AWaP Technical Seminar

Sewer Pipe Laying by Unclemole

Iseki Poly-Tech, Inc.

Tetsuaki Muroi

Iseki Poly-Tech, Inc.

- Iseki is a manufacture of microtunnel boring machine (MTBM)
- Established in 1971
- Sold over 2,500 MTBMs in the world

ISEKI **Sales Achievement at Overseas Countries,**

Asia,Europe,Oceania and American Continet, ISEKI UNCLEMOLE is digging all over the world!

Unclemole Series

Unclemole Series have been developed for different kinds of conditions

Unclemole L:
for longer span including curve

Unclemole V:
for vinyl chloride pipes.

Unclemole Z:
splittable and can start driving from small shafts

Unclemole:
Our basic MTBM with eccentric cutter head rotation

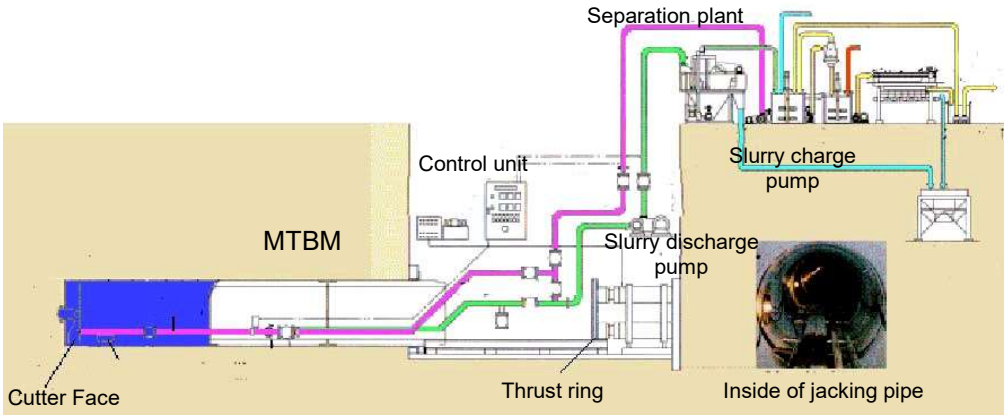
Unclemole V:
for vinyl chloride pipes and applicable to rock/ gravel.

Unclemole Super Junior:
applicable for rock/ gravel and can start from small shafts.

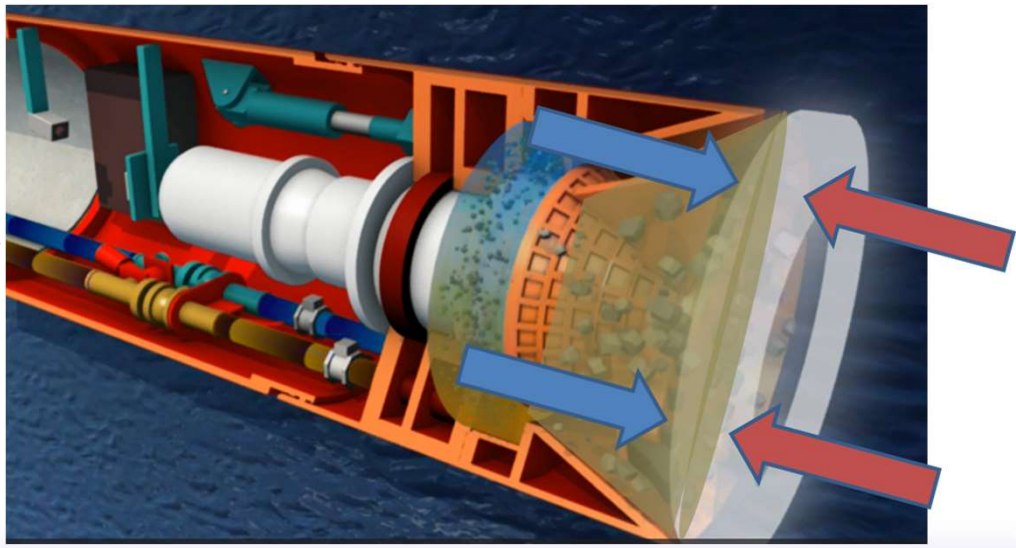
Unclemole Super:
for rock/ gravel.

- Slurry-type MTBM

→ excavated soil to be transported by circulation of slurry

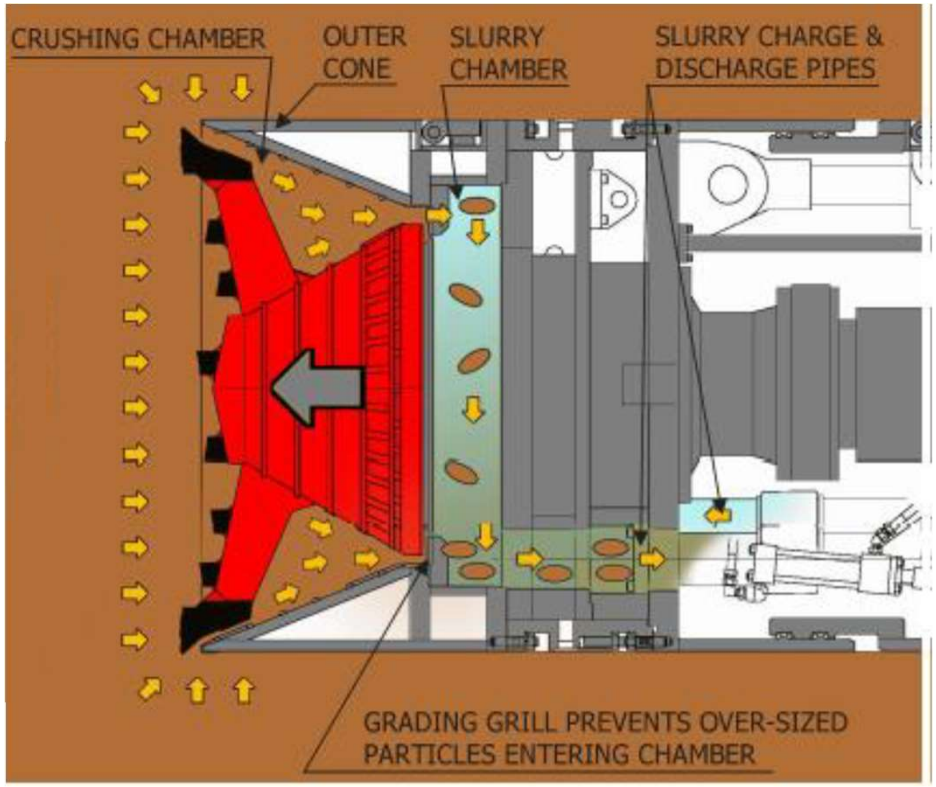


→ pressure at the cutter face is controlled to counterbalance with the earth pressure and groundwater pressure



Unclemole's Features

- Cutterhead with Eccentric Rotation

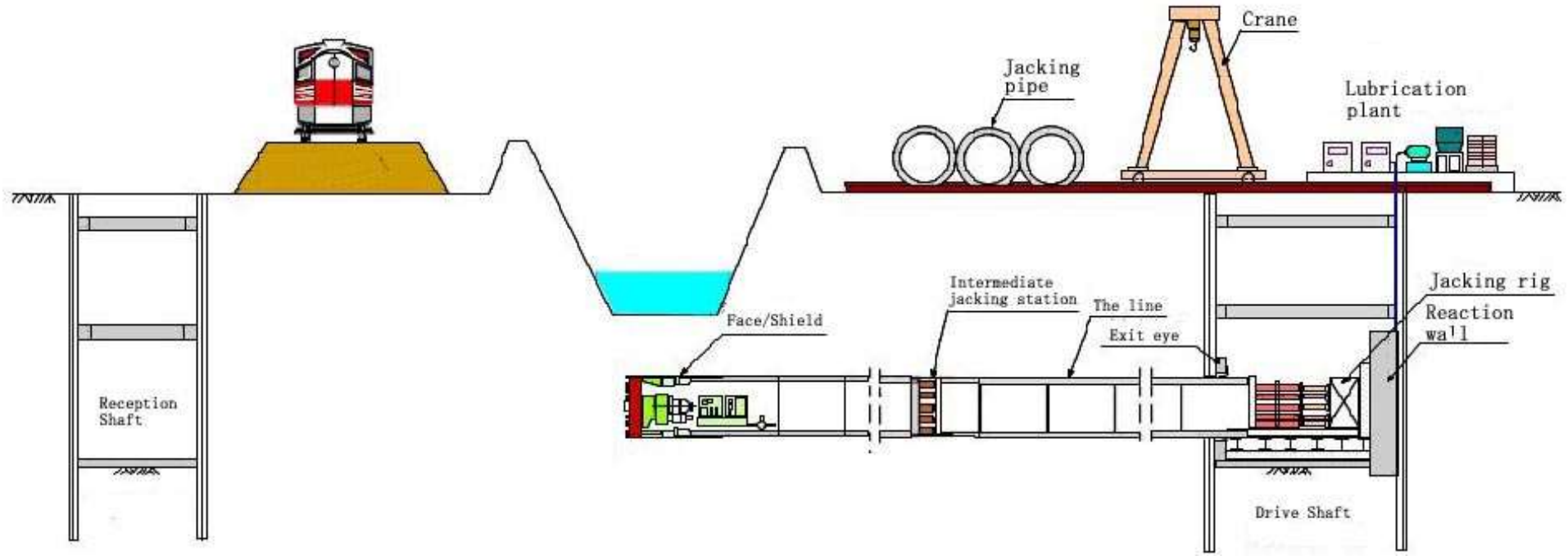


Makes it applicable to wide variety of soil conditions

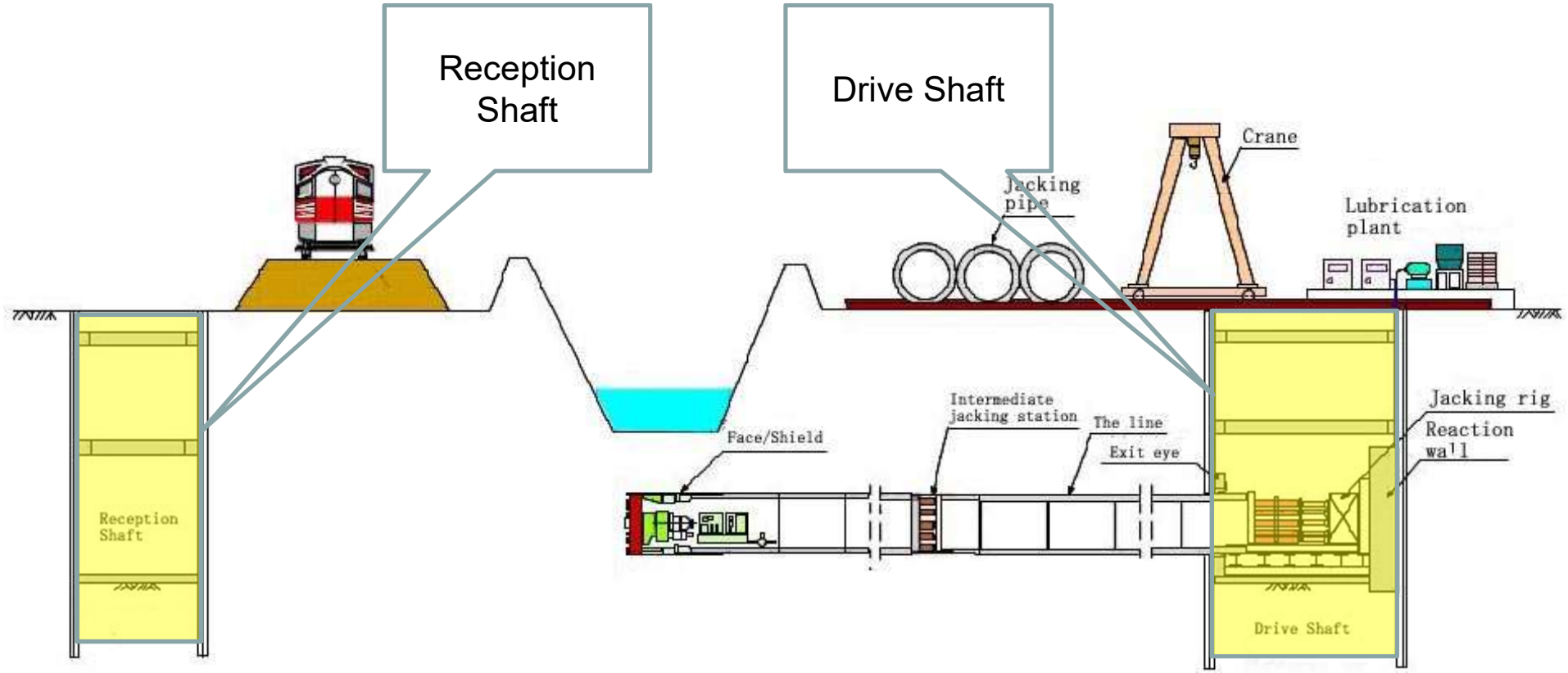
Unclemole's Features

- Applicable Pipe ID: 200mm to 3000mm
- Applicable Pipe Types:
  RC pipes, PVC pipes, steel pipes, Ductile Iron pipes, etc.
- Accuracy easily assured with RSG (reflective steering guidance)
- New machine (Unclemole Shuttle) can be retrieved from the drive shaft, eliminating the needs of an arrival shaft.

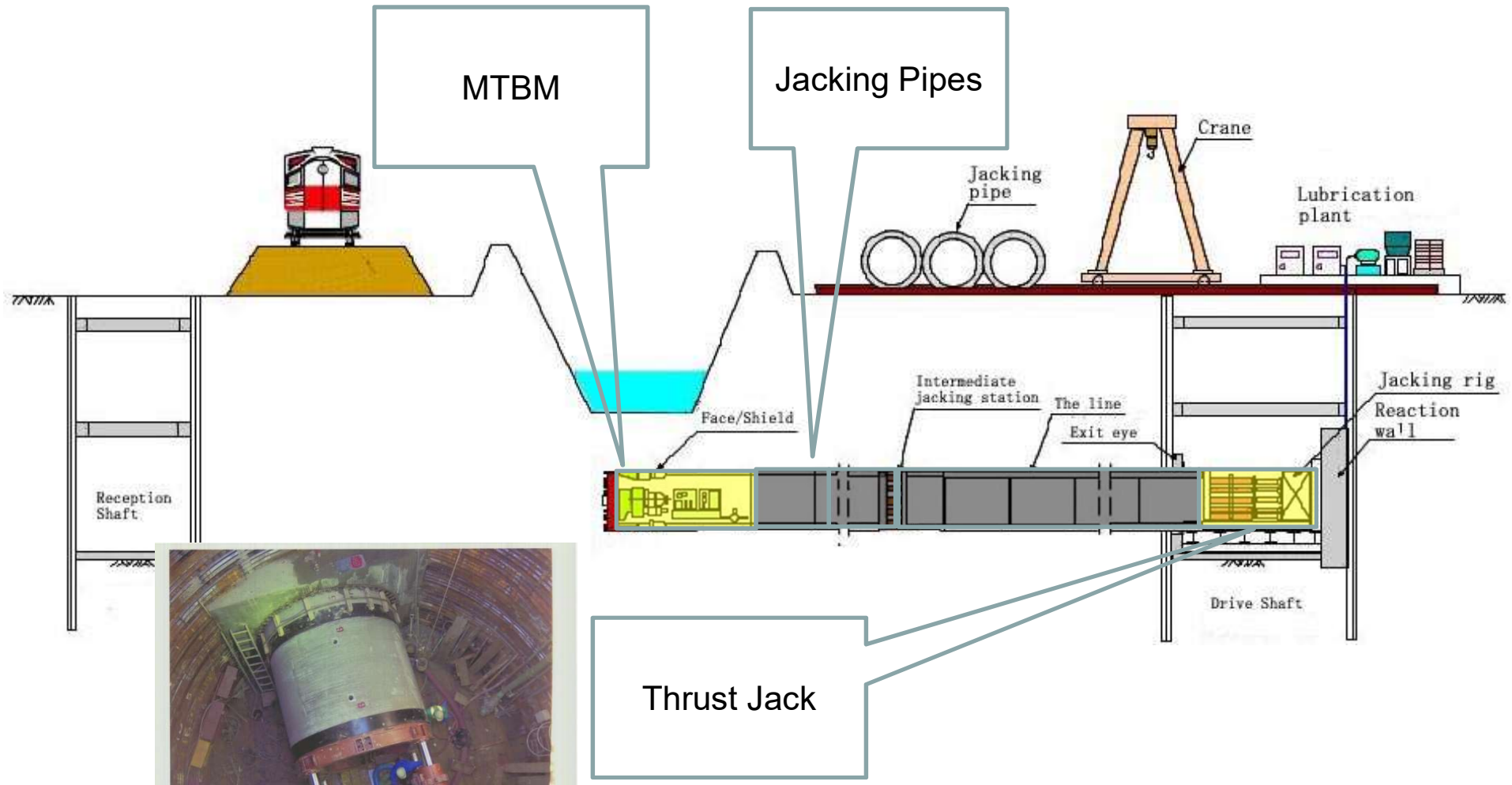
Sewage Pipe Laying Procedure



Sewage Pipe Laying Procedure



Sewage Pipe Laying Procedure



Conclusion

- Iseki's slurry-type MTBM Unclemole is easy to operate.
- Unclemole's eccentric rotation of cutterhead makes it applicable to wide variety of soil conditions.
- Iseki has sold more than 2,500 machines in the whole world, contributing to the development of underground infrastructure.
- Iseki can contribute to the development of underground infrastructure in your country too.

Introduction of NITTOC construction's Technology Pipe Jacking and Auxiliary method

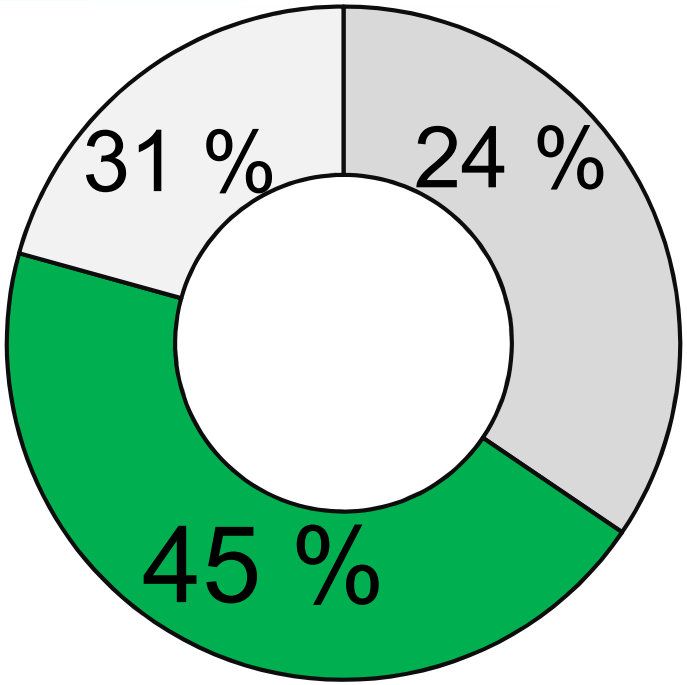
AWaP Technical seminar

August 1, 2023

Introduction of background

Oversea projects

Over 60 civil construction projects in Asia region



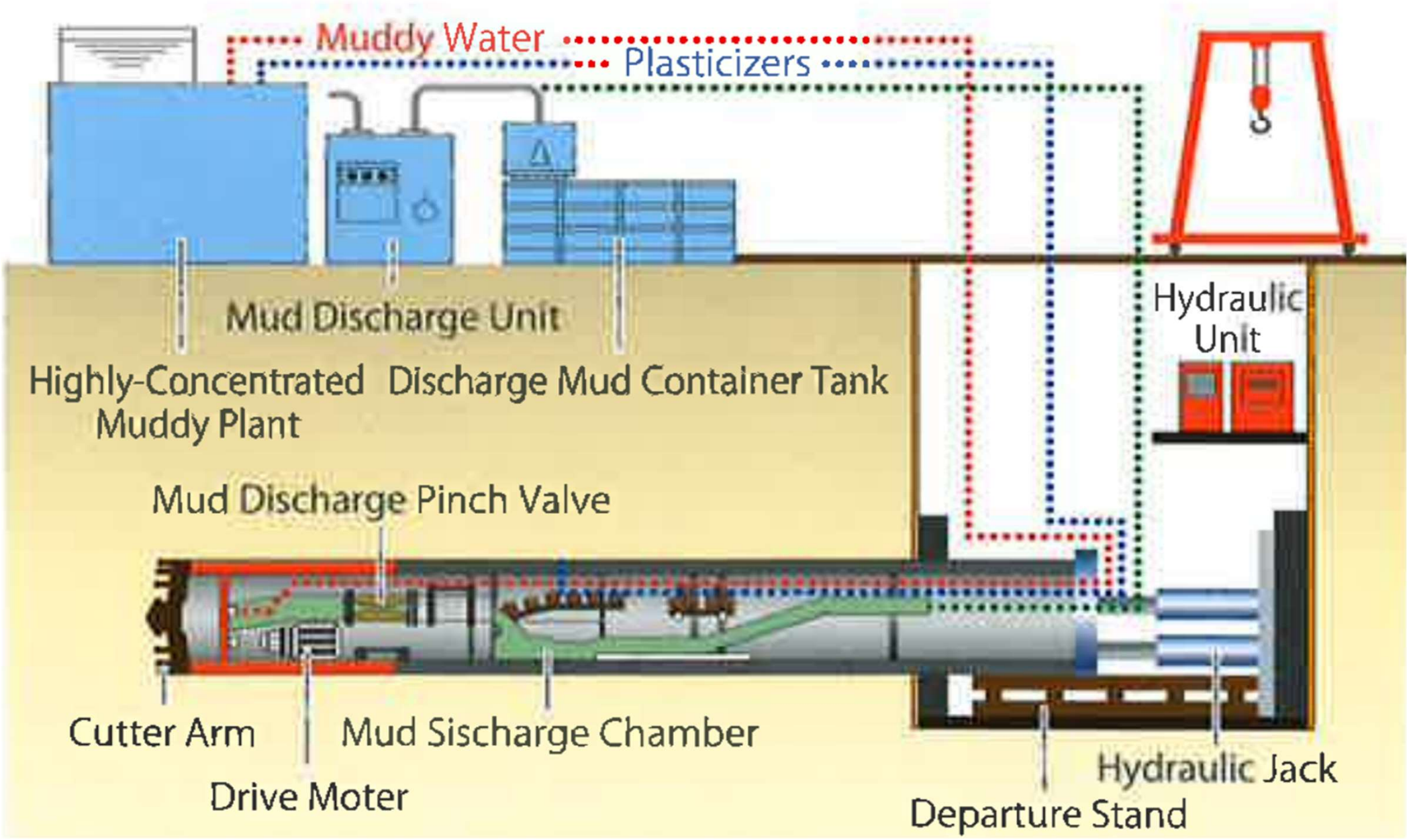
Soil Improvement and Pipe Jacking project

Anchor project

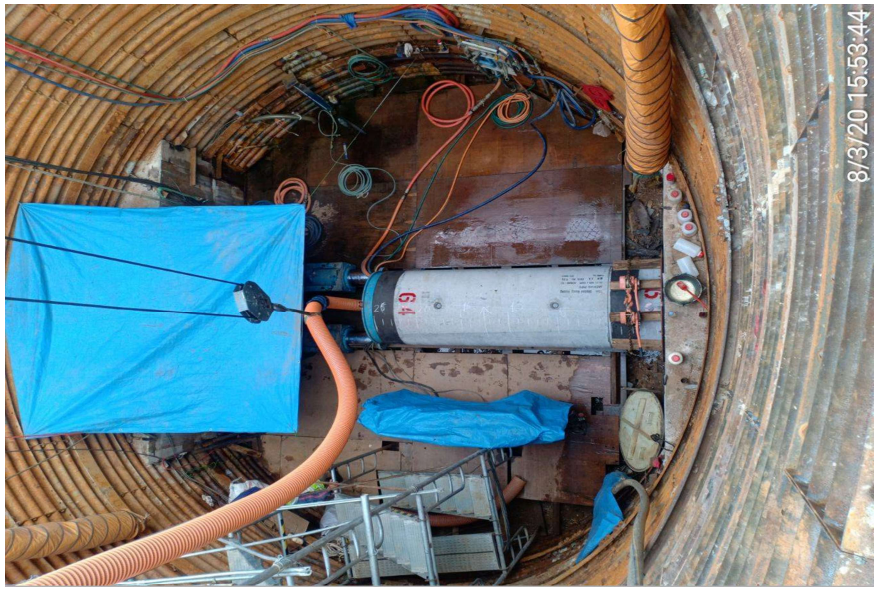
Slope protect project

The rate of Soil Improvement via Pipe Jacking project

Mud Density Type



Site e.g. Mud density (Cambodia)

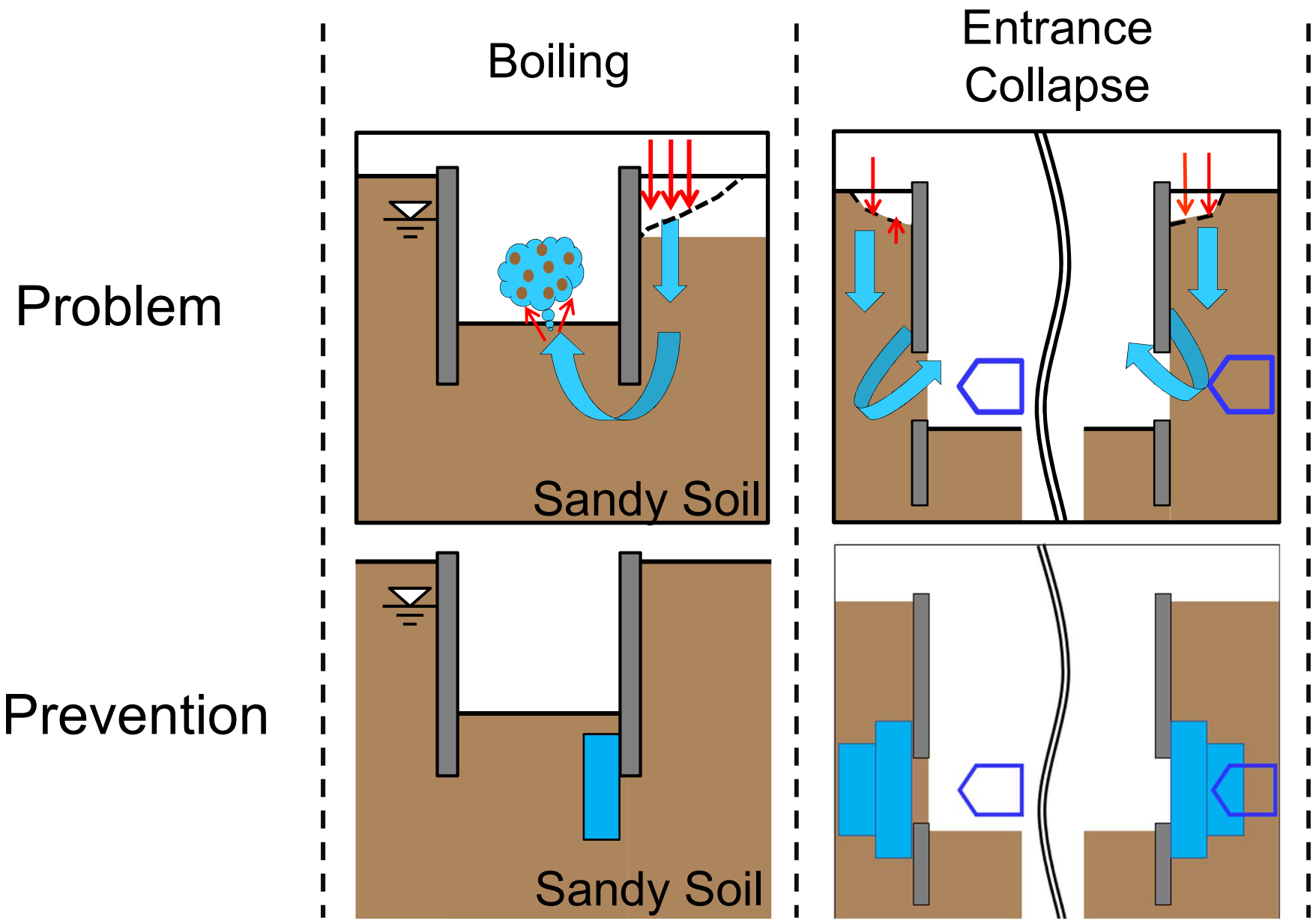


Client：Phnom Penh Ministry of Public Works and Transport

Quantity：Mud density type
φ=800 mm
L=1,495 m（6 span）

Construction period ：2019.8 – 2020.12
(17 mths)

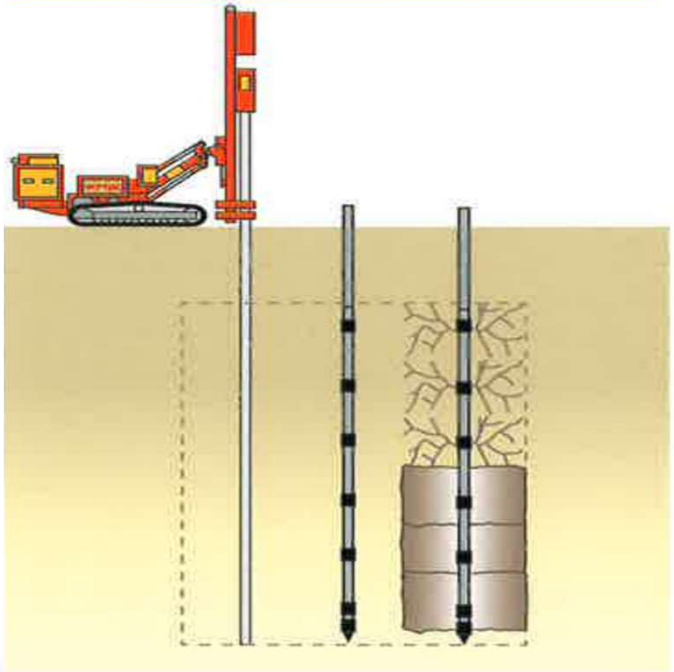
Importance of Soil Improvement for Pipe-Jacking



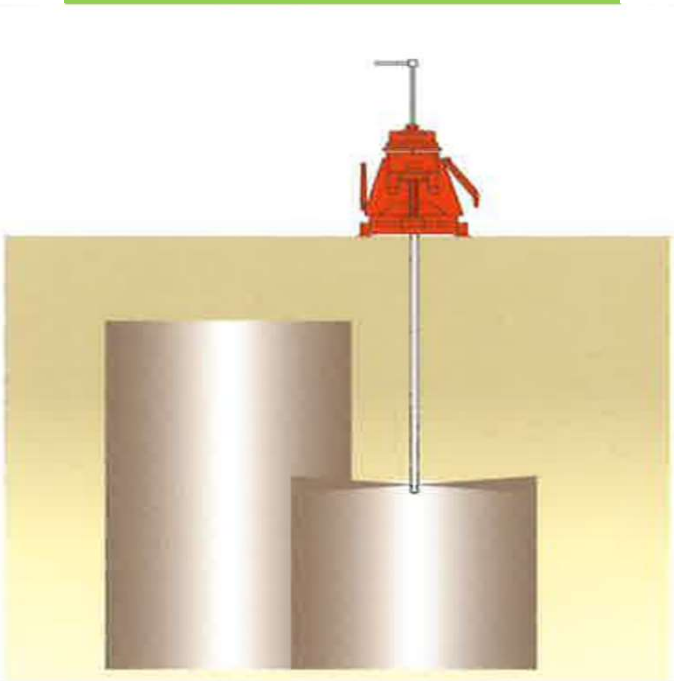
Soil Improvement Methods for Pipe Jacking

Method		Improvement depth (m) 10 20 30 40	Design Strength	Benefit
Chemical Grouting	Double Pipe Strainer		qu=80 kN/m2	Preventing water leakage and reinforcement of ground strength
	Double Packer		qu=100 kN/m2	
Jet Grouting	Superjet		qu=1.0~3.0 MN/m2 (Sand~Cohesive)	Preventing water leakage and reinforcement of ground strength with high effectivity

Chemical Grouting Method



Jet Grouting Method



Thank you for your attention

Contact → Mr. Matsumoto Nao

03-5645-5055 (Overseas Business Division)

nao.matumoto@nittoc.co.jp

Corrosion prevention technology for concrete products

For extended life, reduced costs, and road sag prevention.

HAZAMA ANDO CORPORATION

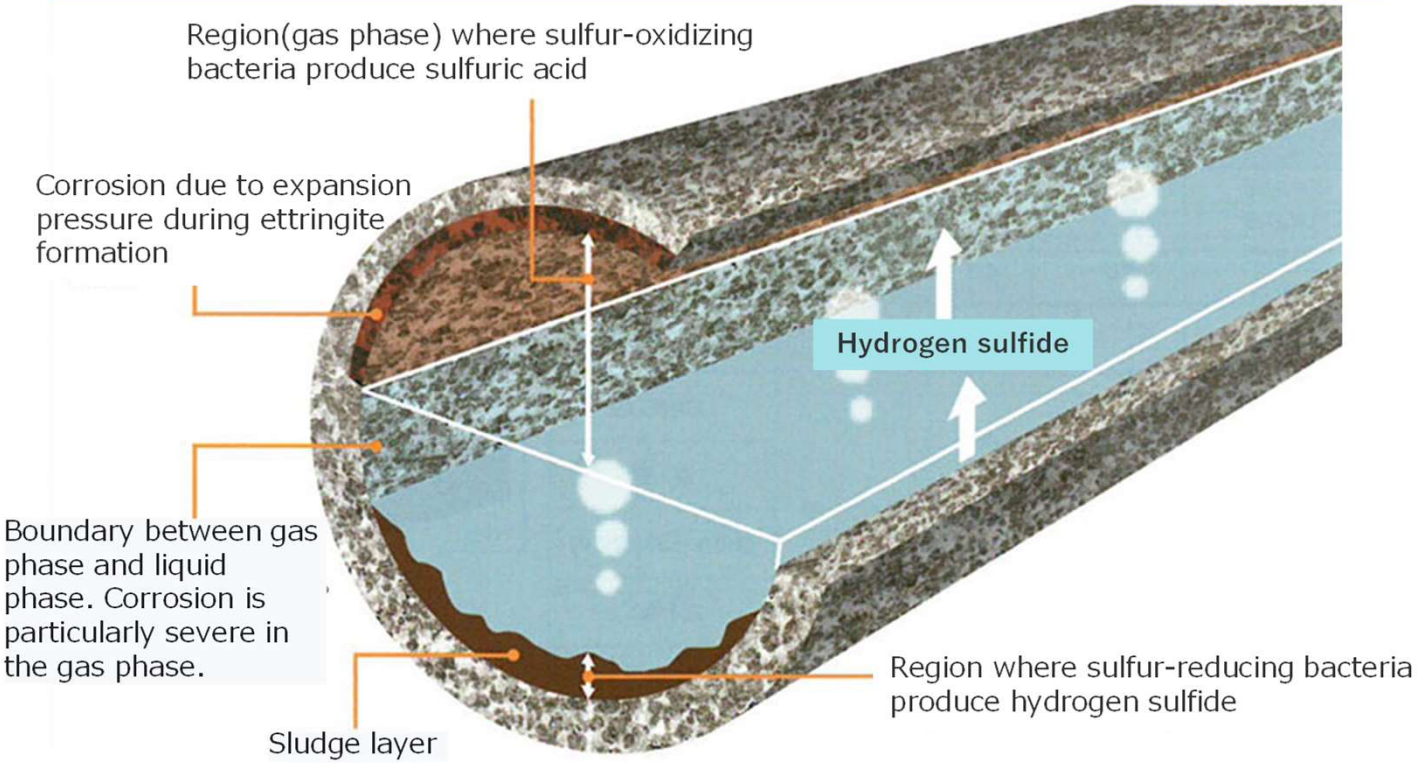
Accidents caused by sag of roads, corrosion of sewage pipes, etc.

- Mechanism to sag roads by pipe corrosion

Places where corrosion are obvious ;

・Sewage facilities→Sewer pipes, Manholes, etc.

・Drainage pits of office buildings, etc.



Corrosion prevention technology for concrete products

Overview

Admixture ***added in advance*** to concrete to ***inhibit the activity*** of sulfur-oxidizing bacteria and iron-oxidizing bacteria that cause sulfuric acid deterioration in concrete.

- Current antibacterial agent (S) ➡ Mainly used in Japan
- New antibacterial agent (C) ➡ Use outside Japan

[Results in Japan].

- Construction Technology Review & Certification (Sewerage Technology) - technology
- Corrosion Resistant Reinforced Concrete Products (Japan Sewage Works Association Type II Certified Materials and Equipment)

[Products: ***more than 20 years of experience***, with ***2,000 tons delivered each year***].

Antibacterial additive effect Comparison with paint-type lining

- Economy

  Reduction in product costs

  by **20-50%**

- Number of manufacturing days

  Molding under normal product manufacturing period

  (shortened to 57%)

- Durability

  Uniform distribution of antibacterial agent within the concrete product maintains corrosion protection performance even if cracks or scratches occur.

Bacteria resistant reinforced concrete product manhole

Corrosion-resistant paint-type lining

Variety uses of antibacterial agents

Effective when mixed into concrete.
→ Demonstrate antibacterial effect.

Life extension measure.
When corrosion protection is required, compared to normal Hume pipe construction
→Material cost increases by about 30%
→Cost reduction of more than 50% including construction cost

Cast in place concrete manholes

Hume pipes

Assenbly manholes

Jacking pipes

BOX culverts

Contact addresses for antibacterial agent

Technical Institute: Technical contact.

Phone No.+81-29-858-8811(Japan)

Email negishi.atsunori@ad-hzm.co.jp

The person in charge Atsunori Negishi

Head quarter Sales division: Contact for general sales.

Phone No. +81-3-3575-6102

Email yamamoto.yoshihisa@ad-hzm.co.jp

The person in charge Yoshihisa Yamamoto

Corporate profiles are available. Please refer this QR code.

Corporate profiles

For providing wastewater treatment to rural

Seiya Kamo

Overseas business department

FujiClean
Toward Clean Water…

Agenda

- ①About FujiClean
- ②About our product
- ③Solution: Case A onsite treatment
- ④Solution： Case B quick sewage treatment

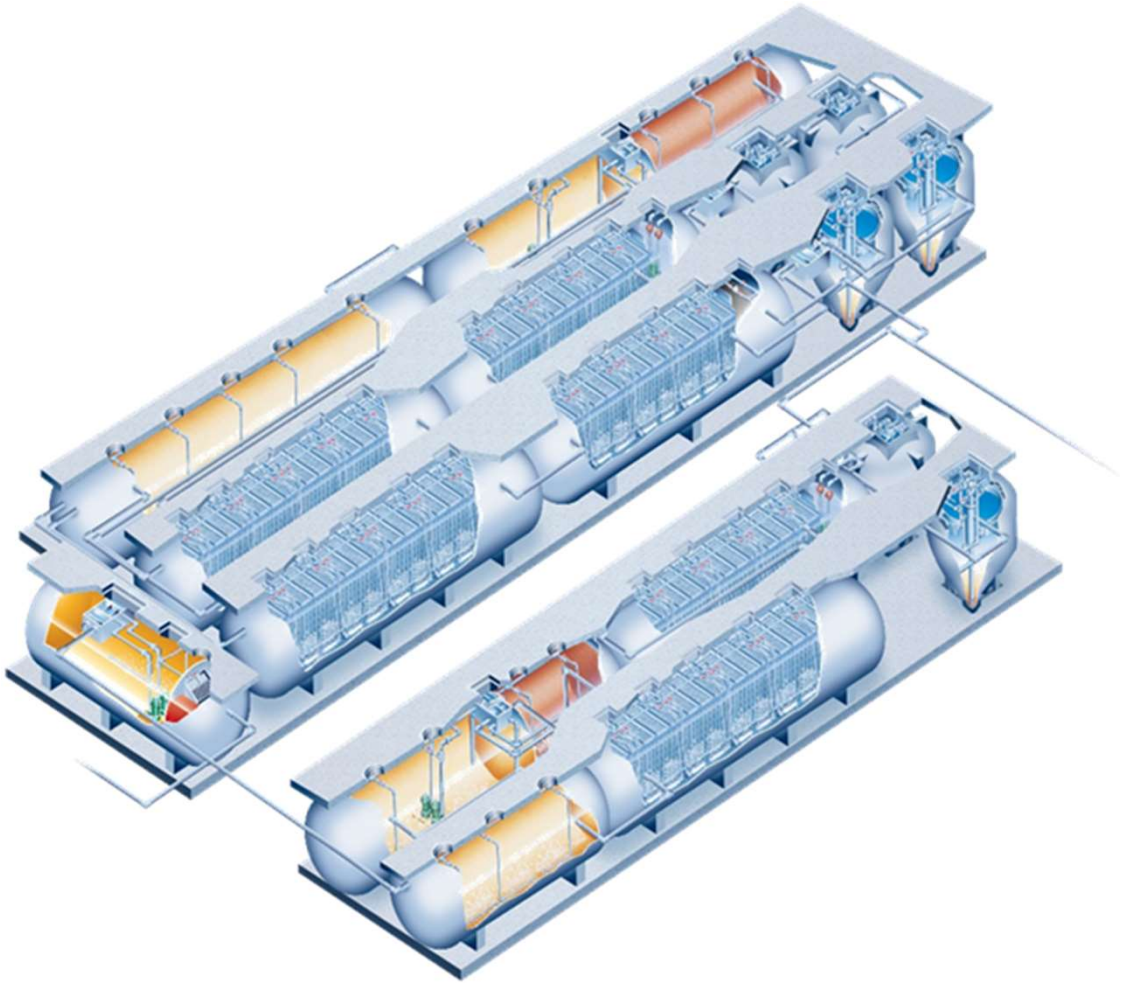
①About Fujiclean

Tubular type

Capsule type

①About Fujiclean

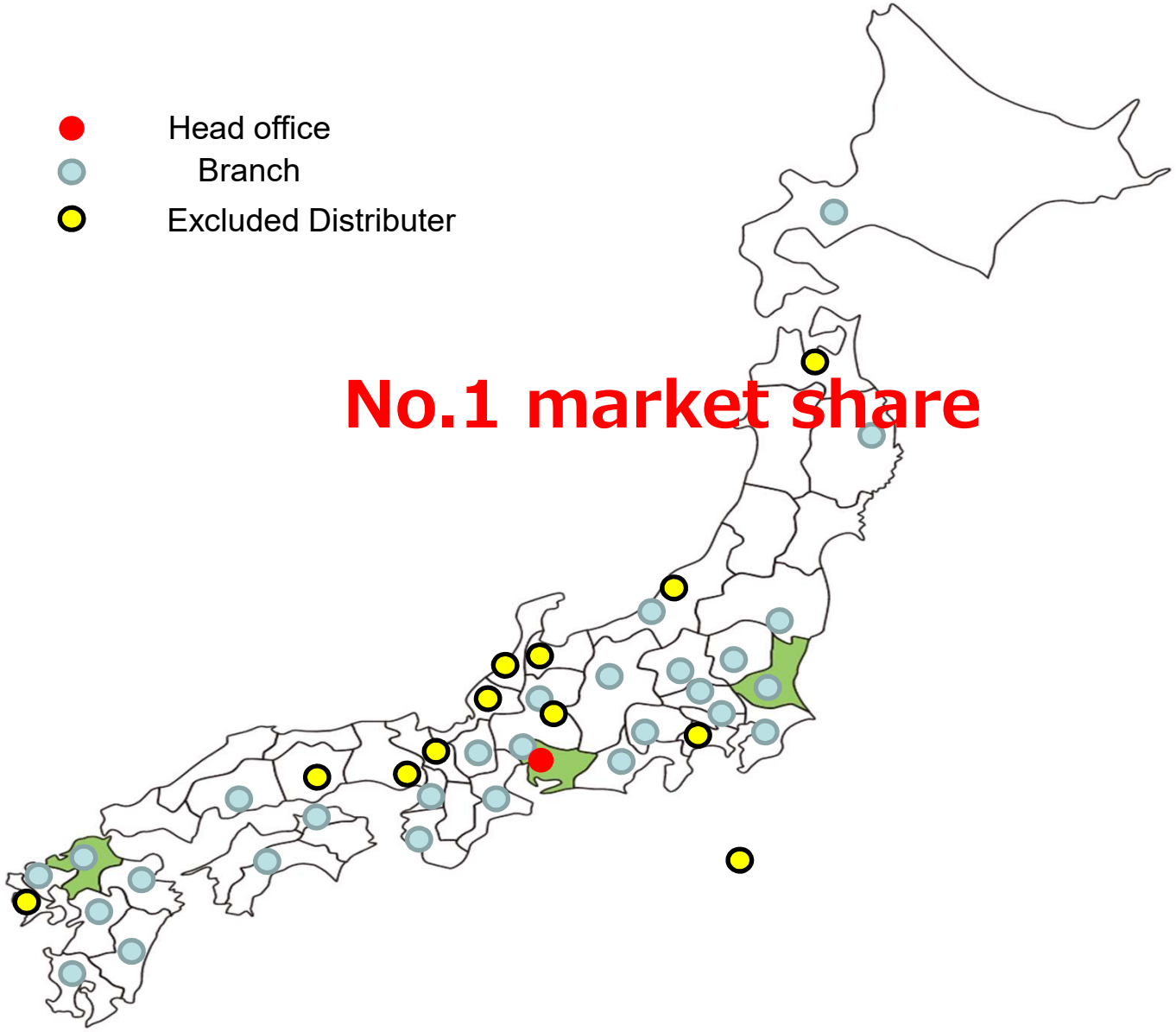
Quick Sewage plant



Air pump

①About Fujiclean

Head office
Branch
Excluded Distributer



No.1 market share

Number of systems installed

50,000
systems a year

Share of Japanese market

42%

General design conditions

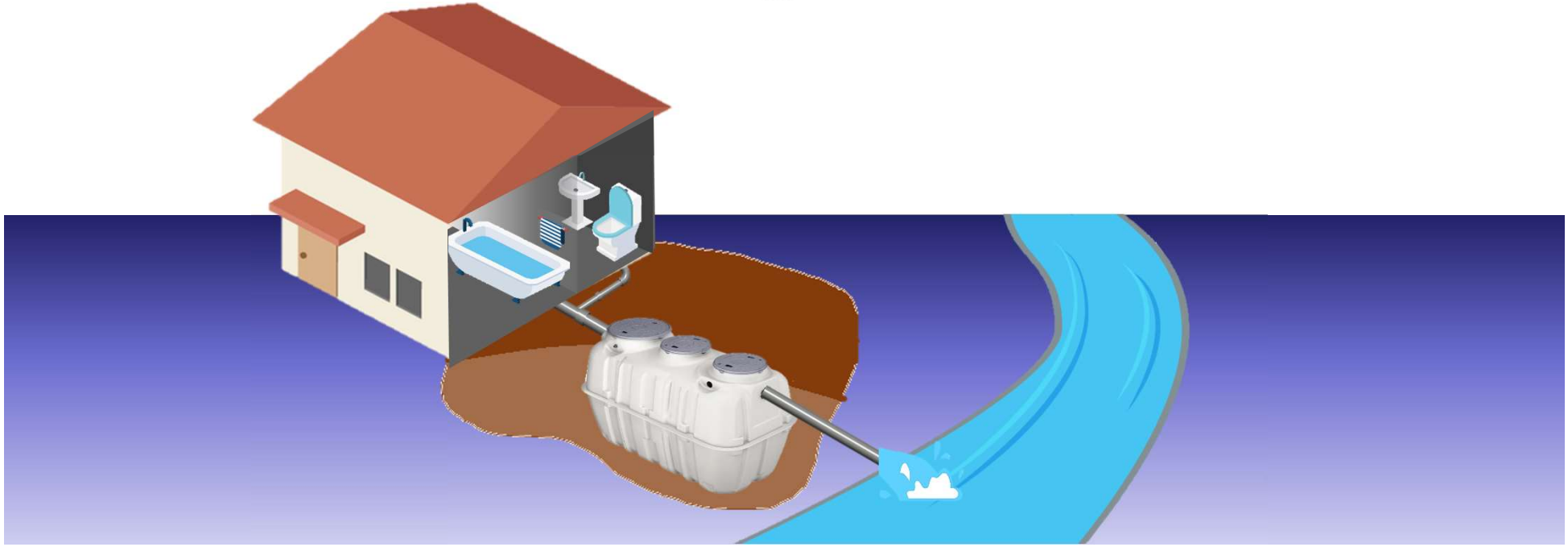
※ basic type and basic inflowing conditions

Influent*1

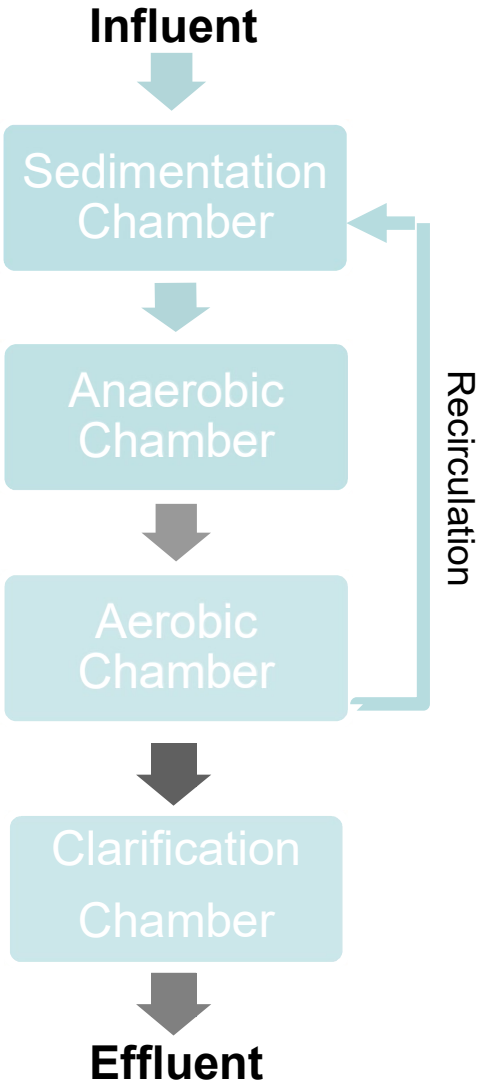
Blackwater & Graywater
・BOD≦200mg/L
・T-N ≦50mg/L

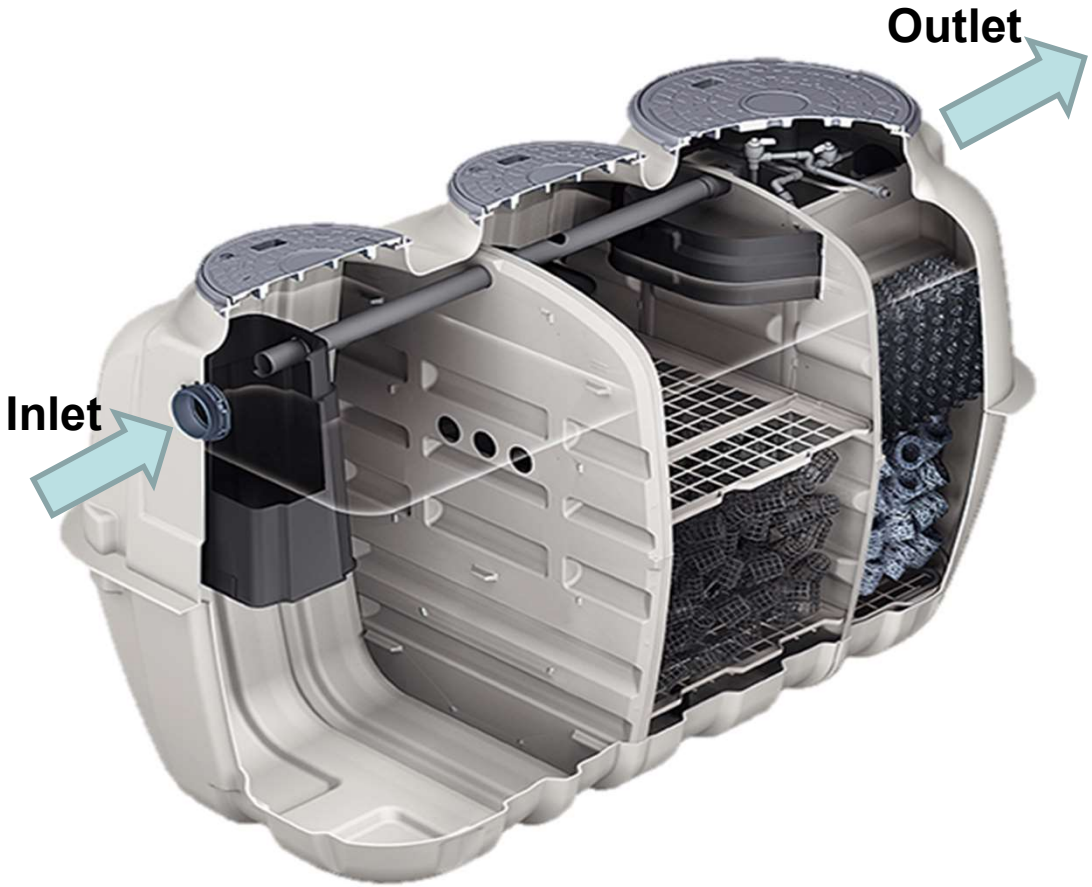
Effluent*2

Blackwater & Graywater
・BOD≧20mg/L
・T-N ≧20mg/L

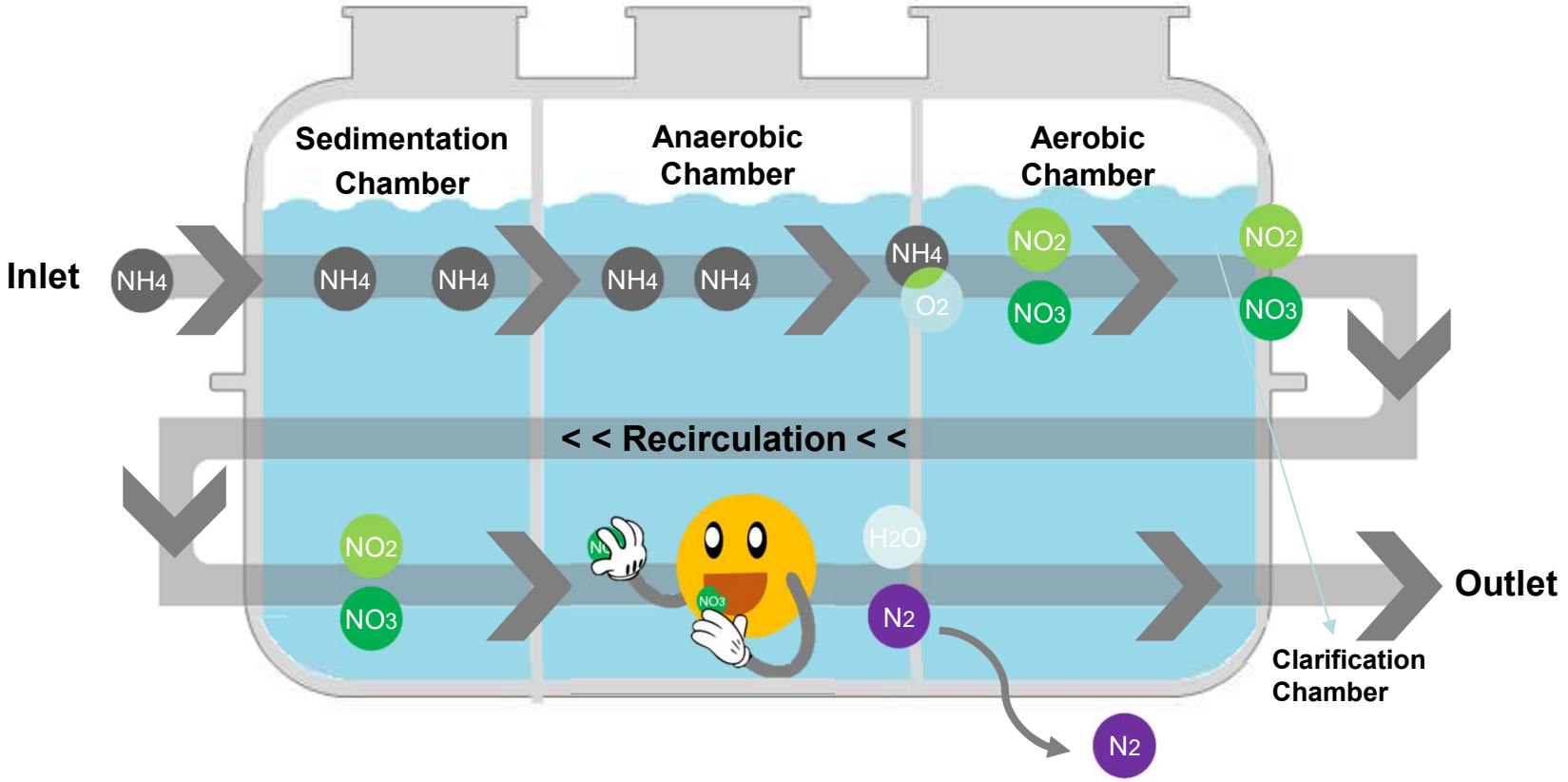


Treatment process①

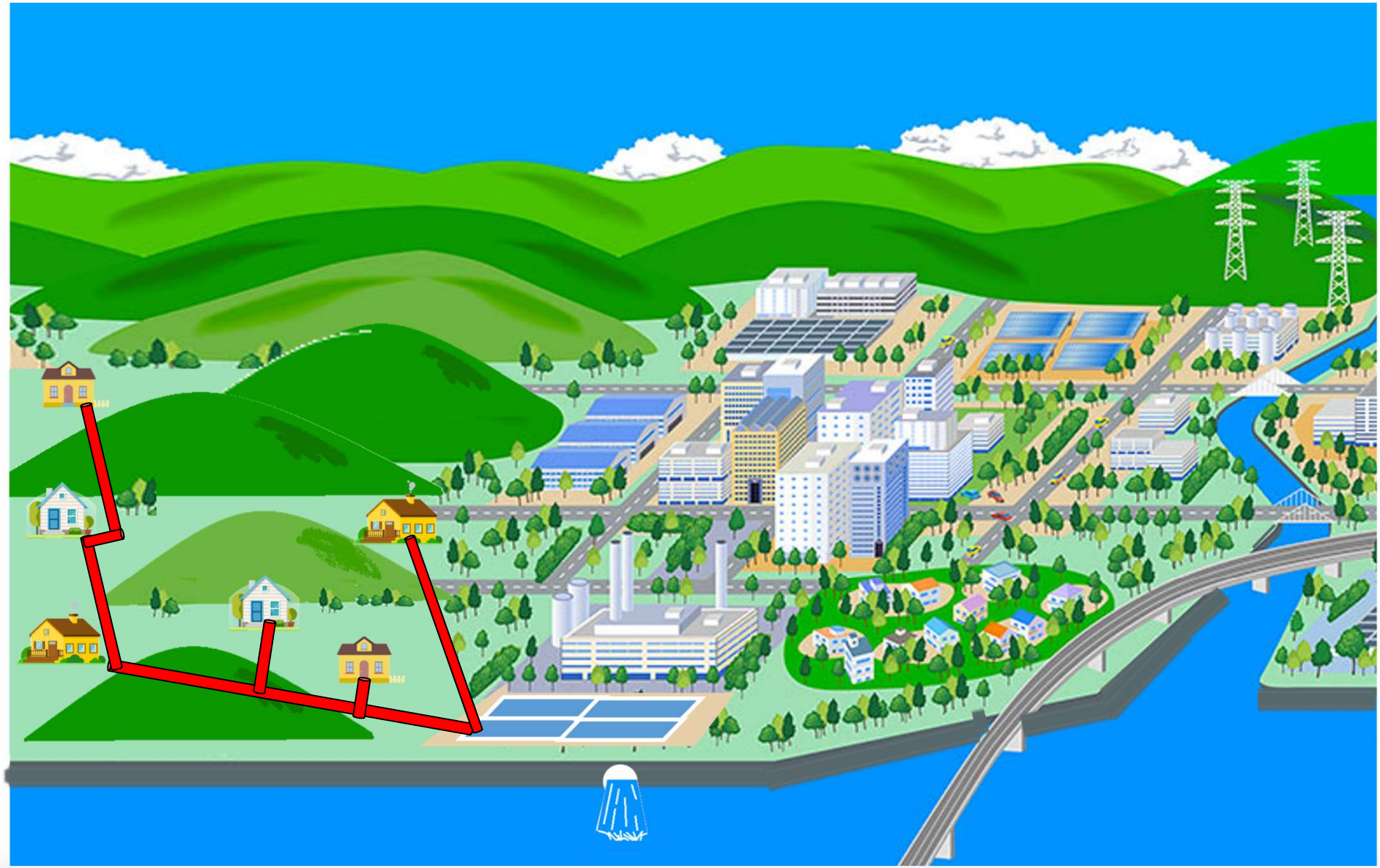




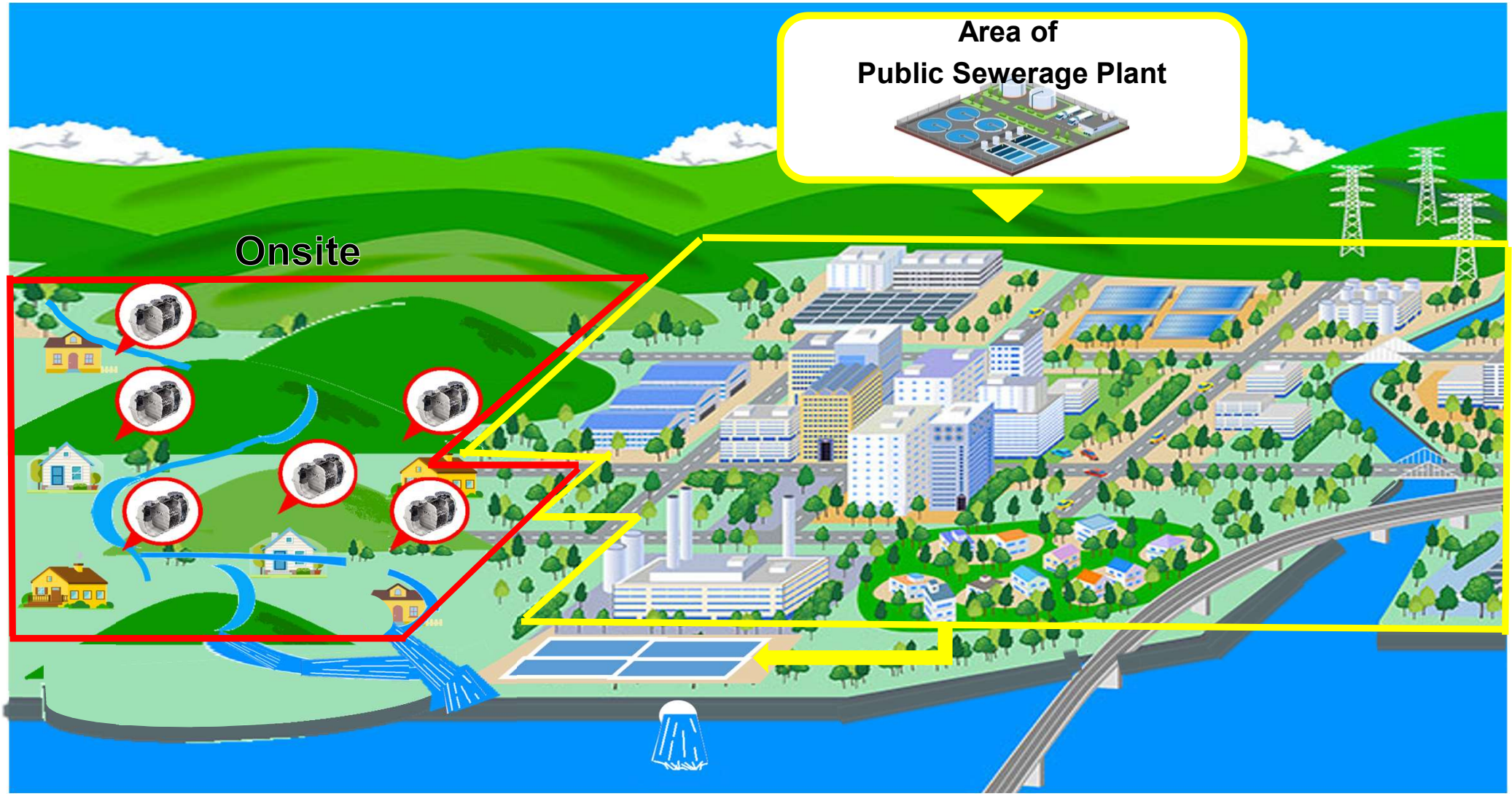
Treatment process②



③Solution Case A　onsite treatment

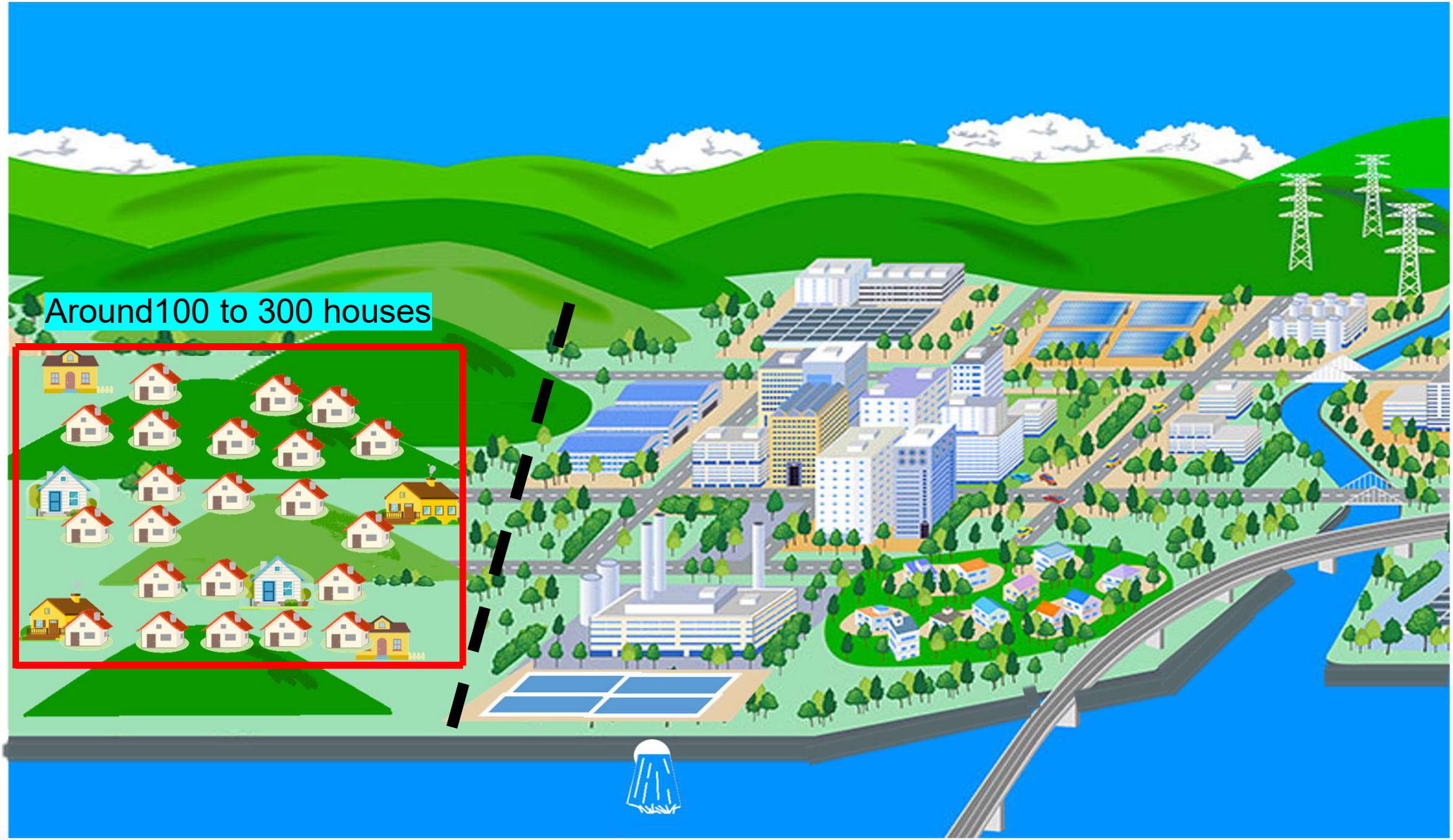


③Solution Case A　onsite treatment



③Solution Case A　onsite treatment

③Solution Case B　quick sewage treatment

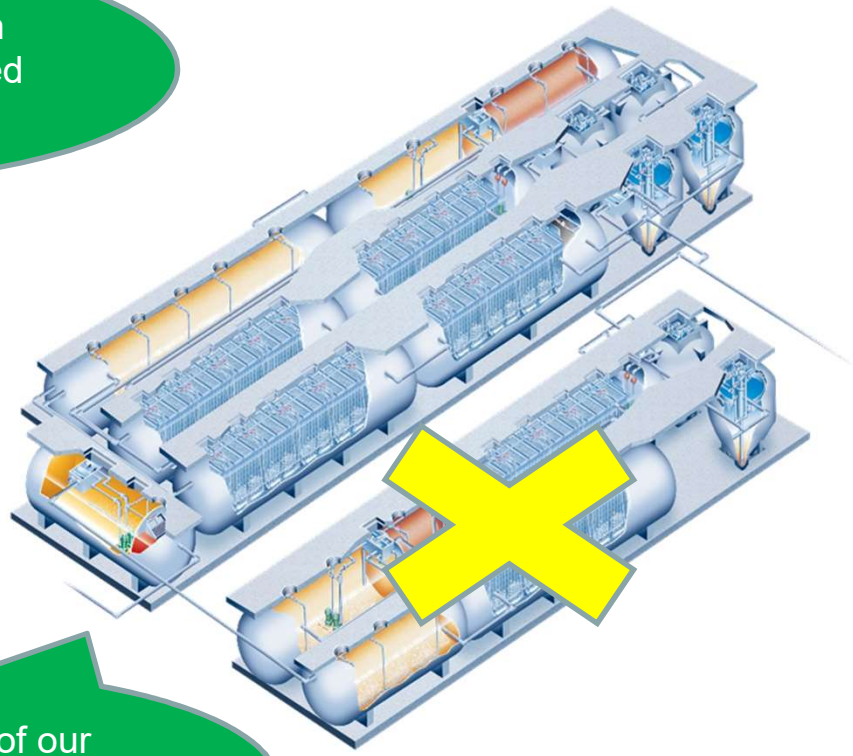


③Solution Case B　quick sewage treatment

Flexible Usage to population changes

population decreased from arranged plan

Flexible to population change both decreased and increased



Only this type of our systems can dawn size and mitigate operation cost


Thank You

Efficient oil-based sludge treatment technology

Utsunomiya Industries Co.,Ltd

Efficient oil-based sludge treatment technology

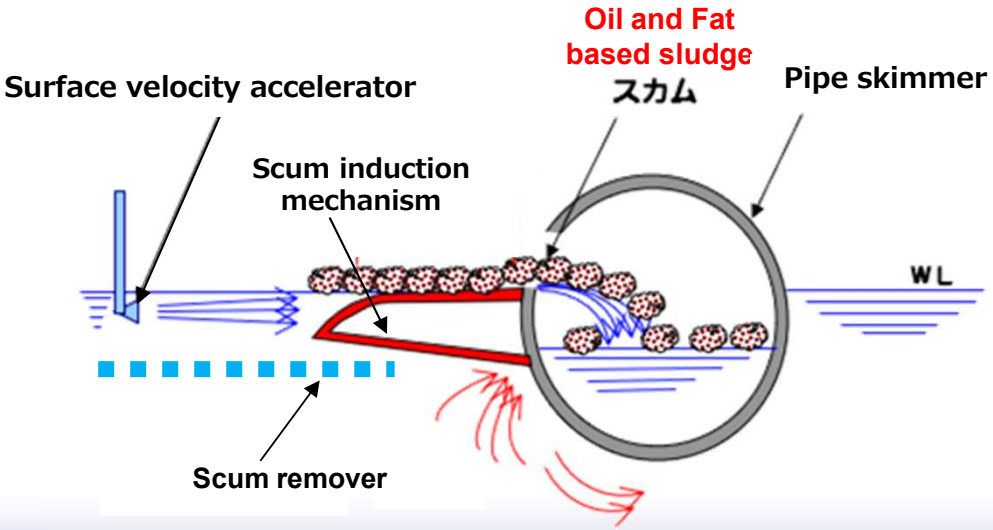
Outline of Technology

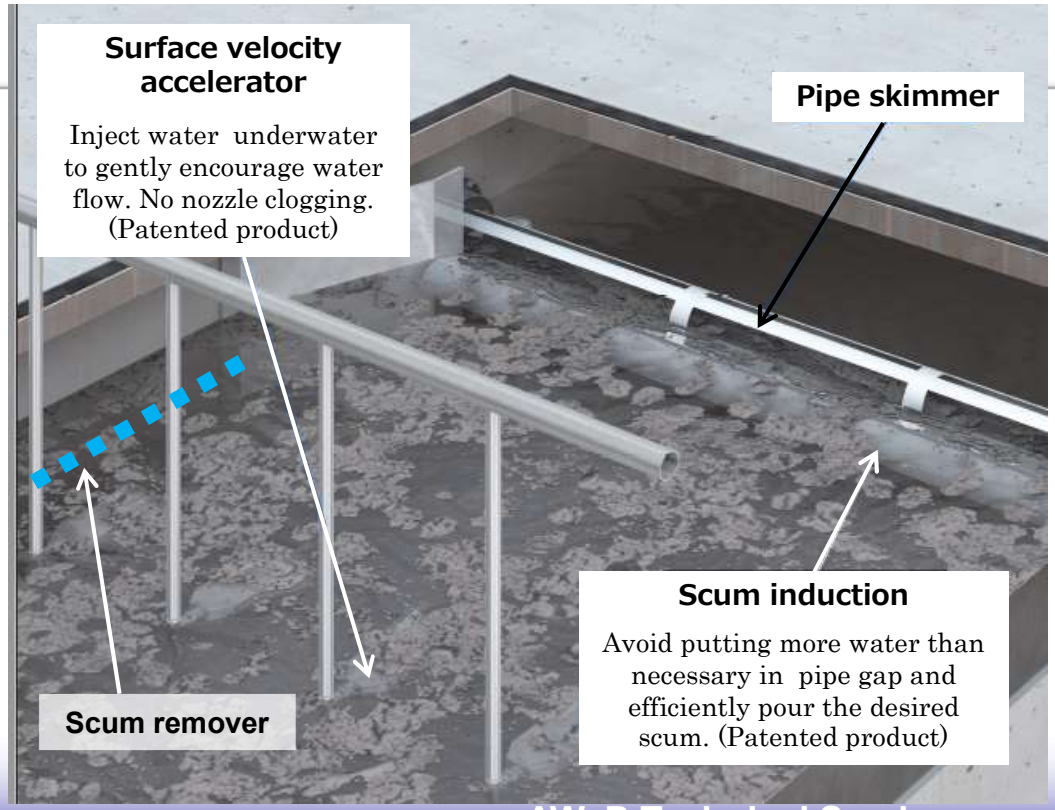
◇**Equipment name** : Scum removal equipment (scum remover, surface flow velocity accelerator, scum guide mechanism)

◇**Outline of equipment** : Scum adhering to the wall is peeled off by the scum peeling device, and then guided to flow into the pipe skimmer by the surface flow velocity accelerator and scum induction mechanism, thereby collecting the scum efficiently.

◇**Purpose** : To reduce sludge treatment costs and environmental impact by improving the efficiency of scum (oil and fat sludge) removal and improving power costs. Also, to improve facility maintenance and management.

◇**Installation Location** : Sewage treatment plant the 1st sedimentation tank, 2nd sedimentation tank and culvert





Efficient oil-based sludge treatment technology

Efficient oil-based sludge treatment technology

Future Development

Ho Chi Minh City, Vietnam and other large cities in Southeast Asia are experiencing an increase in sewage discharge due to population growth and urbanization associated with rapid economic growth, and the current situation is expected to require improvement of water quality in domestic and industrial wastewater.

This technology has the feature of efficiently recovering oil-based sludge, which is generated and becomes a problem during the sewage treatment process, Scum removal equipment can be installed in existing facilities at low cost.

It is also expected to contribute to environmental protection by extending the life of sewage treatment facilities, saving power, reducing CO2 emissions, and improving the quality of water discharged into rivers and the sea, thereby reducing environmental impact and improving energy efficiency.

High Rate Filtration System & Advanced Energy Saving Wastewater Treatment System (Pre-treated Trickling Filter System)

August 2023

METAWATER Co., Ltd.

International Sales & Marketing Department

International Business Division

1. Corporate Overview
2. High Rate Filtration System (HRFS)
   I. Effects of HRFS
   II. Specification
   III. Installation Record
3. Pre-treated Trickling Filter System (PTF)
   I. Background and system flow of PTF
   II. Advantage points of PTF
   III. Installation Record

Corporate Overview

METAWATER is a leading engineering company with unique products and wide range of experiences from product supply, EPC up to O&M service **incl. PPP projects**.

Capital	JPY 11.9 Bil. (ca. US$ 83 Mil.)
Stock Market	Prime Market of Tokyo Stock Exchange (Code:9551)
Net Sales	JPY 150 Bil. (ca. US$ 1.04 Bil.)
Employees	3,496 (consolidated)
Location (JPN)	Tokyo (Head Office), Hino Office, Nagoya Office
(Intl.)	Vietnam, Cambodia, Switzerland, Germany, The Netherlands, USA

Ceramic Membrane

Ozone Generator

High Rate Filtration System

PTF System

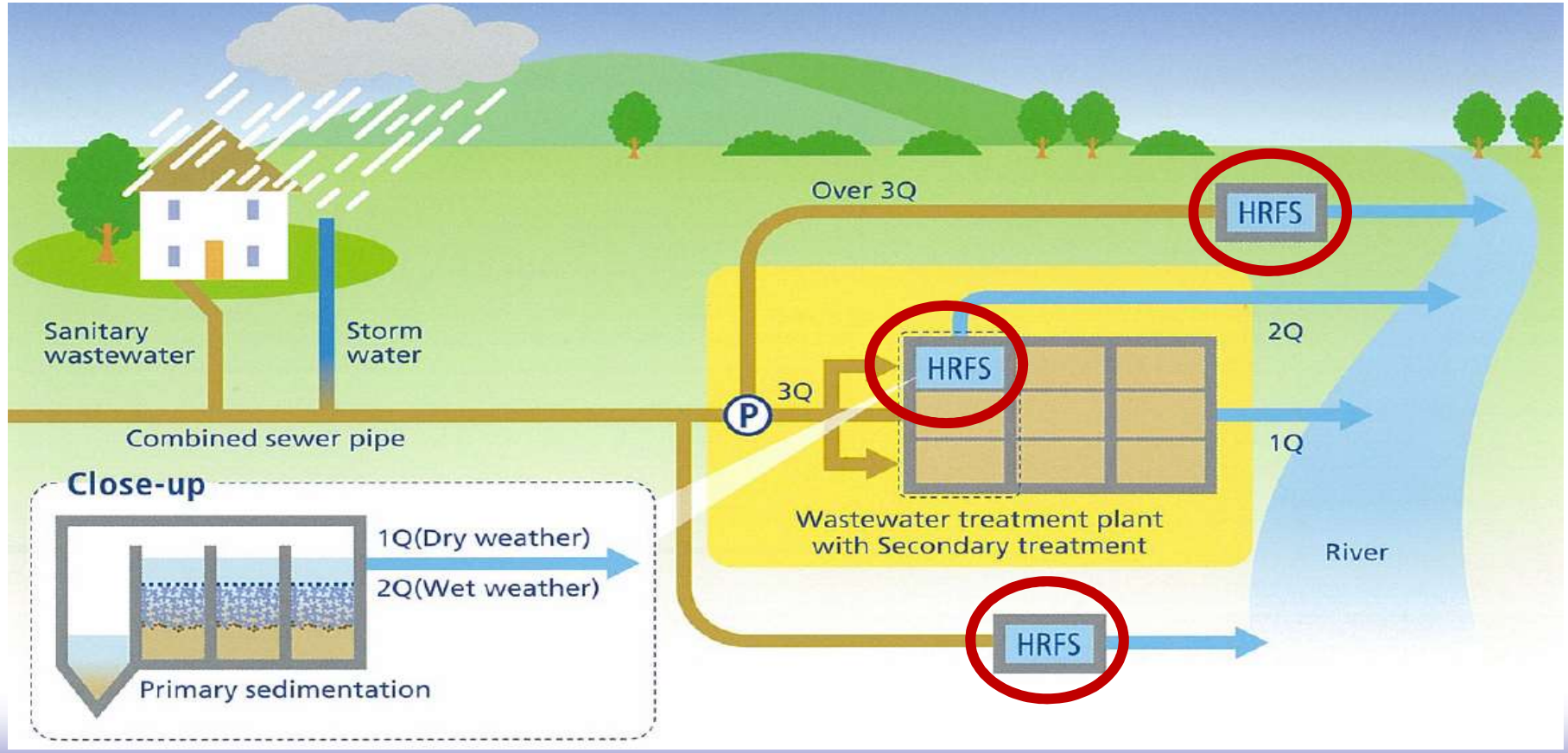
High Rate Filtration System (HRFS)

CSO (Combined Sewer Overflow) water quality has to be improved.

(1) Pollutant load must be reduced

(2) The number of directly discharge must be reduced

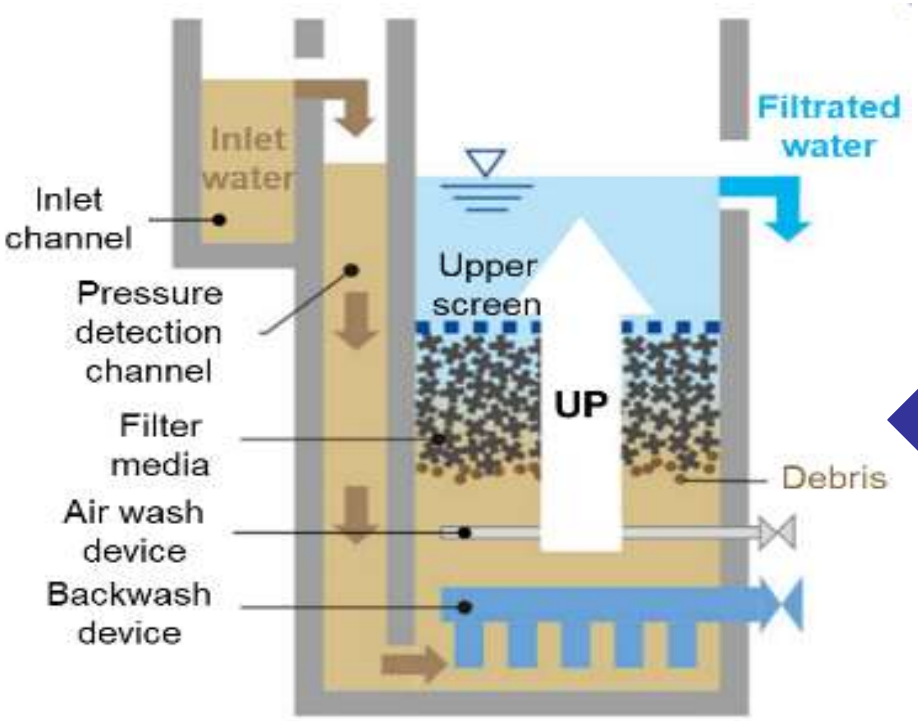
(3) Debris must be reduced



< HRFS design features >

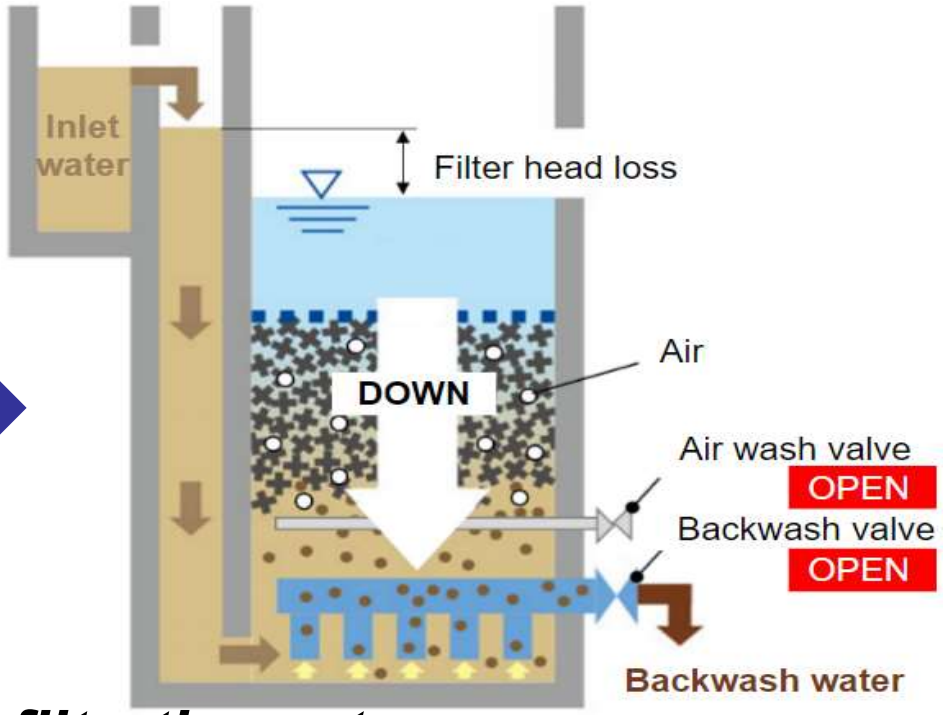
UP FLOW FILTRATION BY FLOATING FILTER MEDIA

Filtrating process



Repeated

Backwashing process



Advantage Points

1. ***High filtration rate***
2. ***High removal ratio***
3. ***Applicable in dry and wet weather***
4. ***No need for coagulant***

53 installations as of Aug. 2023

***Including confirmed future plan**

CSO Treatment
Currently under Construction
Vietnam **Hanoi city** (Yen Xa Sewerage System Project)

Osaka city
(Nakahama WWTP
Chishima WWTP
Ebie WWTP)

Niigata city

Morioka city

Minamisoma city

Numazu city

Tokyo

Pre-treated Trickling Filter System (PTF)

What's the PTF including developing background

■ Pre-treated Trickling Filter System : PTF

The main concepts are
saving energy, **space**, and **easy maintenance**.


Certificate of
Technology Verification

Technology: *Advanced Energy Saving Wastewater Treatment Process*

Applicant: *Metawater Co., Ltd.*

This is the **first technology** that acquired the **"Overseas Use Technology Verification"** conducted by the Japan Sewage Works Agency **in 2014**.

■ System Flow

Advantage points of PTF

1

Provides Good and Stable Treated Water Quality

Whole system removal ratio

SS **90** %, BOD **90** %

2

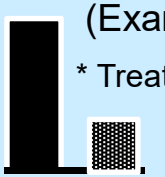
Improved adaptability to a wide range of water volumes, and high adaptability to the expanding deployment

- It is also possible to reduce design costs when introducing this system in other districts by diverting the standardized systems.

3

Low power consumption by energy conservation

- **75 % reduction** compared to the conventional activated sludge process (CAS)



(Example) kWh/m^3

* Treatment capacity 20,000m^3/day

4

Compact Footprint: Highly efficient processing

- **1/2** the installation area compared to the conventional activated sludge process (20,000 m^3/day)

5

The system configuration uses the differential head, which reduces the operational burden.

- Fully automated system in which the processes are naturally processed by using the water head difference.
- No need for skilled personnel (operators)

6

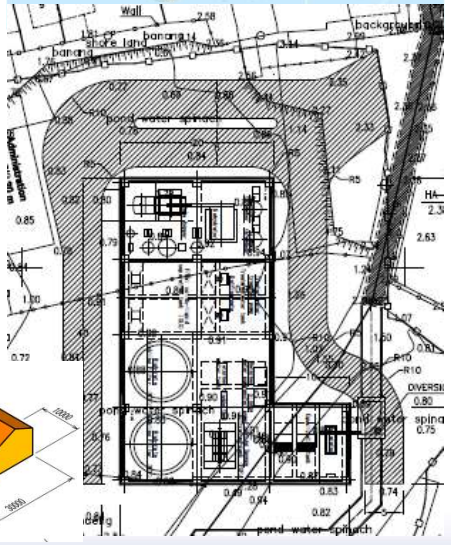
Highly flexible facility layout

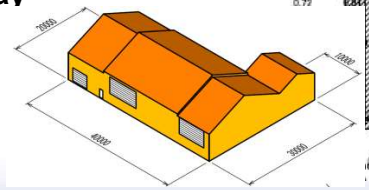
- Adaptable to the surrounding environment
- PTF can be covered outdoors or inside a building (optional)

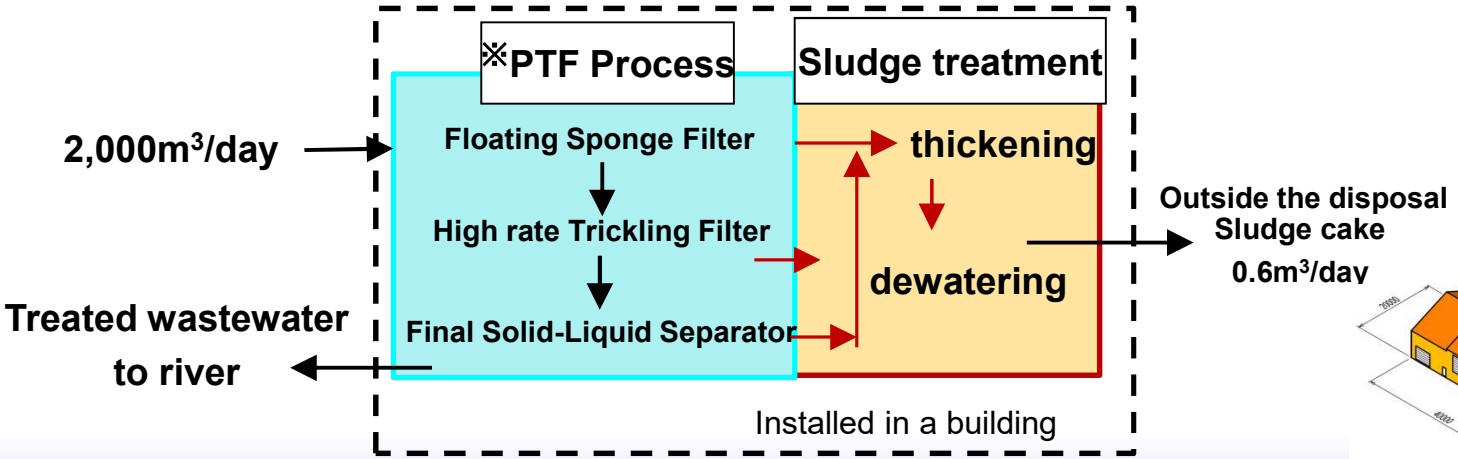
The Project for Water Quality Improvement for Japanese Bridge in Hoi An City

Adoption determination of ODA grant for Hoi An City(Dec. 2016)

Project name	The Project for Water Quality Improvement for Japanese Bridge Area in Hoi An City
Overview of the project	Construction of new wastewater treatment plant of 2,000m^3/day Existing waterway repairing（1.6km） Unit trial operation（Instruction of O＆M）
Schedule	< Terms of work > Construction work：18 month ＋ Instruction of O&M after equipment delivery ：6 months





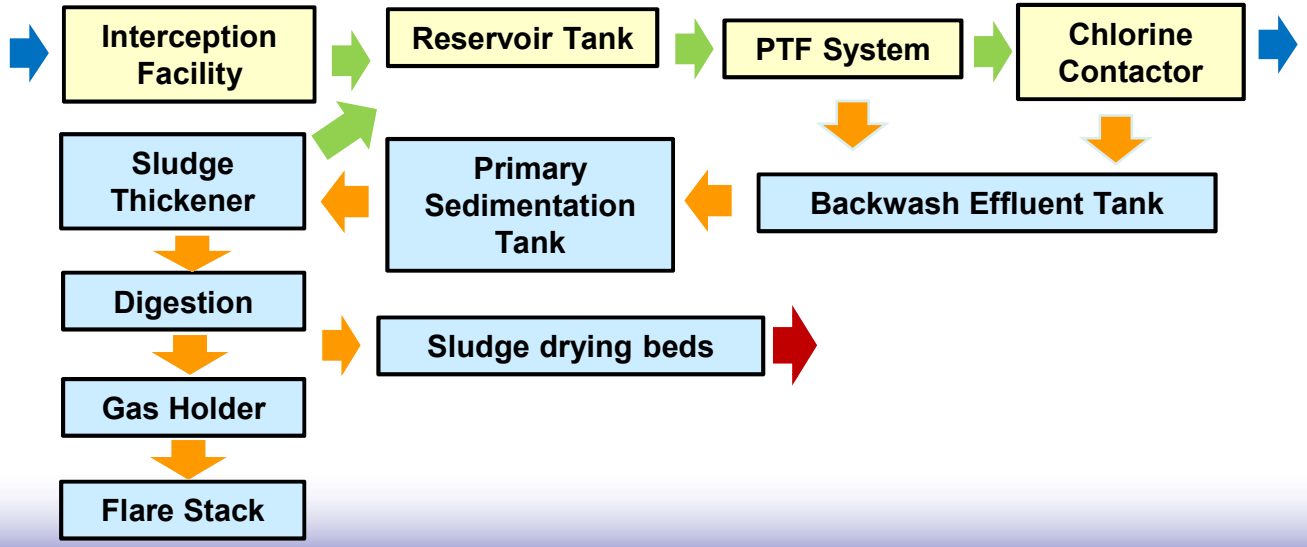


※PTF：Pre-treated Trickling Filter

The Project for Sewerage System Development in Phnom Penh (Under Construction)

Adoption determination of ODA grant for DPWT PPCA(Nov. 2019)

Project name	Project for Sewerage System Development in Phnom Penh
Overview of the project	Construction of new wastewater treatment plant of 5,000m^3/day（Treatment System：Pre-treated Trickling Filter（PTF）System） New water conveyance pipe（1.9km）
Schedule	< Terms of work > Construction work 31.5 months （＊Completion → Nov 15. 2023）



(Courtesy of Feasibility Study Report for Project for Sewerage System Development in Phnom Penh by JICA)

Thank you for your attention.

Contact is as follows :

METAWATER Co., Ltd. Head Office

International Sales & Marketing Department

International Business Division

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E-mail : seo-shintaro@metawater.co.jp

Attention: Michiko Tamaru (Person in charge)

E-mail:tamaru-michiko@metawater.co.jp

TEL : +81-3-6853-7343

Dual DO Control System

-Energy saving Nitrogen removable OD method

Aya Yagi
Maezawa Industries, Inc.

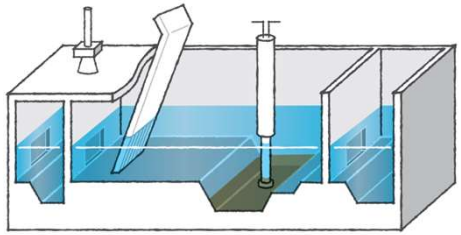
aya_yagi@maezawa.co.jp

Website

Where the system applied

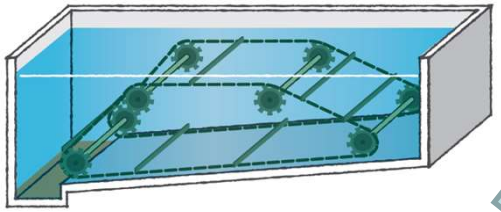
1. Collecting wastewater

Grit chamber



2. Removing large impurities like sands

Primary sedimentation tank



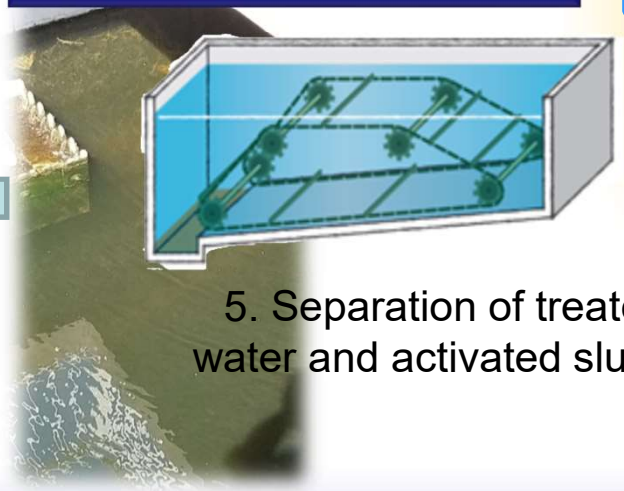
3. Removing small insoluble contaminants

Blower

Reaction tank

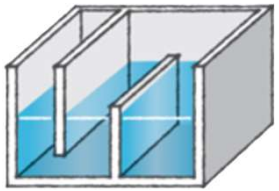
4. Removing dissolved organic matter by bacteria

Final sedimentation basin



5. Separation of treated water and activated sludge

Chemical mixing tank



6. Disinfection if needed

7. Discharge

The Influence of Nitrogen and Phosphorus

Blue tide

Red tide

From the website of Chiba city, Chiba, Japan

https://www.city.chiba.jp/kankyo/kankyohozen/kankyokisei/akashio_aoshio.html

https://www.pref.chiba.lg.jp/wit/jouhou/documents/tokyo-bay-2013.pdf (Japanese)

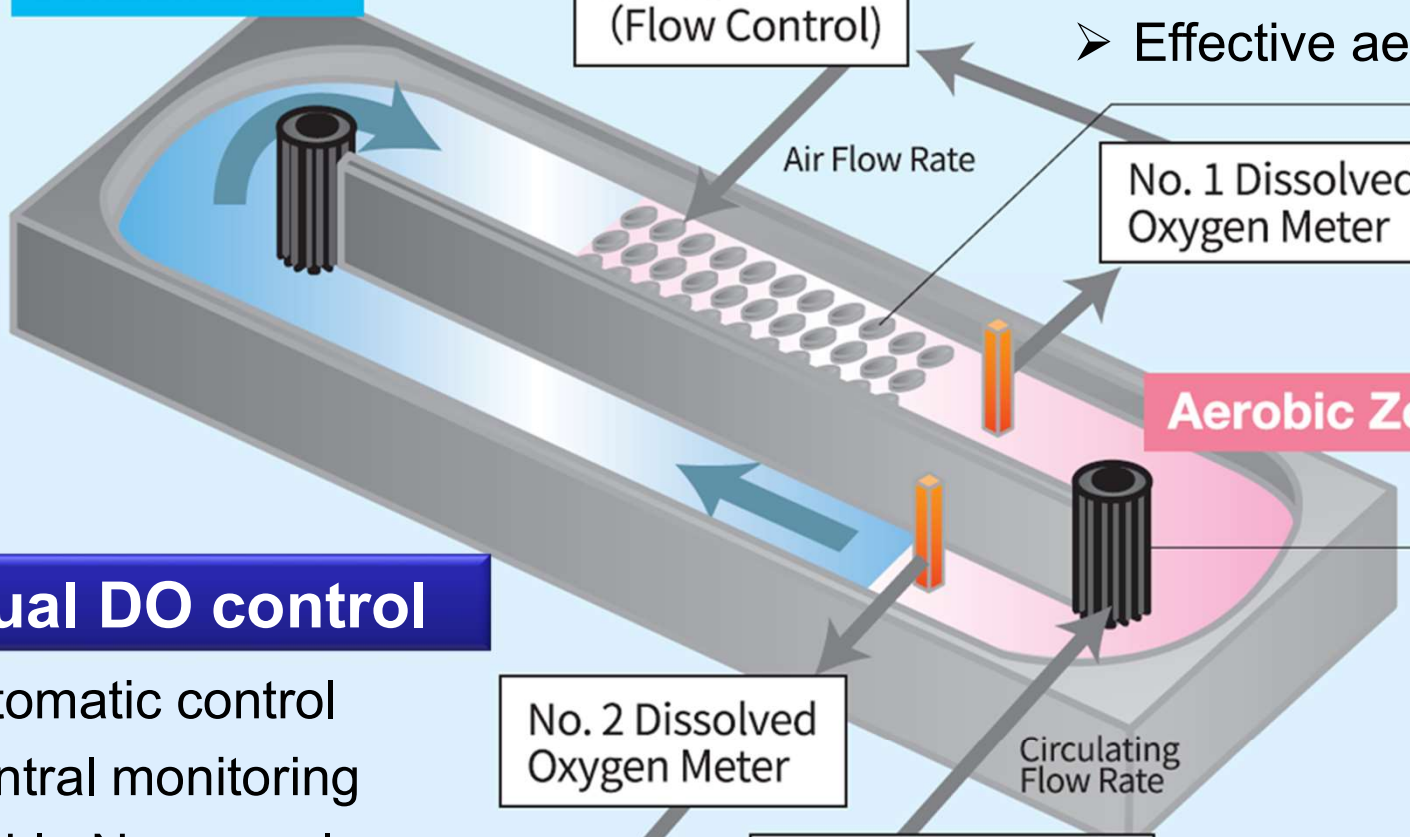
Outline of Dual DO Control system

Separated function

- Max. 7m depth
- Effective aeration

Aerator

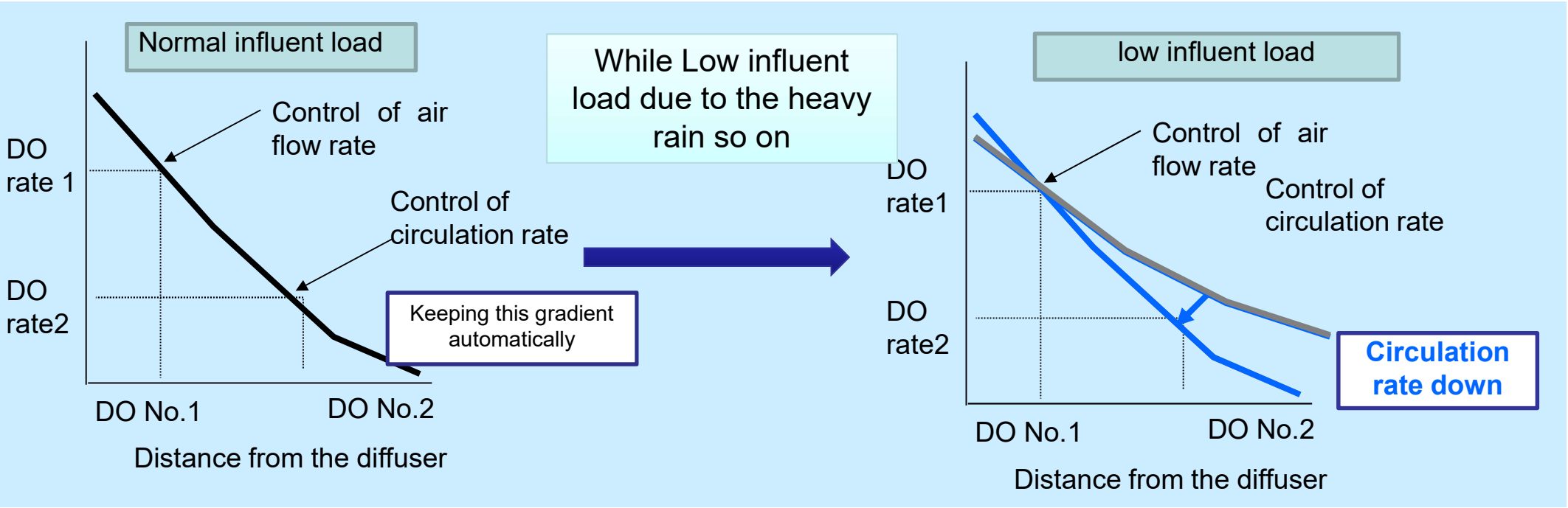
Flow Booster



Dual DO control

- Automatic control
- Central monitoring
- Stable N removal
- Energy saving

How to save energy in Dual DO Control



Consumption energy in the reaction tank

(kWh/kgBOD)

	Dual DO control system	OD with vertical surface aerator
Consumption energy per removed BOD	1kWh/kg BOD (average)	1.6kwh/kg BOD (Technical evaluation, "The development of mechanical aeration equipment for OD method," Ministry of Construction, 1984)

Case study

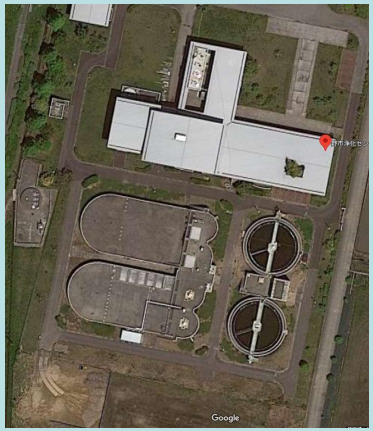
Case 1: Noichi Sewage Treatment Center

Address: Konan city, Kouchi Japan

Capacity: 3,500m3/Day (average)

Process: OD(target substances:SS,BOD)

→**Advanced treatment (SS,BOD,N)**



- The city demands consolidation of WWTPs.
- The city could change the design 4 channels to 3.

As a result, **the construction costs were reduced.**

- Automatic control according to changes in water temperature and volume. The local contractor visits the WWTP **only three times a week for the maintenance.**

Case 2 : Takanosu Sewage Treatment Center

Address: Kitaakita city, Akita Japan

Capacity: 3,300m3/Day (average)

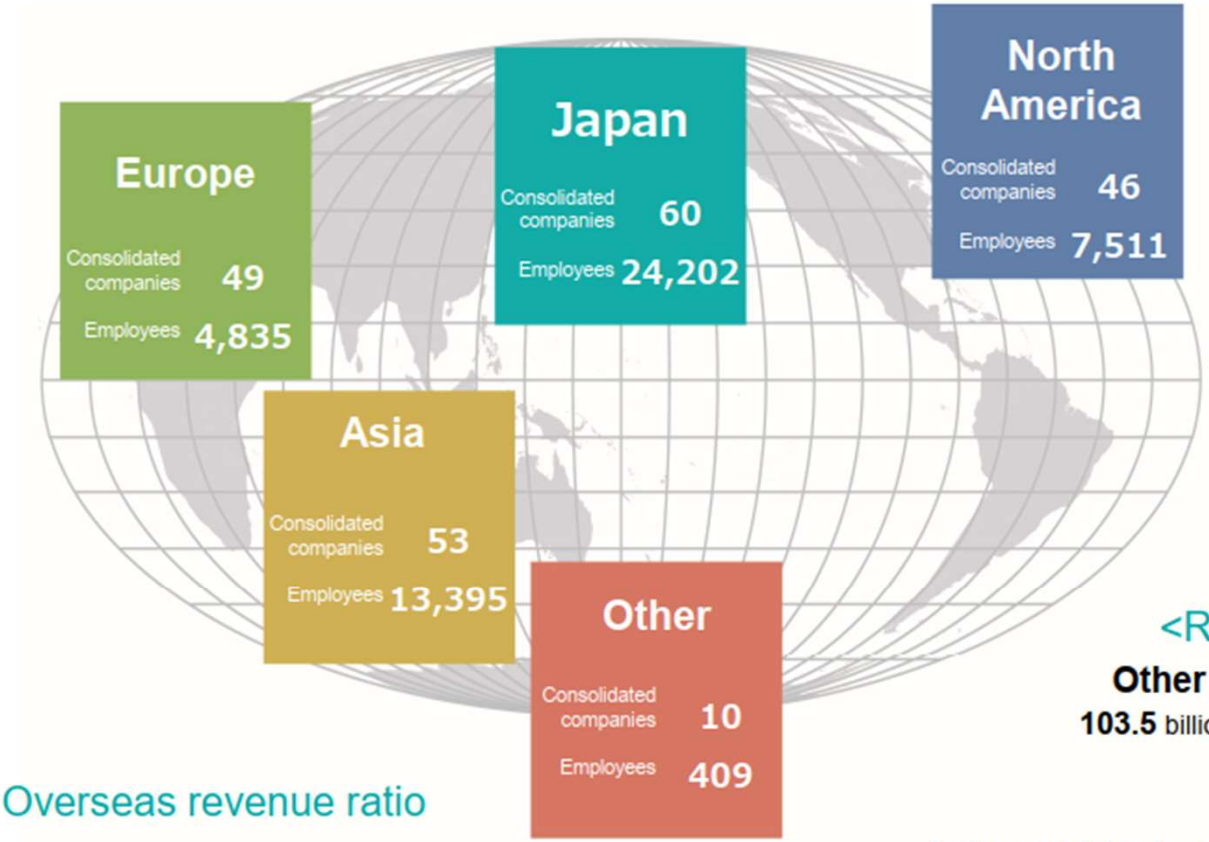
Process: OD

- In order to consolidate treatment districts and reduce costs, the WWTP and the night soil treatment plant were consolidated.
- The capacity expansion of existing WWTP was needed. The city implemented a conversion to Dual DO control system instead of expansion. The construction period was shorter than that of the expansion, and the treatment capacity was also improved.

Introduction of Kubota MBR

KUBOTA Corporation

About us



Total number of consolidated companies

218

Total number of employees

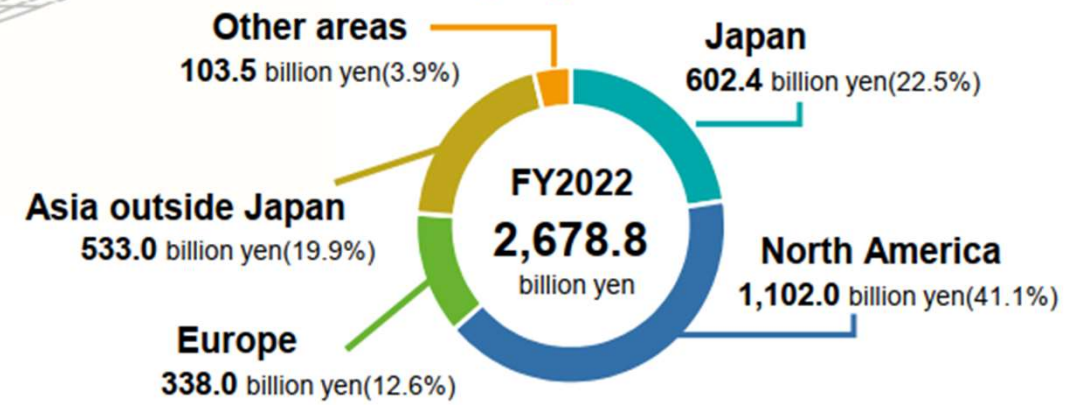
50,352

Overseas revenue ratio

77.5%

Established in 1890

<Revenue by region>



(as of December 31, 2022)

Contents

1. History of MBR System

2. Key technologies for MBR System

3. Advantages of Kubota MBR System

4. References

1. History of MBR System

Business Operations

Water and Environment R&D Center USA
for research and development activity for NA market

Kubota Environment Engineering Shanghai
for Chinese market

Kubota Membrane USA
for NA market

Kubota Membrane Europe
for European market

Kubota Membrane
Co., Ltd. for
maintenance

2016

2011 Huge scale municipal MBR SP series

2009 Economic & environment-friendly RM/RW series

2005

2002 Stainless frame, EK Double deck ES/EK series

2001

1994

1991 Developed SMU Submerged Membrane Unit

1986 Start of KUBOTA MBR

SP

RW

RM

EK

ES

Developments

Contents

1. History of MBR System

2. Key technologies for MBR System

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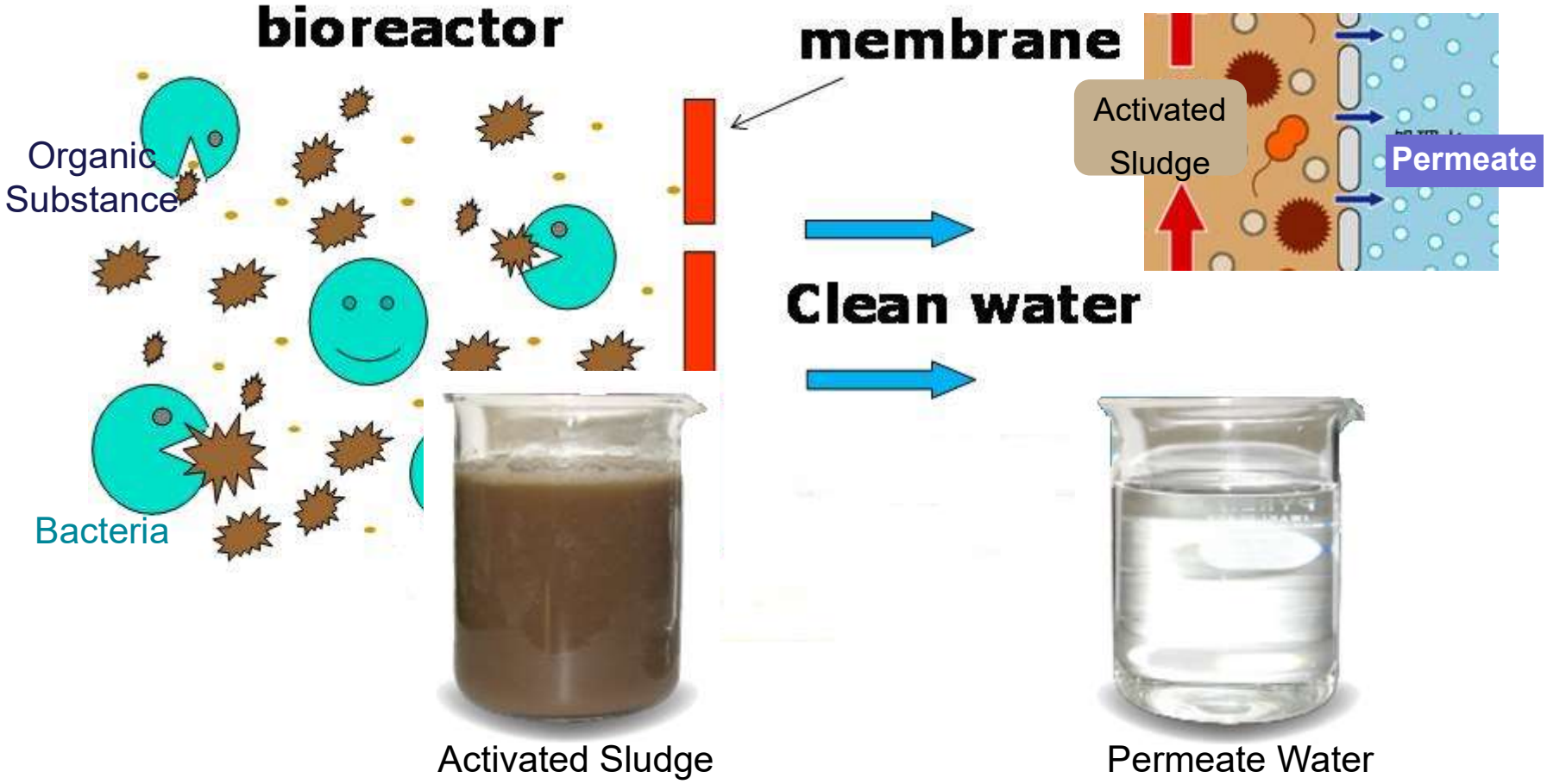
4. References

2. Key technologies for MBR System

MBR is a kind of waste water treatment process combined with bio-treatment and membrane filtration. Membrane separates treated water and activated sludge completely and stably.

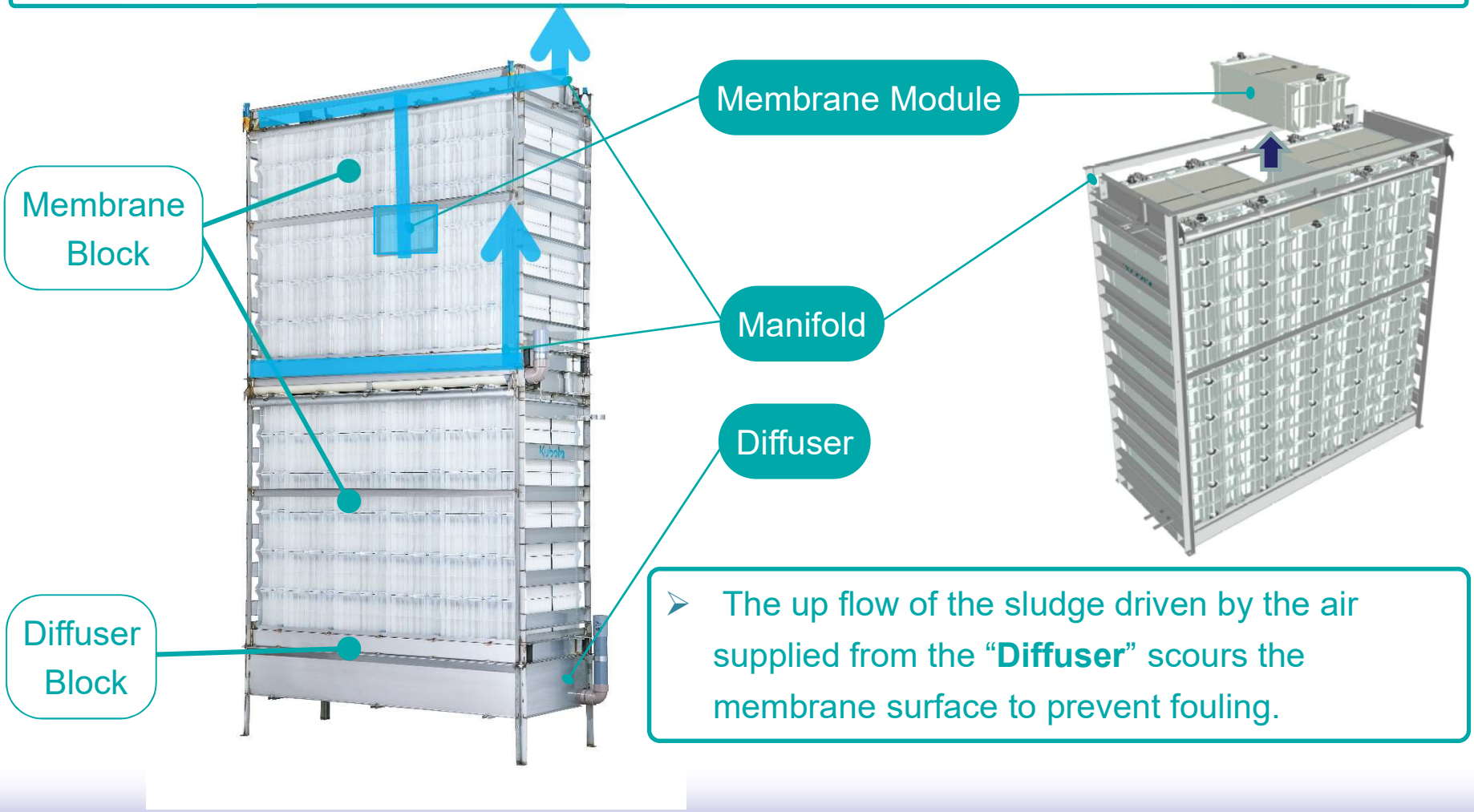


2. Key technologies for MBR System

Submerged Membrane Unit (SMU) **SP Series**

Designed to maximize the performance of Membrane Cartridges.

- Permeated clean water is collected through "**Inbuilt Conduits**" and "**Manifolds**".



- The up flow of the sludge driven by the air supplied from the "**Diffuser**" scours the membrane surface to prevent fouling.

2. Key technologies for MBR System

Membrane Module

Membrane Material: Chlorinated Polyethylene

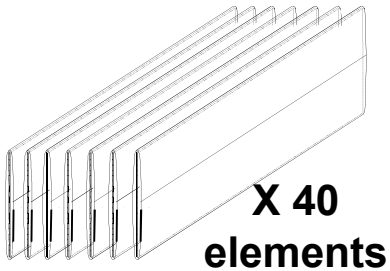
Average Pore Size : 0.2mm (0.4mm in maximum)

Membrane type : Flat sheet type

- The flat plate structure of the membrane cartridge presents less obstacles to scouring flow.
- Less screening residues such as coarse solids and fibers to be tangled to the MBR can reduce the need and frequency of chemical cleaning.

Membrane Module

10 m²/module



SP Element

Element's membrane surface area: 0.25m²

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1. History of MBR System

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3. Advantages of Kubota MBR System

Kubota MBR System is an advanced technology, a combination of Conventional Activated Sludge process and Kubota Submerged Membrane Unit.

Advantages of Kubota MBR System

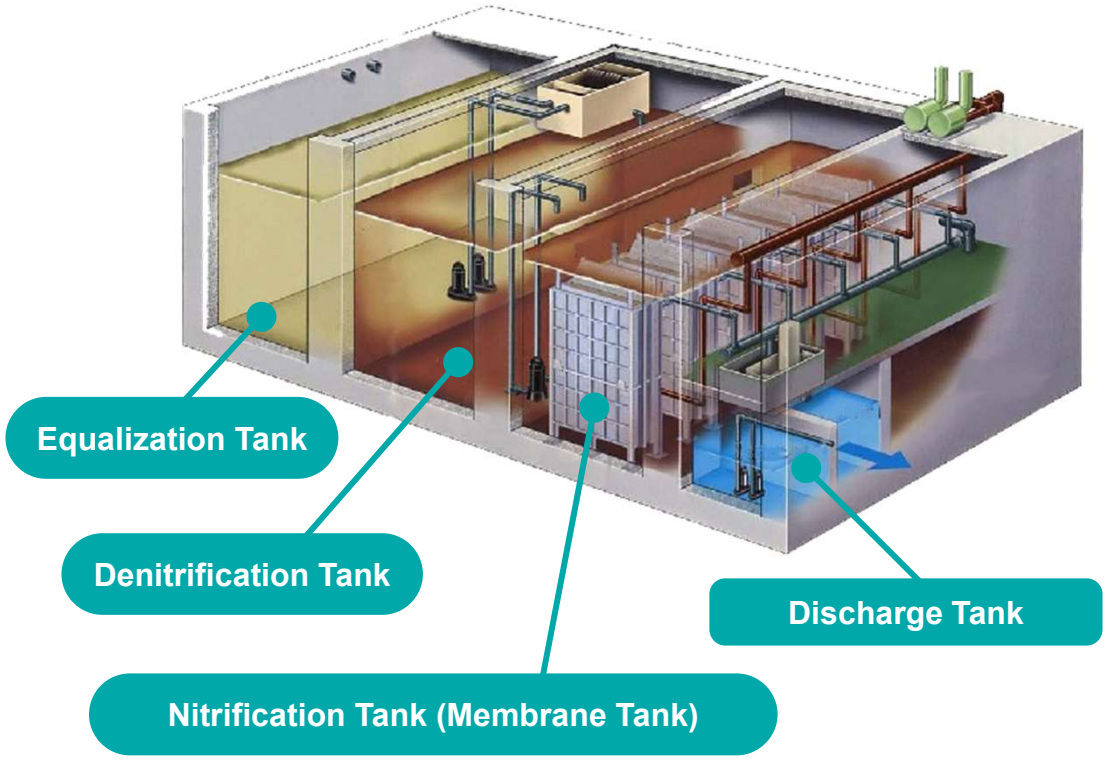
1. Small footprint
- CAPEX & Space saving
- Effective use of land

2. Easy upgrade
- Increase of capacity and performance

3. Easy & simple O&M
- Reduce O&M Cost

4. High effluent quality
- Treated water recycle

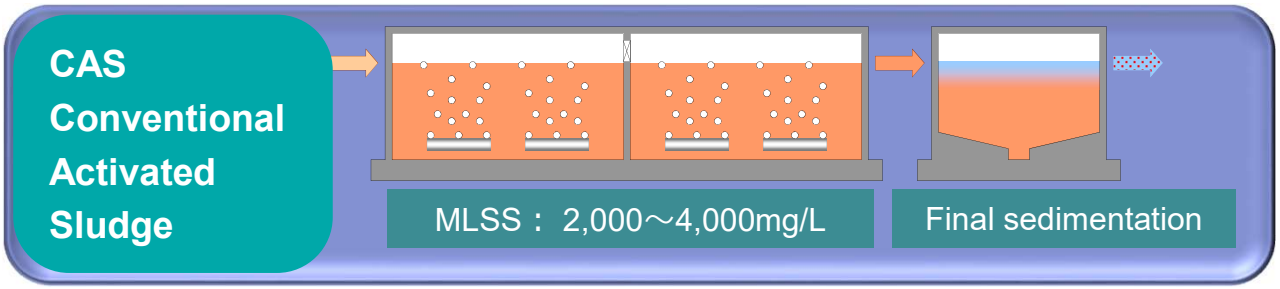
5. Energy Saving
- Reduce O&M Cost

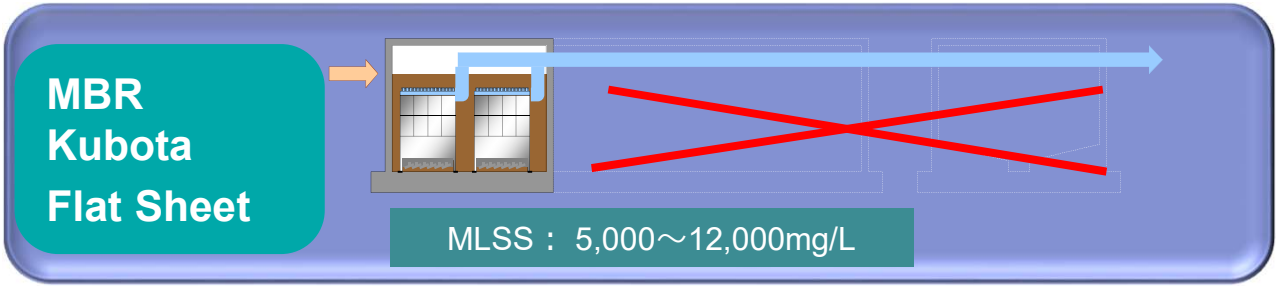


3. Advantages of Kubota MBR System

1. Small footprint
- CAPEX & Space saving
- Effective use of land

Due to the high MLSS compared to CAS, the footprint would be reduced that saves your CAPEX and precious land.





Footprint Comparison

100%

40%

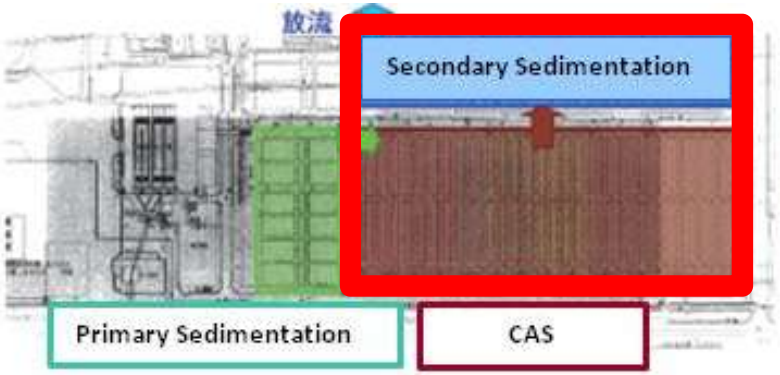
NO CLARIFIER !!
SMALLER TANK !!

3. Advantages of Kubota MBR System

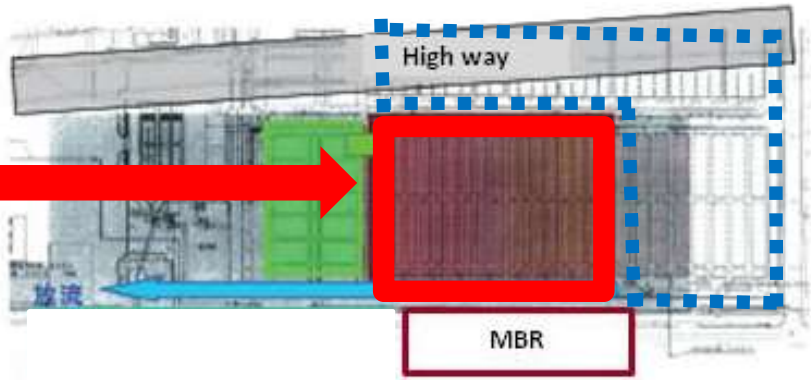
1. Small footprint
- CAPEX & Space saving
- Effective use of land

Sambou 60,000m³/d STP had applied Kubota MBR system due to its small foot print, 40% against the conventional system. The generated land was used in the highway construction.

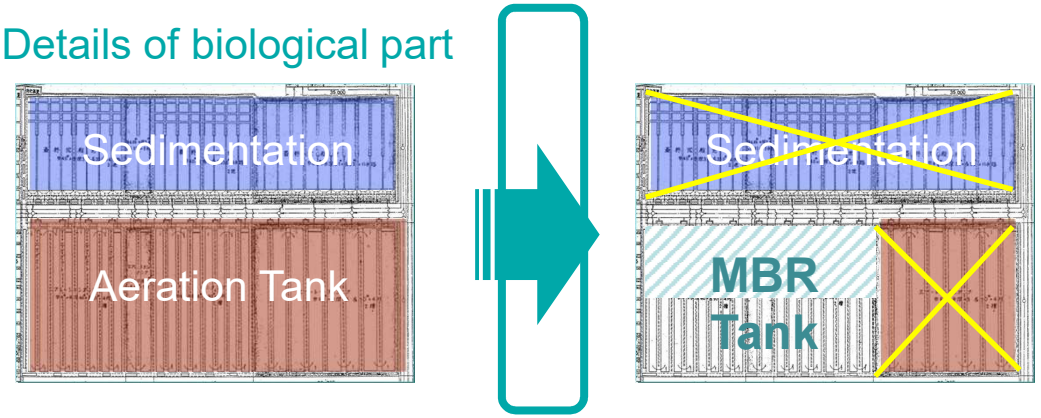
Conventional (10,200 m²)



Kubota MBR (4,040 m²)

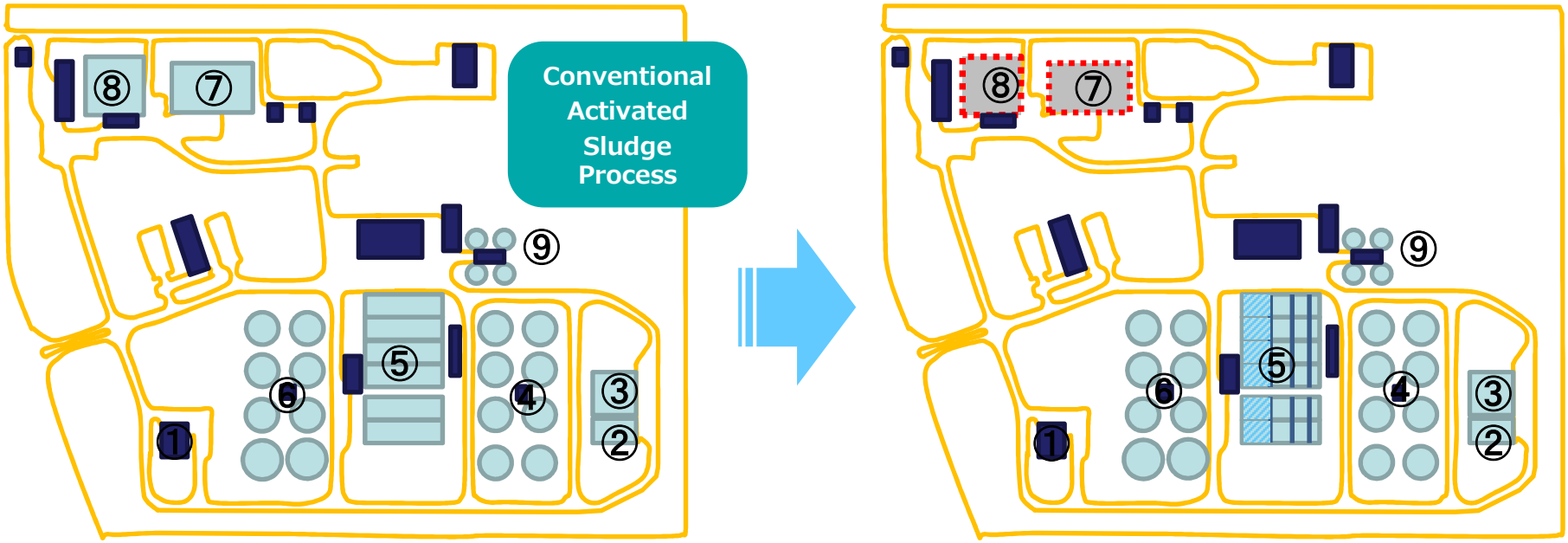


Details of biological part



3. Advantages of Kubota MBR System

The Canton water reclamation facility , located in Ohio US, needed to upgrade its performance (Enhance Nitrogen and Phosphorus Removal, Increase Peak Flow Capacity)



①Raw sewage pump
②Grit removal
③Pre aeration tank
④Primary clarifier
⑤Aeration tank
⑥Secondary clarifier
⑦Sand filter
⑧Disinfection tank
⑨Sludge treatment

Existing : CAS

147,000 m3/d

T-P, T-N removal function: Not equipped

Upgrade : MBR(A2O)

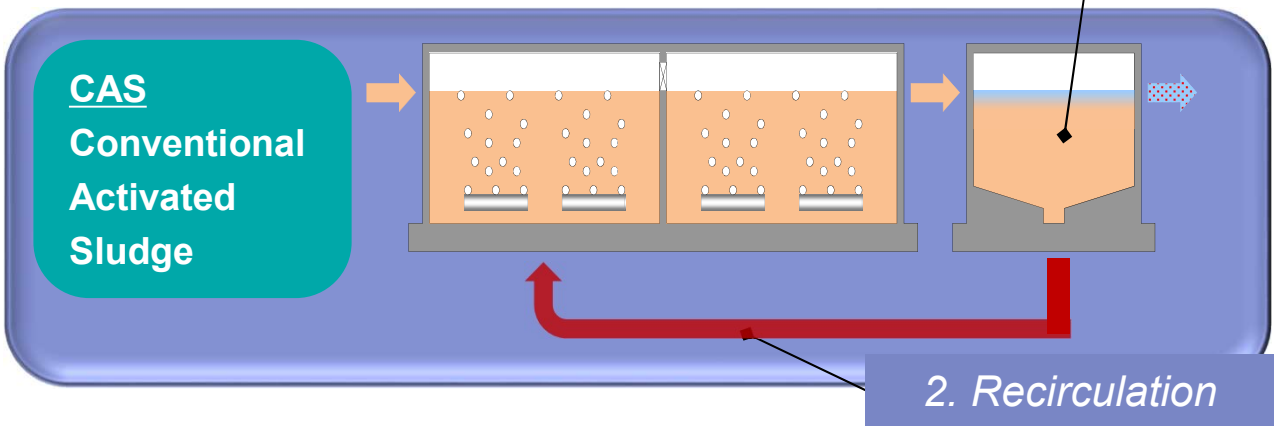
159,000 m3/d

T-P, T-N removal function: Equipped

①Raw sewage pump
②Fine screen
③Grit & grease removal
④Equalization tank
⑤MBR tank (A2O process)
⑥Equalization tank
⑦Eliminated
⑧Eliminated
⑨Sludge treatment

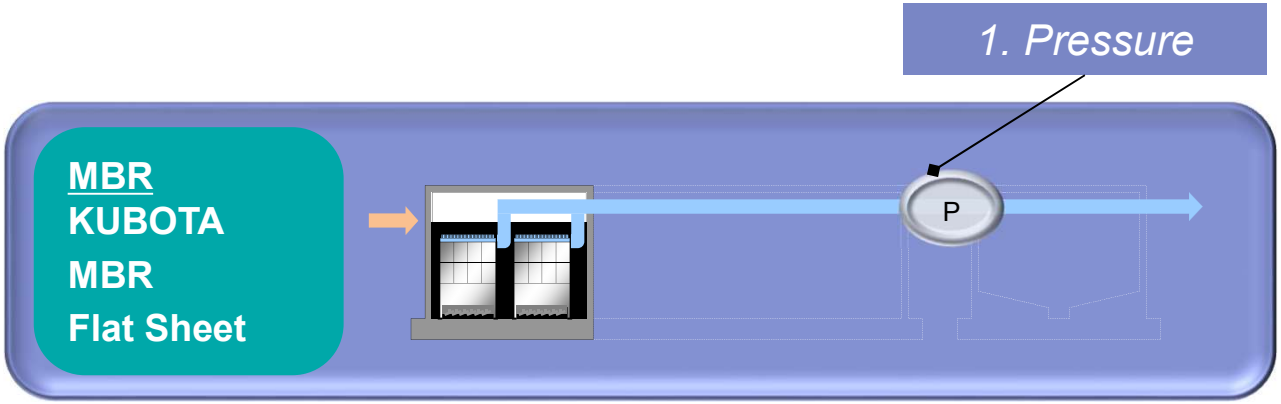
3. Advantages of Kubota MBR System

Due to the membrane separation, only TMP management is required for the MBR that ease the operation and reduce O&M cost.



Management factor

1. Settlement Conditions
   - Settling sludge ratio (SV_{30})
   - Sludge interface position
   - Scum generation
2. Sludge Recirculation



TMP ONLY!!

*TMP: Trans Membrane Pressure

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1. History of MBR System

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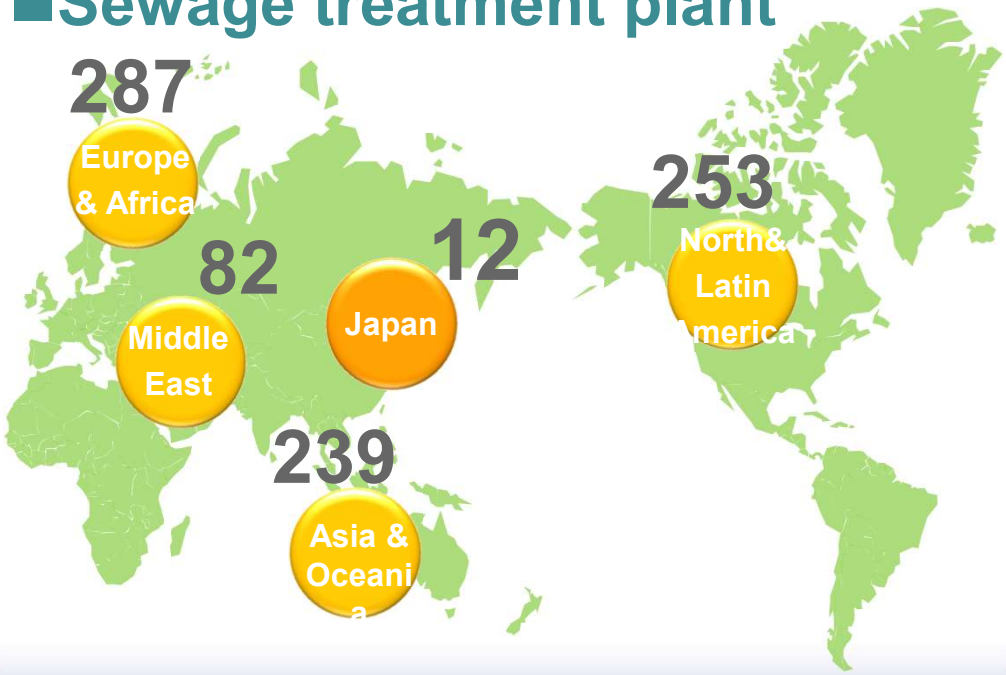
4. References

Installation records of Kubota MBR

Target	Number of plant
Total reference	Over 6,000
Sewage Treatment Plant	About 900
Over 10,000 m3/d	37

Sewage treatment plant



Major projects over 10,000m3/d

Country	Project name	Capacity (m^3/d)	Year of operation
USA	Canton	159,000	2016
Oman	Al Ansab Ph2	125,000	2015
Japan	Sanbou	60,000	2011
Oman	Al Ansab Ph1	55,000	2008
Japan	Nakahama	40,000	2021
Spain	Sabadell	35,000	2008
USA	Delphos	22,710	2006
Turkey	Narlica STP	21,600	2017
Saudi Arabia	Sang Riyadh	20,000	2014
Japan	Senboku	20,000	2015
China	Wuxi Chengbei	20,000	2012
USA	Leoni Township	19,680	2009

Thank you for your attention !

For Earth, For Life

Kubota

FLOOD BUSTER

Pump Gate for Flood Control

ISHIGAKI Company, Ltd.
Yu Kurita

About ISHIGAKI

Establishment

1958

Number of Employees (Group Total)

927

Products

Screw Press

Filter Press

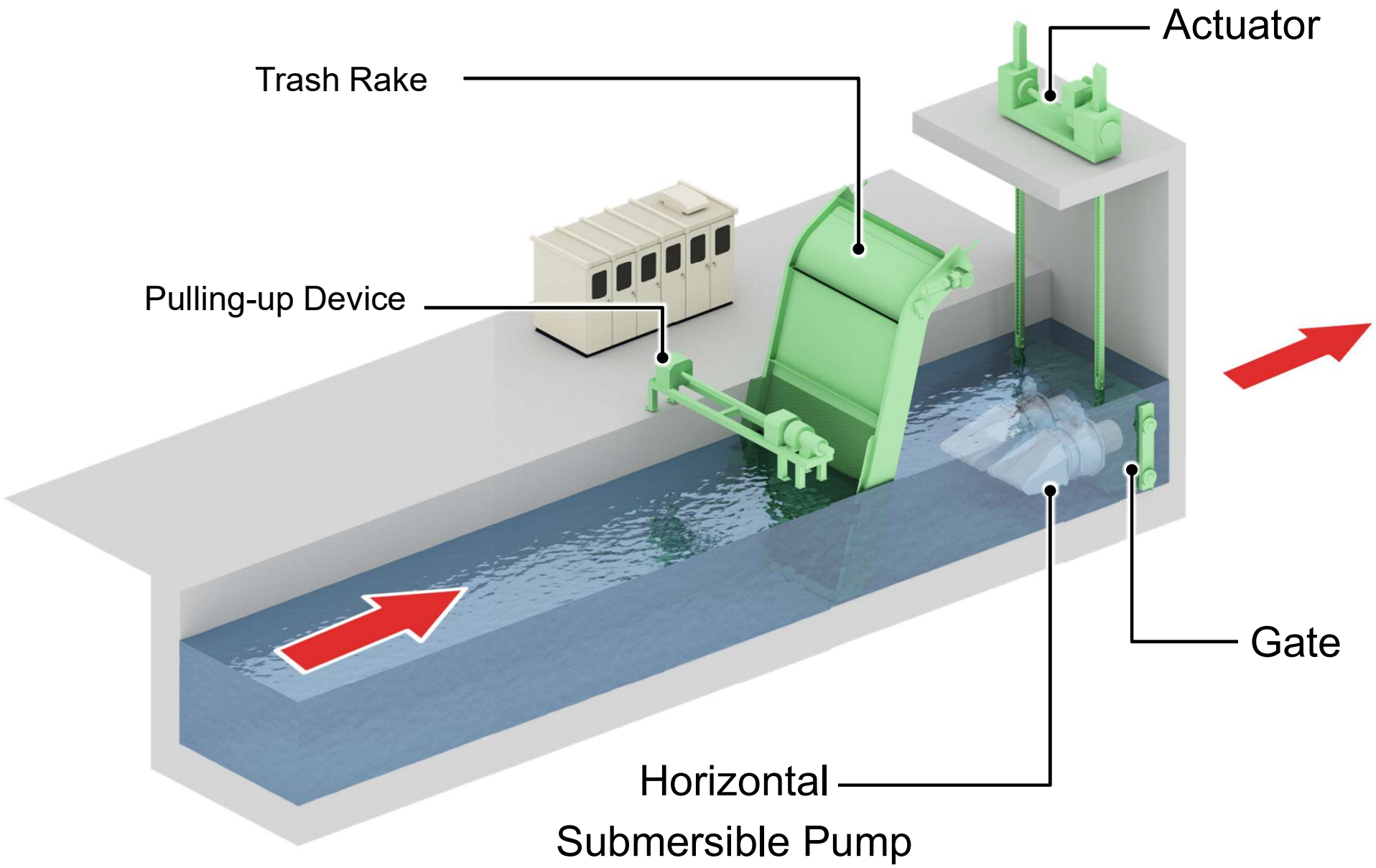
Polishing Filter

Vertical Pump

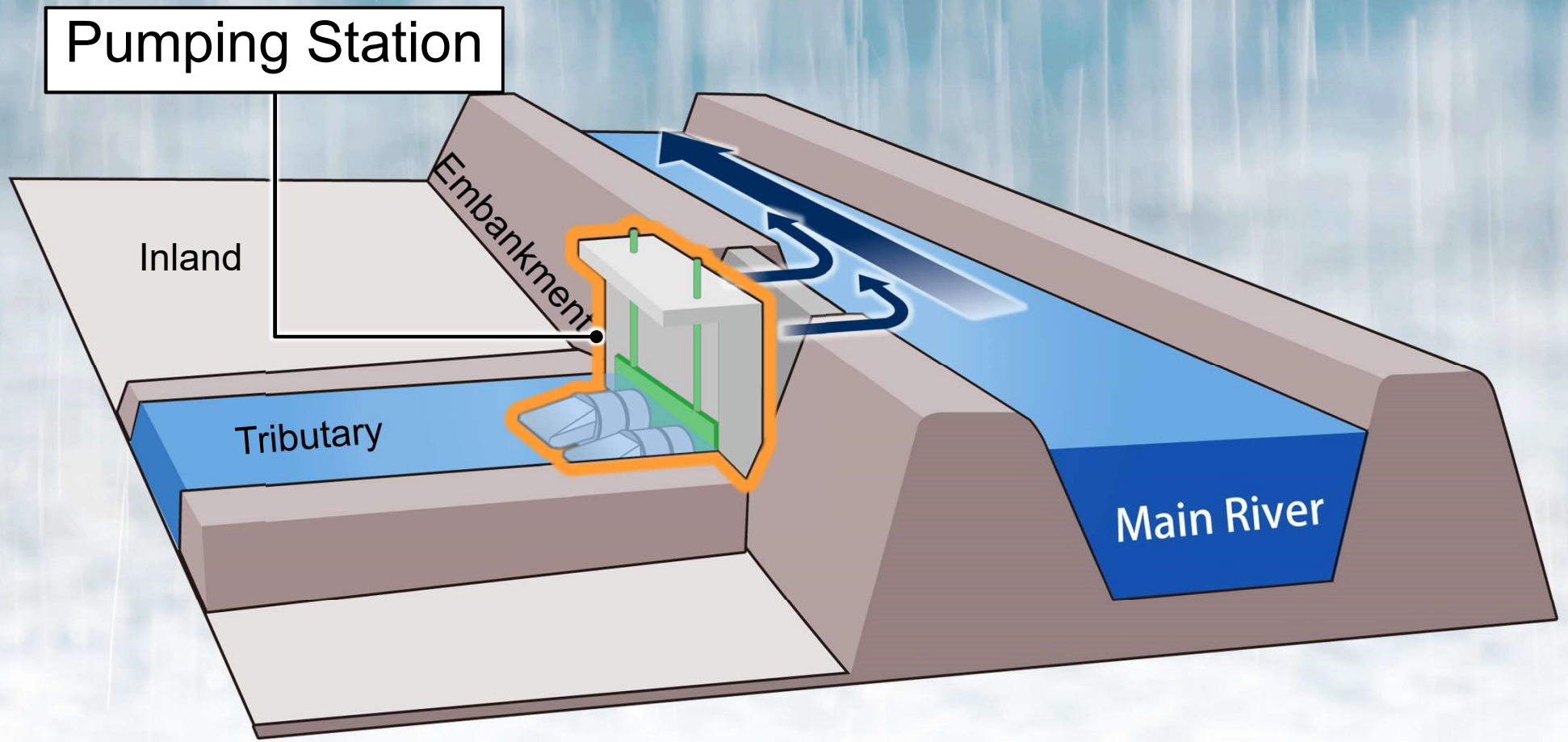
Submersible Pump

Pump Gate

Pump Gate

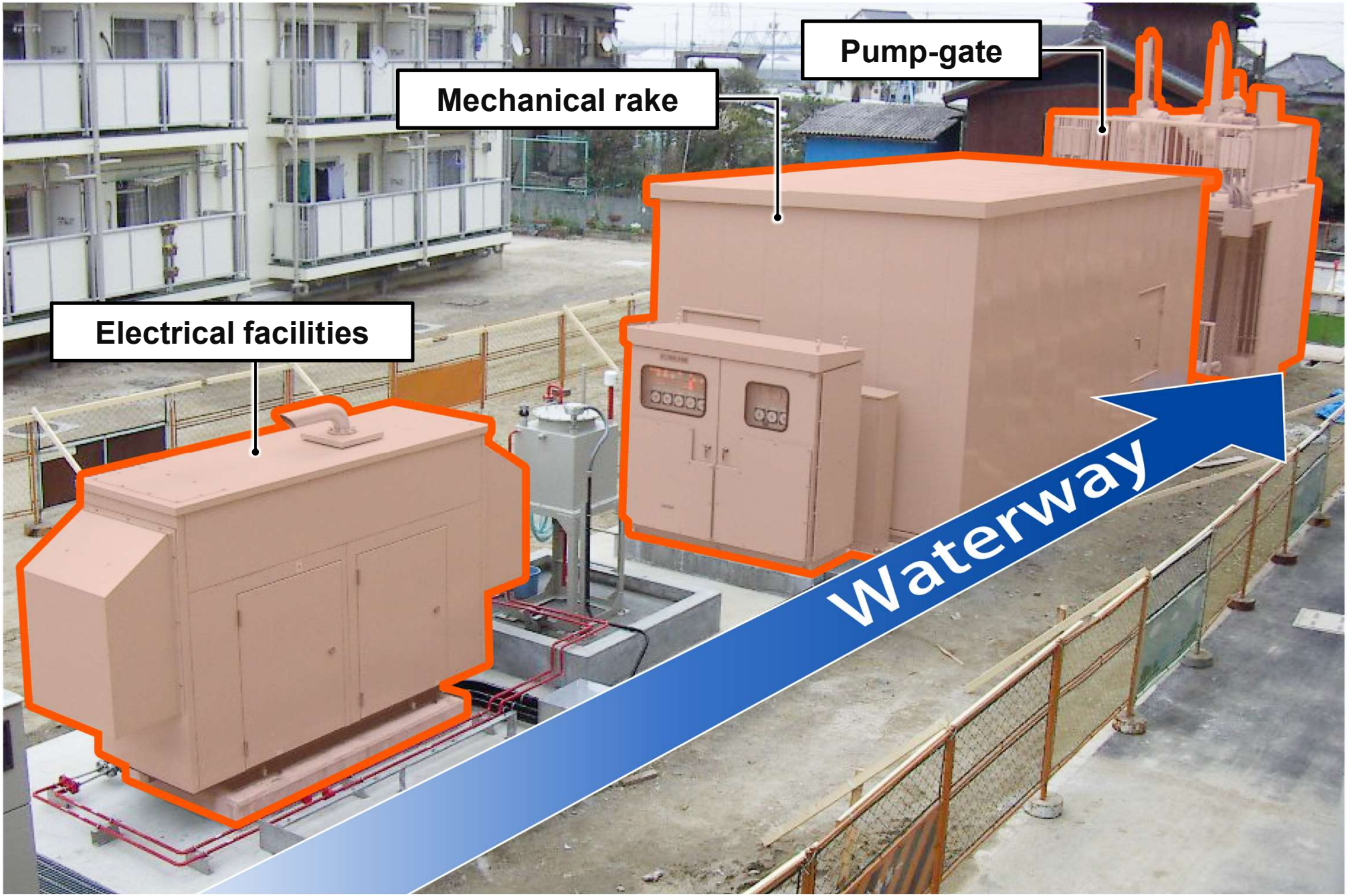

Actuator
Trash Rake
Pulling-up Device
Gate
Horizontal
Submersible Pump

Role of Pumping Station and Pump Gate



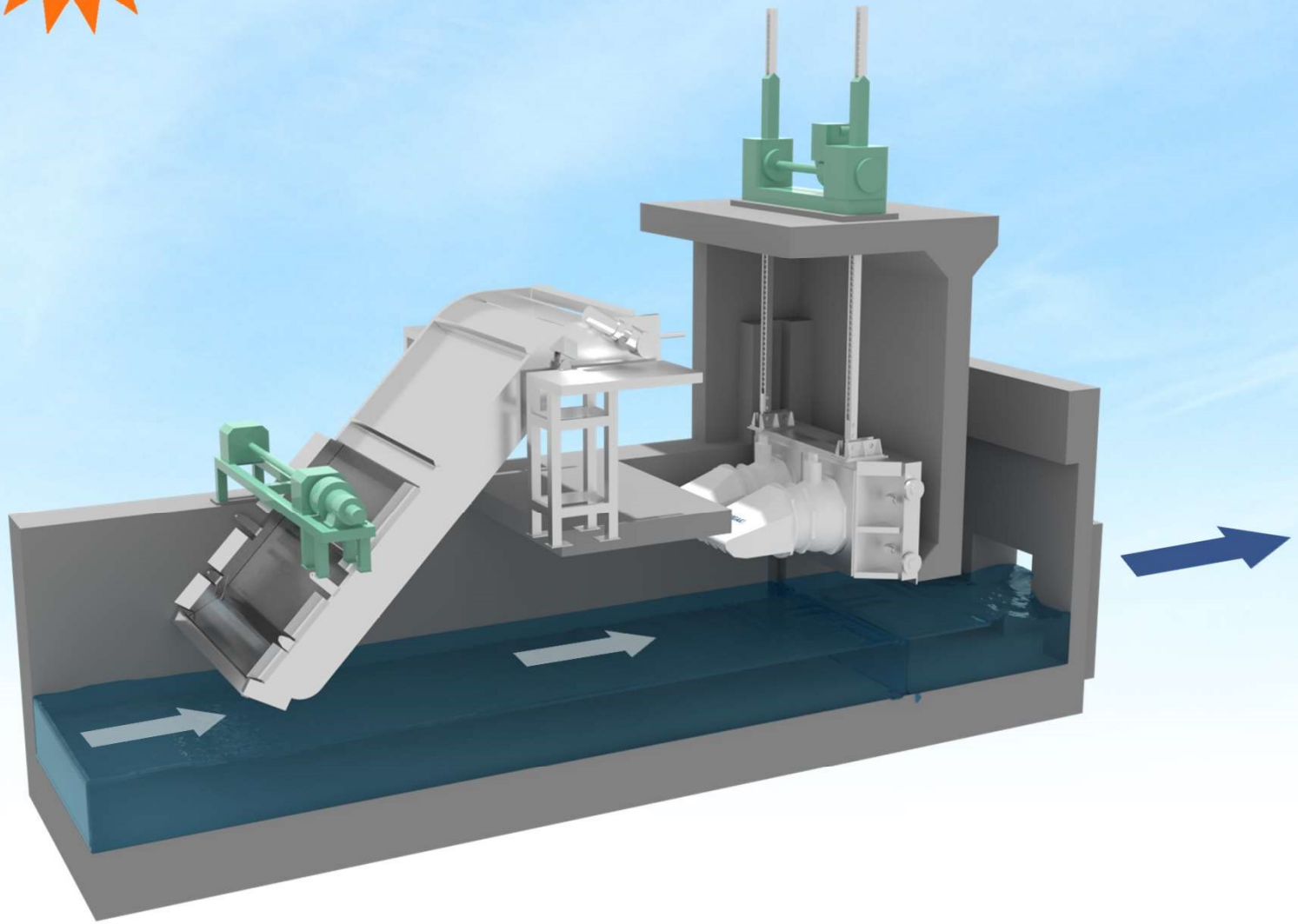
Pump gates and pumping stations prevent flood damage.

Installation Example of Pump Gate



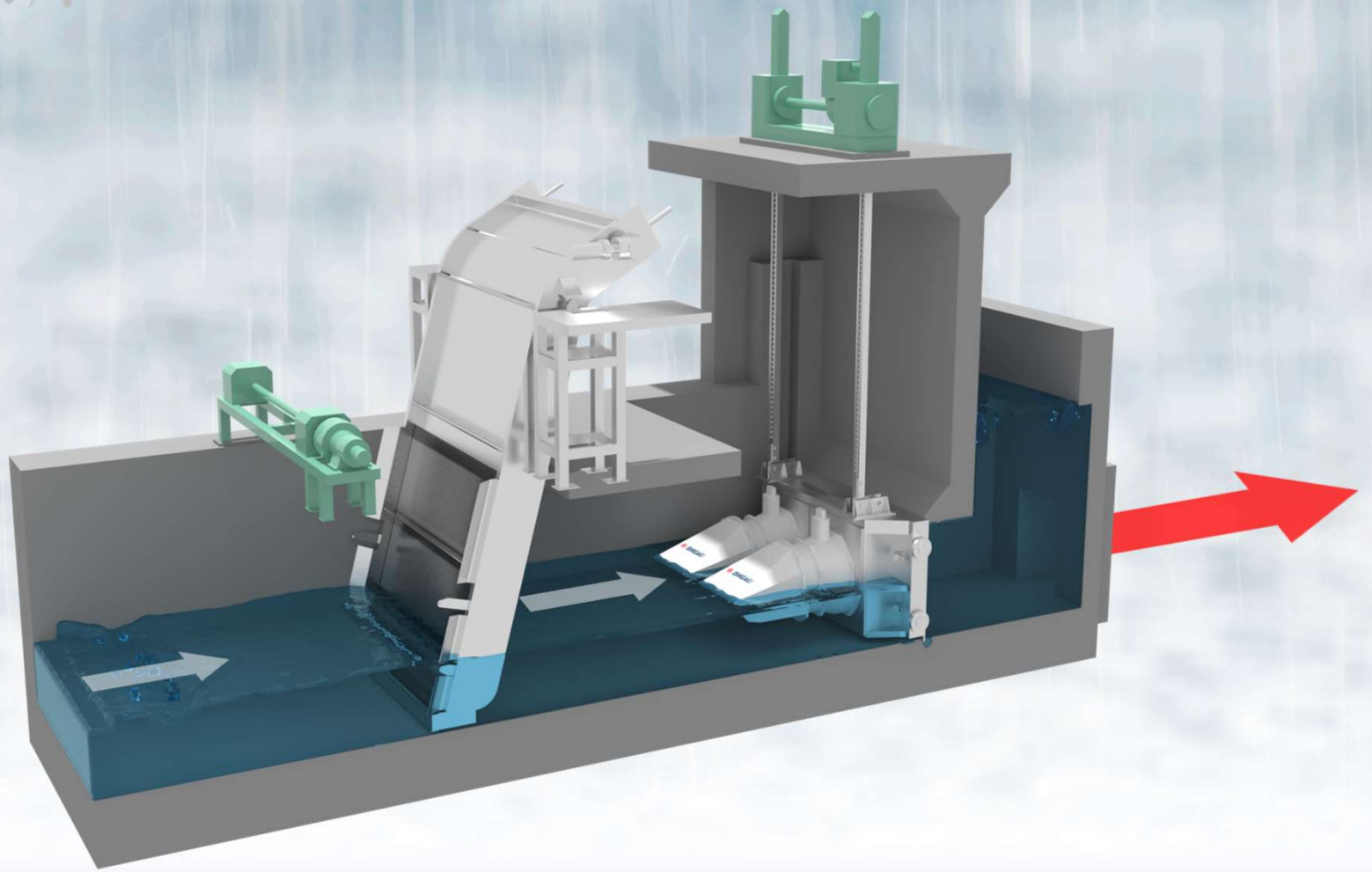
Fine

Natural Drainage

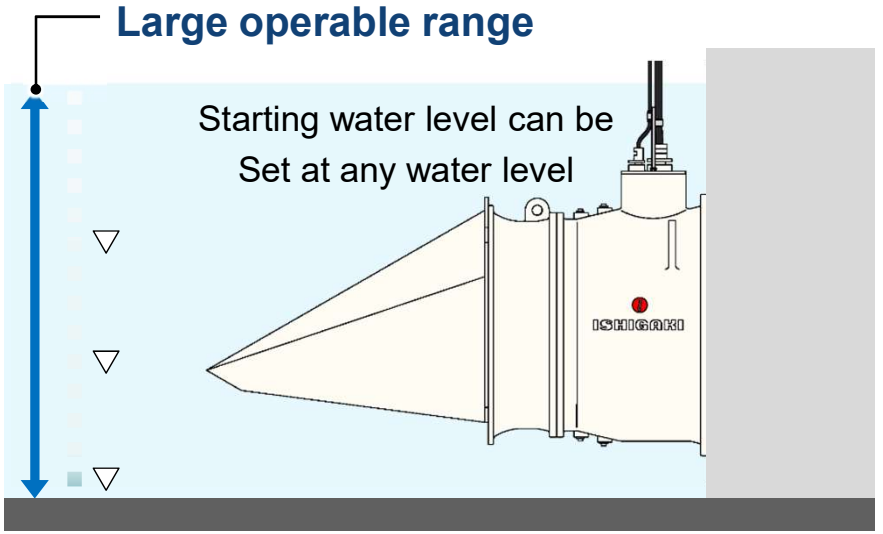


Rain

Forced Drainage



Flood Buster solve the problem



*No stopping water level is required

No need to start and stop repeatedly

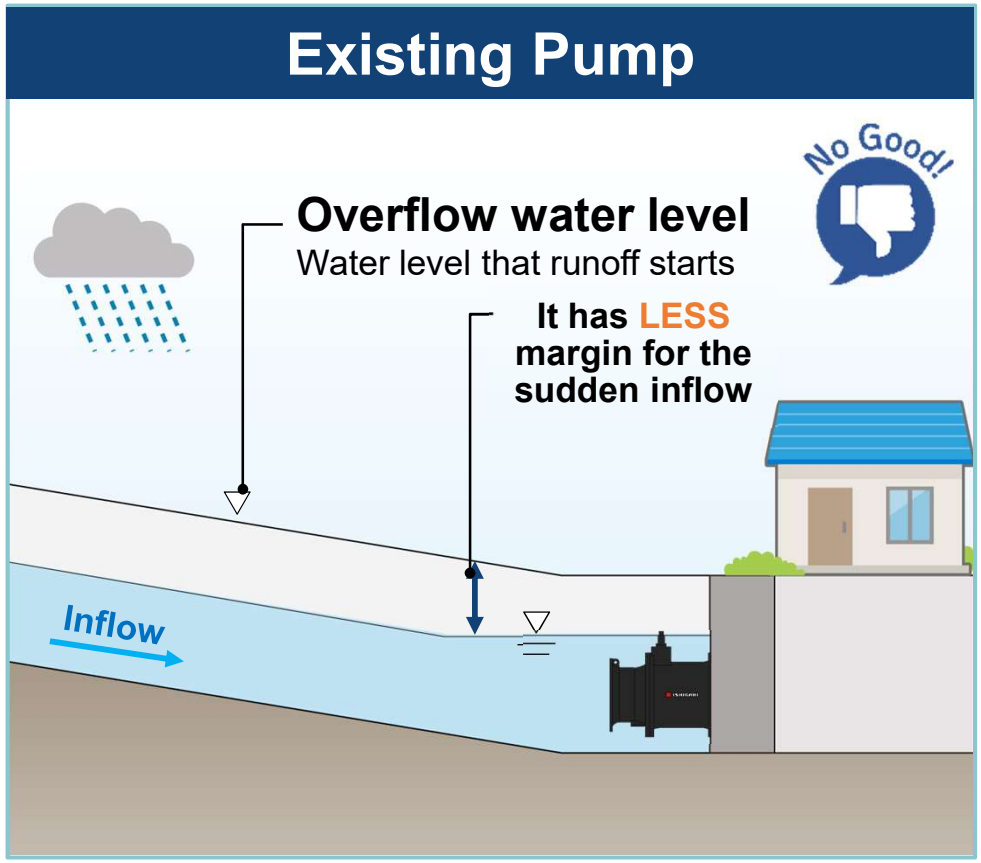
Operate at any water level

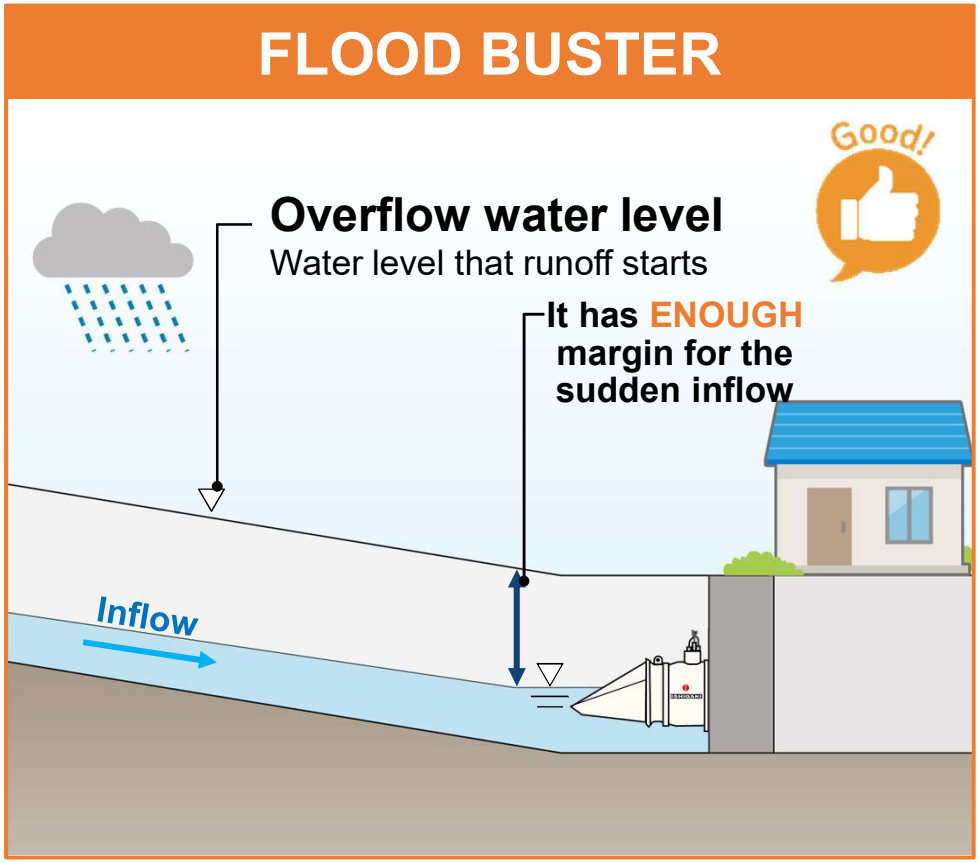
Flood Buster has less load on the electric board than the existing pump.

Reliability

1. Inundation risk reduction

The water level can be kept low at all times because there is no stopping water level and standby operation is possible.

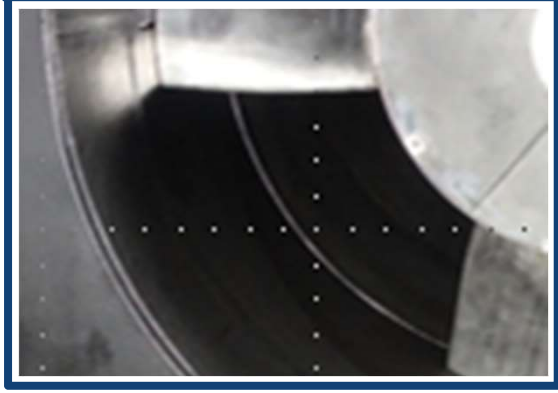


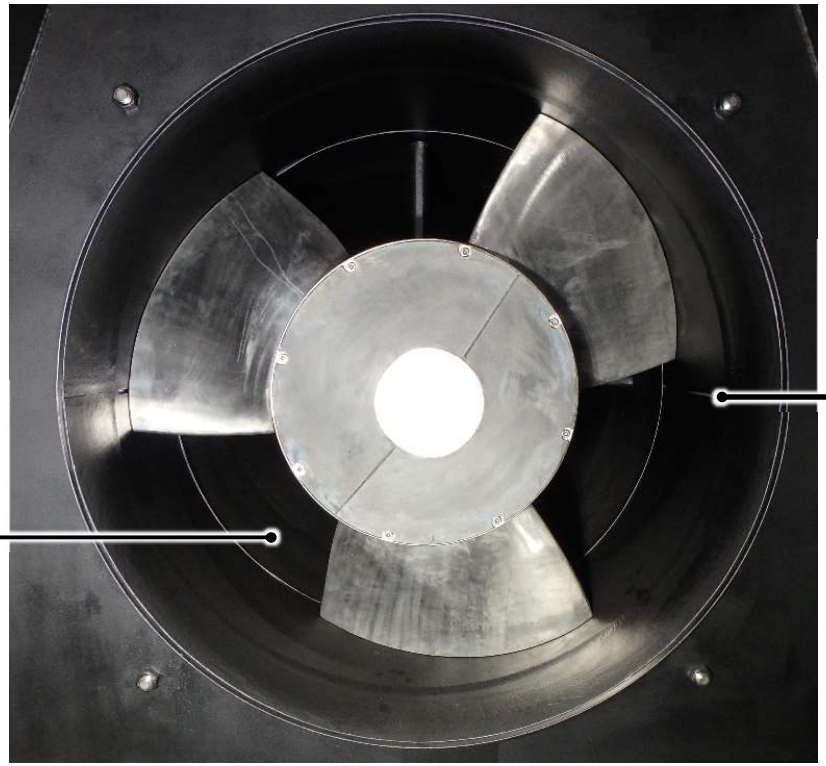


2. Garbage passes impeller easily

Garbage that is **20%** **of the pump diameter**
can pass through.

Space is wide





Slit on the wearing ring

Delivery Record

Japan

60 Pumping Stations

114 Pumps

Philippines

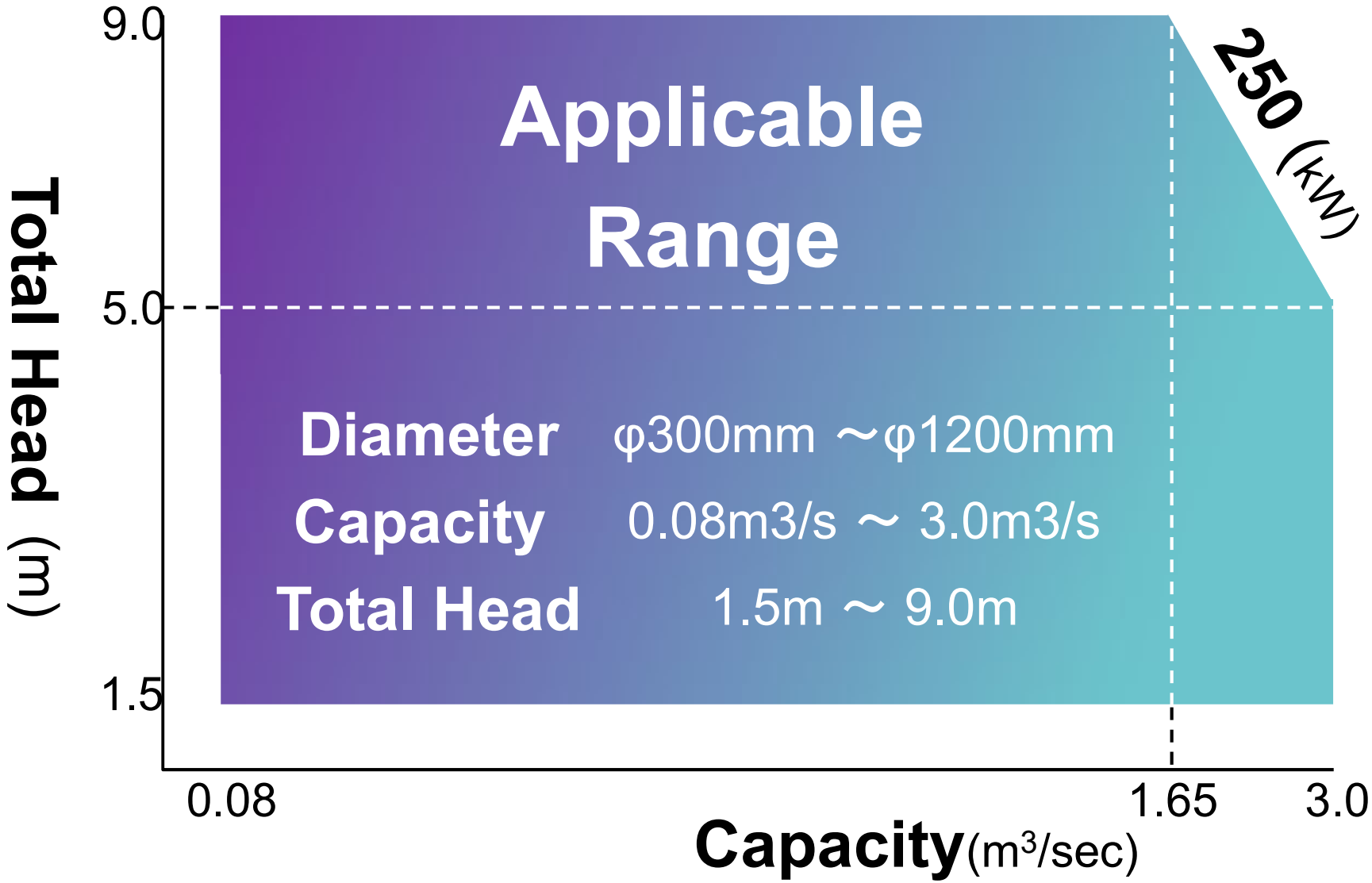
2 Pumping Stations

2 Pumps

Vietnam

WOW TO JAPAN PROJECT

Applicable Range



www.ishigaki.co.jp/en

yu.kurita@ishigaki.co.jp

https://www.youtube.com/watch?v=3hy7FMYNqak