



MINISTRY OF FOREIGN AFFAIRS  
OF DENMARK



---

# Assistance to the Development of the **Mykolaiv** **Masterplan**

---

Water Supply and Sanitation

Existing Situation, Report

Final

# Assistance to the Development of the **Mykolaiv** **Masterplan**

## Water Supply and Sanitation

## Existing Situation, Report

## Final

Project No.

Document No.

A246262

D3\_Existing situation\_Water\_F1

Version

Date Of Issue

Description

Prepared

Checked

Approved

2

2023-10-24

Existing situation

VP, CIVY

TEKB

JKP

# Contents

1	Introduction .....	1
2	Description of the Project Area .....	3
3	Existing situation, Water supply .....	5
3.1	Population and Water Demand projection .....	5
3.2	Overall water supply situation, End 2021 and End 2023 .....	8
3.3	Raw water sources, End 2021 and End 2023 .....	9
3.4	Raw water sources, Options under investigations .....	10
3.5	Water treatment, storage and distribution .....	11
3.6	Non-revenue water .....	14
3.7	Operation and maintenance .....	16
3.8	Current and planned activities for improvement of the situation .....	17
3.9	Water supply, Overall needs assessment .....	20
4	Existing situation, Wastewater .....	21
4.1	Discharge and connections, Selected data .....	21
4.2	Overall sewerage situation .....	21
4.3	Overall wastewater treatment systems situation, End 2021 and End 2023 .....	26
4.4	Environmental considerations .....	31
4.5	Operation and maintenance .....	32
4.6	Current and planned activities for improvement of the situation .....	32

## List of Appendices

Appendix A	Detailed data on water supply and sewerage networks.....	34
Appendix B	Form No. 6 NKREKP .....	35
Appendix C	Layouts.....	39

## List of Figures

Figure 2-1	Project Area.....	3
Figure 3-1	General layout of the water supply infrastructure in Mykolaiv.....	8
Figure 3-2	Water intake at Dnipro River.....	9
Figure 3-3	Water Treatment Plant (general layout) .....	12
Figure 3-4	Water Balance 2021 .....	16
Figure 4-1	Natural catchment areas with contour lines of Mykolaiv's urban area .....	22
Figure 4-2	Schematic layout of the existing sewerage system (with main pumping stations) ....	24
Figure 4-3	General layout of the WWTP .....	29

## List of Tables

Table 3-1	Projection of population and water demand - Summary.....	6
Table 3-2	Water intake and distribution .....	9
Table 4-3	Centralized water supply system connections .....	14
Table 4-1	Wastewater discharge.....	21
Table 4-2	Sludge quantities must be disposed or can be re-used after the indicated Phases of rehabilitation: .....	31
Table 4-3	Achievable effluent standards after each Phase of Rehabilitation vs. EU Discharge Standards (Council Directive 91/271/EEC).....	32

## List of Abbreviations

<b>BOD</b>	Biological oxygen demand
<b>COD</b>	Chemical oxygen demand
<b>CAPEX</b>	Capital expenditures
<b>DS sludge</b>	Dried Stabilized Sludge
<b>DSanPiN</b>	State Sanitary Rules and Standards
<b>DSIF</b>	Danida Sustainable Infrastructure Fund
<b>EC</b>	European Commission
<b>EIB</b>	European Investment Bank
<b>EU</b>	European Union
<b>GFA</b>	GFA Consulting Group
<b>GRP-liners</b>	Glass Reinforced Plastic liners
<b>ICRC</b>	International Committee of the Red Cross
<b>MCA</b>	Mykolaiv City Administration
<b>MFA</b>	Ministry of Foreign Affairs
<b>MPN</b>	Most probable number
<b>MVK</b>	Mykolaivvodokanal
<b>NKREKP</b>	National Commission for State Regulations of Energy and Public Utilities
<b>NRW</b>	Non-Revenue Water
<b>OPEX</b>	Operation expenditures
<b>PS</b>	Pumping station
<b>RO</b>	Reverse osmosis
<b>SCADA</b>	System of Control and Data Acquisition
<b>SS</b>	Suspend solid
<b>TA SP</b>	Technical Assistance Support Provider
<b>TEM</b>	Transient electromagnetic
<b>UMIP</b>	Ukraine Municipal Infrastructure Programme
<b>WTP</b>	Water treatment plant
<b>WWTP</b>	Wastewater treatment plant
<b>WSPS</b>	Water supply pump station

# 1 Introduction

This report has been developed within the framework of the project “Technical advice to the Danish Ministry of Foreign Affairs regarding Mykolaiv - Denmark partnership” financed by the Danish Ministry of Foreign Affairs (MFA). COWI has been entrusted the development of contributions to the masterplan regarding water, energy and solid waste. The masterplan concerns the Mykolaiv City and its development in the period till 2050 (throughout this report Mykolaiv City and Mykolaiv as well as City of Mykolaiv are used synonymously).

*Box 1-1 COWI's contribution to the Mykolaiv Masterplan.*

Mykolaiv Masterplan, which has been requested by the Mayor of Mykolaiv City, has a time horizon till 2050. It provides a compass for actions to be taken by the Mykolaiv City to ensure that it will develop into a thriving city attractive to its citizens and business community.

COWI and One Works assist Mykolaiv City Administration in developing the masterplan. In this work, COWI focuses on three sectors:

- Water and wastewater
- Energy, including power, district heating and renewable energy sources.
- Solid waste management.

Mykolaiv City Administration meets every week with COWI and One Works to ensure proper coordination.

COWI has established a project organization consisting of a project management team and three sector teams of professionals, each headed by a Discipline Leader. Three sectoral Focal Points are responsible for monitoring cross-cutting activities, ensuring coordination between the parties and maintaining consistency in the deliverables.

To enhance transparency in the development of the Mykolaiv Masterplan, given its significant public interest and exposure, COWI has established three sector-specific Sounding Boards inviting all potentially interested parties to take part in these.

The report focuses on analysis of the present situation in water supply and wastewater (throughout this report sanitation and wastewater are used synonymously) in the City of Mykolaiv. The detailed assessment of the existing situation in water supply and sanitation in Mykolaiv provides the helicopter view on the situation that provides the ground to the development of the vision and road map for the reconstruction of the water supply and sanitation sector in Mykolaiv.

As the part of the existing situation MVK has provided the information regarding identified specific areas that are in urgent need of reconstruction or replacement. To address these concerns, the City of Mykolaiv, in collaboration with MVK and COWI aims to compile a Priority Investment Programme (PIP) highlighting the critical investment requirements. Consequently, the City of Mykolaiv has sought assistance from the Danish Government to prepare this prioritized water and wastewater infrastructure project as part of the Masterplan, with the aim of securing financing for the initiative.

Currently, the City of Mykolaiv, in collaboration with MVK, is actively engaged in the execution of several urgent projects. A few projects are also at the preparatory stage of development and planning. We might not cover all the projects, therefore the tables outlining the projects might not be exhausted.

To evaluate the existing situation COWI has had consultations with experts from the MVK as well as French consultancy company EGIS, acting as Technical Assistance Support Provider (TA SP) to Mykolaiv City under the Ukraine Municipal Infrastructure Program (UMIP), a program, which was launched in 2016 by the Ukrainian Government and the EIB. As for EGIS, it has since 2022 been conducting a project on raw water sources in Mykolaiv City and Oblast and finalized Multi-Criteria Analysis Report. Feasibility Study for Mykolaiv Water Supply<sup>1</sup> (It is mentioned throughout this report as EGIS report). The work of GFA financed by ICRC that has launched its research mission in water sector in Mykolaiv, has been assessed as well.

The present report consists of four chapter, including the current introduction.

Chapter 2 provides the description of the project area under analysis. That is the City of Mykolaiv and the areas are serviced by Mykolaivvodokanal.

Chapter 3 gives the detailed assessment of the existing situation in water supply. It describes the present condition of the water supply infrastructure – that is raw water source, water intake along with water treatment and water supply distribution in the city.

Chapter 4 focuses on the detailed assessment of the existing situation in wastewater. It presents the detailed condition of the wastewater infrastructure in Mykolaiv – wastewater treatment plant, sewage system, wastewater treatment.

Annexes collects the maps, documents provided by MVK for the performing of this analysis and additional relevant information necessary to presents the existing situation on the water supply and sanitation sector in Mykolaiv. Some documents in the Annexes stay in Ukrainian.

---

<sup>1</sup> Multi-Criteria Analysis Report. Feasibility Study for Mykolaiv Water Supply, EGIS, 2023-02-06

## 2 Description of the Project Area

The City of Mykolaiv, serving as the administrative centre of the Mykolaiv region, is a prominent urban area in Ukraine with a population of approximately half a million residents, as per the official statistical data prior to the conflict. It holds the rank of the ninth largest city in the country and plays a significant role in business, politics, and culture within the southern region of Ukraine. Geographically, the City of Mykolaiv functions as a separate administrative district (Rayon) within the larger Mykolaiv Oblast. Positioned at coordinates 46°58'30"N 31°59'42"E, it lies 65 km inland from the Black Sea, situated along the estuary of the Pivdennyi Buh River, where it converges with the Inhul River. The hydrographical characteristics of the Inhul and Pivdennyi Buh Rivers result in intricate and meandering courses, particularly before their junction in the northeast corner of Mykolaiv. Consequently, this has given rise to multiple elongated and narrow peninsulas immediately north of Mykolaiv, while the central part of the city itself occupies a peninsula formed by a sharp 180-degree bend in the Pivdennyi Buh River.

Mykolaivvodokanal also known as MVK, represents a publicly owned utility enterprise under the sole ownership of the City. MVK assumes responsibility for supplying water and managing sewerage services in the City of Mykolaiv. Given the scarcity and inferior quality of local groundwater resources, the City relies on the abstraction of raw water from the Dnipro River in Mikilske village, located in the Kherson Oblast. This raw water is then transported over a distance of 73 km to Mykolaiv through two steel water mains. Upon arrival, the water is treated to comply with national water supply standards and subsequently distributed to consumers. As for wastewater management, the City collects the wastewater, subjecting it to partial treatment (limited due to the deteriorating infrastructure), and currently discharges it into Pivdennyi Buh River, failing to meet the prescribed parameters outlined in the national wastewater discharge regulations.

The service area of the MVK is presented below at the map.

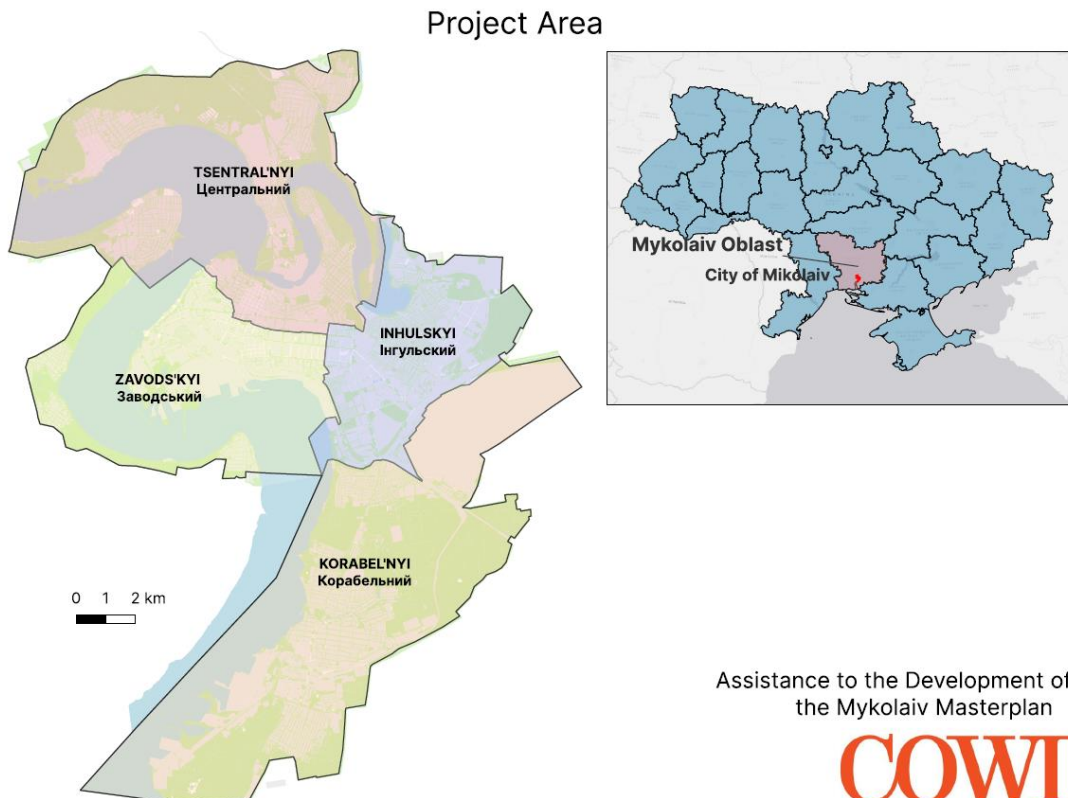


Figure 2-1 Project Area

The City of Mykolaiv encompasses a total area of 260 sq. km, accommodating a population density estimated at approximately 1,959 individuals per sq. km. Structurally, the city is divided into four distinct districts, each with its respective land area as follows:

- Tsentralny District: Covering an area of 79.5 sq.km
- Inhulskiy District: Encompassing 32.7 sq.km
- Zavodsky District: Extending across 52.7 sq.km
- Korabelny District: Spanning an area of 87.9 sq.km.

### 3 Existing situation, Water supply

This chapter focuses on the water supply infrastructure in Mykolaiv, assesses water demands based on the current population situation, provides technical overview of the water treatment, water supply network, raw water sources in Mykolaiv and analyses the current needs in the sector of water supply in the City of Mykolaiv.

#### 3.1 Population and Water Demand projection

As of the beginning of 2021, the total population of the City of Mykolaiv stood at 466,049 individuals, including the settlements within the agglomeration, which totalled 484,691 people. Access to potable water was provided to 401,312 individuals, corresponding to a coverage rate of approximately 82.8%. However, the population of the City of Mykolaiv suffered a significant impact in 2022 due to the activities of the ongoing war, resulting in a considerable exodus of refugees and a dramatic decrease in the number of inhabitants. Since the commencement of the war, no official data regarding the current population has been published, with estimates primarily relying on refugee numbers.

Given the uncertainties associated with the ongoing military operations, which impede the formulation of well-founded projections for the future development of the city and related urban planning activities, making long-term forecasts for infrastructure development is challenging and entails risks. Consequently, the following assumptions for the time horizon of 2050 can be proposed.

The projection for the period leading up to 2050 is determined through calculations based on assumptions of population growth in the City of Mykolaiv. This projection has received support from the local authorities of Mykolaiv. However, even under this projection, the total population is not expected to reach the pre-war figures recorded in 2021 (466,049 people), with, for example, an estimated total population of 444,642 people by 2033.

For the water demand projection, the water balance established by EGIS represents the data before the war and have been used to calculate the water demand. The existing water balance serves as the basis, which is a report provided by MVK (Form No. 6-NKREKP – [Appendix B](#)) as input data for the projected water balance in the years 2033 and 2050. The planned water intake capacity for the Mykolaiv city area is 160,000 m<sup>3</sup>/day by 2033, and 230,000 m<sup>3</sup>/day by 2050.

Table 3-1 Projection of population and water demand - Summary

POSITION	UNITS	2021			2033			2050		
<b>1. Population</b>										
Mykolayiv City Population	no.		466 049		444 642		509 142			
Total population in CVK Water Supply Area (incl. 3 rural localities)			484 691		462 428		534 599			
Registered Population Consumers	no.		401 312		448 555		523 907			
Registered Connection Rate	%		82,8		97,0		98,0			
Unregistered Connected Population, incl. standpipes and	no.		4 847		4 624		5 346			
Unregistered Connection Rate	%		1,0		1,0		1,0			
Total Estimated Connected Population	no.		406 159		453 179		529 253			
Total Estimated Connection Rate	%		83,8		98,0		99,0			
<b>2. Water Abstraction</b>										
TOTAL Water Abstracted	10 <sup>6</sup> m <sup>3</sup> /yr		41,95		48,83		68,59			
	m <sup>3</sup> /d		114 932		133 781		187 918			
Percapita Abstraction (Registered connections)	l/pers/d		286		298		359			
<b>3. Water Losses at Abstraction Facilities</b>										
<b>3.1 Unbilled Authorised Consumption (Technological Use)</b>	10 <sup>6</sup> m <sup>3</sup> /yr		2,25		2,26		3,18			
	m <sup>3</sup> /d		6 164		6 200		8 700			
% of Total Water Abstracted	%		5,4		4,6		4,6			
<b>3.2 Apparent Water Losses due to metering inaccuranc</b>	10 <sup>6</sup> m <sup>3</sup> /yr		0,90		0,90		0,80			
	m <sup>3</sup> /d		2 466		2 466		2 192			
% of total water abstracted	%		2,1		1,8		1,2			
<b>3.3 Real Water Losses</b>	10 <sup>6</sup> m <sup>3</sup> /yr		1,74		2,10		2,00			
	m <sup>3</sup> /d		4 767		5 753		5 479			
% of Total Water Abstracted	%		4,1		4,3		2,9			
<b>3.4 Water Losses Apparent + Real</b>	10 <sup>6</sup> m <sup>3</sup> /yr		2,64		3,00		2,80			
	% of Total Water Abstracted		6,30		6,10		4,10			
<b>3.5 Total Water Losses at Abstraction Facilities(Authorised Ubilled Consumption +Apparent + Real)</b>	10 <sup>6</sup> m <sup>3</sup> /yr		4,89		5,26		5,98			
	m <sup>3</sup> /d		13 397		14 411		16 384			
% of Total Water Abstracted	%		11,7		10,8		8,7			
<b>4. Water Production and System Input</b>										
TOTAL Water Produced and Supplied into the System	10 <sup>6</sup> m <sup>3</sup> /yr		37,06		43,57		62,61			
	m <sup>3</sup> /d		101 534		119 370		171 534			
Percapita System Input (Registered connections)	l/pers/d		253		266		327			

POSITION	UNITS			
		2021	2033	2050
<b>5. Revenue Water</b>				
Total Billed Authorised Consumption	10 <sup>6</sup> m <sup>3</sup> /yr	25,55	31,22	47,05
Average Daily Billed Authorised Consumption	m <sup>3</sup> /d	70 000	85 534	128 904
Percapita Total Billed Authorised Consumption	<b>l/pers/day</b>	<b>174</b>	<b>191</b>	<b>246</b>
Domestic Billed Authorised Consumption	10 <sup>6</sup> m <sup>3</sup> /yr	19,06	22,92	30,60
	m <sup>3</sup> /d	52 219	62 798	83 825
Percentage of Total	%	74,6	73,4	65,0
Per Capita Billed Authorised Consumption (connected)	<b>l/pers/d</b>	<b>130</b>	<b>140</b>	<b>160</b>
Industrial Consumption	10 <sup>6</sup> m <sup>3</sup> /yr	5,47	7,00	14,10
	m <sup>3</sup> /d	14 986	19 178	38 630
	%	21,4	22,4	30,0
Budget organizations	10 <sup>6</sup> m <sup>3</sup> /yr	1,02	1,30	2,35
	m <sup>3</sup> /d	2 795	3 562	6 438
	%	4,0	4,2	5,0
<b>6. Non-Revenue Water in Distribution System</b>				
<b>6.1. Unbilled Authorised Consumption (Technological Use)</b>	10 <sup>6</sup> m <sup>3</sup> /yr	2,99	3,25	4,45
	m <sup>3</sup> /d	8 192	8 900	12 200
% of total system input	%	<b>8,1</b>	<b>7,5</b>	<b>7,1</b>
<b>6.2 Apparent Water Losses</b>	10 <sup>6</sup> m <sup>3</sup> /yr	3,18	2,86	2,53
	m <sup>3</sup> /d	8 713	7 835	6 931
% of system input volume	%	<b>8,6</b>	<b>6,6</b>	<b>4,0</b>
6.2.1 Losses due to metering inaccuracies	%	6,7	6,0	4,0
	10 <sup>6</sup> m <sup>3</sup> /yr	2,81	2,60	2,50
	m <sup>3</sup> /d	7 699	7 123	6 849
6.2.2 Water losses due to unauthorised consumption	10 <sup>6</sup> m <sup>3</sup> /yr	0,37	0,26	0,03
	m <sup>3</sup> /d	1 014	712	82
% Unauthorised consumption	%	1,0	1,0	1,0
<b>6.3 Real Water Losses</b>	10 <sup>6</sup> m <sup>3</sup> /yr	5,34	6,24	8,58
	m <sup>3</sup> /d	14 630	17 100	23 500
% of system input volume	%	<b>14,4</b>	<b>14,3</b>	<b>13,7</b>
<b>6.4 Total Water Losses (Apparent + Real)</b>	10 <sup>6</sup> m <sup>3</sup> /yr	8,52	9,10	11,11
	m <sup>3</sup> /d	23 342	24 932	30 438
% of system input volume	%	<b>23,0</b>	<b>20,9</b>	<b>17,7</b>
% of abstracted water	%	20,3	18,6	16,2
<b>Total Non-Revenue Water in Networks (Apparent + Real + Unbilled Authorised Consumption)</b>	10 <sup>6</sup> m <sup>3</sup> /yr	11,51	12,35	15,56
	m <sup>3</sup> /d	31 534	33 836	42 630
% of system input volume	%	31,1	28,3	24,9
% of abstracted water	%	27,4	25,3	22,7
<b>7 Total Non-Revenue Water</b>	10 <sup>6</sup> m <sup>3</sup> /yr	16,40	17,61	21,54
	m <sup>3</sup> /d	44 932	48 247	59 014
<b>% of Abstracted Water</b>	%	<b>39,1</b>	<b>36,1</b>	<b>31,4</b>

Source: MVK, EGIS report

Based on the above data, it is apparent that the data is based on the situation before the war and therefore the NRW is likely to be unreliable. The data set is in a need of a thorough review to check the adequacy of the calculations as the water balance is based on many estimates and without a hydraulic model or any on-site measurements (night-flow measurements, pressure measurements, flow measurements etc.) due to the ongoing situation.

Additionally, COWI, in collaboration with OneWorks, is presently conducting an in-depth population projection and socio-economic analysis. This study may yield findings that differ from the aforementioned research.

### 3.2 Overall water supply situation, End 2021 and End 2023

The overall water supply situation in Mykolaiv is characterized by the provision of drinking water to a significant portion of the population. Raw water is sourced from the Dnipro River and treated to meet national water supply standards before being distributed to consumers. However, the city faces challenges due to the scarcity and low quality of local groundwater resources. Efforts are made to ensure access to potable water, although specific details about coverage rates or infrastructure conditions are not provided in the given information. A general overview of the water supply system is shown below, and a more detailed layout is presented in the [Appendix C](#).

General Layout of the Water Supply Infrastructure in Mykolaiv

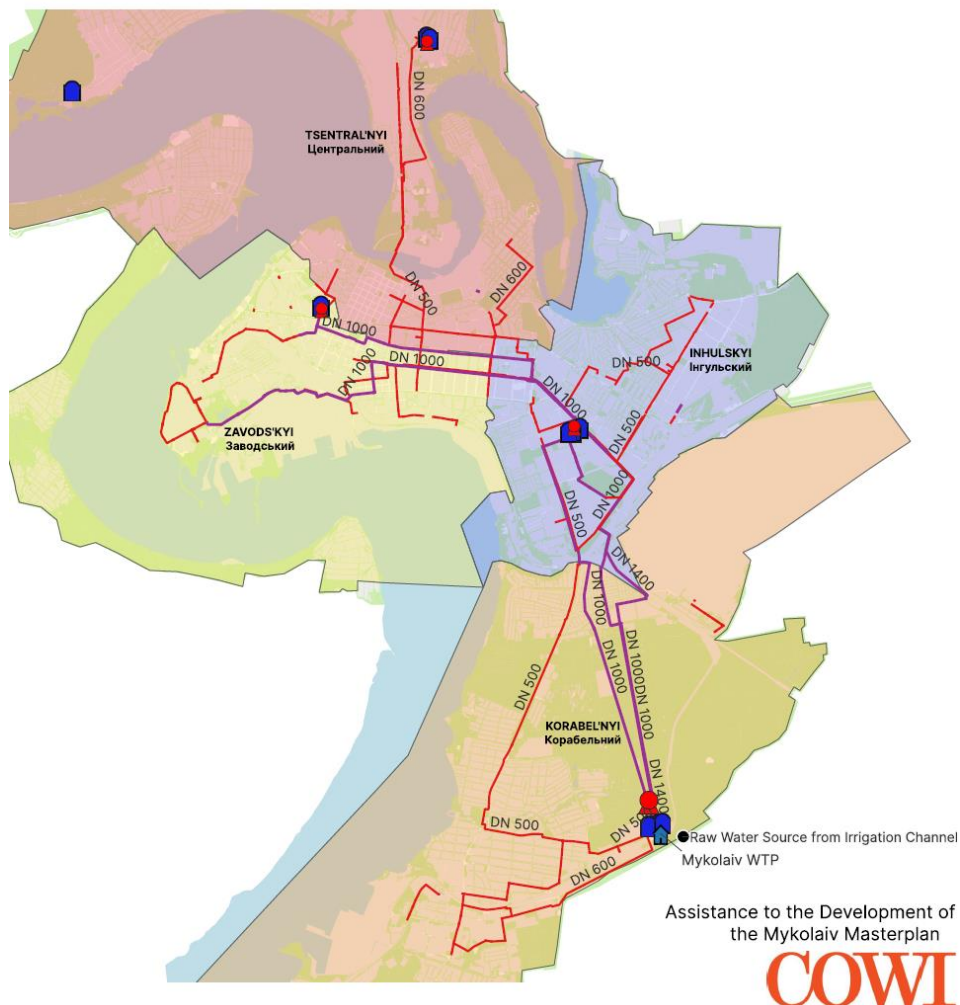


Figure 3-1 General layout of the water supply infrastructure in Mykolaiv

Table 3-2 Water intake and distribution

No	Parameter – yearly production	2020	2021	2022
1	Water intake, thousand m <sup>3</sup>	44,610.36	42,065.77	26,059.57
2	Water supplied to network, thousand m <sup>3</sup>	33,866.54	32,542.06	21,980.01

Source: MVK, EGIS report

### 3.3 Raw water sources, End 2021 and End 2023

Prior to the onset of military operations in Ukraine, the water supply system in the city of Mykolaiv consisted of a surface water intake from the Dnipro River near Mykilske village in the Kherson region. Additionally, the system included underground water intakes from six artesian wells located within various neighbourhoods of Mykolaiv and the Kherson region. The underground water intakes provided water for both domestic and industrial purposes, as well as for the operational needs of the local utility enterprise MVK without requiring additional purification or disinfection.

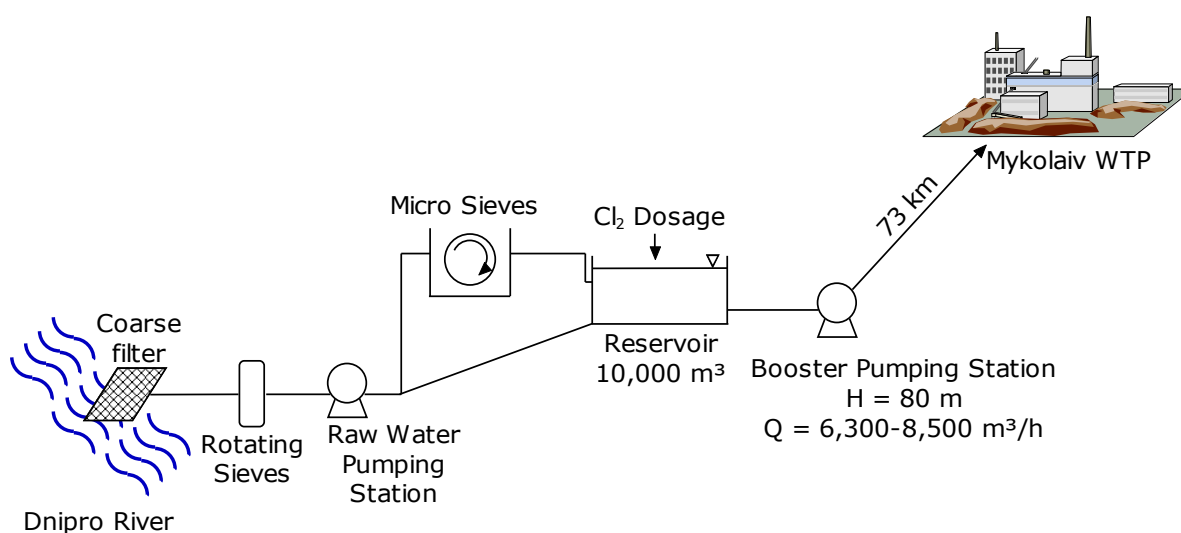


Figure 3-2 Water intake at Dnipro River

Note: At the moment Rotating sieves and Micro sieves units are out of operation. Raw water pumping station is "0-Stage WSPS" and Booster pumping station is 1<sup>st</sup> –Stage WSPS.

Source: MVK.

Following the initiation of armed aggression by the Russian Federation, the water supply system faced significant changes. On April 12, 2022, the Dnipro-Mykolaiv water main, serving as the sole source of drinking water for the city, was destroyed during hostilities near Kiselyvka village in the Kherson region. Consequently, the entire population of approximately 500,000 residents faced a critical humanitarian crisis due to the absence of a centralized supply of drinking water.

Through the efforts of the city authorities and MVK the centralized water supply was partially restored, providing technical water. This helped alleviate the challenging situation faced by the local population concerning their sanitation needs. However, the supply of drinking water remained limited and relied on imported water, mobile reverse osmosis units, and the support of humanitarian organizations and missions.

Unfortunately, the technical water, which had a high salt content, led to accelerated corrosion of steel pipelines and shut-off valves within the centralized water supply system, as they were not designed for operation under such conditions. To address the needs of the centralized water

supply, MVK reactivated wells that were initially installed in 1986 after the Chernobyl Nuclear Power Plant accident.

Following the liberation of the right-bank part of the Kherson region from the Russian invaders, the supply of raw water from the Dnipro-Mykolaiv water intake was partially restored, and MVK briefly resumed supplying fresh water to the centralized water supply system. However, on June 6, 2023, the Russian invaders maliciously destroyed the dam of the Kakhovsky reservoir, resulting in a large-scale man-made catastrophe with ongoing consequences that are yet to be fully assessed.

This disaster severely impacted the Dnipro-Mykolaiv water intake plants, leading to the complete cessation of their operation. As an alternative, MVK was compelled to rely on technical water supply from the Inhulets irrigation system (previously used to fill the Zhovtneve Reservoir until 2006) and the Pivdennyi Buh River. However, the quality of the raw water does not meet the standards required for purification to produce drinking water at the existing water treatment plants in Mykolaiv.

Consequently, the current water supply conditions in Mykolaiv have necessitated the diversification of raw water sources to meet the city's needs.

### **3.4 Raw water sources, Options under investigations**

With the objective of diversifying the sources of raw water and ensuring a reliable water supply for the City of Mykolaiv in light of the threat posed by the Russian invasion of Ukraine, MVK and the City of Mykolaiv have sought technical assistance from the European Investment Bank (EIB) under the UMIP-2 Project. This assistance aims to develop and implement a sustainable long-term solution.

The purpose of this assignment is to prepare a Feasibility Study, which includes analysing of the most cost-effective and secure solution for the city's water supply. It involves determining the location(s) of water intake(s) through a comparison of operational and capital expenditures (OPEX/CAPEX), conducting cost analyses with detailed specifications for the selected option, developing a preliminary design, and generating a comprehensive set of relevant documents. These documents encompass climate vulnerability and environmental impact assessment studies, procurement and implementation plans, and an Allocation Request required for financing the implementation of the chosen solution.

As part of the Feasibility Study, a Multi-Criteria Analysis Report has been prepared by the Consultant (EGIS). This report assesses the current situation, evaluates the availability of water sources, identifies potential alternative options for the city's water supply, and conducts a multi-criteria assessment of each option. It concludes with a recommendation for the most suitable option. The Feasibility Study Report will provide a comprehensive analysis of technical, financial, environmental, social, climate change, and procurement aspects for the selected option.

To identify an alternative solution for water supply, the Consultant assessed both ground and surface water sources in proximity to the City of Mykolaiv within a radius of approximately 100 km. The following main potential sources of raw water were evaluated:

- The Pivdennyi Buh River, which has the capacity to meet the water demand of the city.
- The Inhul River, which is insufficient to satisfy the water needs of the city.
- The Inhulets River, which can serve as an additional water supply source pending the treatment of mining wastewater from the village of Svystunova.
- The Dnipro River, which has an adequate water quantity and an existing water intake.

- The Buh Estuary, which has sufficient water quantity.
- The reserves of fresh groundwater in the region are inadequate to serve as the primary source of water supply.
- The Zhovtneve Reservoir, which enables the utilization of the existing irrigation system and provides sufficient storage capacity for half a year at least of centralized water supply to the City.

Additionally, Mayor of Mykolaiv Olexander Senkivych has requested recommendations from COWI regarding the prioritized raw water options and possible technical solutions in the view of sustainable water supply in Mykolaiv with the horizon 2050.

Box 3-1

Note from COWI

COWI has developed a Note on future sustainable raw water sources. Draft final was submitted to the Mayor of Mykolaiv 20 October 2023.

Seven raw water options were analyzed based on water quality and quantity, required CAPEX and OPEX.

COWI provided a set of thoroughly analysed recommendations regarding the future sustainable raw water source of Mykolaiv City. The time horizon is 2050. Present challenges and threats are considered.

**The primary goal for the for the strategic planning and foreseeing the raw water source should serve the primary goal – enhance Mykolaiv's water supply resilience.**

- Priority 1 – Providing water reserve by reconstructing of Zhovtneve Reservoir
- Priority 2 – Prompt filling of Zhovtneve reservoir
- Priority 3 – Construction of the new water intake from a new location at Pivdennyi Buh at 40 km mark or 51 km mark.

### 3.5 Water treatment, storage and distribution

By the end of the year 2021, the water treatment, storage, and distribution system of the City of Mykolaiv consisted of the following key elements:

- **Water Treatment Plants:** The city operated water treatment plants responsible for treating raw water to meet the required quality standards. These plants utilized various treatment processes such as sedimentation, filtration, disinfection, and potentially additional treatment methods to ensure the water's safety and potability.
- **Water Storage Facilities:** The city had strategically located water storage facilities to store treated water for efficient distribution. These storage facilities, such as reservoirs or water towers, provided a buffer to meet peak demand periods and ensure a continuous water supply to consumers.
- **Distribution Network:** A network of pipelines and distribution systems was in place to transport treated water from the water treatment plants to various parts of the city. This network

comprised underground pipes, valves, pumps, and other necessary infrastructure to ensure reliable delivery of water to consumers.

- **Pumping Stations:** Pumping stations were installed at specific locations along the distribution network to maintain adequate water pressure and facilitate the movement of water throughout the system. These stations played a crucial role in delivering water to higher elevation areas and distant parts of the city.
- **Metering Infrastructure:** The water supply system included metering infrastructure to measure water consumption by individual consumers. This infrastructure typically consisted of water meters installed at residential, commercial, and industrial properties to monitor and record water usage.
- **Control and Monitoring Systems:** The city employed control and monitoring systems to oversee the operation of the water treatment, storage, and distribution system. These systems included sensors, data collection mechanisms, and supervisory control and data acquisition (SCADA) systems to monitor water quality, pressure levels, flow rates, and detect any abnormalities or faults in the system. However, the SCADA system is old and dilapidated and will require extensive updating.

### 3.5.1 Water treatment

The water treatment, storage, and distribution system in the City of Mykolaiv before the war consisted of various key elements as explained above. The system relied on the purification of water from surface sources at treatment plants, specifically Stages I-II and III. The technological process for drinking water purification involved coagulation, settling, filtering, and disinfection.

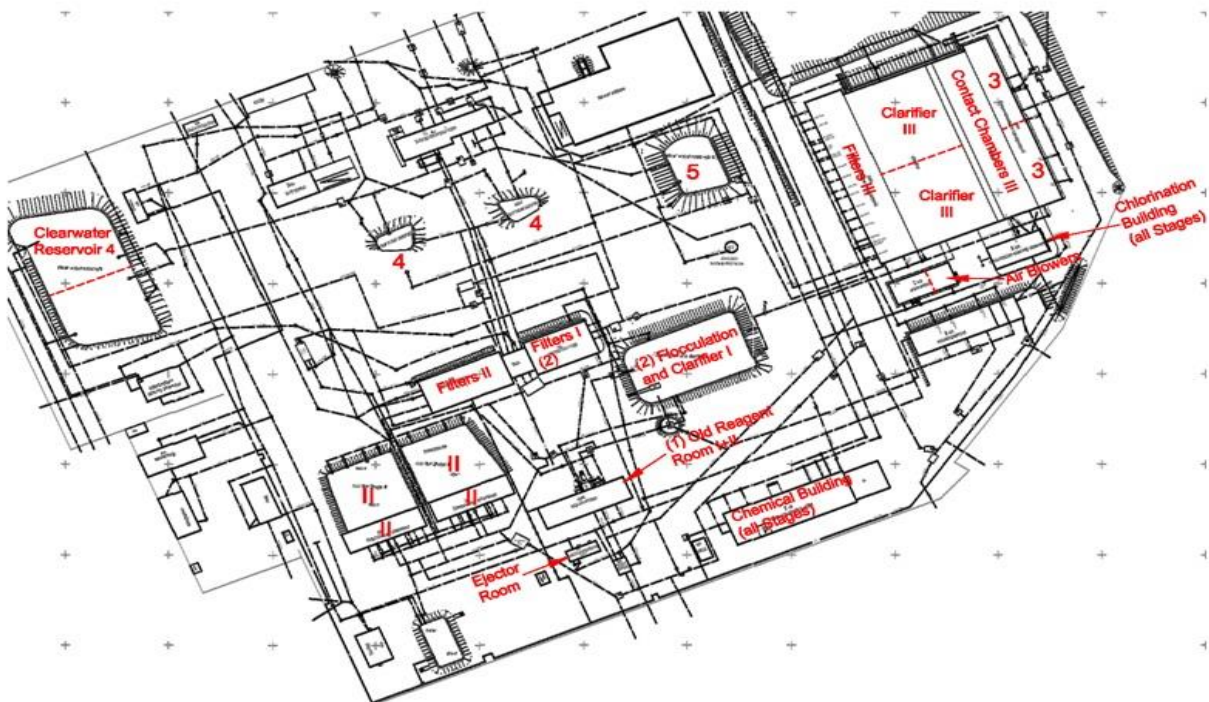


Figure 3-3 Water Treatment Plant (general layout)

Source: MVK.

**Stage I** of the treatment plants, operational since 1958, had a capacity of 40,000 m<sup>3</sup>/day. Its infrastructure included a mixing chamber, coagulation workshop, reaction chamber, horizontal settler, rapid filters unit, a 2,000 m<sup>3</sup> pure water tank, jet chamber No. 1, chlorine storage, 1st-Stage pumping station (2 units), and 2nd-Stage pumping station (2 units).

**Stage II** facilities, commissioned in 1965, had a capacity of 75,000 m<sup>3</sup>/day. The structures comprised a grid chamber, mixing chamber, jet chamber No. 1, reaction chamber (2 units), horizontal settlers (2 units), rapid filters unit, a 2,000 m<sup>3</sup> pure water tank, jet chamber No. 2, 1st-Stage pumping station (additional 3 units), 2nd-Stage pumping station (additional 3 units), and a laboratory.

Following rehabilitation in 1974, the combined productivity of Stages I-II increased to 140,000 m<sup>3</sup>/day. The Zhovtneve Reservoir, previously operated by MVK and the main water supply source before the Dnipro-Mykolaiv water mains, has not been in use since 2007 due to rehabilitation efforts.

Chlorinated water was utilized for disinfection at the wastewater treatment plants (WWTP) in Mykolaiv. Chlorine water preparation took place at the water treatment plants using chlorinators such as "Advance" and "Graviton."

**Stage III** treatment facilities, commissioned in 1979 with a capacity of 95,000 m<sup>3</sup>/day, were designed to treat water from both the Zhovtneve Reservoir (currently undergoing rehabilitation) and the Dnipro-Mykolaiv water intake, ensuring compliance with drinking water quality requirements (DSanPiN 2.2.4-171-10).

The structures of **Stage III** treatment facilities included a main plants unit consisting of two sections with capacities of 60,000 m<sup>3</sup>/day and 35,000 m<sup>3</sup>/day. Each section comprised a contact chamber, horizontal settlers with flocculation chambers, rapid filters, a chemical unit (coagulation room, dosing rooms, blower rooms, transformer room, ventilation chamber room, personnel room, polyacrylamide room, fluorination room, liming room, carbonization room, chlorination room), a 3,000 m<sup>3</sup> pure water tank, a 500 m<sup>3</sup> washwater tower, and a service building.

In addition to the pure water tanks located at treatment plants Phases I-II and III, MVK had additional pure water tanks at the 3rd and 4th Stage pumping stations, Booster PS Pivnichnyi WPS Matviivka, and the Dnipro-Mykolaiv water main.

To address the need for diversification of raw water sources and the implementation of modern purification technology, a large-scale construction project for new water treatment plants is proposed. The new plants, with a capacity of 150,000 m<sup>3</sup>/day, will be based on proven pressure filtration technology by renowned water supply/wastewater company Culligan.

Potential sources of raw water selected for the project include the existing Dnipro-Mykolaiv water intake, the Verkhnoihuletska irrigation system combined with the Zhovtneve Reservoir (requiring complete reconstruction), and the Southern Buh River.

### 3.5.2 Water storage

The water treatment plants in Mykolaiv feature a total of five pure water tanks with varying capacities. These include two pure water tanks, each with a capacity of 2,000 m<sup>3</sup>, one pure water tank with a capacity of 3,000 m<sup>3</sup>, and two pure water tanks, each with a capacity of 6,000 m<sup>3</sup>.

Additionally, the city's water supply pumping stations house a collection of ten pure water tanks, collectively providing a total volume of 74,000 m<sup>3</sup>. These tanks serve to store treated water and ensure a sufficient reserve for the city's water distribution network.

### 3.5.3 Water distribution

The utilization of water supply from street hydrants in the city of Mykolaiv is limited. The water supply system in the city comprises 32 water supply pumping stations (WSPS) and 6 booster pumping stations (BPS) distributed across different neighbourhoods.

The total length of the water supply networks in the city amounts to 1,208.559 km. This includes:

- Water mains with a length of 283 km
- Street networks covering 714 km
- Submain and yard networks spanning 210 km.

There is also a section of the water supply network designated as old and emergency, with a total length of 298 km. This comprises:

- 124 km of water mains
- 124 km of street network
- 50 km of submain and yard networks.

### 3.5.4 House connections and other clients

In the water sector of Mykolaiv, there are various types of clients, including house connections and other entities. House connections refer to residential properties and households that are connected to the water supply network for their domestic water needs. These connections provide potable water for daily use, such as drinking, cooking, bathing, and sanitation purposes.

Apart from house connections, there are other clients in the water sector, which include commercial, industrial, and institutional establishments. Commercial clients may consist of businesses, offices, retail outlets, and restaurants that require water for their operations, cleaning, and other commercial activities. Industrial clients encompass manufacturing facilities, factories, and industrial plants that utilize water for production processes or cooling purposes.

Institutional clients refer to public institutions such as schools, hospitals, government buildings, and other facilities that rely on water supply for their functioning and providing essential services.

Table 4-3 Centralized water supply system connections

Client	Number of connections	Number of water meters
Households	183,470	178,093
Budget Organizations	908	852
Other	7,525	16,535
<b>Total</b>	<b>191,903</b>	<b>195,480</b>

Source: MVK.

### 3.6 Non-revenue water

Non-revenue water in Mykolaiv refers to the water that is lost or unaccounted for within the water supply system, resulting in a loss of potential revenue for the water utility. It is a common challenge faced by many cities and utilities worldwide. Non-revenue water can be categorized into two main components:

**Physical losses:** These losses occur due to leaks, bursts, and other types of infrastructure failures in the water supply network. Aging pipes, inadequate maintenance, and insufficient monitoring systems can contribute to physical losses. Water lost through physical losses does not reach the intended customers and is wasted.

**Commercial losses:** Commercial losses refer to the water that is consumed but not accurately measured or billed. These losses can occur due to inaccurate metering, illegal connections, tampering with meters, billing errors, or inadequate meter reading practices. Commercial losses result in the utility not being able to collect revenue for the water consumed by customers.

The measurement and reduction of non-revenue water is crucial for the sustainability and financial viability of the water utility. It helps in conserving water resources, improving operational efficiency, and ensuring the financial sustainability of the water supply system.

To address non-revenue water, MVK have implemented various strategies such as:

- **Leakage detection and repair:** Regular monitoring, leak detection surveys, active leak detection technology and timely repairs can help minimize physical losses due to leaks and infrastructure failures.
- **Improved metering and billing systems:** Ensuring accurate metering, proper billing practices, and implementing robust meter reading systems can reduce commercial losses and improve revenue collection.
- **Application of the DMAs:** Ensuring permanent precise control over the water distribution system and prompt reaction on the pipe breaks and leakages.
- **Pressure management and Demand Driving Distribution:** Optimizing water pressure in the network can reduce the occurrence of leaks and pipe bursts, minimizing physical losses, as well as decrease of the energy consumption by the system.
- **Customer engagement and education:** Raising awareness among customers about water conservation, the importance of reporting leaks, and discouraging illegal connections can help reduce non-revenue water.

By implementing effective measures to minimize non-revenue water, the water utility in Mykolaiv can improve its operational efficiency, enhance financial sustainability, and ensure a more reliable and sustainable water supply for the city.

The figure below illustrates the situation with NRW in Mykolaiv before the war period.

<b>System Input Volume</b> 101 534 m3/day 100%	<b>Authorised Consumption</b> 78 192 m3/day 77,0%	<b>Billed Authorised Consumption</b>  70 000 m3/day 68,9%	<b>Billed Metered Consumption</b> 52 500 m3/day 52%	<b>Revenue Water</b>  70 000 m3/day 68,9%
		<b>Billed Unmetered Consumption</b> 17 500 m3/day 17,2%	<b>Unbilled Metered Consumption</b> 0 m3/day 0,0%	
		<b>Unbilled Authorised Consumption</b> 8 192 m3/day 8,1%	<b>Unbilled Unmetered Consumption</b> 8 192 m3/day 8,1%	<b>Non-Revenue Water</b> 31 534 m3/day 31,1%
	<b>Water Losses</b> 23 342 m3/day 23,0%	<b>Apparent Losses</b> 8 713 m3/day 8,6%	<b>Unauthorised Consumption</b> 1 014 m3/day 1,0%	
		<b>Customer Meter Inaccuracies and Data Handling Errors</b> 7 699 m3/day 7,6%	<b>Real Losses</b> 14 630 m3/day 14,4%	

Figure 3-4 Water Balance 2021

Source: EGIS report

Before the war, the total volume of NRW in Mykolaiv was 31.1%, indicating a moderate level of water loss and unaccounted-for water within the system. However, during the war period, the level of NRW significantly increased to approximately 43%, reflecting a substantial rise in water losses and a decrease in the efficiency of the water supply network.

The increase in NRW during the war can be attributed to various factors, including infrastructure damage, limited maintenance and repair activities, restricted access to certain areas for monitoring and maintenance, and the overall disruption caused by the conflict.

The existing water balance serves as the basis. The statistical reporting provided by MVK (Form No. 6-NKREKP – Appendix B) has been utilized as input data for the projected water balance in the years 2033 and 2050.

Efforts to reduce and manage NRW play a vital role in restoring the efficiency and sustainability of the water supply system in Mykolaiv. By addressing infrastructure damage, implementing effective leak detection and repair programs, improving metering and billing systems, and ensuring proper maintenance practices, it is possible to mitigate the impact of NRW and enhance the overall performance of the water supply network.

### 3.7 Operation and maintenance

Since February 2022, the city of Mykolaiv has been situated on the front line of a prolonged military conflict against the Russian aggressor. Despite the challenging war conditions, MVK has continued its operational activities throughout 2022 and continues to do so presently, striving to maintain normal operations. However, MVK faces significant challenges in its operational activities due to the disruption of its primary water supply source from the Dnipro River near the village of Mykilske,

located in the Kherson region. This territory was occupied for an extended period during 2022. On April 12, 2022, both pipes DN1400 of the Dnipro-Mykolaiv water main were damaged as a result of shelling, leading to a complete halt in water supply to the city.

To address the city's water needs, an alternative water source from the Pivdennyi Buh estuary, subject to prior cleaning and disinfection at the existing water treatment plant (WTP), has been utilized since May 6, 2022. Although the right-bank part of the Kherson region, where the water intake of MVK is located, was liberated in November 2022, the enterprise has been unable to resume water extraction from the Dnipro River. The water intake site remains on the front line and is consistently subjected to enemy shelling. The water supplied to the city's water supply network from May 7, 2022, until the present does not comply with the state sanitary norms and regulations for drinking water. Additionally, the decrease in the city's population due to hostilities has resulted in a nearly 70% reduction in the enterprise's operating income. As an example, the enterprise's revenue in January 2022 was UAH 60,079.00 thousand, while in June 2022, it dropped to UAH 19,452.00 thousand. Consequently, the enterprise incurred losses of UAH 164,624.00 thousand in its financial and economic activities for 2022.

Throughout 2022, consumer receivables for water supply and wastewater services increased from UAH 133,470.00 thousand to UAH 250,449.00 thousand. This indicates a rise of UAH 116,979.00 thousand in receivables, equating to nearly UAH 10 million per month.

To avoid potential water supply and wastewater service disruptions, the city of Mykolaiv allocated monthly funds of UAH 25.0 million from its budget starting in August 2022 to financially support MVK.

Currently, the enterprise covers approximately 35% of its operational expenses through its own generated revenues. The average monthly inflow of funds from service provision to the enterprise's accounts during wartime amounts to UAH 25,374.00 thousand.

However, the estimated monthly operating expense (OPEX) for the enterprise in 2023 amounts to UAH 66,757.43 thousand. This includes expenses for electricity distribution, salaries, reagents, taxes, network maintenance and repair, fuel and lubricants, and water pressure increase.

Considering the significant funding shortfall to ensure sustainable water supply and wastewater services throughout 2023, the enterprise requires additional financing of an estimated UAH 40,000.00 thousand per month.

These factors collectively exert a negative influence on MVK's operational activities and the maintenance of existing assets.

### **3.8 Current and planned activities for improvement of the situation**

Currently, there are several ongoing and planned activities aimed at improving the water supply situation in Mykolaiv. These activities are crucial for addressing the challenges caused by the war and ensuring a sustainable and reliable water supply for the city. Some of the key activities include the projects presented in the table below.

Name of activity	Description	Expected outcomes	Time frame
<b>Current Activities</b>			
Replacement of the pipes	Due to the destructive influence of the brackish water in the centralized water supply system around of 240 km of steel pipes have been seriously damaged and should be replaced in the nearest time. Thanks to the Danish Government and other Partners, MVK has received big volume of plastic pipes (around 40 km) that should be installed instead of damaged pipes.	<ul style="list-style-type: none"> <li>• Decrease of water losses</li> <li>• Improvement of the quality of the centralized water supply services</li> <li>• Improvement of the quality of the water</li> </ul>	2022-2025
Replacement of the valves and fittings	Due to the destructive influence of the brackish water in the centralized water supply system a lot of old-type valves and fittings have been damaged and require replacement.	<ul style="list-style-type: none"> <li>• Decrease of water losses</li> <li>• Improvement of the quality of the centralized water supply services</li> <li>• Improvement of the quality of the water</li> </ul>	2022-2025
Refurbishment works on the WTP	Due to the destructive influence of the brackish water from the P. Buh River, the existing old technological facilities at WTP have been seriously damaged. A lot of steel pipes, valves and fittings, as well as reinforcement concrete structures should be renovated/replaced.	<ul style="list-style-type: none"> <li>• Decrease of water losses</li> <li>• Improvement of the quality of the centralized water supply services</li> <li>• Improvement of the quality of the water</li> </ul>	2022-2023
Replacement of quartz sand in the speedy filters at 3 <sup>rd</sup> Stage Treatment Facilities of the WTP	Due to the destructive influence of the brackish water from the P. Buh River, the quartz sand in existing old filtration facilities at WTP became non-effective and needs urgent replacement. The quartz sand has been provided by ICRC in total volume of 2800 t.	<ul style="list-style-type: none"> <li>• Improvement of the quality of the centralized water supply services</li> <li>• Improvement of the quality of the water</li> </ul>	2023-2024
Rehabilitation of the water main "Dnipro-Mykolaiv"	In April 2022 Russian invaders seriously damaged water main "Dnipro-Mykolaiv" and stopped supply of the raw water from respective water intake facilities in Kherson oblast. After deliberation of the area by Ukrainian army MVK together with ICRC has started the project on rehabilitation of the damaged pipes, valves and fittings.	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water intake</li> <li>• Supply of the good quality raw water to the WTP of the City of Mykolaiv</li> <li>• Improvement of the quality of the centralized drinking water supply</li> </ul>	2022-2024
Reconstruction of the 2 <sup>nd</sup> Stage WSPS at WTP	This project has been started before the war in the frames of the EIB's project "Development of the water supply and wastewater system in the City of Mykolaiv" and is under implementation by the MVK together	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water supply system</li> <li>• Improvement of the quality of the centralized drinking water supply</li> <li>• Improvement of the reliability and energy efficiency of the WSPS</li> </ul>	2021-2024

	with Danish Partner/Contractor PER AARSLEFF A/S.		
Feasibility study on the new source of raw water	Feasibility Study financed by EIB in the frames of the Project UMIP-2. Contractor/Consultant responsible for preparation of FS – EGIS (France).	<ul style="list-style-type: none"> <li>• Selection of the new sources of the raw water for the City of Mykolaiv</li> <li>• Improvement of the reliability of the centralized water supply system</li> <li>• Selection of the best technological solution for the raw water treatment</li> <li>• Improvement of the quality of the drinking water</li> </ul>	2022-2024
Feasibility study on the diagnostic of the water distribution system	Feasibility Study financed by ICRC. Contractor/Consultant responsible for preparation of FS – GFA Consulting Group (Germany)	<ul style="list-style-type: none"> <li>• Detailed assessment of the existing water supply system</li> <li>• Development of the recommendations in respect of the sustainability and reliability of the water supply system, as well as improvement of the water services.</li> </ul>	2023-2024
<b>Planned Activities</b>			
Reconstruction of the 0-Stage WSPS at water intake “Dnipro-Mykolaiv”	Due to the permanent shelling and destruction of Kahovska dam, water intake facilities “Dnipro-Mykolaiv” including 0-Stage WSPS have been seriously damaged. Ukrainian Government provided financial support to OMA to restore these facilities. It is envisaged to install new modern pumping units, new transformers and other technological equipment and to refurbish damaged reinforcement-concrete structures.	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water supply system</li> <li>• Improvement of the quality of the centralized drinking water supply</li> <li>• Improvement of the reliability and energy efficiency of the WSPS</li> </ul>	2023-2024
Construction of the microfiltration unit at water intake “Dnipro-Mykolaiv”	Due to the full demolition of the microfiltration unit at the water intake “Dnipro-Mykolaiv” as a result of the bombing attack by Russian enemies it is necessary to Construct new building including of installation of new microfiltration equipment and related networks.	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water supply system</li> <li>• Improvement of the quality of the centralized drinking water supply</li> <li>• Improvement of the quality of drinking water</li> <li>• Decrease of NRW</li> </ul>	2023-2025
Reconstruction of the Rotating Screens unit at water intake “Dnipro-Mykolaiv”	Installation of new rotating screens at 0-Stage WSPS.	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water supply system</li> <li>• Improvement of protection of pumping units</li> </ul>	2023-2024
Installation of new disinfection system at 3 <sup>rd</sup> Stage WSPS	Installation of new disinfection system on the base of dosing of hypochlorite.	<ul style="list-style-type: none"> <li>• Improvement of the safety of the local population</li> <li>• Improvement of the quality of drinking water</li> </ul>	2023-2024
Restoration of the Zhovtneve reservoir	Reconstruction of abandoned in 2006 water reservoir combined with the local irrigation system.	<ul style="list-style-type: none"> <li>• Securing of necessary volume of the raw water for uninterrupted centralized water supply during 1 year.</li> <li>• Improvement of the quality of drinking water</li> <li>• Diversification of the sources of the raw water</li> </ul>	2024-2025

Construction of the new water treatment facilities at existing WTP	Due to the reason of diversification of the sources of the raw water for the centralized water supply system, it is necessary to implement respective effective water treatment technology suitable for the different sources of raw water (including brackish water)	<ul style="list-style-type: none"> <li>• Uninterrupted operations of the water supply system</li> <li>• Improvement of the quality of the centralized drinking water supply</li> <li>• Improvement of the quality of drinking water</li> <li>• Decrease of NRW</li> </ul>	2024-2025
Installation of the new RO units at WTP	Installation of three modern RO systems at WTP provided by the German Partners.	<ul style="list-style-type: none"> <li>• Securing production of the necessary volume of drinking water for the local population in case of emergency situation</li> <li>• Improvement of the quality of drinking water</li> <li>• Diversification of the water treatment facilities</li> </ul>	2023 (completed)

Source: MVK.

### 3.9 Water supply, Overall needs assessment

The events that unfolded during the war in Mykolaiv revealed several weaknesses in the centralized water supply system, highlighting the need for specific mitigation measures and further development. Based on these observations, the following components have been identified as essential for addressing the needs:

- Further restoration of the damaged water distribution network (including in parallel establishment of the DMAs).
- Restoration of the water intake Dnipro-Mykolaiv and related water mains: Efforts should be focused on restoring the damaged infrastructure of the water intake and associated water mains to reinstate the reliable supply of water from the Dnipro River.
- Rehabilitation of priority elements of existing water treatment plants (WTP): The rehabilitation of key elements within the existing WTP is necessary to improve their functionality and efficiency. This includes repairs and upgrades to treatment processes, equipment, and facilities.
- Reconstruction of the 0th, 1st, and 2nd Stages Water Supply Pumping Stations (WSPS): The reconstruction of these pumping stations is crucial to ensure proper water distribution and pressure management within the system, as well as increase of the energy efficiency.
- Installation of a new disinfection system at the 3rd Stage WSPS: Upgrading the disinfection system at the 3rd Stage WSPS is necessary to enhance the treatment process and ensure the provision of safe and potable water to consumers.
- Final selection of alternative sources of raw water: The identification and selection of reliable alternative sources of raw water should be concluded, considering factors such as availability, quality, and sustainability.
- Construction of new technological water treatment facilities at the existing WTP: The construction of new water treatment facilities within the existing WTP is essential to accommodate the treatment requirements of alternative raw water sources and ensure the production of high-quality drinking water.
- Restoration of the Zhovtneve reservoir: The rehabilitation and restoration of the Zhovtneve reservoir are necessary to utilize it as a water storage facility, enabling the reliable supply of water to the city.

Addressing these components will contribute to the overall improvement and resilience of the water supply system in Mykolaiv, enhancing its capacity to provide safe, reliable, and sustainable water to the population. These needs assessments form the basis for strategic planning and prioritization of investments in the water sector in Mykolaiv.

## 4 Existing situation, Wastewater

This chapter deals with the present situation in wastewater in Mykolaiv and covers all the technical aspects of the wastewater infrastructure.

### 4.1 Discharge and connections, Selected data

Table 4-1 and 4-2 below provide selected data regarding wastewater discharge and centralized wastewater connections.

Table 4-1 Wastewater discharge

Parameter	2020	2021	2022
Volume of wastewater discharge, thousand m <sup>3</sup>	20,426.89	19,004.63	10,720.39

Source MVK.

Table 4-2 Centralized Wastewater system connections

Client	Number of connections
Households	156,155
Budget Organizations	838
Other	6,778
<b>Total</b>	<b>163,771</b>

Source MVK.

### 4.2 Overall sewerage situation

The wastewater infrastructure in Mykolaiv is organized into distinct systems. The predominant portion of collected wastewater is channelled through the Halytsynivski WWTP, constituting a significant majority, while a minor fraction, approximately 2% of the aggregate wastewater, undergoes treatment at the Varvarivski and Matviivski WWTP.

Established in 1973, the Halytsynivski WWTP in Mykolaiv boast a combined daily processing capacity of 94,000 m<sup>3</sup> through their mechanical treatment facilities and an additional 10,000 m<sup>3</sup>/d via their biological treatment facilities. Subsequent to their initial commissioning, supplementary biological treatment units were brought online in August 1980, augmenting the aggregate biological treatment capacity to 94,000 m<sup>3</sup> per day.

In 1977, the Varvarivski WWTP were inaugurated in Mykolaiv, featuring a design capacity of 3,000 m<sup>3</sup>/day for wastewater treatment. Similarly, the Matviivski WWTP, also established in 1974 within the city of Mykolaiv, possess a design capacity of 455,000 m<sup>3</sup>/year for wastewater treatment.

Mykolaiv's wastewater infrastructure encompasses 32 wastewater pumping stations (WWPS) strategically positioned across diverse neighbourhoods within the city. The comprehensive network of wastewater conduits spans a total length of 725 km, distributed as follows:

- sewer main – 141 km
- street network – 337 km
- submain and yard networks – 247 km.

Moreover, an older and contingency wastewater network measuring 197 km is also present, with the following breakdown:

- sewer main – 97 km
- street network – 55 km
- submain and yard networks – 44 km.

#### 4.2.1 Overview of the sewer system

The hydrological dynamics of Mykolaiv's urban expanse are intricately influenced by the Bug Estuary and the River Inhul, serving as the primary drainage and natural catchment domains. Altitudinal disparities within the city's terrain range from sea level (Buh Estuary) to 58 meters above sea level in the Tsentralnyi District and Shyrokaya Balka Sub-District.

Illustrated in Figure 4-1, the topography of Mykolaiv's urban precinct delineates the contours of its natural catchment areas. The inherent flow pattern directs drainage towards the Buh Estuary and the River Inhul.

The complex topographical layout necessitates the establishment of multiple pumping stations for effective wastewater collection. The principal pumping station operates at an elevation of approximately 12 meters, while the WWTP is situated at an altitude of 40 meters above sea level.

Both treated and untreated domestic and industrial wastewater converge into the Buh Estuary and the River Inhul. A substantial portion of Mykolaiv's wastewater is subject to treatment at the WWTP, strategically located in proximity to the southern urban periphery.

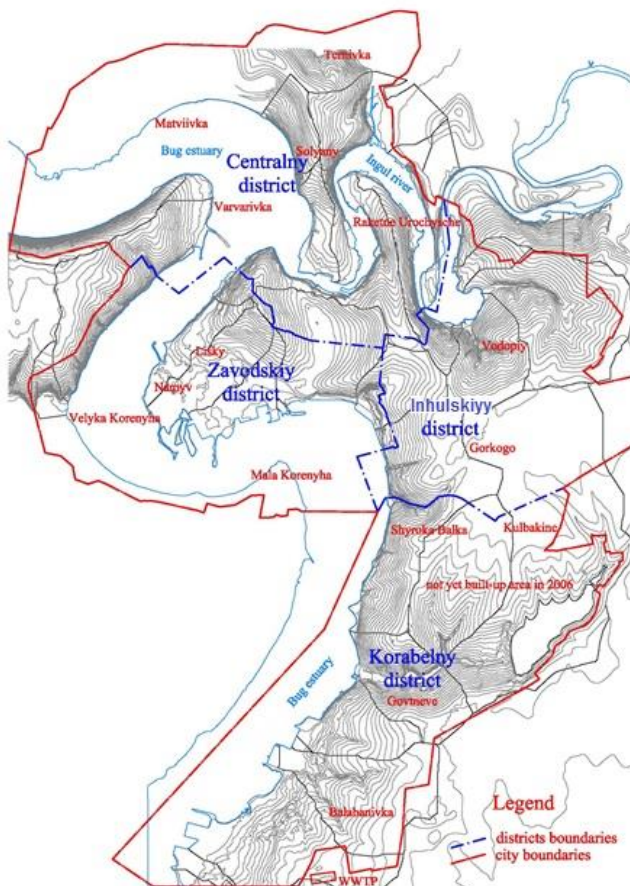


Figure 4-1 Natural catchment areas with contour lines of Mykolaiv's urban area

Source: MVK.

All catchment areas within the region experience anthropogenic influences, with the predominant impact stemming from the discharge of municipal sewage.

Surface water quality undergoes rigorous assessment by the State Department of Environmental Protection on an annual basis.

Notably, the coastal periphery of Mykolaiv city witnesses heightened contamination, primarily attributable to oil products. In this context, among 14 samples taken, 10 exhibited concentrations surpassing the Maximum Allowable Concentration (MAC). Particularly noteworthy are the elevated levels of oil products proximate to the Varvarovskij bridge (exceeding MAC by a factor of 9) and at the portside marine location (exceeding MAC by a factor of 7). No breaches of MAC limits were identified concerning other water quality parameters.

Comprising approximately 780 km of sewers, Mykolaiv's sewerage network serves 78% of households as well as industrial and institutional entities. Facilitated by 32 primary wastewater pumping stations, this network conveys wastewater to a centralized treatment plant.

Regrettably, the existing pumping stations exhibit antiquated characteristics, unreliability, energy inefficiency, and demanding labour requirements. These facilities are presently overseen by a contingent of 260 operators.

Details on the sewerage network are available in [Appendix A](#) and layouts in [Appendix C](#).

Originally designed as a distinct sewer system primarily transmitting wastewater and an ineluctable degree of infiltration water to the central WWTP, the system's operational landscape has evolved. The prevalence of exposed manholes and substantial sewer collapses has led to a substantial influx of surface water runoff into the sewer system. As it stands, the sewer system currently functions more akin to a combined rather than a distinct sewer system.

### General Layout of the Sewer Infrastructure in Mykolaiv

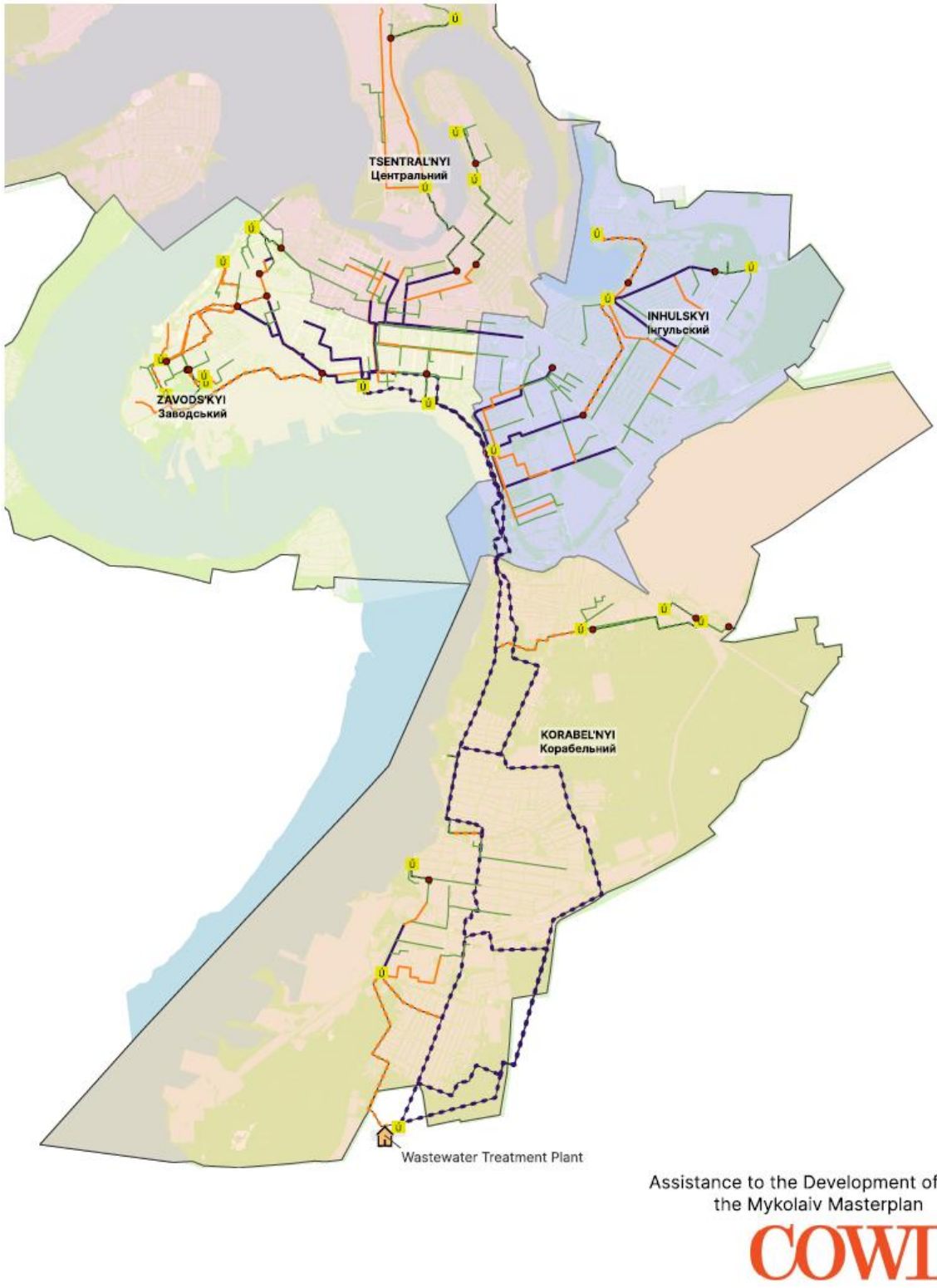


Figure 4-2 Schematic layout of the existing sewerage system (with main pumping stations)

#### 4.2.2 Manholes

Many sewage collectors have corroded manholes requiring renovation or replacement. The high number of open manholes, along with significant sewer collapses, leads to a large volume of surface

water entering the system. Currently, the sewer system functions more as a combined system rather than a separate one.

To address rainwater inflow, prioritizing the replacement of missing manhole covers is crucial. Consideration of lockable designs (where feasible) can deter theft and reduce stormwater entry.

It's likely that settling or improper pavement renewal has caused many manhole covers to sink below street level. Therefore, it is essential to raise these sunken covers to match the street surface.

### 4.2.3 Pumping Station

MVK operates 32 sewage pumping stations to transfer the wastewater to Mykolaiv WTP. They are operated by some 240 employees. The following figure presents a general layout of the sewer infrastructure in Mykolaiv. A more detailed layout can be found in Appendix C.

In general, the wastewater pumping stations have following deficiencies:

- Most low voltage switchgears are not in a satisfactory condition.
- The old oil circuit breakers for the high voltage switchgears should be replaced with vacuum circuit breakers.
- Most controls are designed for duty and stand by pump. This should be changed to duty assist control.
- All pump sets are without service hour meters which should be added.
- Most pumps are without compensation which also should be added.
- All pump sumps and pump rooms are equipped with ventilation and a gas warning system. The gas warning system and the ventilation system is in a very poor condition. Both systems should be refurbished.
- Manual operated screens are installed before the wastewater enters the pump sump. The screens are in very poor condition and should be refurbished.
- Some pumping stations were equipped with grinder (crusher), which are all removed. According to the staff there is no danger that the pumps are clogging and there is no need to reinstall grinders for the pumps actually installed.

### 4.2.4 Sewer Connections

The current connection ratio to the sewerage system was estimated to 78 %. For the projection of wastewater generation, a rate of 78 % is assumed increasing in the future up to 95 % due to network extension and increase of the connection rate within individual urban areas. Moreover, it is assumed that within the sewered areas 100 % of the buildings are connected.

Very often however, as seen in CCTV inspection protocols, the connecting pipes are just stuck into holes drilled into the collectors.

The diameters of the connecting pipes range from 100 to 200 mm. The materials used are ceramic pipes (stoneware), cast iron, plastic and asbestos cement.

### 4.2.5 Conditions of the Sewer Infrastructure

The sewerage network of the City of Mykolaiv is basically designed as a separate sewer system and has a length of approx. 725 km (according to the current data of year 2023). The sewerage system exists of sewers having diameters of 100 mm (minimum) and 1,400 mm (maximum). Used pipe material is RC, CI, St, AC and PVC.

The detailed data on the length, type of material and condition of the wastewater networks is presented in the Appendix A.

Most of the sewers and expressly the gravity sewers of Mykolaiv's sewerage network are built from concrete pipes. This pipe material is especially subject to gas corrosion.

Gas corrosion occurs when wastewater is contained under anaerobic conditions over a longer period of time (longer than 4 hours). Anaerobic conditions are the prevailing conditions in oversized pressure sewer systems with short pumping periods and long detention time of sewage in the completely filled pressure pipes.

Under these conditions the (organic and inorganic) sulphur that is contained in the sewage is converted biologically in the pressure sewer to hydrogen sulphide ( $H_2S$ ) which then dissolves in the wastewater. When the pressure sewer runs into a gravity flow system the dissolved hydrogen sulphide is stripped off the sewage. Once released from the wastewater as  $H_2S$ -gas, odour and corrosion problems begin.

Under aerobic conditions which prevail inside gravity sewers the  $H_2S$ -gas is turned into sulphuric acid ( $H_2SO_4$ ) by sulphur oxidizing bacteria that causes corrosion and destruction of concrete sewer pipes.

### **4.3 Overall wastewater treatment systems situation, End 2021 and End 2023**

The Section presents Description of wastewater treatment plant(s) end 2021 and end 2023 in Mykolaiv.

#### **4.3.1 Wastewater treatment – End 2021**

The Mykolaiv Halytsynivski WWTP, located south of Mykolaiv, was built in 1973 and is operating well beyond its intended lifespan. Both the civil structures and electromechanical equipment are in a state of severe disrepair. Despite diligent efforts by operators, the plant struggles to meet national wastewater effluent discharge standards.

While the reported capacity is 104,000  $m^3/d$ , the actual average wastewater inflow is only around 65,000  $m^3/d$  (max flow). Concentrations in treated wastewater exceed allowable limits significantly for key parameters:

- BOD<sub>5</sub> 81 mg O<sub>2</sub>/l (maximum allowable concentration exceeded by 550 %)
- COD 218 mg O<sub>2</sub>/l (maximum allowable concentration exceeded by 180 %)
- SS 81 mg/l (maximum allowable concentration exceeded by 480 %)

The plant is designed as an activated sludge type facility with several components:

- Wastewater inlet chamber and flow measurement
- Screens
- Grit removal
- Pre-aeration for mixing of mechanically pre-treated wastewater and non-stabilised excess sludge
- Primary sedimentation tanks, which receive not only mechanically pre-treated wastewater, but also non-stabilised excess sludge
- Aeration tanks

- Secondary sedimentation tanks
- Sludge dewatering facilities, which receive non-thickened and non-stabilised raw sludge from the primary sedimentation tanks
- On-site sludge drying (actually not used)
- Chlorine disinfection facilities (never equipped).

The aeration system, while upgraded in 2004, now requires further renovation within the "Development of the Water Supply and Wastewater System in the City of Mykolaiv" project. The operation process also needs improvement for BOD, nitrogen, and phosphorus removal.

Under the current project, MVK has already reconstructed the inlet chamber, screens building, and sand traps, positively impacting the overall treatment process. With support from the Danish Government, MVK has also repaired the air diffusion system in one of the air tanks damaged by shelling.

During the onset of the war, the biological treatment process was severely affected by brackish water, which created an aggressive environment for bacteria and nearly halted the biological treatment process. To address this, MVK introduced a new, brackish water-resistant bacteria strain called "Biomix." This initiative significantly improved biological treatment under the challenging wartime conditions.

The general layout of WWTP is presented in the figure below.

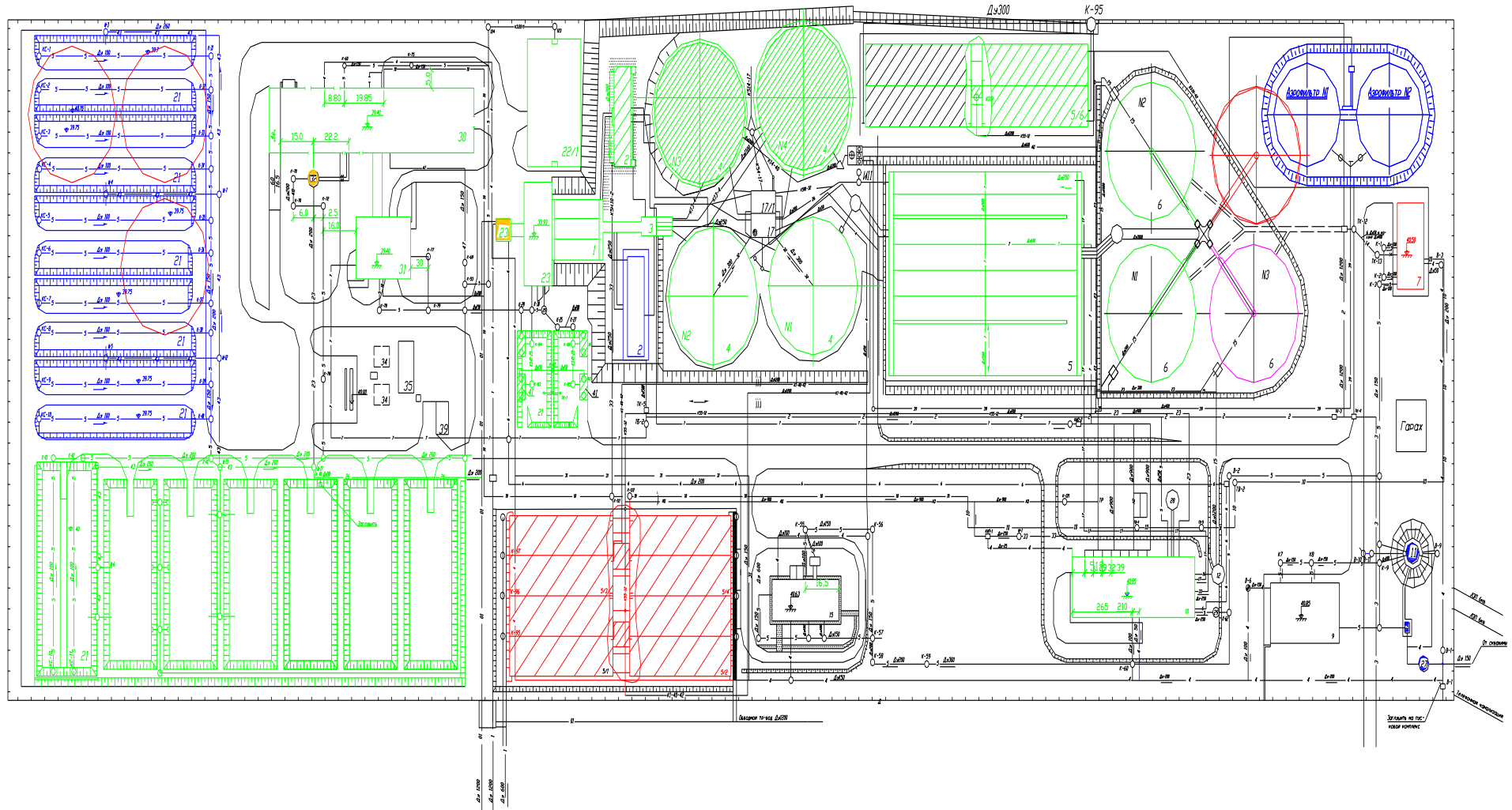


Figure 4-3 General layout of the WWTP

Source: MVK.

### **4.3.2 Industrial wastewater situation**

The majority of industrial establishments in the City of Mykolaiv release their wastewater directly into the centralized collection system without proper pre-treatment. This practice has a detrimental impact on the overall treatment process, as well as on the equipment of pumping stations, WWTP, and sewage collectors.

### **4.3.3 Wastewater treatment – Existing situation**

The current facility has been in operation for 44 years, with limited reinvestment except for the aeration system in the Aeration Tanks (ATs). At present, the plant falls short of treating 100% of incoming wastewater to meet mandated effluent standards, and only a portion of the primary sludge undergoes treatment. There is presently no comprehensive concept in place for the treatment and disposal of sludge.

The presence of brackish water and high concentrations of chlorine in incoming wastewater significantly hinder the biological treatment process. These factors diminish the microbial population in the activated sludge, leading to a notable decrease in its volume.

The proposed three-phase approach aims to:

- Upgrade the plant to a state-of-the-art, energy-efficient facility
- Structurally rehabilitate it for another minimum 15 years of operation
- Handle projected 2030 waste loads
- Comply with current Ukrainian effluent standards
- Maximize energy and thermal power recovery from sludge
- Minimize CO<sub>2</sub> emissions
- Ensure sludge disposal in full accordance with Ukrainian legislation.

Due to time constraints necessitating urgent rehabilitation of the Aeration Tanks, the decision has been made to refurbish the existing plant exclusively for the Korabelnyi district. A new, modern plant will be constructed at a lower elevation closer to the city centre, in line with the 2006 Feasibility Study, to serve the remainder of the city.

These phases have been designed with consideration for available funding, with the first phase being financed by the existing EIB loan. Additionally, this initial phase will yield the most significant environmental benefits.

### **4.3.4 Sludge disposal**

Mykolaiv WWTP lacks sludge stabilisation and thickening facilities, resulting in the disposal of untreated sludge at the site, causing significant odour issues and complaints from nearby residents.

The absence of sludge thickening complicates the dewatering process. This is partially addressed by converting one sedimentation tank into a raw sludge thickener.

Insufficient removal and dewatering of excess and primary sludge lead to ineffective primary and biological treatment stages. This can be resolved by investing in new sludge thickeners.

Table 4-2 Sludge quantities must be disposed or can be re-used after the indicated Phases of rehabilitation:

Sludge Key Data	Phase I		After Phase II	
	2015	2030	2015	2030
DS sludge to dispose after treatment: [to DS/y]	13.370	14.840	6.258	6.953
Thereof sludge [to DS/y]	9.845	10.929	6.209	6.897
Thereof CaO [to /y]	3.445	3.824		
Thereof Polymers [to /y]	80	87	50	55
Volume sludge to dispose after treatment: [m <sup>3</sup> /y]	43.830	48.650	26.995	29.989
Average DS [%]	30,5	30,5	23,2	23,2

Source: MVK.

Sludge can be obtained in liquid form from the static thickener or post-thickener after Phase II, or from the sludge storage tank after mechanical thickening.

The Municipality of Mykolaiv is exploring combined incineration of wastewater sludge with solid waste. In the interim, stabilized sludge treated with quick lime will be used for agriculture, requiring sufficient covered storage.

Phase I includes constructing a covered storage area for 175 days of sludge production. Two 5,000 m<sup>2</sup> covered areas will replace existing sludge storage and drying beds.

Post-Phase II, sludge quantities will decrease, potentially allowing co-incineration with solid waste. The long-term storage area may not be needed, but quick lime may still be used for easier agricultural handling.

## 4.4 Environmental considerations

The WWTP in the city of Mykolaiv has been identified by the Black Sea Commission as a significant environmental concern within the Black Sea catchment area. The direct discharge into the Pivdennyi Buh estuary has wide-ranging impacts on the Black Sea ecosystem. In response, the European Commission initiated a feasibility study in 2005 to develop a project for implementing mitigation measures in line with EU Directive standards for urban wastewater. This led to the creation of the "Development of Water Supply and Wastewater System in the City of Mykolaiv" project in 2006, currently being executed with funding from the EIB's loan, E5P grant, and EPTATF grant.

The proposed project components are designed to meet the specified effluent concentrations after each rehabilitation phase. Compliance with these standards is assessed through 24-hour composite daily samples and annual average results. The achievable effluent standards are compared to EU discharge standards (Council Directive 91/271/EEC) as outlined in the table below.

Table 4-3 Achievable effluent standards after each Phase of Rehabilitation vs. EU Discharge Standards (Council Directive 91/271/EEC)

Parameter		Discharge Standards EU <sup>1</sup>		After Rehabilitation Phase I and II daily maximum	After Phase III only (Ruling Standards since end 2016) daily maximum
		Sensitive areas	Less sensitive areas		
BOD <sub>5</sub>	mg/l	25	25	22	<b>15</b>
	% removal	70-90	70-90	70	Not defined
COD	mg/l	125	125	88	80
	% removal	75	75	75	Not defined
Suspended solids	mg/l	35(60) <sup>2</sup>	35(60) <sup>2</sup>	25	<b>15</b>
	% removal	90(70) <sup>2</sup>	90(70) <sup>2</sup>	90	Not defined
Total Nitrogen	mg/l	10(15) <sup>3</sup> (20 <sup>4</sup> )	---	20	20
	% removal	70-80	---	75	75
Ammonia Nitrogen	mg/l	---	---	2	2
Nitrates	mg/l	Not defined	Not defined	16	16
Total Phosphorus	mg/l	1(2) <sup>3</sup>	---	1 annual mean	1 annual mean
	% removal	80	---	95	95
Faecal Coliforms	MPN/100 ml	---	---	Not defined	Not defined

- Notes:
- 1) Council Directive 91/271/EEC concerning urban waste-water treatment.
  - 2) Higher discharge concentrations (lower % removal) apply for 2.000 – 10.000 PE, lower concentrations (higher % removal) apply for more than 10.000 PE.
  - 3) High discharge concentrations apply for 10.000 – 100.000 PE, lower concentrations apply for more than 100.000 PE. All concentrations refer to annual means.
  - 4) 20 mg/l acceptable if daily average is applied at T<sub>>=12°C</sub> instead of annual average. In this case it has to be proved that the same level of protection is reached.

Source: MVK.

After Phase III, the Mykolaiv WWTP is projected to reliably meet the current UA standards. There is flexibility to potentially alter the sequence of Phase II and III or implement both phases concurrently. Following Phase I, while adherence to ruling effluent standards may be maintained for a majority of the time, it cannot be guaranteed.

## 4.5 Operation and maintenance

Refer to section 3.7.

## 4.6 Current and planned activities for improvement of the situation

Currently, MVK is actively engaged in the execution of the rehabilitation contract for the existing WWTP facilities as part of the "Development of the Water Supply and Wastewater System in the City of Mykolaiv" project. This initiative is funded by an EIB loan and an E5P grant. The pivotal aspect of this project is the phased restoration of the aforementioned aging facilities.

Unfortunately, due to the war, the WWTP rehabilitation contract was temporarily suspended for reasons beyond the parties' control. Nevertheless, both MVK and the Contractor have resolved to proceed with design efforts.

MVK has also received crucial equipment, such as sludge pumps and aeration systems, as part of the rehabilitation works through support from international donors. Notably, the biological treatment process has been enhanced with the introduction of a new bacteria strain resistant to brackish water.

Furthermore, with humanitarian assistance from the Danish Government, MVK has acquired a series of new pumps to replace outdated units in the existing WWPS. This upgrade will notably enhance energy efficiency and system reliability in wastewater collection.

The envisioned wastewater system development plan encompasses the following elements:

- Comprehensive overhaul of existing wastewater pumping stations, integrating SCADA and other automation systems extensively.
- Further refurbishment of the existing WWTP.
- A substantial program for rehabilitating damaged sewage collectors, employing advanced sanitation technology with GRP-liners and installation of new plastic or cast-iron pipes.
- Construction of a new state-of-the-art WWTP, originally planned under the DSIF program prior to the war.

## Appendix A Detailed data on water supply and sewerage networks

Wastewater networks as of 1st of January, 2021											
ME "Mykolaivvodokanal"											
Total length			723,60	km	Emergency amount, total (2020)					60	pcs
incl. main sewers			141,00	km	incl. on the main sewers					17	pcs
pressure sewers				km	on the pressure sewers						pcs
deep-laid sewers				km	on the deep-laid sewers						pcs
street			336,44	km	on the street network					28	pcs
submain, yard			246,16	km	on the submain and yard network					15	pcs
Pipe material	The length of networks according to the diameters of the pipes (mm), km								Total		
	< 100	100-300	300-500	500-700	700-1000	1000-1500	>1500	deep-laid	km	%	
Steel	3,98	4,56	6,28		13,64				28,46	4%	
Cast iron	75,21	24,42	17,93	2,56	16,64				136,76	19%	
Concrete									0,00	0%	
Reinforced concr	5,39	19,42	60,76	19,16	122,05	0,20			226,98	31%	
Asbestos-cemen	14,52	37,38	3,50						55,40	8%	
Plastic	16,19	7,99	4,20	0,23					28,61	4%	
Ceramics	203,79	41,44	2,16						247,39	34%	
PVC									0,00	0%	
Shell									0,00	0%	
Brick									0,00	0%	
<b>Total</b>	<b>319,08</b>	<b>135,21</b>	<b>94,83</b>	<b>21,95</b>	<b>152,33</b>	<b>0,20</b>	<b>0,00</b>	<b>0,00</b>	<b>723,60</b>	<b>x</b>	
<b>%</b>	<b>44%</b>	<b>19%</b>	<b>13%</b>	<b>3%</b>	<b>21%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>x</b>	<b>100%</b>	
Pipe material	The length of the networks according to the operation period (years), km						Total		Depreciate		
	< 5	6-15	16-25	26-35	36-50	>50	km	%	km	%	
Steel	0,58	0,40	5,54	16,51	1,01	4,42	28,46	4%	21,94	0%	
Cast iron	0,43	0,43	12,77	33,55	44,59	44,99	136,76	19%	59,85	8%	
Concrete							0,00	0%		0%	
Reinforced concrete		0,80	9,24	92,70	100,98	23,26	226,98	31%	216,94	30%	
Asbestos-cemen	0,45	1,93	3,86	20,83	16,52	11,81	55,40	8%	35,33	5%	
Plastic	1,59	16,73	0,95	5,88	3,46		28,61	4%		0%	
Ceramics		1,21	7,79	41,83	57,48	139,08	247,39	34%	196,56	27%	
PVC							0,00	0%		0%	
Shell							0,00	0%		0%	
Brick							0,00	0%		0%	
<b>Total</b>	<b>3,05</b>	<b>21,50</b>	<b>40,15</b>	<b>211,30</b>	<b>224,04</b>	<b>223,56</b>	<b>723,60</b>	<b>x</b>	<b>530,62</b>	<b>x</b>	
<b>%</b>	<b>0%</b>	<b>3%</b>	<b>6%</b>	<b>29%</b>	<b>31%</b>	<b>31%</b>	<b>x</b>	<b>100</b>	<b>x</b>	<b>70%</b>	
Pipe material	The length according to the degree of wear and tear (%), km					Total, km	Commissioned in 2020		Replaced networks in 2020		
	< 25	26-50	50-75	76-90	>90		km	%	km	%	
Steel	6,52	17,52	2,59		1,83	28,46	0,19	0%	0,01	0%	
Cast iron	13,63	78,14		5,30	39,69	136,76	0,19	0%		0%	
Concrete						0,00		0%		0%	
Reinforced concr	10,04	193,68	21,35	1,85	0,06	226,98		0%		0%	
Asbestos-cemen	6,24	37,35	7,95	3,86		55,40	0,45	0%		0%	
Plastic	19,27	9,34				28,61	1,07	0%	0,26	0%	
Ceramics	9,00	99,31	100,03	35,05	4,00	247,39		0%		0%	
PVC						0,00		0%	0,27	0%	
Shell						0,00		0%		0%	
Brick						0,00		0%		0%	
<b>Total</b>	<b>64,70</b>	<b>435,34</b>	<b>131,92</b>	<b>46,06</b>	<b>45,58</b>	<b>723,60</b>	<b>1,90</b>	<b>x</b>	<b>0,54</b>	<b>x</b>	
<b>%</b>	<b>9</b>	<b>60</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>100</b>	<b>x</b>	<b>0%</b>	<b>x</b>	<b>0%</b>	
Wastewater network	Total networks		Old and emergency		Networks cost, thousand UAH						
	km	%	km	%	prime	depreciable	ear and tea	%			
Main sewers	141,00	19%	97,70	14%	45278,9	6691,8	38587,1	85%			
Pressure sewers		0%		0%			0,0	0%			
Deep-laid sewers		0%		0%			0,0	0%			
Street network	336,44	46%	56,64	8%	110604,3	18831,9	91772,4	83%			
Submain and yard network	246,16	34%	45,60	6%	80924,9	13778,6	67146,3	83%			
<b>Total</b>	<b>723,60</b>	<b>100%</b>	<b>199,9</b>	<b>28%</b>	<b>236808,1</b>	<b>39302,3</b>	<b>197505,8</b>	<b>83%</b>			

## Appendix B Form No. 6 НКРЕКР

Додаток 6  
до Правил організації діяльності, що надається суб'єктами господарювання у сферах теплопостачання, централізованого водопостачання та водовідведення до  
Національної комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг  
(пункт 3.6)

### ЗВІТНІСТЬ

Звітні та розрахункові дані про обсяги діяльності з централізованого водопостачання та/або централізованого водовідведення

за **2 квартал** 2023 року

Подають	Термін подання	Форма № 6-НКРЕКР-водопостачання/водовідведення (квартальна)
Суб'єкти господарювання, що мають ліцензію на провадження господарської діяльності з централізованого водопостачання та/або централізованого водовідведення	до 25 числа місяця, наступного за звітним періодом	
Національній комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг, та її територіальному органу у відповідному регіоні		ЗАТВЕРДЖЕНО Постанова Національної комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг, 31.05.2017 № 717
Респондент:		
Найменування суб'єкта господарювання:	<b>Миколаївське міське підприємство "Миколаївводоканал"</b>	
Код ЄДРПОУ:	31448144	
Місцезнаходження:	вул. Погранична, 161, м. Миколаїв, 54055 (поштовий індекс, область Автономна Республіка Крим, район, населений пункт, вулиця/приміщення, площа тощо, № будинку/корпусу, № офісу)	

### Розділ 1. Централізоване водопостачання

№ з/п	Показники	Код рядка	Одиниця виміру	За звітний квартал	За період з початку року
А	Б	В	Г	І	ІІ
1	Піднята вода, Q <sub>пл</sub> (рядок 030 + рядок 071 – рядок 060 – рядок 061)	010	тис. куб. м	6,644.50	12,719.42
2	Піднята вода за рік, за ІТНВПВ	020	тис. куб. м		39,098.15
3	Обсяг I підйому води, усього (рядок 031 + рядок 032 + рядок 033)	030	тис. куб. м	6,658.24	12,733.16
3.1	у т. ч.: поверхневий водозабір	031	тис. куб. м	4,613.78	8,058.91
3.2	підземний водозабір	032	тис. куб. м	29.95	49.55
3.3	вода, придбана до II підйому (що не відповідає нормативній якості питної води)	033	тис. куб. м	2,014.51	4,624.70
4	Витрати води на технологічні потреби до II підйому, фактично	040	тис. куб. м	540.16	1,041.16
5	Втрати води до II підйому, фактично	050	тис. куб. м	832.14	1,426.23
6	Обсяг реалізації води до II підйому (що не відповідає нормативній якості питної води)	060	тис. куб. м	13.74	13.74
7	Обсяг води для здійснення іншого виду діяльності, окрім централізованого водопостачання, що не відповідає нормативній якості питної води	061	тис. куб. м	0.00	0.00
8	Подано води в мережу (II підйом), усього	070	тис. куб. м	5,272.20	10,252.03
8.1	з них: придбана питна вода	071	тис. куб. м	0.00	0.00
9	Витрати питної води після II підйому, фактично	080	тис. куб. м	380.60	728.57
10	Втрати питної води після II підйому, фактично	090	тис. куб. м	2,057.39	4,046.81
11	Витрати питної води, за ІТНВПВ (% від піднятої води за рік)	100	%		13.98
12	Втрати питної води, за ІТНВПВ (% від піднятої води за рік)	110	%		28.00
13	Фактичні витрати питної води (% від піднятої води)	120	%	13.86	13.91
14	Фактичні втрати питної води (% від піднятої води)	130	%	43.49	43.03
15	Обсяг реалізації централізованого водопостачання, усього	140	тис. куб. м	2,834.21	5,476.65
15.1	у т. ч.: споживачам, які є суб'єктами господарювання у сфері централізованого водопостачання та/або централізованого водовідведення	141	тис. куб. м	0.00	0.00
15.2	населенню в житлових будинках індивідуальної забудови, усього	142	тис. куб. м	567.44	1,103.22
15.2.1	у т. ч.: без вузла комерційного обліку води	143	тис. куб. м	112.53	212.25
15.2.2	з вузлом комерційного обліку води, встановленим за кошти власників будівлі	144	тис. куб. м	454.91	890.97
15.2.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	145	тис. куб. м	0.00	
15.3	споживачам у багатоквартирних будинках за індивідуальними договорами, усього	150	тис. куб. м	1,763.84	3,485.09
15.3.1	у т. ч.: без вузла комерційного обліку води	151	тис. куб. м	1,711.29	3,389.09
15.3.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	152	тис. куб. м	52.55	96.00
15.3.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	153	тис. куб. м	0.00	0.00
15.4	споживачам у багатоквартирних будинках за колективними договорами та колективним споживачам, усього	154	тис. куб. м	119.38	218.13
15.4.1	у т. ч.: без вузла комерційного обліку води	155	тис. куб. м	11.31	19.87
15.4.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	156	тис. куб. м	108.07	198.26
15.4.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	157	тис. куб. м	0.00	0.00
15.5	підприємствам теплопостачання, усього	158	тис. куб. м	53.84	104.39
15.5.1	у т. ч.: без вузла комерційного обліку води	159	тис. куб. м	0.00	0.00
15.5.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	160	тис. куб. м	53.84	104.39
15.5.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	161	тис. куб. м	0.00	0.00
15.6	іншим споживачам (окрім обсягів у багатоквартирних будинках), усього	162	тис. куб. м	329.71	565.82
15.6.1	у т. ч.: без вузла комерційного обліку води	163	тис. куб. м	7.97	14.75
15.6.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	164	тис. куб. м	321.74	551.07
15.6.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	165	тис. куб. м	0.00	0.00

Продовження додатка 6

2

16	Обсяги водопостачання для здійснення інших видів діяльності ліцензіата, усього	170	тис. куб. м	0.00	0.00
16.1	у т. ч.: для виконання послуг з постачання гарячої води	171	тис. куб. м	0.00	0.00
16.2	для виконання інших видів діяльності	172	тис. куб. м	0.00	0.00
17	Загальний обсяг водопостачання	180	тис. куб. м	2,834.21	5,476.65

## Розділ 2. Централізоване водовідведення

№ п/п	Показники	Код района	Одиниця виміру	За звітний квартал	За період з початку року
А	Б	В	Г	І	Ж
1	Обсяг пропуску стічних вод через очисні споруди, усього	200	тис. куб. м	3,413.43	6,252.81
1.1	у т. ч.: обсяг пропуску стічних вод через власні очисні споруди	201	тис. куб. м	3,413.43	6,252.81
1.2	обсяг пропуску стічних вод через очисні споруди інших суб'єктів господарювання	202	тис. куб. м	0.00	0.00
2	Обсяг реалізації централізованого водовідведення	210	тис. куб. м	2,489.18	4,793.28
2.1	у т. ч.: споживачам, що є суб'єктами господарювання у сфері централізованого водопостачання та/або централізованого водовідведення	220	тис. куб. м	0.00	0.00
2.2	населенню на випуску з житлових будинків індивідуальної забудови, усього	230	тис. куб. м	178.23	363.03
2.2.1	у т. ч.: без вузла комерційного обліку води	231	тис. куб. м	27.00	55.70
	з вузлом комерційного обліку води, встановленим за кошти власників будівлі	232	тис. куб. м	151.23	307.33
2.2.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	233	тис. куб. м	0.00	0.00
2.3	споживачам у багатоквартирних будинках за індивідуальними договорами, усього	240	тис. куб. м	1,755.52	3,466.64
2.3.1	у т. ч.: без вузла комерційного обліку води	241	тис. куб. м	1,703.08	3,370.80
2.3.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	242	тис. куб. м	52.44	95.84
2.3.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	243	тис. куб. м	0.00	0.00
2.4	споживачам у багатоквартирних будинках за колективними договорами та колективним споживачам, усього	244	тис. куб. м	135.11	243.52
2.4.1	у т. ч.: без вузла комерційного обліку води	245	тис. куб. м	14.86	26.94
2.4.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	246	тис. куб. м	120.25	216.58
2.4.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	247	тис. куб. м	0.00	0.00
2.5	підприємствам теплопостачання, усього	250	тис. куб. м	44.04	66.91
2.5.1	у т. ч.: без вузла комерційного обліку води	251	тис. куб. м	4.37	8.69
2.5.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	252	тис. куб. м	39.67	58.22
2.5.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	253	тис. куб. м	0.00	0.00
2.6	іншим споживачам, усього	260	тис. куб. м	376.28	653.18
2.6.1	у т. ч.: без вузла комерційного обліку води	261	тис. куб. м	33.16	41.99
2.6.2	з вузлом комерційного обліку води, що встановлений за кошти власників будівлі або був у наявності при введенні будинку в експлуатацію	262	тис. куб. м	341.75	608.96
2.6.3	з вузлом комерційного обліку води, встановленим не за кошти власників будівлі	263	тис. куб. м	0.00	0.00
2.6.4	суб'єктам господарювання, що надають послуги з вивезення ріжких побутових відходів з вигрібних ям	264	тис. куб. м	1.37	2.23
3	Обсяг стічних вод від здійснення іншого виду діяльності (окрім централізованого водовідведення), усього	270	тис. куб. м	0.00	0.00
4	Загальний обсяг водовідведення	280	тис. куб. м	2,489.18	4,793.28
4.1	з них: обсяг поверхневих стічних вод (від атмосферних опадів)	281	тис. куб. м	0.00	0.00
4.2	обсяг стічних вод від централізованого постачання гарячої води	282	тис. куб. м	0.00	0.00
4.2.1	у т. ч.: споживачам в багатоквартирних будинках, усього	283	тис. куб. м	0.00	0.00
4.2.2	іншим споживачам, усього	284	тис. куб. м	0.00	0.00

\*) Дані заповнюються у випадку наявності інформації (обліку).

\_\_\_\_\_  
(підпис керівника (власника))**Б.Л.Дуденко**

(ініціали, прізвище)

\_\_\_\_\_  
(підпис головного бухгалтера)**О.В.Клис**

(ініціали, прізвище)

\_\_\_\_\_  
(підпис виконавця)**О.С.Аніщенко**

(ініціали, прізвище)

номер телефону виконавця: **0512-58-60-31**

номер мобільного телефону \_\_\_\_\_

електронна адреса виконавця: **anischenko\_os@vodokanal.m****k.ua**

Додаток 6  
до Протоколу організації комісії, що надається суб'єктом господарювання у сферах теплопостачання, централізованого водопостачання та водовідведення до Національної комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг (протокол № 3/2)

## ЗВІТНІСТЬ

Звітні та розрахункові дані про обсяги діяльності з централізованого водопостачання та/або водовідведення  
за **4 квартал** 2021 року

Подать	Термін подання
Суб'єкти господарювання, що мають ліцензію на провадження господарської діяльності з централізованого водопостачання та/або водовідведення	до останнього числа місяця, наступного за звітним періодом
Національній комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг, та її територіальному органу у відповідному регіоні	

Скоригований Форми № 6-НКРЕКП-  
водопостачання/водовідведення (квартальна)  
ЗАТВЕРДЖЕНО  
Постанова Національної комісії, що здійснює державне регулювання у сферах енергетики та комунальних послуг,  
31.05.2017 № 717

Респондент:	
Найменування суб'єкта господарювання:	<b>Міське комунальне підприємство «Миколаївводоканал»</b>
Код ЄДРПОУ:	31448144
Місцезнаходження:	54055, м.Миколаїв, вул.Погранична, 161 (поштовий індекс, область Автономна Республіка Крим, район, населеної пункту, вулиця/провулок, площа тощо, № будинку/корпусу, № квартири/офісу)

Розділ 1. Централізоване водопостачання		Код рядка	Одиниця виміру	За звітний квартал	За період з початку року
№ з/п	Пояснення	А	Б	Г	Д
1	Піднята вода, Q <sub>під</sub> (рядок 030 + рядок 071 – рядок 060 – рядок 061)	010	тис. куб. м	8,960.91	37,541.38
2	Піднята вода за рік, за ІТНВПВ	020	тис. куб. м		44,808.70
3	Обсяг I підйому води, усього (рядок 031 + рядок 032 + рядок 033)	030	тис. куб. м	9,972.15	42,065.77
3.1	у т. ч.: поверхневий водозабір	031	тис. куб. м	9,945.80	41,949.90
3.2	підривний водозабір	032	тис. куб. м	26.35	115.87
3.3	вода, придбана до II підйому (що не відповідає нормативній якості питної води)	033	тис. куб. м	0.00	0.00
4	Витрати води на технологічні потреби до II підйому, фактично	040	тис. куб. м	612.49	2,357.99
5	Втрати води до II підйому, фактично	050	тис. куб. м	255.71	2,641.33
6	Обсяг реалізації води до II підйому (що не відповідає нормативній якості питної води)	060	тис. куб. м	1,011.24	4,524.39
6.1	Обсяг води для здійснення іншого виду діяльності, окрім централізованого водопостачання, що не відповідає нормативній якості питної води	061	тис. куб. м	0.00	0.00
7	Подано води в мережу (II підйом), усього	070	тис. куб. м	8,092.71	32,542.06
7.1	у т. ч.: придбана питна вода	071	тис. куб. м	0.00	0.00
8	Витрати питної води після II підйому, фактично	080	тис. куб. м	629.03	2,994.92
9	Втрати питної води після II підйому, фактично	090	тис. куб. м	2,135.39	8,513.68
10	Витрати питної води, за ІТНВПВ (% від піднятої води за рік)	100	%		13.98
11	Втрати питної води, за ІТНВПВ (% від піднятої води за рік)	110	%		28.00
12	Фактичні витрати питної води (% від піднятої води)	120	%	13.85	14.26
13	Фактичні втрати питної води (% від піднятої води)	130	%	26.68	29.71
14	Витрати та витрати питної води, усього за ІТНВПВ (% від поданої води в мережу за рік)	131	%		0.00
15	Втрати та витрати питної води в системі ПРВ, за ІТНВПВ (% від поданої води в мережу за рік)	132	%		0.00
16	Фактичні втрати та витрати питної води, усього (% від поданої води в мережу)	133	%	44.89	50.73
17	Фактичні втрати та витрати питної води в системі ПРВ (% від поданої води в мережу)	134	%	34.16	35.37
18	Обсяг реалізації централізованого водопостачання	140	тис. куб. м	2,467.55	9,676.54
18.1	у т. ч.: споживачам, які є суб'єктами господарювання у сфері централізованого водопостачання та/або водовідведення	150	тис. куб. м	0.00	0.00
18.2	населенню (індивідуальні житлові будинки), усього	151	тис. куб. м	846.93	3,426.43
18.2.1	у т. ч.: за приладами обліку води	152	тис. куб. м	736.14	3,064.75
18.2.2	без приладів обліку води	153	тис. куб. м	110.79	361.68
18.3	бюджетним установам	154	тис. куб. м	266.31	1,000.09
18.4	іншим споживачам	155	тис. куб. м	1,354.31	5,250.02
18.4.1	з них на вводи в багатоквартирні будинки, де ліцензіат не є виконавцем послуг з централізованого постачання холодної води, водовідведення (з використанням внутрішньобудинкових систем), усього	156	тис. куб. м	247.01	1,009.04
18.4.1.1	у т. ч.: за загальнобудинковими приладами обліку води	157	тис. куб. м	227.68	934.24
18.4.1.2	без загальнобудинкових приладів обліку води	158	тис. куб. м	19.33	74.80
18.4.2	підприємствам теплопостачання, усього	159	тис. куб. м	194.01	521.37
18.4.2.1	з них для приготування гарячої води у багатоквартирних будинках, де ліцензіат є виконавцем послуг з ЦПХВ та водовідведення (з використанням внутрішньобудинкових систем), усього	160	тис. куб. м	0.00	0.00
18.4.2.1.1	у т. ч.: за приладами обліку води на тепловпунктах	161	тис. куб. м	0.00	0.00
18.4.2.1.2	без приладів обліку води	162	тис. куб. м	0.00	0.00
19	Обсяги водопостачання для здійснення інших видів діяльності ліцензіата, усього	170	тис. куб. м	2,860.74	11,356.92
19.1	у т. ч.: для виконання послуг з ЦПХВВ (з використанням внутрішньобудинкових систем), усього	171	тис. куб. м	2,860.74	11,356.92
19.1.1	у т. ч.: за загальнобудинковими приладами обліку води	172	тис. куб. м	40.08	163.31
19.1.2	без загальнобудинкових приладів обліку води	173	тис. куб. м	2,820.66	11,193.61
19.2	для виконання послуг з ЦПГВ, де ліцензіат є виконавцем послуг з ЦПХВВ (з використанням внутрішньобудинкових систем), усього	174	тис. куб. м	0.00	0.00
19.2.1	у т. ч.: за загальнобудинковими приладами обліку води	175	тис. куб. м	0.00	0.00
19.2.2	без загальнобудинкових приладів обліку води	176	тис. куб. м	0.00	0.00
19.3	для виконання інших видів діяльності	177	тис. куб. м	0.00	0.00
20	Загальний обсяг водопостачання	180	тис. куб. м	5,328.29	21,033.46
Розділ 2. Централізоване водовідведення		Код рядка	Одиниця виміру	За звітний квартал	За період з початку року
№ з/п	Пояснення	А	Б	Г	Д
1	Обсяги пропуску стічних вод через очисні споруди, усього	200	тис. куб. м	4,522.94	19,004.63
1.1	у т. ч.: обсяги пропуску стічних вод через власні очисні споруди	201	тис. куб. м	4,522.94	19,004.63
1.2	обсяги пропуску стічних вод через очисні споруди інших суб'єктів господарювання	202	тис. куб. м	0.00	0.00

				Продовження додатка 6	
		2			
2	<b>Обсяг реалізації централізованого водовідведення</b>	210	тис. куб. м	<b>1,765.42</b>	<b>6,915.87</b>
2.1	у т. ч.: споживачам, що є суб'єктами господарювання у сфері централізованого водопостачання та/або водовідведення	220	тис. куб. м	0.00	0.00
2.2	населенню (на випуску з індивідуальних житлових будинків), усього	230	тис. куб. м	292.38	1,116.76
2.2.1	у т. ч.: за приладами обліку води	231	тис. куб. м	254.78	1,007.15
2.2.2	без приладів обліку води	232	тис. куб. м	37.60	109.61
2.3	бюджетним установам	240	тис. куб. м	267.44	986.80
2.3.1	з них: обсяг поверхневих стічних вод (атмосферних опадів)	241	тис. куб. м	0.00	0.00
2.4	іншим споживачам	250	тис. куб. м	1,205.60	4,812.31
2.4.1	з них: на випуску з багатоквартирних будинків, де ліцензіат не є виконавцем послуги з ЦПХВ та водовідведення (з використанням внутрішньобудинкових систем), усього	251	тис. куб. м	252.95	1,029.51
2.4.1.1	у т. ч.: за загальнобудинковими приладами обліку води	252	тис. куб. м	224.78	920.98
2.4.1.2	без загальнобудинкових приладів обліку води	253	тис. куб. м	28.17	108.53
2.4.2	підприємствам теплопостачання	254	тис. куб. м	9.09	31.03
2.4.3	обсяг стічних вод (різних побутових відходів) з вигрібних ям	255	тис. куб. м	29.74	70.97
2.4.4	обсяг поверхневих стічних вод (атмосферних опадів)	260	тис. куб. м	0.00	0.00
3	<b>Обсяги стічних вод від здійснення іншого виду діяльності (окрім централізованого водопостачання), усього</b>	270	тис. куб. м	<b>2,829.61</b>	<b>11,251.12</b>
3.1	у т. ч.: від виконання послуг з ЦПХВ (з використанням внутрішньобудинкових мереж), усього	271	тис. куб. м	2,829.61	11,251.12
3.1.1	у т. ч.: за загальнобудинковими приладами обліку води	272	тис. куб. м	40.08	163.31
3.1.2	без загальнобудинкових приладів обліку води	273	тис. куб. м	2,789.53	11,087.81
3.2	від здійснення інших видів діяльності	274	тис. куб. м	0.00	0.00
4	<b>Загальний обсяг водовідведення</b>	280	тис. куб. м	<b>4,595.03</b>	<b>18,166.99</b>
№ з/п	Детальний	Код району	Одиниця виміру	За липень кварталу	За період з початку року
А	Б	В	Г	Д	Е
1	Подано води у внутрішньобудинкові системи багатоквартирних будинків, де ліцензіат є виконавцем послуг з централізованого постачання холодної води, усього	300	тис. куб. м	2,860.74	11,356.92
1.1	у т. ч.: за загальнобудинковими приладами обліку води	301	тис. куб. м	40.08	163.31
1.2	без загальнобудинкових приладів обліку води	302	тис. куб. м	2,820.66	11,193.61
2	Необліковані витрати води у внутрішньобудинкових системах, за нормою	310	тис. куб. м	0.00	0.00
3	Необліковані витрати води у внутрішньобудинкових системах багатоквартирних будинків з загальнобудинковими приладами обліку води, фактично	311	тис. куб. м	0.00	0.00
3.1	Необліковані витрати води у внутрішньобудинкових системах багатоквартирних будинків з загальнобудинковими приладами обліку води, фактично (% від поданої води у внутрішньобудинкові системи)	312	%	0.00	0.00
3.2	Необліковані витрати води у внутрішньобудинкових системах багатоквартирних будинків без загальнобудинкових приладів обліку води, фактично	313	тис. куб. м	0.00	0.00
3.3	Необліковані витрати води у внутрішньобудинкових системах багатоквартирних будинків без загальнобудинкових приладів обліку води, фактично (% від поданої води у внутрішньобудинкові системи)	314	%	0.00	0.00
4	<b>Обсяг реалізації централізованого постачання холодної води (з використанням внутрішньобудинкових систем), усього</b>	320	тис. куб. м	<b>2,860.74</b>	<b>11,356.92</b>
4.1	у т. ч.: населенню	330	тис. куб. м	2,799.29	11,115.61
4.1.1	у т. ч.: за квартирними приладами обліку води	331	тис. куб. м	2,152.36	8,869.63
4.1.2	без приладів обліку води	332	тис. куб. м	646.93	2,247.98
4.2	бюджетним установам	340	тис. куб. м	5.46	19.05
4.2.1	у т. ч.: за приладами обліку води	341	тис. куб. м	4.75	16.51
4.2.2	без приладів обліку води	342	тис. куб. м	0.71	2.54
4.3	іншим споживачам	350	тис. куб. м	55.99	222.26
4.3.1	у т. ч.: за приладами обліку води	351	тис. куб. м	55.97	222.17
4.3.2	без приладів обліку води	352	тис. куб. м	0.02	0.09
5	<b>Обсяг відведення стічних вод від багатоквартирних будинків, де ліцензіат є виконавцем послуг з централізованого постачання холодної води та водовідведення (з використанням внутрішньобудинкових систем), усього</b>	400	тис. куб. м	<b>2,829.61</b>	<b>11,251.12</b>
6	<b>Обсяг відведення стічних вод від необлікованих витрат води у внутрішньобудинкових системах</b>	410	тис. куб. м	<b>0.00</b>	<b>0.00</b>
7	<b>Обсяг реалізації водовідведення (з використанням внутрішньобудинкових систем) споживачам, усього</b>	420	тис. куб. м	<b>2,829.61</b>	<b>11,251.12</b>
7.1	у т. ч.: обсяг стічних вод від централізованого постачання холодної води (з використанням внутрішньобудинкових систем), усього	430	тис. куб. м	2,829.61	11,251.12
7.1.1	у т. ч.: населенню	440	тис. куб. м	2,773.81	11,029.20
7.1.1.1	у т. ч.: за приладами обліку води	441	тис. куб. м	2,150.42	8,869.22
7.1.1.2	без приладів обліку води	442	тис. куб. м	623.39	2,159.98
7.1.2	бюджетним установам	450	тис. куб. м	5.19	18.37
7.1.2.1	у т. ч.: за приладами обліку води	451	тис. куб. м	4.48	15.83
7.1.2.2	без приладів обліку води	452	тис. куб. м	0.71	2.54
7.1.3	іншим споживачам	460	тис. куб. м	50.61	203.55
7.1.3.1	у т. ч.: за приладами обліку води	461	тис. куб. м	50.59	203.46
7.1.3.2	без приладів обліку води	462	тис. куб. м	0.02	0.09
7.2	обсяг стічних вод від централізованого постачання гарячої води (з використанням внутрішньобудинкових систем), усього	470	тис. куб. м	0.00	0.00
7.2.1	у т. ч.: населенню	480	тис. куб. м	0.00	0.00
7.2.1.1	у т. ч.: за приладами обліку води	481	тис. куб. м	0.00	0.00
7.2.1.2	без приладів обліку води	482	тис. куб. м	0.00	0.00
7.2.2	бюджетним установам	490	тис. куб. м	0.00	0.00
7.2.2.1	у т. ч.: за приладами обліку води	491	тис. куб. м	0.00	0.00
7.2.2.2	без приладів обліку води	492	тис. куб. м	0.00	0.00
7.2.3	іншим споживачам	500	тис. куб. м	0.00	0.00
7.2.3.1	у т. ч.: за приладами обліку води	501	тис. куб. м	0.00	0.00
7.2.3.2	без приладів обліку води	502	тис. куб. м	0.00	0.00

(підпис керівника (власника))

**Борис ДУДЕНКО**

(ініціали, прізвище)

(підпис головного бухгалтера)

**Олена КЛІС**

(ініціали, прізвище)

(підпис виконавця)

**Ольга АНШЕНКО**

(ініціали, прізвище)

номер телефону виконавця: (0512) 58-60-31, 24-01-68

факс:


електронна адреса виконавця: [anschenko\\_os@vodokanal.mk.ua](mailto:anschenko_os@vodokanal.mk.ua)

## Appendix C Layouts

1. Mykolaiv City
2. Mykolaiv City with District Boundaries
3. Existing Water Supply – Mykolaiv North and South
4. Existing Sewer – Mykolaiv North and South



Legend:

 City Boundary

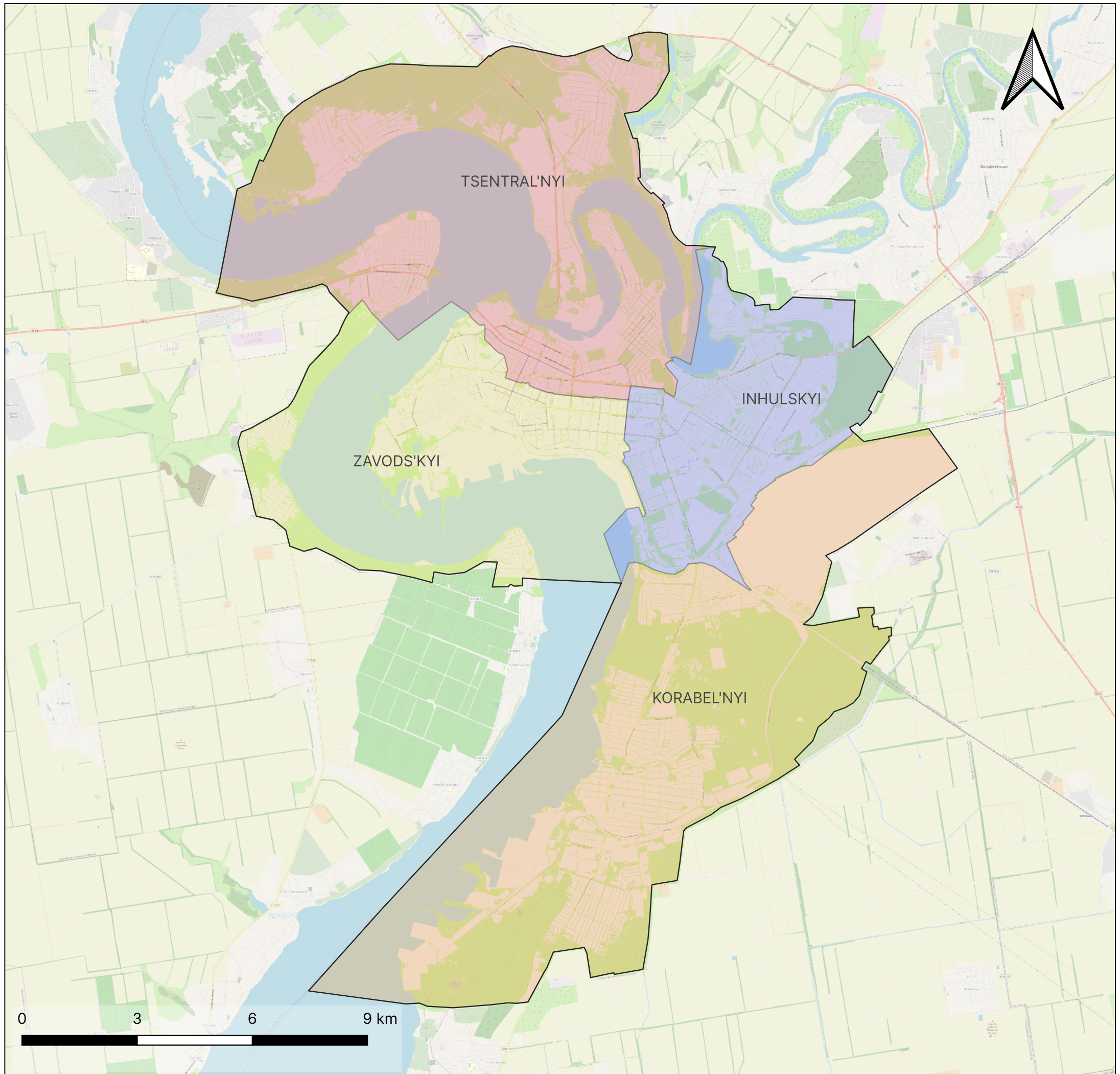


Project Title:  
Assistance to the Development of the Mykolaiv Masterplan






Drawing Title:  
Mykolaiv City

1.0	19/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED





**Legend:**

-  City Boundary
- Districts**
-  INHULSKYI
-  KORABEL'NYI
-  TSENTRAL'NYI
-  ZAVODS'KYI

**ODESSA**



**Project Title:**  
Assistance to the Development of the Mykolaiv Masterplan

**Drawing Title:**  
Mykolaiv City with District Boundaries

1.0	18/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED





- Legend:**
- Reservoirs
  - Pumping Station
  - Water Supply Pumps
- Water Supply Network**
- 0 - 133 mm
  - 150 - 350 mm
  - 400 - 600 mm
  - 700 - 1800 mm
- Not under the responsibility of Vodokanal**
- Private Network
- City Boundary**
- City Boundary
- Districts**
- INHULSKYI
  - KORABEL'NYI
  - TSENTRAL'NYI
  - ZAVODS'KYI

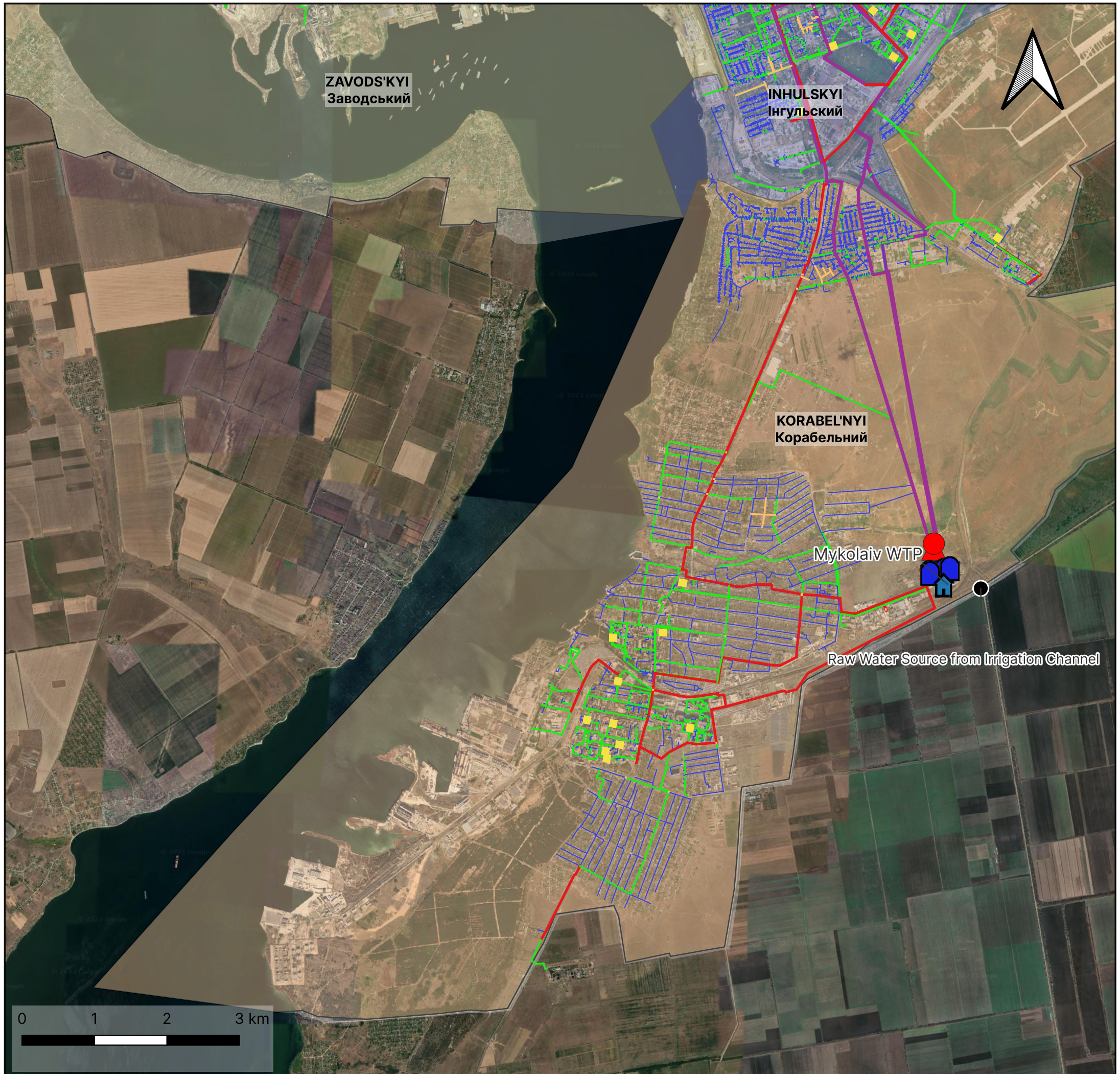


**Project Title:**  
Assistance to the Development of the Mykolaiv Masterplan

**Drawing Title:**  
Existing Water Supply - Mykolaiv North

1.0	23/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED





**Legend:**

- Raw Water Source
- 🏠 Water Treatment Plant
- 🏊 Reservoirs
- 🔴 Pumping Station
- 🟡 Water Supply Pumps

**Water Supply Network**

- 0 - 133 mm
- 150 - 350 mm
- 400 - 600 mm
- 700 - 1800 mm

**Not under the responsibility of Vodokanal**

- Private Network

**City Boundary**

**Districts**

- 🟦 INHULSKYI
- 🟧 KORABEL'NYI
- 🟨 ZAVODS'KYI

**ODESSA**



**Project Title:**  
Assistance to the Development of the Mykolaiv Masterplan

**Drawing Title:**  
Existing Water Supply - Mykolaiv South

1.0	23/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED





**Legend:**

- U Pumping Stations
- Sewage Discharge Chambers
- Pressure Pipes**
- - - 0 - 400 mm
- - - 500 - 600 mm
- - - 800 - 1400 mm
- Gravity Pipes**
- 0 - 400 mm
- 500 - 600 mm
- 800 - 1600 mm
- City Boundary
- Districts**
- INHULSKYI
- KORABEL'NYI
- TSENTRAL'NYI
- ZAVODS'KYI

**ODESSA**



Project Title:  
Assistance to the Development of the Mykolaiv Masterplan

Drawing Title:  
Existing Sewer - Mykolaiv North

1.0	19/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED





Legend:

- Wastewater Treatment Plant
- Pumping Stations
- Sewage Discharge Chambers

- Pressure Pipes
- 0 - 400 mm
  - 500 - 600 mm
  - 800 - 1400 mm

- Gravity Pipes
- 0 - 400 mm
  - 500 - 600 mm
  - 800 - 1600 mm

City Boundary

- Districts
- INHULSKYI
  - KORABEL'NYI
  - ZAVODS'KYI

ODESSA



Project Title:  
Assistance to the Development of the Mykolaiv Masterplan

Drawing Title:  
Existing Sewer - Mykolaiv South

1.0	19/10/2023	TGSZ	TEKB	CIVY
REV.	DATE	PREPARED	CHECKED	APPROVED

