THE BEACON PROJECT

THE BEACON PROJECT

ANNUAL REPORT

APRIL 2023 – MARCH 2024

CONTENTS

1 EXECUTIVE SUMMARY 3
2 KEY HIGHLIGHTS 3
3 INTRODUCTION 4
4 PROJECT GOVERNANCE 5
5 MAP OF THE LAHAN MUNICIPALITY 6
6 OUTCOME 1: Water security 7
7 OUTCOME 2: Safe clean water 11
8 OUTCOME 3: Sanitation with dignity 14
9 OUTCOME 4: Sustainable faecal sludge management 16
10 OUTCOME 5: A legacy that grows 17

On the cover: Jayanti Chaudhary, 18, washing her hands at the water facilities, Shree Secondary School, Lahan, Nepal, October 2023.
Credit: Ram Saran Tamang

1. EXECUTIVE SUMMARY

Between April 2023 and March 2024, The Beacon Project continued to drive progress towards universal access to water, sanitation and hygiene (WASH) in the Lahan Municipality in southeastern Nepal.

All of the partners – Anglian Water (and its alliance partners), WaterAid, the Nepal Water Supply Corporation (NWSC) and the Lahan Municipality – have continued to be steered by 'The Beacon Project Co-Creation Strategy', which is split into five separate outcomes: (1) Water security (2) Safe clean water (3) Sanitation with dignity (4) Sustainable faecal sludge management and (5) A legacy that grows. This report is structured to consider how project interventions and activities during 2023/24 have contributed to each of these outcomes.

HIGHLIGHTS OF 2023/24:

NWSC Lahan extended its service area with a satellite network in Lahan Ward 24.

An additional **2,396** people from **400** different Dalit households have access to safe water from the NWSC connection.

136 people from **20** Dalit households have access to sanitation with the construction of one community toilet at Ward 22.

TWO ADDITIONAL BOREHOLES were drilled in the southern areas of the NWSC Lahan supply network.

889 new tap connections to the NWSC Lahan network.

Over **1,500** more students now have access to clean water in their school.

Nearly **2,400** students attended a course of six hygiene behaviour sessions with topics including safe clean water, handwashing and menstrual health.

OVER 1,100 more students now have renovated toilets in their school.

An additional **6,600** visitors at a health care facility now have clean water and safe sanitation services.

Two international conferences attended to disseminate learning about the project.

432 from **5 DALIT** communities participated in a six-session hygiene behaviour change program.

Lahan supply network now functioning for an average of **10 HOURS EVERY DAY.**

OVER 22KM of water distribution pipeline was installed

The Beacon Project continues to be a world-leading example of how the transition towards universal access to safe and affordable WASH services can be driven at regional scale (as required by the UN's Sustainable Development Agenda).

2. INTRODUCTION

Roshan, 14, washing his face in the existing water facility at his home, Lahan-14, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

The United Nations Sustainable Development Agenda stipulates that everyone should have access to safely managed drinking water and sanitation services by 2030. Based on the latest figures from the Joint Monitoring Programme (JMP) in 2022, only 16% of people in Nepal use safely managed drinking water services, while 51% have safely managed sanitation facilities. Like so many countries around the world, Nepal urgently requires transformative and rapidly scalable initiatives which will accelerate the transition towards universal water, sanitation and hygiene (WASH) services.

The Beacon Project aims to be such an initiative by driving this transition in a specific geographic context – the town of Lahan in southeastern Nepal. The project is 15-year collaborative commitment between WaterAid, Anglian Water (a UK water company), the Nepal Water Supply Corporation (NWSC) and the Lahan Municipality. All partners contribute funding, knowledge and experience to drive project activities. As such, Anglian Water (and their industrial Alliance partners) are not just donors – they channel relevant technical and strategic expertise in response to the stated requirements of the NWSC and other local partners. In fact, financial contributions to project activities have evolved across the project's lifetime and now the majority comes from the Nepalese partners. The project also has other collaborating partners, including with the Nepalese Ministry of Water Supply and local NGO 'Dalit Jankalyan Yuba Club' (DJKYC).

The Beacon Project is structured into five separate work packages, the first four of which are: (1) Water security (2) Safe clean water (3) Sanitation with dignity and (4) Sustainable faecal sludge management.. In each of these, the project seeks to improve both the technical and institutional capacity of institutional providers for delivering safe, inclusive and sustainable WASH services. Technical capacity is improved through the collaborative design and installation of urgently needed infrastructure (borehole wells, pipelines, community toilets, a water quality laboratory, a faecal sludge treatment plant etc.). Institutional capacity is improved through the identification and addressing of key institutional requirements (business plans, asset maintenance regimes, standard operating procedures etc.).

The fifth work package – 'A legacy that grows' – ensures that the project disseminates the knowledge accumulated in Lahan, thereby driving the widescale transition towards universal WASH in other contexts. As such, the project already has numerous examples of influencing wider change in WASH providers across Nepal (e.g., borehole drilling specifications).

The Beacon Project is demonstrating how, through long-term collaborative commitment to improving the technical and institutional capacity of WASH service providers, to bring about sustainable and impactful changes in the living standards of society's most impoverished communities.

3. GOVERNANCE

The Beacon Project has a two-tiered governance structure, with a Board providing strategic direction and a Project Steering Committee (PSC) driving tactical decision making on activities. The two groups met throughout 2023/24:

THURSDAY 15 JUNE 2023 – PROJECT STEERING COMMITTEE MEETING

The Lahan Municipality was approached to offer land on two further borehole sites. The new FSTP site in Lahan Ward 15 was confirmed and boundary wall will be constructed. The Municipality agreed to financially support 400 Dalit Connections.

TUESDAY 4 JULY 2023 – BEACON BOARD MEETING

Each project partner provided an update on progress since the last Board. Details on the project's plan and budget for FY 2023/24 were presented and formally approved. Commitments were agreed to support NWSC expansion into Lahan's rural wards, as well as continued pursuit of construction of an FSTP.

TUESDAY 29 SEPTEMBER 2023 – PROJECT STEERING COMMITTEE MEETING

NWSC now formally adopted a satellite water supply scheme in Lahan Ward 24.The boundary wall of FSTP was started by DJKYC. The WASH Act for Lahan Municipality was drafted.

SUNDAY 26 NOVEMBER 2023 – BEACON BOARD MEETING

Each project partner provided an update on progress since the last Board. There were commitments to progress with urban supply network segmentation, continue developing NWSC business plan, expand financial commitments to assist Dalit connections in Ward 24.

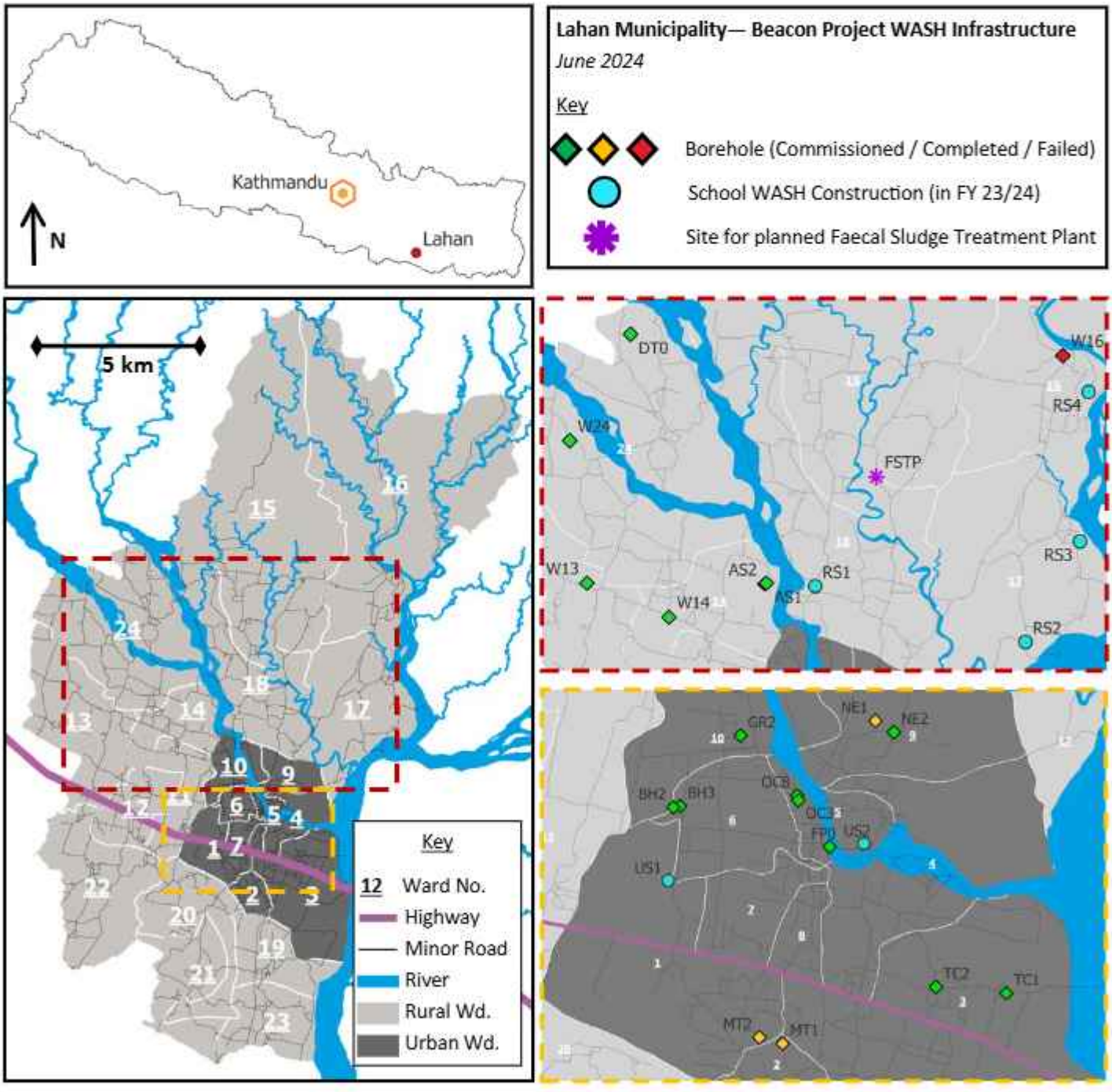
FRIDAY 1 MARCH 2024 – PROJECT STEERING COMMITTEE MEETING

Agreement to attempt the rehabilitation of four rural water supply schemes (and subsequent pump tests) in Lahan Wards 13, 14, 16 and 24. The dispute over the FSTP boundary wall construction was raised and discussed. The Municipality committed to support electrification of Danda Tole community to enable borehole pump operation in Lahan Ward 24.

Representatives from The Beacon Project Board meet in December 2023.
Credit: WaterAid / Kabindra Pudasaini

4. MAP OF THE LAHAN MUNICIPALITY

The context of Lahan is given in the following map:



A map of the Lahan Municipality with (i) key WASH infrastructure locations and (ii) location of school WASH infrastructure programme in 2023/24.

5. OUTCOME 1:
WATER SECURITY

We have continued our efforts to ensure the sustainable access to clean drinking water for all residents of Lahan, by conducting the following activities:

5.1. CONTINUED DRILLING OF NEW BOREHOLES

Three new deep tube wells were drilled with support from the project (*MT1, MT2,* and *DT0* on the map). As in previous years, the construction was supervised by an experienced local hydrogeologist (in consultation with Anglian Water and NWSC), ensuring quality materials and rigorous construction procedures were used. This is vital to ensuring the longevity of quantity and quality of subsequent water yields.

Bores *MT1* and *MT2* will provide much needed operational resilience to the southern areas of NWSC's Lahan supply network, while DT0 is part of a rural community-managed system in the Lahan Ward 24. For the first time in Lahan, the top thirty meters of bores *MT1* and *MT2* were properly sealed to protect the sources from any contamination from the surrounding shallow aquifer.

Across March 2024 NWSC's Lahan network recorded an average input of 5.4 million litres per day (MLD) from nine functional boreholes (*TC1, TC2, NE2, BH2, BH3, GR2, FP0, OC8* and *AS2*).

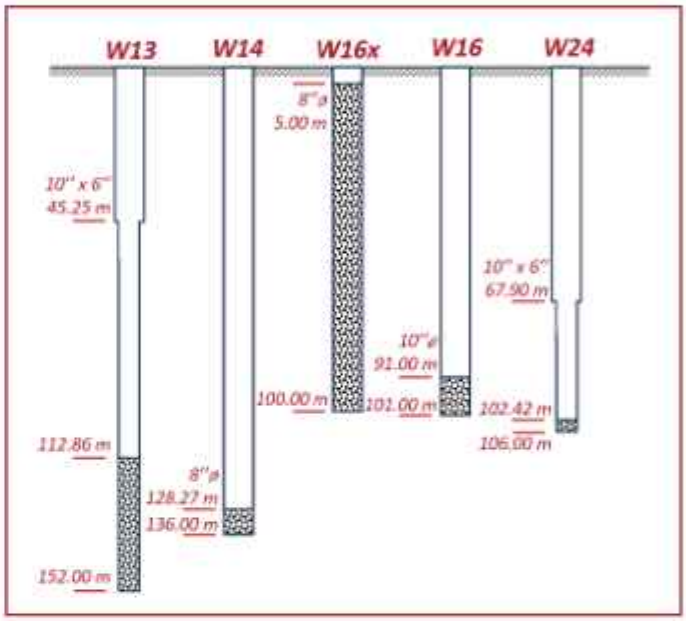
Rup Yadav, Beacon Technical Officer for WaterAid, assessing the functionality of the water distribution system at one of the project sites. Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

5.2. INITIAL EXPANSION OF NWSC SUPPLY NETWORK INTO SURROUNDING RURAL WARDS

With the improved reliability and consistency of NWSC Lahan's urban supply network, the Municipality transferred an existing 'community-managed' supply system in Lahan Ward 24 into NWSC ownership during July 2023. The Beacon Project has facilitated this expansion by assessing the existing assets (consisting of a borehole, overhead water tower and pipe network), conducting infrastructure and drone surveys and providing technical expertise for rehabilitating the system. So far, this 'satellite' network has been connected to 100 properties (including 41 Dalit households), with more planned.

Similarly, the Municipality decided to transfer three further rural schemes (in Lahan Wards 13, 14 and 16) into NWSC control during 2024. To facilitate this process, The Beacon Project has conducted an initial survey of five existing boreholes (the results of which are given below).

Given the substantial infill of borehole *W16x* (as shown on the right), it was considered unfeasible for rehabilitation. At the request of the PSC in March 2024, the four other boreholes (*W13, W14, W16* and *W24* – locations shown on the map) will now undergo cleaning, drilling and test pumping procedures before being incorporated into satellite NWSC systems supplying widespread rural communities.



Results from a survey of five existing boreholes in rural wards of Lahan.

5.3. CONTINUED CCTV SURVEILLANCE OF BOREHOLES

The Beacon Project team carried out 11 CCTV camera surveys in 2023/24 (*GR2, FP0, W13, W14, W16x, W16, W24, DT0, OC8, MAT1, MAT2*). The results for each were reported to key stakeholders and informed ongoing asset management procedures.

WaterAid partners for The Beacon Project engaging in a technical session led by Anglian Water, Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

Phalendra Bista, Lab Chemist at Nepal Water Supply Corporation (NWSC) Lahan, Carl Faisey, Optimisation and Development Scientist at Anglian Water, Kabindra Pudasaini, Beacon Lead for WaterAid Nepal, examining the drinking water processing and supply system at the NWSC facility, Lahan, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

5.4. INCREASED NWSC LAHAN SUPPLY HOURS

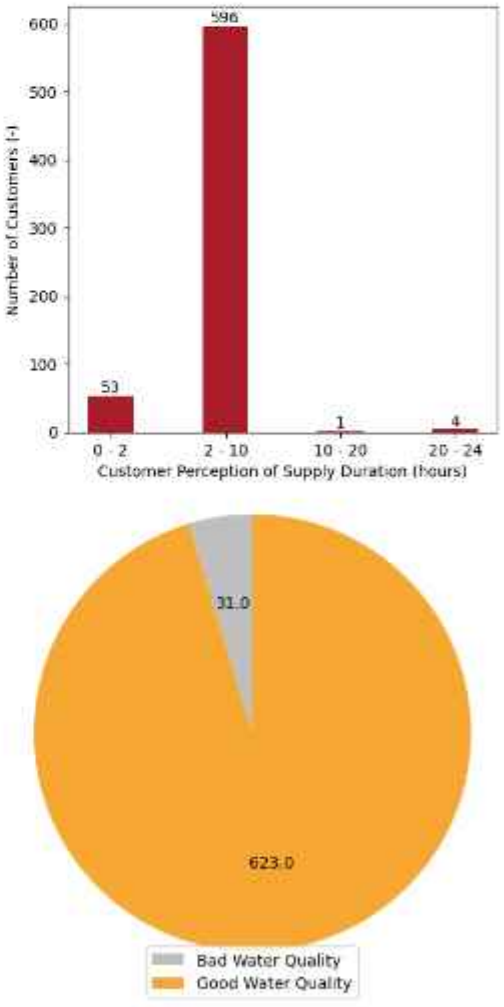
At the end of March 2024 NWSC was supplying water for ten hours per day, split between five in the morning and a further five in the afternoon. This represents an increase of two hours since the last fiscal year (and a doubling since the start of the project). Interestingly, approximately 250 households in the southern areas of the network now receive 24 hour supply – this is a result of their low elevation allowing gravity-fed flow through the supply system.

As the figures on the right show, customers of NWSC Lahan are generally happy with the increased and consistent supply hours, though feedback has highlighted several requests for an additional hour supply in the midday to allow returning school students to use it. The NWSC, in collaboration with The Beacon Project, are currently considering the strategies (and consequent ramifications) of increasing supply in line with this request.

Over the last year, NWSC Lahan has experienced an exponential rise in demand for new connections. This has been driven by the widespread drying of shallow tube wells (the main alternative water source for domestic properties in Lahan). Finding and hiring trained plumbing staff to meet this demand has been a substantial challenge.

5.5. CONTINUED REPAIR OF NWSC LAHAN NETWORK LEAKS

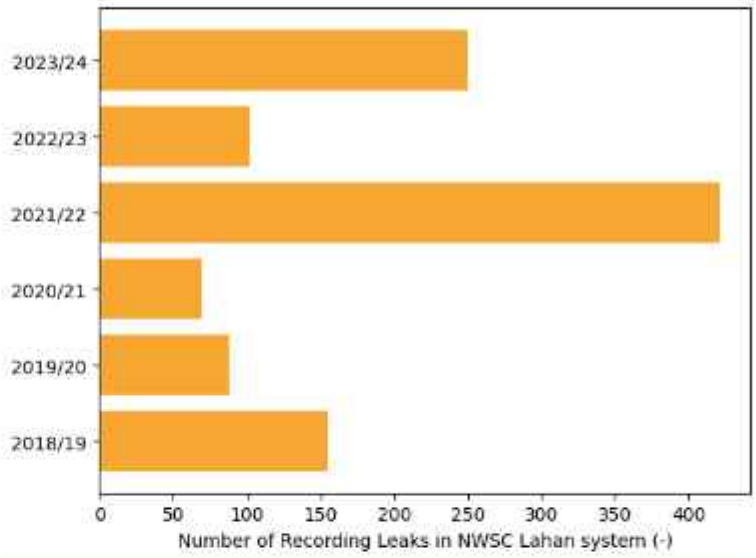
The last year has seen an increase in the frequency of pipeline leaks and bursts, driven by the main highway



NWSC Lahan customer perception of (a) water supply duration and (b) water quality.

expansion works running through the center of Lahan (see the map) and a municipal work program to construct roadside drainage canals. Managing repair works has been a huge challenge for NWSC Lahan as they seek to improve the consistency and reliability of supply, as well as reducing non-revenue water (NRW). During 2023/24, there were 250 leakages identified and repaired (see graph for how this compares with previous years). In addition, public taps were regularly monitored and maintained (as previous leakage at these points was a sizeable contribution to NRW).

Calculations conducted by The Beacon Project during 2023/24 suggest that NRW for NWSC's Lahan supply network could reach 53%. This is lower than last year's figure, but remains high. Increasing the duration of supply results in longer periods of pressurized main – driving pipe bursts and losses through leakage. In addition, a substantial proportion of customer revenue meters remain faulty, meaning that consumption is not being appropriately billed. The Beacon Project has numerous programs of work planned for 2024/25 aimed at tackling some of the issues behind NRW.



Number of leaks identified by the NWSC over the last five years.

Carl Faisey, Optimisation and Development Scientist at Anglian Water; Kabindra Pudasaini, Beacon Lead for WaterAid Nepal; Phalendra Bista, Lab Chemist at Nepal Water Supply Corporation (NWSC) Lahan, Lattu Yadav, Distribution In-charge at NWSC Lahan, reviewing the record keeping systems at NWSC facility during the training, Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

6. OUTCOME 2:
SAFE CLEAN WATER

The Beacon Project continued to support the development of safe, sustainable and equitable access to safe clean drinking water for Lahan residents by carrying out the following activities:

6.1. CONTINUED IMPROVEMENTS TO NWSC LAHAN NETWORK INFRASTRUCTURE

In total, 889 new taps were connected to households – 400 of which in Dalit communities. With this, the total number of connections to the NWSC Lahan network has reached 4,718, which equates to 65% of the serviceable population (i.e., Lahan's urban Wards 1 through 10).

Alongside this, there have been numerous other technical improvements in network infrastructure. Approximately 21 km of HDPE pipe and further 1 km of PVC-O pipe were laid (along with the associated fittings). Of the HDPE pipe, 4 km was small diameter pipe (3" and 4") for customer connections in Lahan Wards 1 through 10. Further pipe laying works are planned, in co-ordination with federal government (in relation to the main highway expansion) and local communities (in particular Dalit communities in Balansher and Bastipur).

In response to customer complaints relating to air being present in their water supply, The Beacon Project also assisted in the installation of five air release valves across the northern (and more elevated) area of the supply network. The installation sites were typically at the end of pipeline spurs. Their installation has led to significant reduction in customer complaints on this topic.

Other infrastructure projects included the desludging of sand and mud slurry from the 550m^3 sedimentation tank. Alongside the manual work (a total of 63 working days for five NWSC staff), a 'standard operating procedure' (SOP) was developed to ensure the standard of delivery (and safety of staff) in future works. To improve the resilience of the system, permanent bypass arrangements were installed for both the sedimentation tank and central storage tower.

Members of The Beacon Project team walking towards the water tower at the Nepal Water Supply Corporation facility, Lahan, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

6.2. WATER QUALITY

After the establishment of the NWSC Lahan field water quality laboratory, The Beacon Project has continued to facilitate the regular collection and testing of samples from across the network. In total, 1,043 samples were tested across 2023/24. The results from the samples informed ongoing operational procedures regarding chlorination of the network and repair of pipeline leaks. Preparations have also been made for the implementation of an NWSC-wide water quality management programme, which will see the laboratory increase its sampling rates further in 2024/25.

6.3. BEGINNING OF TRANSITION TO DATA-DRIVEN NETWORK MANAGEMENT

Last year, six electromagnetic flowmeters (EMFs) were installed at boreholes around the supply network (BH2, BH3, GR2, FP0, OC8 and NE1). This was the first activity of a wider effort by The Beacon Project to drive data-driven management of the NWSC Lahan supply network. These meters, by giving clarity on borehole yields, have helped to identify losses and network restrictions, as well as manage extraction rates. In 2023/24, The Beacon Project supplemented these flowmeters with an additional 14 pressure gauges, thereby improving the capacity of NWSC to understand and manage their supply system.

Furthermore, The Beacon Project has installed digital 'loggers' that allow the remote capture and transmission of data from all network data collection points (i.e., flow and pressure loggers). These loggers, which were generously supplied by i2O Water Ltd, are installed with local sim cards and automatically transmit data at given intervals.

With these expanding datasets, The Beacon Project is improving the capacity of NWSC technical staff to manage their networks (both in terms of live operations and long term asset management). The loggers also allow remote teams across The Beacon Project to work on integrated datasets as the supply system grows.

Prashant, 6, starting his day with a quick shower under the newly built tap at his home, Lahan-10, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

6.4. SURVEYING OF SHALLOW TUBE WELLS IN LAHAN

In 2021, the Nepal census showed that 70% of people in Lahan use shallow tube wells (STWs) and handpumps as their primary source of drinking water. However, there is little data available on the quality of water yields from these sources. As such, in 2023/24 WaterAid Nepal – through The Beacon Project – conducted a detailed water quality survey of 735 domestic STWs in Lahan to identify any key contaminants and quantify public health risk across the municipality.

When considering all ten measured parameters against Nepali national standards, only 11% of STWs were found to provide potable drinking water. Interestingly, this is in stark contrast with public perception, with 95% of people considering the water quality from their domestic tube well as usually acceptable. The detailed results, which contains a breakdown on critical parameters such as E. coli and arsenic, will be detailed in a separate report.

In addition to highlighting public health issues around STWs in the Lahan area, the study has also allowed direct comparison of water quality from NWSC piped supply and domestic self-supply, as well as steering the materials in The Beacon Project's future 'hygiene behavior change' interventions.

6.5. CONTINUED COLLECTION OF NWSC CUSTOMER FEEDBACK

After developing the NWSC Lahan's customer complaints process last year, the service has been contacted by 427 people across 2023/24. Of these, 400 were satisfied with their supply, 20 had issues relating to receiving turbid water and a further 7 had complaints relating to short supply hours.

Gayatri Kumari Pasman, 42, washing the dishes utilising the existing water facility at her home, Lahan-14, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

7. OUTCOME 3: SANITATION WITH DIGNITY

The Beacon Project continued to raise awareness of the importance of sanitation and hygiene in schools and the community by carrying out the following activities:

7.1. ADDITIONAL WASH INFRASTRUCTURE AND EDUCATION IN SCHOOLS

In 2023/24, The Beacon Project installed safe drinking water facilities at five separate schools across Lahan. Two of these involved installing connections to the NWSC Lahan supply network, while the three others (located in rural Wards) involved bespoke solutions (e.g., bio-sand filters). These works ensured that over 1,500 students now have access to clean water in school.

The project also conducted rehabilitation of toilet facilities in four schools across the Municipality. This included ensuring that all toilets are fully accessible. Alongside this work, the project installed handwashing stations at each school. This work provided over 1,100 students and teachers with renovated bathrooms during the school day and ability to practice good hygiene behaviors.

Across all this infrastructure works, The Beacon Project has carefully engaged with teaching teams and student leadership groups to ensure that interventions support a safe and hygienic environment for learning.

The Project also continued to facilitate the delivery of 'hygiene behavior change' (HBC) educational sessions to students at a further six schools. Approximately 2,400 students each attended six sessions covering topics including safe water, handwashing and menstrual health.

Other interventions included the provision of sanitation materials (dustbins, brooms, toilet

Jayanti Chaudhary, 18, drinking from the tap at the water facilities, Shree Secondary School, Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

cleaning equipment etc.) at four schools and assisting two further schools in the establishment of private recuperation spaces for students on their period (thereby reducing the need to skip school).

7.2. ADDITIONAL WASH INFRASTRUCTURE AND EDUCATION IN THE COMMUNITY

The Beacon Project continued to support marginalised communities by providing safe sanitation – a new toilet block in Lahan Ward 22 now provides for 20 Dalit households (approximately 136 people). The project has facilitated the inception of a (female-led) community management committee who collect money from users to purchase commonly used cleaning products and pay electricity/water bills.

A further 432 women from five different Dalit communities received HBC education programmes from a Female Community Health Volunteer (facilitated through The Beacon Project's local partner DJKYC). A further 20 Dalit women received education on menstrual health and hygiene, as well as training to produce reusable pads from cotton (an easily sourced local material).

7.3. ADDITIONAL WASH INFRASTRUCTURE IN HEALTH CARE FACILITIES

The Beacon Project constructed a bio-sand filter, toilets and handwashing stations at a health care facility in Lahan Ward 16, providing staff and 6,600 annual visitors with safe water and sanitation services.

WaterAid partners for The Beacon Project walking towards a borehole site for a risk assessment training session led by Anglian Water, Lahan, Nepal, October 2023.
Credit: WaterAid/ Rani Sarjan Tamang

8. OUTCOME 4:
SUSTAINABLE FAECAL SLUDGE MANAGEMENT

8.1. PROGRESS ON CONSTRUCTION OF FAECAL SLUDGE TREATMENT PLANT (FSTP)

After complications with a previous site, the location for a faecal sludge treatment plant (FSTP) was shifted to a site in Lahan Ward 15 (see map for location) and a boundary wall has largely been constructed. However, a dispute over the land has been raised to the municipality and any further construction has been halted. The municipality remains committed to overcoming these barriers and beginning construction in the next year.

8.2. THREE DAYS TRAINING ON CITY WIDE INCLUSIVE SANITATION (CWIS)

The Beacon Project conducted a 'city-wide inclusive sanitation' (CWIS) orientation programme for the Lahan Mayor, Ward Chairs and Municipal WASH Unit. Following this, a three-day training programme was undertaken with the municipal WASH Unit (and other technical staff members) to give detailed information on CWIS and the opportunities for integration into the planning and implementation of public sector projects.

Rup Yadav, Beacon Technical Officer for WaterAid, and Sebastian Gibbs, Water Resources and Supply Optimisation Engineer of Anglian Water, discussing equipment safety at Nepal Water Supply Corporation (NWSC) facility during the training course, Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

9. OUTCOME 5:
A LEGACY THAT GROWS

9.1. VISIT BY JOINT SECTOR REVIEW TEAM:

In May 2023, The Beacon Project hosted a Joint Sector Review team comprising of representatives from WaterAid Nepal, UNICEF, UN HABITAT, SNV Nepal, Oxfam, Welthungerhilfe, and NARMIN. The team visited Lahan to review the impact and legacy of the project.

WaterAid partners for The Beacon Project at the end of the technical session on 'Borehole, pump selection and hygienic installation training' led by Anglian Water, Lahan, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

9.2. THE BEACON PROJECT'S 'LEGACY THAT GROWS' SHARED LEARNING WORKSHOP ON WATER UTILITY MANAGEMENT IN NEPAL

In November 2023, WaterAid Nepal's Beacon Project team organized (in collaboration with the Ministry of Water Supply) a workshop to disseminate learnings from the Lahan context to provide information on best practices and knowledge for water utility management in Nepal. The 44 participants included representatives from the Department of water Supply and Sewerage Management, Nepal Water Supply Corporation, development partners and sector experts. More information is available here.

9.3. TRAINING ON PUMP DESIGN AND SOP

In October 2023, representatives from Anglian Water provided a two day training program on borehole pump design and maintenance. This was attended by representatives from ten different NWSC branch offices, the Lahan Municipality, the Godawari Municipality, WaterAid Nepal and DJKYC. Topics covered included head loss calculations, pump curve information, hygienic pump installation and safe storage.

WaterAid partners for The Beacon Project participating in a technical session during the borehole, pump selection and hygienic installation training, led by Anglian Water, Lahan, Nepal, October 2023.
Credit: WaterAid/ Ram Saran Tamang

10. CLOSE

We'd like to thank Anglian Water and their Alliance partners, the NWSC, the Ministry of Water Supply and the Lahan Municipality for their continued support of The Beacon Project. We look forward to working together to deliver another year of life-changing improvements for the people of Lahan.

A view of settlements around Lahan, where The Beacon Project is ongoing, Lahan, Nepal, October 2023. *Credit: WaterAid/ Ram Saran Tamang*

FIND OUT MORE INFORMATION ABOUT THE BEACON PROJECT HERE:
washmatters.wateraid.org/projects/the-beacon-project