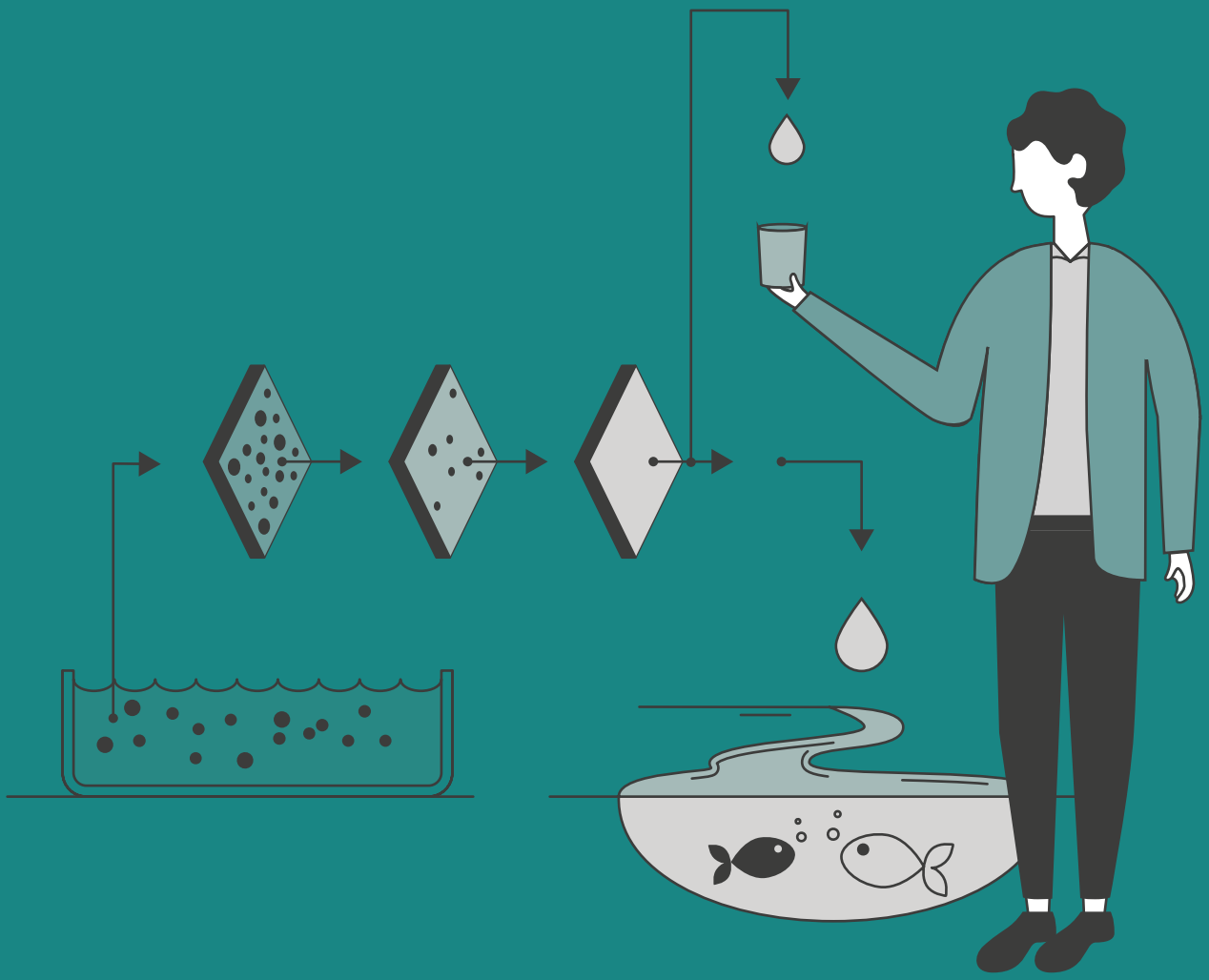
INTEGRATED QUALIFICATIONS SYSTEM



UPDATED SECTORAL QUALIFICATIONS FRAMEWORK FOR WATER AND WASTEWATER MANAGEMENT, RECLAMATION AND REMEDIATION (SQF WWMRR)

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1. Definition of the sector

The Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation (SQF WWMRR) contains descriptions of the competences necessary to plan, organise, implement and supervise the processes of water and wastewater management, reclamation and remediation, specifically in the following areas:

- water abstraction, treatment and supply;
- wastewater collection, transportation and treatment, including discharging wastewater into water and the ground;
- assessment of the condition of ecosystems and the design and implementation of corrective measures in reclamation and remediation processes;
- design, construction and operation of water and sewerage infrastructure;
- performing measurements, observations, laboratory and field tests for water and wastewater management, reclamation and remediation processes;
- water resources management, including the minimisation of water consumption, water reuse and the management of rainwater and snowmelt;
- management of waste, including sludge, generated by the processes of water and wastewater management, reclamation and remediation, in accordance with the concept of sustainable development and the principles of a circular economy.

SQF WWMRR also includes descriptions of the competences needed to conduct educational, informational and awareness-raising activities for the public, entrepreneurs, sector employees and representatives of state and local government institutions on consciously managing water resources, using ecosystems and acting in accordance with the concept of sustainable development and the principles of a circular economy.

2. Practical application of the Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation

The Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation (SQF WWMRR) is a universal tool for managing the competences in the energy sector. Due to the fact that the structure of SQF WWMRR does not impose specific business solutions, it can be used in any number of ways by many different audiences.

Employers

With the help of SQF WWMRR, employers can take a broader view of the industry competences present in their business environment, enabling them to manage their human resources more efficiently and compete more effectively in the labour market. The main advantages of using this tool include support in analysing competence gaps in the industry or company, planning human resource development and the salary grid of job positions, as well as gaining help with recruitment and the selection of personnel.

> The table of competences allowed me to determine the criteria for recruiting staff based on the key competences in the industry, as well as to prepare job descriptions.

> After identifying the main competence gaps in the industry, we launched an apprenticeship programme to prepare our students to successfully enter the labour market.

Schools and educational institutions

On the basis of SQF WWMRR, schools and educational institutions can adapt the curricula they offer to the current and real needs of the labour market. This means that the table of competences supports these institutions in expanding and modifying their teaching programmes and filling in the competence gaps of students, for example, those relating to practical or soft skills. Additionally, it can be a useful tool in career counselling for students or in monitoring the success of school leavers.

Higher education institutions

QF WWMRR is a tool that supports higher education in aligning their study programmes with current trends in industry development. This enables students to be better prepared to enter the labour market and achieve career success. The table of competences also makes it possible to monitor students' progress and evaluate the effectiveness of study programmes.

We used SQF WWMRR to analyse students' level of skills against those needed by the water and wastewater management, reclamation and remediation sector and the effectiveness of our study programmes.

By better matching the needs of our customers, we have become more competitive in the training market.

Training companies

By using SQF WWMRR, training companies can effectively design specialised courses, enabling them to prepare a tailor-made offer for a specific sector and to meet the expectations of their clients. With the help of the sectoral qualifications framework, they can select individual competences and match them to the outcomes of a given training programme. They can also prepare exams to assess knowledge, skills and social competences. The gradation of the complexity of competences in SQF WWMRR also makes it easier to prepare training offers at various levels of proficiency.

IQS stakeholders

Among the broad audience of IQS users, the groups most likely to benefit from the SQF WM are primarily industry organisations and those describing market or sectoral qualifications. Among others, industry organisations are tasked with establishing educational agreements that strengthen cooperation between schools and employers, as well as providing information on the demand for sectoral competences to educational institutions and labour market institutions. In turn, persons describing market or sectoral qualifications can use the framework to more easily define sets of learning outcomes.

Other entities

SQF WM can be used for many other purposes depending on the current needs of the industry. In the water and wastewater management sector, it can be used as a supplementary tool to prepare methods for assessing the knowledge of a company's employees on safety, since every employee is exposed to accidents in the workplace today. Verifying employees' basic competences for the sector can protect a company from negative consequences in the future.

Moreover, the water and wastewater management, reclamation and remediation sector is currently facing a shortage of skilled workers. The Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation can be used to retrain and launch the professional careers of people from related sectors.

As an occupational health and safety specialist, I often use the SQF WWMRR. Analysing the 'Safety' determinant allowed me to quickly identify the competences I should be developing among the employees in this sector during my training courses.

3. Instructions for using the Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation

1 Familiarise yourself with the sectoral determinants, as they indicate the main areas of the sector's activities.

2 Familiarise yourself with the competence series, as they further describe each sectoral determinant.

3 Familiarise yourself with the competences in a given series.

The competences in the SQF at particular levels correspond to second stage Polish Qualifications Framework levels for vocational education and training

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
SECTORAL DETERMINANT I.	knows and understands...								
	is able to...								
SECTORAL DETERMINANT II.	knows and under-								
	is able to...								
SECTORAL DETERMINANT III.	knows and under-								
	is able to...								
SECTORAL DETERMINANT IV.	is ready to....								

Competences are grouped into their appropriate categories by colour:

knowledge (knows and understands...),

skills (is able to...),

social competence (is ready to...).

Important!
A specific process can often be fully described only by combining competence series from the categories of **knowledge** and **skills**.

Remember!
Green competences are designated in bold and indicated as **(GC)** in front of the description.

4. Updated Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation indicating the green competences identified in the sector

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	knows and understands...	Properties of ecosystems	(GC) the types and genesis of ecosystems; (GC) the types and availability of water resources in nature; (GC) the basic concepts and terminology relating to ecosystems, including hydrology, geology, hydrogeology, biology, ecology, sozology, etc.	(GC) the structure and functioning of ecosystems	(GC) the linkages and relationships between ecosystems	(GC) the properties of ecosystems affecting the quantity, quality and availability of water resources, determining the way pollutants spread, and affecting the potential of performing reclamation and remediation processes	(GC) the predicted effects of changes in the structure and functioning of ecosystems	
		Legal requirements pertaining to ecosystems		(GC) the parameters defining the requirements for different ecosystems or their components, e.g., permissible concentrations of substances	(GC) the legal regulations specifying the requirements for a given type of ecosystem; (GC) the legal regulations and standards concerning environmental protection, natural resource management, pollution prevention and waste management, as well as the principles of organisational compliance and quality management of the services provided	(GC) the scientific, legal, social and economic conditions for determining the regulatory requirements for ecosystems	(GC) the trends in national, European and global policies on the exploitation and conservation of ecosystems	
		Anthropogenic factors affecting ecosystems	(GC) the types of anthropogenic factors influencing ecosystems	(GC) the relationship between the type and scale of human activity and the scope, type and scale of ecosystem pollution; (GC) typical activities and methods mitigating climate change and adapting to it	(GC) the impact of anthropogenic factors on ecosystems, including natural phenomena occurring in ecosystems and the quantity, quality and availability of water resources; (GC) the impact of anthropogenic factors on reactions occurring in pollutants present in the ecosystem, including how and at what rate they spread	(GC) the long-term effects of human impact on ecosystems, including on the quantity, quality and availability of water resources	(GC) the directions of change in the manifestations of human activities that may affect ecosystems	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	knows and understands...	Physical, chemical and biological reactions and processes occurring in ecosystems		(GC) the physical, chemical and biological reactions and processes in a given ecosystem	(GC) the factors influencing the course of physical, chemical and biological reactions and processes in a given ecosystem	(GC) the course of physical, chemical and biological reactions and processes taking place in ecosystems	(GC) predicted changes in the physical, chemical and biological reactions and processes occurring in ecosystems	
		Pollutants occurring in ecosystems	(GC) the types and forms of pollution occurring in ecosystems	(GC) the properties of pollutants that affect their impact on the ecosystem, including how and at what rate they spread and penetrate the ecosystem; (GC) the ways pollutants enter and spread in ecosystems	(GC) the impact of pollutants on the equilibrium of an ecosystem	(GC) the long-term effects of pollution on an ecosystem		
		Chemical pollutants of ecosystems	(GC) the chemicals that pollute ecosystems, including persistent organic pollutants	(GC) the properties of chemical pollutants, including persistent organic pollutants; (GC) the concentration standards and thresholds of chemicals present in ecosystems	(GC) the chemical composition of pollutants in ecosystems	(GC) the mechanisms and consequences of the decomposition of chemical substances in the environment; (GC) the natural and induced mechanisms determining the persistence of chemicals		
		The risk to the ecosystem associated with implementing reclamation and remediation processes		(GC) the types of threats to an ecosystem and dependent ecosystems relating to reclamation and remediation processes	(GC) the risk to an ecosystem and dependent ecosystems relating to the implementation of reclamation and remediation processes using ex-situ methods, including the effects of changes in the structure of the ecosystem and the earth's surface, changes in the properties of the ecosystem, changes in hydrological conditions and imbalances in dependent ecosystems	(GC) the risk to an ecosystem and dependent ecosystems relating to the implementation of reclamation and remediation processes using in-situ methods, including the effects of changes in the structure of the ecosystem and the earth's surface, changes in the properties of the ecosystem, changes in hydrological conditions and imbalances in dependent ecosystems	(GC) the mechanisms of the formation of ecological, natural or construction disasters in an ecosystem or dependent ecosystems as a result of implementing reclamation and remediation processes	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	knows and understands...	Availability of water resources	(GC) data on the quality, quantity and availability of water resources at the national or regional level; (GC) the criteria and standards for the quantity of available water from water abstraction recharge areas	(GC) data on the quality, quantity and availability of global water resources	(GC) local problems and threats relating to the quantity, quality and availability of water resources; (GC) a broad scope of the methods of searching for water sources	(GC) global problems and threats relating to the quantity, quality and availability of water resources; (GC) the conditions, factors and processes influencing the formation of local and national water resources	(GC) the conditions, factors and processes influencing the formation of global water resources	
		Calculating water resources	(GC) the formulas for calculating water resources, e.g., to calculate the quantity of rainwater, retention, water loss from evaporation	(GC) the standards and guidelines for calculating water resources and preparing water balances	(GC) the methods of calculating water resources and preparing water balances	(GC) the mathematical models for forecasting the quantity, quality and availability of water resources		
		Retention	(GC) the importance of water in the ecosystem, its circulation cycle in nature, and the ways of shaping water resources; (GC) the principles of storing rainwater and meltwater within the framework of micro-retention	(GC) natural retention factors; (GC) the principles of water storage to counteract floods, water scarcity and droughts; the methods of reducing the vulnerability of communities to natural disasters and catastrophes, including floods and industrial accidents	(GC) the impact of retention on the management of water resources, including the prevention of floods, water shortages and droughts and the mitigation of climate change; (GC) the principles of developing the blue-green infrastructure			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	knows and understands...	Managing water resources	(GC) the basic concepts and terminology relating to water management; (GC) the principles of minimising water consumption and its reuse; (GC) the techniques and technologies of reducing water consumption	(GC) the principles of minimising water consumption in a region, e.g., on the scale of a local community, county, voivodeship; (GC) the principles of efficiently utilising natural resources and their protection and regeneration, including nature-based solutions (NBS); (GC) the principles, benefits and difficulties of managing water catchments; (GC) the methods of assessing the risks relating to climate change (floods, droughts, extreme events)	(GC) the technologies supporting rational water resource management, e.g., minimising water consumption, supporting water reuse; (GC) the legal regulations on the reuse of water, e.g., water from technological processes, treated wastewater, rainwater	(GC) the principles of designing technological processes in a way that reduces water consumption in accordance with the principles of the circular economy; (GC) the principles of designing technological processes in a way that takes into account the reuse of water; (GC) design principles that take into account the replacement of grey infrastructure with blue-green infrastructure; (GC) the impact of urban areas on water resources	(GC) the trends in the technologies and organisational solutions supporting rational water resource management; (GC) the methods and effects of surface water and wetland renaturation	(GC) the latest achievements in the technologies supporting rational water resource management
	is able to...	Analysing the purpose and manner of using the ecosystem	(GC) based on source data, determine the purpose and manner of using an ecosystem	(GC) identify the actual use of an ecosystem; (GC) identify the limitations of the way an ecosystem is used	(GC) formulate recommendations for the protection and use of an ecosystem, including for areas that have undergone reclamation and remediation processes; (GC) comply with laws on environmental protection, natural resource management, pollution prevention, and waste management			
		Analysing hydrological, geological and hydrogeological conditions		(GC) determine hydrological, geological and hydrogeological conditions, e.g., define the topography, supply and drainage areas, catchments, type, quantity, quality and availability of water resources	(GC) assess hydrological, geological and hydrogeological conditions in terms of the possibility of the occurrence and spread of pollutants, as well as the feasibility and effectiveness of reclamation and remediation processes, and water and wastewater management	(GC) analyse hydrological, geological and hydrogeological conditions with the use of mathematical models	(GC) forecast changes in hydrological, geological and hydrogeological conditions, including those resulting from conducted water and wastewater management as well as reclamation and remediation processes	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	is able to...	Researching the history and socio-economic environment of an ecosystem		(GC) based on source data, determine the history and characteristics of the socioeconomic environment of an ecosystem that affects the assessment of the state of its pollution as well as the quantity, quality and availability of water resources	(GC) analyse the historical and current socio-economic environment of an ecosystem and the history of the phenomena occurring in it in terms of the possibility of it being polluted and its potential for reclamation and remediation			
		Determining the state of ecosystem pollution	(GC) indicate possible pollutants in a given ecosystem	(GC) on the basis of source data, determine existing and potential ecosystem pollutants, their age and possible causes	(GC) assess the pollution existing in an ecosystem (e.g., determine where it occurs, sources, how it is spreading)	(GC) analyse the pollution existing in an ecosystem using mathematical models; (GC) prepare an assessment of the state of pollution in an ecosystem	(GC) forecast the state of pollution in an ecosystem on the basis of hydrogeological conditions, the type of pollutants present, forecasts for the management of the ecosystem; (GC) identify possible scenarios of ecosystem degradation	(GC) prepare complex mathematical models to analyse pollutants, e.g., their occurrence, spread
		Determining the impact of pollutants on ecosystems		(GC) identify the way a given type of pollution affects human health and life, the state of the environment, the equilibrium and aesthetic values of the ecosystem; (GC) identify the threats relating to the presence of a given type of pollution in the ecosystem	(GC) identify how a given pollutant interacts with other pollutants and substances in the ecosystem	(GC) analyse the impact of ecosystem pollution on human health and life, the state of the environment, the equilibrium and aesthetic values of the ecosystem; (GC) prepare an assessment of significant risk	(GC) forecast the long-term effects of pollution	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
I. Ecosystems and water resources	is able to…	**Analysing water resources**		**(GC) perform the calculations necessary to develop a water balance**	**(GC) analyse data on water resources, e.g., rainfall, evaporation losses, drainage from a catchment area, retention;** **(GC) prepare a water balance**	**(GC) analyse the quantity, quality and availability of water resources**	**(GC) forecast changes and analyse the factors affecting the quantity, quality and availability of water resources**	**(GC) prepare mathematical models to forecast the quantity, quality and availability of water resources**
		Supporting activities for rational water resource management		**(GC) explain the principles of rational water resource management, including the principles of conserving and reusing water**	**(GC) select the methods and technologies supporting rational water resource management, including methods of minimising water consumption, using grey water, managing rainwater and meltwater;** **(GC) implement plans to adapt to climate change, mitigate its effects and build resilience, with the inclusion of nature-based solutions**	**(GC) prepare information and communications on the principles of rational water resource management, including conserving water, using grey water, managing rainwater and meltwater;** **(GC) conduct training on environmental protection and sustainable development;** **(GC) implement organisational changes to promote sustainable practices and environmental innovations**	**(GC) conduct activities to introduce technological, organisational and legislative changes supporting rational water resource management;** **(GC) determine the cost of ecosystem services;** **(GC) develop plans for adapting to climate change, mitigating its effects, as well as building resilience and solutions based on nature;** **(GC) develop incentive programmes to encourage employees to participate in pro-environmental initiatives**	**(GC) develop technologies and organisational solutions supporting rational water resource management**
II. Stakeholders	knows and understands…	**Water consumers**	the groups of water consumers	the requirements of various consumer groups in terms of the parameters of supplied water, resulting, e.g., from the type of activity they conduct	the legal regulations on the quantity and quality parameters of water supplied to various consumer groups			
		Entities producing wastewater	the types of entities producing wastewater	the factors affecting the amount and parameters of wastewater produced by various entities, e.g., households, businesses	the relationship between the type and scale of activity conducted by businesses and the amount and type of wastewater they produce	the socio-economic mechanisms shaping the structure of generated wastewater		
		Stakeholders of reclamation and remediation processes	the groups of stakeholders of reclamation and remediation processes; the principles of cooperation with stakeholders during reclamation and remediation processes	the scope of responsibility, tasks and expectations of stakeholders during reclamation and remediation processes	the legal regulations defining the scope of responsibility and principles of cooperation with stakeholders during reclamation and remediation processes			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
II. Stakeholders	knows and understands...	**Recipients of products resulting from the treatment of waste generated by the processes of water and wastewater management, reclamation and remediation**	the groups of recipients of products resulting from the processing of sludge, washings and other waste generated by water and wastewater management, reclamation and remediation; the issues relating to climate change, biodiversity loss, pollution and resource depletion	**(GC) the requirements of various groups of recipients in terms of the parameters of products resulting from the processing of sludge, washings and other waste generated by water and wastewater management, reclamation and remediation;** the methods for effectively communicating the environmental benefits of products and services to customers, including environmentally friendly attributes, energy efficiency, resource conservation and potential savings	**(GC) the legal regulations on the use of products resulting from the processing of sludge, washings and other waste generated by water and wastewater management, reclamation and remediation;** **(GC) the legal regulations on waste management and environmental protection**			
		Supervisory institutions and bodies	the tasks and responsibilities of institutions and bodies supervising and monitoring the processes of reclamation and remediation as well as water and wastewater management, e.g., environmental protection inspections, sanitary inspections, water oversight institutions	the principles and procedures of cooperating with institutions supervising activities in water and wastewater management as well as reclamation and remediation	the legal regulations on overseeing the processes of reclamation and remediation as well as water and wastewater management by designated authorities and institutions; the legal regulations on the reporting requirements for water and wastewater management as well as reclamation and remediation			
		Specialists from other fields	the areas of activity of specialists from other fields participating in the processes of reclamation and remediation as well as water and wastewater management	the activities requiring the involvement of specialists from other fields in the processes of reclamation and remediation as well as water and wastewater management; the benefits of involving specialists from other fields in work relating to reclamation and remediation as well as water and wastewater management	the legal regulations specifying the participation of specialists from other fields in the processes of reclamation and remediation as well as water and wastewater management			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
II. Stakeholders	is able to...	**Researching the needs of stakeholders of water and wastewater management processes**	identify the needs of water consumers and entities producing wastewater in terms of the conditions and standards for implementing water supply and wastewater collection services	identify the needs of stakeholders in developing water supply and wastewater disposal systems, e.g., expanding and modernising infrastructure, changing network efficiency	analyse data on the socioeconomic development of a region in terms of the need to provide water and wastewater management services	design standards for the implementation of water supply and wastewater disposal services		
		Researching the needs of stakeholders of reclamation and remediation processes	search for information on the needs of stakeholders in reports, statements, research results, etc.	**(GC) conduct interviews with stakeholders, including those aimed at examining the needs of stakeholders and identifying the state of the ecosystem;** identify the needs and possibilities of investors relating to reclamation and remediation processes, e.g., setting goals for reclamation and remediation, the scope of research, budget, deadline	**(GC) compare the needs and expectations of various stakeholder groups in relation to a given ecosystem**	**(GC) analyse the relevance and prioritise the needs and expectations of various stakeholder groups in relation to a given ecosystem**		
		Cooperating with entities producing wastewater	identify entities generating wastewater in the service area of the wastewater treatment plant	determine the terms of cooperation with entities producing wastewater in the service area of the wastewater treatment plant, including the principles of the delivery, preparation method and parameters of the wastewater	negotiate non-standard terms of cooperation for wastewater collection, including non-standard wastewater parameters, preparation methods and delivery	establish and maintain relationships with customers and cooperants, including as part of industrial symbiosis, and also cooperate with other sectors of the economy	**(GC) develop strategies of cooperation with entities from other industries to increase the efficiency of water and wastewater management processes, including the processes of producing energy from biomass**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
II. Stakeholders	is able to...	**Cooperating with stakeholders of reclamation and remediation processes**	identify the stakeholders of a given reclamation and remediation process	establish the terms of cooperation with entities involved in reclamation and remediation processes, e.g., investors, suppliers, subcontractors, government representatives	reach agreement with the investor on the strategy for implementing reclamation and remediation activities, taking into account the needs and expectations of various groups of stakeholders	resolve disputes relating to the needs and expectations of the stakeholders of implemented reclamation and remediation processes	conduct multilateral negotiations with stakeholders on implemented reclamation and remediation processes	
		Cooperating with specialists from other fields		define the issues and areas requiring the participation of specialists from other fields in the processes of reclamation and remediation as well as water and wastewater management	select specialists from other fields needed in the ongoing processes of reclamation and remediation as well as water and wastewater management	establish and maintain relationships with specialists from other fields participating in reclamation and remediation processes as well as water and wastewater management; develop relationships with stakeholders, including government agencies, non-governmental organisations, businesses and academia, to build partnerships, gather input and support collaboration on sustainable development initiatives; cooperate with the public and private sectors, leveraging their resources and expertise to address complex environmental challenges and drive positive change	identify and develop strategic partnerships with organisations that share similar values and goals relating to sustainable development, including establishing formal agreements, memoranda of understanding and joint initiatives	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
II. Stakeholders	is able to...	**Providing information to stakeholders**	provide information to stakeholders on current reclamation and remediation processes, as well as communicate and explain necessary changes; provide information on the principles of water and wastewater management in the region, e.g., the guidelines of connecting to the network, settling the costs of water supply and wastewater collection	explain the principles of water and wastewater management in a given region; explain the principles of the performance, course and methods used in reclamation and remediation processes; reach agreement with the investor on the scope and manner of providing information to stakeholders during reclamation and remediation processes	**(GC) provide investors and other stakeholders with explanations and arguments relating to issues in the processes of water and wastewater management, reclamation and remediation, e.g., the need to expand water and sewerage infrastructure, perform reclamation and remediation, the justification for using specific methods, the costs and benefits of the activities**	**(GC) prepare information and communications, including marketing and media communications, directed, among others, to the local community, decision makers, business partners, on water and wastewater management in a given region, reclamation and remediation processes, as well as to raise awareness of the processes of water supply, wastewater collection, ecosystem protection, climate change adaptation and mitigation;** **(GC) educate on environmental issues, including climate change, biodiversity loss, pollution and resource depletion, as well as the interrelationships between human activities and the environment;** **(GC) negotiate projects relating to sustainable development**	**(GC) plan marketing and media activities to raise awareness on water and wastewater management, reclamation, remediation and ecosystem protection, as well as to build a positive image of the sector, people and entities operating in it**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
II. Stakeholders	**is able to…**	**Educating stakeholders**		**(GC) conduct information and educational activities on water and wastewater management as well as reclamation and remediation, e.g., conduct study visits, show groups around infrastructure facilities;** **(GC) educate customers about the sector's activities, emphasising environmentally friendly attributes, energy efficiency and resource conservation, including showing customers the links between human activity and the natural environment as well as informing them how they can reduce their negative impact on the environment;** **(GC) build awareness of infrastructure repair and maintenance, highlight the need for and benefits of regular maintenance and repairs**	**(GC) design information and educational activities on water and wastewater management as well as reclamation and remediation, e.g., by developing nature trails, organising open days, planning study visits**	**(GC) conduct training on water and wastewater management processes, the need to protect the environment, using a reclaimed ecosystem, and on ways of preventing ecosystem degradation**	**(GC) develop and implement educational and training programmes to increase awareness about water and wastewater management, performing remedial actions in the environment, using a reclaimed ecosystem, and preventing ecosystem degradation**	**(GC) develop and implement educational and training programmes to increase awareness about water and wastewater management, performing remedial actions in the environment, using a reclaimed ecosystem, and preventing ecosystem degradation**
III. Testing, measurements, data acquisition and analysis	**knows and understands…**	**Measurements, laboratory and field tests required for water and wastewater management as well as reclamation and remediation**	the types of measurements, field and laboratory tests used to determine ecosystem parameters and the presence of pollutants as well as the quality parameters of water, wastewater, sludge and gases	the principles and methods of collecting, labelling, securing, storing and transporting samples of water, wastewater, sludge and gases for laboratory tests; the factors affecting reliable and accurate measurements, e.g., water temperature or turbidity, season of the year, contamination of samples	the principles and methods of collecting, labelling, securing, storing and transporting samples for laboratory tests of ecosystem parameters and the presence of pollutants needed for reclamation and remediation; the principles and methods of measuring the quality parameters of water, wastewater, sediments and gases, including microscopy analyses, needed for water and wastewater management processes	the principles and methods of making field observations and measurements of ecosystem parameters and pollutants needed for reclamation and remediation	**(GC) the directions of development of the methods and technologies for testing, taking measurements and analysing data needed for water and wastewater management, reclamation and remediation**	**(GC) the latest solutions relating to the methods and technologies used for testing, taking measurements and analysing data needed for water and wastewater management, reclamation and remediation**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
III. Testing, measurements, data acquisition and analysis	knows and understands...	**Principles of operating testing apparatus, measuring tools and devices**	the principles of using measuring tools and devices as well as those used to take samples, e.g., of soil, water, wastewater, sludge and gases	the principles of operating the testing apparatus and laboratory equipment used to determine the parameters of water, soil, wastewater, sludge, gases and pollutants occurring in ecosystems	the principles of operating and maintaining automated systems used for, e.g., monitoring the water level in the catchment area supplying the water intake, controlling the parameters of treated wastewater			
		The calibration and legalisation of measuring devices	the principles of the calibration and legalisation of measuring devices; data on the accuracy of measurements made by measuring devices	the guidelines for the calibration and legalisation of measuring devices used to determine the parameters of the water, soil, wastewater, sludge and pollutants occurring in ecosystems	the legal regulations on the calibration and legalisation of measuring devices used in the processes of reclamation and remediation as well as water and wastewater management			
		Data on ecosystems and water resources	the types and sources of current and historical data on water resources, ecosystems and their pollutants	the principles of using maps, databases, geographic information systems and spatial information systems	**(GC) the principles of developing dedicated databases on water resources, ecosystems and the pollutants found in them**	**(GC) property rights and the principles of using data, test results, reports, studies, etc. obtained to assess the condition of ecosystems and the quantity, quality and availability of water resources**		
		Mathematical models for conducting analyses	simple mathematical models used in the data analysis needed for water and wastewater management, reclamation and remediation	the statistical methods used in the data analysis needed for water and wastewater management, reclamation and remediation	**(GC) the principles of developing and validating mathematical and statistical models for researching, assessing, simulating and forecasting the phenomena and processes of water and wastewater management, reclamation and remediation;** **(GC) the methods of data analysis and management for the purpose of optimising processes**	**(GC) the mathematical models used to analyse water resources, ecosystem conditions and pollutants, and the operation of water supply and wastewater disposal systems;** **(GC) intelligent systems for water resource management, water quality monitoring and optimising processes;** **(GC) the tools and models forecasting climate change and its impact on water and wastewater management**	**(GC) the models using artificial intelligence to support the analysis of water resources, the state of the ecosystem and its pollutants, the operation of water supply systems and wastewater disposal systems, e.g., to forecast the state of ecosystem pollution, the quantity of available resources in the water intake catchment area**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
III. Testing, measurements, data acquisition and analysis	knows and...	**Regulations on field and laboratory testing**		the principles of submitting samples for laboratory testing, including the requirements of laboratories performing tests for the processes of reclamation and remediation as well as water and wastewater management	the standards and legal regulations on commissioning and performing field and laboratory tests for the processes of reclamation and remediation as well as water and wastewater management			
	is able to...	**Planning tests and measurements**		estimate the costs of measurements, laboratory and field tests	plan measurements as well as laboratory and field tests, including developing the schedule of measurements and tests, selecting the types of measurements and tests, defining how and where to take samples and their number, and selecting the testing methods and techniques	**(GC) define the goals and scope of tests and measurements in relation to the adopted aims of reclamation and remediation or the premises of water and wastewater management;** analyse the justification for taking measurements as well as performing tests and analyses, taking into account the expected costs and benefits		
		Performing tests and measurements	collect, label, secure, prepare for storage and transport samples, e.g., of soil, water, wastewater and sludge; read, including remotely, data from measuring devices and systems	conduct observations, measurements and tests to determine the parameters of the water, soil, wastewater, sludge and pollutants present in ecosystems	formulate guidelines on the techniques and methods of observation, measurement, sampling and laboratory tests needed for the processes of reclamation and remediation as well as water and wastewater management			
		Operating measuring devices	perform activities to operate simple measuring devices, e.g., manual meters, testers, oxygen meters (calibration, maintenance, adjusting settings in accordance with the manual, performing measurements)	perform activities to operate precise measuring devices, e.g., analysers, spectrophotometers, spectral probes (calibration, maintenance, adjusting settings in accordance with the manual, performing measurements)	perform tasks to operate measurement systems used in the processes of reclamation and remediation as well as water and wastewater management, including applications controlling measuring devices, transmitting and collecting data from measuring devices; supervise the operation of measuring devices	design measurement systems for the processes of reclamation and remediation as well as water and wastewater management		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
III. Testing, measurements, data acquisition and analysis	is able to...	**Obtaining secondary data on ecosystems and water resources**	**(GC) identify sources of historical and current data;** **(GC) acquire, collect and verify the reliability of data on water resources, ecosystems and their pollutants**	**(GC) determine the scope and method of obtaining data on the history and current situation of the ecosystem, useful for analysing water resources, assessing the ecosystem and the pollutants present in them**				
		Analysing measurement and test results		assess the accuracy of measurements and the reliability of the results of observations, measurements and tests; identify irregularities in measurements and test results; monitor climate data and activities based on geographic information systems (GIS); monitor the impact of NBS on the environment and water and wastewater management	interpret the readings of measuring devices and systems as well as the results of observations, laboratory and field tests; identify the possible causes of the incorrect or abnormal results of measurements and laboratory tests	**(GC) analyse data sets for water and wastewater management, reclamation and remediation;** **(GC) analyse climate data;** **(GC) analyse the impact of NBS on the environment and water and wastewater management;** **(GC) plan activities based on geographic information systems (GIS);** **(GC) supply data to tools and models for analysing and forecasting changes to the climate**	**(GC) use models and tools for climate change forecasting and interpret the results**	
IV. Infrastructure design and construction	knows and understands...	**Water supply systems and wastewater disposal systems**	the types of water supply systems and wastewater disposal systems (e.g., by design, operation, service area); the types of components included in water supply systems and wastewater disposal systems	the functions and principles of operating the components of a water supply system and a wastewater disposal system, e.g., water intake, treatment plant, pumping station, water supply system, sewage treatment plant; life cycle assessment (LCA) processes, including the impact of systems on the environment	the principles of selecting devices and installations for equipping the facilities of a water supply system and a wastewater disposal system; the principles of constructing and assembling the components of a water supply systems and a wastewater disposal system; the methods of conducting a life cycle assessment (LCA) to determine the impact of systems on the environment	the principles of designing and constructing water supply systems and wastewater disposal systems; the methods of retaining rainwater where it falls	**(GC) the trends in designing and constructing water supply systems and wastewater disposal systems**	**(GC) the latest solutions in designing water supply systems and wastewater disposal systems**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IV. Infrastructure design and construction	knows and understands...	**Devices, fittings and pipelines**	the types of devices, fittings and pipeline components used in water supply systems and wastewater disposal systems	the principles of operating the devices and fittings used in water supply systems and wastewater disposal systems; **(GC) the properties of pipeline components affecting their durability, reliability and the parameters of the transported medium**	the purpose and construction of devices, fittings and pipeline components used in water supply systems and wastewater disposal systems; the conditions and restrictions on the use of the equipment, fittings and pipeline components in water supply systems and wastewater disposal systems; the legal regulations on the use of devices and fittings in water supply systems and wastewater disposal systems	the principles of configuring and programming computer-controlled devices and fittings used in water supply systems and wastewater disposal systems	**(GC) the trends in the equipment, fittings and pipelines used in water supply systems and wastewater disposal systems**	**(GC) the latest achievements in the equipment, fittings and pipelines used in water supply systems and wastewater disposal systems**
		Hydraulic phenomena	the basic concepts of hydraulics and fluid mechanics (flow, pressure)	the hydraulic phenomena of water supply and wastewater disposal systems that may have a negative impact on Infrastructure	**(GC) the methods of securing water supply systems and wastewater disposal systems against the effects of unfavourable hydraulic and atmospheric phenomena;** **(GC) the methods of assessing the effects of unfavourable hydraulic and atmospheric phenomena**			
		Infrastructure used in reclamation and remediation processes	the types of facilities and installations used in reclamation and remediation processes	the functions and principles of operating the facilities and installations used in reclamation and remediation processes; life cycle assessment (LCA) processes, including the environmental impact of the infrastructure used in reclamation and remediation	the purpose and construction of the facilities and installations used in reclamation and remediation processes; the principles of designing and constructing the facilities and installations used in reclamation and remediation processes; the methods of conducting a life cycle assessment (LCA) to determine the environmental impact of the infrastructure used in reclamation and remediation processes and services			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IV. Infrastructure design and construction	**knows and understands...**	**Legal regulations on infrastructure design and construction**	the terms and definitions resulting from legal regulations on designing and constructing water and wastewater infrastructure as well as the infrastructure used in reclamation and remediation processes	the procedures of securing agreements for projects, site plans and the issuance of technical conditions, permits, authorisations and other administrative decisions relating to designing and constructing water supply and wastewater disposal infrastructure and the infrastructure used in reclamation and remediation processes; the principles and criteria for assessing materials, taking into account resource depletion, energy consumption, emissions, toxicity and recyclability; the principles and criteria for designing infrastructure in accordance with the climate change adaptation and mitigation model; the principles of sustainable water management, including rainwater; the principles of eco-design, extending product life and sustainable production processes, as well as design taking into account environmental impact and the principles of the circular economy	the standards and legal regulations on designing and constructing the facilities, installations and networks included in water supply systems and wastewater disposal systems and those used in reclamation and remediation processes; the legal regulations on connecting users to water and sewerage networks; the organisations and projects being implemented in the field of climate and the environment, sources of funding and financial instruments, and environmental strategies	**(GC) European legal regulations, guidelines and norms defining the standards and models of water supply and wastewater disposal**		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IV. Infrastructure design and construction	is able to…	**Designing infrastructure for collective water supply and wastewater disposal**		conduct life cycle assessments (LCA) of infrastructure, including the materials, installations and other components used; perform calculations, including hydraulic ones, for designing water supply systems and wastewater disposal systems	select the devices, fittings and other components included in the installations, networks and facilities of water supply systems and wastewater disposal systems; define the type and parameters of the devices, fittings and other components included in the installations, networks and facilities of water supply systems and wastewater disposal systems	design individual installations that are components of water supply systems and wastewater disposal systems	**(GC) design water supply systems and wastewater disposal systems and their components with the use of innovative devices and technological solutions;** plan the location of facilities for water supply systems and wastewater disposal systems; plan water supply catchment areas and wastewater disposal zones as well as the method of supplying the water supply network; design climate-resilient infrastructure, using knowledge of climate, sustainable water resource management and the impact of infrastructure on the environment	
		Designing individual water and sewerage installations	perform calculations for designing individual water and sewerage installations, e.g., household wastewater treatment plants, wells, micro-retention systems	select devices, fittings, tanks and other components included in individual water and sewerage installations	define the type, parameters and location of devices, fittings, tanks and other components included in individual water and sewerage installations	design individual water and sewerage installations, e.g., household wastewater treatment plants, wells, micro-retention systems		
		Designing the infrastructure used in reclamation and remediation processes		perform calculations for designing the infrastructure used in reclamation and remediation processes	select the materials and technologies for constructing facilities and installations used in reclamation and remediation processes; define the parameters and location of facilities and installations used in reclamation and remediation processes	design the components of the infrastructure used in reclamation and remediation processes, e.g., aeration installations, remediation heaps		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IV. Infrastructure design and construction	is able to...	**Analysing the efficiency and reliability of water supply systems and wastewater disposal systems**		calculate the efficiency of water supply systems and wastewater disposal systems or their components taking into account the population density of the given area and the activities conducted there; calculate the values of the readings indicating the reliability of water supply systems and wastewater disposal systems or their components	analyse the efficiency and reliability of water supply systems and wastewater disposal systems or their components; identify opportunities and constraints on the expansion of water supply systems and wastewater disposal systems or their components	design solutions optimising the parameters of water supply systems and wastewater disposal systems or their components, including those that increase their efficiency and reliability (e.g., air-venting valves, pressure regulators)	**(GC) model the work of water supply systems and wastewater disposal systems using advanced systems and IT tools**	**(GC) develop simulation models for water supply systems and wastewater disposal systems**
		Making connections	make connections to water and sewerage networks	perform the calculations needed for designing water and sewerage connections; define the technical conditions for connecting a user to the water and sewerage network	select the devices and fittings needed to connect to the water and sewerage network	design connections for water and sewerage networks		
		Using documentation	use the designs of water and sewerage installations and networks as well as the technical documentation of devices and fittings used in water supply systems and wastewater disposal systems	update the data in geographic information and spatial information systems on the facilities, installations and networks included in water supply systems and wastewater disposal systems as well as those used in reclamation and remediation processes	maintain documentation on designing and constructing facilities, installations and networks included in water supply systems and wastewater disposal systems as well as those used in reclamation and remediation processes			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
V. Operating the infrastructure	knows and understands...	**Principles of the operation, maintenance and utilisation of devices, fittings and pipelines**	the principles of operating, maintaining and utilising simple fittings used in water supply systems and wastewater disposal systems, e.g., different types of gate valves, check valves, internal and external hydrants, water meters; the principles of maintaining and operating pipelines	the principles of operating, maintaining and utilising devices and complex fittings used in water supply systems and wastewater disposal systems	the legal regulations on maintaining water and wastewater infrastructure, including the performance of technical inspections; the operating parameters and mode of operation of devices and fittings used in water supply systems and wastewater disposal systems	the mechanisms and criteria for the technical and economic optimisation of the operation of devices, fittings and pipelines used in water supply systems and wastewater disposal systems		
		Specialised auxiliary equipment	the types of tools, devices and specialised vehicles for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems; the principles of the operation and ongoing maintenance of tools, simple devices and specialised vehicles for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems, e.g., locators, washers, pumps, vacuum trucks	the principles of the operation and ongoing maintenance of moderately complex devices for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems, e.g., correlators, geophones, loggers, flow meters	the operating parameters and method of operation of specialised devices and vehicles used for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems	the principles of designing and programming complex diagnostic systems	**(GC) the development directions of devices and vehicles for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems**	**(GC) the latest achievements in the devices and vehicles for the diagnostics, cleaning and unblocking of devices, installations and networks included in water supply systems and wastewater disposal systems**
		Legal regulations on infrastructure maintenance	the concepts and definitions in the legal regulations on the maintenance of water and wastewater infrastructure	the principles of the maintenance, repair management and operation of facilities, devices, installations and networks included in water supply systems and wastewater disposal systems	the standards and legal regulations on the maintenance of water supply systems and wastewater disposal systems			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
V. Operating the infrastructure	is able to...	**Operating devices and fittings**	perform simple activities relating to the operation of individual devices and fittings used in water supply systems and wastewater disposal systems (prepare for operation, start-up, make adjustments, set parameters in accordance with the manual, take readings, shut down, secure after work)	perform tasks relating to the operation of equipment assemblies used in water supply and wastewater disposal systems (prepare for operation, start-up, make adjustments, set parameters in accordance with the manual, monitor parameters, shut down, perform maintenance and secure after work)	perform tasks relating to the operation of devices and their assemblies under variable and not fully predictable conditions resulting, for example, from changes in water quality parameters, the amount of water or wastewater (monitor the operation of devices, adjust parameters depending on the course of the process)	program computer-controlled devices and assemblies of devices; analyse the operation of devices and assemblies of devices with the use of mathematical models and SCADA information systems	modify and optimise the software controlling the operation of devices and their assemblies; **(GC) simulate the operation of water supply systems and wastewater disposal systems using mathematical models**	**(GC) develop simulation models for water supply and wastewater disposal systems**
		Operating specialised auxiliary equipment	perform activities relating to the operation of tools, simple devices and specialised vehicles for diagnostics, cleaning and unblocking devices, installations and networks included in water supply systems and wastewater disposal systems, e.g., locators, washers, pumps, vacuum trucks (calibrate, maintain, adjust settings in accordance with instructions, perform work)	perform activities relating to the operation of moderately complex devices for diagnostics, cleaning and unblocking devices, installations and networks included in water supply systems and wastewater disposal systems, e.g., correlators, geophones, loggers, flow meters (calibrate, maintain, adjust settings in accordance with instructions, perform work)	select tools and devices for diagnostics, cleaning and unblocking devices, installations and networks included in water supply systems and wastewater disposal systems; perform tasks relating to the operation of complex diagnostic systems, including the operation of applications controlling diagnostic devices, transmitting and collecting data from devices; supervise the operation of diagnostic devices and systems			
		Diagnosing failures	perform an organoleptic assessment of the correct functioning of devices, installations and networks included in water supply systems and wastewater disposal systems; read data from measuring devices and systems monitoring the operation of devices, installations and networks included in water supply systems and wastewater disposal systems	locate failures and disruptions in the operation of devices, installations and networks included in water supply systems and wastewater disposal systems; detect and locate unauthorised connections to the water and sewerage network	analyse data from measuring devices and monitoring systems; analyse the typical causes of malfunctions, failures and disturbances in the operation of devices, installations and networks included in water supply systems and wastewater disposal systems	analyse the non-routine causes of malfunctions, failures and disruptions in the operation of devices, installations and networks included in water supply systems and wastewater disposal systems		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
V. Operating the infrastructure	is able to…	**Planning inspections, overhauls, repairs and modernisation**		plan work relating to inspections, overhauls, repairs and the modernisation of devices and water and sewerage installations; estimate the costs of inspections, overhauls, repairs and modernisation	plan work relating to the inspections, overhauls and routine repairs of facilities and networks included in water supply systems and wastewater disposal systems, including the method of their implementation, scheduling, necessary resources and the scope of the network shutdown; identify the needs for reconstructing water and wastewater infrastructure	plan the method of making repairs under non-routine conditions or posing a particular threat to the property, life or health of people; plan the modernisation of devices and installations included in water supply systems and wastewater disposal systems as well as the expansion of water and sewerage networks	**(GC) prepare long-term development plans for water supply systems and wastewater disposal systems**	
		Maintenance, overhauls, repairs, modernisation	perform activities relating to the current and periodic maintenance of devices and fittings (washing, cleaning, unblocking), conduct technical inspections, perform simple repairs and overhauls of devices, installations and networks included in water supply systems and wastewater disposal systems	modernise, perform complex repairs and overhaul devices and installations included in water supply systems and wastewater disposal systems as well as overhaul water and sewerage networks under routine conditions	repair and overhaul devices, installations and networks included in water supply systems and wastewater disposal systems under non-routine or special risk conditions; assess the correctness of performed repairs and overhauls of devices, installations and networks included in water supply systems and wastewater disposal systems			
		Using documentation	use the operating instructions and technical documentation of devices and fittings used in water supply systems and wastewater disposal systems, as well as the operating instructions and technical documentation of specialised auxiliary equipment; read data from geographic information and spatial information systems, including the use of mobile devices, on the facilities, installations and networks included in water supply systems and wastewater disposal systems	maintain the documentation relating to the operation of facilities, equipment, installations and networks included in water supply systems and wastewater disposal systems				

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	knows and understands...	**Water quality parameters**	the parameters characterising water quality at the individual stages of its abstraction, treatment and supply processes	the factors influencing the quality parameters of water at the individual stages of its abstraction, treatment and supply processes	the legal regulations on the quality parameters of water at the individual stages of its intake, treatment and supply processes	**(GC) the scientific, legal, social and economic conditions for determining the requirements pertaining to water quality parameters for the purpose of developing legal regulations**	**(GC) the directions of change in the scope of national, European and global legal regulations on water quality parameters at the individual stages of its intake, treatment and delivery processes**	
		Protecting water intakes	the prohibitions, restrictions and orders in force for the direct and indirect protection of water intake protection zones; the types of entities authorised to perform control activities and responsible for monitoring violations in water intake protection zones	the methods of protecting water supply areas; the procedures for controlling and reporting violations in water intake protection zones	the standards and legal regulations on protecting water supply areas	the methods and models for delineating water intake protection zones		
		Operating water intakes	the types of water intakes	the principles of operating various types of water intakes; the natural phenomena and anthropogenic factors affecting the method of utilising water intakes	the legal regulations on the utilisation of water intakes			
		Water treatment technology		the methods and technologies used in water treatment processes	the principles of selecting the methods and technologies used in water treatment processes depending on, e.g., the source of the water, parameters of abstracted water and intended use of the water	the principles for adapting water treatment methods and technologies in non-routine and unpredictable situations, e.g., sudden changes in water quality, contamination in a water intake protection zone, flooding	**(GC) the trends in technologies used in water treatment processes**	**(GC) the latest technological solutions used in water treatment processes**
		Chemical reactions and biological processes occurring in water treatment processes	the basic concepts of the chemical reactions and biological processes occurring in water treatment processes	the types of chemical reactions and biological processes occurring in water treatment processes	the factors affecting the course of the chemical reactions and biological processes in water treatment processes	the course of chemical reactions and biological processes occurring in water treatment processes		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	knows and understands...	**Unit processes used in water treatment**	the unit processes used in water treatment; the parameters characterising the unit processes used in water treatment	the principles of conducting the unit processes used in water treatment, its stages and course, e.g., ozonation, coagulation, filtration, disinfection	the principles of selecting the parameters of the unit processes used in water treatment; the dependencies between the individual unit processes used in water treatment and their parameters	the effect of individual unit processes on water quality parameters		
		Products used in water treatment processes	the types of products used in water treatment processes, including trade names, types of packaging, labels; **(GC) the types of certificates, labels and standards verifying the environmental performance and safety of materials and substances coming into contact with water;** **(GC) the impact of products on the environment as a result of their use in water treatment**	**(GC) the action, conditions of use, side effects and risks of the products used in water treatment processes**	**(GC) the chemical composition of the products used in water treatment processes;** **(GC) the reactions of the products used in water treatment processes with other chemicals**	**(GC) the effect of the products used in water treatment processes on human health, the welfare of plants and animals, and the course of the technological processes using the supplied water**	**(GC) the trends relating to the products used in water treatment processes**	**(GC) the latest solutions relating to the products used in water treatment processes**
		Irregularities in water abstraction, treatment and supply processes	the types of irregularities in water abstraction, treatment and supply processes	the causes of irregularities in water abstraction, treatment and supply processes	the effect of irregularities in water abstraction, treatment and supply processes on the course and efficiency of these processes as well as on water quality parameters			
		Water balances in the water supply system	**(GC) the types and causes of water losses in water supply systems**	**(GC) the factors influencing water loss;** the coefficients used to calculate the magnitude of water losses in water supply systems; the allowable amounts of water loss in water supply systems	**(GC) the methods and procedures of performing water balances in water supply systems;** **(GC) the methods of detecting and analysing water losses and calculating their amount;** **(GC) the methods of preventing and reducing water losses**	**(GC) the principles of managing the water supply system in the region covered by the water network operator**	**(GC) the principles of the strategic planning of the functioning of the water supply system, the management of water resources and the development of water reserves**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	knows and understands...	**Efficiency of water abstraction, treatment and supply processes**		**(GC) the types of factors affecting the efficiency of water abstraction, treatment and supply processes, including financial and energy efficiency**	**(GC) the methods, organisational and technological solutions increasing the efficiency of water abstraction, treatment and supply processes, including financial and energy efficiency**	the automation and robotization technologies for water supply systems that increase efficiency and reduce resource consumption		
		Costs of water abstraction, treatment and supply activities	the types of costs involved in water abstraction, treatment and supply processes	the cost components of water abstraction, treatment and supply activities; the principles for calculating the costs of activities relating to water abstraction, treatment and supply	**(GC) the principles of financially optimising activities relating to water abstraction, treatment and supply**	the methods of assessing and managing financial risks relating to environmental factors in water supply systems; the methods of ensuring the long-term profitability of investments in water management		
		Managing sludge, washings and other waste generated by water treatment processes	**(GC) the principles of handling sludge, washings and other waste generated by water treatment processes**	**(GC) the possibility of other industries using the sludge, washings and other waste generated by water treatment processes and the substances recovered from them**	**(GC) the chemical composition of the sludge, washings and other waste generated by water treatment processes;** **(GC) the technological possibilities of recovering substances from the sludge, washings and other waste generated by water treatment processes;** **(GC) the economic, organisational and legal conditions for the use of substances recovered from the sludge, washings and other waste generated by water treatment processes**	**(GC) the economic and environmental benefits of managing the sludge, washings and other waste generated by water treatment processes in accordance with the principles of sustainable development**	**(GC) the directions of development of the technologies used for the recovery and reuse of substances from the sludge, washings and other waste generated by water treatment processes**	**(GC) the innovations relating to the technologies used for the recovery and reuse of substances from the sludge, washings and other waste generated by water treatment processes**
		Critical infrastructure	**(GC) the facilities and systems included in the critical infrastructure**	**(GC) the principles of operation and obligations of critical water supply infrastructure operators;** **(GC) the principles of protecting the facilities of the critical water supply infrastructure**	**(GC) the legal regulations on the critical water supply infrastructure**	the methods of risk assessment and management, including the risks relating to environmental factors		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	knows and understands...	**Formal and legal requirements for water abstraction, treatment and supply**	the obligations of the water network operator relating to the processes of water abstraction, treatment and supply	the principles of conducting water abstraction, treatment and supply activities, including fees, required permits and authorisations; the procedures for obtaining permits, authorisations and other administrative decisions for water abstraction, treatment and supply processes	the legal regulations on water abstraction, treatment and supply; the legal regulations on obtaining permits, authorisations and other administrative decisions required for water abstraction, treatment and supply processes			
	is able to...	**Analysing the quality of water from intake areas**		assess the quality of water in terms of the possibility of its treatment and delivery to recipients	analyse the fluctuations in water parameters in the areas supplying water intakes; analyse the factors affecting water quality parameters in the areas supplying water intakes	**(GC) assess the effect of natural phenomena and anthropogenic factors on water quality parameters**	forecast the water quality parameters of intakes	
		Analysing the quantity of water from water intakes		calculate the quantity of water and efficiency of water intakes	analyse the possibilities of building water intakes	analyse the quantity of water and efficiency of water intakes in terms of the possibility of meeting existing and anticipated demand	**(GC) develop long-term forecasts and plans for the operation of water intakes**	**(GC) develop mathematical models to simulate the utilisation of water intakes**
		Water abstraction		monitor and regulate water abstraction from a single water intake	supervise and regulate the operating parameters of a water abstraction system utilising many water intakes	develop water abstraction plans, including determining the amount of water extracted, the amount of raw water reserve		
		Controlling the area supplying the water intake	perform activities relating to the regulation of water flow in the area supplying the water intake	assess water flow parameters in the area supplying the water intake in relation to undertaking water abstraction	select water flow parameters in the area supplying the water intake under routine conditions	select the water flow parameters of a river in the area supplying the water intake in emergency and non-routine situations, e.g., hypoxia, waste discharge		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	is able to...	**Analysing the risks to water intakes and water supply systems**		**(GC) identify threats in the water intake protection zone and water supply system affecting the quality and quantity of water;** **(GC) perform activities preventing the occurrence and limiting the effects of the occurrence of threats in the water intake protection zone and water supply system**	**(GC) assess the risk of threats affecting water quality and quantity in the water intake protection zone and water supply system;** **(GC) prepare a risk assessment for the water intake and water supply system;** design protective zones for water intakes	**(GC) plan and supervise the implementation of activities to prevent the occurrence and limit the effects of the occurrence of threats in the water intake protection zone and water supply system;** **(GC) analyse the impact of the occurrence of threats in the water intake protection zone or water supply system on the quality and quantity of supplied water**	**(GC) design solutions to minimise the probability and consequences of the occurrence of threats in the water intake protection zone and water supply system**	
		Determining the demand for water	perform the calculations for estimating water demand	estimate the water demand of households	estimate the water demand in the region covered by the water network operator's activities	estimate the long-term perspective of the demand for water, taking into account anticipated changes in consumer habits	forecast changes in water demand in the region covered by the water network operator's activities resulting from non-routine socioeconomic situations, natural phenomena, natural disasters, and other situations	
		Ensuring the security of the water supply	perform activities resulting from the procedures that ensure business continuity in water abstraction, treatment and supply processes	implement plans to ensure the continuity of the water supply in the event of planned inspections, repairs, maintenance and modernisation of the devices, installations and networks included in water supply systems	implement plans to ensure the continuity of the water supply in the event of emergency situations, unplanned changes in the quantity or quality parameters of water and other emergencies causing disruptions in the processes of water abstraction, treatment and supply, e.g., contamination of an intake, failure of the water supply system; assess business continuity plans for water abstraction, treatment and supply processes	develop plans and procedures for ensuring the continuity of the water supply in the event of planned inspections, repairs, maintenance and modernisation of devices, installations and networks included in water supply systems	develop plans and procedures for ensuring the continuity of the water supply in emergency situations, unplanned changes in the quantity or quality parameters of water and other emergencies causing disruptions in the processes of water abstraction, treatment and supply, e.g., contamination of an intake, failure of the water supply system	develop multi-year strategies and plans to ensure the security of the water supply

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	is able to...	**Monitoring the distribution of water**		compile data on the distribution of water; identify anomalies in the distribution of water; calculate water losses in water supply systems	analyse the causes of fluctuations in the distribution of water; **(GC) analyse the indicators of water loss in the water supply system;** prepare a water balance for water supply systems	adapt and implement solutions and technologies limiting water losses in water supply systems		
		Designing water treatment technologies			select individual water treatment processes and plan their course depending on the quality of the raw water; select the parameters of the technological processes of water treatment	modify the parameters of the technological processes of water treatment in non-routine and unpredictable situations, e.g., sudden changes in water quality, intake contamination, flood	modify water treatment methods and technologies	develop innovations in water treatment
		Performing water abstraction, treatment and supply processes		monitor the course of water abstraction, treatment and supply processes; identify irregularities and disturbances affecting the course of water abstraction, treatment and supply processes	select the parameters of water abstraction, treatment and supply processes; identify the possible causes of irregularities and disturbances affecting the course of water abstraction, treatment and supply processes	make recommendations for the optimisation of water abstraction, treatment and supply processes		
		Using products in water treatment processes	calculate product doses and apply them in water treatment processes; supervise dosing devices to ensure that the correct amounts of product are being used in water treatment processes	define the conditions for the use of products in water treatment processes	select the type, amount and concentration of the products used in water treatment processes depending on the method used and the quality of the raw water			

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VI. Water abstraction, treatment and supply	is able to...	**Analysing the effectiveness and efficiency of water abstraction, treatment and supply processes**		identify anomalies and disturbances affecting the effectiveness and efficiency of water abstraction, treatment and supply processes	analyse the effectiveness and efficiency of the technological processes of water abstraction, treatment and supply; identify possible causes of irregularities and disturbances affecting the effectiveness and efficiency of water abstraction, treatment and supply processes	adapt and implement solutions and technologies increasing the effectiveness and efficiency of water abstraction, treatment and supply processes	modify technological processes to increase the efficiency and effectiveness of water abstraction, treatment and supply processes	**(GC) develop solutions and technologies to increase the efficiency and effectiveness of water abstraction, treatment and supply processes**
		Optimising the financial aspects of water abstraction, treatment and supply processes	identify the cost components of water abstraction, treatment and supply processes	estimate the costs of activities relating to water abstraction, treatment and supply, including the cost of water losses in the water supply system	analyse the financial efficiency of activities relating to water abstraction, treatment and supply	analyse the possibilities of increasing the financial efficiency of activities relating to water abstraction, treatment and supply; adapt and implement technologies and organisational solutions increasing the financial efficiency of water abstraction, treatment and supply processes		
VII. Wastewater collection, transport and treatment	knows and understands...	**The principles of handling wastewater**	the types and parameters of generated wastewater	the procedures for discharging sewage and industrial wastewater as well as rainfall and snowmelt into the sewerage system; the procedures for handling wastewater not released to the sewerage system; the principles of discharging treated wastewater into the water and ground	the legal regulations specifying the principles of discharging wastewater into the sewerage system, handling wastewater not discharged into the sewerage system and the principles for discharging treated wastewater into the water and ground			
		The balance of wastewater and sewage sludge in wastewater disposal systems		the factors influencing the amount of wastewater in the wastewater disposal system	the methods and procedures of preparing a wastewater and sewage sludge balance	the principles of managing the wastewater disposal system	**(GC) the principles of the strategic planning of the functioning of the wastewater disposal system**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	knows and understands...	**Wastewater treatment technology**		the methods and technologies used in municipal wastewater treatment processes	**(GC) the methods and technologies used in industrial wastewater treatment processes not posing a threat to the environment;** the principles of selecting the methods and technologies used in wastewater treatment processes depending on, e.g., the source, wastewater quality parameters	**(GC) the methods and technologies used in the treatment of highly loaded wastewater containing substances particularly harmful to the environment;** **(GC) the principles of adapting the methods and technologies of wastewater treatment in non-routine and unpredictable situations, e.g., sudden changes in raw wastewater parameters, increased amount of wastewater**	**(GC) the trends in the technologies used in wastewater treatment processes**	**(GC) the latest technological solutions used in wastewater treatment processes**
		The biological processes taking place in wastewater treatment processes	the basic concepts of the biological processes taking place in wastewater treatment processes	the types of biological processes taking place in wastewater treatment processes, including the processes occurring in wastewater treatment using activated sludge	the factors affecting the course of the biological processes taking place in wastewater treatment processes; the factors affecting the quality of the activated sludge used in biological wastewater treatment	the course of the biological processes taking place in wastewater treatment processes		
		The chemical reactions taking place in wastewater treatment processes	the basic concepts of the chemical reactions taking place in wastewater treatment processes	the types of chemical reactions taking place in wastewater treatment processes	the factors influencing the course of the chemical reactions taking place in wastewater treatment processes	the course of the chemical reactions taking place in wastewater treatment processes		
		Unit processes used in wastewater treatment	the unit processes used in wastewater treatment; the parameters characterising the unit processes used in wastewater treatment	the principles of conducting unit processes, their stages and course used in wastewater treatment, e.g., filtration, sedimentation, coagulation, neutralisation	the principles of selecting the parameters of the unit processes used in wastewater treatment; the dependencies between the individual unit processes used in wastewater treatment and wastewater parameters	the effect of individual unit processes on the parameters of treated wastewater		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	knows and understands...	**Products used in wastewater treatment processes**	the types of products used in wastewater treatment processes, including trade names, types of packaging, labelling; the types of certificates, labels and standards verifying the environmental performance and safety of materials and substances used in wastewater treatment; the environmental impact of the products used in wastewater treatment	**(GC) the action, conditions of use, side effects and hazards of the products used in wastewater treatment processes**	**(GC) the chemical composition of the products used in wastewater treatment processes;** **(GC) how wastewater treatment products react with other chemicals**	**(GC) the effects of the products used in wastewater treatment processes on the environment**	**(GC) the directions of development of the products used in wastewater treatment processes**	**(GC) the latest solutions relating to the products used in wastewater treatment processes**
		Treated wastewater	the parameters characterising treated wastewater discharged into the water and ground	the types of substances found in treated wastewater discharged into the water and ground	the standards and legal regulations defining the principles of discharging wastewater into the water and ground, including the requirements for wastewater parameters; **(GC) the way treated wastewater affects the ecosystem**	**(GC) the relationship between the degree of wastewater treatment and its parameters, and the properties and functioning of the ecosystem**		
		Irregularities in wastewater treatment processes	the types of irregularities in wastewater treatment processes	the causes of irregularities in wastewater treatment processes	the impact of the irregularities occurring during wastewater treatment processes on their course and effectiveness and the quality parameters of the treated wastewater			
		Efficiency of wastewater treatment processes		**(GC) the factors influencing the efficiency of wastewater treatment processes, including financial and energy efficiency**	**(GC) the organisational and technological methods and solutions increasing the efficiency of wastewater treatment processes, including financial and energy efficiency**	the process automation and robotization technologies that increase efficiency and reduce resource consumption in the wastewater management sector		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	knows and understands...	**Costs of wastewater collection, transport and treatment as well as sludge processing activities**	the types of costs in wastewater collection, transport and treatment processes as well as in processing sludge and other waste generated by the wastewater treatment process	the cost components of activities relating to wastewater collection, transport and treatment as well as to treating sludge and other waste generated by the wastewater treatment process; the principles of calculating the costs of activities relating to wastewater collection, transport and treatment as well as to processing sludge and other waste generated by the wastewater treatment process	the principles of the financial optimisation of activities relating to wastewater collection, transport and treatment as well as to the processing of sludge and other waste generated by the wastewater treatment process	the methods for assessing and managing financial risks relating to environmental factors in wastewater management; the methods for ensuring the long-term profitability of investments in wastewater management		
		Formal and legal requirements for wastewater collection, transport and treatment	wastewater collection and transport procedures; the obligations of a sewerage network operator relating to wastewater disposal processes	the principles of conducting activities relating to wastewater collection, transport and treatment, including fees, required permits and authorisations; the procedures for obtaining permits, authorisations and other administrative decisions relating to wastewater collection, transport and treatment	the legal regulations on wastewater collection, transport and treatment and on the requirements for vehicles used to transport wastewater; the legal regulations on obtaining permits, authorisations and other administrative decisions required for wastewater collection, transport and treatment			
		Sludge and other waste from wastewater treatment processes	the types of waste generated by wastewater treatment processes; the parameters characterising sludge and other waste generated by wastewater treatment processes	the factors influencing the possibilities of processing sludge and other waste generated by wastewater treatment processes	the chemical composition of sludge and other waste generated by wastewater treatment processes	**(GC) the dependencies between the type and parameters of wastewater and the properties of the sludge and other waste generated by wastewater treatment processes**		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	knows and understands...	**Managing sludge and other waste generated by wastewater treatment processes**	**(GC) the principles of handling sludge and other waste generated by wastewater treatment processes**	**(GC) the possibilities of using the products from the treatment of sludge and other waste generated by wastewater treatment processes and the substances recovered from them in other industries;** **(GC) the possibilities of efficiently using sludge and other waste generated by wastewater treatment processes, including the potential for energy production, biogas extraction and processing, and bio-components**	**(GC) the economic, organisational and legal conditions for the use of substances recovered from sludge and other waste generated by wastewater treatment processes;** **(GC) the technological possibilities of processing sludge and other waste generated by wastewater treatment processes**	**(GC) the economic and environmental benefits of managing sludge and other waste generated by wastewater treatment processes, in accordance with the principles of sustainable development**	**(GC) the directions of development of using the products generated by sludge and wastewater treatment processes**	**(GC) the innovations relating to the use of products generated by sludge and wastewater treatment processes**
		Methods and technologies used in the management processes of sludge and other waste generated by wastewater treatment processes		the types of physical, chemical and biological processes involved in sludge treatment	**(GC) the methods and technologies for processing sludge and other waste generated by wastewater treatment processes, including the methods of obtaining energy from sludge;** **(GC) the principles of selecting the methods and technologies for processing sludge and other waste generated by wastewater treatment, depending on the parameters of the sludge, the purpose of their processing and the required parameters of the products**	the course of the reactions and physical, chemical and biological processes occurring in the management of sludge and other waste generated by wastewater treatment processes	**(GC) the directions of development of the technologies used in processing sludge and other waste generated by wastewater treatment processes, including the methods of obtaining energy from these substances**	**(GC) the innovations relating to the technologies used in processing sludge and other waste generated by wastewater treatment processes, including the methods of obtaining energy from these substances**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	knows and understands...	**Biogas generated by wastewater treatment processes**	the parameters of the biogas generated by wastewater treatment processes	**(GC) the possibility of using biogas generated by wastewater treatment processes;** **(GC) the factors influencing the efficiency of producing biogas generated by wastewater treatment processes**	**(GC) the methods of extracting, processing and treating biogas generated by wastewater treatment processes**	the course of the reactions and physical, chemical and biological processes taking place during biomass processing as well as during the processing and treatment of biogas generated by wastewater treatment processes; **(GC) the dependencies between the parameters of wastewater and sludge and the efficiency of the biogas production process and its parameters**	**(GC) the directions of development of the methods and technologies used in extracting, processing and treating biogas generated by wastewater treatment processes**	**(GC) the innovations relating to the methods and technologies used in extracting, processing and treating biogas generated by wastewater treatment processes**
	is able to...	**Analysing the structure and parameters of wastewater**		monitor the amount and parameters of raw sewage discharged into the sewerage system; identify the factors changing the amount and parameters of raw sewage; assess the quality of treated wastewater in terms of the possibility of its discharge into the water and ground	define the structure and quality parameters of the wastewater produced in a given region; estimate the amount of raw sewage discharged into the sewerage network; prepare a wastewater and sludge balance in the wastewater disposal system	analyse the type, morphology and quality parameters of wastewater produced in a given region	**(GC) forecast changes in the amount and parameters of wastewater resulting from the occurrence of natural phenomena and socioeconomic factors;** **(GC) develop and implement activities aimed at modifying the quality parameters of the raw sewage collected**	
		Designing wastewater treatment technologies			select the unit processes for wastewater treatment and plan their course depending on the quality of raw sewage and the desired parameters of the treated wastewater; select the parameters of the technological processes for wastewater treatment	modify the parameters of the technological processes for wastewater treatment in non-routine and unpredictable situations, e.g., sudden changes in raw sewage parameters, increased amount of wastewater	**(GC) modify the methods and technologies of wastewater treatment**	**(GC) develop innovative methods and technologies in the field of wastewater treatment**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	is able to...	**Conducting wastewater collection, transport and treatment processes**		monitor the course of wastewater collection, transport and treatment processes; identify irregularities and disturbances influencing the course of wastewater collection, transport and treatment processes	plan the course and select the parameters of wastewater collection, transport and treatment processes; identify possible causes of irregularities and disturbances affecting the course of wastewater collection, transport and treatment processes	**(GC) make recommendations for the optimisation of wastewater collection, transport and treatment processes**		
		Using products in wastewater treatment processes	calculate product doses and apply them in wastewater treatment processes; supervise dosing devices to ensure that the correct amounts of product are being used in wastewater treatment processes	define the conditions for using products in wastewater treatment processes	select the type, amount and concentration of products used in wastewater treatment processes depending on the method used, raw sewage parameters and desired parameters of the treated wastewater			
		Analysing the effectiveness and efficiency of wastewater treatment processes		identify irregularities and disturbances affecting the effectiveness and efficiency of wastewater treatment processes	analyse the effectiveness and efficiency of the technological processes in wastewater treatment; identify possible causes of irregularities and disturbances affecting the effectiveness and efficiency of wastewater treatment processes	**(GC) select solutions and technologies which increase the effectiveness and efficiency of wastewater treatment processes**	**(GC) modify technological processes in order to increase the efficiency and effectiveness of wastewater treatment processes**	**(GC) develop solutions and technologies that increase the efficiency and effectiveness of wastewater treatment processes**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	is able to…	**Optimising the financial aspects of wastewater collection, transport and treatment processes and sludge management**	identify the cost components of wastewater collection, transport, treatment as well as the management of sludge and other waste generated by the wastewater treatment process	estimate the costs of activities in wastewater collection, transport, treatment as well as in the management of sludge and other waste generated by the wastewater treatment process	analyse the financial efficiency of the activities of wastewater collection, transport and treatment as well as of the management of sludge and other waste generated by the wastewater treatment process	analyse the possibilities of increasing the financial efficiency of the activities of wastewater collection, transport and treatment as well as of the management of sludge and other waste generated by the wastewater treatment process; adapt and implement technologies and organisational solutions increasing the financial efficiency of wastewater collection, transport and treatment processes as well as of the management of sludge and other waste generated by the wastewater treatment process		
		Ensuring business continuity in wastewater collection, transport and treatment processes	implement activities within the framework of procedures ensuring business continuity in wastewater collection, transport and treatment processes	implement plans to ensure business continuity in wastewater collection, transport and treatment processes in the event of planned inspections, repairs, maintenance and the modernisation of devices, installations and networks included in wastewater disposal systems	implement plans to ensure business continuity in the event of failures, unplanned changes in the quantity or quality parameters of wastewater and other emergencies disrupting wastewater collection, transport and treatment processes, e.g., sewerage network failures; assess business continuity plans for the collection, transport and treatment of wastewater	develop plans and procedures to ensure business continuity in wastewater collection, transport and treatment processes in the event of planned inspections, repairs, maintenance and the modernisation of devices, installations and networks included in wastewater disposal systems	**(GC) develop plans and procedures to ensure business continuity in wastewater collection, transport and treatment processes in the event of failures, unplanned changes in the quantity or quality parameters of wastewater and other emergency situations disrupting the collection and treatment processes, such as, e.g., sewerage network failures**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VII. Wastewater collection, transport and treatment	is able to...	**Planning the management of sludge and other waste generated by wastewater treatment processes**		choose the method of managing sludge and other waste generated by wastewater treatment processes	**(GC) identify opportunities and plan the use of sludge and other waste generated by wastewater treatment processes, taking into account the principles of the circular economy;** **(GC) analyse the rationality of use and assess the environmental impact of individual methods of managing sludge and other waste generated by wastewater treatment processes**	**(GC) establish cooperation with cooperants, including representatives of other industries, in the use of sludge and other waste generated by wastewater treatment processes**	**(GC) analyse the possibility of applying innovations in managing sludge and other waste generated by wastewater treatment processes, in particular those aimed at increasing the efficiency of obtaining energy from sludge, recovering raw materials, including critical raw materials**	**(GC) develop multi-variant strategic scenarios and directions of change in the processing of sludge and other waste generated by wastewater treatment processes, in particular relating to energy generation from sludge**
		Designing the sludge treatment process			select the methods and technologies of processing sludge and other waste generated by wastewater treatment processes depending on the purpose of the processing and the desired parameters of the final products	adapt technologies and organisational solutions for processing sludge and other waste generated by wastewater treatment processes in order to implement the premises of the circular economy	**(GC) modify the methods and technologies of processing sludge and other waste generated by wastewater treatment processes in order to increase the efficiency of obtaining energy from sludge, recovering raw materials and reducing the negative impact on the environment**	**(GC) develop new methods and technologies for the treatment of sludge and other waste generated by wastewater treatment processes enabling the implementation of a sustainable development policy in the field of water and wastewater management**
		Designing and analysing biogas extraction processes		**(GC) identify the factors influencing the efficiency and effectiveness of biogas extraction in wastewater treatment processes**	**(GC) analyse biomass parameters in terms of the efficiency and effectiveness of the biogas extraction process in wastewater treatment processes;** **(GC) select methods and technologies for the extraction, processing and treatment of biogas generated by wastewater treatment processes**	**(GC) analyse the efficiency of the processes of extracting, processing and treating biogas generated by wastewater treatment processes;** **(GC) adapt and implement technologies and organisational solutions increasing the efficiency and effectiveness of the processes of extracting, processing and treating biogas generated by wastewater treatment processes**		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	knows and understands...	**Reclamation and remediation methods**	the types of methods used in reclamation and remediation processes	the methods and technologies used in reclamation and remediation processes, including pollution removal and containment techniques; the course of the technological processes used in reclamation and remediation	the criteria for selecting reclamation and remediation methods	**(GC) the benefits and consequences of using specific reclamation and remediation methods and their impact on the functioning of the ecosystem and dependent ecosystems, including on the natural phenomena occurring in ecosystems**	**(GC) the directions of development of the methods and technologies used in reclamation and remediation processes**	**(GC) the latest methods and technologies used in reclamation and remediation processes**
		The determinants of using reclamation and remediation methods		**(GC) the principles of conducting reclamation and remediation processes resulting from the specificity of the ecosystem**	**(GC) the conditions for using a given method for reclamation and remediation, including technical possibilities and limitations, the limitations resulting from local conditions and the specificity of the ecosystem**	**(GC) the principles of adapting reclamation and remediation methods to specific conditions, including local conditions, the specificity of the ecosystem and available technical solutions**		
		Products used in reclamation and remediation	the types of products used in reclamation and remediation processes, including trade names, types of packaging, labelling; the types of certificates, labels and standards verifying the environmental performance and safety of materials and substances used in reclamation and remediation; the environmental impact of products used in reclamation and remediation	**(GC) the operation, conditions of use, side effects and risks associated with the products used in reclamation and remediation processes**	**(GC) the chemical composition of the products used in reclamation and remediation processes;** **(GC) the way the products used in reclamation and remediation processes affect the ecosystem, including the way they react with other substances**	**(GC) the long-term benefits and consequences of the influence of a given product on the ecosystem**	**(GC) the directions of development of the products used in reclamation and remediation processes**	**(GC) the latest solutions relating to the products used in reclamation and remediation processes**
		Formal and legal requirements for reclamation and remediation		the principles of conducting reclamation and remediation processes pursuant to permits, authorisations, other administrative decisions and agreements in place	the legal regulations defining the conditions for the implementation and course of reclamation and remediation processes; the legal regulations on the use of products in reclamation and remediation processes	**(GC) the current conditions of national, European and global environmental policies relating to reclamation and remediation processes**	**(GC) the directions of change in national, European and global environmental policies relating to the implementation of reclamation and remediation processes**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	knows and understands...	**The principles of obtaining permits, authorisations and other administrative decisions**	the types of permits, authorisations and other administrative decisions required for reclamation and remediation processes	the procedures for obtaining permits, authorisations and other administrative decisions for reclamation and remediation processes; the course of the administrative proceedings relating to activities implemented in reclamation and remediation	the legal regulations on obtaining permits, authorisations and other administrative decisions required for reclamation and remediation processes			
		Irregularities in reclamation and remediation processes		the types and causes of irregularities in reclamation and remediation processes; the types of measures preventing irregularities in reclamation and remediation processes; the types of remedial actions in the event of irregularities in reclamation and remediation processes	the impact of irregularities occurring during reclamation and remediation processes on their course and effectiveness			
		Effectiveness of reclamation and remediation processes		**(GC) the types of factors influencing the effectiveness of reclamation and remediation processes**	**(GC) the impact of external factors, including anthropogenic ones, on the effectiveness of reclamation and remediation processes**	**(GC) the methods of measuring the effectiveness of remediation and reclamation, the criteria for assessing the effectiveness of reclamation and remediation processes**	**(GC) the directions of development of the methods used to increase the effectiveness of reclamation and remediation processes**	
		Costs of reclamation and remediation activities	the types of costs in implementing reclamation and remediation, including the costs of monitoring the results of reclamation and remediation	the cost components of reclamation and remediation activities, e.g., to conduct field studies and laboratory tests, apply specific methods, monitor results; the principles of calculating the costs of reclamation and remediation activities, e.g., testing, in-situ and ex-situ remediation and others, monitoring results	the principles of financially optimising reclamation and remediation activities, e.g., testing, in-situ and ex-situ remediation and others, monitoring results	the methods for assessing and managing financial risks relating to environmental factors in reclamation and remediation; the methods for ensuring the long-term profitability of investments in reclamation and remediation; the financial mechanisms supporting reclamation and remediation activities, e.g., subsidies, funds, discounts		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	knows and understands...	**Managing the waste generated by reclamation and remediation processes**	**(GC) the principles of handling waste generated by reclamation and remediation processes not posing a threat to the environment, human life and health**	**(GC) the principles of handling waste generated by reclamation and remediation processes containing pollutants that may pose a threat to the environment, human life and health;** **(GC) the application of the by-products of reclamation and remediation processes in other industries**	**(GC) the legal regulations specifying the rules for handling waste generated by reclamation and remediation processes;** **(GC) the possibilities and conditions, including the technical, economic, organisational and legal ones, for using waste generated by reclamation and remediation processes**	**(GC) the benefits and consequences of particular methods of managing waste generated by reclamation and remediation processes**	**(GC) the directions of development of reusing waste generated by reclamation and remediation processes**	**(GC) the innovations relating to the technologies of processing and reusing waste generated by reclamation and remediation processes**
		Using waste generated by other industries		**(GC) the use of waste generated by other industries in reclamation and remediation processes**	**(GC) the possibilities and conditions, including the technical, economic, organisational and legal ones, for the use of waste generated by other industries in reclamation and remediation processes;** **(GC) the legal regulations specifying the conditions for using waste in reclamation and remediation processes**	**(GC) the benefits and consequences of using waste generated by other industries in reclamation and remediation processes**	**(GC) the directions of development of using waste generated by other industries in reclamation and remediation processes**	**(GC) the innovations relating to the use of waste generated by other industries in reclamation and remediation processes**
	is able to...	**Setting and assessing the achievement of reclamation and remediation objectives**		monitor the achievement of the stated objectives of reclamation and remediation processes, including the interim objectives of the individual stages of reclamation and remediation	assess the degree of achievement of the stated objectives of reclamation and remediation processes, including the risk of non-performance and selection of corrective actions	define the objectives of reclamation and remediation processes, including the interim objectives of the individual stages of reclamation and remediation; define the indicators and achievement criteria for the objectives of reclamation and remediation		
		Planning the use of polluted and degraded sites			**(GC) analyse the possibilities of managing polluted or degraded ecosystems**	**(GC) develop a concept for the management and use of a polluted or degraded ecosystem, including in situations when reclamation and remediation are abandoned**		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	is able to...	**Assessing the feasibility of reclamation and remediation processes**		reach agreement on the organisational, technological and financial conditions for implementing reclamation and remediation processes	analyse the potential of reclamation and remediation, including determining the possibility of using a given method; assess the formal and legal conditions, including those relating to the terrain and legal status, in terms of the possibility of implementing reclamation and remediation	develop technical and economic analyses for reclamation and remediation processes	**(GC) develop a feasibility study for reclamation and remediation processes**	
		Analysing the risk in reclamation and remediation processes	identify the factors influencing the effectiveness and feasibility of the reclamation and remediation process, e.g., difficulties resulting from geological conditions, changes in the weather	assess the risk factors limiting the feasibility and effectiveness of ex-situ reclamation and remediation processes, resulting, among others, from ecosystem characteristics, land management practices, weather phenomena	assess the risk factors limiting the feasibility and effectiveness of in-situ reclamation and remediation processes, resulting, among others, from ecosystem characteristics, land management practices, weather phenomena	plan activities to minimise the risk factors limiting the feasibility and effectiveness of reclamation and remediation processes, including the planning of alternative solutions		
		Analysing the impact of remediation and reclamation processes on the ecosystem			**(GC) assess the impact of reclamation and remediation processes on a given ecosystem and dependent ecosystems (e.g., outflow of surface water, the impact of pollutants on a reservoir)**	**(GC) diagnose the course of the natural processes taking place in the ecosystem after reclamation and remediation activities;** **(GC) analyse the consequences of not implementing reclamation and remediation processes**	**(GC) forecast the long-term effects of implementing or not implementing reclamation and remediation processes, including forecasting the course of natural processes, forecasting changes in the ecosystem**	
		Selecting technologies		select the devices and equipment for reclamation and remediation processes; select the products required to perform reclamation and remediation	select reclamation and remediation methods (based on testing, diagnosis, established reclamation and remediation objectives)	adapt reclamation and remediation methods in accordance with the objectives of reclamation, remediation, soil and water conditions, type of pollution as well as organisational, financial and social conditions	**(GC) modify the methods and technologies required for reclamation and remediation processes and implement solutions from other fields**	**(GC) develop new methods of reclamation and remediation**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	is able to...	**The logistics of reclamation and remediation processes**		plan activities for the provision, transport, handling and storage of equipment, products and other resources needed for typical reclamation and remediation processes	plan activities for the provision, transport, movement and storage of equipment, products and other resources needed for non-routine reclamation and remediation processes or performed under particularly difficult conditions	establish a schedule of activities to be implemented in reclamation and remediation processes, taking into account variable and not fully predictable conditions resulting from the characteristics of ecosystems, the variability of weather phenomena and the dynamics of natural phenomena; modify schedules in the event of irregularities and disruptions in reclamation and remediation processes		
		Implementing reclamation and remediation processes		monitor the tasks implemented by employee teams, external entities, services, etc. in reclamation and remediation processes	analyse and assess the course of reclamation and remediation processes	coordinate the activities of employee teams, external entities, services, etc. implementing tasks in reclamation and remediation processes or conducting other activities in the sites undergoing reclamation and remediation		
		Identifying irregularities in the course of reclamation and remediation processes		identify irregularities in performed reclamation and remediation processes; implement measures to minimise the effects of irregularities in reclamation and remediation processes	analyse the types and causes of irregularities in reclamation and remediation processes; assess the risk of irregularities occurring in the reclamation and remediation process	plan activities to minimise the effects of irregularities in reclamation and remediation processes	solve the complex, non-routine problems occurring in reclamation and remediation processes	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	is able to…	**Analysing the effectiveness of reclamation and remediation processes**	identify the types of costs of the activities implemented in reclamation and remediation processes	estimate the costs of the activities implemented in reclamation and remediation processes	analyse the factors influencing the effectiveness of reclamation and remediation processes, including cost-benefit analyses; **(GC) analyse and assess the effectiveness of various methods used in reclamation and remediation processes, including economic and environmental effectiveness**	select and analyse effectiveness indicators for various methods used in reclamation and remediation processes; **(GC) determine the possibilities and criteria for optimising the effectiveness of reclamation and remediation processes, including economic and environmental criteria**	**(GC) forecast the effectiveness of reclamation and remediation processes, taking into account scenarios of technological and organisational development**	
		Monitoring the results of reclamation and remediation		plan control activities to monitor the results of reclamation and remediation processes; estimate the costs of monitoring the results of reclamation and remediation	assess the level of the duration of the results of reclamation and remediation processes; identify the causes of deterioration in the durability of the results of reclamation and remediation processes and formulate recommendations for remedial actions	establish indicators of the durability of the results of reclamation and remediation processes and the criteria for their achievement		
		Documenting tasks in reclamation and remediation	read and understand the information in instructions, plans and schedules necessary to perform tasks in reclamation and remediation processes	document the tasks performed in reclamation and remediation processes, including observations, measurements, analyses; use the documentation of the reclamation and remediation processes in progress, including projects, technical documentation, results of assessments and analyses, e.g., the assessment of significant risks	prepare and verify the documentation of conducted reclamation and remediation processes, including debriefings, reports, analyses, specifications			
		Obtaining administrative decisions required for reclamation and remediation processes	identify the required permits, authorisations and other administrative decisions required for reclamation and remediation processes, including those relating to waste management	process and develop the data required to obtain permits, authorisations and other administrative decisions for reclamation and remediation processes	prepare the documentation required to obtain permits, authorisations and other administrative decisions for reclamation and remediation processes	negotiate and reach agreement on issues not regulated by law with administrative authorities for the implementation of reclamation and remediation		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
VIII. Planning and implementing reclamation and remediation processes	is able to...	**Planning waste management**		**(GC) choose the method of managing the waste generated by reclamation and remediation processes**	**(GC) plan the management of waste generated by reclamation and remediation processes, taking into account the principles of the circular economy;** **(GC) analyse the rationality of using particular waste management methods and assess their impact on the environment**	**(GC) establish cooperation with cooperants, including representatives of other industries, for the reuse of waste generated by reclamation and remediation processes**	**(GC) analyse the possibility of applying innovations in managing the waste generated by reclamation and remediation processes in accordance with the concept of sustainable development**	
		Planning the use of waste generated by other industries		**(GC) identify the possibilities of obtaining and using waste from other industries in reclamation and remediation processes**	**(GC) analyse the benefits and effects as well as assess the rationality of using waste generated by other industries in reclamation and remediation processes**	**(GC) establish cooperation with representatives of other industries in order to obtain waste for reclamation and remediation processes**	**(GC) analyse the possibility of implementing innovations in the use of waste generated in other industries in reclamation and remediation processes**	
IX. Safety	knows and understands...	**Threats resulting from the implemented technological processes in water and wastewater management**	the threats resulting from the implemented technological processes occurring at the work station and the site of the plant implementing water and wastewater management operations	**(GC) the types and causes of threats to the safety of people, property and the environment occurring in water and wastewater management operations**	**(GC) the impact of the occurrence of threats in water and wastewater management operations, e.g., water supply system failures, sewage treatment plant failures, on the course of the technological process, the surroundings or the environment**	**(GC) the long-term effects on the surroundings or the environment of the threats in water and wastewater management processes, including the effects of failing to act**		
		Threats to people, property and the environment from implementing reclamation and remediation processes	the threats resulting from the implemented technological processes occurring at the work station and site of reclamation and remediation activities	**(GC) the types and causes of threats to the safety of people, property and the environment occurring during reclamation and remediation processes**	**(GC) the impact of implementing or not implementing reclamation and remediation processes on human health and life as well as on the safety of property and the environment**	**(GC) the long-term effects on the environment, human life and health resulting from implementing or not implementing reclamation and remediation processes, including the effects of failing to act**		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IX. Safety	is able to...	**Threats arising from contact with pollutants and other harmful substances**		the threats resulting from contact with pollutants and other harmful substances found in water, soil, sewage and waste from the processes of water and wastewater management, reclamation and remediation, e.g., poisoning, contamination	the direct effects on health or life resulting from contact with pollutants and other harmful substances found in water, soil, sewage and waste from the processes of water and wastewater management, reclamation and remediation	the long-term effects on health or life resulting from contact with pollutants and other harmful substances found in water, soil, sewage and waste from the processes of water and wastewater management, reclamation and remediation		
		Measures ensuring the safety of the processes of water and wastewater management, reclamation and remediation	**(GC) the principles and procedures of applying measures to ensure safety during the performance of professional tasks and to reduce threats during the processes of water and wastewater management, reclamation and remediation;** **(GC) the principles and procedures of handling the threats occurring in the processes of water and wastewater management, reclamation and remediation**	**(GC) the principles and procedures of selecting measures to reduce the risk of threats and emergency situations occurring during the processes of water and wastewater management, reclamation and remediation;** **(GC) the principles and procedures for responding to kinetic and cyber threats to the critical infrastructure**	**(GC) the methods of identifying, analysing and minimising the risk of threats and emergency situations occurring in the processes of water and wastewater management, reclamation and remediation, including those resulting from the technologies used**	**(GC) the principles of designing methods, organisational solutions and other measures to reduce the risk of threats and emergencies occurring, including the principle of developing safety plans**		
		The principles of safety in performing work in water and wastewater management, reclamation and remediation	the safety principles and procedures in performing the tasks of water and wastewater management, reclamation and remediation, e.g., performing work in sewerage systems, in explosion hazard zones, near water reservoirs, settling tanks, in a road lane; **(GC) the procedures to be followed in case of an accident at work or a situation posing a threat to the health and life of persons performing tasks or bystanders, property or the environment**	the legal regulations on safety rules for performing work in water and wastewater management, reclamation and remediation				

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IX. Safety	is able to...	**The principles of handling products and samples of pollutants**	**(GC) the symbols placed on labels relating to the safety of applying the products used in the processes of water and wastewater management, reclamation and remediation;** **(GC) the safety principles and procedures of handling the products used in the processes of water and wastewater management, reclamation and remediation**	**(GC) the principles of using, warehousing, storing and transporting the products used in the processes of water and wastewater management, reclamation and remediation;** **(GC) the principles of handling typical pollutants, including pollutant samples or contaminated waste**	**(GC) environmental quality standards and other legal regulations specifying the methods of handling products and pollutants**	**(GC) the principles of handling non-routine, rarely encountered, new types of pollutants**		
	is able to...	**Assessing the risk of threats occurring in the processes of water and wastewater management, reclamation and remediation**		identify possible threats to the safety of people and property relating to the processes of water and wastewater management, reclamation and remediation, e.g., methane micro-explosions, release of harmful aerosols, outflow of harmful substances, accumulation of hydrogen sulphide	assess the risk of threats to human health and life and property in the processes of water and wastewater management, reclamation and remediation activities	**(GC) plan solutions to minimise the occurrence of threats to human health and life, property or the environment in the processes of water and wastewater management, reclamation and remediation activities**	develop and update risk management systems	
		Minimising the threats in reclamation and remediation processes		secure the site where reclamation and remediation processes are being performed and perform activities ensuring the safety of employees, bystanders and property	select the methods of securing the site and other solutions ensuring the safety of employees, bystanders and property during the processes of reclamation and remediation, under routine conditions not posing any threats	select and adapt the methods of securing a site and other solutions ensuring the safety of employees, bystanders and property during the processes of reclamation and remediation under non-routine conditions, particularly difficult ones, or those posing a particular threat to human health or life		

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
IX. Safety	is able to...	**Applying procedures to ensure safety in the processes of water and wastewater management, reclamation and remediation**	implement procedures and use personal protective equipment while performing tasks relating to water and wastewater management, reclamation and remediation	supervise the application of procedures and measures ensuring the safety of employees, bystanders and property while performing tasks relating to the processes of water and wastewater management, reclamation and remediation	implement procedures and use personal and collective protection measures in emergency and unpredictable situations posing a threat to health, life or property, e.g., landslide, water supply system failure, discovering explosives; implement procedures for responding to kinetic and cyber threats in the workplace	develop procedures and other measures to ensure safety while performing the processes of water and wastewater management, reclamation and remediation, including in the event of emergencies and unpredictable situations posing a threat to health, life or property		
X. Communication and cooperation	is ready to...	**Communicating with ecosystem stakeholders**		communicate with residents, local communities, representatives of organisations associating ecosystem stakeholders; work with educational institutions, administrative units and social organisations to develop education on environmental protection; promote water and wastewater recycling	build awareness among stakeholders of the proper use of ecosystems	promote knowledge among stakeholders about conscious, sustainable and responsible water use; raise awareness of the need to repair and maintain infrastructure and the benefits of this		
		Communicating with users of water and sewerage networks	**(GC) inform about the principles of using water and sewerage networks properly, the parameters of supplied water and the ability to consume tap water**	communicate with users of water and sewerage networks	maintain proper relationships with users of water and sewerage networks, including in difficult situations caused by, e.g., failures, interruptions in water supply or sewage collection and other disruptions in the provision of services	maintain relationships, including within the framework of industrial symbiosis, with entities producing wastewater	establish and shape the conditions for cooperation with persons and entities operating in the water and wastewater management sector, including the establishment and development of cooperation within the framework of industrial symbiosis	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
X. Communication and cooperation	is ready to…	**Communicating with investors and principals, representatives of environmental protection organisations, public administration and legislators**		**(GC) communicate with investors and principals, including about the short- and long-term benefits and consequences of conducting or not conducting specific activities in water and wastewater management, reclamation and remediation**	**(GC) maintain relationships with investors and principals regarding the implementation of activities to restore and maintain proper soil and water conditions in a given area as well as in water and wastewater management**	**(GC) maintain relationships with public administration representatives and legislators as well as environmental protection organisations regarding the implementation of activities to protect natural resources and conduct sustainable water and wastewater management**	**(GC) establish and shape the conditions for the cooperation of investors, principals, representatives of public administration, legislators and environmental protection organisations to protect natural resources and maintain appropriate soil and water conditions, as well as to conduct sustainable water and wastewater management**	**(GC) establish and shape the conditions for forming international cooperation to protect natural resources and maintain proper soil and water conditions as well as to conduct sustainable water and wastewater management**
		Cooperation with external entities, services and specialists from other industries		communicate with suppliers, subcontractors, specialists from other industries, public services, public administration and representatives of science	maintain relationships with suppliers, subcontractors, representatives of public services and administration, specialists from other industries, representatives of science	**(GC) work together in the community to promote good practices and implement innovative solutions in planning, performing and assessing reclamation and remediation processes as well as planning and conducting sustainable water and wastewater management;** coordinate and manage projects implemented in cooperation with partners aimed at developing sustainable water and wastewater management methods; identify and develop strategic partnerships with organisations that share similar sustainable development values and goal**s**	**(GC) support the cooperation and integration of the community of entities involved in planning, performing and assessing reclamation and remediation processes as well as planning and conducting sustainable water and wastewater management;** cooperate on behalf of sustainable development with stakeholders, including government agencies, non-governmental organisations, social organisations, businesses and academia	**(GC) initiate and develop cooperation in the community on a national and international scale, for the transfer of innovative solutions in reclamation and remediation as well as water and wastewater management**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
XI. Responsibility for the environment	is ready to…	Care for ecosystems		**(GC) transfer knowledge on the causes and effects of soil and water pollution and on how pollution may be prevented**	**(GC) promote the principles and methods of ecosystem use that support its functioning, maintain the effects of reclamation and remediation, and prevent soil and water pollution;** **(GC) actively support and promote activities on behalf of environmental protection**	**(GC) take actions and promote solutions to support the functioning of ecosystems, including the maintenance of proper soil and water conditions and preventing the pollution of ecosystems**	**(GC) take actions to increase stakeholder awareness of the causes and effects of soil and water pollution, how pollution may be prevented, the importance of reclamation and remediation processes, and the advantages of using methods to support the functioning of ecosystems**	**(GC) shape attitudes on the sustainable use of ecosystems**
		Care for water resources		**(GC) apply the principles that reduce water consumption, including recycling and recovery;** **(GC) apply the principles of sustainable water resource management**	**(GC) promote the principles and methods that help reduce water consumption and promote its reuse**	**(GC) promote attitudes of responsibility towards water resources, including attitudes and ideas supporting sustainable water resource management**	**(GC) promote the importance of sustainable water resource management**	**(GC) shape the conditions to conduct international initiatives for sustainable water resource management, including the protection of global water resources**
		Impact of activities on the environment		promote the organisation's initiatives on behalf of sustainable development, inspiring employees to take it into account in their work and decision-making; **(GC) perform professional tasks, taking into account their impact on the environment, in particular on the equilibrium of ecosystems and water resources**	**(GC) take responsibility for the impact of the processes of water and wastewater management, reclamation and remediation on the environment, in particular on the equilibrium of ecosystems and water resources**	**(GC) adopt priorities relating to environmental aspects when making decisions on planning and implementing activities in water and wastewater management, reclamation and remediation**	promote initiatives that support minimising the organisation's impact on the environment	
XII. Work standards		Effective waste management			**(GC) undertake activities for the effective use of sludge, washings and other waste generated by the processes of water and wastewater management, reclamation and remediation, including the search for new opportunities and technological-organisational solutions**	**(GC) establish and shape the conditions for cooperation in the development and implementation of solutions in the sector for the effective use of sludge, washings and other waste generated by the processes of water and wastewater management, reclamation and remediation**	**(GC) initiate and take actions to popularise solutions for the effective use of sludge, washings and other waste generated by the processes of water and wastewater management, reclamation and remediation**	**(GC) establish and shape the conditions for cooperation in the development and implementation of solutions in the sector for the effective use of sludge, washings and other waste generated by the processes of water and wastewater management, reclamation and remediation**

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
XII. Work standards	is ready to…	**Attentiveness to the quality of performed work**	take into account the impact of how tasks are performed on the course of the processes of water and wastewater management, reclamation and remediation	take into account the impact of how activities are performed and decisions made by oneself and a subordinate team on the correctness of the course and outcome of the processes of water and wastewater management, reclamation and remediation	**(GC) take into account the long-term benefits and consequences for the environment as well as the safety and quality of life of people resulting from the accurate and reliable implementation of activities in the processes of water and wastewater management, reclamation and remediation**	**(GC) perform activities to disseminate the principles of reliability and accuracy in performing tasks in the processes of water and wastewater management, reclamation and remediation**		
		Performing tasks and making decisions under non-routine conditions	undertake activities under difficult conditions, e.g., in the presence of unpleasant odours, noise, harmful biological and chemical factors, enclosed spaces	undertake activities under variable conditions relating to the instability of natural phenomena, including hydrogeological and atmospheric conditions, as well as the dynamics of chemical and biological processes; undertake activities under variable, non-routine conditions resulting from the organisation of work, e.g., work during non-standard hours, shift work, remote work, work in virtual teams, on-call duty	take responsibility for the course of the processes taking place under variable conditions resulting from the instability of natural phenomena, including hydrogeological and atmospheric conditions, and the dynamics of chemical and biological processes	make decisions under variable conditions resulting from the instability of natural phenomena, including hydrogeological and atmospheric conditions, and the dynamics of chemical and biological processes		
		Openness to change			adapt to changes in the work environment resulting from technological progress, including automation and digitalisation; adapt to changes in the work environment relating to the occurrence of exceptional situations in the socioeconomic environment, e.g., pandemic, war	perform activities to better adapt subordinates and co-workers to changes in the work environment	**(GC) undertake activities to increase the openness of the industry community to changes relating to the implementation of new technical and organisational solutions**	

SECTORAL DETERMINANT		COMPETENCE SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
XII. Work standards	is ready to...	**Responsibility for safety**	take into account the impact of the activities conducted on one's own safety and that of one's co-workers; use environmentally friendly technologies that minimise exposure to harmful substances	take responsibility for one's own safety in the performance of professional tasks	take responsibility for the safety of people, property and the environment in planning and supervising the activities conducted in the processes of water and wastewater management, reclamation and remediation	**(GC) make decisions under time pressure and in situations threatening the safety of people, property and the environment in the processes of water and wastewater management, reclamation and remediation**	**(GC) make decisions in high-risk situations relating to a direct threat to human life and health or the possibility of environmental contamination, an ecological, natural or construction disaster**	
		Responsibility for the safety of the water supply and wastewater disposal systems			take responsibility for the proper functioning of the facilities included in the critical infrastructure	make decisions under time pressure and in difficult situations relating to the occurrence of disruptions in the processes of water abstraction, treatment and supply as well as the collection, transport and treatment of wastewater	make decisions in situations posing a threat to the continuity of the water supply, e.g., failures, contamination of water supply networks, natural disasters, cyber attacks	

5. Glossary of terms used in the updated Sectoral Qualifications Framework for Water and Wastewater Management, Reclamation and Remediation

Term	Definition	Reference
Blue-green infrastructure	A multifunctional network of terrain covered with vegetation and water, and solutions based on natural functions, designed and managed in a way that ensures a wide range of ecosystem services	Definition based on https://klimada2.ios.gov.pl/wp-content/uploads/2023/11/Modul-9-2_Zazielenianie-miast-1.pdf This term is used in the updated SQF.
Critical infrastructure	A component, facility, equipment, network, or system, or part of a component, facility, equipment, network, or system, necessary for the provision of water supply and sewerage services	Definition based on Directive 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC.
Ex-situ reclamation and ex-situ remediation	Implementing reclamation and remediation work away from a polluted site, involving the excavation of contaminated soil or water, their relocation and treatment outside the ecosystem	Not only land, but also water reclamation is important in the sector. Ex-situ groundwater remediation methods are used.

Geographic information system (GIS)	Technology used to generate and analyse all types of data, manage it and prepare maps. A GIS system combines data with maps, integrating location data (information about where objects are located) with all types of descriptive information (the characteristics of the objects).	Definition based on geographic information system (GIS), https://www.esri.com/pl-pl/what-is-gis/overview
Industrial symbiosis	Cooperation between companies and other organisations aimed at the optimal use of raw materials, infrastructure, materials, and expertise	Industrial symbiosis involves more elements of exchange. It does not focus solely on raw materials. It is also possible to exchange and share infrastructure or expertise.
In-situ reclamation and in-situ remediation	Implementing reclamation and remediation work at a polluted site	
Nature-based solutions (NBS)	Solutions inspired and supported by nature that are profitable while providing environmental, social, and economic benefits and helping to build resilience	Definition proposed by the European Commission. This concept is found in the updated SQF.
Products	Chemical and biological substances, solutions, mixtures used in water and wastewater management, reclamation and remediation processes, e.g., coagulants, reagents	
Reclamation	Designating or restoring degraded or devastated land to its original utility or natural value through appropriate landscaping, improving its physical and chemical properties, regulating water relations, restoring soils, strengthening slopes, and rebuilding or constructing necessary roads	Pursuant to Art. 4(18) of the Act of 3 February 1995 on the protection of agricultural and forest land (Journal of Laws of 1995, no. 16, item 78).

Remediation	Subjecting soil, land and groundwater to measures designed to eliminate or reduce the quantity of substances causing risk, to control them and to limit their spread, so that the contaminated site no longer poses a threat to human health or the environment, taking into account the current and, as far as possible, planned future use of the site	Pursuant to Art. 3 of the Act of 27 April 2001 – the law on environmental protection (Journal of Laws of 2001, no. 62, item 627).
Resilience	The ability of an entity or community to prevent, protect against, respond to, resist, mitigate, and absorb an incident and adapt and recover from it	Own definition based on Directive 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC.
Stakeholders (relating to water and wastewater management processes)	Persons, communities, companies, organisations, institutions, universities and research units that have an impact on water and wastewater management processes, e.g., contractors, representatives of local authorities, decision-makers, regulators, investors, sub-contractors and landowners, as well as individuals, communities, companies, organisations and institutions that are customers and users of water supply systems and wastewater collection and treatment systems	Stakeholders, particularly in the context of awareness raising, may include people who do not have an interest in the sector.

Stakeholders (relating to reclamation and remediation processes)	Persons, communities, companies, organisations, institutions, universities and research units that have an impact on reclamation and remediation processes, e.g., investors, clients, site owners, decision-makers, regulators, participants or contractors in reclamation and remediation processes, as well as individuals, communities, companies, organisations and institutions that use or benefit from sites subject to reclamation and remediation processes	Stakeholders, particularly in the context of awareness raising, may include people who do not have an interest in the sector.