

Asaka Purification Plant

— L e a f l e t —



**Bureau of Waterworks
Tokyo Metropolitan Government**

<http://www.waterworks.metro.tokyo.jp/>

<http://www.waterprofessionals.metro.tokyo.jp/>

Outline of the plant

Asaka Purification Plant is located in Asaka City, Saitama Prefecture about 23 kilometers northwest of Shinjuku, Tokyo. It has been constructed to meet the water demand that kept increasing and started water supply in 1966. The plant was enlarged further more, and now it becomes an eminent large-scale plant in Japan.

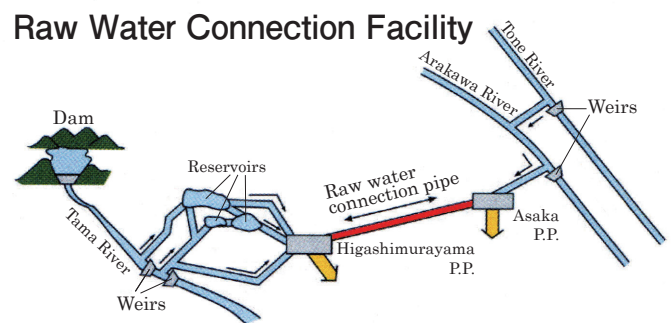
This plant purifies the raw water taken from the Tone river and the Arakawa river which are called the Tone and Arakawa river systems.

Furthermore, in order to supply safer and better tasting water, the Bureau decided to introduce an advanced purification system. No.1 Advanced Purification Plant was completed in November 2004 and No.2 Advanced Purification Plant was completed in March 2014. Now, the whole quantity of water intake at this plant is treated under the advanced purification system and is supplied mainly to Southern and Western Districts in the Tokyo 23 Ward.

Address	1-3-1, Miyado, Asaka-shi, Saitama
Lot area	228,205m ²
Plant Capacity	1,700,000m ³ /day
Service area (As of March 2016)	The Ward of Chiyoda, Chuo, Minato, Shinjuku, Bunkyo, Taito, Shinagawa, Meguro, Ota, Setagaya, Shibuya, Nakano, Suginami, Toshima, Kita, Itabashi, and Nerima The City of Hachioji, Mitaka, Machida, Tama and Inagi

Features of the plant

- ◆ It is the largest purification plant of all that we have. It supplies about 1/4 of the water used in Tokyo.
- ◆ The raw water of the Tone, Arakawa, and Tama river systems can be mutually accommodated by a Raw Water connection Pipe between Asaka Purification Plant and Higashimurayama Purification Plant. It is very useful in case of water shortage or water pollution accidents of rivers and so on.
- ◆ Since this plant can receive 2 kinds of power supply by not only power utility company but also an independent electric power plant, it can continue operating the treatment and supplying the water, even if commercial power supply is interrupted from any chance such as thunder or earthquake.
- ◆ And, a transmission pipe of this plant is connected with a main-pipe of Saitama-Prefecture, water is mutually able to be supplied each other.
- ◆ It is the first Plant in Japan that has two kinds of sand filter basins not only before but also after ozone treatment and biological activated carbon adsorbing treatment.
- ◆ Solar Power Generation Facility has installed on the former filter basins.



Outline of the Advanced Water Treatment Facility

Asaka Purification plant has numerous difficulties on the raw water which has musty odor, trace organic substances and ammonium-nitrogen, etc.

Though it is treated with powdered activated carbon to remove these substances, construction was started of an Advanced Water Treatment Facility Combining both ozone and biological activated-carbon adsorbing treatment in October 1999 to ensure steady and effective purification in the future.

This is the third Advanced Water Treatment Facility following the Kanamachi and Misato Purification Plants of ours.

The Advanced Water Treatment System has the effect that decomposes musty odor, trace organic substances and ammonium-nitrogen by the oxidation function of ozone, and removes them by adsorption function of granular activated carbon and biodegradation action of microorganisms that live on the surface of activated carbon.

The treated water is used for the bottled water “Tokyo-sui” too.

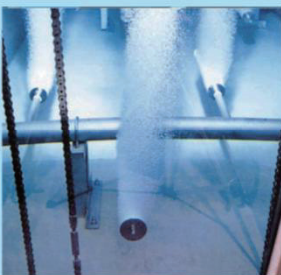


Mechanism of Advanced Water Treatment

Ozone treatment

Ozone(O_3) is a powerful oxidizing agent comprised of three oxygen atoms, and decomposes the organic substances that cause the musty odor.

It is also useful for oxidizing dissolved manganese in the water, as well as disinfection.



Biological activated carbon adsorbing treatment

When the water passes through the layer of activated carbon that is 2.5 meters in depth in about 15 minutes, odor and organic substances are adsorbed by them with huge surface and are eaten and eliminated by microorganisms on the surface. (It makes the life of biological activated carbon longer.)



Image of the ozonation

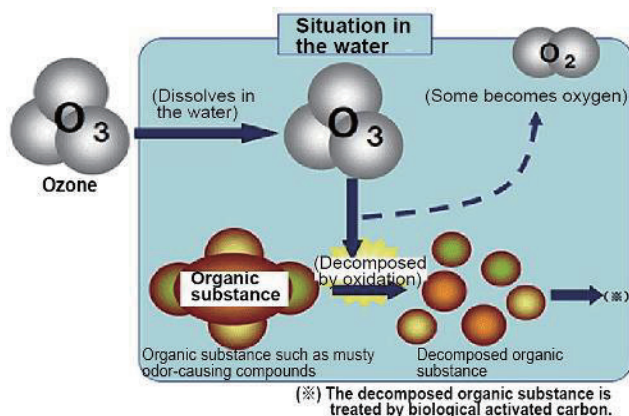
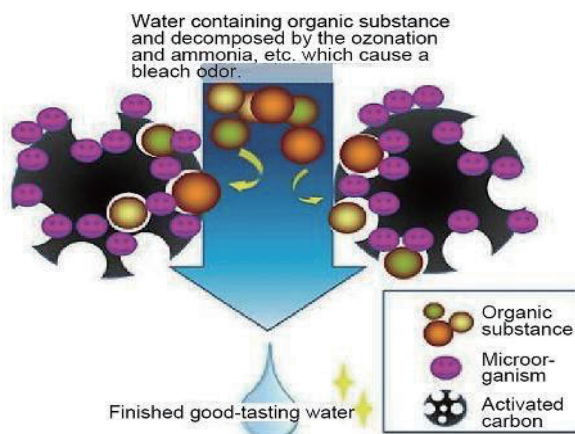
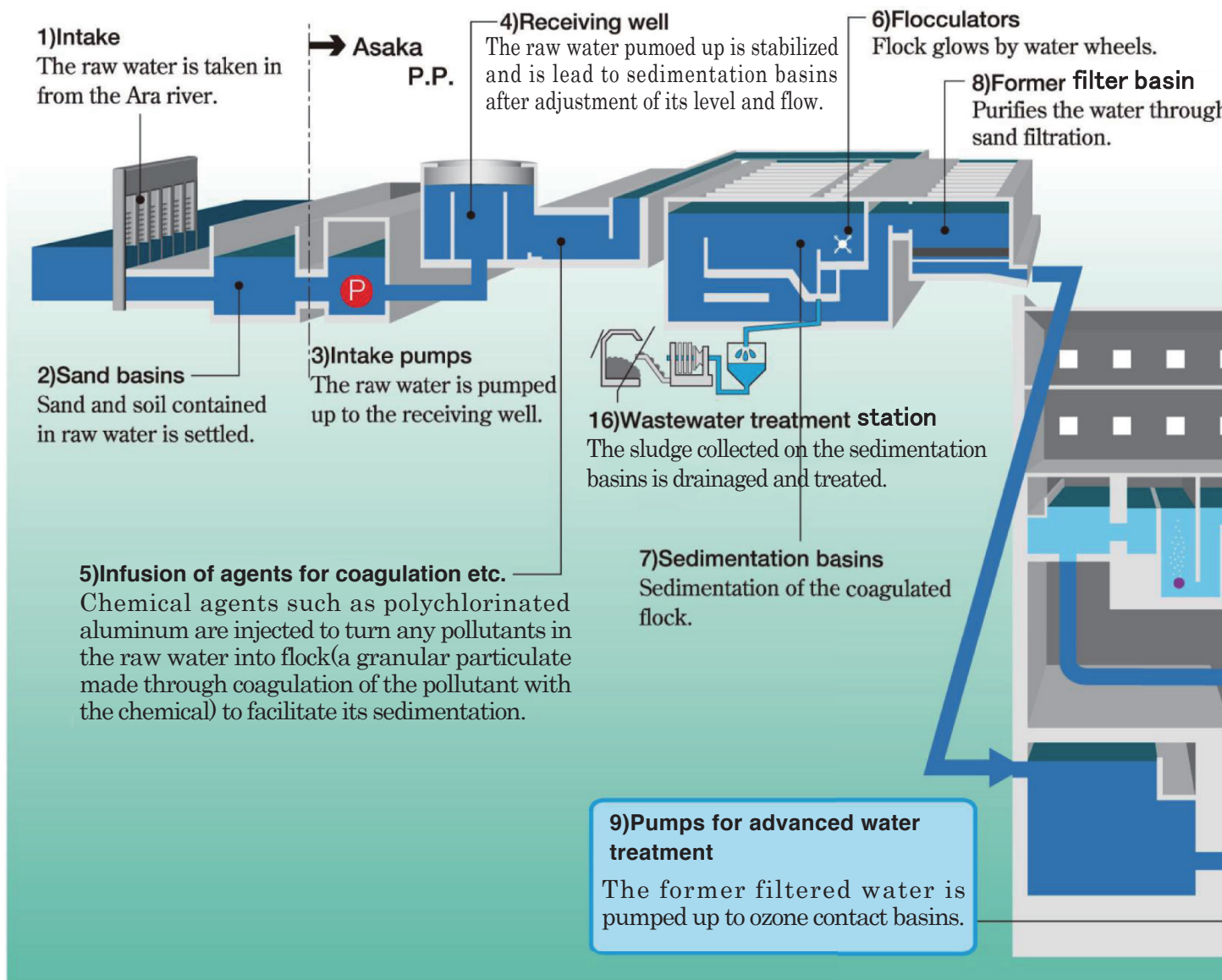


Image of the biological activated carbon treatment



Flow through the Advanced Water Treatment



Pumps for advanced water treatment

These pumps pump the former-filtered water up into the ozone contact basins. The flow rate is adjusted by altering the angle of the blades, providing for wide-ranging control, simplified incidental facilities, and reduced energy losses.

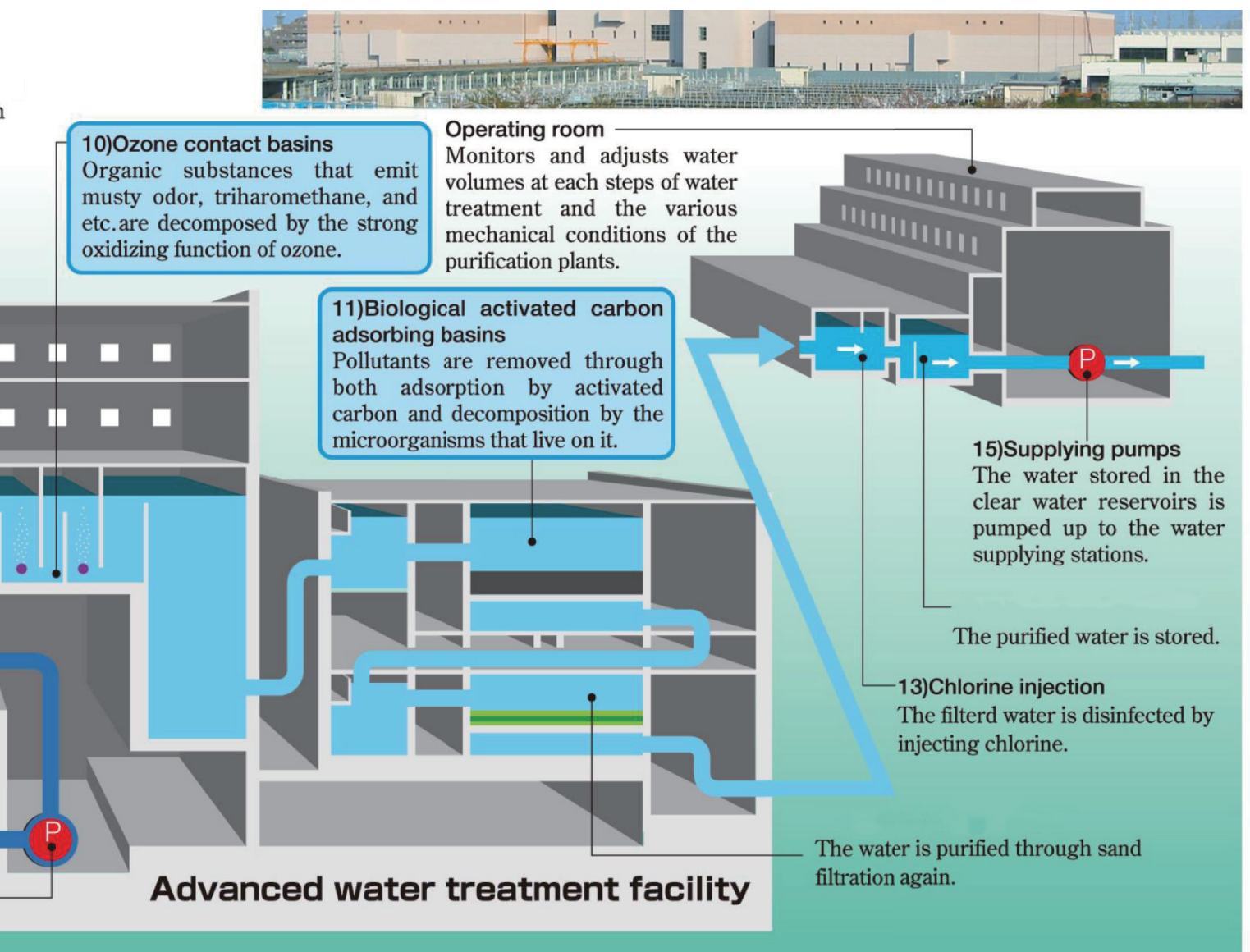


Ozone generation

Ozone is generated by converting the natural oxygen through applying high voltage to the air. It is most efficient when the air is drier, very dry air at temperatures below zero is used.

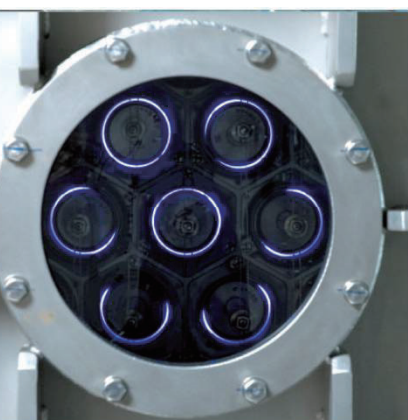


Water Treatment Facility



erator

atural oxygen in the air to ozone
Since ozone is generated more
air that is not dewy even at 60



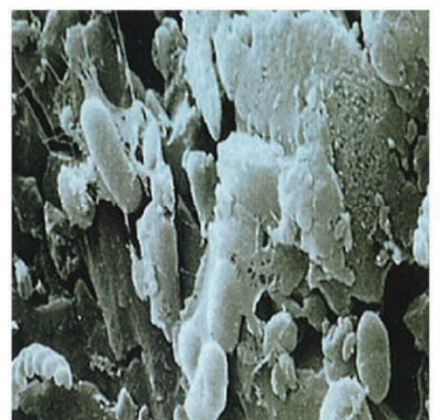
Activated carbon

Activated carbon is a carbon substance that has innumerable minute pores, and thus has very high adsorption capacity. It is very effective in removing odors and color from water.



Biological activated carbon

Biological activated carbon removes organic substances, etc. by the biodegradation action of microorganisms that lives on the surface of the activated carbon in addition to the adsorption by the activated carbon.



For Supplying Further Potable Delicious Water

At Asaka Purification Plant, for the purpose of supplying potable delicious water, chemical dosing is controlled with high precision, and various other efforts are made. For instance, monitoring of abnormal water quality caused by fish, automatic water quality measurement and examinations of water quality within the Plant and survey on the water sources by the Plant's technical staff.

Meanwhile, the Tone River and the Arakawa River, which are the water sources, contain a high proportion of musty odor-causing compounds and trihalomethane precursors.

To eliminate such contaminants and supply potable delicious water, Asaka Purification Plant employs the advanced water purification system that utilizes ozone and biological activated carbon.



Water tank system for detecting poisonous substances



Water quality meter (Trichloramine meter)



Water quality examination



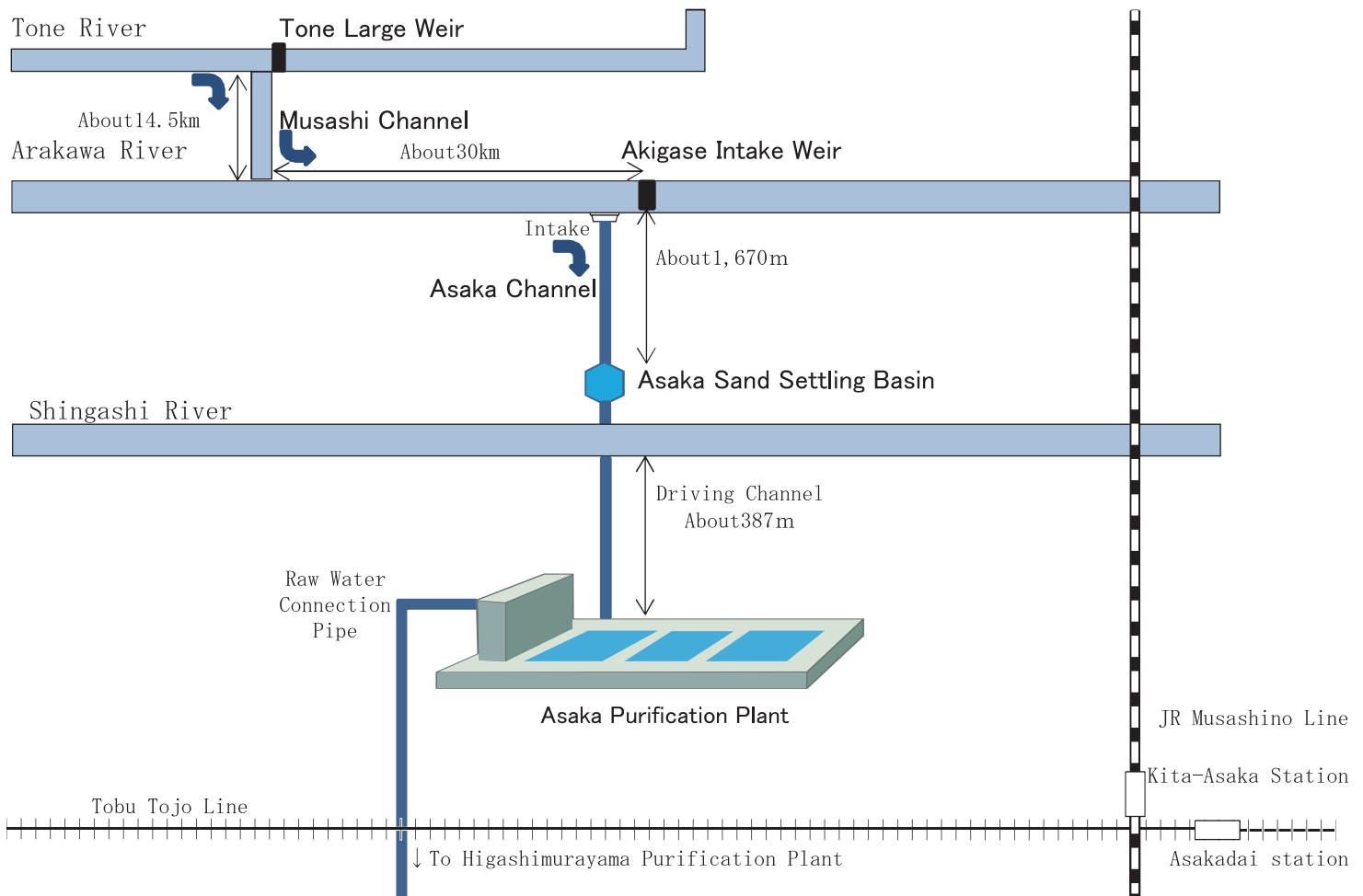
Water quality survey on the water resources

Flow of Raw Water

-from Tone Large Weir to Asaka Purification Plant-

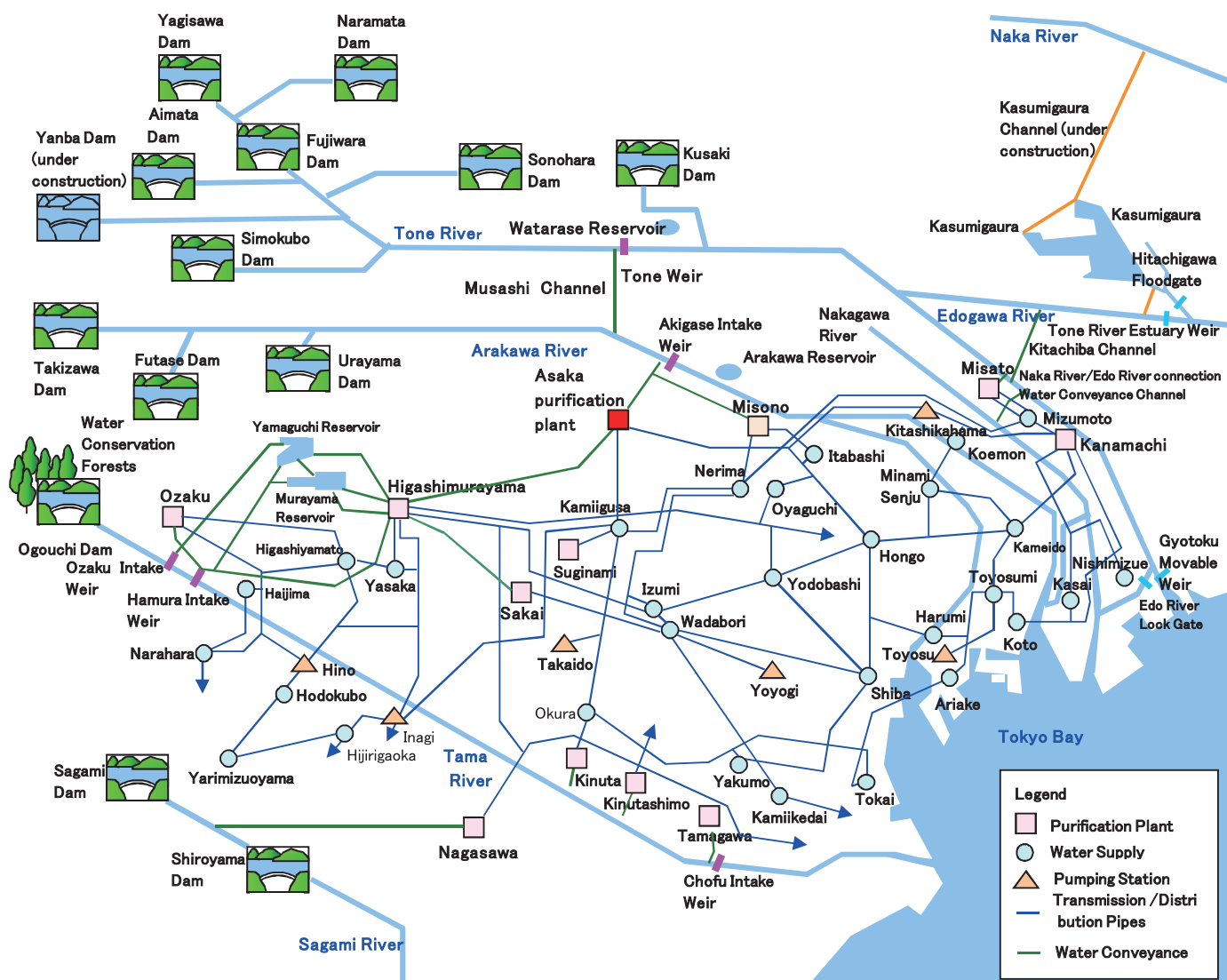
The water of the Tone river taken at the Tone Large weir is lead into the Arakawa river through the Musashi Water Conveyance Channel.

Afterwards, it is taken at the Akigase Intake Weir and lead to Asaka Purification Plant through the Asaka Water Conveyance Channel.



MEMO

Water Resources and Water Supply System in Tokyo



Outline of Purification Plant

As of March 2016(Heisei 28)

Water Resources	Purification Plant	Plant Capacity (m ³ /day)	Ratio(%)		Treatment Method
			Purification Plant	System	
Tone/Arakawa River System	Kanamachi	1,500,000	21.9	79.9	Rapid sand filtration/Advanced water treatment (1,500,000m ³ /day)
	Misato	1,100,000	16.0		Rapid sand filtration/Advanced water treatment (1,100,000m ³ /day)
	Asaka	1,700,000	24.8		Rapid sand filtration/Advanced water treatment (1,700,000m ³ /day)
	Misono	300,000	4.4		Rapid sand filtration/Advanced water treatment (300,000m ³ /day)
Tama River System	Higashi-murayama	880,000	18.4	17.0	Rapid sand filtration / Tone/Arakawa River systems advanced water treatment (880,000m ³ /day)
	Ozaku	280,000	4.1		Rapid sand filtration
	Sakai	315,000	4.6		Slow sand filtration
	Kinuta	114,500	1.7		Membrane filtration/Slow sand filtration
	Kinutashimo	70,000	1.0		Membrane filtration/Slow sand filtration
	Tamagawa	-152,500	—		Slow sand filtration/Rapid sand filtration
Sagami River System	Nagasawa	200,000	2.9	2.9	Rapid sand filtration
Ground water	Suginami	15,000	0.2	0.2	Chlorine injection only
Total		6,859,500	100.0	100.0	—

※The Tamagawa purification plant is currently not in operation and is excluded from the plant capacity



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