



नेपाल खानेपानी संस्थान
Nepal Water Supply Corporation

IMPROVEMENT OF WATER SUPPLY SYSTEM IN BIRATNAGAR



INITIAL ENVIRONMENTAL EXAMINATION REPORT

AUGUST 2021

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Submitted to:
Ministry of Water Supply
Government of Nepal
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Nepal

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Abbreviations

ADB	Asian Development Bank
BMC	Biratnagar Metropolitan City
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EMP	Environment Management Plan
EPA	Environment Protection Act
EPR	Environment Protection Rules
ESMP	Environmental and Social Management Plan
GIS and RS	Geographic Information Systems and Remote Sensing
GoN	Government of Nepal
HDPE	High Density Poly Ethylene
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
LCD	locally-fitted, compact, and distributed
LGs	Local Governments
MLD	million litres per day
NDWQS	National Drinking Water Quality Standards
NEA	Nepal Electricity Authority
NGO	non-governmental organization
NWSC	NEPAL WATER SUPPLY CORPORATION
O & M	Operation and Maintenance
OHTs	Overhead tanks
PS	Pump Station
SDGs	Sustainable Development Goals
SPS	Safeguard Policy Statement
WHO	World Health Organization
WUSC	Water User and Sanitation Committee

Weights and Measures

°C	degree Celsius
dB(A)	decibel acoustic
Ha	hectare
km	Kilometer
kV	kilovolt
kWh	kilo watt hour
<i>lpcd</i>	Liter per capita per day

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Executive Summary

Background of the Project

Biratnagar Metropolitan City is one of the fast growing cities of Nepal. With the fast growth, the water demand of Biratnagar is growing rapidly as well. Thus, need to improve the current water supply system of the city have been realized. Water demand study carried out in the year 2018 by Japan International Cooperation Agency (JICA) concluded that with 2% annual rate of population growth, the current water demand was estimated to be 120 *lpcd*. Furthermore, the current water demand has also been reported to be 26,100m³/day, whereas 9,100 m³/day is being supplied. Thus there is an urgency to improve the existing water supply system in the city.

Distribution system of the Biratnagar City is one of the oldest in the country which has not been improved till date. Contamination of the water through leakages in the distribution lines is a serious possibility, exposing users to water borne diseases. In 2014, jaundice outbreak in Biratnagar was speculated to have caused due to this reason. The Himalaya Times reported that 12 deaths and more than 2000 people were taken ill in Biratnagar during that time¹. This also indicates urgency for the improvement of distribution lines.

Thus, NSWC in support of JICA has initiated this project for improvement of drinking water supply system of Biratnagar.

Introduction of the Project

The proposed project will supply drinking water to 14 wards (1,2,3,4,5,6,7,8,9,10,11,12,13, and 14) of the Biratnagar Metropolitan City.

The followings are components of the project:

- a. Rehabilitation of 3 existing pump stations (PS) located at Tinpaini, Devkota and Munal Path
- b. Construction of a new pump station/ PS No.5 at ward 5, and
- c. Laying of approximately 170 km of distribution pipe lines in all 14 wards of BMC

After the completion of the project, a total of about 15,652 m³/day will be distributed. This project will add 6,552 m³/day of water to the existing system, thus a total of 93,720 population of BMC will be served.

IEE study

An Initial Environmental Examination (IEE) is required to be carry out in accordance with the requirement of Environmental Protection Act 2019 and Environmental Protection Regulations 2020, which have stipulate that an IEE study has to be carried out for the water supply schemes designed to distribute water to the population between 50,000 to 200, 0000 and/or if new sources are to be constructed for the same. The main objective of the IEE study is to undertake assessment of the impacts associated with the project construction and

¹ THT (2017) Biratnagar at high risk of jaundice epidemic, The Himalayan Times, Kathmandu
<https://thehimalayantimes.com/nepal/biratnagar-high-risk-jaundice-epidemic>

implementation, and design measures to minimize adverse impacts while enhancing social and environmental benefits.

Environmental Condition and Impacts

Physical Environment

Excavation works and diggings are essential during construction period, primarily to lay down pipelines, which might cause erosion and cave-ins thereby causing soil erosion, silt runoff and unsettling of street surfaces. Furthermore, unorganized disposal of the excavated earth can disturb the street surface and decrease the aesthetic and economic values of the area.

Air pollution during construction period, mainly in the form of dust is expected. The air pollution is considered as one of the significant impacts in magnitude because it will affect the resident population as well as the dwellers, as the construction works will be carried in the heavily populated and market areas.

The excavation works are expected to disturb the drainage pattern, disturb local drains, and also create puddles, which will result in water logging. Since the project area is located in the Terai region, water logging can become breeding ground for mosquitos increasing risk of fatal diseases like dengue.

Noise is almost inevitable during the construction phase. Construction works will be carried out in the heavily populated area, thus, its impact is expected to be higher to the local population. Furthermore, its significance will be even higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Though the market area already have higher noise level, mainly contributed by traffic, the construction works and use of heavy vehicles will add noise. The noise will be more disturbing for local population if the construction works are carried out during the nights.

Biratnagar has two rivers, namely Singiyahi and Kesaliya, which are already polluted. Both of these river get polluted one rivers enter Biratnagar residential and market areas. However, construction activities could further pollute them by: (i) poorly managed construction sediments, and waste materials; and (ii) poor sanitation practices of construction workers.

Construction works might damage local infrastructure, such as local road, drains, sewers pipelines, and compound walls of local houses. Water pipelines are usually laid underground about 3 feet deep, so existing roads and streets will have to be dug to lay those water pipes. Thus about 117.5 km of trenches in roads and streets and foot-paths will have to be dug along the proposed alignments to lay those pipes. The width of the trenches that will have to be dug will be about 2 feet to accommodate the pipes and give needed spaces for the concerned workers to work on them. The width and depth of the trenches may vary as per the sizes of the pipes and situation of the roads/streets.

The construction will generate spoil from the excavations. Solid waste will also be generated from the workers. These need to be collected and disposed safely; otherwise, these will create

sanitary issue. This is particularly sensitive as the construction will be carried out in the populated areas.

Biological Environment

- Open space of Tinpaini PS being used for parking may get affected during the transportation and piling of construction materials.
- Since, the construction work takes place in very small area of land, environmental impacts on the vegetation and natural ecosystem seem to be less significant. However, grass species and regeneration will get affected during the construction work in the site but can be re-established later.
- The construction site is not directly associated with the forests that are supposed to be prime habitat of different fauna. However, the movement of wildlife may get affected due to construction work.
- Most of the bird species were found to be native to the project site. In addition, the site is also the destination for migratory birds. Therefore, the activities carried out during the construction period for example, movement of workers, vehicles, etc. may affect the movement and occurrence of birds on the site.
- The aesthetic beauty of the site during the construction period will be unappealing.
- The constructed site later may get affected by the invasion of existing invasive species like Mikania, Water Hyacinth, etc.

Socio-economic and Cultural Environments

The current population of BMC is 2,14,663², which is about 19.77% of the total population of the entire Morang district. The population was 1,66,674 [male 53% (87,664) and female 47% (79,010)] in 2001 and was 2,01,125 [male 51% (108,827) and female 49% (105,836)] in 2011. The increased population between 2001 and 2011 seemed at 34,451. The increased population refers the annual growth (straight line) at 2.07% growth rate. The other report of the same area claims total population as 2,71,354³. The methods of calculating might be different purposively. With reference to the Report of RUDP, the annual Straight-Line population growth rate stands at 6%. However, the base population is 236,895 for the year 2015 and the annual population growth at 3.37% for IEE⁴. If RUDP's growth rate (3.37%) is considered then the population of BMC would be 289,017 for the year 2021. With the population density of 2,788 per (m)². The ward no 6 is largest ward (17,748) and ward no 19 is smallest one (5,640) in terms of population and household too. Similarly, ward no 4 is largest one in terms of physical area. The overall ratio of male to female population is 1.03 with 50.70% (108,827) of males and 49.30% (105,836) of females. The sex ratio of male to

² As posted on its official website

³ Regional Urban Environmental Improvement Project (RUDP)

⁴ Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-metropolitan City.

female population was 1.11 in census year 2001. The population is categorized into 3 major groups' i.e. young dependent population (age: <15) constitutes 34%, most economically active population (age: 15 to 59) constitutes more than 61% and elder dependent population (age: >59) constitutes about 5% based on the census of 2001. 'The dominant ethnic population is Hill Brahmin constituting more than 20% followed by the other terai caste/ethnicity. The presence of dalit vulnerable population (Damai, Kami, Sarki etc.) is less than 1 %.'⁵. Majority of the people use Nepali language followed by the Maithali. The BMC is religiously harmonized municipality wherein exists Hindu, Islam, Jainism, Kirat, and Christianity.

'The total literacy rate is 50.5%, (male 59.5% & female 39.6%)'⁶.

'There are 3 hospitals including other with several private clinics and pathology labs, more than five nursing homes, 50 private clinics & 10 pathology laboratories, one veterinary hospital offering eminent verities of treatment facilities like X-ray, laboratory, operation theatre, OPD and ECG to both human being and animal as well'⁷.

'About 71% of the total population is economically active, of which about 46.2% are engaged in agriculture followed by 32.4% in service and rest in trade and labor'⁸.

The IEE survey enumerated a total of 1,192 population in a total of 216 sample household in the proposed new PS area i.e. ward no 5 of BMC. The proportion of the male and female is 51.01% and 48.99% respectively. Majority of population is enumerated under the age group 21 - <=30 (25.59%) followed by age group 0 - <=10 (23.07%), age group 11- <=20 (19.30%) and so on. For this purpose, the population of less than 10 years and more than 60 years are considered to be the economically dependent to the economically active population. Excluding the referred figure, about 72% population are economically active.

The primary survey identified more than 25 ethnic group within the project area (new PS site) as the mixed community of both hill and terai inhabitants. The majority represents by Mandal (17.13%), followed by Yadav (9.26 %), Khawas (8.80%), Satar (6.02%) and so on. Further, almost 68% (male 34.14% and female 33.39%) of the total people are either can read only (4.87%) or are able to read and write (62.67%). The population under the age 6 was also found to be going school (private) under pre-primary level. Very interestingly, the education level of both men and women are almost the same.

⁵ IEE report on Additional Drainage, Sewerage, and Roads Improvement Works prepared by the Regional Urban Environmental Improvement Project (RUDP) for Biratnagar Sub-metropolitan City

⁶ PPTA

⁷ IEE report on Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-metropolitan City Biratnagar

⁸ As per census 2001

The previous tendency of people merely engaging in the agriculture are now radically changing as most of the people are found diverted into other occupation mainly in salary/wage (52.31%), followed by having their own enterprises (22.22%), and abroad job (15.74%) as agriculture remained less lucrative to acclimatize as the major occupation and source of income. This might be the reason of being metropolitan city as well. However, the given enumerated case of holding the job in abroad is assumed to be very nominal. As anticipated, the reason behind this might be fear of taxation. At the same time, activities like rearing livestock is also given less priority to express as the major occupation.

The income of people is almost equal to the national income. In overall, the per capita income of the people is about 128 thousand. The expenditure of the people is almost equal to the income of the people. In accordance to the annual income, the households are categorized into 3 groups i.e., the households having income more than 2 lakh are categorized under High Income Group (HIG), having income between 200K & 75K under Middle Income Group (MIG), and having income less than 75K under the Low Income Group (LIG). The majority of households are computed under MIG (71%), followed by the HIG (15%) and LIG (14%).

Only about 12% of the household (HHs) have their own land in the proposed new PS site. At the same time, nearly 80% of the HHs' either don't have their own product (30%) or insufficient (49%) to meet their year round demand of foods. Only 6% of HHs' are reported having surplus food. On the other hand, 100% of the HHs' have their own house. However, the houses are categorically different one to another, Kachhi with thatched roof house (62%), Semi-Pakki roofed by either tin or tile (14%) and modern type of house structure with cemented column/wall with concrete casting roof (24%). Very alarmingly, about 2.3% HHs' reports that they do not have own toilet at their house premises and use open land for defecation. This is a very crucial and distressing situation which needs prompt action against it. Almost 100% people in the project area uses ground water using conventional hand pump with no any deficiency all-round year of water fetched from the hand pump.

Electricity facility is connected in almost all houses supplied from the national grid provided by NEA and almost all have at least one set of functioning mobile set. A municipal school under GoN namely Siddhakali Aadharbhut Vidyalaya established in 2046 BS is situated in the Damabandi, Kulharba. The urbanizing pace is taking in place.

The proposed project site is being built up in the municipal owned land. So there won't be any land acquiring issues. Even a single parcel of land of the private site is needed.

Perception towards the Project

Peoples' perception towards the project is very affirmative and believed that this would help to institute favorable impacts in their day to day life's deeds. Most of the people perceived that the project would stand as the landmark to change their lives giving adequate and quality water. By the completion of the project, their source of drinking water would change as they have been consuming iron containing ground water. Secondly, if the source of water is changed then their health status would also be changed in a positive manner. At the same

time, the people would have a gracious opportunity too for the opening of employment opportunities. The project is highly worthy in terms of entire manner of social life.

Socio-Economic Impacts

There won't be any private property conceived to be occupied for the project purpose. Hence, no any physical housing or other assets or resources which belong to the private owner will be lost or damage. The selected land and area are completely free from encumbrances.

Neither land-use would change nor would any agricultural land come under the depletion by the intervention of the project. The project won't damage even the standing crops and the existing cropping pattern would remain the same.

Excavation of the roads for laying down the distribution water supply pipeline would temporarily cause inconvenience to local businessman, vendors, local resident and pedestrians to use those roads & walkway during the construction period. At the same time, temporarily, few informal vendors are also observed running the roadside fast-food and other business along the pipe laying alignment, which might have some critical affects during the construction period. Correspondingly, even big permanent shops of different types might not get sufficient customers and would be unable to manage their daily income and expenditure due to disturbed roads access during the construction period.

Vulnerably, the local people would not be prone to face any critical situation for their living and livelihood. Even the indigenous people/community would not have any adverse impact due to installation of the new pump station but they do have positive impact as they would have opportunity of the project connecting with the piped line water. Similarly, this would not prone to affect the heritage, customs and traditions of the area. However, the inflow of outside employees would elevate few risks on social, economic and communicable aspects. The threat of social security also cannot be ignored in the presence of outsiders.

Except for some of the adverse impact anticipated during the construction period, the project won't give much negative impact at the operation phase. It would have a better opening for the people with having hygienic water supply which might motivate their cleanliness and better health.

Mitigation Measures

Physical environment

During the construction, precautionary measures will be taken to prevent and/or minimize erosion. Proper backfilling trenches will be done. The exposed soil has to be stabilized by covering the trenches by permanently or temporarily with road blacktopping or cement or vegetated to prevent further soil erosion.

Prevention/minimize air pollution:

The following measures will be carried out to prevent and/or minimize air pollution:

- confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;

- if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- place signage at active work sites in populated areas;
- requiring trucks delivering aggregates and cement to have tarpaulin cover;
- limiting speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
- prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- use of vehicles complying with Nepal Vehicle Mass Emission Standards (NVMES), 2069 enforcement, and green sticker standards; and
- prohibit open burning of solid waste.

Minimization of noise level: The following measures will be carried out to minimize the noise coming from the construction works.

- using equipment that emits the least noise, well-maintained and with efficient mufflers; restricting noisy activities to day time;
- avoiding use of noisy equipment or doing noisy works at night time;
- limit engine idling to a maximum of one minute;
- spread out the schedule of material, spoil and waste transport; and
- minimizing drop heights when loading and unloading coarse aggregates.

Prevention/minimization of pollution of the water bodies is maintained by;

- excess spoils will be disposed designated spoil disposal sites
- locating temporary storage areas on flat grounds at safe distance from main surface drainage routes;
- shielding temporary storage areas with sandbags; and
- providing adequate water supply and sanitation facilities at work sites.

Minimize damage to local infrastructures: Installing of the pipeline will damage roads/footpaths. The roads in BMC are blacktopped with foot-paths on both sides of the roads/streets. Care will be taken to lay the water pipes in the side foot-paths as far as possible to avoid any disturbance to traffic along the roads/streets. The dug roads/streets will be immediately backfilled once the pipe laying work is complete in each of them. However the complete reinstatement work may take some time (usually not more than a year) as the concerned contractor may wait for the newly backfilled soil/earth in the trenches to get compacted and also wait until constructions of air valve chambers/sluiice valve chamber are not fully done. In case of blacktopped or cemented roads/streets the complete reinstatement work may take some more time/even 2-3 years depending on the completion time given to the concerned contractor/s.

The water pipelines may criss-cross the sewer pipes/drains. Usually the sewer lines are laid deeper than 3 feet as per need to gain enough slope/grade, so in such cases there may not be any damage except in the cases of manholes where due precautionary measures will have to be done to avoid any damage. However the road drains and other open drains constructed to

dispose the rain/storm water may get damaged in some cases while digging trenches for water pipes. These will have to be repaired instantly once the water pipes are laid.

Biological environment

- Construction materials will be transported at the time of its use only.
- The construction area will be surrounded by fence to prevent the movement of wildlife and green curtain barrier will be managed to prevent the birds' movement on the working site. Such barrier will also help on reducing the impact on aesthetic value of the site.
- The invasion of alien species can be controlled by cutting them before their flowering stage and using them as livelihood option, for example, making compost manure.
- Tree felling will be avoided in the project site. If they have to be harvested, it will be done under the directives of Divisional Forest Office (DFO). It will also be ensured that 25 native tree species are planted to compensate felling of one single tree.

Socio-economic environment

- For overall, a nodal officer is suggested to nominate from the municipality to be solely engaged for addressing the grievances which are likely to emerge from the locals throughout the project construction period. Furthermore, it is also recommended that the BMC authority in association with the water supply office at Biratnagar should notify all the impacting people, business houses etc. about the construction of the project before the construction starts. To control over the loss asset like business and constraint on the walkways due to the excavation of road for laying the pipeline, the contractor should manage to use favorable options such as planking etc. At the same, the contractor should excavate in such a way that should minimize damage.
- It is suggested to establish a small health desk board & open up employment opportunity to skilled & unskilled labor for the local people.

Alternative Analysis

- With no new project designs proposed and no new operation procedures, the stress on the existing water supply would be inadequate and of poor quality which could further escalate the adverse effects on the health of the residents which could get worse due to constant increase in population. This will lead to increase in adverse effects on health of the city population.
- Similarly, with an alternative source of water supply to the metropolitan city which is from the nearby Singiyahi and Kesaliya river as an alternative to the project. The water is of very poor quality and not very reliable during the dry season. With the need of robust intake structures, there needs to be a lookout on these rivers for flooding during the rainy season along with the necessity of pumping stations, new water pump lines, power transmission lines and standby power generators for this particular alternative. Furthermore, both rivers have very limited water flow in the dry season, hence water supply on these will drastically reduce the flow in the downstream which will have considerable adverse effects on the fish culture and on other river water related human activities in the downstream.

- Alternative Source of Project which can be from the Koshi River to the project area has been conducted. In terms of the project design, technology and site; abundant water will be available to the beneficiaries as it is a big river. However, the location being very far that is around 30 km from Biratnagar city will emphasize the need of pump stations to be constructed at different points/locations to pump the river water. Also, the project will need robust intake structure to be constructed (to survive the frequent flood conditions) and a full-fledged treatment plant to treat water pumped all the way from the source (water mostly laden with silt and dirt most of the time). The need of long water pumping transmission and distribution lines, surface and overhead reservoirs will be crucial which will further increase the time schedule of the project as there are more physical structures to be constructed. The project will need the acquisition of productive land for the construction of pump stations at different locations and some land for the treatment plants, surface reservoirs and over-head tanks. With such conditions such as the need of robust structures long transmission pipeline and multi stage pumping, treatment plants, the project will be relatively an expensive one.

Consultation, Disclosure and Grievance Redress Mechanism

The stakeholders were involved during the IEE throughout the discussions on site. Stakeholders have expressed their views which were incorporated in the IEE project. The consultation process will continue during project implementation to ensure that the stakeholders are engaged in the project and will have the opportunity to participate in the development and implementation of the project.

Environmental Monitoring Plan

The project management office, regional project management office and the consultant will be responsible for the environmental monitoring. With the support from the regional project management office, the consultant will submit monthly reports to the Project Management Office. These very monthly reports will be submitted on semi-annual basis for further development.

Conclusion

Under GON's Environmental Protection Act 2020 and Regulation 2021, the proposed project has been classified under Schedule 2, i.e. the projects requiring IEE study. Thus, this IEE study was carried out to meet, following the approval of its Terms and Reference (ToR) document. Primary finding of this is that the proposed project is not an environmentally critical undertaking. IEE indicates that the proposed project, and its components, is not located within or adjacent to environmentally sensitive areas. The extent of adverse impacts is expected to be local, confined within the projects main areas of influence, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site specific.

Similarly, the proposed project will bring about benefits of access to a reliable supply of safe and potable water; promote good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and enhance community health, improved quality of life and safe communities as outcomes. Based on the above findings, we have concluded that the proposed the project no further require special study or detailed EIA.

कार्य कासीरांश

प्रस्तावको भू मिका

विराटनगर महानगरपालिका ने पालकैबै भन्दातिशिल शहरहरुमा पर्द छ यस शहरको जनसंख्या बृद्धिमाएको तिव्रताले गर्दा पानीको मागमा पनि तिव्रता आइरहे कछे । सन २०१८ मा जापान अन्तराष्ट्रिय सहयोग संस्था (ICA) ले गरे कछे अध्ययनले विराटनगरमा १२० लिटर प्रति व्यक्ति पानीको माग रहे कछेनाएको थियो । हाल विराटनगरको पानीको माग २६,१०० घन मि. भएतापनि, खाने पानी संस्थाले केवल १,१०० घन मि. पानी मात्र उपलब्ध गराउन सके कछे । यसको साथै, विराटनगरको खाने पानीबितरण प्रणाली पनि साह्रै पुर्णान्नाइसके कछेसको कारणले धेरै ठाँउहरूमा हवाटको समस्या रहे कछे । यी चुनौतीहरूबाखाने पानीदुषण्ड, उपभोक्ताहरुलाई रोग लाग्ने संभावना पनि प्रवल रहे कछे । २०१४ मा विराटनगरमा फैलिएको जन्डिस (jandice) रोगको कारक प्रदूषित खाने पानीनसक्ने अनुमानिएको थियो । त्यसबेला १२ जनाको मृत्यु कारिब २००० जनालाई संक्रमणको तथ्याङ्क “द हिमालयन टाइम्स” को रिपोर्ट माउल्ले खगरिएको थियो । यसले विराटनगरको समग्र खाने पानीबितरण प्रणालीको स्तर उन्नति गर्नु पर्ने टडकारो आवश्यकता रहेको जनाउछ ।

यसकारणले ने पालकाने पानीसंस्थानले ICA को सहयोगमा यस “विराटनगर खाने पानीसुधार आयोजनाको” पहल गरे कछे ।

प्रस्तावको परिचय

प्रस्ताव गरिएको आयोजनाले विराटनगर महानगरपालिकाको १४ वटा वार्डहरूमा खाने पानीपुर्ति गर्ने छ

- यस आयोजनाको मुख्य रचनाहरूसं प्रकार छन् ।
- हाल सं चालिस्निपानी, देवकोटा तथा मुनालमाहे कछेवटा पम्प स्टेसनहरूको स्तर उन्नति
- वडा नं ५, शिध्दकाली आधारभूत स्कूल लजिकै नयाँ पम्प स्टेसनको निर्माण
- कुलकरिब १७० कि.मी. बितरण पाइप लाइन विराटनगर महानगरपालिकाको १४ वटा वार्डहरूमा छर्ने

यस आयोजनाले थप ६,५५२ घन मी पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल ३२,६५२ घन मी पानी विराटनगरमा बितरण गर्ने, जसले गर्दा कुल ३३,७२० जनालाई यस आयोजनाले खाने पानी पुर्गाउने छ

प्रारम्भिक वातावरणिय मूल्याङ्कन

वातावरण संरक्षणियमावली २०७७ को अनुसूची ३ (सम्बन्धित) अनुसार खाने पानी स्किम जसको क्षमता ५० हजार देखि लाख सम्म जनसंख्यालाई बितरण गर्ने तथा जसले नयाँ पानीको श्रोतको उपयोग गर्छ, त्यस्तो आयोजनाको प्रारम्भिक वातावरणिय मूल्याङ्कन अध्ययन गर्न अनिवार्य हुन्छ । जसलाई सम्बोधन गर्न, यस प्रारम्भिक वातावरणिय मूल्याङ्कन अध्ययन गरिएको हो । यस अध्ययनको मुख्यदेखि आयोजनाको निर्माण तथा संचालन गर्दा हुनसक्ने वातावरणिय तथा

सामाजिक प्रभावको बिशले षणरी प्रतिकु षभावहरुको न्यू निकरणदेँ आयोजनाको सकारात्मक प्रभावलाई बू ष्छिर्ने रहे क्छे ।

वातावरणिय परिस्थिति तथा प्रभावहरू

भौतिक वातावरण

निर्मा णक्यै राषाडप बिछ्याउनको लागि जमिनको खु दाइथा उत्खनन् जस्ता कार्य हस्मनिवार्य हुन्छ । यी कार्य हस्सु ख्यतयशहरी क्षे भित्र हुने हुँ ,यसको प्रभाव धे जैनसं ख्यालाईर्ने अनु मान गरिएको छ । खु दाईक्येकारणले बाटोघाटो अवरूध्द हुनको साथै उत्खनन्बाट उत्पन्न हुने माटो, सडकको छे उम्सु पारिँ स्थानियहरुको आवतजावतमा व्यवधान आउनु क्सेसाथै त्यस स्थानको सु न्दरताम्मानि हास आउने क्छ

निर्माण अवधिको दै रासिस्कने धु लोक्केरणले गर्दा वायु प्रदु षण्हुने अपे क्षारिएको छ, जसले स्थानिय वासिन्दाको साथै आवतजावत गरिरहने जनता र आयोजनाको कामदारहरूलाई समे षभाव पार्न सक्ने क्छ

उत्खनन् तथा खु दाइक्येकार्य हस्सु ख्यतयशहरी क्षे त्रम्मारिने हुँ ,य्साटो पानीसँ बैगे शहरको पानी निकासहरुमा जम्मा हुने, जसले गर्दा निकासहरु थु निष्पानी जम्मा हुनसक्छ । तराई क्षे त्रम्माहाँ को भूबनोटका कारण पानी जम्मा हुने (water logging) समस्या बढि हुने गर्द छ यस्ता स्थानहरु लामखु ट्टे प्रक्सेन् स्थल बत्राले डेँ षुस्ता रोगको विस्तार हुन मदत पु ग्दछ ।

निर्मा णक्येकार्य हरुक्सेनि प्रदु षण्हुनसक्ने प्रवल सं भावनहन्छ । निर्मा णकार्य हस्सुहरि क्षे त्रम्मुने हुँ ,यसको प्रभाव अझै बढि मात्रमा हुनसक्छ । त्यस माथि अस्पताल, स्कू लादिमा यसले धे प्रैभाव पार्ने क्छदिनमा गरिने निर्मा णक्सेन्दा रात्रिमा गरिने निर्मा णक्सेन बढि प्रभाव पार्ने क्छ

बिराटनगर भएर दु खोलाहरु बग्दछन् - सिङगियाही र के सलीया यी दु बैखोलाहरु हालको अवस्थामानै प्रदू षिछन, मु ख्यतयमी खोलाहरु बिराटनगरको शहरी क्षे त्रम्मावे शरे पछिन प्रदु षित भएको दे खिन्छनिर्मा णक्येरणमा, पानीसँ बैगे गएको माटो र आयोजनाका कामदारहरूको खराब सरसफाईको अभ्यासले यी खोलाहरू अरु बढि प्रदू षिछनसक्छन ।

निर्मा णकार्य ,लेख्खु ख्यतयमाईप लाईन बिछ्याउदा, करिब ३ फिट गहिरो र २ फिट फराकिलो खाडल खन्नु पर्हुन्छ, जसले गर्दा सडकहरू, पानी निकासका ढलहरु, घरहरुको पार्खा बा भित्ताहरुमा क्षति पु ग्दछ ।

निर्मा णस्थलहरुबाट उत्पादन हुने माटो र कामदारहरुबाट उत्पादन हुने फोहरको व्यवस्था राम्रोसं ग नगरिएमा यसबाट स्वच्छता र जनस्वास्थमा नकारात्मक प्रभाव पर्न सक्छ । शहरको घना वस्तीमा सं चालहुने निर्मा णकार्य भएकोले यो प्रभाव झन सं वे दनहिससक्छ ।

जै विक्कातावरण

यस आयोजनाले वनस्पति र प्राकृतिक पारिस्थितिकिय प्रणालीमा खासै असर नपर्ने देखिन्छ । यद्यपी यसका के ही निर्मा णकार्यथोसैमात्रमा घासको प्रजाति र तिनको पुनर्उत्पादनमा असर पर्ने देखिन्छ जुन पछि पुनः स्थापित हुन सक्छ । आयोजना क्षेत्र जङ्गली जनावरहरुको वासस्थानसँ ग्मोडिएको छैन वा टाढा रहे क्छे । तथापि वन्यजन्तुको आवत जावतमा भने निर्माण कार्यले असर गर्न सक्ने देखिन्छ ।

आयोजना क्षेत्रमा इएका धेरैजसो चराचुरुङ्गीहरूको प्रजाति रैथाने रहेको पाईयो । साथै उक्त क्षेत्र वसाई सरेने चराचुरुङ्गीको गन्तव्यको रूपमा पनि रहेको हुँ । निर्माण कार्यका बेलामा हुने विभिन्न गतिविधिहरू जस्तै कामदार तथा गाडीहरूको आवतजावतले यस्ता चराचुरुङ्गीको घटना दर्ताका साथै उनीहरूको आवतजावत मा समेत असर गर्ने देखिन्छ ।

निर्माण कार्य सम्पन्न भएको स्थल पछि गएर वनमारा, जलकूम्भी, जस्ता मिचाहा प्रजातिले ढाकिन सक्छ ।

सामाजिक आर्थिक कक्षा सांस्कृतिक विरासत

बिनापा। को वे साइटले दिएको जानकारी अनु सहालको जनसंख्या १४,६६३ छ, जु सम्पूर्ण पौरं ग जिल्लाको कुल जनसंख्याको ३६ पाँच भागको एक भाग (१९.७७%) हो । जनगणना २००१ मा १,६६,६७४ [पुरुष ३३% (८७,६६४) र महिला ४७% (७९,०१०) थियो, भने २०११को जनगणना अनुसार यहाँ जनसंख्या ०१,१२५ पुरुष ११% (१०८,८२७) र महिला ४९% (१०५,८३६)] थियो। साल २००१ र २०११ जनगणना बीचमा करीब ३४,४५१ वृद्धि भएको देखिन्छ RUDP ले २०१५ मा तयार गरे को IEE को आफ्नो प्रदिवे दनमन्तनसंख्या ३३७% लाई मानेको छ र यही वृद्धि दरलाई प्रतिवे दनमानि मानिएको छ जस अनुसार २०२१ को बिनापा। को जनसंख्या ८९,०१७ हुने छ। जनघनत्व २,७८८ प्रति वर्ग की.मी. छ । जनसंख्या वृद्धि सावले वार्ड नं ६ सबै भन्दा लोर्ड (१७,४४८) हो भने वार्ड नं १९ सबै भन्दा नो ९५,६४०० वार्ड हो, त्यस्तै, वडा नम्बर ४ भौतिक क्षेत्रको हिसाबले सबै भन्दा लोर्ड। पुरुष महिला जनसंख्याको मग्न अनुपात ०३ छ (पुरुष ०१.७०%) र महिला (४९.३०%) रहेको छ।

बिनापा मा उमे : २१५ का आश्रित जनसंख्या ४४%, उमे : १५ दे खि ९ वर्ष क्यार्थि करूपले सक्रिय जनसंख्या १%, र उमे : ३५९ का बहुधा आश्रित जनसंख्या ४४% रहे क्यन् जनसंख्याकहि सावले दलित (दमाई, कामी, सार्की आदि) को उपस्थिति १% भन्दा कम छ। बहुसंख्याकाषीहरु मै थलीभा र ने पालीभाषा दुबै बोल्दछन, र बंगाली गायत थारु भाषा को उपस्थिति पनि उल्लेख्य छ। धार्मिक रूपले अति सहिष्णु नगरपालिकामा हिन्दू, इस्लाम, जै, नकिरात, र ईसाई सामाजिक सामन्जस्यमा रहे क्यन् ।

कु साक्षरता दर ५०।५% (पु. ५९.५% र महिला ३९.५%) छ।

यहाँ ३ निजी अस्पतालहरु सहित धेरै सिजी क्लिनिकहरु र प्याथोलोजी प्रयोगशालाहरु, पाँच भन्दा बढि नरसिंह गहोपा १० निजी क्लिनिक र १० प्याथोलोजी प्रयोगशालाहरु, एक पशु चिकित्सालय छन् जसबाट एक्सरे, अपरे, शस्त्रिएटर, ओपीडी जस्ता उपचार सुविधाहरु उपलब्ध छन् ।

आर्थिक रूपमा सक्रिय जनसंख्यामध्ये करीव ४६.२% कृषिमा र ३२.४% सेवा क्षेत्रमा र श्रममा छन्।

परियोजना क्षेत्र वक्त्रोधारभू स्थिति (PS नम्बर ५)

प्रस्तुत सर्वेक्षणले स्थावित नयाँ पम्प स्टे सहाई नं ५) मा कूल १६ नमूनाहरू रीमा ल १,१९२ जनसंख्या गरी रहेको। पुर्ण महिलाको अनुपातमशः ५१.०१% र ४८.९९ % छ। बहसंख्या जनसंख्या ५५.५९% उमेर समूह ११ देखाइ १० वर्ष कानुन भने उमेर समूह १० वर्ष

भित्रका २३.०७% रहे काछसउमे समू छ दे खि० वर्ष भित्रका १९.३०% रहे काछन। लगभग २% जनसंख्या छर्रुपमा सक्रिय छन।

प्रस्तु द्वारमिक सर्वे क्षणखेरियोजना क्षेत्रमाँ PS साइट) भित्र २५ भन्दा बढी पहाडी र तराईका जातीय बासिन्दाहरुको मिश्रित समु दायक्षेपमा पहिचान गरे कछे। बहुमत मण्डल (१७.१३%), पछी यादव (९.२६%), खवास (८.८०%), सतार (६.०२%), त्यस पछि अन्य रहे कछन् । कूजनसंख्याको लगभग ६८% (पु रुष ४१.१४% र महिला ३३.३९%) मध्ये ४८७% जनसंख्याद्वारा मात्र जान्दछन ६२.६७% जनसंख्याद्वारा सले खुबै जान्दछन। यस क्षेत्रमा वर्ष मु निक्कनसंख्या नि पू प्रथमिक तह अन्तर्गत सिद्यालय (निजी) जाँ धेरै कमोइयो। रोचक कु सु बै रुष महिलामा शै क्षिकताको स्तर लगभग उस्तै छ।

के वक्ता पिम्मा लखने पहिले कोवृ तिम्रब आमू खरिवर्त आएको दे खिन्छ। आजकाशे रै जसो मानिसहरु मु खरूपमा तलबर्ज्याला (५२.३१%) मा सं लखन् भने आफ्नै उद्यम (२२.२२%) मा सं लग हुने कछे खरूपमा कम छै यस बाहे कै दे शिक्षा (१५.४४%) मा पनि सं लखन् आजका दिनमा कृषि दिने प्रतिफलको न्यू नताको कारणले कृषि प्रेक्षिको आकर्षक कम हुँ दिएको दे खिन्छ। भवतः यस्तो अवस्था यो महानगर भएको कारणले पनि हुनसकछ।

आयव्ययको हिसावले यहाँ कछेनताको आय लगभग राष्ट्रियस्तरको आय जतिकै छ। औसतमा, यँ हा प्रतिव्यक्ति प्रतिवर्ष आय लगभग १२८ हजार छ। साथै खर्च पनि लगभग उतिकै छ। वार्षिक आयको अनुसायहाँ परिवारहरुलाई ३ समू हम्सर्गीक गर्न सकिन्छ । वार्षिक लाख भन्दा बढी आय भएका परिवारहरुलाई उच्चआय समू (HIG), ७५ हजार दे खि लाख सम्मका आय भएका परिवारलाई मध्यमआय समू (MIG) र वार्षिक ७५ हजार भन्दा कम आय भएकालाई न्यू आय समू (LIG) वर्गकरण गरि विश्लेषण गर्दा समग्र जनसंख्याकै १५% MIG मा १५% HIG मा र बाँ क्शे ४% LIG मा दे खिन्छ।

प्रस्तावित नयाँ PS साइट क्षेत्रमा रधु सीधै लगभग ७८% घरधु रीक्याफ्नै निजि जग्गा छै मात्रै बुझिन्छने बाँ क्शे २% मात्रै आफ्नै निजि जमिन छ। आफ्नै खे त बारीमा निजि उत्पादन भएको खाद्यान्नले वर्ष भसै पु र्छि पु गदै भन्नेसवालमा झन्डै ८०% HHs को आफ्नै उत्पादनले वर्ष भखान पु गदै केन वक्शे ७५% घरधु रीक्याफ्नै वर्ष भखान पु ग्ने अतिरिक्त वचत पनि हुन्छ भन्ने बुझिन्छ। वक्शे दे खि महिनासम्म (८%), ६ दे खि महिना सम्म (५%), र ९ दे खि महिना सम्म (२%) छ। निजि आवासको सवालमा भन्नु पर्दा यस क्षेत्रमा र्क्षणीयका मध्ये सबै परिवारको आफ्नै निजि आवास छ तर आफ्नो हैसियतनु सायको निर्माण र चल्ने फरक फरक छन् ६२% घरपरिवारको खर / फु सलेएको कच्ची घर छ, १४% को टिन अथवा टायलले छाएको अर्ध पक्की घर छ भने बाँ की २४% को सिमे कै गारो वा पिलर सहितको ढलान गरिएको पक्की घर छ।

सर्भे क्षणले खाएकै भन्दा श्रु लाग्ने सू चल्ने शौचालय सम्बन्धी विवरण हो। महानगरपालिका क्षेत्रमाँ अंश एपनि यहाँ करीव २.३% घरपरिवारको आफ्नो घर परिसर भित्र आफ्नै निजि शौचालय छै र शौचको लागि नजिकै कछे ललामिन (प्रायः खे / बारी) प्रयोग गर्द छन। यद्यपि, घरधु रीक्याफ्नै विवरणमा कै फियलै भने यो अत्यन्त सं वे दनक्षीय हो। यसको विशिष्ट अध्ययन गराई हाल्नु पर्ने अवस्था दे खिन्छ मानवीय स्वास्थ्यको दृष्टिकोणबाट अति महत्वपू णी विषयलाई तत्काल सम्बोधन गरी शौचालय निर्माणको पहल गर्नु अर्थात् आवश्यक दे खिन्छ। खाने पानीको सवालमा यस क्षेत्रमाँ जसो परिवारको निजि ह्यान्डपम्प छन्, सबै खे मिगल प्रयोग गर्द छस

उपलब्धता पर्याप्त छ। तर धेरै जसो खेडा पहे ल्हेने गरेको गुनासो र्द छन। त्यसै, यहीं राष्ट्रिय विद् युप्रश्तारणलाइनबाट प्रशारित विद् युसबै जसोरले प्रयोग गर्द छसहरे करमा एउटा न एउटा चालु अवस्थाको मोबाइल फोन छ। साथै शिक्षाको लागि यसै कु ल्हरबद्धमावं प्रिटीलमा बिस। २०४६ सालमा स्थापित नगरपालिका अन्तर्ग सिद्धकाली आधारभू विद्यालय सं चालिछ। शहरीकरणको गति बढिरहे क्छे।

स्थानीय वासिन्दा, वडा कार्या लस बिनापा ले उपलब्ध गराएको आधिकारिक जानकारी अनु सार प्रस्तावित आयोजना स्थल नगरपालिकाको स्वामित्वमा रहे क्छेगगा हो त्यसै ले सैगगा अधिग्रहण गर्नु सम्लोहर हुने छै न

परियोजना प्रतिको स्थानीयको धारणा

परियोजना प्रति स्थानीय वासिन्दाको धारणा उत्साहपू र्ण सकारात्मक पाइएको छ। स्थानीयहरु, आयोजनाले स्वच्छ खाने पानीको उपलब्धता गराई स्थानीय वासिन्दाको दै निक्कीवन सहज बनाउने छ भन्ने विश्वास अभिव्यक्त गर्द छन। भू मिगलको सोझै प्रयोगले निम्त्याएको कपडा पहे ल्हेने समस्यालाई यस आयोजनाले समाप्त पार्ने छ भन्ने प्रति पनि स्थानीयहरु आशातित छन्। धेरै जसो मानिसहरुलाई यो आयोजनाले पर्याप्त गुणस्तरीयानी उपलब्ध गराएर उनीहरुको जीवन परिवर्त न गर्न क्छोगि यो एक ऐतिहासिक स्थल (PS-५) बन्ने छ। परियोजना सम्पन्न भएपछि, उनीहरुको पिउने पानीको स्रोत परिवर्त हुने, छ। हिले भू मिगलमा भएको फलामीय तत्व प्रत्यक्ष खाईरहे क्छन् सो पू र्ण रुपस्र्द हुने, छ। जसले उनीहरुको स्वास्थ्य स्थिति पनि सकारात्मक तरीकाले परिवर्त न हुने छ। साथसाथै आयोजना निर्मा षवधिमा स्थानीयले रोजगारीको अवसर पनि प्राप्त गर्ने छन। तसर्थ समग्ररुपमा, यो परियोजना मानवीय सामाजिक जीवन परिवर्त नक्छेकारात्मक सं वाहकबन्ने छ र समग्र दृष्टिकोण बाट उपयु क्तव्यवश्यक र योग्य छ।

परियोजनाले पार्ने प्रभावहरु

यस परियोजनाले परियोजनाको उद्देश्य पूर्ति गर्न क्छोगि कसै क्छे मैजी सम्पत्ति प्राप्त गर्ने छै न। साथै कु नै ऋवास, भौतिक सं रचना अन्य निजी व्यक्तिसं सम्बन्धित सम्पत्ति लगायतका स्रोतहरु नाश वा क्षति हुने छै न। नयाँम्पस्टे स(PS-५) स्थापना तथा सं चालमर्न छनौट गरिएको भू स्थि त्र बाधाहरुबाट पू र्ण मुयाक्छ।

यस परियोजनाले न वर्त माभू उपयोगमा परिवर्त मर्ने छ न कु क्छे षोग्य भू मिगलस्तक्षे पर्ने छ त उत्पादनमा नै नकारात्मक प्रभाव पार्ने छ। यहाँ समक्कि यो परियोजनाले वर्त मानव अवस्थामा गाईएको बालीलाई पनि नाश गर्ने छै न। विद्यबालीढाँ चरिवर्त हुँ दैउस्तै रहने छ।

तर, पु रान्मोईपलाई विस्थापित गर्न वा पू र्णपले नयाँ पाईप बिछ्याउन बिनापा, वडा नं। १ दे स्छि सम्मको करीव १६५ की।मी। सडकक्षे छान्नु पर्ने वाध्यता छ। यसकारण स्थानीय बासिन्दा, सडक सं गै का ठू र्खाना व्यापारी, सडक क्षे त्रस्र्से पसल सं चालमर्ने विविध खाले अनौपचारिक व्यवसायीहरु लगायत पै दल्लात्रीहरुलाई निर्मा षवधिभर सामान्य तर प्रत्यक्ष असर हुने दे खिन्छ। यस अवधिमा ठू र्खाना स्थायी पसलहरुमा पर्याप्त आहकहरु नहुन सक्छन जसले दै निक्काय र व्ययको व्यवस्थापन गर्न असहज हुने छ। साथै अनौपचारिक व्यवसाय या त सो अवधिमा वन्द गर्नु हुन्छ या अन्यत्र

स्थान्तरण गरी सं चालमर्नु हुन्छ त्यसै गरी दस्तात्रीहरुले पनि निर्मा अवधिभर असु विभाहसु स गर्नु पर्ने हुन्छ।

आदिवासी जनजाति/समु दायलाईम्प स्टे शस्थापनाको कारण कु भैतिक लसर पर्ने दे खिदै न। त्यसै गरीयस क्षे त्रकसामाजिक सां स्कु लिम्पदा, परम्परालाई नकारात्मक असर पर्ने पनि दे खिदै नक्षे त्रके दारबिचालित बाह्य कर्म चारीहरुव मजदू हरुको आगमनले सामाजिक, आर्थि क सामाजिक सञ्चारका पक्षहरुमा के ह्मीखिम बढाउन सक्ने छ। सामाजिक सु रक्षामार्ग सक्ने देखल लाई पनि नकार्न सकिदै न।

निर्मा णकद्वैरान, वायु प्रदू षणमे कालन र अन्य श्वाशप्रश्वाश सम्बन्धी समस्याहरु पर्न सक्छन, विशेष गरीसलवालिका र ज्ये ष्ठागरिकहरुमा यो समस्या अझ झन जटिल हुन सक्छ। त्यसै गरीनि प्रदू षणलेस्थानीय जनताबासिन्दाहरुलाई असहज अवस्था हुन सक्ने छविषे सगरीतको समयमा सामान्य ध्वनिपनि कर्क सहुनेनाले निर्मा णक्षेत्रजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

निर्मा णवधिका के भैतिक लभाव बाहे करियोजना सञ्चालन चरणमा धे नैकारात्मक असरहरु हुने छै नमन्त्रे आं कलमर्न सकिन्छ। यो स्वच्छ पानीको आपू र्ति सम्बन्धित परियोजना भएको कारण स्थानीयहरुलाई आफ्नो घर वरपरको सरसफाइलाई ध्यानदिन प्रे रिख्नि गर्न सक्छ। स्थानीयहरुकोगि यो एउटा सु नौल्लेवसर साबित हुन सक्छ।

न्यू निकरणकपायहरु

भै तिक्तातावरण

- माटोको क्षयलाई रोक्न वा कम गर्न निर्मा णरणमा सक्दो सावधानी अपनाउन जरुरी छ, जसमा खाडलमा पाईप बिछ्याउदा लगतै खाडलहरु माटोले पु ,सिके सम्प्रायी वा अस्थाइ सडकको कालोपत्रे ले सिमे न्दा घास् विरुवाले छोप्नु पर्छ ।
- वायु प्रदू षणकोकथामको लागी निर्मा णरणमा उत्खनन भई थु प्रिएक्मोटो जसवाट वायु मा धु लोकमोत्रा बढ्न सक्छ, त्यसरी जम्मा हुने माटोलाई सके सम्छोपे राख्ने, वा पानी छर्के र राख्ने गर्नु पर्छ । साथै खनिएका सडकहरु कालोपत्रे गर्ने, नत्र अस्थाई रुपमा रोडाहरुले छोप्नु पर्छ ।
- ध्वनि प्रदू षणलाई कम गर्न सके सम्म आमवाज गर्ने उपकरणहरुको प्रयोग गर्नु पर्द ,साथै शहरि क्षे त्रमना वस्ति नजिक निर्मा णकार्य दिनमा मात्र सं चालमर्नु पर्द छ यस लगायत, अस्पताल, स्कु लस्ता सं बे दनक्षेत्रजिक निर्मा णर्दा बिशे ध्यान पु र्यासम्बन्ध गरि मात्र कार्य हसम्पादन गर्नु पर्द छ
- आयोजनाबाट हुनसक्ने खोलानालाहरुको प्रदू णरोक्न वा कम गर्न उत्खननबाट निस्के को माटोलाई समयमै तोकिएका स्थानमा बिसर्ज मर्नु पर्छ । यसको साथै निर्मा णमाग्रीहरुको भण्डारण गरिने स्थान खोलानालाबाट टाढा राख्नु पर्छ
- निर्मा णर्दा सडकमा खाडल बनाउनु पर्ने वाध्यता रहन्छ, जसलाई सके सम्म कम गर्न सडक छे उक्थे टपाथम्माईप लाईनलाई बिछ्याउन प्राथमिकता दिनु पर्छ, जसले सडकको क्षति कम हुनु कोसाथै आवतजावतमा पनि कम असर पर्ने छ खनिएको सडकको पु र्नि र्वा णको व्यवस्था पनि यसै आयोजना भित्रै पारिने छ, जसले गर्दा सडकको छिटै पु र्निर्मा ण गर्न सकिने छ ।

- पाईप लाईन बिछ्याउदाको खाडलले स्थानियहरुको ढल लाईन, घरको पर्खा ब्लादीमा पनि असर पर्न सक्दछ छ आयोजनाले यस्ता असरलाई सके सम्म गर्न प्रयास गर्ने ,छार कु नै अवस्थामा असर पर्न गएमा, आयोजनाले तु रन्तैयस्ता क्षतिको पु त्रनिर्माण गर्ने प्रवधान पनि राख्ने छ

जै विज्ञानावरण

- निर्माण कार्यका लागि सामग्रीहरु प्रयोगको बेलामा मात्र स्थलमा पुर्‍याइनेछ ।
- निर्माण स्थलमा वन्यजन्तुको आवतजावत रोक्न छेकबार र चराचुरुङ्गीको आवतजावत रोक्न अग्लो हुने गरी हरियो जाली लगाईने छ ।
- मिचाहा प्रजातिहरुलाई फैलिन नदिन यसलाई फूल फूलन अगावै काट्ने र यसरी काटिएको भागलाई जैविक मल बनाई जीविकोपार्जनको विकल्पको रुपमा पनि प्रयोग गर्न सकिन्छ ।
- परियोजना क्षेत्रमा रुख कटानको कार्यलाई प्राथमिकता दिईने छैन । रुख काट्नुपर्ने अवस्था आएमा डिभिजन वन कार्यालयको निर्देशनमा काटिने छ र प्रत्येक रुख काटे बापत प्रति रुख २५ वटा (कम्तिमा पनि) का दरले रैथाने प्रजातिका विरुवाहरु रोप्न लगाईनेछ ।
- आयोजनाका कामदार, प्रावधिक, व्यवस्थापक आदीको साथै स्थानिय वसिन्दाहरुलाई आयोजना क्षेत्रमा आईने वनस्पति तथा जिव जनावरहरुको बारे मा जानकारी दिई सं रक्षणमा सहयोग पु र्या छेने तनामू लक्ष्य क्रमहरुसं चालनार्नु पर्ने छ साथै आयोजनासं ग सम्बन्धितहरुलाई बाध्यात्मक अवस्था बनाउन, उनीहरुको नियु क्तिकार्य सम्झै ,तथादीमा जै विविधताको सं रक्षणप्रतिको प्रतिबद्धता समावे शरिनु पर्छ ।

सामाजिक - आर्थि कातावरण

- समग्रमा, बिनापाको तर्फ बाढकजना सम्पर्क अधिकारी मनोनयन गर्न सु झापरिन्छ जसले परियोजनाको निर्मा णवधि भर स्थानीयहरुबाट उब्जिन सक्ने गु नासाहरुलाई सम्बोधन गर्न सकोस। यसबाहे ,बिनापा र खाने पानीका लयक्सें यु असोजनमा परियोजना शु रुहुने विषे सगर्खेत्र थाल्नु भन्दा अगाडि विषयमा माइकिं रसार्व जनिक सू चनकारी गरी स्थानीयलाई सो अवधिभरी सं यमिसई सहयोग गर्ने र आफ्नो व्यवस्था मिलाउने समय सिमा तोकी दिनु पर्ने छ।
- आवासको पहुँ चम्पवरोध, हानि, वा त्यस्तै अन्य सम्पत्ति जस्तै व्यापारव्यवसाय वा बाटो हिड् ने लुप्तसक्ने अवरोध न्यू र्गान व्यवस्थितरनु कू विकल्पकासाथ खत्रे काम गर्न ठे के दारलिई शिसर्नु पर्ने छ।
- ध्वनि, वायु तथा धू लेआदि जस्ता प्रदू षणबाटस्थानीयहरुलाई बचाउन, रातको समयमा उच्चध्वनि यु क्कपकरणहरुको उपयोग सके सम्मगर्न सिफारिश गरिएको छ। धू लोजन्य प्रदू षणमियन्त्रण गर्न निर्मा णवधिभर खनिएको ठाउँ हरुमा छर्क सिफारिश गरिएको छ। साथै तत्काल प्राथमिक स्वास्थ्य से षपलब्धताको लागि एक स्वास्थ्य डे स्कबोस्थापित गर्न अभिप्रे रितरिएको छ भने निर्मा णकार्य क्को लागि स्थानीय श्रमको उपयोग गर्न सु झाव दिईएको छ।

वैकल्पिक विश्लेषण

- कुनै नयाँ परियोजना डिजाइन प्रस्तावित छैन र कुनै नयाँ संचालन प्रक्रिया पनि छैन। विद्यमान पानी आपूर्ति मा रहेको अपर्याप्त कम गुणस्तरको पानी स्थानीयको स्वास्थ्यमा प्रतिकूल असरलाई बढावा दिने छ। जुन बढ्दो खेती र उद्योगहरूले पानीको आवश्यकता पुर्याउन सक्ने देखिन्छ। महानगरलाई पानी आपूर्तिको वैकल्पिक स्रोतको रूपमा नजिकैको सिङ्गियाही र के सलीमाही परियोजना एक विकल्पको रूपमा छ। नदीको पानी धेरै कम गुणस्तरीय छ र पानी चाहिने सुख्खा मौसममा यो धेरै भरपर्दो छैन। वर्षाको समयमा आउन सक्ने बाढीलाई मध्यनजर गर्दै, यस स्रोतको लागि बलियो इन्टेक संरचनाको आवश्यकता पर्छ, जस्तै त्यहाँ पम्प स्टेशनहरूको निर्माण, पानी पम्प लाइनहरू, बिजुली प्रसारण लाइनहरू र स्ट्यान्डबाई बिजुली जनरेटरको उपलब्धता हुन सके यो एक विशेष विकल्प हुने देखिन्छ।
- दुई बैदीहरूमा सुख्खासमयमा पानीको बहाव धेरै नै हुन्छ। तसर्थ यी नदीहरूको डाउन स्ट्रिममा तटवर्ती पानीको आपूर्ति बहावमा भारी गिरावट हुन्छ। जसले गर्दा माछा मारी जीविकोपार्जन गर्ने संस्कृति अन्य नदिजन्य मानवीय क्रियाकलापमा उल्लेखनीय रूपमा नराम्रो असर गरेका छन्।
- परियोजनाको वैकल्पिक स्रोत कोशी नदी देखि परियोजना क्षेत्र सम्म हुन सक्छ। परियोजना डिजाइन, प्रविधि र परियोजना स्थलका सन्धर्भमा एक ठूलो बाढी भएकोले लाभार्थीहरूलाई प्रशस्त मात्रामा पानी उपलब्ध हुने छ। तर यो नदि विराटनगर शहरबाट ३० किलोमिटर टाढा भएकोले नदीको पानी पम्प गर्न विभिन्न बिन्दु/स्थानहरूमा पम्प स्टेशनहरूको निर्माणको आवश्यकता पर्नेछ। साथै, परियोजनालाई बलियो इन्टेक संरचना निर्माण गर्न को लागी (बारम्बार बाढीको स्थिति बाट बच्न) र एक पूर्ण क्षमतायुक्त पानी प्रशोधन प्लाण्ट आवश्यक पर्ने छ। जसले सम्पूर्ण रूपले बाढी पम्प गरिएको पानीको फोहर तथा गादयुक्तलाई प्रशोधन गरोस। यसको लागि पानी पम्प गर्ने लामो ट्रान्समिशन लाइन, सतह तथा ओभरहेड लाइन महत्वपूर्ण आवश्यकता हुने छन्। जुन निर्माण गर्ने धेरै शैतिक संरचनाहरूको आवश्यकता पर्ने र यसले परियोजना निर्माणको समय तालिका अझ बढाउने छ। साथै उल्लेखित अवस्थालाई पूर्ण गर्न बलियो संरचनाको प्रसारण पाइपलाइन तथा बहुचरण गरिने पम्प प्रशोधन प्लाण्ट आवश्यक हुने, जसले परियोजनाको लागत अनपेक्षाकृत बढाउने देखिन्छ।

परामर्श, प्रकटीकरण र गुनासो निवारण संयन्त्र

परियोजना स्थलमा गरिएको प्रारम्भिक वातावरणिय परिक्षण छलफलमा सरोकारवालाहरूलाई संलग्न गरिएको थियो। र सरोकारवालाहरूले व्यक्त गरेका कम्प्लेन्टहरूलाई प्रारम्भिक वातावरणिय परिक्षण परियोजनामा समावेश गरिएको थियो। परियोजनाको कार्यान्वयनअघि सबै सरोकारवालाहरूलाई नियमित परामर्श प्रक्रियामा समावेश गरिने छ जसले उनीहरूलाई परियोजनासँग जोडी राख्ने तथा परियोजनाको निर्माण कार्य न्वयमन अवसर प्रदान गर्ने छ।

पर्यावरण अनुगमन योजना

वातावरणिय अनुगमनकालागि परियोजना व्यवस्थापन कार्यालय त्रिभुवन परियोजना व्यवस्थापन कार्यालय परामर्शदातासँगै वहुने छन् र त्रिभुवन परियोजना व्यवस्थापन कार्यालयको सहयोगमा,

परामर्श दातास्रोत रिपोर्ट परियोजना व्यवस्थापन कार्यालयलाई ज्ञाउनु छ। र यी मासिक रिपोर्ट हरभर्षको रूपमा परियोजनाको आगामी विकाशकालागि बुझाईनेछे।

निष्कर्ष

यस आयोजनाको प्रारम्भिक वातावरणीय परिक्षण नेपाल सरकारको वातावरण संरक्षण नियमावली २०७७ अनुसार भएको छ। यस आयोजनाले निर्माणकालमा वातावरणमा न्यून असर पर्ने देखिन्छ, जसको निवारण वा न्यून निकास गर्ने उपायहरू यस अध्ययनले सिफारिस गरेका छन्। समग्रमा यस परियोजनाको वातावरणीय परिपेक्षमा नकारात्मक असर बढि रहेको छैन।

1 NAME AND ADDRESS OF THE PERSON/INSTITUTION PREPARING THE REPORT

Proponent of the proposed project is Nepal Water Supply Corporations (NWSC). The office address of NWSC is:

Nepal Water Supply Corporation
Tripureshwor Marga
Kathmandu, Nepal
P.O.Box: 5349

NWSC has entrusted Yachiko, Japan to undertake the detail design of the project, and thereafter, Yachiko has assigned METCON as the sub-contractor for undertaking the IEE study of the proposed project for and on behalf of NWSC. The detailed address of Yachiko, Japan and METCON is presented below:

Yachiko Engineering CO., LTD
Consulting Engineers and Architects
Tokyo, Japan.
Email: kt-fujii@yachiyo-eng.co.jp

METCON Consultants
43 / 15 Dandibaba Marg, Tangal, Kathmadu-2, Nepal.
Phone: (977)-4412-902
Email: info@mgplconsult.org
Web: www.mgplconsult.org

2 INTRODUCTION

2.1 Objective of the study

The primary objective of the proposed project is to improve existing water supply system of Biratnagar Metropolitan City (BMC), which is the third largest economic city of Nepal. Currently Nepal Water Supply Corporation (NWSC) and three Water User and Sanitation Committees (WUSC) are implementing the drinking water supply system in the city. However, only between 25% – 30% of the current population is receiving the water supply. The huge population is still devoid from their services.

The project will cover the following wards of BMC - 1,2,3,4,5,6,7,8,9,10,11,12,13 & 14.

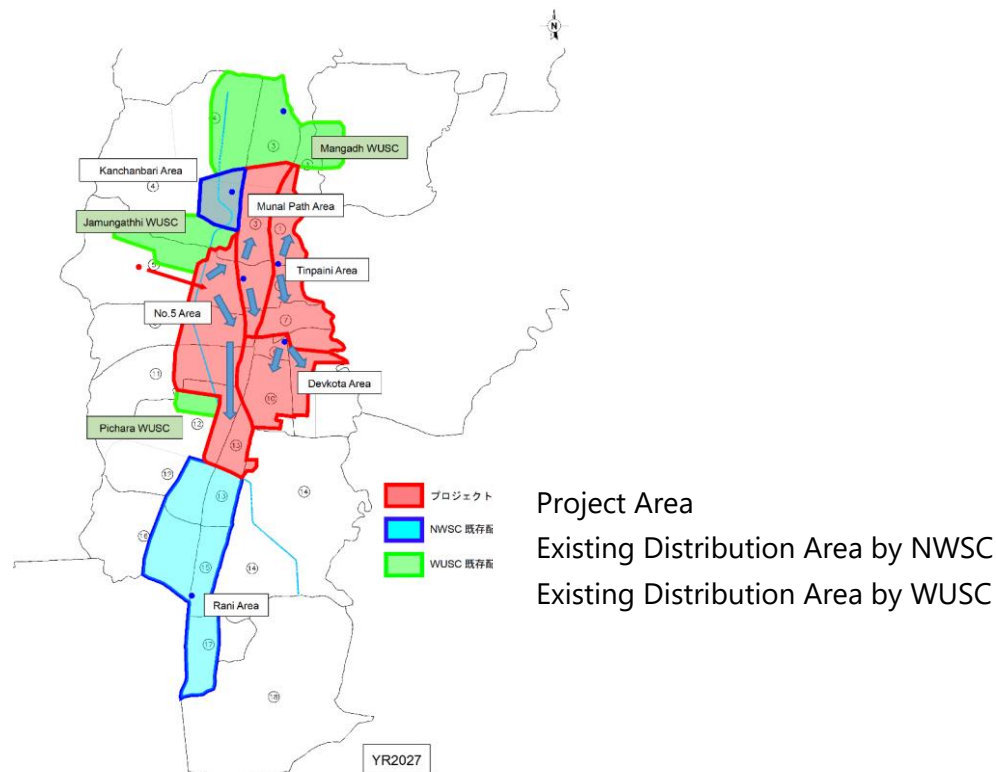


Table 1: Estimated Coverage of Piped Water Supply

WUSC	Service Population 2019		Population 2019	Coverage
NWSC	56,900	91,202	305,968	30%
Jamungathhi WUSC	3,472			
Pichara Biratnagar WUSC	4,325			
Mangadh WUSC	26,505			

Source: JICA Study Team

2.2 Landuse impact of the project

The proposed project is not expected to make any significant changes in the existing land use, primarily because it proposes to improve existing water supply system of BMC. It intends to improve existing pump station, water treatment, and supply systems. The only new addition is the water pumping station at Pump no 5 which is near the Bishal Chowk in Jyoteshwor,

Biratnagar which needs to be established as a new pumping station including water treatment facility and storage facilities. Currently, the land is used for grazing, though its ownership belongs to a school- Siddhakali Aadharbhoot Bidhyalaya. The school has already agreed to provide this land to the project.

2.3 Environmental Impact, Impact on human lives and Population pressure

The first and primary positive impact of this project is that it will significantly improve the sanitary and health condition of BMC. Currently, NWSC has not been able to adequately meet the water demand of BMC. The water supply has been limited to residents of the core BMC, while majority of residents are compelled to rely on hand pumps or private boring to meet their water supply needs. Moreover, quality of the water supplied by NSWSC as well as the ground water extracted by hand pumps/boring has been doubted for contamination. The 2014 outbreak of jaundice had been attributed to the poor quality of water (Poudyal, et al., 2017). Thus the proposed project is expected to improve the water supply in terms of quantity and quality.

The construction activities, itself, have been considered primary source of environmental impact as well as impact on local human lives. The construction works will be carried out in the core urban area, as a result of which the project is expected have significant impacts, such as:

- The local ambient air quality as well as noise level are expected to deteriorate due to the dust generated from the construction activities, traffic congestion and jam due to the road blockages as roads will be excavated for distribution line laying, as well as the exhausts coming from the heavy machineries deployed for the construction works.
- The primary source of water for the proposed project is ground water. 4 pumping stations distributed around BMC are proposed to be improved, thus, the quantity of water pumped out will significantly increase. Though ground water recharge in the Biratnagar region is strong fed by the Sapta Koshi River system as well as Siwalik range, changes in the ground water status might be a possibility. If the ground water table goes down, it can decrease effectiveness of hand pumps and borings used by locals, or drying of local well and ponds, particularly during the dry season.

2.4 Impact on local infrastructure

The construction activities, particularly spoil storage that are generated from road excavations might disturb the drainage systems causing water loggings. This situation might worsen during the monsoon period. Furthermore, spoil can also clog the sewage and drain as these will drain into the sewages and drains.

The excavation in the urban area will damage existing municipal and private infrastructures, such as - sewage lines, drainage lines, water supply lines, electric distribution lines, telephone lines, multimedia supply lines etc.

3 PROJECT BACKGROUND

The proposed project intends to improve existing water supply system of the Biratnagar Metropolitan City to meet increasing demand of safe drinking water. The project intends to improve existing water distribution system, improve existing pumping station, and construct a new pumping station. Thus, this project falls into the category of projects that require undertaking of Initial Environmental Examination (IEE) in accordance with the Environmental Protection Regulation 2020 (EPR2020), which stipulates that the water supply project that intends to supply water to a population of 50,000 to 2 lakh or if a new source is to be constructed for the same requires undertaking of IEE study.

3.1 Type of Project

3.1.1 Existing Water Supply System

The history of piped water system in Biratnagar is about 50 years old. Before that residents of Biratnagar have been using water from the shallow tube wells/bore holes called hand pumps or dug wells constructed at different points by the municipality or by individuals themselves in their backyards.

The primary source of water for Biratnagar has always been the ground water. Though the Koshi River flows about 30 km west from the city in the west, its water has not been considered for drinking water of Biratnagar. Furthermore, two small rivers - Singiyahi (flows from the east of the city) and Kesaliya (flows from the west of the city), however, these river has limited water, particularly in the dry seasons, and are heavily contaminated. So people have been opting for the ground water for their domestic use as it is very easily accessible.

The ground water is easily available at a depth of 5-8 feet though the quality is not reliable and is mostly contaminated. The average depths of hand pumps/shallow tubewells used by common people are in the range of 15-50 feet. Deeper the tube-well better is the quality. Water of most of the hand pumps in the city contains excessive iron and is contaminated to great extent. A large section of the population are still using such hand pumps as all areas are not fully covered by the existing piped water system or piped water supply does not fulfill/meet all the water demand. Presently Nepal Water Supply Corporation (NWSC) and three Water User and Sanitation Committees (WUSCs) namely Jamunagachhi WUSC, Pichhara Biratnagar WUSC and Mangad WUSC are looking after the water supply in Biratnagar. The main urban areas are covered by NWSC and outer peri-urban areas are looked after by the local constituted WUSCs.

The existing NWSC run piped water supply system is being served by water pumped from deep tube wells (more than 100 metres deep) located at different parts of the city, stored in the several overhead/elevated concrete tanks and through pipelines laid underground along the streets. The elevated tanks mostly are located within the tube well/ pump station compounds. Water reaches to the residents through private connections. The supply system was augmented at different times with addition of deep tube wells, elevated tanks and extensions of pipelines in various newly developed areas as time passed on. The system was operated by the municipality itself earlier and later it was handed over to Nepal Water Supply Corporation (NWSC) about 40 years ago. Water is being served through ½” private connections for general households while some businesses and industries have bigger size connections. Because of rapid growth of population and extension of widely scattered dwellings, the present water supply has become inadequate.

The most significant issues that NWSC has to address immediately are (a) provide sufficient water, and (b) improve quality of the supplied water, (c) increase service hours. With the current circumstances, available financial resources needs to be invested for water treatment and storage. Thereafter, improvement of service coverage, shall be prioritized later. Basic design conditions are mentioned in the table below:

Table 2: Basic Design Condition

Indicator	Present	Plan for 2027
Piped water coverage	30% for the Target Survey Area	50%
Service Population	56,900	69,322 in East
		24,398 in West
Consumption	100 -120 LCD	125LCD
Water quality	Contaminated with coliform, iron, manganese	Within Nepal drinking water quality standards
Distribution service hours	Approx. 13 hours	24 hours

Source: JICA Study Team

In order to achieve the goals the following items will be implemented:

- The construction of a new pumping station / renewal of well pumping stations / water purification facilities,
- the renewal of aging water distribution pipes / water pipes.

3.1.2 Water Sources

The details of the existing water sources around the BMC have been illustrated in the table below:

Table 3: Details of existing water sources

SN	Description	Tube well	Depth of the well	Size of the well	Column Pipe size	Pump installed end level	Pump capacity	Pump Discharge	Pump head	Date of construction	Present status	Remarks
		unit	M	Inch	mm Dia	m	HP	Lpm	m	Year		
I	Devkota Chowk PS	1	200	14×8	125	21	35	1800	50-60	1984	Running	Pump Station--PS
		2	150	12×8	100	21	35	1800	50-60	2012	Running	
		3	150	12×8	100	21	21	1100	50-60	2016	Running	
II	Tinpaini PS	1	150	12×8	150	21	25	1300	50-60	2014	Running	
		2	150	12×8	200	21	25	~ 1300	50-60	2019	Running	
III	Munal path PS	1	200	12×8	100	21	20	1000	50-60	1998	Running	
		2	150	12×8	150	21	20	1000	50-60	2015	Running	
		3	200	12×8	100	21	20	1000	50-60	1998	Running	
IV	Rani PS	1	150	12×8	100	21	15	700	50-60	2016	Running	
		2	150	12×8	100	21	20	1000	50-60	2013	Running	
V	BFM PS	1	150	12×8	150	21	20	1000	50-60	2014	Running	
VI	Kanchanbari PS	1	150	12×8	125	21	20	1000	50-60	2013	Running	
VII	Pichara PS	1	150	12×8	100	21	20	1000	50-60	2013	Running	

3.1.3 Storage and Treatment

The available storage and treatment plants and the existing water reservoirs have been mentioned in the table below.

Table 4: Details of existing water reservoirs

SN	Reservoir/Location	Type	Unit	Material	Capacity	Treatment Plant and capacity	Remarks
1	Devkota Chowk PS	Elevated	1	RCC	450 m3	--Chlorine (Bleaching Powder) mixing unit	
		Surface/Ground	--	--	--		
2	Munal Path PS	Elevated	1	RCC	450 m3	--Chlorine (Bleaching Powder) mixing unit	
		Surface/Ground	--	--	--	- Iron and Manganese removal device or pressure filter(Not effective)	
3	Tinpaini PS	Elevated	1	RCC	450 m3	--Chlorine (Bleaching Powder) mixing unit	
		Surface/Ground	--	--	--		
4	Rani Area PS	Elevated	1	RCC	450 m3	--Chlorine (Bleaching Powder) mixing unit	
		Surface/Ground	--	--	--	--Iron and Manganese removal devices	
5	Pichhera	Elevated	--	--	--	--	Water directly pumped into the distribution system
		Surface/Ground	--	--	--		
6	BFM	Elevated	--	--	--	--	Water directly pumped into the distribution system
		Surface/Ground	--	--	--		

3.1.4 Pipelines (Transmission & Distribution)

The distribution pipelines in the Biratnagar city was laid about 50 years back when the system was first built. The distribution system was extended at different times to meet the growth of the city and on demand of the local people. New pipelines were laid as new tube wells were constructed in new areas and extensions were subsequently made by laying further new distribution lines as per the demands of new settlements in different later years. Most of those pipelines have been of Ductile Iron (DI) and Galvanized Iron (GI) pipes. Only limited records of the old pipelines exist in Biratnagar NWSC Branch office. However an approximate length has been estimated with the help of old working plumbers. Total length of pipelines (service and distribution mains) is estimated to be about 100 km of different sizes ranging 12"-1.5" in diameter.

3.1.5 Public, Government and Private Taps

The details of the available public, governmental and private pipeline have been illustrated in the table below:

Table 5: Details of Existing Water Connections

SN	Size	Public	Government	Private	Total	Remarks
1	½" Dia.	25	132	11,612	11769	- Except for the public taps, all connections are metered. - Average 60-65 new connections per month - Average revenue per tap per month- NRs.250=300/-
2	¾" Dia.	None	12	16	28	
3	1" Dia.	None	18	24	42	
4	1.25" Dia	None	None	None	None	
5	1.5" Dia.	None	None	None	None	
Grand Total					11839	As of 21 March, 2021

Source: NWSC, Biratnagar Branch

Note: Water is supplied either through the gravity flow from OHTs or water from the deep tube well is directly pumped into the distribution mains.

3.1.6 Water Quantity and Quality

Out of the total population of Biratnagar city, only around 30-33% of the population is supplied with water. The beneficiary population of the water supply system was estimated to be about 72,000 in year 2016). By 2019 the number of people served is expected to have gone to more than 90,000.

Table 6: Estimated Coverage of Existing Piped Water Supply

WUSC	Service Population 2019		Population 2019	Coverage
NWSC	56,900	91,202	305,968	30%
Jamungathhi WUSC	3,472			
Pichara Biratnagar WUSC	4,325			
Mangadh WUSC	26,505			

Source: JICA Study Team

Total Daily Water Demand ----- 26,100m³/day (26.1 MLD)
 Total Daily Water production capacity-----9100 m³/day (9.1 MLD)
 Total Daily Water supply -----5300 m³/day (5.3 MLD)
 Non-revenue water (NRW) -----3800m³/day (3.8 MLD) makes about 42% and it gives water per capita per day--73 lpcd as water coefficient.

The water supply is intermittent and the supply is made three times a day, with the total supply period/time of 10-11 hours. The supply hours are 5:00 AM -9:00 AM; 12:00 Noon -2:00 PM and 4:00 PM – 9:00 PM.

Generally, deep tube has satisfactory water quality unlike hand pumps as these extract water from shallow aquifer. The hand pump water found to have excessive iron content, and sometimes also contaminated with coliforms. In case of Biratnagar city piped supply, the water being ground water from deep wells, is good at all the sources except for some iron and manganese. However, its quality can deteriorate considerably due to poorly maintained, old and leaking distribution system pipelines. To address such contamination, extensive chlorine treatment by dosing bleaching powder is carried out. There are no other treatments except for one iron removal device at Rani PS and one pressure filter at Munalpath PS, however, these were found to be ineffective and/or inadequate. There was a Jaundice outbreak in Biratnagar in 2014 during the period of April to July. There were 120 cases of infection and 12 deaths. People had suspected the city water supply as one of the prime causes. So NWSC has become quite serious about disinfecting water with chlorine before sending it for distribution.

[Source: JICA Report (REPORT ON SITUATIONAL ANALYSIS OF WATER SUPPLY IN BIRATNAGAR/ Nepal Water Supply Corporation, Biratnagar-August, 2019)]

3.1.7 Proposed New Water Supply Project

The proposed new project is supposed to focus areas mainly covered by Ward 1,2,3,4,5,6,7,8,9,10,11,12,13, and 14 of Biratnagar Metropolitan City. Major components of the proposed new project in brief:

- a. Construction of 1 new pump station /PS No.5,
- b. Rehabilitation of 3 existing Pump Stations (PS) located at Tinpaini, Devkota and Munal Path respectively,
- c. Laying approximately 117.5 KM length of transmission and distribution pipe lines of sizes ranging from 3’’ to 12’’ Dia.

Table 7: New Project components in detail

SN	Project components/ Locations	New Tube well construction		Treatment Plant for removal of iron and manganese		New Reservoir/Water Tank construction (Clear water tank)				Pump house construction	Admin istration office	Drainag e construction	Remarks
						Surface/ Ground ((Semi-basement)		Elevated/Overh ead					
		Unit	Capacity	Unit	Capacity	Unit	Capacity	Unit	Capacity	Unit	Unit	Unit	
a	Construction of 1 new pump station/PS 5	3	1200 lt./min.	1	3600 lt/min.	1	450 cu-m	1	1200 cu-m	1	1	1	-To serve west Biratnagar
		4,889 m3/day (Max.)											
Note: Clear water reservoir will have an 8 hours capacity.													
b	Rehabilitation of 3 existing Pump stations(PS)	Renewal of old existing tube wells											To serve east Biratnagar
	Tinpaini PS	3	1200 lt./min	1	3600 lt/min.	1	1200 cu-m	—	—	—	—	1	
		4,584m3/day (Max.)											
	Devkota Chowk	3	1200 lt./min	1	3600 lt/min.	1	1200 cu-m	—	—	—	—	1	
		4,903m3/day (Max.)											
	Munal Path	3	1200 lt./min	1	3600 lt/min.	1	1200 cu-m	—	—	—	—	1	
		4,406m3/day (Max.)											
Note: Clear water reservoir will have an 8 hours capacity.													
c	Pipeline construction in the project area	Length			Size		Materials		Remarks				
		Approximately 170 KM			3” to 12” Diameter		DI and HDPE		DI-----Ductile Iron, HDPE-----High Density Poly Ethylene				

Table 8: Proposed Distribution pipe plan

	Renewal+ new(m)							Existing (m)	Total (m)
Diameter	12"	10"	8"	6"	4"	3"	Sub-total	12"~1.5"	
Material	DIP	DIP	HDPE	HDPE	HDPE	HDPE		DIP/GI	
Devkota PS	323	2,164	318	2,373	15,008	14,225	34,411	8,633	43,044
Tinpaini PS	-	61	323	3,865	11,036	8,125	23,410	13,951	37,361
Munal Path PS	497	1,893	-	728	8,538	7,164	18,820	13,504	32,324
New No.5 PS	3,344	465	2,841	3,350	18,539	12,193	40,732	16,073	56,805
Total	4,164	4,583	3,482	10,316	53,121	41,707	117,373	52,161	169,534

3.1.8 Water Quality after the completion of the new proposed project

As the ground water in Biratnagar area contains excess iron and manganese, the water is proposed to be treated for iron and manganese removal in the new project. So treatment plants are proposed at all the four pump stations where works are to be done under the new project. Oxidation treatment is required for the removal of Iron and Manganese. Iron is oxidized by air, and Manganese is oxidized by chlorine. The resulting water quality for distribution after treatment will be as per Nepal Drinking Water Quality Standard.

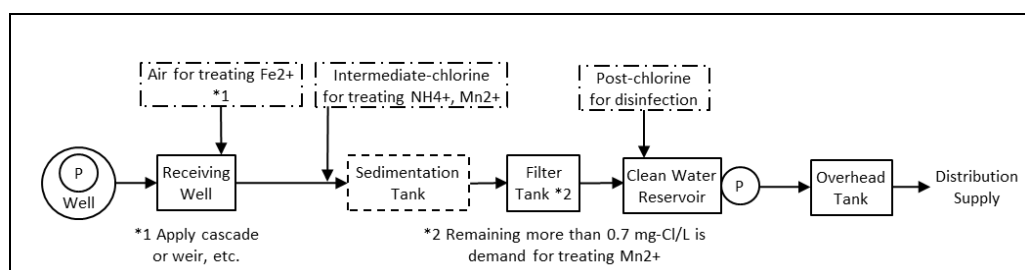


Figure 2: Block Flow

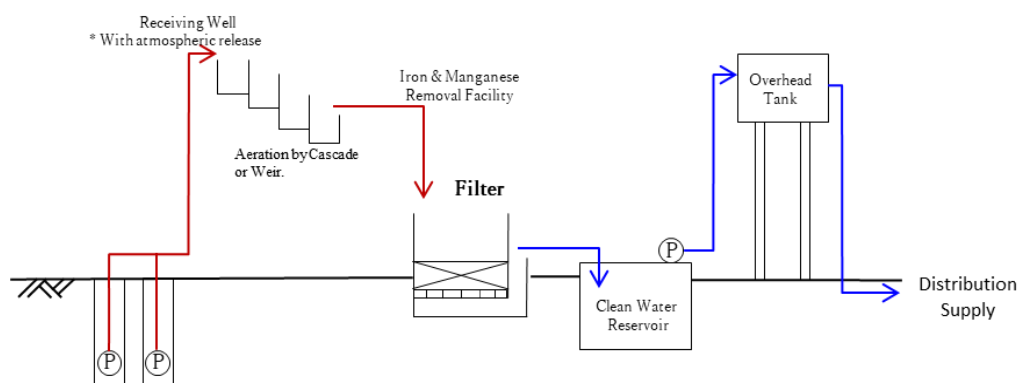


Figure 3: Water Treatment Process

Table 9: Proposed Basic Design Condition

Indicator	Present	Plan for 2027
Piped water coverage	30% for the Target Survey Area	50%
Service Population	56,900	69,322 in East ; 24,398 in West
Consumption	100 -120LCD	125LCD
Water quality	Contaminated with coliform, iron, manganese	Within Nepal drinking water quality standards
Distribution service hours	Approx. 10-13 hours	24 hours

Source: JICA Study Team

3.1.9 Construction facilities

The available and new pumping station has been illustrated below with the pump station (PS) facility plan.

Table 10: PS facility plan

Area	Distribution Area	Water Supply Quantity (Daily maximum) m ³ / day	Well	Water Treatment Facility	Clean Water Reservoir (Semi-basement)	Elevated tank
East	Devkota PS	4,903	1,200L/min × 3 wells (Renewal)	3,600L/min (New)	1,200m ³ (New)	450m ³ (use the existing tank)
	Tinpaini PS	4,584	1,200L/min × 3 wells (Renewal)	3,600L/min (New)	1,200m ³ (New)	450m ³ (use the existing tank)
	Munal Path PS	4,406	1,200L/min × 3 wells (Renewal)	3,600L/min (New)	1,200m ³ (New)	450m ³ (use the existing tank)
	Sub-total	-13,893			8-hour capacity	
West	New No.5 PS	4,889	1,200L/min × 3 wells (New)	3,600L/min (New)	450m ³ (New)	1,200m ³ (New)
	Sub-total	-4,889			8-hour capacity	
	Total	-18,782				

3.1.10 Wells and Water Treatment (Removal of Iron, Manganese) Facilities

Based on the existing wells, water intake quantity of wells is set to be 3600 l/min (1,200 Liter / min × 3) for 3 wells in each PS. The figure below shows the Borehole Structure of Deep Well.

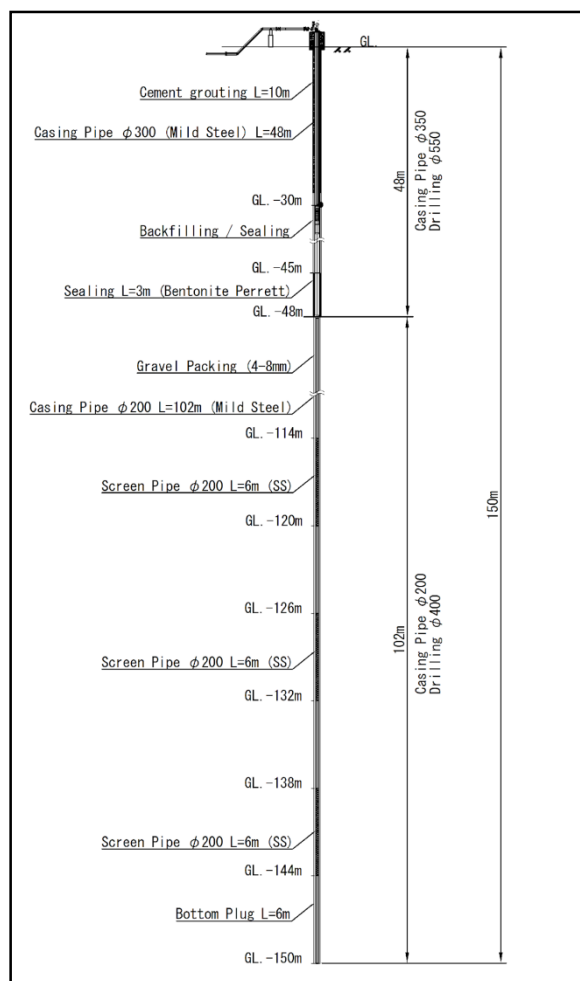


Figure 4: Borehole Structure of Deep Well

According to the water quality test, concentrations of Iron and Manganese were found to be remarkable for water treatment. Thus, such contamination will be focused for the removal of such to satisfy the Nepal Drinking Water Quality Standards. The Figure below illustrates the water treatment system and processes. Oxidation treatment is required for the removal of Iron and Manganese. Iron is oxidized by air, and Manganese is oxidized by chlorine.

Figures below show the drawings of the Water Treatment Facility.

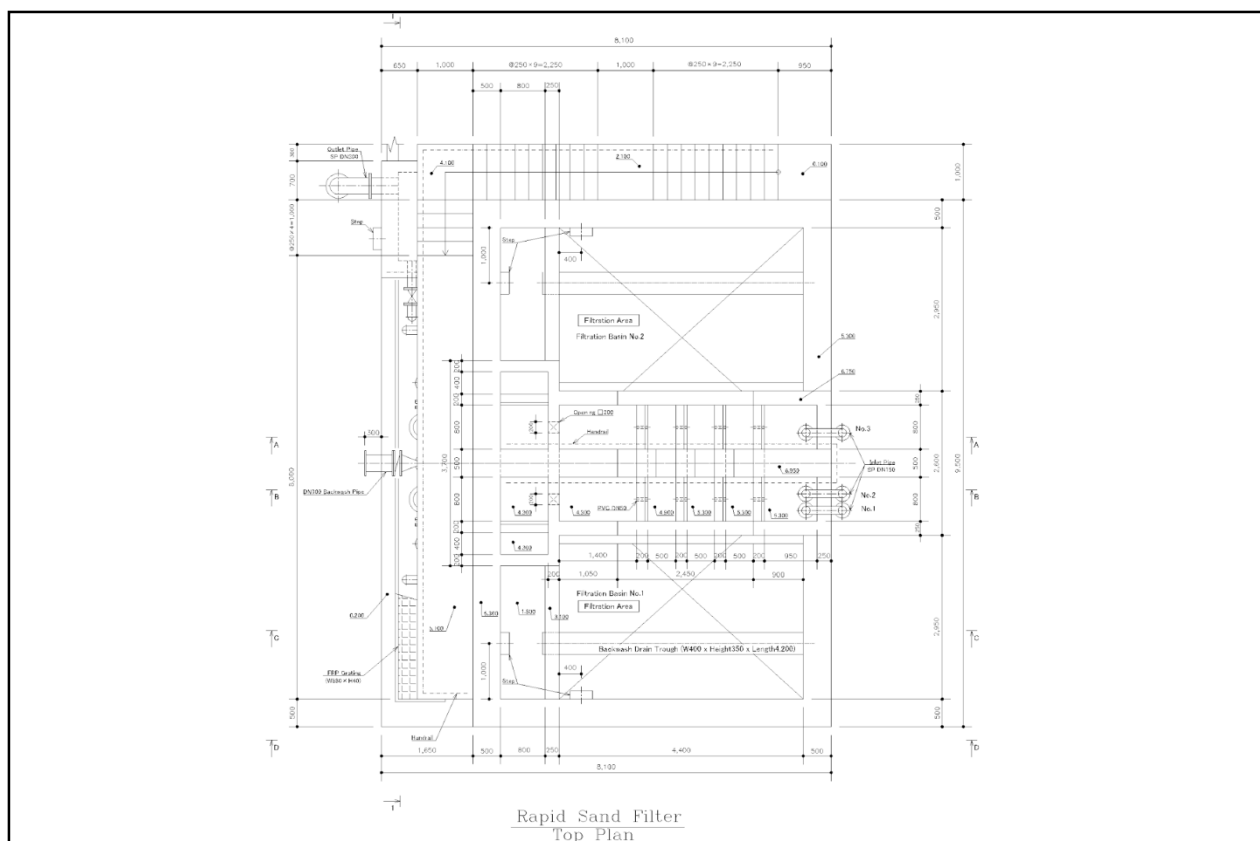


Figure 5: Top Plan of Water Treatment Facility

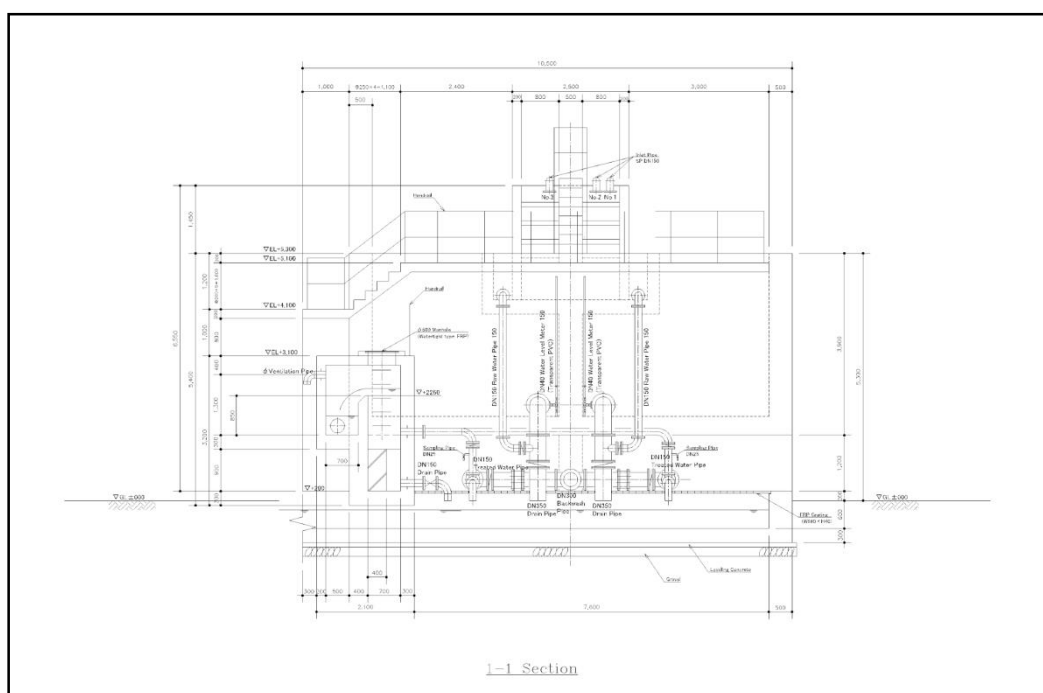


Figure 6: Section of Water Treatment Facility

3.1.11 Clean Water Reservoirs and Overhead Tanks

The storage capacity will be secured by both types of reservoirs in total. The 3 existing PSs have little space for additional overhead tanks (OHTs). Therefore, storage capacity will be

secured by large size of clean water reservoirs which will be in semi-basement type. The capacity of a clean water reservoir is 1,200 cubic meters for each pumping station. Similarly, for the new pumping station, both overhead tanks and treated water reservoirs will be constructed. The capacity of the overhead tanks is 1,200 cubic meters and the capacity of the clean water reservoir is 450 cubic meters. The main aim is to secure an 8-hour capacity of daily maximum water volume.

The figure below illustrates the drawings of clean water reservoirs in the existing pumping stations.

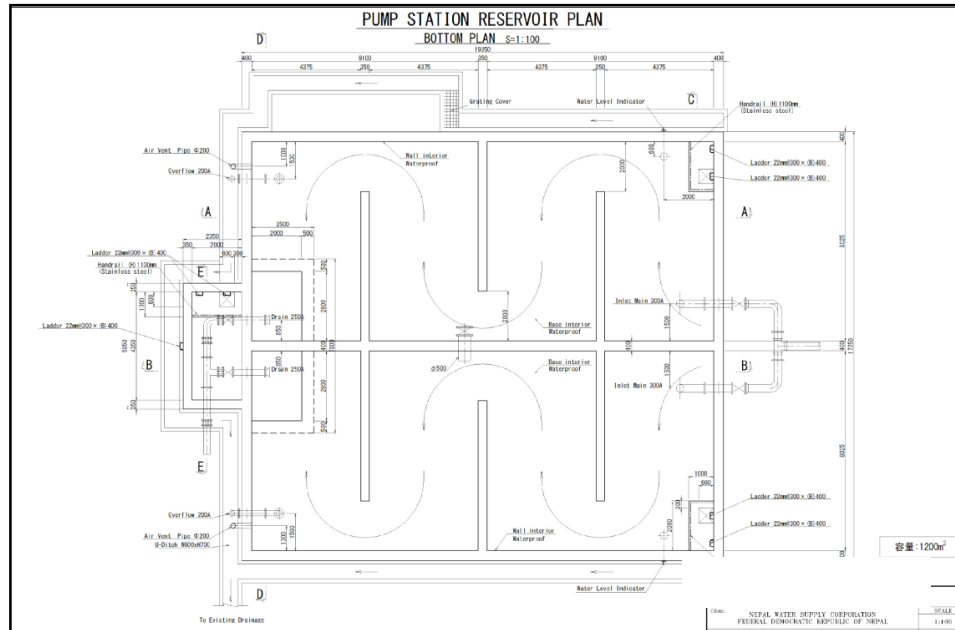


Figure 7: Plan of Clean Water Reservoir in existing PSs (1,200 m³)

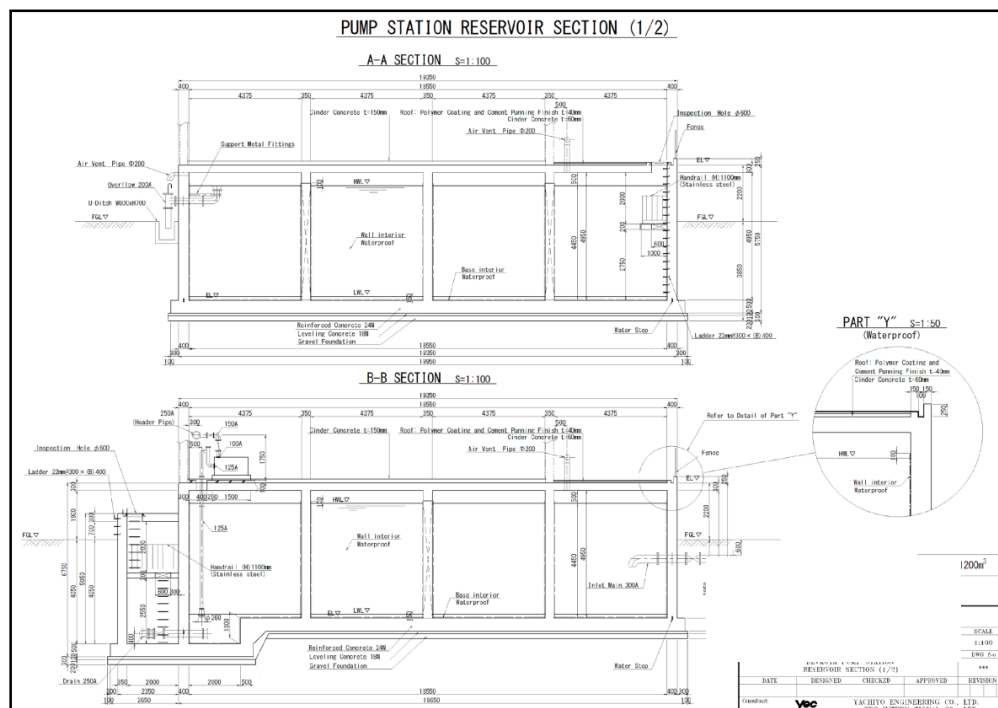


Figure 8: Section of Clean Water Reservoir in existing PSs (1,200 m³)

Figure below shows the drawings of the Clean Water Reservoir for new PS.

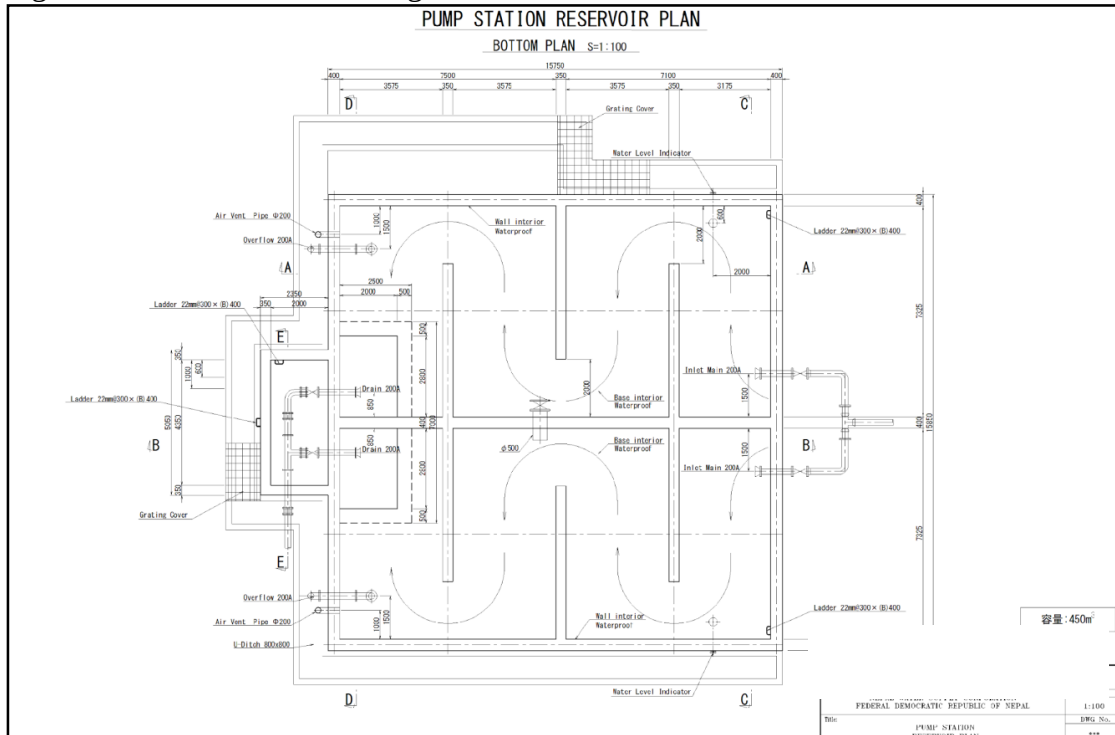


Figure 9: Plan of Clean Water Reservoir in new PS (450 m³)

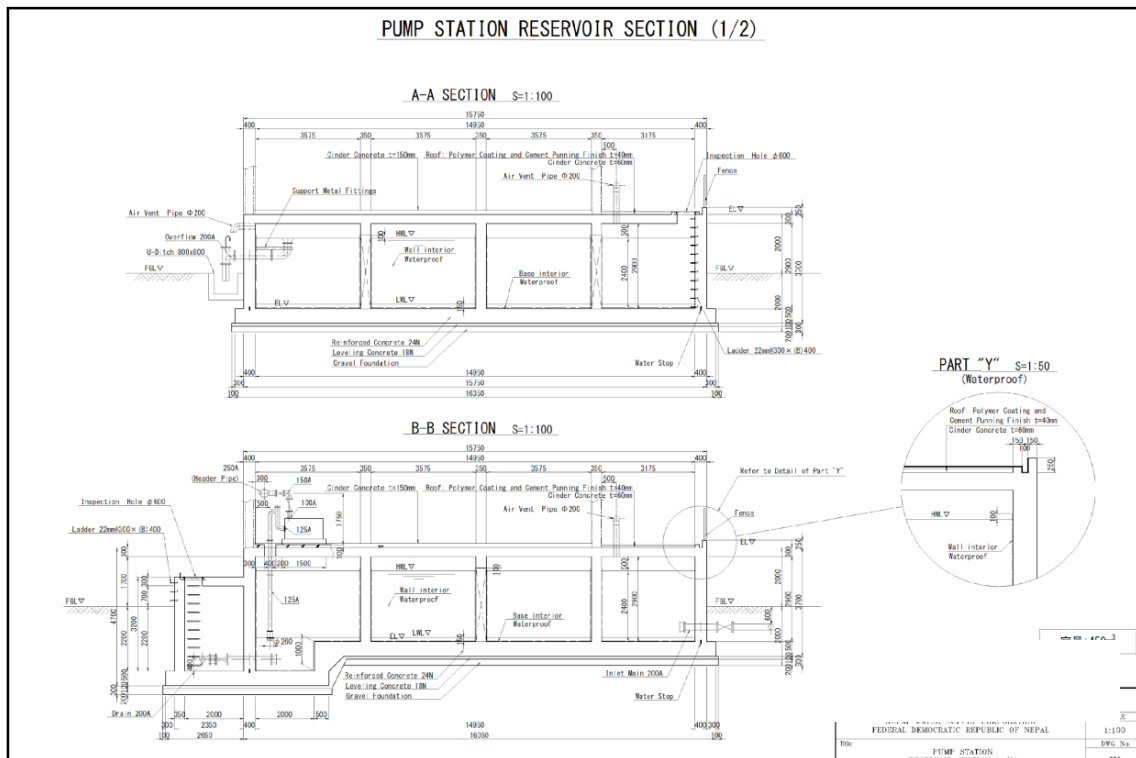


Figure 10: Section of Clean Water Reservoir in new PS (450 m³)

Similarly, the figure below shows the detailed layout of the overhead tank in the new pumping station.

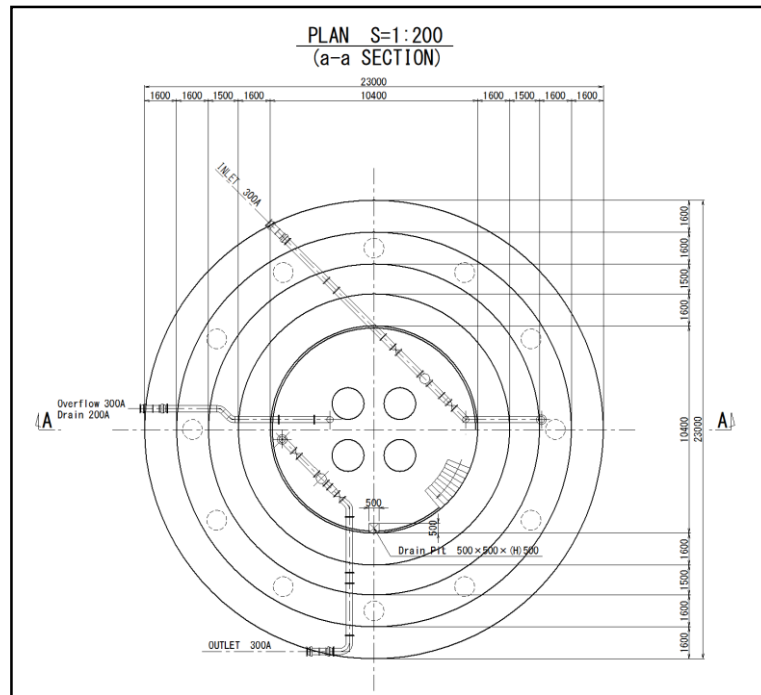


Figure 11: Plan of Overhead Tank in new PS.

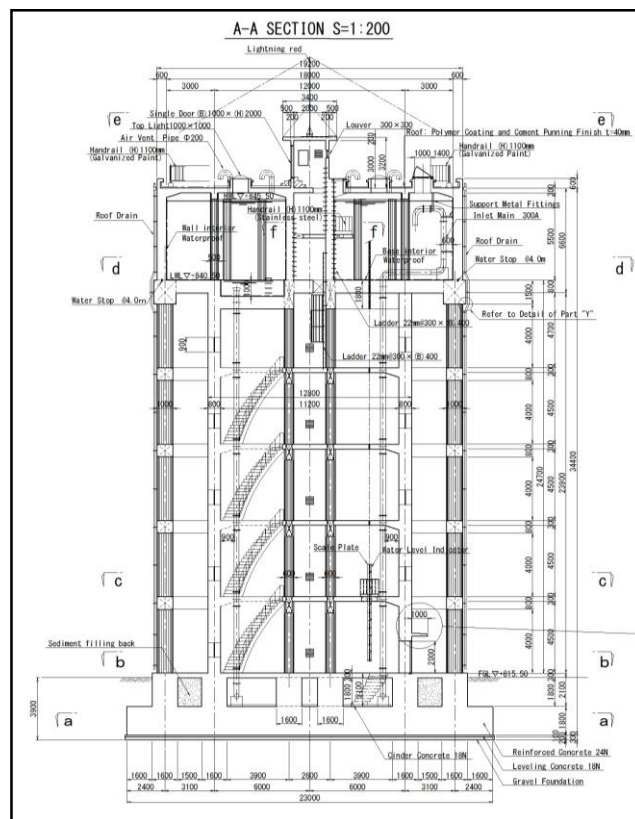


Figure 12: Section of Overhead Tank in new PS

3.1.12 Administration Building

An administration building for the new pumping station should be built for the operation and maintenance of the project. The administration building consists of an office room, storage units and toilets, etc. A plan of administration building is shown in Figure below. Similarly,

septic tank for the toilets is required besides the administration building. And for the exiting pumping stations , existing administration building including septic tank will be utilized (not included) in the Project.

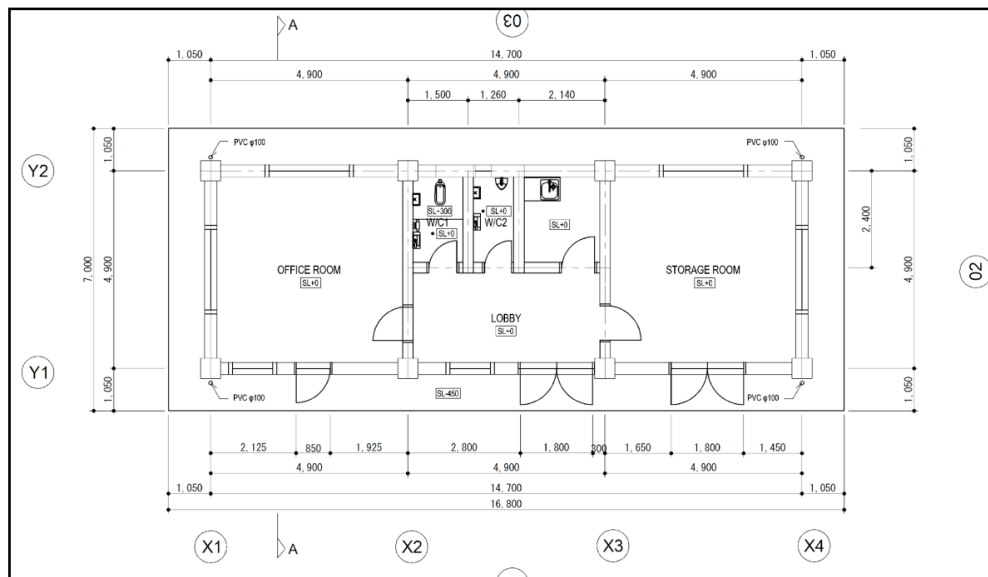


Figure 13: Plan of Administration Building

3.1.13 Operation Room

An operation room for the new installed facility (3 PSs to be rehabilitated and 1 PS to be newly constructed) such as chemical facility, treated water pumps to the overhead tanks, electrical facility, etc. will be built on the ground water tank to minimize required space of pumping stations and to avoid flood disaster. The detailed plan of the operation room is shown in the Figure below.

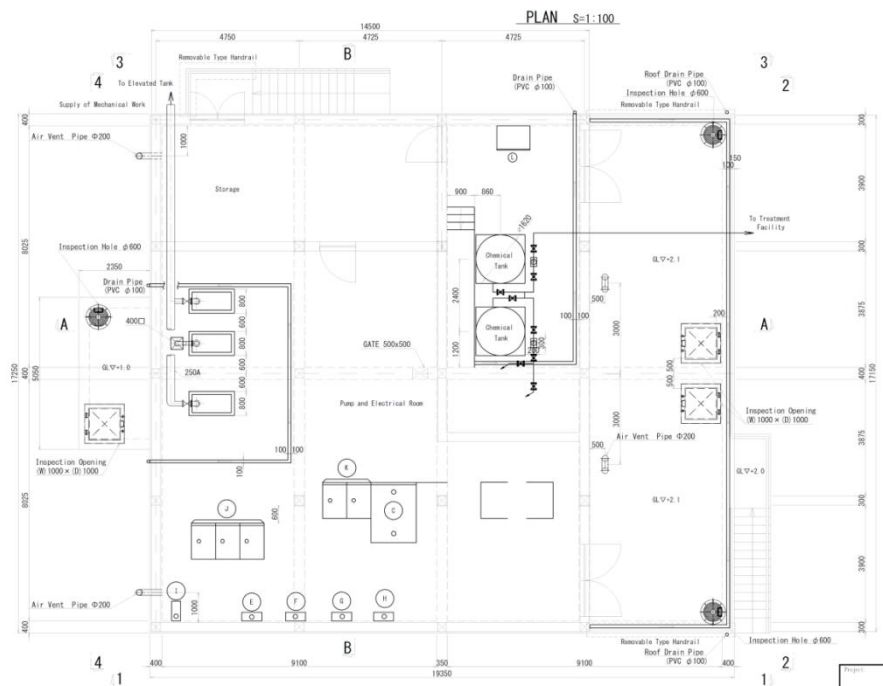


Figure 14: Plan of Operation Room

3.1.14 Distribution Networks

The existing pipes need to be replaced since there are a lot of old aged pipes which results in a lot of leakage in volume and number of locations. However, the priority of the existing pipes to be replaced has been based on the area covered by ADB road project and then by the area necessary for double pipelines on both sides of road. Similarly, other important pipelines which may also have leakages are also to be mended. The details of the distribution pipe plan are shown in the Table and in the Figure below.

Table 11: Distribution Pipe Plan

	Renewal + New(m)							Existing (m)	Total (m)
Diameter	12"	10"	8"	6"	4"	3"	Sub-total	12"~1.5"	
Material	DIP	DIP	HDPE	HDPE	HDPE	HDPE		DIP/GI	
Devkota PS	323	2,164	318	2,373	15,008	14,225	34,411	8,633	43,044
Tinpaini PS	-	61	323	3,865	11,036	8,125	23,410	13,951	37,361
Munal Path PS	497	1,893	-	728	8,538	7,164	18,820	13,504	32,324
New No.5 PS	3,344	465	2,841	3,350	18,539	12,193	40,732	16,073	56,805
Total	4,164	4,583	3,482	10,316	53,121	41,707	117,373	52,161	169,534

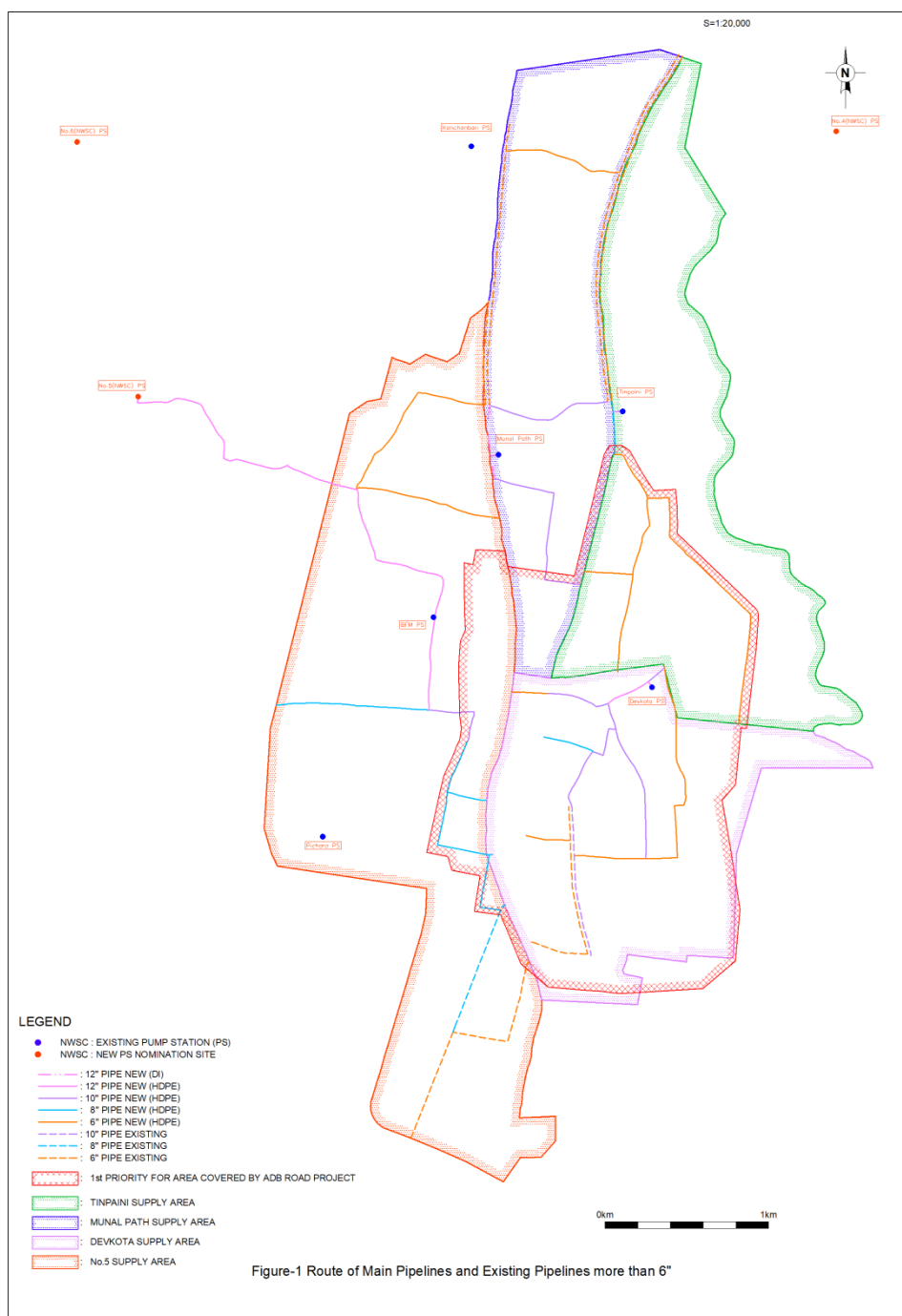


Figure 15: Plan for Route of Pipelines to be laid (Main pipe)

3.2 Construction Management of the study

3.2.1 Temporary yard

A temporary yard is needed for the construction purpose. Biratnagar Metropolitan City (BMC) has agreed to provide the yard during construction with an area of 3,500 square meters approximate.

3.2.2 Quarry sites

The Project will purchase the crushed stones and sands from suppliers. Therefore, the Project does not quarry directly.

3.2.3 Excavation and Disposal site

Disposal site for surplus soil has also been allocated by the BMC which will excavate soils with an estimated area of approx. 30,000m³. The necessary land area is 10,000m² and with an assumption of the height of the soil pile up to 3m. The estimated location for the disposal site for surplus soil is shown in the figure below.



Figure 16: Candidate of disposal site for surplus soil

3.2.4 Temporary office

A temporary office will be installed with an area of approx. 200 square meters the location of which will be determined later by the Contractor.

3.2.5 Material storage

Storage unit for the construction is adjusted not to exceed the capacity of the temporary yard where the materials will be covered by sheets, not to get wet.

3.3 Project Management for Construction

3.3.1 Material required for the project

Major construction materials required during and for the construction of the Project have been mentioned in the table below.

Table 12: Major materials required for the Project

Construction works			
Items required			
Item number	Civil Engineering facilities	Distribution pipelines	Machineries etc.
1	Crushed stones/aggregates	DI pipes	Pumps for deep wells
2	Cement	HDPE pipes	Sand to remove Manganese
3	Sand	Valve	Chlorine tank
4	Rebar/Steel Reinforcement		

3.3.2 Human Resources

Necessary human resources required for the project has been mentioned in the table below. Accidents which include even the traffic accidents are anticipated during the construction stage and the operating stage as well. To prevent the accidents, personal protective equipment such as gloves and helmets as well as safety training for construction works will be managed. Similarly, also during the operation phases accidents by operation of machineries are probable, hence safety training for such are also encouraged.

Table 13: Human Resources Required for the Project

Construction works			
SN	Civil Engineering facilities	Distribution pipelines	Machineries
1	Foreman	Plumbers	Electricians
2	Skilled labour/Drillers		Mechanists
3	Common labour		
4	Rebar worker		

3.4 Land Requirement for Project Components

The rehabilitation of pumping stations will be utilizing the existing lands. For the instalment of the new pumping station, the land to be used is to be rented by the Government. The BMC will implement the procedures of land use, based on the Land Acquisition, Resettlement and Rehabilitation Policy 2015 AD in Nepal.

3.4.1 O & M Equipment and Tools

Equipment is required for the measurement of the water quality. NWSC will measure water quality in the administration office. Equipment list for the measurement of water quality parameters are mentioned below. Similarly, mini excavators will be required for the construction of service pipes and other construction facilities.

Some equipment's to measure the water quality has been listed below:

- pH meter
- Turbidity meter
- Residual chlorine meter
- Iron / Manganese meter
- E coli meter

3.4.2 Project Implementation Plan

The project will begin its work after the completion of the grant agreement which is followed by the detailed design study for 6 months. The project facilities are expected to be completed by the end of 2024. A general project implementation plan has been shown in the table below.

Table 14: Project Implementation Plan

Table 1-7. Project Implementation Plan																																					
Year	2022												2023												2024												
Month	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11			
Grant Agreement	■																																				
Detailed Design		■	■	■	■	■	■																														
Bidding Procedures								■	■	■	■																										
Construction												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		

Source: General Project Outlines/ Yachiyo Engineering Co., Ltd. (YEC)-Japan

The salient feature of the project has been listed in the table below:

Table 15: Salient Features of the Project

SN	Items	Description
1	Name of Project	Improvement of Water Supply in Biratnagar
2	Type	
3	Study Level	Initial Environmental Examination
4	Location Area	
	Province	Province no 1
	District	Biratnagar
	Municipality	Biratnagar Metropolitan City
	Wards	Partial Areas of Ward Nos. 1,2,3,4,5,6,7,8,9,10,11,12,13,14
5	Available Facilities	
	Road	Dharan road and Municipality road
	Water Supply System	Available
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Population status of the beneficiary of the subproject	
	Present Population (2019): Survey Year	56,900 (served population)
	Design Year Population (2027)	93,720 (served population)
7	Water Demand (LCD)	
	Design Year (2027)	125 LCD
8	Proposed Water Source Characteristics	
	Source Name	Ground water
	Source Location	Devkota, Tinpaini, Munal Path, and New No. 5 (Ramganj)
	Safe Yield (lpm)	1,700 Litter / min
9	Structures	
	OHTs	RC, 1,200 m ³ (New No.5), H=approx.. 30 m
	Pumps	1,200 Litter / min, centrifugal pump
	Deep Tube wells	Dia. 350mm, Depth: 150m
	Electricity line	approx. 100 m * 4 PS (service electrical wire)

	Transformer	11kV to 400V, and 400V to 200V, in each PS
	Generator	-
	Valve Chambers	-
	Office Building	1 story, 7m * 12m, constructed in new No. 5 PS, RC frame brick wall
	Guard house	-
	Generator House	-
	Household Connection	Constructed by NWSC's another project
	Fire Hydrants	
	Distribution Network (kilometre)	Approx. 169 kilometres
10	Total Cost of the Project (NRs.)	
	Water Supply Component (NRs.)	approx. 2 billion 3 thousand million
	Sanitation Component (NRs.)	0

3.5 Project Description

3.5.1 Project area

The project area include Biratnagar Municipality City of Province 1 wards number 1,2,3,4,5,6,7,8,9,10,11,12,13 and 14.

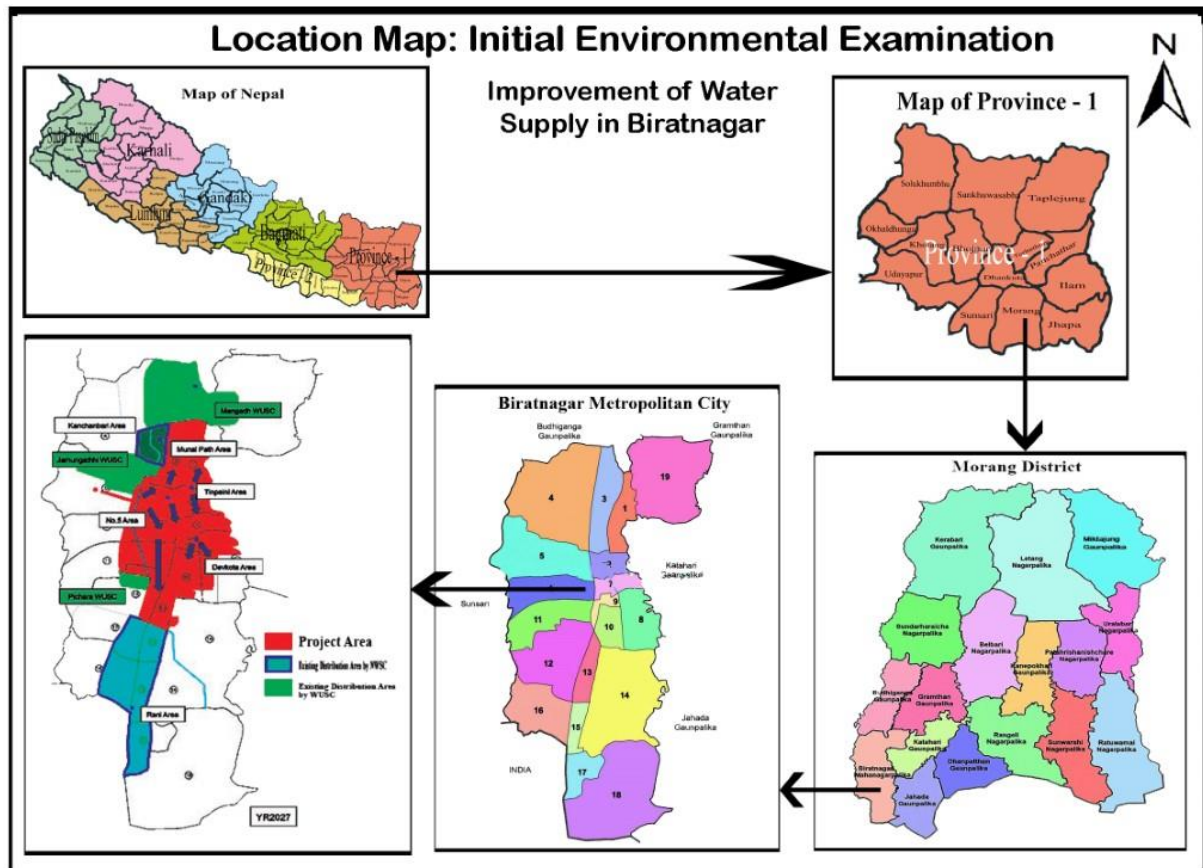


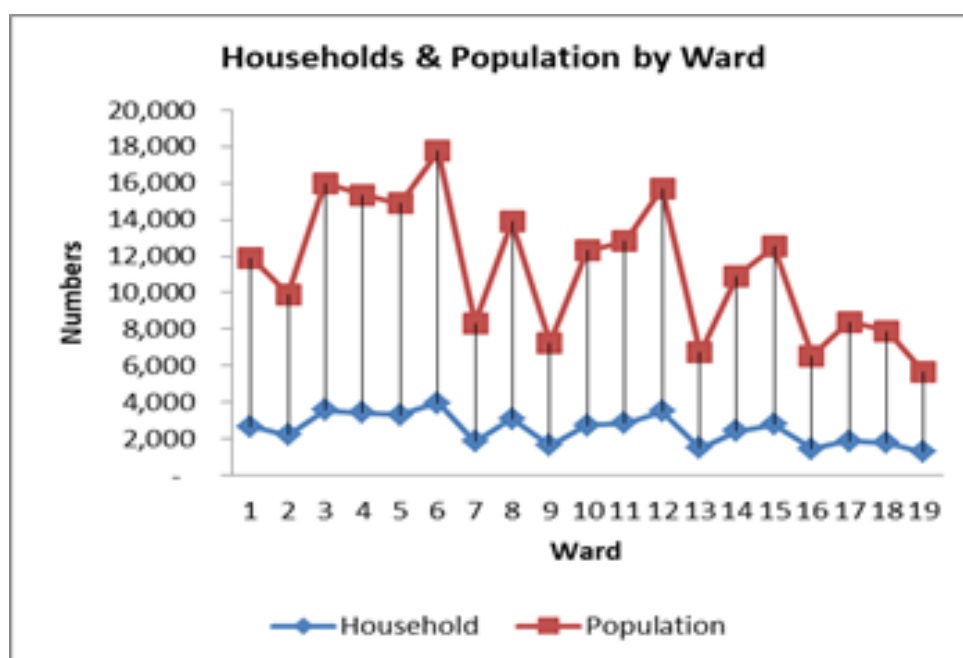
Figure 17: Project Location Map

3.5.2 Population Demography of the Project Area

The population of BMC was reported to be 1,66,674 by 2001 census, which grew to 2,01,125 in 2011 census. The population of men comprised of 53% (*i.e.* 87,664) and women population was 47% (*i.e.* 79,010) in 2001 census, whereas, the sex proportion changed in 2011 census with percentage of men decreased to 51% (108,827), whereas women population grew to 49% (105,836). The increased population between 2001 and 2011 seemed at 34,451, which refers the annual growth rate (straight line) at 2.07%.

According to BMC's official website, the total population is 2,14,663 (male 1,08,827 and female 1,05,863) and households 47,798 for the year (2020). Moreover, the Regional Urban Environmental Improvement Project (RUDP) officials had reported the total population of census 2011 is 2,71,354 increased total 1,04,680 population. If the given figure is considered then the annual straight-line population growth rate stands at 6%. However, they had viewed that they had considered the base population is 236,895 for the year 2015 and the annual population growth is 3.37% while preparing the report for Initial Environmental Examination (IEE) on Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-

metropolitan City. If the growth rate (3.37%) of RUDP is considered then the population for year 2021 would be 289,017.



The IEE survey enumerated the population of 1,192 in 216 sampled households within the delineated project area. The ratio of the male to female is 51.01% and 48.99%.

Table 16: Household/ population of the project area

S.N	Name of Settlement	# of Household	# of Population
1	Damabandi	49	258
2	Damabandi, Karkhana tole	17	104
3	Damabandi, Kulharba	56	310
4	Damabandi, Prithivi chowk	4	27
5	Damabandi, Pulchowk	14	78
6	Damabandi, Shankarbari	63	349
7	Shankarbari, Keshaliya	13	66
Total		216	1,192

Source: Household Survey, April, 2021

3.5.3 Historical and Archaeological site nearby

No definable historical and archaeological sites are evident within the project area. Though it is not closer to the project area but in entire BMC area Temples, mosques, and churches are existed. Kali mandir, Hanuman Mandir, Radhakrishna mandir etc. of Hindus and Bilal Masjid, Kari Sahab Mosque, Jama Masjid etc. of Muslim are famous cultural sites.

3.5.4 Access to the project area

There are different ways to reach the project area from the capital (by bus, by car or by air). By air the flight time between Biratnagar (BIR) and Kathmandu (KTM) is around 40 min and

covers a distance of around 232 km. When you drive by car or by bus, we will need to travel approximately 379 km via the BP Highway and East West highway which will take an approximately 9 hours.

3.6 Current Physical Environment

3.6.1 Topography

Biratnagar Metropolitan City (BMC) serves as the administrative capital of Province no.1. It is located about 399 km (248 mi) east from the Kathmandu. BMC covers an area of 58.48 sq. km and is located at 26°28' N and 86°19' E.

The municipality is mainly located in the Tarai region, thus, it has gentle terrain, which is gradually sloping from north to south. The range of elevation observed in the municipality is between 62m *asl* in the southern parts and 76m in the northern parts. BMC lies close to the Koshi River, which is about 30km in the west, while two small rivers bordering the town Singiyahi that flows from the east and Kesaliya from the west.

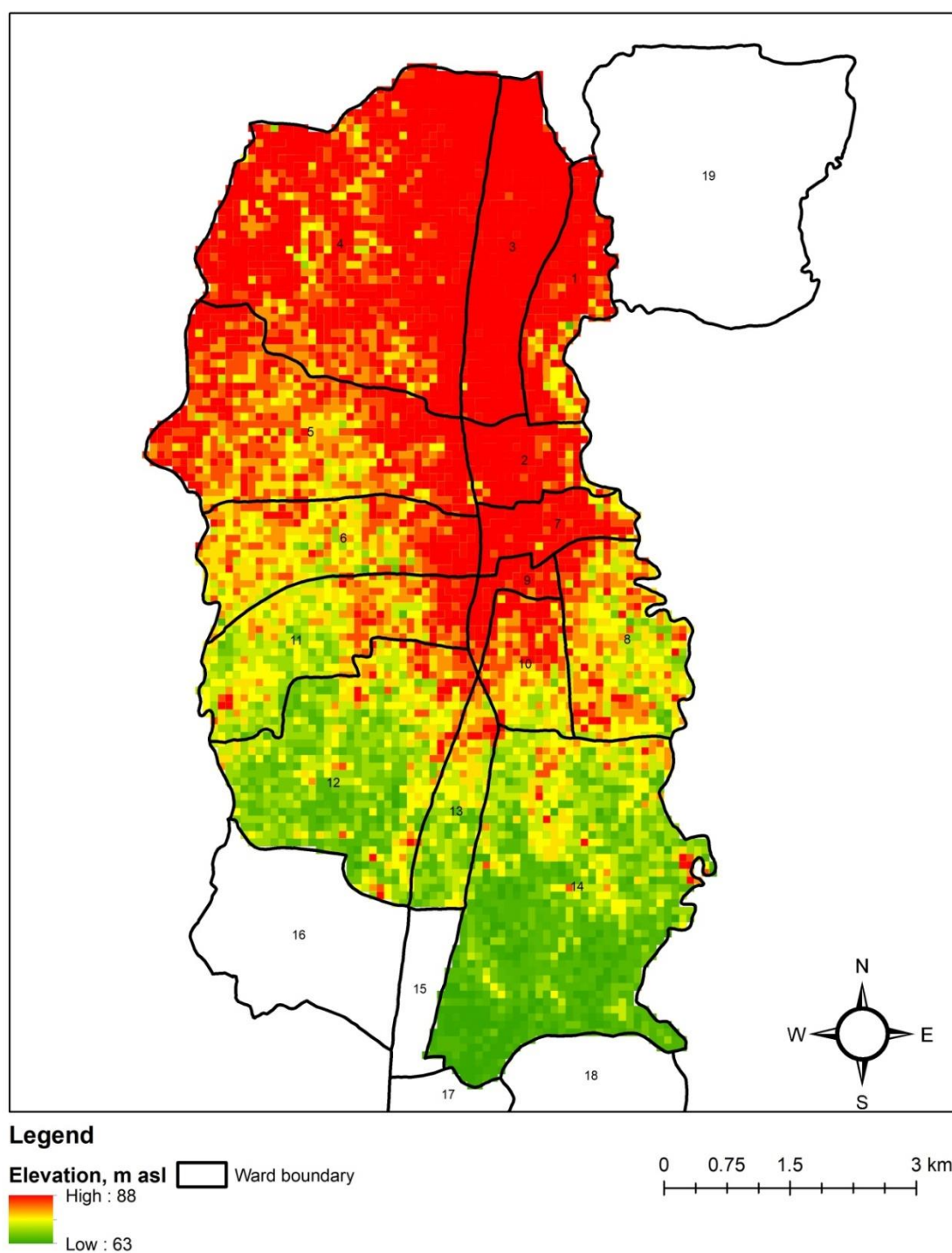


Figure 18: Terrain of the project ward (source: SRTM)

3.6.2 Land use

The Biratnagar Metropolitan covers an area of 58.48 km² where most of the land is covered by agricultural land and settlements.

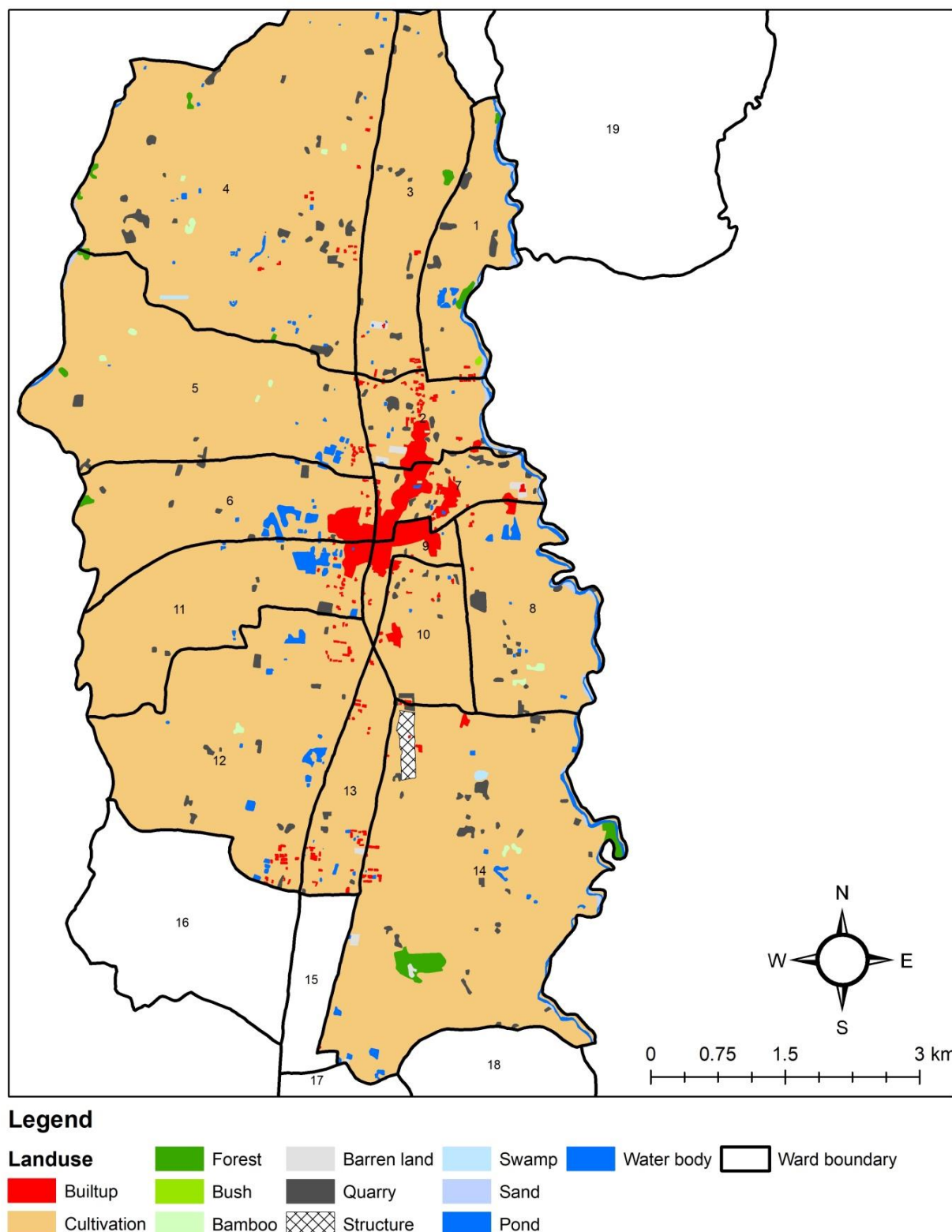


Figure 19: Land use of the project wards (Source: Survey Department)

3.6.3 Climate

The climate of the project area is sub-tropical. The mean annual temperature ranging from about 25°C to 30°C and the maximum and minimum temperature is 42°C and 0°C respectively.

The annual precipitation ranges from about 1595 – 2279 mm. More than 80% of the total annual rainfall occurs in four summer months – June to Sept.

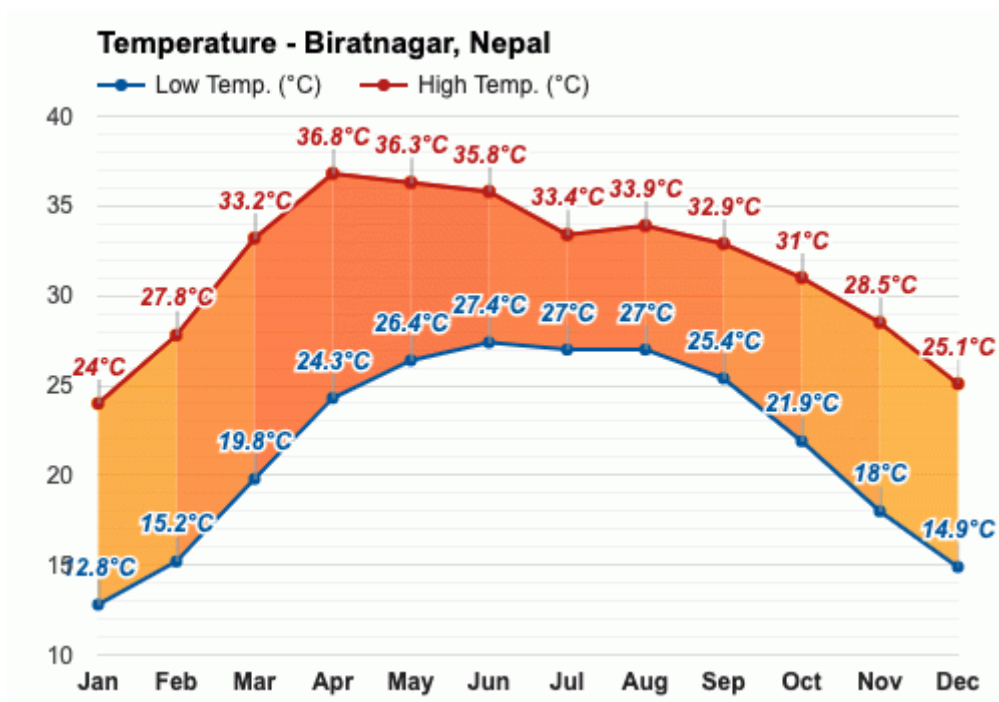


Figure 20: Average monthly temperature (source: DHM)

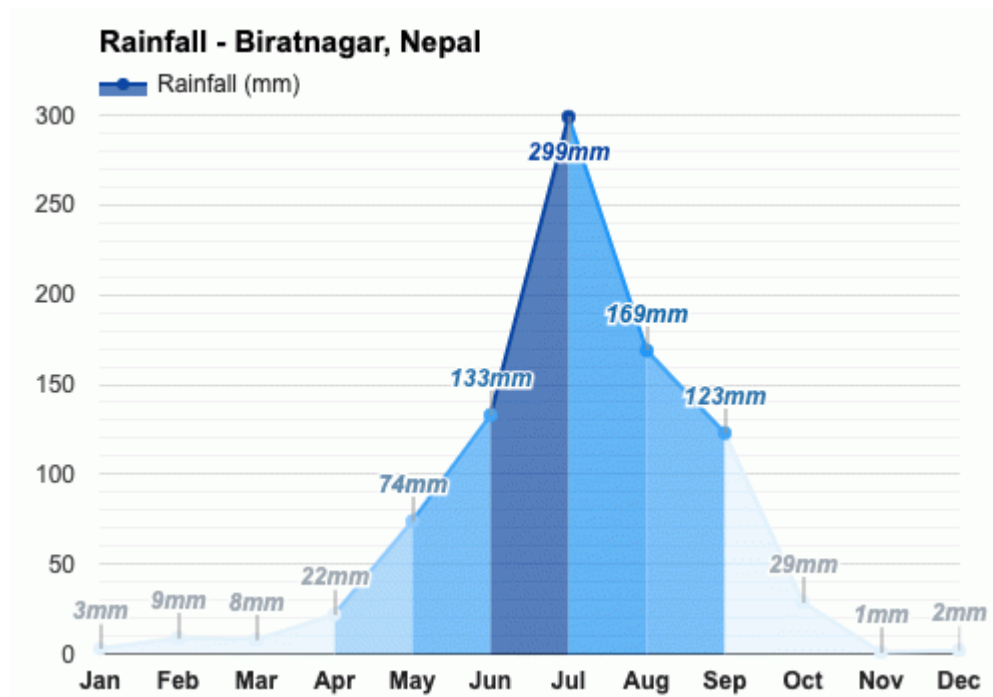


Figure 21: Average monthly rainfall of the project area

3.6.4 Hydrology

The subproject area is drained by Singiyahi and Kesaliya River. These rivers are flooded during summer monsoon and river bank cutting, particularly at the meander bend during flooding, is common. During dry winter period, the water in these rivers is very low. There is absolute lack

of information on the behaviour of surface and ground water. Groundwater depth is between 9-15 m with 1.-2m fluctuation during dry and wet seasons.

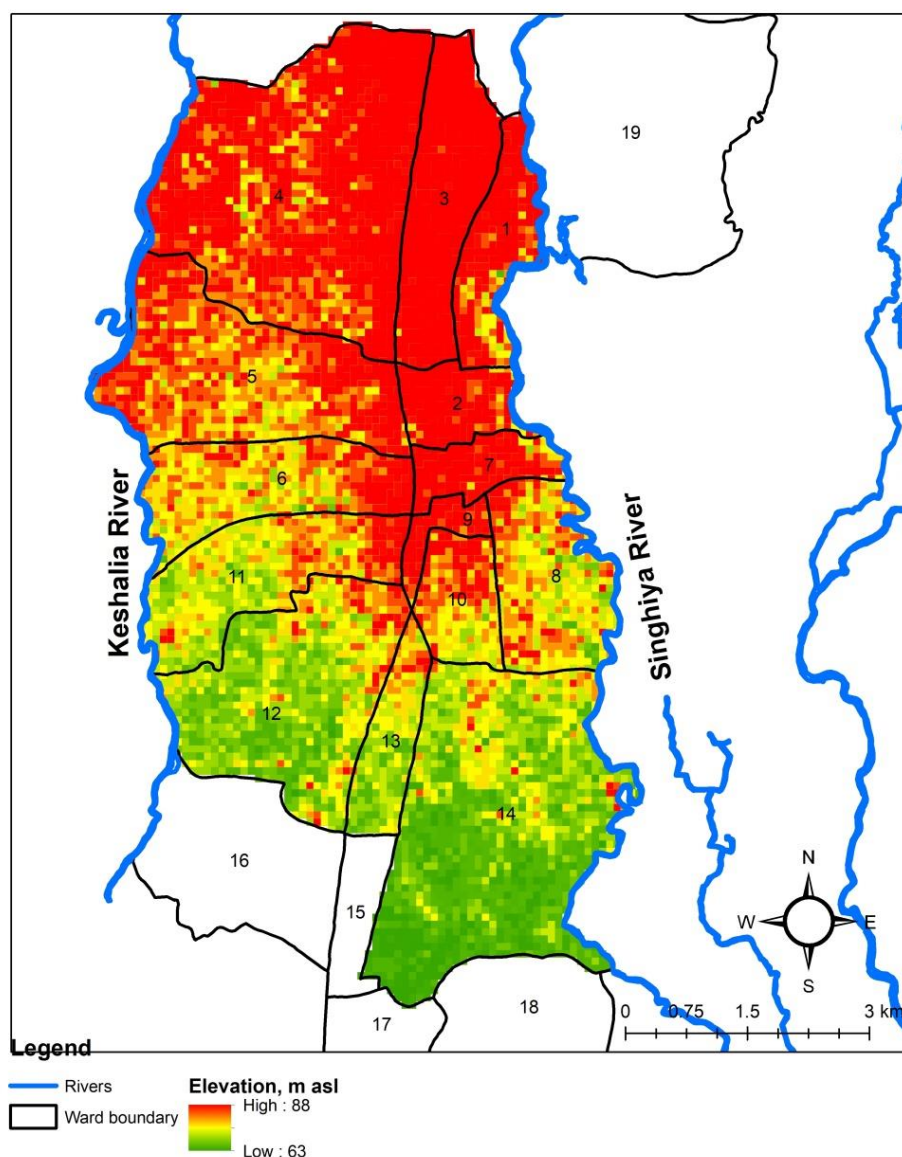


Figure 22: River network of the project area

3.6.5 Water Supply and Sanitation

The water supply in Biratnagar Metropolitan city is managed by the Nepal Water Supply Corporation (NWSC) and three Water User and Sanitation Committees (WUSCs) namely Jamunagachhi WUSC, Pichhara Biratnagar WUSC and Mangad WUSC. The main urban areas are covered by NWSC and outer peri-urban areas are looked after by the local constituted WUSCs. The existing NWSC run piped water supply system is being served by water pumped from deep tube wells (more than 100 metres deep) located at different parts of the town, stored in the several overhead/elevated concrete tanks and through pipelines laid underground along the streets. The elevated tanks mostly are located within the tube well/ pump station compounds. The water reaches to general people through private connections. The water is being served through ½" private connections for general households while some businesses

and industries have bigger size connections. Because of rapid growth of population and extension of widely scattered dwellings, the present water supply has become inadequate.

3.6.6 Water Quality

The quality of water in the deep tube wells is good but with majority of hand pumps in the city, the water quality is not that good both chemically and biologically. The reason behind this low quality water is due to the shallow water which contains excessive iron and is usually found to be contaminated. In case of Biratnagar city piped supply, the water being ground water from deep wells, is good at all the sources except for some iron and manganese. However the quality goes down considerably when it reaches consumers through the distribution system due to faulty leaking pipelines as they are mostly very old and are poorly maintained. To address to this type of contamination the water is being chlorinated/ treated by dosing bleaching powder water solution at the sources. There are no other treatments except one iron removal device at Rani PS and one pressure filter at Munalpath PS which are not that effective or are inadequate. NWSC is quite serious about disinfecting water with chlorine before sending it for distribution. (JICA Report (REPORT ON SITUATIONAL ANALYSIS OF WATER SUPPLY IN BIRATNAGAR/ Nepal Water Supply Corporation, Biratnagar-August, 2019)]

During the field inspection, water samples from the rivers bordering the metropolitan city were collected and its water quality analysed for various physical and chemical parameters illustrated below:

Table 17: Physical and Chemical water quality parameters of Singiyahi River

Parameters	Units	WHO GV	NDWQS	Upstream	Mid-Point	Downstream	APHA, Standard Methods and equipment used
pH	-	8.1-8.5*	6.5-8.5*	7.8	7.8	7.8	pH Meter
Turbidity	NTU	-	5	5.8	17.2	11.1	Electronic Turbidity Meter
Electric Conductivity	µS/cm	-	1500	332.0	207.0	231.0	Conductivity Meter
Temperature	°C	-	-	26.7	26.5	26.5	Mercury Thermometer
TDS	mg/l		1000	165.0	102.0	116.0	Gravimetric Method
DO	mg/l	-	-	4.0	4.1	4.1	Winkler Method
Total Hardness	mg/l	500	500	492.1	502.6	508.1	EDTA Method
Alkalinity	mg/l	500	-	4.2	4.2	4.4	Titration Method
Phenolphthalein Alkalinity	mg/l	-	-	0	0	0	Titration Method
Ammonia	mg/l	1.5	1.5	0.1	0.1	0.1	Phonate Method
Nitrate	mg/l	50	50	2.9	2.8	2.8	Phenol Disulphonic Method
Phosphate	mg/l	NA	NA	0.4	0.5	0.5	Spectrophotometric Method

APHA: American Public Health Association, Standard Methods for the Examination of Water and Waste Water. WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal). *These values show lower and upper limits.

Table 18: Physical and Chemical water quality parameters of Kesaliya River

Parameters	Units	WHO GV	NDWQS	Upstream	Mid-Point	Downstream	APHA, Standard Methods and equipment used
pH	-	8.1-8.5*	6.5-8.5*	8.1	7.9	7.6	pH Meter
Turbidity	NTU	-	5	41.7	17.9	12.8	Electronic Turbidity Meter
Electric Conductivity	µS/cm	-	1500	333.0	345.0	284.0	Conductivity Meter
Temperature	°C	-	-	26.7	26.9	26.3	Mercury Thermometer
TDS	mg/l		1000	167.0	174.0	147.0	Gravimetric Method
DO	mg/l	-	-	4.2	4.0	4.1	Winkler Method
Total Hardness	mg/l	500	500	442.4	440.1	444.1	EDTA Method
Alkalinity	mg/l	500	-	2.5	2.6	2.4	Titration Method
Phenolphthalein Alkalinity	mg/l	-	-	0	0	0	Titration Method
Ammonia	mg/l	1.5	1.5	0.0	0.0	0.0	Phonate Method
Nitrate	mg/l	50	50	2.4	2.5	2.4	Phenol Disulphonic Method
Phosphate	mg/l	NA	NA	0.3	0.4	0.4	Spectrophotometric Method

APHA: American Public Health Association, Standard Methods for the Examination of Water and Waste Water. WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal). *these values show lower and upper limits.

The test reports show that all parameters of water quality of the sample collected are within the permitted value of NDWQS.

3.6.7 Ground Water

Biratnagar is located in the Tarai plains, where the existing sources of water supply are primarily ground water. Piped water system was initiated about 50 years ago. People get their water from shallow tube wells/bore holes called hand pumps or dug wells constructed at different points by the municipality or by individuals themselves in their backyards. The city's source of water supply is fully ground water as people opt for ground water for their domestic use as it is very easily accessible. The average depths of hand pumps/shallow tubewells used by common people are in the range of 15-50 feet. Quite a big section of population still use and are dependent on such hand pump water as all areas are not fully covered by the existing piped water system or piped water supply does not fulfil/meet all the water demand.

3.6.8 Groundwater Quality

Groundwater depth in the project area lies between 9-15 m with 1-2m fluctuation during dry and wet seasons. Its ease of availability at a depth of 5-8 feet has made it a reliable source of water even though its quality is not reliable and is mostly contaminated. Water of most of these hand pumps in the city contains excessive iron and is contaminated to great extent. However, with deeper tube-well, the quality of ground water becomes better.

3.6.9 Air Quality

During the field survey, field observations show the main cause of air pollution in the project area ate the air pollution caused by fugitive dust from the vehicular movements particularly over unpaved roads and construction activities. Air emissions are also observed from open burning especially in the agricultural lands, vehicular exhaust from old vehicles and emission from industrial emissions. The magnitude of air quality in the project area is observed to be minimal.

Table 19: National ambient air quality standard for Nepal, 2003

Parameters	Units	Averaging Time	Concentration in Ambient Air, Maximum	Test Method
TSP (Total Suspended Particulates)	µg/m ³	Annual	-	High Volume Sampling
		24 hours *	230	
PM ₁₀	µg/m ³	Annual	-	Low Volume Sampling
		24 hours *	120	
Sulphur Dioxide	µg/m ³	Annual	50	Diffusive sampling based on weekly average
		24 hours **	70	To be determined before 2005A.D

Nitrogen Dioxide	$\mu\text{g}/\text{m}^3$	Annual	40	Diffusive sampling based on weekly average
		24 hours **	80	To be determined before 2005A.D
Carbon Monoxide	$\mu\text{g}/\text{m}^3$	8 hours **	10000	To be determined before 2005A.D
		15 min	100000	Indicative samplers ***
Lead	$\mu\text{g}/\text{m}^3$	Annual	0.5	Atomic Absorption Spectrometry, analysis of PM 10 samples****
		24 hours	-	
Benzene	$\mu\text{g}/\text{m}^3$	Annual	20*****	Diffusive sampling based on weekly average
		24 hours	-	

* Note: 24 hourly values shall be met 95% of the time in a year. 18 days per calendar year the standards may be exceeded but not on two consecutive days.

**Note: 24 hourly standards for NO₂ and SO₂ and 8 hours standard for CO are not to be controlled before MoPE has recommended appropriate test methodologies. This will be done before 2005.

***Note: Controlled by spot sampling at roadside locations: Minimum one sampler per week taken over 15 minutes during peak traffic hours, i.e. in the period 8am-10am or 3pm-6pm on a work day. This test method will be re-evaluated by 2005.

****Note: If representativeness can be proven, yearly averages can be calculated from PM₁₀ samples from selected weekdays from each month of the year.

*****Note: To be re-evaluated by 2005.

Source: Batabaranyamapdanda tatha sambhandit suchana haru ko sangalo, Ministry of Environment, 2067

3.6.10 Noise Quality

The project area lies in the main area of the city where the main source of noise quality deterioration is due to the honking of the vehicles, unmanaged traffic and construction works. The increasing number of automobiles and unmanaged traffic contributes to noise pollution.

Table 20: Noise quality standard

Noise Level Guidelines		
Receptor	Daytime Laeq(dBA)	Night Time Laeq (dBA)
Residential, Institutional and Educational	55	45
Industrial, Commercial	70	70

Source: IFC EHS Guideline, 2007.

Sound level meters were used to measure the noise quality over a time period of 24 hours in our project areas (4 pumping stations). The graph below shows the variation in noise during the daytime and during the night time as well.

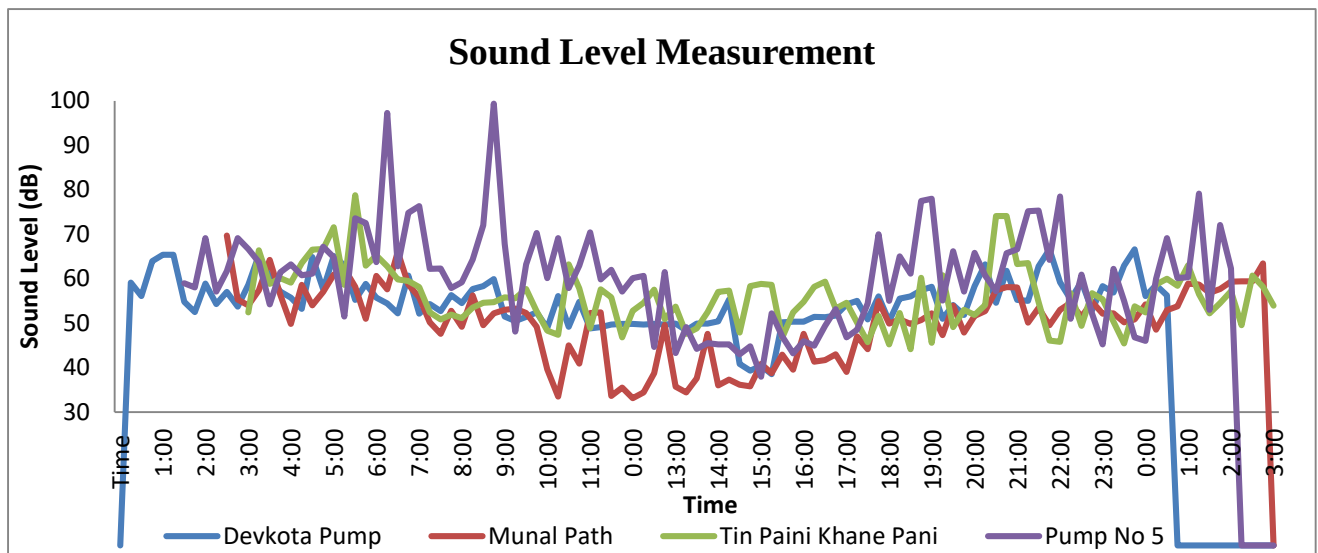


Figure 23: Noise level of the project area

3.6.11 Solid Waste Management

The project area is an important industrial area of the country where the majority of the population is daily commuters who travel to the city from adjacent towns for work and education. The current situation of solid waste management in Biratnagar Metropolitan city comprises of waste collection from households and institutional sources. However, the quantity and estimation of waste collected varied largely with other cities due to the floating population in BMC and higher commercial activities occurring in the city.

The solid waste collection method deployed in the project area is open dumping the waste. Waste is dumped on the banks of Keshaliya river, about 300 meters north of Keshaliya Bridge on the Keshaliya Marga situated in Ward No 6 of BMC. Moreover, due to the limited space for dumping, the waste in the landfill is often burnt to reduce the volume and make room for dumping of more waste.

The metropolitan city employs a public private partnership (PPP) model whereby the responsibility for collection and management of waste is handed to a private company, Waste Management Group Nepal Pvt. Ltd. and J.V. as per the contract with BMC. The company uses a total of 51 vehicles for the collection and transportation of waste.

3.7 Current Biological Environment

3.7.1 Distribution of Vegetation in the project area

The project area is located in the urban area where the presence of vegetation is sparse. However, the urban vegetation found has been recorded. Some exotic tree species like Gulmohar (*Delonix regia*), Ashok (*Saraca indica*), Ipil ipil (*Leucaena leucocephala*), Masala (*Eucalyptus camaldulensis*), Teak (*Tectona grandis*). Furthermore, fruit trees like Coconut (*Cocos nucifera*), Mango (*Mangifera indica*), Amala (*Phyllanthus emblica*), Amba (*Psidium guajava*), etc. were also recorded. In addition to it, some fodder species like Kutmero (*Litsea monopetala*) were also recorded from the project sites. This vegetation has been presented in the table below.

Table 21: Tree species recorded in the project area

SN	Local Name	English Name	Scientific Name	Family	CITIES-Appendix Status
A. Tinpaini Pumping Site					
1	Neem	Neem	<i>Azadirachta indica</i>	Meliaceae	-
2	Gulmohar	Gold Mohur	<i>Delonix regia</i>	Leguminosae	-
3	Aap	Mango	<i>Mangifera indica</i>	Anacardiaceae	-
4	Maulsari	Indian fruit Tree	<i>Mimusops elengi</i>	Sapotaceae	-
B. Munal Path Pumping Site					
1	Kadam	Burflower tree	<i>Anthocephalus chinensis</i>	Rubiaceae	-
2	Neem	Neem Tree	<i>Azadirachta indica</i>	Meliaceae	-
3	Simal	Silk cotton	<i>Bombax ceiba</i>	Bombaceae	-
4	Sissoo	Indian rosewood	<i>Dalbergia sissoo</i>	Leguminosae	II
5	Masala	Red gum	<i>Eucalyptus camaldulensis</i>	Myrtaceae	-
6	Mango	Mango	<i>Mangifera indica</i>	Anacardiaceae	-
7	Amba	Guava	<i>Psidium guajava</i>	Myrtaceae	-
8	Jamun	Java Plum	<i>Syzygium cumini</i>	Myrtaceae	-
C. Devkota Pumping Site					
1	Seto siris	White Siris Tree	<i>Albizia procera</i>	Mimosaceae	-
2	Chatiwan	Devil Tree	<i>Alstonia scholaris</i>	Apocynaceae	-
3	Kadam	Burflower tree	<i>Anthocephalus chinensis</i>	Rubiaceae	-
4	Coconut	Nariwal	<i>Cocos nucifera</i>	Anacaceae	-
5	Sissoo	Indian rosewood	<i>Dalbergia sissoo</i>	Leguminosae	-
6	Masala	Red gum	<i>Eucalyptus camaldulensis</i>	Myrtaceae	-
7	Dumri	Dumri	<i>Ficus racemosa</i>	Moraceae	-
8	Mango	Mango	<i>Mangifera indica</i>	Anacardiaceae	-
9	Ashok	Ashoka	<i>Saraca indica</i>	Leguminosae	-
D. Proposed Soil Dumping Site					
1	Kadam	Burflower tree	<i>Anthocephalus chinensis</i>	Rubiaceae	-
2	Bans	Bamboo	<i>Bambusa nutans</i>	Graminaceae	-
3	Ipil Ipil	Ipil-Ipil	<i>Leucaena leucocephala</i>	Mimosaceae	-
4	Kutmero	Litsea	<i>Litsea monopetala</i>	Lauraceae	-
5	Mango	Mango	<i>Mangifera indica</i>	Anacardiaceae	-
6	Amala	Amala	<i>Phyllanthus emblica</i>	Euphorbiaceae	-
7	Ashok		<i>Saraca indica</i>	Leguminosae	-
8	Jamun	Java Plum	<i>Syzygium cumini</i>	Myrtaceae	-
9	Sagawan	Teak	<i>Tectona grandis</i>	Verbenaceae	-
E. Yard					
1	Seto siris	White Siris Tree	<i>Albizia procera</i>	Mimosaceae	-
2	Rajbriksha	Indian Laburnum	<i>Cassia fistula</i>	Caesalpinaceae	-
3	Masala	Red gum	<i>Eucalyptus camaldulensis</i>	Myrtaceae	-
4	Rubber	Rubber Plant	<i>Ficus elastic</i>	Moraceae	-
5	Mango	Mango	<i>Mangifera indica</i>	Anacardiaceae	-
6	Khote salla	Chir pine	<i>Pinus roxburghii</i>	Pinaceae	-
7	Ashok	Ashoka Tree	<i>Saraca indica</i>	Leguminosae	-
8	Jamun	Java Plum	<i>Syzygium cumini</i>	Myrtaceae	-

The volume of the standing trees were calculated using the constant values like Pi Value (3.1415), Form-factor (0.5). The diameter and height values were measured and collected from the site. The diameter was measured using diameter tape and height was measured using sunto clinometer. The detail inventory data from the site are provided below.

Table 22: Volume of standing trees in the project area

S.N.	Species	Diameter (in cm)	Height (in m)	Volume (in cubic m)	Remarks
A. Tinpaina Pumping Site					
1.	Gulmohar	38.20	5.2	0.2979	
2.	Mango	26.74	6.5	0.1825	
3.	Maulsari	35.01	7.1	0.3418	
4.	Neem	27.69	8.1	0.2439	
B. Munal Path Pumping Site					
1.	Kadam	48.70	14.1	1.3133	
2.	Simal	130.51	23.4	15.6511	
3.	Sissoo	29.28	8.5	0.2863	
4.	Kadam	53.79	14.1	1.6023	
5.	Masala	66.21	23.6	4.0626	
6.	Masala	54.75	18.4	2.1659	
7.	Sissoo	18.78	10.3	0.1427	
8.	Masala	50.93	23.2	2.3631	
9.	Sissoo	39.47	11.5	0.7036	
10.	Sissoo	32.79	12.1	0.5108	
11.	Sissoo	26.10	12.3	0.3291	
12.	Jamun	44.56	9.8	0.7643	
13.	Mango	35.97	6.0	0.3048	
14.	Kadam	19.74	8.5	0.1300	
15.	Kadam	80.85	10.3	2.6440	
C. Devkota Pumping Site					
1.	Kadam	39.79	8.7	0.5409	
2.	Seto Siris	20.69	10.5	0.1765	
3.	Seto Siris	30.56	10.5	0.3850	
4.	Mango	44.25	10.1	0.7764	
5.	Mango	29.92	9.2	0.3234	
6.	Mango	41.70	8.0	0.5463	
7.	Ashok	12.10	3.8	0.0218	
8.	Ashok	13.69	4.1	0.0302	
9.	Ashok	12.73	4.2	0.0267	
10.	Ashok	14.32	4.1	0.0330	
11.	Sissoo	24.19	8.5	0.1953	
12.	Mango	34.38	11.5	0.5337	
13.	Mango	31.19	8.3	0.3172	
14.	Dumri	52.52	12.2	1.3216	
15.	Mango	21.65	5.1	0.0938	
16.	Dumri	49.02	14.2	1.3400	

17.	Sissoo	18.14	12.1	0.1564	
18.	Masala	49.97	19.5	1.9125	
19.	Masala	40.11	18.1	1.1434	
20.	Ashok	16.55	4.6	0.0495	
21.	Seto Siris	56.02	13.4	1.6515	
22.	Chatiwan	14.01	3.2	0.0246	

In the overall project site, majority of mango trees are available followed by Sissoo, Masala, Kadam and Ashok respectively. However, in case of volume, Simal trees have high volume (15.6511m³) followed by Masala (11.6475 m³), Kadam (6.2305 m³), Mango (3.0781 m³), Dumri (2.6616 m³), Sissoo (2.3242 m³), Seto Siris (2.213 m³) and so on. Majority of Kadam, Masala and Sissoo were found in the Munal Path pumping site. Similarly, in case of Devkota pumping site, majority of tree species like mango, Ashok, seto siris, etc. are available.

Different shrubs species like Aasuro (*Adhotoda vasica*), Argeli (*Girardinia diversifolia*), Simali (*Vitex negundo*), etc. were also found in the project area. The details of the shrub species are provided below:

Table 23: Shrub species reported in the project area

SN	Local Name	Scientific Name	Family	IUCN Status
1	Aasuro	<i>Adhotoda vasica</i>	Acanthaceae	Least Concern species
2	Argeli	<i>Girardinia diversifolia</i>	Urticaceae	Least Concern species
3	Simali	<i>Vitex negundo</i>	Lamiaceae	Least Concern species

The project site is also rich in variety of grass species. Grasses like Bermuda grass (*Cynodon dactylon*), Common Finger grass (*Digitaria eriantha*), Weeping grass (*Eragrostis curvula*), Sabai Grass (*Eulaliopsis binata*), etc. were reported on the sites.

Table 24: Grass species found in the project area

SN	Local Name	English Name	Scientific Name	Family
1	Dubo	Bermudagrass	<i>Cynodon dactylon</i>	Gramineae
2		Common Finger grass	<i>Digitaria eriantha</i>	Gramineae
3		Weeping grass	<i>Eragrostis curvula</i>	Gramineae
4	Babiyo	Sabai Grass	<i>Eulaliopsis binata</i>	Gramineae
5	Siru	Kunai Grass	<i>Imperata cylindrica</i>	Gramineae
6	Kans	Wild sugarcane	<i>Saccharum spontaneum</i>	Gramineae
7	Amliso	Broom Grass	<i>Thysanolaena latifolia</i>	Gramineae

Epiphytes like (*Drynaria quercifolia*), (*Lepisorus thunbergianus*), (*Nephrolepis cordifolia*), (*Pyrrosia lanceolata*), etc. and Ferns like (*Diplazium esculentum*), (*Adiantum caudatum*), were observed during the field visit on the project site.

Similarly, Endemic and alien species like Lahare banmara (*Mikania micrantha*), Seto Banmara (*Eupatorium odoratum*), Besaram (*Ipomea carnea*), Jalajambhu (*Alternanthera philoxeroides*) and Lajjawati (*Mimosa pudica*) were also reported in the site.

Table 25: Endemic and alien species found in the project area

SN	Local Name	English Name	Scientific Name	Family	Protection status
1	Gandhe	Goatweed	<i>Ageratum conyzoides</i>	Asteraceae	NA

2	Jalajambhu	Alligator weed	<i>Alternanthera philoxeroides</i>	Amaranthaceae	NA
3	Kalo Banmara	Crofton weed	<i>Eupatorium adenophorum</i>	Asteraceae	NA
4		Devil weed	<i>Eupatorium odoratum</i>	Asteraceae	NA
5	Besaram	Morning Glory	<i>Ipomoea carnea</i>	Convolvulaceae	NA
6	Gandhe kanda	Spanish flag	<i>Lantana camara</i>	Verbenaceae	NA
7		Cut grass	<i>Leersia hexandra</i>	Poaceae	NA
8	Lahare banmara	Bitter vine	<i>Mikania micrantha</i>	Asteraceae	NA
9	Lajjawati	Touch-me-not	<i>Mimosa pudica</i>	Fabaceae	NA

3.7.2 Faunal Diversity and Distribution

As the project area is urban area, not much of the wildlife was found. Some wildlife that could adapted to the urban environment were report and are presented below.

Around 14 bird species were reported in the project sites of which 13 species were of Least Concerned status, for example, Koili (*Eudynamys scolopaceus*), Nyauli (*Megalaima asiatica*), Bhangera (*Passer domesticus*), Dagle rupi (*Acridotheres tristis*), Jureli (*Pycnonotus cafer*), etc and one was Near Threatened status i.e . Sarus (*Ciconia episcopus*). On the basis of bird's behavior, they can be resident and visitors and they can be common, fairly common and uncommon on the basis of population status. The details of birds reported in the site are given below:

Table 26: Bird Species in the Project Area

SN	Local Name	English Name	Scientific Name	Family	IUCN Status	Remarks
1	Bhith Rupi	Bank Myna	<i>Acridotheres ginginianus</i>	Sturnidae	LC	R, FC
2	Dangre Rupi	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	LC	R, FC
3	Bakkulla	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	LC	R, FC
4	Saras	Woolly-necked Stork	<i>Ciconia episcopus</i>	Ciconiidae	NT	SV, UC
5	Parewa	Common Pigeon	<i>Columba livia</i>	Columbidae	LC	R, FC
6	Kag	House Crow	<i>Corvus splendens</i>	Corvidae	LC	R, FC
7	Kafal Pakyo	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae	LC	SV, C
8	Koili	Asian Koel	<i>Eudynamys scolopaceus</i>	Cuculidae	LC	R, FC
9	Nyauli	Blue-throated Barbet	<i>Megalaima asiatica</i>	Megalaimidae	LC	R, C

10	Phistey Chara	Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	LC	R, FC
11	Bhangera	House Sparrow	<i>Passer domesticus</i>	Passeridae	LC	R, FC
12	Suga	Slaty-headed Parakeet	<i>Psittacula himalayana</i>	Psittacidae	LC	R, UC
13	Jureli	Redvented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	R, FC
14	Dhukur	Red-collared Dove	<i>Streptopelia tranquebarica</i>	Columbidae	LC	R, C
Note: LC = Least Concern; NT = Near-threatened						
R= Residential, SV= Summer Visitor, C= Common, FC= Fairly Common, UC= Uncommon						

The project area contains a variety of reptiles, for example, lizards, snakes, etc. Among them Snakes like Karet (*Bungarus lividus*), Dhaman (*Ptyas mucosus*), Hariyo Sarpa (*Trimeresurus albolabris*), and Lizards like Chheparo (*Calotes versicular*), were reported in the site having Least Concerned status in IUCN Red List. The reptiles reported from the site are given below:

Table 27: Reptiles reported from the project area

SN	Local Name	English Name	Scientific Name	Family	Conservation Status(IUCN)	CITIES APPENDIX
1	Harhare Sarpa	Striped Keelback	<i>Amphiesma stolatum</i>	Colubridae	LC	-
2	Krait	Lesser Black Krait	<i>Bungarus lividus</i>	Elapidae	LC	-
3	Krait	Greater Black Krait	<i>Bungarus niger</i>	Elapidae	LC	-
4	Goman	Spectacled Cobra	<i>Naja kaouthia</i>	Elapidae	LC	II
5	Andho Sarpa	Chinese Mountain Pit Viper	<i>Ovophis monticola</i>	Viperidae	LC	-
6	Dhaman	Oriental Rat Snake	<i>Ptyas mucosus</i>	Colubridae	LC	II
7	Hariyo Sarpa	Green pit viper	<i>Trimeresurus albolabris</i>	Viperidae	LC	-
8	Chheparo	Oriental Garden Lizard	<i>Calotes versicular</i>	Agamidae	LC	-
9	Mausuli	Brooke's House Gecko	<i>Hemidactylus brooki</i>	Gekkonidae	LC	-

Note: LC = Least Concern

As amphibians, various types of frog species like Asian Common Toad (*Duttaphrynus melanostictus*), Himalayan Toad (*Duttaphrynus Himalayanus*) and Skittering Frog (*Euphlyctis cyanophlyctis*) were observed during the field survey of which details is given below:

Table 28: Amphibians reported from the project area

SN	Local Name	English Name	Scientific Name	Family	Status
1	Bhyaguto	Asian Common toad	<i>Duttaphrynus melanostictus</i>	Bufonidae	LC
2	Bhyaguto	Himalayan toad	<i>Duttaphrynus Himalayanus</i>	Bufonidae	LC
3	Bhyaguto	Skittering frog	<i>Euphlyctis cyanophlyctis</i>	Dicroglossidae	LC

Note: LC = Least Concern

Mammals reported in the project area are Nyauri (*Herpestes auropunctatus*), and Musa (*Rattus rattus*). The detail status of such species is mentioned below:

Table 29: Mammals reported from the project area

SN	Local Name	English Name	Scientific Name	Family	Status
1	Nyauri	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	Herpestidae	LC
2	Musa	House Rat	<i>Rattus rattus</i>	Muridae	LC

Note: LC = Least Concern

3.8 Current Socio-Economic Environment

3.8.1 Population Demography

The population of BMC was reported to be 1,66,674 by 2001 census, which grew to 2,01, 125 in 2011 census. The population of men comprised of 53% (i.e. 87,664) and women population was 47% (i.e. 79,010) in 2001 census, whereas, the sex proportion changed in 2011 census with percentage of men decreased to 51% (108,827), whereas women population grew to 49% (105,836). The increased population between 2001 and 2011 seemed at 34,451, which refers the annual growth rate (straight line) at 2.07%.

According to BMC's official website, the total population is 2,14, 663 (male 1,08,827 and female 1,05,863) and households 47,798 for the year (2020). Moreover, the Regional Urban Environmental Improvement Project (RUDP) officials had reported the total population of census 2011 is 2,71,354 increased total 1,04,680 population. If the given figure is considered then the annual straight-line population growth rate stands at 6%. However, they had viewed that they had considered the base population is 236,895 for the year 2015 and the annual population growth is 3.37% while preparing the report for Initial Environmental Examination (IEE) on Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-metropolitan City. If the growth rate (3.37%) of RUDP is considered then the population for year 2021 would be 289,017.

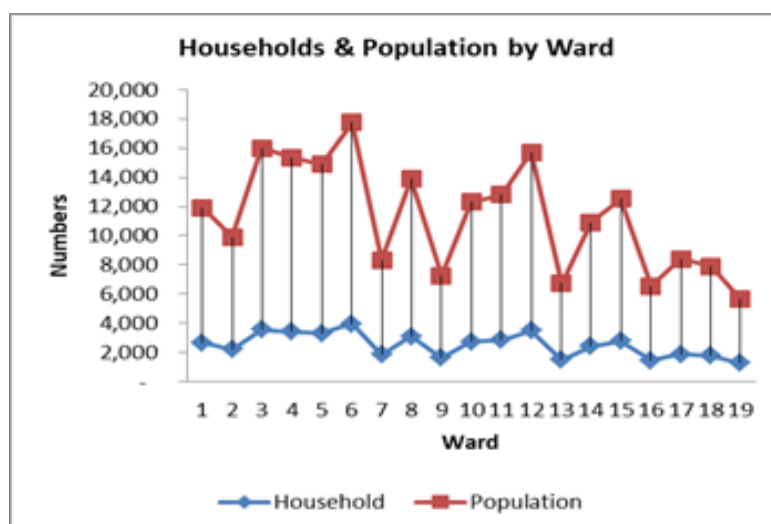


Figure 24: Household and Population by Ward

The IEE survey enumerated the population of 1,192 in 216 sampled households within the delineated project area. The ratio of the male to female is 51.01% and 48.99%.

Table 30: Household/ population of the project area

SN	Name of Settlement	# of Household	# of Population
1	Damabandi	49	258
2	Damabandi, Karkhana tole	17	104
3	Damabandi, Kulharba	56	310
4	Damabandi, Prithivi chowk	4	27
5	Damabandi, Pulchowk	14	78
6	Damabandi, Shankarbari	63	349
7	Shankarbari, Keshaliya	13	66
Total		216	1,192

Source: Household Survey, April, 2021

3.8.2 Household and Population by Sex

The actual ward wise household and population can only be confirmed after 2021 CBS census is complete. However, the BMC official website reported that the total population and household of entire BMC and only population distribution of each ward. Currently the BMC is having 19 wards and earlier there were 22 wards while executing its services as the sub metropolitan city. Nevertheless, the team had tried to retrieve the sex wise population by ward for the current year adopting the reference of sex wise population of census 2001.

The ward no 6 is largest ward (17,748) and ward no 19 is smallest ward (5,640) in terms of population and respectively household too. Similarly, the ward no 4 is largest one in terms of physical area. The overall ratio of male to female population in BMC is 1.03 with 50.70% (108,827) of males and 49.30% (105,836) of females. The sex ratio of male to female population was 1.11 in census year 2001.

Table 31: Population of BMC by Sex (2020 AD)

Ward	Household	Population			Area in Sq. Km.	Average Household Size	Sex Ratio	Population Density
		Total	Male	Female				
1	2,656	11,928	6,047	5,881				
2	2,208	9,914	5,026	4,888				
3	3,563	16,002	8,112	7,890				
4	3,417	15,346	7,780	7,566				
5	3,313	14,880	7,544	7,336				
6	3,952	17,748	8,998	8,750				
7	1,857	8,342	4,229	4,113				
8	3,091	13,880	7,037	6,843				
9	1,613	7,245	3,673	3,572				
10	2,738	12,295	6,233	6,062				
11	2,848	12,792	6,485	6,307				
12	3,495	15,697	7,958	7,739				
13	1,492	6,701	3,397	3,304				
14	2,429	10,910	5,531	5,379				
15	2,787	12,515	6,345	6,170				
16	1,456	6,537	3,314	3,223				
17	1,869	8,393	4,255	4,138				
18	1,759	7,898	4,004	3,894				
19	1,255	5,640	2,859	2,781				
Total	47,798	214,663	108,827	105,836	76.99	4.49	1.028	2,788.19

Sources⁹

Similarly the project area has a large portion of son/daughter by relation. Please refer to Table below.

Table 32: Population by relation HH by sex in the project area

SN	Relation to HH	Sex of Member		Total
		Male	Female	
1	Head	17.37	0.76	18.12
2	Husband/wife	0.42	17.53	17.95
3	Son/Daughter	22.15	11.33	33.47
4	Grand children	7.47	4.78	12.25
5	Son/Daughter in law	0.00	10.23	10.23
6	Daughter/Son in law	0.08	0.00	0.08
7	Parent	1.59	1.93	3.52
8	Father/Mother in law	0.00	0.08	0.08
9	Brother/Sister in law	0.08	0.76	0.84
10	Household Widow	1.85	1.59	3.44
Total		51.01	48.99	100.00

Source: Household Survey, April, 2021

⁹ The population by ward was sourced from <https://biratnagarmun.gov.np/en/ward-profile> and the number of households and the population by sex was adjusted from the accumulated figure of Biratnagar Metropolitan city as demonstrated in <https://biratnagarmun.gov.np/en/ward-profile>

3.8.3 Population by Age Group

The population in BMC is categorized into 3 major age groups *i.e.* (a) younger dependent population, (b) economically active population and (c) elder dependent population.

The recent age wise population data is not available, thus, 2001 census data has been considered as the references and presented in the percentage value so as to understand the conspicuous scenario of the age composition in BMC.

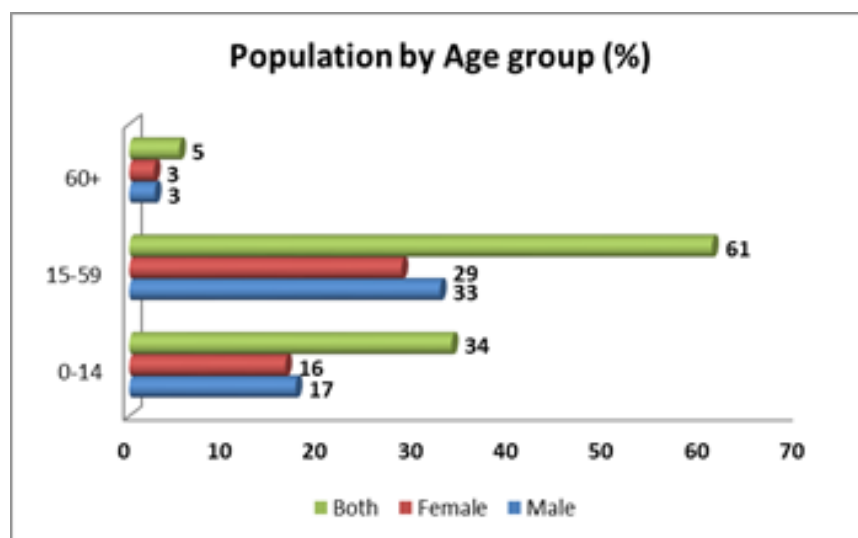


Figure 25: Population by Age Group

The age group between the age of 15 and 59 has been considered as the economically active age group. In BMC, this age group constitutes more than 61 percent, whereas younger dependent age group has 34 percent and elder dependent are 5 percent.

The sampled population of the project area is grouped into different age groups in order to understand population size by the age group. This grouping is also useful to understand the proportional ratio of economically active and dependence population within the project area.

The majority of enumerated population were under the age group 21-≤30 (25.59%) followed by age group 0-≤10 (23.07%), age group 11-≤20 (19.30%) and so on. Normally, the population of less than 10 years and more than 60 years are considered to be the economically dependent to the economically active population. With this reference, the project area has about 28% dependent population. Please refer to the table below.

Table 33: Population by age and sex

Sl. No.	Age Group	Sex of Member		Total
		Male	Female	
1	0-≤10	13.76	9.31	23.07
2	11-≤20	7.38	11.91	19.30
3	21-≤30	13.67	11.91	25.59
4	31-≤40	3.78	4.70	8.47
5	41-≤50	7.05	5.62	12.67
6	51-≤60	3.19	2.77	5.96
7	61-≤70	1.51	2.01	3.52
8	71+	0.67	0.76	1.43
Total		51.01	48.99	100.00

Source: Household Survey, April, 2021

3.8.4 Population by Ethnic Group

The IEE report of Additional Drainage, Sewerage, and Roads Improvement Works prepared by the Regional Urban Environmental Improvement Project (RUDP) for Biratnagar Sub-metropolitan City, has depicted that the dominant ethnic population of Biratnagar is Hill Brahmin constituting more than 20 % followed by the other Terai caste/ethnicity except to Tharu (Indigenous/Janajati), Rajbansi (Indigenous/Janajati), Dhanuk, Muslim, Baniya, Yadav, Kewat, Malaha (Indigenous), Marwari, Teli, Halwai, Kayastha, Dushad/Paswan (Dalit Vulnerable Pop), other Terai Dalit. The least population is of Kami, Damai, Sarki (Dalit Vulnerable Population) which is less than 1 %.

Table 34: Population by ethnicity/caste

Caste/Ethnicity	Population	%	Rank by Population
Hill Caste/Ethnicity			
Hill Brahmin	37,493	20.80%	1
Chhetri	18,068	10.00%	3
Newar (Indigenous/Janajati)	9,594	5.30%	5
Rai	2,821	1.60%	18
Kami, Damai, Sarki (Dalit Vulnerable Pop) Total	1,708	0.90%	21
Other Caste/Ethnicity (Total)	5,847	3.20%	9
Total Hill Caste/Ethnicity	75,531	41.90%	
Terai Caste/Ethnicity		0.00%	
Tharu (Indigenous/Janajati)	4,994	2.80%	14
Rajbansi (Indigenous/Janajati)	5,028	2.80%	13
Dhanuk	6,587	3.70%	8
Muslim	16,490	9.20%	4
Baniya	2,503	1.40%	20
Yadav	7,320	4.10%	6
Kewat	7,078	3.90%	7
Malaha (Indigenous)	4,460	2.50%	15
Marwari	5,737	3.20%	10
Teli	5,493	3.00%	11
Halwai	3,330	1.80%	17
Kayastha	3,618	2.00%	16
Dushad/Paswan (Dalit Vulnerable Population)	2,635	1.50%	19
Other Terai Dalit	5,288	2.90%	12
Other Terai Caste/Ethnicity	24,046	13.30%	2
Total Terai Caste/Ethnicity	104,607	58.10%	
Total Population	180,138	100.00%	

Source¹⁰:

¹⁰ IEE report on Additional Drainage, Sewerage, and Roads Improvement Works prepared by the

The survey had identified more than 27 ethnic groups within the project area (new PS site), which is a mixture of both Hill and Tarai communities. To be oriented with the exact name of ethnicity, the entire ethnic people are not grouped into the standard format as CBS does. The majority represents by Mandal (17.13%), followed by Yadav (9.26 %), Khawas (8.80%), Satar (6.02%) and so on. Please refer to the table below.

Table 35: Ethnicities of the project area population

SN	Ethnicity	Name of Settlement							Total
		Damabandi	Damabandi, Karkhana tole	Damabandi, Kulharba	Damabandi, Prithivi chowk	Damabandi, Pulchowk	Damabandi, Shankarburi	Shankarburi, Keshaliya	
1	Badahi	1.39	-	0.46	0.46	-	2.31	-	4.63
2	Gaderi	-	-	-	0.46	-	-	-	0.46
3	Hajam	-	-	-	-	-	0.46	-	0.46
4	Hill Brahmin	1.39	-	-	0.46	-	1.39	-	3.24
5	Hill Chhetri	1.39	-	2.31	-	-	1.39	-	5.09
6	Hill Dalit	0.46	-	0.46	-	-	0.93	0.46	2.31
7	Hill Janajati	-	-	0.46	-	1.85	0.46	-	2.78
8	Jhangad	2.31	-	0.46	-	-	0.93	4.63	8.33
9	Kamat	-	0.46	-	-	-	-	-	0.46
10	Kewat	-	-	-	-	-	1.85	-	1.85
11	Khawas	0.46	5.56	0.46	0.46	-	1.85	-	8.80
12	Mahato	-	-	-	-	0.93	0.46	-	1.39
13	Mandal	2.31	-	6.94	-	-	7.41	0.46	17.13
14	Mehata	1.39	-	-	-	-	-	-	2.77
15	Mushahar	-	-	0.93	-	-	-	-	0.93
16	Muslim	0.93	-	1.85	-	0.46	0.93	-	4.17
17	Pandit	0.46	-	-	-	-	-	-	0.46
18	Poddar	-	-	-	-	-	0.93	-	0.93
19	Rai	0.46	-	-	-	-	-	-	0.46
20	Rajbansi	0.46	0.93	0.46	-	-	-	-	1.85
21	Ray	0.46	-	-	-	1.85	2.78	-	5.09
22	Satar	5.56	-	-	-	-	-	0.46	6.02
23	Teli	0.93	-	0.46	-	0.46	0.46	-	2.31
24	Terai Dalit	0.46	-	2.78	-	-	-	-	3.24
25	Tharu	0.46	0.93	-	-	-	1.39	-	2.78
26	Turaha	-	-	2.78	-	-	-	-	2.78
27	Yadav	1.39	-	5.09	-	0.93	1.85	-	9.26
Total		22.69	7.87	25.93	1.85	6.48	29.17	6.02	100.00

Source: Household Survey, April, 2021

3.8.5 Language

The majority of the people use Nepali language for their day to day communication followed by the Maithali language. At the same time local indigenous languages like Birat Rajbanshi also known as Khotta/Khoratha is also the communicating language spoken by the respective communities. Further, Hindi and Marwardi are also the language for some population.

The Hill and Terai communities are living harmoniously in the project area. Nepali is understood as well as used for communication by the locals. However, almost 85% of respondents have Maithili as their mother tongue followed by Nepali 11.1%. Some Bangali and Tharu speaking populations were also reported from the project area. Please refer to the table below.

Table 36: Language spoken by locals in the project area

SN	Name of Settlement	Language				Total
		Bangali	Maithili	Nepali	Tharu	
1	Damabandi	0.5	19.9	2.3	0	22.7
2	Damabandi, Karkhana tole	0.9	6.5	0	0.5	7.9
3	Damabandi, Kulharba	0.5	22.7	2.8	0	25.9
4	Damabandi, Prithivi chowk	0	1.4	0.5	0	1.9
5	Damabandi, Pulchowk	0	4.6	1.9	0	6.5
6	Damabandi, Shankarbari	0	24.5	3.2	1.4	29.2
7	Shankarbari, Keshaliya	0	5.6	0.5	0	6
Total		1.9	85.2	11.1	1.9	100

Source: Household Survey, April, 2021

3.8.6 Literacy and Education

The exact data on education and literacy status of the BMC is not available, as it will be available only after completion of the census 2021. However the source¹¹ taken from PPTA mentioned that the total literacy rate is 50.5%, which comprises of 59.5% of men and 39.6% of women. The census 2001, reported that the literacy rate was more than 75%, which comprised of 44.2% of men and 31.5% of women.

Table 37: Literacy rate of BMC (2001)

Sl. No.	Status	Male	Female	Total
1	Can't Read & Write	8.5%	15.5%	24.0%
2	Can Read Only	2.6%	2.6%	5.3%
3	Read & Write	41.6%	28.8%	70.4%
4	Not Stated	0.1%	0.2%	0.3%
Total		52.8%	47.2%	100.0%

Source: Census 2001, CBS

¹¹ IEE report on Additional Drainage, Sewerage, and Roads Improvement Works prepared by the Regional Urban Environmental Improvement Project (RUDP) for Biratnagar Sub-metropolitan City

The primary survey for the IEE study revealed that almost 68% (34.14% men and 33.39% women) of the total people are either can read only (4.87%) or are able to read and write (62.67%). The survey on education part was carried out to population above the age of 6. However, the populations under the age 6 were also found to be going school (private) under pre-primary level. Those populations also can read and write but omitted for calculating the education level and literacy rate. Interestingly; the education level of both men and women; were found to be almost equal in the project area. Please refer to the table below.

Table 38: Literacy status of locals (by sex) [%]

SN	Education Level	Sex of Member		Total
		Male	Female	
1	Can't Read & Write	7.05	9.06	16.11
2	Can Read Only	2.35	2.52	4.87
3	Read & Write	31.80	30.87	62.67
4	Not Applicable	9.82	6.54	16.36
Total		51.01	48.99	100.00

Source: Household Survey, April, 2021

3.8.7 Religion

The BMC has population belonging to different religious groups, though remarkably large population belongs to the Hinduism. The other religions are Islam, Jainism, Kirat, and Christianity. Biratnagar is known for its high-spirited festival celebration. During Dashain, the largest festival in the country, a large number of devotees visit the Kali Mandir, a temple dedicated to Goddess Kali that lies in the heart of the town.¹²

The people of almost all religious beliefs except Christian were reported from the project area. The majority of the population belongs to the Hindu religion, which is almost 95% of the total population followed by the Muslim 4.2% and Buddhist less than 1%. Please refer to the table below.

Table 39: Population by religion in the project area

SN	Name of Settlement	Religion			Total
		Buddhist	Hindu	Muslim	
1	Damabandi	0.0	21.8	0.9	22.7
2	Damabandi, Karkhana tole	0.0	7.9	0.0	7.9
3	Damabandi, Kulharba	0.0	24.1	1.9	25.9
4	Damabandi, Prithivi chowk	0.0	1.9	0.0	1.9
5	Damabandi, Pulchowk	0.5	5.6	0.5	6.5
6	Damabandi, Shankarbari	0.0	28.2	0.9	29.2
7	Shankarbari, Keshaliya	0.0	6.0	0.0	6.0
Total		0.5	95.4	4.2	100.0

Source: Household Survey, April, 2021

3.8.8 Population Density

With given population as 214,663 and total area of the BMC as 76.99, the density could be estimated as 2,788 people per sq. meter.

¹² <https://en.wikipedia.org/wiki/Biratnagar#Religion>

3.8.9 Education and Literacy

The IEE report¹³ mentioned that the total literacy rate of BMC is 50.5%, 59.5% of which are men and 39.6% are women female. However, the census 2001 reported that the literacy rate was more than 75% which comprised of 44.2% men and 31.5% women.

Table 40: Literacy rate (2001AD)

Unit: as shown

SN	Status	Male	Female	Total
1	Can't Read & Write	8.5%	15.5%	24.0%
2	Can Read Only	2.6%	2.6%	5.3%
3	Read & Write	41.6%	28.8%	70.4%
4	Not Stated	0.1%	0.2%	0.3%
Total		52.8%	47.2%	100.0%

Source: Census 2001, CBS

A municipal school under GoN namely Siddhakali Aadharbhut Vidyalaya established in 2046 BS is situated in the Damabandi, Kulharba in order to facilitate the children of the area. However this is primary level school and need to go away from the area for higher education. The survey reported that about 49% of the household send their children to government school whereas 37% sending to private boarding school which is situated outside of the project area. About 15% has reported that their children either go to private boarding school or government school.

Table 41: Education facilities in the project area [%]

SN.	Name of Settlement	Education Facility			Total
		Government School	Private Boarding	Both Government & Private School	
1	Damabandi	8.3	12.0	2.3	22.7
2	Damabandi, Karkhana tole	4.6	1.4	1.9	7.9
3	Damabandi, Kulharba	15.3	5.6	5.1	25.9
4	Damabandi, Prithivi chowk	0.9	0.9	0.0	1.9
5	Damabandi, Pulchowk	0.9	4.6	0.9	6.5
6	Damabandi, Shankarbari	15.7	9.3	4.2	29.2
7	Shankarbari, Keshaliya	2.8	3.2	0.0	6.0
Total		48.6	37.0	14.4	100.0

Source: Household Survey, April, 2021

3.8.10 Health and Sanitation

The Initial Environmental Examination (IEE) on Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-metropolitan City Biratnagar had enumerated three hospitals, namely (a) Koshi Zonal Hospital, (b) Maternity Hospital and (c) Golcha Eye Hospital. The Koshi Zonal Hospital had facilities like X-ray, laboratory, Operation Theater, OPD and ECG.

¹³ IEE report on Additional Drainage, Sewerage, and Roads Improvement Works prepared by the Regional Urban Environmental Improvement Project (RUDP) for Biratnagar Sub-metropolitan City

Beside these hospitals; Biratnagar also have several private clinics and pathology labs. There were more than five nursing homes, 50 private clinics and 10 pathology laboratories within the municipality. One veterinary hospital was also located within the municipality.

The common diseases reported were stomach ache/problem (25% cases), cough/asthma (19%), typhoid/pneumonia (19%), diarrhea (6%), malaria (6%), head ache (6%), eye infection (6%) and throat/nose infection (6%). The main cause for gastroenteritis and diarrhoea could be due to poor water quality, lack of proper surface drainage systems and solid waste management.¹⁴

About the health seeking behavior, more than 75% of the people of the project area reported that they consult for their health problem either to government district hospital (38%) or both private and government district hospital (40%). Less than 20% of the people go to private hospital. Please refer to the table below

Table 42: Population using the local health facility type [%]

SN	Name of Settlement	Health Facility					Total
		Government Health Post/Health Centre	Government District Hospital	Government Other Institution	Private Hospital	Both District & Private Hospital	
1	Damabandi	0	3	0	10	9	23
2	Damabandi, Karkhana tole	0	3	0	0	4	8
3	Damabandi, Kulharba	0	15	0	5	6	26
4	Damabandi, Prithivi chowk	0	1	0	0	0	2
5	Damabandi, Pulchowk	0	1	0	0	5	6
6	Damabandi, Shankarbari	2	10	0	2	15	29
7	Shankarbari, Keshaliya	0	5	0	1	0	6
Total		2	38	1	19	40	100

Source: Household Survey, April, 2021

About 2.3% of the population have reported to disown toilets at their houses thus practice open defecation and urination. This is an alarming situation, which needs to be promptly addressed. The seldom occurring of water born disease is may be the causes of open defecation by those who do not have own toilet at their house premises.

¹⁴ Initial Environmental Examination (IEE) on Additional Drainage, Sewerage, and Roads Improvement Works for Biratnagar Sub-metropolitan City.

Table 43: Type of toilets in the project area houses [%]

SN	Name of Settlement	Type of toilet					Total
		Toilet with flush (connected to sewer)	Toilet with flush (connected to safety tank)	Toilet without flush	Public latrine	No toilet	
1	Damabandi	0.0	1.9	19.4	0.0	1.4	22.7
2	Damabandi, Karkhana tole	0.0	0.5	7.4	0.0	0.0	7.9
3	Damabandi, Kulharba	0.0	0.9	24.1	0.0	0.9	25.9
4	Damabandi, Prithivi chowk	0.0	0.0	1.9	0.0	0.0	1.9
5	Damabandi, Pulchowk	0.5	1.9	4.2	0.0	0.0	6.5
6	Damabandi, Shankarbari	0.0	0.5	28.2	0.5	0.0	29.2
7	Shankarbari, Keshaliya	0.0	0.0	6.0	0.0	0.0	6.0
Total		0.5	5.6	91.2	0.5	2.3	100.0

Source: Household Survey, April, 2021

3.8.11 Cultural Phenomenon

Almost every kind of festivals of different religions are celebrated in BMC. A remarkable portion of the population practice Hinduism, thus Hindu festivals are celebrated in the project area such as Dashain, Dipawali, Jitiya Pavain are the famous festival of the people in the area. A large number of devotees visit the Kali Mandir, a temple dedicated to Goddess Kali that lies in the heart of the town. At the same time the existence of other religions like Islam, Jainism, Kirat, and Christianity are also well respected. Biratnagar is known for its high-spirited festival celebration.

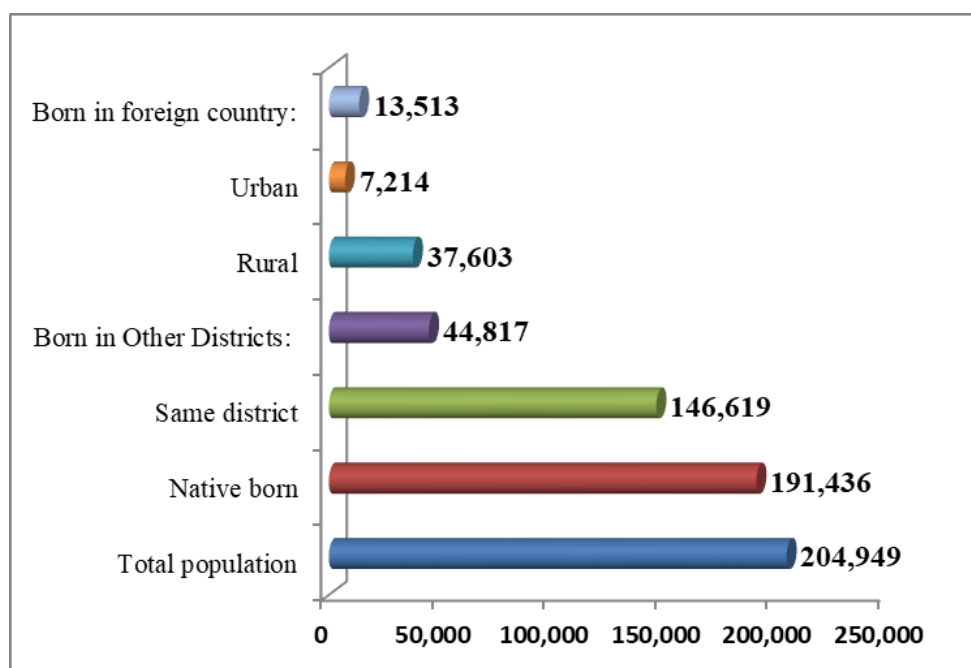
3.8.12 Economic Activities

As per 2001 census, about 71% of the total population is economically active. About 46.2% of the economically active population is engaged in agriculture followed by 32.4% in service and rest in trade and labor.¹⁵

3.8.13 Migration in Biratnagar Metropolitan City

The BMC has been experiencing a remarkable numbers of in-migration resulting in emergence of squatter settlements in several areas. If this issue is not addressed on time, it might grow out of hand for the authorities. The Population Monograph of Nepal, Volume I (Population Dynamics), 2014 as depicted in the Appendix 10.2: In-migration to urban areas, of the total population (2,04,949), 44,817 were born in other districts and 13,513 were born in foreign country.

¹⁵ RUDP



Total population: 204,949

Native born: 191,436 (93.4%)

Same district: 146,619 (76.6%)

Born in Other Districts:

Rural: 37,603 (19.6%)

Urban: 7,214 (3.8%)

Total (Number) 44,817 (23.4%)

Born in foreign country:

13,513 (6.6%)

Though, the BMC had experienced a remarkable numbers of in-migration, yet it is not significant in the project area as reported by the household survey. Less than 3% of the total surveyed household reported that they had migrated to this area from elsewhere. Please refer to the table below.

Table 44: Status of migration in the project area

S N	Migratio n	Name of Settlement							Total
		Damabandi	Damabandi Karkhana tole	Damaband i, Kulharba	Damaband, Prithivi chowk	Damabandi, Pulchowk	Damabandi, Shankarbari	Shankar bari, Keshali ya	
1	Yes	1.39	-	0.46	-	-	0.93	-	2.78
2	No	21.30	7.87	25.46	1.85	6.48	28.24	6.02	97.2 2
Total		22.69	7.87	25.93	1.85	6.48	29.17	6.02	100. 0

Source: Household Survey, April, 2021

Of the total in-migrated households, about 17% was migrated here because of the natural disaster they had faced at their place of origin whereas more than 83% of them have migrated looking a better employment opportunity.

Table 45: Reasons for migration [%]

SN	Reason for Migration	Name of Settlement			Total
		Damabandi	Damabandi, Kulharba	Damabandi, Shankarbari	
1	Natural disaster	16.67	-	-	16.67
2	Looking for work	33.33	16.67	33.33	83.33
Total		50.00	16.67	33.33	100.00

Source: Household Survey, April, 2021

3.8.14 Gender Issues

Both men and women had equal education levels in the project area, which indicates that the growing gender equality in the newer generation. Critical gender issues are less evident in the project area.

3.8.15 Major Occupation

The trend of people engaging in the agriculture in Nepal has been changing. People are now diverting into other occupations as agriculture is becoming less attractive, particularly in the urban areas. The agriculture and its associated sub activities like rearing livestock is being a less priority to express as the major occupation for the people as only 8.33% (agriculture 7.87% and livestock (0.46%) of the total surveyed household expressed that agriculture was their major occupation. Majority of the people were engaged in Salary/Wage (52.31%), followed by the having Own Enterprises (22.22%), External job (15.74%) and so on.

Table 46: Major occupation of the HH in the project area [%]

SN	Main Occupation of HHH	Name of Settlement							Total
		Damabandi	Damabandi, Karkhana tole	Damabandi, Kulharba	Damabandi, Prithivi chowk	Damabandi, Pulchowk	Damabandi, Shankarbari	Shankarbari, Keshaliya	
1	Agriculture	2.78	-	2.31	-	0.93	0.93	0.93	7.87
2	Livestock	-	-	-	-	-	0.46	-	0.46
3	Salary/Wage	7.41	6.02	17.59	0.46	2.31	17.59	0.93	52.31
4	Own Enterprises	9.72	0.46	1.39	-	1.85	4.63	4.17	22.22
5	External job	2.78	1.39	4.17	1.39	1.39	4.63	-	15.74
6	Household Work	-	-	-	-	-	0.93	-	0.93
7	Remittances	-	-	0.46	-	-	-	-	0.46
Total		22.69	7.87	25.93	1.85	6.48	29.17	6.02	100.00

Source: Household Survey, April, 2021

3.8.16 Income and Expenditure

The data on income/expenditure of the households within the project area were collected simply by asking them on the real time basis. Normally, people do not keep any records of income in a systematic way so as to be able to express whenever is asked about the budgeting. Hence the amount presented in the report needs further verification with different parameters in order to express accurately. The given income amount is just to be oriented the income status. However, the survey data shows that the income of the people is almost equal to the national income. In overall the per capita income of the people in the project area is about 128 thousand. Please refer to the table below.

Table 47: Income level [NRs]

S N	Name of Settlement	# of Household	# of Population	Sum of Income ('000)	Income/HH ('000)	Income/Capita ('000)
1	Damabandi	49	258	36,842	751.89	142.80
2	Damabandi, Karkhana tole	17	104	11,068	651.07	106.43
3	Damabandi, Kulharba	56	310	36,326	648.69	117.18
4	Damabandi, Prithivi chowk	4	27	2,580	645.00	95.56
5	Damabandi, Pulchowk	14	78	12,926	923.27	165.72
6	Damabandi, Shankarbari	63	349	45,292	718.92	129.78
7	Shankarbari, Keshaliya	13	66	8,213	631.77	124.44
Total		216	1192	153,248	709.48	128.56

Source: Household Survey, April, 2021

The project area households were grouped based on their income levels as (a) High Income Group (HIG), (b) Middle Income Group (MIG) and (c) Low Income Group (LIG). The households having income more than 2 lakh are categorized under HIG, having income between 2 lakh and 75 thousand under MIG and having income less than 75 thousand under LIG. With this categorization, the majority of the households fall under the MIG with 71%, followed by the HIG 15% and LIG 14.

Table 48: Income groups [%]

SN	Name of Settlement	Income Group			Total
		LIG	MIG	HIG	
1	Damabandi	3	14	6	23
2	Damabandi, Karkhana tole	2	6	0	8
3	Damabandi, Kulharba	3	21	2	26
4	Damabandi, Prithivi chowk	0	1	0	2
5	Damabandi, Pulchowk	0	5	1	6
6	Damabandi, Shankarbari	4	20	5	29
7	Shankarbari, Keshaliya	1	5	0	6
Total		14	71	15	100

Source: Household Survey, April, 2021

The income and expenditure of the people in the project area were also found to be equal.

Table 49: Expenditure level [NRs]

S N	Name of Settlement	# of Household	Numbers of Population	Sum of Expenses	Expense s/HH	Expenses /Capita
1	Damabandi	49	258	39,366	803.39	152.58
2	Damabandi, Karkhana tole	17	104	14,926	877.98	143.52
3	Damabandi, Kulharba	56	310	41,173	735.24	132.82
4	Damabandi, Prithivi chowk	4	27	2,520	630.00	93.33
5	Damabandi, Pulchowk	14	78	15,336	1,095.43	196.62
6	Damabandi, Shankarbari	63	349	50,285	798.17	144.08
7	Shankarbari, Keshaliya	13	66	11,700	900.00	177.27
Total		216	1192	175,306	811.60	147.07

Source: Household Survey, April, 2021

While calculating the income and expenditure of the people in the project area, almost 14% was found to be in deficit.

Table 50: Per-capita income and expenditure [NRs]

Sl. No	Income	128.56
1	Expenditure	147.07
2	Saving +/- Deficit -	(18.50) -14%

3.8.17 Land and Agriculture

The survey had reported that about 12% of the households owned the land. The data of peoples' engagement as the main occupation as agriculture also validates the data of holding own land. About 8% of the total households had reported engaged in agriculture as main occupation.

Table 51: Ownership of the cultivated land in the project area [%]

SN	Having own cultivating land	Name of Settlement							Total
		Damabandi	Damabandi, Karkhana tole	Damabandi, Kulharba	Damabandi, Prithivi chowk	Damabandi, Pulchowk	Damabandi, Shankarbari	Shankarbari, Keshaliya	
1	Yes	5.09	-	3.24	-	-	2.78	0.93	12.04
2	No	17.59	7.87	22.69	1.85	6.48	26.39	5.09	87.96
Total		22.69	7.87	25.93	1.85	6.48	29.17	6.02	100.00

Source: Household Survey, April, 2021

About 80% of the households have either no own product (30%) or sufficient food from their own product (49%). Only 6% is having surplus food.

Table 52: Food sufficiency [%]

SN	Name of Settlement	Food Sufficiency months						Total
		Less than 3 months	3 to < 6 months	6 to < 9 months	9 to < 12 months	12 or surplus	No Own Product	
1	Damabandi	8	0	1	0	4	9	23
2	Damabandi, Karkhana tole	5	2	0	0	0	0	8
3	Damabandi, Kulharba	6	3	1	0	1	14	26
4	Damabandi, Prithivi chowk	1	0	0	0	0	0	2
5	Damabandi, Pulchowk	5	0	0	0	0	1	6
6	Damabandi, Shankarbari	24	2	3	0	0	0	29
7	Shankarbari, Keshaliya	0	0	0	0	0	5	6
Total		49	8	5	2	6	30	100

Source: Household Survey, April, 2021

3.8.18 Housing & Ownership

100% of the households have reported that they have their own house in the project area. Of the total households more than 60% households having *Kachhi* with thatched roof house structure and about 14% are having *Semi-Pakki* roofed by either tin or tile. Further, only 24% of the households have reported that they have modern type of house structure with cemented column/wall with concrete casting roof.

Table 53: House structure type [%]

SN	Name of Settlement	Type of House			Total
		Concrete roof/Pakki/Cemented	Semi-Pakki (tin/tile/slate roof)	Kachhi- Thatched roof	
1	Damabandi	8	3	12	23
2	Damabandi, Karkhana tole	1	2	5	8
3	Damabandi, Kulharba	2	5	19	26
4	Damabandi, Prithivi chowk	1	0	1	2
5	Damabandi, Pulchowk	4	2	0	6
6	Damabandi, Shankarbari	7	3	19	29
7	Shankarbari, Keshaliya	0	0	6	6

Total	24	14	62	100
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Source: Household Survey, April, 2021

3.8.19 Irrigation and Cropping Pattern

The rain fed is the main irrigation system in the project area. The dominant crop in the project area is paddy followed by the wheat.

3.8.20 Electricity & Communication

Almost all houses have electricity facility connected with the national grid provided by NEA. Similarly, due to advance change in mobile technology, almost all have at least one set of functioning mobile set.

3.8.21 Urbanization

The urbanization is taking rapid pace in the project area. The house structures are rapidly changing. The toilets are being replaced by the modern means of technology. Except the piped water supply, the urban amenities like road, drain, and sewer lime *etc.* being built up or being upgraded.

3.8.22 Water Supply & Sufficiency

Almost cent percent of the people in the project area uses ground water using conventional hand pump.

Table 54: Sources of drinking waters in the project area [%]

SN	Name of Settlement	Main source of drinking water		Total
		Hand pipe/Tube-well	Open well	
1	Damabandi	22.7	0.0	22.7
2	Damabandi, Karkhana tole	7.9	0.0	7.9
3	Damabandi, Kulharba	25.5	0.5	25.9
4	Damabandi, Prithivi chowk	1.9	0.0	1.9
5	Damabandi, Pulchowk	6.5	0.0	6.5
6	Damabandi, Shankarbari	29.2	0.0	29.2
7	Shankarbari, Keshaliya	6.0	0.0	6.0
Total		99.5	0.5	100.0

Source: Household Survey, April, 2021

Almost cent percent of the people in the project area is having not water deficiency fetched from the hand pump.

Table 55: Water sufficiency in the project area [%]

SN	Name of Settlement	Water Sufficiency		Total
		Yes	No	
1	Damabandi	22.7	0.0	22.7
2	Damabandi, Karkhana tole	7.9	0.0	7.9
3	Damabandi, Kulharba	25.5	0.5	25.9
4	Damabandi, Prithivi chowk	1.9	0.0	1.9
5	Damabandi, Pulchowk	6.5	0.0	6.5
6	Damabandi, Shankarbari	28.7	0.5	29.2
7	Shankarbari, Keshaliya	6.0	0.0	6.0
Total		99.1	0.9	100.0

Source: Household Survey, April, 2021

3.8.23 Historical and Archaeological site

No definable historical and archaeological sites are evident within the project area. Though it is not closer to the project area but in entire BMC area Temples, mosques, and churches are existed. Kali mandir, Hanuman Mandir, Radhakrishna mandir etc. of Hindus and Bilal Masjid, Kari Sahab Mosque, Jama Masjid etc. of Muslim are famous cultural sites.

3.8.24 Perception of the People towards the Proposed Project

During the field survey, the peoples' perception towards the ongoing project was also collected. It was carried out to make locals aware and/or understand how the project would affect them. Their perceptions are presented below:

- Most of the people had viewed that the project would stand as the landmark to change their day to day life. Soon after the completion of the project, their source of drinking water would change as they had been using iron containing ground water these days.
- Secondly, if the source of water is changed then their health status would also be changed in a positive manner. At the same time, the people would have a gracious opportunity too to work in the project during and after construction. The project is highly worthy in terms of entire manner of social life.

4 IMPACT ASSESSMENT

Based on baseline environmental studies, the initial environmental examination of direct, indirect and cumulative nature of the proposal actions on the following aspects of the environment shall be identified and predicted for construction and operation phases of the proposal. Adverse and beneficial Impacts/Issues that are not identified or anticipated at this stage, if later discovered during IEE study, shall be duly incorporated in the report.

4.1 Socio Economic and Cultural Impact

Impact during Construction phase

Loss of housing, other assets, resources use: As the new pump station is being constructed under the municipal owned land, the replacement of the pipes are being done within the ROW approximately spanning 165 KM crossing to different road intersections, the debris yard during the construction period is planned to be selected at the public land, therefore, there won't be any private property is conceived to be occupied for the project purpose during the project construction period. Hence, no any physical housing or other assets or resources which belong to the private owner will be lost or damage. The selected land and area are completely free from encumbrances.

Land Use, Agricultural lands, Cropping Pattern: Neither land use would be changed within the project area nor would any agricultural land come under the depletion by the intervention of the proposed project. Even the project won't damage the standing crops. The existing cropping pattern would remain the same.

Loss of access to facilities, services, or natural resources: The installation of the new pump stations and rehabilitation of 3 existing pump houses would not generate to any loss of access to facilities, services or nay natural resources. However, the excavation of the roads for laying down the distribution water supply pipeline would temporarily cause inconvenience to local businessman, vendors, local resident and pedestrians to use those roads & walkway during the construction period. At the same time, temporarily, few informal vendors are also observed running the roadside fast-food and other business along the pipe laying alignment, which might have some critical affects during the construction period. Correspondingly, even big permanent shops of different types might not get sufficient customers and would unable to manage their daily income and expenditure due to disturbed roads access during the construction period.

Living and Livelihood: Vulnerably the local people would not prone to face any critical situation for their living and livelihood as the project would not affect in any way the economic and social activity of the local people. Nevertheless, the equipment, vehicles and mass of labors used for the construction activities at the period of the construction, some noise, dusts and air pollution would evident which might cause disturbance among the locals people, permanent businessmen and community at large.

Indigenous community, Dalit and Janajati: Few indigenous people/community, hill & Terai dalit and muslim are reported residing within the surveyed area i.e. the area proposed for the new pump station. Most of the people won't have their own land within the vicinity of the project area. They would not have adverse impact due to installation of the new pump station but they would have the positive impact as they would have opportunity of the project connecting with the piped line water. They even would not lose any housing, strip of land, crops, trees and other fixed assets owned or controlled by them.

Heritage, customs and traditions: Except few religious temples along the roadside, no as such cultural heritage sites are confirmed. The project will not affect at any cost such roadside temples. Further, the project will not alter or undermine the people's local knowledge, customary behaviors or institutions. They are open to maintain distinctive customs and traditions and economic activities in their locality. No cultural integrity will be disturbed.

Influx of Outsider: Inflow of contractor's construction employees camping nearby the local community would elevate few risks on social, economic and communicable aspects. The threat of social security also cannot be ignored in the presence of the outsiders. Disturbance on the local socio-cultural environment due to the compelled interaction between locals (such as shops etc.) and outsiders is likely to affect the local social harmony. This might cause some disputes too. Sometimes the bartering between locals and outsiders during the shopping would also turn into the big disputes in the area.

Land Occupation: The new pumping site is proposed in the public land under Municipality's control. Currently, this land is being used of local residents for stockpiling their agriculture inputs as well as to hold their livestock temporarily. The occupation of this land for the pump station would prevent their free usage which might cause few temporary grievances.

Health Condition: During the construction period, the air pollution might cause irritation and respiratory discomfort to the local residents. Particularly, children and senior citizen, and residents with chronic respiratory syndromes might suffer from such cause severe than youngsters. Similarly the sound/noise pollution would rudely disturb to the local peoples/residents. The sounds at the night time even become much screamer than that of day which cruelly affects the sleep of people in the nearby areas. This might irritate them and also might have some different health problems. Water borne disease might affect the population in case the drinking water is contaminated by sewage lines and clogged drains. Possible drain clogging and water logging with increased sewage/waste water production and inadequate sewerage system will lead to foul smell and good mosquito breeding spots which may prove to be big nuisance for the city people. In addition to that too many mosquito breeding spots have numerous health consequences. Nearby flowing Singhiyahi river and Kesaliya River will have more flow of contaminated water because of additional waste water getting in from the city areas making them smelly which the local people will not appreciate.

Resettlement: No resettlement plan is required to this project.

Impact during the Operation Phase

Except some of the adverse impact anticipated during the construction period, the project won't give much negative impact at the operation phase. It would have a better opening for the people with having the hygienic water supply which might motivate them cleanliness of their surroundings too. This might open for employment generation, increase in income, skills enhancement, development of market/commercial center, appreciation of land value, women empowerment, enhancement to market activities etc.

Mitigation Measures

In overall, a nodal officer is suggested to nominate from the municipality to be solely engaged for addressing the grievances which likely to emerge from the locals throughout the project construction period. The locals might be defined as the local residents, shopkeepers, temporary

venders and so on. The officer would be responsible for collecting the possible grievances and forward it to the concerned authority for prompt response so that the proposed project would constructed smoothly without any major hassles. Further, it is also recommended that the BMC authority in association with the water supply office at Biratnagar should notify all the impacting people, business houses etc. about the construction of the project before the construction starts.

In order to control over the loss of housing, other asset like business and constraint on the walkways due to the excavation of road for laying the pipeline, the contractor should manage to use favorable options such as planking etc. At the same, the contractor should excavate in such a way that cause minimum damage. Similarly, if possible, recommend a prominent location for roadside temporary business for those who lose their daily income.

In order to safeguarding the people through screaming noise, air and dust pollution, not suggested to use high sounding equipment at night, sprinkle the water to control over the dust pollution. Establishment of small health desk board is suggested. Open up the skilled and unskilled labour employment opportunity if possible for the locals.

4.2 Biological Impacts

Impact during Construction Phase

Loss of open space: The baseline information reveals that there is no any sort of ecologically important species. Therefore there will be no harm in the ecology of the area. Open space in Tinpaini PS however was very small and used for parking usually, may be affected while transporting and piling the construction materials during construction phase.

Loss of vegetation and regeneration: Firstly, the felling of trees will be avoided while doing the construction work of pumping stations as per design. If it is unavoidable, the felling of selected trees, as marked and approved by divisional forest office, will be done (Maximum 50 trees from all site). There will be loss of grass species and regeneration in construction phase, which may be re-established during operation phase or in long run. Since, the project components require a very small area of land for implementation, environmental impacts on the vegetation and natural ecosystem don't seem to be significant. Thus, the project will have less or no impacts on floral diversity.

Impacts on fauna: As the working site is not directly connected with forest patches nearby and the permanent habitat of any mega-fauna was also not recorded, thus no major impacts are expected. Major structures will be built on relatively clear land which was not inhabited by any wildlife. However, some native animals' movement on the area, usually on the night, will be affected. And their movement on construction site, during working period will be affected.

Impacts on birds: From field visit, major bird species included in Least Concerned status in IUCN Red List were found to be common. Though most of them were native to the pumping site, their nest was not seen on the vicinity. However, PS of Munal Path was found to be the habitat of birds, for example, nests in the Bombax ceiba, which may be affected if tree had to be harvested during the construction phase. Similarly, reporting of Near Threatened bird species (*Ciconia episcopus*), a migratory bird, was also done during field visit, and there will be no direct impact in its habitat, however its movement may be affected while construction

work happen in the site. Also, the movement of workers and vehicles for transporting construction materials may affect the appearance of birds on the site.

Impacts on aesthetic value: The aesthetic value of the site during construction will not be appealing to eyes due to ongoing construction works, pile of construction materials, pile of construction waste, etc. in the site.

During Operation Phase:

Invasion of alien plant species: The cleared site during construction later may get covered by the invasive species like Mikania, Jalajambhu, Besaram, etc.

Mitigation Measures

Loss of open space: Raw materials required will be bought and brought at the time of its utility.

Loss of vegetation and regeneration: In condition to felling trees, individuals those who will be marked and approved by divisional forest office for removal, only be felled (Maximum of 50 from all site). As compensation to those felled trees, plantation of tree saplings at the ratio of 1:25 (minimum) must be done, i.e. for every tree cut down, 25 replacements must be planted to the proposed area. The site for re-plantation should be approved and mentioned prior. While replacements be made, introduction of exotic species should be discouraged and native species should be given priority.

Impacts on fauna: The movement of the fauna in the working site can be controlled by the fencing. As the movement of fauna to the site may be due to the leakage-water from the pumping station which may be alternatively supplied by constructing small water pond in nearby vicinity, outside the active working area.

Impacts on birds: Generally, there is practice of providing barriers of green curtain materials so that the movement of the birds will be checked entering into the construction site. The height of the barrier must be according to the height of flight made by the birds in the site.

Impacts on aesthetic value: (i) Raw materials required will be bought and brought at the time of its utility (ii) Construction site will be enclosed with barriers (green curtain material).

Invasion of alien plant species: One of the prominent mitigation measures for the invasion of alien species is cutting before its flowering stage. The cuttings after, can be dried and can be added to make a compost manure.

4.3 Physical Impacts

Impacts during the Construction phase

Land stability and erosion: Excavation works and diggings are essential during the construction period primarily to lay down pipelines, which might cause erosion and cave-ins thereby causing soil erosion, silt runoff and unsettling of street surfaces. Furthermore, unorganized disposal of the excavated earth can disturb the street surface and decrease the aesthetic and economic values of the area. These activities can cause disturbance and discomfort for road users and locals. Since the construction work will be carried out in the flat terrain, thus landslides are not expected. However, some erosion can be expected as the ground will be excavated in the

project area, thus, which can get eroded by water and wind. The impact is thus direct in nature, local in extent, high in magnitude and short term in duration.

Air pollution: Air pollution during construction period, mainly in the form of dust is expected. Dust will be generated from (i) earthworks such as clearing, grubbing, excavations, and drilling; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iii) transport, loading and unloading of natural aggregates; (iv) movement of construction-associated vehicles; and (v) on-site rock crushing and concrete mixing; (vi) burning of firewood for cooking and heating in work and labor camps. The air pollution is considered as one of the significant impacts in magnitude because it will affect the resident population as well as the dwellers, as the construction works will be carried in the heavily populated and market areas. The impact is thus indirect in nature, local to regional in extent, medium in magnitude and short term in duration. The excavation works are expected to disturb the drainage pattern, disturb local drains, and also create puddles, which will result in water logging. Since the project area is located in the Terai region, the water logging can become breeding ground for mosquitos increasing risk of fatal diseases like dengue.

The excavation works are expected to disturb the drainage pattern, disturb local drains, and also create puddles, which will result in water logging. Since the project area is located in the Terai region, the water logging can become breeding ground for mosquitos increasing risk of fatal diseases like dengue.

Noise: Noise is almost inevitable during the construction phase. It will be mainly coming from earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. Construction works will be carried out in the heavily populated area, thus, its impact is expected to be higher to the local population. Furthermore, its significance will be even higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Though the market area already have higher noise level, mainly contributed by traffic, the construction works and use of heavy vehicles will add noise. The noise will be more disturbing for local population if the construction works are carried out during the nights. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site. The comparative illustration of national standards versus WHO guidelines is in Table 11 of Section III. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

Pollution of the nearby water bodies: BMC has two rivers, namely Singiyahi and Kesaliya. These rivers are currently already in the polluted state, mainly once these rivers enter the BMC residential and market area. However, construction activities could further pollute them by: (i) poorly managed construction sediments, and waste materials; and (ii) poor sanitation practices of construction workers. The impact is thus direct in nature, local to local in extent, medium in magnitude and short term in duration.

Damage of local infrastructures: Construction works might damage local infrastructure, such as local road, drains, sewers pipelines, and compound walls of local houses. The project has provision of installing 117.5 km of pipelines of different sizes ranging between 12' dia. to 3' dia. The water pipelines are usually laid underground about 3 feet deep, so existing roads and streets will have to be dug to lay those water pipes. Thus about 117.5 km of trenches in roads and streets and foot-paths will have to be dug along the proposed alignments to lay those pipes.

The width of the trenches that will have to be dug will be about 2 feet to accommodate the pipes and give needed spaces for the concerned workers to work on them. The width and depth of the trenches may vary a little bit as per the sizes of the pipes and situation of the roads/streets.

Sewer lines and road drains have been constructed in many parts of Biratnagar city, most of which are laid underground along and in the roads/streets. Hence there are lot of possibilities that constructions of water pipelines and other related necessary structures like air valve chambers, sluice valve chambers may come across those existing many sewer lines and road drains, and they may get damaged to some degrees.

While digging trenches for the pipelines or pits for appurtenances like air valve chambers or sluice valve chambers in the footpaths or in narrow roads/streets, the nearby/adjoining boundary walls of private and public properties may get damaged by caving- in of their foundations in spite of all the possible precautionary measures.

NTC and NEA both are trying to replace pole held overhead transmission cables and wires based service delivery system by service through transmission cables and wires held in underground plastic conduits. These conduits are also usually buried underground about 3 feet deep and there are chambers with manholes at different places for regular maintenance purposes. Hence there are possibilities that digging trenches for water pipes along the roads/streets may damage those underground conduits holding cables or wires and the appurtenance chambers built for maintenance inspite of all the efforts to avoid that type of incidents. In case such damages happen they should be repaired immediately.

Generation of spoil and solid waste: The construction will generate spoil from the excavations. The solid waste will also be generated from the workers. These need to be collected and disposed safely; otherwise, these will create sanitary issue. This is particularly sensitive as the construction will be carried out in the populated areas.

Impact during Operation Phase

Ground water depletion: The ground water recharge in the Biratnagar region is strong fed by Sapta Koshi River system as well as Siwalik range, the possibility of ground water depletion needs to be explored as a possible impact during operation of the system.

Water quality of Singhiyahi and Kesaliya: More waste water/sewage will be generated/produced as more water will be consumed by the city population, thus in absence of adequate proper sewerage system and treatment system, high possibility of water logging due to clogged drains leading to foul smells and good mosquito breeding spots. The quantity of sewage will increase with the increased water supply. The sewage will finally be disposed in to Singhiyahi and Kesaliya rivers, degrading their water quality.

Mitigation Measures

Most cost effective and pragmatic mitigation and enhancement measures for all perceived adverse impacts of the identified environmental issues for construction and operation phases shall be identified to minimize the adverse environmental impacts and maximize the beneficial ones.

Prevention/minimization of erosion: During the construction, precautionary measures will be taken to prevent and/or minimize erosion. Proper backfilling trenches will be done. Temporary

access, diversions, and signboards for pedestrians will be provided. The exposed soil will be stabilized and revegetated to prevent further soil erosion.

Prevention/minimize air pollution: The following measures will be carried out to prevent and/or minimize air pollution:

- a. confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- b. watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- c. if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- d. during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- e. place signage at active work sites in populated areas;
- f. requiring trucks delivering aggregates and cement to have tarpaulin cover;
- g. limiting speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
- h. prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- i. use of vehicles complying with Nepal Vehicle Mass Emission Standards (NVMES), 2069 enforcement, and green sticker standards; and
- j. prohibit open burning of solid waste.

The following air quality standards shall be maintained in the project area:

Table 56: Ambient air quality standards

Parameter	Averaging period ¹⁶	Nepal's ambient air quality standard, 2003 ¹⁷ [$\mu\text{g}/\text{m}^3$]	WHO air quality guidelines		Standard value to be followed by the project
			Global Update 2005	Second Edition 2000	
TSP	Annual	-	-	-	-
	24 hour	230	-	-	230
PM ₁₀	Annual	-	20	-	20
	24 hour	120	50	-	50
PM _{2.5}	Annual	-	10	-	10
	24 hour	-	25	-	25
SO ₂	Annual	50	-	-	50
	24 hour	70	20	-	20
	10 min	-	500	-	500
NO ₂	Annual	40	40	-	40
	24 hour	80	-	-	80
	1 hour	-	200	-	200
CO	8 hour	10,000	-	10,000	10,000

¹⁶ Due to short term duration of the civil works, the shortest period will be more practical to use.

	15 min	100,000	-	100,000	100,000
Pb	Annual	0.5	-	0.5	0.5
Benzene	Annual	20	-	-	20

Minimization of noise level: The following measures will be carried out to minimize the noise coming from the construction works

- using equipment that emits the least noise, well-maintained and with efficient mufflers;
- restricting noisy activities to day time;
- avoiding use of noisy equipment or doing noisy works at night time;
- limit engine idling to a maximum of one minute;
- spread out the schedule of material, spoil and waste transport; and
- minimizing drop heights when loading and unloading coarse aggregates.

The standard for the noise level will be followed, according to which noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site. The comparative illustration of national standards versus WHO guidelines is presented below

Table 57: Noise standards

Receptor	National Noise Standard Guidelines, 2012 [dB] ¹⁸		WHO Guidelines Value for Noise Level Measured Out Doors [One house LA _q in dBA] ¹⁹		Standard values to be followed by the project [dB] ²⁰	
	Day	Night	07:00 - 22:00	22:00 – 7:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55			65	55
Rural residential area	45	40	55	45	45	40
Urban residential area	55	50	55	45	55	45
Mixed residential area	63	55	55	45	55	45
Quiet area	50	40			50	40
Water pump	65	65			65	65
Diesel generator	90	90			90	90

¹⁸ Environmental Protection Act 2020 (as implementing rules on noise standard guidelines)

¹⁹ Guidelines for Community Noise, WHO, 1999.

²⁰ If less stringent levels or measures are appropriate in view of specific project circumstances, the project office will provide full and detailed justification for any proposed alternatives.

Prevention/minimization of pollution of the water bodies is maintained by;

- a. excess spoils will be disposed is designated spoil disposal sites
- b. locating temporary storage areas on flat grounds at safe distance from main surface drainage routes;
- c. shielding temporary storage areas with sandbags; and
- d. providing adequate water supply and sanitation facilities at work sites.

For management and final disposal of solid wastes following mitigation, measures that will be applied are:

- a. collection of recyclable solid wastes and supply to scrap vendors
- b. ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water.
- c. establishment of separate bounded areas for the collection and storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site
- d. collection of biodegradable wastes in separate vessels and transfer to municipal waste disposal system.
- e. application of various waste disposal systems for diverse wastes produced on site as per consultations with environmentalists.

Minimize damage to local infrastructures: Installing of the pipeline will damage roads/footpaths. The roads in BMC are blacktopped with the foot-paths on the both sides of the roads/streets. Care will be taken to lay the water pipes in the side foot-paths as far as possible to avoid any disturbance to traffic along the roads/streets. The dug roads/streets will be immediately backfilled once the pipe laying work is complete in each of them. However the complete reinstatement work may take some time (usually not more than a year) as the concerned contractor may wait for the newly backfilled soil/earth in the trenches to get compacted and also wait until constructions of air valve chambers/slucice valve chamber are not fully done. In case of blacktopped or cemented roads/streets the complete reinstatement work may take some more time/even 2-3 years depending on the completion time given to the concerned contractor/s.

The water pipelines may criss-cross the sewer pipes/drains. Usually the sewer lines are laid deeper than 3 feet as per need to gain enough slope/grade, so in such cases there may not be any damage except in the cases of manholes where due precautionary measures will have to be done to avoid any damage or minimum damage. However the road drains and other open drains constructed to dispose the rain/storm water may get damaged in some cases while digging trenches for water pipes. These will have to be repaired instantly once the water pipes are laid.

If the boundary walls of other private structures are damaged during the construction, these need to be reinstated as soon as possible by the project without causing any loss to the owners. In case there are losses to the owners, they should be compensated fully at the earliest.

Table 58: Summary of Socio-Economic Impacts

SN	Description of Impact	Magnitude		Extent		Duration		Significant
	Construction phase							
1	Loss of housing, other assets, resources use	Minor	10	Site Specific	10	Short Term	5	25
2	Land Use, Agricultural lands, Cropping Pattern	Minor	10	Site Specific	10	Short Term	5	25
3	Loss of access to facilities, services, or natural resources	Minor	10	Local	20	Short Term	5	35
4	Living and Livelihood	Minor	10	Local	20	Short Term	5	35
5	Indigenous community, Dalit and Janajati	Minor	10	Local	20	Short Term	5	35
6	Heritage, customs and traditions	Minor	10	Local	20	Short Term	5	35
7	Influx of Outsider	Moderate	20	Local	20	Short Term	5	45
8	Land Occupation	Minor	10	Site Specific	10	Short Term	5	25
9	Health Condition	Minor	10	Local	20	Short Term	5	35
10	Resettlement	Minor	10	Site Specific	10	Short Term	5	25
	Operation phase							
1	Beneficial Impact	Moderate	20	Local	20	Medium Term	10	50

Table 59: Summary of Biological Impacts

SN	Description of Impact	Magnitude		Extent		Duration		Significance
	Construction phase							
1	Loss of open space	Minor	10	Site Specific	10	Short Term	5	25
2	Loss of vegetation and regeneration	Moderate	20	Site Specific	10	Short Term	5	35
3	Impacts on fauna	Minor	10	Site Specific	10	Short Term	5	25
4	Impacts on birds	Minor	10	Local	20	Short Term	5	35
5	Impacts on aesthetic value	Minor	10	Site Specific	10	Short Term	5	25
	Operation phase							
1	Invasion of alien plant species	Minor	10	Local	20	Short Term	5	35

Table 60: Summary of Physical Impacts

SN	Description of Impact	Magnitude		Extent		Duration		Significance
	Construction phase							
1	Land instability and erosion	Minor	10	Site Specific	10	Short Term	5	25
2	Air pollution	High	60	Local	20	Short Term	5	85
3	Water logging	High	60	Local	20	Short Term	5	85
4	Change in land use	Minor	10	Site Specific	10	Long term	20	40
5	Noise pollution	High	60	Local	20	Short Term	5	85
6	Water pollution	Medium	20	Local	20	Short Term	5	45
7	Damage to existing infrastructures	High	60	Local	20	Short Term	5	85
8	Spoil and solid waste generation	High	60	Local	20	Short Term	5	85
	Operation phase							
1	Ground water depletion	Minor	10	Local	20	Medium Term	10	40
2	Poor sewage unable to manage increased water consumption and disposal	Minor	10	Local	20	Medium Term	10	40
3	Water degradation on Singhiliya and Keshaliya River due to increased disposal of water	Minor	10	Local	20	Medium Term	10	40

5 ANALYSIS OF ALTERNATIVES

5.1 No Project

With no new project designs proposed and no new operation procedures, the stress on the existing water supply would be inadequate and of poor quality. This could further escalate the adverse effects on the health of the residents which could get worse due to constant increase in population. Furthermore, shortfall of safe drinking water will continue and will rather go on increasing as time will pass with continuous growth in population. This will lead to increase in adverse effects on health of the city population.

5.2 Project Location

An alternative source of water supply to the metropolitan city, that is from nearby Singiyahi and Kesaliya river is an alternative to the project. However, not much water is available in the sources. The water is of very poor quality and not very reliable during the dry season. With the need of robust intake structures, there needs to be an lookout on these rivers for flooding during the rainy season. Similarly, there is also the necessity of pumping stations, new water pump lines, power transmission lines and standby power generators for this particular alternative. For the treatment of water, an effective water treatment plant needs to be in operation with numerous pump stations and overhead reservoirs along with necessary water transmission lines and distribution lines.

Studying for the alternative for procedure of operation, the water from the two rivers will be pumped for needful treatment to treatment plants located nearby surface reservoirs as the treated water will be pumped to the overhead reservoirs for distribution. If these changes are to be adapted to the project, additional time will be needed for the project as there are more physical structures to be constructed and more raw materials like aggregates and sand will be needed for the construction of related physical structures which needs to be brought from far away quarries and sand mines/rivers.

The project might make more safe water available to the city population which will have good effect on the health condition of the local people. However, there will be the need to acquire land for the purpose of construction of treatment plants and surface reservoirs. This alternative might not have a direct impact on the critical wildlife habitat and protected species, but the reduced flow in both of the rivers will have adverse effects on the fish life in the downstream of the river.

Both of the rivers have very limited water flow in the dry season, hence water supply on these will drastically reduce the flow in the downstream which will have considerable adverse effects on the fish culture and on other river water related human activities in the downstream. In the rainy season, there is severe flooding in the rivers thus needing very robust intake structures.

5.3 Alternative Source of Project

Studying for the alternative source of water supply from Koshi River to the project area has been conducted. In terms of the project design, technology and site; abundant water will be available to the beneficiaries as it is a big river. However, the location being very far that is around 30 km from Biratnagar city will emphasize the need of pump stations to be constructed at different points/locations to pump the river water. Similarly, the project will need robust intake structure to be constructed (to survive the frequent flood conditions) and a full-fledged

treatment plant to treat water pumped all the way from the source (water mostly laden with silt and dirt most of the time). The need of long water pumping transmission and distribution lines, surface and overhead reservoirs will be crucial which will further increase the time schedule of the project as there are more physical structures to be constructed. Similarly, more raw materials like aggregates and sand will be needed for construction of the related physical structures which will be brought from far away quarries and sand mines/rivers. Similarly, the project will also need the acquisition of productive land for the construction of pump stations at different locations and some land for the treatment plants, surface reservoirs and over-head tanks. Though there is abundant water in Koshi river, it is very far from the project area and water will have to be pumped with booster pumps at several places. The water is mostly laden with silt and mud and thus an effective treatment system/plant will have to be provided. With long transmission pipeline and multi stage pumping, the project will be relatively an expensive one.

6 ENVIRONMENT MONITORING PLAN

6.1 Institutional Arrangement

6.1.1 Project Management Office

Department of Water Supply (DSS) will be the executive agency, which will establish a Project Management Office (PMO) for the project. PMO will be responsible for overall planning, management, implementation, monitoring and reporting of the project.

The project officer (Environment) will be engaged in PMO to ensure implementation of environmental safeguards. He/she will be responsible for:

- a. Review and confirm existing IEEs and EMPs are updated based on detailed designs;
- b. Ensure that EMPs are included in bidding documents and civil works contracts;
- c. Provide insights on environmental management aspects of the project to ensure EMPs are implemented;
- d. Establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- e. Facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- f. Supervise and provide guidance necessary to properly carry out the environmental monitoring and assessments;
- g. Review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;
- h. Consolidate monthly environmental monitoring report;
- i. Ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;
- j. Assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns
- k. Address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
- l. Undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
- m. organize periodic capacity building and training programs on safeguards for project stakeholders.

6.1.2 Project Management and Quality Assurance Consultant.

The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas. The detailed TORs are in the PAM:

- a. Ensure that the quality of the designs and construction of all water supply and sanitation components implemented under the project are to the required standards; and
- b. Assist the PMO with the overall planning, implementation and monitoring of the project during all stages of implementation including adherence to all environmental and social safeguards' requirements.

6.1.3 Civil Works Contracts and Contractors

The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The

contractor will be required to submit to PMO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP. The contractor will be required to undertake day to day monitoring and report to the PMO.

A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions.

The PMO will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

6.2 Mitigation Measures

Most cost effective and pragmatic mitigation and enhancement measures for all perceived adverse impacts of the identified environmental issues for construction and operation phases shall be identified to minimize the adverse environmental impacts and maximize the beneficial ones. A mitigation and enhancement matrix shall be prepared for construction and operation phases showing environmental issues, impacts, mitigation commitments to address the impact, agency responsible for implementation, implementation schedule and mitigation costs in tabular matrix. Furthermore, the following shall be also considered:

- Enhancement measures shall be proposed for heightening benefits accrued from the project: required fund shall be allotted to realize the intended enhancement. Any activities/measures proposed for the enhancement of living-living standard / quality of life/functioning or performance of local institutions shall be separately discussed under Corporate Social Responsibility (CSR);
- The Proponent shall also review the responsibilities of the local, district and central level institutions and those affected by the project construction and propose steps to ensure necessary coordination during the project implementation;
- Awareness and training programs described in the report shall include sufficient detail to cover the target group, frequency and program conductor. Allocated cost for such program shall justify the proposed activities;
- The cost for mitigation and enhancement measures shall be provided separately according to construction and operation stages for physical environment, biological environment and socioeconomic and cultural environment;
- Those mitigation measures that can be or are part of contractual obligation for project construction shall be clearly identified. Mechanisms of ensuring implementation of those mitigation measures as compliance of contractors shall be proposed;
- Organization chart for implementation of mitigation measures, with a clear provision of mitigation and monitoring unit, shall be proposed;

Management of muck and spoil disposal sites shall be proposed considering on matters like spoil/muck volume and its weight, topography, slope stability of proposed sites, depth of overburden, rock mass properties, and likelihood of generating new slides. Disposal site shall be planned with drainage facilities.

6.3 Mitigation Measure

An EMP includes mitigation measures to reduce all negative impacts to the acceptable levels. The EMP will guide the environmentally-sound construction of the project and ensure efficient lines of communication between PMO, consultants and contractors. The EMP will

- a. ensure that the activities are undertaken in a responsible non-detrimental manner;
- b. provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site;
- c. guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject;
- d. detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and
- e. ensure that safety recommendations are complied with.

The contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved EMP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE, EMP and site-specific EMP (SEMP). The contractor shall allocate budget for compliance with these IEE, EMP and SEMPER measures, requirements and actions. The contractor will be required to submit, for review and approval, a SEMPER including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program as per EMP. No works can commence prior to approval of SEMPER.

6.3.1 Prevention/minimization of erosion

During the construction, precautionary measures will be taken to prevent and/or minimize erosion. Proper backfilling trenches will be done. Temporary access, diversions, and signboards for pedestrians will be provided. The exposed soil will be stabilized and revegetated to prevent further soil erosion.

6.3.2 Prevention/minimize air pollution

The following measures will be carried out to prevent and/or minimize air pollution:

- a. confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- b. watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- c. if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces;
- d. during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- e. place signage at active work sites in populated areas;
- f. requiring trucks delivering aggregates and cement to have tarpaulin cover;
- g. limiting speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
- h. prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- i. use of vehicles complying with Nepal Vehicle Mass Emission Standards (NVMES), 2069 enforcement, and green sticker standards; and
- j. prohibit open burning of solid waste.

The following air quality standards shall be maintained in the project area:

Table 61: Ambient air quality standards

Parameter	Averaging period ²¹	Nepal's ambient air quality standard, 2003 ²² [$\mu\text{g}/\text{m}^3$]	WHO air quality guidelines		Standard value to be followed by the project
			Global Update 2005	Second Edition 2000	
TSP	Annual	-	-	-	-
	24 hour	230	-	-	230
PM ₁₀	Annual	-	20	-	20
	24 hour	120	50	-	50
PM _{2.5}	Annual	-	10	-	10
	24 hour	-	25	-	25
SO ₂	Annual	50	-	-	50
	24 hour	70	20	-	20
	10 min	-	500	-	500
NO ₂	Annual	40	40	-	40
	24 hour	80	-	-	80
	1 hour	-	200	-	200
CO	8 hour	10,000	-	10,000	10,000
	15 min	100,000	-	100,000	100,000
Pb	Annual	0.5	-	0.5	0.5
Benzene	Annual	20	-	-	20

6.3.3 Minimization of noise level

The following measures will be carried out to minimize the noise coming from the construction works

- using equipment that emits the least noise, well-maintained and with efficient mufflers;
- restricting noisy activities to day time;
- avoiding use of noisy equipment or doing noisy works at night time;
- limit engine idling to a maximum of one minute;
- spread out the schedule of material, spoil and waste transport; and
- minimizing drop heights when loading and unloading coarse aggregates.

The standard for the noise level will be followed, according to which noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site. The comparative illustration of national standards versus WHO guidelines is presented below:

²¹ Due to short term duration of the civil works, the shortest period will be more practical to use.

Table 62: Noise standards

Receptor	National Noise Standard Guidelines, 2012 [dB] ²³		WHO Guidelines Value for Noise Level Measured Out Doors [One house LA _q in dBA) ²⁴		Standard values to be followed by the project [dB] ²⁵	
	Day	Night	07:00 - 22:00	22:00 – 7:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55			65	55
Rural residential area	45	40	55	45	45	40
Urban residential area	55	50	55	45	55	45
Mixed residential area	63	55	55	45	55	45
Quiet area	50	40			50	40
Water pump	65	65			65	65
Diesel generator	90	90			90	90

6.3.4 Prevention/minimization of pollution of the water bodies

- excess spoils will be disposed is designated spoil disposal sites
- locating temporary storage areas on flat grounds at safe distance from main surface drainage routes;
- shielding temporary storage areas with sandbags; and
- providing adequate water supply and sanitation facilities at work sites.

For management and final disposal of solid wastes following mitigation, measures that will be applied are:

- collection of recyclable solid wastes and supply to scrap vendors
- ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water.
- establishment of separate bounded areas for the collection and storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site
- collection of biodegradable wastes in separate vessels and transfer to municipal waste disposal system.
- application of various waste disposal systems for diverse wastes produced on site as per consultations with environmentalists.

6.3.5 Minimize damage to local infrastructures

Installing of the pipeline will damage roads/footpaths. The roads in BMC are blacktopped with the foot-paths on the both sides of the roads/streets. Care will be taken to lay the water pipes in the side foot-paths as far as possible to avoid any disturbance to traffic along the roads/streets. The dug roads/streets will be immediately backfilled once the pipe laying work is complete in each of them. However the complete reinstatement work may take some time

²³ Environmental Protection Act 2020 (as implementing rules on noise standard guidelines)

²⁴ Guidelines for Community Noise, WHO, 1999.

²⁵ If less stringent levels or measures are appropriate in view of specific project circumstances, the project office will provide full and detailed justification for any proposed alternatives.

(usually not more than a year) as the concerned contractor may wait for the newly backfilled soil/earth in the trenches to get compacted and also wait until constructions of air valve chambers/sludge valve chamber are not fully done. In case of blacktopped or cemented roads/streets the complete reinstatement work may take some more time/even 2-3 years depending on the completion time given to the concerned contractor/s.

The water pipelines may criss-cross the sewer pipes/drains. Usually the sewer lines are laid deeper than 3 feet as per need to gain enough slope/grade, so in such cases there may not be any damage except in the cases of manholes where due precautionary measures will have to be done to avoid any damage or minimum damage. However the road drains and other open drains constructed to dispose the rain/storm water may get damaged in some cases while digging trenches for water pipes. These will have to be repaired instantly once the water pipes are laid. If the boundary walls of other private structures are damaged during the construction, these need to be reinstated as soon as possible by the project without causing any loss to the owners. In case there are losses to the owners, they should be compensated fully at the earliest.

6.3.6 Pressure on the Ground Water Resources

It is important to keep updated records of the water extracted from the pumping stations, including the status of water discharge in nearby wells and hand pumps. Though the Terai region has large overall aquifer, local ground water table might get affected by the pumping stations. This has to be continuously monitored on one hand, on the other if the drying of the water is recorded, the project will compensate by providing the water to the users of those well and pumps.

6.3.7 Water quality of Singhiyahi and Kesaliya

The BMC has to consider expansion of sewage coverage in the city so that it can trap the increased waste water. It is important for Biratnagar, as water logging is common issue in Terai region, which provide breeding ground for water borne diseases. In order to prevent these, sewage system has to be improved. Furthermore, the waste water treatment facility of BMC has to be upgraded as well to accommodate the additional waste water. And lastly, regular water quality monitoring of the Keshaliya and Singhaniya rivers shall be conducted to keep track of their pollution level.

Table 63: Environment Management Plan

Field	Enhancement/ Mitigation measures	Locati on	Responsible for implementation	Require resources			Monitoring
				Human resources	Time	Estimate d cost	
Preconstruction Activities							
Consents, permits, clearances, no objection certificate, etc.	Obtain all of the necessary consents, permits, clearance, NOCs etc. before the start of civil works. Include in detailed design drawings and documents all conditions and provisions if necessary.	BMC	PMO and design, supervision and management consultants	Environment al Officer		NA	Documentation of the consent, permits, clearance, NOCs, and detailed designs
Disruption of services of existing utilities	Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction.	BMC	PMO	Environment al Officer		NA	List of affected utilities, and operators, Bid document to include a requirement for contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours.
Drinking water supply	Provision of water treatment plant to meet satisfactory water quality with the intake being at least 30m upstream from sanitation facilities. Also “housed” dosing unit with ventilation for chlorine and training operators for handling chlorine.	BMC	PMO and design, supervision and management consultants	Environment al Officer		NA	Incorporated in the final design and should be communicated to the contractors

Construction work camps, stockpile areas, storage areas, and disposal areas	Determine locations before award of construction contracts	BMC	PMO and design, supervision and management consultants			NA	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land.
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution. Follow the principle of “Reduce, Reuse, Recycle, and Recover” with measures such as the prohibition of unwanted littering and discharge of waste, Solid waste management in a pit or disposed in municipal collection system	BMC	PMO and design, supervision and management consultants	Environmental Officer		NA	Visual inspection

Quality of ambient air, surface water bodies, and noise	Construction activities and construction camps can impact the ambient quality of air, quality of surface water bodies, and level of noise in the areas of works. Baseline data gathering for ambient air, surface water quality and noise level at all construction sites. Comparison of the results with environmental quality monitoring during construction and O&M phases with these baseline data to determine any negative impact.	BMC	PMO and design, supervision and management consultants	Environmental Officer		NA	Results of laboratory analyses
Construction Activities							
Physical Environment							
Topography, landforms, geology, and soils	Sand, gravel or crushed stone will be required for this project. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land). The project will utilize readily available sources with environmental clearance and license. The project will use the raw materials from alternative sources.	BMC	PMO, Contractor				Records of sources of materials

Water quality	Trenching and excavation, run-off from stockpiled materials and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water. Spoils management plan will comply with the reuse of excess spoils and materials, disposal sites will be designated areas. Also, earthwork will be conducted during dry season and the stockyards will be at least 300m away from watercourses. Fuel storage area will be away from water drainage and precautions will be taken to minimize the overuse of water	BMC	Contractor	Environmental Officer		NA	Areas for stockpiles with storage of fuels and lubricants and waste materials are to be monitored. The number of silt traps installed along trenches leading to water bodies should be controlled with no visible degradation to nearby drainage, water bodies due to construction activities. Also visual inspection by regional PMOs and Environmental officers on weekly basis. The frequency and sampling sites should be finalized during detailed design and final location of projects components.
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Air quality	Construction work at the dry season and transporting construction materials may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in air environment. Use of physical controls, sprays, covers, compaction, screening, enclosure, windbreaks, binders and road surfacing along with some measures to taken such as covering of delivery trucks during transportation, construction vehicle's speed to be limited to 30kph, use of vehicles complying with NVMES, 2069. Also prohibition of open burning of solid waste and minimizing the stockpile height are to be followed.	BMC	Construction / Contractor				Location of stockpiles along with the number of complaints from sensitive receptors is to be monitored. A certification that vehicles are compliant with air quality standards and the heavy equipment and machinery with air pollution control devices need to be monitored.
Noise Quality	Temporary increase in noise level and vibrations by excavation equipment, and the transportation of materials, equipment and people. However, the proposed project will follow ROW alignment along with the preparation of work schedule with community consultation and local administration. Measured such as minimize drop heights, no horns until necessary, use of modern vehicles and machinery with low noise emissions while maintain low noise levels. Also warning signs in noise hazard areas need to be	BMC	Contractor				Number of complaints from sensitive receptors and the use of silencers in noise-producing equipment and sound barriers or acoustic housing need to be incorporated along with the monitoring of equivalent day and night time noise levels.

	incorporated. Workers must wear hearing protection and identification of vibration risk to nearby structures with maintaining caution working in such areas.						
Biological Environment							
Biodiversity	Activities in WUSC acquired area. There are no protected areas that will be impacted in or around project sites. Felled trees will be replaced by compensatory plantation at minimum 1:25 ratio i.e., for every tree cut down, 25 replacements must be planted.	BMC	Contractor				PIU and PMO to report in writing the number of trees cut and planted if any (during detailed design stage). Some complaints need to be monitored from sensitive receptors on disturbance of vegetation, poaching fishing, etc.
Social Environment							
Existing provisions for pedestrians and other forms of transport	The road closure is not anticipated. Hauling of construction materials and operation of equipment onsite can cause traffic problems. However, the proposed project will follow ROW alignment. Preparation of suitable transportation routes with safe passage for vehicles and pedestrians, schedule material deliveries on low traffic, erect and maintain barricades if required and the completion of work quickly nearby	BMC	Construction Contractor				Traffic route during construction works, including number of permanent signs, barricades, and flagmen on worksite need to be monitored along with the number of complaints from sensitive receptors and

	institution, place of worship, business, hospitals, and schools along with the restoration of damaged properties and utilities (if any).						placement of signage at the project location.
Socioeconomic status	Staffing will be required during construction which can result in an increase in local revenue. So, engagement of the local workforce and secure construction materials from the local market.	BMC	Construction Contractor				Record of employment and sources of materials to comply with Nepal Labor Act (1992) and district wages
Other amenities for community welfare	Civil works may result in an impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage infrastructure located alongside the roads. Identification of location and nature of existing infrastructure before excavation to minimize repeated disturbance to locals by integrating other forms of infrastructures. Also, informing local about nature, duration and possible impacts of the construction and integrate their concerns and prompt relocation of infrastructure materials along with prior permission from local authority for water use are some of the measures to be taken into account.	BMC					Contingency Plan and Utilities management and monitoring the number of complaints from sensitive receptors

Community health and safety	Construction works will impede the access of residents and business in limited cases. Measures such as identification of stockyard areas in consultation with local administration, working on private land with written permission of landowners and the PMOs, working with small mechanical excavator for trenching and constructing gender friendly toilets for workers with the prohibition of alcohol and drugs on site are some of the mitigating measures. Similarly, following the code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work along with the maintenance of a complaint logbook in workers camp with prompt action of complaints is to be followed during the time period.	BMC	Contractor				The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at the project location Agreement between landowner and contractors in case of using private land as work camps storage areas etc.
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Workers Health and Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works. Comply Labor Act (1992) of Government of Nepal where there is the need to follow the instructions stated below; - Train all site personnel on environmental health and safety - Exclude public from worksites - Provide personal protective equipment to workers and ensure their effective usage - Document procedures to be followed for site activities; and - Maintain accident reports and records. - Make first aid kits readily available - Maintain hygienic accommodation in work camps. - Ensure uncontaminated water for drinking, cooking and washing, - Assure clean eating areas - Make sure sanitation facilities are readily available - Provide medical insurance coverage for workers; Provide orientation for guest visitors - Ensure that visitors do not enter	BMC	Contractor				Site –Specific H&S plan Equipped first-aid stations Medical insurance coverage for workers Number of accidents Records of supply of uncontaminated water Condition of eating areas of workers Record of H&S orientation training Availability of personal protective equipment at construction site % of moving equipment outfitted with audible back- up alarms Signage for storage and disposal areas Condition of sanitation facilities for workers
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	hazard areas unescorted; - Require workers to wear high visibility clothes - Ensure moving equipment is outfitted with audible backup alarms; - Chemical and material storage areas need to be marked clearly - Hearing protection equipment enforced in noisy environment						
Physical and cultural heritage	There are no archaeological, paleontological, or architectural sites of significance listed by local, national authority and (UNESCO). Stop work immediately to allow further investigation if any findings are suspected.	BMC	Contractor				Records of chance finds
Operation activities							
Damage due to debris, spoils, excess construction materials	Removal of spoils wreckage, rubbish, or temporary structures which are no longer required; All excavated roads shall be reinstated to original condition. All disrupted utilities should be restored; All affected structures are to be rehabilitated /compensated and the construction camp needs to clear of spills e.g. oil, paint, etc. and other pollutants after dismantling. Furthermore, all hardened surfaces shall be ripped; all imported materials shall be removed and all temporary	BMC	Contractor				PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.

	services shall be cancelled with a request to the PMO in writing that worksites and camps are vacated and restored to pre-project conditions.						
Drinking water supply system	To avoid the delivery of unsafe water preparation of operations and maintenance plan should be done. Proper handling and storage of calcium Hypochlorite with ensure qualified persons to handle disinfection, safe storage of chemicals. Ensure capacity of WUSC to implement quick response to hazardous chemical spills and implement SPS-complaint with an EMP and a water safety plan and monitor the water quality.	BMC	PMO and design, supervision and management consultants	Environmental Officer			Water Quality reports WTP records in the log book
Mishandling of chlorine	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion results in irritation of the esophagus, a burning sensation in the mouth and throat, and spontaneous vomiting. Ensure proper storage and handling practices for chemicals along with assurance of a knowledgeable and skilled person in charge of chlorine handling. Also, there is a need to ensure the use of PPE while using chemicals and use of chlorine as per WHO guideline.	BMC	PMO and design, supervision and management consultants	Environmental Officer			Water quality test

7 PUBLIC HEARING

The EPR 2020 stipulates undertaking of public hearing as one of the mandatory requirements of the IEE process. A community level consultation public hearing was organized for the proposed pumping station to fulfil the EPR 2020 requirement. The public hearing also served to bring together the proponent and affected stakeholders in a forum to express their opinions and offer suggestions on a proposed undertaking in order to assist the decision-making process. Thus, the public hearings for the proposed pumping station was organized to:

- Inform local communities in the project area about the findings and outcomes of the IEE study of the rehabilitation of the pumping stations and the installing the new pumping station.
- consult the potential project affected families and other stakeholders on the issues dealt by the IEE study; and
- provide an official forum for the affected families and other stakeholders to express their concerns, opinions and suggestions on the issues dealt by the IEE report, and/or on any other outstanding issues.

Total 26 stakeholders participated in public hearing.

Table 64: Schedule of public hearings is presented below

SN	Level	Location	Date	Total number of participants	Project impact
1	Community level.	Shiddhakali Aadharbhoot Bidhyalaya, Kulaharuwa, Ward No 5	Bhadra 20, 2078	26	New Pumping station to be built

7.1 PUBLIC DISCLOSURE

The following documents were disclosed for the public hearing.

- Project brochure
- IEE executive summary in Nepali
- The main purpose of the above disclosure materials was to adequately inform the stakeholders of the IEE findings. These documents covered the essence of the IEE report in simple language.

7.2 PUBLIC HEARING PROCEDURES

Preparation for the Public Hearing

The announcement was made on the disclosure of the summary of the draft IEE Report in Nepali as well as the dates of public hearings and national workshops in the national daily “Gorkhapatra” on 13th Bhadra, 2078 (August 29th, 2021).

The IEE summary in Nepali with a cover letter was delivered to the project affected municipalities and affected ward offices, community organisations, women groups, local NGOs. The cover letter made a request to the stakeholders for providing their comments and suggestions as well as to participate in the public hearings. The letter and their confirmation of receiving by stakeholders are given in Annex. The names of the stakeholders at district and municipality/wards are shown in Annex.

Notification of the Public Hearing

The affected families and concerned stakeholders were notified about the undertaking of public hearing program through;

- invitation letters to the concerned stakeholders,
- pasting of public notice in the project affected municipalities and wards, and
- announcements in public media.

Invitation for the public hearing: The concerned stakeholders were formally invited for the public hearing with the invitation letter. The invitation letter along with the Summary IEE report were hand delivered to the invitees.

Pasting of the public hearing notice: The notice of the public hearing were also pasted in the project affected area. The notice was pasted at the public places like – ward office, schools, health posts and sub-health posts, offices of forest users groups, *etc.* The letter confirming pasting of the notice by these offices are attached in the Annex.

Announcement in Public Media: The public hearing notice was published in the national daily and local daily which were used to inform local population of the project area about the details of the public hearing.

The brochures were distributed on the day of the public hearings.

Shiddhakali Aadharbhoot Bidhyalaya Public Hearing

The Shiddhakali Aadharbhoot Bidhyalaya Public Hearing was attended by 26 participants from project influenced ward; Ward No 5 of Biratnagar metropolitan city. The attendance of participants has been presented in Annex. The participants included farmers, teachers, students, NGOs, CBOs, businessmen, servicemen, forest user groups, government organizations, indigenous community, women, youths and representatives from district and VDC level political parties.

Type: Public Consultation and Information Meetings

Subject of Consultation: Presentation of the proposed project and soliciting opinions of stakeholders.

Date: 20th Bhadra, 2078. (5th September, 2021)

Location: Shiddhakali Aadharbhoot Bidhyalaya, Kulaharuwa, Ward No 5, Biratnagar

Time Duration: 10: 00 AM to 12:00 noon

Total Participants: 26 (Male-14 & Female-12)

Purpose of Consultation and Issues/themes covered:

The main purpose of this public consultation was to provide information about the proposed project to the project affected people and the institutions located within the project area, create friendly environment so that the participants discuss about the positive and negative impacts due project implementation among the participants and with the IEE Team, and to collect the major environmental impacts, issues and recommended mitigation measures as foreseen by the project people.

Targeted Stakeholders: Local communities, Project Affected People, NGO, Co-operatives, and other institutions located in the project area

Institutions/firms and individuals involved in communicating: IEE consultant team, Nepal Khanepaani Sansthan Biratnagar Branch officer.

Preparation of Consultation:

Prior Information Dissemination: One week prior to the actual consultation meetings, three representations of the consultants visited the project affected area to invite officials of municipality, wards, CBOs, local NGOs, schools, local government officials, and other institutions located in the project area and requested them to participate in the public consultation meeting.

Mode of Consultation: Verbal Communication

Documentation and Records of Consultation: Minutes, written and signed opinions and suggestions, attendance sheets signed by stakeholders, photographs, video.

Attendees/Participants

Altogether, 26 stakeholders participated in the public hearing workshop which was organized at the affected areas. Specifically, the workshop was conducted at community level organized at the project affected area in Shiddhakali Aadharbhoot Bidhyalaya Ward no 5. There were 14 male participants and 12 female participants in the workshops. The expert team members shared the IEE report in order to get their comments and their concerns on it.

Table 65: Participants in public hearing workshops

Consultation venue	Female	Male	Total
Shiddhakali Aadharbhoot Bidhyalaya Ward no 5.	12	14	26

Major issues discussed on the IEE Report

The main social concerns/issues raised by during the public hearing at Biratnagar Metropolitan City Hall and the locals in the public hearing program at Kulharuwa of BMC were;

- The IEE report has carried out detailed investigation on the possible impacts of the project to the Biratnagar environmental, social and economic condition, which we believe will minimize the possible impacts.
- The report has mentioned that the improvement project will add additional 6,555 m³/day water making the available water for supply to 15000 m³/day. However, the report also says the current demand for drinking water is 26000 m³/day and in future this demand will grow with the growth in population. Thus, it is necessary for the NSWC to start planning for next phase of projects immediately.
- The report has also mentioned necessity for improvement of water quality, we appreciate that the project has included water treatment plant and water quality testing laboratory as a part of the improvement project.
- The IEE report and its executive summary shall be made available to the Municipality once the report is approved by concerned authority.
- People of ward no 5 has fought hard to get the land for pump station 5 for this project. We hope that this project makes good use of our effort to complete the project so that people of Biratnagar can get clean drinking water.
- Shiddhakali Adharbhut School is located right next to the proposed pump site 5, thus, during the project construction period, the school operation might be affected due to noise. Thus, the project and school have to coordinate to synchronize work schedule as well as the project shall prioritize use of less noisy equipment to minimize noise disturbance.
- Since Shiddhakali Adharbhut School is the immediate neighbor of the project, we hope that the project and school can work together to improve the condition of the school. The Corporate Social Responsibility (CSR) of NSWC might be directed towards school improvement.

8 CONCLUSION

Under GON's Environmental Protection Act 2020 and Regulation 2021, the proposed project has been classified under its schedule 2, *i.e.* the projects requiring IEE study. Thus, this IEE study was carried out to meet, following the approval of its Terms and Reference (ToR) document.

The primary finding of this is that the proposed project is not an environmentally critical undertaking. IEE indicates that: the proposed project, and its components, is not located within or adjacent to environmentally sensitive areas.

The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

The few adverse impacts of moderate magnitude during construction will be temporary and short-term (*i.e.*, most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to Contractors. Hence, mitigation measures would not be difficult to implement.

The proposed project will bring about: (i) the benefits of access to a reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes.

Based on the above findings, we have concluded that the proposed the project no further require special study or detailed EIA.

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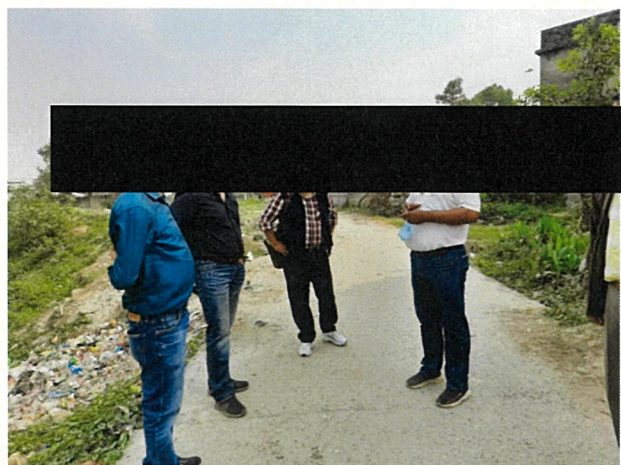
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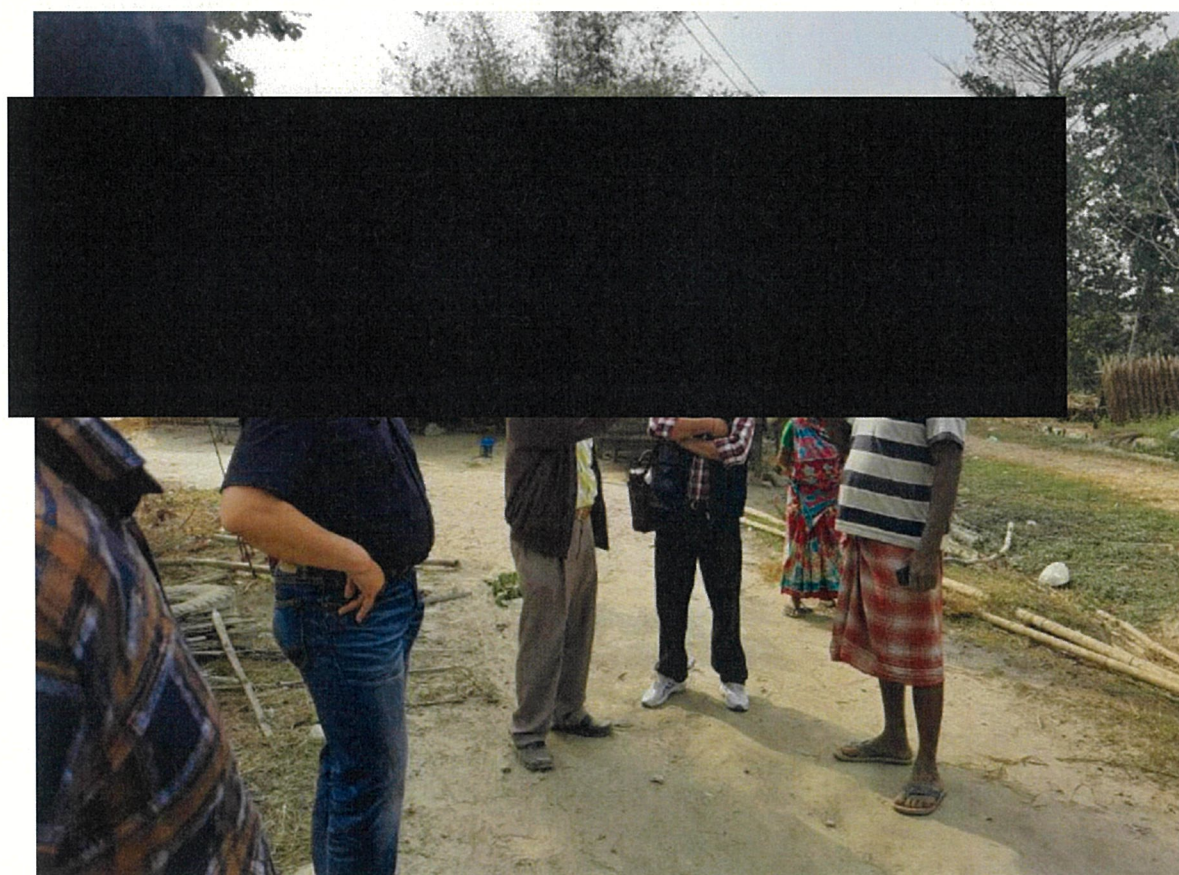
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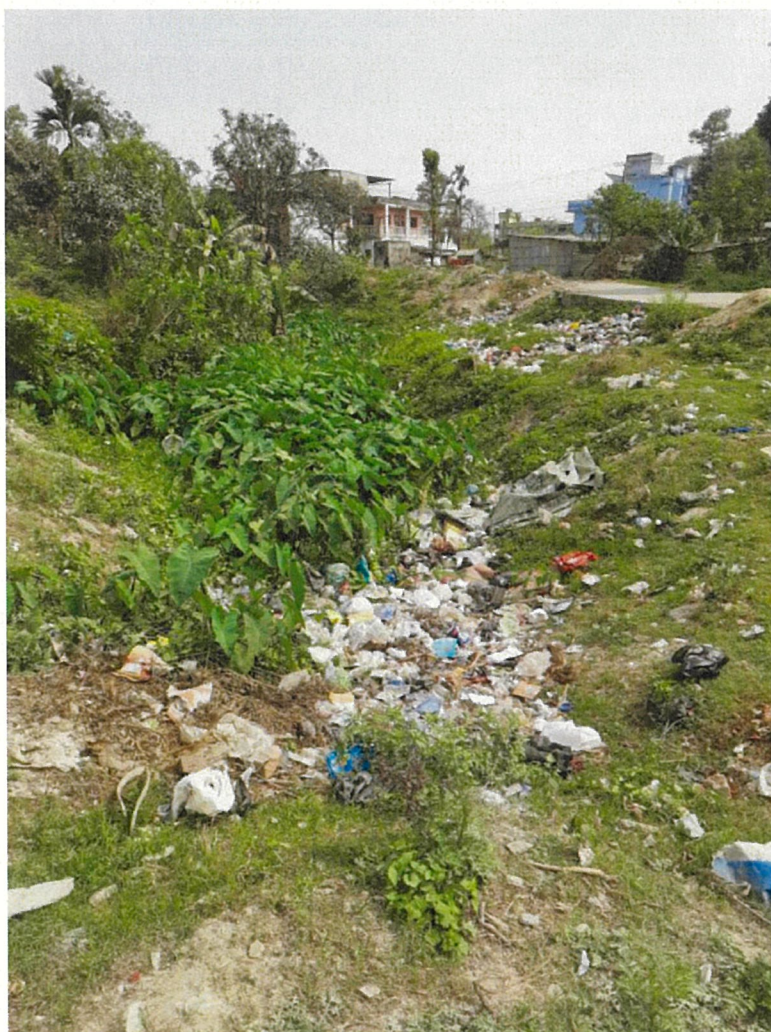
ANNEXES

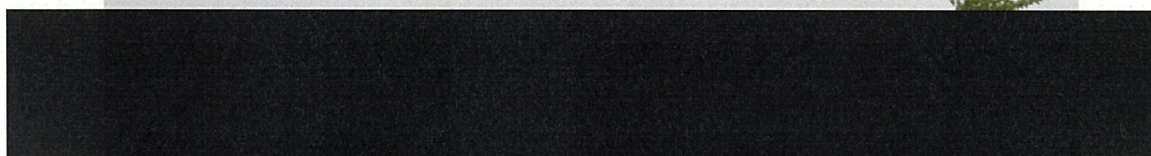
ANNEX A: FIELD SURVEY











ANNEX B: CHECKLIST OF PHYSICAL ENVIRONMENTAL COMPONENT

1. Landslides and Slope Stability

Date of observation:

Landslide location (District, Municipality, ward no, settlement name):

GPS coordinate:

Date and time of landslide (if known):

Dimensions:

Length (m):

Width (m):

Depth (m):

Volume (m³):

Area (m²):

Slope:

Approximate ground slope before landslide (degree):

Current slope angle (degree):

Current slope direction (degree):

Landslide type: Shallow | Debris flow | Debris slide | Creep | Rock slide | Deep-seated | Mega

Drainage system: Poor | Fair | Good

Undercutting by River/Stream: Yes | No

Toe cutting by road/ trail/ mining: Yes | No

Observation:

2. River hydrology

Location

Name of River/ stream

Date and time of observation:

On spot water quality parameters:

Turbidity:

pH:

Temp:

Note: Other chemical and Biological parameters will be analysed in the lab.

3. Air and Noise Pollution

Location

Date and time

GPS location

Air quality observation at field: good | fair| poor

Source of air pollution

Intensity of activities causing air pollution

Noise level reading:

Source of noise pollution:

4. Solid waste

Type of waste

Quantity of waste

Source of waste

Nearby features: Forest | River| school| other

Species of Reptiles					
S.No.	Local Name	English Name	Scientific Name	Status	Remarks
Note: Status Critically Endangered= CR; Endangered = EN; Vulnerable = VU; Near threatened = NT; Least Concern = LC					

Species of Amphibians					
S.No.	Local Name	English Name	Scientific Name	Status	Remarks
Note: Status Critically Endangered= CR; Endangered = EN; Vulnerable = VU; Near threatened = NT; Least Concern = LC					

Species of Avifauna					
S.No.	Local Name	English Name	Scientific Name	Status	Remarks
Note: Status Critically Endangered= CR; Endangered = EN; Vulnerable = VU; Near threatened = NT; Least Concern = LC					

ANNEX E: CHECKLIST FOR INVOLUNTARY RESETTLEMENT IMPACT SCREENING & CATEGORIZATION FORM SOCIAL MONITORING

A. Project Data

Municipality: Biratnagar Metropolitan City

Project Title: Improvement of Water Supply in Biratnagar

Name of Pump Station/Spoiling Site/Storage Yard:

Location:Ward No.....

Name of Consulted Person:

Date of Social Screening (dd/mm/yy).....

B. Screening Questions for Resettlement Categorization

Probable Involuntary Resettlement Effects	Yes	No	Not Known	Possible	Remarks
1. Will the project include any physical construction work?					
2. Does the project include upgrading or rehabilitation of existing physical facilities?					
3. Are any project effects likely to cause any damage/ loss of housing, other assets, resource use?					
4. Is the site for chosen for this work free from encumbrances and is in possession of the government/Municipality?					
5. If the site is privately owned, will this be purchased or obtained through voluntary donation?					
6. If the land parcel has to be acquired, is the actual plot size and ownership status known?					
7. Is land for material mobilization or transport for the civil work available within the existing plot/ Right of Way?					
8. Are there any non-titled people who living/doing business on the proposed site for civil work?					
9. Will there be loss of /damage to agricultural lands, standing crops, trees?					
10. Will there be loss of incomes and livelihoods?					
11. Will people lose access to facilities, services, or natural resources?					
12. Does the Municipality have its own laws/ regulations for land acquisition?					
13. Are any vulnerable households including Dalits and Janjatis affected?					

14. Whether the affected land/structure owners likely to lose less than 10% of their land/structure area.					
15. If so, are these land / structure owners willing to voluntarily donate the required land for this project?					
16. Is any temporary impact likely?					

C. Estimates of Specific Impacts									
Components of the project	Private land required in Sq. Mts.	No of land owners losing more than 10% of land area	Government land required in Sq. mts.	Forest land required in Sq mts	No of houses affected	No of shops affected	No of other structures affected	No of Squatters affected	Public utilities affected

D. Information on Affected Persons

Any estimate of the likely number of households that will be affected by the project?

☐ No. ☐ Yes. If yes, approximately how many?

No. of HHs losing <10% of their productive assets (land/ cowshed/shops/economic units)

No. of HHs losing 10% or more of their productive assets?

Are any of them poor, female-headed households, or vulnerable to poverty risks? ☐ No. ☐ Yes.
If Yes, please briefly describe their situation with estimated numbers of HHs?

Are any vulnerable households including Dalits and Janjatis affected? ☐ No. ☐ Yes.
If yes, please briefly describe their situation with estimated numbers of HHs?

What are the needs and priorities for social and economic betterment of vulnerable people including Dalits and Janjatis who are affected by this project?

E. Decision on Categorization

After reviewing the answers above, it is determined that the project is:

- Categorized as an A project, a full Resettlement Plan is required []
- Categorized as a B project, a short Resettlement Plan is required []
- Categorized as a C project, no Resettlement Plan is required []

Prepared by:

Date:

Reviewed by:

Date:

Approved by:

Date:

Endorsed by:

Date:

ANNEX F: IPS & VULNERABLE GROUPS IMPACT SCREENING & CATEGORIZATION FORM SOCIAL MONITORING

A. Project Data:

Municipality: Biratnagar Metropolitan City

Project Title: Improvement of Water Supply in Biratnagar

Name of Pump Station/Spoiling Site/Storage Yard:

Location:Ward No.....

Name of Consulted Person:

Date of Social Screening (dd/mm/yy).....

B. Identification of Impact on IPs/ Vulnerable Group in the project Area

Impact on Indigenous Peoples (IPs)/ Ethnic Minority(EM)/ Vulnerable Group	Not known	Yes	No	Remarks or identified problems, if any
1. Are there Dalits, Janjatis, or ethnic minorities present in project locations?				
2. Do they maintain distinctive customs and traditions and economic activities in their locality?				
3. Will the project in any way affect their economic and social activity and make them more vulnerable?				
4. Will the project affect their socioeconomic and cultural integrity?				
5. Will the project disrupt their community life?				
6. Will the project positively affect their health, education, livelihood or social security status?				
7. Will the project negatively affect their health, education, livelihood or social security status?				
8. Will the project alter or undermine their local knowledge, customary behaviors or institutions?				
9. Are IP and VC households likely to lose customary rights over, access to land?				
10. Are IPs and VCs likely to lose shelter/business and be displaced?				
11. In case no disruption of indigenous community life as a whole, will there be loss of housing, strip of land, crops, trees and other fixed assets owned or controlled by individual indigenous households?				

C. Specific Impacts on IPs and VCs									
No of IP families losing land	No VC families losing land	No of IP HHs losing house over 10% of their residence	Govt land required in Sq. mts.	Forest land required in Sq mts	No of IP/VC houses affected	No of IP/VC shops affected	No of other IP/VC structures affected	No of IP/VC Squatters affected	Public utilities affected

D. Additional Information Required

- Total and affected areas of land, by type of land assets;
- Total and affected areas of structures, by type of structure (main or secondary);
- Legal status of affected land and structure assets, and duration of tenure and ownership;
- Quantity and types of affected crops and trees;
- Quantity of other losses, e.g. business or other income, jobs or other productive assets, estimated daily net income from informal shops;
- Quantity/area of affected common property, community or public assets, by type;
- Summary data on PAP households including ethnicity, name of the head of household, sex, household size, primary and secondary source of income, if headed by women, or consists of marginalized ethnic groups, Dalits, Muslims/religious minorities, elderly, disabled, indigenous people, below poverty line), landless or households losing 50% of total landholdings (particularly those totally dependent on agriculture for livelihood).
- Identify whether affected land or source of income is primary source of income; and
- Knowledge of the project and preferences for compensation and as required, relocation sites and rehabilitation measures.

E. Anticipated project impacts on indigenous peoples

Project activity and output	Anticipated positive effect	Anticipated negative effect
1.	1.	
2.		
3.		
4.		
5.		

F. Decision on Categorization

After reviewing the above, it is determined that the project is:

- ☐ Categorized as an A project, an Indigenous Peoples Development Plan (IPDP) is required []
- ☐ Categorized as a B project, a specific action favorable to indigenous peoples is required and addressed through a specific provision in related plans such as a Resettlement Plan, or a general Social Action Plan []
- ☐ Categorized as a 'C' project, no IPDP or specific action required []

Prepared by:

Date:

Reviewed by:

Date:

Approved by:

Date:

Endorsed by:

Date:

ANNEX G: HOUSEHOLD QUESTIONNAIRE FOR SOCIO-ECONOMIC AND CULTURAL RESOURCES

Place and Respondent	Particulars	Code/ID
1. Name of Municipality	Biratnagar Metropolitan City	
2. Name of Settlement		
3. Ward No:		
4. Respondent's Name		
5. Sex	Male/ Female/other	
6. Contact Phone/Mobile Number		

A1. Demographic Information

1. Information on Social Condition

Name	Relation to HH head	Sex	Age(yrs)	Education (≥5 yrs)	Marital Status (≥10yrs)	Main Occupation (≥10yrs)
				Level		
	1. Head 2.Husband/wife 3.Son/Daughter 4Grand children 4.Son/Daughter in law 5.Daughter/Son in law 6.Parent 7.Father/Mother in law 8.Brother/Sister in law 9.Household Widow 10. Others	1.Male 2.Female 3.Third Gender		1.Can read & write 2. Can read only 3. Can't read & write 4. Beginners 5. Primary (1-5) 6. L. Secondary (6-8) 7. Secondary (9-10) 8. SLC/Equivalent 10.Inter/Equivalent 11. Grad/Equivalent 12.PG/Equi/above	1.Married 2 Divorced 3. Separate 4.Widow/Widower 5. Unmarried	1.Agriculture 2.Livestock 3.Horticulture 4.Fisheries 5. Salary/Wage 6.Own Enterprises 7. External job 8.Household Work 9. Student 7. No work 8.Others:____ —
a	b	c	d	e	f	g

2	What is your ethnicity?		
3	What is your religion?		
4	Which Language you speak?		
5	In last 12 months, how many members of your family have migrated and for what reason?(Multiple Choice)	Reason for migration	Yes =1 No =2
		a	b
		1. Family reason	
		2. Education/Training	
		3. Natural disaster	
		4. Looking for work	
		5. Easier lifestyle	
6	Please give ownership of the house where you lived for last 12 months?	6. No migration	
		7. Other (specify).....	
		1.Own house	
		2.Rented house	
		3. Relative house	
		4. Land owner's house (Included in rented land)	
		5. Other institutional house (free provided by government)	
7	What type of residential house do you live at present?	1. Concrete roof/Pakki/Cemented 2. Semi-Pakki (tin/tile/slate roof) 3. Kachhi-Thatched roof 4. Others (specify).....	
8	For how many months out of last 12 months, the produce from your farm was able to meet the food needs of your family?	1. Less than 3 months 2. 3 to< 6 months 3. 6 to < 9 months 4. 9 to <12 months 5. 12 or surplus	
9	What is the principle source of drinking water for your house hold?	1.Piped water 2.Covered well 3.Hand pipe/Tube-well 4.Open well 5.Spring 6.River 7.Other source	
10	Is that water is sufficient?	1.Yes, 2.No	

11	Please mention the type of toilet being used by your household since last 12 months?	1.Toilet with flush (connected to sewer) 2.Toilet with flush (connected to safety tank) 3.Toilet without flush 4.Public latrine 5.No toilet
----	--	---

A2. Health Facility

S.N	Question	Response/Answer	
12	Where do the family members go for treatment in case of health problem?	Government	Private
		1.Village Health Post/centre	6.Private hospital
		2.District Hospital	7.Pharmacy/Clinic
		3.Mobile Clinic	8.Health worker's home
		4.AyurvedaCentre	9. Others
		5.Other Govt. Institution	

A3. Education Facility

S.N	Question	Response/Answer
13	Where do your children go for education	1. Government School, 2. Private Boarding

B. Economic Condition

B 1. Expenditure and Income

S N	Question	Response/Answer	
1 4	What are the expenditures of household over last 12 months?	Activities	Amount (Rs.)
		a	b
		1.Food	
		2.Fuel	
		3.Apparel and personal items	
		4.Social and religious activities/Donation/Charity	
		5.Insurance and taxes	
		6.Repair and maintenance of house, vehicles, equipment	
		7.Transportation	
		8.Newspaper/communication	
		9.Disaster related expenses	
		10.Input cost for agriculture/livestock/other enterprises	
		11.Health	
		12.Education	
		13.Cash losses	
		14.Other (If any)	
1 5	What is your approximate annual household	Enterprises/Activities	Gross Income (Rs)
		a	b
		1.Agricultural wages/labour	
		2.Nonagricultural wages/salary	

	income of last year?	3.Sale of agricultural products	
		4.Livestock/fisheries sale	
		5.Milk and milk product sale	
		6.Remittances	
		7. Occupational work (tailoring, black smithy, carpentry etc.).	
		8.Forestry related products sale	
		9.Pension	
		10. Own enterprise	
		11. Others	

B.2 Land and Agriculture

2.2 Land and Agriculture

S.N.	Question		Response/Answer	
16	Do you have your own agricultural land at present? (under cultivation)		1.Yes 2.No	
17	If yes area? B-K-D		B-K-D	Major Irrigation Source
		Khet		
		Bari		
		Orchard		
		Pond		
		Other		
Note : Area : B = bigaha, K = Kattha, D = Dhur. Source of irrigation: 1= Tube well/Boring 2= Cont. flow canal 3=Natural flow canal 4= Pond, well 5= Mixed 6=NWSC supply, 7=Others				

18	In the past year, what crops did you grow in KHET land?	Crop pattern	Area		
			B	K	D
		a	b		
		1.Rice- rice-wheat			
		2.Rice- wheat-fallow			
		3.Rice -wheat-maize			
		4.Rice-wheat-vegetable			
		5. Rice-pulses-fallow			
		6. Rice-wheat-mungbean			
		7. Rice-wheat-dhaincha			
		8. Rice-potato-fallow			
		9. Rice-maize-fallow			
		10. Rice-fallow-fallow			
		11. Rice-barley-fallow			

		12. Rice-finger millet-fallow			
		13.Other			
19	In the past year, what crops did you grow in BARI land?	Crop pattern	Area		
			B	K	D
		a	b		
		1.Maize- upland rice-fallow			
		2.Maize-finger millet-fallow			
		3.Maize-finger millet-wheat			
		4.Upland rice-fallow-fallow			
		5.Maize-mustard-fallow			
		6.Maize-rice-wheat			
		7.Maize-barley			
		8.Jute-mustard-fallow			
		9.Jute-wheat-fallow			
		10.Vegetable - vegetable			
		11.Vegetable-maize			
		12.Off season vegetable			
		13. Other.....			

C. Opinion towards the Project

20. Please provide us your opinion on current situation within the area (Please use proving helps)

21. Please provide the land value currently prevails in the area.

22. Please provide the current activities along the Project Site.

23. How do you perceive the change after the rehabilitation/new construction of PS (Please use proving helps)

24. If the change is negative please provide how this can be mitigated? (Please use proving helps)

Thanks

Name of Enumerator...

Signature

Date

Name of Supervisor

Signature

Date

ANNEX H: BASELINE STATUS OF PROJECT AREA (PS NO 5)

Sex of Respondent by Settlements				
Sl. No	Name of Settlement	Sex of Respondent		Total
		Male	Female	
1	Damabandi	40	9	49
2	Damabandi, Karkhana tole	16	1	17
3	Damabandi, Kulharba	49	7	56
4	Damabandi, Prithivi chowk	4	0	4
5	Damabandi, Pulchowk	7	7	14
6	Damabandi, Shankarbari	38	25	63
7	Shankarbari, Keshaliya	12	1	13
Total		166	50	216

# of Family Members				
Sl. No	Name of Settlement	Total	Minimum	Maximum
1	Damabandi	258	3	9
2	Damabandi, Karkhana tole	104	4	10
3	Damabandi, Kulharba	310	2	9
4	Damabandi, Prithivi chowk	27	5	9
5	Damabandi, Pulchowk	78	2	9
6	Damabandi, Shankarbari	349	2	15
7	Shankarbari, Keshaliya	66	3	8
Total		1192	2	15

Relation of Respondents to Household Head by Sex of Respondent				
Sl. No	Relation to HH	Sex of Respondent		
		Male	Female	Total
1	Head (Respondent him/herself is Head)	137	7	144
2	Husband/Wife		31	31
3	Son/Daughter	20	10	30
4	Parent	9	1	10
5	Father/Mother in law		1	1
Total		166	50	216

Education Level of Household Head				
Sex of HHH	Education Level			
	Can't Read & Write	Can Read Only	Read & Write	Total
Male	64	14	129	207
Female	6	0	3	9
Total	70	14	132	216

Marital Status of Household Head				
Sex of HHH	Marital Status (?10yrs)			
	Married	Widow/Widower	Unmarried	Total
Male	207			207
Female	9			9
Total	216			216

Main Occupation of Household Head			
Occupation	Sex of HHH		Total
	Male	Female	
Agriculture	15	2	17
External job	32	2	34
Household Work	2		2
Livestock	1		1
Own Enterprises	44	4	48
Remittances	1		1
Salary/Wage	112	1	113
Total	207	9	216

Major Ethnicity by Settlement									
Sl. No.	Ethnicity	Name of Settlement							Total
		Damabandi	Damabandi, Karkhana tole	Damabandi, Kulharba	Damabandi, Prithivichowk	Damabandi, Pulchowk	Damabandi, Shankarbhari	Shankarbhari, Keshaliya	
1	Badahi	3	0	1	1	0	5	0	10
2	Gaderi	0	0	0	1	0	0	0	1
3	Hajam	0	0	0	0	0	1	0	1
4	Hill Brahmin	3	0	0	1	0	3	0	7
5	Hill Chhetri	3	0	5	0	0	3	0	11
6	Hill Dalit	1	0	1	0	0	2	1	5
7	Hill Janajati	0	0	1	0	4	1	0	6
8	Jhangad	5	0	1	0	0	2	10	18
9	Kamat	0	1	0	0	0	0	0	1
10	Kewat	0	0	0	0	0	4	0	4
11	Khawas	1	12	1	1	0	4	0	19
12	Mahato	0	0	0	0	2	1	0	3
13	Mandal	5	0	15	0	0	16	1	37
14	Mehata	3	0	0	0	0	3	0	6
15	Mushahar	0	0	2	0	0	0	0	2
16	Muslim	2	0	4	0	1	2	0	9
17	Pandit	1	0	0	0	0	0	0	1

18	Poddar	0	0	0	0	0	2	0	2
19	Rai	1	0	0	0	0	0	0	1
20	Rajbansi	1	2	1	0	0	0	0	4
21	Ray	1	0	0	0	4	6	0	11
22	Satar	12	0	0	0	0	0	1	13
23	Teli	2	0	1	0	1	1	0	5
24	Terai Dalit	1	0	6	0	0	0	0	7
25	Tharu	1	2	0	0	0	3	0	6
26	Turaha	0	0	6	0	0	0	0	6
27	Yadav	3	0	11	0	2	4	0	20
Total		49	17	56	4	14	63	13	216

Major Religion by Settlement					
Sl. No.	Name of Settlement	Religion			Total
		Buddhist	Hindu	Muslim	
1	Damabandi	0	47	2	49
2	Damabandi, Karkhana tole	0	17	0	17
3	Damabandi, Kulharba	0	52	4	56
4	Damabandi, Prithivi chowk	0	4	0	4
5	Damabandi, Pulchowk	1	12	1	14
6	Damabandi, Shankarbari	0	61	2	63
7	Shankarbari, Keshaliya	0	13	0	13
Total		1	206	9	216

Major Language by Settlement						
Sl. No.	Name of Settlement	Language				Total
		Bangali	Maithili	Nepali	Tharu	
1	Damabandi	1	43	5	0	49
2	Damabandi, Karkhana tole	2	14	0	1	17
3	Damabandi, Kulharba	1	49	6	0	56
4	Damabandi, Prithivi chowk	0	3	1	0	4
5	Damabandi, Pulchowk	0	10	4	0	14
6	Damabandi, Shankarbari	0	53	7	3	63
7	Shankarbari, Keshaliya	0	12	1	0	13
Total		4	184	24	4	216

Migration by Settlement				
Sl. No.	Name of Settlement	Migration		Total
		Yes	No	
1	Damabandi	3	46	49
2	Damabandi, Karkhana tole	0	17	17
3	Damabandi, Kulharba	1	55	56
4	Damabandi, Prithivi chowk	0	4	4
5	Damabandi, Pulchowk	0	14	14

6	Damabandi, Shankarbari	2	61	63
7	Shankarbari, Keshaliya	0	13	13
Total		6	210	216

Reason for Migration by Settlement				
Sl. No.	Name of Settlement	Reason for Migration		Total
		Natural disaster	Looking for work	
1	Damabandi	1	2	3
2	Damabandi, Kulharba	0	1	1
3	Damabandi, Shankarbari	0	2	2
Total		1	5	6

Ownership of House by Settlement			
Sl. No.	Name of Settlement	Ownership of House	
		Own house	Total
1	Damabandi	49	49
2	Damabandi, Karkhana tole	17	17
3	Damabandi, Kulharba	56	56
4	Damabandi, Prithivi chowk	4	4
5	Damabandi, Pulchowk	14	14
6	Damabandi, Shankarbari	63	63
7	Shankarbari, Keshaliya	13	13
Total		216	216

Type of House by Settlement					
Sl. No.	Name of Settlement	Type of House			Total
		Concrete roof/Pakki/Cemented	Semi-Pakki (tin/tile/slate roof)	Kachhi-Thatched roof	
1	Damabandi	17	6	26	49
2	Damabandi, Karkhana tole	3	4	10	17
3	Damabandi, Kulharba	5	10	41	56
4	Damabandi, Prithivi chowk	2	0	2	4
5	Damabandi, Pulchowk	9	4	1	14
6	Damabandi, Shankarbari	15	7	41	63
7	Shankarbari, Keshaliya	0	0	13	13
Total		51	31	134	216

Food Sufficiency (months) by Settlement								
Sl. No.	Name of Settlement	Food Sufficiency months						Total
		Less than 3 months	3 to < 6 months	6 to < 9 months	9 to < 12 months	12 or surplus	No Own Product	
1	Damabandi	18	1	2	1	8	19	49

2	Damabandi, Karkhana tole	11	4	1	0	0	1	17
3	Damabandi, Kulharba	12	7	2	1	3	31	56
4	Damabandi, Prithivi chowk	3	0	0	0	0	1	4
5	Damabandi, Pulchowk	10	1	0	1	0	2	14
6	Damabandi, Shankarbari	52	4	6	0	1	0	63
7	Shankarbari, Keshaliya	0	1	0	1	0	11	13
Total		106	18	11	4	12	65	216

Main source of drinking water by Settlement				
Sl. No.	Name of Settlement	Main source of drinking water		Total
		Hand pipe/Tube-well	Open well	
1	Damabandi	49	0	49
2	Damabandi, Karkhana tole	17	0	17
3	Damabandi, Kulharba	55	1	56
4	Damabandi, Prithivi chowk	4	0	4
5	Damabandi, Pulchowk	14	0	14
6	Damabandi, Shankarbari	63	0	63
7	Shankarbari, Keshaliya	13	0	13
Total		215	1	216

Water Sufficiency by Settlement				
Sl. No.	Name of Settlement	Water Sufficiency		Total
		Yes	No	
1	Damabandi	49	0	49
2	Damabandi, Karkhana tole	17	0	17
3	Damabandi, Kulharba	55	1	56
4	Damabandi, Prithivi chowk	4	0	4
5	Damabandi, Pulchowk	14	0	14
6	Damabandi, Shankarbari	62	1	63
7	Shankarbari, Keshaliya	13	0	13
Total		214	2	216

Type of toilet by Settlement							
Sl. No.	Name of Settlement	Type of toilet					Total
		Toilet with flush (connected to sewer)	Toilet with flush (connected to safety tank)	Toilet without flush	Public latrine	No toilet	
1	Damabandi	0	4	42	0	3	49
2	Damabandi, Karkhana tole	0	1	16	0	0	17
3	Damabandi, Kulharba	0	2	52	0	2	56
4	Damabandi, Prithivi chowk	0	0	4	0	0	4
5	Damabandi, Pulchowk	1	4	9	0	0	14
6	Damabandi, Shankarbari	0	1	61	1	0	63
7	Shankarbari, Keshaliya	0	0	13	0	0	13
Total		1	12	197	1	5	216

Health Facility by Settlement							
Sl. No.	Name of Settlement	Health Facility					Total
		Government Health Post/Health Centre	Government District Hospital	Government Other Institution	Private Hospital	Both District & Private Hospital	
1	Damabandi	0	7	1	21	20	49
2	Damabandi, Karkhana tole	0	7	0	1	9	17
3	Damabandi, Kulharba	0	32	1	10	13	56
4	Damabandi, Prithivi chowk	0	2	0	1	1	4
5	Damabandi, Pulchowk	0	2	0	1	11	14
6	Damabandi, Shankarbari	4	22	0	4	33	63
7	Shankarbari, Keshaliya	0	11	0	2	0	13
Total		4	83	2	40	87	216

Education Facility by Settlement					
Sl. No.	Name of Settlement	Education Facility			Total
		Government School	Private Boarding	Both Government & Private School	
1	Damabandi	18	26	5	49
2	Damabandi, Karkhana tole	10	3	4	17
3	Damabandi, Kulharba	33	12	11	56
4	Damabandi, Prithivi chowk	2	2	0	4
5	Damabandi, Pulchowk	2	10	2	14
6	Damabandi, Shankarbari	34	20	9	63
7	Shankarbari, Keshaliya	6	7	0	13
Total		105	80	31	216

Expenditure of the People in the Project Area (PS 5)			
Name of Settlement	Cases	Mean	Sum
Damabandi	49	803,387.76	39,366,000.00
Damabandi, Karkhana tole	17	877,976.47	14,925,600.00
Damabandi, Kulharba	56	735,235.71	41,173,200.00
Damabandi, Prithivi chowk	4	630,000.00	2,520,000.00
Damabandi, Pulchowk	14	1,095,428.57	15,336,000.00
Damabandi, Shankarbari	63	798,171.43	50,284,800.00
Shankarbari, Keshaliya	13	900,000.00	11,700,000.00
Total	216	811,600.00	175,305,600.00

Income of the People in the Project Area (PS 5)			
Name of Settlement	Cases	Mean	Sum

Damabandi	49	751,885.71	36,842,400.00
Damabandi, Karkhana tole	17	651,070.59	11,068,200.00
Damabandi, Kulharba	56	648,685.71	36,326,400.00
Damabandi, Prithivi chowk	4	645,000.00	2,580,000.00
Damabandi, Pulchowk	14	923,271.43	12,925,800.00
Damabandi, Shankarbari	63	718,919.05	45,291,900.00
Shankarbari, Keshaliya	13	631,769.23	8,213,000.00
Total	216	709,480.09	153,247,700.00

Income Group by Settlement					
Sl. No.	Name of Settlement	Income Group			Total
		Low Income Group	Middle Income Group	High Income Group	
1	Damabandi	6	30	13	49
2	Damabandi, Karkhana tole	5	12	0	17
3	Damabandi, Kulharba	7	45	4	56
4	Damabandi, Prithivi chowk	1	3	0	4
5	Damabandi, Pulchowk	1	10	3	14
6	Damabandi, Shankarbari	9	43	11	63
7	Shankarbari, Keshaliya	2	10	1	13
Total		31	153	32	216

Having own cultivating land				
Sl. No.	Name of Settlement	Having own cultivating land		Total
		Yes	No	
1	Damabandi	11	38	49
2	Damabandi, Karkhana tole	0	17	17
3	Damabandi, Kulharba	7	49	56
4	Damabandi, Prithivi chowk	0	4	4
5	Damabandi, Pulchowk	0	14	14
6	Damabandi, Shankarbari	6	57	63
7	Shankarbari, Keshaliya	2	11	13
Total		26	190	216

Current Land Value/Kattha around the PS 5				
Name of Settlement	Cases	Maximum	Minimum	
Damabandi	49	4,000,000	2,500,000	
Damabandi, Karkhana tole	17	3,500,000	3,250,000	
Damabandi, Kulharba	56	5,000,000	2,250,000	
Damabandi, Prithivi chowk	4	5,000,000	3,500,000	
Damabandi, Pulchowk	14	3,750,000	3,500,000	
Damabandi, Shankarbari	63	4,000,000	3,250,000	
Shankarbari, Keshaliya	13	3,750,000	3,250,000	
Total	216	5,000,000	2,250,000	

ANNEX I: RECOMMENDATION LETTERS FROM BIRATNAGAR METROPOLITAN CITY



नेपाल खानेपानी संस्थान

शाखा कार्यालय बिराटनगर

पत्र संख्या :- २०७७/०७८

चलानी नं.:- ३३६

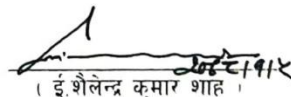
दिनांक: ०८-०९-२०७८
३२१-५९४००४

मिति:- २०७८/०९/०५

विषय :- आवश्यक सहयोग गरि दिने बारे ।

✓ श्री बिराटनगर महानगरपालिका
बिराटनगर महानगरपालिकाको कार्यालय
बिराटनगर, मोरङ्ग ।
श्री STIUP Project
बिराटनगर महानगरपालिका
बिराटनगर ।

उपरोक्त विषयमा, नेपाल खानेपानी संस्थानको कार्य क्षेत्र रहेको यम बिराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाईका(JICA) मार्फत आयोजनाको अध्ययन कार्य अधि वढेकोमा^१ उक्त आयोजनाको परामर्शदाताको रूपमा रहेको यचियो ईन्जिनियरिङ्ग कम्पनी लि.ले प्रारम्भिक वातावणीय प्रभाव मूल्यांकन कार्यको लागि मेटकोन कन्सल्टेन्ट प्रा.लि., काठमाण्डौलाई जिम्मेवारी तोकेकोले उक्त कार्य सम्पन्न गर्न आवश्यक पर्ने सूचना तथा तथ्यांकहरू तर्होवाट मेटकोन कन्सल्टेन्ट प्रा.लि लाई उपलब्ध गराई आवश्यक सहयोग गरि दिन हुन अनुरोध छ ।


(ई.शैलेन्द्र कुमार शाह)

सहायक प्रबन्धक

कार्यालय प्रमुख

कार्यालय प्रमुख

बोधार्थ :-

श्री ईन्जिनियरिङ्ग महाशाखा
नेपाल खानेपानी संस्थान
प्रधान कार्यालय, त्रिपुरेश्वर, काठमाण्डौ ।
श्री YACHIYO ENGINEERING CO. LTD.
काठमाण्डौ ।
श्री मेटकोन कन्सल्टेन्ट प्रा.लि.
काठमाण्डौ ।

प्रधान कार्यालय
त्रिपुरेश्वर मार्ग
काठमाण्डौ
नेपाल

पो.ब.नं. : ५३४९

Email:- biratnagarnwsc@gmail.com

फोन नं.: ०१-४११७३३१
०१-४११७३२६
०१-४११७३२८

भूमिगत --- दि. १०/११/१६
क ---
दर्ता नं. ४५५
मिति: १६/११/१६



नेपाल टेलिकम
प्रदेशीय निर्देशनालय
प्रदेश नं.-१, बिराटनगर
दर्ता नं. ३९६३
मिति: २०६८/११/१६

१०/११/१६
२०६८/११/१६



दर्ता नं. ४५५

२०६८/११/१६

दर्ता नं. १८३९
०६/०९/०६

ANNEX I: MINUTE OF THE DISCUSSION WITH MAYOR

आज मिति २०७८/०७/०८ जेका दिन विराटनगर महानगरपालिकाको कार्यालय, को प्राङ्गणमा यस पत्रिकाका मे प्रमुख श्री भीम पराजुली ज्यूको अध्यक्षता नेपाल खानेपानी संस्थानको कार्य क्षेत्र रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि JICA मार्फत आयोजनाको अध्ययन कार्य सहित प्रारम्भिक वातावरणीय प्रभाव मूल्यांकनको कार्य समेत आघे वढि रहेकोमा नपासहितको वडाहरूको अस्थितिमा निम्न वडाहरूको प्रस्तावहरूका फलफल तथा निर्णय गरियो ।

प्रस्तावना :

- १) शान्तिपानी सुधार तथा विस्तार कार्यको आयोजनाको प्रारम्भिक स्थिति बारेमा छलफल गर्ने ।
- २) उक्त आयोजनामा संलग्न हुने क्षेत्रहरूसँगको समन्वयन गर्ने गराउने र अन्य कार्यहरूमा सबलिमरण गर्ने सम्बन्धमा ।
- ३) विविध ।

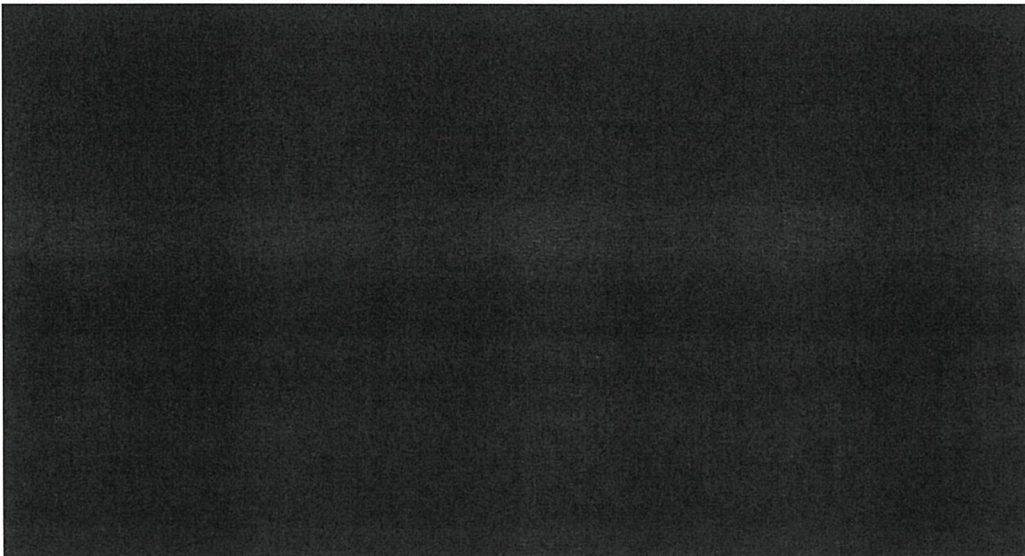
छलफल तथा निर्णयहरू :

- १) उपरोक्त प्रस्ताव नं १ को उपर छलफल गर्दा यस महानगरपालिकाको विभिन्न शाखाहरूसँगको कार्यहरूलाई सहमिलरण गर्ने सम्बन्धमा आवश्यक जानकारी दिने कार्यहरू गर्नु साथै हाल सम्पन्न भइरहेको कार्यलाई समेत यस मितिदेखि छलफल गर्ने काम भयो ।
- २) प्रस्ताव नं २ को उपर छलफल गर्दा यस नगरपालिकामा सम्पूर्ण कार्यलय तथा शाखाहरूसँग समन्वय तथा सबलिमरणको लागि आवश्यक फलत गर्ने प्रतिबद्धता गरी यस JICA प्रोजेक्ट को सम्पूर्ण कार्यलाई ग्रहण गर्ने कार्य समेत भयो ।
- ३) विविध विषय उपर छलफल गर्दा कार्यक्षेत्र समेत रहेको नगरपालिकाको सम्पूर्ण वडाहरूलाई आवश्यक सहयोग गर्ने गरी पत्राचार गर्ने छलफल गरी निर्णय गरियो ।

ANNEX J: FOCUS GROUP DISCUSSION WITH MOTHERS GROUP AT PUMP NO 5

आज मिति २०७८ साल वैशाख ०८ गते प्रदेश नं. १ मा रहेको नेपाल
खानेपानी संस्थानको कार्यक्षेत्र विराटनगर महानगर पालिकाका
लागी विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार गर्ने
परियोजना अन्तर्गत रही वार्ड नं. ५ मा रहनुभएका स्थानिय आमा
समूहका सदस्यसंग Focus Group Discussion गरियो। उक्त
द्विफलमा देहाय बमोजिमको उपस्थिति रह्यो।

स्थान: श्री सिद्धकाली आचार्यन विद्यालयको कायापट्टीको प्राङ्गण
समय: विहान ८:३०



ANNEX K: SUPPORT LETTER FROM YACHICO

yec YACHIYO ENGINEERING CO., LTD.
Consulting Engineers & Architects



Tel :81-3-5822-2740
Fax :81-3-5822-2791
e-mail:intl@yachiyo-eng.co.jp

7 April 2021

To,
Dr. Bhupendra Prasad
General Manager,
Nepal Water Supply Corporation
Central Office, Tripureshwor,
Kathmandu, Nepal

Subject: Request to provide support

Dear Sir,

I would like to inform you that Yachiyo Engineering Co. Ltd. have contracted Metcon Consultants Pvt. Ltd. of Kathmandu, Nepal on 26th February 2021 for "Preparation works of Terms of Reference (TOR) of Initial Environmental Examination (IEE) Study and IEE Report for The Preparatory Survey for the Project for Improvement of Water Supply System in Biratnagar".

Team of Metcon Consultants Pvt. Ltd. have planned to conduct the field survey and data collection works in Biratnagar from 15th April 2021. They are planning to conduct stakeholders meetings including several government and other organizations during their study period. Thus I would like to request you to provide us your valuable cooperation and support for the proposed study and provide them an official letter addressed to organizations listed below for their time for meetings, support and cooperation during the data collection and study period.

The list of organizations to be visited are as follows:

1. Biratnagar Municipality Office,
2. CDO Office, Mornag, Biratnagar
3. 14 Ward Offices of Biratnagar Municipality
4. Department of Roads, Biratnagar
5. Department of Irrigation, Biratnagar

Page 1 of 2

yec YACHIYO ENGINEERING CO., LTD.
Consulting Engineers & Architects

Tel :81-3-5822-2740
Fax :81-3-5822-2791
e-mail:intl@yachiyo-eng.co.jp

6. Nepal Electricity Authority, Biratnagar
7. Nepal Telecom, Biratnagar.
8. Secondary Towns Integrated Urban Environmental Improvement Project, Biratnagar
9. Any other organizations/institutions, if required (will request later)

Thanking your for your kind support and cooperation.

With Sincere Regards,


Katsumi Fujii
Team Leader
Yachiyo Engineering Co., Ltd.
Tokyo, Japan
Email : kt-fujii@yachiyo-eng.co.jp



CC:

1. Mr. Iswar Prasad, Manager, NWSC Kathmandu
2. Mr. Shailendra Shah, Office Chief, NWSC Biratnagar.
3. Mr. Nitigya Rajbhandari, Managing Director, Metcon Consultants Pvt. Ltd.

ANNEX L: SUPPORT LETTERS FROM PAFS



विराटनगर महानगरपालिका
नगर कार्यपालिकाको कार्यालय
मोरङ, विराटनगर-१, नेपाल

प.स. : ०७७/०७८

च.नं. : ४७९६

मिति: २०७८/०१/०९

श्री वडा कार्यालय १, २, ३, ४, ५, ६, ७, ८, ९, १०, ११, १२, १३, १४
विराटनगर महानगरपालिका, मोरङ

विषय: आवश्यक सहयोग गरिदिने सम्बन्धमा ।

उपरोक्त विषयमा नेपाल खानेपानी संस्थानको कार्य क्षेत्र रहेको यस विराटनगर महानगरपालिकाको विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग (JICA) मार्फत आयोजनाको अध्ययन कार्य अघि बढेकोमा उक्त आयोजनाको परामर्शदाताको रूपमा रहेको यचियो इन्जिनियरिंग कम्पनी लि.ले प्रारम्भिक वातावरणीय प्रभाव मुल्यांकन कार्यको लागि मेटकोन कन्सल्टेन्ट प्रा.लि, काठमाण्डौलाई जिम्मेवारी तोकेकाले उक्त कार्य सम्पन्न गर्न आवश्यक पर्ने सूचना तथा तथ्यांकहरू तहांबाट मेटकोन कन्सल्टेन्ट प्रा.लि लाई आवश्यक सहयोग गरि दिनु हुन अनुरोध छ ।

दुर्गा खतिवडा

उपसचिव (दसौं तह)

ANNEX M: PHOTOGRAPHS OF FGDS



FGD with the Mayor of Biratnagar Metropolitan City



FGD at the Regional Town Development Unit



FGD with the Mothers Group at the Pump No 5



FGD with the residents of Pump No 5



FGD with Nepal Khane Pani Sanstha Biratnagar

ANNEX N: PUBLICATION OF NOTICE FOR PUBLIC HEARING

नीको
अर्को
भएको
गतको
पूरा
नकारी
प्रतिबारे
नकारी
फल
जिल्ला
भयो।

क्ष
क
गरी
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ना
हुने

मा
नै
मा
दि
थर
को
संग
नि

हुँदै
क
न।
गम
को

का,
का,
का
डक
पमा



नेपाल खानेपानी संस्थान विराटनगर शाखाको

**विराटनगरको खानेपानी सुधार आयोजनाको प्रारम्भिक वातावरणिय
अध्ययन प्रतिवेदन तयारीका लागि सार्वजनिक सुनुवाइ सम्बन्धि सूचना**

(प्रकाशित मिति : २०७८ भाद्र १३)

प्रदेश १, मोरंग जिल्ला, नेपाल खानेपानी संस्थान विराटनगर शाखा द्वारा निम्न बमोजिमको प्रस्ताव कार्यान्वयन गर्न लागिएको छ।

प्रस्तावको नाम र ठेगाना	नेपाल खानेपानी संस्थान, विराटनगर शाखा, विराटनगर फोन : ०२१ - ५१४००४, Email: biratnagarwsc@gmail.com
प्रस्तावको व्यहोरा	नेपाल खानेपानी संस्थान, विराटनगरले विराटनगरमा हाल गरिरहेको खानेपानी आपूर्तिमा बढ्दो शहरीकरणको कारण कमशः खानेपानी अभाव बढ्दै गएको छ। यसको निवारणको लागि नेपाल खानेपानी संस्थान तथा JICA को संयुक्त प्रयासमा विराटनगर महानगरपालिकाको हालको खानेपानी बितरण प्रणालीको सुधार गर्ने यस आयोजनाबाट प्रस्ताव गरिएको छ। यस सुधार आयोजना अन्तर्गत, हाल सञ्चालित तिनवटा पम्पिंग स्टेशनहरु तीनपैनी, देवकोटा चोक र मुनाल पथको सुधार गरिनुको साथै थप एक नयाँ पम्प स्टेशन (स्टे नं. ५) को स्थापना पनि गर्ने प्रस्ताव गरिएको छ। साथै उल्लेखित सबै पम्प स्टेशनहरुमा पानी शुद्धीकरणका आवश्यक भौतिक पूर्वाधारहरुको पनि निर्माण गरिने छ। यस आयोजनाले विराटनगरमा खानेपानी बितरण प्रणालीको सुधार गर्न नयाँ प्रसारण र वितरण पाइपलाइनहरु (लगभग ११७.५ कि मि - लम्बाई र ३' देखि १२" व्यास सम्मको) विराटनगर महानगरपालिकाको निम्न उल्लेखित १४ वटा वडाहरुमा जडान गर्ने प्रस्ताव गरेको छ।
प्रभाव पर्ने सक्ने जिल्ला / न पा / गा पा :	मोरंग जिल्ला विराटनगर महानगरपालिका १, २, ३, ४, ५, ६, ७, ८, ९, १०, ११, १२, १३, १४ वडा

माथि उल्लेखित प्रस्तावको प्रारम्भिक वातावरणिय अध्ययन प्रतिवेदन तयारी गर्ने क्रममा सो क्षेत्रको प्राकृतिक भौतिक प्रणाली, जैविक प्रणाली, सामाजिक प्रणाली, संस्कृतिक प्रणाली र आर्थिक प्रणालीबीच के कस्तो प्रभाव पर्दछ भनि यकिन गर्न सो स्थानको तथा त्यस क्षेत्रका विद्यालय, अस्पताल, स्वास्थ्य चौकी तथा सरोकारवाला व्यक्ति वा संस्थाको राय सुझाव लिन आवश्यक भएकोले, सार्वजनिक सुनुवाइको कार्यक्रम तपसिल बमोजिमको स्थानमा आयोजना गर्न लागेको व्योहरा यसै सूचना माफत सम्बन्धित सबैलाई जानकारी गराइन्छ।

तपसिल

स्थान : शिद्वकाली आधारभुत विद्यालय, कुलहरुवा वडा नं. ५
मिति : २०७८ भाद्र २० गते, समय : बिहानको १० बजे

राय सुझावको लागि पत्राचार गर्ने ठेगाना

प्रस्तावको नाम र ठेगाना :	नेपाल खानेपानी संस्थान, विराटनगर शाखा, विराटनगर फोन : ०२१ - ५१४००४, Email: biratnagarwsc@gmail.com
परामर्शदाताको नाम र ठेगाना :	METCON Consultants, काठमाडौं, Email: info@mgplconsult.org फोन : ९७७ ४४१२ ९०२

विदेशी विन
तीन हजार
सो बराबरक
लागि मात्र
रकमसम्मक
बिजनेस
(बीसीआई)
परिको छ।

यस शास्त्र
तपसिलमा
गर्गएको छ
बुझाई सु
निम्न मिति
भाग लिई
समेत सर्व

क्र. सं.	
१)	१०९०
२)	१०९०
३)	१०९०
४)	१०९०
५)	१०९०

सार्वजनिक

- १) धितो
- २) लिलाम
- ३) बुझाउ
- ४) डाँक
- ५) लिलाम
- ६) लिलाम
- ७) लिलाम
- ८) कर्जाको
- ९) लिलाम

ANNEX O: NOTICES REGARDING PUBLIC HEARING



नेपाल खानेपानी संस्थान

शाखा कार्यालय विराटनगर

फोन: ०२१-४१९३२९
०२१-४१९००४

मिति:- २०७८/०५/१७

पत्र संख्या :- २०७८/०७९

चलानी नं.:- ५८

विषय :- सार्वजनिक सुनुवाई सम्बन्धमा ।

श्री जिल्ला प्रशासन कार्यालय
विराटनगर, मोरङ ।

उपरोक्त सम्बन्धमा, यस विराटनगर महानगरपालिकामा नेपाल खानेपानी संस्थान विराटनगर शाखाबाट वितरण भई रहेको खानेपानी सेवा प्रवाहमा सुधार ल्याउन जापान सहयोग निकाय (JICA) बाट विराटनगरमा खानेपानी सुधार आयोजना शुरु भईरहेको र त्यस अन्तर्गत तयार भई आएको प्रारम्भिक वातावरणीय अध्ययन प्रतिवेदन उपर सार्वजनिक सुनुवाई गरि त्यसबाट आएका सल्लाह सुभाषहरूलाई उक्त प्रतिवेदनमा समावेश गर्न आयोजना कार्यन्वयन प्रक्रिया अन्तर्गतको अति आवश्यक चरण भएकोले, हालको कोरोना महामारीलाई मध्यनजर गर्दै अपनाउनु पर्ने स्वास्थ्य मापदण्डको पालना गरि गराई सार्वजनिक सुनुवाई संचालन गर्न लागिएको व्यहोरा जानकारी गराउदै उक्त स्थानमा आवश्यकता अनुसार सुरक्षा प्रवन्धको आवश्यक व्यवस्था मिलाई दिनु हुन सादर अनुरोध छ ।

तपसिल :-

स्थान :- श्री शिद्धकाली आधारभूत विद्यालय, कुलहरूवा, विराटनगर महानगरपालिका वडा नं.-५

मिति :- २०७८ भाद्र २० गते ।

समय :- बिहान १०:०० बजे ।


(ई.शैलेन्द्र कुमार शाह)

सहायक प्रवन्धक

कार्यालय प्रमुख

कार्यालय प्रमुख

बोधार्थ :-

श्री इन्जिनियरिङ्ग महाशाखा

नेपाल खानेपानी संस्थान

प्रधान कार्यालय, त्रिपुरेश्वर, काठमाण्डौ ।

श्री विराटनगर महानगरपालिकाको कार्यालय

विराटनगर, मोरङ ।

✓ श्री METCON Consultants

काठमाण्डौ : आवश्यक सम्बन्ध गर्नु हुन ।

प्रधान कार्यालय
त्रिपुरेश्वर मार्ग
काठमाण्डौ
नेपाल

फोन नं.: ५३४९

Email:- biratnagarwsc@gmail.com

फोन नं.: ०१-४१९७३३१
०१-४१९७३२६
०१-४१९७३२८



नेपाल खानेपानी संस्थान

शाखा कार्यालय विराटनगर

फोन: ०२१-५१३३२९
०२१-५१४००४

मिति:- २०७८/०५/१८

पत्र संख्या :- २०७८/०७६

चलानी नं.:- ६०

विषय :- प्रारम्भिक वातावरणीय प्रतिवेदन उपर छलफल सम्बन्धमा ।

श्री नेपाल विद्युत प्राधिकरण
शाखा कार्यालय, विराटनगर
विराटनगर, मोरङ्ग ।

उपरोक्त सम्बन्धमा, यस विराटनगर महानगरपालिकामा नेपाल खानेपानी संस्थान विराटनगर शाखाबाट वितरण भई रहेको खानेपानी सेवा प्रवाहमा सुधार ल्याउन जापान सहयोग निकाय (JICA) बाट विराटनगरमा खानेपानी सुधार आयोजना शुरु भईरहेको र त्यस अन्तर्गत तयार भई आएको प्रारम्भिक वातावरणीय अध्ययन प्रतिवेदन उपर छलफल गरि आएका सल्लाह सुझावहरूलाई उक्त प्रतिवेदनमा समवेश गर्न आवश्यक भएकोले तर्वाबाट उक्त छलफल कार्यक्रममा तपसिल बमोजिमको स्थानमा उपस्थिती जनाई दिनु हुन सादर अनुरोध गर्दै उक्त विराटनगर खानेपानी सुधार आयोजनाको लघु जानकारी यसै पत्र साथ संलग्न राखि पठाईएको छ ।

तपसिल :-

स्थान :- विराटनगर महानगरपालिका कार्यालयको सभाहल

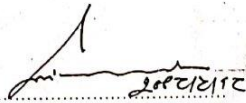
मिति :- २०७८ भाद्र १९ गते ।

समय :- बिहान ८:०० बजे ।

बोधार्थ :-

✓ श्री METCON Consultants

काठमाण्डौ : उल्लेखित कार्यक्रमको लागि आवश्यक समन्वय गर्नु हुन ।



(ई.शैलेन्द्र कुमार शाह)

सहायक प्रबन्धक

कार्यालय प्रमुख

प्रधान कार्यालय
त्रिपुरेश्वर मार्ग
काठमाण्डौ

फोन नं. : ५३४९

Email:- hiratnagar@nwsc@gmail.com

फोन नं. : ०१-४११७३३१
०१-४११७३३६
०१-४११७३३८



नेपाल खानेपानी संस्थान

शाखा कार्यालय विराटनगर

फोन: ०२१-४१३३२९
०२१-४१४००४

मिति:- २०७८/०५/१७

पत्र संख्या :- २०७८/०७९

चलानी नं.:- ५६

विषय :- प्रारम्भिक वातावरणीय प्रतिवेदन उपर छलफल सम्बन्धमा ।

श्री तगर प्रमुख ज्यू
विराटनगर महानगरपालिकाको कार्यालय
विराटनगर महानगरपालिका
विराटनगर, मोरङ ।

उपरोक्त सम्बन्धमा, यस विराटनगर महानगरपालिकामा नेपाल खानेपानी संस्थान विराटनगर शाखाबाट वितरण भई रहेको खानेपानी सेवा प्रवाहमा सुधार ल्याउन जापान सहयोग निकाय (JICA) बाट विराटनगरमा खानेपानी सुधार आयोजना शुरु भईरहेको र त्यस अन्तर्गत तयार भई आएको प्रारम्भिक वातावरणीय अध्ययन प्रतिवेदन उपर छलफल गरि तहाँबाट आएका सल्लाह सुझावहरूलाई उक्त प्रतिवेदनमा समावेश गर्न आवश्यक भएकोले तहाँबाट आवश्यक जनप्रतिनिधी, कर्मचारीहरु एवं व्यक्तित्वहरुले उक्त छलफल कार्यक्रममा तपसिल बमोजिमको स्थानमा उपस्थिती जनाई दिनु हुने आवश्यक व्यवस्था मिलाई दिनु हुन सादर अनुरोध छ ।

तपसिल :-

स्थान :- विराटनगर महानगरपालिका कार्यालयको सभाहल
मिति :- २०७८ भाद्र १९ गते ।
समय :- विहान ८:०० वजे ।


(ई.शैलेन्द्र कुमार शाह)

सहायक प्रबन्धक
कार्यालय प्रमुख
कार्यालय प्रमुख

बोधार्थ :-

श्री ईन्जिनियरिङ्ग महाशाखा
नेपाल खानेपानी संस्थान
प्रधान कार्यालय, त्रिपुरेश्वर, काठमाण्डौ ।

✓ श्री METCON Consultants

काठमाण्डौ : उल्लेखित कार्यक्रमको व्यवस्थापन गर्नु हुन ।

प्रधान कार्यालय
त्रिपुरेश्वर मार्ग
काठमाण्डौ
नेपाल

पो.ब.नं.: ५३४९

Email:- biratnagarwsc@gmail.com

फोन नं.: ०१-४११७३३९
०१-४११७३२६
०१-४११७३२८

ANNEX O: PICTURES OF PUBLIC HEARING



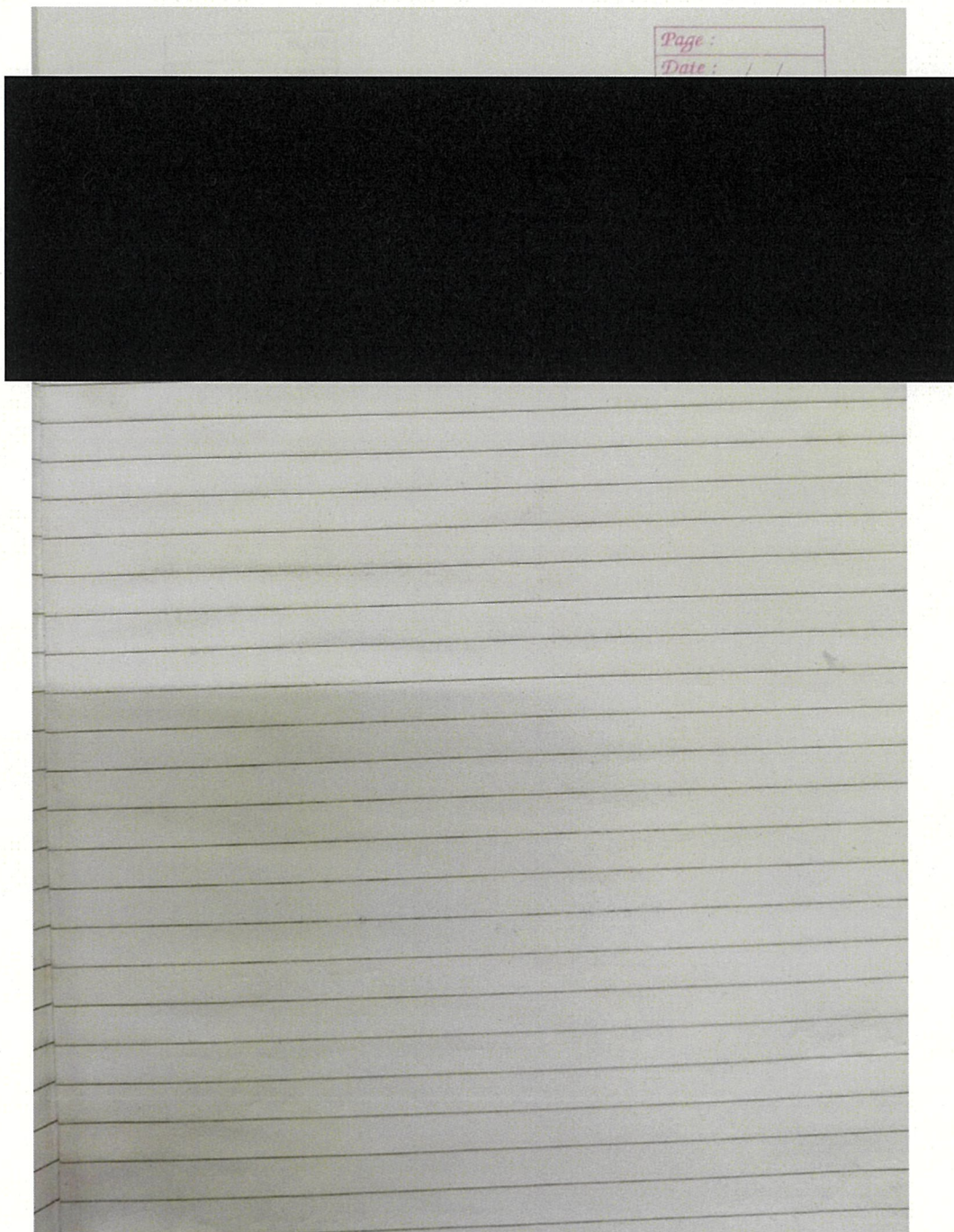




ANNEX P: MEETING MINUTES OF THE PUBLIC HEARING

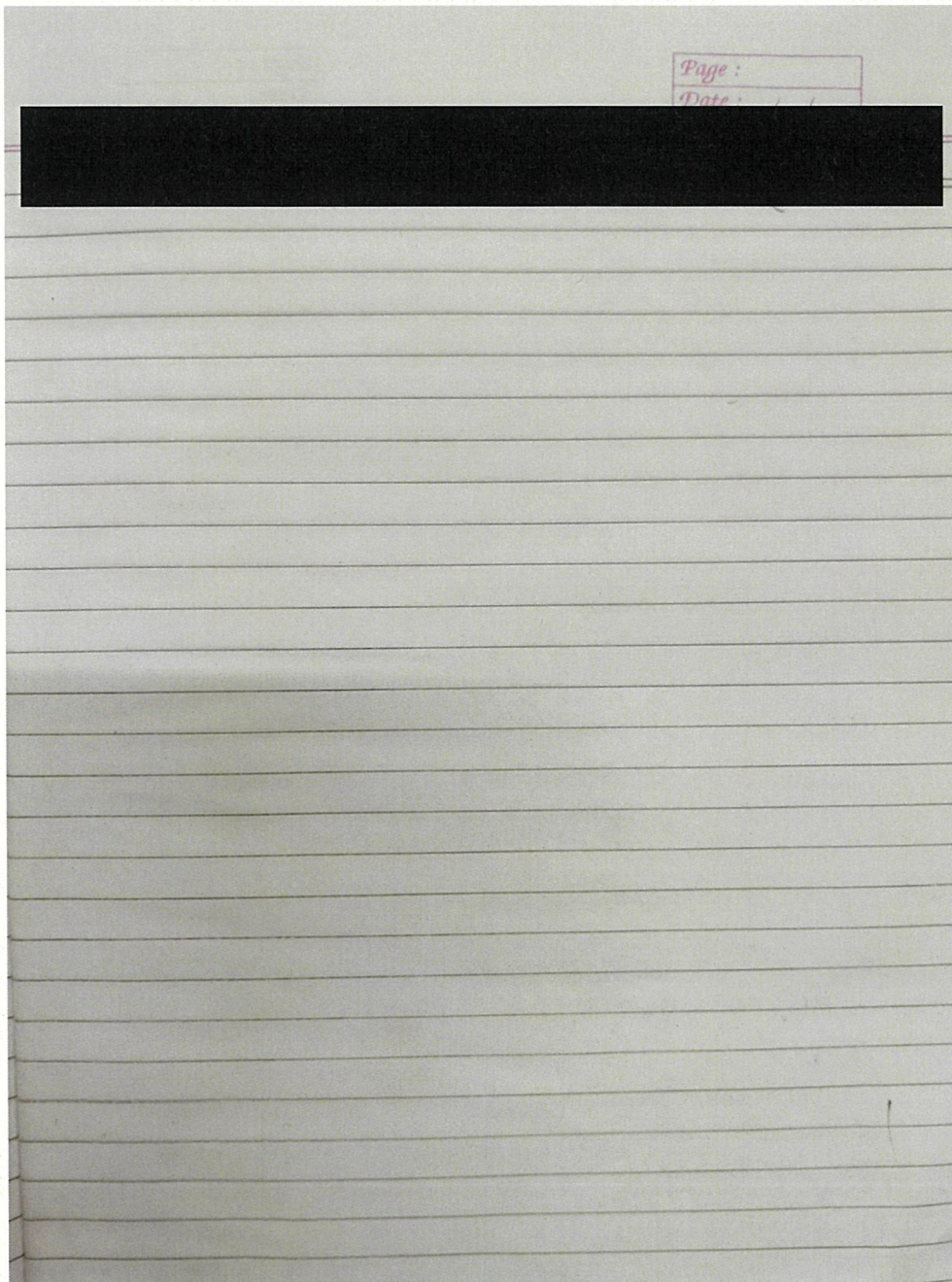
Date: / /

आज मिति २०७८ साल माघ २० गते आइतबारका दिन
नेपाल खानेपानी संस्थान गारका कार्यालय बिराटनगरबाट
वितरण भैरहेको खानेपानी सेवा पुनारु सुचारु ल्याउन
जापान सहयोग निकाय (JICA) बाट बिराटनगरमा
खानेपानी सुधार आयोजना सुरु भैरहेको र त्यस अन्तर्गत
तयार भैरहेको आएको प्रारम्भिक वातावरणिय परियोजना
पुनर्विदलन उपर सार्वजनिक सुनुवाई गर्न मध्य प्रधाननगरपालिका
काड नं. २ का वडा अध्यक्ष श्री मिन कुमार थापाको अध्यक्षता
अध्यक्षतामा वडाको बैठकले तयारित बमोजिमको हलफत गर्दै
देहाय बमोजिमको उपायपति रह्यो।



Date: / /

आज मिति १०७८ साल भाद्र पक्षको शनिवारका दिन नेपाल खानेपानी संस्थान गार्का कार्यालय बिराटनगरबाट बितरण भैरहेको खानेपानी सेवा प्रवाह सुधार ल्याउन जापान सहयोग निकाय (JICA) बाट बिराटनगरमा खानेपानी सुधार आयोजना सुरु भैरहेको र त्यस अन्तर्गत तयार भई आएको प्रारम्भिक वातावरणीय मूल्याङ्कन प्रतिवेदन उपर रम सार्वजनिक सुनवाई गर्न यस महानगरपालिकाका नगर प्रमुख ठीग मिम - पराजुली ज्यू को अध्यक्षतामा बसेको बैठकले तपसिल वमोजिमको हतफल भई देहाय वमोजिमको उपस्थिति रहयो।



ANNEX Q: RECOMMENDATION LETTER FROM THE PROJECT AFFECTED WARDS



विराटनगर महानगरपालिका
नगर कार्यालयको कार्यालय
.....१..... नं. वडा कार्यालय
विराटनगर, मोरङ
१ नं. प्रदेश, नेपाल


मिति: २०६८/११

विषय : राय सुभाष सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको बातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौनती गरि धेरै ठाउँमा भएको चूहाबट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको वेलांमा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा व्य्धान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।


सचिव

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ। त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ। विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ।
३. वन फडानी कम हुने भएकोले।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम: लक्ष्मी प्रसाद शिवालय

पद:

वडा सचिव

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... २ नं. वडा कार्यालय

विराटनगर, झापा

१ नं. प्रवेश द्वार



मिति: २०८१०६१०९

विषय : राय सुझाव सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यब्धान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

- ० निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/वासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।

दस्तखत:

नाम:

पद:



[Handwritten signature]
कमल पोखरेल
उपप्रमुख



विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

.....ने. वडा कार्यालय



मिति: २०६८/०९/१०

विषय : राय सुभाब सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंतती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुप्रिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

२०६८/०९/१०
प्रसाद गुप्ता
सहायक प्रमुख
नगरपालिका



- ० निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन्, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्ने जटिल हुन सक्छ। त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ। विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ।
३. वन फडानी कम हुने भएकोले।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम:

पद:


२०८८/०६/०७
रि. प्रसाद गुरुगाँई
वडा सचिव
काठमाडौं

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल।



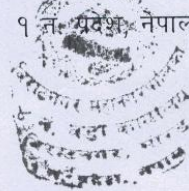
विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... नं. वडा कार्यालय

विराटनगर, मोरङ

१ नं. प्रदेश, नेपाल



मिति: ०६/११/१९

विषय : राय सुभाष सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौंनती गरि धेरै ठाउँमा भएको चूहाबट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलासमा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

०६/११/१९
राय सुभाष
सहायक प्रमुख

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

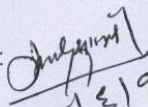
उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत: 
नाम: ०६८१६१९
पद: माध्यम प्रसाद काफ्ले
वडा सचिव



बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।



विराटनगर महानगरपालिका

नगर कार्यलयको कार्यालय

..... २ नगर वडा कार्यालय

विराटनगर नगर

१ नं. प्रदेश, नेपाल

मिति: २०७१/११/३०

विषय : राय सुझाव सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्त जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम:

पद:

मि. नकुमा (आचार्य)
(वडा अध्यक्ष)
प्रमाणित - ५

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... नं. वडा कार्यालय

विराटनगर, मोरङ
१ नं. प्रदेश, नेपाल

मिति: २०८८/०८/०९

विषय : राय सुभाष सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको बातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- ० यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- ० हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- ० निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ धुप्रिदा स्थानीयहरूको आवत जावतमा व्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

२०८८/०८/०९
रामेश्वर विष्ट

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ। त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ। विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ।
३. वन फडानी कम हुने भएकोले।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखतः

नामः

पदः

७/१०/०६/०९

राजकुमार विश्वास

१६/०५/०९

राजकुमार विश्वास
उप सचिव
६ नं. वडा कार्यालय

बोधार्थः

श्री METCON Consultant

काठमाण्डौ, नेपाल।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

.....६..... नं. वडा कार्यालय

विराटनगर, मोरङ

१ नं. प्रदेश, नेपाल

विराटनगर महानगरपालिका
७ नं. वडा कार्यालय
विराटनगर, मोरङ
प्रदेश नं.-१, नेपाल

मिति: २०७३.०७.२१

विषय : राय सुझाव सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ। यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपिँदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ।

(Signature)

- ० निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ ।

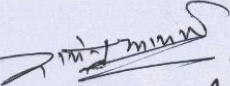
उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखतः  **वडा सचिव**
नामः **राजेश्वर आचार्य**
पदः **गो.प्र.**

बोधार्थः

श्री METCON Consultant

काठमाण्डौ, नेपाल ।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... नं. वडा कार्यालय

विराटनगर, मोरङ

१ नं. प्रदेश, नेपाल



द. नं. १०४४
०६८१५/२०

मिति: २०७८/४/२०

विषय : राय सुभाष सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौंनती गरि धेरै ठाउँमा भएको चूहाबाट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

नबल अयलि
अध्यक्ष

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन्, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/वासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम:

पद:

निश्चल अर्याल
25674190
निश्चल अर्याल
बडा अधीक्षक
बसन्त

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... नं. वडा कार्यालय

विराटनगर, मोरङ



मिति: २०७५.०८.२०

विषय : राय सुभाष सहित सिफारिस गरिएको बारे।

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोन्नती गरि धेरै ठाउँमा भएको चूहाबट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

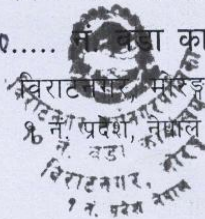
- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुप्रिदा स्थानीयहरूको आवत जावतमा व्य्थान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।



विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

...१०... नगर कार्यालय



मिति: २०७८/०४/३०

विषय : राय सुभाब सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- ० यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- ० हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- ० निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुप्रिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

सहायक उपप्रमुख
सहायक उपप्रमुख

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन्, विशेषगरी बालबालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/वासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वस्थ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको



बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।

दस्तावेज:

नाम:

मुकुन्दचन्द्र उपाध्याय

पद:

प्रशासकीय अधिकृत, शाखा अधिकृत
मुकुन्दचन्द्र उपाध्याय



विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

.....१.५.... नं. वडा कार्यालय

विराटनगर, मोरङ

१ नं. प्रदेश, नेपाल

मिति: २०७८/५/३०

विषय : राय सुझाव सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान

विराटनगर, शाखा ।

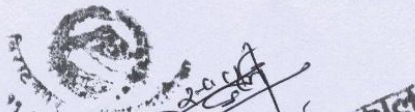
प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- ० यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- ० हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- ० निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।



- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन्, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वस्थ, खानेपानी पुर्‍याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।

दस्तखतः

नामः

पदः



सुरस्वती ढकाल
बडा-मन्त्री



विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

१२००० नं. वडा कार्यालय

विराटनगर, सौरङ्ग

१ नं. प्रदेश, नेपाल

विराटनगर महानगरपालिका
नगर कार्यलयको कार्यालय
१२००० नं. वडा कार्यालय
विराटनगर, सौरङ्ग
१ नं. प्रदेश, नेपाल

मिति: १०८५/११/१०

विषय : राय सुभाष सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा व्यबधान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ । त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/बासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ । विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले ।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ ।
३. वन फडानी कम हुने भएकोले ।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल ।



दस्तखत:

नाम:

पद:

हिरालाल कामत

वडा अध्यक्ष - वि.सं. १२

हिरालाल कामत
वडाअध्यक्ष वडा नं. १२



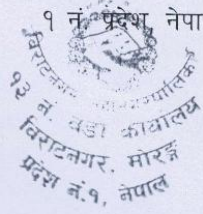
विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

.....१५. नं. वडा कार्यालय

विराटनगर, मोरङ

१ नं. प्रदेश, नेपाल



मिति: २०७२.१४.१९

विषय : राय सुझाव सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान

विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- ० यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको वितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा वितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- ० हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरौंनती गरि धेरै ठाउँमा भएको चूहावट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- ० निर्माण कार्यको बेलामा भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुपेरिदा स्थानीयहरूको आवत जावतमा ब्यब्धान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।


करिलाल महता
अध्यक्ष

- ० निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन्नु जटिल हुन सक्छ। त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/वासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ। विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ।
३. वन फडानी कम हुने भएकोले।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम:

पद:

२१/३९
श्री लाल पौडेल
१३/०६/२०७३
श्रीलाल पौडेल
वडा अध्यक्ष

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल।





विराटनगर महानगरपालिका

नगर कार्यालयको कार्यालय

..... १४.११.२०७८ मा वडा कार्यालय

विराटनगर, मोरङ

१४.११.२०७८ प्रदेश, नेपाल

३२२०

मिति: ०७.११.२०७८

विषय : राय सुभाष सहित सिफारिस गरिएको बारे

श्री नेपाल खानेपानी संस्थान
विराटनगर, शाखा ।

प्रस्तुत विषयमा मिति २०७८ भाद्र २० गते नेपाल खानेपानी संस्थानको कार्य क्षेत्रमा रहेको यस विराटनगर महानगरपालिकाका विभिन्न वडाहरूमा खानेपानी सुधार तथा विस्तार कार्यको लागि जापानी सहयोग नियोग जाइका (JICA) मार्फत अध्ययन कार्यको सार्वजनिक सुनुवाइ सम्पन्न भई तदनुसार कार्यान्वयन हुने आयोजनामा यस क्षेत्रमा निम्नानुसारको वातावरणीय प्रभाव पर्न जाने देखिन्छ:-

(क) सकारात्मक प्रभाव:-

- यस आयोजनाले थप ६,५५२ घन मी. पानी प्रति दिन हालको बितरण प्रणालीमा प्रदान गरि कुल १५,६५२ घन मी. पानी विराटनगरमा बितरण गर्नेछ, जसले गर्दा कुल ९३,७२० जनालाई यस आयोजनाले खानेपानी पुर्याउनेछ ।
- हाल संचालित तीनपैनी, देवकोटा तथा मुनाल पथमा स्थित ३ पम्प स्टेशन हरूको स्तरोंनती गरि धेरै ठाउँमा भएको चूहाबट रोकिने छ । यसले गर्दा ति ठाउँहरूबाट हुने खानेपानीको प्रदुषण न्यूनीकरण गर्न सकिन्छ, जसको कारण फोहोर खानेपानी बाट हुने रोगलाई पनि न्यूनीकरण गर्न सकिन्छ ।

(ख) नकारात्मक प्रभाव:-

- निर्माण कार्यको वेलासम्म भुईँ खन्ने कारणले बाटो घाटो अवरुद्ध हुनका साथै उत्खनन गर्दा आउने माटो सडक छेउ थुप्रिदा स्थानीयहरूको आवत जावतमा ब्यब्धान आउनुका साथै त्यस स्थानहरूको सुन्दरतामा पनि असर पर्नेछ ।

१४.११.२०७८

- निर्माणको दौरान, वायु प्रदूषण, नेत्र जलन र अन्य श्वास-प्रश्वास सम्बन्धी समस्याहरु पर्न सक्छन, विशेषगरी वालवालिका र ज्येष्ठ नागरिकहरुमा यो समस्या अझ भन जटिल हुन सक्छ। त्यसैगरी ध्वनि प्रदूषणले स्थानीय जनता/वासिन्दाहरुलाई असहज अवस्था हुन सक्नेछ। विशेष गरी रातको समयमा सामान्य ध्वनि पनि कर्कस हुने हुनाले निर्माणक्षेत्र नजिकका मानिसहरुको निद्रा प्रभावित हुनसक्छ।

उल्लेखित प्रभावको आधारमा सकारात्मक प्रभाव अभिवृद्धि गर्ने र नकारात्मक प्रभाव न्यून गर्ने वातावरणीय व्यवस्थापनको योजना कार्यन्वयन गर्दा उल्लेखित प्रस्तावको सकारात्मक प्रभाव बढी हुने देखिएकोले उल्लेखित प्रस्ताव निम्न आधारमा कार्यन्वयन गर्न मिल्ने व्यहोरा उल्लेख गरी यो सिफारिस गरिएको छ।

प्रस्ताव कार्यन्वयन गर्न मिल्ने आधार:

१. प्राविधिक हिसाबले उपयुक्त भएकोले।
२. आयोजनाले बढ्दो जनसंख्यालाई स्वच्छ खानेपानी पुर्याउने छ।
३. वन फडानी कम हुने भएकोले।
४. स्थानीय जनताको यस संरचना निर्माणमा सकारात्मक सहभागिता तथा रचनात्मक सहयोग रहेकोले

प्रस्ताव कार्यन्वयन गर्न नमिल्ने आधार :

१. खासै उल्लेखनीय केही नभएको

दस्तखत:

नाम:

पद:

रामे. ५
२१/१०
सचिव

बोधार्थ:

श्री METCON Consultant

काठमाण्डौ, नेपाल।

