Protecting the living environment

Discharging domestic wastewater into sewer pipes keeps towns clean and hygienic, and protects the living environment by reducing odors and pest infestations.

Protecting the city from disasters

Stormwater falling on the city is collected in sewer pipes and discharged into rivers and the sea, or temporarily stored in sewer pipes, protecting the city from flooding.

Protecting the natural environment

By cleaning domestic wastewater at wastewater treatment plants and returning it to rivers and the sea, the natural environment of the surrounding area is protected.

Protecting the future environment

Clean water and by-products of sewage treatment are reused. We also work to reduce greenhouse gas emissions.

WASTEWATER TREATMENT PLANTS

REACTION TANKS

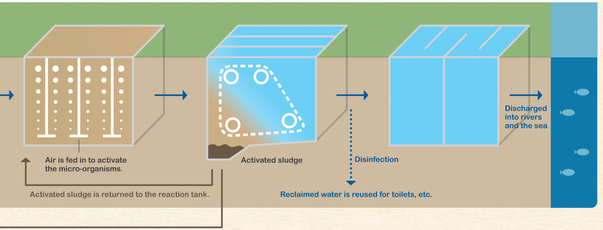
The action of micro-organisms in activated sludge (a mass of micro-organisms and organic matter) removes pollutants (organic matter, nitrogen, phosphorus, etc.).

FINAL SEDIMENTATION TANK

The activated sludge gathers and sinks, and the effluent flows to the disinfection facility. Most of the settled activated sludge is returned to the reaction tank, while the remainder is sent to the sludge treatment plant.

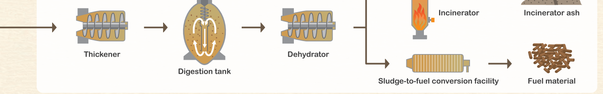
DISINFECTION FACILITY

The cleaned water is further disinfected. The water is then discharged into rivers and the sea.



SLUDGE TREATMENT PLANTS

Sludge sent from wastewater treatment plants is treated and reused as a resource.



Yokohama's sewage works and the SDGs

The City of Yokohama's sewerage system is related to 11 of the 17 Sustainable Development Goals (SDGs) adopted at the UN Summit in 2015, and efforts are being made to achieve these goals.

Goals relevant to Yokohama's sewerage system

Dear citizens of Yokohama

Preparation for heavy rain

Internal water flood hazard maps are available, which provide various information on areas that are likely to be inundated by sewer pipes and waterways in the event of heavy rainfall, as well as the depths to which they will be inundated. Please check before heavy rainfall.

City of Yokohama Website
Internal water flood hazard map

For more info

A 12-minute video, "Kaba no Dai-chan no Gesuido Kyoshitsu" (Kaba no Dai-chan's Sewerage Classroom) is now available, which explains Yokohama's sewerage system in an easy-to-understand manner for everyone from primary school students to adults.

Sewage treatment system introductory video

Site visits

Tours are available at the wastewater treatment plants and the sludge treatment plants. If you wish to visit, please contact the plants.

Introduction to wastewater treatment plants, etc.

Your cooperation is requested

Please do not pour waste, oil, chemicals, etc. into the sewers. It can clog sewer pipes, and pollute rivers and the sea, so wastewater treatment may not be carried out properly. We ask for your cooperation.

●For further information, please contact:
Facility Management Division, Sewerage and Rivers Bureau, City of Yokohama
6-50-10, Honcho, Naka-ku, Yokohama
045-671-3969 045-641-4870
E-mail:gk-shisetsukanri@city.yokohama.jp

Prepared in April 2024

Sewerage and Rivers Bureau, City of Yokohama

THE ROLE OF THE SEWERAGE SYSTEM

Where does the water we casually use and flush away, or rainwater, go?
What role does the sewerage system play?

City of Yokohama water environment character-
Kaba-no-Dai-chan

SEWAGE TREATMENT PROCESS

There are two types of water that flow into the sewerage system: sewage and stormwater. Sewage is sent to the wastewater treatment plants, and then turned into clean water, and discharged into rivers and the sea. Stormwater is discharged into rivers and the sea via sewer pipes and stormwater drainage pumping stations.

SEWER PIPES

Sewage and stormwater are sent to pumping stations and water treatment plants by means of slight gradients. Stormwater may also be discharged directly into rivers or the sea.

PUMPING STATIONS

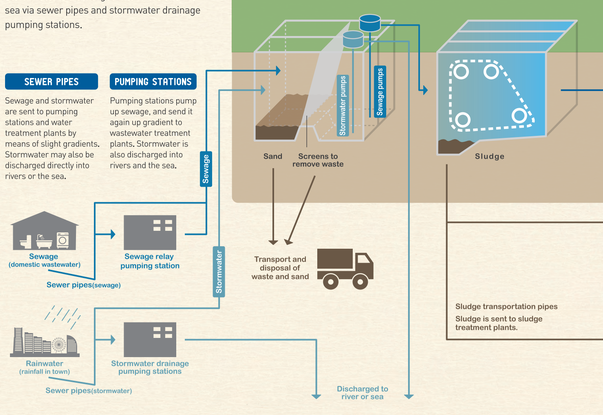
Pumping stations pump up sewage, and send it again up gradient to wastewater treatment plants. Stormwater is also discharged into rivers and the sea.

SETTLING GRIT CHAMBER AND PUMPING FACILITY

Removes large pieces of waste and sand from the sewage as it flows downstream. The sewage is then pumped to the primary sedimentation tank.

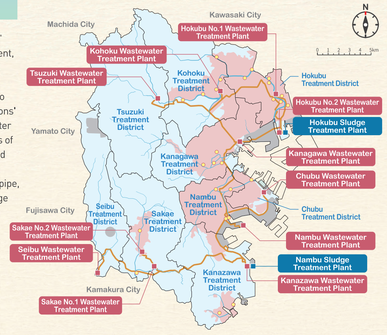
PRIMARY SEDIMENTATION TANK

Suspended solids in the incoming water slowly sink, and the effluent flows into a reaction tank. The settled sludge is sent to sludge treatment plants.



SEWERAGE FACILITIES IN THE CITY

Sewerage facilities include "sewer pipes" that channel sewage down a slight gradient, "wastewater treatment plants" that turn sewage into clean water, and "sludge treatment plants" that convert sludge into resources. There are also 'pumping stations' for relaying sewage or draining stormwater into rivers or the sea. There are two types of sewage collection systems: combined and separate. The combined system collects sewage and stormwater together in one pipe, while the separate system collects sewage and stormwater in separate pipes.



(End of 2020)

Legend

- Combined area
- Separate area
- Treatment district boundary
- Outside the Sewerage Act project planning area (within the planning area boundary)
- Outside the planning area
- Wastewater treatment plants (11)
- Sludge treatment plants (2)
- Pumping stations (26)
- Sludge transportation pipes

Administrative wards and sewage treatment districts

There are 18 administrative wards in the city, but apart from these, the city is divided into nine districts according to topography to facilitate the collection of sewage, which are called treatment districts.

Sewers in the city

The city's underground sewage system is a network of sewer pipes with diameters ranging from about 25 cm to 8.5 m.
Its total length is approximately 12,000 km, which is longer than the distance between Yokohama and New York.

▲The locations of underground sewer pipes in the city can be viewed on the Dai-chan Map on the City of Yokohama website.

COLUMN 1

Do you know the differences between manholes?

There are various types of manholes. Water that flows through a manhole in a combined area or a manhole marked "osui" (sewage) is treated at a wastewater treatment plant, while water that flows through a manhole marked "ame" (stormwater) is discharged directly into a river or the sea. What manholes are there near you?

Manholes in the City of Yokohama are numbered so that their locations can be identified. ▲

Maintenance of wastewater treatment plants

24-hour operation monitoring

The City of Yokohama processes approximately 1.5 million m^3 of sewage per day. As sewage flows into the wastewater treatment plants constantly, staff are stationed there 24 hours a day to ensure that it is treated without a break. The equipment at the wastewater treatment plants and pumping stations is automated and centrally controlled from a central operations room in the wastewater treatment plant. In addition, inspections, repairs and renewals are carried out regularly to ensure that the equipment is always in good working order.

Central operations room at a wastewater treatment plant
This is where the plant's operational status is monitored. ▶

Water quality management

To ensure stable treated water quality, water quality tests are carried out at each stage of the water treatment process. Sewage is cleaned by microorganisms. The plant's operation and management ensures that the activated sludge microorganisms in the reaction tanks are kept in good condition. More than 40 effluent standards are applied to the discharged water, and compliance with standard values is checked.

Microorganisms that clean sewage
Microorganisms vary according to region, temperature, etc. ▶

Stormwater drainage

How stormwater drainage works

During heavy rainfall, the stormwater that falls on the city collects in the sewer pipes, and large amounts of stormwater flow into the wastewater treatment plants and pumping stations. Large pumps pump up the stormwater that flows into the city, and smoothly discharge it into rivers and the sea so that the city is not flooded. The wastewater treatment plants and pumping stations are also equipped with power generation facilities and engines to operate the pumps in the event of a power failure.

Generators to power stormwater pumps ▶

Preparedness for heavy rain

The wastewater treatment plants constantly maintain pumps and power generation equipment, and also conduct drills in case of emergencies. In addition, agreements on emergency measures in the event of a disaster have been concluded with private companies, and joint drills are conducted so that if the wastewater treatment plants or other facilities are compromised by a disaster, they can take immediate emergency measures.

In 2004, Typhoon No.22 flooded the west exit of Yokohama Station. ▶

COLUMN 2

"Stormwater tanks" under the ground

As a flood control measure in the basin of the Tsurumi River, a Class A river that flows through the City of Yokohama, there is the Nippa Suehiro Trunk line, the largest stormwater storage pipe in the city. This pipeline has a drainage area of approximately 4,500 ha, a storage capacity of approximately 410,000 m^3, a maximum pipe diameter of 8.5 m, and a total length of approximately 20 km. It is large enough to accommodate a blue whale.

During heavy rainfall, stormwater is collected here. There are a number of shafts that serve as entrances and exits. ▲

EFFECTIVE USE OF SEWERAGE RESOURCES AND ASSETS

The City of Yokohama makes effective use of sludge and recycled water, which are by-products of sewage treatment, and of facilities such as wastewater treatment plants in various ways.

Effective use of sewerage resources and assets

01 Sludge
Fuel, construction materials, etc.

Effective use of digestion gas

Sludge is decomposed by microorganisms in the digestion tanks, and digestion gas is generated. The digestion gas contains methane, which is effectively used as fuel for generators and auxiliary fuel for incinerators.

▲ Digestion tank at a sludge treatment plant

Effective use of incinerated ash

Incinerated ash is effectively used as an additive for improved soil and a raw material for construction materials, contributing to a recycling-based society.

Conversion of sludge into fuel

Sludge is converted into a resource and used as an alternative fuel to coal, thereby contributing to the prevention of global warming.

▲ Alternative fuel made from sludge

Use of phosphorus as fertilizer

Phosphorus is recovered from sludge as a raw material for fertilizers, contributing to domestic production and stable supply of fertilizers.

▲ Recovered phosphorus
Source: Ministry of Land, Infrastructure, Transport and Tourism website

02 Reclaimed water
Toilet water, streams, etc.

Effective use of recycled water

Some of the water cleaned at the wastewater treatment plants (recycled water) is sent to nearby commercial facilities and Yokohama City Hall, and used as a heat source for air-conditioning, toilet flushing water, for streams, etc.

▲ Seasonal plants can be viewed around the 4 km-long Egawa stream.

▲ Mark indicating that recycled water is used for toilets.

03 Facilities
Solar power generation, etc.

Effective use of facilities

The upper parts of facilities such as the wastewater treatment plants and stormwater reservoirs for pollution control are used for solar power generation projects. In addition, playing fields and open spaces have been created and opened as facilities for public use.

▲ Electricity generated from the tops of facilities is sold to power companies.

▲ The upper part of the facility is open to the public as a playing field.

INITIATIVES FOR A SUSTAINABLE SOCIETY

Decarbonization initiatives

In the sewerage business, we are working towards 'zero greenhouse gas emissions' and 'environmentally friendly use of electricity' by FY2030. From 2030 onwards, we aim to achieve virtually zero greenhouse gas emissions by using decarbonized electricity, and through initiatives such as 'greenhouse gas utilization'.

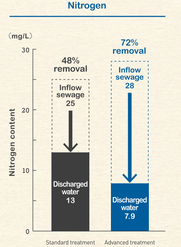
CARBON NEUTRALITY

Initiatives with particular focus up to 2030	Initiatives of particular importance after 2030
Zero greenhouse gas emissions Changing over to equipment with reduced emissions	**Use of greenhouse gases** Reducing emissions of greenhouse gases
Use of eco-friendly electricity Reducing emissions from electricity usage	**Compensating for emissions** Compensate for emissions with other initiatives

Advanced treatment

Advanced treatment is a treatment method that removes nitrogen and phosphorus in addition to the organic matter removed by conventional sewage treatment. Nitrogen and phosphorus are nutrients for plankton, so removing them makes it more difficult for red tides to occur.

◀ Red tide in Tokyo Bay
The brownish color is plankton, which has developed in large quantities, and deprives fish of the oxygen they need to survive.



COLUMN 3

Widespread use of sewerage systems and river water

When sewerage systems are widespread, river water becomes cleaner. A quantifiable indicator of water cleanliness is BOD (biochemical oxygen demand). As shown in the graph on the right, it can be seen that BOD has decreased as sewerage systems have become more widespread.