UNIVERSAL WATER REGISTRY

UWR Rainwater Offset Unit Standard (UWR RoU Standard)

Concept & Design: Universal Water Registry

www.uwaterregistry.io

Project Concept Note & Monitoring Report

(PCNMR)

Project Name: Effluent Treatment, Water Recycling and Reuse in Reclaimed Rubber Manufacturing by SUIL

UWR RoU Scope: 5

Monitoring Period: 01/01/2019-31/12/2024

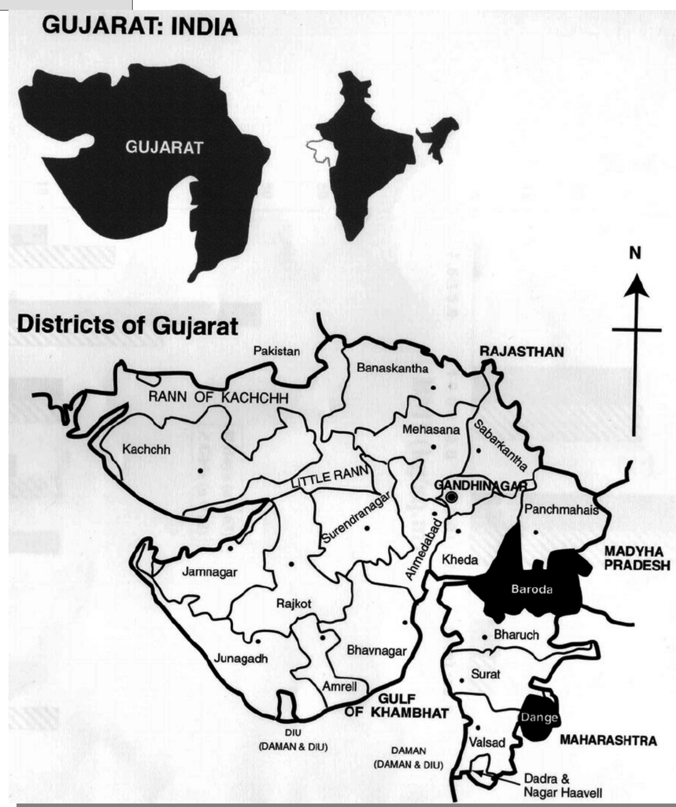
Crediting Period: 01/01/2019-31/12/2024

UNDP Human Development Indicator: 0.644 [1](India)

[1] https://www.undp.org/

A.1 Location of Project Activity

State	Gujarat
District	Vadodara
Block Basin/Sub Basin/Watershed	Please refer to http://cgwb.gov.in/watershed/basinsindia.html
Lat. & Longitude	22°29'15.3"N 73°17'49.7"E
Area Extent	Survey No. 54/B, Pratapnagar, Savli, Jarod Road, Samlaya, Gujarat 391520
No. of Villages/Towns	1



Geographical Map Of Project Location

Geographical Map of Project Location

A.2. Project owner information, key roles and responsibilities

Project Proponent (PP):	**Sampann Utpadan India Limited**
UCR Project Aggregator	Viviid Emissions Reductions Universal Private Limited
Contact Information:	lokesh.jain@viviidgreen.com

SAMPANN UTPADAN INDIA LIMITED, based in Vadodara, Gujarat, operates an integrated Effluent Treatment Plant (ETP) within its industrial premises located at Survey No. 54/B, Pratapnagar, Savli–Jarod Road, Samlaya, Vadodara-391520, Gujarat. The (ETP) was commissioned in November 2018, it is designed to collect, treat, and manage 10KLD effluent generated from the reclaimed rubber processing operations, ensuring compliance with environmental regulations and supporting responsible water reuse practices. The treated effluent is recycled and reused within the plant itself, specifically in the rubber batch-making process. This closed-loop system not only minimises freshwater dependency but also exemplifies the plant's commitment to sustainable industrial water management.

The project owner holds exclusive water user rights within the project boundary and maintains undisputed legal title over the land where the ETP is installed, as part of its own manufacturing site in Samlaya, Vadodara. These rights enable the company to independently manage water intake, effluent treatment, and reuse infrastructure.

Sampann Utpadan India Limited has secured all necessary statutory approvals, including those mandated by the Gujarat Pollution Control Board under the Water (Prevention & Control of Pollution) Act, along with other applicable environmental clearances required for construction and operation of the ETP.

The total capital investment for the project is estimated at 12-20 Crores, covering planning, engineering design, civil construction, installation of advanced effluent treatment technology, commissioning, and compliance with environmental permitting requirements.

A.2.1 Project RoU Scope

PROJECT NAME	**Effluent Treatment, Water Recycling and Reuse in Reclaimed Rubber Manufacturing at Sampann Utpadan India Limited**
UWR Scope:	Scope 5: Conservation measures taken to recycle and/or reuse water, spent +washing wastewater etc. across or within specific industrial processes and systems, including wastewater recycled/ reused in a different process, but within the same site or location of the project activity. Recycled wastewater used in off-site landscaping, gardening or tree plantations/forests activity are also eligible under this Scope.
Date PCNMR Prepared	29/07/2025

A.3. Land use and Drainage Pattern

Not Applicable.
This project activity involves treating and reusing wastewater. It does not include any land-use practices. Also, this is an industrial process designed with technical requirements and following the specified

norms of the local pollution control board. Hence, the project activity does not harm any land and Drainage system**.**

A.4. Climate

The operations of the ETP are fully mechanized and located within a covered plant infrastructure. Thus, weather conditions such as temperature and humidity do not impact the process.

All treatment units (biological, filtration, RO, evaporation) function independently of climatic variables. Hence, operational consistency is maintained year-round.

A.5. Rainfall

The facility is designed for effluent treatment and is not dependent on rainwater. Rainwater harvesting is not integrated into this facility as water is derived from industrial operations. Proper drainage channels are installed to prevent rainwater ingress into effluent channels.

A.6. Ground Water

The project activity does not draw water from the ground water reservoirs as it treats and reuses wastewater.

A.7. Alternate methods

On the bases of the on-site data including topography, rainfall patterns, hydrogeology, aquifer status, land use, and water availability multiple options were assessed before selecting solar evaporation pans for boiler blow-down effluent management within Sampann Utpadan India Limited's ETP project at Samlaya, Vadodara, Gujarat:

Regional Topography & Drainage: The Samlaya site features flat-to-gently undulating terrain with minimal natural drainage. Surface runoff is limited, and there are no nearby perennial streams. This makes conventional land-based discharge or drainage systems impractical, as they risk pooling and environmental contamination.

Annual Rainfall & Groundwater Recharge: Vadodara region receives 700–800 mm of annual rainfall, mostly during the southwest monsoon (June–September). Though modest, recharge is low in the clay-rich soils around Samlaya, and existing agricultural and industrial drawdown has further stressed the aquifer.

Groundwater Quality & Aquifer Status: Monitoring reveals brackish groundwater with elevated hardness and total dissolved solids. This renders dilution or groundwater discharge unsuitable and conflicts with zero-liquid-discharge expectations within the plant boundary.

Regulatory Prohibitions on Surface Discharge: Under Gujarat Pollution Control Board (GPCB) norms, treated or untreated effluent discharge into surface waterways or land outside the facility is prohibited. The project must ensure zero external discharge, requiring all treatment and reuse to remain within the site.

Evaluation of Alternative Treatment Options

- **Zero Liquid Discharge (ZLD)** using reverse osmosis, multi-effect evaporation, and crystallization was considered. Though capable of handling high-strength effluent, ZLD's capital expenditure, high energy consumption, and complex operations were disproportionate to the limited 0.3 KLD boiler blow-down volume.

- **Constructed Wetlands** offered a lower-energy alternative. Yet, inconsistent performance against variable COD/TDS concentrations and the need for substantial land (~0.2–0.3 ha) made this option impractical given land constraints.

Technical and Operational Advantages

1. **Cost-Effectiveness**: Relies on passive solar energy, minimizing operating expenditure with modest initial investment.

2. **Water Conservation**: Eliminates freshwater dilution requirements, preserving scarce water resources.

3. **Regulatory Compliance**: Fully aligned with GPCB zero-discharge mandates; lined pans prevent contamination and runoff.

4. **Operational Simplicity**: Easily managed by existing staff without specialist skills or high-power demand.

5. **Scalability**: Designed for future integration with RO or thermal systems if blow-down volumes or wastewater characteristics evolve.

Given the semi-arid climate, scarce drainage, stressed groundwater, strict discharge norms, and limited site area, solar evaporation pans offered the most practical, sustainable, and cost-effective solution. The design sustains water balance, meets regulatory requirements, and allows flexibility for future technological enhancements.

A.8. Design Specifications

The effluent treatment system implemented at Sampann Utpadan comprises a structured sequence of physical, chemical, and biological treatment stages, all designed to ensure the effective reduction of pollutants in wastewater before safe discharge or reuse. The following is a detailed explanation of each structure involved, based on location and function, mapped closely to the ETP flow diagram.

Collection and Equalization Stage

At the initial stage, wastewater is collected in Collection Tanks (2 KL and 8 KL capacities) located at different site points to segregate varying effluent loads. These tanks receive low to medium TDS and COD wastewater streams, ensuring no cross-contamination with hazardous or highly toxic substances. From here, the effluent is pumped to a Collection cum Equalization Tank via a Filter Press, which serves to remove oil and grease. This tank also functions to homogenize fluctuations in flow rate and pollutant load, thereby ensuring steady downstream treatment performance. An Air Diffuser is provided within the tank to maintain suspension and prevent sludge deposition.

Primary Chemical Treatment

The equalized effluent is transferred to Lime Dosing Tanks, where lime is added to adjust the pH and promote the precipitation of heavy metals and other impurities. These tanks are equipped with continuous mixing arrangements to ensure uniform chemical distribution.

The pH-adjusted effluent is then pumped to a Fenton Treatment Tank, where a chemical oxidation reaction is induced using ferrous sulphate, hydrogen peroxide, and sulphuric acid. This step breaks down complex organic molecules into simpler and less harmful compounds, such as CO_2, water, and inorganic salts. Proper dosing is critical and based on online/regular monitoring of COD levels.

The oxidized water moves next to the Feed Tank, which serves as a buffer and temporary holding unit before primary settling. This tank ensures regulated flow to the next stage and accommodates minor load fluctuations.

In the Primary Settling Tank (PST), a coagulant is dosed from the Coagulant Dosing Tank to destabilize and aggregate colloidal particles. To enhance flocculation and separation efficiency, polyelectrolytes are added through a Poly Dosing Tank into a Static Mixer. The resulting sludge is then settled and removed into a Sludge Sump before being dewatered via a Filter Press. The leachate from the filter press is routed back to the Feed Tank, ensuring no untreated liquid is released.

Secondary Biological Treatment

The clarified supernatant from PST flows by gravity into a Bioreactor/Aeration Tank. This biological unit promotes aerobic microbial degradation of residual organic matter. Air is continuously supplied through diffusers, maintaining dissolved oxygen (DO) levels between 2–4 mg/L. MLSS (Mixed Liquor Suspended Solids) and MLVSS (Mixed Liquor Volatile Suspended Solids) are regularly monitored to sustain an optimal microbial population.

After sufficient retention, the effluent flows into the Secondary Settling Tank (SST), where biomass separation occurs. A portion of the settled sludge is recycled to the aeration tank to maintain biomass concentration, while the rest is sent to the sludge sump for further treatment.

Tertiary Treatment and Polishing

The clear overflow from SST is collected in a Final Storage Tank, from where it is pumped to a dual-stage filtration system consisting of Pressure Sand Filter (PSF) and Activated Carbon Filter (ACF). These filters remove residual suspended solids, turbidity, color, and trace organics, thereby polishing the effluent for reuse. The treated water is then conveyed for gardening purposes, supporting the site's sustainability goals.

Conveyance System Description

The conveyance system comprises a network of corrosion-resistant RCC pipelines, MS pipelines, and HDPE chemical dosing lines, equipped with submersible and centrifugal pumps. These facilitate the transfer of water between tanks and units, ensuring pressurized flow where necessary, and gravity-based flow where feasible, minimizing energy use.

Parameters for Estimation of Artificial Recharge Water Quantity

The volume of treated water diverted for reuse or artificial recharge is estimated using:

- Flow meters installed at key discharge points.
- Pump run hours and discharge capacities.
- Effluent quality parameters, especially BOD, COD, TSS, pH, and oil & grease.
- The availability window of source water is recorded during peak and non-peak industrial hours to establish recharge timelines.

Source Water Quality and Pretreatment Needs

Source effluent typically exhibits medium TDS (~500-1000 mg/L), COD (up to 1000 mg/L), and varying pH (6–9). Pretreatment such as oil & grease removal via filter press, pH adjustment through lime dosing, and chemical oxidation in the Fenton Tank is crucial to prepare the water for effective biological treatment downstream.

A.9. Implementation Benefits to Water Security

Sampann Utpadan India Limited has established a comprehensive effluent treatment and reuse framework that significantly enhances onsite water security by minimizing dependence on external freshwater sources and optimizing reuse within the facility. The Effluent Treatment Plant (ETP) treats process wastewater generated from the reclaimed rubber manufacturing operations, ensuring compliance with Gujarat Pollution Control Board (GPCB) discharge norms and facilitating internal recycling.

As of now, no formal artificial recharge structures such as recharge pits, injection wells, or trenches—have been installed at the Samlaya facility. However, the plant has implemented an internal water recycling system that significantly contributes to sustainable water management at the facility level. From January 2019 to December 2024, a total of 4,694.20 kiloliters (KL) of treated water has been reused within the rubber batch making process. This consistent reuse of treated effluent, averaging approximately 70 KL per month, has helped minimize freshwater extraction and contributed indirectly to local water security. While the system is not explicitly intended for groundwater recharge, incidental runoff or overflow directed toward on-site greenbelt irrigation may allow limited percolation into the soil. This incidental infiltration could support sub-surface aquifer recharge depending on the soil's permeability characteristics in the area.

The plant is built around a highly efficient, reuse-first water management strategy that ensures treated effluent is fully reused in-house, primarily within the rubber batch manufacturing process. This closed-loop system significantly reduces reliance on external freshwater sources and prevents unnecessary groundwater abstraction, embodying the company's commitment to water sustainability and operational self-sufficiency. Although groundwater development estimates specific to the Vadodara district have not been independently verified, prevailing local patterns of seasonal water scarcity and distribution challenges suggest moderate to high aquifer stress. Within this regional context, the plant's self-contained water reuse model plays a critical role in enhancing local water resilience while offering a scalable example of environmentally responsible industrial design.

Looking ahead, Sampann Utpadan plans to augment water resilience by exploring future projects like rooftop rainwater harvesting and dedicated recharge infrastructure. Proposed interventions include percolation pits or recharge trenches, which would supplement natural aquifer recharge and further stabilize groundwater levels in the region, which face pressure from industrial and agricultural extraction.

Overall, through its systematic approach to effluent recycling, land reuse, and evaporation-based disposal, Sampann Utpadan demonstrates a robust closed-loop water management model. This model substantially reduces reliance on freshwater sources, supports long-term water availability, and contributes to sustainable aquifer stability, achieving regional water security without additional artificial recharge installations at this stage.

A9.1 Objectives vs Outcomes

The primary objective of Sampann Utpadan India Limited's Effluent Treatment Plant (ETP) initiative at Samlaya, Vadodara was to implement a fully integrated, closed-loop water management system focused on long-term environmental sustainability and operational water resilience. The system was designed to minimize dependence on external freshwater sources by enabling full in-house reuse of treated effluent, eliminating discharge beyond the facility boundaries, and supporting greenbelt irrigation within the plant premises. The project was conceived with a forward-looking vision, serving both current process needs and laying the foundation for future upgrades such as artificial recharge structures and rooftop rainwater harvesting, to further strengthen water security in a region known to experience seasonal groundwater stress.

Since the system became operational, key outcomes include:

- **Effluent Recycling & Usage**: By treating process effluent and consistently reusing it within the plant's operations, specifically in the rubber batch making process, as per observed monthly trends. There is currently no separate diversion of treated effluent shown for greenbelt irrigation in the available records.

- **Freshwater Demand Reduction**: By utilising the treated water internally, the plant has effectively substituted a significant volume of freshwater demand, thereby contributing to reduced groundwater extraction.

- **Regulatory and Operational Compliance**: The system meets GPCB's zero-discharge requirements, aligns with Gujarat's wastewater reuse policies introduced in 2018, and adheres to current industrial mandates. Continuous flow monitoring, effluent testing, and record-keeping ensure sustained compliance.

- **Groundwater Sustainability**: Vadodara district has groundwater development levels at approximately **64–67%**, indicating moderate to high stress. The company's water-use profile recycling and minimizing extraction, directly contributes to reducing local groundwater pressure.

- **Ecological Co-benefits**: Greenbelt irrigation has enhanced vegetation cover and soil moisture retention, likely supporting incidental aquifer recharge in permeable zones.

Looking ahead, Sampann Utpadan plans to explore the installation of percolation pits, trenches, and rooftop rainwater harvesting systems, designed to further enhance water security and aquifer recharge. These future measures would align with regional efforts such as conjunctive use strategies that utilize both surface and groundwater resources effectively.

A9.2 Interventions by Project Owner / Proponent / Seller

Sampann Utpadan India Limited adopted a forward thing approach and developed its Effluent Treatment Plant (ETP) as an integral part of its commitment to environmental stewardship and sustainable operations. The project was never seen as a reactive or regulatory requirement, but rather as a purposeful investment in water resource conservation and circularity. Right from its design phase, the plant was equipped to enable the consistent internal reuse of treated effluent particularly in the rubber batch-making process, thereby reducing freshwater demand and minimizing the ecological footprint of operations. Alongside the infrastructure, the company also initiated dedicated internal awareness and capacity-building sessions to educate plant personnel on the long-term value of effluent reuse, efficient water management, and the environmental responsibilities inherent to industrial growth. This proactive and values-driven approach has embedded sustainability deeply into the operational ethos of the facility.

To support this, the project team conducted a site-specific water budget assessment and hydro-operational mapping, referencing data from Vadodara district, where groundwater development levels range between 54% and 65%, indicating moderate to high aquifer stress. The internal water balance shows that the treated process effluent is reused entirely in the rubber batch making process, forming the core of the plant's water circularity.

No data is currently available regarding the treatment or disposal of high-TDS streams such as boiler blow-down. However, operational practices appear to maintain a closed-loop water management system with minimal or no external discharge, thereby contributing to local groundwater conservation.

To implement this model, physical technical infrastructure upgrades were undertaken. The ETP was equipped with biological treatment tanks, sand and activated carbon polishing filters, polishing units such as pressure sand and activated carbon filters, final storage reservoirs, and treated water distribution infrastructure. Treated water is directly channeled into internal processes, promoting continuous reuse.

Sampann Utpadan has also built robust governance and monitoring protocols, including internal audits and regular reporting to the Gujarat Pollution Control Board. These procedures help ensure adherence to zero-discharge norms and state reuse policy mandates while enhancing operational transparency and accountability.

The outcome of these interventions is a functional, self-contained water management system that treats and reuses the process effluent entirely within the facility, primarily in the rubber batch-making process. This eliminates the need for freshwater abstraction for this volume and significantly reduces pressure on the already stressed local groundwater resources. With zero effluent discharge, supported by internal recycling and solar evaporation of high-TDS residuals, the facility fully complies with environmental norms and serves as a scalable model for sustainable industrial water management.

A.10. Feasibility Evaluation

The Effluent Treatment Plant (ETP) implemented by Sampann Utpadan India Limited at Samlaya, Vadodara has demonstrated economic and operational feasibility. The project was designed and commissioned by M/s Velesolv Envirotech Private Limited and adheres to the Zero Liquid Discharge (ZLD) framework as required by the Gujarat Pollution Control Board (GPCB).

The system is designed to treat and recycle industrial effluent for internal reuse. As per verified internal monthly records, approximately 10 kilolitres per day (KLD) of treated effluent is consistently reused within the facility, particularly in the rubber batch-making process. This internal recycling significantly reduces the dependency on external freshwater sources, especially important in Vadodara district, which is known to have moderate to high levels of groundwater stress.

The treatment system comprises a sequence of conventional but effective units, including Fenton-based chemical treatment, aerobic biological treatment, secondary settling, and tertiary treatment via pressure sand and activated carbon filters. The treated effluent is routed for internal reuse, while high-TDS streams such as boiler blow-down are reportedly managed through lined solar evaporation ponds, ensuring no untreated discharge leaves the premises.

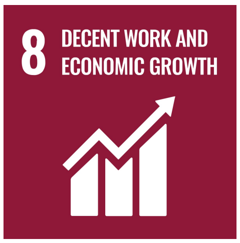
The system reduces operational expenditure associated with freshwater procurement and ensures compliance with environmental norms, avoiding penalties or regulatory action. The project's performance is reflected in consistent recycling records, and no significant operational or design failures have been reported post-commissioning.

While a third-party financial audit or formal cost-benefit analysis is not included at this stage, the observed reuse volumes and process continuity indicate a financially sound and technically stable system. The plant has also been designed to accommodate future enhancements like rainwater harvesting and groundwater recharge structures, subject to feasibility and regulatory clearance.

A.11. Ecological Aspects & Sustainable Development Goals (SDGs):

The sustainable development attributes attached to the project activity are demonstrated below:

Sustainable Development Goals Targeted	Most relevant SDG Target/Impact	Indicator (SDG Indicator)
	3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	The PP showcases how recycling and reusing wastewater can prevent depletion of natural water reserves and prevent water scarcity during droughts. The hazardous impact of industrial wastewater is now avoided due to this project. The PP ensures water availability in the nearest to the project location.

	6.3: By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally	The PP has showcased recycling and safe reuse of 4,694 kiloliters within the industry during this monitored period, which directly correlates to this indicator 6.3.
	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Number of jobs created, and the Number of people trained as part of this project activity.
	13.2: Integrate climate change measures into national policies, strategies, and planning	Recycling and reusing wastewater are an effective solution for climate change adaptation because it helps mitigate the impacts of droughts, floods, and other extreme weather events that are becoming increasingly common due to climate change due to water scarcity. The quantity of wastewater recycled and reused by the PP is the SDG indicator.

A.12. Recharge Aspects:

NA

A.12.1 Solving for Recharge

NA

A.13. Quantification Tools

Baseline scenario:

The baseline scenario is the situation were, in the absence of project activity, the PP would have one or all of the following options:

a. Installed multiple bore wells within the project boundary which would have depleted the local groundwater resources (aquifers); **and/or**

b. Diverted existing safe drinking water resources from the surrounding residential area; **and/or**

Hence the following baseline scenario is applicable for this project activity:

"The net quantity of treated ETP effluent / wastewater that would be discharged directly into the local drain/sewer without further being recycled and/or reused daily post treatment per year."

The net quantity of treated water used is measured via flow meters installed at the site. The primary set of data records are kept at plant level, managed by the team. Also, for conservative purposes, the working days or operational days have been assumed at 355 days in a year during the 1st monitoring period. However, the number of days is not an influential parameter on RoUs calculation as RoUs are calculated based on the total quantity of treated water being recycled & reused.

Month	INLET (Total Water in Equlisation tank) (in KL)	Total Water Treated (in KL)	Total Water Reuse for Rubber Batch Making Procces (KL)	RoUs with Uncertainity Factor
Jan-19	80	70	70	68.6
Feb-19	90	70	70	68.6
Mar-19	90	70	70	68.6
Apr-19	80	70	70	68.6
May-19	80	70	70	68.6
Jun-19	90	70	70	68.6
Jul-19	90	70	70	68.6
Aug-19	90	70	70	68.6
Sep-19	80	70	70	68.6
Oct-19	90	70	70	68.6
Nov-19	80	70	70	68.6
Dec-19	90	70	70	68.6
Jan-20	80	70	70	68.6
Feb-20	80	70	70	68.6
Mar-20	60	40	40	39.2
Apr-20	0	0	0	0
May-20	0	0	0	0
Jun-20	0	0	0	0

Jul-20	50	30	30	29.4
Aug-20	70	60	60	58.8
Sep-20	80	70	70	68.6
Oct-20	80	70	70	68.6
Nov-20	80	70	70	68.6
Dec-20	80	70	70	68.6
Jan-21	90	70	70	68.6
Feb-21	100	70	70	68.6
Mar-21	100	70	70	68.6
Apr-21	90	70	70	68.6
May-21	90	70	70	68.6
Jun-21	80	70	70	68.6
Jul-21	90	70	70	68.6
Aug-21	100	70	70	68.6
Sep-21	100	70	70	68.6
Oct-21	100	70	70	68.6
Nov-21	100	70	70	68.6
Dec-21	100	70	70	68.6
Jan-22	100	70	70	68.6
Feb-22	90	70	70	68.6
Mar-22	90	70	70	68.6
Apr-22	90	70	70	68.6
May-22	90	70	70	68.6
Jun-22	100	70	70	68.6
Jul-22	100	70	70	68.6
Aug-22	90	70	70	68.6
Sep-22	90	70	70	68.6
Oct-22	100	70	70	68.6
Nov-22	100	70	70	68.6
Dec-22	100	70	70	68.6
Jan-23	100	70	70	68.6
Feb-23	90	70	70	68.6
Mar-23	80	70	70	68.6
Apr-23	90	70	70	68.6
May-23	90	70	70	68.6
Jun-23	90	70	70	68.6
Jul-23	100	70	70	68.6
Aug-23	100	70	70	68.6

Sep-23	100	70	70	68.6
Oct-23	110	70	70	68.6
Nov-23	90	70	70	68.6
Dec-23	80	70	70	68.6
Jan-24	90	70	70	68.6
Feb-24	110	70	70	68.6
Mar-24	100	70	70	68.6
Apr-24	110	70	70	68.6
May-24	120	70	70	68.6
Jun-24	120	70	70	68.6
Jul-24	130	70	70	68.6
Aug-24	130	70	70	68.6
Sep-24	130	70	70	68.6
Oct-24	140	80	80	78.4
Nov-24	140	80	80	78.4
Dec-24	150	90	90	88.2
Total				**4,694**

Quantification

Year	Total ROUs (1000 liters)/yr UCR Cap (1 million RoUs/yr
2019	823
2020	539
2021	823
2022	823
2023	823
2024	862.4
Total RoUs	**4,694**

A.14. UWR Rainwater Offset Do No Net Harm Principles

The SAMPANN ETP project aligns with the Universal Water Register's "Do No Net Harm" framework through water reuse, conservation, and inclusive governance within an industrial water-treatment context. First, by treating and reusing effluent on-site, through direct recycling into process operations or irrigation, the project helps increase sustainable water yield in areas facing aquifer stress. This internal reuse reduces external freshwater extraction and eases pressure on depleted groundwater reserves.

Second, while not a rainwater project per se, Sampann Utpadan India Limited prevents indirectly "unutilized water" by capturing process-generated wastewater that would otherwise be discharged or lost, channelling it into productive reuse streams. By intercepting effluent that might enter sewers or drains, the project conserves water resources that would ordinarily be wasted.

Third, any excess treated water is conserved or strategically stored before discharge, for instance in balancing tanks or for seasonal irrigation ensuring that water is held for future use rather than released immediately. This storage capacity, albeit modest, offers operational flexibility and offsets external water demand during drier periods.

Finally, Sampann Utpadan India Limited enhances local women's participation and professional development by incorporating them into ETP operational roles such as monitoring, data entry, log maintenance, and compliance documentation. Although industrial effluent projects often feature limited female workforce representation, community-based water governance case studies in India have demonstrated how structured inclusion of women in technical and managerial roles, backed by training, can elevate both project outcomes and gender equity.

In this way, the Project Activity advances the UWR's Do No Net Harm principles by optimizing industrial effluent reuse, conserving internally generated water, storing treated effluent for future use, and deliberately fostering gender-inclusive operations.

A.15. Scaling Projects-Lessons Learned-Restarting Projects

Sampann Utpadan India Limited's ETP-based closed-loop water management system offers a replicable model for sustainable industrial water use, particularly across Gujarat's water-stressed industrial corridors. By demonstrating how treated effluent can be fully reused within core manufacturing processes, the project showcases a practical and cost-effective pathway to reduce freshwater dependency, minimize discharge, and enhance local water resilience. Its design and operational success make it well-suited for broader scaling across similar facilities seeking to adopt circular water strategies, especially in regions facing increasing pressure on groundwater resources. The model also provides valuable insights for industries aiming to future-proof their operations through environmentally conscious water stewardship.

A key insight drawn from this project is that onsite ETP reuse, it presents a cost-effective and operationally straightforward alternative to centralized ZLD systems or dependence on municipal recycled water supplies. The facility consistently treats and reuses over 10 KLD of process effluent within its rubber batch-making operations, as verified by internal records, and achieves zero liquid discharge through internal recycling and solar pond evaporation. This operational model serves as a scalable template for other industrial units in the region.

To scale further, Sampann Utpadan India Limited could integrate into Gujarat's planned treated wastewater reuse grids, which are targeting the delivery of up to 1,000 MLD of reclaimed water to industrial clusters such as Vadodara, Ahmedabad, Surat, and Jamnagar. Facilities with onsite systems like Samlaya could connect to these grids selectively, helping maximize water conservation while avoiding redundant infrastructure.

Another avenue for scaling involves leveraging CSR investments in environmental sustainability. In FY 2023–24, Gujarat companies spent ₹419.6 crore on environmental CSR initiatives, a 90% increase over the previous year, with substantial focus on industrial water reuse and greenbelt projects in Vadodara and surrounding hubs Sampann Utpadan India Limited could tap into this funding to support complementary interventions like artificial recharge pits, rooftop rainwater harvesting, or greenbelt expansion.

Restarting previously stalled water-conservation projects, such as recharge trenches or stormwater harvesting structures through CSR partnerships or public-private frameworks presents another opportunity. These interventions would supplement the existing ETP reuse infrastructure, promote incidental groundwater recharge, and further reduce reliance on borewell abstraction aligning with integrated urban-industrial water management goals.

