



# Securing Drinking Water after Earthquakes: Preparation of Small-scale Emergency Water Supply Tanks

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## Preface

Tokyo Waterworks has been promoting the seismic retrofitting of waterworks facilities, enhancement of backup functions, and development of emergency water supply facilities in order to secure as much drinking water as possible for Tokyo residents, even after earthquakes. This poster introduces the development of small scale emergency water supply tanks which could have shortened construction times or reduced costs.

## Tokyo Waterworks Seismic Countermeasures

### 1. Seismic retrofitting of waterworks systems

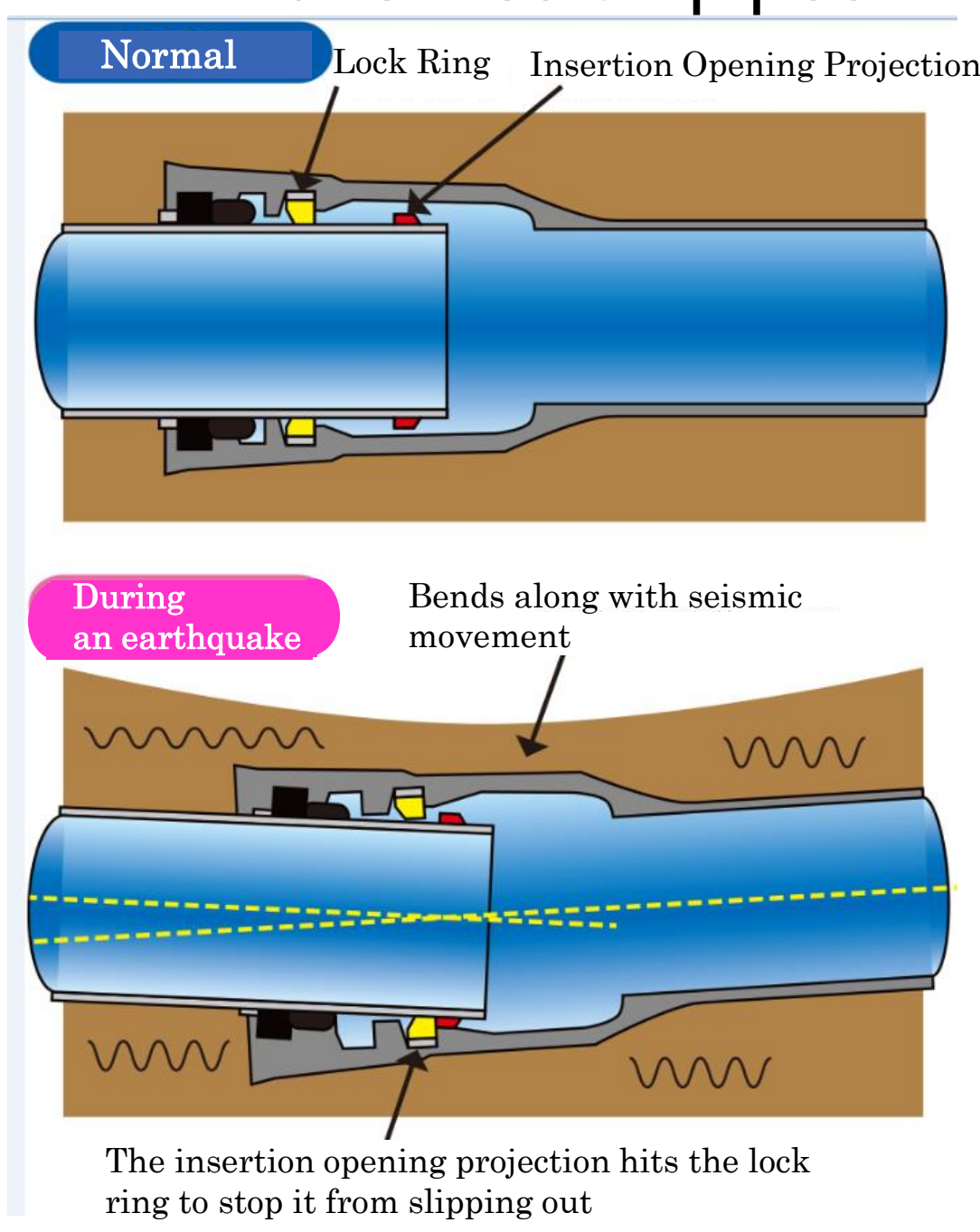
#### 1) Seismic retrofitting of waterworks facilities

To secure water supply as much as possible after earthquakes, improve seismic resistance of waterworks facilities overall.

- ⇒ Seismic retrofitting of reservoirs (seismic wall reinforcement)
- Seismic retrofitting of pipelines (seismic resistant fittings)

#### 2) Enhancement of backup functions

To supply water as much as possible even if one facility stops, duplicate waterworks pipes and network together distribution and transmission pipes



Functions of seismic fitting pipes

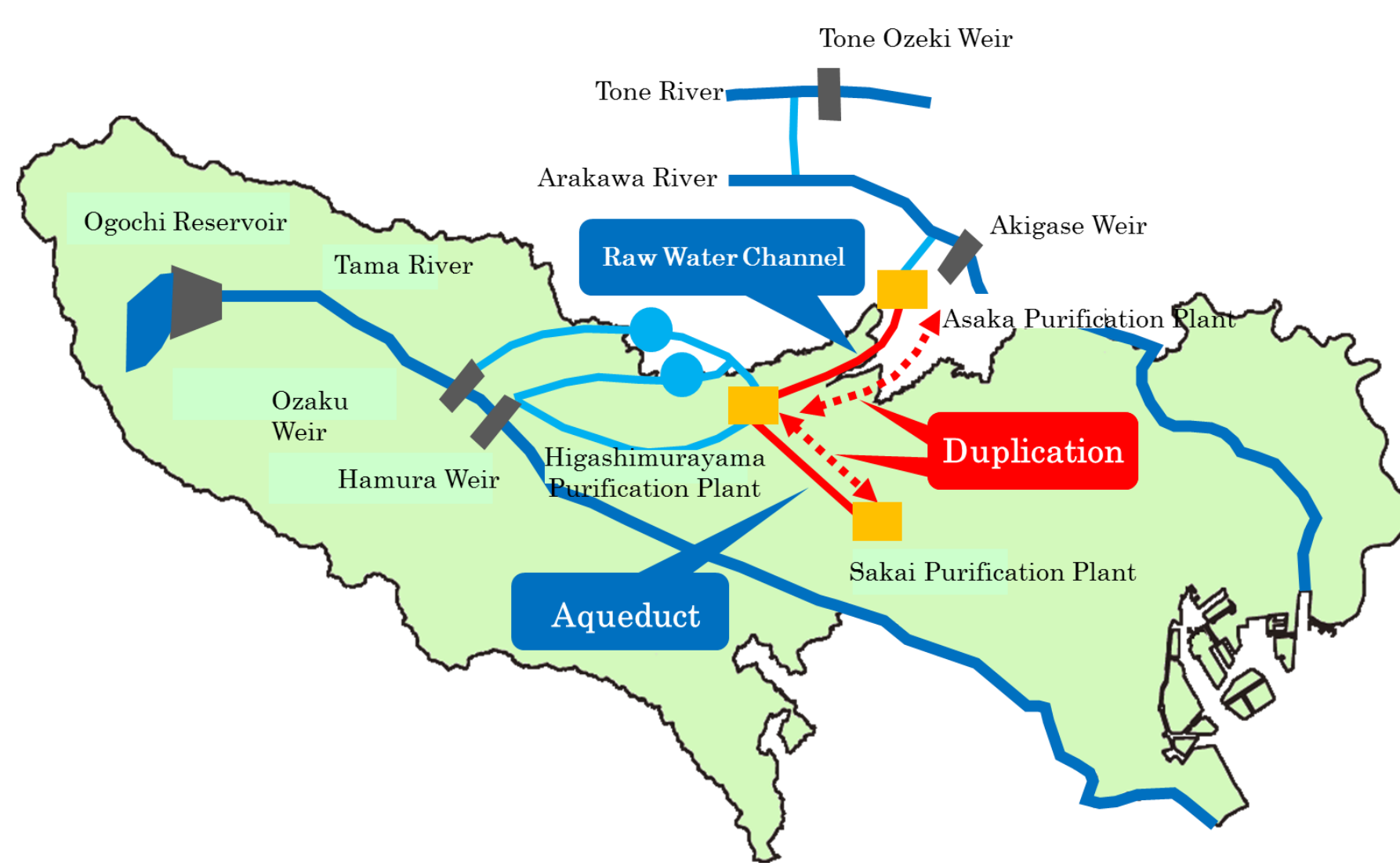


Image of aqueducts Duplication

### 2. Securing drinking water

In order to better secure water supply after earthquakes, position purification plants, water supply stations, and emergency water supply tanks as water supply bases ( Emergency water supply station ), **to develop emergency water supply facilities.**

## Types of Emergency Water Supply Tanks

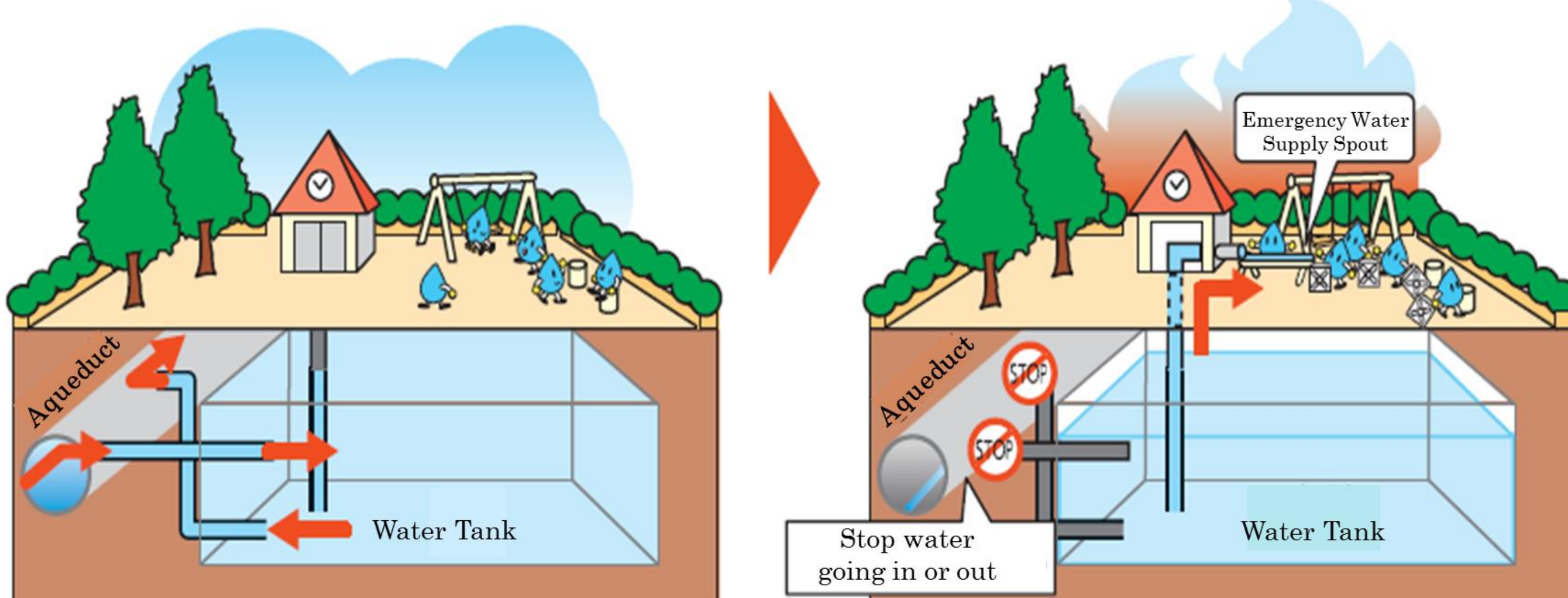
#### [Emergency Water Supply Tanks]

##### 1) Large Tank (Capacity: 1,500 cubic meters)

Underground reinforced concrete structure, water supply tank and pump, joined with standby generator storage room

##### 2) Small Tank (Capacity: 100 cubic meters)

Underground ductile iron and steel structure with adjacent pump storage room



- Emergency water supply tanks are connected with distribution pipes, with fresh water cycling through, **under metropolitan and city parks.**

## Water Supply Bases Development State

#### [Current Development State]

**212 bases** in Tokyo (purification plants, water supply stations, emergency water supply tanks)

\*In consideration for people carrying drinking water on foot, **bases are located within about 2 kilometers of residences**

#### [Stored Volume of Water]

**1,020,000 cubic meters**

\*With a supply of 3 liters/person/day after earthquakes, **there is water for 13 million Tokyo residents for 3 weeks**

		Wards District		Tama District		Total	
		Number	Volume Stored m <sup>3</sup>	Number	Volume Stored m <sup>3</sup>	Number	Volume Stored m <sup>3</sup>
Purification Plant/Water Supply Station		32	576,680	93	361,350	125	938,030
Emergency water supply tanks	Large Tank	46	69,000	7	10,500	53	79,500
	<b>Small Tank</b>	<b>23</b>	<b>2,300</b>	<b>5</b>	<b>500</b>	<b>28</b>	<b>2,800</b>
	<b>Total</b>	<b>101</b>	<b>647,980</b>	<b>105</b>	<b>372,350</b>	<b>206</b>	<b>1,020,330</b>

#### Number of Water Supply Base

( Emergency water supply station ) and Volume Stored

#### [Roles for each section of Tokyo]

##### Disaster Prevention Division, Bureau of General Affairs

- Select candidates
- Coordinate municipalities locally

##### Bureau of Waterworks

- Study possibility of installing emergency water supply tanks
- Manage, install, and maintain emergency water supply tanks

## Small Emergency Water Supply Tanks

#### [Advantages]

- 1) Can be installed in small parks
- 2) Easy to select candidates and coordinate with local municipalities
- 3) Can be installed with existing products made in factories **and assembling distribution pipe materials on-site**
- 4) Shortens construction period and reduces cost simultaneously
- 5) Because the water supply tank is buried entirely underground, part of the space above it can be used for parks or the like.

⇒ **Can get the greatest return for the smallest investment**

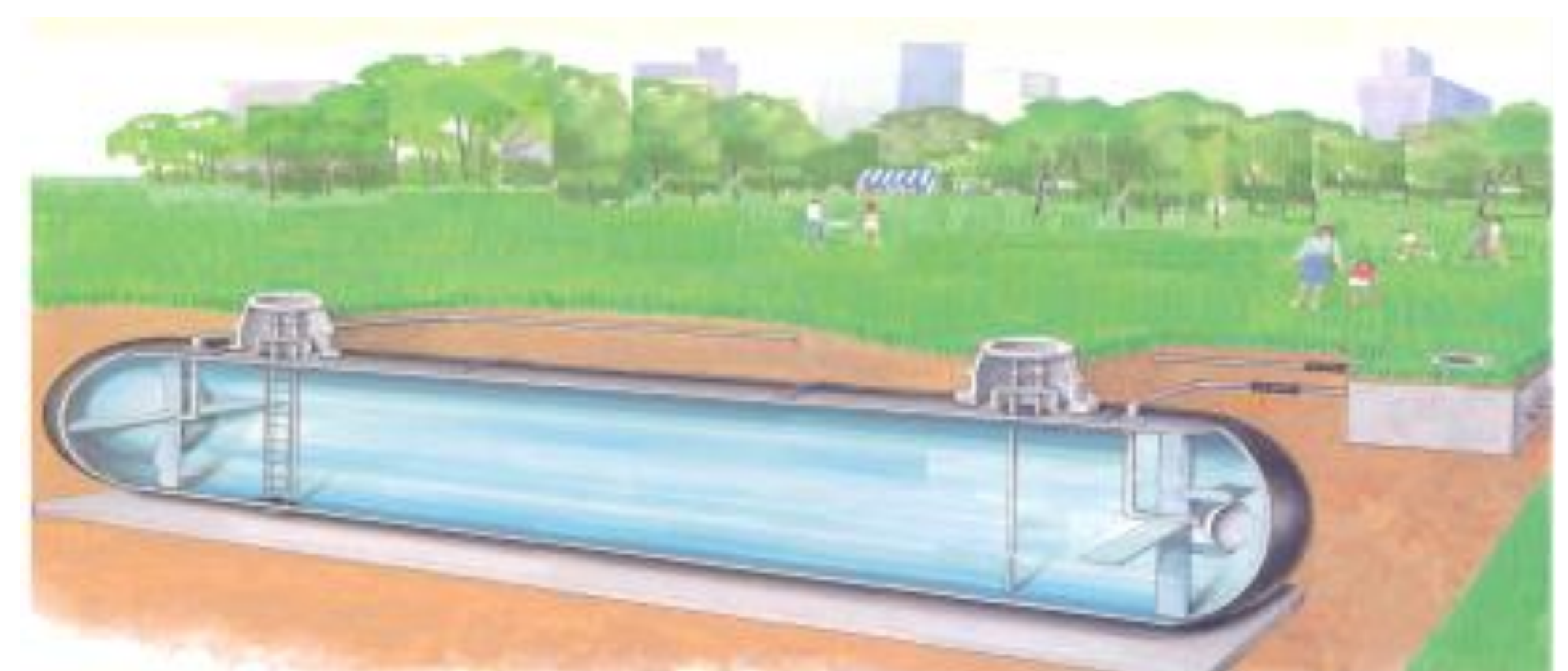


Image of Small tank

## Development State of Small Emergency Water Supply Tanks

- **In order to eliminate any gaps where there are no water supply bases within 2 km of residences, install small water supply tanks**
- **Almost all gaps are expected to be eliminated by the end of 2018**

## Securing drinking water after earthquakes

Seismic retrofitting of waterworks systems, such as seismic resistant fittings for waterworks pipelines, requires many years and massive investment. Therefore, the Tokyo Waterworks will use the advantages of **small emergency water supply tanks**, promote their **installation in gap areas**, and strive to **properly maintain and manage** them so that Tokyo residents can use these facilities after earthquakes.