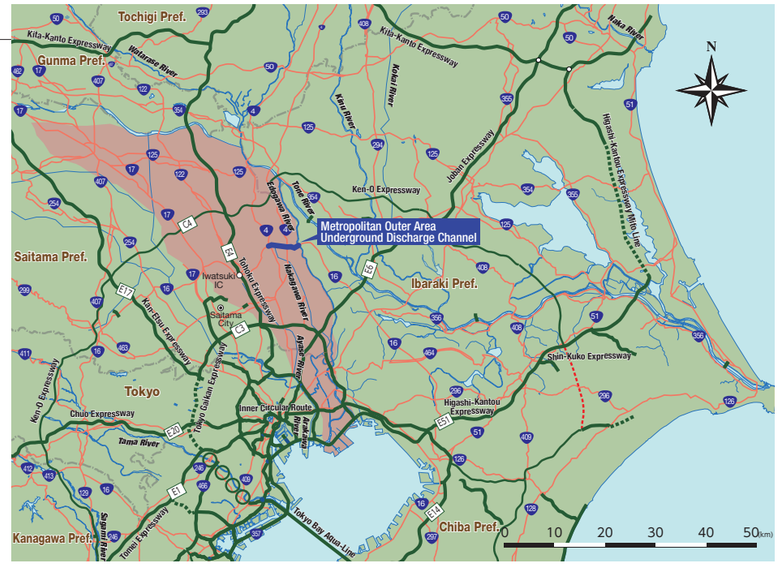
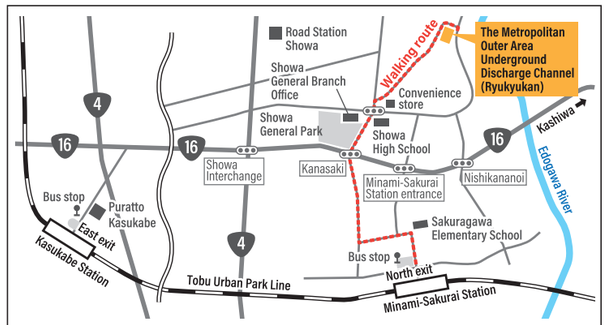
Location



Overview of the Metropolitan Outer Area Underground Discharge Channel (Ryukyukan)



Train: 40 minute walk (about 3 km) from Minami-Sakurai Station on the Tobu Urban Park Line
Car: 30 minutes (about 17 km) by car from Iwatsuki IC (Touhoku Expressway) towards Noda using Route 16
Car: 40 minutes (about 20 km) by car from Kashiwa IC (Joban Expressway) towards Noda using Route 16

■ **The Metropolitan Outer Area Underground Discharge Channel Branch Administration Office**

Phone : 048-746-7524

■ **Ryukyukan**

Opening Hours

9:30 to 16:30 (Last entry at 16:00)

Closed

Mondays and year-end/New Year's holidays

(* Mondays are exclusively for group tours.)

Address

720 Kamikanasaki, Kasukabe City, Saitama Prefecture, 344-0111

Phone: 048-747-0281 (Tours)

Phone: 048-746-0748 (Ryukyukan exhibit hall)

The Showa Drainage-Pump Station of the Metropolitan Outer Area Underground Discharge Channel is one of the "Best 100 Viewing Spots of Mt. Fuji in Kanto."

The Best 100 Viewing Spots of Mt. Fuji in Kanto is a collection of areas in the Kanto region known for their excellent views of Mt. Fuji. This collection aims to create beautiful communities by supporting the utilization and preservation of the surrounding landscape.

The Showa Drainage-Pump Station of the Metropolitan Outer Area Underground Discharge Channel, where Ryukyukan is located, has been selected as one of these viewing spots.

You can see Mt. Fuji from the popular Ryukyukan with the Saitama New Urban Center skyline in the foreground.

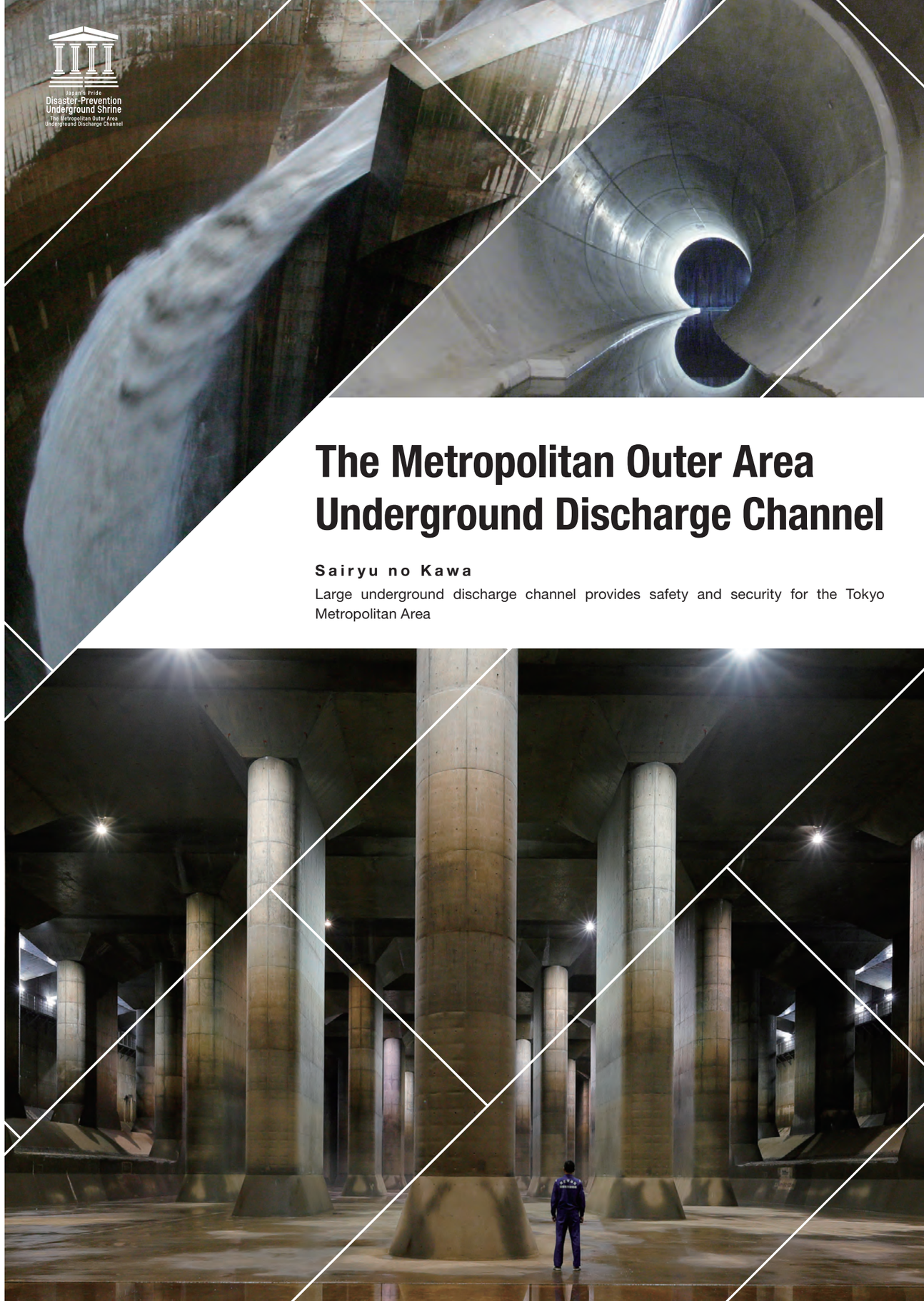
Edogawa River Office, Kanto Regional Development Bureau, Ministry of Land, Infrastructure, Transportation and Tourism

134 Miyazaki, Noda City, Chiba Prefecture, 278-0005 Phone: 04-7125-7311 (Reception)

Website: https://www.ktr.mlit.go.jp/edogawa

March 2020

Japan's Pride
Disaster-Prevention Underground Shrine
The Metropolitan Outer Area Underground Discharge Channel



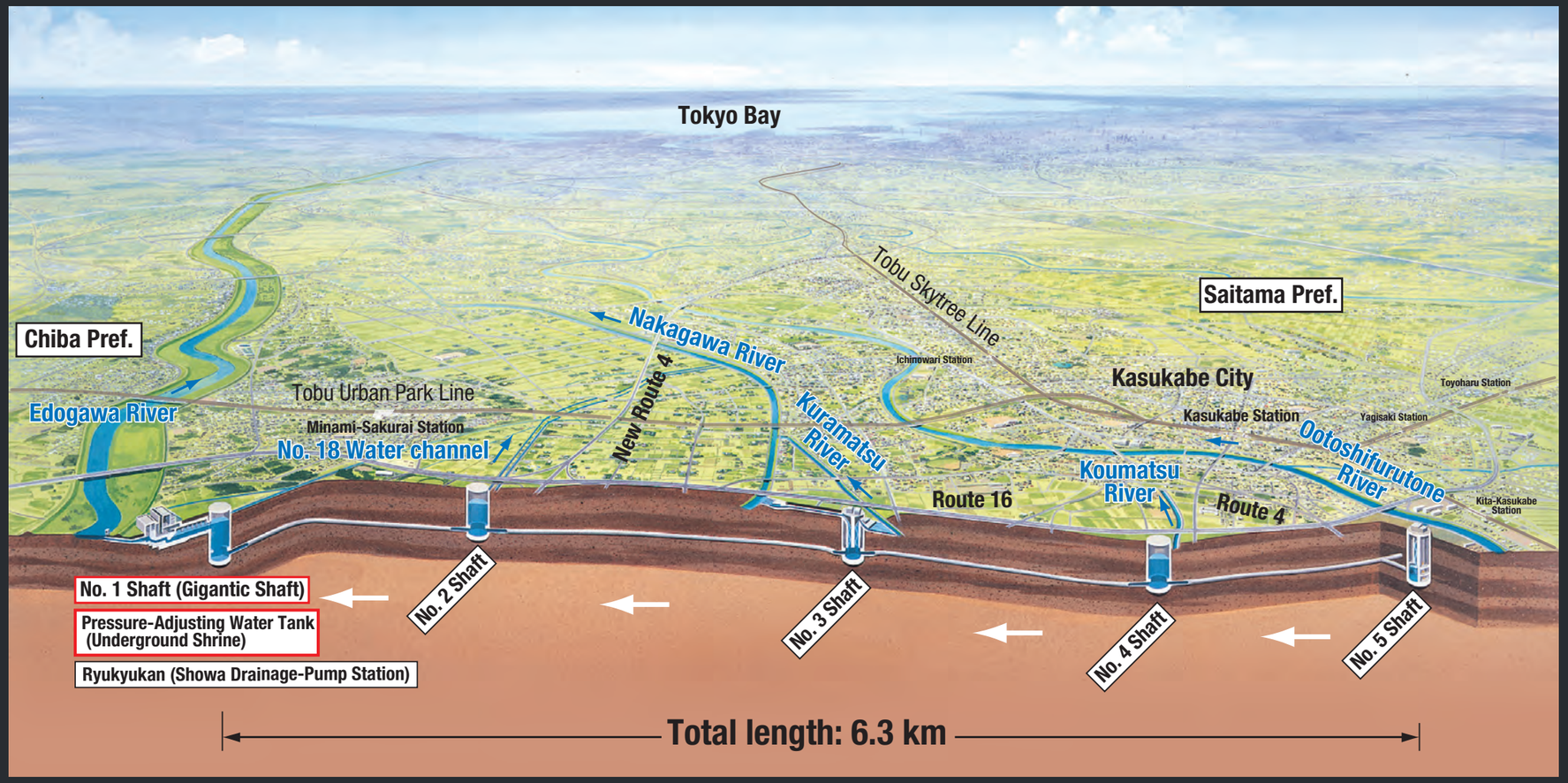
The Metropolitan Outer Area Underground Discharge Channel

Sairyu no Kawa

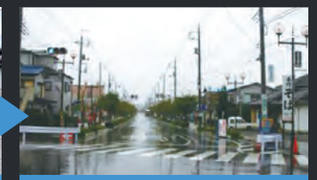
Large underground discharge channel provides safety and security for the Tokyo Metropolitan Area

One of the World's Largest Underground Discharge　Channels 50 Meters Below Ground

The Metropolitan Outer Area Underground Discharge Channel, one of the world's largest, takes in overflow from small to mid-size rivers, such as the Kuramatsu and Oootoshifurutone, and directs it to the Edogawa River through a 6.3 km tunnel running 50m below ground. Construction was started in March 1993 utilizing world-class Japanese civil engineering technologies. Following a construction period of 13 years, in June 2006 it became possible to direct water from the Oootoshifurutone River into the Edogawa River.



Before the Metropolitan Outer Area Underground Discharge Channel
[Typhoon No.3, July 2000
(Average rainfall in basin: 160 mm)]



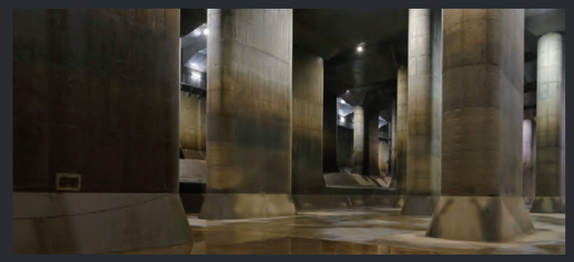
After completion of the Metropolitan Outer Area Underground Discharge Channel
[Typhoon No.22, October 2004
(Average rainfall in the basin: 199 mm)]

Water is taken into the Metropolitan Outer Area Underground Discharge Channel about seven times a year, with the largest amount of water discharged approximately 19 million m3 (during Typhoons No. 17 and No. 18 in September 2015). The flood control effect from this water system was remarkable, serving to greatly reduce flood damage in the Nakagawa/Ayase River basin.

Operating Statistics of the Metropolitan Outer Area Underground Discharge Channel

Year	Annual Amount Regulated	
	Times	Water Volume (x 10,000 m³)
FY 2006	7	2,021
FY 2007	6	879
FY 2008	10	1,592
FY 2009	5	742
FY 2010	7	586
FY 2011	9	1,494
FY 2012	4	839

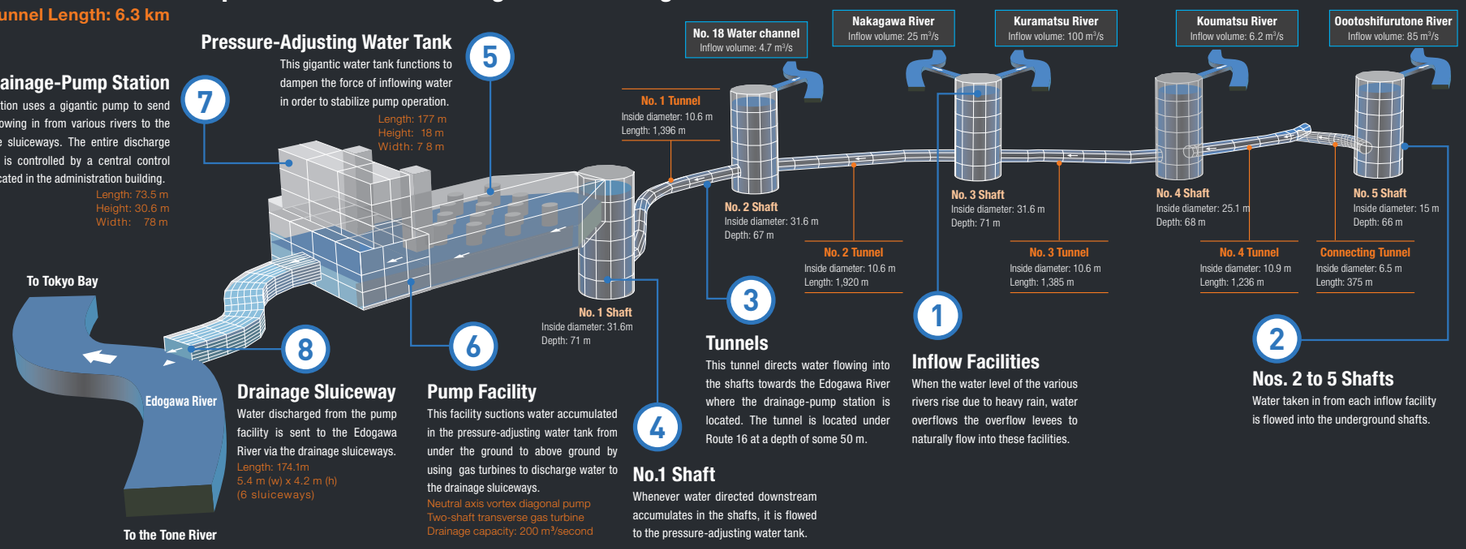
Year	Annual Amount Regulated	
	Times	Water Volume (x 10,000 m³)
FY 2013	12	1,864
FY 2014	6	2,229
FY 2015	9	2,698
FY 2016	5	630
FY 2017	5	1,717
FY 2018	4	61
FY 2019	7	1,948



Pressure-Adjusting Water Tank

Mechanisms of the Metropolitan Outer Area Underground Discharge Channel

Total Tunnel Length: 6.3 km



Drainage-Pump Station

This station uses a gigantic pump to send water flowing in from various rivers to the drainage sluiceways. The entire discharge channel is controlled by a central control room located in the administration building.

Length: 73.5 m
Height: 30.6 m
Width: 78 m

Pressure-Adjusting Water Tank

This gigantic water tank functions to dampen the force of inflowing water in order to stabilize pump operation.

Length: 177 m
Height: 18 m
Width: 7 8 m

Drainage Sluiceway

Water discharged from the pump facility is sent to the Edogawa River via the drainage sluiceways.

Length: 174.1m
5.4 m (w) x 4.2 m (h)
(6 sluiceways)

Pump Facility

This facility suctions water accumulated in the pressure-adjusting water tank from under the ground to above ground by using gas turbines to discharge water to the drainage sluiceways.

Neutral axis vortex diagonal pump
Two-shaft transverse gas turbine
Drainage capacity: 200 m³/second

Tunnels

This tunnel directs water flowing into the shafts towards the Edogawa River where the drainage-pump station is located. The tunnel is located under Route 16 at a depth of some 50 m.

Inflow Facilities

When the water level of the various rivers rise due to heavy rain, water overflows the overflow levees to naturally flow into these facilities.

No.1 Shaft

Whenever water directed downstream accumulates in the shafts, it is flowed to the pressure-adjusting water tank.

Nos. 2 to 5 Shafts

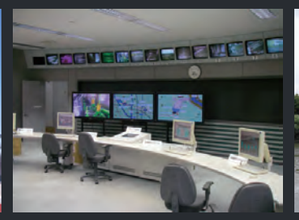
Water taken in from each inflow facility is flowed into the underground shafts.

Inflow Facilities (No. 3 Shaft)

Shaft (No. 1 Shaft)

Tunnel (No. 1 Tunnel)

Showa Drainage-Pump Station



Central Control Room

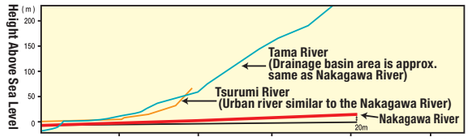
Drainage Sluiceway

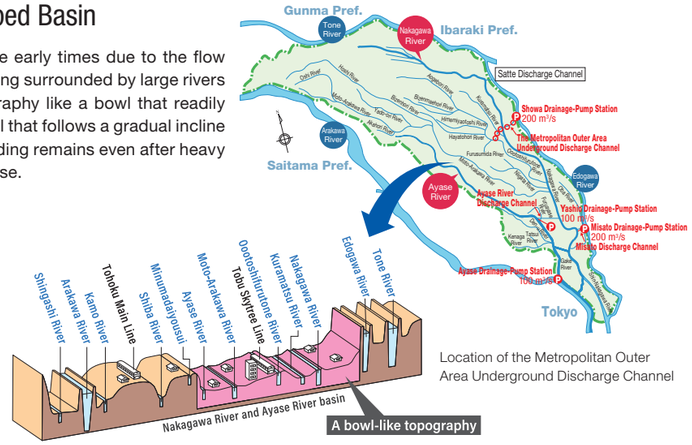
Why was the Nakagawa/Ayase River Basin Repeatedly Devastated by Flooding due to Heavy Rains?

Water Readily Accumulates in the Bowl-Shaped Basin

The Nakagawa/Ayase River basin has suffered damage since early times due to the flow changing whenever the Tone and Arakawa Rivers flooded. Being surrounded by large rivers like the Tone, Edogawa and Arakawa Rivers, it has a topography like a bowl that readily accumulates water. Additionally, the area features a water level that follows a gradual incline making it difficult for water to flow, such that the threat of flooding remains even after heavy rains fall because the river water level does not readily decrease.

Gradual Inclination of the Nakagawa and Ayase Rivers





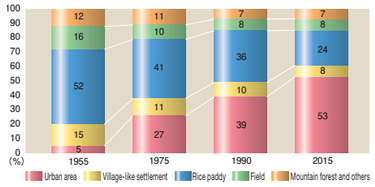
Location of the Metropolitan Outer Area Underground Discharge Channel

Waves of Rapidly Advancing Urbanization and Repeated Flood Damage

Convenient transportation service in living near the city center has resulted in rapid urbanization from 1955 onwards, together with a concentration of persons and assets. Additionally, a great amount of rice paddies and other fields that provided water retarding and retention in the river basin were lost due to increasing urbanization, and the installation of conventional flood control facilities alone was not sufficient to rapidly reduce flood damage.

July 1985 Niigata River (upstream)

Changes in Land Utilization in the Nakagawa/Ayase River Basin



Major Floods in Recent Years

Flood Date	Rainfall (mm/48 hr)	Flooded Area(ha)	Flooded Houses (Houses)
September, 1958 (Flooding due to the season's 22nd typhoon/Kanogawa Typhoon)	266.9	27,840	41,544
September, 1982 (Flooding due to the season's 18th typhoon)	195.5	5,076	29,457
August, 1986 (Flooding due to the season's 10th typhoon)	200.3	2,116	16,874
September, 1991 (Flooding due to the season's 18th typhoon)	184.3	2,493	17,946
August, 1993 (Flooding due to the season's 11th typhoon)	182.5	3,498	14,180
September, 1996 (Flooding due to the season's 17th typhoon)	168.7	1,111	2,893
September, 1998 (Flooding due to the season's 5th typhoon)	132.3	60	241
August, 1999 (Flooding due to tropical storm)	174.0	154	706
July, 2000 (Flooding due to the season's 3rd typhoon)	163.4	195	1,080
July, 2002 (Flooding due to the season's 6th typhoon)	143.4	24	85
October, 2004 (Flooding due to the season's 22nd typhoon)	200.1	416	867
December, 2006 (Flooding due to atmospheric depression)	170.5	52	211
End of August 2008 (Severe rainstorms/Concentrated rain)	135.0	150	2,046
October, 2013 (Flooding due to the season's 26th typhoon)	180.9	47	1,729
September, 2015 (Flooding due to the season's 17th and 18th typhoons)	228.7	1,040	4,837
August, 2016 (Flooding due to the season's 9th typhoon)	111.5	19	56

Urban Planning to Protect Against Flooding: "Comprehensive Flood Control Measures for the Nakagawa and Ayase Rivers"

In order to protect the basin from flood damage, the Nakagawa and Ayase Rivers were designated as a part of the comprehensive flood control projects for specified rivers in 1980, and the "Nakagawa/Ayase River Basin Comprehensive Flood Control Measures Council", consisting of the national government, Tokyo, Saitama, Ibaraki, and related municipalities in these three prefectures, was established in this same year. The "Nakagawa/Ayase River Basin Development Project" was established in 1983, and based on this plan together with the river flood control measures, the "Comprehensive Flood Control Measures for the Nakagawa and Ayase Rivers" were implemented to apply unified basin management to the entire area in order to prevent flood runoff from increasing due to basin development as much as possible and with the goal of urban development that is highly resistant to flood damage. The Metropolitan Outer Area Underground Discharge Channel is, in particular, demonstrating its effectiveness as the main pillar of these measures.

Comprehensive Flood Control Measures for the Nakagawa and Ayase River

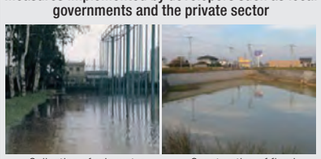
River Measures (River Improvements, Flood Control)

Measures implemented by river management entity (national and prefectural)

- River channel improvements
- Discharge channels and drainage-pump stations

Drainage Basin Measures (Outflow Prevention)

Measures implemented by developers such as local governments and the private sector



- Collection of rain water using schoolyards
- Construction of flood control reservoirs

Soft Measures

Implemented across the entire river basin (By the national government, local governments, and persons living in the basin area, etc.)

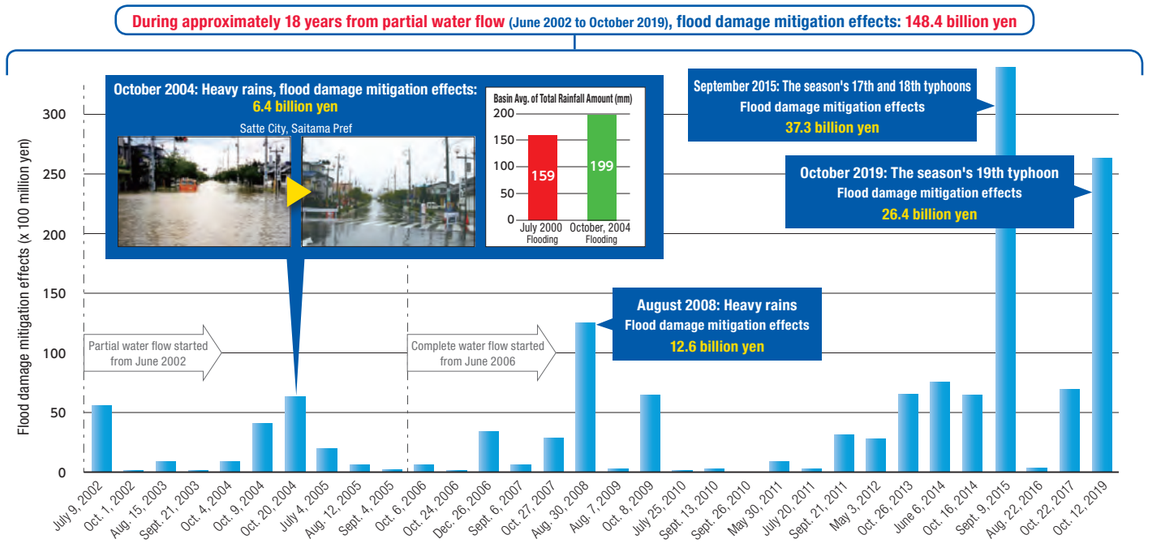
- Strengthening of flood prevention operations system
- Public announcement of predicted flood areas
- Strengthening of prediction and alarm systems

Flood Control Effects of the Metropolitan Outer Area Underground Discharge Channel

The Metropolitan Outer Area Underground Discharge Channel is making a significant contribution to reducing damage due to flooding of the Nakagawa/Ayase River basin.

The effects of constructing the Metropolitan Outer Area Underground Discharge Channel have been studied by using a flood analysis simulation to calculate the possible damage that would occur if these facilities were not present, and then preliminary calculations are made to estimate how much flood damage has been reduced due to these facilities. The flood damage mitigation effects of the Metropolitan Outer Area Underground Discharge Channel have been calculated for major flooding from after the start of partial water flow in June 2002, with the results showing a total reduction of approximately 148.4 billion yen in flood damage over the approximately 18 years since this partial water flow started. During the season's 19th typhoon (East Japan Typhoon) in October 2019, the average rainfall of the Nakagawa/Ayase River basin was 216 mm/48 hours (preliminary value), resulting in an outflow that surpassed the "flood risk water level" at the Yoshikawa Water Level Observation Station on the Nakagawa River. The Edogawa River Office operated all the drainage facilities to reduce the river water levels to regulate the some 12.18 million m³ of flood water, the third highest ever, in the Metropolitan Outer Area Underground Discharge Channel. As a result, the number of flooded houses in the Nakagawa/Ayase River basin for 1.1 times the rainfall amount of the flooding in September 1982 was reduced by some 90%, and the amount of damage was decreased by approximately 26.4 billion yen.

Flood Damage Mitigation Effects of the Metropolitan Outer Area Underground Discharge Channel (Total since partial water flow in 2002)



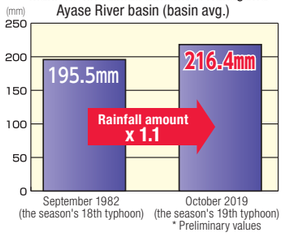
The Metropolitan Outer Area Underground Discharge Channel - Ranking of flood regulation total amounts

Rank	Date	Total Flood Regulation Amount (x 1,000 m³)	Basin Avg. 48-hr. Rainfall Amount (mm/48 hr.)
1	September, 2015 (Flooding due to the season's 17th and 18th typhoons)	19,031	228.7
2	June, 2014 (Flooding due to atmospheric depression)	13,426	200.7
3	October, 2019 (Flooding due to the season's 19th typhoon)	**12,180**	**216.4**
4	October, 2017 (Flooding due to the season's 21st typhoon)	12,040	193.9
5	August, 2008 (Flooding due to atmospheric depression)	11,720	135.0
6	October, 2014 (Flooding due to the season's 18th typhoon)	7,316	194.6
7	October, 2013 (Flooding due to the season's 26th typhoon)	6,848	180.9
8	October, 2004 (Flooding due to the season's 22nd typhoon)	6,720	200.1
9	May, 2012 (Flooding due to atmospheric depression)	6,678	140.0
10	December, 2006 (Flooding due to atmospheric depression)	6,621	170.2

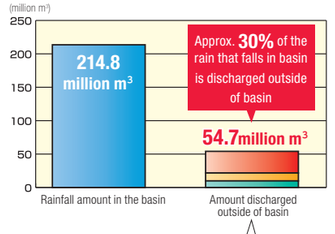
* The total flood regulation amount is calculated by adding the amount of water stored in discharge channels, shafts, and similar facilities to the total amount of discharged water.

Flood control effects during the season's 19th typhoon (East Japan Typhoon, October 2019)

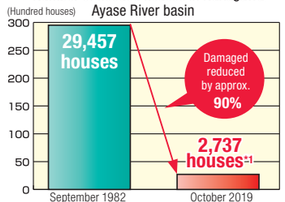
▼ Max. 48-hr. rainfall amount in Nakagawa/Ayase River basin (basin avg.)



▼ Discharge capacity of the Nakagawa/Ayase River basin



▼ Number of flooded houses in Nakagawa/Ayase River basin



*1: The numbers of flooded houses is the total for the cities and towns of the Nakagawa/Ayase River basin according to damage status officially announced by Saitama Prefecture (as of December 23, 2019). The number of flooded houses may include some cities and towns outside of the Nakagawa/Ayase River basin due to unclear address details.

Major Facilities of the Metropolitan Outer Area Underground Discharge Channel

Inflow Facilities

Take in Water from “Overflow Levees” during Flooding

Flood waters are taken into the Metropolitan Outer Area Underground Discharge Channel at the overflow levees on the embankments of the Nakagawa, Kuramatsu and Oootoshifurutone Rivers. If the water level of a river surpasses the height of the overflow levee, flood water will naturally flow into the inflow facility. The height of the overflow levee is set at nearly the same height as that of the lowest nearby ground, so that it can function effectively even during small to medium-scale flooding.

Inflow Specifications

River (inflow facility)	Inflow volume	Overflow width	Planned volume	Inflow method
Nakagawa River	25m³/s	17 m	250m³/s	Overflow levee method
Kuramatsu River	100m³/s	53 m	100m³/s	
Oootoshifurutone River	85m³/s	33 m	395m³/s	
No. 18 Water channel	4.7m³/s	4.1 m		
Koumatsu River	6.2m³/s	9.0 m		

Inflow facility (Kuramatsu River Inflow Facility)

Shaft

Maintain and Control Flood Inflow and Discharge Channel

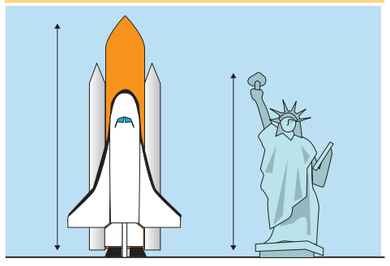
The five shafts (No. 1 to 5) are deep shafts connected to each other through the underground tunnel and are used to take in flood water from rivers including the Nakagawa, Kuramatsu, and Oootoshifurutone. They are also used for installing ventilation systems and other operations, and play an important role in the maintenance and management of the Metropolitan Outer Area Underground Discharge Channel. They consist of a gigantic cylinder some 70m in depth and an inner diameter of approximately 30m, making them large enough to accommodate a space shuttle or the Statue of Liberty.

Shaft Specifications

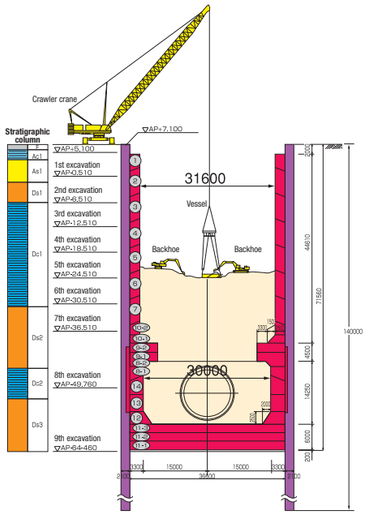
	Upper side wall	Lower Side Wall	Shaft depth	Construction method
No. 1 Shaft	Diam.: 31.6 m Wall thickness: 2.5 m	Diam.: 30.0 m Wall thickness: 3.3 m	GL-72.1 m	Inverted and permanent lining methods
No. 2 Shaft			GL-71.5 m	
No. 3 Shaft			GL-73.7 m	
No. 4 Shaft	Diam.: 25.1 m Wall thickness: 2.0 m	Diam.: 22.5 m Wall thickness: 3.3 m	GL-69.0 m	
No. 5 Shaft	Diam.: 25.0 m Wall thickness: 2.0 m	Diam.: 15.0 m Wall thickness: 2.0 m	GL-74.5 m	Super Open Caisson System (SOCS)

No. 1 Shaft

Shaft Cross-Section (No. 2 Shaft)



No. 5 Shaft



New Attempt at this Project

Nos. 3 and 5 Shafts (Vortex drop shafts)

No. 3 Shaft employs a vortex drop shaft at the Kuramatsu River inflow facility to cause an inflow of flood water from the Kuramatsu and Nakagawa Rivers. The shape of the inflow port has been modified so that water runs down from the inflow port of the shaft along the wall surface. This was employed to prevent unnecessary resistance resulting from the intersection of the linear inflows of the two rivers by lessening the impact of water falling from nearly 60m in height. This approach was also used for No. 5 Shaft.

Thorough Recycling

Among the soil types produced by excavation during construction work using the slurry shield method, secondary soil of a fine grain size was treated as industrial waste. However, with a revision of the law in 1997, such soil is recyclable if certain requirements are met. This project was certified as No. 1 and No. 2 of the Health and Welfare Minister certification on July 23, 1998, and was certified as No. 3 on October 1 of the same year. Treated soil generated from this construction work was used to construct the Edogawa River Super Levee.

Tunnels

“Underground River” 50m Underground with a Total Length of 6.3km

This underground river was constructed to lead flood water flowing in from the Nakagawa, Kuramatsu, Oootoshifurutone and other rivers to the Edogawa River. It consists of tunnels with an inner diameter of approximately 10m and an overall total length of 6.3km connecting the five shafts. These tunnels are constructed under Route 16 at a depth of 50m. It can drain flood water at a speed of up to 200m³/second.

No. 4 Tunnel

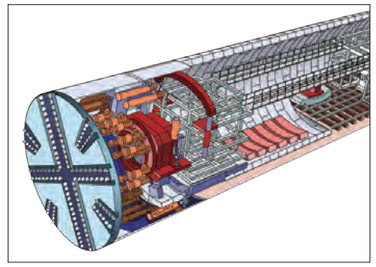
Shield Tunnel

Tunnel (Underground River) Using the Shield Method

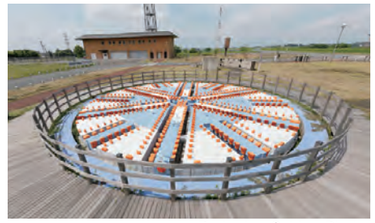
[What is a Shield Tunnel?]
The closed slurry shield method was chosen because construction was carried out deep underground (50m below ground level) and a large opening (inner diameter of the tunnel is 10.6m) was required. A shield tunnel is a tunnel created by a cylindrical steel tube that digs while pushing the soil away. The excavator equipped to this cylindrical steel tube digs the soil while protecting the machine from earth and sand at the front, and pushes the shield machine forward. Behind the protruding shield machine, “segments” are automatically assembled in a cylindrical shape. This process is repeated to create a full tunnel.
Scale models are displayed inside Ryukyukan, and some actual components are displayed outside.

Tunnel Specifications

Section	Tunneling section	Tunneling extension	Tunnel inside diameter	Construction Start	Completion Dates
No. 1 Tunnel	No. 1 Shaft => No. 2 Shaft	1,396 m	10.6 m	February, 1997	March, 2001
No. 2 Tunnel	No. 2 Shaft => No. 3 Shaft	1,920 m	10.6 m	March, 1996	June, 2001
No. 3 Tunnel	No. 3 Shaft => No. 4 Shaft	1,384 m	10.6 m	March, 1996	June, 2000
No. 4 Tunnel	No. 4 Shaft => Oootoshifurutone River	1,235 m	10.9 m	July, 2000	March, 2004
Connecting Tunnel	No. 5 Shaft => No. 4 Tunnel	380 m	6.5 m	October, 2001	June, 2005



Shield Machine



Ryukyukan Outdoor Display

Development of New Type of Segment

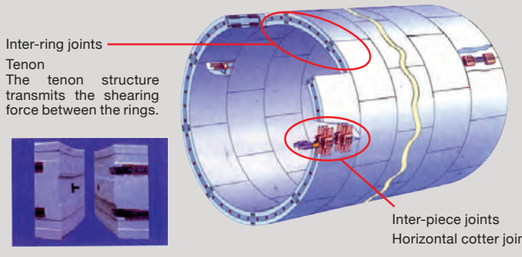
The Metropolitan Outer Area Underground Discharge Channel is a large-diameter internal water pressure shield tunnel that utilized new technologies for its construction. A new type of segment was developed using state-of-the art technology to make the segments easier to work with during construction.

Features

Supports internal water pressure...Provides safety in relation to not only the shield outer pressure, but also against internal pressure
- Smooth inner surface...Keeps segments dent-free due to flowing water
- High rigidity...Wedge-shaped joints improve segment bonding force
- High-speed automatic assembly...Wedge effect provides bonding control and eliminates supplementary work

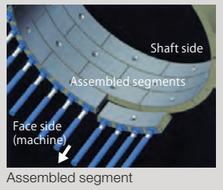
■ Horizontal Cotter Type RC Segment (No. 1 Tunnel)

Inter-ring joints
Tenon
The tenon structure transmits the shearing force between the rings.

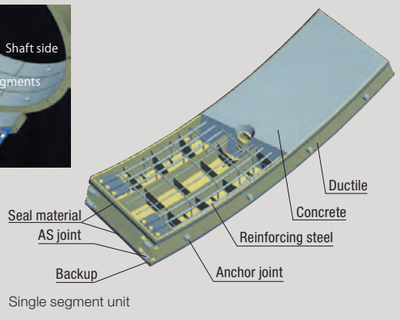


With this method, C-type hardware is embedded in the surface fitting so that when assembling a segment, H-type hardware is inserted from the tunnel shaft direction to the space formed between a pair of C-type hardware in order to bond them.

■ DRC Segment (No. 4 Tunnel)



Assembled segment



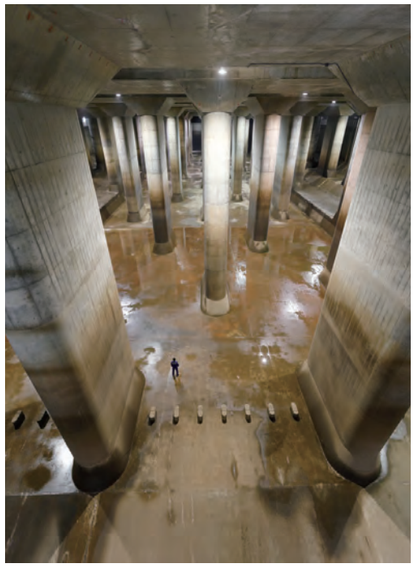
Single segment unit

Pressure-Adjusting Water Tank

Gigantic “Underground Shrine”

This enormous water tank, built at approximately 22m below ground to reduce the flow of water from the underground tunnels and drain it smoothly into the Edogawa River, is 177m long, 78m wide, and 18m high.

It stabilizes operation of the pumps and adjusts sudden water pressure changes that can result from an emergency stoppage. Each of the 59 pillars is 7m long, 2m wide,18m high, and weighs 500 tons. They stand supporting the cistern ceiling making it appear to be a shrine built underground.



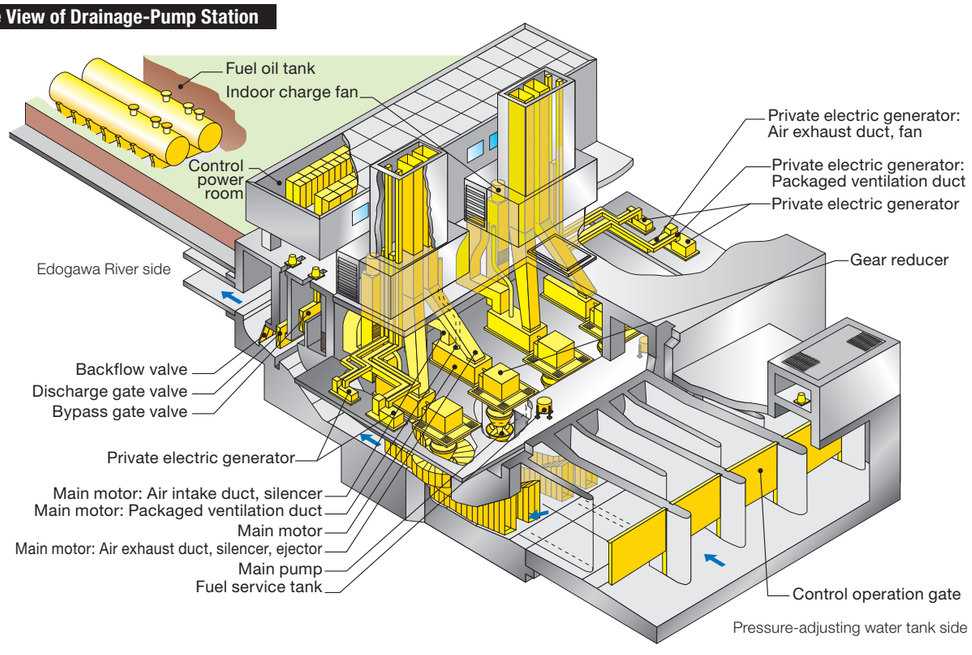
Drainage-Pump Station

The “Heart” Controlling this Gigantic System

The Showa Drainage-Pump Station is considered the heart of the Metropolitan Outer Area Underground Discharge Channel because it plays two key roles. One is to discharge the flood water that flows down from the underground tunnels, from the pressure-adjusting water tank and through the gigantic pump and the drainage sluiceways, to the Edogawa River. The other is to operate and centrally monitor all of the inflow facilities.

Showa Drainage-Pump Station

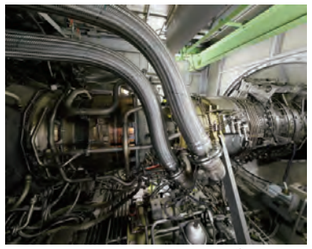
Bird’s-Eye View of Drainage-Pump Station



Pump Facility

Drain a Full 25 meter Swimming Pool in One Second

Four gigantic pumps, the largest of their kind in Japan with a 50m3/second drainage capacity, have been installed. Using gas turbines, they rotate the bladed wheel called an impeller at a high speed to provide energy (lift and centrifugal force) to water and generate water flow. The gas turbine used is a modified version of one designed for aircraft, with its key characteristics being a compact size, and reduced noise and vibrations. The maximum drainage capacity is 200m3 (equivalent to a 25m swimming pool full of water) per second.

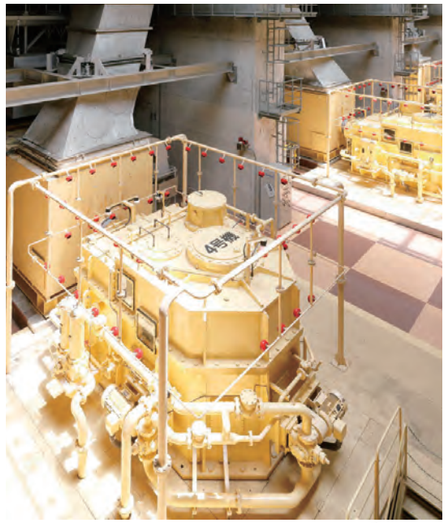


Gas turbine

Bladed wheel (impeller)

Specifications

1. Installation location　Chisaki, Kamikanasaki, Kasukabe City, Saitama Prefecture
2. Drainage pump facility
   - ① Pump specifications
     - Pump model: Neutral axis vortex diagonal pump (high-flow rate type)
     - Planned drainage capacity: 50 m³/second (per pump)
     - Planned total pump head: 14 m
     - Flow control: Pump speed-based 0 to 100% control of flow
     - Number of installed pumps: 4 units
   - ② Motor specifications
     - Motor model: Two-shaft transverse gas turbine (converted aircraft type)
     - Rated output: 10,300 kW (14,000 PS)
     - Fuel: Bunker A
   - ③ Gear reducer specifications
     - Gear reducer model: Orthogonal axis gear reducer (locked train structure)
     - Reduction ratio: 1/27.6
3. Operation control
   - Machine side operation of each facility, and centralized monitoring and operation control from the central control room

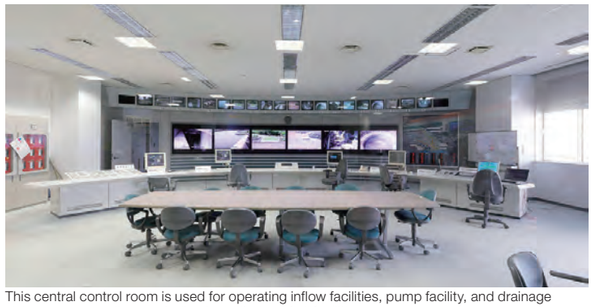


Pump room

Drainage Sluiceway

Drain Flood Water into the Edogawa River

This facility is used for draining flood water from the Metropolitan Outer Area Underground Discharge Channel. Flood water suctioned by the pump at the drainage-pump station is drained into the Edogawa River through six drainage sluiceways, each 5.4m x 4.2m. It also prevents backwater from the Edogawa River.



This central control room is used for operating inflow facilities, pump facility, and drainage sluiceways, as well as centralized monitoring of all facilities.

A single car of the E235 series (2.95 m (w) x 3.62 m (h)) of the JR Yamanote Line can be easily housed in a single drainage sluiceway.

“Ryukyukan:” An Underground Exploration Museum of the Metropolitan Outer Area Underground Discharge Channel

The Ryukyukan features exhibits related to the Edogawa River and the natural environment surrounding it, with an emphasis on the Metropolitan Outer Area Underground Discharge Channel that is working out of sight underground. This facility also functions as the location of integrated and lifelong learning, in collaboration with the local community.

Ryukyukan Information

Opening Hours: 9:30 to 16:30 (Last entry at 16:00)
Closed: Mondays and year-end/New Year’s holidays (* Mondays are exclusively for group tours.)
Free entry

* Reservations are not needed to use the underground experience hall, exhibit hall, and other rooms.
* Separate reservations are required for a tour of the underground facilities such as the pressure-adjusting water tank. Cost: See the guided tour website for details
* Please make a reservation beforehand if you have a group of 20 or more persons (Kasukabe City website).

首都圏外郭放水路 地底探検ミュージアム
RYU KYU KAN
龍Q館

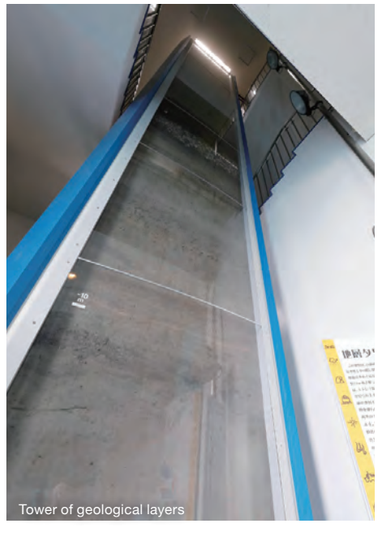
Origin of the Name “Ryukyukan”
The Metropolitan Outer Area Underground Discharge Channel was constructed in order to reduce flood damage in the eastern part of Saitama Prefecture, a chronically flooded region. It is the largest underground discharge tunnel in Japan, and was constructed 50m underground along Route 16 to discharge some of the flood water of the Nakagawa, Kuramatsu, Ootoshifurutone and other rivers to the Edogawa River.
The purpose of Ryukyukan is to the inform the public of the important role the Metropolitan Outer Area Underground Discharge Channel plays.


Ryukyukan


Shield machine scale model


Exhibit hall


Underground experience hall


Tower of geological layers

Birth of the “Sairyu no Kawa”!
The name “Sairyu no Kawa” was selected from names submitted by the public to promote the Metropolitan Outer Area Underground Discharge Channel, with the hope it will encourage love and familiarity from the local residents.

Information about the Metropolitan Outer Area Underground Discharge Channel

Edogawa River Office Website and Official Twitter

The Edogawa River Office website has a webpage for the Metropolitan Outer Area Underground Discharge Channel with information about facilities, tours, and Ryukyukan. (Multiple languages available) There are also videos taken with drones showing flood inflow and other interesting aspects.
The official Twitter account provides administrative and local information for rivers managed by the Edogawa River Office.

Edogawa River Office Website

Twitter
@mlit_edogawa

Homepage

Twitter

Apps for the Metropolitan Outer Area Underground Discharge Channel

Multilingual Audio Guide App

The app offers a tour of the Metropolitan Outer Area Underground Discharge Channel, explaining its role, main facilities, and must-see features with audio and explanations in Japanese, English, and Chinese (simplified and traditional).

Download on the App Store
GET IT ON Google Play

Simulated Flood Experience AR App

The app offers a tour of the Metropolitan Outer Area Underground Discharge Channel, explaining its role, main facilities, and must-see features with audio and explanations in Japanese, English, and Chinese (simplified and traditional).

Download on the App Store
GET IT ON Google Play

* If you download the app before taking part in a guided tour, you can enjoy an AR experience inside the “Underground Shrine” (pressure-adjusting water tank).

Media Coverage of the Metropolitan Outer Area Underground Discharge Channel

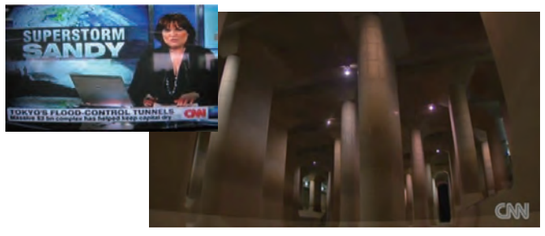
The Metropolitan Outer Area Underground Discharge Channel Attracts Attention Overseas

One of the world’s largest underground discharge channels receives attention from abroad.

The Metropolitan Outer Area Underground Discharge Channel has been covered by both Japanese and foreign media, and has become a popular infrastructure tourist spot.
The increase in inbound tourism demand has resulted in many foreign tourists taking guided tours of the facility.

Reported on CNN

CNN reported on the Metropolitan Outer Area Underground Discharge Channel as a flood control measure to protect Tokyo for its relevance to Hurricane Sandy, which hit New York (November 1, 2012).
“How giant tunnels protect Tokyo from flood threat”



“Still, the underground marvel could inspire engineers to look for new ways to try to contain Mother Nature in the future.” (Quoted from CNN report)

* Created by the Kanto Regional Development Bureau based on material from CNN.co.jp

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