DOI: https://doi.org/10.33005/border.v7i2.1299
Border: Jurnal Arsitektur, Vol.7 No.2, November 2025
ISSN 2656-5889 (printed) / ISSN 2685-1598 (online)

INTEGRATING GREEN BUILDING PRINCIPLES AND ISLAMIC JURISPRUDENCE (FIQH) IN ABLUTION WASTEWATER REUSE FOR URBAN MOSQUES IN INDONESIA

Ulfiatun Risma[1*], Dany Perwita Sari[2]
[1]Department of Architecture, Diponegoro University, Semarang, Indonesia
[2]Research Center for Structural Strength Technology, Research Organization for Energy and Manufacture, National Research and Innovation Agency (BRIN), Tangerang Selatan, Indonesia
* Email correspondence: ulfiarisma78@gmail.com

Received: August 2025; Accepted: November 2025; Published: November 2025

ABSTRACT

In Indonesia, which is the most populous Muslim-majority country in the world, there is currently a shortage of water sources and mosques are considered as one of the public building that produce water waste the most because of the ablution (wudhu) activities. A medium-sized mosque, for instance, consumes water between 3,000 and 3,500 liters daily. Therefore, this study is aimed at incorporating green building and fiqh in the reuse of ablution wastewater. Using a qualitative-descriptive method, this study investigates the water use behavior, technology of water taps, and treatment feasibility for the study of mosque typologies. Wastewater from ablution is considered light greywater and is in a safe range of pollutants (TSS 0 mg/L, BOD 2.3 mg/L, COD 7.4 mg/L, pH 8.4) which meets the requirements of class I clean water. Multi-stage sedimentation, sand-zeolite, activated carbon, and UV filtration can minimize the demand on clean water by 40-60%. The fiqh principle of reuse, assuming that water's fundamental properties and volume (over two qullah or ~270 L) do not change, is pertinent here. The combination of these techniques confirms that ablution water reuse satisfies the green building water-efficiency objectives while also manifesting the Islamic principles of cleanliness (*taharah*) and moderation (*wasatiyyah*).

Keywords: Ablution wastewater; mosque; green building; indonesia green building rating system; greywater reuse; islamic jurisprudence (Fiqh)

INTRODUCTION

Indonesia is the world's most populous Muslim country (Kementerian Agama Republik Indonesia, 2020), with over 299,692 mosques (Kementerian Agama Republik Indonesia, 2024), each of which house significant socio-cultural functions. Some functions include being a place of worship, education, and social gathering. One of the primary activities performed in mosques is the ritual of ablution (wudhu). The purification ritual entails the washing of specific body parts with water before engaging in selected religious acts according to the procedures outlined in the Islamic scripture law (*Al-Qur'an: Surah Al-Ma'idah Ayat 6*, 2019). The ablution process requires a significant amount of water, as a medium mosque would use 3,000 liters a day in ablution practice (Surya Wardanu *et al.*, 2018). Such water use has placed mosques as notable establishments contributing to the over urban water use and likely to practice eco-responsibility.

Following the implementation of Ministerial Regulation No. 21 of 2021 on the Green Building Assessment System, 21 of 2021, the Indonesian government considers water efficiency as one of the three major pillars of sustainable building performance (Kementerian PUPR, 2021). These pillars are applicable for not just residential or commercial building, but also religious ones. In this case, mosques, which are considered Grade 10 buildings, are sponsors of the adoption of sustainable approaches for water saving, greywater reuse, and treatment technologies. In Indonesia, several recent studies highlight the green mosque as a model of eco-friendly worship place, integrating ecological consciousness and Islamic principles of stewardship and moderation. For instance, the Management of Masjid Raya Baiturrahman Semarang, is one of the mosques that can illustrate the integration of tropical modern architecture and microclimate responsive design, and construction of sustainable water management systems, demonstrating the capability of mosques to serve as spaces for spiritual and eco balance (Firmansyah *et al.*, 2024). This also shows that in mosque architecture, environmental stewardship is a design, but also an Islamic ethic responsibility toward the environment.

Among architectural scholars and in the range of environment and design disciplines, ablution wastewater, also refers to as light greywater, is a bit more amenable to treatment and reuse than other domestic wastewater streams (Hadisantoso *et al.*, 2018; Afiatun, Wahyuni and Harto, 2022). This reuse also helps mosques get green building certificates in water conservation and relieves the pressure on urban water supplies. From the religious perspective, this study was assessed using Islamic jurisprudence (fiqh). According to ancient scholars, Musta'mal, water for ablution – is considered thahir and is pure, but is neither purifying (thahur) until 2 qullah (≈270 liters) is continuously used, otherwise it must be colorless, odorless, and tasteless. This water can be thahur and if its thahur then it can be used for purification. This appreciation is found where environmental engineering mingles with Islamic law, creating artifacts of deep spirituality that balance engineering and technology.

Combining the tenets of green construction with Islamic law (fiqh) creates opportunities for the effective and responsible application of sustainable water management in the mosques of urban area in Indonesia. Addressing the following three issues is the focus of this study because few have done so in the past:

(1) An evaluation of the potential reuse of wastewater generated during ablution, based on the principles of green building, and the examination of associated sustainment issues.
(2) Reviewing water reuse and recycling permits, as well as the Islamic jurisprudence implications of water purity.
(3) Integrating mechanical and behavioral efficiencies (such as water-saving faucets and judicious water use) into the mosque's water management system.

This study proposes a Green Building-Fiqh Integration Paradigm for onsite re-se of ablution water that synergizes environmental policy, architectural creativity, and Islamic law, positioning the mosque as a model of spiritual sustainability and a pioneer where 'ecological-innovation' is perfectly integrated with religion and nature.

METHODS

This study applies a qualitative descriptive approach to explore the relationship between sustainable building principles and Islamic jurisprudence (fiqh) regarding the management of the reuse of ablution wastewater from mosques in urban areas. The study focuses on interpreting and integrating ideas, rather than conducting experiments, to establish a link between what can be built and what is permissible according to religion in the realm of sustainable architecture.

This research is divided into three components or stages of analysis which are interrelated and presented sequentially in the discussion. First, a literature synthesis includes a review of relevant studies and legal documents related to green building frameworks, wastewater treatment technologies, and Islamic legal principles related to the sanctity of water. Reference sources include Greenship Rating Tools for New Buildings v1.2 (GBCI Indonesia, 2021), LEED (Leadership in Energy and Environmental Design) v4.1 on Water (U.S. Green Building Council, 2020), and classical fiqh texts such as Al-Majmu' (Imam Ahmad, 2005) and I'anah al-Talibin (Ad-Dimyathi, 1298). This exploration establishes a conceptual link between sustainability parameters and Islamic fiqh categories related to water, that’s musta'mal, thahir, thahur.

In the second phase, we conducted a technical assessment aimed at determining the feasibility and effectiveness of a system design for the reuse of ablution wastewater. Data from previous studies and field surveys at three city mosques, Istiqlal Grand Mosque in Jakarta, Salman Mosque in Bandung, and Ulul Albaab Mosque in Pasundan University Bandung, which differ in user types and behaviors were readily collected. Observation locations focused on water use and consumption patterns, faucet type (whether manual, automatic, or sensor-type), user behavior in terms of ablution duration and water-saving behavioral cues, and compliance, average flow rate, and user behavior were documented. In reviewing technical references for wastewater treatment, system components sedimentation, sand and carbon filtration, and UV disinfection were assessed to produce treated water that meets the minimum Class I water quality standard (Peraturan Perundangan No 22, 2021) used for system balance. This data was used to estimate the potential for clean water recovery for previous mosque applications (Suratkon, Chan and Ab Rahman, 2014; Salikha, 2019; Afiatun, Wahyuni and Harto, 2022).

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

The third phase of validation involved the Islamic jurisprudence (fiqh) of the characteristics of the treated or treated ablution water, and how they meet the requirements of Islamic law and its laws. This assessment draws on classical and contemporary Islamic jurisprudence (fiqh). These findings were combined with technical findings to ensure that the new environmental concept aligns with Islamic moral beliefs.

The results from each section of the research were then combined and integrated into the Green Building-Fiqh Integration Matrix. This matrix helps connect concepts of water efficiency and sustainable building design with Islamic fatwas on clean water and water reuse.This research aimed to obtain and document consultations with a green building architect and a fiqh scholar specializing in fiqh al-bi'ah (Islamic environmental law). This consultation ensures that the methodological systematization will be reflected in the research results, as this and subsequent discussions answer the reviewers' questions about the clarity, coherence, and consistency of the research phases and results

RESULT AND DISCUSSION

Conceptual and Regulatory Context

Under Ministerial Regulation No. 21 of 2021 concerning the Green Building Assessment System, water efficiency is a crucial component of construction sustainability evaluation, as it requires effective environmental resource management, wastewater treatment, and water reuse (Kementerian PUPR, 2021). Based on this regulation, mosques are classified as Class 10 non-residential buildings, where the implementation of green building principles is highly recommended, particularly in the areas of water conservation and wastewater treatment, as ablution is one of the most water-consuming activities in its operation.

In light of this, both the Greenship New Building Assessment Tool v1.2 (GBCI Indonesia, 2021) and LEED v4.1 Water Efficiency (U.S. Green Building Council, 2020) focus on this commitment from the hierarchy of reduction, source control, and reuse. A total of 17.09% of the maximum achievable score for the Water Conservation category in the Greenship Indonesia assessment (GBCI Indonesia, 2016) indicates the importance of effective water management, particularly the reuse of ablution wastewater, in the water management component of the assessment for construction sustainability certification.

It is prudent, in conjunction with the aforementioned regulations, to also examine recent research in Indonesia that focuses on *Green mosques* as a case where environmental concerns and spiritual awareness converge. One such work, the Baiturrahman Grand Mosque in Semarang (Firmansyah *et al.*, 2024), demonstrates how the modern school of tropical architecture and microclimate-responsive design reflect the integration of modern architectural goals and sustainability in places of worship. This architectural design's respect for the fusion of environmental awareness and religious conviction reflects the Qur'anic ideal of wasatiyyah, which represents balance and stewardship as a vicegerent on earth, thus greatly enhancing the mosque's significance as both a spiritual haven and a dynamic center for ecological balance.

From an Islamic perspective, core principles such as israf (avoiding waste) and maslahah (social welfare) serve as fundamental ethical benchmarks for sustainable practices. The Prophet Muhammad (peace be upon him) emphasized the prohibition of wasting water, even when it is abundantly available in rivers during purification processes (Ahmad, 887). Therefore, the application of environmentally friendly construction methods, especially when integrated with Islamic legal principles, not only encourages innovation in ablution water management but also affirms moral and ethical values related to purity (*taharah*), moderation, and justice in environmental management practices.

Exploring methods that meet ecological standards and religious hygiene principles while simultaneously enabling the reuse of ablution wastewater has opened up new perspectives on viewing mosques as a representation of sustainable design in urban Indonesia. Furthermore, this study evaluates their ecological impact in the context of religious activities and spiritual practices, emphasizing the mosque's role not only as a space of worship but also as a model for the integration of environmental sustainability and religious values.

Technical and Behavioral Variations in Ablution Water Use

The largest water consumption in mosques comes from ablution activities. In medium-sized mosques, such as the Jami' Mosque at the sub-district level, daily water needs range from 3,000 to 3,500 liters (Surya Wardanu *et al.*, 2018). However, the amount of water used and water management patterns can vary between mosques, influenced by the type of faucet technology used, congregational behavior, and the design configuration of the ablution room.

The volume of ablution water use varies as described in Table 1. This difference is determined not only by the function and scale of each mosque, but also by the type of faucet installed, the level of water usage control, and the discipline of the congregation in performing ablution. These findings indicate that implementing more efficient faucet technology and managing user behavior can be key factors in reducing ablution water consumption across various mosque types.

Mafra et al. (2018) conducted a study on movement time in 25 mosques (n = 734 respondents) in Palembang. This study found that the average time was 64 seconds with an average water consumption of 4.42 L/person, and a tap flow rate of around 0.07 L/s (Mafra *et al.*, 2018). A primary reason identified was the continuous running of the manual faucets while the abluents perform the rite. When compared with the Prophet’s example approximately 0.6 L per ablution Musnad Ahmad, Hadist No. 8833 this indicates current practices consume up to seven times more water, highlighting both technical inefficiency and ethical deviation from the principle of moderation (*wasatiyyah*) (Imam Ahmad, 2005).

Because prayers are carried out five times a day, the consumption of clean water in the mosque also has a big role for the smooth running of worship every day. Based on several studies, the average estimate of the volume of ablution water per individual ranges is mentioned in Table 2. This means that more than 3,500 liters of clean water have the potential to become wastewater every day from ablution, cleaning, and other mosque activities.

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

Table 1. Quality parameters of raw water and used ablution water

Mosque	Typology	Faucet Type	Avg. Flow (L/min)	Avg. Use (L/person)	Key Influencing Factors
Istiqlal, Jakarta	Grand	Sensor	2.5	3.5	Automatic shut-off; high turnover; longer queues
Salman ITB, Bandung	Campus	Manual	4.0	1.5	User discipline; signage; compact layout
Ulul Albaab, Bandung	Community	Manual	5.0	3.9	Idle flow; low awareness; limited design

(Source: several empirical studies, 2025)

Mechanical and behavioral control measures are therefore essential. Sensor-based or self-closing faucets can reduce consumption by 30–50 %, while behavioral interventions such as educational signage, flow-rate displays, and ergonomic layout design further minimize idle flow. At Salman ITB Mosque, for instance, signage and compact circulation helped achieve the lowest per-person water use (≈ 1.5 L), proving that behavioral design can be as effective as advanced technology.

This is the comparison which examine the dual level of efficiencies proposed by green building framework (Suratkon, Chan and Ab Rahman, 2014; Shafiquzzaman *et al.*, 2020):

1) Source-control efficiency. This is achieved by the use of low flow plumbing fixtures, pressure regulation, and automated faucets.
2) Behavioural efficiency. This is achieved through Education, Spatial Design, and Mindfulness of Rituals.

On a bigger scale, case studies affirm the efficiency potential of ablution water recycling systems. Istiqlal Mosque, Jakarta, recorded 36% clean water savings using a wetland-based physical treatment system (Salikha, 2019); Ulul Albaab Mosque, Pasundan University, recorded 95.3% savings with chemical filtration (Afiatun, Wahyuni and Harto, 2022); and mosque of a few campuses in Malaysia recorded 55% water savings using the SmartWudhu' system (Suratkon, Chan and Ab Rahman, 2014). These findings show that total water savings of 40- 60% are realistically reachable with a combination of technology and behavioral interventions and that achievement is in total harmony with principles of green buildings and Islamic morals regarding water.

Analysis of the ablution wastewater treatment system

In purification prior to prayer, people wash their hands, mouth, face, head and feet with clean water and this water is then categorized as light greywater (Utaberta and Handryant, 2014) which is domestic wastewater without any chemicals (Khajvand *et al.*, 2022) explains this type as being different from heavy greywater which is domestic wastewater and contains chemicals which are from the kitchen and toilets as well as the water from bathing, laundry, and dishwashing (Utaberta and Handryant, 2014; Khajvand *et al.*, 2022).

Table 2. Estimated average volume of ablution water per individual

No	Literatures	Volume of water	Information
1.	Utaberta (2014)	3.5 L	Malaysian Mosque
2.	Siti Aisya (2018)	1.5 L	Salman Mosque, ITB
3.	Hadisantoso et al. (2020)	3.0 L	UIN Bandung campus mosque
4.	Afiatun (2022)	3.9 L	Ulul Albaab Mosque, Pasundan University
5.	Hadith of the Prophet	1.5 L	The Prophet's recommendation for the use of ablution water

(Source: several empirical studies, 2025)

Using the formula:

Total water = number of pilgrims x volume of water per person (1)

Total water = number of pilgrims x volume of water per person = 857 x 3.9 liters = 3,342.3 liters = 3.34 m^3 per day.

According to Minister of Indonesia's regulation number 22 of 2021 that described in Table 3 , Class I drinking water must meet strict quality thresholds, with maximum values of 40 mg/L for TSS, 2 mg/L for BOD, 10 mg/L for COD, and a pH range of 6–9 (Peraturan Perundangan No 22, 2021). When examining the characteristics of ablution water and the measured analysis together, there appears to be little difference between the two.The used ablution water container recorded a TSS of 0 mg/L, BOD of 2.3 mg/L, COD of 7.4 mg/L, and pH of 8.4 (Hadisantoso *et al.*, 2018). These values indicate very low levels of contamination and, in some cases, nearly meet clean water standards.

Considering the quality of the water used for ablution, it has great potential for reuse. This water can easily meet non-potable needs such as flushing toilets, gardening, or cleaning outdoor areas (Shafiquzzaman *et al.*, 2020). If properly cared for to maintain its essential properties, this water can also meet the requirements of Islamic law for ritual (Shafiquzzaman *et al.*, 2020). Reusing ablution water not only eases pressure on clean water supplies but also strengthens conservation efforts within mosque environments.

Technical feasibility and Analysis of ablution wastewater treatment system

Treating ablution wastewater is one of the best methods for conserving water and is one of the first methods used to embrace the sustainable building approach in mosques. Since this wastewater is considered low greywater and has only minor amounts of organic and chemical impurities, it is easy to reuse it after simple filtration and or advanced treatment. There is also an Islamic dimension to this practice of reusing water for ablution. Islam has a strong position against waste (israf), and also has a stewardship role of the natural resources (*khalifah fil ardh*).

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

Table 3. Quality parameters of raw water and used ablution water

No	Parameters	Raw water (class I)	Used ablution water
1.	Total Suspended Solids	3,40 mg/L	0 mg/L
2.	Biological Oxygen Demand	2 mg/L	2,3 mg/L
3.	Chemical Oxygen Demand	10 mg/L	7,4 mg/L
4.	pH	6 – 9	8,4

(Source: Hadisantoso et al., 2018 and Peraturan Perundangan, 2021)

Recent studies confirm the technical feasibility of this practice. Some laboratory tests reveal used ablution water has TSS = 0 mg/L, BOD = 2.3 mg/L, COD = 7.4 mg/L, and pH = 8.4 (Hadisantoso *et al.*, 2018). In comparison with the water quality standards for domestic waste water stipulated in Minister Regulation No. 11 of 2021 (Peraturan Perundangan, 2021) and the water quality of class 1 (nearest to clean water), these values show the water has a reasonable treatment potential and if treated can be put to many uses.

The treatment process as mentioned in Figure 1 generally consists of three main stages—physical, chemical, and biological filtration—which can be applied individually or in combination to achieve optimal results (Ameer *et al.*, 2025; Tagar and Qambrani, 2025), with a particular focus on cost-effectiveness, treatment efficiency, social acceptance, and environmental concerns, including:

- Physical method

This method is used to remove solid particles, sand, oil, and sediment from ablution water waste, also called a simple wastewater treatment system as illustrated in Figure 2. Generally as an initial stage (pre-treatment). These are often applied as pre-treatment stages and are low-cost and easy to maintain.

- Biological method

After going through the pre-treatment stage, the low-speed purification method utilizes naturally occurring microscopic organisms to break down organic matter and contaminants in the used washwater as illustrated in Figure 3. This process can proportionally reduce BOD and COD levels and improve water quality and hygiene.

- Chemical method

This method utilizes chemical elements to deactivate, precipitate, or eliminate microorganisms contained in ablution wastewater as described in Figure 4. This process involves several multi-stage filtration processes applied after pre-treatment to remove color, odor, and residual organic matter.

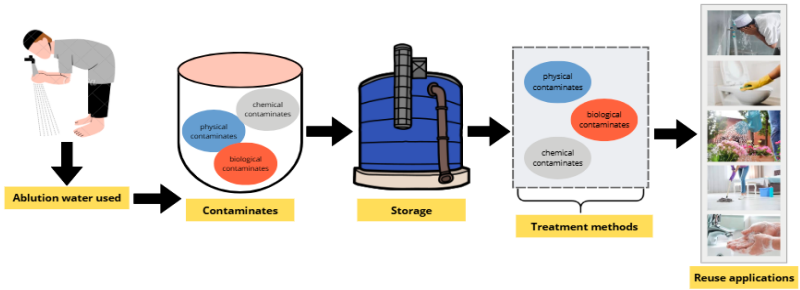

Figure 1. Methods of treating ablution water
(Source: Analysis of several empirical studies, 2025)

The application of this filtration system has been proven in various mosques in Indonesia, showing a high level of efficiency and good adaptability, as in the table 4.

The shift from a simple sand-zeolite system to a sophisticated hybrid system of nanofiltration and ozonation demonstrates continued technological progress and remains practical for mosque-scale applications. The combination of zeolite filtration with an aeration–adsorption process offers an economical and energy-efficient solution, significantly reducing the concentration of suspended solid particles while improving the odor and microbiological quality of the water.

The results of this study support the assumption that treated ablution water can be safely reused for various non-potable purposes, including flushing toilets, irrigating plants, cleaning outdoor areas, and ritual purification activities, in accordance with specific Islamic jurisprudence requirements, namely without changes in color, odor, or taste, with a minimum volume of two *qullah*, or approximately 270 liters.

Furthermore, this is coupled with the Indonesian Green Building Water Efficiency Credit (Kementerian PUPR, 2021), which encourages the adoption of sustainable sources and water recycling methods in places of worship. The potential of fiqh and technical efficiency to provide legitimacy to water reuse in mosques allows these initiatives to be positioned as both useful innovations for the environment and as exemplifying spiritually the principles of sustainable Islamic architecture.

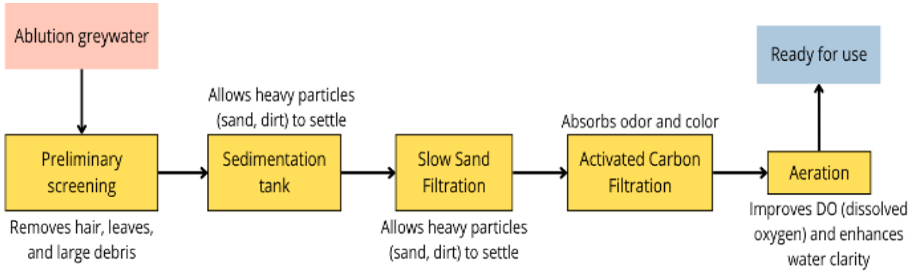

Figure 2. Physical method state
(Source: Author, 2025)

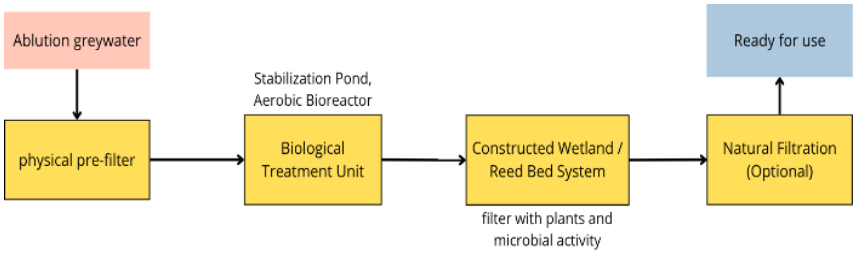

Figure 3. Biological method state
(Source: Author, 2025**)**

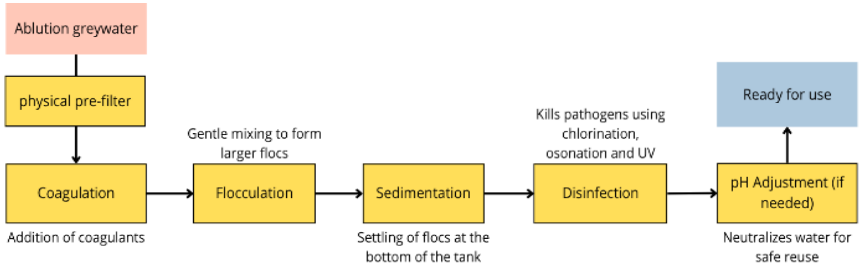

Figure 4. Chemical method state
(Source: Author, 2025)

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

Table 4. Comparative Performance of Ablution Water Treatment Systems

Study / System	Main Process	Key Results	Output Quality	Reuse Type
Masjid An-Nashr, Bogor (Lubis and Sutisna, 2022)	Sand + Zeolite + Carbon	Clear, odorless water, pH 7–8	Class II standard	Non-potable reuse
RABANI System, UNDIP (Cahyaningrum, Suci and Cahyaningrum, 2020)	Nanofiltration + Electrocoagulation + Ozone	Turbidity ↓94%, Fe ↓69%, NH_3 ↓85%	Clean, odorless	Re-ablution possible
Ulul Albaab Mosque, Pasundan University (Afiatun, Wahyuni and Harto, 2022)	Chemical Filtration	Clean water savings up to 95.3%	Meets local reuse standard	Non-potable reuse
Istiqlal Mosque, Jakarta (Salikha, 2019)	Physical + Wetland System	Water savings 36%	Stable effluent	Non-potable reuse
SmartWudhu', Malaysia (Suratkon, Chan and Ab Rahman, 2014)	Zeolite + Activated Carbon	55% water savings	Clear, odorless	Non-potable reuse

(Source: several empirical studies, 2025)

Islamic law studies of musta'mal water

In Islamic fiqh, musta'mal water (ablution water waste) is water that has been used to lift hadas or najis, or water that drips from the body during ablution. This type of water is generally considered sacred (*thahir*) but not purifying (*thahur*). In other words, it may still be used to perform ablution again on the condition that the quantity of water is large (two *qullah* or more) and its essential characteristics, its taste, color, and smell remain unchanged (Ad-Dimyathi, 1298).

The Prophet's Allah said, "If water reaches two qullahs, then it does not defile anything unless it changes its nature" (Daud *et al.*, no date). Two *qullah* water is equivalent to 270 liters (Muhajir, 2014), also called Thahur water (pure/raw water). Other types of water are musta'mal water (water used for bathing/ablution), najis water (exposed to impurity and changing its nature) and *mutaghayyir* water (changing its nature, e.g. coffee water) (Zainuddin, 1532).

In the context of ablution water waste treatment, if the volume of water used is large (two *qullah* or more, over 270 liters) and its color, smell, and taste remain unchanged, it is still categorized as thahur—holy and purifying water. This classification provides an important foundation for justifying the reuse of ablution water in a manner compliant with Islamic jurisprudence, particularly when supported by adequate filtration and purification systems that preserve its physical and spiritual purity.

It is better if you have gone through the filtering process as explained in the Kitab of I'anah at-Talibin, Juz 1, p. 25:

"فإن خالطه مستعمل، فإن غيَّر إطلاقه لم يجز التوضؤ به، وإلا جاز"

"If musta'mal water is mixed with absolute water, then it removes the absolute nature of the water, then it is not permissible to perform ablution with it. But if it does not

eliminate its absolute nature, then it is permissible to perform ablution with the water" (Ad-Dimyathi, 1298). From the legal literature of Islamic fiqh, it is stated that the reuse of ablution water waste, whether using the filtering process or not, is classified as purifying water (raw water) provided that the total volume of water is more than 270 liters and does not undergo changes in properties (taste, color, and smell).

CONCLUSION

This study concludes that ablution wastewater reuse is a technically and theologically feasible strategy for achieving sustainable water management in Indonesian urban mosques. Experimental evidence shows that light greywater ablutions (wudhu) have passed reconditioning and safe reuse standards and can be achieved by simple filtration. It has been shown that this type of filter that uses a combination of physical, chemical and biological treatment processes can save about 1200 to 2000 liters of clean water every day, which is about 40-60% of a mosque's daily water use.

In Islamic fiqh, the reuse of musta‘mal water for wudhu is permissible and has to be 2 qullah or 270 liters or more, and the water must retain its original characteristics in terms of color, smell and taste. This shows a marriage of environmental engineering with religion that embraces the ethical tenets of conserving health and the environment as enjoined by the Holy Quran.

The study shows that behavioral and mechanical controls such as educational signage, designed ergonomically, and sensor-faucets in place to reduce source consumption are beneficial before any reuse is considered, and that this has been the most important element of the study. With such activities, the Green–Fiqh Integration Framework is improved as a water-efficient design has been combined with the Islamic ethical imperative.

Future assessments should include pilot evaluations and estimates of community impact regarding socio-economic viability and feasibility of maintenance and user acceptance. Such a holistic approach could spark a shift in mosques to become the first examples of green faith architecture, thus increasing the chances of public and religious sustainable designs to proliferate in urban Indonesia.

REFERENCES

Ad-Dimyathi, M.S. (1298) Kitab I‘anah at-Thalibin. 1st edn.

Afiatun, E., Wahyuni, S. and Harto, J. (2022) ‘Study of Potential Utilization of Recycling Ablution Used Water, Case Study at Ulul Albaab Mosque, Universitas Pasundan, Bandung, Indonesia’, Journal of Community Based Environmental Engineering and Management, 6(2). Available at: https://doi.org/https://doi.org/10.23969/jcbeem.v6i2.6150.

Ahmad (887) ‘Larangan Boros Air’. Available at: https://muhamadbasuki.web.id/kitab/hadis/sunan-ibnu-majah/no/425#gsc.tab=0.

Al-Qur’an: Surah Al-Ma’idah Ayat 6 (2019). Jakarta. Available at: https://quran.nu.or.id/.

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

Ameer, S. et al. (2025) 'A systematic literature review on potential of ablution greywater reuse: current insights, challenges, and future prospects', Applied Water Science, 15(7), p. 173. Available at: https://doi.org/10.1007/s13201-025-02488-0.

Cahyaningrum, Ema, Suci, R.Y. and Cahyaningrum, Emi (2020) 'RABANI (Reaktor Baru Wudhu Masa Kini) : Sistem Daur Ulang Air Wudhu yang Syar'i Berbasis Neo', Jurnal Dinamika, 1(1). Available at: https://doi.org/10.18326/dinamika.v1i1.54-64.

Daud, A. et al. (no date) 'Hadist Nabi'.

Firmansyah, M.V. et al. (2024) 'Concept And Meaning Of Baiturrahman Grand Mosque Building Semarang As A Green Place Of Worship And Sustainable', Border Jurnal Arsitektur, 6(2), pp. 119–132. Available at: https://doi.org/10.33005/border.v6i2.777.

GBCI Indonesia (2016) 'GREENSHIP Rating Tools Existing Building', in GREENSHIP Rating Tools. 1.1. Indonesia. Available at: https://gbcindonesia.org/files/resource/41209249-29c0-482a-ae95-7f34e0533e9a/RINGKASAN EB 1.1.pdf.

GBCI Indonesia (2021) 'GREENSHIP Rating Tools New Building', in GREENSHIP Rating Tools (revised edition). Jakarta: GBC Indonesia.

Hadisantoso, E.P. et al. (2018) 'Pengolahan Limbah Air Wudhu Wanita dengan Metode Aerasi dan Adsorpsi Menggunakan Karbon Aktif', al-Kimiya, 5(1), pp. 1–6. Available at: https://doi.org/10.15575/ak.v5i1.3719.

Imam Ahmad (2005) 'Musnad Ahmad bin Hanbal [Hadith No. 8833]', in Dar al-Kutub al-'Ilmiyyah.

Kementerian Agama Republik Indonesia (2020) Menjadi Muslim, Menjadi Indonesia (Kilas Balik Indonesia Menjadi Bangsa Muslim Terbesar), Kemenag.go.id. Available at: https://kemenag.go.id/opini/menjadi-muslim-menjadi-indonesia-kilas-balik-indonesia-menjadi-bangsa-muslim-terbesar-03w0yt.

Kementerian Agama Republik Indonesia (2024) Jumlah Masjid Terdaftar Menurut Tipologi, Satu Data Kemenag. Available at: https://satudata.kemenag.go.id/dataset/detail/jumlah-masjid-terdaftar-menurut-tipologi.

Kementerian PUPR (2021) 'Permen Menteri Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia Nomor 21 Tahun 2021', Menteri Pekerjaan Umum dan Perumahan Rakyat Republik Indonesia.

Khajvand, M. et al. (2022) 'Management of greywater: environmental impact, treatment, resource recovery, water recycling, and decentralization', Water Science and Technology, 86(5), pp. 909–937. Available at: https://doi.org/10.2166/wst.2022.226.

Lubis, M.N. and Sutisna, S.P. (2022) 'Desain Sistem Penggunaan Kembali Limbah Air Wudhu di Masjid An-Nasr Cilendek Timur Bogor Sesuai Syariat Islam', Jurma Jurnal Program Mahasiswa Kreatif, 6(1). Available at: https://pkm.uika-bogor.ac.id/index.php/pkm-p/article/download/1158/920.

Mafra, R. et al. (2018) 'Pengukuran Durasi Waktu Berwudhu dan Volume Penggunaan Air Pada Masjid-Masjid di Kota Palembang', Jurnal Arsir, 2(2).

Muhajir, K.A. (2014) Fahtul Mujibil Qarib.

Peraturan Perundangan (2021) 'Peraturan Pemerintah (PP) Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup'.

Peraturan Perundangan No 22 (2021) ‘Peraturan Pemerintah (PP) Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup’. Indonesia. Available at: LN.2021/No.32, TLN No.6634, jdih.setkab.go.id : 374 hlm.

Salikha, R.N. (2019) Skema pemanfaatan air bekas wudu sebagai sumber air alternatif: studi kasus Masjid Istiqlal, Jakarta. Universitas Indonesia. Available at: https://lib.ui.ac.id/detail?id=20489791&lokasi=lokal.

Shafiquzzaman, M. et al. (2020) ‘Development and evaluation of treatment options for recycling ablution greywater’, International Journal of Environmental Science and Technology, 17(3), pp. 1225–1238. Available at: https://doi.org/10.1007/s13762-019-02537-7.

Suratkon, A., Chan, C.M. and Ab Rahman, T.S.T. (2014) ‘SmartWUDHU’: Recycling Ablution Water for Sustainable Living in Malaysia’, Journal of Sustainable Development, 7(6). Available at: https://doi.org/10.5539/jsd.v7n6p150.

Surya Wardanu, S. et al. (2018) ‘Analisis Kebutuhan Air Bersih Pada Sistem Air Bersih Masjid Raudhatul Ilmi Sekolah Tinggi Penerbangan Indonesia’, Jurnal Ilmiah Aviasi Langit Biru, 11(3), pp. 1–68. Available at: http://beritatrans.com/2016/01/06/tommy-ajak-.

Tagar, S. and Qambrani, N.A. (2025) ‘A Review on Treatment Methods, Recycling, and Reuse of Ablution Greywater for Sustainable Water Resource Management’, Water Conservation Science and Engineering, 10(1), p. 36. Available at: https://doi.org/10.1007/s41101-025-00357-0.

U.S. Green Building Council (2020) ‘LEED v4.1: Building design and construction – Water efficiency’, in. Washington: DS:USGBC. Available at: https://www.usgbc.org/leed.

Utaberta, N. and Handryant, A.N. (2014) Greywater Treatment System In Universiti Kebangsaan Malaysia Mosque : Utilizing Filter Wells as An Alternative Sustainable Innovation, Journal of Islamic Architecture.

Zainuddin, S. (1532) Fath al-Mu‘in Bab Sifat al-Ma’’’.

ISSN 2656-5889 (cetak) / ISSN 2685-1598 (online)

 DOI: https://doi.org/10.33005/border.v7i2.1299

This page was purposefully left blank.