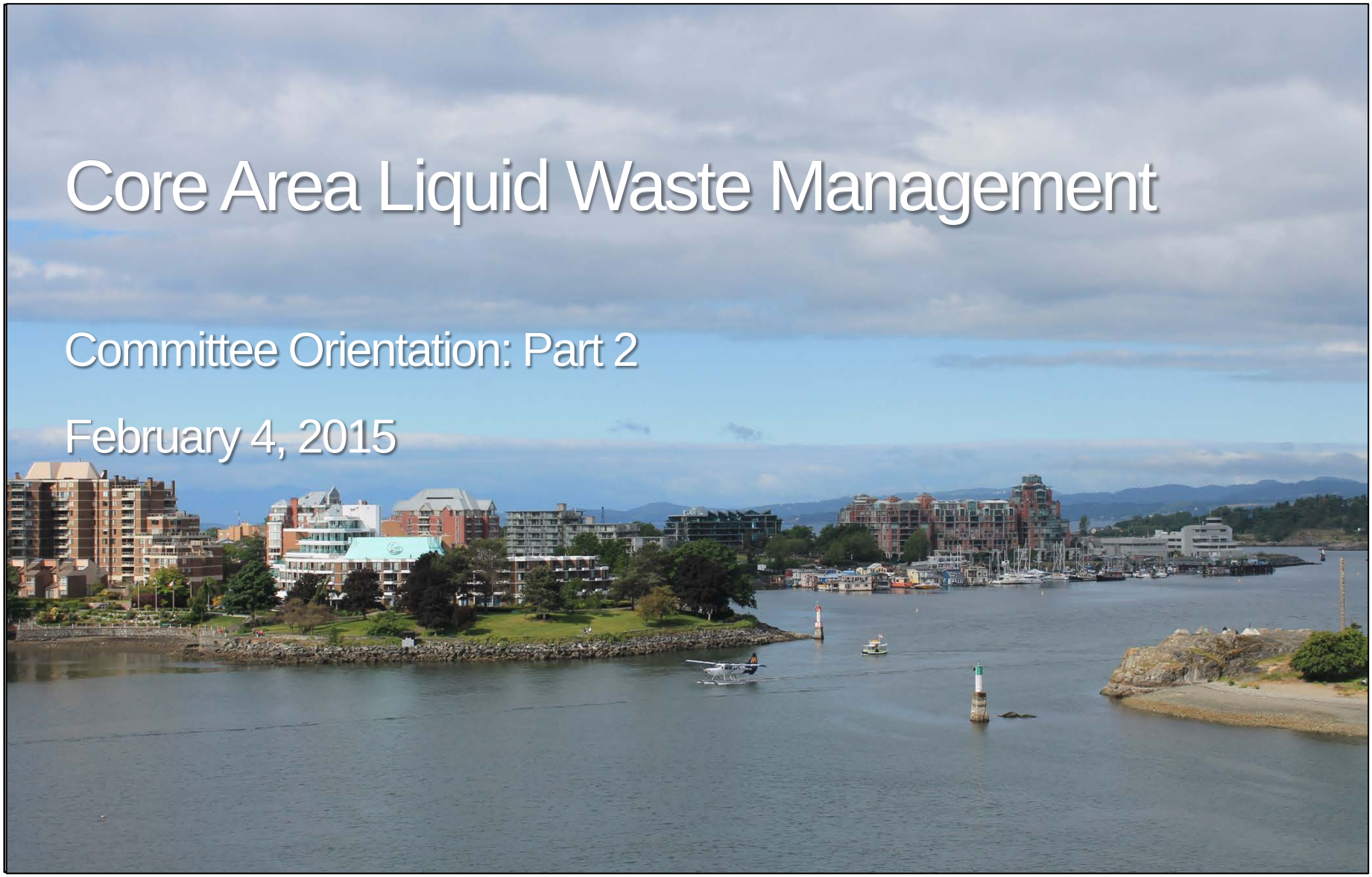
Core Area Liquid Waste Management

Committee Orientation: Part 2

February 4, 2015



Presentation Overview

- Session Two (February 4, 2015)
  - Why do we have to treat?
  - Planning for treatment
  - What is treatment?
  - Paying for treatment
  - Current Status & Next Steps

Why do we have to treat?

Why do we have to treat?

What is Treatment?

In order to reduce **contaminants** entering the receiving environment through wastewater, it is **treated** to protect human health and the environment.

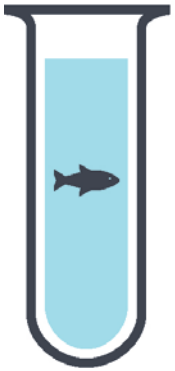
Suspended Solids
Biodegradable Organics
Pathogenic Bacteria
Nutrients
Trace Contaminants

Source Control
Preliminary Treatment
Primary Treatment
Secondary Treatment
Tertiary Treatment

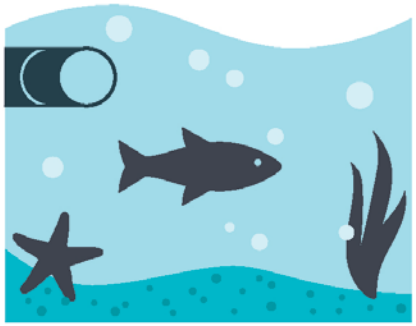
Why do we have to treat?

Regulatory Requirements & Beyond

MEETING THE REGULATORY REQUIREMENTS



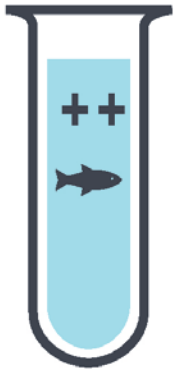
Effluent Quality



Threats to the Environment

Probability of Overflow

FURTHER REFINEMENT



Why do we have to treat?

Measuring effluent quality

→ Liquids = Effluent

Effluent Evaluation

TSS (Total Suspended Solids) ☐

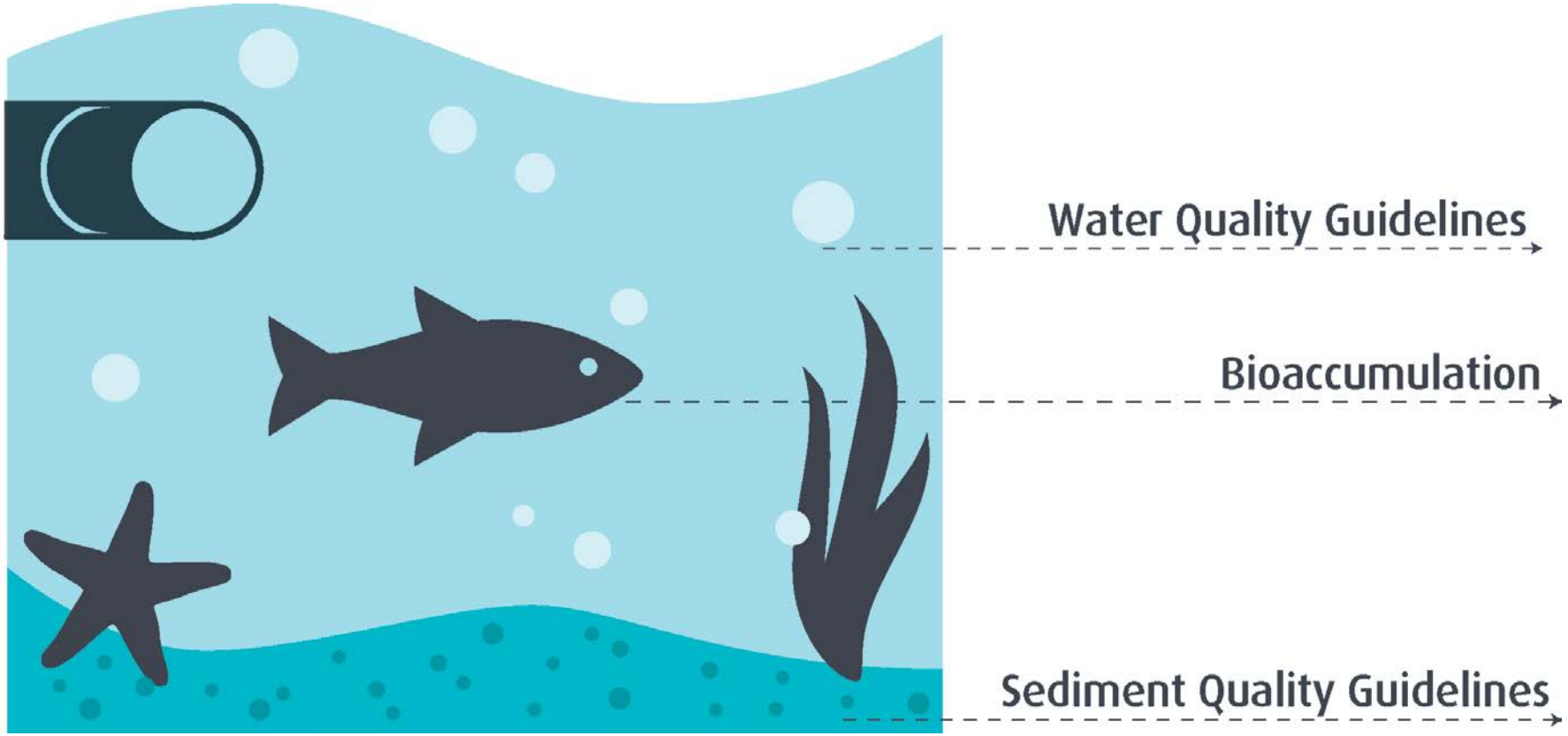
Any organic or inorganic solids suspended in water that are not considered dissolved (measuring < 2microns).

BOD (Biochemical Oxygen Demand) ☐

The amount of oxygen required to decompose organic matter (sewage) in a sample of water.

Why do we have to treat?

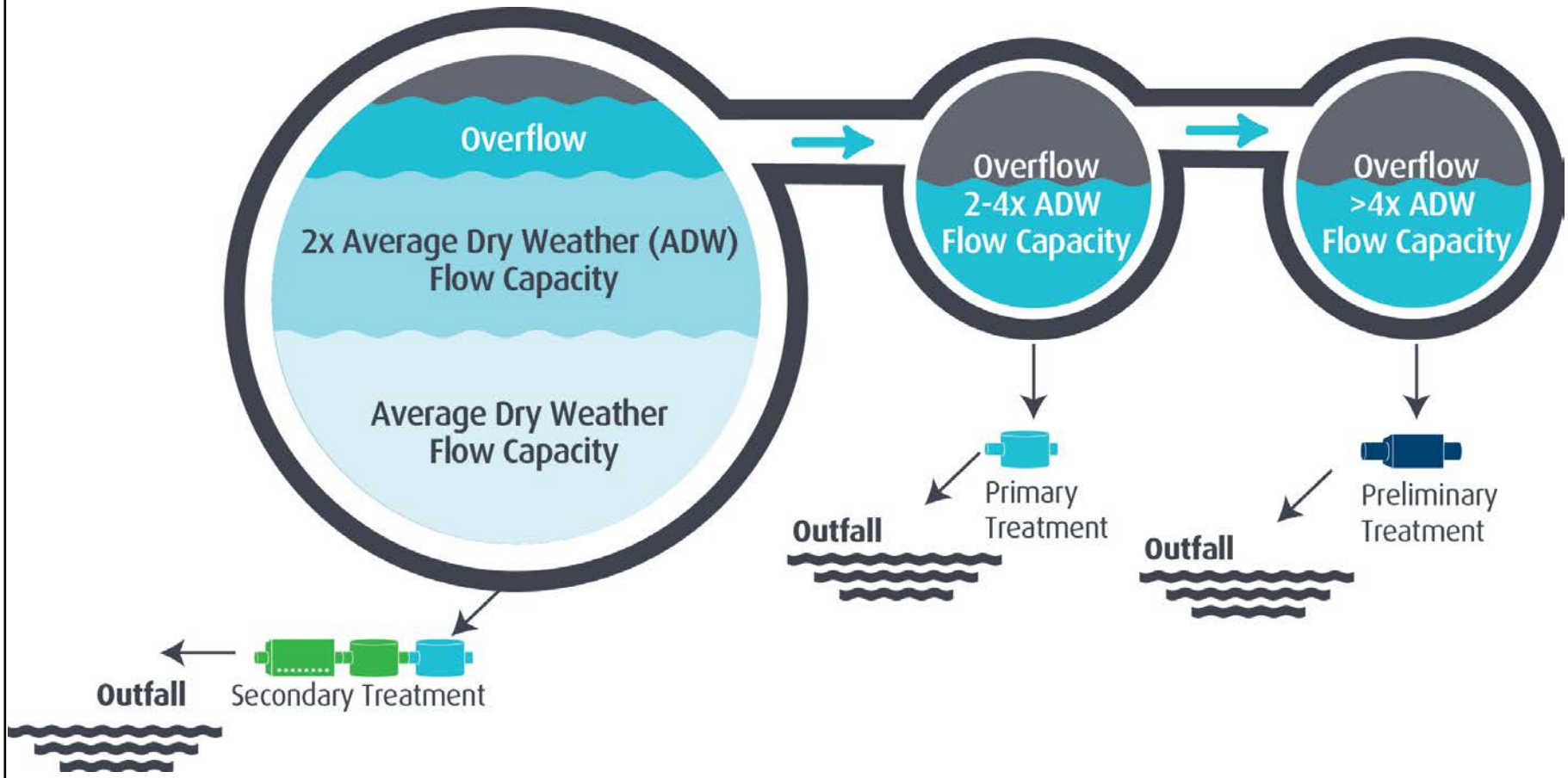
Threats to the Environment



Why do we have to treat?

Reducing Probability of Overflows

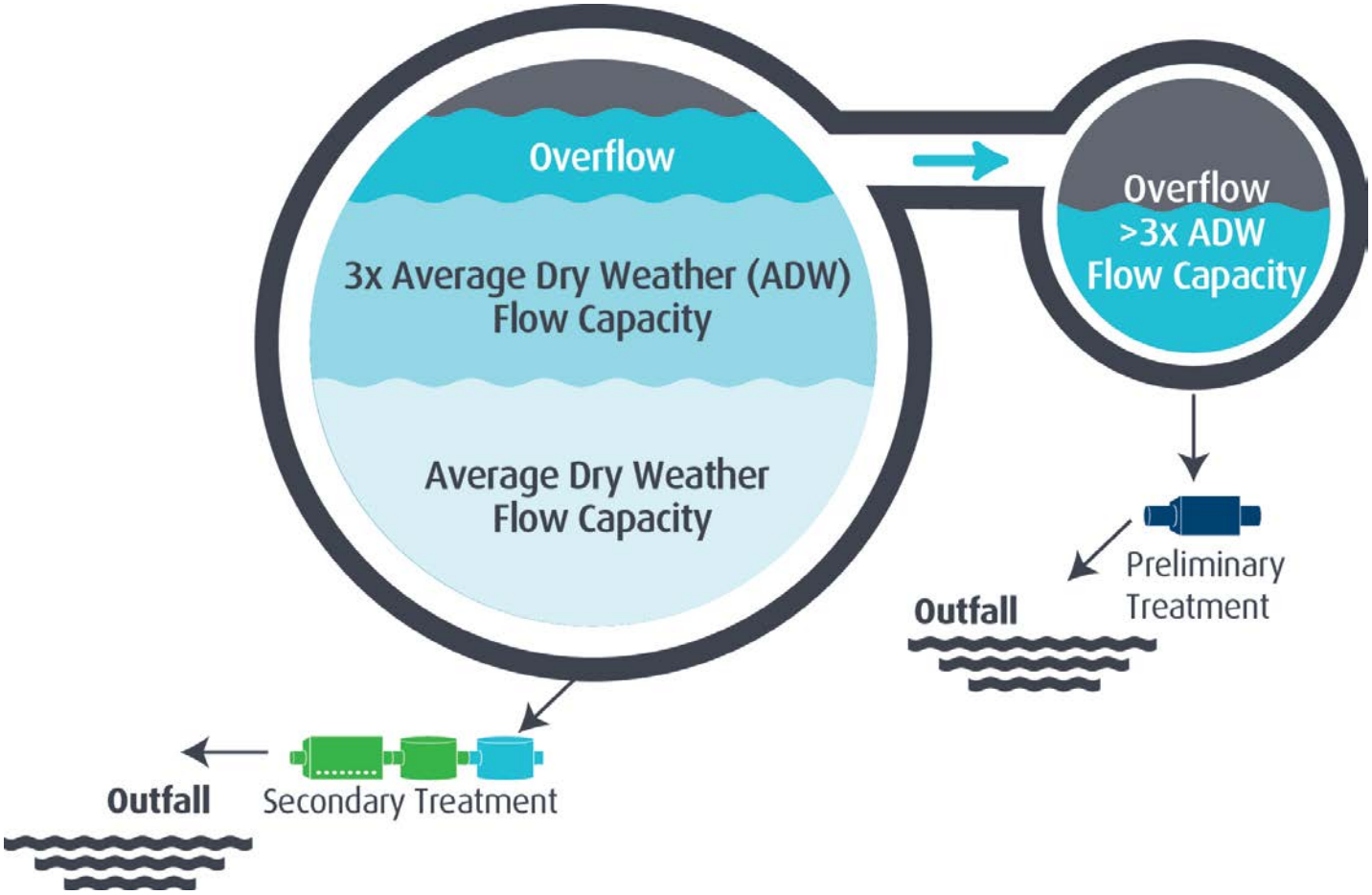
Macaulay Point Requirements



Why do we have to treat?

Reducing Probability of Overflows

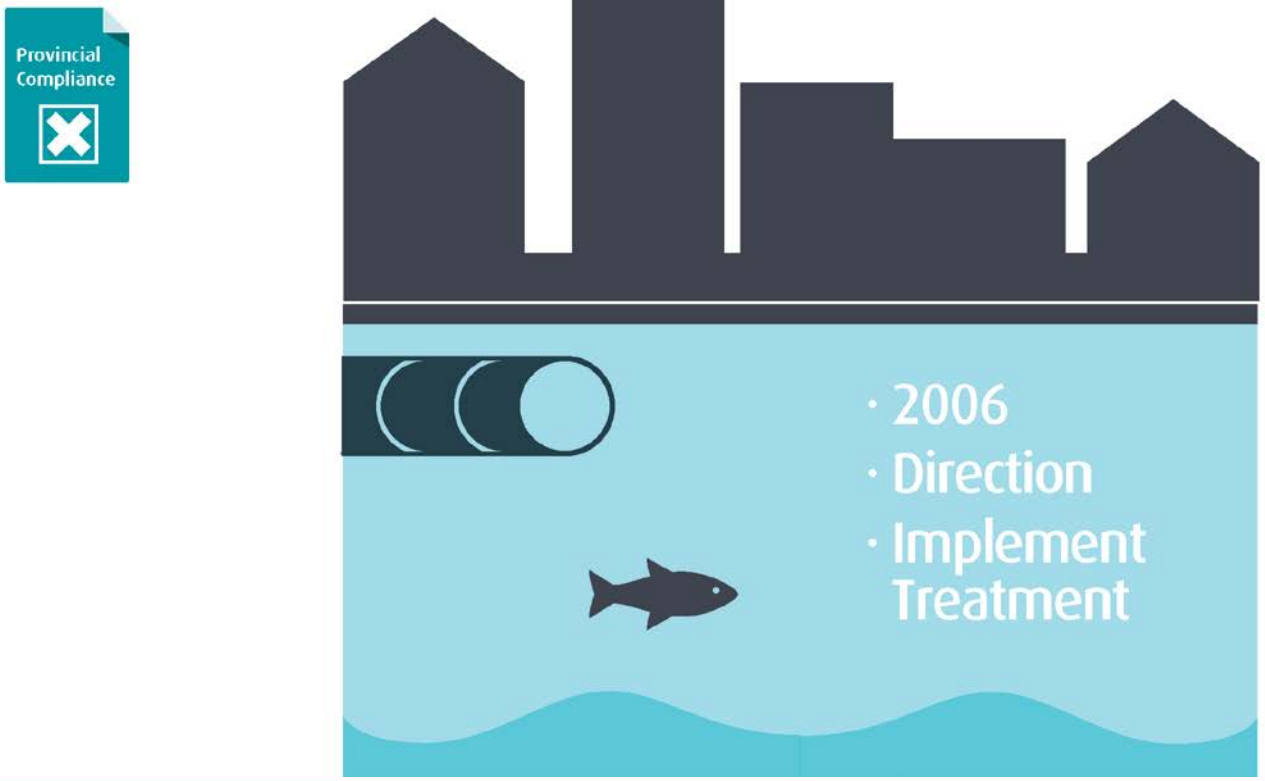
Clover Point Requirements



Why do we have to treat?

Regulatory Requirements

Provincial Evaluation

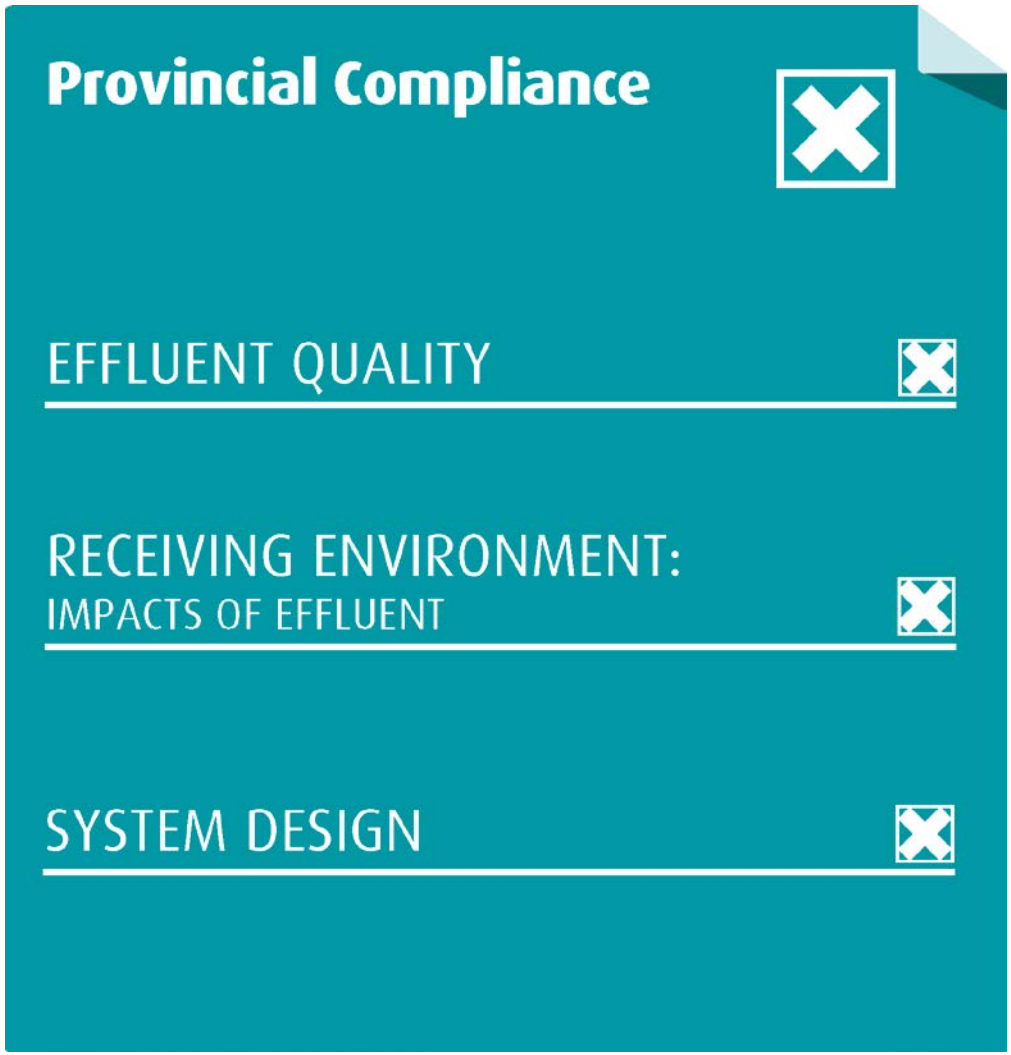


The Federal standard for effluent quality (TSS/BOD) currently **exceeds** the Provincial standard.

The Provincial direction to treat is based on exceedance of **environmental guidelines**.

Why do we have to treat?

Regulatory Requirements



Why do we have to treat?

Regulatory Requirements

Provincial Compliance

EFFLUENT QUALITY

- TSS (Total Suspended Solids) ≤45 mg/L
- BOD (Biochemical Oxygen Demand) ≤45 mg/L

RECEIVING ENVIRONMENT: IMPACTS OF EFFLUENT

- Edge of Initial Dilution Zone = Water Quality Guidelines
- Outside Dilution Zone = Sediment Quality Guidelines

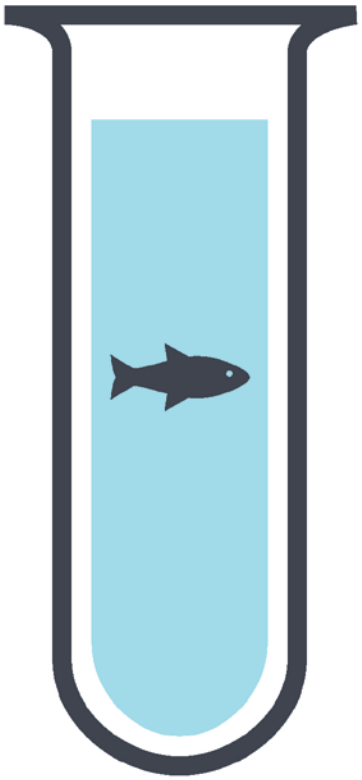
SYSTEM DESIGN

- Capacity: 2x Average Dry Weather (ADW) Flow requires Secondary Treatment *(3x at Macaulay)*
- Capacity: 2x-4x ADW Flow requires Primary Treatment
- Capacity: >4x ADW Flow requires Preliminary Treatment *(>3x at Macaulay)*

Why do we have to treat?

Regulatory Requirements

Federal Evaluation



- Federal Regulations: 3500 Facilities
- 3 levels of Risk: Low, Medium, High
- High Risk Discharge: 2020

Volume + Effluent Quality (TSS/BOD) = HIGH RISK

Why do we have to treat?

Regulatory Requirements

Federal Compliance

EFFLUENT QUALITY

TSS (Total Suspended Solids) ≤25 mg/L	☒
BOD (Biochemical Oxygen Demand) ≤25 mg/L	☒
Un-ionized Amonia concentrations <1.25 mg/L	☑
Acute Toxicity to Fish Results >100%	☒

Why do we have to treat?

Questions?

Planning for Treatment

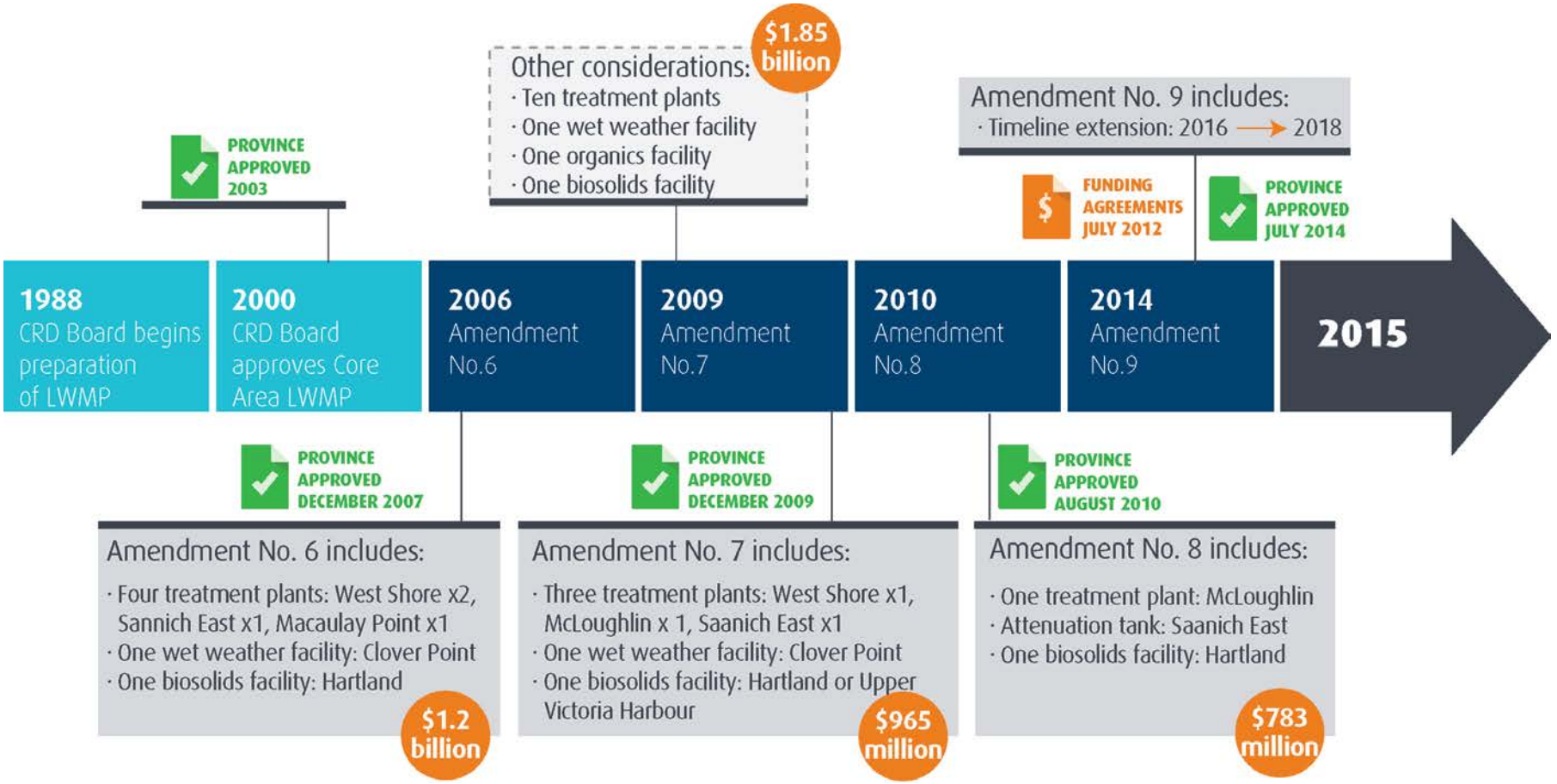
Planning for Treatment

- What is a liquid waste management plan?
  - community-specific solutions for wastewater management
  - approved by the Province (Minister of Environment)

- The Core Area Liquid Waste Management Plan:
  - 25-year plan, Approved
  - wastewater management strategies, including treatment
  - includes treatment system configuration, biosolids management, costs and implementation schedule

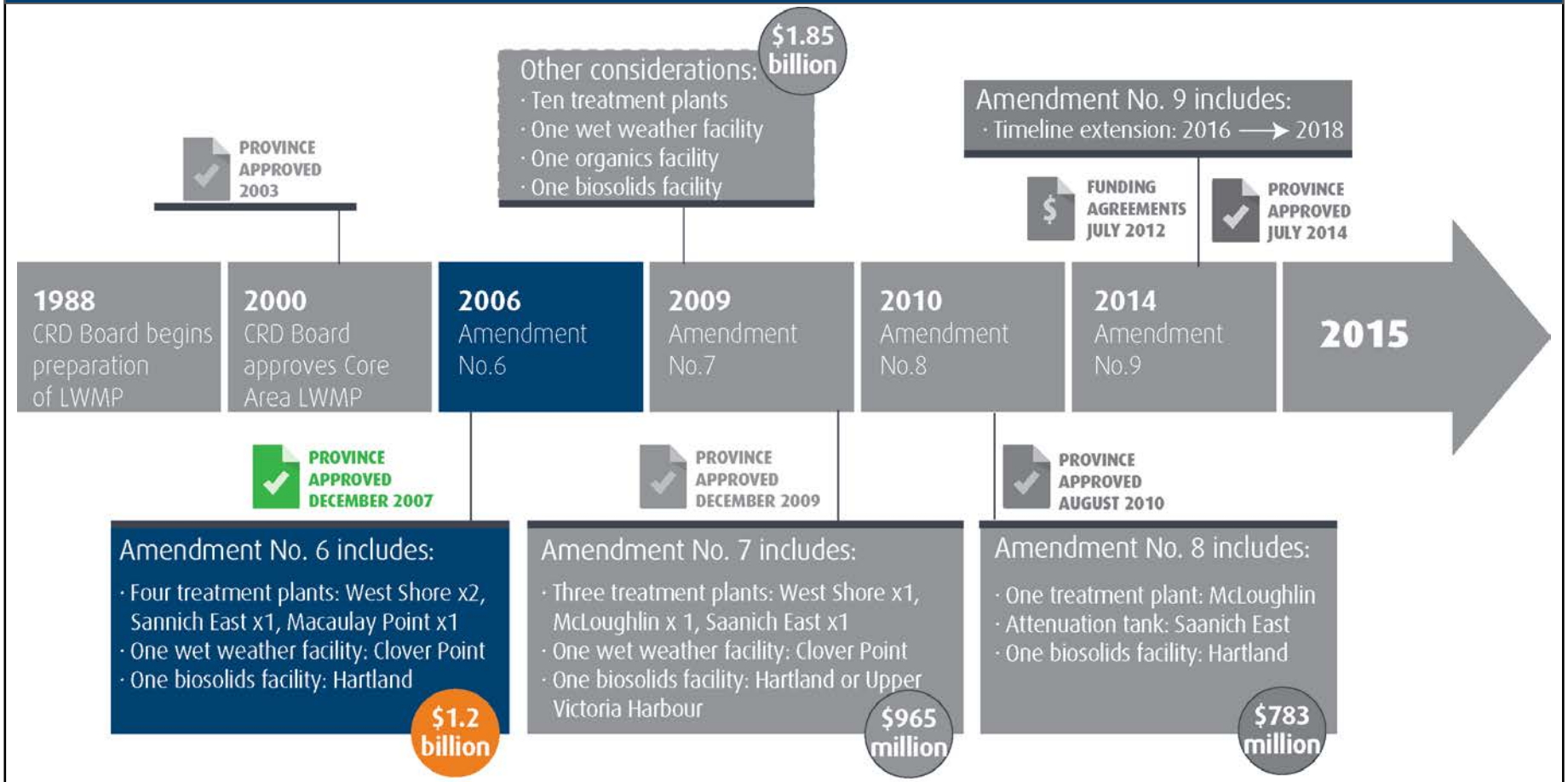
Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan



Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan

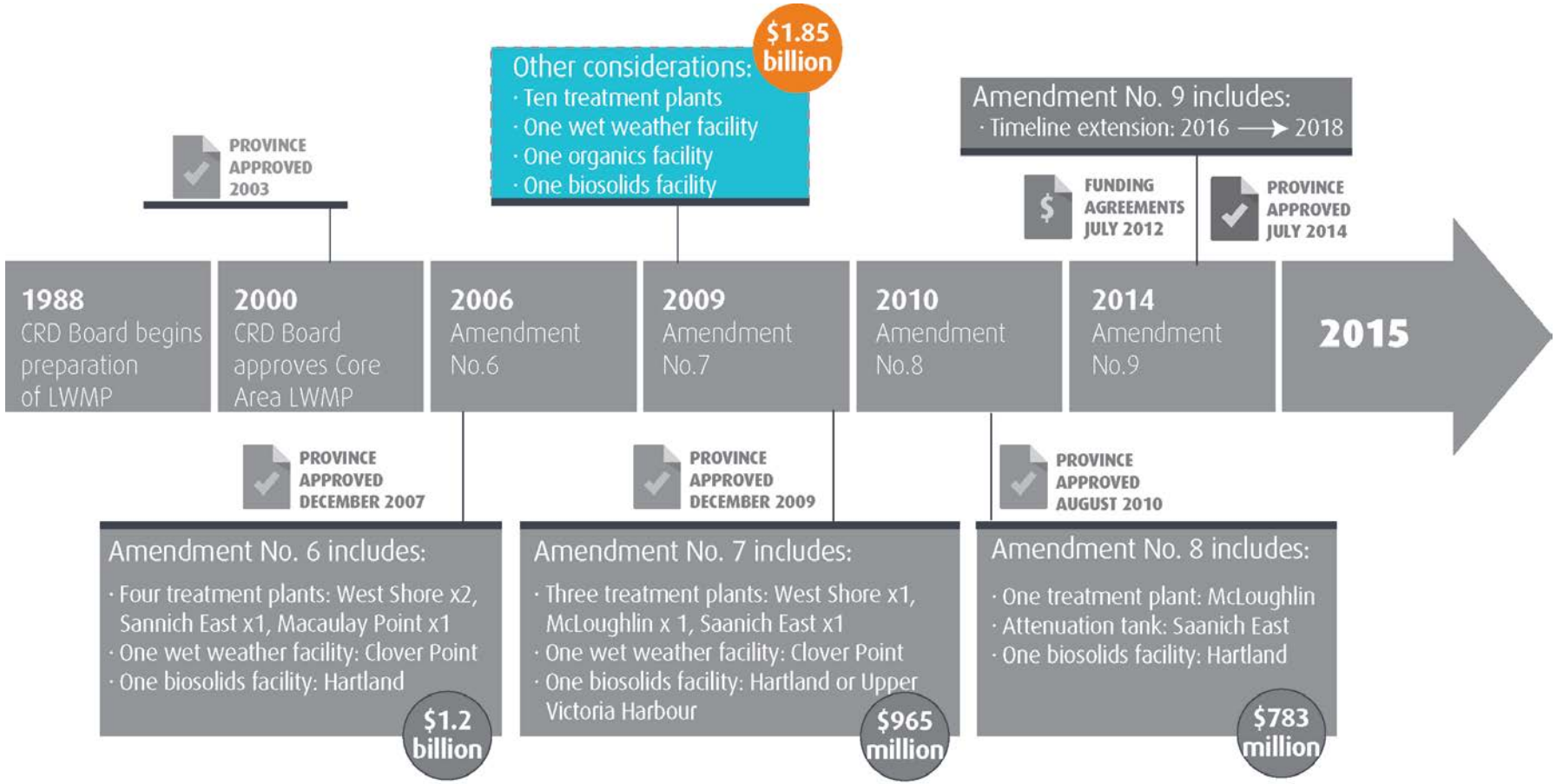


Planning for Treatment

Amendment 6 – Facilities: 4 Treatment, 1 Wet Weather, 1 Biosolids

Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan

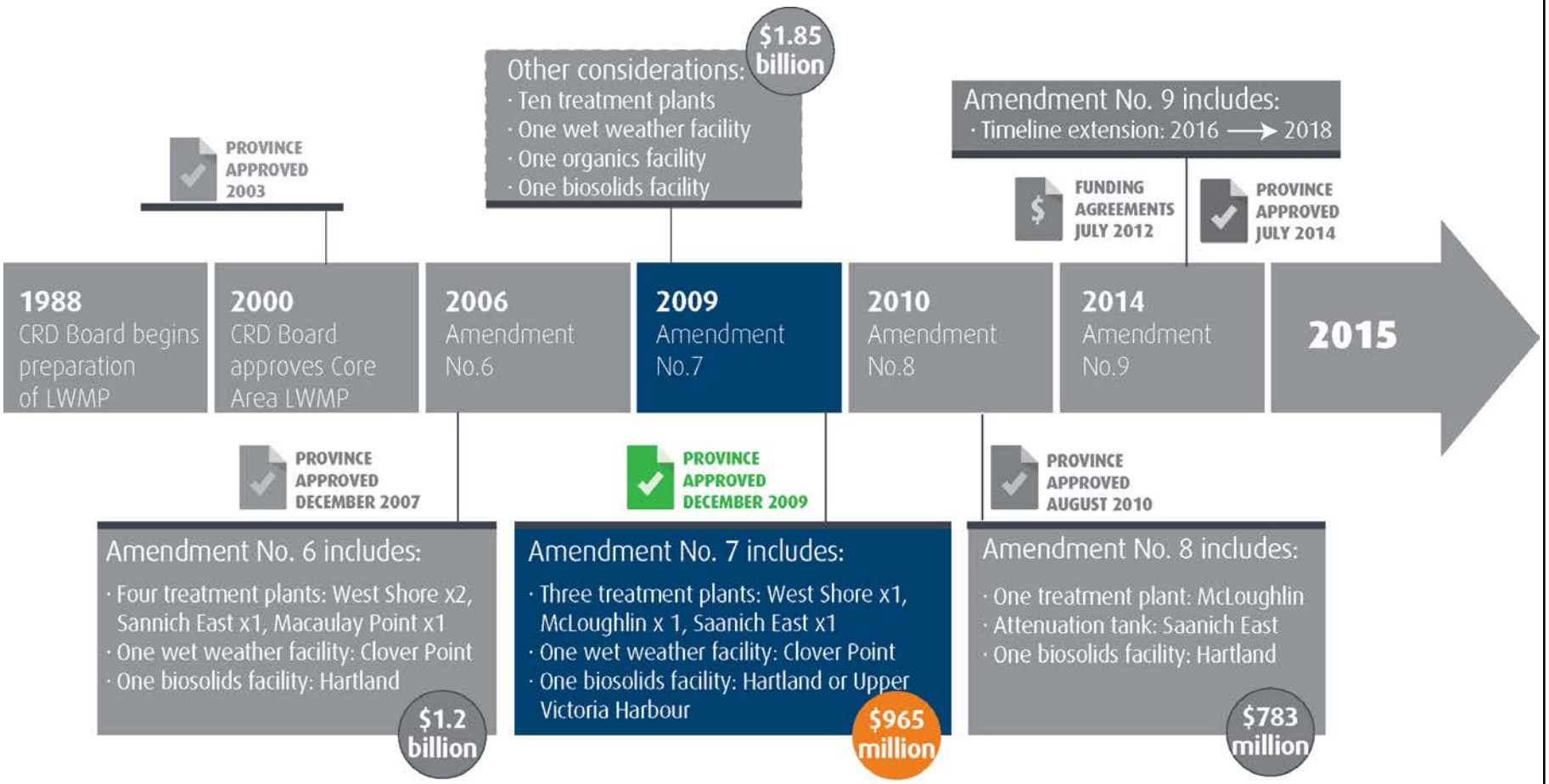


Planning for Treatment

Other Considerations – Facilities: 10 Treatment, 1 Wet Weather, 1 Organics, 1 Biosolids

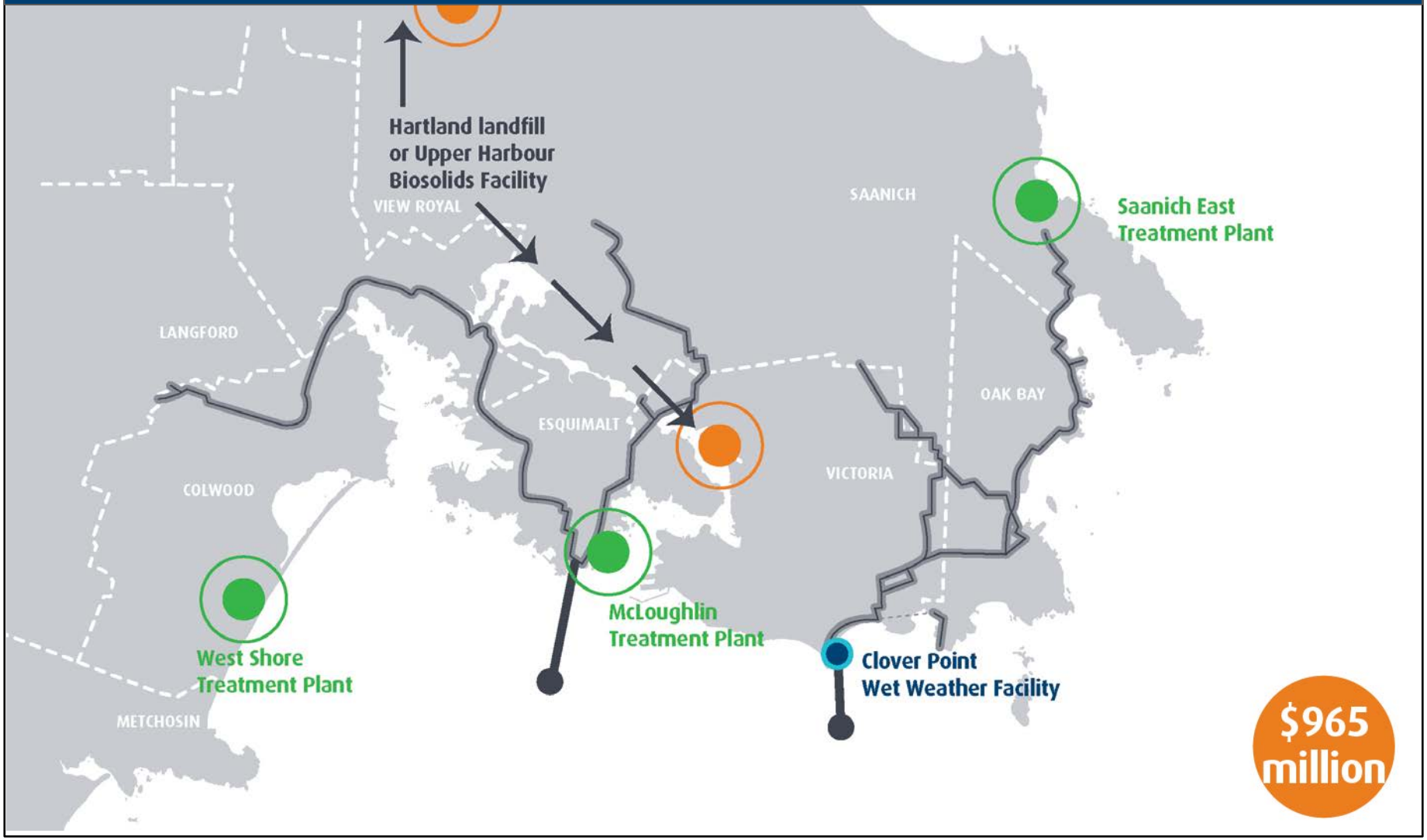
Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan



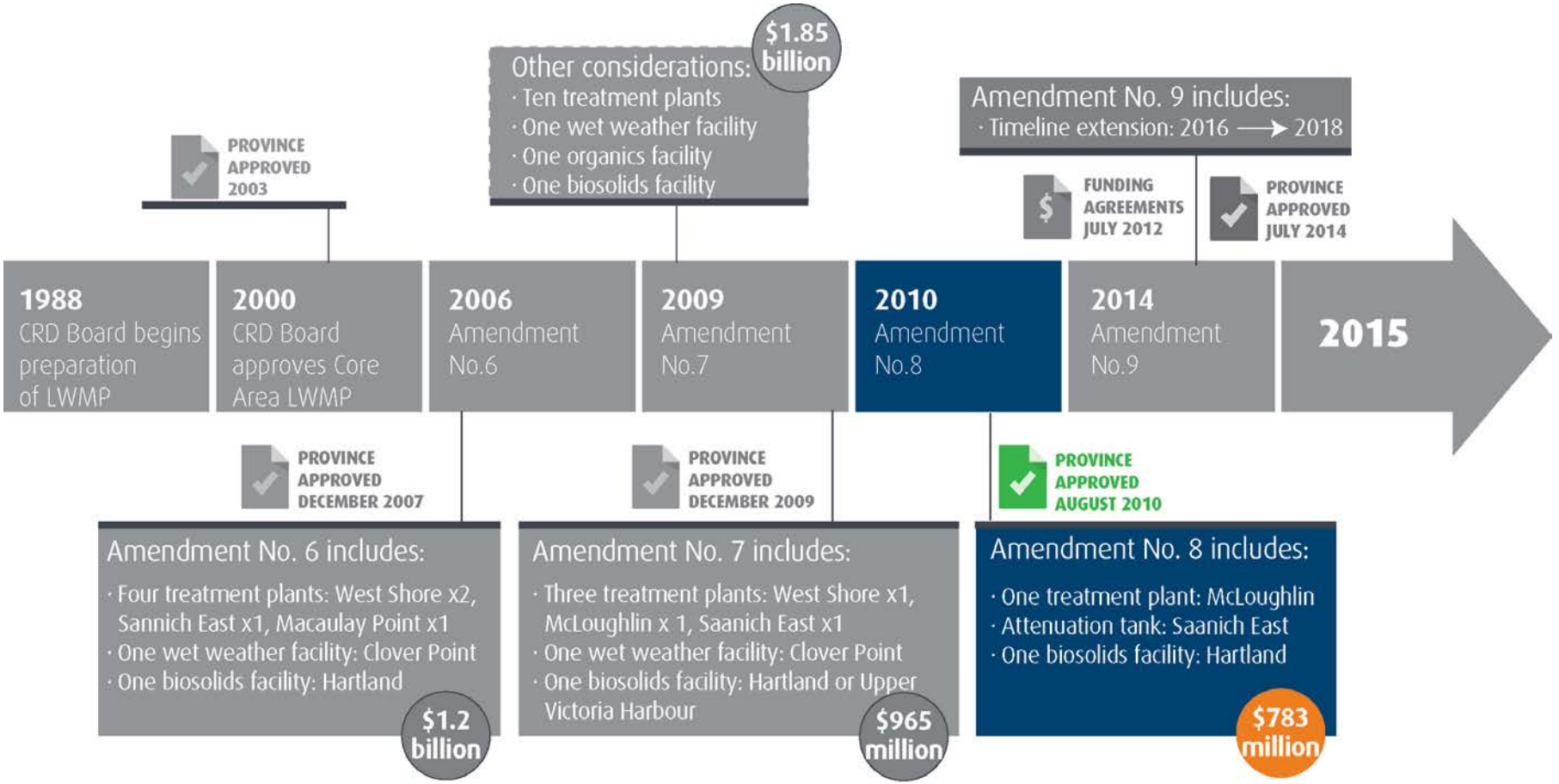
Planning for Treatment

Amendment 7 – Facilities: 3 Treatment, 1 Wet Weather, 1 Biosolids



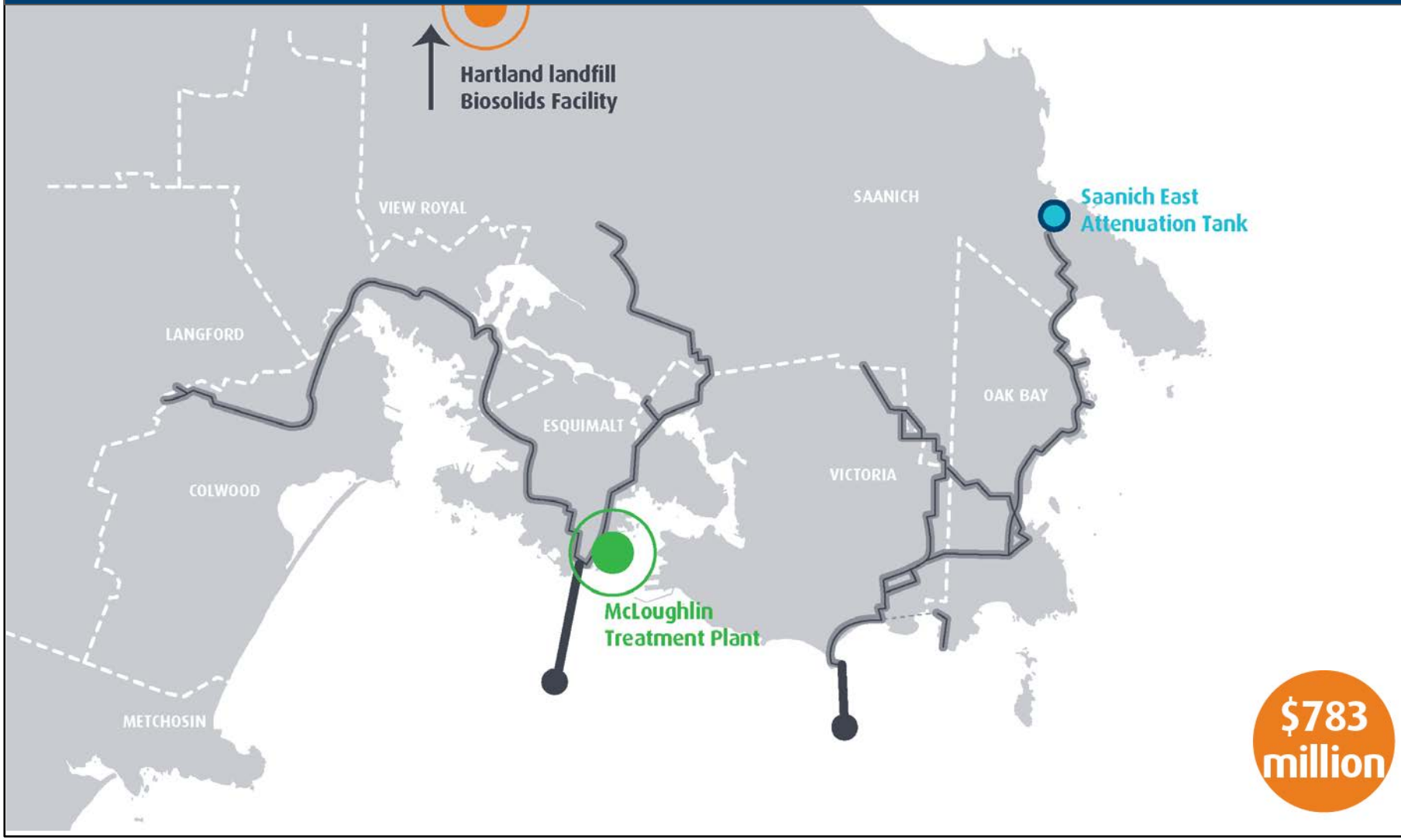
Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan



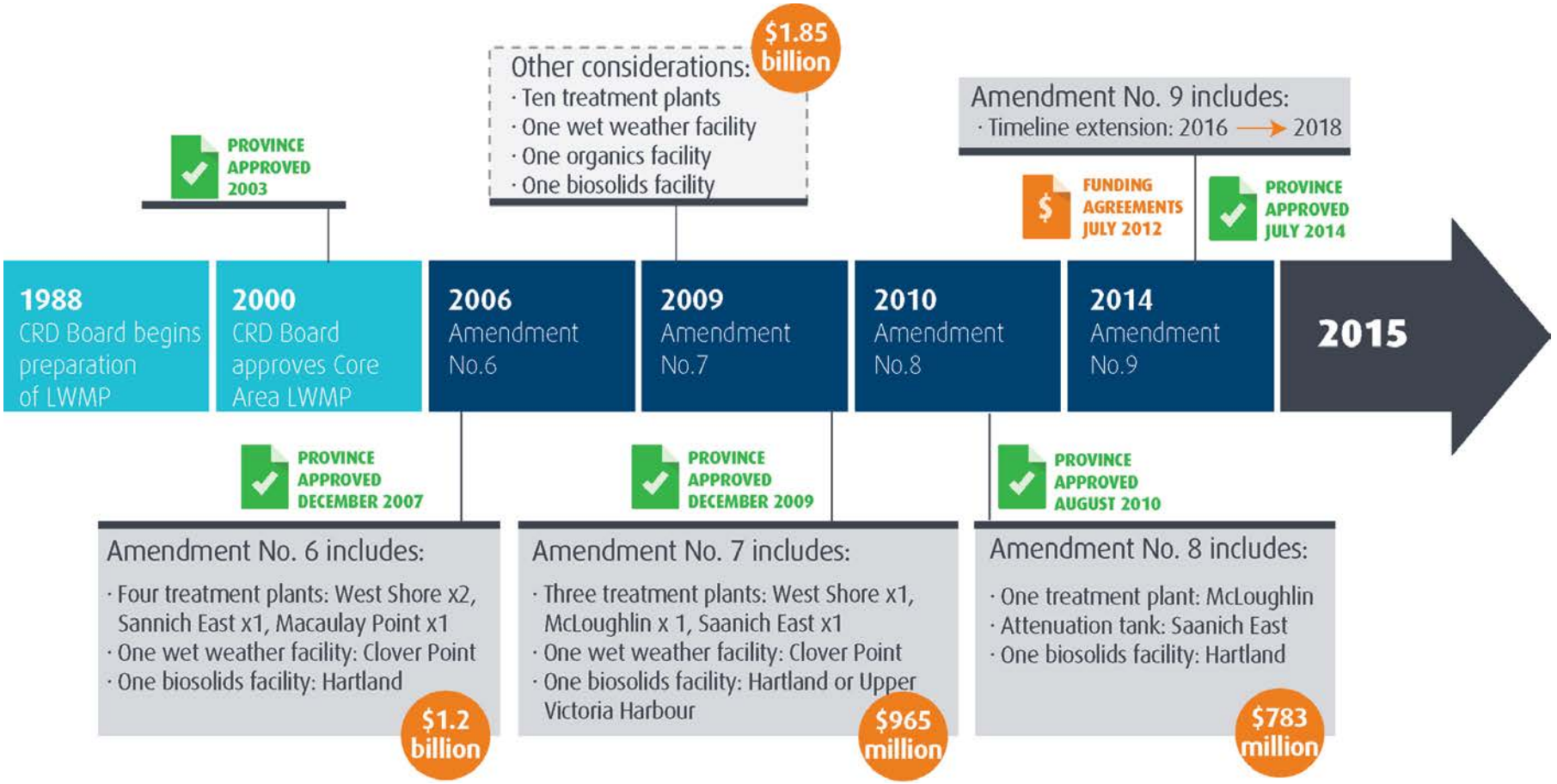
Planning for Treatment

Amendment 8– Facilities: 1 Treatment, 1 Attenuation Tank, 1 Biosolids



Planning for Treatment

Refinement of the Core Area Liquid Waste Management Plan

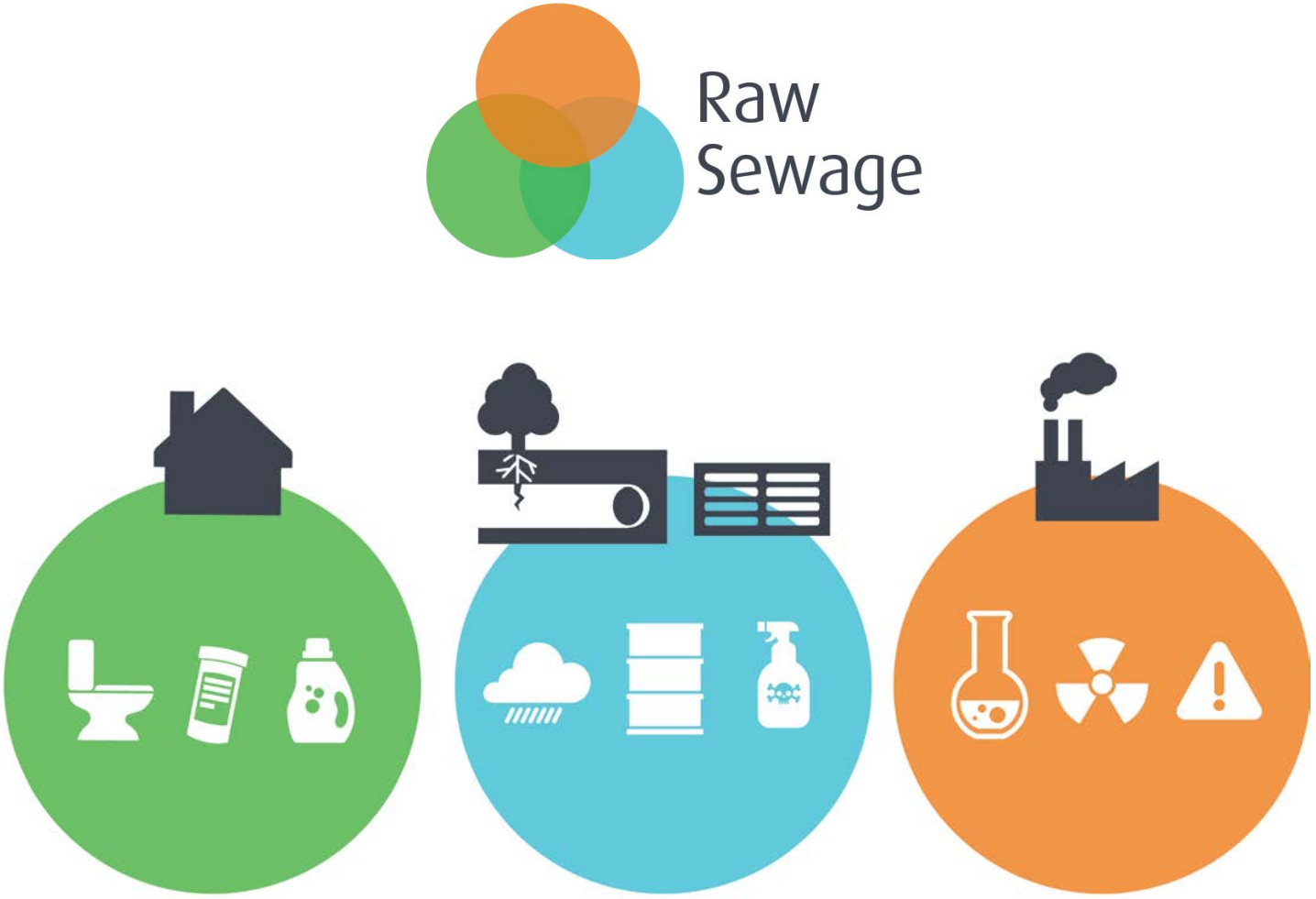


Questions?

What is treatment?

What is treatment?

What is wastewater?



What is treatment?

Source Control

What is treatment?

Source Control

Industry Sectors
CODES OF PRACTICE & INSPECTIONS:

- Food Services
- Dry Cleaning
- Dentists
- Photographic Imaging
- Automotive repair
- Vehicle Wash
- Carpet Cleaning
- Fermentation
- Printing
- Laboratories
- Recreation Facilities

1200+ inspections per year

Industry Contaminants
BEST PRACTICES & ENFORCEMENT:

97% compliance rate

- arsenic
- chromium
- copper
- lead
- mercury
- nickel (Ni)
- silver (Ag)
- zinc (Zn)

and many more...

Household Contaminants
EDUCATION & OUTREACH:

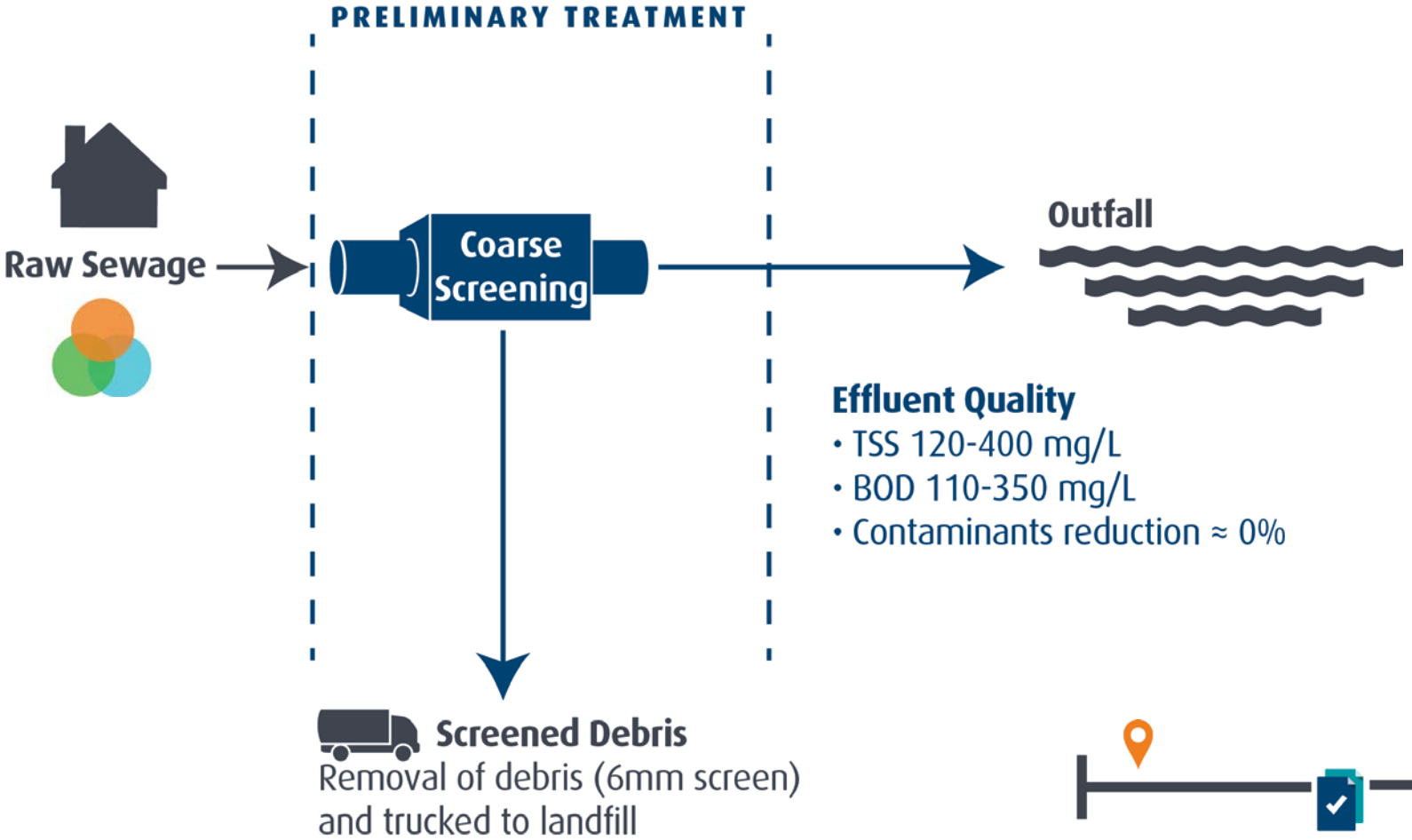
33% increase in Medication Returns

- Surfactants
- Fats
- Oils
- Grease
- Pharmaceuticals
- Hazardous Wastes

What is treatment?

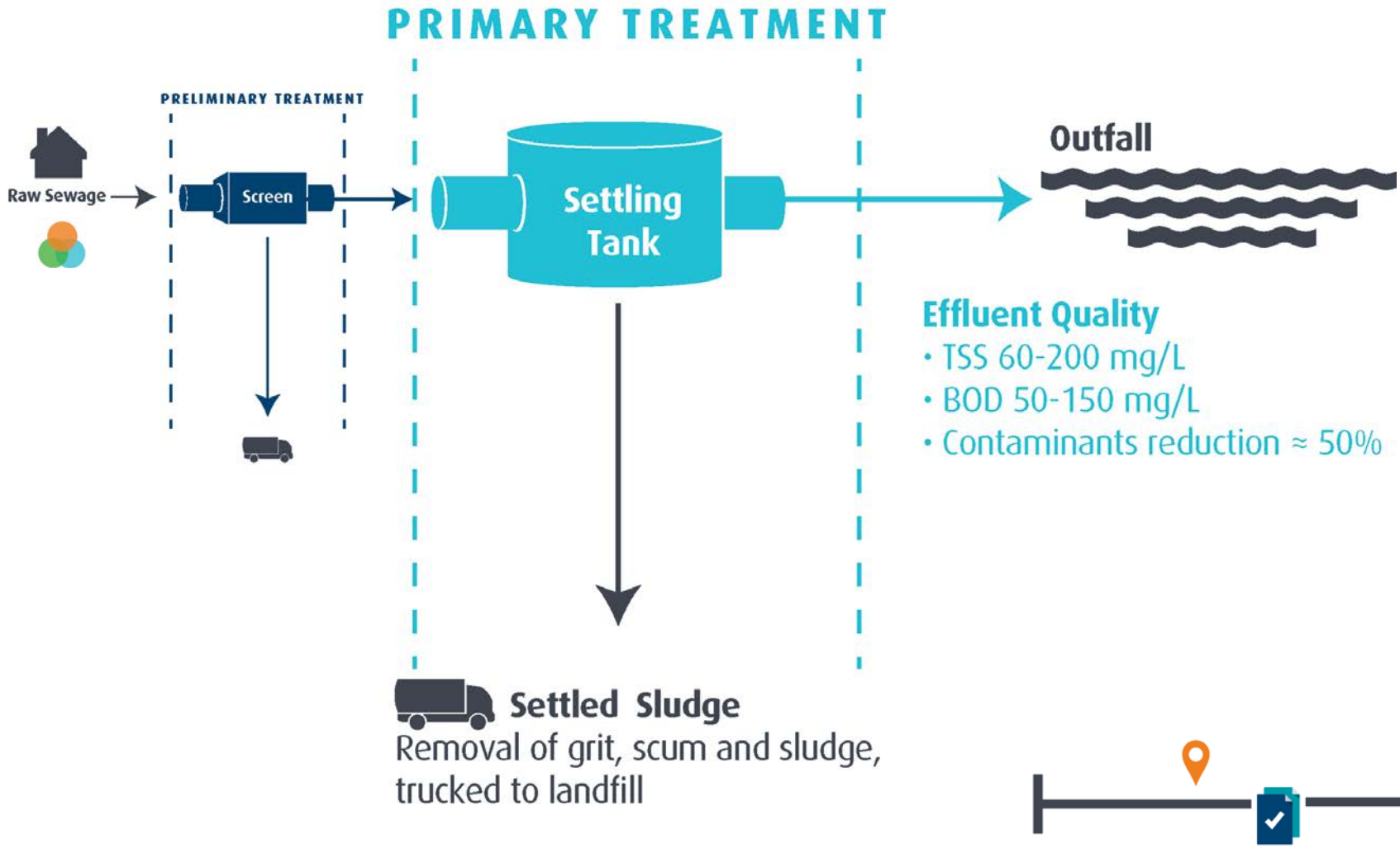
Preliminary Treatment

Examples: *Macaulay Point, Clover Point*



What is treatment?

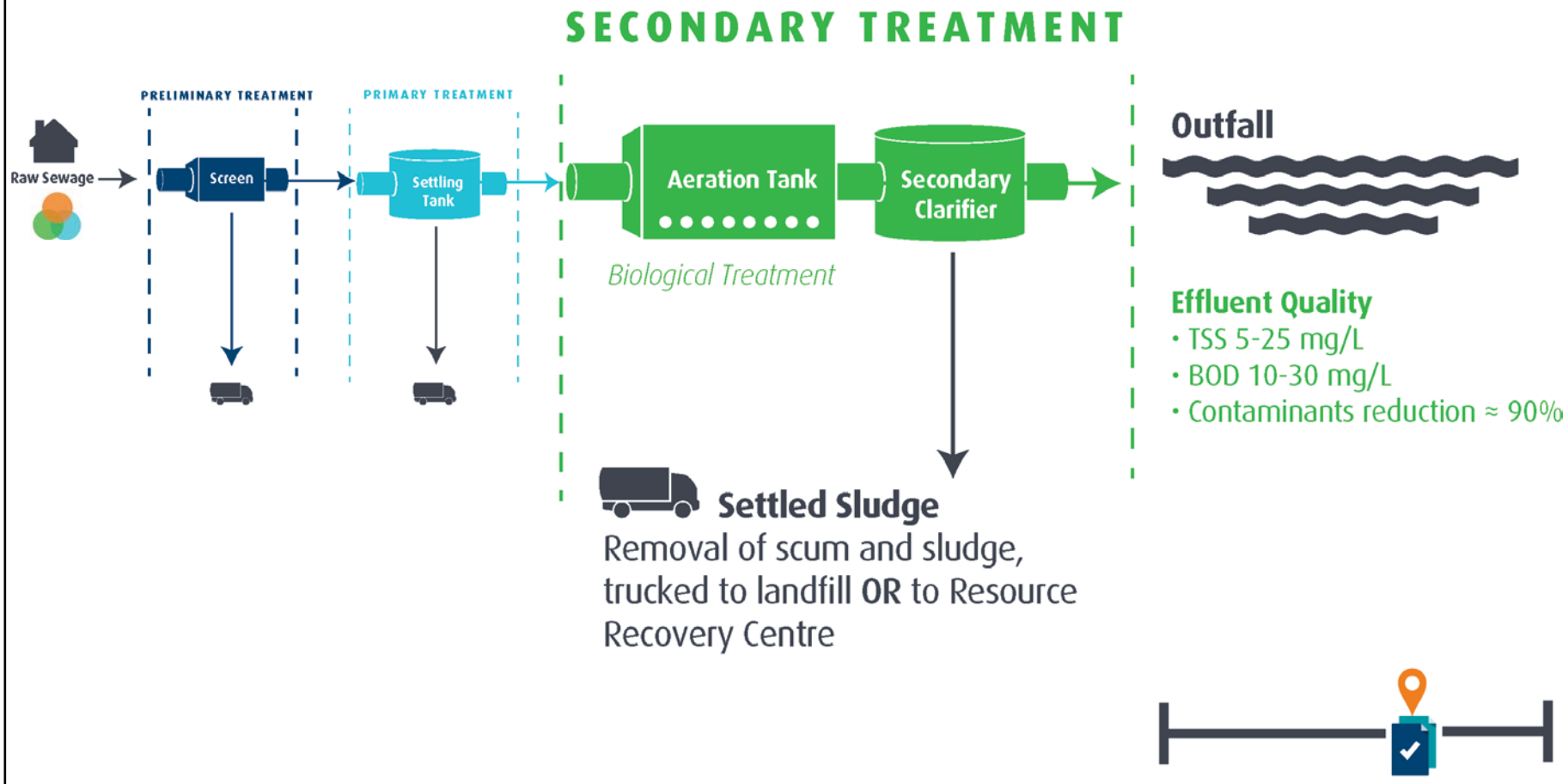
Primary Treatment



What is treatment?

Secondary Treatment

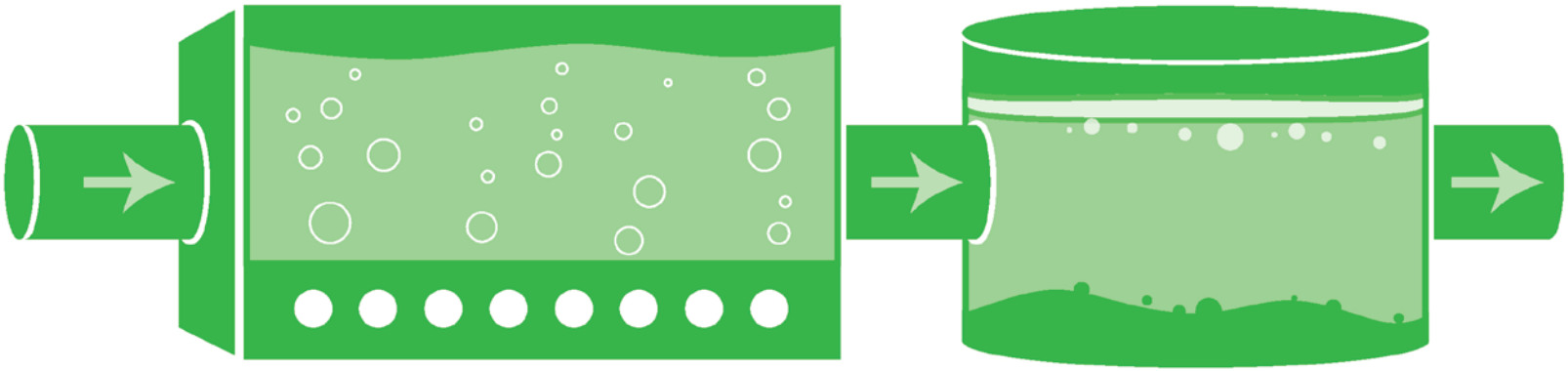
Example: *Saanich Peninsula Wastewater Treatment Plant*



What is treatment?

Secondary Treatment

Example: *Saanich Peninsula Wastewater Treatment Plant*

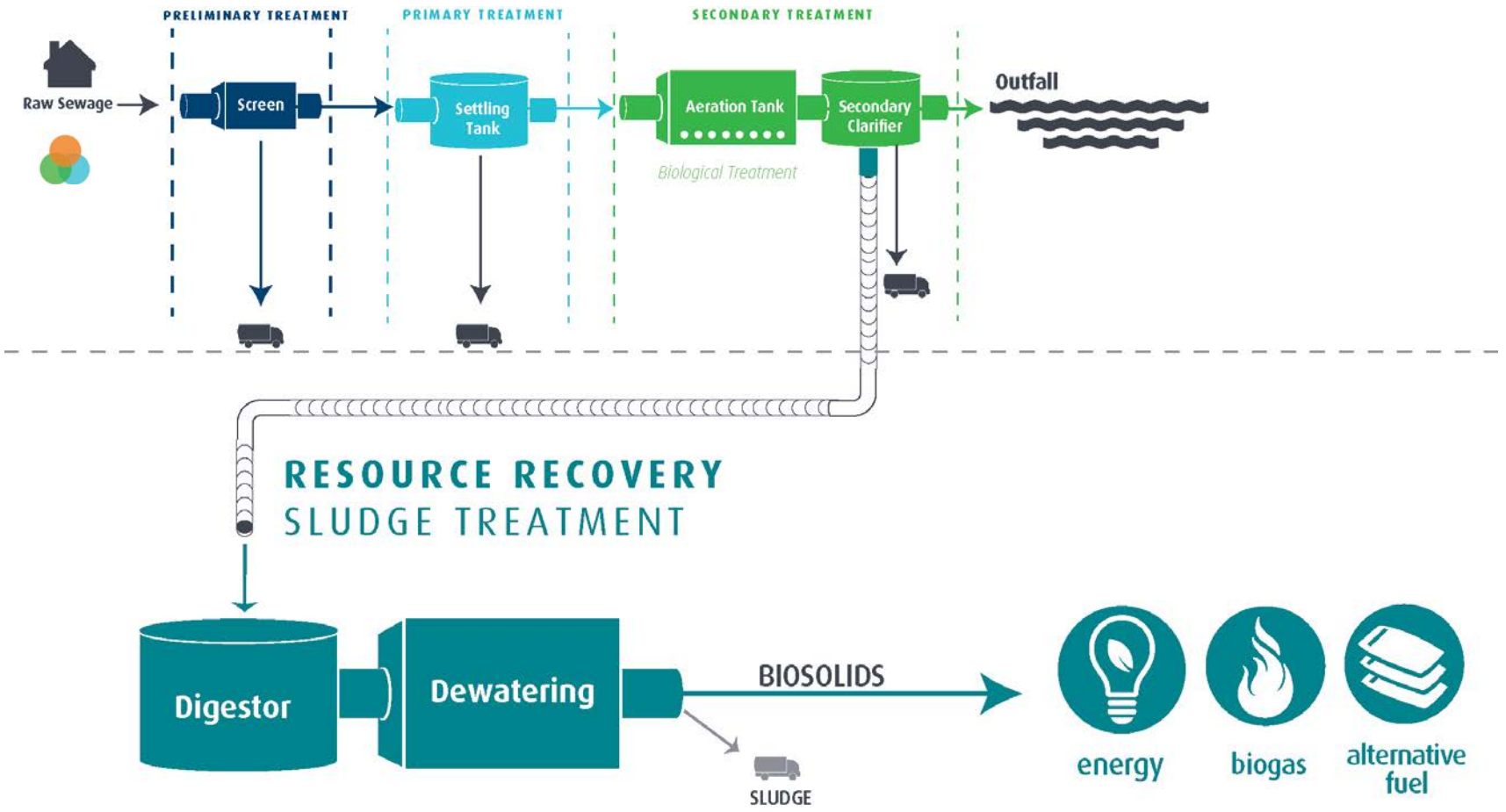


Aeration Tank

Secondary Clarifier

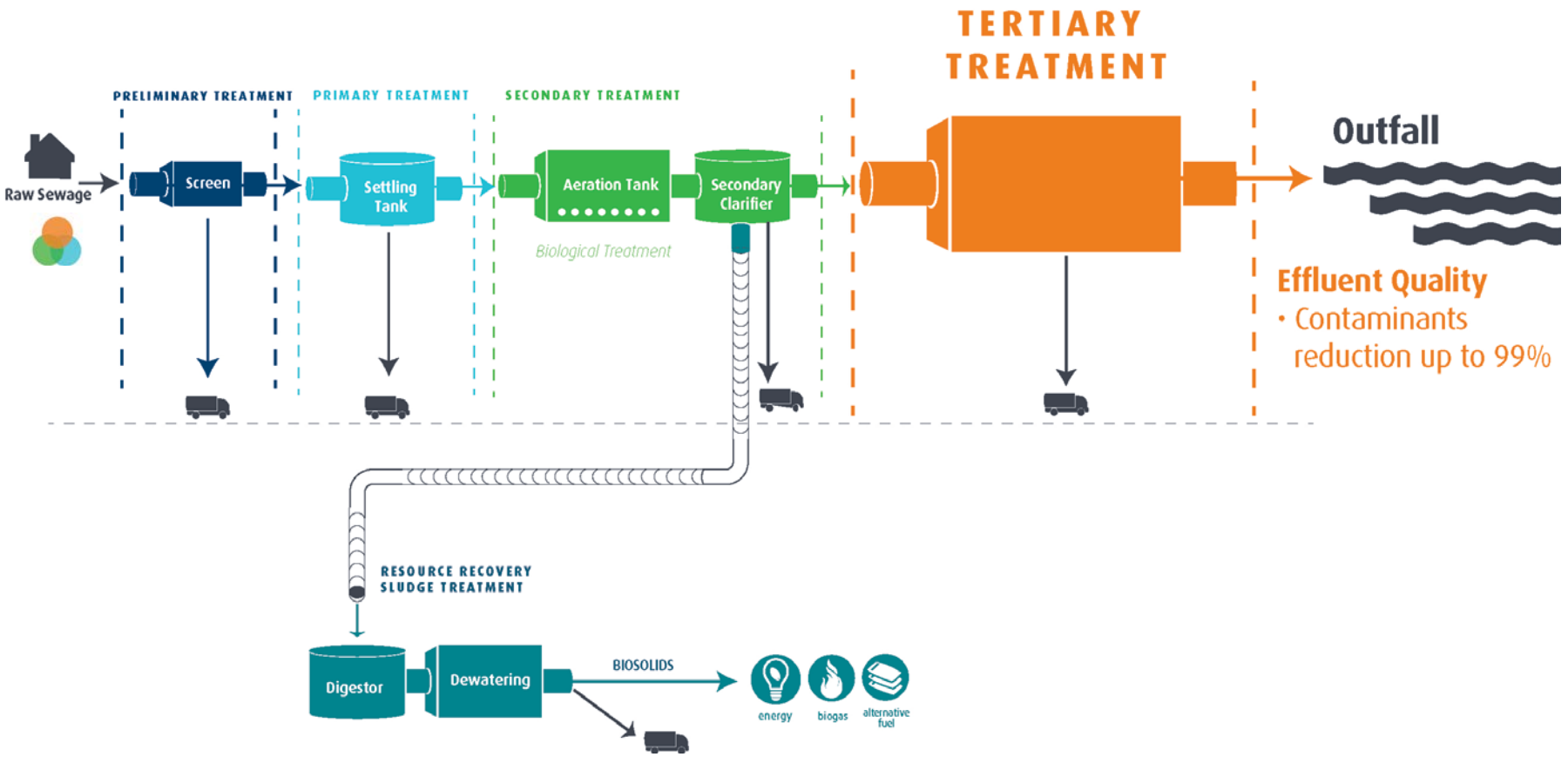
What is treatment?

Biosolids (Resource Recovery)



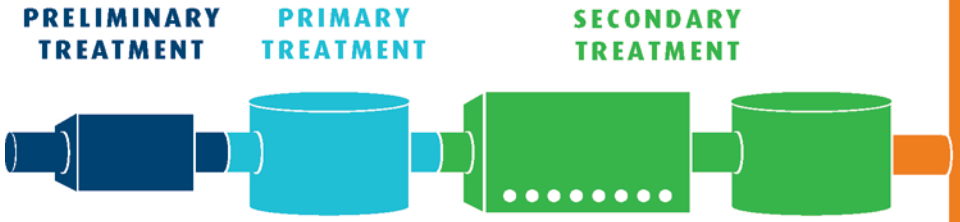
What is treatment?

Tertiary Treatment



What is treatment?

Tertiary Treatment



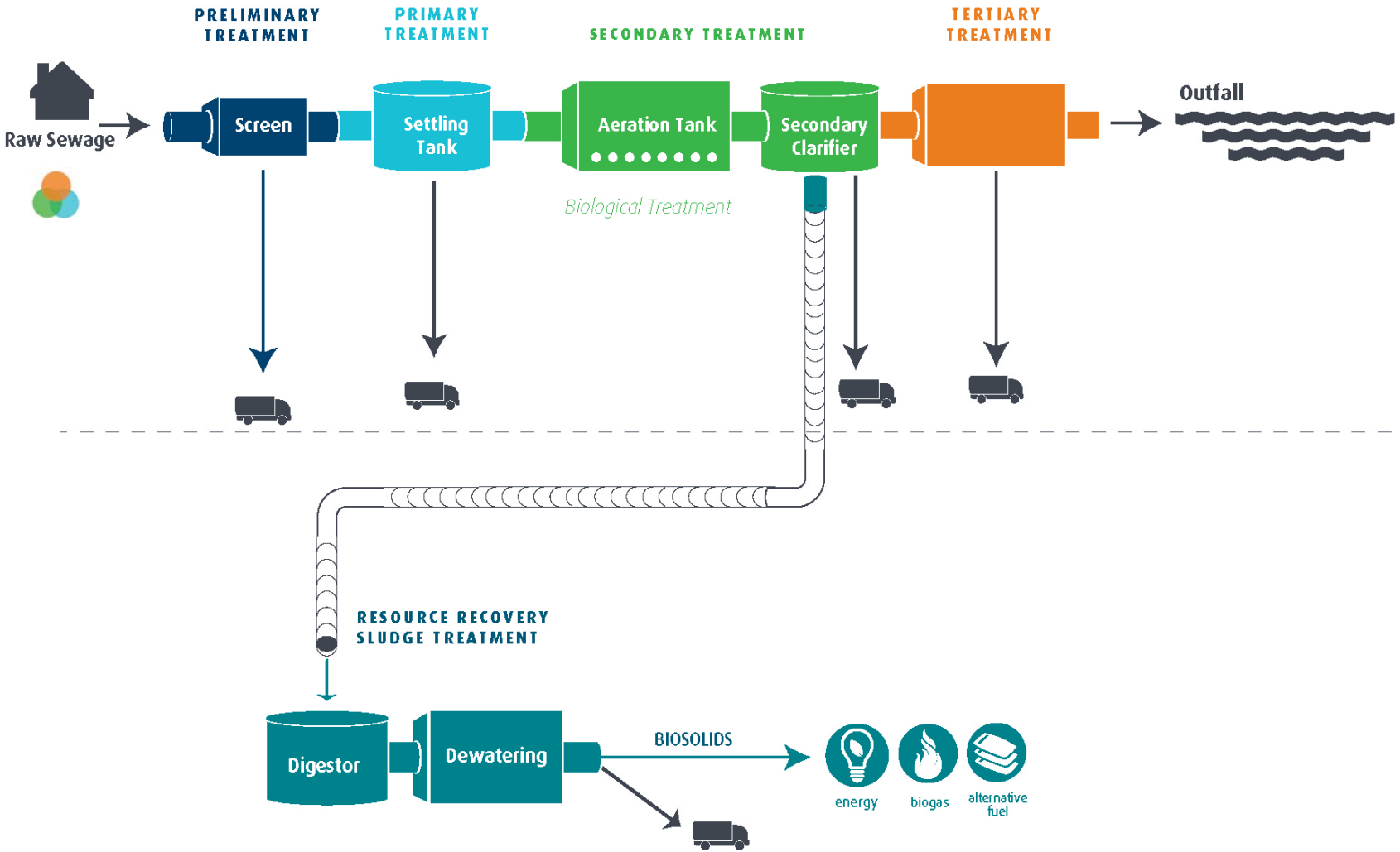
Tertiary treatment is all further treatments (beyond secondary) required for any use of effluent beyond discharge at an outflow.

Nitrogen Removal
Filtration
Reverse Osmosis
Disinfection
Activated Carbon
Reclamation
Phosphorus Removal
Chlorination
Eutrophication
Ozonation
Advanced Oxidization
Chemical Precipitation
Denitrification

TERTIARY

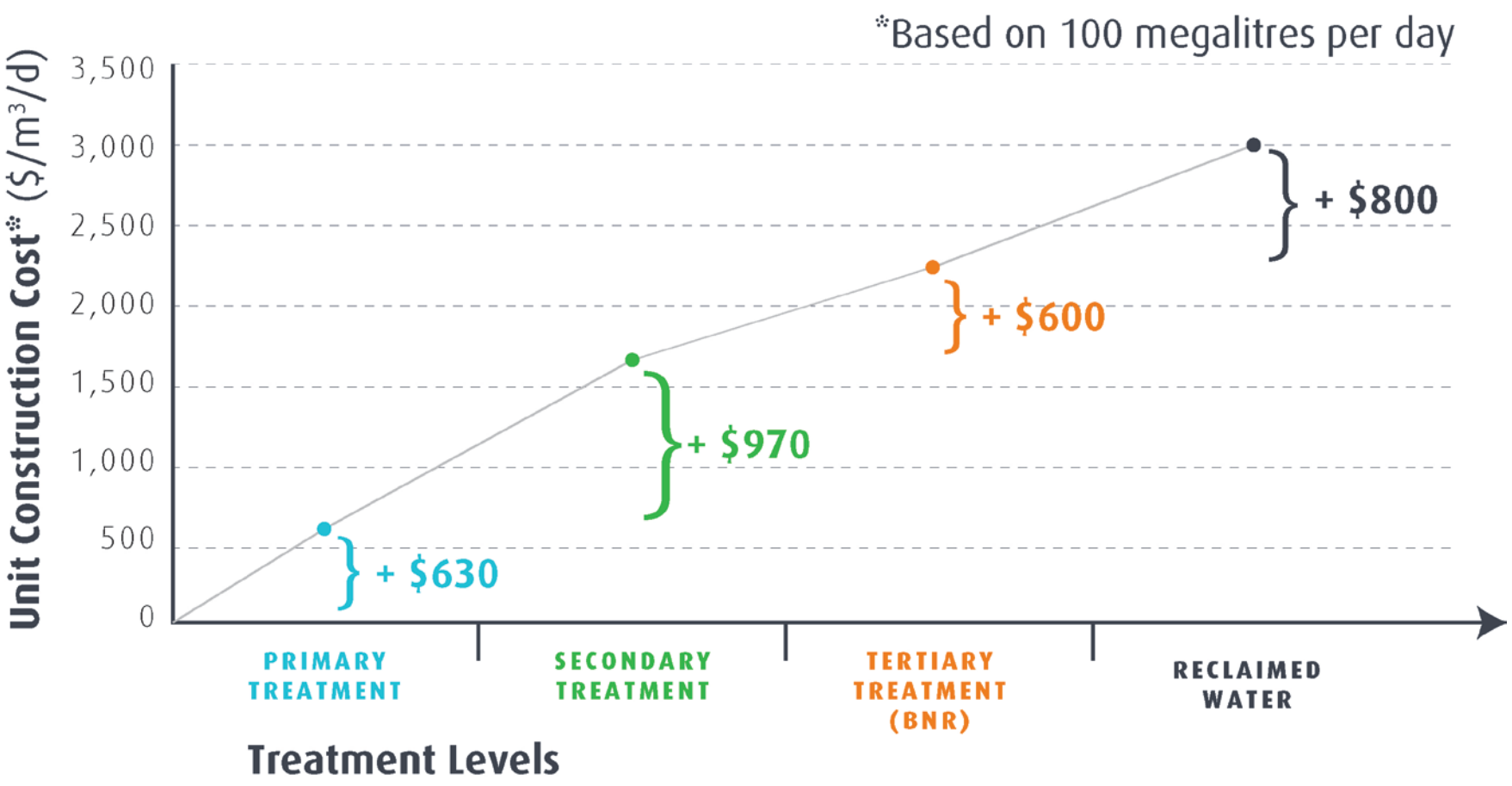
What is treatment?

Wastewater Treatment



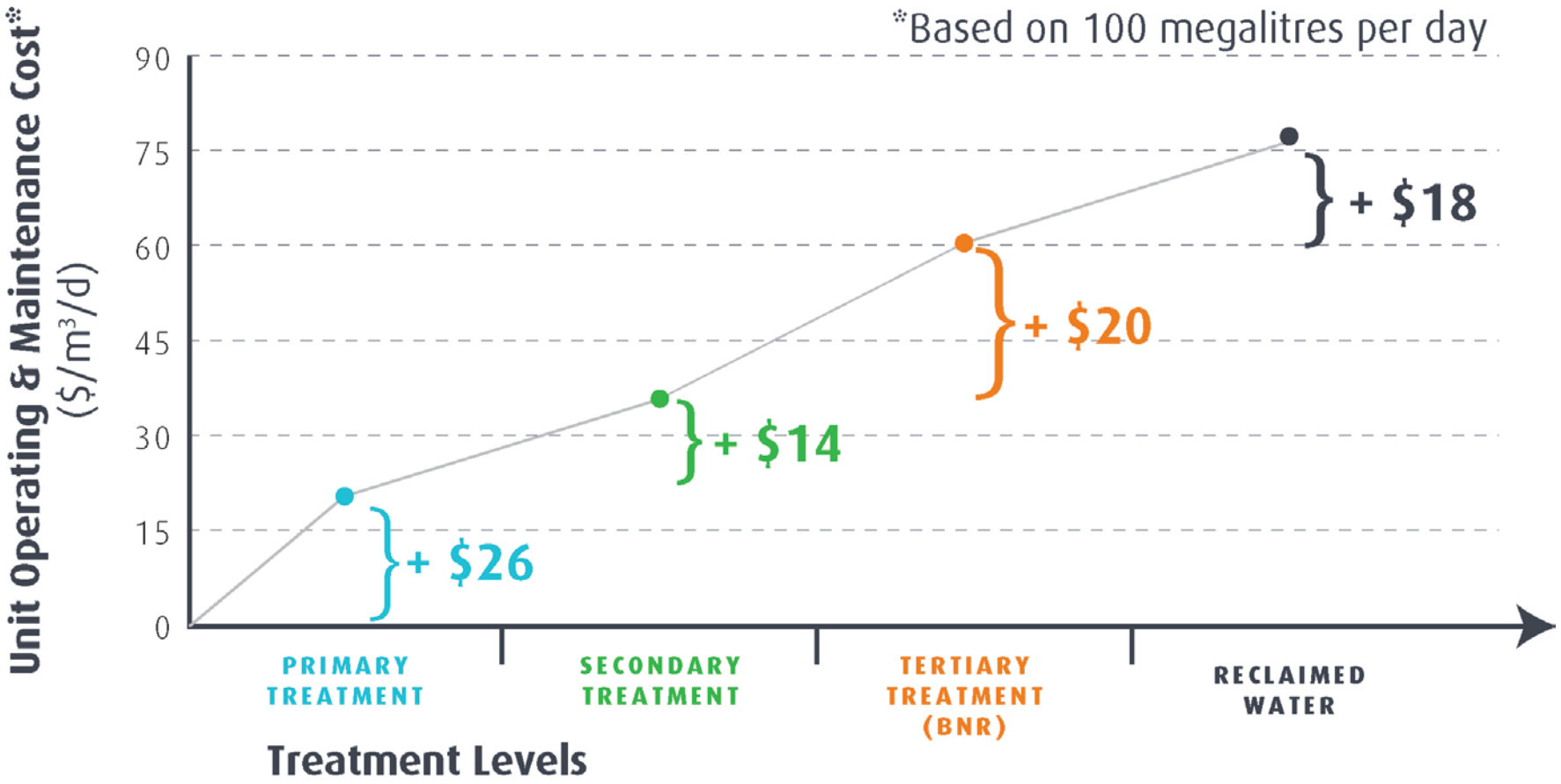
What is treatment?

Cost of Construction by Treatment Level



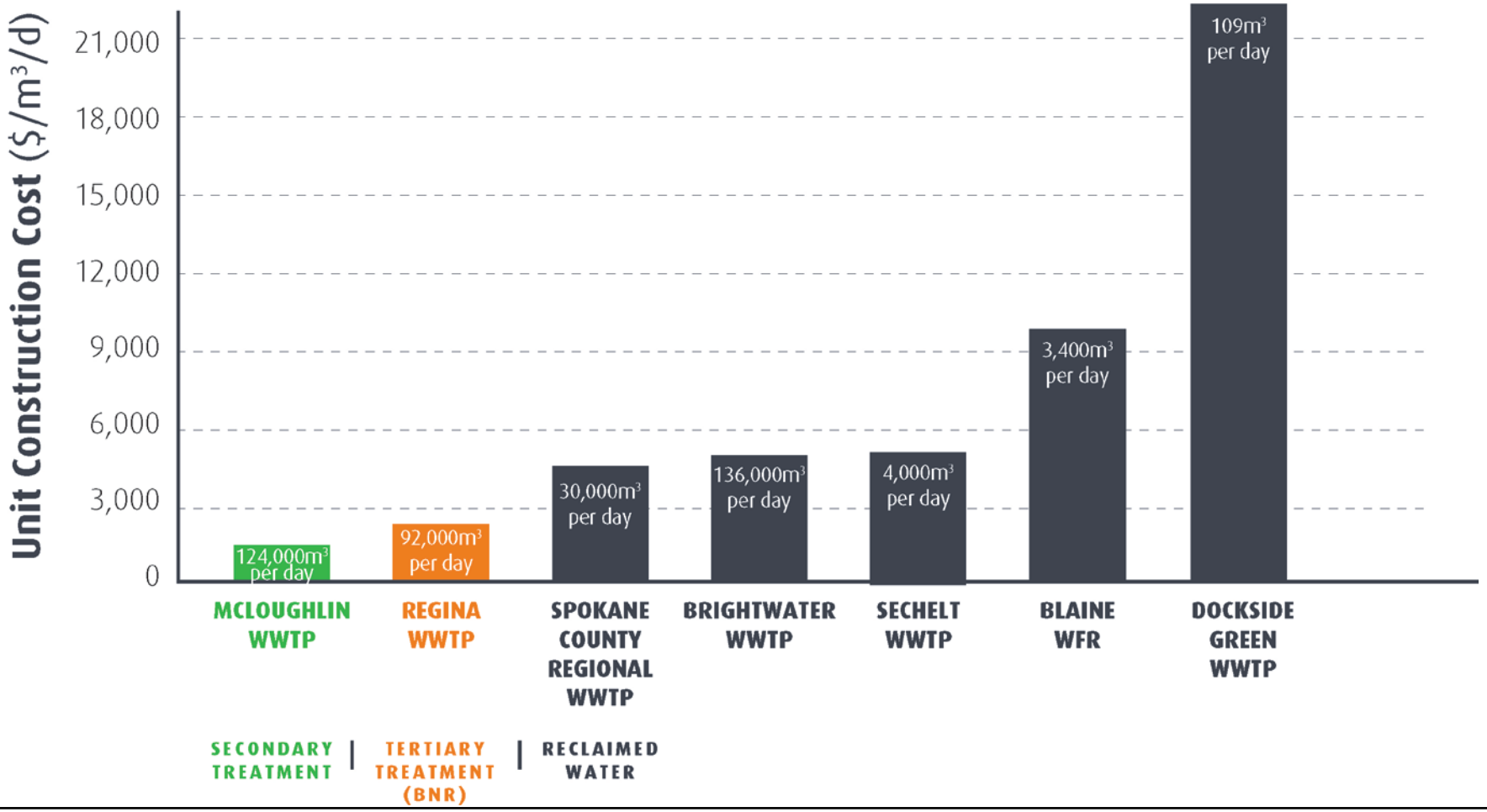
What is treatment?

Cost of Operating & Maintenance by Treatment Level



What is treatment?

Cost of Construction by Facility Capacity - Examples



What is treatment?

Questions?

How do we pay for treatment?

Paying for Treatment

Funding Agreements – Subject to Performance and/or Completion

Federal Funding

2019 — $120 M — Building Canada Fund — TREATMENT PLANT

2019 — $50 M — Canada Green Fund — CONVEYANCE

2015 — $83.4 M — PPP Canada — BIOSOLIDS

Provincial Funding

2020 — $248 M — Province of BC

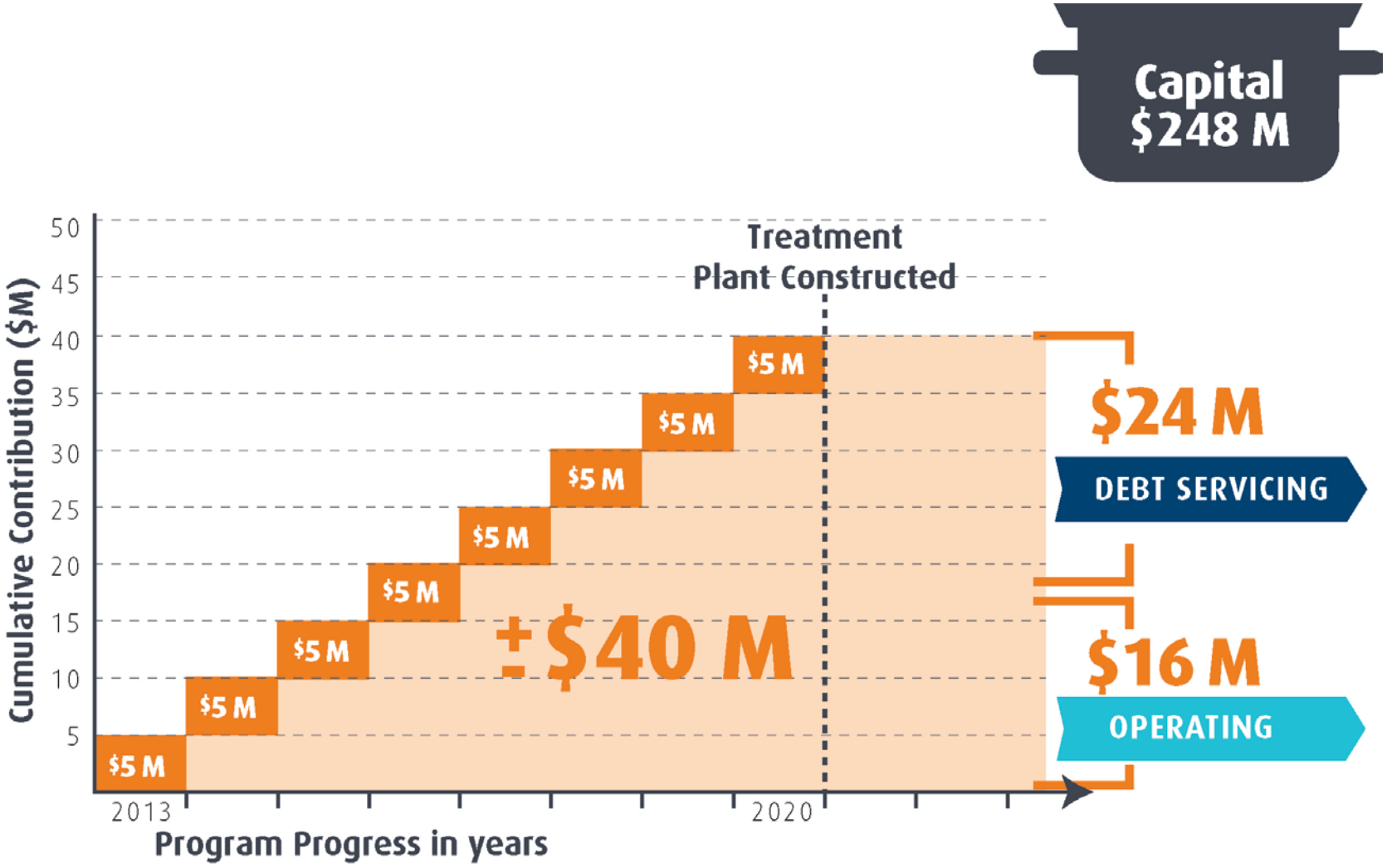
$62 M — TREATMENT PLANT

$62 M — BIOSOLIDS

$124 M — OPERATING

Paying for Treatment

Ramping Up to Treatment



Paying for Treatment

Funding & Cost Breakdown

FUNDING

GRANTS

FED

PROV

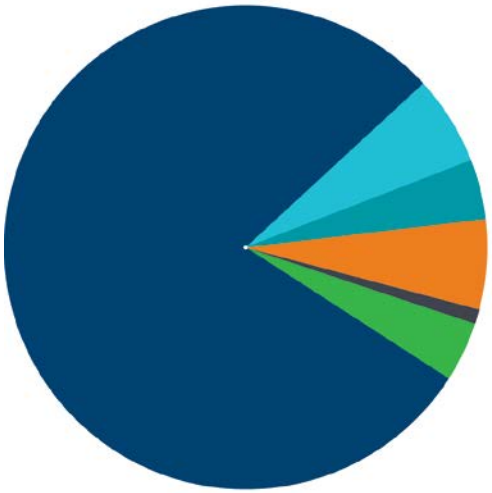
$501

CRD **$248**

CRD BALANCE **+$39**

\+ ADVANCED OXIDATION

$788 M



$624.8 M
CONSTRUCTION

$50.4 M
MANAGEMENT & COMMISSION

$40.9 M
CONTINGENCIES

$31.4 M
FINANCING

$30.2 M
PROFESSIONAL FEES

$10.2 M
LAND

$788 M

Paying for Treatment

Financial Details Timeline

(up to MID 2012) PRE-PROGRAM ACTIVITIES

CRD Liquid Waste Management Planning

2/3 Grants **$10M**

(MID 2012 - END 2013) PROGRAM IMPLEMENTATION

$23.9 M

Seaterra Start Up

Environmental Studies

Planning

$10.2M Land Purchases

- $5.3M Haro Woods & Buffer
- $4.7M McLoughlin
- $0.2M planning
- ~~$17M Viewfield~~

(2014) YEAR TO DATE

$24.8 M

$53.9 M Budget

Seaterra & Program Pause

Craigflower Pump Station

- $12.8M Paid
- $12M Committed

Note: excludes unwinding costs (negotiable) if necessary

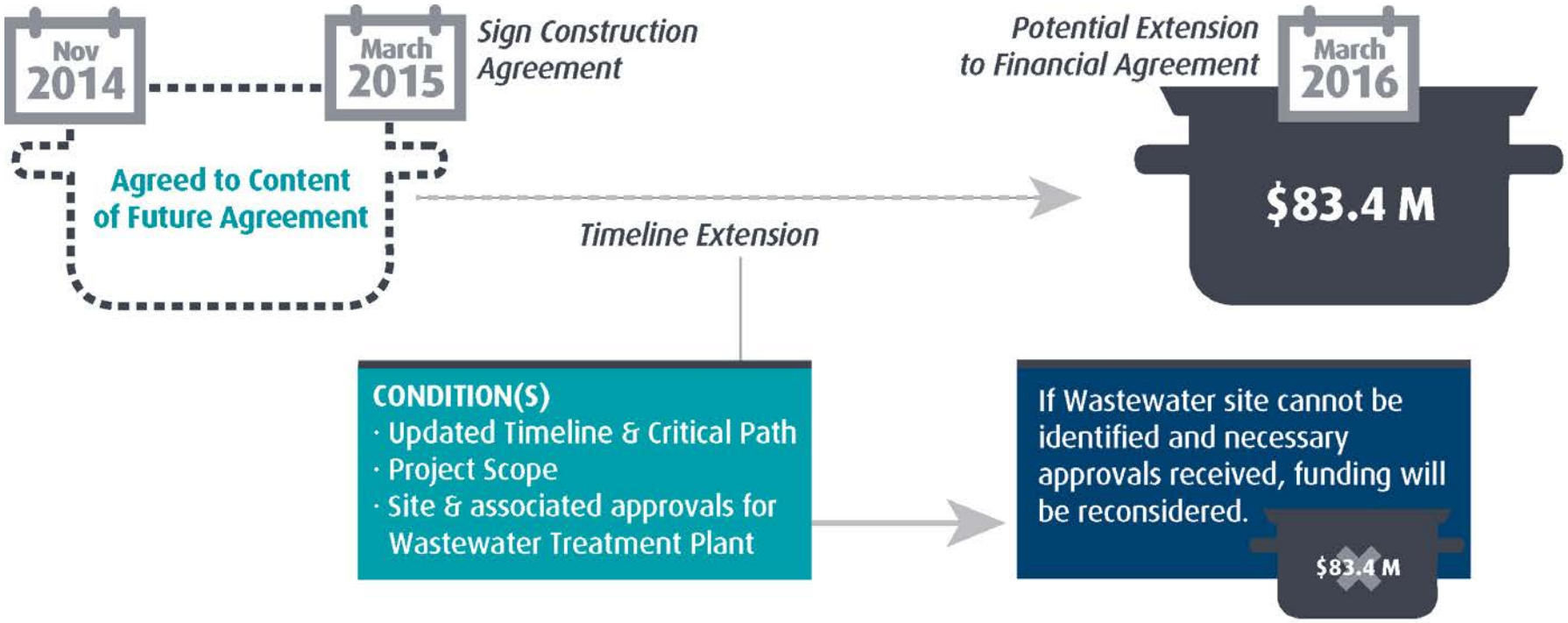
(2015) CURRENT

≈$170,000
per month
Seaterra

\+ CRD Liquid Waste Management Planning

Paying for Treatment

Funding Agreement – PPP Canada Grant *(Biosolids)*



How do we pay for treatment?

Questions?

Current Status & Next Steps

Questions?

Thank you.