LWMP Public Open House

PREPARED BY: Paul Nash
DATE: November 1, 2016

Treatment Options and Funding Application

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Original Mandate

"to develop an environmentally sustainable method to treat the liquid waste that is produced by the Village"

WAC expanded mandate

"to develop an environmentally sustainable method to treat the liquid waste that is produced by the Village, that is ***affordable***, and, ideally, economically *productive*, environmentally *enhancing* and socially *beneficial*"

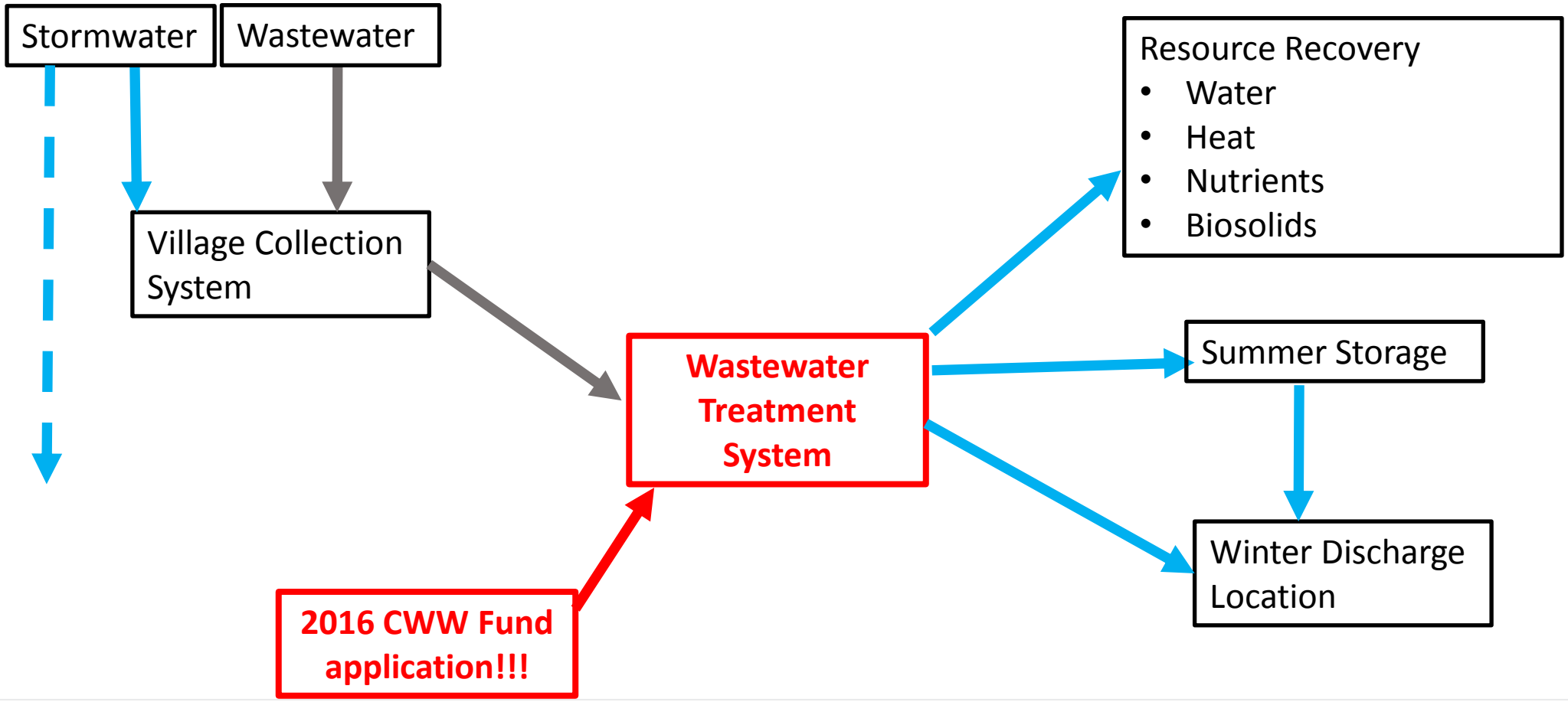
Clean Water and Wastewater Fund

- **Federal Funding Component 50%**
- **Provincial Funding Component 33%**
- **Municipal Funding component 17%**
- **Applications due Nov 23 2016**
- **Project completion deadline Mar 31 2018**

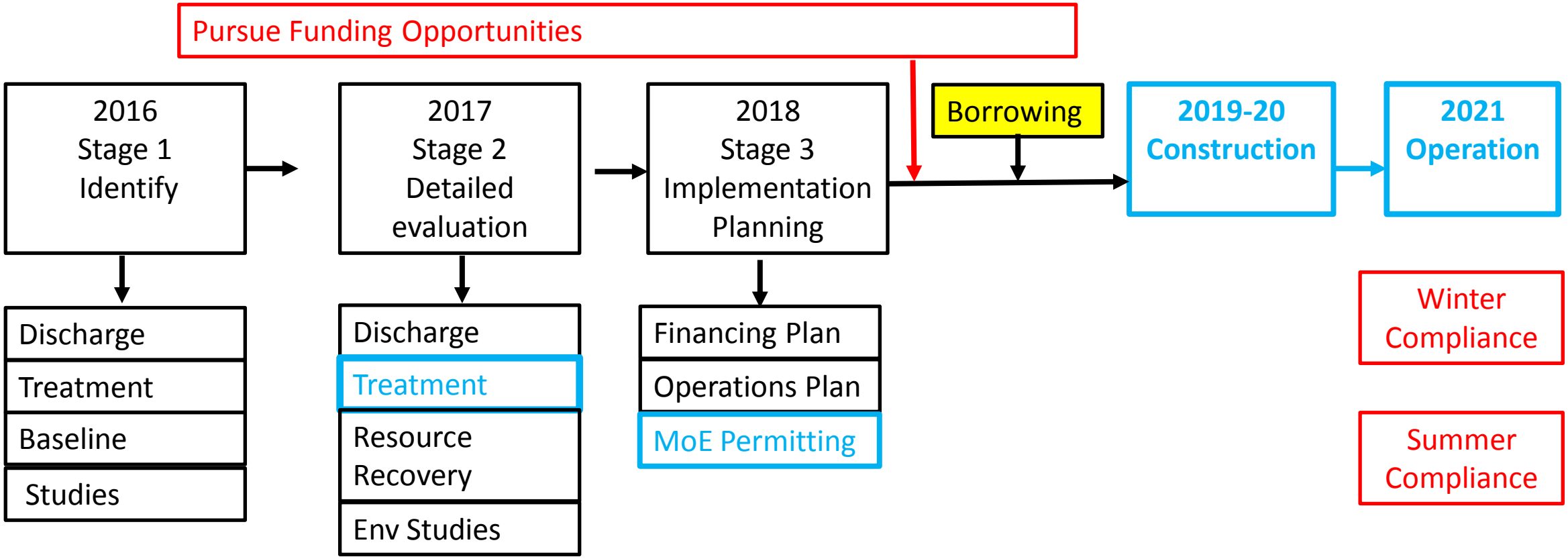
CWWF Eligible Works

- Water, **Wastewater**, Stormwater
- Distribution, collection systems
- Storm/sewer separation
- **Treatment plants**
- Design and planning for **upgrades to wastewater treatment** infrastructure to **meet federal regulatory requirements**;
- New construction projects, including the construction of **naturalized systems** for management and treatment of wastewater and storm water
- Initiatives including **studies and pilot projects related to innovative and transformative technologies**
- **A specific objective to enable communities to do things they could not otherwise do without this funding.**

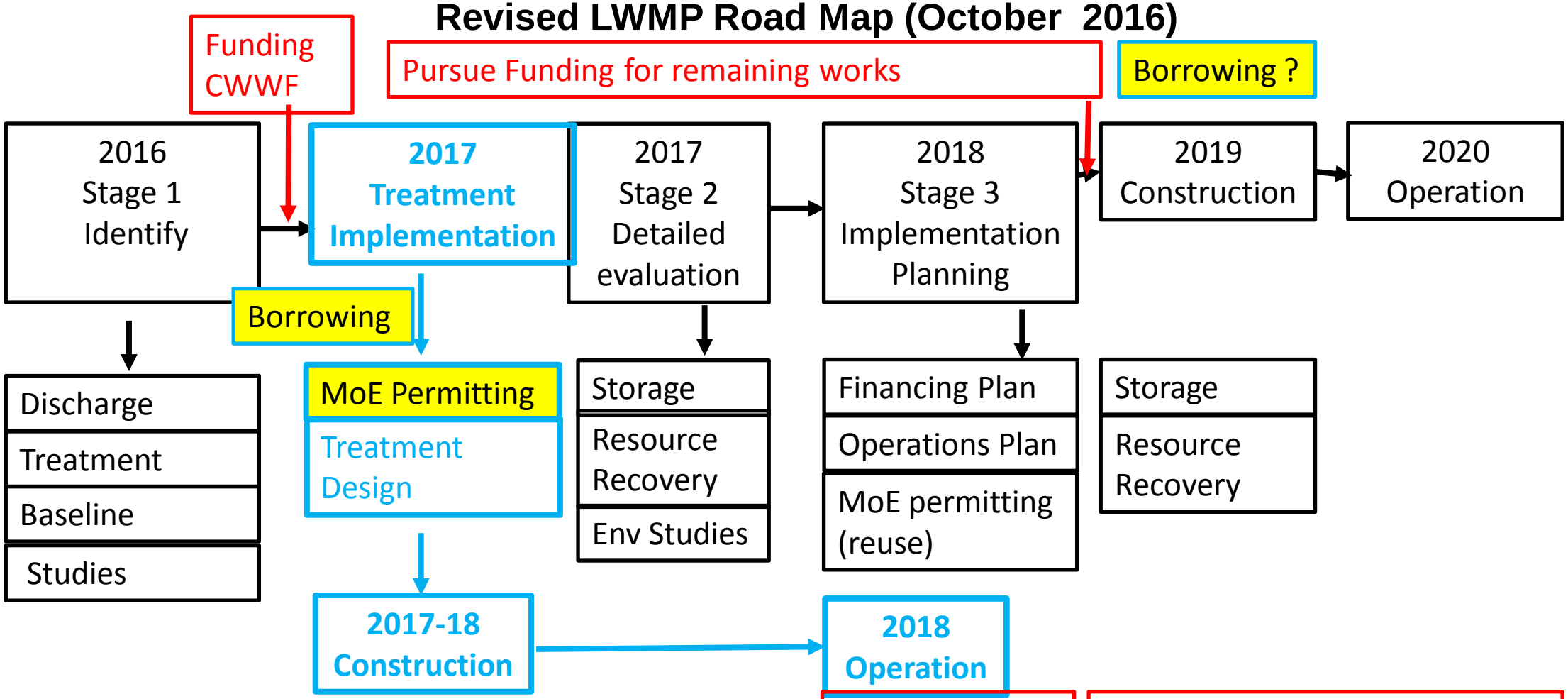
LWMP Physical Components



Cumberland LWMP Road Map (March 2016)



Revised LWMP Road Map (October 2016)



Potential Works completed by March 2018

Treatment Works	Possible Completion by Mar 2018
New Mechanical Treatment Plant	Yes*
Upgrades and add-ons to existing Lagoon	Yes
Constructed ***Treatment*** Wetland	No**
Reclaimed Water system	No
Conveyance to alternate discharge location	No
Pilot tests of innovative systems	No

* Possibility for modular system components

**Possibility for small scale wetland for effluent polishing purposes.

Project Process (greatly simplified)

- **Council Nov 14** — Decision to submit application
- **Nov Min of Env registration**
- **Nov 23 submit application**
- **Nov 24 Construction Planning** — Obtain quotes on major process equipment
- **Mar 2017 Funding announced**
- **Construction Mar 2017-Mar 2018**
- **Apr 2018 Commissioning**

Risks

- Funding may not be obtained
- The work done sits unused for a year or more
- Forces the use of off the shelf treatment systems
- Some innovative treatment options may be excluded
- Project costs after Apr2018 not included – 100c on the dollar
- Ministry of Environment permitting must be brought forward

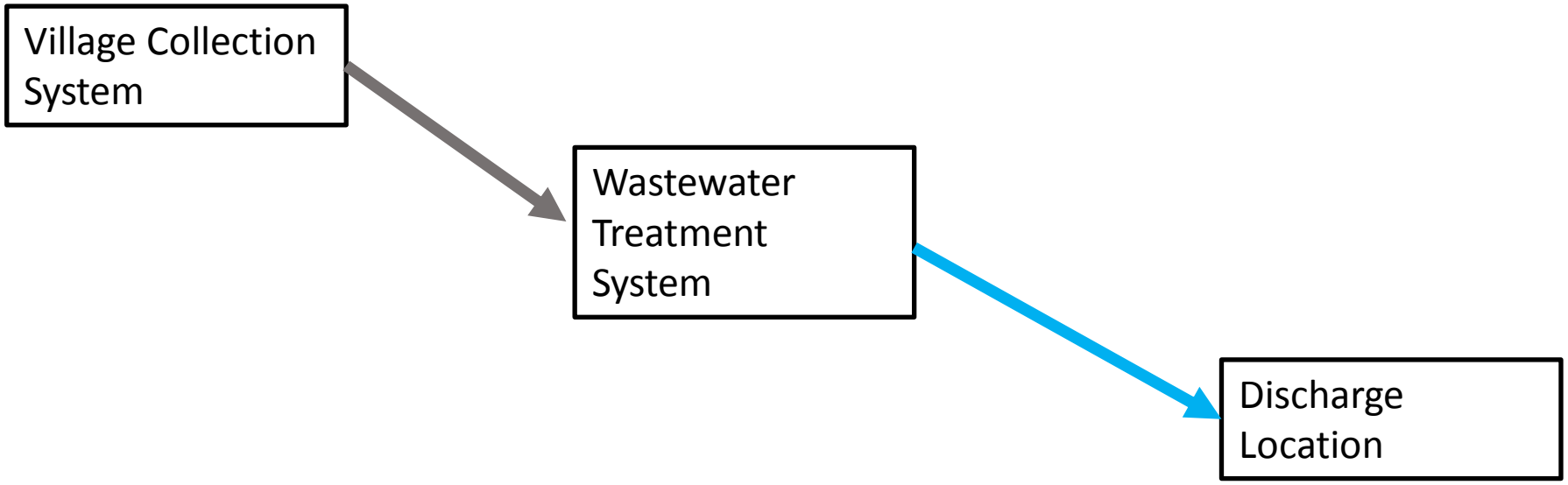
Rewards

- Funding at 17c on the dollar
- Winter compliance achieved three years earlier
- Most or all treatment works completed, to be "reuse ready"
- Remainder of LWMP more focused

- **After 18 years of planning, the "treatment" is done!**

2.8 Technical Goals and mandatory requirements

Engineer's view of Wastewater System



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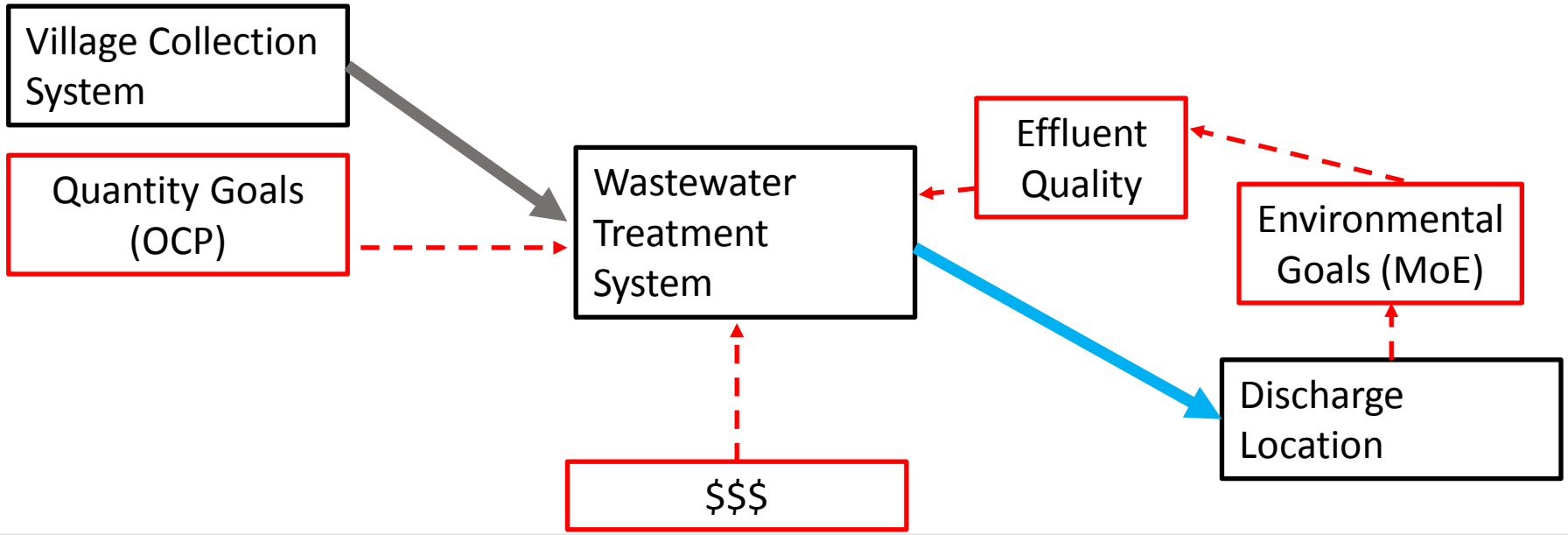
Engineer's view of Wastewater System Goals



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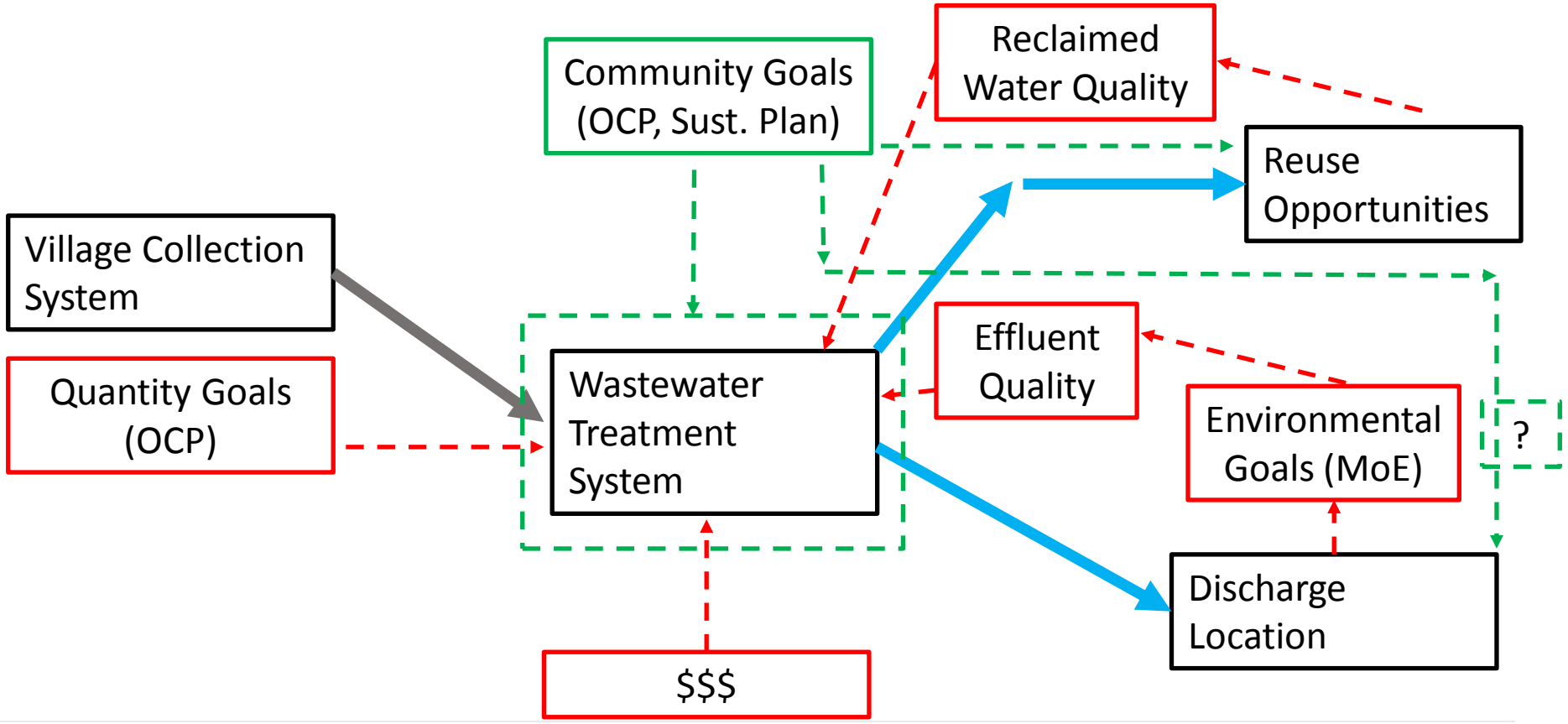
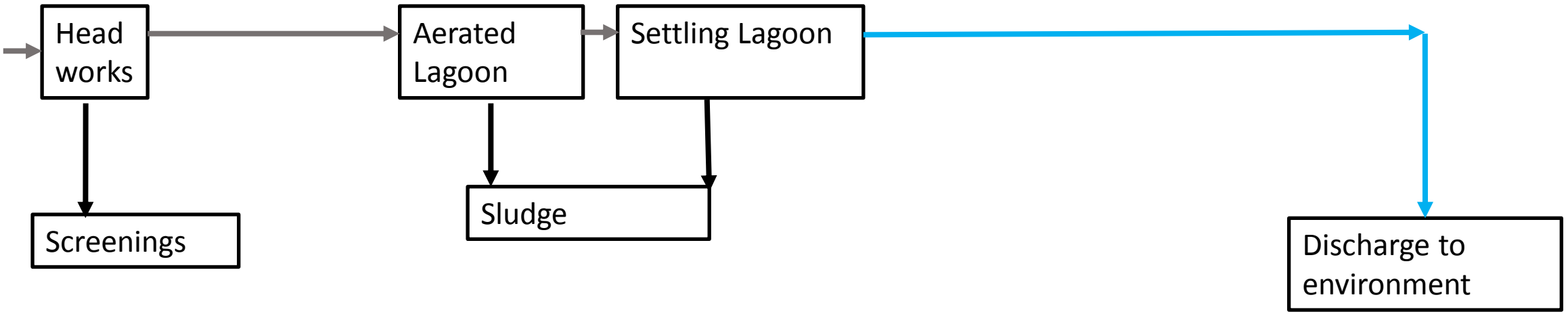
WAC view of Wastewater System Goals



Treatment specific Needs and Wants

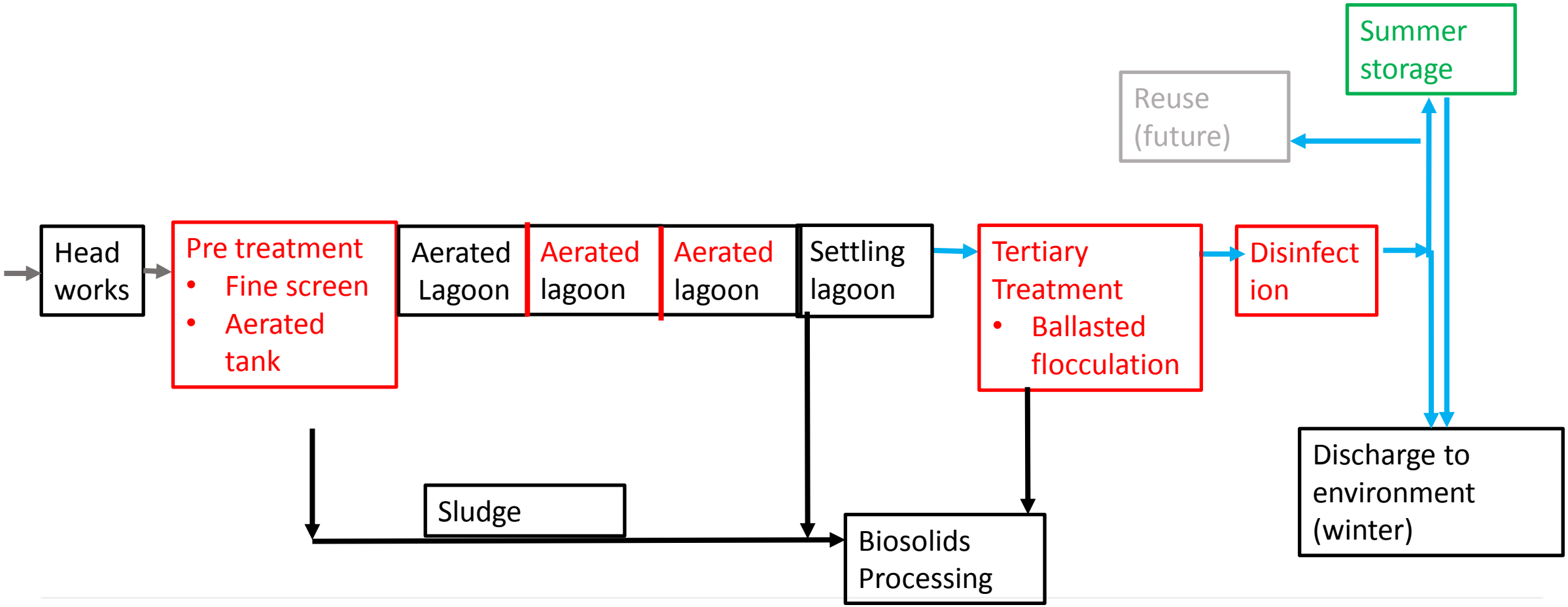
NEEDS	WANTS
Mandatory Requirements • Effluent quality • Reliability • Safety • Wet weather flow handling	Aspirational Goals • Innovation • Naturalised treatment • Reduce GHG's • Remove toxins • Heritage Architecture
Wastewater Treatment Components	Optional Components Other features
Proven Technologies	Innovative & creative

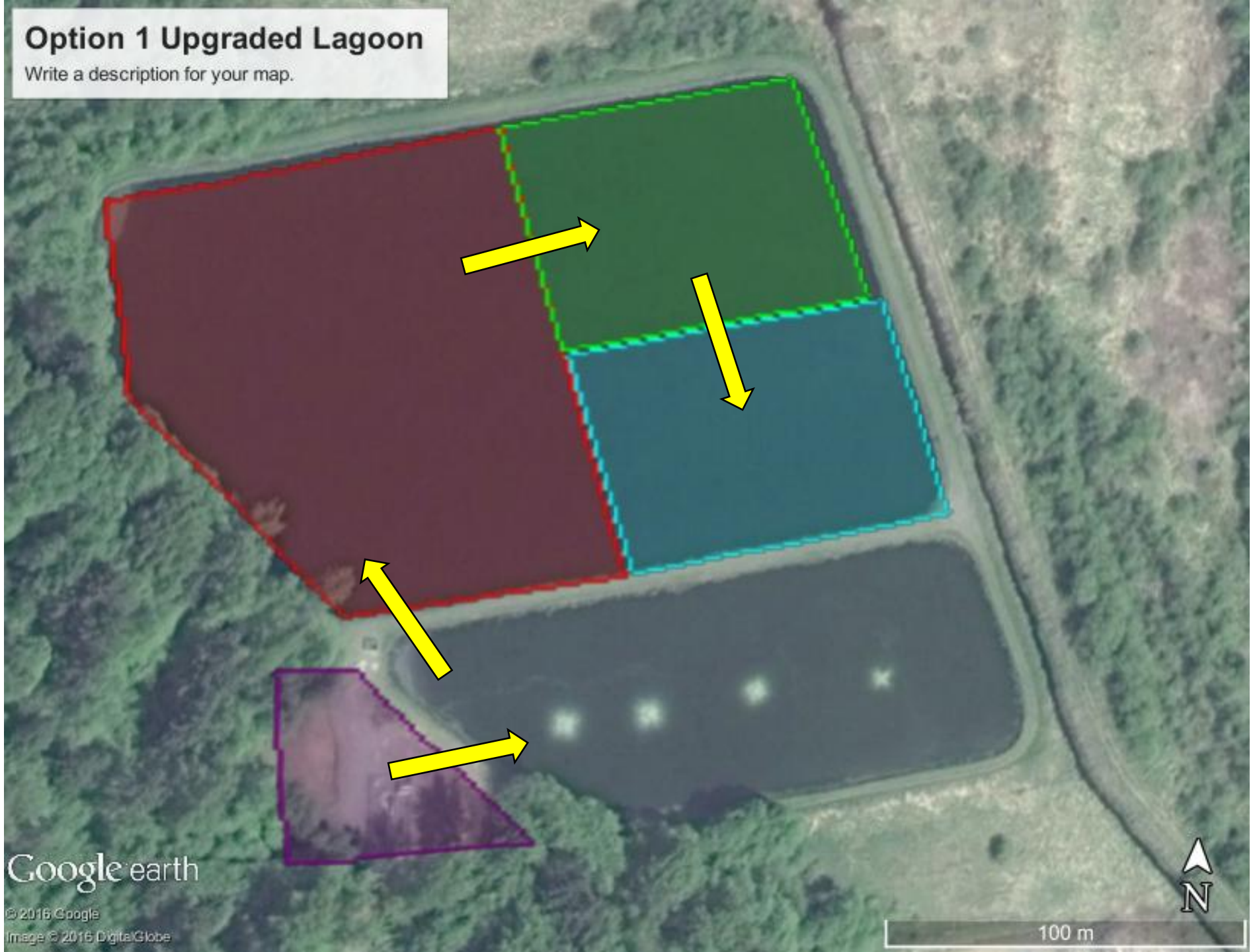
Cumberland Treatment System 2016



Option 1 Enhanced Lagoon

New components in red




Option 1 Upgraded Lagoon
Write a description for your map.
Google earth
© 2016 Google
Image © 2016 DigitalGlobe
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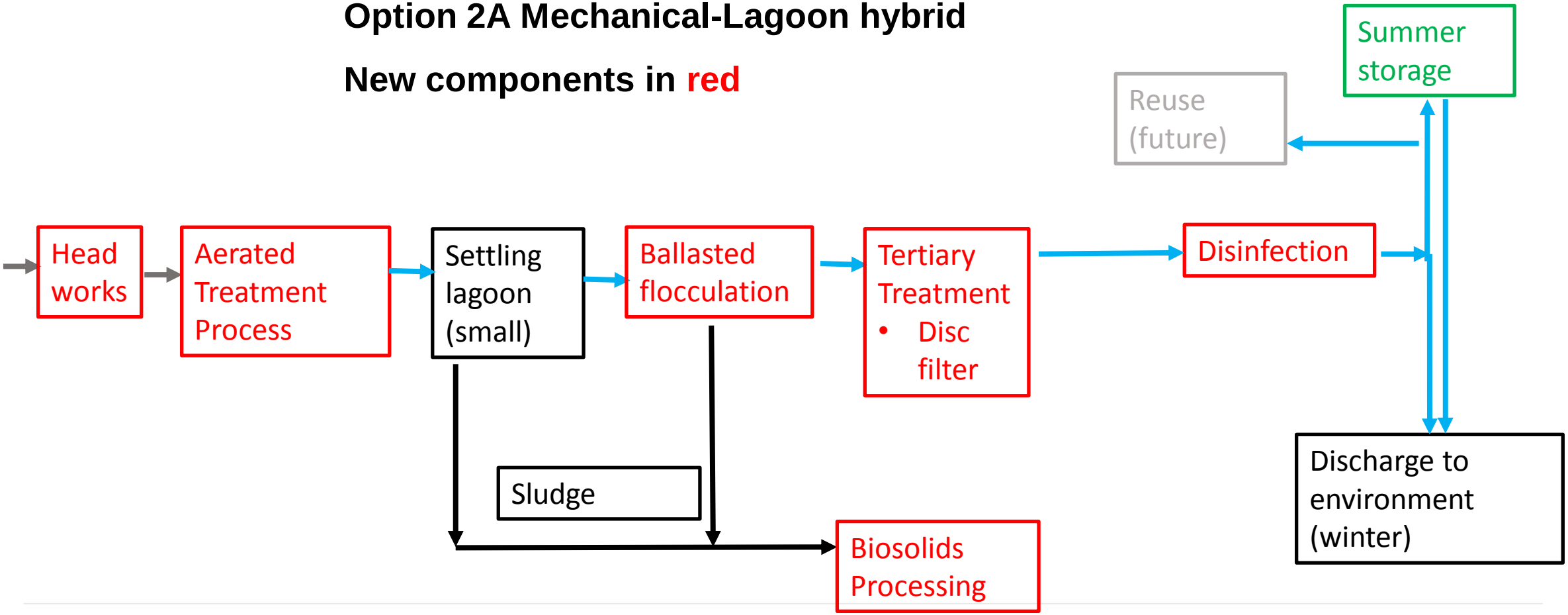
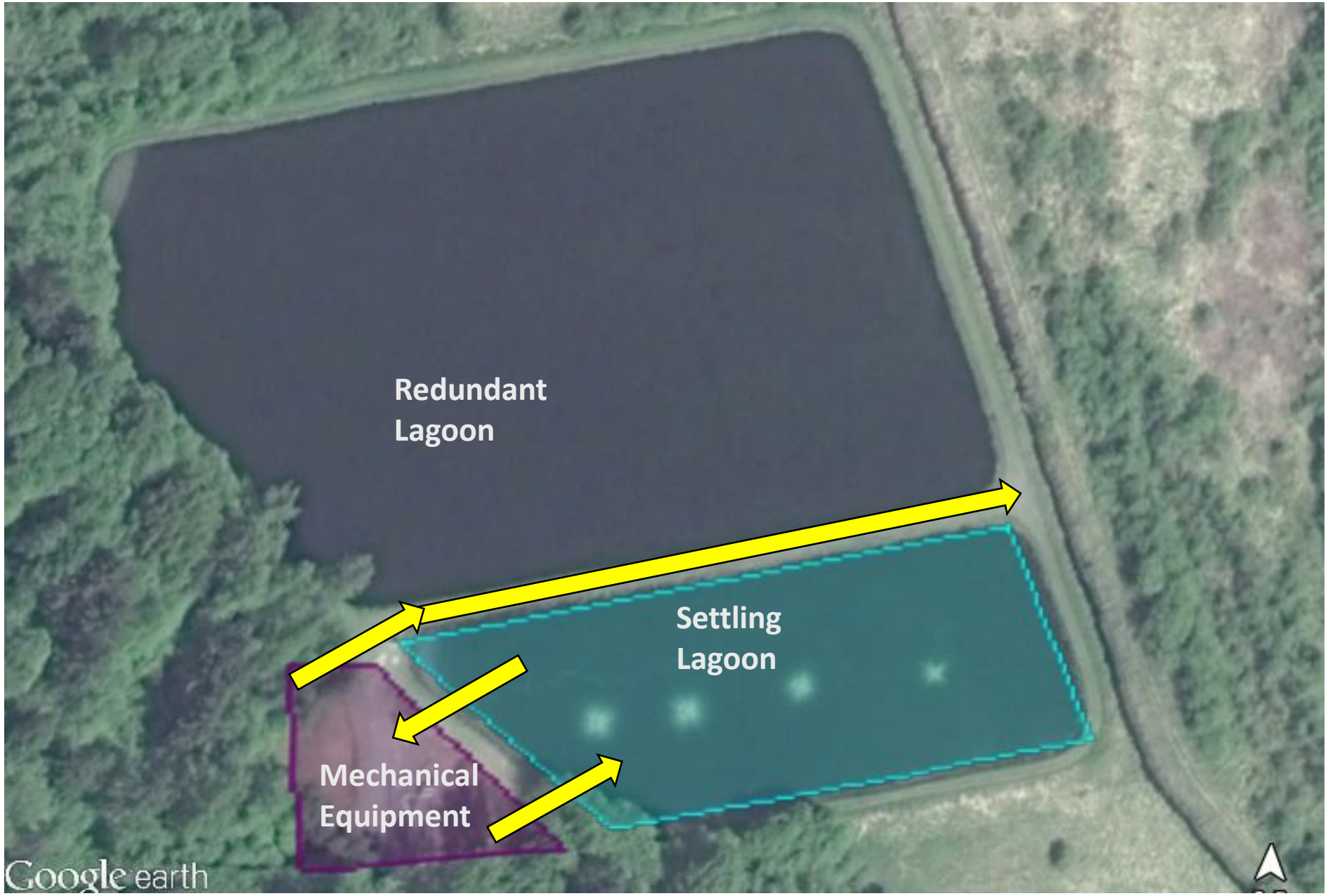
100 m

Option 2A Mechanical-Lagoon hybrid

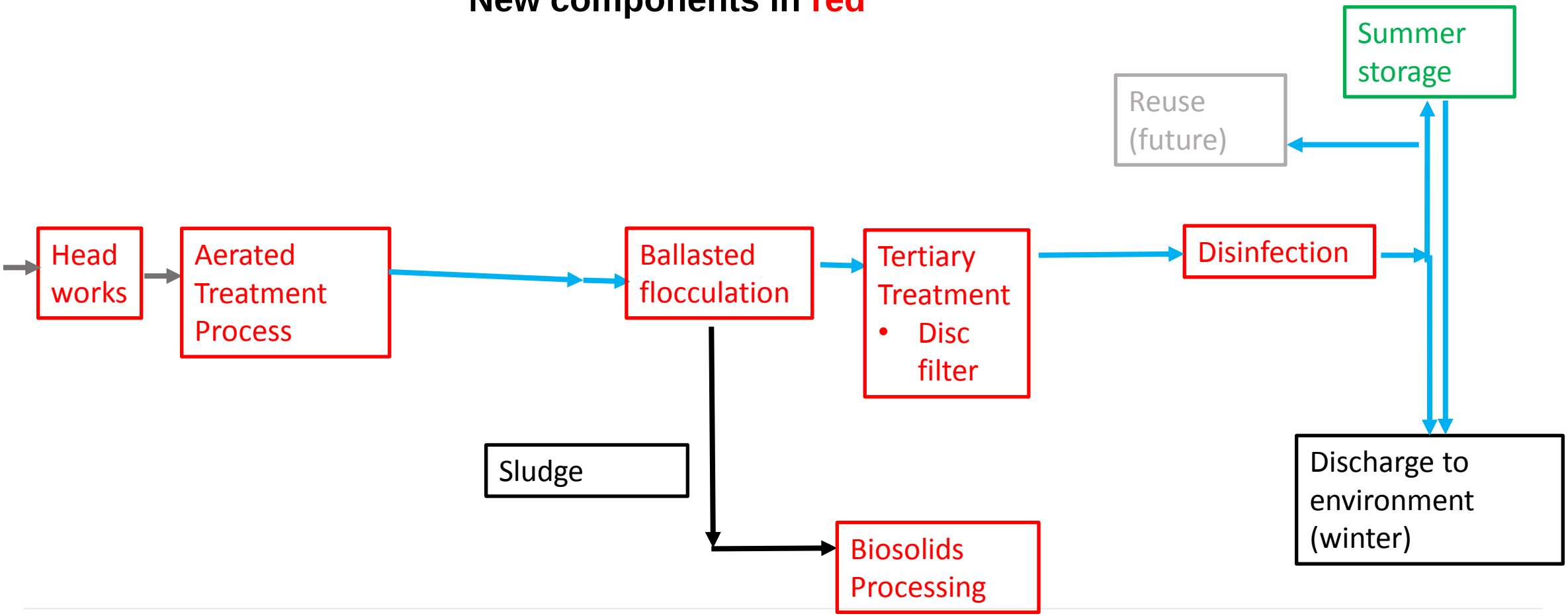
New components in red




Redundant
Lagoon
Settling
Lagoon
Mechanical
Equipment
Google earth

Option 3A All Mechanical Plant

New components in red




Redundant
Lagoon
Redundant
Lagoon
Mechanical
Equipment
Google earth
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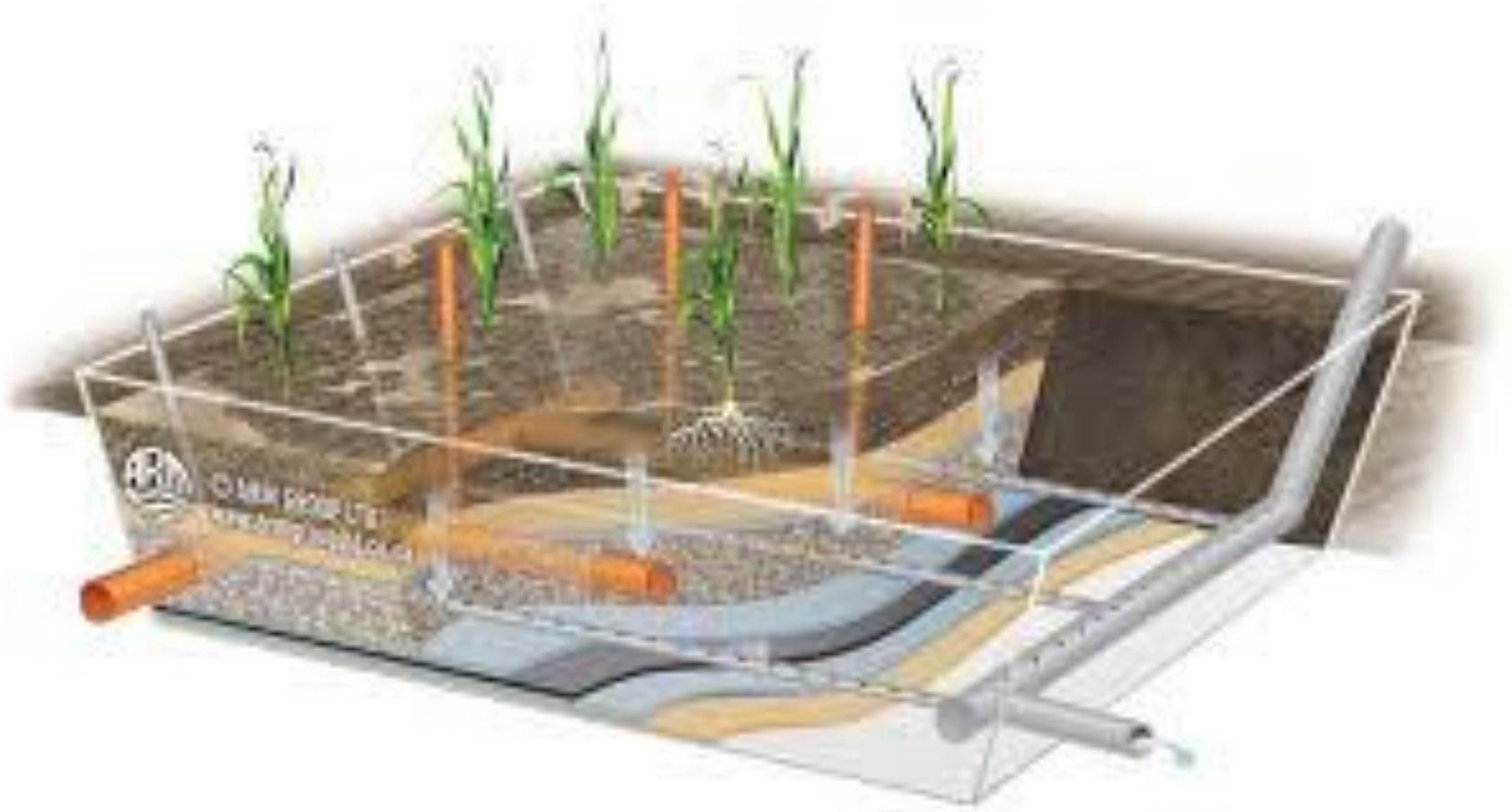
100 m

Reed Bed

- Also called a Sub Surface Flow Constructed Wetland
- Fill part of the redundant lagoon with media and plants
- Send Treated flows in dry weather
- Take bypass flows in wet weather
- (ARM example)
- Enhanced removal of trace organics
- Potential for Carbon sequestration

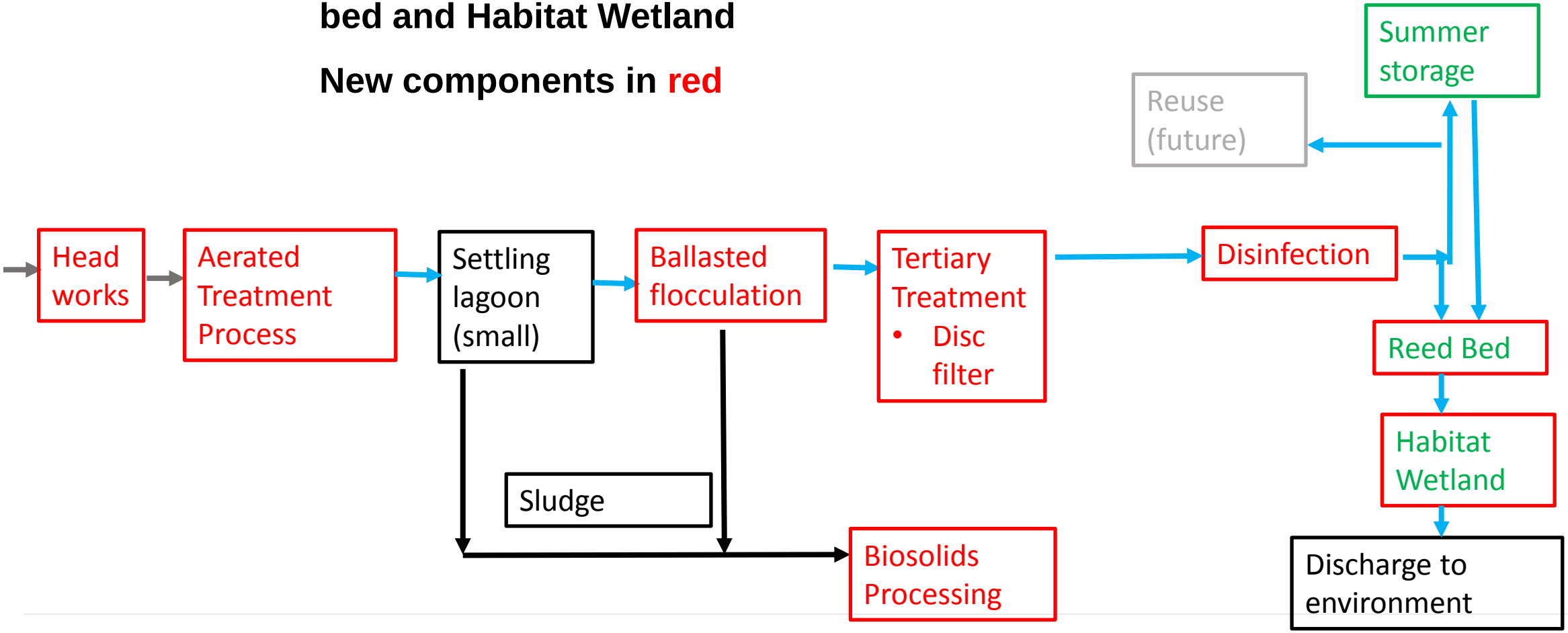


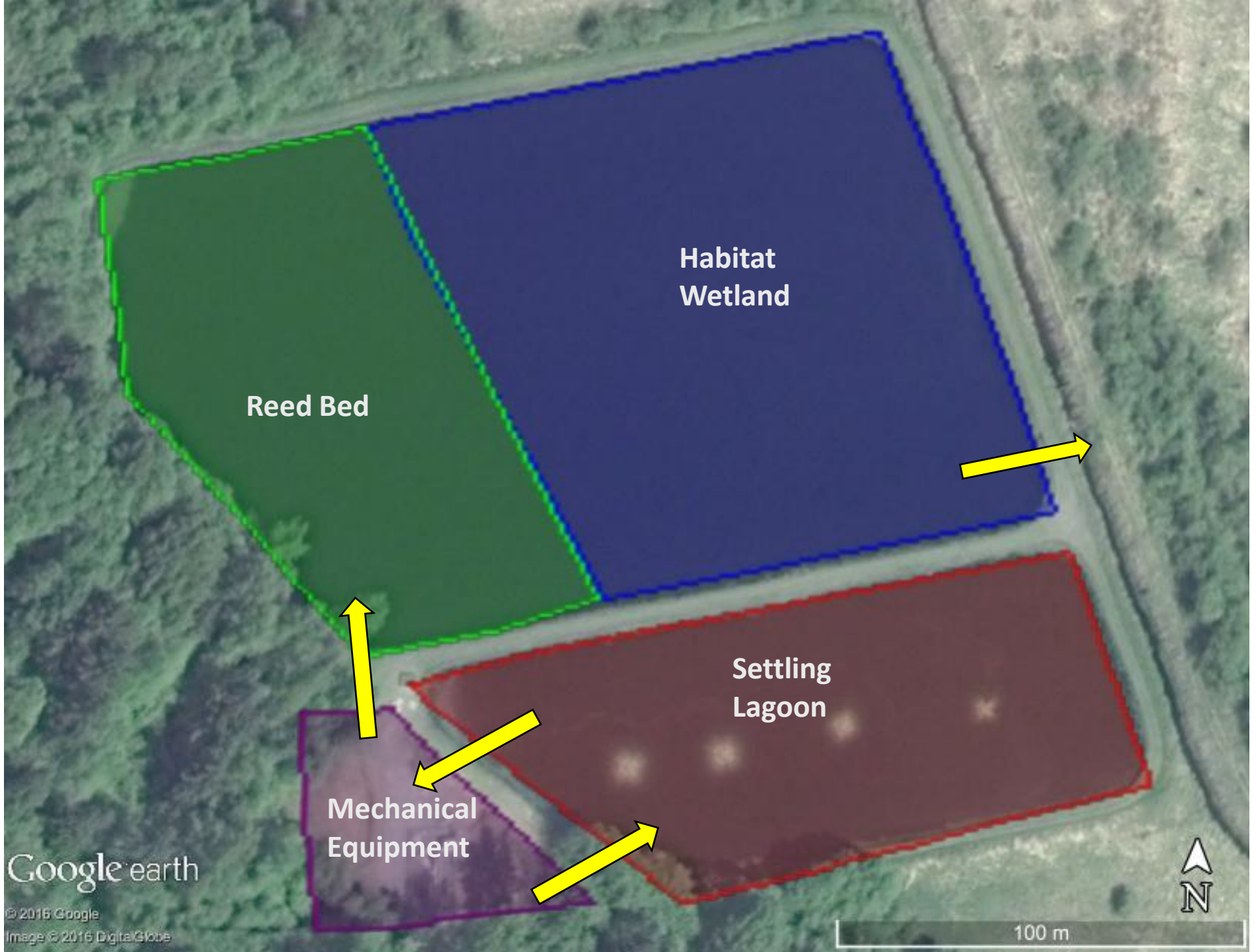
Small Habitat and Storage Wetland

- Re-Purpose the redundant main lagoon to make a pond/wetland
- Treated water from reed bed moves through a constructed system
- Water plants and landscaping
- Islands, habitat
- Publicly accessible, walking paths, interpretive signage
- Opportunities for community involvement in the planning
- Can’t be built until after March 2018

Option 2B Mechanical-Lagoon hybrid with Reed bed and Habitat Wetland

New components in red




Habitat
Wetland
Reed Bed
Settling
Lagoon
Mechanical
Equipment
Google earth
© 2016 Google
Image © 2016 DigitalGlobe
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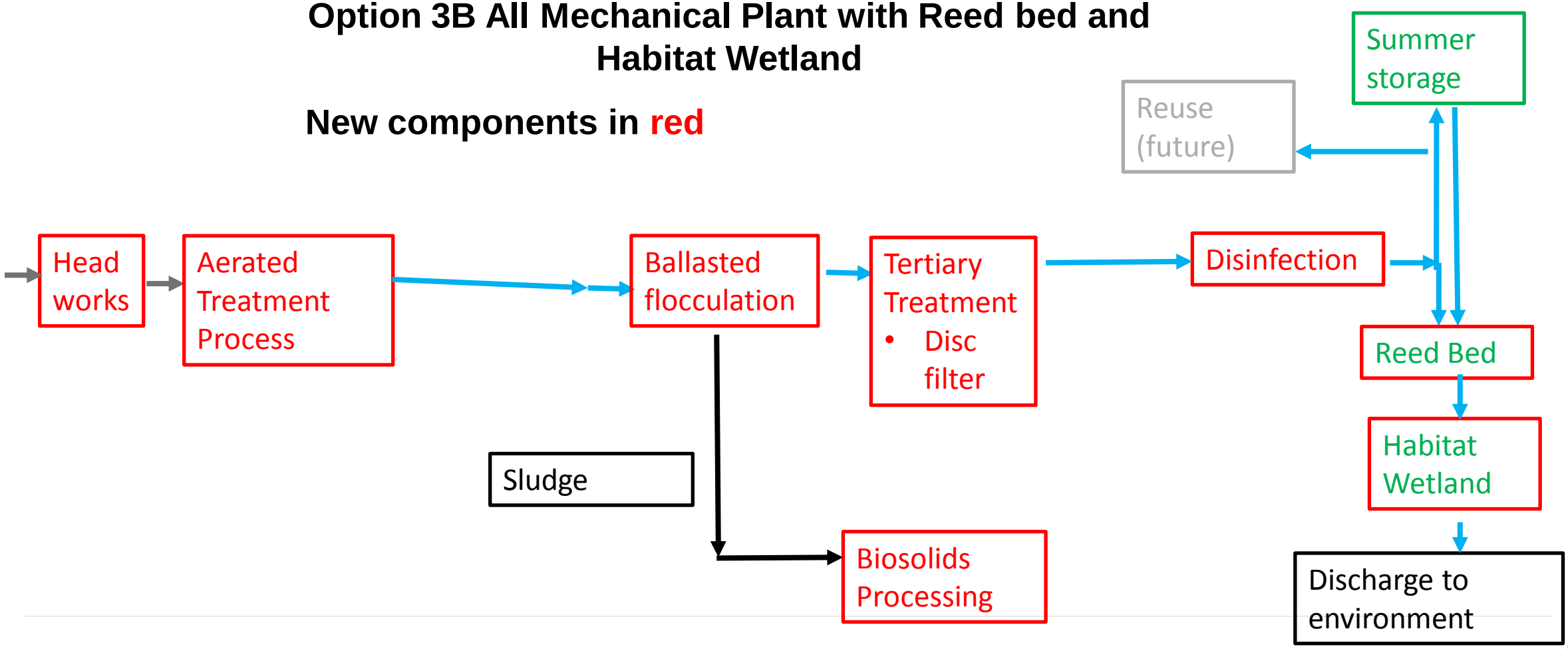
100 m

Option 3B All Mechanical Plant with Reed bed and Habitat Wetland

New components in red




Habitat
Wetland
Reed Bed
Mechanical
Equipment
Google earth
© 2016 Google
Image © 2016 DigitalGlobe
N
100 m

Summary of Treatment Options (1)

	Description	Cost Range	Time Risk	Op Cost	Op Complexity	Ancillary Benefits
Lagoon Based						
1	Lagoon with Mech pre-treatment	$10-17m	M	L	L	L
Mechanical Based						
2A	Mechanical-Lagoon Hybrid	$10-17m	L	M	M	L
3A	All Mechanical plant	$10-17m	L	M	M	L
Mechanical Plus Reed Bed	$2m (estimated) add on					
2B	Mech-Lagoon	$12-19m	M	M	M	M-H
3B	All Mech	$12-19m	M	M	M	M-H

Option C – Charcoal.

- Use Charcoal as part of the media for the Reed Bed
- Charcoal further enhances treatment
- Reduces colour, odour (and taste!)
- Shown effective in removing trace organics, pharmaceuticals etc
- *Would be the first municipal treatment plant in Canada to specifically target pharmaceuticals*

The "Carbon Economy"

- Potential for locally sourced and made charcoal
- Charcoal persists in the ground for centuries/millennia
- Turning wood into charcoal turns it from ***carbon neutral*** to ***carbon negative***
- Approx 1000 tons of charcoal=
- 500 tons of fixed carbon=
- 1830 tons of CO2 equivalent
- $55k at BC Carbon tax rate $30/t CO2e
- $91k at 2022 Federal Carbon price of $50/t CO2e
- Current Village of Cumberland net CO2e is 54t/year
- Potential to offset 24 years of VOC emissions
- *Potentially the first "Carbon Negative" wastewater treatment plant in the world*

Summary of Treatment Options (2)

	Description	Cost Range	Time Risk	Op Cost	Op Complexity	Ancillary Benefits	Carbon Footprint
Lagoon Based							
1	Lagoon with Mech pre-treatment	$10-17m	M	L	L	L	300
Mechanical							
2A	Mechanical-Lagoon Hybrid	$10-17m	L	M	M	L	590
3A	All Mechanical plant	$10-17m	L	M	M	L	550
Mechanical Plus Reed Bed	$2m (estimated) add on						
2B	Mech-Lagoon	$12-19m	M	M	M	M-H	590
3B	All Mech	$12-19m	M	M	M	M-H	550
Carbon Sequestration							
2C & 3C	**Charcoal media in Reed Bed**	**$12-19m**	**M**	**M**	**M**	**H**	**-1200**

Cost Implications

Cost Range	Portion by Mar 2018 95%	5% Apr 2018	Fed+ Prov contribution	VoC contribution	VoC %
$12m	11.4	0.6	9.5	2.5	21.2%
$15m	14.3	0.75	11.8	3.2	21.2%
$17m	16.2	0.85	13.4	3.6	21.2%
$19m	18.1	0.95	15.0	4.0	21.2%

The Questions

- The CWWF is an excellent funding opportunity
- 21 c on the dollar!
- Enables the Treatment Works to advance by 2-3 years
- Time deadline of March 2018 limits scope to treatment only
- Three major options
  - Lagoon based
  - Lagoon-mechanical hybrid
  - All mechanical
- Reed Bed and Habitat Wetland are optional add-ons to the Mechanical options

Summary

- The CWWF is an excellent funding opportunity
- 21 c on the dollar!
- Enables the Treatment Works to advance by 2-3 years
- Time deadline of March 2018 limits scope to treatment only
- Three major options
  - Lagoon based
  - Lagoon-mechanical hybrid
  - All mechanical
  - They are all similar in cost !
- Reed Bed and Habitat Wetland are optional add-ons to the Mechanical options
- How to proceed?

How clean is the water?

Thank You !

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