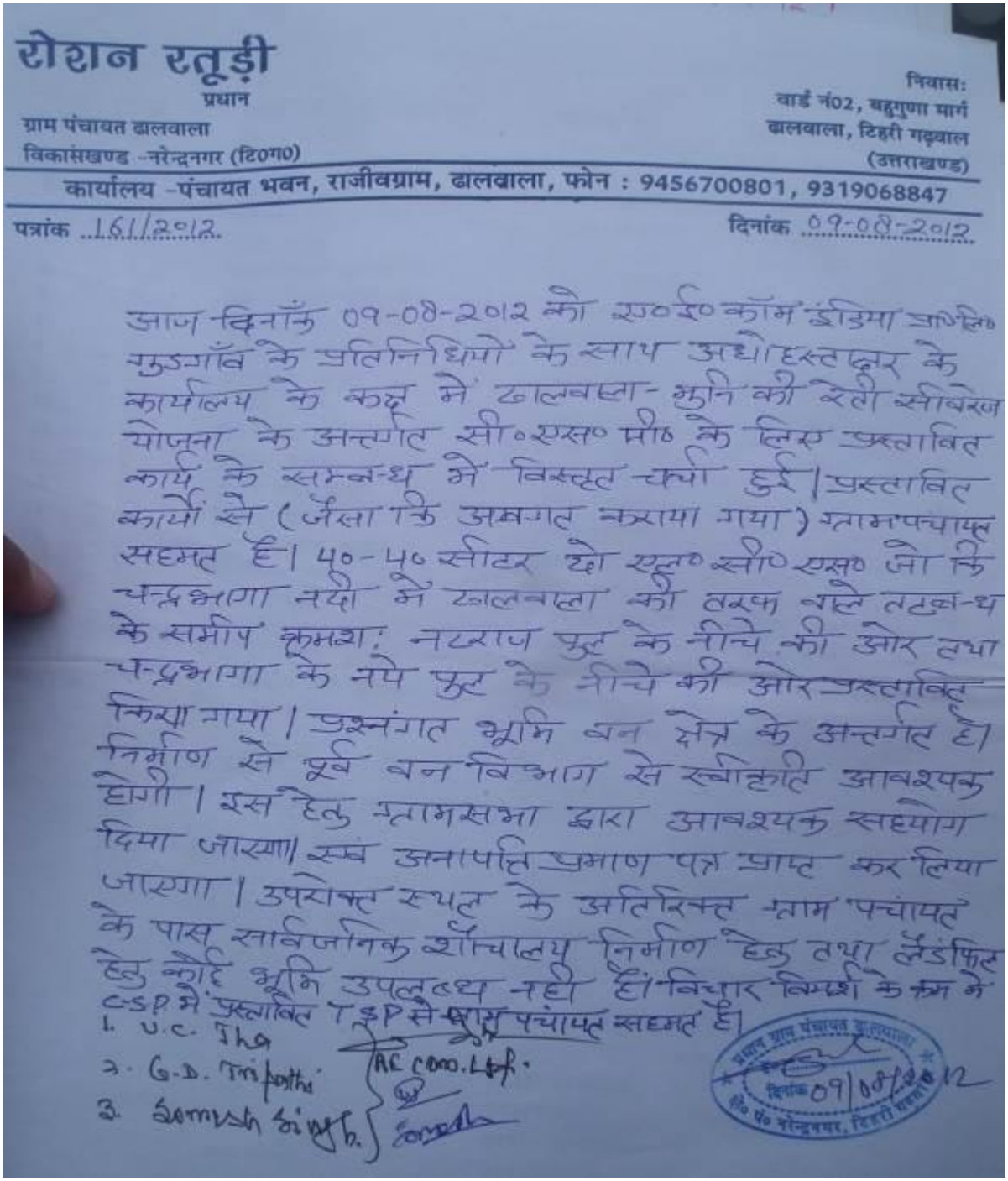
अतः कृपया चोरपानी में ही STP का निर्माण स्थल प्रस्तावित किया जाए।

बैठक के प्रतिभागी :-

① केदार जोशी (सहायक)
② संदीप कश्यप (परि० अभियन्ता)
③ एस० एस० सिंह (स० परि० अभियन्ता)
④ यू० सी० झा
⑤ जी० डी० तिवाड़ी
⑥ सोमेश सिंह

(प्रतिनिधि M.E. Com.)

प्रधान ग्राम पंचायत ढालवाला दिनांक 11/08/2017 जि० टिहरी गढ़वाल



रोशन रतूड़ी
प्रधान
ग्राम पंचायत ढालवाला
विकासखण्ड -नरेन्द्रनगर (टि0ग0)

निवास:
वार्ड नं02, बहुगुणा मार्ग
ढालवाला, टिहरी गढ़वाल
(उत्तराखण्ड)

कार्यालय -पंचायत भवन, राजीवग्राम, ढालवाला, फोन : 9456700801, 9319068847

पत्रांक ..161/2012.

दिनांक 09-08-2012

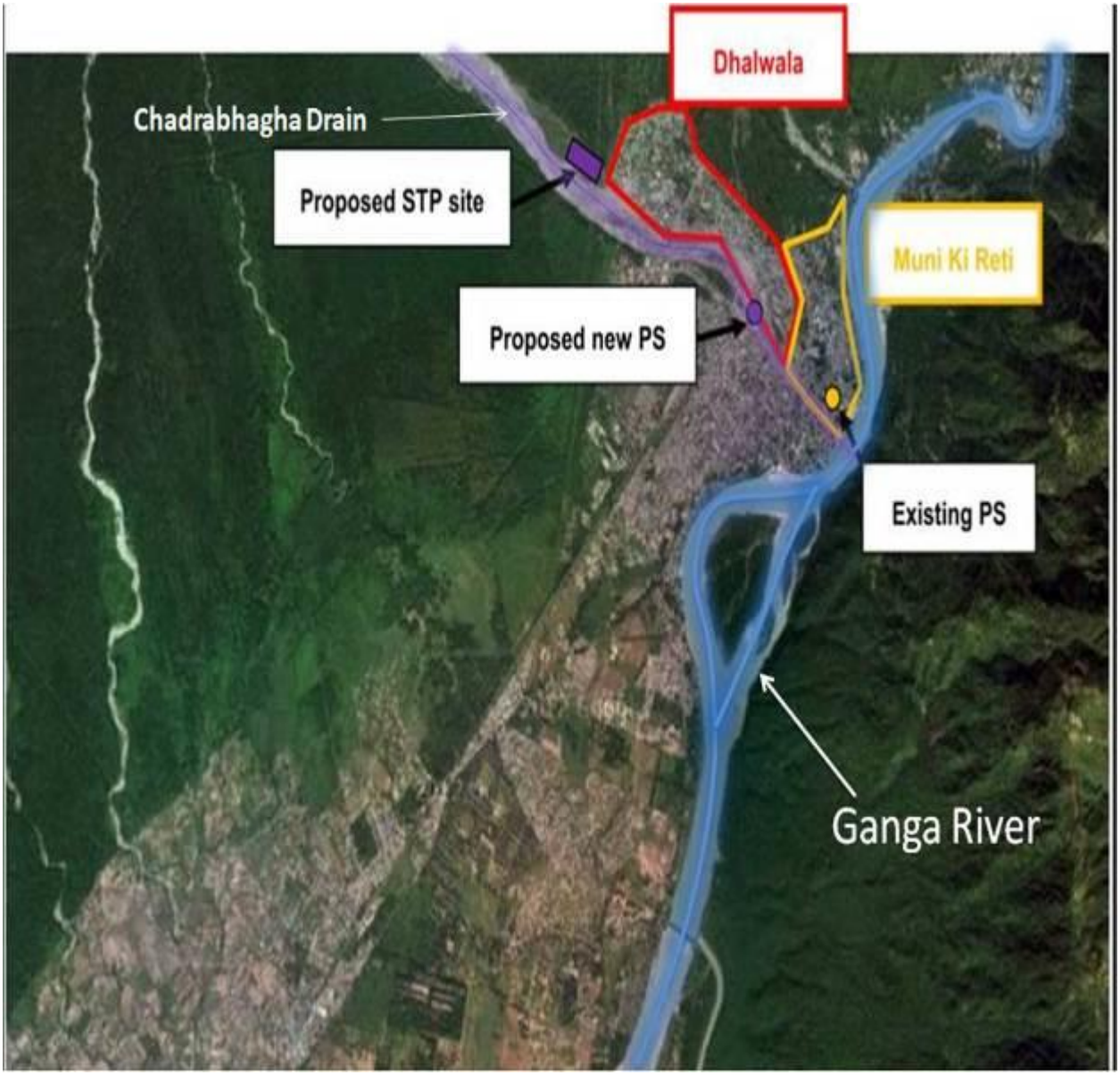
आज दिनांक 09-08-2012 को एच0ई0 कॉम इंडिया प्रा0लि0 गुड़गाँव के प्रतिनिधियों के साथ अधोहस्ताक्षर के कार्यालय के कक्ष में ढालवाला-मुनि की रेती सीवरेज योजना के अन्तर्गत सी0एस0पी0 के लिए प्रस्तावित कार्य के सम्बन्ध में विस्तृत चर्चा हुई। प्रस्तावित कार्यों से (जैसा कि अवगत कराया गया) ग्रामपंचायत सहमत है। 40-40 सीटर दो एस0टी0पी0 जो कि चन्द्रभागा नदी में ढालवाला की तरफ वाले तटबन्ध के समीप क्रमशः नटराज पुल के नीचे की ओर तथा चन्द्रभागा के नये पुल के नीचे की ओर प्रस्तावित किया गया। प्रश्नगत भूमि वन क्षेत्र के अन्तर्गत है। निर्माण से पूर्व वन विभाग से स्वीकृति आवश्यक होगी। इस हेतु ग्रामसभा द्वारा आवश्यक सहयोग दिया जायेगा। एवं अनापत्ति प्रमाण पत्र प्राप्त कर लिया जायेगा। उपरोक्त स्थल के अतिरिक्त ग्राम पंचायत के पास सार्वजनिक शौचालय निर्माण हेतु तथा लैंडफिल हेतु कोई भूमि उपलब्ध नहीं है। विचार विमर्श के क्रम में CSP में प्रस्तावित 1 STP से ग्राम पंचायत सहमत है।

1. U.C. Jha
2. G.D. Tripathi
3. Santosh Singh

AE com. Ltd.

प्रधान ग्राम पंचायत ढालवाला
दिनांक 09/08/2012
वि0 ख0 नरेन्द्रनगर, टिहरी गढ़वाल

Annexure C


Dhalwala
Chadrabhagha Drain
Proposed STP site
Muni Ki Reti
Proposed new PS
Existing PS
Ganga River

Annexure D

Photograph of Plantation at STP (tentative site) and nearby area

Annexure E

STP Site Photographs

Bird Eye view of STP site along with Chandrabhaga drain

Distance of STP site from nearby habitant area

Distance of STP site from nearby habitant area

Bird eye view of project town Dhalwala

Raw sewer is flowing in natural rain water drain (Existing conditions)

Raw Sewer flowing in Rain water drain and meeting with River Ganga (Existing condition)

Consultation with Dhalwala Pradhan for location of STP site

Dumping of waste to River

Public consultation at Crematoria

Consultation with Business group

4. Regulations and Legal Framework

4.1 Applicable Laws and Regulations – Environmental

The Government of India has laid down various policy guidelines, regulations, acts and legislations pertaining to sustenance and protection of environment and its various components. The following are the key regulations in India applicable for various development Projects.

- The Environment (Protection) Act, 1986
- The Ancient Monuments and Archaeological Sites and Remains Act and amendments, 1958
- Wildlife Protection Act, 1972
- Water (Prevention and Control of Pollution) Act, 1974 and its amendments
- Air (Prevention and Control of Pollution) Act, 1981
- Forest (Conservation) Act, 1980 and its amendments
- The Environment (Protection) Act, 1986
- The Motor Vehicle Act, 1988
- Hazardous Wastes (Management & Handling) Rules, 1989
- The Municipal Solid Wastes (Management and Handling) Rules, 2000

The Environment (Protection) Act, 1986

The Environment (Protection) Act, popularly known as EP Act, is an umbrella legislation that supplements existing environmental regulations. Empowered by the EP Act, the Ministry of Environment & Forests (MoEF), Government of India has issued the following notifications regulating siting of Projects and its operation, procuring clearance to establish industries and development of Projects with appropriate EIA studies, coastal zone regulations and other aspects of environment care:

- Empowers the Government of India to make rules to regulate environmental pollution by stipulating standards and maximum allowable limits to prevent air, water, noise, soil and other environmental pollutants
- Prohibits operations that emit pollutants in excess of standards
- Regulates handling of hazardous substances and identifies persons responsible for discharges and pollution prevention
- It deals with offences committed by Government Departments

- Formulated Environmental (Protection) Rules, 1986, Hazardous Wastes (Management and Handling) Rules, 1989 and Manufacture, Storage & Import of Hazardous Chemical Rules, 1989 in accordance with the sections 6, 8 and 25 of Environment Protection Act.

Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments: - Any component of the project having potential to generate sewage or trade effluent will come under the purview of the Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments. Such projects have to obtain Consent to Establishment (CTE) under Section 25 of the Act from State Pollution Control Board (SPCB) before starting construction of STP and Consent to Operate (CTO) before starting operation. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies. The following subprojects require CTE and CTO from SPCB:

(i) New or augmentation of water treatment plants; and

(ii) New or augmentation of sewage treatment plants.

Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments: - The subprojects having potential to emit air pollutants into the atmosphere have to obtain CTE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from SPCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution. The following require CTE and CTO from SPCB:

(i) Diesel generators; and

(ii) Hot mix plants, wet mix plants, stone crushers, etc., if installed for construction.

(iii) Emissions and discharges shall comply with standards notified by the CPCB.

Forest Legislations: - The government's forest legislation dates back to enactment of the Indian Forest Act of 1927. This Act empowers State of Uttarakhand to declare "any forest land or waste-land, which is the property of government or over which the government has proprietary rights or to the whole or any part of the forest-produced of which the government is entitled," a reserved forest or protected forest. The Act also allows government control over forest and lands not being the property of the government.

For reserved forests and village-forests, activities like clearing or breaking up of any land for cultivation or for any other purpose, damage to vegetation and/or trees and quarrying or removing any forest produce are prohibited. For protected forests, with the provision of the Act, State of Uttarakhand makes rules to regulate activities like cutting of trees and removal of forest produce; clearing or breaking up of land for cultivation or any other purpose; and for protection and management of any portion of protected forest.

According to the Act, State of Uttarakhand requires prior approval of MoEF for the use of forest land for non-forest purposes (means the breaking up or clearing of any forest land) or for assigning lease to any private person or agency not controlled by government. The Forest (Conservation) Rules of 2003 issued under this Act provide specific procedures to be followed for conversion of forest land for non-forest purposes. For the proposed project 1 Ha of forest

land is required to divert for construction of STP.

Conversion of forest lands that are part of National Parks and/or Sanctuaries and Tiger Reserve areas (notified under Indian Wildlife [Protection] Act of 1972) is not permitted. In exceptional case, State of Uttarakhand requires consent of the Indian Board of Wildlife for obtaining approval of the State Legislature for de-notification of the area as a sanctuary. The State or National Wildlife Board under MoEF is the authority which will grant a "No Objection Certificate" for any construction within a sensitive area. Every user agency, who proposes to use any forest land for non-forest purposes and use buffer zone of the wildlife protected areas for other purposes, must apply for forest and/or wildlife clearance.

Cutting of trees in non-forest land, irrespective of land ownership, also requires permission from the State Forest and Environment Department. Afforestation to the extent of two trees per each tree felled is mandatory.

The proposed project components are not coming under any Wildlife sanctuary or national Park area so clearance under this act is not required.

Ancient Monuments and Archaeological Sites and Remains Rules, of 1959 and amendments of 2011:- The Rules designate areas within a radius of 100 meters (m) and 300 m from the "protected property" as "protected area" and "controlled area" respectively. No development activity (including mining operations and construction) is permitted in the "protected area" and all development activities likely to damage the protected property are not permitted in the "controlled area" without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.

For the subproject, activities within Archaeologically Protected Areas will be avoided. If activities are to be done in the controlled area of protected properties, then the executing and implementing agencies and the line department will take the necessary No Objection Certificates from ASI.

The Environmental Impact Assessment Notifications 2006 and its Amendments

The EIA Notification of MoEF dated of 2009 is silent on the requirement of an environmental clearance for a sewerage network project.

Table 4.1: Summary of Environmental Regulations and Legislations

S. No.	Act/ Rules	Purpose	Applicability (Yes/ No)	Reasons for Applicability	Authority
1	Environment Protection Act,1986	To protect and improve overall environment	Yes	As all environmental notifications, rules and schedules are issued under this act	MoEF, GoI, DoE, State Govt. CPCB, SPCBs
2	Environmental Impact	Mandatory environmental	No	This notification is not applicable for	MoEF, EIAA

S. No.	Act/ Rules	Purpose	Applicability (Yes/ No)	Reasons for Applicability	Authority
	Assessment Notification 14th Sep-2006	clearance to certain category of new development activities following environmental impact assessment		Sewage Treatment Facility	
3	Municipal Wastes (Management and Handling) Rules, 2000	To manage collection, transportation, segregation, treatment, and disposal of municipal solid wastes	No	This notification is applicable only for Municipal Solid waste Treatment facility investments	MoEF, EIAA, CPCB, SPCBs
4	Coastal Regulation Zone (CRZ) Notification 1991 (2011)	Protection of fragile coastal belt	No	As this Project location is not located along coastal belt	
5	Land Acquisition Act, 1894 (As amended) and the Right to fair compensation **and** Transparency in land acquisition, Rehabilitation and resettlement Act , 2013	Sets out rules for acquisition. of land by government	No	No private land acquisition is required for the project however forest land need to be diverted for STP and approach road area.	Revenue Department, State Government
6	The Forest (Conservation) Act,1980	To check deforestation by restricting conversion of forested areas into non- forested areas	Yes	Applicable, there is diversion of forest land for construction of STP	Forest Department, State Government and Ministry of Environment and Forests, Government of India
7	Wild Life (Protection) Act, 1972	To protect wildlife through National Parks and Sanctuaries	Yes	The project components are not located within any National Parks or	NOC from Chief forest Conservator Wildlife

S. No.	Act/ Rules	Purpose	Applicability (Yes/ No)	Reasons for Applicability	Authority
				wildlife Sanctuaries area But STP site proposed is about 2.5 km Aerial distance from Rajaji National Park and hence applicable.	/Chief wild life warden is attached as Annexure 4.
8	Air (Prevention and Control of Pollution) Act, 1981	To control air pollution by controlling emission of air pollutants as per the prescribed standards.	Yes	to obtain CTE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from SPCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution. The following require CTE and CTO from SPCB: (i) Diesel generators; and (ii) Hot mix plants, wet mix plants, stone crushers, etc., if installed for construction. Emissions and discharges shall comply with standards notified by the CPCB.	Uttarakhand Environment Protection and Pollution Control Board
9	Water Prevention and Control of Pollution) Act, 1974	To control water pollution by controlling discharge of pollutants as per the prescribed standards	Yes	To obtain Consent to Establishment (CTE) under Section 25 of the Act from State Pollution Control Board (SPCB) before starting	Uttarakhand Environment Protection and Pollution Control Board

S. No.	Act/ Rules	Purpose	Applicability (Yes/ No)	Reasons for Applicability	Authority
				construction and Consent to Operate (CTO) before operation. The Water Act also requires the occupier of projects to take measures for abating the possible pollution of receiving water bodies.	
10	The Noise Pollution (Regulation and Control) Rules, 2000	The standards for noise for day and night have been promulgated by the MoEF for various land uses	Yes	This act will be applicable for all construction equipment deployed at worksite	SPCBs
11	Ancient Monuments and Archaeological Sites and Remains Act, 1958	Conservation of cultural and historical remains found in India	No	None of the project component is in proximity to any Ancient Monument, declared protected under the act.	Archaeological Dept. GoI, Indian Heritage Society and Indian National Trust for Art and Culture Heritage (INTACH).
12	Public Liability and Insurance Act, 1991	Protection from hazardous materials and accidents.	Yes	Contractor need to stock hazardous material like diesel, Bitumen, Emulsions etc.	SPCBs

4.2 Applicable Laws and Regulations - Social

All strategic interventions on human development, spread across all social issues, need directives of policies and legal support to operationalize the appropriate actions. These policies and legislations help to overcome the constraints and support administrator, implementer, community and individual in delivery of justice. This section includes the National policies and Acts as detailed under:

National Policies and Acts

i) National Tribal Policy, 2006

ii) The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation

and Resettlement Act, 2013 and

iii) Forest Rights Act, 2006

The National Tribal Policy (2006)

The Policy has the following objectives:

Regulatory Protection

- Providing an environment conducive to the preservation of traditional and customary systems and regime of rights and concessions enjoyed by different Schedule Tribe (ST) communities, and reconciliation of modes of socio-economic development with these.

- Preventing alienation of land owned by STs and restoring possession of wrongfully alienated lands.

- Protection and vesting of rights of STs on forestlands and other forest rights including ownership over Minor Forest Produce (MFP), minerals and water bodies through appropriate legislations and conversion of all forest villages into revenue villages.

- Protection of political rights to ensure greater and active participation of tribal peoples in political bodies at all levels.

This policy is not applicable as no forest dwelling tribes are affected by Muni ki Reti waste water management project.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (The Central Government has notified January 01, 2014 as the effective date of the act,)

The act provides for transparent process and fair compensation to land owners and those affected by land acquisition, for land acquired for public purpose. In determining market price, (Sec 26 read with 1st Schedule) the land owner in urban area will get twice, due to the 100% solatium and in rural area, the multiplying factor is 1 to 2 depending on distance from nearest urban centre, to be notified by appropriate government, and then 100% solatium.

Traditionally R&R has been in the form of a one-time compensation, which was decided using the last registered sale or a similar sale in the vicinity of the land as a base. After the proposed project is set up, the land prices rise owing to the benefits of the development. This creates considerable dissatisfaction amongst the displaced people. To prevent such issues, the entire R&R package stipulates the provision of employment by the project owner in cases where jobs are generated by the project and basic infrastructure including drinking water, individual electric connections, health centre etc for the resettled. Over and above this, delivery of the compensation and the R&R are proposed to be preconditions to the transfer of the land title.

The procedure for acquisition and R&R will include a Social Impact Assessment (SIA) which will cover the investigation of public purpose, minimum extent of land required thereof, estimation of displacement and social impact on affected families apart from the overall cost versus benefit

analysis for the proposed project.

The act restricts the use of emergency clause to defense, national security and natural calamities.

Since there is no land acquisition in "legal terms" in this subproject, therefore this is not applicable.

Forest Rights Act 2006

The Act basically does two things:

- Grants legal recognition to the rights of traditional forest dwelling communities, partially correcting the injustice caused by the forest laws.
- Makes a beginning towards giving communities and the public a voice in forest and wildlife conservation

With present design no forest dwelling communities is getting affected by the Muni ki Reti waste water management project.

4.3 Other Legislations applicable to Construction Projects under NGRBA (as per NGRBA Program Framework)

Construction stage generally involves equity, safety and public health issues. The construction agencies therefore will be required to comply with laws of the land, which include inter alia, the following:

- **Workmen's Compensation Act 1923** (the Act provides for compensation in case of injury by accident arising out of and during the course of employment);
- **Payment of Gratuity Act, 1972** (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years);
- **Employees PF and Miscellaneous Provision Act 1952** (the Act provides for monthly contributions by the employer plus workers);
- **Maternity Benefit Act, 1951** (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.);
- **Contract Labor (Regulation and Abolition) Act, 1970** (the Act provides for certain welfare measures to be provided by the contractor to contract labour);
- **Minimum Wages Act, 1948** (the employer is supposed to pay not less than the Minimum Wages fixed by the Government as per provisions of the Act);
- **Payment of Wages Act, 1936** (it lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers);
- **Equal Remuneration Act, 1979** (the Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against

Female employees);

- **Payment of Bonus Act, 1965** (the Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages);

- **Industrial Disputes Act, 1947** (the Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment);

- **Industrial Employment (Standing Orders) Act; 1946** (the Act provides for laying down rules governing the conditions of employment);

- **Trade Unions Act, 1926** (the Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities);

- **Child Labour (Prohibition and Regulation) Act, 1986** (the Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry);

- **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979** (the inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back, etc.);

- **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act,** 1996 and the Cess Act of 1996 (all the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.);

- **The Factories Act, 1948** (the Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities);

- **Hazardous Wastes (Management and Handling) Rules, 1989** (the Rules govern handling, movement and disposal of hazardous waste);

- **Manufacture, Storage and Import of Hazardous Chemicals Rules 1989, amended 1994 and 2000** (the Rules provide indicative criteria for hazardous chemicals and require occupiers to identify major accident hazards and prepare on-site and off-site emergency plans)

5. Baseline Status

5.1 Geographical Location

Muni-ki-Reti Dhalwala lies at the confluence of River Ganga from North & Chandrabhaga River from south. Located in Tehri- Garhwal region of Uttaranchal on the national highway NH-58 at a distance of about 45 km from Dehradun, the Capital City of Uttarakhand, Muni Ki Reti is one of the river side town and important tourist place in Uttarakhand State. The holy city; Rishikesh and Haridwar are located at about 2 km and 27 km respectively away from the town through which holy river Ganga passes.

Muni Ki Reti is a small town in Tehri Garhwal district of Uttarakhand state in India. Situated at an elevation of 356 meters above the sea level, Muni Ki Reti is mistakenly considered an extension of Rishikesh, being very close to it.

5.2 Climate

The town experiences cold winters during November – February, with temperatures ranging from 5-8°C and summers from May – June with temperatures varying from 20-30°C. The monsoon period extends from June to September with average rainfall recorded is 435 mm.

5.3 Topography

The Muni Ki Reti-Dhalwala town is at a latitude and longitude of 30°04'N & 78°10'E respectively with hilly terrain slopping towards river Chandrabhaga on the right side of the town and River Ganga along the National Highway. The sacred Ganga River passes through the said town. On average, the town's altitude is 356 meters above mean sea level. However there is a wide variation in the town's elevation ranging with a difference of 50 m between the highest and lowest point in the town. The city is surrounded by seven prominent Shivalik hills and a main tourist destination with respect to the sacred river Ganges.

Due to the fragile eco-system and geo-dynamic terrain, Uttarakhand State is highly vulnerable to natural disasters like earthquakes, landslides, forest fires, and cloud burst etc. According to hazard zoning in the Vulnerability Atlas of India, the whole of Uttarakhand falls under "very high" to "high" category earthquake zone. The problems of landslides, subsidence, and erosion are quite common in the hilly regions of the State due to combination of several factors like geological movements, structure, lithology, water seepage, soil cover, vegetal cover, weather, and climatic changes.

5.4 Air Quality

The proposed subproject does not cover industrialized areas, and hence the air pollution due to industrial works is not significant. The main sources of air pollution at present are due to emissions from mobile sources i.e. from minor vehicular traffic and wind-blown dust/sand.

Uttarakhand Environment Protection & Pollution Control Board (UEPPCB) regularly carryout ambient Air quality monitoring of towns. Results of ambient air quality at the nearest station (Rishikesh) is presented in table 5.1 below.

Table 5.1: Average Ambient Air Quality Data of Rishikesh Station

Month	Monthly Average Value (µg/m³)			
	Respirable Suspended Particulate Matter	Suspended Particulate	Sulphur Di-oxides	Oxides of Nitrogen
January -14	114.69	229.31	22.46	26.17
February – 14	116.43	223.74	22.78	26.92

5.5 Noise

The subproject area represents mostly urban area of Muni ki reti and rural area of Dhalawala. The ambient noise levels vary from very low to low in the urban, built-up areas. Near some congested areas, the noise levels are moderate. The overall impact on the ambient noise level is not significant. The CPCB has specified following standards for permissible limit of noise depending on the area.

Table 5.2: Permissible Noise Limit (as per CPCB Guidelines Limits in dB (A) Leq)

Category of Area/ Zone	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Noise testing for the project area was carried out for three days (from 12.07.2014 – 14.07.2014) at different locations. The locations were strategically selected to represent all the categories of development. The results are presented in table 5.3 below.

Table 5.3: Results of Noise pollution testing (in dB(A))

S. No	Test Parameters	At Proposed STP Site, Upper Chor Pani near Village - Dhalwala	Village – Dhalwala (Residential Zone)	Tehri Road near Dhalwala Police Station (Commercial Zone)	Govt. Animal Hospital, Muni Ki Reti, Tehri, Garwal (Silence Zone)	Madhuban Ashram, Kailash Gate, Muni Ki Reti (Silence Zone)	Proposed SPS Location – Muni Ki Reti	On Project Site Compile Point of Dhalwala & Ganga River near Ganga	Utkal Ashram Sanchalan, Shree Ram Nand Ashram, Muni Ki Reti near SPS - 01	Proposed SPS – 02 near Dhalwala Area	Haridwar Road On Chandra bhaga Bridge (Commercial Zone)
1.	L_{day} (6.0 AM TO 10.0 PM)	64.74	47.67	63.65	42.76	45.69	66.74	65.37	43.92	68.48	62.72
2.	L_{night} (10.0 PM TO 6.0 AM)	55.66	43.52	55.85	37.13	41.54	57.37	57.49	39.86	59.42	54.27
3.	Leq	61.41	47.98	63.36	42.0	45.43	62.91	61.87	43.75	64.67	62.67
4.	L_{max}	66.9	49.8	70.6	45.7	48.7	67.5	67.3	47.5	69.8	69.4
5.	L_{min}	47.6	39.9	44.8	34.9	37.4	49.7	48.5	35.8	50.9	45.7

5.6 Water quality

The Central Pollution Control Board (CPCB) with the assistance of Environment Protection and Pollution Control Board Uttarakhand regularly checks the water quality of River Ganga for a considerable time period. BOD, DO, and Faecal Coliforms (FC) normally indicate the biological health of a river. These parameters were selected to study the water quality trend in the River Ganga for the year 2011 in Uttarakhand. Water quality status of River Ganga in Upstream of Laxman Jhula in Uttarakhand in terms of DO, BOD, and FC is shown in Table 5.1 below. The laboratory water quality testing reports of River Ganga and drains in Muni ki Reti area are attached in DPR of Sewerage works.

Detailed water Quality status of Muni ki Reti is attached as Annexure -5

Table 5.4: River Water Quality in Ganga at upstream of Muni Ki Reti

Sr. NO.	Month	Temp °C	pH	DO (mg/L)	BOD (mg/L)	Total Coli form /100ml
1.	Jan-2012	13.0	6.84	9.2	1.2	60
2.	Feb-2012	15.3	7.43	7.8	1.23	70
3.	March-2012	16.0	7.48	8.8	1.0	110
4.	April-2012	19.7	7.96	8.8	1.0	70
5.	May-2012	18.6	8.12	8.0	1.6	80
6.	June-2012	18.0	8.12	8.4	1.2	160

Source: River Water pollution Status, January 2012 to June 2012, CPCB.

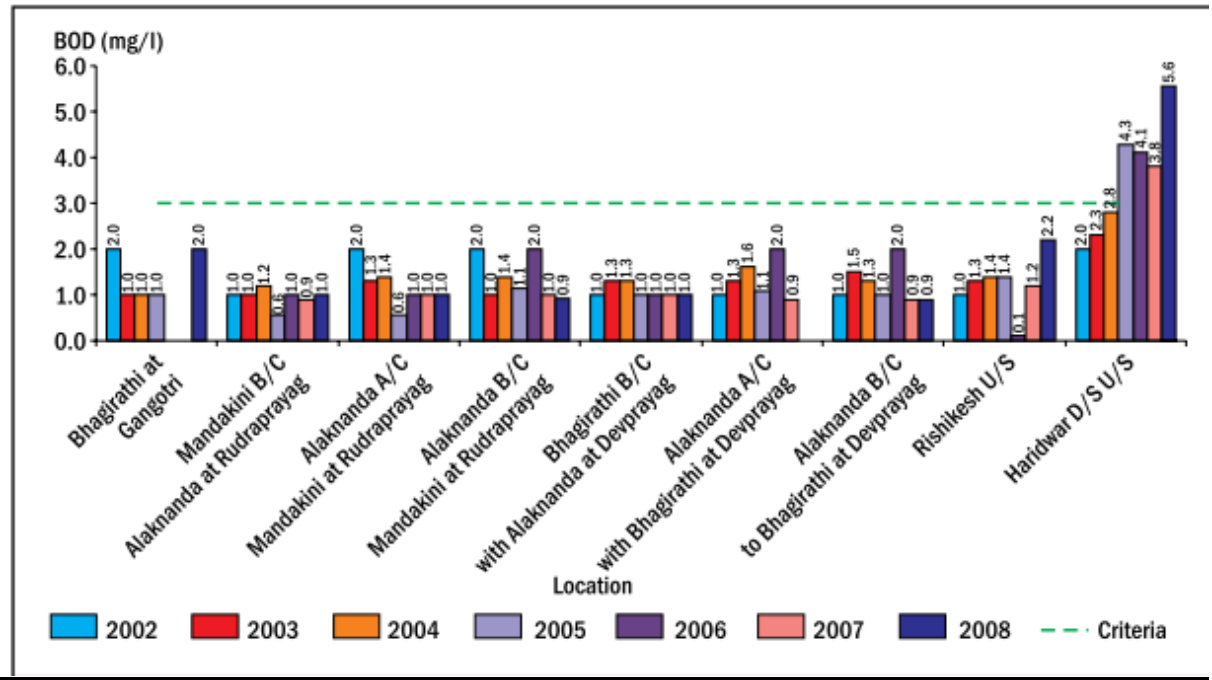


Figure 5.1: Trend in biochemical oxygen demand in the River Ganga in Uttarakhand

WATER QUALITY DATA FOR RIVER GANGA
(Summer Average: March-June)

SUMMER AVERAGE VALUES FOR WATER QUALITY ON MAIN STEM OF RIVER GANGA UNDER GANGA ACTION PLAN

STATION NAME	DISTANCE IN KM	DISSOLVED OXYGEN (DO) (mg/l) (Acceptable limit 5 mg/l or more)																					
		1986	1987	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rishikesh	0	8.1	8.1	7.1	6.8	8.5	9.0	9.6	9.0	8.9	8.9	9.3	9.0	9.1	8.2	9.2	8.4	8.5	8.3	8.2	8.1	8.0	7.48
Hardwar D/S	30	8.1	7.7	6.9	7.1	7.7	7.2	8.8	8.4	8.4	8.8	8.6	8.6	8.8	7.8	9.0	8.1	8.1	8.1	8.1	7.9	7.8	7.38
Garhmukteshwar	175	7.8	4.7	6.1	7.2	-	8.5	8.0	7.9	7.7	8.1	8.1	7.9	7.8	7.4	8.2	7.6	7.7	7.7	7.9	7.8	7.9	7.43
Kannauj U/S	430	7.2	7.7	7.1	7.3	7.7	7.2	8.8	8.0	8.0	7.8	7.4	7.1	7.4	7.6	7.9	6.95	8.5[@]	7.3	6.8	6.5	7.2	7.32
Kannauj D/S	433	NA	6.5	6.1	7.1	7.1	8.4	7.2	7.8	7.9	7.5	7.4	8.8	6.8	6.5	6.2	7.85	7.6[@]	6.45	6.4	6.2	7.6	7.03
Kanpur U/S	530	7.2	7.8	7.9	7.8	7.5	7.5	7.0	8.1	7.8	7.5	6.7	6.8	4.9	6.2	6.7	7.18	6.2[@]	6.2	5.8	4.9	7.5	6.35
Kanpur D/S	548	6.7	6.2	4.4	5.1	5.6	5.2	4.6	6.8	6.4	5.6	5.2	7.5	4.8	7.2	4.4	5.28	4.7[@]	3.9	4.6	6.0	7.5	6.18
Allahabad U/S	733	6.4	7.8	8.0	7.1	6.8	6.9	8.2	8.2	8.9	7.4	7.7	8.8	7.5	13.0	10.0	7.82	8.5[&]	7.1	7.9	8.4	8.1	7.67
Allahabad D/S	743	6.6	6.7	6.9	6.4	7.6	7.2	7.4	8.2	8.5	7.6	8.2	7.9	7.2	8.2	7.3	6.58	8.4[&]	8.5	8.8	7.7	8.1	7.98
Varanasi U/S	908	5.6	8.4	7.8	7.6	7.3	8.2	7.2	8.5	8.0	8.8	8.8	8.2	6.5	10.8	7.2	6.30	8.6[&]	8.7	8.1	7.5	7.8	8.46
Varanasi D/S	916	5.9	8.6	7.2	6.8	7.1	7.6	6.8	8.0	7.7	8.7	6.6	8.4	7.2	7.5	8.1	5.55	8.3[&]	8.65	8.4	7.3	7.7	7.85
Patna U/S	1188	8.4	8.5	7.7	8.1	8.1	8.2	7.0	6.8	7.3	7.5	7.0	7.7	7.8	7.0	7.5	6.55	7.4	7.4	7.1	6.0	7.0	6.13
Patna D/S	1198	8.1	8.7	7.5	7.4	8.0	8.0	7.2	6.9	7.0	7.1	7.2	7.8	7.7	7.1	7.8	6.73	8.0	8.1	6.9	5.9	6.8	6.10
Rajmahal	1508	7.8	8.1	7.8	7.5	8.1	8.5	7.6	7.6	7.3	7.2	6.9	7.5	7.7	7.9	7.5	6.90	7.4	7.2	7.4	6.2	6.5	6.35
Palta	2050	NA	7.3	6.8	7.3	7.4	7.1	6.8	6.7	6.6	6.5	7.3	NA	6.8	7.2	7.2	7.55	7.0	6.96	6.9	6.9	7.2	7.61
Uluberia	2500	NA	5.8	6.4	5.9	6.9	6.1	6.8	6.6	5.5	5.1	6.6	NA	-	5.4	5.6	6.33	5.4	5.45	6.8	5.3	5.4	6.51

STATION NAME	DISTANCE IN KM	BIOCHEMICAL OXYGEN DEMAND (BOD) (mg/l) (Acceptable limit less than 3mg/l)																					
		1986	1987	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rishikesh	0	1.7	2.8	1.5	1.1	1.2	1.3	2.0	1.5	1.0	1.1	1.1	1.0	1.1	1.2	0.5	1.1	1.0	1.1	1.2	1.2	1.0	1.48
Hardwar D/S	30	1.8	3.9	1.8	1.1	2.0	1.4	2.1	1.7	1.1	1.3	1.6	1.2	1.4	1.7	0.8	1.5	1.4	1.3	1.3	1.4	1.3	1.90
Garhmukteshwar	175	2.2	2.7	3.4	1.6	NA	1.6	2.5	2.4	1.5	1.5	1.8	1.4	1.8	2.2	1.2	1.9	2.0	2.1	2.0	1.9	2.0	2.18
Kannauj U/S	430	5.5	2.7	2.6	NA	2.1	2.3	2.7	2.4	2.9	3.4	3.6	5.3	14.4^	1.1	1.2	1.73	1.7[@]	1.11	1.7	2.9	1.5	4.18
Kannauj D/S	433	NA	5.1	3.0	3.0	2.7	2.5	3.0	3.2	3.2	3.7	3.5	4.8	11.8^	4.2	3.3	3.18	4.5[@]	4.2	4.1	3.1	4.8	4.58
Kanpur U/S	530	7.2	2.9	2.7	1.6	1.7	1.9	5.0	2.0	2.8	3.1	4.3	4.6	14.5^	3.8	3.7	3.20	4.3[@]	6.8	2.9	3.4	3.8	3.34
Kanpur D/S	548	8.6	9.7	3.5	65.8	25.0	24.5	8.5	5.5	4.1	5.4	6.4	6.5	18.5^	4.8	6.1	5.73	5.4	6.8	5.2	4.1	3.9	4.16
Allahabad U/S	733	11.4	7.0	2.6	2.3	2.0	1.8	2.3	4.5	2.5	3.3	4.3	1.8	5.3	8.0	4.8	7.38[$]	5.5[&]	4.9	7.5	4.8	6.3	5.51
Allahabad D/S	743	15.5	8.2	2.0	1.7	1.9	1.9	3.6	3.2	3.3	2.1	2.6	3.2	3.6	3.8	3.2	3.58	3.1[&]	3.2	4.1	3.2	4.0	4.41
Varanasi U/S	908	10.1	4.1	2.6	1.2	0.9	0.8	1.8	2.6	2.2	2.4	2.9	2.2	2.5	3.0	2.5	2.60	2.0[&]	2.1	2.3	2.2	3.8	2.26
Varanasi D/S	916	10.6	4.8	5.9	1.9	1.3	1.0	2.9	1.4	2.3	3.1	4.3	3.7	4.4	2.5	5.4	2.65	2.3[&]	2.25	3.7	3.0	3.1	3.78
Patna U/S	1188	2.0	1.9	0.3	1.4	1.2	1.2	1.6	1.5	2.0	2.0	1.2	1.9	1.9	1.8	2.0	1.63	2.0	2.0	1.7	1.7	1.6	1.79
Patna D/S	1198	2.2	2.1	0.3	0.9	1.6	1.5	1.6	1.4	1.6	1.3	1.6	2.4	2.4	1.9	2.8	1.65	2.2	2.3	1.8	2.4	2.1	2.20
Rajmahal	1508	1.8	1.6	0.3	1.0	0.6	0.7	1.9	1.7	1.3	1.4	1.1	1.5	1.5	1.4	2.2	2.10	1.8	1.95	1.6	2.0	1.6	1.63
Palta	2050	NA	1.0	0.9	0.8	1.0	0.9	2.5	2.1	1.6	2.1	2.2	NA	1.3	2.6	2.2	2.03	3.1	2.58	2.6	2.2	2.7	2.53
Uluberia	2500	NA	1.1	1.0	0.8	1.0	0.9	3.2	2.8	2.0	2.4	2.2	NA	-	1.9	1.9	2.43	2.6	2.64	3.2	3.6	2.4	2.69

* Mean value for the months of March to June when the temperatures are high and flows are low.
NA --> Date not available.

Source: BHEL, Hardwar
IIT, Kanpur
CPCB, Zonal Office, Lucknow
Patna University, Patna
BCKV, West Bengal

5.7 Drainage

There are 15 nos. of Nala/Natural Drainage in the town that are carriers of sewage and storm water that finally discharge the same into river Ganga . Further, of these Fifteen, ten (10) are pure storm water carrying channel and are elaborated below:

1. Dhalwala Nala
2. Darshan mahavidhyala Nala
3. Old Hanuman Temple Nala
4. Police Guest house Nala
5. PWD Guest house Nala
6. Omkarnand Public Ghat Nalaz
7. Public Toilet Nala
8. Asian Gems & Handicraft Nala
9. Shivanand Bhawan Nala
10. Naw Ghat Nala

All above Nala used to carry untreated sewage, but with increased coverage of sewerage network and on-site disposal system and also due to efforts made by Uttrakhand irrigation department, discharge of untreated wastewater is stopped in these drains.

Following five (5) drains are carrying untreated wastewater in addition to storm water at present.

1. Khara Sroat Nala:
2. Bus Stand Nala
3. Shamshan Ghat Nala
4. Ganga Resort Nala
5. Chandreshwar Nala

Bus Stand Nala

Shamshan Ghat Nala

Detailed Drain water Quality status of Muni ki Reti is attached as Annexure -6

5.8 Biodiversity and Ecological Resources

Uttarakhand the 27th state of Republic of India lies between 28° 44' & 31° 28' N Latitude and 77° 35' & 81° 01' East longitude. It was carved out of UP on 9th November 2000 with 13 Districts. The geographical area of the state is 53,483 sq. km and the terrain and topography of the state is largely hilly with large areas under snow cover and steep slopes. Uttarakhand is geopolitically also very sensitive state due to its international boundaries in North (Nepal & Tibet). It forms North-Western boundary with Himachal Pradesh, North and North-Eastern boundary with Tibet, Eastern with Nepal and Southern with plains of UP. Whereas, the Southern boundary is artificial, remaining namely Northern, Western and the Eastern boundaries are natural with Tons and Yamuna rivers in West, Kali in the East and the Indo-Tibetan watershed in the North. Thus the state is of immense importance not only for the states, downstream due to soil and moisture conservation but strategically also due to its international border with Nepal & Tibet (China).

Major portion of the state is mountainous and these mountains (Himalayas) are one of the youngest mountain systems of the world (40 million years in age compared to peninsular mountains of 1500-2500 million years old) and hence ecologically very fragile and relatively much more susceptible to earthquakes and landslides. There are four major river systems viz. Ganga, Yamuna, Ramganga & Sharda originating from the state along with their tributaries are major source of water for drinking, irrigation and hydropower. The major wealth of the state is its forests with very rich biodiversity. Therefore, any let up in land management, of which forest management is the core, will have a telling effect on state's downstream with regard to water supply, soil erosion and consequent floods and impoverishment of agricultural land.

The state has 13 districts as administrative units with 78 Tehsils and 95 community development blocks .The human population of the State is 84.79 lacs (2001) compared to 25.18 lacs in 1951 and that of livestock is 49.4 lacs in 2003 as compared to 41.68 lacs (1993) and 38.692 in 1972. The human and livestock population is largely dependent on forests due to Agrarian economy and age old pastoralism leading to heavy pressure on forests and consequent degradation of ecology and environment of the area.

Although the State of Uttarakhand is well endowed with biological resources, the past decades

have seen an increase in pressure on the state's natural ecosystems. The entire Siwalik ecosystem of Uttarakhand has been virtually degraded of its forest cover, and forested landscape has been pushed to the Upper reaches of the State.

The state is represented by biographic zone 2B Western Himalaya and 7B Shiwaliks consisting of Kumaon and Garhwal two regions. Total geographical area of the state (53,483 sq.km) is 1.6 % of country's geographical area, out of which 46,035 sq.km is hilly. The state has thus varied terrain, major portion of which is mountainous with unique ecological diversity consisting of high alpine areas to the Sub-tropical and Tropical regions.

Physiographically, the state can be divided into three zones namely, the Himalaya, The Shiwalik and the Tarai Region. The state has a temperate climate except in plain areas where the climate is tropical. The average annual rainfall is 1550 mm.

Uttarakhand State Symbols	
Tree:	*Rhododendron arboreum* (Burans)
Flower:	*Saussures obvallata* (Brahm Kamal)
Animal:	*Moschus chrysogaster* (Musk Deer)
Bird:	*Lophophorus impejanus* (Monal)

There are four major river systems viz. Ganga, Yamuna, Ramganga & Sharda originating from the state along with their tributaries which are major source of water for drinking, irrigation and hydropower. The major wealth of the state is its forests with very rich biodiversity. The state ranks sixth among the other states in terms of percentage of recorded forest area.

The hilly State of Uttarakhand has a forest cover of 65 % of its total geographical areas (slightly lower than the stipulated 66.6 % forest cover for hilly states). Muni ki Reti - Dhalwala, is a semi urban area surrounded by hilly forested areas. There is no remaining natural habitat within the developed area of the City.

5.9 Protected Areas

Due to vast biodiversity present in Uttarakhand 12 percent of total geographical area is protected areas which includes 6 National Park & 6 Wildlife Sanctuary. Uttarakhand is home to many rare species of plants and animals, many of which are protected by sanctuaries and reserves. National parks in Uttarakhand include the Jim Corbett National Park (first national park of India) at Ramnagar in Nainital District, and Valley of Flowers National Park and Nanda Devi National Park in Chamoli District, which together are a UNESCO World Heritage Site. A number of plant species in the valley are internationally threatened, including several that have not been recorded from elsewhere in Uttarakhand. Rajaji National Park in Haridwar District and Govind Pashu Vihar National Park and Sanctuary and Gangotri National Park in Uttarkashi District are some other protected areas in the state.

According to scientific studies in the state 102 mammals, 600 of birds, 19 amphibians, 70 reptiles and 124 species of fish are found. In these above mentioned species there are globally endangered species which consists of tiger (Panthera tigers), Asian elephant (Elephus maximus), Guldar (Panthera pardus), Musk deer (Moschus chrysogaster), Snow leopard (Panthera uncial), Monal (Lophophorus impejanus) etc.

Protected areas in Uttarakhand:-

Uttarakhand has 6 National Park and 6 Wildlife Sanctuary and 2 Conservation Reserve, whose details are as follows in Table 5.2 to 5.4:-

Table 5.5: National Parks

S. No	Protected Area	Area (km^2)	Inauguration year
1	Corbett National Park	520.82	1936
2	Nanda Devi National Park	624.60	1982
3	Valley of Flowers National Park	87.50	1982
4	Rajaji National Park	820.42	1983
5	Gangotri National Park	2390.02	1989
6	Govind National Park	472.08	1990
	TOTAL	**4915.44**	

Table 5.6: Wildlife Sanctuary

S. No	Protected Area	Area (km^2)	Inauguration year
1	Govind wildlife sanctuary	485.89	1955
2	Kedarnath wildlife sanctuary	975.20	1972
3	Askot wildlife sanctuary	599.93	1986
4	Sonanadi wildlife sanctuary	301.18	1987
5	Binsar wildlife sanctuary	47.07	1988
6	Mussoorie wildlife sanctuary	10.82	1993
	TOTAL	**2420.09**	

Table 5.7: Conservation Reserve

S. No	Protected Area	Area (km^2)	Inauguration year
1	Jhilmil Jheel Conservation Reserve	37.84	2005
2	Aasan Conservation Reserve	4.44	2005
	TOTAL	**42.28**	

The closet protected area to Muni ki Reti is Rajaji National Park. The park is been created in 1983 by incorporation of three sanctuaries - Rajaji sanctuary (estd. 1948) Motichur sanctuary (estd. 1964) and Chilla sanctuary (estd. 1977) after the name of renowned statesman and freedom fighter Shri C. Rajgopalachariya - The first and last Governor General of independent India popularly known as "Rajaji". The park is spread over an area of 820.42 sq. km. in three Districts- Dehradun, Haridwar & Pauri Garhwal of Uttarakhand State, India. The Park has got the largest area representing Shiwalik Eco-system. The Shivalik trail is 10 million year old and very rich in fossils. Its fossils faunal remains include about 50 species of elephant; one of them is present today. Figure 5.2 shows distance between STP and Nearest National Park.

Figure 5.2 Location of Nearest National Park to STP location

The majestic Ganges flows through the National Park for a distance of 24km, besides the innumerable streams and brooks making it rich and diverse. It offers ample opportunities to nature lovers to enjoy the captivating landscape and wildlife. Rajaji is thickly foliated predominantly by the Rajaji is thickly foliated predominantly by the Sal Forest and a number of other forest types which include the Western Gangetic Moist and Northern dry Deciduous and Khair - Sissoo forests. Low Alluvial Savannah Woodlands cover the drier southern margins of the park, in contrast to the Shiwalik Chir-Pine on the high reaches of the hills.

The park is home to the Tiger, Leopard, Himalayan Bear, Cheetal, hog deer, barking deer, Sambar deer, wild boar, antelopes such as the Nilgai, Goral , Jackal, Hyena, Jungle Cat, Leopard Cat, Civets, Himalayan Yellow-Throated Marten, Sloth Bears, Pythons, King Cobra, Common Krait, Indian Cobra and the Monitor Lizard and above All the Asian Elephant.

Figure 5.3 Map of Rajaji National Park

Table 5.8 and Figure 5.4 & 5.5 below gives the distance of STP site from important sensitive receptors

Table 5.8:Surrounding Features of proposed STP Site within a radius of 10 km

Feature	Aerial Distance	Direction WRT proposed site
Tirsat Reserved Forest	2.1 Km	South West
Protected Forest (Dhalwala)	0.0 km	-
Raidaspur – Residential	1.4 km	South
Ashutoshnagar	1.3 km	South
Brahmanada Ashram	1.4 km	South East
Kailash Ashram	1.7 km	South East
Muni ki Reti	2.6 km	South
Rishikesh	1.8 km	South West
Barkot Reserve Forest	2.0 km	West
Chandrabhaga River	50 m	South
Narendra Nagar	4.2 km	North
River Ganga	3.5 km	South

Figure 5.4: Toposheet showing STP site and nearby features within 3 km and 10 km radius

Figure 5.5: Site Surroundings Image– 500 m and 10 km circles

Flora

The flora of Tehri Garhwal can be divided into six main categories of tropical dry deciduous forests, Sal forests, Chir forests, oak deodar, fir and spruce forests, and finally the Alpine pastures. The variety of forests is perhaps enough to make anyone realize the sheer multiplicity of the flora species. These forests not provide a safe haven for animals but also help the villagers to maintain the ecological balance and give them firewood and food. The scent of damp earth, leaves and the noise of grasshopper are the essence of Garhwali forests.

There are many trees like chir, Oaks, Conifers, Sal, Deodar, Haldu, Yew, Cypress, Rhododendron, Birch, Horse-Chestnut, Cycamore, Willow and Alder are found here. A large variety of medicinal herbs, shrubs and bushes like Brahmi and Ashwagandha and fruits like Cornel, Figs, Kaiphal, Mulberry, Kingora, Raspberry, Blackberry, Currants, Medlars, Gooseberries, Hazelnuts, Apples, Pears, Cherries, Apricots, Plums, Peaches, Oranges, Limes, Bananas, Pomegranates and Walnuts are found in abundance.

As per present site conditions only small shrubs and herbs need to be remove for construction of STP. None of these shrubs and herbs is endangered or rare. There scientific names of shrubs and herbs present at site and nearby area are provided below in table 5.8.

List of Flora and Fauna of Narendra Nagar Forest Division (with highlighted flora and Fauna of Muni Ki Reti) are attached as Annexure - 7

Table 5.9 Common plant (Generally Seasonal herbs and shrubs) found at STP and nearby area

S. No	Scientific Name	Common Name
1	*Zizyphus mauritiana*	Ber
2	*Lantana camara*	Lantana
3	*Parthenium hysterophorus*	Carrot Grass
4	*Cannabis sativa*	Bhang
5	*Urtica dioica*	Bicchu buti
6	*Colebrookea oppositifoila*	Bhirmoli

The present STP site is a barren forest land and no tree cutting is involved in construction of STP. Site photograph are attached as figure 5.6 below.

Figure 5.6 STP Site Photographs

Bird Eye view of STP site along with Chandrabhaga

Distance of STP site from nearby habitant area

Distance of STP site from nearby habitant area

Bird eye view of project town Dhalwala

The present STP site is a barren forest land and no tree cutting is involved in construction of STP

Fauna

The district of Tehri Garhwal is full of rich animal life which includes mammals, reptiles, Pisceans and birds. The forests are full of animals like Monkey, Langur, Wild-Cat, Goat, Pig, Fox, Wild-Dog, Black Bear and the Flying Squirrel (locally called Rinoola), elephants and critically endangered Musk Deer are found.

A number of carnivore species live in Tehri Garhwal region like the Snow Leopard, Leopard and sometimes Tigers. The Snow Leopard is rare and seriously endangered. The avian species consist of Pheasants, Kalij, Koklas, Cheers, Monal, Wild Fowls, Harial, Parrots, Chatak, Papiha, Haldu, Neelkanth, Pigeons, Partridges, Kala Titar, Chakor and Neora. The reptile population is represented by Cobra, Russell's viper, Ancistrodon himalayanus, Rat Snake, Leech and Blood-Sucking Lizard.

Pair of Hornbill at Muni Ki Reti

The Project Site location and Setting

The land identified for STP Site is forest land. It is a forest land but it is not close to an eco-sensitive area like national park, wild life sanctuary etc. However, to use it for construction of STP it will require Forest Clearance as per Forest (Conservation) Act, 1980 (With Amendments made in 1988) and Forest (Conservation) Rules, 2003 (With Amendments made in 2004).

The project site has sparse vegetation and perennial source of water, at present site is a barren land with seasonal grasses and construction of STP will not involve any tree cutting.

The proposed project site is a forest land with some seasonal herbs bushes only and will not result in loss of income from agricultural land, plantation or other existing land-use. The construction of proposed project will not require relocation of households or displace any tribal settlement

Project shall not result in reduction of access to traditional and river dependent communities (s). Moreover, there is no tribal settlement in or around the project area. Thus, there will be minimal adverse social impacts due to the project.

The vicinity of the project site falls under elephant corridor which is however at present is restricted to the right bank of river Chandrabhaga. However necessary protection works to be undertaken before the construction work as per the condition of No-Objection of Wildlife department. The NOC from Chief wildlife warden for the same is attached as **Annexure – 9**.

Socio Economic and Demographic Status

The area along the proposed project is Muni ki Reti classified as class IV town and has a Nagar Panchayat. The Muni ki Reti Nagar Panchayat (MNP) was established in 1950. The MNP has 7 wards and 7 elected members, led by a chairperson that is directly elected by the people. The administrative functions are led by Executive officer (EO). The MNP is responsible for provisions of services as sanitation (community toilets, LCS) street-lighting maintenance of roads, parks, and recreational facilities. Main sources of revenue generation for MNP are property taxes, license fees and rent for market buildings.

Dhalwala is Village (Rural area) in Narendra Nagar Mandal in Tehri Garhwal district, in Uttarakhand State. Dhalwala is 44 km far from its State's Capital City Dehradun.

Dhalwala GP has 15 wards and each ward has elected members, led by Gram Pradhan. Dhalwala Gram Panchayat (DGP) has the same duties for Dhalwala as MNP has for Muni ki Reti.

Muni Ki Reti is well connected with major destinations of the region like Dehradun (51 km), Rishikesh (3 km), Haridwar (27 km). From Delhi, one has to take NH 58 to Rishikesh from where Muni Ki Reti is another 3 km drive. Nearest railhead is Rishikesh and nearest airport is Jolly Grant (17 km) of Dehradun.

5.10 Administrative divisions

Muni ki Reti and Dhalwala are spread over an area of 6.00 sq. km. The population of Muni-ki-Reti was 7,881 as per 2001 census and & 10,551 as per 2011 census. The population of Dhalwala is 11,755 as per 2001 census and 18,007 as per 2011 census (as per data collected from Statistical department Narender Nagar). With this the growth rate for Muni Ki Reti and Dhalwala is increasing arithmetically. The Population Density of Muni-ki-Reti is 1,760/km2 & Population Density of Dhalwala is 3,000/km2 for the Year 2011. Copy of census population certified by Muni ki Reti Nagar Panchayat is attached as **annexure -3.**

5.11 Ward wise Census Population Data

Table 5.10: Population of Muni Ki Reti

S. No.	Name of ward	Population 2001	Population 2011	House Hold 2011
1	Satrughan ward	1185	1428	358
2	Bhagan Gad ward	1128	1771	411
3	Ganga Chetra ward	1121	1055	259
4	Shisumwada ward	1205	1124	136
5	Veshnav Devi Mandir ward	1133	2376	541
6	Swami Narayan Basic School ward	1068	1167	252
7	Dayanand Ashram ward	1041	1630	392
Total		**7,881**	**10,551**	**2,349**

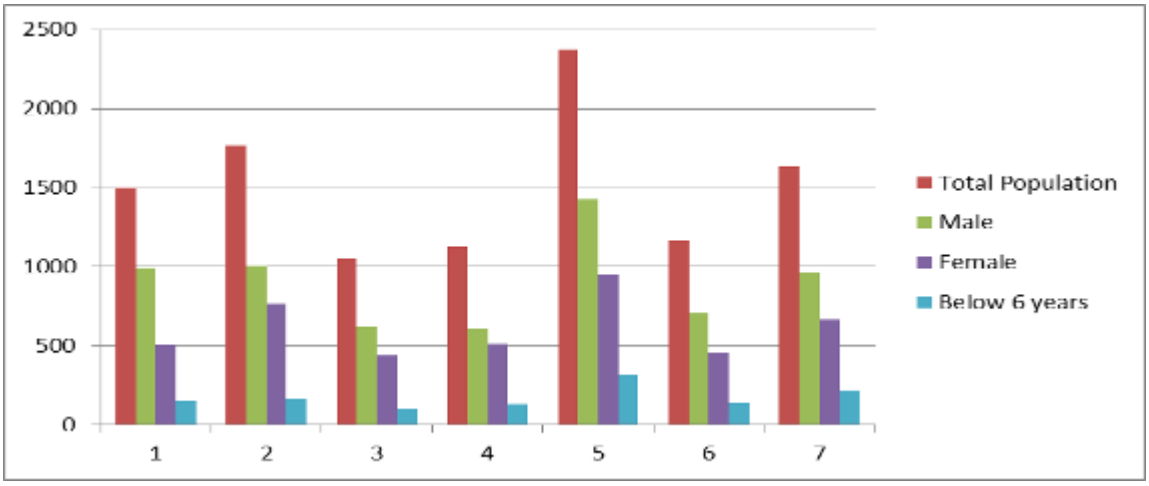
Table 5.11: Population of Dhalwala

S. No	Name of ward	Population 2001	Population 2011	House hold 2011
1	Ward No.1	647	991	184
2	Ward No.2	627	960	178
3	Ward No.3	999	1,530	283
4	Ward No.4	744	1,140	211
5	Ward No.5	686	1,051	195
6	Ward No.6	744	1,140	211
7	Ward No.7	1,098	1,682	311
8	Ward No.8	882	1,351	255
9	Ward No.9	627	960	171
10	Ward No.10	647	991	177
11	Ward No.11	744	1,140	204
12	Ward No.12	940	1,440	257
13	Ward No.13	666	1,020	189
14	Ward No.14	744	1,140	204
15	Ward No.15	960	1,471	272
	Total	**11,755**	**18,007**	**3,302**

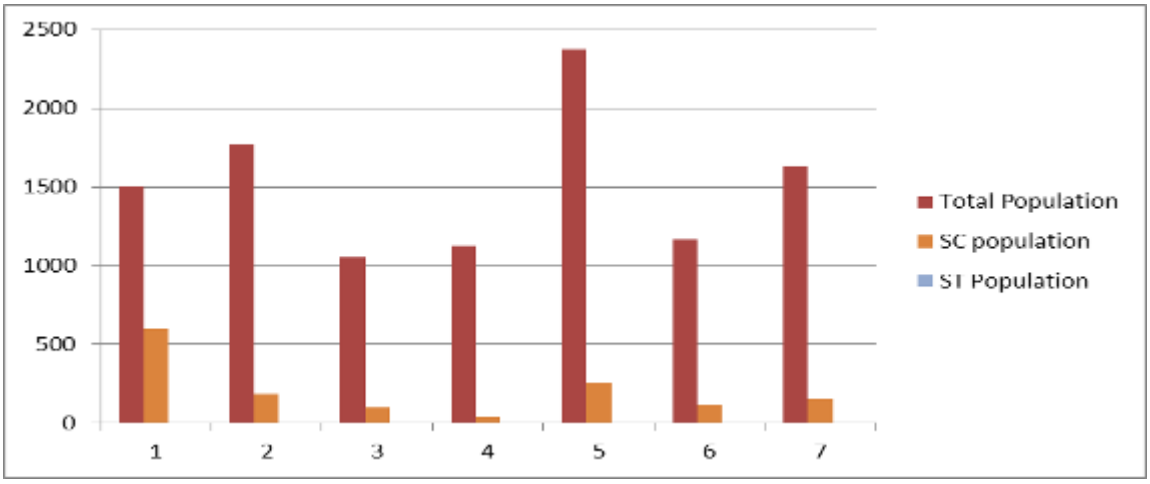
There is no specific data available with ULB regarding socio economic status of people in Muni ki Reti – Dhalwala. However, as per discussion with ULB officials, substantial segment of population (about 50%) in Muni ki Reti are engaged in Tourism, and River-rafting. About 30% population earns through Hotel industry. Being termed as holy town, Muni ki Reti has considerable population of Sadhus residing in various Ashrams. Only a small portion (about 5%) is associated with Government services.

In Dhalwala majority of people are either have Government service or associated with tourism industries. There are some small industries, which cater the needs of approximately 5% of population.

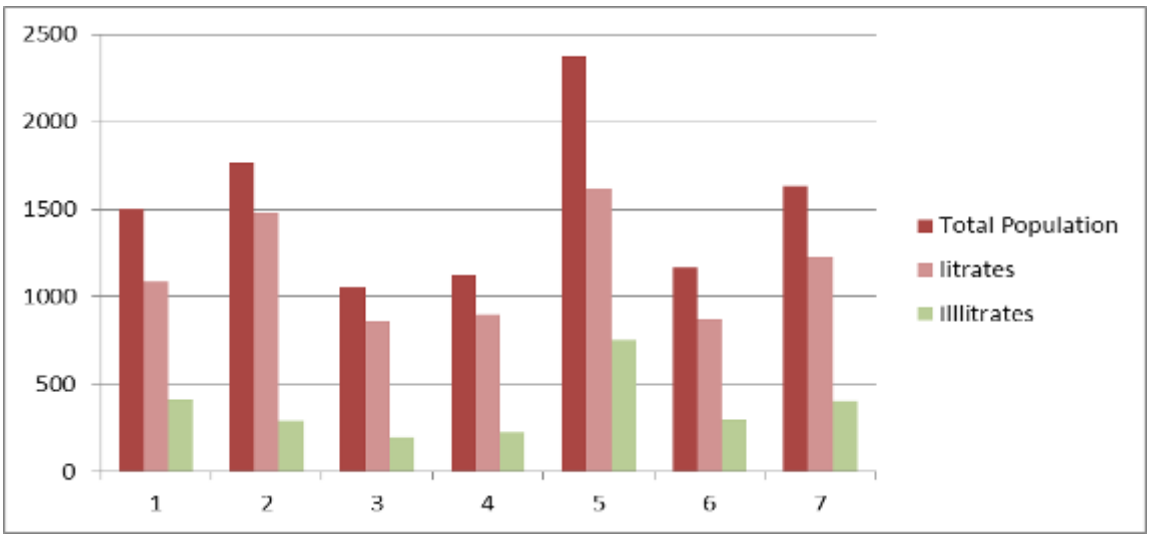
Total number 22 BPL card holder in Muni ki Reti and 56 in BPL card holder are in Dhalwala.



Graph showing Ward wise Male Female and Children below 6 years ratio



Graph showing Ward wise Schedule cast Schedule tribe ratio with Total Population of Muni ki Reti



Graph showing Ward wise litrates and illiterate ratio with Total Population of Muni ki Reti
Source: Census 2011

5.12 Economical activities

The economy of the town is centred on the agriculture, business and service sectors. A major portion of the town has rural base which makes the people engaged in agricultural activities. Business in the town is mainly centred on retailing goods. Also since the town lies on the Yatra (pilgrimage) routes, the floating population of towns on the holy festivals like Kumbh, Shivratri and Char Dham yatra, in particular is often several times the resident populations which provide tourism another commercial activity of the town. List of Hotels in Muni ki Reti are given below in table 5.12.

Table 5.12: Guest Houses and Hotels

S.N.	Name of Hotel/Guest House	Rooms
1.	Raj Laxmi hotel	10
2.	Shri Badrinath Kedarnath Mandir Samiti Yatri Vishram Grah	15
3.	Hotel Shivlok	10
4.	Dhanventari Bhavan Dharmshala	20
5.	Andhra Ashram	25
6.	Bajrang Paying Guest House	8
7.	Balaji Paying Guest House	5
8.	Ambika Paying Guest House	6
9.	Sony Paying Guest House	10
10.	JNM Thirth Yatri Niwas	5
11.	Madhban Ashram	25
12.	Hotel Vasundhara Palace	25
13.	Tourist Guest House	5
14.	Shiv Ganga Paying Guest House	6
15.	Hotel Great Ganga	18
16.	Onkaranand Gita Sadam	25
17.	Yogeshwaranand Athithi Ashram	20
18.	Pure Inn	10
19.	Onkaranand Ganga Sadan	25
20.	Ganga Beach Resort	20

Vegetable Market

1. Near 14 Bigha area Dhalwala
2. Vegetable markets of Muni Ki Reti are situated in Rhishikesh

5.13 Industrial activities

Uttarakhand has seen strong industrialization during the past five years, but that was mainly in the plains, following the special package announced by the Centre in 2003. Thus an Integrated Industrial Development Policy 2008 was launched in February especially for the industrial development of hilly and remote areas in the state. This policy aims to accelerate industrial development in the industrially backward and remote hill districts of the state, to develop industrial infrastructure, and to encourage entrepreneurial development through market encouragement and financial support to entrepreneurs. The policy aims to provide assured, good quality, uninterrupted and affordable power for industries and to simplify and rationalize labour laws and procedures in line with current requirements.

Small-scale industries - cottage, Khadi and village industries, handicrafts, and the silk and handloom sectors are most dominant around local villages of Muni ki Reti. Other than theses, tourism is the most popular industry in this area with domestic and international markets. The area attracts tourists for pilgrimages, cultural tourism, nature tourism, adventure tourism, wildlife tourism, eco-tourism, and amusement and leisure tourism.

As per the secondary data collected from the town, Muni ki Reti & Dhalwala does not have any polluting industries.

5.14 Educational activities

There are many educational institutes in the project area. List of some major institutes is provided below:

Details of Educational Institutes in Muni-ki-Reti

a. Purnanand Inter college (600-700 Seats)
b. Omkara Inter College (500 Seats)
c. Omkara Institute of Technology (500 Seats)
d. Swami Janardhan School upto Class 8th (250 Seats)

Details of Educational Institutes in Dhalwala

a. MIT College (1000 – 1200 Seats)
b. Saraswati Vidhya Mandir Girls (300-400 Seats)
c. Saraswati Vidhya Mandir Boys (400-500 Seats)

5.15 Cultural activities

The religion and culture urges the people of Muni ki Reti - Dhalwala find an expression in various fairs, which are in turn closely linked to the economic activities of the region. Number of folk songs and dances has been kept alive because of these fairs. In older times, when means of transport weren't so good these fares were an opportunity for friends and relatives to meet regularly. The fairs and folk festivals of Muni ki Reti - Dhalwala are very colourful and distinctive, and are the blend of various natural, social and cultural factors. The people also celebrate all the major Indian festivals. Basant Pancharni, Bhitauli, Harela, Phooldei, Batsavitri, Ganga Dusshera, Dikar Puja, Olgi or Ghee Sankranti, Khatarua, Ghuian Ekadashi and Ghughutia

are some of the major festivals celebrated in Muni ki Reti and Dhalwala.

5.16 Religious activities

Traditionally considered the gateway for the Char Dham and Kawad pilgrimage — Badrinath, Kedarnath, Gangotri, and Yamunotri attract many pilgrims, making it a town of religious significance.

The Religious places and Historical important places of Muni ki Reti - Dhalwala are

- Ram Jhula
- Prachin Adi Badrinarayan Shatrughan Mandir
- The Herbal Garden
- Shri Kailash Ashram
- Shri Shivananda Ashram
- Omkarananda Ashram Himalayas
- Swami Dayananda Ashram
- Baba Mastram Gufa
- Mangal Ashram
- Yog Niketan Ashram
- Harihar Kailash Gyan pith
- Kailash Ashram
- Sitaram Ashram
- Swatantranand Ashram
- Panchwati Ashram
- Ishwardas Ashram
- Dayanand Ashram
- Avdhooth wara Ashram
- Vitthal Ashram
- Swami Narayan ashram
- Yogpith Ashram
- Madhuwan Ashram
- Shatrughan mandir
- Madhuban mandir
- Kailash Ashram Temple

Ram Jhula is located 3 kilometres north of Rishikesh at Muni Ki Reti. Built in the 1986, over river Ganges to cross the river and is a landmark of Muni ki Reti.

There are some of the Hindu ashrams and religious centres like "Gita Bhawan", and "Swargashram" located here. It is also a connecting bridge between Swargashram, Gita Bhawan and other temples with Sivananda Ashram. Though similar in design, this bridge is bigger than Lakshman Jhula. This bridge constructed with the span of 450 feet (140 m) and above 59 feet (18 m) from summer water level.

As per Archaeological Survey of India (list of protected monument provide below) no monument is Muni ki Reti is having Archaeological significance.

Protected Monuments in Uttarakhand

Uttarakhand

Sl. no	Name of monument(s)	Location
1.	Vaishnav group of temples- Dew al	Pauri
2.	Devalgarh group of Temples- Devalgarh	Pauri
3.	Shiv Temple- Paithani	Pauri
4.	Shivalaya- Kukhargaon	Pauri
5.	Laxmi- Narayan Group of Temples- Sumari	Pauri
6.	Narayankoti Group of Temples-Narayankoti	Rudraprayag
7.	Nalachatti Temple/Stupa	Rudraprayag
8.	Damyanti Temple-Hyun	Rudraprayag
9.	Laxmi-Narayan Group of Temples-Bairangana	Rudraprayag
10.	Vaitarni Group of Temples- Gopeshvar	Chamoli
11.	Govind Group of Temples- Simli	Chamoli
12.	Kulsari Temple- Kulsari	Chamoli
13.	Narayan Group of Temple- Devrana	Chamoli
14.	Surya Group ofTemple- Ranihaat	Tehri
15.	Raj-Rajeshw ar Temple- Raniaat	Tehri
16.	Nanda Devi of temples-Bajinga	Tehri
17.	Kyark Raithal Group of temples	Uttarkashi
18.	Jamdaghni Temple- Than	Uttarkashi
19.	Mahasu Temple-Barkot	Uttarkashi
20.	Mahasu Temple-Pujeli	Uttarkashi
21.	Devdara Temple- Paunti	Uttarkashi

Source: www.asi.nic.in

There are several important religious and historical places in small town of Muni-ki-Reti and therefore adequate construction mechanism to be taken to ensure that there won't be any disturbance to the foundation of these religious places due to construction

6. Environmental and Social Impacts

Pollution abetment projects may prove beneficial for the environment and society or they may have some adverse impacts as well. Planners and decision makers have realized the importance of understanding the consequences of any such projects on both environmental and social sectors, and have started taking steps to avoid any adverse impacts. Based on the major findings obtained from the field visits and secondary data analysis, the possible environmental and social issues with reference to the proposed sewer works in Muni ki Reti is been discussed in these sections. The proposed sub-project consists of three major activities which include:

- Construction of approximately 29.5 km long sewerage network including all required trunk/ branch/ lateral sewer.
- Construction of 7.5 mld capacity STP
- Construction of sewage pumping station

The construction activities would generally include earthworks (excavation, filling, shuttering, compacting), temporary diversion of existing sewer lines, civil construction (sewer lines, STP, SPS, etc) and E & M installation and commissioning.

Potential Environmental Impacts

The environmental impact of the proposed project may be categorized in two phases:

- During the construction phase which would be temporary and short term;
- During the operation phase which would have long term effects

The activities identified for project under each phase are:

A. Construction phase

1. Site clearing and levelling
2. Excavation & Foundation
3. Transportation of construction materials, equipment's & machineries
4. Construction of STP Units & related infrastructure

B. Operation phase

1. Operation of STP
2. Disposal of treated effluent

Impacts during construction phase

The impacts of construction stage activities on the various environmental parameters are examined below:

Impact on Air Environment

During the construction phase emissions is expected from the diesel generator(s). Another source of air pollution is from materials transport through heavy vehicles to the site. These emissions are temporary in nature. Bulldozers, excavators, cranes, DG sets, welding machines, trucks and trailers for transportation of materials will also contribute to gaseous emissions

through use of diesel as a fuel. Based on the field observation of ongoing projects and interaction/consultation with stake-holders, it is expected that the levels of dust (RSPM and SPM), carbon mono-oxide (CO),hydrocarbons and NOx (NO & NO_2) is likely to increase during the construction phase mainly because of:

Excavation, backfilling, compaction activity and movement of vehicles on un-paved roads (increases dust level) Vehicle exhausts from construction machinery and from light and heavy vehicles for transportation of pipes and construction material like cement, etc. (increases in NO_2).

Use of portable diesel generators and other fuel fired machinery (increases in CO).

However, the emission of NOx, SO_2 is expected to cause negligible change in the ambient air quality. During pipeline laying. The following activities cause air pollution:

Emissions from equipment used for construction of the pipeline.

Emissions of dust during excavation of soil

Emissions from the exhausts of vehicles used for the transport of the workers, the transport of construction materials and equipment and construction vehicles themselves During pipeline laying, air emissions are not expected to adversely impact ambient air quality in and around project activity area. Due flat terrain good dispersion is available for quick dispersal of the pollutants and thereby the impacts due to NOx, SO 2 emissions during the construction will be negligible.

Impact on Noise levels

The proposed construction activities are expected to increase the noise levels mainly due to plying of construction vehicles, pumping machines, use of portable generators, mechanical machinery such as cranes, riveting machines, hammering etc. There will be an increase in noise levels in areas situated close to the road due to movement of trucks and construction activities. Temporary impacts may especially be felt at educational facilities like schools/colleges , cultural/religious centres including all temples, mosques and Gurudwaras in the region. However, the impact of truck movements and construction activities on noise level in residential areas situated at 50 meter and beyond from the road will be insignificant considering the excess attenuation and will be below the stipulated National Ambient Noise Level standard i.e. 55 dB(A) during day time. Increase of noise level at night may produce disturbances, causing sleeplessness in people in the vicinity of the site in case construction activity is extended into the night hours. As per the baseline environmental status, the noise levels in Muni Ki Reti zone are expected to be within permissible limits as the area is mostly residential and has limited commercial, and no industrial area. However, these impacts are of temporary nature, lasting only during the construction period.

The proposed project sites are located in open areas with no major industrial activities undertaken in the vicinity of the sites. Current noise sources at the sites of the project are merely due to natural sources. Manmade sources include traffic noise which was negligible in the project sites due to low traffic volumes. The construction of the treatment plant will may

impact noise level during the construction phase but during operation phase, noise levels are not expected to exceed current baseline measurements.

Construction activities will take place across the whole project components that include Sewerage

- Treatment Plant, emergency overflow pipe, lying of sewer pipe line and outfall. In general, the impact of the construction will depend on;
- The proximity of the construction activities to noise sensitive receivers (NSRs);
- The specific heavy equipment deployed; and
- The length of time over which the construction works are taken.

Typical noise emissions from various construction equipments that may be used at the project sites are summarized in table below:-

4. **Noise and Vibration Impacts.** Noise and vibration-emitting construction activities include earthworks, rock crushing, concrete mixing, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise and vibration impacts will be high in areas where noise-sensitive institutions such as health care and educational facilities are situated. These impacts will be temporary, short-term, intermittent, and expected to be in the range of 80 to 100 dB(A) as per **Table 6.1** (typical noise levels of principal construction equipment).

Table 6.1: Typical Noise Levels of Principal Construction Equipment

CLEARING		STRUCTURE CONSTRUCTION	
Bulldozer	80	Crane	75-77
Front end loader	72-84	Welding generator	71-82
Jack hammer	81-98	Concrete mixer	74-88
Crane with ball	75-87	Concrete pump	81-84
		Concrete vibrator	76
EXCAVATION & EARTH MOVING		Air compressor	74-87
Bulldozer	80	Pneumatic tools	81-98
Backhoe	72-93	Bulldozer	80
Front end loader	72-84	Cement and dump trucks	83-94
Dump truck	83-94	Front end loader	72-84
Jack hammer	81-98	Dump truck	83-94
Scraper	80-93	Paver	86-88

GRADING AND COMPACTING		LANDSCAPING AND CLEAN-UP	
Grader	80-93	Bulldozer	80
Roller	73-75	Backhoe	72-93
		Truck	83-94
PAVING		Front end loader	72-84
Paver	86-88	Dump truck	83-94
Truck	83-94	Paver	86-88
Tamper	74-77	Dump truck	83-94

Source: U.S. Environmental Protection Agency. Noise from Construction Equipment and Operations. Building Equipment and Home Appliances. NJID. 300.1. December 31. 1971

Effective noise management protocols would be implemented wherever applicable during construction and operating phases of the life of this project. Besides this protocol measures, construction work will be limited to day time periods, thus avoiding the night time which is the most noise sensitive. The following measures should be treated as a part of the project proposal which include:

- planting of buffer trees and shrubs where appropriate;
- locating noisy equipments as far as possible from NSRs;
- orienting equipment with high directivity to emit noise away from NSRs;
- switching off unnecessary or idle equipments;
- fitting of noise mufflers to mobile equipments; and

Preventive maintenance of equipment to minimize noise emissions.

In the light of the prevailing low ambient noise levels in the area surrounding the project sites, it is inevitable that some noise disturbance will be experienced, particularly during the construction of the emergency outfall pipe. Such impacts, although temporary and therefore reversible, are assessed to be negative and low to moderate significance.

Impact on Land Environment

The land identified for proposed STP is Government forest land and it is adjacent to Rajaji National Park, because of this project falls under High assessment category. But NOC has been obtained from Additional Principal Chief conservator of Forest (Wild Life). As per the directives from the Wildlife Department it is planned to construct a protection wall surrounding the proposed STP to mitigate the adverse impacts. However, local land and soil may get affected during construction work as it would involve land clearing. Normally removal of vegetation and land clearing is associated with soil erosion, however these issued are localised temporary effect and associated with construction phase only.

Excessive debris, trash or construction remnants (e.g. dirt piles) may create problems related to drainage, unhygienic conditions and poor aesthetics. If construction materials are handled appropriately, it may affect agricultural lands minutely.

Uncontrolled disposal of municipal solid waste generation at SPS and Sludge at STP may impact the land environment.

Since the project does not involve any private land acquisition hence, there will not be any impacts on titleholders land or structures

Surface and Ground Water Hydrology

The proposed project being located near the river Ganga may result in the change in direction of the flow of surface runoff from the catchment area. However, the quantity of water reaching the river Ganga is not going to change. The project area has a major water bodies and also some important ghats on Ganga to be picked up in River front development. However these areas are not expected to be affected as sewer lines are not planned to be laid through any of these areas. However, with other finer materials such as construction powders, fluids and greases, if not appropriately managed or in the event of an accident, there may be potential for temporary contamination of the river Ganga via the various drains and nallas, during rainfall.

Impact on Biological Environment

Under the proposed project STP is proposed on forest land. However, clearance from the forest department has already been received. NOC has been received from the National Board for Wildlife. As detailed out there are no endangered floral species in the study area. The proposed project does not envisage any destruction or displacement of any endemic floral or faunal species, hence the impact will be insignificant.

Impact on Socio-Economic Environment

All the activities to be carried out during construction and operation phases will require skilled and unskilled labourers, hence creating temporary as well as permanent employment for local people. As the proposed project is located within the city limit with lot of employment opportunities, it is likely to have positive socio-cultural economic impact.

Impact on Occupational Health and Safety

The construction of STP facilities is not going to involve the large scale construction activities; however, all the workers will be equipped with necessary personal protective equipments (PPE) and will be trained for safety aspects to be followed during working hours.

Impact on Environmental sensitive areas

Based on observations and findings from field visits, interaction with government officials and consultation with local residents, an assessment of the environmentally and ecologically sensitive areas was made. The area does not have any flora and fauna components which require any special attention from conservation point of view. However, STP under the proposed project is to be constructed on the forest land and NOC has been received both from the Forest department and Wildlife Department.

With regard to sensitive aquatic areas and water bodies, there are none. It was also observed that the major land use pattern of the area is residential, with limited agricultural and no forest areas.

There are no major tourist areas falling in the area, except the banks of river Ganga which is mainly utilized by tourists/ pilgrims for conducting aarthi Pooja or homm-havans and for having a holy bath especially during festival times. Even the river banks will not be impacted by the sewer works as, the construction and operational works will take place inside the residential areas which are away from river banks.

Impact on Traffic

Due to the excavation work which will take place on the main roads of the city, there will be a disturbance in the traffic movement. People may suffer some inconvenience during the morning and evening peak hours. Traffic disruption can be expected in busy areas such as area around NH -58 area due to transportation of material of construction. Also many of the roads in many pockets of the district are very narrow some ranging from 7 -12 ft. wide. Any excavation along the roads in these areas will inhibit traffic movement. Temporary inconveniences caused by construction if the project is implemented in a timely manner. However, the same interviewees felt that they had little confidence in the ability of the agency to execute a project in an efficient manner. They had grievances with the long duration of construction work.

Impact on existing utility services

The road opening activities may damage the underground water pipelines or electricity poles in the vicinity of the site for the proposed sub-projects. This will lead to water supply interruptions, disruption in electricity supply and will involve expensive repair costs. For sewerage works in the entire city, flooding could be an issue during the monsoons, especially in the congested regions areas. This issue may further aggravate due to blocked drains and poor solid waste management in the city.

Impacts during operation phase

The impacts of operation stage activities on the various environmental parameters are examined below:

Air Environment

As the STP does not involve any type of unit operations releasing the gaseous emissions, hence, the impact on ambient air quality is likely to be negligible.

Water Environment

Water resources in the project area would be the most positively benefited. The probably environmental impacts related to water during operation stage may include unpredictable events such as:

- Temporary flooding of adjacent areas due to accidental leakages/bursts and also due to blockages and backlogging of lines.

- Water pollution and possibility of mixing with water supply line due to leakages/ overflows from the sewer lines
- Impairment of receiving water quality in surface/sub-surface source due to inadequate /inefficient sewage treatment process.

Noise quality

Improper handling and irregular maintenance of operating machines including pumps, generators, air diffusers, etc may lead to increased noise pollution during operation activity.

Impact on Occupational Health and Safety

As the operation of STP facilities involve handling and use of chemicals such as Lime, Poly electrolyte, Urea, DAP etc. the safety of workers invites safety considerations. As the workers will be equipped with necessary **p**ersonal **p**rotective **e**quipments (PPE) and will be trained for safety aspects to be followed during working hours, the impact will be insignificant as a whole. However, the guidelines of CPCB for health and safety of workers at Effluent Treatment Plant will be strictly adhered to.

Dewatering of Excess Water & Sludge Disposal

The waste water generated during construction will be dewatering by well sinking method and other method to control the water table the details process is given below:

- During construction, ground and surface water shall be controlled to the extent that excavation and pipe installation can proceed in the specified manner and such that the trench bottom is not disturbed to the detriment of the pipe installation. Trench water shall not be permitted to enter the pipe being installed unless approval is received from the Engineer.
- Pumps, well points, or other equipment shall be employed to keep excavations free of water.
- Caution shall be exercised to make sure that foundation problems with existing structures and works under construction do not result from the selected method of dewatering excavations.
- Discharge from pumps, well points, or other dewatering equipment shall be located and controlled such that loss, damage, nuisance, or injury does not result.
- The contractor shall be responsible for any claims or actions resulting from the dewatering operation.
- waste sludge generated during excavation will be collected properly and will disposed on identified

Waste disposal site regularly by packed tractor trolley, mounted tanker and other environmental friendly collection and disposal sources.

Wild life Movement

As the proposed STP is in close vicinity to the Rajaji National Park and during the operation phase, movement of elephants towards the site can be anticipated. However, on the directives of wild life department, protection wall is proposed to build in the periphery of proposed STP.

As the area near to proposed site is not under any agricultural activity, there are less chances of the conflicts among wildlife and the local residents.

Conclusion

For the proposed project, land has been received from the forest department after completing all the necessary processes anf from the Rishikesh Nagar Palika and Jalsanthan. However, no land acquisition from the titleholders will be done, there are no R&R issues related to land acquisition, including but not limited to loss of property, resettlement, land regulations, etc. Sewer lines will pass through various residential colonies of sewerage zone. Moreover there would be no loss of community assets during the construction as noticed during field survey and consultation with the local people. Loss of access in temporary manner would be compensated by local mitigation measures as discussed later in the report. The likely beneficial impacts of the projects include:

- Improvement in sewerage collection and treatment within the cities/towns
- Prevention of storm drains carrying sanitary sullage or dry weather flow
- Prevention of ground water and soil pollution due to infiltration of untreated liquid waste
- Prevention of discharge of untreated sewage into River Ganga
- Improvement in water quality of River Ganga, a national resource
- Improvement in environmental sanitation health and reduction in associated health hazards within the cities/towns
- Improvement in quality of life, human dignity and increased productivity
- Reduced nuisance of open defecation due to low cost sanitation and reduced malarial risks and other health hazards.
- EMP clearance from NMCG and World Bank and disclosure as required;
- Integrating the EMP in the bid document of contractor as an addendum;
- Tree plantation around the STP;

7. Social Development Outcomes and Issues

Access to sewer network: This service will cater to the projected population until the year 2045. According to the DPR, population in Muni ki Reti is expected to increase from 13,943 in 2015 to 23,555 by 2045 and from 24,610 in 2015 to 47,117 by 2045 in Dhalwala. In this time, waste water generation is expected to increase from 3.830 MLD to 7,020 KLD. Increased sewerage will prevent outflow of waste water to the Ganga.

Better hygienic conditions: The sewerage network will provide improved environmental conditions due to the contained handling of wastes, leading to improved public health conditions and will likely reduce the average medical expenses of the residents in the project areas. According to DPR this area is completely un-sewered and waste water finds its way into the river through open drains. These areas suffer from powerful odors and greater amounts of flies/mosquitoes, which will be mitigated with the sewerage connection and overall improvement in environment and health is anticipated from this project.

Increase in household connections: 100% sewer connection has been proposed for Muni ki Reti – Dhalwala and this will be achieved by 2013.

Decrease in water pollution: Because of the sewer line connection, all the waste water will be collected and directed to treatment plant, which only after treatment will be disposed of to the river, hence decreasing the pollutant load in the river. Due to current pollution, water quality in the river Ganga is impaired at the Muni ki Reti Dhalwala.

Increase in aesthetic value of the project area: connection to sewer lines enhance the aesthetic value of the area, as there will be more cleanliness and no wastewater discharge to open area. This will also lead to appreciation in the property value. This will eventually lead to increase in standard of living of the people in the project site. The support for this statement comes from the counter-factual scenario observed in areas with only nalas (bad odor, insects, etc.).


Raw sewage is flowing in natural water drains (Existing conditions)

Cultural sentiments: Proper sewage disposal would increase the river water quality. As the holy river is attached to many rituals and customs, enhanced river water quality would connect to sentiments of the people. Especially during `Kumbh Mela' better water quality for bathing would be boon for pilgrims.

7.1 Social Development Issues in Project Vicinity and Social Services to be provided by the project

The social benefits of the proposed project are given above. The social services required to ensure that these benefits are realized are given below:

Ensure backward section of the society gets the facility: Some residents complained that they did not feel they personally would benefit from the project as their houses did not have sewer connection. Thus, increasing household connections will ensure that project benefits are equitably distributed. Special care should be taken to ensure access for backward and vulnerable sections of the society. Full benefits of the facilities proposed under DPR cannot be realized unless a programme to improve coverage of branch sewers and household connection is carried in parallel.

Increasing public toilet facilities: Similarly increasing public toilet facilities will ensure that residents of Muni ki Reti - Dhalwala without permanent housing and tourists (especially visiting during `Kumbh Mela and Char Dham Yatra' are able to benefit from the increased sewerage access. Increasing toilet access will decrease practices such as Open Defecation. This eventually would lead to better water quality and would have better environment and social ramifications.

Targeting of economically weaker communities: for construction jobs related to sub-project: In order to ensure that the economic benefits of the sub-project is felt by those in need, those from backward communities should be specifically targeted for relevant jobs.

Proper clean-up of project debris: In order to maximize aesthetic benefits and ensure that debris does not clog sewer path, proper clean-up of project areas must be performed after the project is completed. Collection and disposal of debris is essential for proper function of other essential processes like traffic routing, pedestrian pathways, and clearance of dust and particles causing pollution. Clean area will also enhance the aesthetic value and increase the property rate of the area.

7.2 Community Awareness and Participation

Introduction

Community awareness and participation is the key to success for achieving 100% sanitation and to ensure personal hygiene in the community. A group of people living together with common interests and purpose may be called a community. There are certain common grounds amongst all the members and groups of any given community. These grounds are: locus, cast, creed, religion, customs, traditions, attitudes, gender, age group etc., because of these common interests. The local body can never be successful in urban sanitation without active community awareness and participation, whatever may be the investments made through municipal or Government funds.

The local bodies such as ward committees of municipality corporations ward council of municipalities and Nagar Panchayats are the institutions of grass root democracy having

elected members representing a small group of electorate. It also has an outreach service at the ward level through which it can easily interact with the people on almost all-important issues. The local body should therefore, seriously consider involving the community in all programmes through a consultative process and variety of other communication approaches dealt with in this chapter later, and adopt strategies which are acceptable to the community.

Need for Community Awareness and Participation

The objective of a sanitation and sewerage agency is to provide safe, hygienic sanitation facilities and adequate sewage collection, treatment, and disposal services to improve public health at a reasonable cost. The residents must realize that the quality of life depends on how and what the sewerage utilities serve and that sewage collection and treatment is not a free service but a value added service with cost implications. Unfortunately, these services are most often considered to be free by the residents, and the sanitation and sewerage services providers do not enjoy the confidence of residents. This in turn fails to acquire a satisfactory level of support and participation from the residents. Hence, attention should be paid to community awareness and participation programmes.

The objective of any community awareness and participation programme is to develop an understanding of the benefits of sewage collection, treatment and disposal, improved sanitary conditions, better user understanding and involvement in terms of time and money, and enhanced acceptability of this concept and organizational credibility.

On the other hand, the community has responsibility for participating willingly in community awareness and involvement programmes, understanding the significance of sewerage system to achieve sanitized community, and bring about behavioural changes aimed at adoption of healthy sanitation practices.

Community Awareness Programme

For the successful implementation of any programme involving the community at large in universal sanitation in urban areas, it is essential to spell out clearly and make known the manner in which the local body proposes to tackle the problem of urban sanitation and the extent to which community participation in urban sanitation is expected to make the city sanitized, healthy and liveable and improve the quality of life in the city.

The scope of the community awareness programme includes the following:

a) Enable the community to understand the need for the sewerage system

b) Enable the community to understand the need for proper sewage treatment and disposal

c) Enable the community to participate in planning

d) Enable the community to appreciate that this service is not free because it is valuable and has direct impact on health and living environment

e) Enable the community to understand what they get (tangible/intangible, long term/short term benefits) in return

f) Inform and obtain approval of the community for various improvement measures thus creating a feeling of close participation.

Process of Building Community Awareness and Involvement

For developing community awareness and involvement, the appropriate opinion leaders such as community leaders, teachers, and the public at large should be identified. Efforts should also be made to involve the sanitation inspector and other staff of the local government as also the chief health officer. Communication material should preferably be prepared to suit the target audience: house owners, Residents Welfare Associations, Government organizations, Government aided organizations, Shulabh Sauchalayas, bus stands, Bathing Ghats etc. The communication policy for this purpose should involve the elected civic body, Consumer Action Groups, Residents Welfare Associations, local NGOs, local community workers, and so on. The agency should try new and imaginative ways to involve local communities in its plans and programmes, and thereby provide the public its due pride of belongingness and involvement.

Defining the Concerned Local Community

The following points need to be considered for defining the concerned local community:

a) Geographic and administrative boundaries

b) Major media in the concerned locality (newspaper, radio/television, local speakers and town meetings)

c) Residents (demographic and economic conditions).

Communication Strategy

Information sharing & Communication Planning is an integral part of planning for sustained development. The development of human society has largely been due to its ability to communicate and use information and ideas for progress. This project is being implemented with the aims to reduce environmental pollution due to improper sanitation facilities. The success of this project is heavily dependent on the participation of the people, in the implementation process. To enable people to participate in the development process, it is necessary that people have adequate knowledge about the nature and content of these projects. Information Education and Communication, therefore, assumes added significance in the context of this project. The feedback received on the implementation of such projects in the field indicate that these projects are critically dependent on the awareness level about them, transparency in the implementation process at the field level, participation of the people in the development process and accountability of different groups of stakeholders with different stakes e.g. Executive agency, Municipality, beneficiaries, contractors etc.

Information, Education and Communication plays a pivotal role in creating awareness, mobilizing people and making development participatory through advocacy and by transferring knowledge, skills and techniques to the people. It is also critical for bringing about transparency in implementation of the project at the field level and for promoting the concept of accountability and social audit. It is proposed to formulate appropriate IEC strategy in tune with the communication needs of the project. The IEC activities are to be undertaken through the available & effective modes of communication in order to inform the people with messages and details on Solid Waste Management Project. Dissemination of information has to be sustained over a period of time and also that in order to make communication effective, it has to be in the language and idiom of the target groups. Accordingly, efforts are required to be made through Electronic Media and Print Media to disseminate information in regional languages and dialects, besides Hindi and English. In addition, the Action Plan also envisages IEC activities through other modes of communication, outdoor publicity and other conventional and non-conventional modes of communication for reaching out to the people in project areas.

Public Outreach

The public outreach strategy needs to involve every section and layer of the society, including and involving school children, student community, teachers and community leaders and spiritual leaders and other identified stakeholders that will also engage the attention of mass media. Special strategic focus on the involvement of women from all sections of the society as active partners in the program needs to be emphasized; women are the primary trainers at home and most primary teachers. The program would encourage and persuade the general public to adopt better health, hygiene, and sanitation practices. Various issues like water conservation, safe drinking water facility, provision of clean, safe and separate toilets for girls and boys, adequate dustbins for solid waste segregation at source, regular health check-ups etc need to be targeted.

The overall perception management strategy would require active participation of religious personnel and elders of various communities and proactive members of the community (including spiritual leaders) who can assume leadership in such situations. The other important human resource that would become a very effective agent of change and is to be integral part of strategizing for this agency would be students in schools, colleges and universities and the teaching fraternity. The messages for “Save Ganga” have to be incorporated in larger construction of messages for saving the environment and giving clean, green and safe future to our children.

The communication program and outreach activities also propose to use community occasions and festivals as special opportunities for pursuing a vigorous message culmination domain.

Media Outreach

Advertising Campaigns to Build Awareness

The Uttrakhand Peyjal Sansadhan Vikas Evam Nirman Nigam as the executive agency for the Ganga Action Plan in Uttrakhand, can develop many advertising campaigns with an eye on engaging citizens of Muni ki Reti – Dhalwala area and also to promote certain behavioural

changes such as installation of sewer connection, using dustbins, community toilets and rain water harvesting, full page student-friendly advertisements on the back of text books, school note books. The text book advertisements will target not only at the school children, but also their parents and family members as well.

Under GAP all the advertising campaigns of Previous Action plans could be reiterated. In addition, it is suggested that advertising campaigns could be printed in Daily Newspapers of project town on a regular basis. Besides, the local television network could also be engaged to air the advertisement campaigns. It is also felt that advertising campaigns' banners could be prepared.

The population of Nearby town and from all over the nation, mostly Hindus, invariably visit river Ganga for religious activities specially bath on Magh Purnima, Makar Sankranti, Holi, Dasahra, Kartik Purnima, Kumbha Mela, Kawar Yatra and Amawasya days. It is suggested that on these days concerted efforts on communication of messages through banners, posters, audio and video medium, etc., could be placed along the banks of river Ganga on these designated days for people to see, hear and absorb.

It is suggested that Announcement vehicles could be used of to propagate the advertisement campaigns in the entire town. This would be an effective way of communicating the program, initiatives, activities, etc., of the Uttrakhand Payjal Sansadhan Vikas Evam Nirman Nigam under the GAP.

Critical Media Coverage and Analysis

Print Media

The power of the press arises from its ability of appealing to the minds of the people and being capable of moving their hearts. Despite the fast growth of the electronic media, the printed word continues to play a crucial role in disseminating information and mobilizing people. It is required to ensure that the Project is portrayed in proper perspective, several steps need to be taken to sensitize the media about health & sanitation issues. During the implementation period, it is proposed to organize press conferences, press tours and workshops, so as to sensitize press persons about these issues. It is also proposed to issue advertisements at regular intervals in State and Regional Press. It is also proposed to publish booklets, leaflets providing information about the project & need for proper health & sanitation simple language in Hindi and Regional languages. The other possible means for publicity could be printing & distribution of wall calendars, desk calendars.

List of Local News Paper in Muni ki Reti - Dhalwala Area

1. Danik Jagran
2. Hindustan
3. Amar Ujala

Electronic Media

An intensive IEC campaign over the Electronic Media (Radio and TV) is also required for optimum dissemination of information on these issues. In order to meet the area and region specific communication needs of this project, audio and video programmes of suitable time period shall be produced and broadcast/telecast over local and primary stations of All India Radio and Regional Kendras of Doordarshan. In addition short duration spots on different themes relating to health & sanitation shall need to produce in different languages and broadcast over AIR and Doordarshan. Synergies between different media can be exploited to great advantage. **For meeting expenditure on IEC activities, a suitable provision in cost estimates has been taken.**

List of Local TV channel

1. ETV, Uttrakhand
2. TV 100
3. Zee UP/Uttarakhand
4. Sahara News Uttarakhand

Advocacy outreach

Advocacy is one of the main tools used to mobilize politicians and other partners for a cause. "Advocacy is speaking up, drawing attention to an issue, winning the support of key constituencies in order to influence policies and spending, and bring about change. Successful advocates usually start by identifying the people they need to influence and planning the best ways to communicate with them. They organize networks and coalitions to create a groundswell of support that can influence key decision- makers. They work with the media to help communicate the messages.

There are at least two messages we need to get across to politicians and other key partners. Lack of sanitation is responsible for most of the diseases and death in developing countries today. Sanitation together with hygiene education will break the cycles of these diseases. Different messages may be needed for the general public based upon prestige, comfort, convenience and privacy. Whether health should also be a message for the general public will depend upon the outcome of the market research required to target the general public.

The target audience for this advocacy plan are Stakeholders of Executing and implementing agencies of this project, stakeholders of ULBs, MLA and MP etc. The best way identified to communicate with these identified groups are personal contact, through the media (newspapers, television or radio), or through traditional channels of communication such as temples, spiritual leaders etc.

Community Participation Units

For successful implementation of project and its consequent efficient & uninterrupted operations, the active participation of all the stakeholders is of utmost importance which includes the actual users. The primary task is to educate, inform and enlighten the public for

do's and don'ts for effective utilization of waste management system. The required do's and don'ts are as below:

- For connecting the property to Public Sewer as soon as the system is commissioned.
- To connect all the sullage disposal units to Sewers
- Not to dump any solid waste in property connection to manholes
- Not to discharge any objectionable liquid in public sewers
- Not to connect rain spouts to sewers
- Proper dispose of Solid waste
- Not to defecate in open places and promotion of use of community toilets

Motivate public to pay for municipal services

- Not to dump solid waste in raw sever in open rain fed drains

To achieve these objectives, it is proposed to setup a community participation unit which will perform following activities:

- Devise & implement a Communication Plan
- Implement a Media Plan for dissemination of information
- Catalyze formation of user groups, resident welfare association for effective involvement of users

The various components for these activities shall be as follows:

The objective should be to ensure that the communities are aware that

1. There is a need for conservation program and that they will benefit from it.

2. There are costs involved in such programs and part of the O&M burden will have to be borne by them,

3. The communities are effectively involved in all stages of the project cycle from conceptualization, to preparation, to finalisation, to implementation and finally O & M.

4. Public Awareness & Public Participation should be a front-end activity of the project.

The entire programme of conservation should be conceived, formulated, implemented, monitored and evaluated in close consultation with the stake holding communities following the approach of 'Participatory Appraisal'.

The agency that will plan, implement and coordinate the awareness campaign should be identified.

With a view to focus on issues relating to protection and improvement and cleaning of rivers, a massive program of environment education and awareness is imperative.

- Local influential/Community leaders,
- Local NGOs, RWA,
- School teachers and students,
- Elite groups and organizations like Rotary Club, Lions club, Associations and forums of writers and artists, etc.,
- Religious leaders and Sadhus,
- Representatives of industry (including tourism) and commerce,
- Leaders of trade unions and organisations like safai karamchari sanghs, Vyapar Mandal
- Leaders of teachers and students associations,
- Representatives of political parties including the elected office bearers and members of local bodies,
- Members of legislative assemblies, legislative councils and parliament representative of local constituencies,
- Representatives of media viz. editors/correspondents of local press and key functionaries of local radio and TV stations,
- Grassroot level functionaries of Municipalities and state government departments like public health, forestry, Jal Nigam, PWD, etc.,

Public Awareness and Public Participation as Front End Activity

Action Points for Community Awareness

- With the involvement and help of the ULB Committee, or otherwise, for each ward identify an active NGO or promote a group of interested and committed people to be involved in Pollution Abatement Project.

- The agency preparing the Pollution Abatement Project should prepare a plan of awareness generation and public participation and submit it to the Committee for approval. The plan could consider including the following activities, among others:-

  a) Print and electronic media including the local newspapers should be invited and supported in covering the issue of pollution of the rivers.

  b) A website may be created to provide facts about the state of sanitation, in particular, the degradation of the river.

  c) Holding locality wise meetings and group discussions with influential people whereby the extent of river pollution, the related physical and human factors, the consequent health hazards and the possible remedial measures are highlighted through talks and technical presentations by the experts and social workers

  d) Motivating influential group to play a leading role in promoting environmental sanitation and community health, particularly prevention of river pollution.

  e) Motivating and advising local NGOs to participate in outlining execution and follow up efforts of community action plans for ensuring a clean and healthy community life in general and protection of river water quality in particular.

  f) Promoting schools as models of clean living and healthy environments and training school teachers and students as motivators and informal change agents for involving

families and communities in clean river programs in general and maintenance of toilets/bathing ghats/crematoria in particular.

g) Motivating school management programs/events administrative and teaching faculty to organise special programs for checking river pollution and plantation of trees on river banks.

h) Motivate the local influential trade, business, professional, social service, religious associations/chambers/Clubs and individuals to participate in awareness generation program.

i) Inform, educate and invite potential investors to associate themselves in activities as solid and liquid waste management services through an effective strategy of public-private partnership. They can also sponsor plantations on river banks and adopting a certain planted area for protection and preservation.

j) Awaken, educate, organize and motivate religious leaders and priests to participate actively in river pollution control through such efforts as educating the masses, checking the dumping of temple waste on the river bank and throwing of half burnt or unburnt dead bodies into the river.

k) Motivate the office bearers of trade unions and other professional organizations like teachers and students associated to win public support for their cause by rendering some fruitful service to the society. While doing so they may give highest priority to community health promotional measures like river pollution control and conservation of the quality of river water.

l) Motivate local MLAs and MPs and leaders of political parties to participate actively in the promotional efforts of community involvement for protecting river against the hazards of pollution-an effort, which shall pay them abundantly through the building of positive public opinions. They should also be motivated to form local level all party organizations/ forums to promote the measures of river pollution control. In addition, they should be motivated to take keen interest in the proper utilization of the funds provided for river pollution. In addition, they should be persuaded to play effective liaison between the government and the people to ensure the timely completion of different programs and activities undertaken by the Directorate of National River Conservation Program

m) Motivate leading persons representing local press and electronic media in fact, they need to be properly educated and encouraged to be conscious of their social commitment and social obligations. They should also be convinced that socially conscious media shall always be aptly recognised and enormously rewarded through the creation of a sound base of enlightened clientele group which in the long run will help them through the image building process. Accordingly, the editors and correspondents of local press, the officers and key functionaries of coverage to the aspect of river pollution control measures through the active involvement of the people.

n) Awaken, educate and encourage the grassroots level functionaries belonging to such departments of state govt. as local bodies like, public health, sewerage, forestry, water supply, public works, electricity, industry, tourism etc. to take special interest in the activities which are directly related to the aspect of river pollution control.

o) They should be particularly motivated to be more conscious of their commitment and obligation to ensure the purity of river water so that the future of the present and coming generations of the society and so also the members of their own community is safe-guarded against health hazards.

p) Organise campaigns to encourage the use of community toilets and discourage open defecation, especially on open land near river banks.

q) In areas where there are sewers, encourage people to connect their houses to the sewer.

r) Organise, for different sections, events such as essay, debates, posters, slogan, painting, script etc.

Cost Estimate

A provision of Maximum up to 2% of the project cost (reimbursable as per actual) may be made for generation of public awareness and securing public participation. Various items of cost for which provision should be made are illustrated in the table below:

Table 7.1: Cost Estimate for Public Awareness and Public Participation (as per actual)

S. No	Item	No of Activities to be proposed	Unit cost	Total Amount
A	**Mass Media**			
1	Programs across for one year on community Radio	90	6,000	5,40,000.00
2	Advertisement of local Cable Network/ Radio	200	500	1,00,000.00
3	Print Media publicity in local papers, magazines etc. Advertisement in the tourist guide books etc., Special features and commissioned articles	6	5,000	30,000.00
4	Print material for Distribution including publicity on match boxes, stationary, stickers, etc.	30	1,000	30,000.00
5	Wall Painting/ Hoarding at strategic points in the city and on buses, rickshaws etc.	20	10,000	2,00,000.00
			Sub Total	**9,00,000.00**
B	**Events**			
1	Sponsoring / Organizing Events like Puja, Local Festivals etc.	10	20,000	2,00,000.00
2	Preparation of Exhibition Material, Posters and Organizing these events-river festival and run	20	10,000	2,00,000.00

S. No	Item	No of Activities to be proposed	Unit cost	Total Amount
	for the river events			
3	Special Cultural Events, Performances of Folk Media: (Folk theatre, Folk Music, Folk Stories) Street Plays (performances specially for slum localities)	20	25,000	5,00,000.00
			Sub Total	9,00,000.00
C	**Groups and Meetings**			
1	Environmental Awareness at Schools Level (Talks, Essay, painting competitions, debates, other activities	20	15,000	3,00,000.00
2	Formation of Action Groups, Self-help groups and support to social groups/clubs for awareness generation activities	20	10,000	2,00,000.00
3	Other Awareness activities like public meetings, public debates, Meetings with different Unions, felicitation of best workers etc.	20	10,000	2,00,000.00
			Sub Total	7,00,000.00
			Grand Total	25,00,000.00

7.3 Governance & Accountability Action Plan and Grievance Redressal Mechanism

The Citizen monitoring committee formed by District Magistrate, Tehri will work as Grievance Redressal and GAAP Committee. This Governance Accountability Action Plan (GAAP) and Grievance Redressal Mechanism (GRM) would provide an accountability and transparency of system for works carried out in the project and for resolution of complaints and issues of the residents of the area. PM, Ganga shall formulate procedures for implementing the GRM and GAAP. The Jal Nigam shall undertake GRM's initiatives that include procedures of taking/ recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders etc. paying particular attention to the impacts on vulnerable groups. The GRM would address affected persons' concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to the affected persons.

Grievance Redressal and GAAP Committee

The information should include procedures of taking/ recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders. Grievances not settled as per the above standard mechanism will be brought to the Grievance Redress Committee (GRC). This GRC consists of the following persons listed in Table below:

A citizen monitoring committee formed by D.M. Tehri under NGRBA Program

1	**District Magistrate**	**Chair Person**
2	Superitending of Police, Tehri	Member
3	Chief Development Officer, Tehri	Member
4	Chairman, NPP, Muni Ki Reti	Elected Member
5	District Coordinator, Nehri Yuva Kendra, Tehri	Elected Member
6	Commandant NSS, Tehri	Elected Member
7	NGO, Working in District	The Clean Himalayan Society, Muni Ki Reti, Tehri
		Shree Badri - Kedar Seva Sansthan, Tehri
8	Senior Citizen nominated under project area	Sh. Chandravir Pokhariyal, Kailash Gate, Muni Ki Reti, Tehri
		Sh. Om Prakash Nautiyal, Shivanand Nagar, Muni Ki Reti, Tehri
9	Nominated officer of concern department under NGRBA Programme	Member
A.	SDM, NarenderNarender Nagar	Member
B.	Executive Officer, Nagar Palika, Muni Ki Reti, Tehri	Member
C.	Assistant Engineer, Rishikesh, U.K.J.S.	Member
D.	Executive Engineer, Narender Nagar, U.K. PWD	Member
E.	Executive Engineer, Narender Nagar, U.K. Irrigation	Member
F.	D.F.O. Forest Deptt., Narender Nagar	Member
10	Nominated Representative of USPCB	Member
11	Project Manager, CRM Unit (Ganga), U.K.Peyjal Nigam, Rishikesh	Member Secretary

Functions of Grievance Redressal Committee

The main responsibilities of the GRC will be to: (i) provide support to Affected Persons (APs) on problems arising from right of way issues such as crop compensation and/or land/property acquisition; (ii) record AP grievances, categorize, and prioritise grievances and resolve them; (iii) immediately inform the Jal Nigam/ Jal Sansthan of serious cases; and (iv) report to APs on developments regarding their grievances and the decisions of the GRC.

Jal Nigam should made a Complaint registration system under supervision of GRC which should

have following facilities

- The system is accessible over the internet.
- The system allows for registering complaints & appeals received via email, post or online.
- Using the system a complainant can track the status of the filed complaint/appeal
- The system automatically assigns registered complaint to relevant officer based selections made by the complainant.
- To provide work progress reports on timely manner.
- The system has automated grievance redressal and escalation timelines.
- The system allows to upload/download scanned copies of letters/documents
- All grievances should be addressed within one months of it receipt

Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost and other assistance. Periodic meetings of GRC can be conducted by the Jal Nigam so that all the problems and responses received by individuals in the GRC. The GRC will meet every month if grievances are brought to the Committee to determine the merit of each grievance, and resolve grievances within a month of receiving the complaint, failing which APs will have the right to address his grievance to appropriate legal authorities for redressal. Records will be kept for all grievances received, including: contact details of the complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, as well as the final outcome.

The maximum financial power to the committee shall be as per power delegation of the state government for each case from the EMP. The GRC will continue to function during the life of the Project construction and operation time. Environmental and social grievances will be handled in accordance to the project's GRM. Open and transparent dialogue will be maintained with project affected persons as and when needed. The GRM for the project provides an effective approach for complaints and resolution of issues made by the affected community in reliable way Annual Budget of Grievance Redressal Committee and GAAP is provided below in table 7.3.

Table 7.2: Annual Budget of Grievance Redressal Committee and GAAP

Item	Cost in INR
Website Development and Hosting	1,00,000.00
Computer / Telephone Operator	1,80,000.00
Transport, utilities & consumables	1,00,000.00
Publication/Communication	60,000.00
Annual Training/ Workshops	60,000.00
Annual Total	**5,00,000.00**

8. Environmental Management Plan

There are adverse environmental impacts for which mitigation plans are prepared and given in Tables below 8.1 to 8.4. These impacts include direct, indirect, cumulative, and induced impacts in the project's area of influence. Each project needs to be scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Environmental impacts include those related to the natural environment (air, water, and land); human health and safety; and trans-boundary and global environmental aspects. Environmental guidelines – policies and requirements – seek to avoid, minimize, or mitigate adverse environmental impacts.

The organogram for the implementation and monitoring of EMP is presented in figure 7.1 DBO contractor shall report the implementation of EMP to Environmental Expert of UKJN through monthly reports. Further a bi annually report is to be prepared and required to be given NMCG for the progress made in implementing the EMP.

Figure 8.1 - Organogram for the implementation and monitoring of EMP

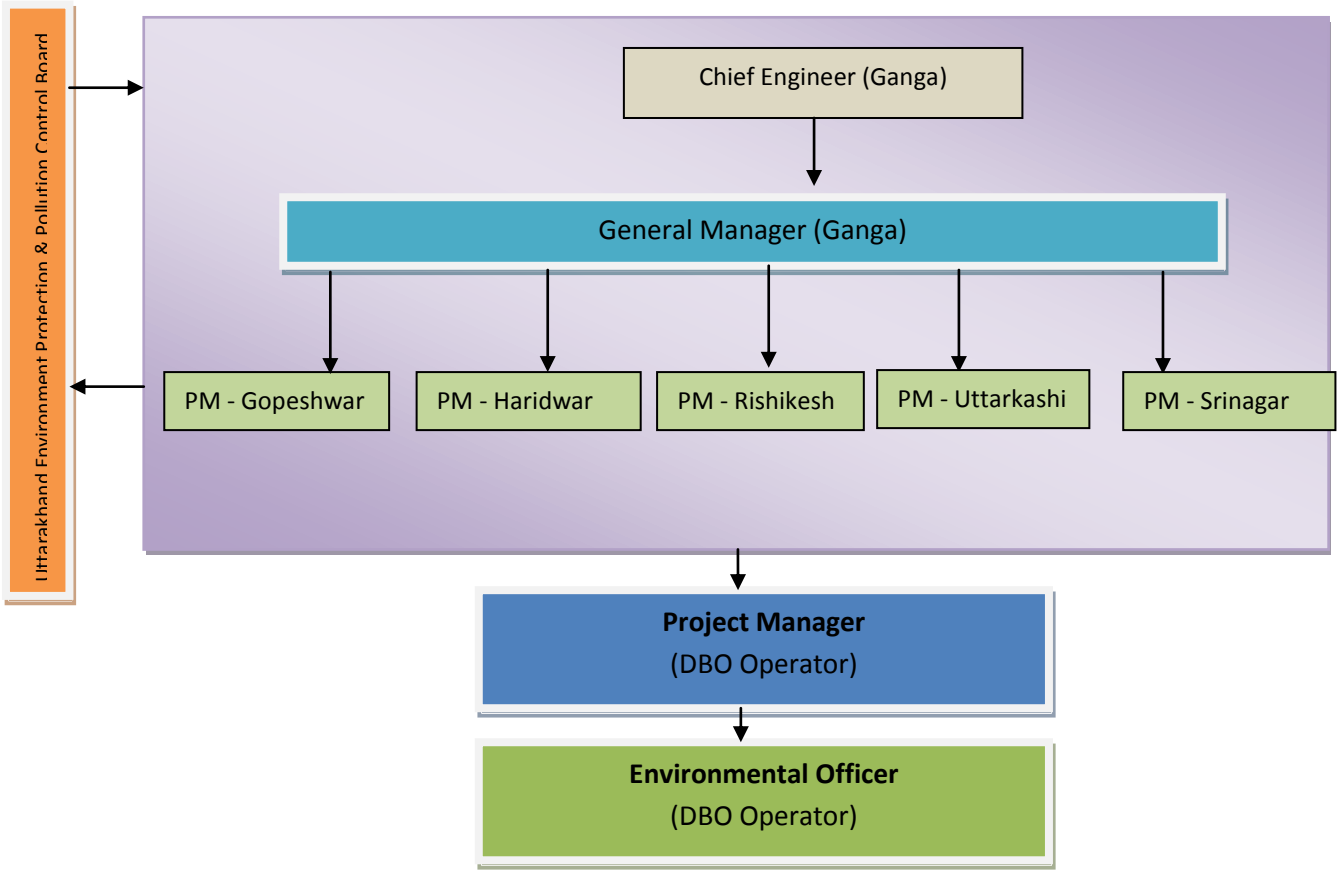


Table8.1: Anticipated Impacts and Mitigation Measures – Pre-construction Environmental Mitigation Plan

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
A. Design and Development Phase					
Sewage Treatment plant	Treated water disposal into nearby stream	• Pollution of received water body (river) or land due to inefficient treatment or non-operation of STP	Temporary	• The treated water quality shall comply with the prescribed standards of the bid document and other applicable conditions of consent to establish issued by the state pollution control board. • Selection of best available sewage treatment technology with High BOD removal efficiency. • Ensuring development and compliance to standard operation and maintenance practices. • Provision of effective screening at inlet of STP for removal of grit, fine plastics and other suspended solids • Provision of effective separation and controlled disposal of digested sludge • Provision effective disinfection before discharge of treated water for irrigation or to river	DBO Operator
	STP Breakdown	• Discharge of untreated sewage leading river pollution.	Temporary	• Provision of adequate holding capacity adequate for storage of sewage to prevent flow of untreated sewage to river.	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
	Flooding due to rain water run off	• Rain water may flood the STP area in absence of adequate provision of diverting rain water flow towards STP from periphery area	Temporary	• Suitable drainage provision shall be made to divert the rain water likely to be accumulated from peripheral catchment area of STP, to natural drainage stream or area.	DBO Operator
	Sludge disposal	• Disposal of sludge leading to contamination of land and water.	Permanent	• Efficient Sludge dewatering with minimum land involvement shall be adopted. • Provision shall be made for intermittent storage of digested sludge at STP site. • The digested sludge shall be utilised as manure or disposed to suitable site as approved by DBO engineer. If disposal is made for land fill, the site shall be located away from habitation and water bodies and shall be pre-approved by concerned authorities like Municipal corporation, Pollution Control Board or urban development authority.	DBO Operator
	Provision for safety of workers and safe operation of STPs	• Accidents leading to injury or death of workers (Fall of workers from Height, Fall into deep water tanks, Short Circuiting) • Accidental slip, trip and fall in walk ways or work areas • Fire	Permanent	• Ensure adequate provision of Handrails on both sides of walkways close to deeper tanks and STPs need to be ensured; • All electric switches (including unit specific on-off switches installed at respective units) and panels should have adequate protection	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
		• Exposure to toxic gas such as chlorine		from rain water to prevent short circuiting • Proper earthling with installation of earth circuit breakers shall be made • Walk ways designs shall be made with proper slope to avoid accumulation of rain water. Material handling and storage shall be so designed that walk way surface remains free from wet or oil surface situation to prevent slips, trip or fall accidents. • Provision of interlock system to either stop STP or divert untreated effluent to holding tanks in case of short circuiting, or mall functioning of STP • Prepare emergency preparedness plan including identification of assembly area in case of fire	
	Location of STP	• Noise/Odour/fly nuisance hazards to neighbouring areas. • Cutting of Trees	Permanent	• Ensure minimum noise generation; at pump station in STP • Minimize Tree cutting if involved. • Tree plantation of at least two rows around the periphery of STP site and landscaping to prevent spread of bad odour with large canopy/ broad leaves trees like Sesum, Neem, Bargad, Teak, Sal, etc.	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				• Accumulated sludge and solid waste to be cleared within 24 hours and spraying of suitable herbicides on accumulated sludge/solid waste to reduce odour.	
B. Construction phase					
Sewage treatment plant	Wild Life Safety	Loss of Wild animals life due to accidents	Temporary	• As per direction of forest department trench and protection wall should be constructed before the start of construction work at STP	As a part of forest clearance INR 2.03 Lakh are reserved for construction of animal corridor protection work
	Excavation	Loss of topsoil due to excavation activities.	Temporary	• The existing STP shall not be demolished till alternate arrangement for treatment of existing sewage is made to ensure that untreated sewage is not discharged to river. • Excavation shall be planned in such a manner that such that no damage occurs to existing structures. • Top soil should be separately stockpiled and utilized for green belt development or landscaping after completion of work	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
		Construction waste	Temporary	All the associated construction waste should be properly managed by storing and disposing off at suitable refusal sites approved by DBO engineer.	DBO Operator
		Nuisance due to domestic solid waste disposal	Temporary	• Provide two bins for recyclable and non-recyclable wastes. • Ensure that recyclable and non-recyclable wastes are collected in segregated manner in theses bins before disposal. Recyclable material should be sold. Non-recyclable material should be disposed to designated land fill area of the city. • Provide adequate sanitation facility for workers at construction sites.	DBO Operator
		Dust Generation due to construction activities	Temporary	• Excavated material transported by trucks will be covered and/or wetted to prevent dust nuisance. • Suppressing dust generation by spraying water on stockpiles and unpaved movement areas • Water sprinkling over excavated areas, unpaved movement areas and stockpiles. • Transportation of loose construction material through covered trucks. • Use dust curtains (polysheets/	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				sheets) around the construction area for containing dust spread. • Construction equipment must comply with pollution norms and carry Pollution Under Control certificate.	
		Temporary flooding due to uneven dumping of construction waste	Temporary	• The construction waste material should be stored on the higher areas of the site and or areas where water may accumulate creating flooding like situation	DBO Operator
		Spillage of fuel and oil	Temporary	• Care to be taken to store fuel and oil (if required) at a place away from any drainage channel/nalla preferably to be stored in drums mounted on a concrete paved platform with slop draining to small spills collection pit.	DBO Operator
		Noise and vibration disturbances to residents and businesses	Temporary	• Construction activities to be carried out in day time with prior intimation to local residents and shop keepers. • Use of low noise and vibrating equipment (such as enclosed generators with mufflers, instruments with built in vibration dampening and improved exhaust), to meet standards as prescribed by CPCB5. • Provision of protective equipment (PPE) like ear muffs and plugs for	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				construction workers. . • Provision of noise barriers as feasible in inhabited areas, particularly near sensitive zones like hospitals, schools etc. • DG set to be fitted acoustic enclosure.	
Construction camps	Sanitation	Nuisance due to absence of facility of sanitation and solid waste management	Temporary	• Labour camp if provided, must have adequate provision of shelter, water supply, sanitation and solid waste management	DBO Operator
General: safety during construction	Safety and Health Hazard	Safety hazards to labours and public. Workers are seen to working without any PPE even at height.	Temporary	• Comply with the Occupational health and Safety act of India • Ensure that the contact details of the police or security company and ambulance services nearby to the site. • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Follow safe practices for working at height or confined area or underground working for safety of workers • Erect warning signs/ tapes and temporary barriers and/or danger tape, marking flags, lights and flagmen around the exposed construction works warn the public and traffic flow of the	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				inherent dangers. • Provide adequate PPE to workers such as helmets, safety shoes, gloves, dust masks, gumboots, etc. to workers • Provide handrails on both sides of walkways close to deeper tanks and STPs need to be ensured; • Smaller on and off switches at STP units to be installed with protection from rain water to minimize electrical short circuit; • Monthly reporting of all accidents and immediate reporting to DBO engineer and owner.	
C. Operation phase					
Sewage treatment plant	Treatment and Disposal of Treated Water and Sludge	River, land or ground water pollution due to discharge of untreated or partially treated sewage due to inadequate or inefficient STP operations.	Temporary	• Monitor the treated sewage quality and ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use. • Follow standard operating procedures for operation and maintenance. • Undertake periodic audit as per these procedures. • Comply with all applicable condition of consent to operate • Quarterly monitoring of influent sewage, treated sewage, upstream and downstream point of treated	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				sewage disposal point to river	
		Problems arising due to bad odour, insects, polluted air,	Temporary	• Maintain the green belt as per provision of design to prevent spread of bad odour with large canopy/ broad leaves trees like Sesum, Neem, Bargad, Teak, Sal, etc. • Accumulated sludge and solid waste to be cleared within 24 hours and spraying of suitable herbicides on accumulated sludge/solid waste to reduce odour. • Quarterly monitoring of Ambient Air Quality with respect to PM10, PM2.5, Sox and NOx, CO and Odour at three locations (at STP site, minimum 500 m away from STP site in up-wind and down-wind direction of STP area.	DBO Operator
		Increase in Ambient Noise Level and discomfort to neighbouring people	Temporary	• Proper handling and regular maintenance of operating machines including pumps, generators, air diffusers, etc. • Quarterly Monitoring of Ambient Noise level to check compliance to standards. • Quarterly monitoring of ambient noise levels (day and night) at same locations as of ambient air	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible agency
				monitoring	
		Indiscriminate disposal of sludge leading to contamination of land and soil.	Temporary	• Prepares sludge disposal plan as per desire stage provisions and guidelines and adhere to the same. • Ensure proper functioning of STP for digestion of sludge and ensure adequate functioning of dewatering units for efficient functioning of system	DBO Operator
		River, land or ground water pollution due to discharge of untreated or partially treated sewage due to inadequate or inefficient STP operations.	Temporary	• Ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use. • Follow standard operating procedures for operation and maintenance. • Undertake periodic audit as per these procedures. • Comply with all applicable condition of consent to operate	DBO Operator
General Safety	Workers exposure to hazardous materials/situations	Serious/health/ safety hazards	Temporary	• Ensure availability of PPE for maintenance workers. • Follow safety measures and Emergency preparedness plan evolved at design stage	DBO Operator

Table 8.2: Environmental Management Plan for Muni Ki Reti Sewerage Project (Networks)

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
A. Design and Development Phase					
Sewerage Network and Sewage Pumping Station	Accidental leakages/ bursts	• Due to accidental burst or leakage of sewers, flooding of the nearby areas • Backlogging due to unexpected heavy flow rates	Temporary	• Designing sewers with adequate capacity and flow velocity • Provision for Regular inspection and maintenance of the sewers • Preparation of safety and Emergency Preparedness plan	DBO Operator
	Location of Sewage Pumping Station and Pumping of sewage to STP	• Noise and odour nuisance hazards to neighboring areas. • Cutting of Trees	Permanent	• Ensure minimum noise generation at pump station in SPS by use of less noise generating equipment meeting prescribed noise standards as applicable and enclosed generators. • Minimize Tree cutting if involved. • Tree plantation of at least two row around the periphery of SPS site and landscaping to prevent spread of bad odour with large canopy/ broad leaves local trees like Sesum, Bargad, Teak, Sal, etc. • Accumulated sludge and solid waste to be cleared at short intervals and spraying of suitable herbicides on	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
				accumulated sludge/solid waste to reduce odour. • Provision for regular maintenance and switching off equipment when not in use;	
B. Construction phase					
Sewerage (laying of sewers) and Sewage Pumping station	Excavation, cutting, back filling, compaction and construction operations	Damage to underground utilities like water, gas line, electricity and telephone conduits, etc. due to construction activities. Management of Intercepted Ground Water	Temporary	• Identify existing underground other utility structures, lines through available records and in consultation with concerned authorities and plan construction activities accordingly to minimize damage to such utilities. These underground utilities encountered in excavating trenches carefully shall be supported, maintained and protected from damage or interruption of service until backfill is complete and settlement has taken place.	DBO Operator
		Accidents/ damages due to erosion/ sliding of vertical sides of excavated trenches while places the pipes	Temporary	• Maintaining the excavation by Shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, or other materials • Exposed surface shall be resurfaced and stabilized. Exposed surface will be resurfaced and stabilized by	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
				making the sloping sides of trench to the angle of repose at which the soil will remain safely at rest.	
		Generation of substantial debris, top soil and muck during construction	Temporary	• Top soil shall be preserved and may be used for agricultural purpose or development of city parks. • Soil and debris may be managed for planned land filling and landscaping; • Debris may be suitably stored to filling back the excavated areas after placing the trunk sewer lines.	DBO Operator
		Dust Generation (Air Pollution) due to excavation, cutting, back filling and compaction operations	Temporary	• Water sprinkling over excavated areas, unpaved movement areas and stockpiles. • Transportation of loose construction material through covered trucks. • Use dust curtains (polysheets/ sheets) around the construction area for containing dust spread at SPS building construction site. • Construction equipment must comply with pollution norms and carry Pollution Under Control certificate.	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
		Noise and vibration disturbances to residents and businesses	Temporary	• Construction activities to be carried out in day time with prior intimation to local residents and shop keepers. • Construction work near schools and colleges to be carried out during vacations and work near hospitals to be completed on priority basis (in shorter time period with alternate provision of traffic, accessibility of exit/entry gates etc.). • Use of low noise and vibrating equipment meeting prescribed noise standards. • Provision of protective equipment (PPE) like ear muffs and plugs for construction workers. . • Provision of noise barriers in inhabited areas, particularly near sensitive zones like hospitals, schools etc. • DG set to be fitted acoustic enclosure.	DBO Operator
		Temporary flooding due to excavation during monsoons or blockage of surface drains	Temporary	• Stockpiled areas to be bordered by berms; • Stockpiles to be done in high areas to avoid flow in storm water run-off channels and erosion;	DBO **Operator**

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
		Increased traffic inconvenience (emissions, congestions, longer travel times, blockage of access)	Temporary	• Alternate traffic routing must be adopted in consultation with concerned traffic police authorities. Proper traffic planning be made for narrow lane areas. • Work should to be completed on priority near business and market place to minimize business loss. • Care should be taken to minimize congestion and negative impacts at schools and hospitals. Safe access shall be maintained to these places during construction. • Provide temporary crossing/ bridges as may be required to facilitate normal life and business. • Detailed traffic management will be discussed with local police and contractor has to submits detailed traffic plan within 3 months from date of award for approval of EA.	DBO Operator
		Settlement of backfilled area after construction	Temporary	• The backfilling material shall be free from petroleum products, slag, cinders, ash or other material. • Backfilling activity shall be completed within five days of laying of sewer.	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
				• Proper compaction as per the soil condition and retain the original level of alignment and grade.	
		Spillage of fuel and oil	Temporary	Care to be taken to store fuel and oil (if required) at a place away from any drainage channel/nalla preferably to be stored in drums mounted on a concrete paved platform with slop draining to small spills collection pit.	DBO Operator
		Nuisance due to solid waste disposal	Temporary	• Provide two bins for recyclable and non-recyclable wastes. • Ensure that recyclable and non-recyclable waste is collected in segregated manner in theses bins before disposal. Recyclable material should be sold. Non-recyclable material should be disposed for designated land fill area of the city. • Provide adequate sanitation facility for workers at construction sites.	DBO Operator
Laying of network		Impact on archaeological, historical or cultural important sites are near construction site	Temporary	• No construction activity should be allowed within 200 m of archaeological, historical or cultural important sites are affected	DBO Operator
General: safety during	Accidents	Safety hazards to labours and public	Temporary	• Comply with the Occupational health and	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
construction				Safety act of India • Ensure that the contact details of the police or security company and ambulance services nearby to the site. • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Erect warning signs/ tapes and temporary barriers and/or danger tape, marking flags, lights and flagmen around the exposed construction works warn the public and traffic flow of the inherent dangers. • Provide adequate safety precautions such as helmets, safety shoes, gloves, dust masks, gumboots, etc. to workers • Monthly reporting of all accidents and immediate reporting to DBO engineer and owner.	
C. Operation phase					
Sewer and Sewage Pumping Station	Leakage/ overflows	Water pollution and possibility of mixing with water supply line	Temporary	• Regular monitoring of sewer line and manholes for visible leakages/ overflows. • Immediate repair shall be carried out to plug the	DBO Operator

Activity		Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency
				leakages. Restore the sewer and other utility services if damaged due to leakages.	
	Waste Handling	Bad odour, Health hazard and public nuisance	Temporary	• Provision for regular clearance of sludge and solid waste to minimize odor nuisance • Ensure maintenance of Green belt as planned • Periodic disposal of accumulated sludge/solid waste to disposal site as approved by DBO engineer.	DBO Operator
General Safety	Workers exposure to toxic gases in sewers and hazardous materials during sewer maintenance work	• Serious/health/ safety hazards • The toxic gases are likely to contract communicable diseases from exposure to pathogens present in the sewage.	Temporary	• During cleaning/ maintenance operation, the sewer line will be adequately vented to ensure that no toxic or hazardous gases are present in the line. • Ensure availability of PPE for maintenance workers. • Follow safety and Emergency Preparedness plan prepared at design stage • Monthly reporting of all accidents and immediate reporting to DBO engineer and owner.	DBO Operator

Table 8.3: Environmental Monitoring Plan

Environmental component	Project stage	Parameters to be monitored	Location	Standards	Implementation	Supervision
1.Air Quality	A. Pre-construction stage (The project once assigned to contractor)	PM_{10}, $PM_{2.5}$, SO_2, NOx, SPM, CO along with Meteorological data-temperature Humidity, wind speed, wind direction	Inside and outside (0.5 km) of the proposed STP	National Air quality standards of CPCB	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	B. Construction Stage	PM_{10}, $PM_{2.5}$, SO_2, NOx, SPM, CO along with Meteorological data-temperature Humidity, wind speed, wind direction	Inside and outside (0.5 km) of the proposed STP	National Air quality standards of CPCB	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	C. Operation Stage	PM_{10}, $PM_{2.5}$, SO_2, NOx, SPM, CO along with Meteorological data-temperature Humidity, wind speed, wind direction	Inside and outside (0.5 km) of the proposed STP	National Air quality standards of CPCB	Contractor by NABL accredit laboratory	O& M Contractor/ Jal Sansthan
2.Water Quality	A. Pre-construction stage (The project once assigned to contractor)	EC, TSS, DO, BOD, P^H Oil and grease, Pb,	Nearest downstream handpump /drain around the STP and SPS	National water quality standards of CPCB	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	B. Construction Stage	EC, TSS, DO, BOD, PH, Oil and grease, Pb	Nearest downstream handpump / drain around the STP and SPS	National water quality standards of CPCB	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	C. Operation Stage	EC, TSS, DO, BOD, P^H Oil and grease, Pb	Nearest downstream handpump / drain around the STP	National water quality standards of CPCB	Contractor by NABL accredit laboratory	O & M Contractor/ Jal Sansthan

Environmental component	Project stage	Parameters to be monitored	Location	Standards	Implementation	Supervision
			and SPS			
3.Noise/ Vibration	A. Pre-construction stage (The project once assigned to contractor)	Noise level (dB level)	Inside and outside (0.25 km) of the proposed the STP and SPS	CPCB standards for Noise and vibrations	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	B. Construction Stage	Noise level (dB level)	Inside and outside (0.25 km) of the proposed the STP and SPS	CPCB standards for Noise and vibrations	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	C. Operation Stage	Noise level (dB level)	Inside and outside (0.25 km) of the proposed the STP and SPS	CPCB standards for Noise and vibrations	Contractor by NABL accredit laboratory	O & M Contractor/ Jal Sansthan
4. Soil	A. Pre-construction stage (The project after assign to contractor)	PH, Sulfate (SO_3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed the STP and SPS	As per CPCB standards	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	B. Construction Stage	PH, Sulfate (SO_3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed the STP and SPS	As per CPCB standards	Contractor by NABL accredit laboratory	Contractor/ Pey Jal Nigam
	C. Operation Stage	PH, Sulfate (SO_3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed the STP and SPS	As per CPCB standards	Contractor by NABL accredit laboratory	O & M Contractor/ Jal Sansthan

8.1 EMP Costs

Most of the mitigation measures require the Construction Contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or Pey Jal Nigam/ Jal Sansthan are included in the budgets for the civil works and do not need to be estimated separately here.

The remaining actions in the EMP are the various environmental monitoring activities to be conducted by the Environmental Monitoring Specialist. These have not been budgeted elsewhere, and their costs are shown in **Table 8.5.** The figures show that the total cost of environmental management and monitoring for the subproject as a whole (covering design period, 2 years of construction phase and the first five years of O&M Phase) is INR 5233000.

Table 8.4: Environmental Management and Monitoring Costs (INR) for Pre- construction and construction Phase

Phase	Component of EMP	Mitigation measure	Cost included in the DPR (Yes/no/not clear) (or Details if provided in DPR)	Remarks	Cost in Rupees
Design and Development	Provision for accidental leakages / bursts in SPS,STP	Proper drainage arrangements to prevent water stagnation/ flooding in SPS site area & STP	Yes (not specific but included as a part of associated construction activity)	Included in DPR for Sewerage system in Muni ki Reti,	
	Location of SPS,STP	Appropriate siting, and enclosing within building to reduce noise and odour nuisance to surrounding area	Yes	The proposed SPS,STP will be enclosed which will prevent noise and enclosed nature and appropriate cleaning and maintenance will prevent odour nuisance	
Construction	Excavation, Cutting and filling operations	Review of existing infrastructure, shoring trenches, reinstatement/ resurfacing	Yes	The proposed DPR includes these activities	
	Damage public utilities	Proper reviewing of existing drawing s of utilities, informing concern authorities and reinstatement of public utilities	Yes	The proposed DPR includes these activities	
	Dust generation	Water sprinkling on excavated material to suppress dust and provision of top cover when transported through vehicles		Approximately for 4,00,000 /year	8,00,000
	Noise and vibrations	Usage of sound barriers or sheets.	No.	Approximately for 3,00,000 /year	6,00,000
	Temporary flooding or , water logging	Alternate traffic re-routing, Ensuring storage of excavated soil material on the higher lying areas	Yes	DPR for Sewerage system in Muni ki Reti	
	Increased traffic	Traffic re-routing	No	Approximately 2,00,000	4,00,000

Phase	Component of EMP	Mitigation measure	Cost included in the DPR (Yes/no/not clear) (or Details if provided in DPR)	Remarks	Cost in Rupees
	inconvenience			per year	
	Safety hazards to workers and residents	Putting fences or other barricades to demarcate the area	No	Approximately 2,00,000 per year	4,00,000
Labour camps (if adopted)	Health hazards and nuisance due to absence of facility for sanitation or solid waste management	Sanitation	No	Approximately 2,00,000 per year	4,00,000
Construction	Fly Nuisance at STP	Application of insecticides	No	Lumpsum Cost Rs. 2,00,000/- per year	4,00,000
	Treatment of Disposal of Sludge	Ensure proper functioning of STP for digestion of sludge	No	Lumpsum Cost Rs. 2,00,000/- per year	4,00,000
	Sludge Monitoring	Analysis of sludge and its neutralization	No	Lumpsum cost Rs. 3,00,000.00/-	3,00,000
	Tree Plantation & Landscaping		No	Lumpsum cost Rs 5,00,000/-	5,00,000
	Trench and protection wall should be constructed before the start of construction work at STP	As a part of forest clearance INR 2.03 Lakh are reserved for construction of animal corridor protection work	No	Lumpsum 2,03,000/-	2,03,000
	Training and Awareness generation	Among the workers of construction camp and operators of STP and Monitoring and Evaluation expert	No	As per public awareness budget of DPR	
		Total			**44,03,000**

Table 8.5: EMP Budget

Item	Location	Season	Year	Total no. of samples	Unit Cost	Total Cost
Environment Monitoring during Construction Stage						
Air quality Monitoring	3	3	2	18	7,000.00	1,26,000.00
Metrological data	3	1	2	6	3,500.00	21,000.00
Noise / vibration	3	3	2	18	2,000.00	36,000.00
Water analysis	3	3	2	18	6,500.00	1,17,000.00
Soil analysis	1	3	2	6	5,000.00	30,000.00
	Sub total					**3,30,000.00**
Environment Monitoring Cost (Operation Stage)						
Air quality Monitoring	3	3	5	45	7,000.00	3,15,000.00
Metrological data	1	3	5	15	3,500.00	52,500.00
Noise / vibration	1	1	5	5	2,000.00	10,000.00
Water analysis	1	3	5	15	6,500.00	97,500.00
Soil analysis	1	1	5	5	5,000.00	25,000.00
Sub-Total						**5,00,000.00**
TOTAL for Environmental Monitoring						**8,30,000.00**
Total Cost of EMP and Environmental Monitoring						**52,33,000**

9. Conclusion

The environmental impacts of all elements of the infrastructure proposed under the Muni ki Reti - Dhalwala Sewerage and Sanitation Subproject were assessed. Potential negative impacts were identified in relation to both construction and operation of the improved infrastructure, but no major impacts were identified as being due to either the project design or location. Only for construction of STP diversion of forest land is necessary. Mitigation measures have been developed in generic way to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the outline designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design.

During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and import a similar amount of sand to support the pipes in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation.

Once the system is operating, most facilities (STP, pumping house) will operate with routine maintenance, which should not affect the environment. Leaks in the sewage network will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. It will also be conducted in areas that have already been excavated, so there will be no need to protect archaeological material.

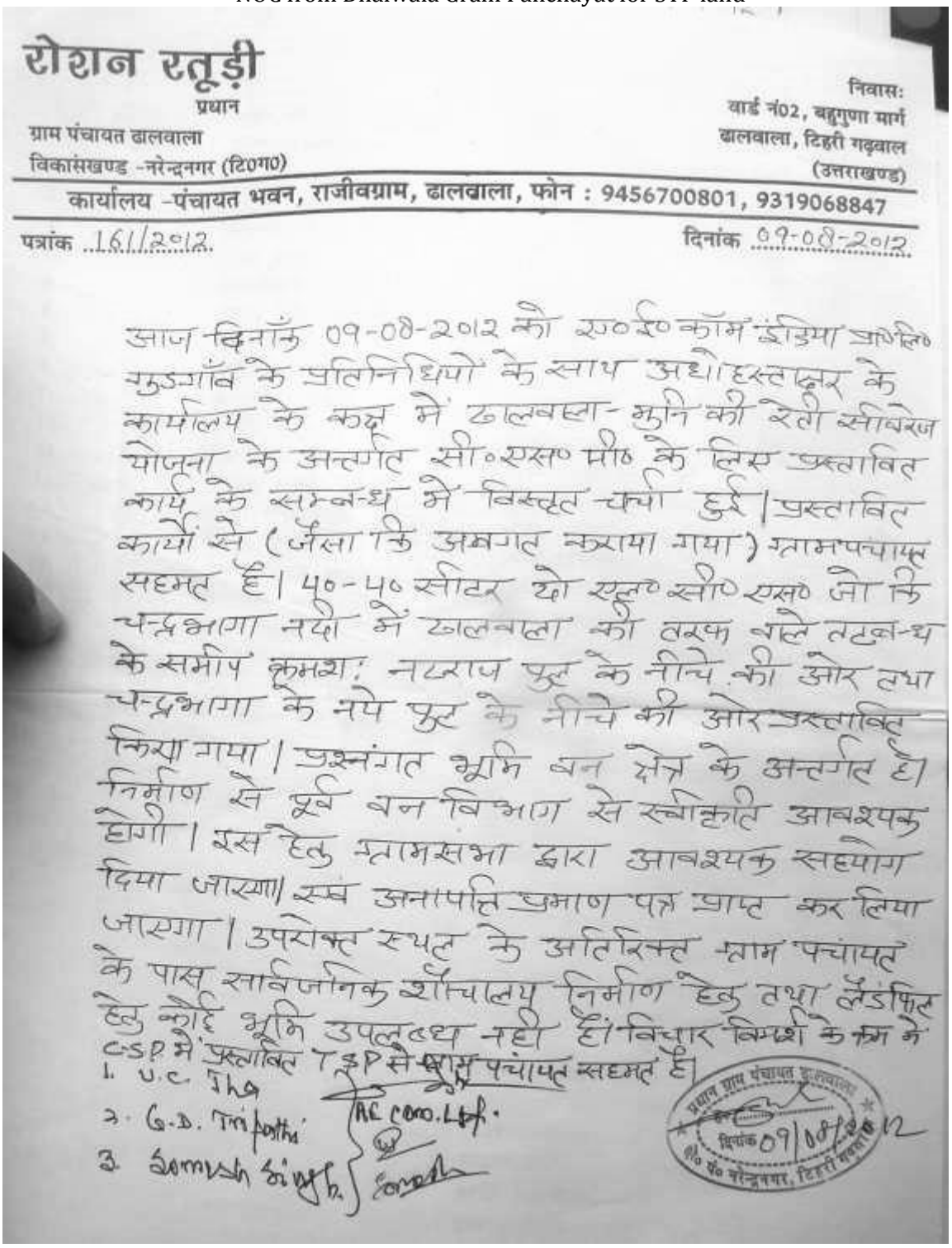
The regular removal of sludge from the treatment reactor ponds should also have no environmental impacts, and if tests show that the drying procedure removes bacterial contamination the material should be sold to farmers to fertilize soil, as this will provide an environmental gain and some cost recovery.

The main impacts of the operating sewerage system will be beneficial as human waste from those areas served by the new network will be removed rapidly and treated to an acceptable standard. This will improve the environment and appearance of these areas, and the health and quality of life of the citizens. Diseases of poor sanitation should be reduced, which should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

Mitigation will be assured by a program of environmental monitoring conducted during both construction and operation to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the Pey Jal Nigam. There will also be longer-term surveys to monitor the quality of discharged treated effluent and health status in vicinity of the facility.

Annexure -1

NOC from Dhalwala Gram Panchayat for STP land



रोशन रतूड़ी
प्रधान
ग्राम पंचायत ढालवाला
विकासखण्ड -नरेन्द्रनगर (टि0ग0)

निवास:
वार्ड नं02, बहुगुणा मार्ग
ढालवाला, टिहरी गढ़वाल
(उत्तराखण्ड)

कार्यालय -पंचायत भवन, राजीवग्राम, ढालवाला, फोन : 9456700801, 9319068847

पत्रांक ..161/2012.

दिनांक 09-08-2012

आज दिनाँक 09-08-2012 को एन०ई०कॉम इंडिया प्रा०लि० गुड़गाँव के प्रतिनिधियों के साथ अधोहस्ताक्षर के कार्यालय के कक्ष में ढालवाला-मुनि की रेती सीवरेज योजना के अन्तर्गत सी०एस०टी० के लिए प्रस्तावित कार्य के सम्बन्ध में विस्तृत चर्चा हुई। प्रस्तावित कार्यों से (जैसा कि अवगत कराया गया) ग्रामपंचायत सहमत है। 40-40 सीटर दो एस०टी०पी० जो कि चन्द्रभागा नदी में ढालवाला की तरफ वाले तटबन्ध के समीप क्रमशः नटराज पुल के नीचे की ओर तथा चन्द्रभागा के नये पुल के नीचे की ओर प्रस्तावित किया गया। प्रश्नगत भूमि वन क्षेत्र के अन्तर्गत है। निर्माण से पूर्व वन विभाग से स्वीकृति आवश्यक होगी। इस हेतु ग्रामसभा द्वारा आवश्यक सहयोग दिया जायगा। एवं अनापत्ति प्रमाण पत्र प्राप्त कर लिया जायगा। उपरोक्त स्थल के अतिरिक्त ग्राम पंचायत के पास सार्वजनिक शौचालय निर्माण हेतु तथा लैंडफिल हेतु कोई भूमि उपलब्ध नहीं है। विचार विमर्श के क्रम में DSP में प्रस्तावित T&P से ग्राम पंचायत सहमत है।

1. U.C. Jha
2. G.D. Tripathi
3. Santosh Singh

RC Comp. Ltd.

प्रधान ग्राम पंचायत ढालवाला
दिनांक 09/08/2012
ब्लॉ० सं० नरेन्द्रनगर, टिहरी गढ़वाल

रोशन रतूड़ी
प्रधान
ग्राम पंचायत ढालवाला
विकासखण्ड -नरेन्द्रनगर (टि०ग०)

निवासः
वार्ड नं02, बहुगुणा मार्ग
ढालवाला, टिहरी गढ़वाल
(उत्तराखण्ड)

कार्यालय -पंचायत भवन, राजीवग्राम, ढालवाला, फोन : 9456700801, 9319068847

पत्रांक 168/2012 (2) दिनांक 11/08/2012

अतः जनभावना एवं भविष्य में S.T.P निर्माण किए जाने के प्रकरण में जनविरोध के दृष्टिगत योजना के फलीभूत न हो पाने की प्रबल सम्भावनाओं को देखते हुये उक्त स्थल पर STP का निर्माण न किया जाए।

इस सन्दर्भ में आपको यह अवगत कराना है कि पूर्व में आपके कार्यालय के सहायक परियोजना अभियन्ता द्वारा मुझसे विचार-विमर्श कर ग्राम पंचायत ढालवाला के शीर्ष पश्चिमी भाग के समीप आरक्षित वन क्षेत्र के चोरपानी ब्लॉक में STP के लिए जगह चयनित की थी। जिससे ग्राम सभा सहमत है। सम्भवतः चोरपानी स्थित स्थल का निरीक्षण आपके उच्चाधिकारियों द्वारा भी किया जा चुका है।

अतः कृपया चोरपानी में ही STP का निर्माण स्थल प्रस्तावित किया जाए।

बैठक के प्रतिभागी :-

1. कैलाश जोशी (सहायक)
2. संदीप कश्यप (परि० अभियन्ता)
3. एस० एन० सिंह (स० परि० अभियन्ता)
4. यू० सी० झा
5. जी० डी० त्रिपाठी (प्रतिनिधि सिंह (Con.)
6. सोमेश सिंह

प्रधान ग्राम पंचायत ... दिनांक 11/08/2012

Annexure -2

Minutes of Meeting with Muni ki Reti Nagar Panchayat and Dhalwala Gram Panchayat

मुनि की रेती नगर एवं आसपास के सैटेलाईट टाऊन की राष्ट्रीय गंगा नदी बेसिन प्राधिकरण कार्यक्रम के अन्तर्गत सी0एस0पी0, एफ0आर0, डी0पी0आर0 आदि के सम्बन्ध में।

उपरोक्त विषयक कार्यक्रम के अन्तर्गत आज दिनांक 13–08–2012 को अधिशासी अधिकारी नगर पंचायत मुनि की रेती की अध्यक्षता में एक बैठक का आयोजन नगर पंचायत के सभागार में किया गया। जिसमें माननीय सभासद् नगर पंचायत मुनि की रेती, श्री सन्दीप कश्यप, परियोजना अभियन्ता, श्री एस0एन0 सिंह, सहायक परियोजना अभियन्ता, श्री टी.एस. गुंसाई, सहायक अभियन्ता, सिंचाई विभाग, ग्राम प्रधान, जनप्रतिनिधि एंव कन्सल्टेन्सी फर्म ए0इ0 कॉम के प्रतिनिधिगण उपस्थित हुए।

उपरोक्त विषयक योजनाओं से सम्बन्धित कार्यक्रमों पर विचार किया गया श्री कश्यप परियोजना अभियन्ता एवं कन्सल्टेन्ट श्री अनूप सिंह टीम लीडर ए0कॉम इण्डिया प्रा0 लि0 द्वारा योजना से सम्बन्धित लाभान्वित होने वाले क्षेत्रों और कार्यक्रमों के बारे में विस्तार से चर्चा की।

वार्ड के सभासदों तथा अधिशासी अधिकारी द्वारा अपने क्षेत्र की समस्याओं के बारे में विस्तृत जानकारी दी गयी तथा यह अपेक्षा व्यक्त की गयी कि इस योजना में उनके द्वारा बतायी गयी पर्यावरणीय स्वच्छता एवं नदी प्रदूषण से सम्बन्धित समस्त समस्याओं का प्रस्तावित योजना में निस्तारण कर लिया जायेगा तथा उनके सुझावों को भी योजना में सम्मिलित कर लिया जाए। मुख्य प्रस्ताव निम्नवत् है :–

सीवरेज :–सीवरेज से सम्बन्धित समस्याओं के सन्दर्भ में माननीयों द्वारा अवगत कराया गया कि क्षेत्र में पुरानी डाली गयी सीवर लाईन की क्षमता वर्तमान आबादी के आधार पर सर्वथा अपर्याप्त है तथा लाईनें भी क्षतिग्रस्त प्रतीत होती है। अतः इनके स्थान पर नई सीवर लाईन बिछायी जाए अथवा आवश्यकतानुसार समानान्तर दूसरी लाईन डाली जाए। उपरोक्त के अतिरिक्त जो क्षेत्र सीवर लाईन से वंचित रह गये है उनमें नई सीवर लाईन डाली जाए। उनके द्वारा यह भी अनुरोध किया गया कि क्षेत्र के निचले भूस्तर वाले हिस्से को भी सीवर लाईन से लाभान्वित किया जाए।

सालिड वेस्ट मैनेजमेन्ट–सालिड वेस्ट मैनेजमेन्ट के अन्तर्गत फर्म के विशेषज्ञ डॉ0 आचार्या जी द्वारा कूड़ा एकत्रीकरण से लेकर निस्तारण तक से सम्बन्धित यन्त्र संयंत्रों का डिमान्सट्रेशन दिया गया। इस सम्बन्ध में माननीयों द्वारा यह विचार व्यक्त किया गया कि इस हेतु उपलब्ध यंत्र–संयंत्रों के अलावा अतिरिक्त मात्रा के लिए आवश्यक व्यवस्था योजना में प्रस्तावित किये जाए। वर्तमान में जो लैंड फिल साइट (खारा स्त्रोत के निकट) उपयोग में लाया जा रहा है वही योजना में प्रस्तावित किया जाए।

सार्वजनिक शौचालय–सार्वजनिक शौचालय से सम्बन्धित प्रस्ताव के अन्तर्गत विचार विमर्श में यह निश्चित पाया गया कि नगर पंचायत क्षेत्र में भूमि उपलब्ध न होने के कारण अतिरिक्त शौचालय कॉम्पलेक्स का निर्माण किया जाना सम्भव नही है। अतः मोबाइल शौचालय उपलब्ध कराया जाना प्राक्कलन में प्रस्तावित किया जाए। ढालवाला क्षेत्र में मोबाइल शौचालय के अतिरिक्त वन भूमि से स्वीकृति प्राप्त करते हुए चन्द्रभागा नदी के किनारे 40–40 सीटों वाले दो शौचालय काम्पलेक्स का निर्माण प्रस्तावित किया जाए।

.....2

शवदाह ग्रह (क्रेमोटेरिया)– शवदाह ग्रह (क्रेमोटेरिया) के सम्बन्ध में यह विचार निश्चिय पाया गया कि वर्तमान शव दाह स्थल के समीपस्थ क्षेत्र में ही उन्नत किस्म का क्रेमोटेरिया बनाया जाए।

रीवर फ्रंट डेवलपमेन्ट–रीवर फ्रंट डेवलपमेन्ट के अन्तर्गत घाटों के अवशेष निर्माण कार्य एवं सौन्दर्यीकरण का कार्य प्राक्कलन में सम्मिलित किए जाने हेतु प्रस्तावित किया गया।

अन्त में समस्त माननीयों द्वारा यह विचार व्यक्त किया गया कि स्वच्छता एंव गंगा नदी के प्रदूषणकी पूर्ण रोकथाम के लिए सचेष्ट होकर पूर्ण सजगता के साथ प्रस्तावित योजना में आवश्यक अन्य सभी कार्य सम्मलित किए जाए।

धन्यवाद सहित।

भवदीय,

(अनूप सिंह)
टीम लीडर
ए0इ0 कॉम इण्डिया प्रा0 लि0

संलग्नः बैठक में उपस्थित सदस्यों की सूची

मुनि की रेती नगर एवं आसपास के सैटेलाईट टाऊन की राष्ट्रीय गंगा नदी बेसिन प्राधिकरण कार्यक्रम के अन्तर्गत सी0एस0पी0, एफ0आर0, डी0पी0आर0 आदि के सम्बन्ध में अधिशासी अधिकारी नगर पंचायत मुनि की रेती की अध्यक्षता में आहूत बैठक दिनांक 13–08–2012 स्थान नगर पंचायत सभागार, नगर पंचायत मुनि की रेती ।

उपस्थिति –

क्रम सं0	नाम	पदनाम	विभाग	हस्ताक्षर
1	[illegible]	[illegible]	[illegible]	
2	संदीप [illegible]	परि० अभि०	[illegible]	
3	[illegible]	प्रधानी ग्राम पंचायत हालवाला	9319068847	
4	एस.एन.सिंह	सहा. परि. अभि.	नि. जलु. इकाई (गंगा) उ. पेय. निगम 7830500850	
5	अनूप सिंह	टीमलीडर	AECOM 09899711307	
6	डॉ. के. डी.वी. आचार्य	सॉलिड वेस्ट विशेषज्ञ	AECOM 09829065565	
7	[illegible]	सलाहकार	AECOM 9412030370	
8	जी. डी. त्रिपाठी	अभियंता	AECOM 9412071279	
9	धर्मेन्द्र प्रसाद कुकरेती	सहा. परि. अभि.	नि. जलु. इकाई (गंगा) 7830500870	
10	JITENDRA KUMAR	Com Himalayan	9410574664	
11	प्रदीप राणा (सभासद नं० मुनी रीरेती)		9412052771	
12	[illegible] (सभासद नं० मुनि रेती)		9719335	
13	T.S. Gusain A.E. I.D-2 Maniya		8954171035	

Annexure – 3

Census Population of Muni ki Reti

NAGAR PANCHAYAT MUNI KI RETI POPULATION AS PER CENSUS 2011

S.No.	Town Code	Name	Tehsil Name	No_HH	TOT_P	TOT_M	TOT_F	P_06	P_SC	P_ST	P_LIT	P_ILL
01	800303	WARD NO.-0001	Narendranagar	367	1497	992	505	154	600	0	1087	410
02	800303	WARD NO.-0002	Narendranagar	411	1770	1004	766	164	184	1	1477	293
03	800303	WARD NO.-0003	Narendranagar	260	1055	617	438	100	100	0	857	198
04	800303	WARD NO.-0004	Narendranagar	270	1124	609	515	135	38	0	901	223
05	800303	WARD NO.-0005	Narendranagar	541	2376	1425	951	317	262	7	1622	754
06	800303	WARD NO.-0006	Narendranagar	252	1167	706	461	137	119	0	871	296
07	800303	WARD NO.-0007	Narendranagar	393	1631	968	663	216	150	0	1224	407
TOTAL				2494	10620	6321	4299	1223	1453	8	8039	2581

Source : http://tehri.nic.in

Census of India

Confidential
FORM NO.PT-1

Register for posting of Enumeration Block Totals

Annexure-1
To be completed by 7 march,2011

Rural /Urban Code: 2 | Type of charge (usual -1/special-2): 1 | Name of charge: Nagar Panchayat Muni Ki Reti

State -Uttrakhand code 05 | District -Tehri code 04 | Tashil -Narendra Nagar code 037 | Town -Muni Ki Reti code 7017

Village /ward	EB No	Number of Household				Total population of EB				Number of children in age group 0-6				Numbers of literates			
		Total	normal	Inst.	h.Less	Persons	Males	Females	Others	Persons	Males	Females	Others	Person	Males	Females	Others
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0001	1	120	72	6	42	420	335	85	-	29	14	15	-	314	260	54	-
0001	2	150	117	117	-	584	387	197	-	53	31	22	-	460	329	131	-
0001	3	88	88	-	-	424	224	200	-	63	32	31	-	254	147	107	-
0002	4	97	95	-	-	524	338	186	-	44	18	26	-	440	303	137	-
0002	5	154	149	5	-	650	347	303	-	58	30	28	-	547	312	235	-
0002	6	160	160	-	-	597	321	276	-	66	34	32	-	468	265	203	-
0003	7	136	130	5	-	541	327	214	-	39	19	20	-	442	282	160	-
0003	8	123	120	3	-	514	288	226	-	62	27	35	-	390	246	144	-
0004	9	126	126	-	-	577	311	266	-	61	37	24	-	468	266	202	-
0004	10	10	144	144	-	547	298	249	-	74	43	31	-	425	242	183	-
0005	11	59	58	1	-	228	128	100	-	29	19	10	-	190	110	80	-
0005	12	201	198	3	-	886	595	291	-	118	63	55	-	566	399	167	-
0005	13	143	143	-	-	656	351	305	-	91	47	44	-	459	262	197	-
0005	13(1)	138	138	-	-	606	355	251	-	82	40	42	-	383	247	125	-
0006	14	162	160	2	-	521	307	214	-	55	30	25	-	421	271	150	-
0006	15	150	149	1	-	646	400	246	-	79	38	41	-	457	302	155	-
0007	16	94	94	-	-	397	218	179	-	54	32	22	-	300	178	122	-
0007	17	171	171	-	-	702	403	299	-	113	59	54	-	495	305	190	-
0007	18	127	122	5	-	531	344	187	-	50	21	29	-	393	265	128	-
Page Total		2349	2374	294	48	10551	6277	4274	-	1220	634	586	-	7872	4991	2881	-

Annexure 4 :

33
वनभूमि – हस्तान्तरण (मुनि की रेती ढालवाला जलोत्सारण योजना)
दिनांक 03-05-2014

nandadevi biosphere reserve | 75 | CORBETT

कार्यालय प्रमुख वन संरक्षक (वन्य जीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखंड

5– चन्द्रवनी, पोस्ट मोहब्बेवाला, देहरादून (उत्तराखंड) फोन/फैक्स – 0135– 2644691 email : cwlwua@yahoo.co.in

पत्र संख्या शि0– 2729 / 12–1 दिनांक, शिविर, देहरादून, ~~अप्रैल~~ 01 मई 2014

सेवा में,

अपर प्रमुख वन संरक्षक एवं नोडल अधिकारी,
भूमि सर्वेक्षण निदेशालय, इन्दिरानगर, फारेस्ट कालोनी, देहरादून।

विषय:– जनपद टिहरी गढ़वाल के अन्तर्गत मुनिकीरेती, ढालवाला में जलोत्सारण योजना के निर्माण हेतु 0.99 है0 वन भूमि का गैर वानिकी प्रयोग हेतु उत्तराखण्ड पेयजल विभाग एवं निर्माण निगम को 30 वर्षो की लीज पर हस्तान्तरण।

संदर्भ:– प्रभागीय वनाधिकारी, नरेन्द्रनगर वन प्रभाग की पत्र संख्या 2974/12–1(52) दिनांक 21–04–2014

महोदय,

विषयक प्रस्ताव पर प्रभागीय वनाधिकारी, नरेन्द्रनगर वन प्रभाग द्वारा भाग–2 पर की गयी संस्तुति तथा भाग तीन पर वन संरक्षक, भागीरथी वृत्त द्वारा प्रकट की गयी सहमति के आधार पर इस शर्त के साथ सहमति प्रकट की जाती है कि हाथी आवागमन बाधित नहीं होने हेतु पहले सुरक्षात्मक कार्य किये जायेगें तदोपरान्त निर्माण कार्य प्रारम्भ किया जायेगा। मूल प्रस्ताव 3 प्रतियों में संलग्न कर भेजे जा रहे हैं।

संलग्नक–उपरोक्तानुसार।

भवदीय,

(हस्ताक्षर)

प्रमुख वन संरक्षक, वन्यजीव/
मुख्य वन्यजीव प्रतिपालक,उत्तराखण्ड

संख्या 2729 (1)/ दिनांकित।

प्रतिलिपि– निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित–

1–वन संरक्षक, भागीरथी वृत्त, मुनिकीरेती।
2– प्रभागीय वनाधिकारी, नरेन्द्रनगर वन प्रभाग, मुनिकीरेती।
3–परियोजना प्रबन्धक, निर्माण एवं अनुरक्षण ईकाई (गंगा) उत्तराखण्ड पेयजल संसाधन विकास एवं निर्माण निगम ऋषिकेश, उत्तराखण्ड।

(हस्ताक्षर)

प्रमुख वन संरक्षक, वन्यजीव/
मुख्य वन्यजीव प्रतिपालक,उत्तराखण्ड

Received 3/5/14

SL 1cooky A.E.

3-5-14 PM

River Water Quality Test Reports

Annexure - 5

Test Reports of River Water Quality, including those by CPCB, SPCB and other agencies

प्रदूषण नियन्त्रण अनुसंधान संस्थान
भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार (उत्तराखण्ड) –249403
PCRI/051
POLLUTION CONTROL RESEARCH INSTITUTE
[A Govt. of India - UNDP / UNIDO Project]
BHARAT HEAVY ELECTRICALS LIMITED
RANIPUR, HARIDWAR (U.K.) - 249 403
(Approved Lab under Environment (Protection) Act, 1986; EIA Consultant by NABET, QCI)

TEST REPORT

Lab Reference No: TL121317 **Date :** 24.12.2012
Indentor : Er. G. D. TRipathi, AECOM, 9/F, Infinity Tower-C, DLF Cyber City, DLF Phase II, Gurgaon, Haryana
Customer's Ref. No.: AECOM/IN/2012/UK/10 dated 30.10.20112
Work Order No.: 12-0158-O-291
Sample Collected by: **Indentor** **Collection Date:** 12.12.2012
Sample/Job: Water Sample from Ganga River D/S (Muni Ki Reti)

PARAMETER	UNIT	OBTAINED VALUE
BOD_3 at 27°C	mg/L	1.6
Chloride (as Cl)	mg/L	6
COD	mg/L	5
Fecal Coliform	MPN/100mL	130
Oil & Grease	mg/L	ND
pH	-	7.2
Total Coliform	MPN/100mL	360
Total Dissolved Solids	mg/L	220
Total Suspended Solids	mg/L	98

ND – Not Detectable

24/12/12
(Dr. S. Bhatnagar)
Sr. Manager (PCRI)
डा० एस० भटनागर
(Dr. S. Bhatnagar)
सीनियर मैनेजर (Sr. Manager)
Pollution Control Research Institute
प्रदूषण नियंत्रण अनुसंधान संस्थान
BHEL, Ranipur, Haridwar

Remarks :- (1) This report refers only to the particular sample/job submitted for testing.
(2) This report is not to be reproduced wholly or partly and can not be used as an evidence in the court of law and should not be used in any advertising media without our special permission in writing.
(3) Samples will be disposed off after one month from the date of issue of Test Certificate.

PCRI/051

प्रदूषण नियन्त्रण अनुसंधान संस्थान

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार (उत्तरखण्ड) –249403

POLLUTION CONTROL RESEARCH INSTITUTE

(A Govt. of India - UNDP / UNIDO Project)

BHARAT HEAVY ELECTRICALS LIMITED

RANIPUR, HARIDWAR (U.K.) - 249 403

(Approved Lab under Environment (Protection) Act, 1986; EIA Consultant by NABET, QCI)

TEST REPORT

Lab Reference No: TL121318 **Date :** 24.12.2012

Indentor : Er. G. D. TRipathi, AECOM, 9/F, Infinity Tower-C, DLF Cyber City, DLF Phase II, Gurgaon, Haryana

Customer's Ref. No.: AECOM/IN/2012/UK/10 dated 30.10.20112

Work Order No.: 12-0158-O-291

Sample Collected by: **Indentor** **Collection Date:** 12.12.2012

Sample/Job: Water Sample from Ganga River U/S (Muni Ki Reti), Near Darshana Mahavidyalaya

PARAMETER	UNIT	OBTAINED VALUE
BOD_3 at 27°C	mg/L	1.2
Chloride (as Cl)	mg/L	6
COD	mg/L	5
Fecal Coliform	MPN/100mL	110
Oil & Grease	mg/L	ND
pH	-	7.2
Total Coliform	MPN/100mL	300
Total Dissolved Solids	mg/L	94
Total Suspended Solids	mg/L	62

ND – Not Detectable

24/12/12

(Dr. S. Bhatnagar)
Sr. Manager (PCRI)

डा0 एस0 भटनागर
(Dr. S. Bhatnagar)
वरिष्ठ प्रबन्धक (Sr. Manager)
Pollution Control Research Institute
प्रदूषण नियन्त्रण अनुसंधान संस्थान
BHEL, Ranipur, Haridwar

Remarks :- (1) This report refers only to the particular sample/job submitted for testing.
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(3) Samples will be disposed off after one month from the date of issue of Test Certificate.

PCRI/051

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RANIPUR, HARIDWAR (U.K.) - 249 403

(Approved Lab under Environment (Protection) Act, 1986; EIA Consultant by NABET, QCI)

TEST REPORT

Lab Reference No: TL121319 **Date :** 24.12.2012

Indentor : Er. G. D. TRipathi, AECOM, 9/F, Infinity Tower-C, DLF Cyber City, DLF Phase II, Gurgaon, Haryana

Customer's Ref. No.: AECOM/IN/2012/UK/10 dated 30.10.20112

Work Order No.: 12-0158-O-291

Sample Collected by: **Indentor** **Collection Date:** 12.12.2012

Sample/Job: Water Sample from Ganga River U/S (Tapovan), Near proposed STP Location

PARAMETER	UNIT	OBTAINED VALUE
BOD_3 at 27°C	mg/L	1.3
Chloride (as Cl)	mg/L	6
COD	mg/L	5
Fecal Coliform	MPN/100mL	100
Oil & Grease	mg/L	ND
pH	-	7.9
Total Coliform	MPN/100mL	280
Total Dissolved Solids	mg/L	120
Total Suspended Solids	mg/L	48

ND – Not Detectable

24/12/12

(Dr. S. Bhatnagar)
Sr. Manager (PCRI)

डा० एस० भटनागर
(Dr. S. Bhatnagar)
वरि० प्रबन्धक (Sr. Manager)
Pollution Control Research Institute
प्रदूषण नियन्त्रण अनुसंधान संस्थान
BHEL, Ranipur, Haridwar

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CENTRAL POLLUTION CONTROL BOARD

Ministry of Environment & Forests (Govt. of India)

Basin wise Water Quality Data - 2011

WATER QUALITY OF RIVER GANGA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY			B.O.D. (mg/l)			NITRATE- N+ NITRITE-			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml		
1491	BHAGIRATHI AT GANGOTRI	U.K	3.0	8.0	5.5	8.0	8.9	8.5	7.7	8.1	7.9	88	102	95				0.00	0.30	0.15						
1484	ALKANANDA B/C MANDAKINI AT RUDRA PRAYAG	U.K	10.0	21.0	16.6	8.6	12.2	9.6	7.2	8.7	8.0	105	193	145				0.00	0.50	0.08	700	4300	2500	9300	9300	9300
1485	MANDAKINI B/C ALKALNADA AT RUDRAPRAYAG	U.K	10.0	20.0	16.6	7.0	9.8	8.8	7.3	8.7	8.0	67	205	115				0.00	0.50	0.08	1500	2100	1800	4300	46000	25150
1486	ALKANANDA A/C MANDAKINI AT RUDRAPRAYAG	U.K	10.0	22.0	17.6	8.6	10.3	9.3	7.6	8.6	8.1	84	194	150	0.6	0.8	0.7	0.00	0.50	0.08	9300	24000	16650	46000	46000	46000
1487	ALKANANDA B/C TO BHAGIRATHI AT DEVPRAYAG	U.K	12.0	22.0	18.4	7.7	11.4	9.1	7.4	8.6	8.1	104	196	141	0.6	1.9	1.2	0.00	0.60	0.09	900	9300	5100	4300	15000	9650
1488	BHAGIRATHI B/C WITH ALAKNANDA AT DEVPRAYAG	U.K	12.0	22.0	18.3	7.6	9.8	8.6	7.4	8.5	8.0	92	188	135	1.0	1.0	1.0	0.00	0.40	0.06	400	900	650	2100	4300	3200
1489	ALKANANDA A/C WITH BHAGIRATHI AT DEVPRAYAG	U.K	12.0	22.0	18.4	8.0	10.2	8.7	7.4	8.5	8.1	106	167	132	0.6	0.8	0.7	0.00	0.50	0.08	9300	46000	27650	24000	110000	67000
1060	**GANGA AT RISHIKESH U/S**	U.K	11.4	19.5	17.1	8.0	11.0	9.1	7.0	8.4	7.7	94	148	121	0.2	3.0	1.7							5	200	99
2725	A/C R.SONG NR SATYANARAYAN TEMPLE D/S RAIWALA	U.K	16.0	26.0	21.9	5.2	11.0	7.8	6.8	8.6	7.7	117	480	305	1.4	7.6	4.5				800	800	800	1600	35000	4467
1061	GANGA AT HARIDWAR D/S	U.K	16.1	24.5	20.0	4.2	8.8	6.7	6.7	8.5	7.6	122	305	196	0.6	11.0	5.6				300	2000	1150	200	580000	50917
2727	UPPER GANGA RIVER D/S ROORKEE	U.K	12.2	31.0	19.4	6.4	10.4	8.3	6.8	8.4	7.8	123	208	157	1.0	3.8	2.5				5	11	8	140	700	377
1062	GANGA AT GARHMUKTESHWAR	U.P	13.5	25.0	19.6	7.0	10.0	8.2	7.2	7.5	7.4	181	290	221	2.8	4.5	3.4	0.00	0.73	0.50	310	2100	1162	700	4300	2497
2488	GANGA U/S, ANOOPSHAHAR	U.P	13.0	24.0	18.3	7.0	10.6	8.4	7.0	8.0	7.4	100	285	196	1.6	3.8	2.8	0.00	0.74	0.21	110	1100	673	430	2000	1377
2489	GANGA D/S, ANOOPSHAHAR	U.P	13.0	24.0	18.5	7.2	10.5	8.3	7.2	8.2	7.6	110	480	230	2.2	6.1	3.6	0.00	0.96	0.23	150	1200	783	640	2400	1713
1145	GANGA AT NARORA (BULANDSAHAR)	U.P	14.0	25.0	19.2	7.4	11.6	8.7	7.0	7.8	7.5	110	240	189	1.9	6.6	3.1	0.00	0.80	0.23	70	610	420	150	1400	850
2490	AT KACHHLA GHAT, ALIGARH	U.P	14.0	25.8	20.3	7.6	9.2	8.3	7.2	7.7	7.4	116	289	206	2.2	6.8	3.7	0.00	0.95	0.28	300	1300	840	930	2600	1743
1063	GANGA AT KANNAUJ U/S (RAIGHAT)	U.P	15.0	32.0	25.6	6.0	9.8	7.9	7.1	8.5	8.0	53	541	327	3.4	6.2	4.5	0.00	5.46	2.25	700	9000	3042	2800	20000	10075
1066	GANGA AT KANNAUJ D/S	U.P	15.0	32.0	25.6	6.0	10.1	7.8	7.2	8.6	8.0	55	544	324	4.2	9.0	5.5	0.98	4.33	2.25	900	9000	3508	4300	49000	20208
1146	GANGA AT BITHOOR (KANPUR)	U.P	15.0	32.0	25.6	6.2	14.3	8.7	7.4	8.8	8.2	450	558	510	2.6	5.6	4.0	0.24	3.88	1.70	900	4300	1700	1100	21000	7750
1067	GANGA AT KANPUR U/S (RANIGHAT)	U.P	15.0	32.0	25.8	6.0	12.8	8.6	7.4	9.1	8.2	49	560	316	3.0	5.5	4.3	0.46	3.95	2.03	900	28000	6667	1100	150000	31992

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY			B.O.D. (mg/l)			NITRATE- N+ NITRITE-			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml		
1068	AT KANPUR D/S (JAJMAU PUMPING STATION)	U.P	15.0	32.0	25.8	4.0	11.5	6.9	7.1	8.8	8.0	55	637	381	6.6	9.6	8.4	1.12	4.74	2.77	4000	93000	38942	23000	240000	151333
1147	GANGA AT DALMAU (RAI BAREILLY)	U.P	15.0	25.0	20.7	6.8	9.5	7.8	7.1	8.6	7.9	146	415	281	3.4	4.2	3.8	0.78	1.10	0.85	4600	6300	5300	6800	8700	7775
2498	GANGA AT KALA KANKAR, RAEBARELI	U.P	16.0	25.0	20.9	6.8	9.0	7.7	7.0	8.6	7.8	149	409	261	3.3	4.0	3.8	0.76	0.98	0.84	4100	6300	4980	6800	8800	7510
1046	AT ALLAHABAD (RASOOLABAD)	U.P	21.0	29.0	25.6	6.0	9.8	7.2	7.4	8.4	8.0	278	488	387	2.8	6.0	4.2	1.40	1.88	1.71	3000	3500	3358	7000	9000	7750
2487	GANGA AT KADAGHAT, ALLAHABAD	U.P	21.0	29.5	25.7	6.1	10.1	7.6	7.4	8.4	7.9	266	480	374	2.3	4.8	3.6	1.39	1.85	1.65	2100	3000	2492	3500	6000	4167
1049	AT ALLAHABAD D/S (SANGAM)	U.P	21.5	30.5	26.2	6.0	9.4	7.2	7.4	8.4	8.0	271	598	450	2.6	5.6	4.0	1.44	1.70	1.61	2800	5000	3408	6000	14000	8583
2485	GANGA U/S, VINDHYACHAL, MIRZAPUR	U.P	19.0	32.0	27.4	5.9	11.1	8.7	7.6	8.3	8.0	201	537	387	2.3	10.5	3.7	0.00	6.50	1.96	40	700	332	110	5400	1995
2486	GANGA D/S, MIRZAPUR	U.P	18.0	33.0	27.1	5.1	10.3	7.7	7.3	8.2	7.8	207	555	396	2.9	4.5	3.6	0.00	7.80	2.29	230	7000	2377	490	17000	5708
1070	AT VARANASI U/S (ASSIGHAT)	U.P	18.0	27.0	22.3	7.5	7.8	7.6	7.5	7.8	7.6	224	266	250	3.7	4.2	3.9				8000	8000	8000	13000	13000	13000
1071	AT VARANASI D/S (MALVIYA BRIDGE)	U.P	18.5	27.5	22.8	7.0	7.2	7.1	7.9	8.1	8.0	240	290	272	5.2	9.6	8.0				34000	46000	40000	46000	70000	58000
1073	GANGA AT TRIGHAT (GHAZIPUR)	U.P	19.5	28.5	23.8	7.0	7.4	7.3	7.9	8.2	8.0	232	270	257	4.1	4.4	4.3				13000	13000	13000	17000	21000	19667
1074	GANGA AT BUXAR,BIHAR	BIHAR	16.0	31.0	24.4	7.8	9.0	8.4	7.6	8.5	8.2	287	402	345	2.7	2.8	2.8				1100	9000	3122	2800	16000	6867
2551	GANGA AT BUXAR, RAMREKHAGHAT	BIHAR	16.0	31.0	23.7	7.8	8.7	8.4	7.4	8.6	8.2	310	386	357	2.6	3.0	2.9				5000	9000	7500	16000	24000	22000
1077	GANGA AT KHURJI, PATNA U/S	BIHAR	17.0	32.0	25.1	8.0	8.9	8.4	7.9	8.6	8.2	262	416	327	2.6	2.8	2.7				1300	5000	2767	2400	16000	7044
2556	AT INDRAPURI, DEHRI ON SONE	BIHAR	19.0	29.0	23.2	7.9	8.8	8.3	7.3	8.3	7.8	228	288	259	2.6	2.8	2.7				700	2400	1188	1400	3000	2338
2564	AT CONFL. SONE DORIGANJ, CHAPRA	BIHAR	16.0	25.0	22.3	7.9	9.3	8.5	7.1	8.1	7.7	214	380	298	2.7	2.8	2.8				1100	3000	1922	2200	5000	3933
2552	DARBHANGA GHAT AT PATNA	BIHAR	18.0	31.0	24.1	7.9	8.7	8.4	7.9	8.6	8.3	271	410	334	2.8	3.0	2.9				9000	9000	9000	16000	24000	23111
1079	AT PATNA D/S (GANGA BRIDGE)	BIHAR	18.0	32.0	24.4	7.9	8.7	8.4	8.0	8.6	8.2	292	495	350	2.7	3.0	2.9				3000	9000	5667	9000	24000	18778
2555	GANGA AT PUNPUN, PATNA	BIHAR	19.0	33.0	24.6	6.9	8.0	7.3	7.1	8.7	7.8	312	574	413	2.6	3.0	2.7				1100	3000	1589	2200	9000	3667
2553	GANGA AT FATUHA	BIHAR	18.0	31.0	24.6	8.0	8.8	8.4	8.1	8.7	8.3	282	420	327	2.7	2.9	2.8				1400	5000	2675	3000	16000	7313
1817	GANGA AT MOKAMA (U/S)	BIHAR	20.0	30.0	25.0	7.1	8.7	8.0	7.8	8.2	8.0	339	389	375	2.6	2.8	2.7				1100	5000	2575	2200	16000	6588
1815	GANGA AT MOKAMA (D/S)	BIHAR	20.0	28.0	24.6	6.8	8.8	7.9	7.6	8.2	8.0	362	388	375	2.9	3.0	3.0				2100	9000	7638	8000	24000	22000
1818	GANGA AT MUNGER	BIHAR	20.0	28.0	24.8	6.2	8.6	7.8	7.7	8.1	8.0	298	366	345	2.6	2.9	2.7				800	5000	2178	2200	9000	4967
2554	GANGA AT SULTANGANJ, BHAGALPUR	BIHAR	20.0	27.0	24.6	6.4	8.7	7.8	7.6	8.1	7.9	354	384	363	2.7	2.8	2.7				1300	3000	1943	2200	5000	3371
1819	GANGA AT BHAGALPUR	BIHAR	20.0	27.0	24.9	6.2	8.6	7.7	7.7	8.1	7.9	355	395	368	2.6	2.9	2.8				1300	9000	3686	2200	90000	22743
1816	GANGA AT KAHALGAON	BIHAR	19.0	30.0	25.0	6.4	8.7	7.9	7.7	8.2	8.0	286	372	344	2.7	2.9	2.8				1100	9000	5611	2800	24000	11422
1080	GANGA AT BAHARAMPORE	W.B	14.5	32.0	26.3	6.9	11.2	8.3	7.2	8.4	7.8	209	360	294	1.0	3.9	2.2	0.19	0.73	0.39	17000	240000	105364	26000	300000	140545
2511	NABADIP ON GANGA,GHOSHPARA NEAR MONIPURGHAT	W.B	15.0	32.0	26.0	6.7	10.6	8.5	7.1	8.3	7.8	147	352	290	1.0	3.7	2.1	0.05	0.75	0.34	1300	50000	13573	1700	90000	21973

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY			B.O.D. (mg/l)			NITRATE- N+ NITRITE			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml		
2506	TRIBENI ON GANGA, NR BURNING GHAT	W.B	20.0	32.0	27.8	4.8	13.4	8.2	7.0	8.5	7.9	185	354	289	0.8	2.9	1.7	0.00	0.52	0.26	700	11000	3064	900	14000	4755
1054	GANGA AT PALTA	W.B	19.0	30.5	27.0	5.7	11.0	7.7	7.2	8.2	7.8	181	353	287	1.3	2.8	2.1	0.14	0.85	0.43	23000	220000	84667	50000	280000	128333
1472	GANGA AT SERAMPORE	W.B	20.0	33.0	28.3	5.1	13.2	7.8	7.1	8.4	7.9	185	355	286	0.9	3.2	1.9	0.00	0.54	0.26	14000	170000	66667	22000	220000	97917
1053	GANGA AT DAKSHINESHWAR	W.B	18.0	32.0	26.9	5.2	13.9	7.8	7.3	8.3	7.8	235	370	306	3.0	5.0	4.0	0.06	0.89	0.30	17000	1100000	270333	22000	2500000	653083
1471	GANGA AT HOWRAH-SHIVPUR	W.B	19.0	32.0	27.0	4.8	12.8	7.3	7.5	8.2	7.8	194	370	301	2.4	8.2	4.0	0.02	0.72	0.27	33000	650000	130750	34000	850000	223667
1470	GANGA AT GARDEN REACH	W.B	16.0	33.0	26.6	4.4	12.2	6.8	7.5	8.3	7.8	235	371	316	1.9	5.6	4.1	0.04	1.00	0.29	8000	400000	164833	11000	650000	247167
1052	GANGA AT ULUBERIA	W.B	18.0	37.0	27.1	4.3	11.0	5.9	7.5	8.4	7.8	234	545	326	0.3	5.9	2.8	0.10	1.26	0.38	14000	140000	32500	17000	280000	68833
1469	GANGA AT DIAMOND HARBOUR	W.B	18.0	32.0	26.8	5.4	8.5	7.1	7.5	8.5	7.9	261	10240	3186	1.1	5.1	2.3	0.08	0.74	0.34	8000	80000	20333	11000	110000	30667

Source: (http://www.cpcb.nic.in/data_statics.php)