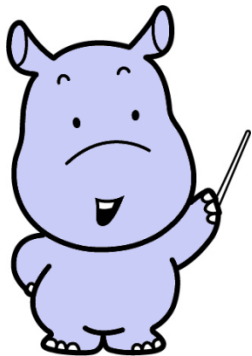


Initiatives for Water Recycling in Yokohama City



Environmental Planning Bureau
City of Yokohama



1. About Us: Yokohama City

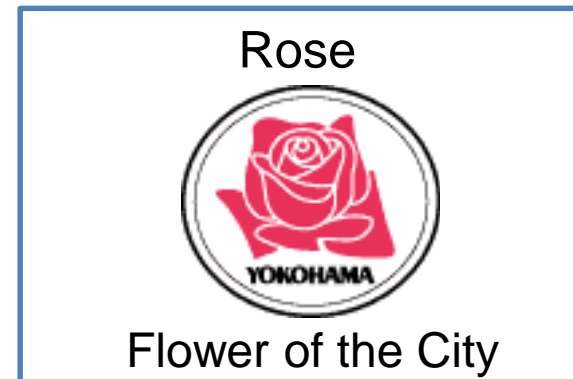
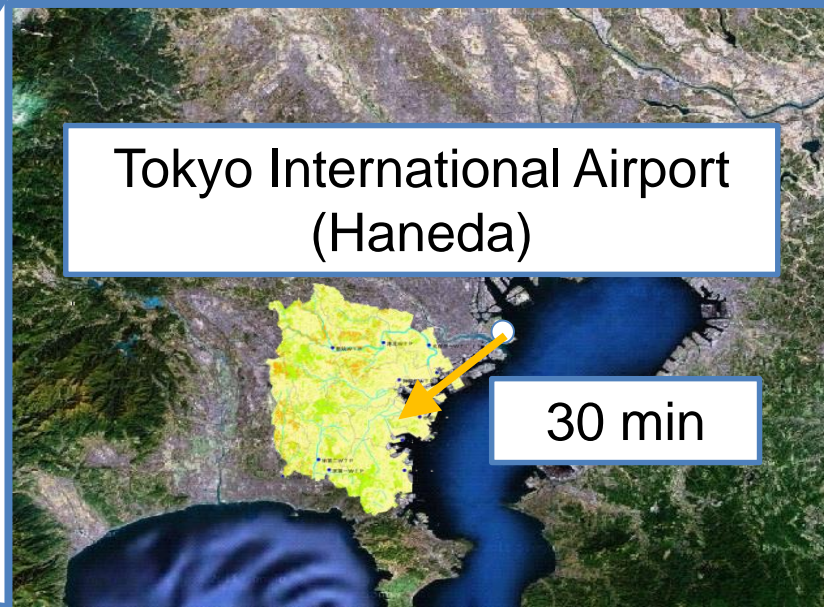
2. Water Recycling



1. About Us: Yokohama City

2. Water Recycling

1. About Us: Yokohama City



1. About Us: Yokohama City



Nissan Stadium



[Upcoming Events]

- * Rugby World Cup 2019
- * Tokyo Olympic 2020 Soccer Game

Pacifico Yokohama



[Latest Event]

- * 50th ADB Annual Meeting 2017

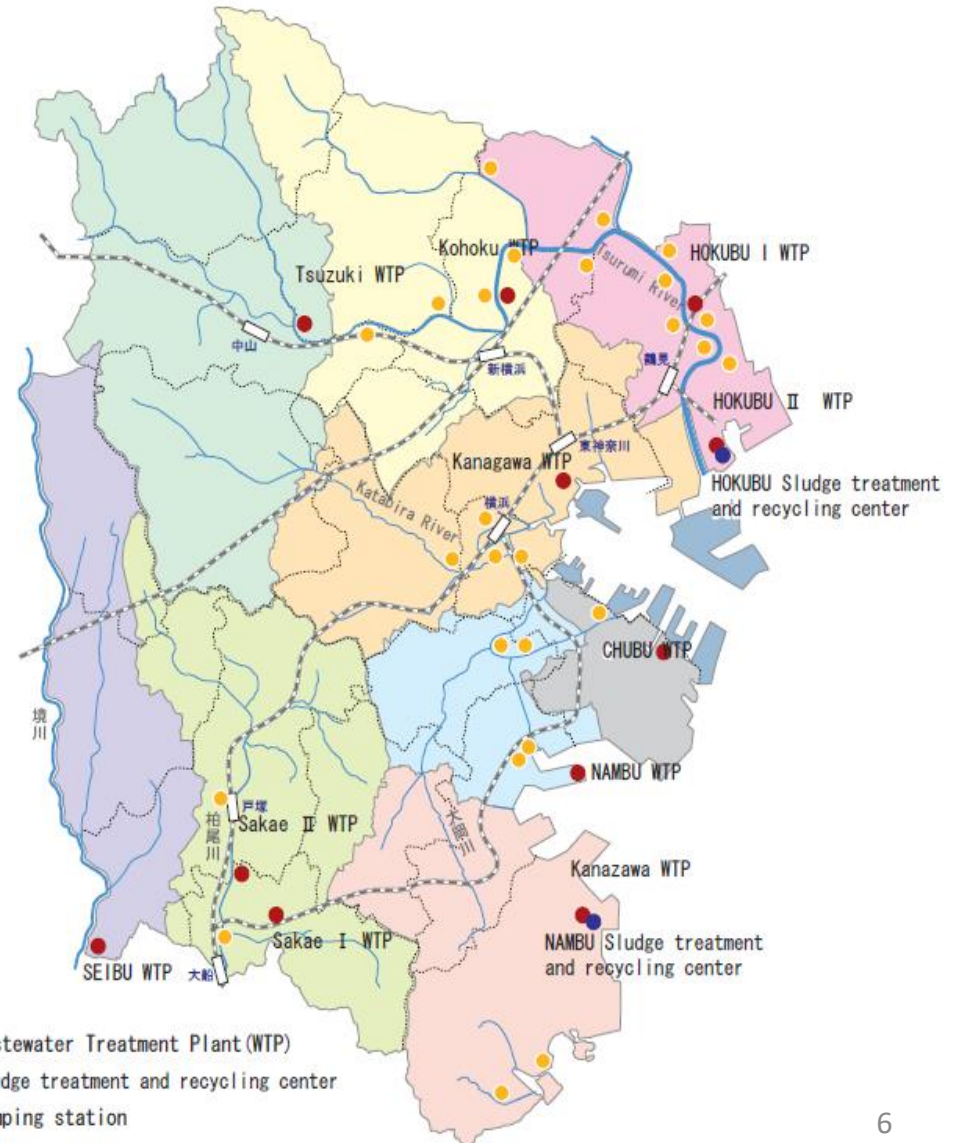
M	Meeting
I	Incentive Travel
C	Convention
E	Event / Exhibition



Sewage Works

Population	3.7 million
Service Rate	99.9%

Treatment District	9
Wastewater Treatment Plant ●	11
Sludge Treatment Plant ●	2
Pumping Station ●	26
Total Length of Sewer	11,800 km
Manhole	530,000
Total Assets	39 Billion USD
Volume of Treated Wastewater	590 mil. M3/y (=1.6 mil m3/d)





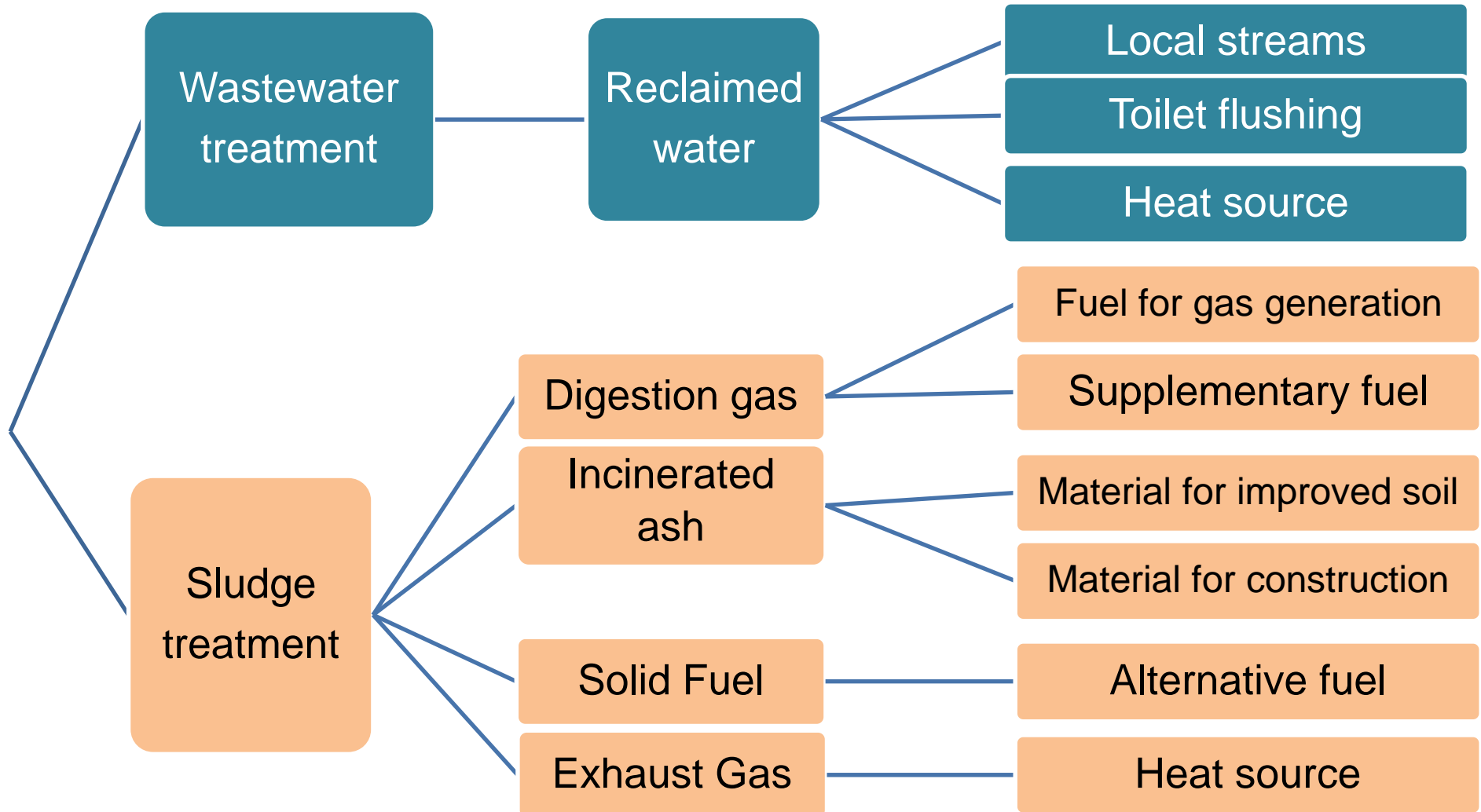
1. About Us: Yokohama City

2. Water Recycling

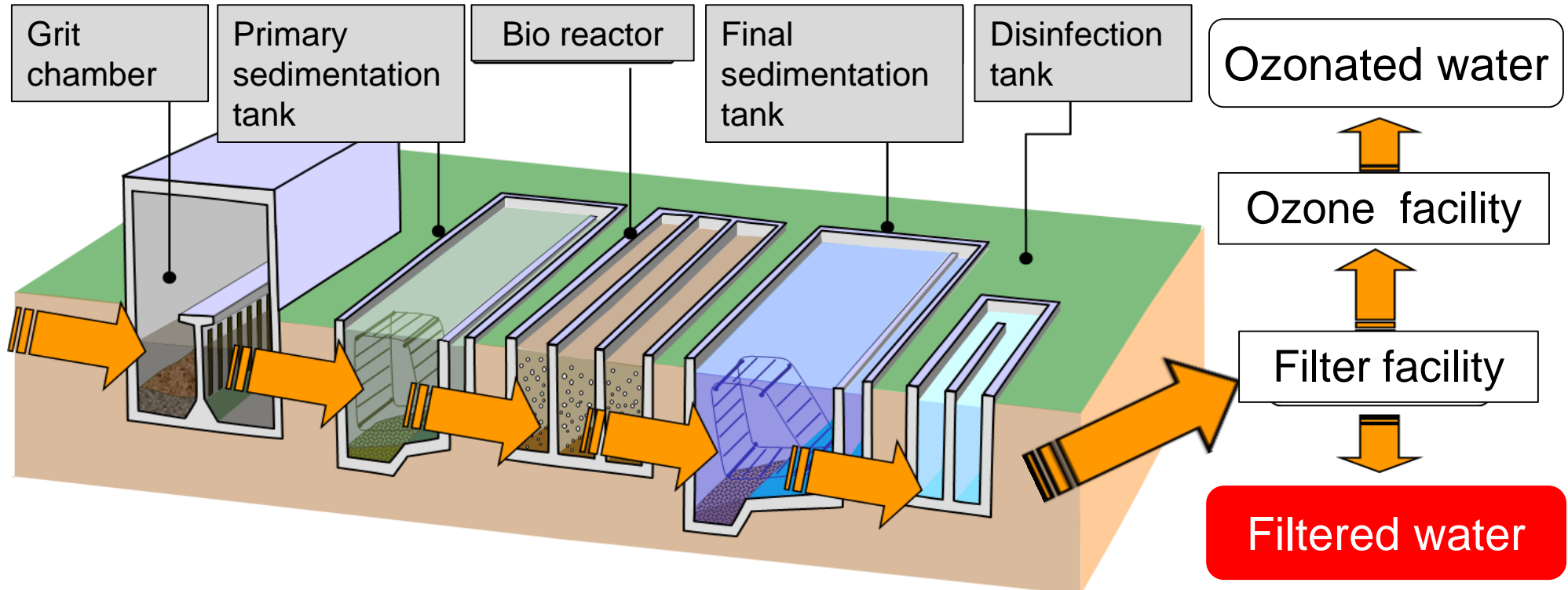
2. Water Recycling



Effective Use of Wastewater/Sewage Sludge



2. Water Recycling



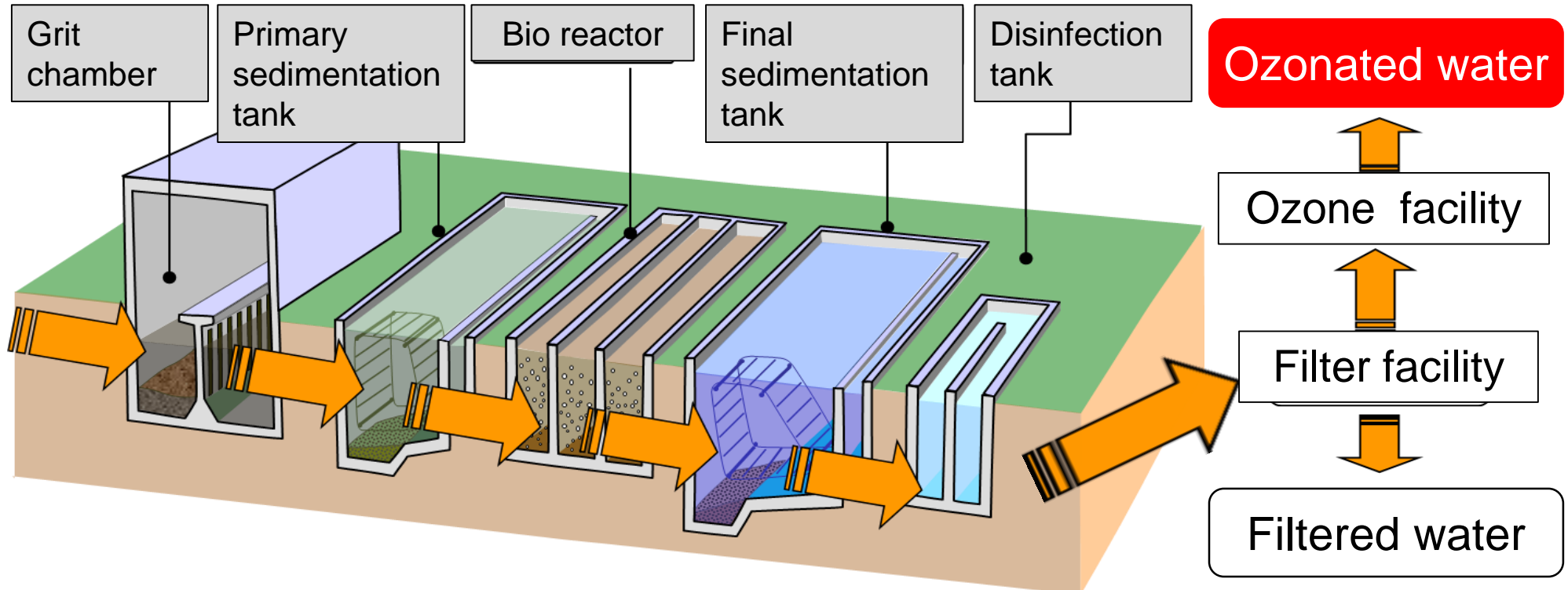
Filtered water:

Reclaimed water which is filtered with sand and disinfected with chlorine.

Main use:

Washing construction sites, cleaning roads, etc.

2. Water Recycling



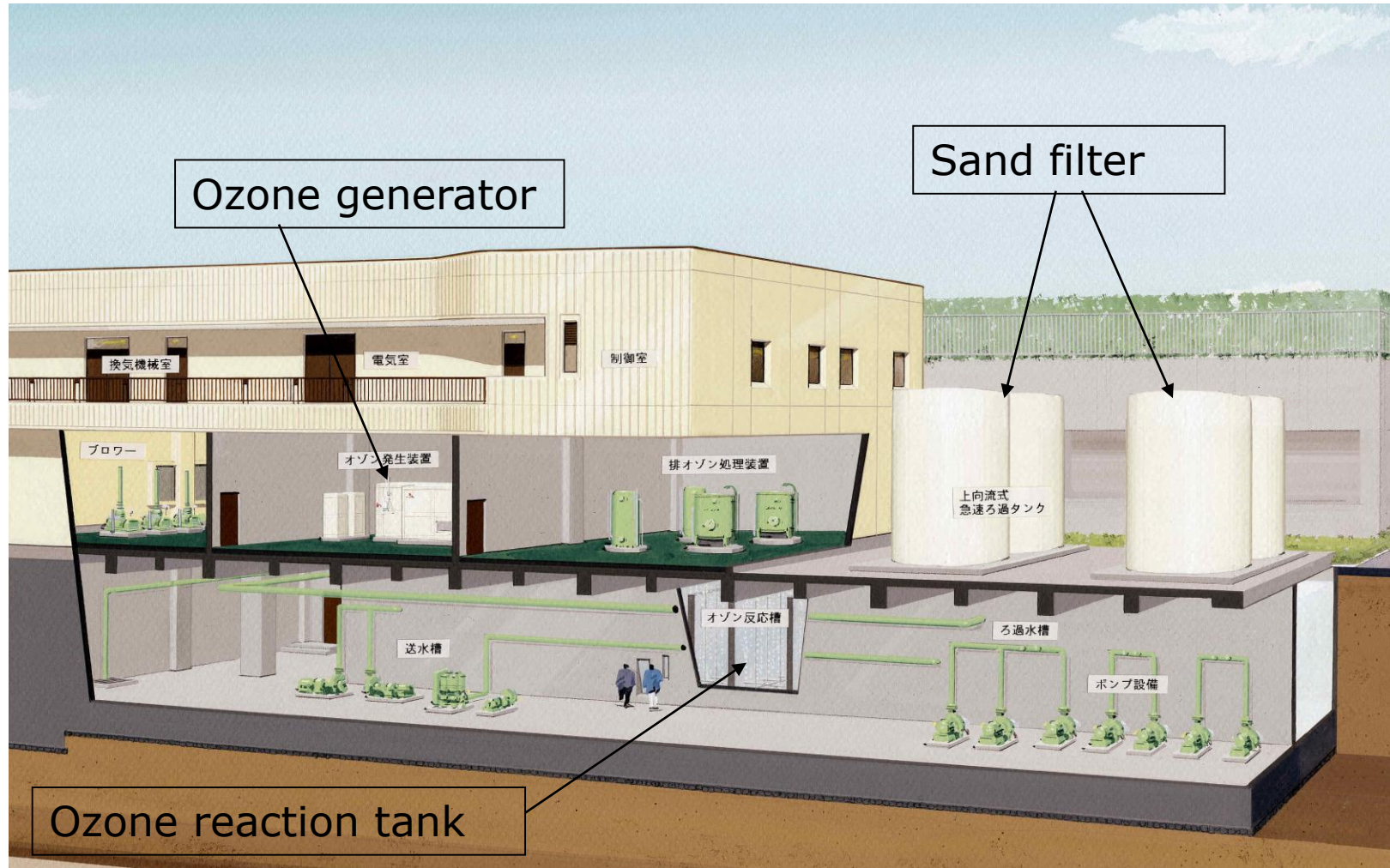
Ozonated water:

Reclaimed water which is filtered with sand and treated with ozone oxidation.

Main use:

Toilet flushing, local stream, heat source for air conditioner, etc.

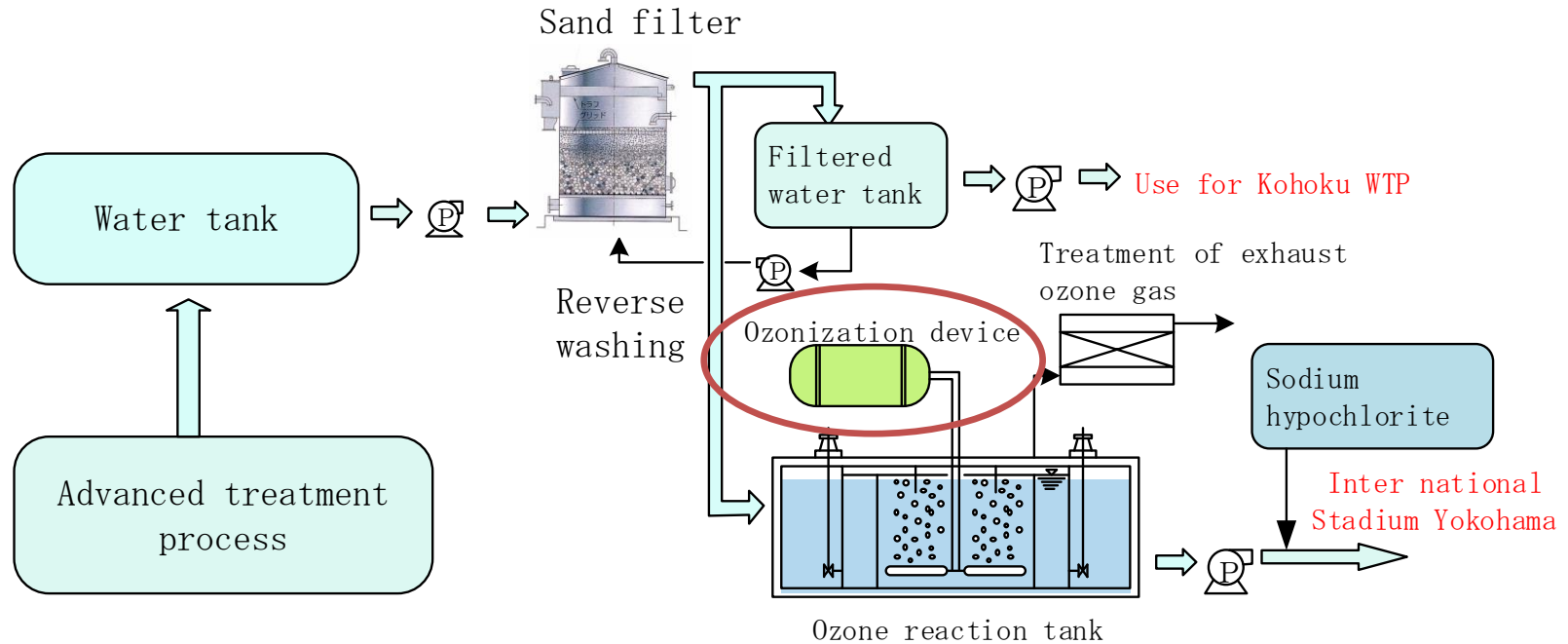
2. Water Recycling



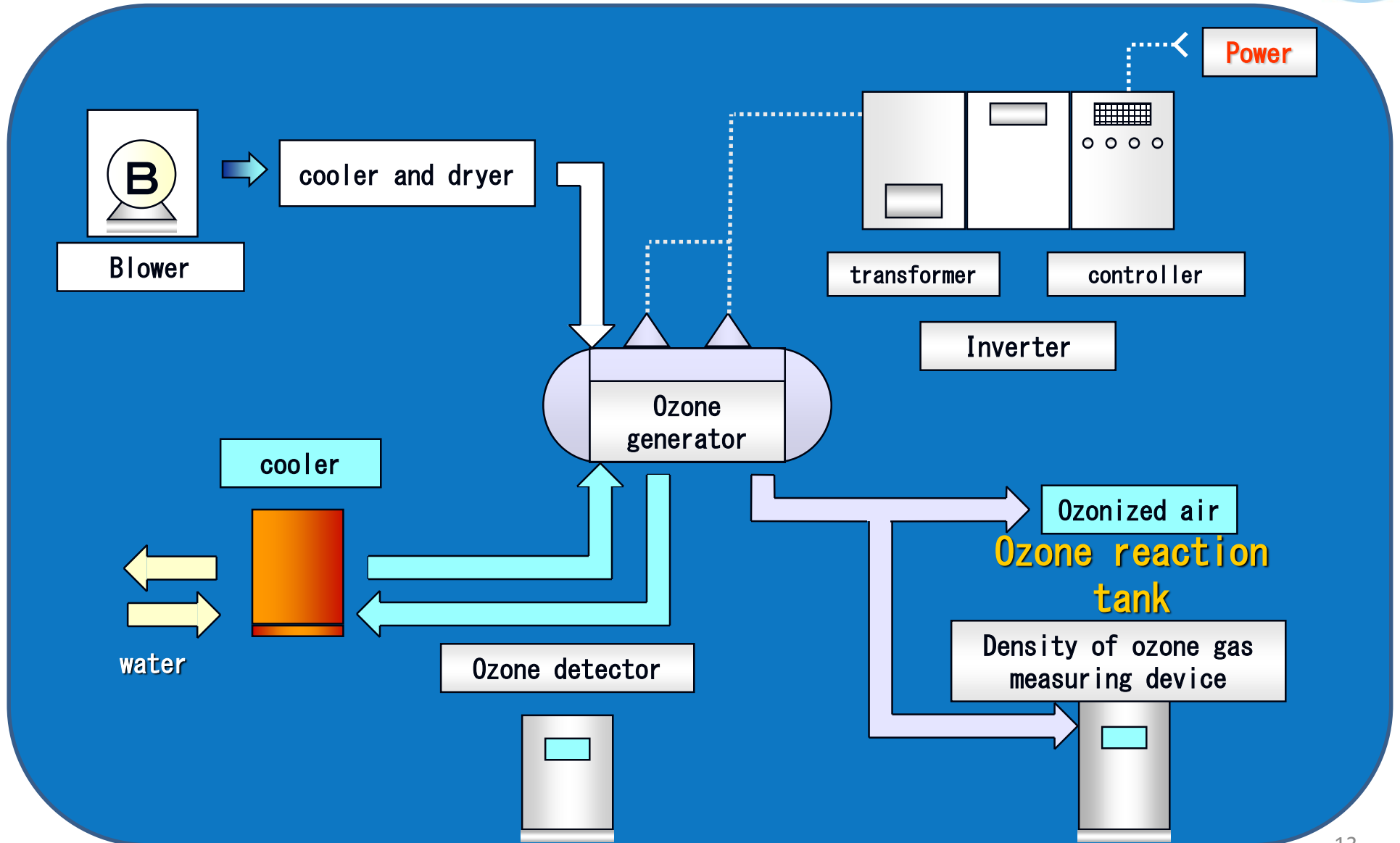
2. Water Recycling



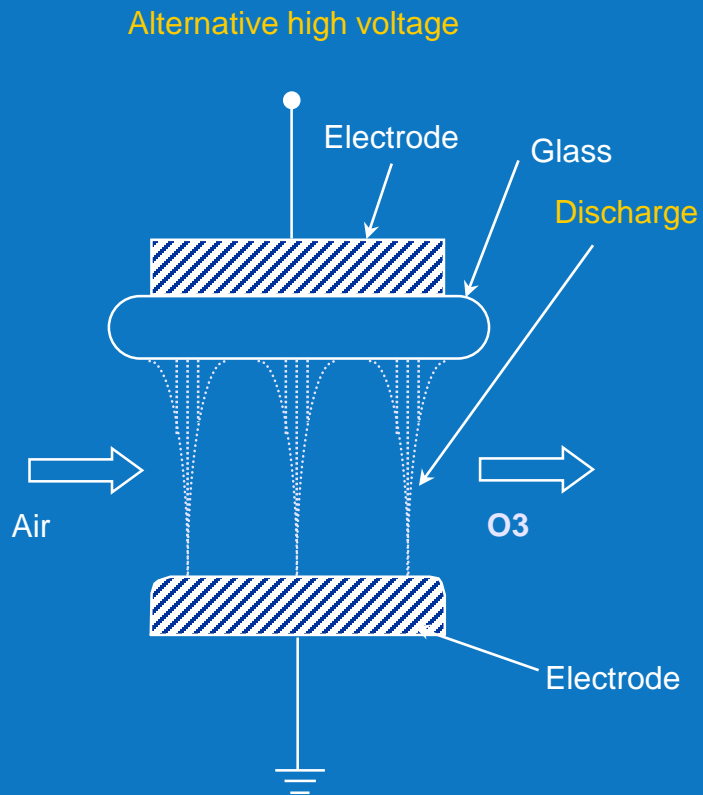
Flow of reuse treated water



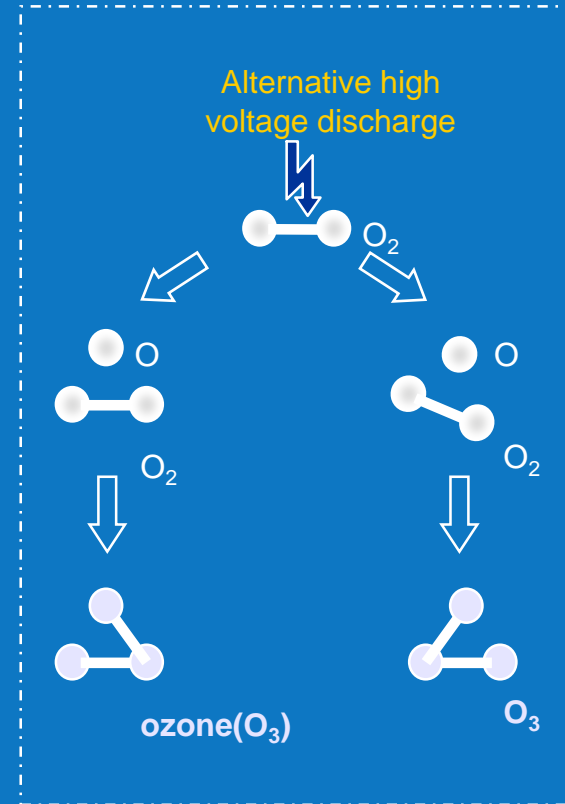
2. Water Recycling



2. Water Recycling

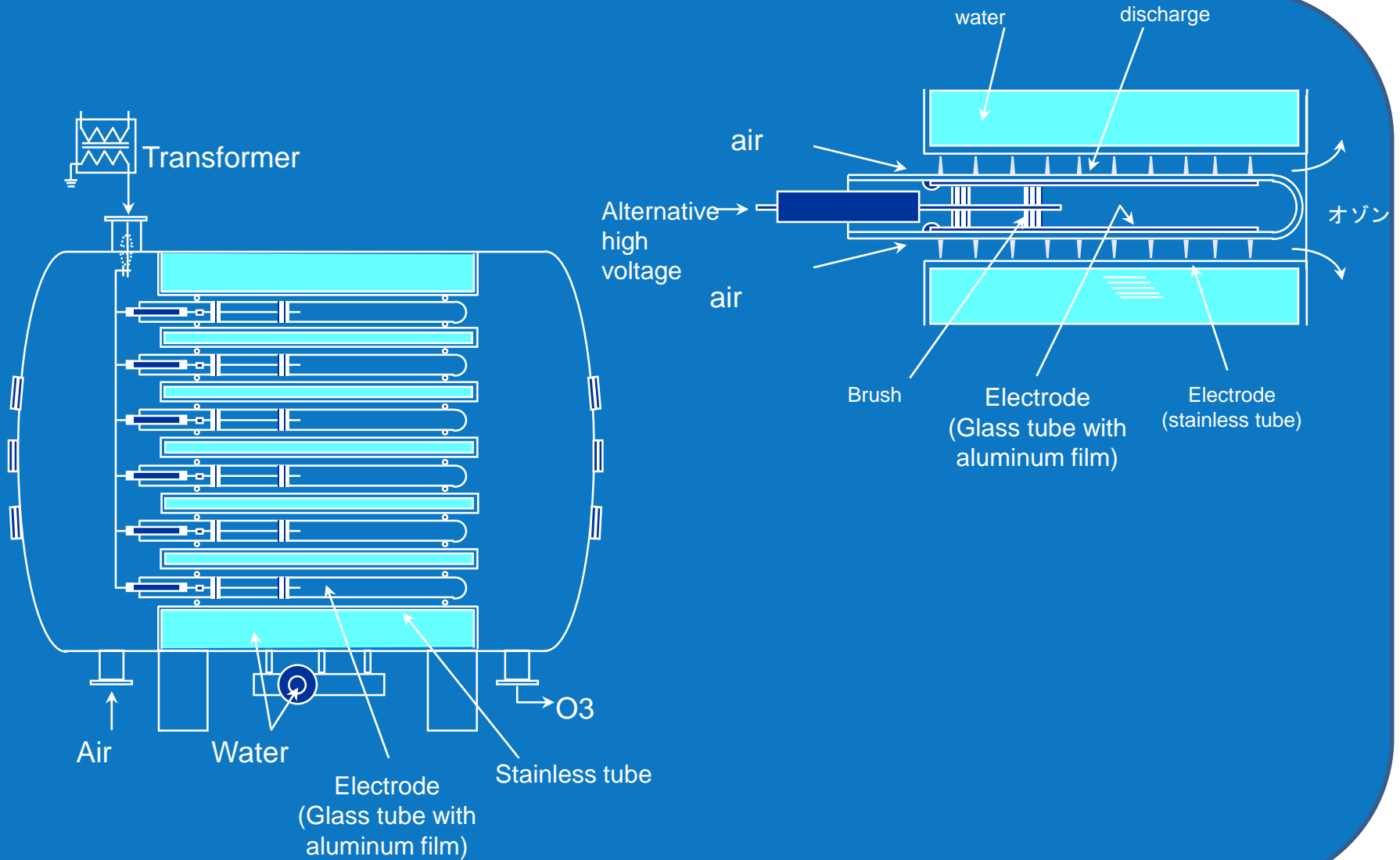


structure



principle

2. Water Recycling





Fare-paying services

- ✓ Supplying to commercial facilities, municipal facilities (except sewage works)
- ✓ Selling via reclaimed water supplying device



Free-of-charge services

- ✓ Cooling and washing equipment in treatment facilities
- ✓ Carried to local streams and parks for restoration of water environment



2. Water Recycling



2. Water Recycling

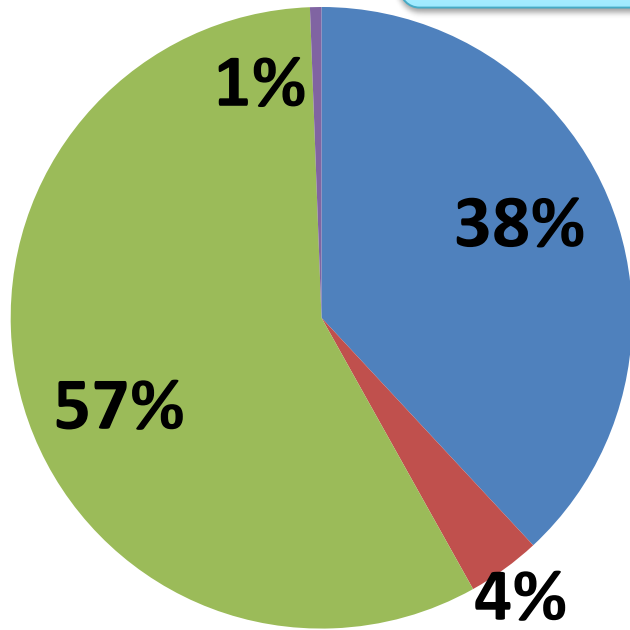


We sell reclaimed water (sand filtered water) to public works contractors.

2. Water Recycling

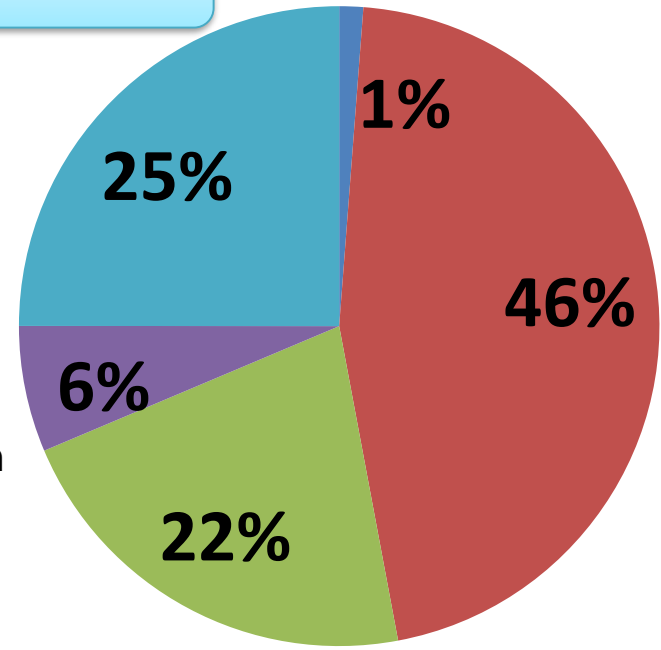


Supplying sand filtered water



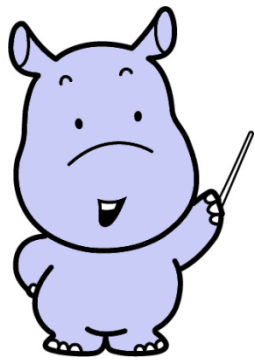
1996 (Approx. 6,000m³)

- Sewer cleaning
- Road cleaning
- Soil watering/
Dust prevention
- Watering trees
- Others



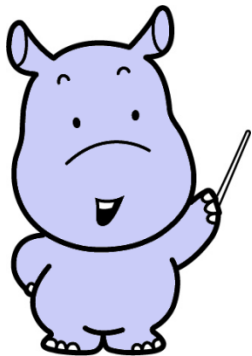
2015 (Approx. 40,000m³)

Around 1996, filtered water was mainly used for cleaning sewers and dust prevention. Nowadays it is used for cleaning roads and washing construction sites.



Thank you for your attention.

Initiatives for Sewerage BCP in Yokohama City



Environmental Planning Bureau
City of Yokohama



1. About Us: Yokohama City
2. Development of Sewerage BCP*
3. Implementation of Sewerage BCP*

*BCP: Business Continuity Plan



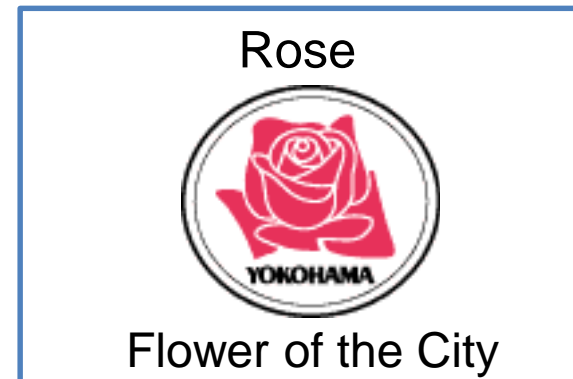
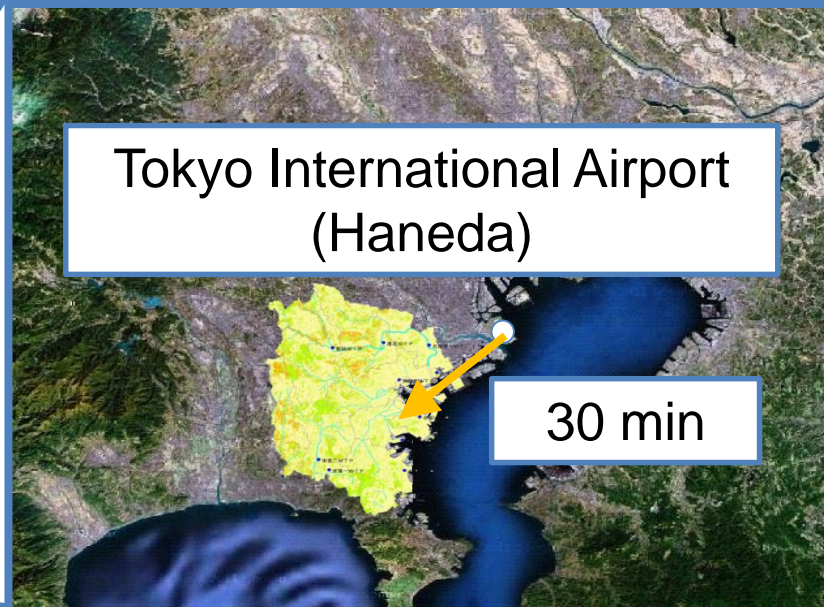
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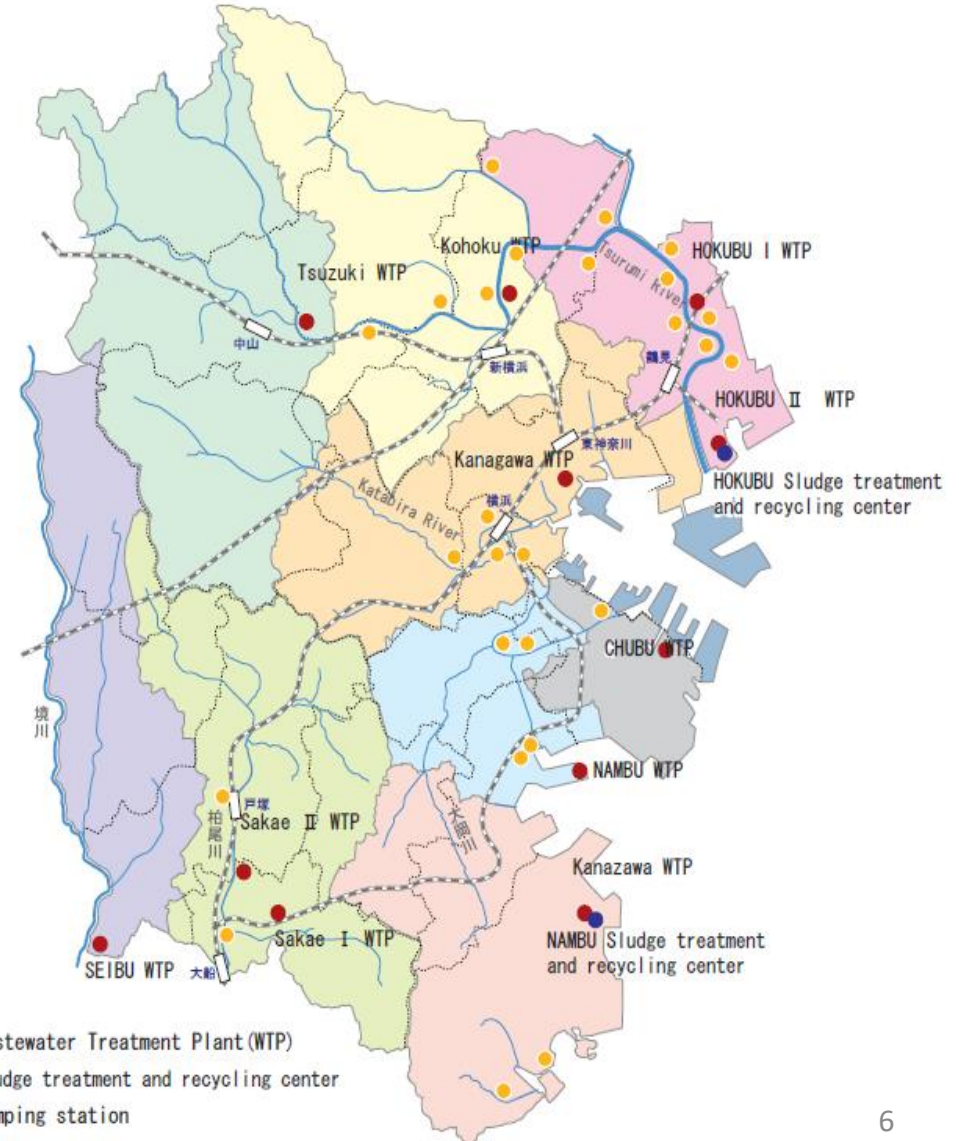
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*BCP: Business Continuity Plan

2. Development of Sewerage BCP



March 11, 2011 Great East Japan Earthquake

Minamigamou Wastewater Treatment Center in Sendai City

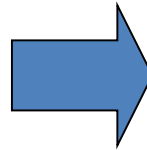


Damaged plant



Damaged grit separator

Main pumping facilities in Minamigamou WTC



The walls collapsed and the pillars inside were curved.

2. Development of Sewerage BCP



Support in the affected areas (First stage survey in Sendai City)



Field survey



Visual confirmation
Inside manholes

2. Development of Sewerage BCP



When a disaster occurs,

- ✓ What should we, who are in charge of sewage works, do?
- ✓ Our supervisors may also be affected.
- ✓ Can we deal with it on our own initiatives, even without their instructions?

2. Development of Sewerage BCP



After supporting in affected areas,
We recognized the need of

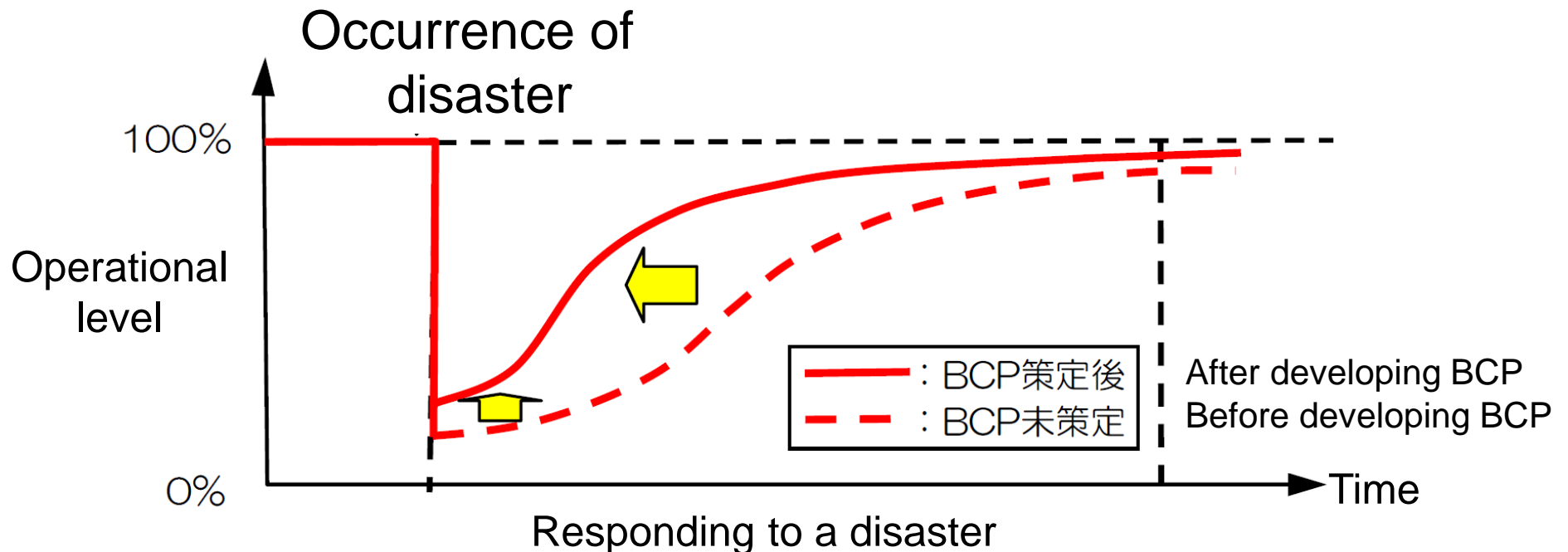
- ✓ **Imagery rehearsal** under severe conditions such as no resources or tsunami in order to respond to unexpected damages
- ✓ **Regular drills and trainings** in simulated disaster



Development of Business Continuity Plan



BCP: Business Continuity Plan



Conceptual diagram

2. Development of Sewerage BCP



Under the following circumstances:

- ✓ Shortage of resources: manpower, equipment, fuel, etc.
- ✓ Little or no information
- ✓ Damaged utilities

To minimize the damage:

- ✓ Out of service
- ✓ Deterioration of sewerage function

Who? By when? Do what? To what extent?

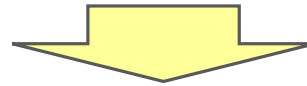
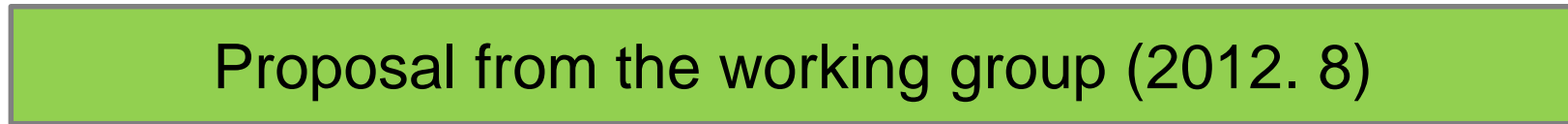
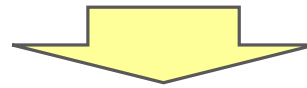
→ Action Plan: Sewerage BCP

2. Development of Sewerage BCP



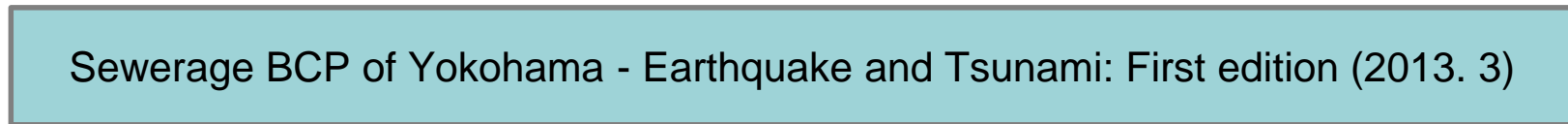
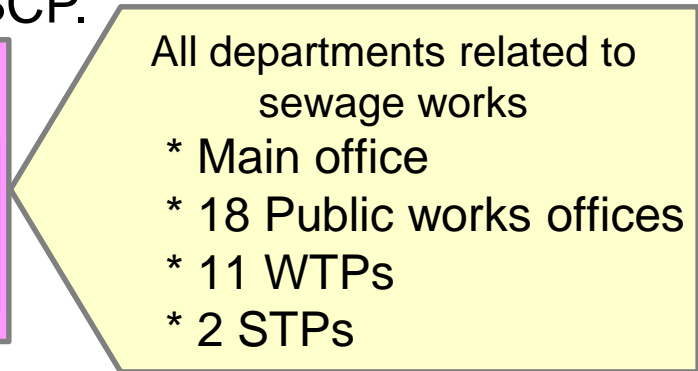
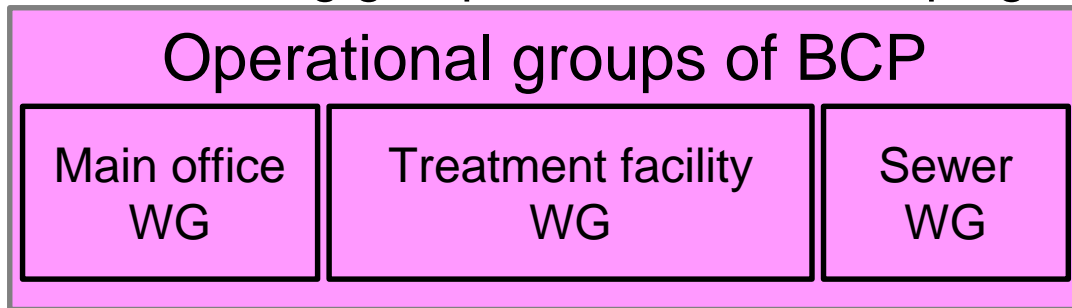
1. March, 2013 -

The working group started considering the framework of BCP.



2. September, 2012 -

Each working group worked for developing BCP.



2. Development of Sewerage BCP



Lessons from Great East Japan Earthquake

1. First priority

It is going to be difficult to continue working, if there is no one engaged in the sewage works in case of disaster.

→ **Biological safety of human body**

2. Damage from tsunami

Due to the tsunami along with Great East Japan Earthquake the treatment facilities were severely damaged and shut down. The functional decline continued for a long time.

→ **Including measures against tsunami in BCP**



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- 3. Implementation of Sewerage BCP***

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High-Priority Tasks

We have to continue to provide sewage services in case of disaster.

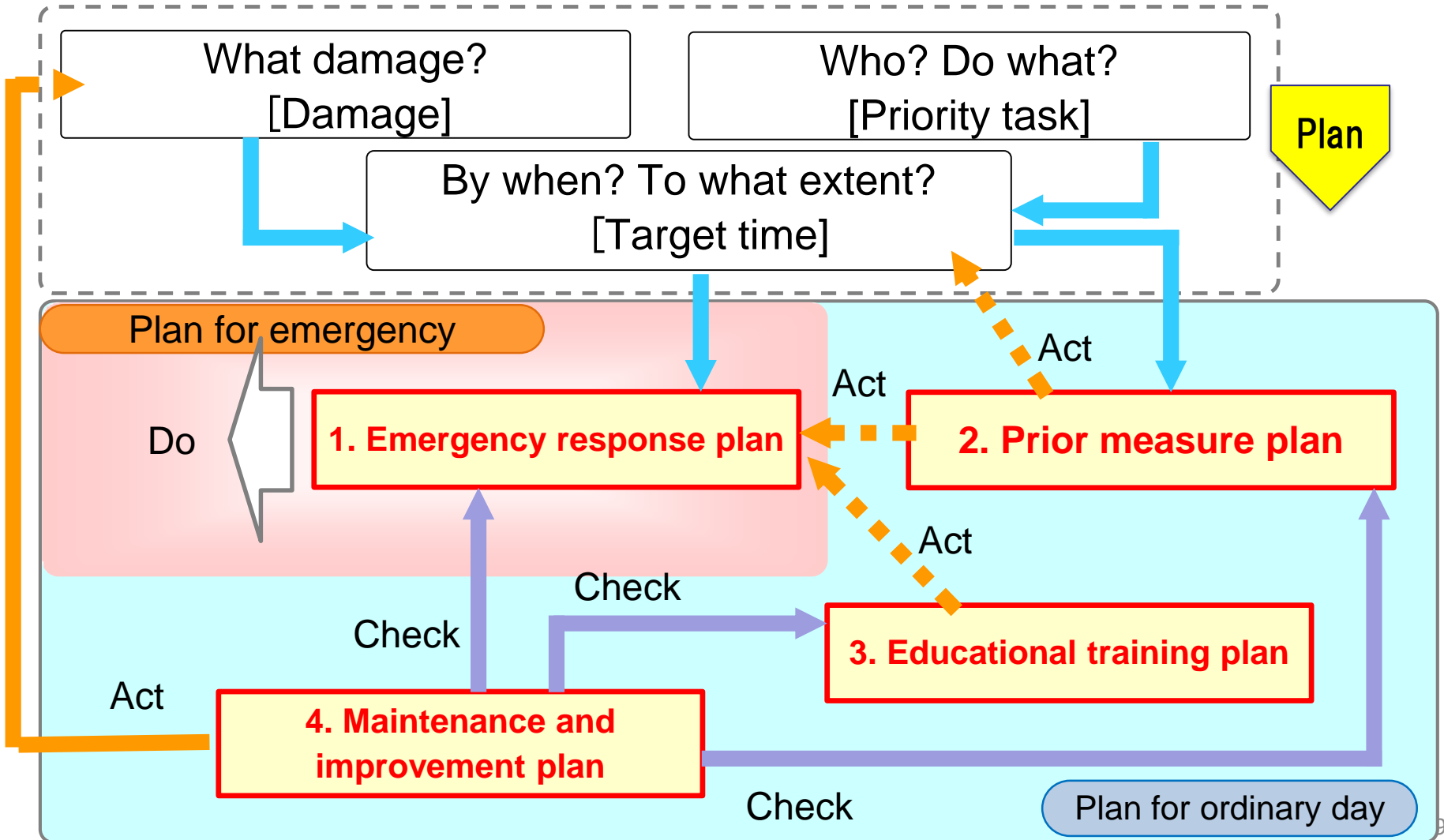
We need to deal with

1. Toilet issues
2. Overflow of wastewater
3. Transportation systems
4. Discharge of raw sewage
5. Inundation

3. Implementation of Sewerage BCP



Spiral Up of Sewerage BCP based on 4 plans



3. Implementation of Sewerage BCP



Emergency response plan

No.	ワーク フロー 番号	対応時 期 (時間)	担当班		非常時優先業務	行動内容	業務目標 (成果)	対応 場所	参照文書類 (文書、マニ ュアル類)
			班	部署					
1	管復1	~6時間	下水道 管路復 旧班		管路復旧班の設置	対策本部立上げ	本部体制の 確立	関内中 央ビル	
12			下水道 管路復 旧班	下水道建 設事務 所	工事現場安全 の管路)	現場の 応じて緊 急措置等の対応を行う。	害状況の 把握	下水道 建設現 場	
13	管復11	24時間 ~5日間	下水道 管路復 旧班	管路保全課 管路整備課 下水道建設 事務所	調査(蓋掛け含む) (その他の管路)	被災が想定される地域のマン ホールの蓋を開けて人孔と管内 の状況を確認する。	市全域の被 害状況の把 握	市内調 査実施 箇所	下水道管路施設 震後対策マニ ュアル 保全課・土 木事務所編(平 成14年横浜市下 水道局)
14	管復12	3日間~	下水道 管路復 旧班	土木事務所 業者	応急復旧(その他の管 路)	最低限の流下機能を応急的に 回復するために必要な復旧工 事を行う。	市全域の被 害状況の把 握	市内応 急復旧 工事实 施箇所	
15	管復12	24時間 ~7日間	下水道 管路復 旧班	管路保全課	台帳準備(その他の管 路)	調査から復旧に至るまでに用い る台帳を準備する。	市全域の被 害状況の把 握	関内中 央ビル	

Priority task

Time

Detailed action

Location

Department

Goal (Result)

Related documents
(manuals, etc.)

3. Implementation of Sewerage BCP



1. Development of Sewerage BCP: First edition (FY2012)
→ Organizing the work strategically in case of disaster
2. Agenda (FY2013)
 - (1) Entrenching Sewerage BCP
 - Creating detailed procedures
 - (2) Securing lacking operational resources
 - Securing a hub and utilities
 - (3) Developing structure
 - Contact structure and method of conveying information

Considering detailed and effective ways after the drills

3. Implementation of Sewerage BCP



Map exercise – Sewerage BCP

- ✓ Date: November 20, 2013 13:00 – 17:15
- ✓ Method: Map exercise (RPG method)
- ✓ Estimated duration: Right after the occurrence – Three days after
- ✓ Contents: Operation of crisis-response meeting for sewerage recovery
Information gathering/conveying, discussion on urgent matters, PR

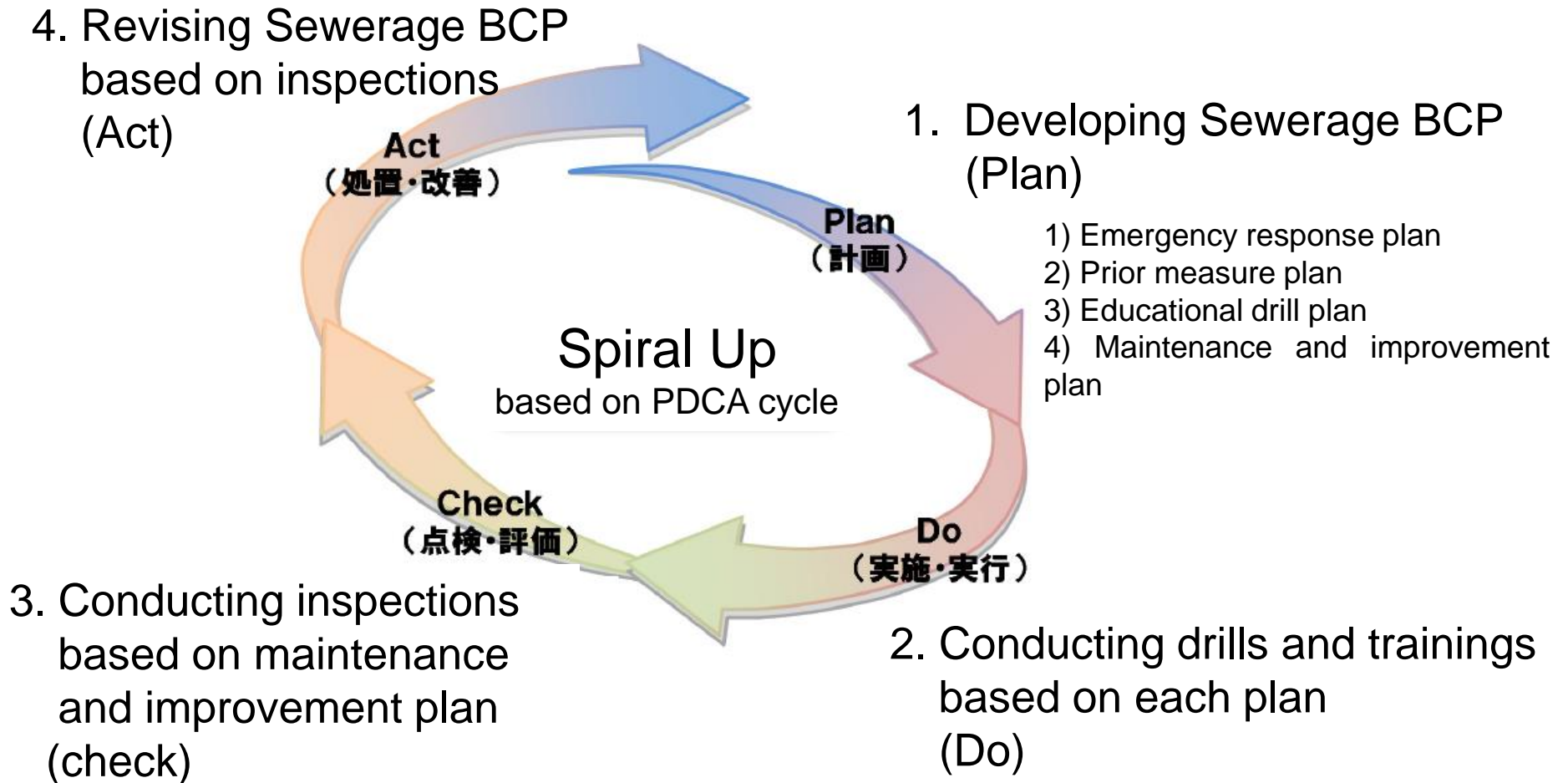




Issues: what we learned from the drills

- ✓ Creating the manuals
which link to effective response to the disaster
- ✓ Improving the drills
- ✓ Prior measures
(working environment, office equipment, etc.)

3. Implementation of Sewerage BCP



3. Implementation of Sewerage BCP



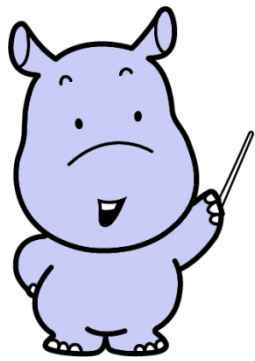
Review of Sewerage BCP

After developing the Sewerage BCP, we recognize the following.

- ✓ The simulated situation is just one of the numerous situations that may happen in the future.
- ✓ It is important to improve responding abilities to disaster.
- ✓ The principle of developing BCP is to discuss various matters among us.



Our own Sewerage BCP



Thank you for your attention.