

Transformation of the Kathmandu Valley through improved water supply, sanitation and sewerage management

Message from KUKL-PID

Kathmandu Upatyaka Khanepani Limited, Project Implementation Directorate (KUKL-PID) is working round the clock with its mission of providing safe drinking water to the residents of the Kathmandu Valley. PID scope covers a number of projects for development of infrastructures for water supply and one project for wastewater management in the Kathmandu Valley.



Kathmandu Valley Water Supply Improvement Projects (KVWSIP) include construction of essential infrastructure for efficient water supply while Kathmandu Valley Wastewater Management Project (KVVMP) covers construction and rehabilitation of Wastewater Treatment Plants (WWTP), Intercepting Sewers and Decentralized Wastewater Treatment Plants (DEWATS) in different locations in the Kathmandu Valley.

Infrastructure development for water supply operation in the Kathmandu Valley is gaining momentum. Till December 2022, PID has completed around 77 km pipeline of Bulk Distribution System (BDS) and 10 Service Reservoir Tanks (SRTs) with total storage capacity of 74,000 m³ at nine different locations. Similarly, approximately 1,006 km of distribution networks have been laid in the first phase, serving population of around 1.26 million with about 103,000 households in the Kathmandu Valley under ADB financing. Out of 1,006 km of DNI, 545 km has been commissioned and tested. Additional work under the Government of Nepal financing includes 10.84 km of BDS, 3 SRTs with capacity 30,000 m³ and DNI of about 800 Km. To further cater the needs of remaining areas, Second Kathmandu Valley Water Supply Improvement Project (approximately additional 800 km of DNI work) with ADB financing is under consideration for the augmentation of drinking water in Kirtipur, Madhyapur and Bhaktapur Municipalities.

Under wastewater component, the Guheshwori WWTP-Nepal's first modern WWTP is in operation. Similarly, two DEWATS at Gokarna and Hanumanghat of Bhaktapur are under construction. Rebidding has been initiated for construction and operation of treatment plants at Dhobighat, Balkumari (Kodku) and Sallaghari.

Finally, I would like to thank Kathmandu Valley residents and the stakeholders for their immense support in carrying out activities for a successful completion of Melamchi Khanepaani Project.


Er. Rajendra Sapkota
(Project Director)



■ Former honorable Prime Minister Sher Bahadur Deuba inaugurating Guheshwori Wastewater Treatment Plant at Guheshwori, Kathmandu on July 31, 2022.

Guheshwori Wastewater Treatment Plant operating in a full swing

Former honorable Prime Minister (PM) Sher Bahadur Deuba inaugurated the Guheshwori WWTP on July 31, 2022 amid a program organized by Ministry of Water Supply, KUKL-PID. During the program, former PM appreciated the PID efforts towards improving the water quality and preserving ecosystem of urban rivers. Former PM Deuba said that WWTPs played a significant role in maintaining the water quality of Bagmati River as well as supporting the promotion of religious tourism. He reiterated government's commitment to support the project and also directed concerned authorities to speed up the construction of WWTPs in other places such as Balkumari, Dhobighat, Sallaghari and Gokarna.

Former Minister for Water Supply, Umakant Chaudhary, Mayor of Kathmandu Metropolitan City, Balendra Shah, secretary and officials from Ministry of Water Supply, Country Director of Asian Development Bank, Nepal Resident Mission, Project Director and officials from KUKL- PID and dignitaries from various national and international organizations and other concerned were present in the program.

Guheshwori WWTP is currently operating in a full swing. At present, the treatment plant is treating 32.4 million liters of wastewater every day, which is discharged to the holy Bagmati River after treatment where various Hindu rituals, are performed including cremation. Currently, around 300,000 people residing in Chabahil, Boudhha, Jorpati and surrounding areas are directly benefitted from the WWTP. This plant has not just preserved the beauty of rivers and ecosystem but also played significant role in creating higher impacts on health outcomes of the Kathmandu inhabitants.

Furthermore, this treatment plant has enriched the river water with high concentration of oxygen. Biochemical Oxygen Demand (BOD₅), a measurement of organic pollution in water, concentration of the treated water is maximum 10 ppm, which is lesser than the National standard set out by the government i.e. 50 ppm. Low BOD₅ means water is purer and very much suitable for aquatic life as well as to maintain the aesthetic quality of rivers and streams.

Kathmandu Valley Water Supply Improvement Project at a Glance

KVWSIP, commonly known as Melamchi Subproject-II, is Nepal government's 'National Pride Project'. It is being implemented under the financial assistance of Asian Development Bank (ADB) and Government of Nepal (GoN), while the executing agency for the project is Ministry of Water Supply and the implementing agency is KUKL-PID.

PID scope under KVWSIP covers development of infrastructure, from laying pipelines for bulk water transmission to household connection and meter installation, free of cost to the public. The contracts under ADB funding (BDS 1, BDS 2, BDS 3 and BDS 4) are almost complete including all the commissioning.

The major infrastructure works under GoN financing included construction of (i) additional 10.84 km BDS pipeline from Sundarjal to Chabahil (BDS-05) to augment the present transmission line capacity from 222.5 MLD to 510 MLD, (ii) three SRTs (with 6,000 m³ capacity at Kirtipur, 8,500 m³ capacity at Mahankalchaur and 19,000 m³ capacity at Old Balaju Reservoir, and (iii) approximately 796 km of distribution network improvement. The works for BDS, 2 SRTs and DNIs are progressing well whereas, procurement of SRTs at Old Balaju Reservoir are being initiated.

Likewise, Second Kathmandu Valley Water Supply Improvement Project (SKVWSIP) is in the pipeline with ADB financing. All the preparatory works are almost complete and will be presented on ADB Board of Directors as soon as the Melamchi Headworks damage issues are resolved. SKVWSIP will include approximately additional 800 km of DNI work with population of 430,000 and 103,000 number of households in Kirtipur, Madhyapur and Bhaktapur Municipalities.

Current status of the Bulk Distribution System as of December 2022

BDS packages	Target (km)	Progress (km)	Remarks
BDS-01	9.57	9.57	Completed
BDS-SRT-0 1	11.26	11.26	Completed
BDS-SRT-02	25.37	25.37	Completed
BDS-SRT-03	15.06	15.06	Completed
BDS-SRT-04	14.55	14.55	Completed
BDS-05	10.84	0.76	Construction Ongoing
Total	86.65	76.57	

DNI packages-Target (primary plus secondary and tertiary pipeline)

DNI packages	Target (km)	Progress (km)	Cumulative Progress (%)	Remarks
DNI pkg 1	302.10	302.10	100	Commissioning Ongoing
DNI pkg 2	305.05	305.05	100	Commissioning Ongoing
DNI pkg 3	175.76	175.76	100	Commissioning Ongoing
DNI pkg 4 (7A)	223.05	223.05	100	Commissioning Ongoing
Total	1005.96	1005.96	100	
DNI pkg 5 (7B)	233.06	135.69	29.72	Construction Ongoing
DNI pkg 6 (7C)	283.29	181.76	33.86	Construction Ongoing
DNI pkg 7 (9A Mandikhatar)	129.50	85.94	30.12	Construction Ongoing
DNI 9A-1 Kapan	150.33	73.08	38.57	Construction Ongoing
Total	796.18	476.47	59.84	

Water network of Kathmandu Valley using valves actuated with SCADA

PID is in the process of managing the water supply network in the Kathmandu Valley using valves actuated with Supervisory Control and Data Acquisition (SCADA) system, which is a centralized monitoring and control system for water network and supply mechanisms.

This is a fully automatic system where water supply networks can be seen, monitored, and controlled by the SCADA system installed in the central control room located in KUKL office, Panipokhari. Similarly, equal distribution of water as per consumption capacity, measurement of chlorine and turbidities in the BDS outlet, pressure management through air valves in BDS, DNI and primary line can also be tackled by the SCADA system. This system further collects and shares important data and information related to the water supply network from across infrastructure in real time.

Initially, the SCADA system will have details of 15 reservoirs in the BDS and 46 outlets along with 140 air valves in the water distribution system. At present, 15 Reservoir Management Unit (RMU) chambers are under construction and the design of Outlet Management Unit (OMU) is going on.

A joint venture of two French and a Nepali contractor, VCGP-WMI-Kalika JV has signed the contract agreement on 29th September 2020



■ Construction of RMU Chamber at New Bansbari, Kathmandu is in progress

for SCADA contract which is a design, build and operate contract. In the pilot phase, 1,000 smart meters will be installed in Anamnagar area (DNI 4) and Chamati area (DNI 10) to test the smart technology of the SCADA system. This is the first effort of such kind towards water utility automation in the country. Its success will be replicable in other water system of the country.

Delay in completion of work

Disruption of Melamchi water, due to unprecedented floods of 2020, restricted the KVWSIP from realization of the project objectives. Major part of the KVWSIP components is nearing final construction stage but the unavailability of the water has delayed in various activities such as testing, commissioning and disinfection of DNI pipelines, completion of house connection to the consumers and non-revenue water assessment.

Key Challenges

The KVWSIP is continuously lagging behind to meet its target because of third party damage in various locations. Damages in the pipelines are not visible due to delay in resumption of water supply from Melamchi. Such damages are likely to exacerbate with the extension of the contract completion periods of the DNI contractors.

MUN ROAD contract terminated

Road reinstatement works for municipal road under DNI packages (MUN ROAD contract) was terminated due to contractor's poor performance. Major works in this contract were 12,000 m³ asphalt works of about 110 km municipal roads with other associated works such as drain, base work etc. Before contract termination, only about 6,000 m³ (around 45 %) asphalt work is completed so far.

Kathmandu Valley Wastewater Management Project (KVVMP)

There are six major tributaries of Bagmati river namely Bishnumati, Dhobikhola (Rudramati), Manohara, Tukucha (Ichhumati), Nakkhu, and Balkhu and five major sub-tributaries i.e. Godavari, Hanumante, Sangla, Mahadev Khola, and Kodku khola with all the important religious and cultural heritage. But due to rapid and unplanned urbanization in the Kathmandu Valley, almost all rivers have been converted to sewers as 60 per cent of the river lengths passes through urban settlements. Large portion of clean water from upstream of rivers have been diverted into water supply system leaving the rivers virtually dry. At the same time, the sewage collected is being discharged directly into the river without treatment. As a result, the rivers are virtually converted into drainage.

Considering the situation, Kathmandu Valley Wastewater Management Project (KVVMP) was initiated in 2013 to revive the beauty of Kathmandu rivers by discharging only treated water, rich in oxygen, into the rivers. PID scope under KVVMP covers construction and rehabilitation of five Wastewater Treatment Plants (WWTP) and two Decentralized Wastewater Treatment Plants (DEWATS) in different location in the Kathmandu Valley. To realize its scope, PID has prepared 'The Sewer Network Master Plan' under the KVVMP, which includes construction of Intercepting Sewers (IS) along the rivers- Hanumante, Manohara, Khasyang Khusung and Sewer Network rehabilitation in Lalitpur Metropolitan City (LMC) and Gokarna Municipality. Regarding the progress status,

Progress status of ongoing contracts under KVVMP as of December 2022

SN.	Contract Package	Target (km)	Progress (km)	Overall Progress
1	IS01 (Hanumante Interceptors)	16.72	16.72	100% (Completed)
2	IS02 (Manohara Interceptors)	6.05	6.05	100% (Completed)
3	IS03 (Khasyang Khusung)	7.68	7.68	100% (Completed)
4	SN03 (Patan Sewer)	2.8	1.52	53.90 %
5	SW01 (Baluwater Stormwater pipeline)	1.23	0.90	32.50 %

Progress status in WWTP construction as of December 2022

SN.	Contract Package	Total Capacity	Progress
1	TP-01 (Guheshori WWTP)	32.4 MLD	Completed and in operation since 2020
2	TP-03 (Dhobighat WWTP)	37 MLD	84.40 %
3	DEWATS01 (Gokarna and Hanumanghat)	4 MLD	2.2 %

Guheshwori Wastewater Treatment Plant (32.4 MLD) has been completed and in operation since October 2020, and others are under construction. Besides that, two small DEWATS; at Gokarna (3 MLD) and Hanumanghaat (1 MLD) are also under implementation.

Intercepting Sewers

Intercepting sewers have been constructed along major tributaries and sub-tributaries of Bagmati

River. Altogether, construction of 16.72 km out of 25 km intercepting sewers along Hanumante, 6.05 km out of 11 km along Manohara and 7.68 km along Khasyang Khusung have been completed. Interceptors along Manohara and Hanumante couldn't be completed as planned due to Right of Way issues. These intercepting sewers are very important for carrying the domestic sewers to the Treatment Plants where the wastewater is treated and discharged again into the rivers.

Contract terminated

Contract package for construction of wastewater treatment plants at Sallaghari, Kokdu and Dhobighat (TP02) was terminated because of the contractor's poor performance. The overall progress under this contract was 27.1 per cent only in last 6 years. Procurement of the remaining works under TP-02 has been initiated with preparation of new bidding document.

Contract awarded for DEWATS

PID has awarded contract for construction of DEWATS at Gokarna and Hanumanghat. The contract was awarded in March 2022 with contract period 18 months. After the completion of these DEWATS, the river systems along Hanumante upstream of Sallaghari and Bagmati upstream of Gokarna are expected to revive with treated water. Similarly, the bidding documents have been finalized for the construction of Gokarna Sewer Network.

Sewer rehabilitation work in Patan

KUKL-PID in collaboration with Lalitpur Metropolitan City has taken the responsibility of sewer network management in Patan Durbar Square area which has been a burning issue since a long time. This is a 2.8 km sewer rehabilitation work in the core area of LMC (SN03) which is anticipated to relieve Patan inhabitants from years long water-logging and inundation particularly along World Heritage site of Patan Durbar Square. This package includes extension and construction of sewer system from Lagankhel Bus Stand area to Sankhamul and from Kumariapati Tole at Sontha via Ititole, Ikhalkhu, Mahapal Junction and Kwalkhu. Currently, sewer pipe laying works in the stretch between Mangalbazar to Lagankhel chowk at SN03 is gaining momentum. This stretch is a busy commercial area with dense public movement during day time and it is difficult to execute construction works using heavy equipment. Citing this scenario, contractor has started work at night time too. Commencement

of work in two shifts is likely to complete pipe laying works before the upcoming monsoon.

Heritage Impact Assessment of Patan Durbar Square

Since the sewer rehabilitation work at SN03 lies in the world heritage site, Heritage Impact Assessment of Patan Durbar Square was conducted before commencing construction works to ensure that project's activities have minimal impact on sensitive heritage and cultural assets.

Baluwater Stormwater Management

KUKL-PID has started laying of pipelines at Baluwater covering Prime Minister's official Residence, with management of stormwater in the area with Government of Nepal sole financing. This is a 1.23 km stormwater management work that began in March 2022 and expected to be completed by June 2023. At present, manhole construction, box culvert construction and other works are ongoing in the area.

Community Awareness and Mobilization Activities by CASSC-03

School programs to raise awareness among students



Award ceremony of Speech competition held at Baneshwor-based Shree Ratna Rajya Secondary School.

PID is organizing various awareness raising activities in public schools in the Kathmandu Valley to mobilize school children as agents of change in the water, sanitation and hygiene sector.

This year PID organized two Kathmandu valley-wide inter-school programs and an intra-school program. In June 6, PID in association with Naxal-based Shree Nandi Secondary School, organized an inter-school poetry competition titled 'Environment Conservation and its importance' on the occasion of World Environment Day-2022. A total of 25 students from 15 public schools from Kathmandu, Lalitpur and Bhaktapur district had participated in the competition.

Similarly, another inter-school program included speech competition titled 'Management of drinking water and environmental protection'. This program was held at Shree Ratna Rajya Higher Secondary

School on 13th December, 2022. A total of 25 students from 13 public schools had participated in the program.

Likewise, an art competition titled 'Clean water, healthy life' was also held among girl students of Adarsha Kanya Niketan Secondary School on November 14, 2022. A total of ten students from grade VI to X had participated in the competition.

Community Awareness and Social Safeguard Consultants (CASSC-03) under KUKL-PID has been organizing school programs especially in public schools inside Kathmandu Valley aligning with project areas to aware public about the importance of water, health and sanitation. School program aims to prepare students as agents of change to sensitize their families and neighbors about the importance of drinking water, wastewater management and its benefits to Kathmandu denizens.

Socio-Economic Household Survey in the Kathmandu Valley

PID started a socio-economic baseline survey to find out the socio-economic condition of the people in the project area. A total of 5,500 households have been selected as sample and exploratory research design has been adopted. Data collection for the survey has been completed and data analysis is ongoing. This survey will validate and establish baseline data on the situation of the people in the service area of KUKL operation. The survey will prepare the report based on the socio-economic information of households with gender specific characteristics and with the indicators on income, health/nutrition, incidences of water borne diseases, education, occupational categories with influential positions and existing water source, among others.



Art by Kabita Ghising, who bagged first prize in intra-school art competition held at Adarsha Kanya Niketan Secondary School.

GESI orientation to sensitize KUKL and PID officials

PID organized a Gender Equality and Social Inclusion (GESI) orientation program on 1st December, 2022 with an objective to familiarize and sensitize KUKL-PID officials about the GESI concepts, theory, framework and methodology.

GESI is a serious global challenge and our development partners are committed towards its compliance in every project and activities to ensure that women, the poor and other socially excluded groups, being one of the important factors, share equal benefits during the implementation of the project. Therefore, PID- the implementing agency of projects funded

by ADB and Nepal Government, organized the program to strengthen the capacity of all stakeholders on GESI implementation.

Senior officials from KUKL and PID, engineers from Design and Supervision Consultants, experts and Team Leader of CASSC-03 had participated in the program. Subechha Khadka, GESI Consultant from ADB, Kamal Adhikari, senior sociologist from Ministry of Urban Development and Vidhya Bhandari, sociologist from PID shared their insights and experiences on GESI and its mainstreaming in various projects as well as its implementation in PID.

During the program, KUKL which is a service provider, was urged to mainstream GESI within the organization for effective delivery of its services. Laxmi Pant, Chief, Safeguard Unit, PID said that there was a dire need of GESI compliance in KUKL than in PID. Similarly, Prakash Kumar Rai, Manager, KUKL also assured to design a separate GESI unit while restructuring the office for GESI compliance.

Overall, the program was a good platform to elucidate on GESI implementation in KUKL-PID and its project activities, and interaction between the implementing agencies.

OUR REQUEST

Project Implementation Directorate apologizes for inconvenience to the public during the implementation of the national pride project and appeal everyone to support this project for the betterment of everyone residing in the Kathmandu Valley.

**Kathmandu Upatyaka Khanepani Limited (KUKL)
Project Implementation Directorate (PID)**

Anamnagar, Kathmandu, Phone No: 01-5705771, 5705916, 5705148, Fax: 01-5705057, **Toll-free no:1139**
Email: pidkukl@gmail.com | **Website:** www.kuklpid.org.np | **Facebook:** http://www.facebook.com/pidkukl