REGULATORY REQUIREMENTS FOR WATER USE, WASTEWATER MANAGEMENT AND ENVIRONMENTAL ASSESSMENT IN THE DESIGN AND OPERATION OF CARWASH STATIONS

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Abstract. Carwash stations are water-intensive and discharge wastewater containing suspended solids, petroleum products and surfactants. This research reviews the Uzbek regulatory framework for water use, wastewater management and environmental assessment of carwash stations as of 2026, with reference to selected international standards. The analysis shows that national legislation already provides a basis for permitting, pretreatment and water accounting, while integration of water efficiency, local treatment and reuse into design remains the main area for development.

Keywords. carwash stations; water use; wastewater treatment; environmental regulation; water reuse; environmental impact assessment; sustainable water management.

Introduction

Carwash stations are small but numerous water users. Reported consumption varies widely with washing method and vehicle type, and a review of on-site carwash treatment concluded that 100 to 200 L per passenger car is a reasonable range, with heavy vehicles requiring considerably more. The same review reported median concentrations of 186 mg/L suspended solids, 418 mg/L chemical oxygen demand

(COD), 28 mg/L oil and grease and 13 mg/L anionic surfactants in surveyed carwash wastewater [1]. These values are literature medians, not regulatory limits, but they show that carwash effluent is an industrial wastewater that needs pretreatment before discharge.

Water availability makes this issue more pressing in Uzbekistan. The national Concept for the Development of the Water Sector for 2020 to 2030 projects a water deficit of about 7×10^9 m³ by 2030 and 15×10^9 m³ by 2050 [2]. Full-scale experience shows that treatment and recycling can reduce freshwater demand substantially. A Brazilian installation using flocculation, column flotation, sand filtration and chlorination reclaimed about 70% of wash water and reduced fresh water use to less than 40 L per wash [3].

The purpose of this thesis is to review the Uzbek regulatory and technical requirements that govern water use, wastewater management and environmental assessment of carwash stations as of 2026, to compare them with international frameworks, and to link these requirements to engineering practice. The analysis follows the chain water consumption → wastewater generation → pollutant removal → treated water quality → discharge or reuse → environmental compliance. Legal documents were verified against the official legal database of the Republic of Uzbekistan (lex.uz) and official publisher sites. Documents whose current status could not be confirmed are identified as such and are not presented as current requirements.

National regulatory framework in Uzbekistan

The national framework relevant to carwash stations has changed considerably since 2025. Three groups of instruments apply: mandatory legislation (codes and laws), subordinate regulations (Cabinet of Ministers resolutions and sanitary rules), and construction norms approved by the construction authority.

Water resources and water use. The Water Code of the Republic of Uzbekistan was approved by Law No. ZRU-1076 of 30 July 2025 and entered into

force on 31 October 2025 [4]. It replaced the Law "On water and water use" of 1993. The Code allows wastewater disposal only when ecological and sanitary requirements are met (Art. 9), requires a permit for special water use (Arts. 56 and 57), establishes water accounting and reporting by water users (Art. 49), sets conditions for discharge of wastewater into water bodies (Art. 110), and provides for secondary use of wastewater for landscape greening (Art. 111). For a carwash station, these provisions become relevant when it abstracts groundwater from its own well or discharges treated effluent outside the municipal sewer.

Water supply and sewerage services. Most urban carwash stations are connected to municipal networks. Their relations with the utility are governed by the Law "On drinking water supply and wastewater disposal" No. ZRU-784 of 22 July 2022, in force since 24 October 2022 [5]. The Law defines the communal-ecological norm for wastewater quality (Art. 3), sets special rules for receiving industrial wastewater (Art. 31) and requires accounting of drinking water and wastewater volumes (Art. 48). Detailed conditions are set by the Rules for the acceptance of industrial wastewater into municipal sewerage networks, approved as Annex 1 to Cabinet of Ministers Resolution No. 11 of 3 February 2010, substantially revised in 2018 and last amended in 2025 [6]. The Rules require subscribers to pretreat industrial wastewater in local treatment facilities to the established norms, set permissible concentrations for listed substances, and provide for increased compensation payments for above-norm discharges and for regular quality control by the utility. Carwash effluent is industrial wastewater in this sense.

Environmental protection, control and waste. The Law "On nature protection" No. 754-XII of 1992, amended most recently in December 2025, sets the general system of environmental norms and payments for pollution [7]. The Law "On environmental control" No. ZRU-363 of 2013 obliges economic entities to carry out industrial environmental control, including recording of environmental impact factors

(Arts. 19 and 20) [8]. The Law "On waste" No. 362-II of 2002, amended in 2026, requires waste passports (Art. 27) and waste placement limits for legal entities [9]. These obligations apply to the oily sludge, grit and spent filter media from carwash treatment units.

Environmental assessment. The Law "On environmental expertise, environmental impact assessment and strategic environmental assessment" No. ZRU-1036 of 24 February 2025 entered into force on 25 August 2025 and replaced the Law "On environmental expertise" of 2000 [10]. It is implemented through Cabinet of Ministers Resolution No. 234 of 11 May 2026, in force since 14 August 2026, which repealed Resolution No. 541 of 2020 [11]. This procedure is discussed separately below.

Sanitary requirements. Hygienic protection of water bodies is regulated by sanitary rules and norms (SanPiN RUz). The Ministry of Health lists SanPiN RUz No. 0318-15 on hygienic and anti-epidemic requirements for the protection of water bodies [12]. Its current consolidated status could not be confirmed in the official legal database, so no limit values from it are cited here.

Institutions. In November 2025 the Ministry of Ecology was transformed into the National Committee of the Republic of Uzbekistan on Ecology and Climate Change, and a Unified Ecological Online Platform was planned to become operational by September 2026 [13].

Table 1. Key national and international regulatory instruments relevant to carwash water management

Regulatory instrument (legal category)	**Scope**	**Relevance to carwash stations**
Water Code, Law ZRU-1076, 2025 (mandatory law)	Water use, special water use permits, discharge, accounting, reuse	**Permits for own-well abstraction or direct discharge, water accounting**

Law ZRU-784, 2022 (mandatory law)	Drinking water supply and wastewater disposal services	**Contract with utility, industrial wastewater acceptance, volume accounting**
CM Resolution No. 11, 2010, Annex 1 (regulation)	Acceptance of industrial wastewater into municipal sewers	**Local pretreatment, permissible concentrations, compensation payments**
Law ZRU-1036, 2025, and CM Resolution No. 234, 2026 (law and regulation)	Environmental expertise, EIA, SEA, public hearings	**Screening, EIA documentation and expertise conclusion before construction**
Laws No. 754-XII, ZRU-363 and 362-II (mandatory laws)	Nature protection, environmental control, waste	**Pollution payments, industrial environmental control, sludge management**
ShNK 2.04.01-22 and KMK 2.04.02-19 (construction norms)	Internal water supply and drainage, external water supply	**Water demand, network and drainage design**
WBG General EHS Guidelines, 2007 (lender requirement)	Wastewater, ambient water quality, water conservation	**Binding only through financing agreements**
ISO 14001:2026 and ISO 46001:2019 (voluntary standards)	Environmental and water efficiency management systems	**Operational control, water-use baselines and targets**
Directive (EU) 2024/3019, Regulation (EU) 2020/741 (EU law,	**Urban wastewater treatment, agricultural water reuse**	**International benchmark, not applicable in**

reference only)		**Uzbekistan**

Water supply, wastewater and design requirements for carwash stations

Construction norms translate legal obligations into design parameters. For building services, the current document is ShNK 2.04.01-22 "Internal water supply of buildings and wastewater disposal", approved by Order No. 01/2-59 of the Ministry of Construction and Housing and Communal Services of 22 August 2024 and in force since 2 October 2024 [14]. External water supply networks and structures are designed to KMK 2.04.02-19, amended in 2022 [15]. KMK 2.04.03-97 on external sewerage networks and structures is widely referenced in design practice, but its current edition could not be confirmed in the official database during this review. It is therefore treated as indicative only. No current Uzbek construction norm dedicated specifically to carwash stations was identified, so process-specific design relies on the general norms, the sewer acceptance rules and technical literature.

Water demand and hydraulic design. Design flow should be derived from the number of wash bays, the washing technology and the expected number of vehicles per day, rather than from a single per-vehicle figure, because reported consumption ranges widely [16]. Peak hourly flow governs the sizing of sediment chambers, oil separators and pumps. The domestic water supply for staff and customers is designed to the building norm, while process water can be supplied partly from recycled water.

Separation of flows. Three flows should be kept separate: domestic wastewater from toilets and washrooms, process wastewater from wash bays, and stormwater from paved areas. Domestic wastewater can go directly to the municipal sewer. Process wastewater requires local pretreatment under the sewer acceptance rules [6]. Runoff from areas exposed to oil should pass through an oil separator before discharge.

Pollutant removal. A typical treatment train includes grit and sediment removal, gravity oil separation, a physicochemical stage and filtration. Reviews show that single processes rarely achieve reuse quality and that combined processes are the most

promising option [16], [17]. Reported efficiencies include about 90% turbidity removal and about 80% COD removal for electrocoagulation, and about 85% suspended solids removal for flocculation-flotation [16]. These are literature results and depend on influent composition and operating conditions.

Storage, disinfection and reuse. Recycled water needs a storage tank with controlled residence time. High counts of fecal and total coliforms were found both in raw and in treated carwash water at a full-scale plant, which made final disinfection necessary before reuse [18]. Closed-loop operation also accumulates dissolved salts and surfactants, so some bleed-off and fresh-water make-up remain necessary.

Sludge, maintenance and monitoring. Grit, oily sludge and spent media must be removed regularly, recorded and handed over in line with the waste legislation [9]. Flow meters on fresh water, recycled water and discharge, together with periodic sampling, support both the water accounting obligations and industrial environmental control [5], [8].

Table 2. Relationship between water-management requirements and engineering measures

Requirement	**Environmental objective**	**Engineering measure**	**Expected outcome**
Water accounting (Water Code, Law ZRU-784)	Efficient water use	Meters on fresh, recycled and discharged water	**Verified water balance, basis for reporting**
Local pretreatment before sewer discharge (CM Resolution No. 11)	Protection of sewer and municipal treatment plant	Sediment chamber, oil separator, physicochemical stage	**Discharge within communal-ecological norms**

Separation of wastewater flows (building norms)	Avoid dilution and overload of treatment units	Separate domestic, process and storm drainage	**Smaller, more stable treatment units**
Discharge conditions (Water Code, Art. 110)	Protection of receiving water bodies	Treatment to permit conditions, or avoid direct discharge	**Reduced pollution load**
Waste passports and limits (Law No. 362-II)	Safe sludge management	Sludge dewatering, storage and licensed transfer	**Traceable residue management**
Industrial environmental control (Law ZRU-363)	Compliance assurance	Sampling programme, logbook, online sensors where feasible	**Documented compliance**
Water efficiency (policy and good practice)	**Lower freshwater demand**	**Recycling loop with filtration and disinfection**	**Lower abstraction and discharge volumes**

Environmental impact assessment and permitting

The environmental assessment of a carwash station in Uzbekistan now follows Law No. ZRU-1036 of 2025 and Cabinet of Ministers Resolution No. 234 of 2026. Under the Law, state environmental expertise covers, among other objects, materials on land plot selection for construction, pre-project and project documentation, and operating enterprises with a negative impact on the environment. The Law provides for

both state and public environmental expertise and introduces strategic environmental assessment for programmes and urban development plans [10].

Screening and classification. Resolution No. 234 divides objects into three categories by degree of environmental risk: high (Category I), medium (Category II) and low (Category III). Its Annex 1 lists activities by sector [11]. Resolution No. 541 of 2020 used four categories and was repealed on 14 August 2026. According to official reporting, the new list reduces the number of small, low-impact businesses that must undergo the formal procedure [19]. The accessible text of Annex 1 did not allow the authors to confirm whether, or in which category, stand-alone carwash stations are listed. The classification of a specific project therefore has to be checked against Annex 1. It may also depend on associated activities, such as a fuel station or vehicle service facility on the same site, and on whether effluent goes to a municipal sewer or to a water body.

Documentation, public participation and review. Where expertise is required, the developer prepares environmental impact assessment materials through a qualified project developer, and Resolution No. 234 sets separate regulations on the EIA procedure, public hearings and public environmental expertise (Annexes 3 to 5). The review period is 25 working days for Categories I and II and 15 working days for Category III [11]. A conclusion on EIA materials remains valid for three years, and a conclusion on draft environmental standards for five years [13].

Before construction. A positive expertise conclusion, where required, is obtained at the project documentation stage. In parallel, the developer needs technical conditions and a contract with the water and sewerage utility, and a special water use permit if water is abstracted from a well or effluent is discharged to a water body [5], [10], [15].

During operation. The operator must meet the conditions of the expertise conclusion and the sewer acceptance rules, carry out industrial environmental control,

keep water accounting and manage waste under waste passports [6], [8], [9], [10]. The planned Unified Ecological Online Platform indicates a move towards digital reporting of environmental data [13].

The assessment level is therefore not uniform. A small carwash connected to a municipal sewer and a large truck wash with its own well and direct discharge face different obligations, even though both must pretreat their process wastewater.

Discussion.

The analysis indicates that the Uzbek framework already contains the main legal elements needed for carwash water management. Water use is permitted and accounted for, industrial wastewater must be pretreated before entering municipal sewers, environmental assessment is risk-based, and operators must carry out industrial environmental control. International instruments, including the World Bank Group EHS Guidelines, ISO 14001:2026, ISO 46001:2019 and EU water legislation, are not binding in Uzbekistan unless adopted through financing agreements or voluntary commitments, but they consistently support pretreatment, segregation of wastewater streams and systematic water-efficiency management [20], [21], [22], [23], [24]. These measures also contribute directly to SDG targets 6.3 and 6.4 on wastewater treatment, safe reuse and water-use efficiency [25].

Several interface issues between national requirements, international good practice and practical conditions at carwash stations deserve attention. The Water Code explicitly provides for secondary use of wastewater for landscape greening [13], but the reviewed documents do not set quality criteria specifically for recycled water used in vehicle washing. A potential area for further development is fit-for-purpose guidance covering at least suspended solids, oil, surfactants and microbiological indicators, since coliform bacteria were found in treated carwash water at full scale [18]. Sewer acceptance rules are expressed as permissible concentrations [6]. Recycling reduces discharge volume and total pollutant load, but the smaller bleed-off

stream can be more concentrated in dissolved salts and surfactants. Recognition of load-based or water-balance-based compliance for facilities with verified recycling loops would help ensure that concentration limits alone do not discourage recycling.

Design practice faces a further gap. No current national construction norm dedicated to carwash stations was identified, and the current status of the external sewerage norm could not be confirmed, so designers combine general building norms, sewer acceptance rules and literature data. Reviews consistently recommend combined treatment trains rather than single processes [16], [17], and technical guidance linking these processes to national discharge and reuse conditions would reduce uncertainty in design and expertise. Economic feasibility is another constraint, as many small carwashes lack treatment infrastructure because of cost [16]. Full-scale experience nevertheless reports an amortization period of about eight months for installations with more than 30 washes per day [18], and international practice increasingly supports incentives or tariff signals that reward verified water savings.

Monitoring completes the chain from water consumption to compliance. Industrial environmental control and water accounting are mandatory, yet at small facilities they are often limited to periodic sampling. The planned national online platform and simple flow metering of fresh, recycled and discharged water would make water balances verifiable [13], and ISO 46001 offers a voluntary framework for turning these data into targets [24]. Overall, the reviewed requirements emphasize discharge compliance, whereas modern carwash design should also address water efficiency, pollution prevention at source, treatment performance, reuse, residue management, monitoring and lifecycle environmental performance.

Conclusion

As of 2026, water management at carwash stations in Uzbekistan is governed mainly by the Water Code of 2025, the 2022 Law on drinking water supply and wastewater disposal, the rules for accepting industrial wastewater into municipal

sewers, and the laws on nature protection, environmental control and waste. Together they require permitted and metered water use, local pretreatment of process wastewater, controlled discharge, industrial environmental control and proper management of oily sludge. Current construction norms provide the basis for water supply and drainage design, but no dedicated national design norm for carwash stations was identified.

Environmental assessment follows the 2025 Law on environmental expertise, EIA and SEA and Cabinet of Ministers Resolution No. 234 of 2026. The procedure is risk-based, with three categories and differentiated review periods, so the obligations of a specific carwash depend on its classification, scale, associated activities and discharge route. International instruments such as the World Bank Group EHS Guidelines, ISO 14001, ISO 46001 and EU water legislation are not binding in Uzbekistan unless adopted through financing agreements or voluntary commitments, but they provide useful benchmarks.

SDG targets 6.3 and 6.4 and the projected national water deficit point in the same direction. Carwash stations should be designed as integrated water systems in which water efficiency, local treatment of oil and suspended solids, disinfection, reuse and monitoring are planned together, rather than as facilities designed only to meet discharge limits.

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