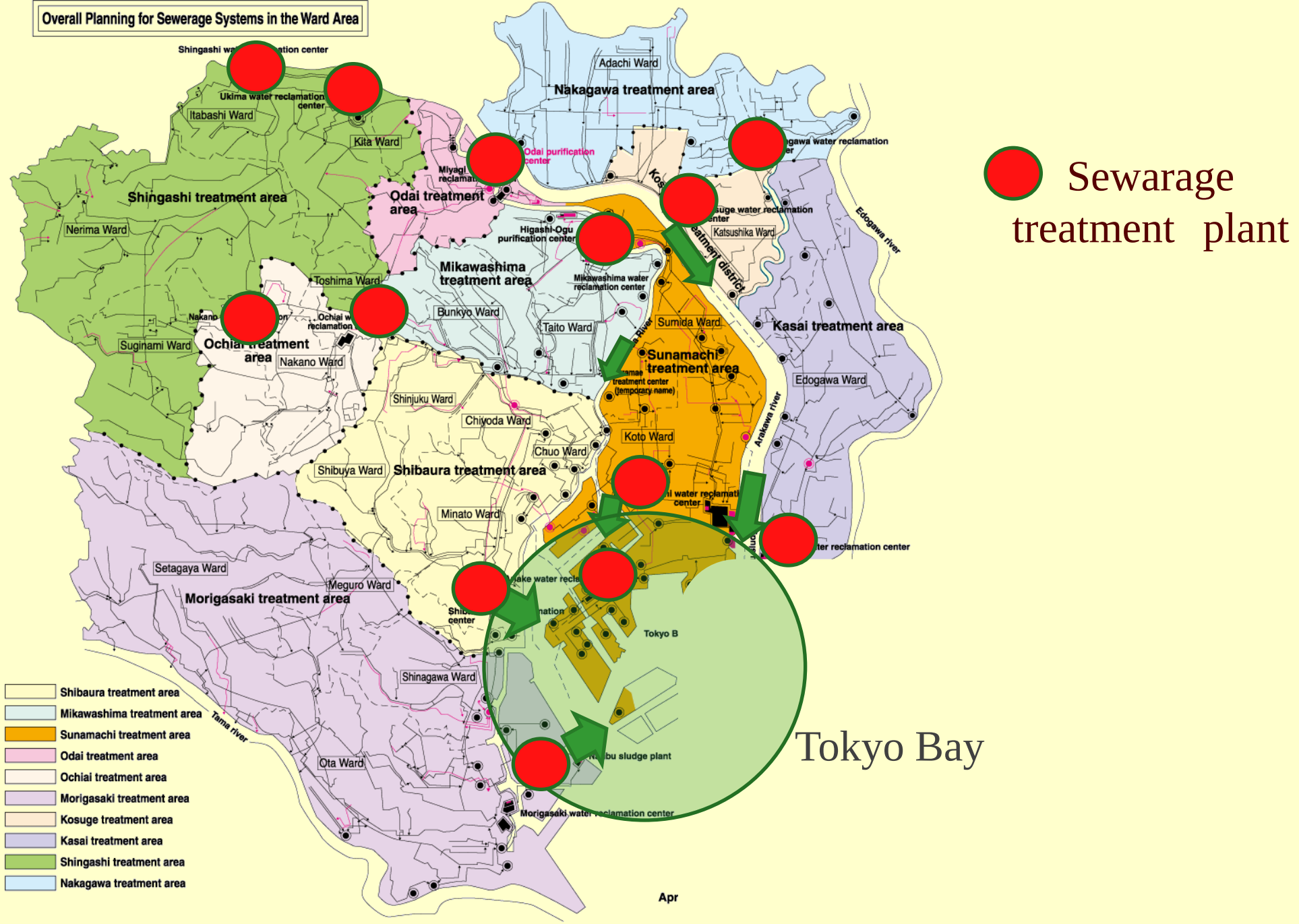
Sewerage in Tokyo


Overall Planning for Sewerage Systems in the Ward Area
Adachi Ward
Nakagawa treatment area
Itabashi Ward
Kita Ward
Shingashi treatment area
Odai treatment area
Nerima Ward
Toshima Ward
Mikawashima treatment area
Katsushika Ward
Kasai treatment area
Suginami Ward
Ochiai treatment area
Nakano Ward
Bunkyo Ward
Taito Ward
Sumida Ward
Sunamachi treatment area
Edogawa Ward
Shinjuku Ward
Chiyoda Ward
Koto Ward
Chuo Ward
Shibuya Ward
Shibaura treatment area
Minato Ward
Setagaya Ward
Meguro Ward
Morigasaki treatment area
Tokyo B
Shinagawa Ward
Ota Ward
Tama river
Arakawa river
Edogawa river
Shibaura treatment area
Mikawashima treatment area
Sunamachi treatment area
Odai treatment area
Ochiai treatment area
Morigasaki treatment area
Kosuge treatment area
Kasai treatment area
Shingashi treatment area
Nakagawa treatment area
Sewarage treatment plant
Tokyo Bay

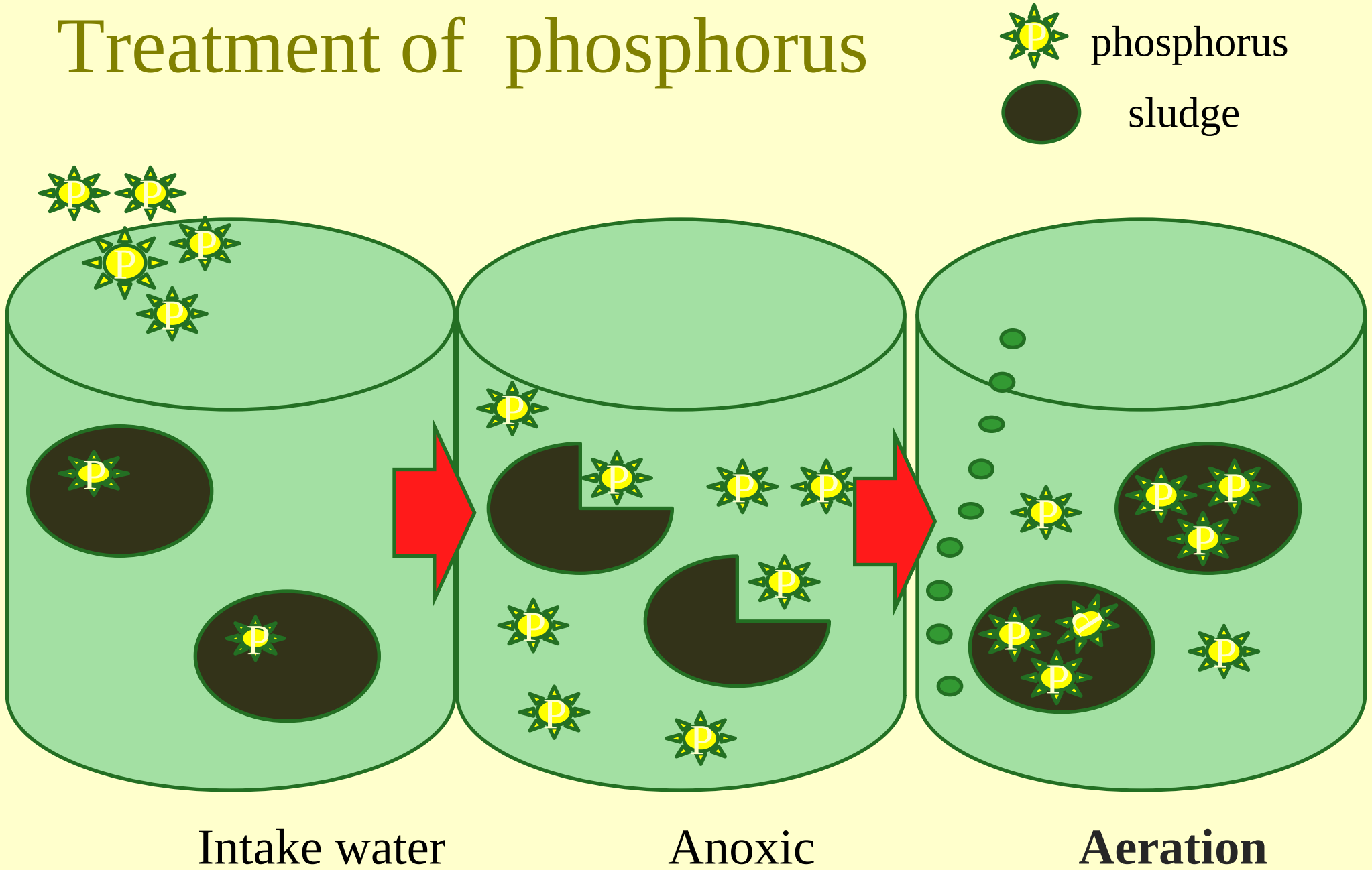

・Combined sewer system
・Need for advanced wastewater treatment
Receiving water body (Tokyo bay) is closed.
・Needs for effective use of site

Red tide at Tokyo Bay

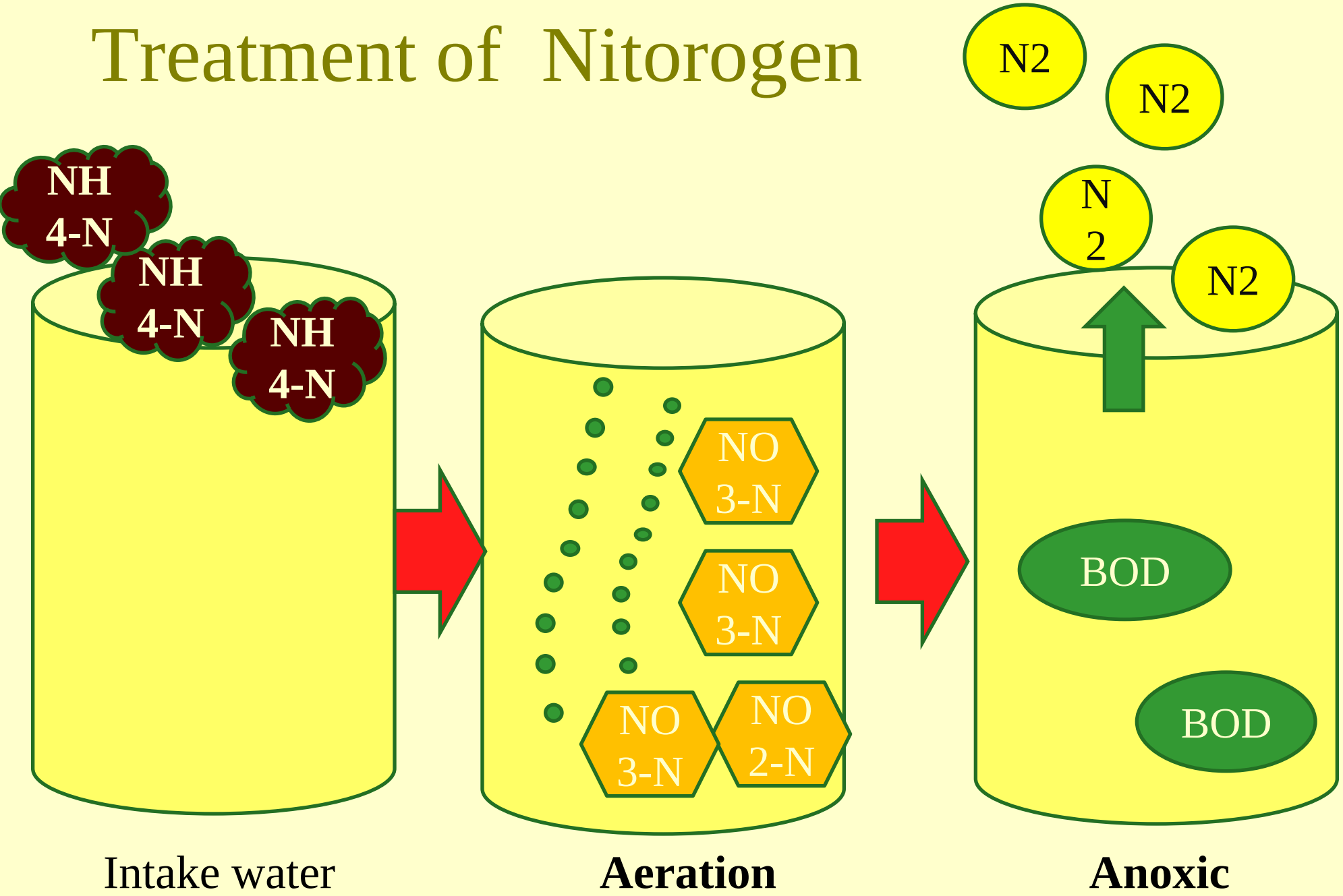
Average water quality of water reclamation centers

Item	Intake water	Discharge water	removal rate
BOD	153	3	98%
COD	79	11	86%
Total nitrogen	31.9	13.1	59%
Total phosphorus	3.4	1.2	65%

Treatment of phosphorus



Treatment of Nitorogen



Methods for removal of nutrients

II

Advanced wastewater treatment

Removal of nitrogen

- Recycled nitrification/denitrification process
- Nitrification-denitrification using endgeneous respiration process

Removal of phosphorus

- Anaerobic-oxic activated sludge process
- Activated sludge process with chemical addition

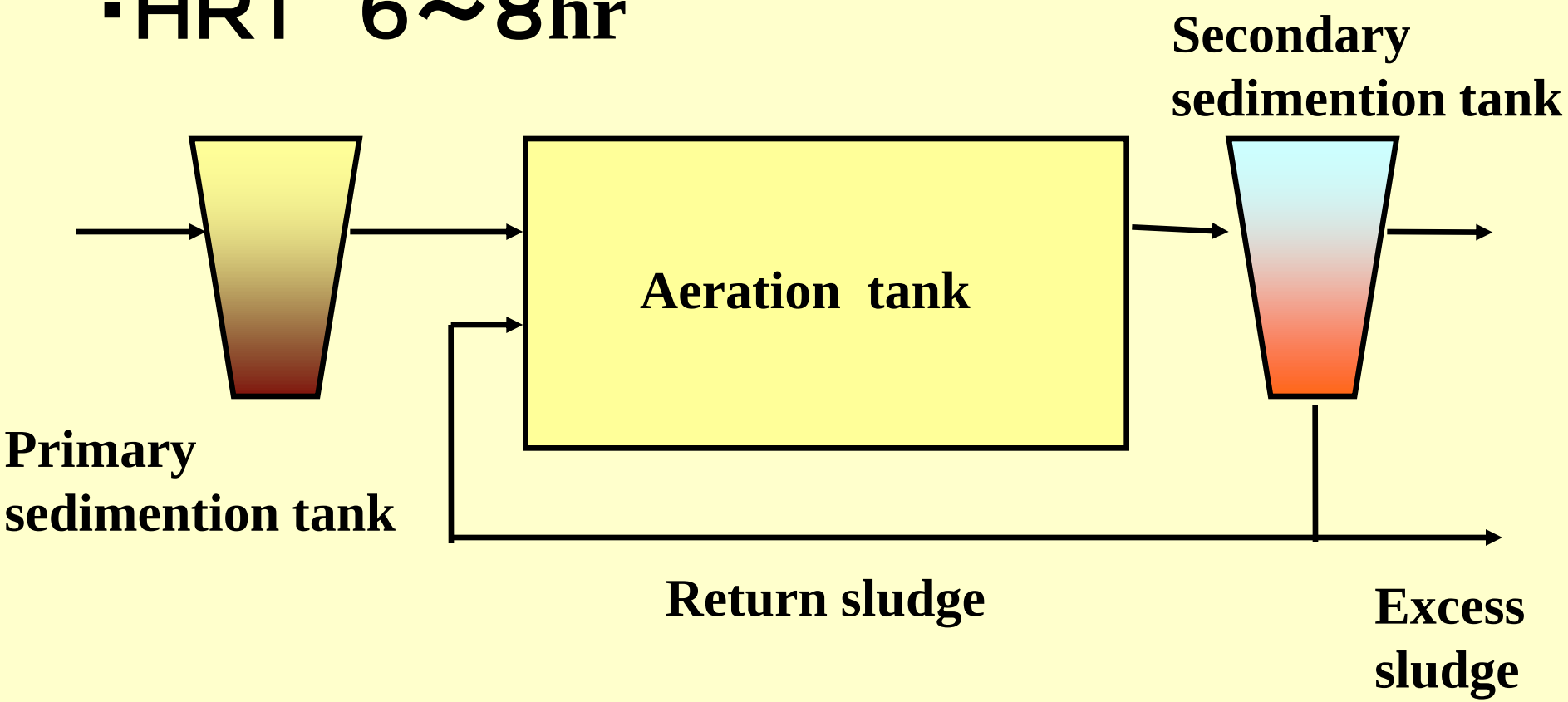
Removal of nitrogen and phosphorus

- Anaerobic-anoxic-oxic activated sludge process
- Recycled nitrification/denitrification process with chemical addition

: processes used in Tokyo Metropolitan Government

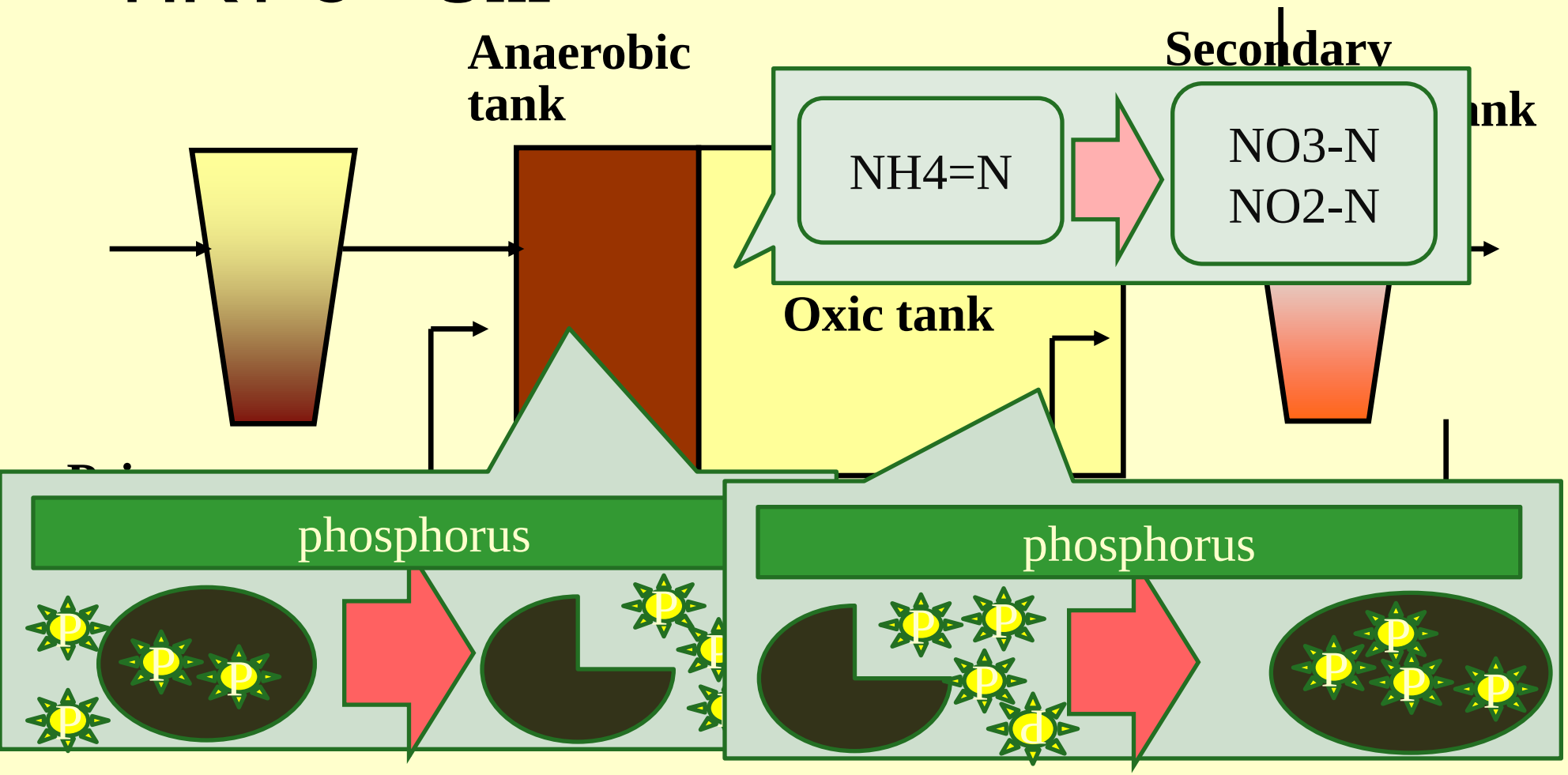
Conventional activated sludge process

・HRT　6～8hr

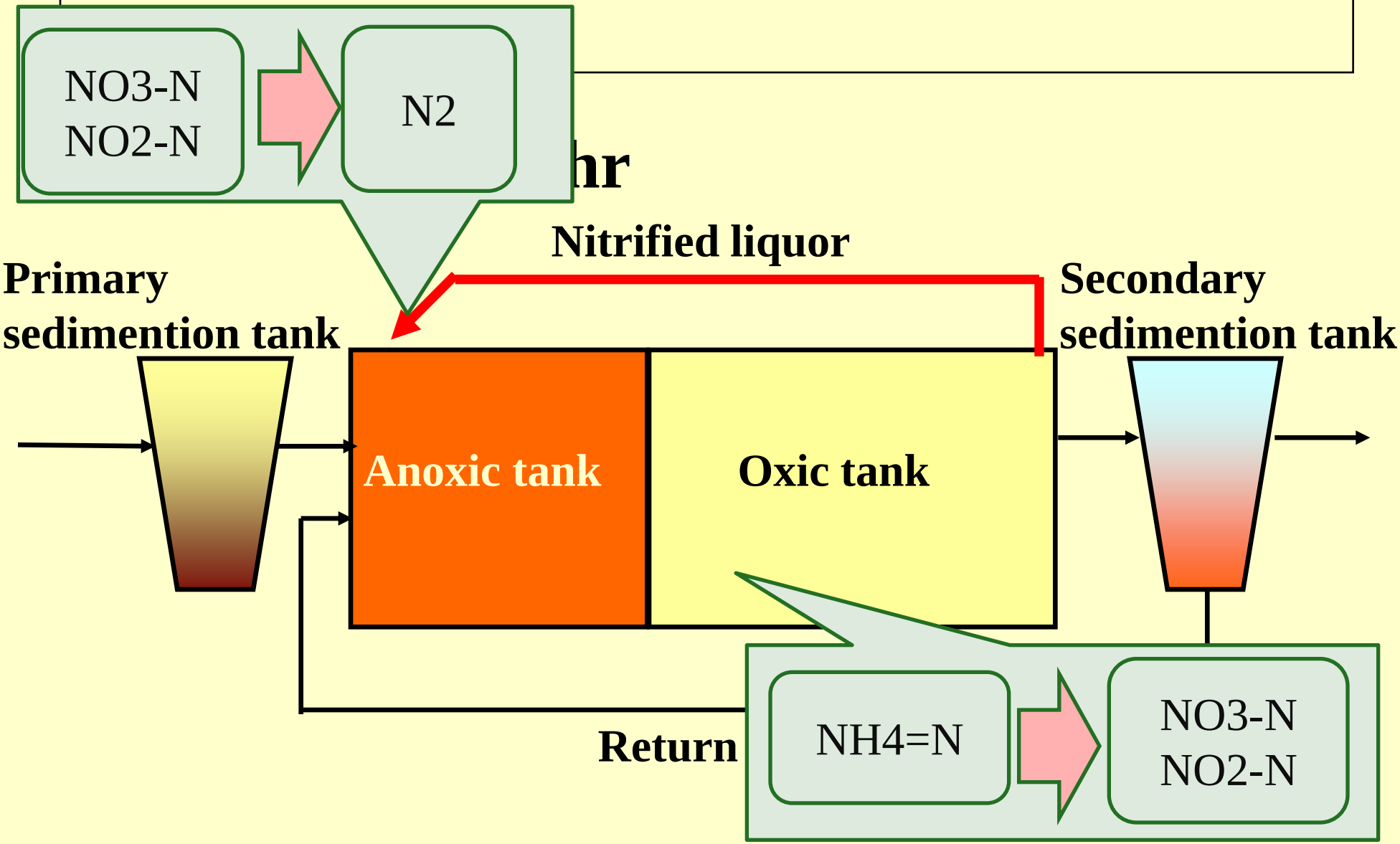


Anaerobic-oxic activated sludge process (AO process)

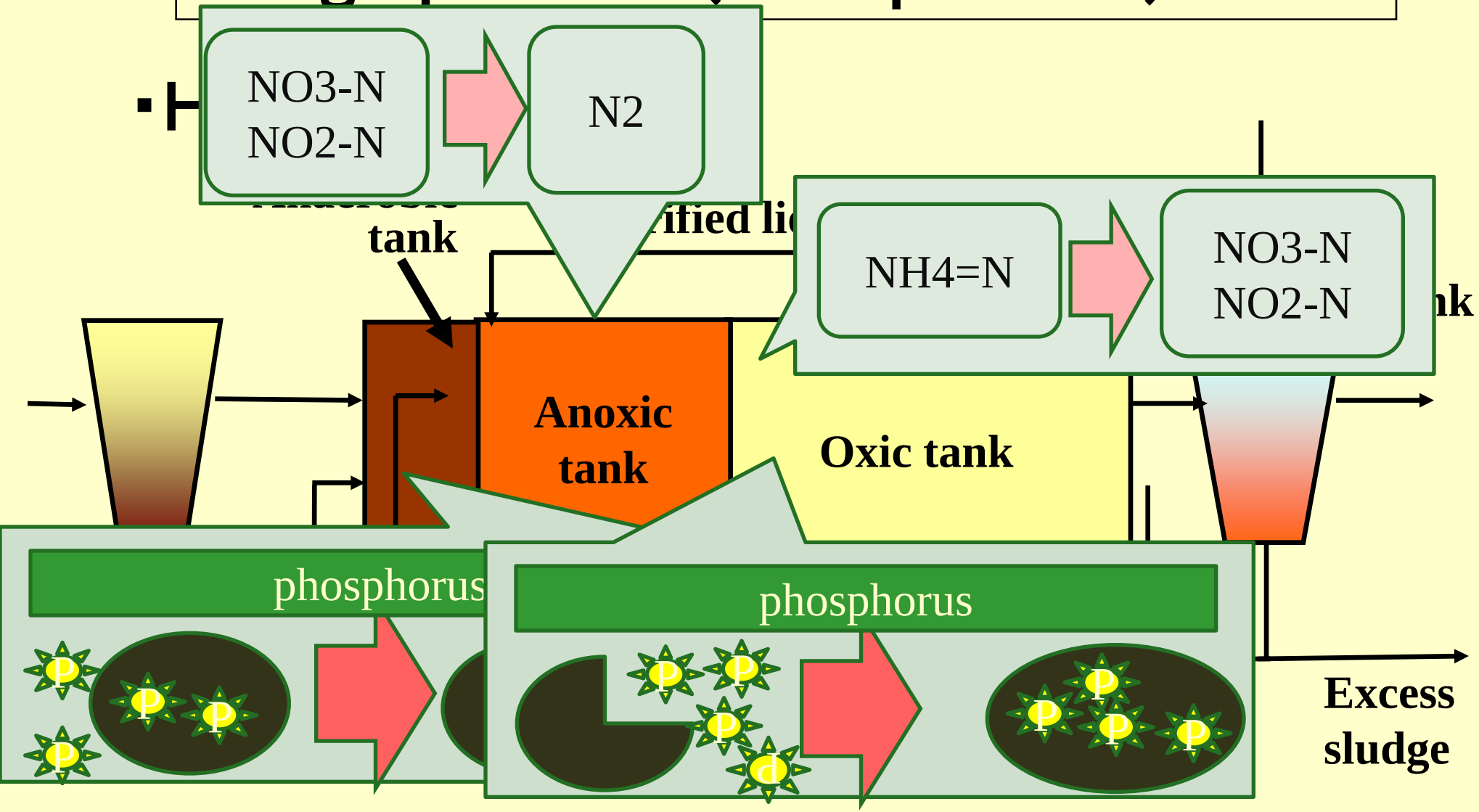
- HRT 6～8hr



Recycled nitrification/denitrification

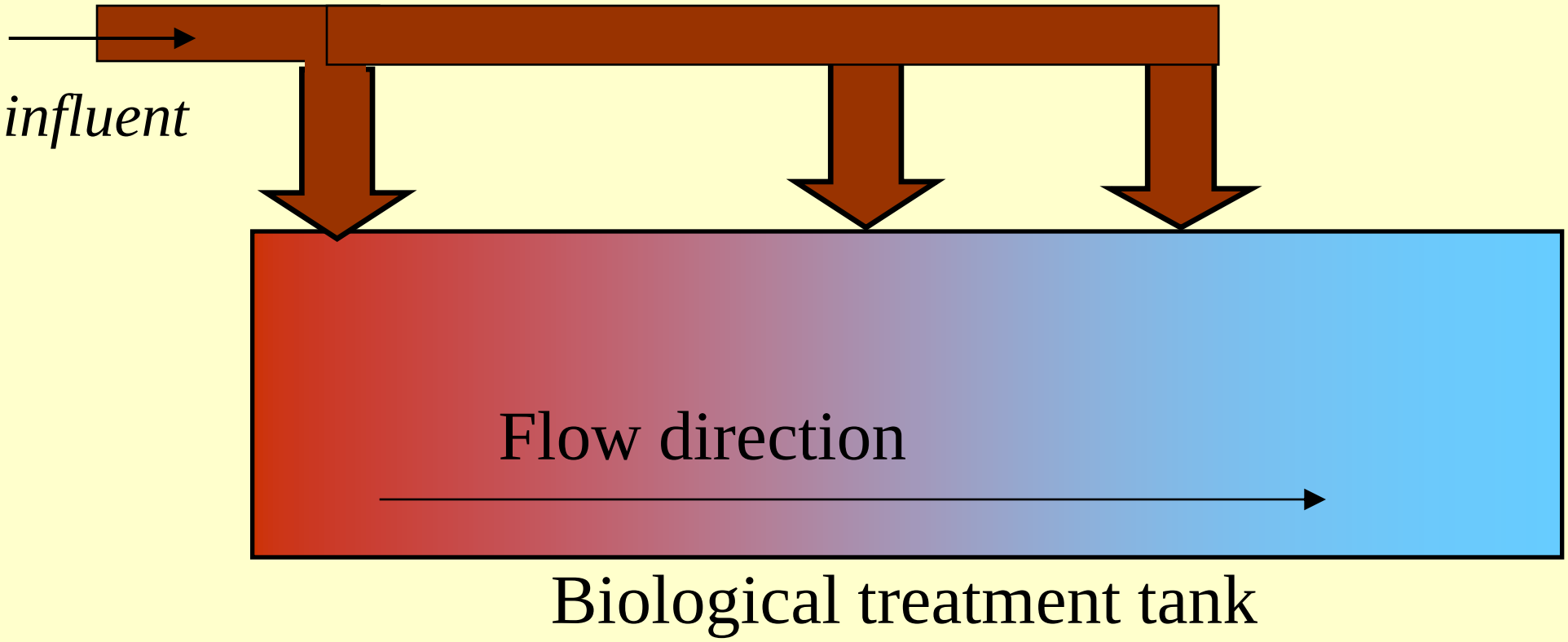


Anaerobic-anoxic-oxic activated sludge process (A2O process)



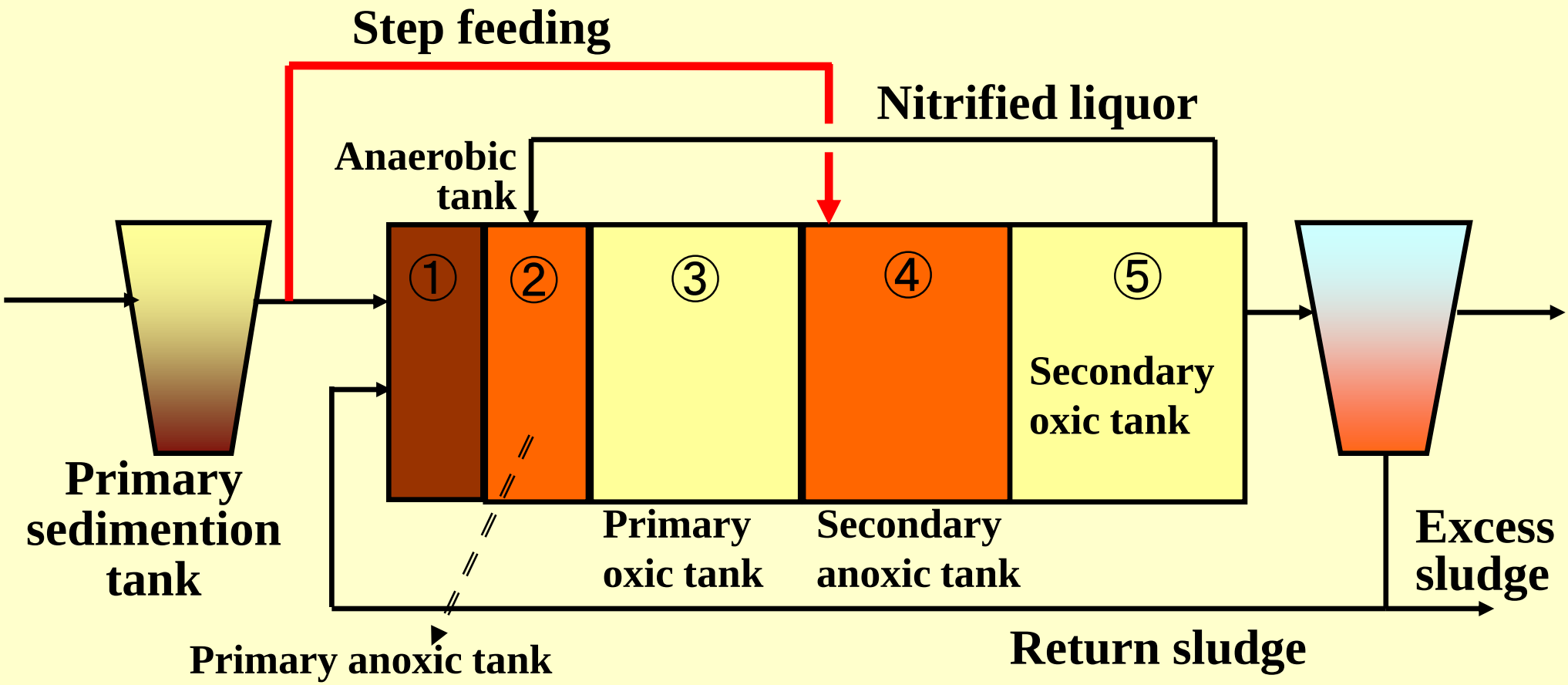
Methods for reduction of space and treated time

Step feeding of influent



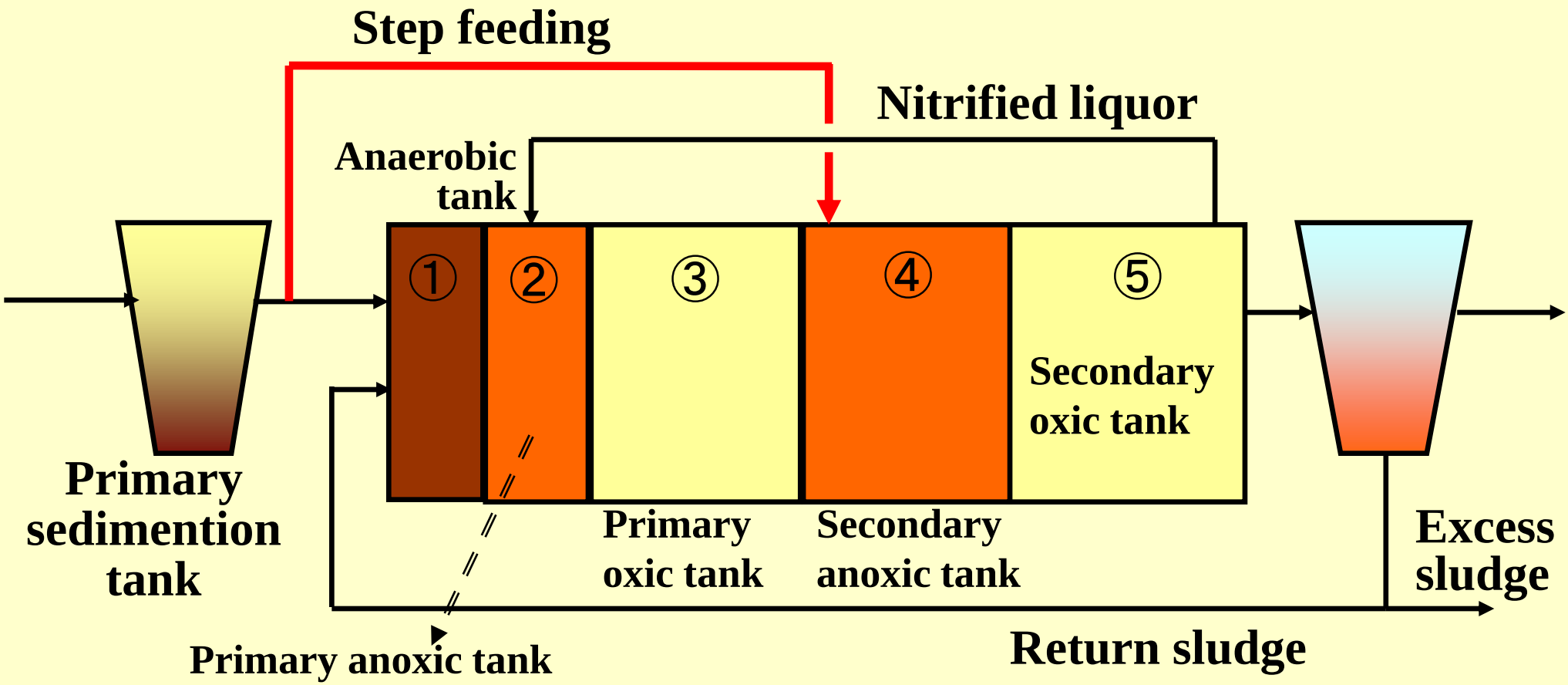
Anaerobic-anoxic-oxic activated sludge treatment process of stepped influent type

・HRT　10～12hr　(A2O process with stepped type)



Anaerobic-anoxic-oxic activated sludge treatment process of stepped influent type

・HRT　10～12hr　(A2O process with stepped type)



Introduction of advanced treatment

CASE 1

STP in enough space of land

A_2O process

HRT : approx.16hours

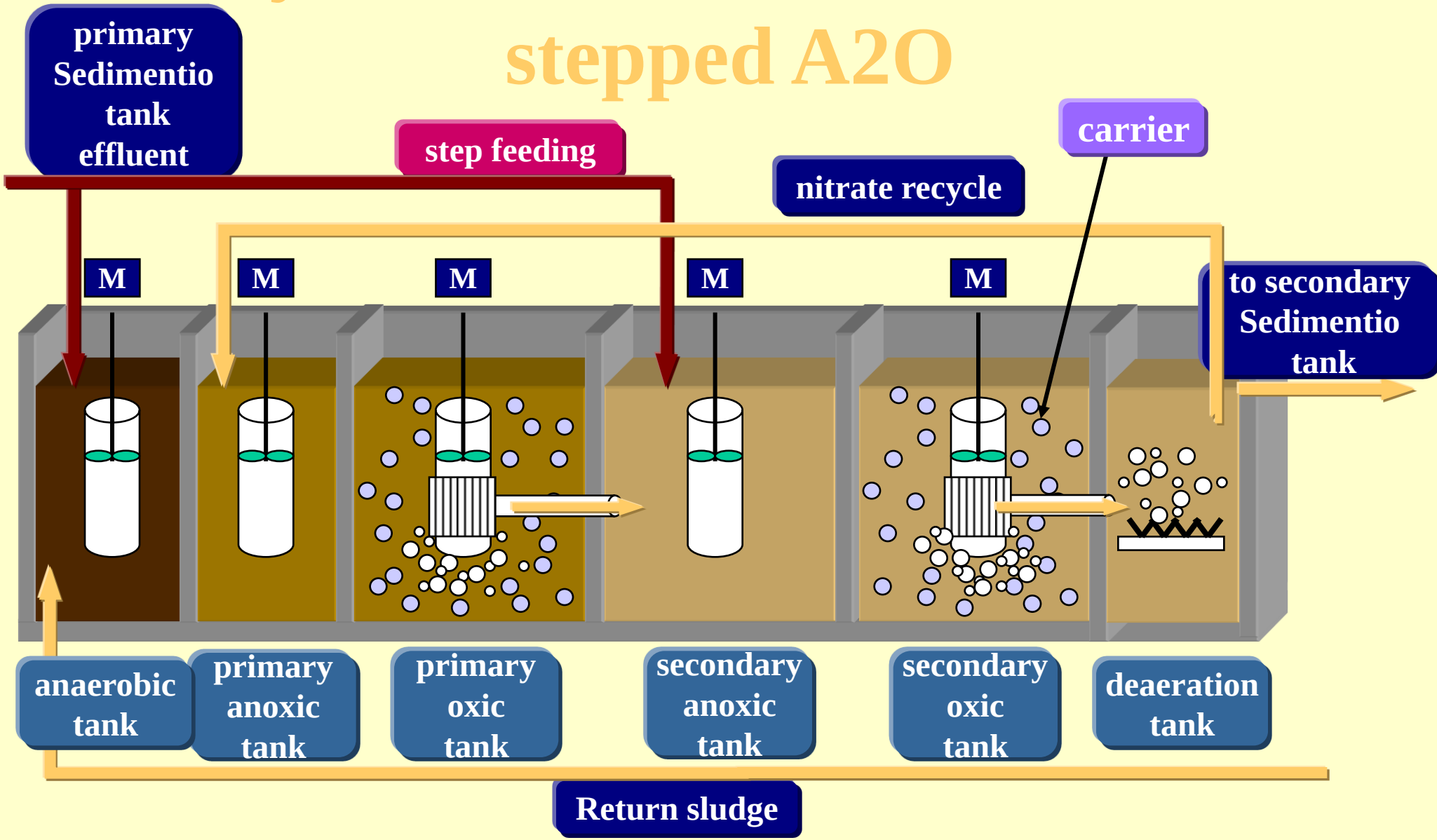
CASE 2

STP in limited space

A_2O process of stepped type

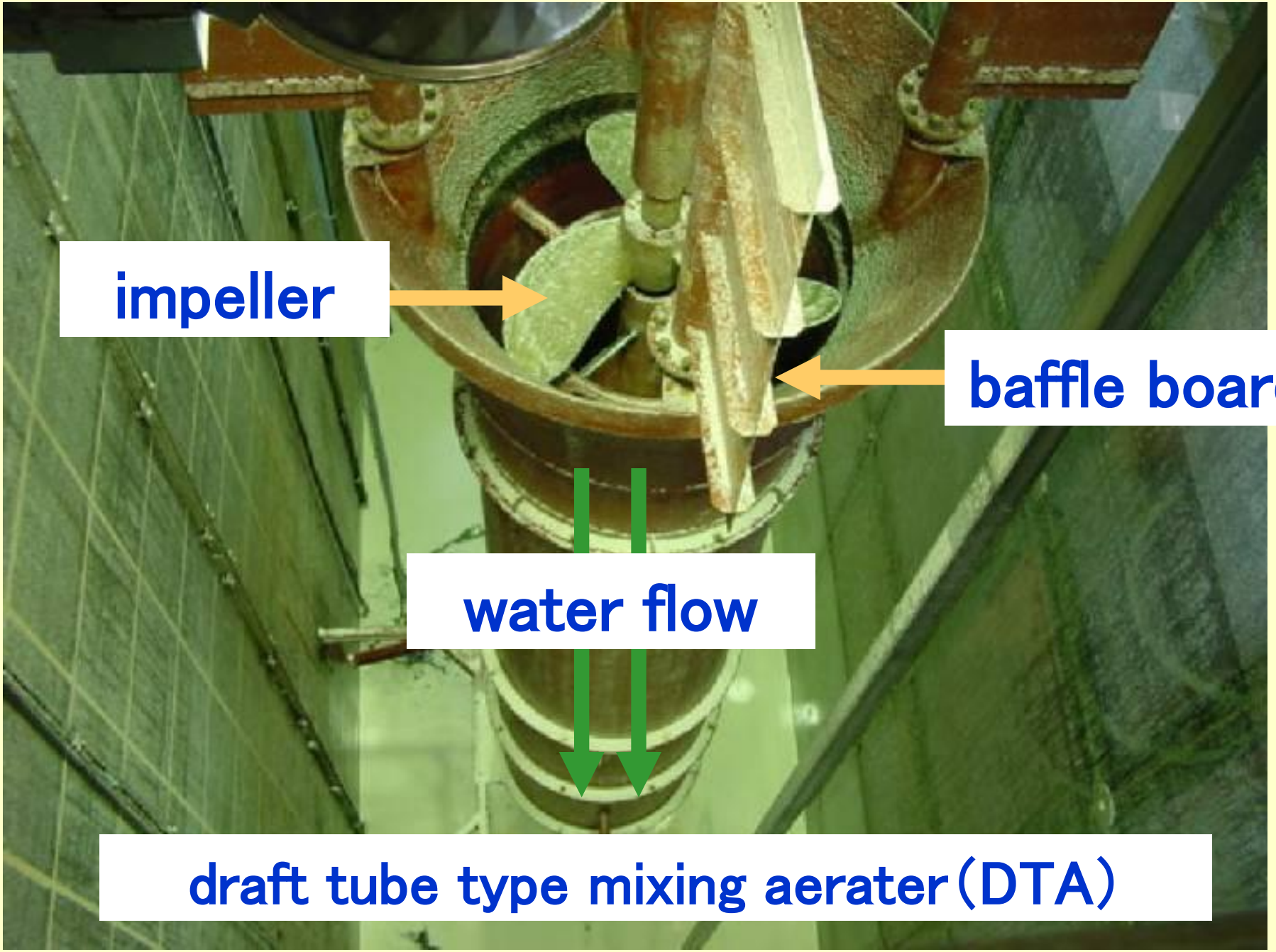
HRT : approx.12hours

System flow of carrier added stepped A2O



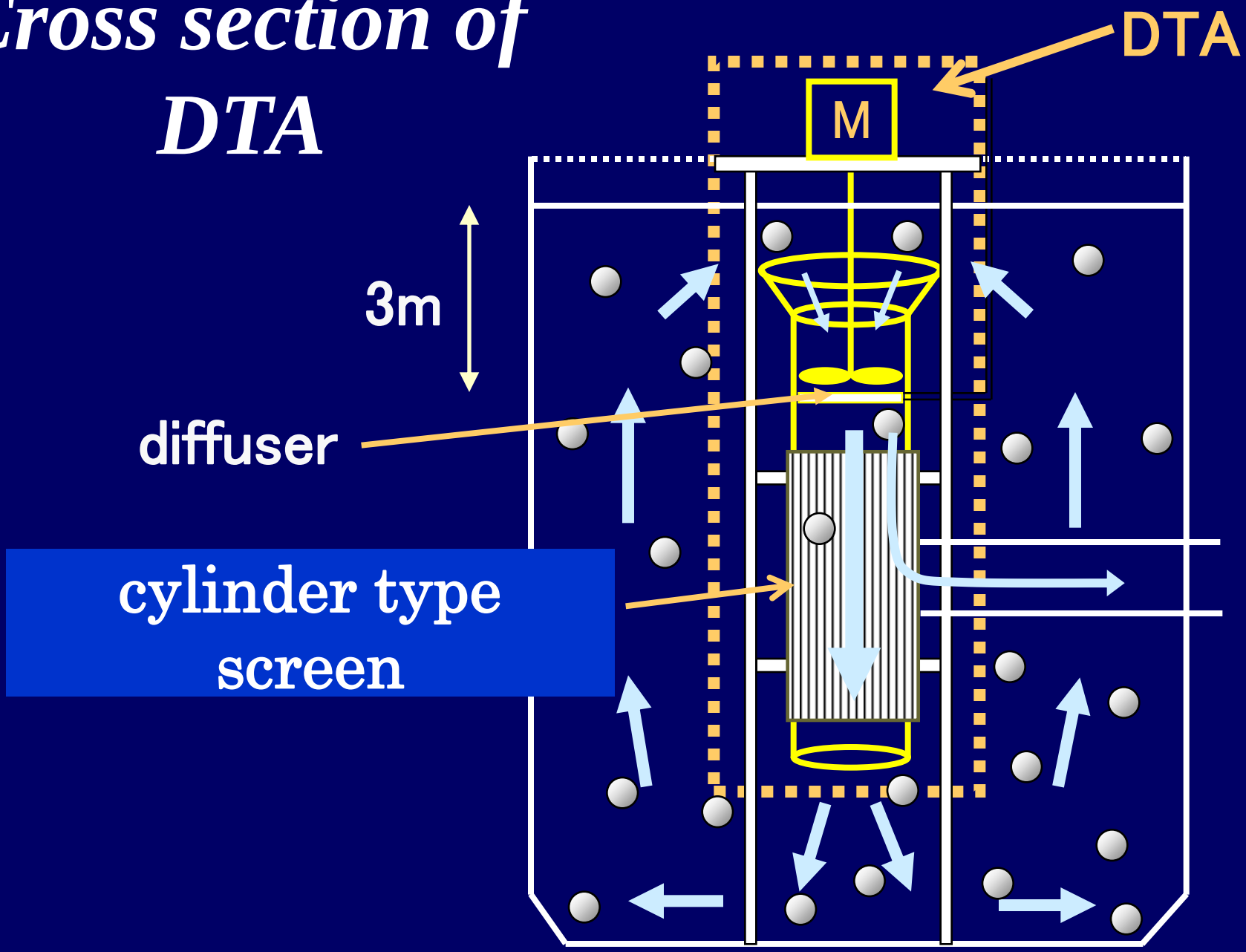
Carrier

- Spherical
- Diameter : 4mm
- Specific gravity : 1.007



draft tube type mixing aerater（DTA）

Cross section of DTA



Volume of aerobic tank of

Carrier added activated sludge method

	activated sludge process	carrier added activated sludge method
nitrification rate mgN/L-tank･hr	3-5	10-12

※MLSS 2,000-2,500mg/L

※dosage of carrier 10-12%

Volume of aerobic tank can be reduced to 1/2-1/4!

Tokyo Bay