APPENDIX 1 – EVENT AND FEEDBACK REPORT: JAN. 29 + 30, INFORMATION SESSIONS

EVENT SUMMARY & FEEDBACK OVERVIEW

Comox Valley Sewer Service Liquid Waste Management Plan – Long List Options
Public Information Sessions – January 30 & 31, 2019

Prepared By: ZINC Strategies
Prepared For: Christianne Wile (Manager, External Relations)

EXECUTIVE SUMMARY

In January 2019, phase three of the public consultation process for the Comox Valley Sewer Service planning process got underway. This stage followed earlier outreach steps focused on introducing the process (phase one) and collecting feedback on goals and objectives (phase 2).

Phase three focused on the presentation of the long-list of options for treatment, conveyance and resource recovery to the public, with the goal of collecting their feedback on whether any additional options should be considered.

Two information sessions were held in late January with 56 participants. Themes of feedback included a focus on foreshore/marine environment protection and ongoing opposition to the Comox No.2 Pump Station. Generally, there were no glaring oversights to the public, who was eager to start weighing in on the ideas as well. The events support the continued establishment of consistent and ongoing outreach for the liquid waste planning process.

PART 1 – EVENT SUMMARY

OVERVIEW

Tools used to collect feedback on the long list options included two information sessions held January 30 and 31, 2019. These public events offered an opportunity for community members to learn about the liquid waste management planning process, review the long list options and provide thoughts on any options that have been missed or comment on other factors that should be considered.

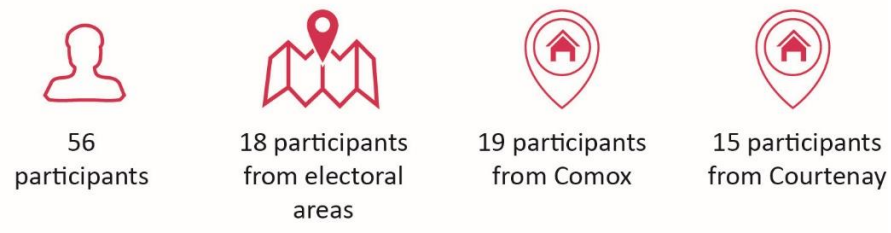
The drop-in sessions were held at two locations: in Comox at the K'òmoks First Nation Hall, and in Courtenay at the Rotary Hall (Florence Filberg Centre) – from 5-7 pm both evenings.

The below report summarizes the event and feedback collected.

1. EVENT GOALS

- To inform the public about details of each of the long list options selected by the Public and Technical Advisory Committees (PAC/TAC).
- To gather feedback on the long list options, and understand whether any relevant options have been missed and should be considered.
- To provide information on the LWMP process and future opportunities for public engagement.
- To provide residents with an overview of the current Comox Valley sewer system, and explain why the management planning process is needed.
- To bring awareness to and encourage residents to register for the online tool, ConnectCVRD.

2. BY THE NUMBERS



3. EVENT DETAILS

- Approximately 56 people attended the open houses: est. 27 at the first (Jan. 30) and est. 29 at the second (Jan. 31).
- Thirteen information boards were on display, outlining the planning process, public engagement timeline and long list options for treatment, conveyance and options for resource recovery.
- Two of these boards offered a direct opportunity for feedback – residents were encouraged to write down thoughts/ideas and place on boards as a method of sharing.
- Sixteen-page booklets, detailing technical specifications of each long list option for treatment and conveyance, were made available to attendees, in addition to an LWMP backgrounder.
- Reflective outdoor open house signs were posted to help direct visitors to event locations.
- Kris La Rose, senior manager, water & wastewater, was event host, with support from CVRD staff Marc Rutten, Adem Idris and Christianne Wile. They were supported by ZINC Strategies consultants + Walt Bayliss of WSP.
- While the majority of feedback was received directly by team members, seven feedback forms were submitted.
- Two members of the LWMP public advisory committee attended to hear feedback from the public, as did three elected officials from Courtenay, Comox + CVRD.

PROMOTION/OUTREACH

As free, public events, the info sessions were promoted via regular media and social media channels:

- A news release was issued Jan. 8 and was published in local media outlets.
- Newspaper print ads ran Jan. 17, 24 & 29.
- Radio ads ran Jan. 14-28 inclusive.
- Posters and save-the-date cards where shared at community hubs (rec centres, municipal halls).
- The event was posted on Facebook and promoted, reaching 2,327 people and generating 21 event responses.
- Sewage commission members were advised/invited by email.

PART 2 – FEEDBACK THEMES

THEMES OF COMMENTS

The info sessions provided an opportunity for many in the service area to better understand the LWMP process and have a first look at the long list of options. Comments gathered by regional district staff and consultants at the events generally fell into the following themes:

1. **Focus on Foreshore Protection**: There is strong concern about conveyance routes along the estuary/foreshore – environmental protection should be a priority.
2. **High Treatment Standards**: There is strong support to further investigate options for higher/highest level of treatment.
3. **Tunneling Peaks Interest**: There is generally support for tunneling and for "doing it right the first time", no matter the costs – though there is some concern about impacts to groundwater from tunneling and overland conveyance.
4. **Comox No. 2 Opposition Remains**: Participants attending from Lazo Road area are strongly opposed to the long list options that involve the addition of Comox No.2 Pump Station.

FEEDBACK SUMMARY

The following feedback was collected from the feedback forms, interactive boards and summary notes from staff participants. Note: comments are shared as written.

WASTEWATER TREATMENT + RESOURCE RECOVERY

Are there any other options that should be considered?

- Limiting the size of the population of the Comox Valley. If we can't handle more sewage, why should we allow more people to live here?
- Why not a total system at Fields site where sewage is treated and returned to water clean + potable, Alert Bay has such a system

Is there any other information you would like the committee to consider?

- Recovery of as much as possible
- Ideally, I would like to see all wastewater re-used
- Perhaps beyond your scope, but reducing the amount of effluent – particularly stormwater
- What are the possibilities of dealing with waste in neighbourhood manure composting facilities?
- Why is the area south (Baynes Sound), which has no sewer service, not a higher priority?

Additional comments:

- If possible, for each option could info about energy requirements be included?
- More info, if possible, on technologies for secondary + tertiary processes
- It may be useful to research efficacy of microplastic washing machine filters to reduce household laundry sources
- Support Option 4 + recovery of resources
- Build in capabilities for future improvements in sewage treatment and resource recovery. Even if non-economical now.
- Recovering resources should be explored to the full extent. Option 4 – spend money now!
- Where will the $$ come from to implement these options?
- Requesting more info around disinfection technologies (UV, Ozone, Chlorine, etc.)
- Will the odour implications of the various options be evaluated?
- Why keep using a system that was a bad idea to start with: Brent Rd. plant stinks, Forcemain in foreshore
- Any system that adds pollutants to the straight is clearly not sustainable

CONVEYANCE

Are there any other options that should be considered?

- N/A

Is there any other information you would like the committee to consider?

- Use 3C if possible

- What is the approximate size of these main lines? RE: Deep marine concept – how is the condition of the exposed pipe going to be monitored? Would you use "smart pigs" like those used in the oil patch?

Additional comments:

- No option in the estuary is the only way to keep it half decent. Did you look at the old pipe from the base? It was a sieve.
- Option # 4 or 5 only ones acceptable
- With the least risk of contaminating marine environment
- More info please on lifespan of each option if there is any difference
- Option #1 goes through a swath of area that is on well water. My understanding is that projects must not put potable water at risk. A sewer line going through an area where residents rely on well water puts their water source at risk. How can this proposal be justified?
- 3 A, B, C – Spend the money now
- Why is Area B not represented on Sewage Commission? Why is Croteau Beach still in the crosshairs of a system we can't access?
- Why is Regional District not on the sewage board? We need system that keeps the s*** out of the bay (Comox).

PHOTOS

CONCLUSION

These events were another positive step to engage the public in the LWMP process, with clear feedback from many that the outreach process has been reliable and consistent. Attendees now have an understanding of the options being considered, and while there was interest and discussion, no large "gaps" were identified in the list.

The feedback collected at these events, in combination with input collected through the online consultation tool ConnectCVRD, will serve as valuable insight for committees as they consider options for the short list.

APPENDIX 2 – CONNECTCVRD ANALYTICS: JAN. 28-FEB. 5, LONG LIST OPTIONS

Survey Report

28 January 2019 - 06 February 2019

Reviewing the Long List: Are we on track?

PROJECT: Help shape the future of our Sewer System in Courtenay and Comox

Connect CVRD

engagement hq by Bang the Table

Q1 Are there any other treatment plant options you would like considered? Please share.

RPearson 1/30/2019 10:59 AM	No other considerations
Edi Johnston 1/30/2019 12:24 PM	Is tertiary the same as "Disinfection" if not, please consider tertiary as well.
gu3 1/30/2019 07:19 PM	Our preferred option is #4 - the community and the CVRD have Stewardship Responsibilities that extend well into the future. Option #4 sets the stage to deliver on those responsibilities. This is the option we can be proud of for years to come as we will have made the effort and investment to do our best for the long-term health and sustainability of the environment, and related resources such as shellfish.
fmayhood 1/31/2019 09:31 AM	Separate storm water and waste water systems. Reuse grey water locally, rather than dump it in the ocean.
dbroten 1/31/2019 01:10 PM	Capture and use of methane
jrsmith1 1/31/2019 08:07 PM	No
Michele.jones 2/02/2019 10:59 AM	No
johnrushforth 2/02/2019 11:18 PM	I don't know if it is economically viable but basically I think we should be studying/considering biomethane production from sewage and not dumping our poop in the ocean.
Linda-Claire Steager 2/04/2019 09:48 AM	Does biological treatment mean filtering through a wetland area with rushes similar to what has been used in apartment complexes in France and China?
edonalds 2/04/2019 10:21 AM	I support Option #3. We might as well pay now for the highest possible contamination-free system. it begins aging the minute it is in operation. Consider it a long -term investment. Hope it lasts longer than a new car!!
bcmills 2/04/2019 06:07 PM	This feedback is coming from Association for Denman Island Marine Stewards. We support advanced treatment of all flows (#4). This would prepare the region most effectively for the impact of climate change on the region. The idea of protecting shellfish removal of contaminants, reclaiming water for other uses and optimal filtration will make a difference as climate change and population increase effects us.

Optional question (11 responses, 8 skipped)

Q2 Is there any other information on treatment you'd like the committee to consider? Please share.

Jennysteel 1/30/2019 10:50 AM	Ellimination of odours in the surrounding community is mandatory. Even today there ar still strong odours in the Curtis Rd community on a frequent basis. If this is not fixed and taken into consideration in any plans CVRD WILL face a nuisance law suit..
Edi Johnston 1/30/2019 12:24 PM	As our oceans are in crisis, what can be done to remove excreted pharmaceuticals, micro-plastics etc.?
fmayhood 1/31/2019 09:31 AM	Ballpark costs and benefits for each option? Why do storms double (or more) inflow to the treatment plant?
vincevt 1/31/2019 11:29 AM	Some discussion on source control to raise public awareness of their role in keeping emerging contaminants out of the wastewater system
jrsmith1 1/31/2019 08:07 PM	No
Michele.jones 2/02/2019 10:59 AM	Not at this time
Tim 2/02/2019 08:40 PM	The 4 options presented are a good template for a series of long term plans. Option 1 is current practice. Option 2 should be considered the goal of a 5 (?) year plan to reduce the # of days >2xADWF to zero (if possible) through the reduction of I & I. This would reduce or eliminate the need for additional capacity. Option 3/4 should be considered the goal for a 20(?) year plan to move to tertiary treatment which I imagine is the ultimate long term goal for any waste treatment system. Included in this goal would be the future inclusion of any new technologies to deal with emerging contaminants.
Linda-Claire Steager 2/04/2019 09:48 AM	The above mentioned method if not being considered.
edonalds 2/04/2019 10:21 AM	My main concern is the 1. The Estuary is not negatively affected – for any species that uses the waterways 2. The smelly station at the end of 20 ST becomes redundant or is updated 3. The ocean is not negatively impacted. 4. Tax increases are related and reasonable.
bcmills 2/04/2019 06:07 PM	WE wonder about the taking of solid wastes to the landfill, as the pharmaceuticals and microplastics that are inevitably in the solid waste will just be returning to the water table and thus ultimately into the ocean.
salty 2/06/2019 08:20 AM	Seems like option number 4 is the obvious choice. Will be interesting to see the difference in capital and operating costs between options 3 and 4.

Optional question (11 responses, 8 skipped)

Q3 Are there any other conveyance options you'd like considered? Please share.

RPearson 1/30/2019 10:59 AM	Efficiencies and costs should be the consideration and not local interests in what might be the best approach for a route. Let the engineers decide what is best for the community.
gu3 1/30/2019 07:19 PM	The deep sea conveyance option sounds very expensive. It also hints at potential problems related to spills, leakages, challenging maintenance, and so forth. I don't have a clear understanding of the benefits and drawbacks of each option, but like the idea of upgrading the Courtenay station. Decentralized sounds reasonable, but would there be unnecessary duplications of infrastructure?
fmayhood 1/31/2019 09:31 AM	Above ground/elevated pipe?
Jill 1/31/2019 04:47 PM	I like the overland option 4. No pipes in the water, please
edonalds 2/04/2019 10:21 AM	I was the best possible long-term option for ALL Species that share this habitat. If it means front end loading, then so be it.
bcmills 2/04/2019 06:07 PM	Conveyance systems #3 or #4 seem appropriate to us. We support no system that requires tunneling though archelological sites, estuaries, or marine areas. These methods would impact vital spawning and nursery grounds, would disrupt marine habitat and vegetation;, and would result in the release of persistent organic pollutants, micropastics, and stored CO2 into the atmosphere or water column.

Optional question (6 responses, 13 skipped)

Q4 Is there any other information on conveyance that you'd like the committee to consider? Please share.

Edi Johnston 1/30/2019 12:24 PM	With sea level rise, increased tide height and storm damage, please stay away from the shoreline or any marine involvement.
gu3 1/30/2019 07:19 PM	What are the implications for each option in the event of an earthquake?
fmayhood 1/31/2019 09:31 AM	Earthquake survival properties of each option?
vincevt 1/31/2019 11:29 AM	Unless costs are significantly lower for options that include Comox #2 pump station, it seems that proceeding with any of those options would be a tough sell given the prior public backlash. Tunnelling seems like the least disruptive option for construction, but it will be interesting to see how costs compare
Tim 2/02/2019 08:40 PM	I believe that any new conveyance system must be overland in order to avoid any undue threat to our estuary, the health of our marine environment, and the shellfish industry among others. It is also my understanding that designing a conveyance system where these types of pump stations are built in series is considered "not best practice" and results in high risk of disaster These considerations seem to eliminate 5 of the 11 options right off the bat. (1A,B& C. 2A. and 6) Option 4 seems to require very high head (79m?) and seems a bit fanciful. Option 5 seems to involve very high costs for very little benefit. The tunnelling options seem to allow us to avoid major pump station construction and long term maintenance of same. Option 3C seems to be optimal.
Linda-Claire Steager 2/04/2019 09:48 AM	How safe is each location, ie pipes bursting or leaking with resulting contamination of the land and water?
edonalds 2/04/2019 10:21 AM	I think that one-way streets should be attempted for 5 years as a minimum. Traffic flows lights on 17th St bridge. No one knows whether traffic will increase given electronic vehicles, improved public transportation, again populations possible train service etc. I do think that large trucks and other such vehicles should use By pass roads and not go through the urban environment.
salty 2/06/2019 08:20 AM	Would an upgrade to the KFN pump station help alleviate pressure on the Courtenay Pump station (help to get waste up and over the hill) in any of the overland/tunnelling options?

Optional question (8 responses, 11 skipped)

Q5 Are there any other resource recovery options you'd like considered? Please share.

RPearson 1/30/2019 10:59 AM	I am in favor of any of the recovery solutions if they have a sound ROI on the community over the long run.
Edi Johnston 1/30/2019 12:24 PM	Please explore all options, the less we pump into the ocean, the better.
gu3 1/30/2019 07:19 PM	Please take a look at Abbotsford's system. We toured it years ago and were very impressed. Abbotsford uses treated solids and reclaims water. Very impressive system and approach, but have to assume that things have advanced even further.
dbroten 1/31/2019 01:10 PM	METHANE - biodigester
Linda-Claire Steager 2/04/2019 09:48 AM	Has methane capture from sewage been considered?. We could generate power. The library has a small book- the Pooh Book, I think. It tells of a city in Sweden that caotures the methane from excrement and powers the city. Toronto is now using zoo pooh to capture methane.
edonalds 2/04/2019 10:21 AM	solar solar, solar find out what other other nordic countries are doing. Possibly also China. They are far ahead of us regarding green alternatives.
bcmills 2/04/2019 06:07 PM	We support both the recovery of reclaimed water ant heat recovery. We support innovating for future health of the planet and its resources. Thank you

Optional question (7 responses, 12 skipped)

Q6 Is there any other information on resource recovery you'd like the committee to consider? Please share.

gu3 1/30/2019 07:19 PM	Please tour Abbotsford's system and consider their approach . . . with perhaps some advances that have evolved as a result of their system.
vincevt 1/31/2019 11:29 AM	The ability to use reclaimed water for irrigation seems compelling, considering long-term climatic trends towards drier summers, and the impacts that will have on local agriculture
Linda-Claire Steager 2/04/2019 09:48 AM	Use of excrement to capture methane. Plus, the then clean poop can be used as fertilizer.
edonalds 2/04/2019 10:21 AM	Are there no recycling of poop options? In China and Latin America human waste have been used for centuries.

Optional question (4 responses, 15 skipped)

IDEAS TOOL SUMMARY

IDEAS SUMMARY

3	Ideas
5	Contributors
7	Contributions

TOP 3 IDEAS BASED ON CONTRIBUTORS

4	2	1
Contributed to	Contributed to	Contributed to
Treatment Solutions	Conveyance Solutions	Resource Recovery Solutions

IDEAS

Treatment Solutions

VISITORS 5	CONTRIBUTORS 4	CONTRIBUTIONS 4

01 February 19

Sharon P.

VOTES	UNVOTES
0	0

Mini Treat sewage at each pump station. By the tim e it gets to the sewage plant the process wouldn't ha ve to be so intense.

05 February 19

greendog

VOTES	UNVOTES
0	0

Get the system away from the water--off the foresho re, out of the estuary and off the ocean floor. Has th e CVRD learned nothing in 40-years

04 February 19

Kal

VOTES	UNVOTES
0	0

Biofuel production from the renewable sewage slud ge is becoming a feasible reality all over the world . Why not here too?

Biofuel

04 February 19

Jim Elgie

VOTES	UNVOTES
0	0

Boydel Wastewater Technologies Inc. is a Vancouv er Island company located in Chemianus. Very envir onmental and cost effective system.

Boydel.ca

IDEAS

Conveyance Solutions

VISITORS 7	CONTRIBUTORS 2	CONTRIBUTIONS 2

05 February 19

greendog

VOTES	UNVOTES
0	0

Get the system away from the water--off the foresho re, out of the estuary, forget the ocean floor. Has the CVRD learned nothing in 40-years

23 January 19

Sid Lodewyk

VOTES	UNVOTES
0	0

Satellite sewer truck dumping station

To limit truck traffic through residential areas, trucking distances and odours associated with sewer truck dumping, the long term plan should include a dumping st ation in an industrial area.

IDEAS

Resource Recovery Solutions

VISITORS 1	CONTRIBUTORS 1	CONTRIBUTIONS 1

05 February 19

greendog

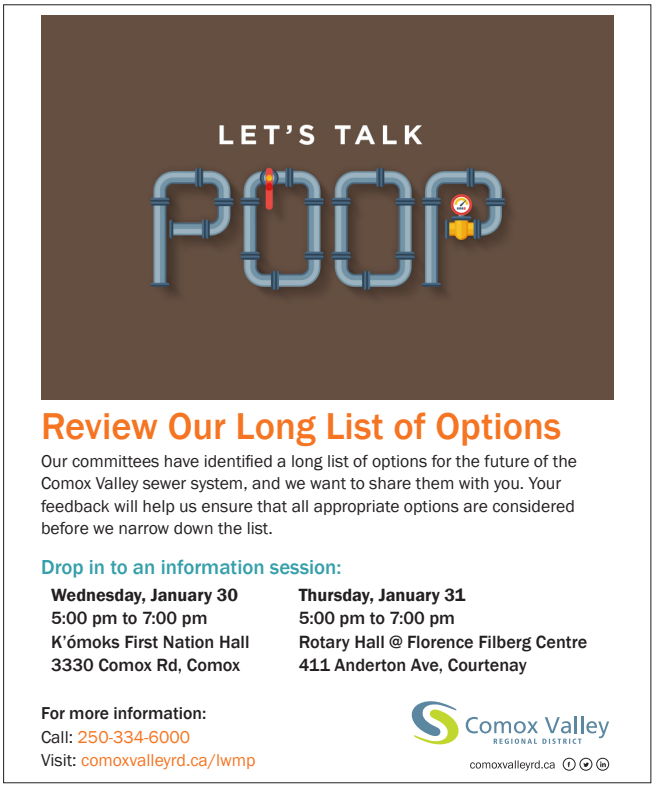
VOTES	UNVOTES
0	0

What do you intend to do by way of reclamation of t he pipeline that should be taken off the foreshore an d removed from the inland portion

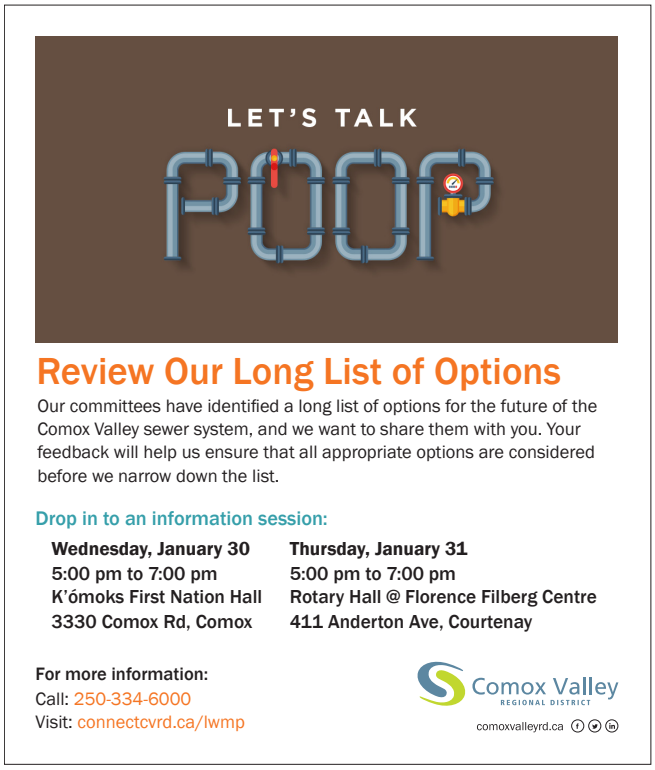
carrying sewage up to the plant. There are cost savings to be had!

APPENDIX 3 – SAMPLE ADVERTISEMENTS

Posters + “Save the Date” Cards: Distributed at recreational facilities throughout Courtenay/Comox

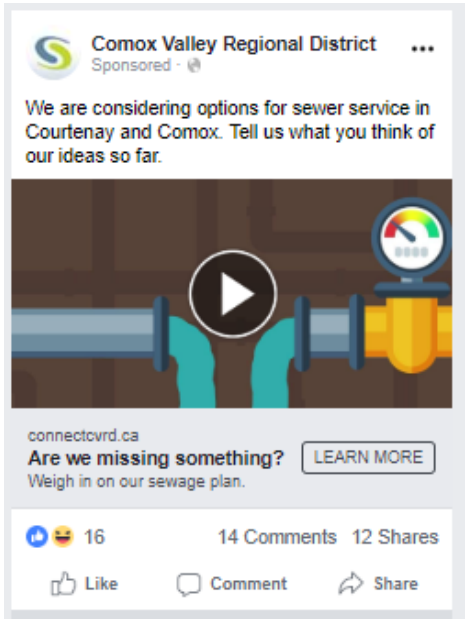


Print Ad: Comox Valley Record



Digital Display Ad: Displayed on screens at recreational facilities throughout Courtenay/Comox

Social Media Ad: Facebook & Instagram



Radio Ad Script

PROJECT: CV Sewer Service LWMP
MEDIA: 30 second ads
CAMPAIGN: Facilitated Session 3 Invite
RUN DATES: Jan. 14-28, 2019
FREQUENCY: TBD

SCRIPT
Want your say on the future of sewer service in Courtenay and Comox? Planning for the service is now underway and a long list of options has been developed. Now - it's your turn to learn more about the options and let us know if we've missed anything before the list is narrowed down. Information sessions will be held Wednesday January 30th at the K'omoks First Nation Hall and Thursday January 31st at Rotary Hall in Courtenay's Filberg Centre. Both run from 5 to 7 p.m. – drop in when it suits you. Learn more at comoxvalleyrd<dot>c-a<backslash>l-w-m-p.

APPENDIX 4 – INFORMATIONAL MATERIALS (EXAMPLES)

Long List Backgrounders

Long List Option No.1 — Conveyance (Estuary Alignments)

This alignment would involve installation of a new forcemain within or along the Comox harbour foreshore. The forcemain would transition to an overland pipe between Comox and the Lazo Road height of land. To convey the sewage over the Lazo Road height of land the following options are suitable:

1A. The forcemain from Courtenay Pump Station (PS) would continue directly to the treatment plant through a new tunnel at the Lazo Road height of land. The tunnel would reduce the required pressures in the system. Pending the tunnel elevation, a new pump station may be required in the general vicinity of the existing Jane Pl. Pump Station (PS). In which case, the existing Jane Pl. PS would be repurposed as a small subdivision pump station.

Advantages

- Potentially limited hydraulic changes to existing pump stations hydraulics subject to tunnel elevation.
- Minimizes construction of a forcemain through Comox
- Involves only two large pump stations

Disadvantages

- Involves work along and potentially in the estuary, including environmentally and archaeologically sensitive areas
- Elevated maintenance and risk management needs due to proximity to marine environment
- Elevated construction and operational risk associated with a tunnel

1B. The forcemain from Courtenay Pump Station (PS) would continue directly to the treatment plant such that there is no in-line pump station. In order to overcome the Lazo Road height of land, Courtenay PS would be upgraded to ensure the forcemain pressure is sufficiently high. As a result, the existing Jane Pl. Pump Station (PS) would not be able to cope with this higher hydraulic requirement and a new pump station would be required to convey raw sewage into the forcemain between Courtenay PS and the treatment plant. The existing Jane Pl. PS would be repurposed as a small subdivision pump station.

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Email: engineeringservices@comoxvalleyrd.ca
Phone: 250-334-6000

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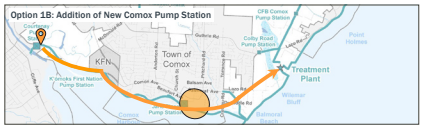
Advantages

- Minimizes construction of a forcemain through Comox
- Involves only two large pump stations (Jane Pl. PS repurposed as local facility only)

Disadvantages

- Involves work along and potentially in the estuary, including environmentally and archaeologically sensitive areas.
- Elevated maintenance and risk management needs due to proximity to marine environment



1C. A new pump station facility located somewhere between Comox and Lazo Road height of land. This would be an inline facility which receives raw sewage from Courtenay Pump Station (PS) discharge and pumps it over Lazo Road height of land to the treatment plant. The Jane Pl. Pump Station (PS) would tie-in to the Courtenay PS discharge forcemain at a location upstream of the new pump station. The elevation of the new pump station would have to be low enough to permit the Jane Pl. PS to hydraulically connect.

Advantages

- Minimize hydraulic changes to existing Courtenay and Jane Pl. Pump Stations
- Maximize useful life of existing foreshore forcemain
- Minimizes construction of a forcemain through Comox

Disadvantages

- Single point of failure of sewage conveyance system
- Involves operation and maintenance of three large pump stations, one highly critical
- Involves work along and potentially in the estuary, including sensitive areas
- Elevated maintenance and risk management needs due to proximity to marine environment

Long List Option No.2 — Conveyance (Overland Alignments)

This alignment would involve installation of a new forcemain overland from Courtenay Pump Station (PS) towards the treatment plant. This forcemain would pass over the Comox Rd. hill. Due to the change in discharge pressure a significant upgrade or rebuild would be required at the Courtenay PS. Several routing options are available, including:

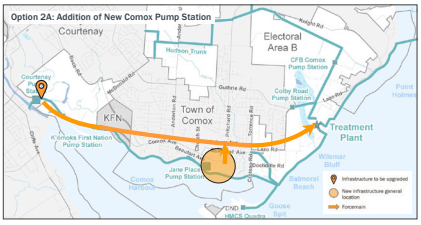
2A. The Courtenay PS would be upgraded to allow sewage from Courtenay to be pumped directly to the treatment plant. As a result, the existing Jane Pl. Pump Station (PS) would not be able to cope with this higher hydraulic requirement and a new high pressure head pump station would be required in the general vicinity of the existing Jane Pl. PS. This new facility would convey raw sewage into the forcemain between Courtenay PS and the treatment plant. The existing Jane Pl. PS would be repurposed as a small subdivision pump station.

Advantages

- No pipe in the estuary, mitigating environmental and archaeological risks
- All pipe and structures on-land to maximize maintenance accessibility
- Involves only two large pump stations (with Jane Pl. repurposed as local PS)

Disadvantages

- Significant hydraulic changes to the Courtenay PS and Jane Pl. PS
- Construction of new conveyance system through an area with significant existing infrastructure



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Phone: 250-334-6000

Comox Valley Regional District

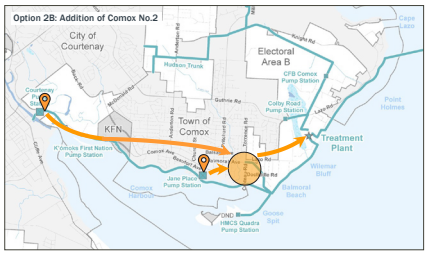
2B. The forcemain from the Courtenay Pump Station (PS) would convey raw sewage over the Comox Rd. hill and down into a new pump station located between Glacier View Drive and Comox Rd. The elevation of the new pump station must allow enough pressure to convey the sewage over Lazo Road to the treatment plant without exceeding the pressure capacity at Jane Pl. Pump Station (PS).

Advantages

- No pipe in the estuary mitigating environmental and archaeological risks
- All pipe and structures on-land to maximize maintenance accessibility
- Minimize hydraulic changes to existing Jane Pl. PS

Disadvantages

- Pump in series and single point of complete failure of sewage conveyance system
- Involves operation and maintenance of three large pump stations, one of high criticality
- Significant hydraulic changes to the Courtenay PS
- Construction of new conveyance system through an area with significant existing infrastructure



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Comox Valley Regional District

Long List Option No.3 — Conveyance (Tunnelling Alignments)

This alignment would involve installing a combination of new forcemains and gravity sewer mains overland from the Courtenay Pump Station (PS) towards the treatment plant. The tunnel alignments would be selected to either minimize pumping requirements or, where possible, utilize gravity sewer mains. The primary areas where tunnelling would be appropriate are under the Comox Rd. and Lazo Rd heights of land. Several combinations of forcemain/gravity sewer mains are described below:

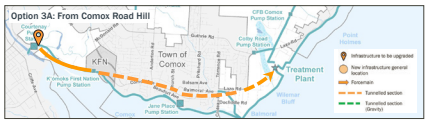
3A. Sewage would be pumped from the Courtenay PS to a tunnel constructed through Comox Rd. hill. The forcemain would transition to an open cut installation through Comox and back to a tunnel to pass under the Lazo Road height of land and down to the treatment plant. The Jane Pl. Pump Station (PS) could connect to the forcemain without modifications if the elevation of the tunnel does not require additional pumping capacity.

Advantages

- No pipe in the estuary mitigating environmental and archaeological risks
- Reduces pressures at the existing pump stations
- Significantly alleviates the high pressure head requirements for the Courtenay PS and Jane Pl PS as compared to other overland options

Disadvantages

- Elevated costs and risks due to tunnelling
- Construction of new conveyance system through an area with significant existing infrastructure



3B. A new forcemain would be installed from the Courtenay Pump Station (PS) directly to the treatment plant with a tunnel installed for the forcemain to pass through the Lazo Rd height of land. The existing Jane Pl. Pump Station (PS) would likely not be able to cope with this higher hydraulic requirement and therefore a new high pressure head pump station would be required near the existing Jane Pl. PS. This new facility would convey raw sewage into the forcemain between Courtenay PS and the treatment plant. The existing Jane Pl. PS would be repurposed as a small subdivision pump station. If the tunnel elevation is sufficiently low, the existing Jane Pl. PS would be suitable.

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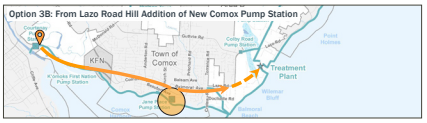
Advantages

- No pipe in the estuary mitigating environmental and archaeological risks
- All pipe and structures on-land to maximize maintenance accessibility
- Alleviates some of the high pressure head requirements as compared to other overland options

Disadvantages

- Construction of new conveyance system through an area with significant existing infrastructure
- Higher upgrade requirements at the Jane Pl. PS as compared to the other tunnel options



3C. A new forcemain from Courtenay Pump Station (PS) would continue directly to the treatment plant. A gravity sewer main tunnel would pass through the Lazo Rd height of land at the required slope. The Jane Pl. Pump Station (PS) would connect to the gravity sewer main through a new forcemain and the tie-in location would depend on the gravity sewer main alignment. The elevation of the new tunnel would determine whether Jane Pl. PS would need to be replaced to accommodate a high pressure head pump.

Advantages

- No pipe in the estuary mitigating environmental and archaeological risks
- All pipe and structures on-land to maximize maintenance accessibility
- Alleviates some of the high pressure head requirements for the Courtenay PS and most of the high head requirements for the Jane Pl. PS as compared to other overland options

Disadvantages

- Construction of new conveyance system through an area with significant existing infrastructure
- Gravity sewer main alignment must follow a specific slope which is dependent on the topography.
- Gravity sewer mains are significantly larger diameter as compared to forcemains for the same flow

Long List Backgrounders

Long List Option No.1 — Wastewater Treatment (Meet Regulatory Discharge Standards)

Option 1 would meet federal and provincial regulatory requirements for secondary treatment with discharge to open marine waters (the treatment plant outfall extends 2,825 m from shore at Cape Lazo into the Strait of Georgia and the discharge diffuser is 60 m below water at low tide). As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements needed to protect the environment according to provincial regulations. If no additional requirements are identified, the B.C. Municipal Wastewater Regulation (MWR) and the Canada Wastewater Systems Effluent Regulations (WSER) would apply to Option 1. These include:

Municipal Wastewater Requirements

Secondary treatment for up to two times average dry weather flow (2xADWF):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 45 mg/L
- Total suspended solids (TSS): max. day 45 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)

Primary treatment for flows in excess of 2xADWF (interim):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 130 mg/L
- Total suspended solids (TSS): max. day 130 mg/L
- Note: If flows are > 2xADWF during storm or snowmelt event with a less than 5-year return period, a discharger must have a liquid waste management plan or specific study and implement the plan's or study's measures.

WSER

- 5-day Biochemical Oxygen Demand (BOD5): monthly avg. not to exceed 25 mg/L
- Total suspended solids (TSS): monthly avg. not to exceed 25 mg/L
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15oC
- Note: The WSER standards apply to the combined discharge – this may require chemical addition to enhance primary treatment or other measures to ensure that the secondary treatment bypass does not cause the combined effluent to exceed the WSER discharge standards for BOD5 and TSS

An EIS was completed for the treatment plant discharge in 2010; this showed that disinfection of the effluent to achieve a fecal coliform count of less than 8000/100 mL in the discharge would be required to protect local shellfish resources outside the initial dilution zone (IDZ). Disinfection to this standard was assumed for Option 1.

Note: Plant data from 2013 to 2017 show that the number of days when flows exceeded 2xADWF ranged from 0 days (2013) to 31 days (2015) – over the 5 years of record, flow exceeded 2xADWF on a total of 58 days (the total volume of flow greater than 2xADWF represented only about 1% of the total plant flow over that period)

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Advantages

- Meets regulatory requirements for discharge to open marine waters
- Avoids the cost of subjecting relatively infrequent high wet weather flows to secondary treatment
- Coagulating (thickening) chemicals can be added to enhance primary treatment if needed when flows exceed average dry weather flows
- Includes disinfection to protect shellfish resources outside the initial dilution zone

Disadvantages

- Flows in excess of average dry weather flows would bypass secondary treatment and so would not receive biological treatment

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Long List Option No.2 — Wastewater Treatment (Provide Secondary Treatment for all Flows)

Option 2 is similar to Option 1, except that there would be no wet weather bypass of secondary treatment for increased flows. For Option 2, the entire plant influent flow would pass through secondary treatment (this is the current configuration of the treatment plant). As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 2, it was assumed that the disinfection process would be designed to achieve recreational standards in the undiluted effluent. The following treatment and discharge standards would apply to Option 2:

Secondary treatment for the entire plant flow:

- 5-day Biochemical Oxygen Demand (BOD5): max. day 45 mg/L, monthly avg. not to exceed 25 mg/L
- Total suspended solids (TSS): max. day 45 mg/L, monthly avg. not to exceed 25 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15oC
- Disinfection - fecal coliforms not to exceed 200 FC/1900 mL

Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Entire plant flow is subjected to secondary (biological) treatment
- Includes enhanced disinfection to protect shellfish resources
- Effluent meets standards for reclaimed water use for lower likelihood for direct human contact

Disadvantages

- Secondary treatment must be sized to accommodate all wet weather flows, increasing capital and operating costs compared to Option 1

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Long List Option No.3 — Wastewater Treatment (Advanced Treatment for Increased Flows)

Option 3 would incorporate the same preliminary, primary and secondary treatment processes as Option 2. In addition, Option 3 would include advanced (tertiary) filtration of the secondary treated effluent for increased flows during wet weather events to enhance removal of suspended solids. As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 3, the disinfection process would be designed to achieve a higher standard than Option 2 but would still only be treated to a standard of 'lower likelihood for direct human contact'. The following treatment and discharge standards would apply to Option 3:

Advanced treatment (tertiary filtration) for flows up to 2xADWF:

- 5-day Biochemical Oxygen Demand (BOD5): max. day 10 mg/L, avg. 5 mg/L
- Total suspended solids (TSS): max. day 10 mg/L, avg. 5 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15oC
- Future addition of processes that are proven for removal of emerging contaminants at municipal wastewater plants

Primary treatment for flows in excess of 2xADWF (interim):

- 5-day Biochemical Oxygen Demand (BOD5): max. day 130 mg/L
- Total suspended solids (TSS): max. day 130 mg/L
- Note: If flows are > 2xADWF during a storm or equivalent snowmelt event with a less than 5-year return period, a discharger must (have a liquid waste management plan or specific study and implement the plan's or study's measures.
- Disinfection of combined effluent - fecal coliforms not to exceed 200 FC/100 mL

Note: Plant data from 2013 to 2017 show that the number of days when flows exceeded 2xADWF ranged from 0 days (2013) to 31 days (2015) – over the 5 years of record, flow exceeded 2xADWF on a total of 58 days (the total volume of flow greater than 2xADWF represented only about 1% of the total plant flow over that period).

SEE OVER FOR FURTHER DETAILS

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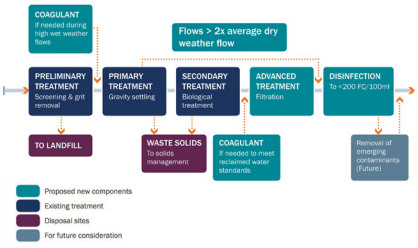
Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Majority of plant flow is subjected to advanced (tertiary) treatment
- Includes enhanced disinfection to protect shellfish resources
- Combined effluent meets standards for reclaimed water use for lower likelihood for direct human contact
- Ability to increase coagulation (thickening) and disinfection to meet standards for moderate or greater likelihood for direct human contact

Disadvantages

- Higher capital and operating costs than Options 1 and 2
- Flows > twice the average dry weather flow do not pass through advanced treatment
- Higher operational costs if treating reclaimed water to greater likelihood for direct human contact



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Long List Option No.4 — Wastewater Treatment (Provide Secondary Treatment for all Flows)

Option 4 would incorporate the same preliminary, primary, secondary, and advanced (tertiary) treatment processes as Option 3. However, for Option 4, the entire plant influent flow would pass through advanced (tertiary) filtration to enhance removal of suspended solids. As with the other options, an updated Environmental Impact Study (EIS) would be required to identify any additional treatment requirements that might be needed to address protection of the receiving environment. For Option 4, the disinfection process would be designed to achieve shellfish standards in the undiluted effluent, and disinfection could be increased to meet the reclaimed water standards for greater direct human contact if desired. This is the highest standard proposed. The following treatment and discharge standards would apply to Option 4:

Advanced (tertiary) treatment for the entire plant flow:

- 5-day Biochemical Oxygen Demand (BOD5): max. day 10 mg/L, avg. 5 mg/L
- Total suspended solids (TSS): max. day 10 mg/L, avg. 5 mg/L
- pH 6 to 9
- Ammonia concentration does not cause chronic toxicity at the edge of the initial dilution zone (IDZ)
- Total residual chlorine < 0.02 mg/L
- Un-ionized ammonia < 1.25 mg N/L at 15oC
- Disinfection - fecal coliforms not to exceed 14 FC/100 mL
- Future addition of processes that are proven for removal of emerging contaminants at municipal wastewater plants

Advantages

- Exceeds regulatory requirements for discharge to open marine waters
- Entire plant flow is subjected to advanced (tertiary) treatment
- Includes enhanced disinfection to protect shellfish resources
- Effluent meets standards for reclaimed water use for greater likelihood for direct human contact

Disadvantages

- Higher capital and operating costs than Options 1, 2 and 3
- Higher operational costs if treating reclaimed water to greater likelihood for direct human contact

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Treatment Planning Considerations

The Comox Valley Sewer Service treats its wastewater at a treatment plant located on Brent Road, Comox. That facility opened in 1984 and will require upgrades in order to accommodate our communities' continued growth and meet increasing environmental regulations.

To plan for the future of treatment for the service's wastewater, technical consultants and advisory committees have considered:

AREA GROWTH AND TREATMENT STANDARDS

- **FUTURE GROWTH:** Capacity of the treatment plant needs to increase to accommodate growth of the service area.
- **EFFLUENT QUALITY:** Federal and provincial regulations for effluent quality have changed. As a community should we be aiming to achieve or do better than regulatory limits?
- **ENVIRONMENTAL PROTECTION:** Cape Lazo and neighbouring Baynes Sound are environmentally sensitive areas that support many activities, including the shellfish aquaculture sector. Achieving a standard that best protects these resources is considered in options for the treatment plant.

COSTS OF WASTEWATER TREATMENT

- **COST:** Generally speaking, the higher the degree of treatment, the higher the construction and operating costs.
- **HOW TO PAY:** Future planning has to balance treatment goals with the financial resources available to the community. While capital costs can be eligible for grant funding, ongoing operations and maintenance costs are not.
- **SETTING GOALS:** One option presented on the long list meets the provincial standards while three offer a voluntary improvement to what is required.

EMERGING CONTAMINANTS

- **INCREASED FOCUS:** The impacts of emerging contaminants has drawn increasing attention in the public and was flagged as a concern in earlier stages of this planning process.
- **PREVENTION:** There is still a lot to learn about many contaminants (ie: antibiotics or personal care products), and limiting their entry into the system is likely the best approach to managing them.
- **LOOKING AT OPTIONS:** Including the necessary components to address metals or microplastics is being considered.

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Recovering Resources

In recent years, there has been increasing interest in recovering resources created through the collection and treatment of wastewater – such as reusable water, or heat. Resource recovery can have environmental benefits and generate revenue streams, but these must be weighed against increased capital and operations costs. As part of this planning process, options for resource recovery are being considered.

RECLAIMED WATER

- Some of the treatment plant options on the long list are designed to produce effluent that meets requirements for reclaimed water.
- Since this adds to cost of treatment, it's key to find a market for the resulting product.
- Onsite, this could include expanded use of reclaimed water, or offsite applications could use larger amounts (ie: irrigation or industrial use) – but this would require installation of pipes to get the water to where it is needed.

HEAT RECOVERY

- The use of heat extracted from the treatment process for space heating of buildings is becoming more common.
- Along with water reclamation, heat recovery for use onsite at wastewater treatment facilities is more cost effective than heat recovery at pump stations.
- Need to consider whether there's a nearby user who could use exported heat.

BENEFICIAL USE OF TREATED SOLIDS

- The CVRD already has a system in place to recover nutrients from the solids collected through the wastewater treatment process using a composting system.
- The final product – SkyRocket – is a Class A compost and is allowed for sale to individuals and commercial use.

Technical consultants also looked at other resource recovery options but suggest they are not feasible at this point:

- Production of Biogas: The current plant production is not large enough to make this economical.
- Extraction of Nitrogen and Phosphorus for Fertilizer Pellets: Due to the treatment processes currently in place, and cost, this is not feasible.
- Hydroelectric Turbine at Outfall: There is insufficient pressure head at the treatment plant's outfall for this.

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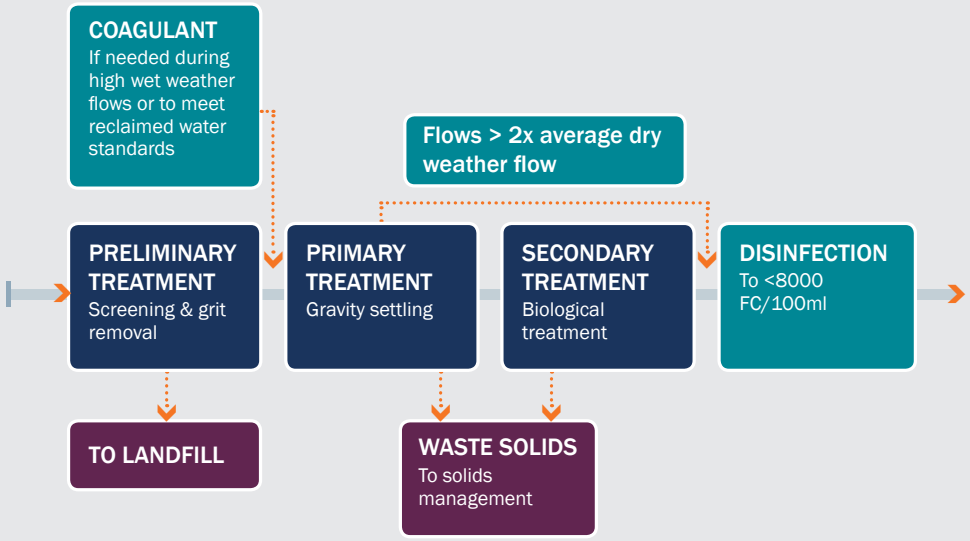
Treatment Planning: Options 1 and 2

Four options have been developed for consideration. Below is a summary of Options 1 and 2 – please refer to your background package for thorough details about treatment standards for each.

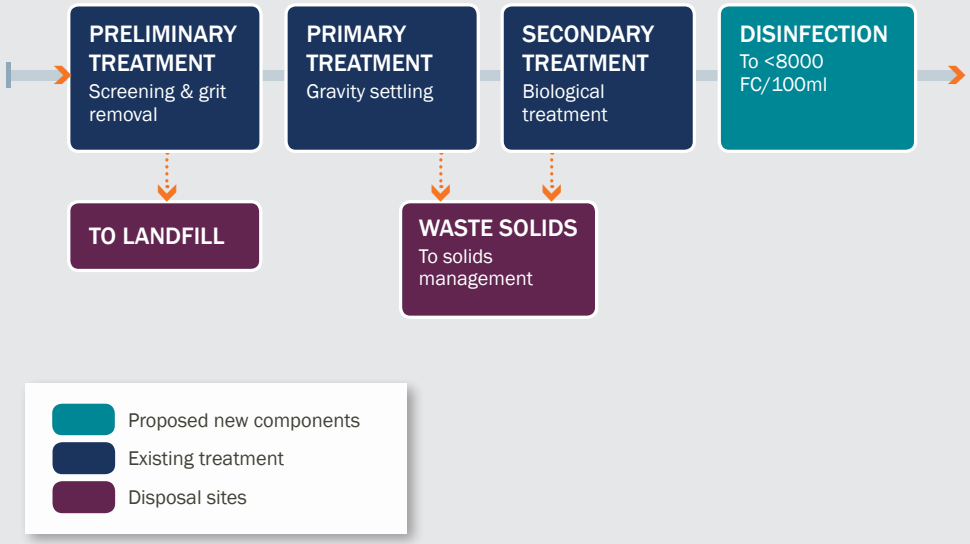
OPTION 1: Meets regulatory discharge standards

- Three-stage treatment (primary, secondary and disinfection)
- Bypass of secondary treatment for days of heavy inflows due to storms to avoid high infrastructure costs
- Addition of a coagulating (thickening) agent to enhance primary treatment in cases of high inflows
- Addition of disinfection to protect shellfish



OPTION 2: Secondary treatment for all flows (current system)

- Similar to Option 1, but with no bypass for heavy inflows, meaning all wastewater will move through secondary (biological) treatment
- Infrastructure must be sized to process max inflow - although majority of the time it is unused - resulting in increased capital and operating costs
- This is the current process at the treatment plant with the addition of disinfection for shellfish protection outside the initial dilution zone



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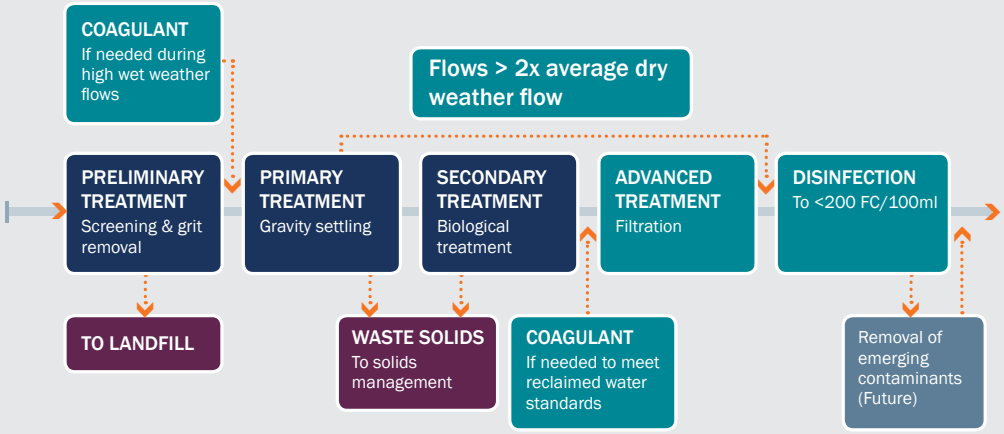
Treatment Planning: Options 3 and 4

Four options have been developed for consideration. Below is a summary of Options 3 and 4 – please refer to your background package for thorough details about treatment standards for each.

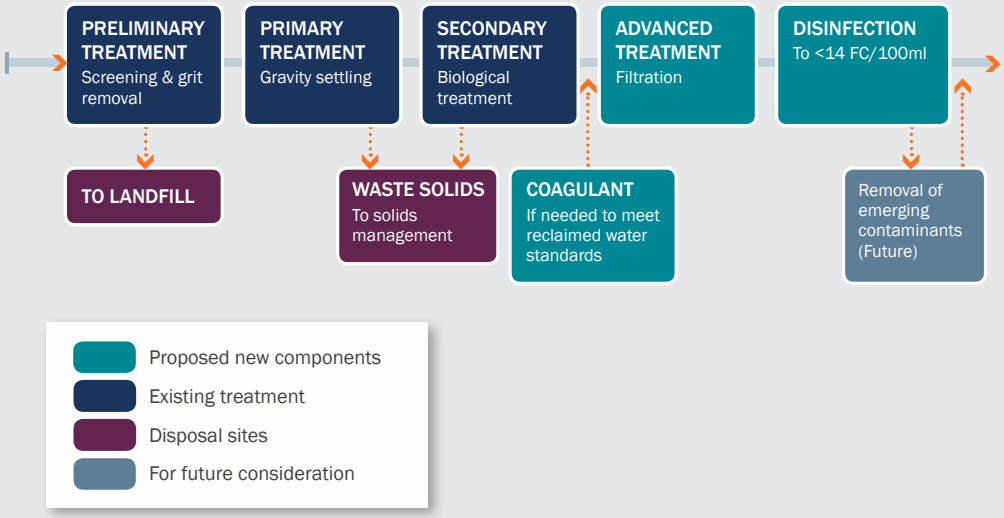
OPTION 3: Advanced treatment for up to 2x the average dry weather flow

- Similar to Option 2, with the addition of filtration for flows up to two times the average daily water flow
- Further protect shellfish and provide the best opportunity for reclaimed water by combining with installation of disinfection
- Increased capital/operating costs to Options 1 and 2



OPTION 4: Advanced treatment for all flows

- Similar to Option 3, but with all flows – regardless of amount – moving through filtration
- Further protect shellfish and provide the best opportunity for reclaimed water by treating and disinfecting all wastewater
- Increased capital/operating costs to Options 1, 2 and 3



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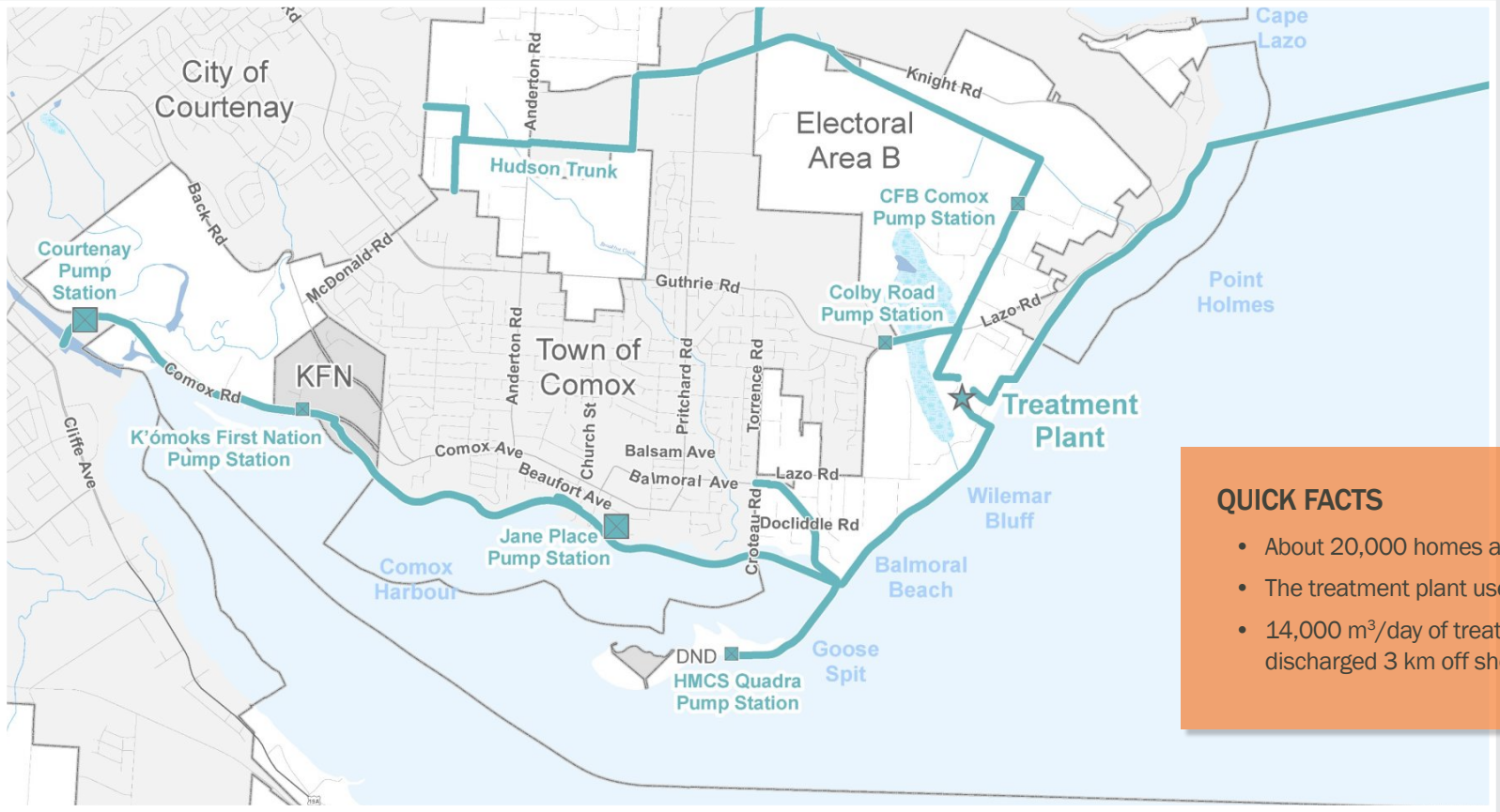
Sewer System Map

To understand the options proposed for a new conveyance system to serve Comox and Courtenay residents in the long term, it's important to understand the current system.



QUICK FACTS

- About 20,000 homes are connected to the service
- The treatment plant uses secondary treatment
- 14,000 m^3/day of treated effluent on average is discharged 3 km off shore

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Your Ideas: Treatment and Resource Recovery

Share your thoughts on the options presented for wastewater treatment and resource recovery here.
Have we missed anything? Are there any that should be removed?

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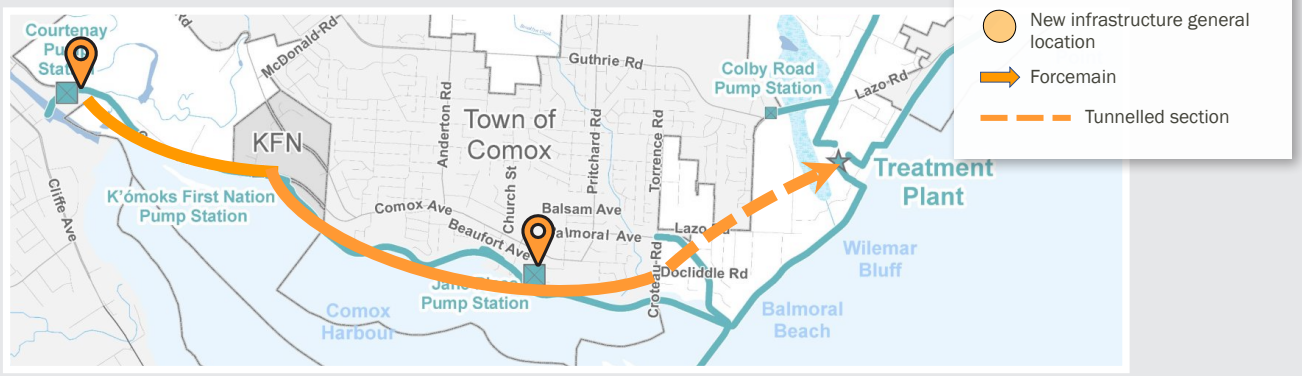
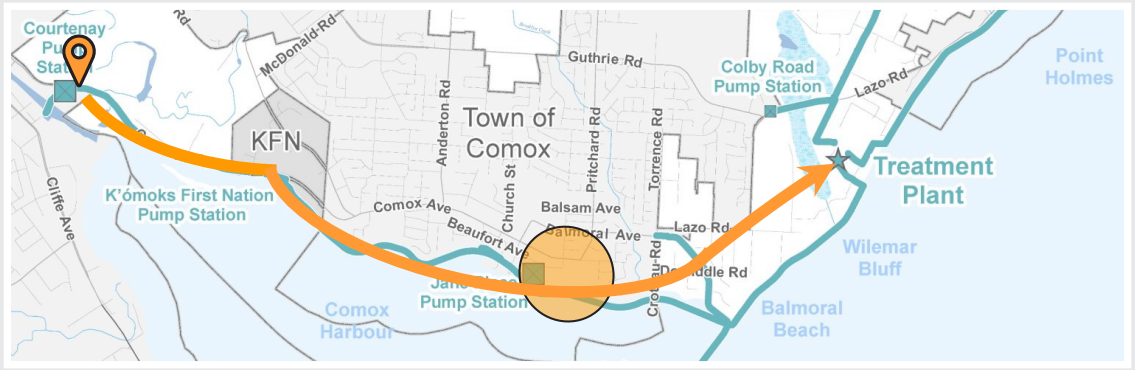
Moving Wastewater: Estuary Routes

Eleven options for conveyance are included on the long list. Below is a summary of the three options that use an estuary route for the conveyance system (moving wastewater from major pump stations to the treatment plant). Please refer to your background package for thorough details about each option.

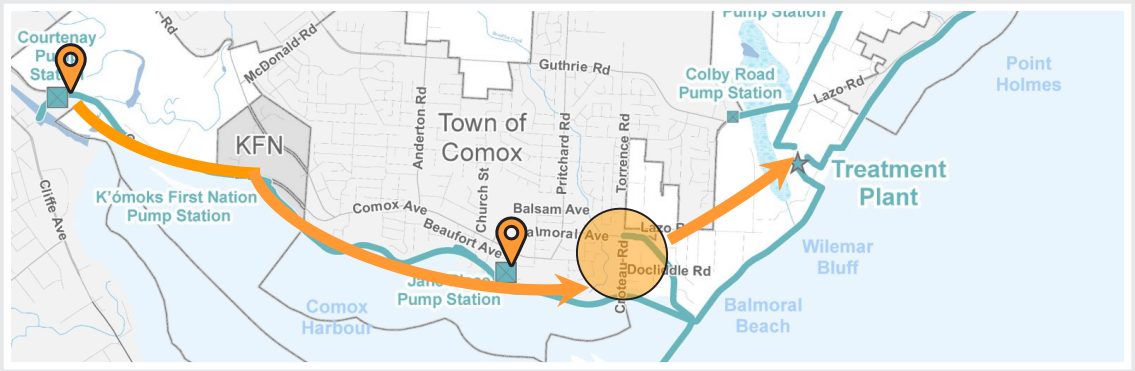
1a. Estuary Alignment – Tunnelling: Foreshore forcemain with tunneled route through Lazo Road height of land and (possibly) new pump station at low elevation in Comox.



1b. Estuary Alignment – Addition of New Comox Pump Station: Foreshore forcemain route with upgrades to Courtenay pump station and new high-head station at low elevation in Comox.



1c. Estuary Alignment – Addition of Comox No.2: Foreshore forcemain route with addition of new in-line pump station between Comox and Lazo Road height of land.



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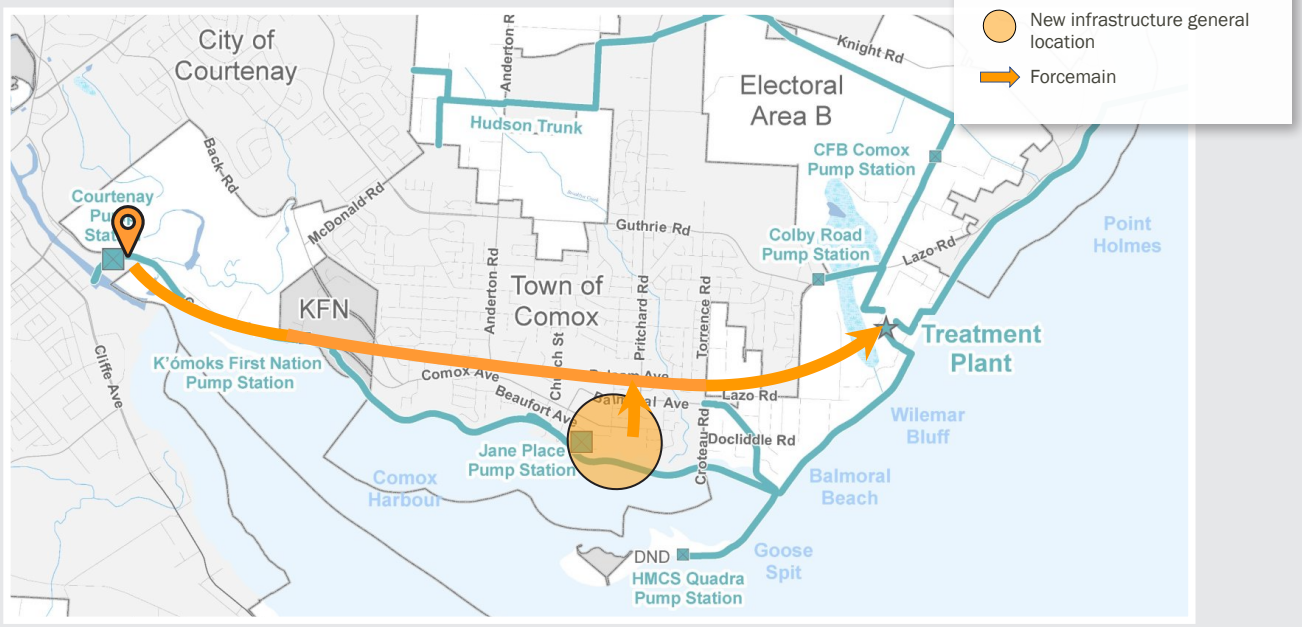
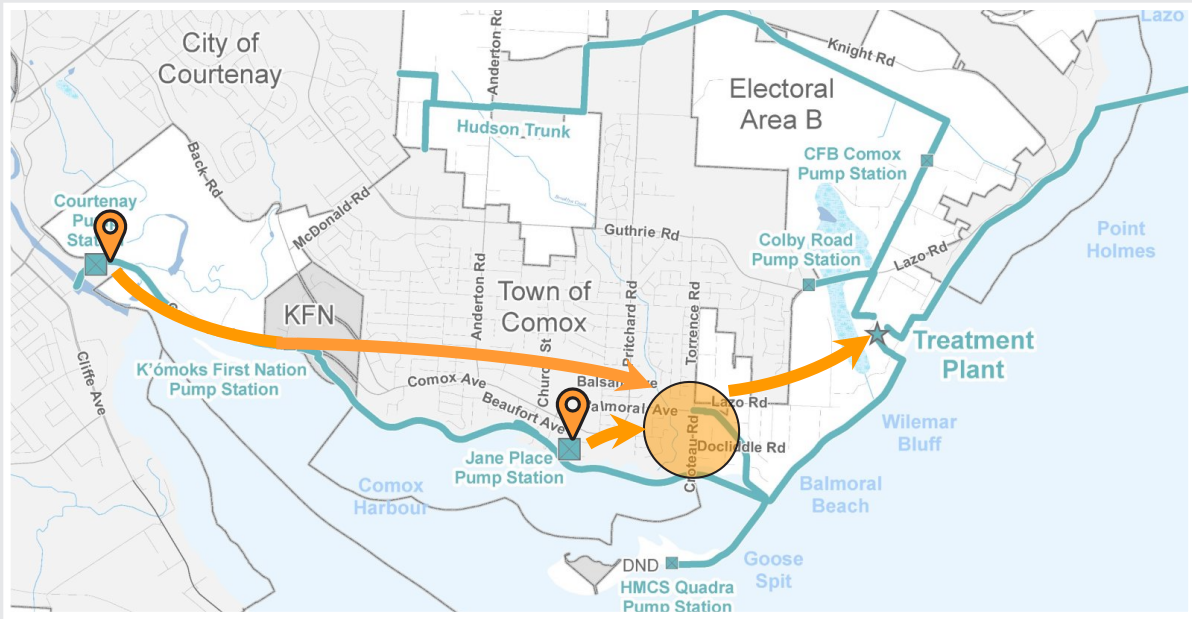
Moving Wastewater: Overland Routes

Eleven options for conveyance are included on the long list. Below is a summary of two options that include an alignment overland for the conveyance system (moving wastewater from major pump stations to the treatment plant). Please refer to your background package for thorough details about each option.

2a. Overland Alignment – Addition of New Comox Pump Station: New forcemain along Comox Road from upgraded Courtenay pump station and new pump station at low elevation in Comox.



2b. Overland Alignment – Addition of Comox No.2: New forcemain from Courtenay pump station along Comox Road, with new in-line pump station.



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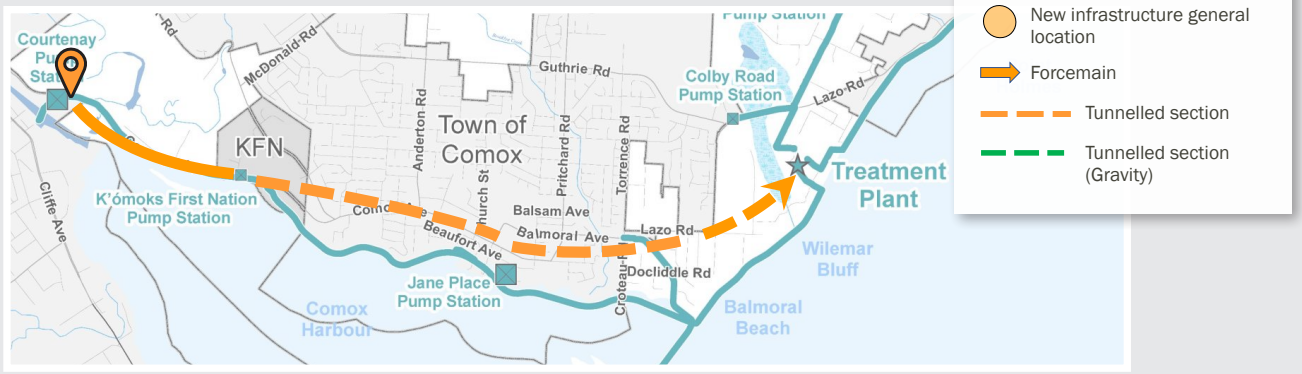
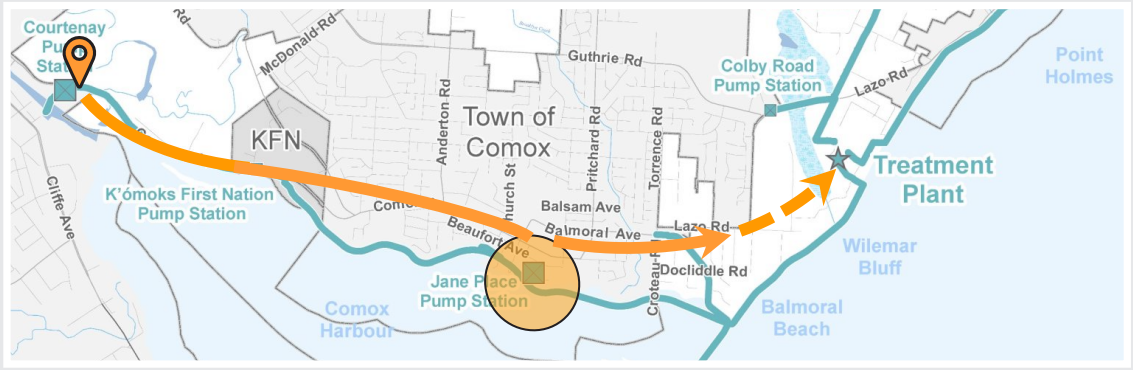
Moving Wastewater: Tunnelling

Eleven options for conveyance are included on the long list. Below are three options that include tunnelling for the conveyance system (moving wastewater from major pump stations to the treatment plant). Please refer to your background package for details about each option.

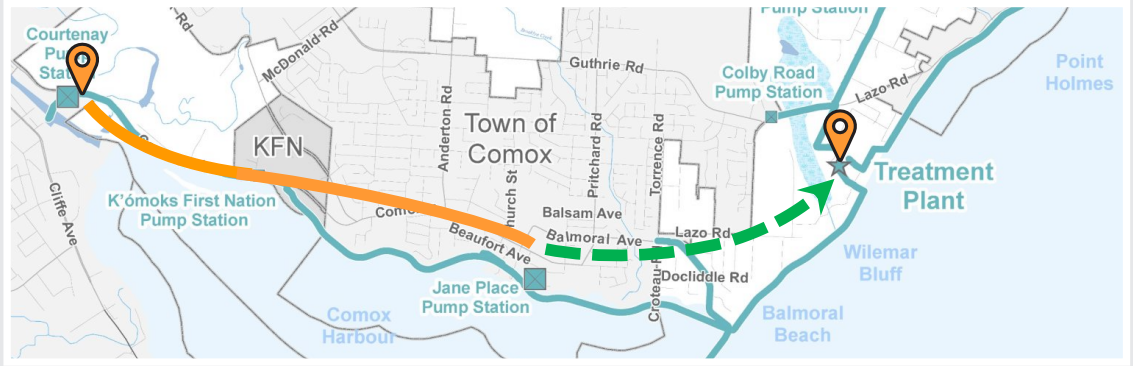
3a. Forcemain Tunnel Alignment – From Comox Road Hill:
Tunnel through Comox Road and Lazo Road hills and forcemain installed through Comox, with Jane Place connecting in.



3b. Forcemain Tunnel Alignment – From Lazo Road Hill Addition of New Comox Pump Station: Open cut forcemain with tunnel through Lazo Road hill and new pump station at low lying area in Comox (or modify existing pump station if possible).



3c. Gravity Tunnel Alignment – From Lazo Road Hill: Open cut forcemain to gravity main at Lazo Road with route determined by required slope.



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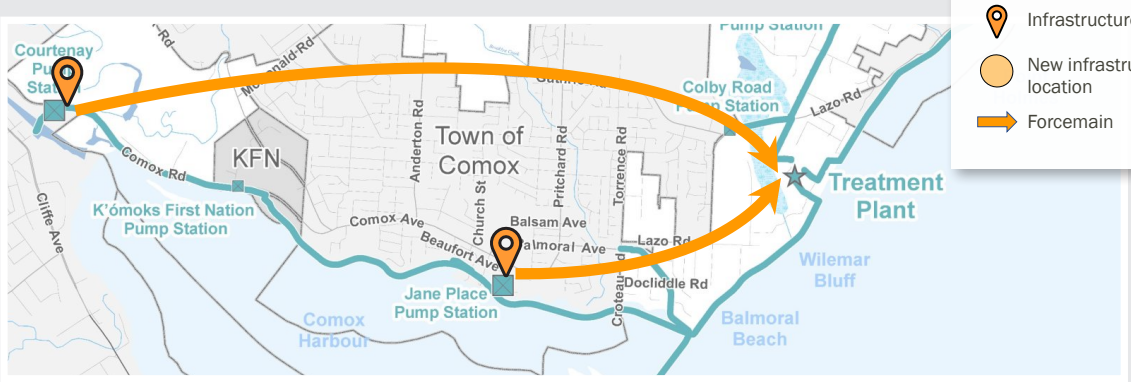
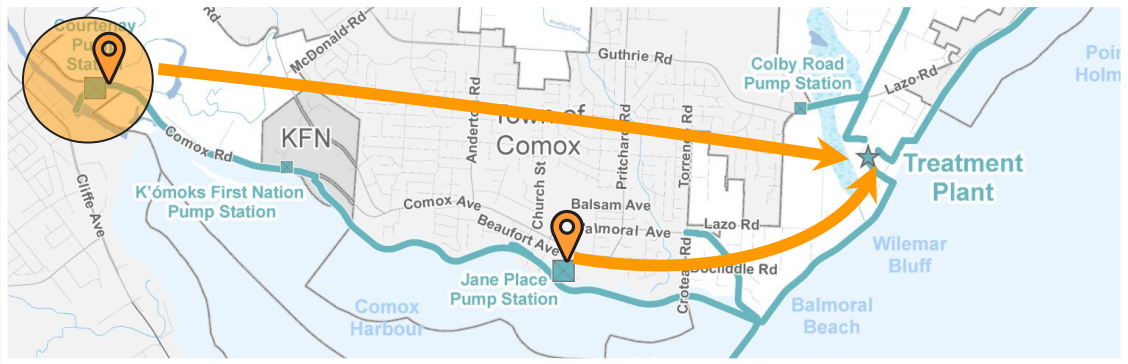
Moving Wastewater: Alternatives

Eleven options for conveyance are included on the long list. Below are three alternative options for the conveyance system (moving wastewater from major pump stations to the treatment plant). Please refer to your background package for thorough details about each option.

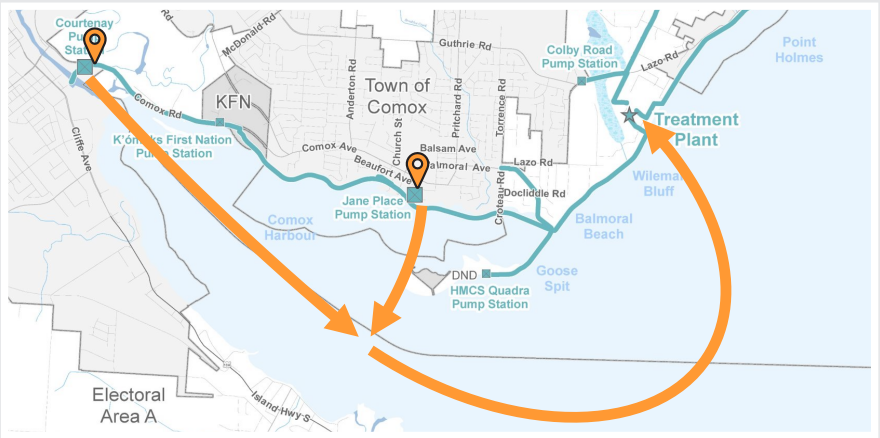
4. North Side Concept: Routing new forcemain to the north side of the service, maintaining separate one from Jane Place.



5. Decentralized Treatment: Addition of a new treatment plant near Courtenay pump station, treated effluent piped to existing outfall.



6. Deep Marine Concept: Siting forcemain in deep water, connecting existing pump stations to existing treatment and discharge points.



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Your Ideas: Conveyance

Share your thoughts on the options presented for conveyance (moving wastewater) here. Have we missed anything? Are there any that should be removed?

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