

1. Water Recycling Program Implementation



Pilot plant of research

ANNEX I

Passos per la instal·lació de sistemes de aprofitament d'aigües grises.
 Instal·lar una doble xarxa de recollida d'aigües residuals, una per les aigües negres procedents dels WC i la cistina i una altra per les aigües grises procedents dels lavabos i les dutxes.
 Es recomana la reutilització de l'aigua usada en els banys, dutxes i lavabos, amb objecte de que siguin utilitzades en activitats que no requereixin una qualitat elevada, com són l'omplert de cisternes WC i, si s'escau, el reg.
 La recirculació requerirà la recollida d'aquesta aigua en un dipòsit d'emmagatzematge, a continuació es sotmetrà a un tractament per complir els requisits mínims sanitaris, després es bombejarà fins a un segon dipòsit on s'emmagatzemarà l'aigua destinada al compliment de les cisternes.
 Les aigües pluvials es recolliran conjuntament amb les grises, el sobreesborador del dipòsit degussarà directament al medi natural, el Torrens de l'Abella.
 S'instal·larà una xarxa diferent de l'aigua sanitària per els diferents inodors de l'edifici. La canonada portarà un dispositiu per desferriar-la.
 Per poder reutilitzar les aigües, s'hauran de tractar amb processos fisicoquímics i/o biològics per assegurar la qualitat mínima. En el cas de utilització de l'aigua per reg, s'hauran de fer anàlisis periòdics. Complert amb la normativa vigent sobre la legiosel·la.
 Es reservarà l'espai necessari pel dipòsit d'acumulació de les aigües i per d'instal·lació de depuració. Aquest espai disposarà d'un mínim de ventilació i per poder netejar el filtre i la depuradora, tindrà fàcil accés.
 En tots els punts de consum de l'aigua reutilitzada (cisternes, punts de reg,...) s'instal·larà un cartell visible que posi: "Aigua no potable".

Sistema de tractament d'aigües grises
 Tractament de flotació de les partícules lleugeres, digestió anaeròbica, airejat, clarificació i desinfecció. Tractar l'aigua perquè aconseguim nivells baixos de sòlid en suspensió i DBO.
 La desinfecció es realitza per cloració.
 El tractament ha de garantir una qualitat de les aigües grises igualant o millorant els raus dels indicadors biològics anomenats a continuació:

Paràmetres	Valors
Contingut microbis 20º (UFC/ml)	<10
Contingut microbis 37º (UFC/ml)	50
Coliforms totals (UFC/100ml)	Absent
Coliforms fecals (E. coli) (UFC/100ml)	Absent
Pseudomonas aeruginosa (UFC/100ml)	Absent
Staphylococcus aureus (UFC/100ml)	Absent
Fecal streptococcus (UFC/100ml)	Absent

El dipòsit pel tractament d'aigües grises serà registrable, sent accessible per el seu manteniment i neteja.

UdG building technical specifications: installation and gray water treatment system



Rain catchment for watering the garden



Irrigation of trees with regenerated water



Pilot test of the condensation



Rain collected from a parking area

Description:

Mainly to emphasize that the UdG's strategy in water management is based on saving and efficiency in all points where there is water consumption.

1. There are pilot plants of the LEQUIA research group on wastewater treatment and recycling.
2. The installation of gray water recycling systems is included in the building specifications of the UdG:
<https://www.udg.edu/ca/portals/50/Sostenibilitat/Directrius%20habitatges%20UdG.pdf?ver=2019-12-10-121347-673>
3. In the ecosocial garden, apart from rainwater harvesting, the collection of groundwater is being studied.
4. Irrigation of trees with regenerated water from the tertiary treatment of the municipal wastewater treatment plant.
5. A pilot test has been carried out to take advantage of the condensation water from the spaces where the CPDs are installed.
6. Rain collected from a parking area treatment by filtration, evacuates to the natural environment.

2. Consumption of treated water

	
Wastewater treatment plant in the city of Girona	Water treatment plant in the city of Girona

	
<p style="text-align: center;">Water purification plant</p>	<p style="text-align: center;">Water catchment tanks</p>

Description:

The waste water treatment system is centralized throughout the city, therefore it is *supracampus*.

Once some of the rainwater has been diverted to the natural environment, all the wastewater from the University of Girona is treated at the city's water treatment plant.

The wastewater treatment system in the city of Girona is based on a process designed to ensure effective purification of water before it is returned to the environment.

Stages of the system:

1. **Collection:** Domestic, industrial and university wastewater is collected through a sewer network that transports the water to the treatment plant.
2. **Pre-treatment:** Once at the treatment plant, the wastewater undergoes pre-treatment where larger solids, such as paper, plastics, and other waste that could damage the treatment equipment, are removed.
3. **Primary treatment:** In this phase, the wastewater is allowed to settle in large tanks, allowing heavier solids to settle at the bottom (sludge) and lighter materials to float to the surface (scum). These substances are removed to prevent their entry into the next stages.
4. **Secondary treatment:** Here, the wastewater is treated using biological processes. Microorganisms are added to break down the organic matter present in the water. This process may include systems such as biological reactors or sand beds.
5. **Tertiary treatment:** In this stage, additional processes are carried out to remove nutrients such as nitrogen and phosphorus, as well as to improve water quality. This may include filtration, disinfection with chlorine, or UV radiation.
6. **Reuse and discharge:** Once treated, the water can be reused for non-potable purposes, at the UdG this water is used to water the campus trees. If not reused, it can be discharged into the Onyar River, complying with established environmental regulations.

7. Sludge management: The sludge generated during the treatment process is managed appropriately, often through processes such as anaerobic digestion, which can produce biogas for energy use.

Apart from the consumption of regenerated water for non-potable uses from the municipal treatment plant, all the water consumed at the University of Girona comes from the water purification system of the city of Girona, a process designed to guarantee that the water that reaches citizens is safe and suitable for human consumption. Water is mainly collected from natural sources, such as rivers and aquifers. In Girona, water comes mainly from the Onyar River and underground water sources.

In the city of Girona there are also different water catchment tanks. An example of these water collection systems is the cistern of the Faculty of Letters and Tourism of the UdG in the Barri Vell campus

3. Water pollution control in campus area





Wastewater treatment plant



Water treatment projects of the LEQUIA Research Group

Description:

The University of Girona bases its strategy on the control of water pollution on prevention and minimization at source.

Laboratory waste: A very thorough control is carried out on the management of waste in the teaching and research laboratories with the aim of discharging the waste water into the municipal sewerage network with a quality comparable to domestic waste water. To avoid discharge into the sanitation network, during 2023 1.2 tons of laboratory waste have been managed through authorized managers.

The scientific degrees have subjects on sustainability and specifically on waste minimization, such as [Green Chemistry](#) or the [Integrated Scientific Techniques](#) subject common to all scientific degrees in which knowledge and good practices in the management of laboratory waste are imparted .

Prevention: the minimization of waste is explicitly included in all the protocols of laboratory practices in which, apart from encouraging water conservation, the correct management of waste is insisted upon, taking into account that each product, by-product or chemical or biological waste has its own segregated container.

Control: Also, periodically, the sanitization and replacement of the filters of all the sources of the faculties and other university departments are carried out. The UdG is subject to inspections and controls by the Catalan Water Agency, and we are connected to the municipal sewerage network where analyzes and controls are also carried out.

Applied research: One of the UdG research groups with the most international recognition for the development of eco-innovative solutions in the field of the environment is LEQUIA, especially for water treatment.

The Laboratory of Chemical and Environmental Engineering (LEQUIA) is a research group of the University of Girona (UdG) devoted to the development of eco-innovative environmental solutions. Our current research lines are: i) innovative bioprocesses for treatment, resource recovery and synthesis of new products; ii) physicochemical advanced processes for treatment and/or reuse of liquid and gas side streams; and iii) planning, control and evaluation of complex environmental systems.

<http://www.lequia.udg.edu/>