



**JOURNAL OF TOURISM,
HOSPITALITY AND
ENVIRONMENT MANAGEMENT
(JTHER)**


www.gaexcellence.com/jthem




MANAGING GREYWATER REUSE: REGULATORY STRATEGIES AND IMPLEMENTATION IN GREEN BUILDING PROJECTS

Siti Sarah Sulaiman^{1*}, Suhaili Ishak², Rasyikah Md Khalid³, Saiful Azmi Samad⁴

¹Faculty of Law, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia

 siti_sarah@uitm.edu.my

 <https://orcid.org/0000-0002-1077-2894>

²Faculty of Business, Management and Professional Studies, MSU

 suhaili@msu.edu.my

 <https://orcid.org/0009-0001-9850-1254>


³Faculty of Law, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia

 rasyikah@ukm.edu.my

 <https://orcid.org/0000-0002-6328-5520>

⁴Legal Department, Selayang Municipal Council, Selayang, Selangor, Malaysia

 saifulazmi.samad@mps.gov.my

 <https://orcid.org/0009-0003-4497-0789>

*Corresponding Author

Article Info:

Article history:

Received date: 17.12.2025

Revised date: 15.01.2026

Accepted date: 05.03.2026

Published date: 31.03.2026

To cite this document:

Sulaiman, S. S., Ishak, S., Md Khalid, R., & Samad, S. A. (2026). Managing Greywater Reuse: Regulatory Strategies And Implementation In Green Building Projects. *Journal of Tourism Hospitality and Environment Management*, 11 (43), 717-728.

Abstract:

Greywater is wastewater from domestic activities such as showers, handwashing, laundry, and washing machines. Reusing greywater for non-potable activities such as gardening, toilet flushing, and car washing has been proven to be a sustainable solution to freshwater scarcity. This approach is particularly relevant in Malaysian states such as Selangor, which are regularly affected by water shortage due to water pollution and prolonged dry seasons. Greywater reuse remains relatively underdeveloped in Malaysia. Notably, as the number of water supply disruptions has increased, there has been a call for an alternative water supply using greywater. Reusing greywater is also part of the Green Building initiatives that can be implemented in Malaysia. Since there is no specific law or standard governing the development of greywater treatment systems to ensure a sustainable water supply in Malaysia, this paper examines a potential regulatory mechanism for governing greywater systems in anticipation of wider national adoption. To achieve this objective, this paper examined the laws of other countries, namely California greywater regulations, California Plumbing Code (CPC), and the European Standard "EN 16941 series, on-site non-potable water systems- Part 2: Systems for the use of treated greywater (EN 16941 2:2021)" which regulates the greywater treatment system. Both jurisdictions adopt performance-based technical standards, while Malaysian law is silent on this aspect. Thus, this paper

proposes a regulatory framework that integrates building control requirements, plumbing standards and planning conditions to integrate greywater reuse within Malaysia's green building regime. The standard must be adhered to in addition to the conditions imposed by the local planning authority upon granting the planning permission. A well-regulated greywater treatment system can enhance urban water resilience and help diversify Malaysia's water supply sources. This also contributes to Sustainable Development Goal 6 (Clean Water and Sanitation) particularly 6.3 on improving water quality and wastewater treatment.

DOI:10.35631/JTHER.1143044 **Keywords:**

Freshwater Scarcity, Greywater, Green Building, Planning Permission, Regulation



© The authors (2026). This is an Open Access article distributed under the terms of the Creative Commons Attribution (CC BY NC) (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial reuse, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial reuse, please contact jthem@gaexcellence.com.

Introduction

Access to fresh water has become a matter of concern in many parts of the world, including Malaysia. According to the National Water Services Commission (SPAN) in Peninsular Malaysia and Labuan, water consumption increased to 230 litres per capita per day in 2019, well above the 165 litres per capita per day required by the United Nations (Foo, 2019). Water demand is directly affected by population growth and economic activity in the country. However, water supply and services have been consistently disrupted by unscheduled interruptions due to water pollution (The Malaysian Reserve, 2020; The Straits Times, 2019). In light of the above, one innovation in green technology with great potential to alleviate freshwater scarcity is greywater treatment and reuse, which has been proven effective in increasing freshwater supply. According to Soong et al. (2021), a greywater recycling system refers to the recycling of less-polluted wastewater, such as that from bathroom sinks, showers, and laundry, as it does not contain chemical or biological contaminants. Thus, treatment will be easier and quicker.

Furthermore, greywater represents 43–70% of total domestic wastewater (Kai et al., 2018). If this portion of water is intercepted and separated from blackwater (contaminated with faeces and urine) for treatment and then reused as an alternative to freshwater for non-potable activities such as flushing toilets, landscape irrigation, and pond filling, a massive amount of freshwater could be saved. It would shorten the precious water loop, helping alleviate water shortages. Greywater is also demonstrated to be a more reliable water source than rainwater, as it is not dependent on weather conditions (Lim, 2017).

Although greywater can serve as an alternative to freshwater for non-potable uses, Malaysia does not have a specific law governing its use. Consequently, the term "greywater" does not exist under legislation governing the water industry. Notably, there is no specific legislation to

regulate compliance with green technology or green construction practices which incorporate a greywater reuse system. However, several policies support conservation, including the National Policy on the Environment (2002), the National Green Technology Policy (2009), the National Climate Change Policy (2009), and the Green Index Malaysia, which promote environmentally sustainable development and align with the National Housing Policy.

Additionally, the absence of laws and guidelines regulating greywater treatment has caused difficulties for the local planning authority in dealing with planning applications for buildings incorporating greywater schemes. It makes things more difficult when the project proponents themselves lack understanding of greywater treatment, as there are no guidelines or standards for them to refer to (Ni, S.H. et al., 2021). Moreover, there is no detailed reference that can serve as a benchmark for measuring compliance with the conditions imposed thereunder. According to Dato Dr Ir Mohd Abdul Karim Abdullah (The Edge Markets, 2021), an organisation that incorporates sustainability into its operations may achieve longevity, reduce costs, and improve the environment. As such, the country requires urgent legal arrangements to efficiently regulate the greywater system toward a feasible and sustainable solution.

Literature Review

Greywater treatment has been accepted as a green strategy to achieve water efficiency. In line with this, many research studies are being conducted that cover different perspectives, especially from a scientific and technical perspective. One crucial aspect being discussed is greywater quality. Inefficient wastewater treatment results in greywater being discharged into the environment without decontamination, thereby contaminating water (Khan et al., 2021). Specifically, greywater, which makes up the majority of wastewater, should be treated appropriately to reduce pollutants before it is reused, used, or discharged into the river. Therefore, technological advancement plays a pivotal role in improving the wastewater treatment process and greywater quality. Jiang et al. (2021) emphasised the importance of making significant efforts to develop programmes for effective greywater management and treatment to prevent further environmental deterioration of water resources.

One crucial effort to improve greywater quality is to adopt green technologies, such as greywater treatment systems, as mandatory fittings in green buildings. The World Green Building Council (WGBC) describes a green building as "a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts on our climate and natural environment" (Franco et al., 2021). Vyas, G. S., and Jha, K. N. (2017) established that the significant environmental benefit of adopting green building technologies is the increase in "water efficiency", which entails lowering water use as well as wastewater production (Sheth, 2017).

Nonetheless, Ignatius et al. (2022) asserted that green building design is a concept developed to promote environmental protection and sustainable development. Therefore, it must meet the requirements of sustainable building. In Malaysia, the Green Building Index (GBI) is used as a rating mechanism for the green grading and certification of Malaysian buildings. A GBI certification gives a quantitative rating of how "green" or sustainable a building is. Under the water-efficiency criteria, the GBI encourages wastewater harvesting and recycling for building use or irrigation. Similarly, Nguyen et al. (2021) reported that the green building rating system in Vietnam, LOTUS, also encourages water recycling and harvesting to reduce domestic water consumption. However, greywater is a more reliable water source than rainwater, making it a

more sustainable solution. Therefore, water recycling is integrated into the green strategy to achieve water efficiency. As the construction industry increasingly embraces greener features, installing a greywater system would expand the concept of green buildings in Malaysia.

Research on public perception of greywater use is another relevant aspect for determining the public's readiness to reuse wastewater and for developing methods to treat greywater. Generally, most users want to reuse greywater for non-contact activities (Oteng-Peprah et al., 2018). The usage of greywater for indoor or outdoor activities is also recognised by the syariah principles. As Islam discourages the waste of water and encourages the conservation of clean water supply, ablution water can be recycled for watering plants, flushing toilets, and washing cars (Suratkon et al., 2014).

Furthermore, legal constraints have long been a major obstacle to regulating the greywater system. In Malaysia, water supply and services are classified under the Concurrent List, following the 2006 amendment of the Ninth Schedule of the Federal Constitution. Therefore, the water sector is now under the state and federal governments. The state government manages water supplies (for example, groundwater extraction). In contrast, water services, including sewerage services and matters related to the sustainability of the construction industry, are managed by the federal government (Oh et al., 2018). Consequently, each state in Malaysia would need to obtain federal approval to implement a greywater recycling system. Although the objective of the Ninth Schedule amendment was to strengthen the Federal government's role in water governance, it only complicates governance of the country's water sector.

Despite increasing interest in sustainable water reuse, Malaysia lacks a specific legal and technical framework governing greywater treatment systems, causing uncertainty for developers and the local authorities. Thus, this paper contributes to the body of knowledge.

Methodology

The data collection method used in this study is doctrinal analysis, which examines laws, policies, and standards relevant to the implementation of the greywater system. The analysis examines legal principles, rules, and concepts derived from authoritative primary and secondary sources. The relevant legislation subjected to analysis is the Environmental Quality Act 1974 and its subsidiary legislation, the Street, Drainage and Buildings Act 1974, the Town and Country Planning Act 1976, and the Uniform Building By-Law. To understand the practices in other jurisdictions, a comparative analysis was conducted of the European Standard "EN 16941 series, on-site non-potable water systems- Part 2: Systems for the use of treated greywater (EN 16941 2:2021)" and the California greywater regulations, the California Plumbing Code (CPC). This standard assists the authorities in integrating world-recognised technical standards into Malaysian laws and guidelines.

Discussion

Greywater As An Alternative Solution To Freshwater Scarcity

Sustainable Development Goal 6 aims to be achieved by 2030. It seeks to expand international cooperation and support capacity-building for developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling, and reuse technologies. Moreover, it strives to ensure

equitable access to clean water. To ensure Sustainable Development Goal 6 is achieved, Malaysia has demonstrated its commitment by developing several policies to protect water-related ecosystems. These include the National Forestry Policy 1978, the National Policy on Biological Diversity 1998, the National Environmental Policy 2002, the National Policy on Climate Change 2009, National Energy Policy 1979, National Green Technology Policy 2009, National Tourism Policy Study 1992, the National Urbanisation Policy 2006, the National Physical Plan (2010-2020) and the National Agro-Food Policy (2011-2020) (Khalid, 2018). In the year 2012, the National Water Resources Policy was launched, which specifically highlighted aspects of water resource security and sustainability (Khalid, 2018).

Nevertheless, government policies and initiatives cannot end water disruptions or shortages. Therefore, alternatives such as greywater should be introduced as water resources. However, several challenges must be addressed before a greywater system can operate effectively. Among other challenges is the lack of regulations and guidelines developed by experts in the field (Ni et al., 2021).

Regulating Greywater Systems In Green Building Projects At The Local Planning Authority Level

Green technology and green construction are key initiatives implemented in Malaysia to promote sustainable development. Consequently, incorporating greywater treatment systems into green building designs has become relevant. Greywater treatment systems represent an innovation in green technology, enhancing water efficiency through recycling and water-saving fittings. These systems help conserve large amounts of fresh water and mitigate water scarcity in Malaysia. This initiative aligns with the objective of the 12th Malaysian Plan (2021-2025). The adoption of green technology and green construction is a decision made by the project proponent. In developing a green building, certain characteristics must be met. To further encourage the adoption of green construction, the GBI was established. The GBI, an environmental rating system for buildings, was developed collaboratively by the Malaysian Institute of Architects and the Association of Consulting Engineers Malaysia.

Developers who meet the GBI's listed criteria earn sufficient points to be certified as a green building. It should be noted that the local planning authority's conditions and guidelines are also intended to ensure that the approved project includes certain green building elements. However, while these requirements may not align exactly with the GBI criteria, they often share a degree of similarity. Additionally, developers may not always accept the planning authority's requirements in their entirety. For example, if a proposed development is not part of the green building project, some developers are reluctant to comply with the planning conditions imposed by the local planning authority. Conversely, when the project proponent submitted a planning application for the development of a green building, they voluntarily chose to comply with all the green building criteria (Sulaiman & Maidin, 2015). Although the green building concept is the best practice for sustainable development, the local planning authority has yet to make it compulsory.

The powers exercised by the local planning authority to control development activities commence at the stage of processing an application for planning permission. Planning permission is a development control tool at the local planning authority level. An application for planning permission must go through four stages. This approach involves applications for land development under the National Land Code 1965, for planning permission under the Town

and Country Planning Act 1976, and for building plans, earthworks plans, and road and drainage plans under the Street Drainage Building Act 1974. Notably, different legislations regulate various applications. All these Acts are implemented and enforced by different departments. Applications for land development matters, such as conversions, amalgamations, subdivisions, and partitions, are processed by the Land Office. In contrast, planning permission, building plans, earthwork plans, and road and drainage plans are approved by the relevant departments of the local planning authority: the planning department, the building department, and the engineering department. Notably, apart from the land office and local authorities, various other agencies are also involved in giving feedback or recommendations for the proposed development. These agencies are the Town and Country Planning Department, Land Office, Department of Fire and Rescue, Tenaga Nasional Berhad, Department of Environment, Indah Water Consortium, State Water Authority, Mineral and Geoscience Department, Department of Irrigation and Drainage, Public Works Department, and other relevant enforcement agencies in controlling development activities. In particular, feedback and responses from the above-mentioned agencies are very relevant in determining whether the application for planning permission will be approved, rejected, or approved with conditions. Moreover, all development activities require planning permission from the local planning authority, as provided in section 19(1) of the Town and Country Planning Act 1976 (TCPA 1976). This section prohibits any person other than a local authority from commencing, undertaking, or performing any development without planning permission. Specifically, any new development, retrofitting, or renovations that include the greywater treatment system for green building certification require planning permission before the commencement of the works. The local planning authority, in dealing with the application, may take into consideration any matters which it thinks reasonable and necessary, given proper planning for the construction of green building projects. From there, they may decide either to reject, approve totally, or approve with conditions according to section 22(3) of the TCPA 1976. The power for the local planning authority to impose conditions is conferred by section 22(5) of the TCPA 1976, which includes the power to impose a condition regulating adherence to green building standards. To this end, planning permission and planning conditions are tools to ensure compliance with the laws governing greywater management. As stated by Ismam et al. (2018), the regulatory framework can ensure the usage of technology in construction waste management through the 4Rs concept. Thus, in cases where the development plan includes installing a greywater treatment system as an initiative to achieve a higher GBI rating, the developer must follow the guidelines herein proposed to secure planning permission from the local planning authority. Nonetheless, this condition must only be imposed on green building projects and cannot be compulsory for all other building projects. This is because not all proposed developments are considered green buildings. Green technology and green construction require extensive research and expertise across various fields, which explains the high construction costs.

Greywater Regulations In Other Jurisdictions

California Greywater Regulations, California Plumbing Code (CPC)

The California greywater code is embedded in Chapter 15 of the CPC-Alternate Water Sources for Non-Potable Applications. The CPC permits the reuse of greywater through a tiered approach, which removes some permitting barriers and is therefore more flexible. It is a user-friendly permit-by-rule regulation with Best Management Practices (BMPs). The tiered approach provides different requirements depending on the amount of greywater produced. As

water flow increases, regulatory requirements change. Simple, safest Tier 1 greywater systems that meet the CPC conditions can be installed without a permit, fees, or inspections. Nevertheless, riskier and more complex tier 2 systems that do not meet the stated requirements, as well as tier 3 high-flow systems, must apply for construction permits.

According to Yu et al. (2013), it is crucial to ease restrictions and guidelines to promote the development of low-cost, proven treatment technologies and encourage more people to reuse greywater. The CPC is also realistic and easy to follow, from private homeowners interested in installing indoor greywater reuse systems to builders of large-scale commercial greywater systems. In addition to the above, California also adopts a localised approach to greywater regulation, allowing the state government to delegate regulatory authority to local and regional governments. According to Li, A., and Lilley, T. (2020), the provincial government in California also has an essential role in regulating greywater systems. The CPC allows city, county, and local governments to adopt stricter greywater construction standards than state standards, giving them greater control over greywater systems within their jurisdictions.

Notably, California has adopted the California Green Building Standards Code (CALGreen), a first-of-its-kind mandatory Green Buildings Standard Code in the United States. This code applies to the planning, design, operation, construction, use, and occupancy of every new building or structure constructed in California. This code also includes, among others, regulations on water efficiency and conservation, which are the primary objectives of installing a greywater system. For instance, newly constructed residential and non-residential buildings must reduce water consumption by 20% "based on the maximum allowable water use per plumbing fixture and fitting as per the California Building Standards Code." It is required for residential, commercial, and public school buildings. Specifically, CALGreen requires the installation of alternative non-potable waste piping and components during construction, per submitted and approved designs, details, and plans, and these components must be verified in accordance with CALGreen. This approach aims to accommodate accessibility, ease of installation, and ease of operation. Buildings and homes that have passed a state inspection can be labelled "CALGreen compliant" without incurring additional costs or third-party inspections.

The European Standard "EN 16941 Series, On-Site Non-Potable Water Systems- Part 2: Systems For The Use Of Treated Greywater (EN 16941 2:2021)"

The Eurocode "EN 16941 series, on-site non-potable water systems- Part 2: Systems for the use of treated greywater (EN 16941 2:2021)" is a comprehensive set of standards on greywater treatment and reuse schemes that has been adopted by many countries but has yet to be adopted by Malaysia. This newly revised European standard guideline was approved by the European Committee for Standardisation (CEN) on 20 December 2020. The Eurocode laid down the terms and definitions, including "greywater", "non-potable", and light greywater. These definitions would certainly help set a standardised parameter that would otherwise depend on the different meanings in the literature. Notably, the most crucial part of Eurocode EN 16941 2:2021 is the in-depth explanation of principles for every functional element, namely collection, treatment, and storage. It also provides guidelines on sizing and installation, the quality of non-potable water, and maintenance.

From a legal perspective, the strength of the standards lies in their role as a comprehensive technical benchmark that shifts liability and clarifies compliance across the European Union. Even though the standards themselves are voluntary and do not have the force of law, the enforcement element stems from their interaction with national laws and the "Presumption of Conformity." If a legal dispute arises, the standard is the yardstick for judging whether a system was designed responsibly or negligently.

Thus, the implementation of Eurocode EN 16941 2:2021 as a new guideline for installing a greywater recycling system in green building projects is a novelty that will regulate adherence to green building standards by green building developers. The guideline must be adopted in Malaysia and given the status of a national standard (MS EN) as the basis for drafting a policy that best suits Malaysia's planning situation. Moreover, the precise substance and value of the guideline proposed herein must be recognised by the federal legislature so that the Federal Town and Country Planning Department may supplement the government's planning policy with the said guideline. The effect is that the approach will carry greater weight and is not merely a recommendation or direction. Furthermore, this guideline will be essential at the local authority level. It will provide guidance and serve as a point of reference to the local planning authority in dealing with green building applications submitted by project proponents. As a result, it contributes toward a more holistic and rounded development decision in the area.

Conclusion

Overall, this paper discusses greywater as an alternative water resource in a country experiencing repeated water disruptions and water shortages. Although greywater recycling is safe to use, it still needs to be regulated by specific laws and guidelines. As of today, there is no specific legislation governing greywater treatment or its use. Like other green building criteria, the implementation of a greywater system remains voluntary. It is embedded in the conditions imposed by the local planning authority if the planning permission is categorised for a green building. This paper suggests the need to develop a code modelled on Eurocode EN 16941 2:2021 to guide developers of green buildings with on-site greywater systems. In particular, the code must be adhered to in addition to the conditions imposed by the local planning authority upon planning permission. The code will also serve as a point of reference for the local planning authority when dealing with future applications for planning permission to develop green buildings. Additionally, Malaysia should also emulate California's permit-by-rule regulation and localised approach to regulating greywater reuse to make the law more user-friendly. A well-regulated greywater treatment system can enhance urban water resilience and help diversify Malaysia's water supply sources. Such a system also contributes to Sustainable Development Goal 6 (Clean Water and Sanitation), particularly target 6.3, which focuses on improving water quality and wastewater treatment.

-
- Acknowledgements:** This study was supported by the Faculty of Law, Universiti Teknologi MARA Shah. Great appreciation to the Legal Adviser of Selayang Municipal Council for the contributions to planning law, greywater treatment, and management discussion.
- Funding Statement:** “No Funding”
- Conflict of Interest Statement:** The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the Journal of Tourism, Hospitality and Environment Management (JTHER).
- Ethics Statement:** This study did not involve any human participants, animals, or sensitive data requiring ethical approval. The authors confirm that the research was conducted in accordance with accepted academic integrity and ethical publishing standards.
- Author Contribution Statement:** All authors contributed significantly to the development of this manuscript. Dr Siti Sarah Sulaiman was responsible for the conceptualisation, methodology, and overall supervision of the study. Dr Siti Sarah Sulaiman and Prof. Dr Rasyidah Md Khalid handled data collection, analysis, and interpretation of results. Dr Suhaili Ishak and Mr Saiful Azmi Samad contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.
-

References

- Al-Adhadh, A. R., Aziz, H. Y., & Abbas, B. J. (2019). Reviewing the Advantages and Disadvantages of reusing the Greywater. *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)*, 16(6), 78–82. <https://doi.org/10.9790/1684-1606037882>
- Che Noh, N. (2020, September 3). 1,292 kawasan alami gangguan bekalan air. *Berita Harian*. Retrieved July 23, 2022, from <https://www.bharian.com.my/berita/wilayah/2020/09/727556/1292-kawasan-alami-gangguan-bekalan-air>
- Endo, S, Koga, S (2021). Johkasou–Wastewater Management in a Local Municipality in Japan. Tokyo, Japan: Asian Development Bank Institute Case Study No. 2021-4 (October). <https://www.adb.org/publications/johkasou-wastewater-management-japan>
- Filali, H., Barsan, N., Souguir, D., Nedeff, V., Tomozei, C., & Hachicha, M. (2022). Greywater as an Alternative Solution for a Sustainable Management of Water Resources—A Review. *Sustainability*, 14(2), 665.
- Foo, D. C. Y. (2021, 24 March). Transforming the national water sector beyond Covid-19. *New Straits Times*. Retrieved 3 June 2022, from <https://www.nst.com.my/opinion/columnists/2021/03/676405/transforming-national-water-sector-beyond-covid-19>
- Franco, M. A. J. Q., Pawar, P., & Wu, X. (2021). Green building policies in cities: A comparative assessment and analysis. *Energy and buildings*, 231, 110561.
- Ignatius, A., Ofoegbu, B. U., Oparaugo, K. O., Marvise, D., Anaba, A., & Blessing, U. (2022). Issues On Green Building Design in Nigeria and its Effect. *International Journal of Environmental Research & Earth Science*, 24(4), 297–312. https://www.cambridgenigeriapub.com/wp-content/uploads/2022/05/CJERES_Vol24_No4_March_2022-21.pdf
- Ismam. J.N., Ahmad @ Mohamed. N. & Talkis. N.A. (2018). Construction Waste Management: Preparedness Towards The 4th Industrial Revolution. *ESTEEM Journal of Social Sciences and Humanities*, (2) 71-80
- Khalid, R.M. (2018). Review of The Water Supply Management and Reforms Needed to Ensure Water Security in Malaysia, *International Journal of Business and Society*, 19(S3), 472-483.
- Khalil, M., & Liu, Y. (2021). Greywater biodegradability and biological treatment technologies: A critical review. *International Biodeterioration & Biodegradation*, 161, 105211.
- Khan, S. A. R., Ponce, P., Yu, Z., Golpîra, H., & Mathew, M. (2022). Environmental technology and wastewater treatment: Strategies to achieve environmental sustainability. *Chemosphere*, 286, 131532.
- Krishnan, D. B. (2022, May 3). 472 areas in Klang Valley to face unscheduled water disruption from 3pm today. *New Straits Times*. Retrieved July 20, 2022, from <https://www.nst.com.my/news/nation/2022/05/793605/472-areas-klang-valley-face-unscheduled-water-disruption-3pm-today>
- Li, A., & Lilley, T. (2020). Compliance models for off-grid wastewater treatment and reuse. *Environmental Law Reporter*, 50(5), 10375-10384.
- Lim, W. K. (2017). Wastewater recycling process: An active solution. Malaysian Green Building Confederation. [http://www.mgbc.org.my/Downloads/20170826-GBI-Pro-Series-2017-Waste-Water-Recycling/02_Greywater_Water_Reuse_and_Water_Recycling_\(Lim_Wee_Keong\).pdf](http://www.mgbc.org.my/Downloads/20170826-GBI-Pro-Series-2017-Waste-Water-Recycling/02_Greywater_Water_Reuse_and_Water_Recycling_(Lim_Wee_Keong).pdf)

- Loh, J., & Yong, T. T. (2022, March 1). Adopt Drastic Strategies to Tackle River Pollution. *Bernama*. Retrieved July 22, 2022, from <https://www.bernama.com/en/thoughts/news.php?id=2037983#:~:text=On%20Dec%2016%2C%202021%2C%20the,areas%20in%20Selangor%20and%20Putrajay>
- Monash University. (2014, 30 May). Quest to Solve Water Scarcity. *Engineering*. Retrieved 8 September, 2021, from <https://www.monash.edu.my/engineering/news-events/news/2014/quest-to-solve-water-scarcity>
- Nguyen, T. P., Nguyen, V. A., Pham, D. D., & Do, H. Q. (2021). Intergrating Building Information Modelling (BIM) and Tools with Green Building Certification System in Designing and Evaluating Water Efficiency of Green Building for Sustainable Buildings. *IOP Conference Series: Materials Science and Engineering*, 1079(3), 032063. <https://doi.org/10.1088/1757-899x/1079/3/032063>
- Ni, S.H., Omar, R., Chen, G.K. & Wee, S.T. (2021). The Challenges of Implementing Greywater Recycling System in Residential Buildings. *Research in Management of Technology and Business*, 2(1), 1113-1129.
- Oh K.S., Leong, J.Y.C, Phaik, Poh, P.E., Meng, N. Chong, M.N. & Lau, E.V. (2018). A review of greywater recycling related issues: Challenges and future prospects in Malaysia. *Journal of Cleaner Production*, 171, 17–29. <https://doi.org/10.1016/j.jclepro.2017.09.267>
- Oteng-Peprah M, Acheampong MA, deVries NK. (2018). Greywater Characteristics, Treatment Systems, Reuse Strategies and User Perception-a Review. *Water Air Soil Pollut.* 229(8):255
- Ryan, A. M., Spash, C. L., & Measham, T. G. (2021). Motives Behind Domestic Greywater and Rainwater Collection: Evidence from Australia (No. 05/2021). WU Vienna University of Economics and Business.
- Sheth, D. (2017). Water efficient technologies for green buildings. *Int. J. Eng. Innov. Sci. Res.* ISSN, 1, 5-10.
- Sood, S. M., Chua, K. H., & Peng, D. L. Y. (2011). Sustainable development in the building sector: green building framework in Malaysia. *ST-8: Best Practices & SD in Construction*, 1-8.
- Soong, H. N., Omar, R., Goh, K. C., & Seow, T. W. (2021). The Challenges of Implementing Greywater Recycling System in Residential Buildings. *Research in Management of Technology and Business*, 2(1), 113–1129. <https://doi.org/10.30880/rmtb.2021.02.01.081>
- Sulaiman, S.S. & Maidin, A.J. (December 2015). Negotiating Development Through Planning Agreement Mechanism To Promote Voluntary Compliance of Green Technology And Sustainable Development Indicators, *Alam Cipta*, Vol 8 (Special Issue 1), 22-28.
- Suratkon, A., Chan, C.M. & Tuan Ab Rahman, T.S. (2014). Smart WUDHU': Recycling Ablution Water for Sustainable Living in Malaysia, *Journal of Sustainable Development*, Vol. 7, No. 6, 150-157.
- The Edge Markets. (2021, 30 May). Sustainability and technology go hand in hand. *The Edge Markets*. Retrieved 10 June 2022, from <https://www.theedgemarkets.com/content/advertise/sustainability-and-technology-go-hand-in-hand>
- The Malaysian Reserve. (2020, 10 December). Alarming water margins of below 15% in 6 states. Retrieved 5 June 2022, from <https://themalaysianreserve.com/2020/12/10/alarming-water-margins-of-below-15-in-6-states/>

- The Straits Times. (2019, March 26). Thousands in Johor affected by water supply cut due to ammonia pollution at Sungai Benut River. The Straits Times. Retrieved July 24, 2022, from <https://www.straitstimes.com/asia/se-asia/thousands-in-johor-affected-by-water-supply-cut-due-to-ammonia-pollution-at-sungai>
- Vyas, G. S., & Jha, K. N. (2017). Benchmarking green building attributes to achieve cost effectiveness using a data envelopment analysis. *Sustainable Cities and Society*, 28, 127-134.
- Yu, Z. L., Rahardianto, A., DeShazo, J., Stenstrom, M. K., & Cohen, Y. (2013). Critical Review: Regulatory Incentives and Impediments for On-site Graywater Reuse in the United States. *Water Environment Research*, 85(7), 650–662. <https://doi.org/10.2175/106143013x13698672321580>
- Zhang, Y., Wang, H., Gao, W., Wang, F., Zhou, N., Kammen, D. M., & Ying, X. (2019). A survey of the status and challenges of green building development in various countries. *Sustainability*, 11(19), 5385.