COUNCIL REPORT

REPORT DATE: February 20, 2018
MEETING DATE: February 26, 2018

TO: Mayor and Councillors

FROM: Paul Nash, LWMP Project Coordinator

SUBJECT: 2018 LWMP Wastewater Treatment Options

RECOMMENDATION

i. THAT Council receive the 2018 LWMP Wastewater Treatment Options report.

ii. THAT the following recommendation of the Technical Consultant and Wastewater Advisory Committee be adopted for the preferred Discharge Option:

1. *With the exception of future reuse applications, discharge shall continue to be to the Maple Lake Creek watershed;*
2. *A second (indirect) discharge location to the Maple Lake Creek watershed via the North Wetland be established; and,*
3. *Any future reuse applications take into consideration maintaining minimum dry weather flows in Maple Lake Creek.*

AND THAT Option 1, Phase 2A – Upgraded Lagoon to MEP quality, with discharge to the North Wetland – be adopted as the preferred long term Treatment Option;

AND THAT the Biochar Reed Bed be adopted as part of the long-term Treatment Option, subject to further study and successful pilot testing;

AND THAT a complete project, rather than a phased one, be pursued for all grant applications, and only execute a phased project if there is insufficient grant funding obtained for a complete project;

AND THAT Cumberland moves to implementation of a project using the regulatory authority of the Discharge Permit, and seeking elector approval for any borrowing, rather than waiting for authorizations by completion of Stage 3 of the LWMP;

AND THAT Council direct staff to provide a report summarizing the risks and opportunities associated with seeking elector approval for borrowing in advance of securing grant funding.

SUMMARY

The renewed Cumberland LWMP began March of 2016, with the Stage 1 work being completed in 2016. Following the unsuccessful funding application of November 2016, the Stage 2 LWMP work plan that was presented to Council in April 2017 has been substantially completed. This work plan was to do field study on the lagoons and receiving environment, and develop lagoon based treatment options as alternatives to the mechanical treatment options developed in 2016.

This report summarizes the following:

- Findings of the 2017 field study program;
- Treatment Options developed;
- Evaluation process used by the Wastewater Advisory Committee (WAC)
- Remaining work to complete Stage 2 of the LWMP; and,
- Provides the recommendations made by the WAC.

BACKGROUND

2016 LWMP Activities

Within the three stage LWMP process, Cumberland effectively completed Stage 1 in 2016, and is now in Stage 2;

Stage 1 Set the goals and identify the broad options to achieve them. (2016)

Stage 2 Study the shortlisted options and decide preferred option. (2017-18)

Stage 3 Detailed study of preferred option, develop plans for implementation and financing, Ministry Approval (2018-19)

Summary of 2017 Stage 2 LWMP Study

The overall work plan for 2017 was presented to Council on April 24th and consisted of;

- Field studies of the treatment lagoons and the current receiving environment of Maple Lake Creek and Trent River.
- Developing lagoon based and “baseflow mechanical” treatment options, in addition to the “full flow mechanical” option developed in November 2016.
- Developing a “phased approach”, with the intention being to have a first phase treatment project in the order of $5M.
- Studying the various discharge options shortlisted in 2016.
- Studying of emerging contaminants (pharmaceuticals etc) and treatment options, including the biochar reed bed.
- Other studies as part of the normal Stage 2 LWMP scope of work;
    - Integrated Resource Recovery
    - Biosolids
    - Stormwater and infiltration
    - Servicing options for Comox Lake area

- Grant funding opportunities.

This work is captured in a series of Technical Memorandums (TM's), which have been provided to the WAC in advance of the relevant decision making meetings. The complete list and status of these is shown below in Table 1.

Table 1. Status of Technical Memorandums.

TM No.	Title	Status
1	Regulatory Framework	Completed Oct 2017
2	Financial Framework	Completed Oct 2017
3	Historical and Projected Flows and Loads	Completed Oct 2017
4	Lagoon Performance	Completed Oct 2017
5	Receiving Environment	Completed Oct 2017
6	Discharge Options	Completed Oct 2017
7A	Treatment Options	Completed Nov 2017
7B	Treatment Options Cost Comparison	Completed Nov 2017
8	Emerging Contaminants	Completed Jan 2018
9	Effluent Polishing by Biochar Reed Bed	Completed Jan 2018
10	Biosolids Management	TBC March 2018
11	Integrated Resource Recovery (water and heat)	TBC March 2018
12	Servicing of Comox Lake Area	TBC March 2018
13	Stormwater Management	TBC March 2018
14	Grant Funding Opportunities	Completed Jan 2018
15	Water Conservation	TBC March 2018
	Stage 2 LWMP Report	Draft TBC March 2018 Final TBC April 2018

The major findings of this work have been (greatly) simplified below.

Regulatory

1. The existing Discharge Permit allows (and requires) construction of upgraded works to meet the permit conditions – this is the scope of a Phase 1 project. The Permit flow limit of 910 cu.m/day for average flow (currently 770 cu.m/day) is expected to be reached sometime between 2023 and 2029.
2. If construction is implemented using the authority of the Permit, works can be constructed to give greater flow capacity – up to the design dry weather flow of 1800 cu.m/day. But to actually use this capacity – when average flows exceed 910 cu.m/day, will require new

authorization by either registering under the Municipal Wastewater Regulation, or completing the LWMP to Stage 3 and getting Ministerial approval.

3. The Discharge Permit requires phosphorus treatment of the effluent to a concentration of <1.0mg/L, which can easily be achieved by conventional nutrient removal methods. The "in-stream" phosphorus criteria of <0.005mg/L is proposed by BC MoE for *new discharges* to freshwater streams on Vancouver Island. It does not apply to the existing discharge, which is governed by the Permit. When the Permit average flow of 910 cu.m/day is exceeded, and the new authorization under either the MWR or an LWMP is required, then this phosphorus criteria is intended to apply.
4. The effluent quality level required by the Permit ("30-30" for BOD and TSS) is very close to that required by the new Federal regulations ("25-25"), and also that required by the MWR for reuse where there is "Moderate Exposure Potential" ("MEP, 25-25"). Discharge of the treated water to the natural wetland area to the north can be done as an MEP reuse. Reuse for irrigation, or direct discharge to Maple Lake Creek in summer, is classed as "Greater Exposure Potential" (GEP, 10-10) reuse and requires a higher standard "10-10" effluent.
5. Doing any reuse of water, other than internal use within the treatment system, will require a new authorization under the MWR or a completed LWMP, and thus cannot happen if a project is done using the authority of the Permit.
6. The MWR also has requirements for equipment redundancy which the Permit does not. So even though the Permit effluent quality is similar to the MEP and Federal requirements, there are additional works required to when upgrading from Permit to MWR even with no change of effluent quality.
7. Innovative treatment methods (such as the Biochar Reed Bed) might improve the water quality beyond Permit, to the levels required by the MWR for GEP reuse. If this is included in a first phase (Permit compliance) project, the performance can be field evaluated for several years, and if proven successful, can be included in the future MWR/LWMP authorization. In effect, the Permit allows this higher performance to be targeted, without being required, and if proven before it is required.

Lagoons and Receiving Environment

1. The lagoons are doing a surprisingly good job of wastewater treatment, but in summer this performance is masked by the growth of algae.
2. The wetlands are achieving good levels of disinfection through natural die-off, but disinfection is still (and always) required before discharge from the treatment works, even under storm flow conditions.
3. In late summer, the effluent is effectively the only flow in Maple Lake Creek, and represents about half of the flow volume of the lower Trent River. Withdrawal of the effluent flow – for storage, reuse or discharge to another watershed (e.g. as proposed by the South Sewer Project), would have serious impacts on both receiving environments.

Phosphorus and the Trent River

Phosphorus concentrations in effluent, and the receiving waters of the Trent River, have long been an issue for Cumberland's wastewater treatment, with the concern mainly being the

possibility of excess phosphorus leading to algae blooms in the lower Trent River in the summer. Influent phosphorus to the lagoons is typically 6 to 7 mg/L – a normal level for municipal wastewater, and effluent phosphorus is typically 5 to 6mg/L, a normal level for lagoon treatment with no dedicated phosphorus removal. The existing natural wetlands in Maple Lake Creek are doing a surprisingly good job of removing the phosphorus, consistently achieving a concentration of 0.2 mg/L, or 96.7% removal. This is a performance achieved only by the best wastewater treatment plants, and is a real-world example of an ecological service being performed by a "Natural Asset." This is different to earlier views of Maple Lake Creek, such as the 2011 Pulsed Discharge Study, which regarded MLC as a "conduit" for the effluent, with little removal of Phosphorus.

In late summer, when the Cumberland effluent is the only water in MLC, the dilution with the with the lower Trent River is in the order of 1:1. The resulting phosphorus concentration in the mixed waters is typically 0.03 to 0.06mg/L, which is close to the objective of 0.005mg/L. At the observed flow volumes – in the order of 700 cu.m/day each in MLC and the Trent, the amount of remaining phosphorus that needs to be removed to meet the 0.005mg/L is about 70 grams per day.

Once phosphorus removal is instituted at the lagoons, to meet the Permit requirement of <1mg/L, 83% of the phosphorus has been removed before the water goes into MLC. It is anticipated that the existing natural wetlands, now starved for phosphorus, will remove the remaining phosphorus to even lower concentrations than present. So it is possible that the Trent in-stream objective of P<0.005mg/L might be achieved by the combination of upgraded treatment and the natural wetlands. If this objective is not achieved, it may still be the case that the stream health of the lower Trent is being protected anyway, This will require on going monitoring once the new system is implemented and would be the central part of a future EIS for MWR registration or Stage 3 LWMP.

Discharge Options

1. Because of the adverse effect of removing summer effluent flow from Maple Lake Creek, summertime discharge to Maple Lake Creek should be continued (after proper treatment).
2. Discharge to Maple Lake Creek can also be done indirectly, via the natural wetland area to the north of the lagoons - called "wetland augmentation", and this is an MEP (Moderate Exposure Potential) reuse of the water.
3. With Maple Lake Creek effectively becoming the only discharge option, all the others that remove water from Maple Lake Creek (summertime storage or diversion) become environmentally unacceptable and were not studied in any detail.

Treatment Options

The performance data from the lagoon allowed the development of an "upgraded lagoon" treatment option, which could be done in several phases and to meet different quality levels.

Four different treatment "long term" Treatment Options were developed, to meet the MWR requirements for the 20 year design population of 7000 people and projected dry weather flow of 1800 cu.m/day. Additionally, a "Phase 1" option, to meet the Permit requirements, was also developed. Phase 1 does not meet the long-term requirements, but can be a first phase for any of the four long term treatment options.

The Options are summarized below;

Table 1. Comparisons for all Treatment Options.

	Option 1 Upgraded Lagoon			**Option 2**	**Option 3**
	Phase 1	**Phase 1 + Phase 2A,**	**Phase 1+ Phase 2B,**	**Baseflow Mechanical,**	**Full Flow Mechanical,**
Regulatory Standard	**Permit Compliance**	**MWR MEP**	**MWR GEP**	**MWR GEP**	**MWR GEP**
Effluent Quality	25-25	25-25	10-10	10-10	10-10
Population capacity	4500-5000	7000	7000	7000	7000
Design horizon	2023-2029	2039	2039	2039	2039
Tertiary treatment flow capacity (cu.m/day)	none	none	3600	3600	3600
Secondary treatment flow capacity (cu.m/day)	>14,400	>14,400	>14,400	>14,400	14,400 max
Discharge Location	MLC	North Wetland	MLC	MLC	MLC
Lagoon Use	All Flow	All Flow	All Flow	Only for flow > 3600	De-commissioned
Complexity	moderate	moderate	high	highest	high
Energy use	moderate	moderate	moderate	high	highest
Biosolids withdrawal	Periodic dredging + low volume continuous	Periodic dredging + low volume continuous	Periodic dredging + low volume continuous	Continuous	Continuous
Capital Cost for single execution	$5.6M	$8.7M*	$10.6M	$ 9.3 M	$14.8 M
Capital cost for two-phased execution	N/A	$9.5M*	$ 11.7M	$10.2M	$16.3M
Annual Operating Cost	$350k	$375k	$425k	$450k	$500k

Notes:

- *Costs are a Class C estimate, to +/- 25%*
- *The cost difference between a single and two-phase execution is in re-mobilizing and managing a second project.*
- *Option 1, Phase 2A includes $1M for the Wetlands Augmentation, as it is integral, and required, for this Option. It is a discretionary add-on (for $1M) to Phase 1 or 2B, and Options 2 and 3.*

- *None of these costs include the Biochar Reed Bed, which is also a discretionary add- on for $1M, to any of the options.*

Grant Funding Opportunities

The "Ability to Attract Grant Funding" is one of the categories of the Evaluation System, and worth 17% overall. At meeting #14, held on November 30, 2017 it was determined by the Committee that there was insufficient information to make meaningful evaluations for this category. At the request of the Committee, a detailed study of grant funding opportunities, and the likelihood of the various options to received grants, was made and reported as Technical Memo #14, which was reviewed at meeting #15, held on January 25, 2018.

The study showed that Option 1, Phase 1, and Option 3 had the least chances of securing grant funding, while 2A, 2B and Option 2 were close, with 2A being the highest. The study also showed that the discretionary add-ons, of the wetlands augmentation and the biochar reed bed, each conferred a higher ranking when they were included with any Option, giving a lot of evaluation benefit for their relatively low cost.

The main reason 2A is the highest score for "Ability to Attract Grant Funding" is because it already includes the wetland augmentation component. Combined with being the lowest capital cost of any of the long-term options makes it the winner in the "affordability" category.

Public Feedback

Public Open House #4 was held on November 23, 2017 to present the results of the 2017 study and gather feedback on the long term options, and preference for a two phased or complete project. The response from the Open House can be summarized as follows;

1. There was general understanding as to why discharge must continue to Maple Lake Creek.
2. There was unanimous preference for Option 1, Phase 2A as the preferred long term treatment option.
3. The majority preference was for a phased approach, if it delivers the lowest initial tax burden.
4. There was also some preference for pursuing funding for a complete project, and doing the phased approach only if grant funding is not secured.

Evaluation, Decisions and Recommendations from the Wastewater Advisory Committee.

With the field work and study of discharge and treatment options completed and presented to the public, the Committee evaluated the options, with a view to making five major decisions and recommendations;

1. A preferred **Discharge Option.**
2. A preferred long-term **Treatment Option.**
3. Whether to include the **Biochar Reed Bed** with the preferred Option.

4. Whether to pursue funding for a **complete project** (Phase 1 &2), or just **Phase 1.**
5. Whether to move directly to **implementation**, or continue to the **Stage 3 LWMP.**

The Committee process to make these decisions is detailed in the attached minutes of meetings #14, November 30, 2017 and #15, January 25, 2018 and summarized below.

Preferred Discharge Option (Nov 30, 2017)

In considering the importance of maintaining summertime flows in Maple Lake Creek, The Technical Consultant recommends that:

1. *With the exception of future reuse applications, discharge shall continue to be to the Maple Lake Creek watershed.*
2. *A second (indirect) discharge location to the Maple Lake Creek watershed via the North Wetland be established.*
3. *Any future reuse applications take into consideration maintaining minimum dry weather flows in Maple Lake Creek*

Recommendation: The Wastewater Advisory Committee accepts the Technical Consultant recommendations on Discharge, and recommends adoption of these to Council.

Preferred Long Term Treatment Option (Nov 30, 2017)

The Committee used the Evaluation System on November 30 to score and rank the options, with the scoring summarized as follows

		Option 1 Upgraded Lagoon		**Option 2**	**Option 3**
	Category Score	**Phase 1 + Phase 2A**	**Phase 1+ Phase 2B**	**Baseflow Mechanical**	**Full Flow Mechanical**
Affordability	40	36.6	27.5	26.7	11.4
Economic Benefits	20	12.9	11.5	8.8	9.3
Environmental Benefits	20	16.5	14.1	12.9	14.5
Social Benefits	20	13.9	12.4	10.4	10.4
Total Score	**100**	**79.8**	**65.6**	**58.8**	**45.7**

Recommendation: Following the results of the evaluation system, the Committee recommends Option 1, Phase2A – Upgraded Lagoon to MEP quality, with discharge to the North Wetland – as the preferred long term Option

With the long-term option confirmed, the evaluation system was used again at Meeting #15, held on January 25, 2018 to assess the various phasing combinations for this option, with and without the Biochar Reed Bed.

The Biochar Reed Bed concept was originally developed in October 2016, as part of the Clean Water and Wastewater Fund application, and is described in Technical Memo # 9 – Effluent Polishing by Biochar Reed Bed. It was recognized then that this element achieves a lot of benefits – as measured by the evaluation system - for a relatively small additional cost. It also improves the

chances of attracting grant funding. This component can be added to any of the studied Treatment Options, and so was left out of the Option evaluation and selection process, and then brought back for consideration as an add-on to the Preferred Option.

The intention of this evaluation was to see whether the Biochar Reed Bed was worth including, and whether there was more benefit in pursuing funding for a phased approach or one complete project.

Project Phasing	Two Phase	Two Phase	Two Phase	Complete Project	Complete Project
2019 Project Description	Phase 1 Only (no Wetland)	Phase 1 +Wetland	Phase 1 + Wetland + Reed Bed	Phase 1+2A (incl wetland)	Phase1+ 2A +Wetland +Reed Bed
2023 project Description	Phase 2A + Wetland	Phase 2A	Phase 2A	No Project	No Project
First Phase Capital Cost	$5.6M	$6.6M	$7.6M	$8.7M	$9.7M
Second Phase Capital Cost	$3.9M	$2.9M	$2.9M	-	-
Total Capital Cost	**$9.5M**	**$9.5M**	**$10.5M**	**$8.7M**	**$9.7M**
Net Cost, first phase (2/3 grant)	$1.9M	$2.2M	$2.5M	$2.9M	$3.2M
Net Cost, Second Phase (Use $1.95M in DCC's, no grant)	$1.9M	$0.9M	$0.9M	-	-
First Phase Tax Burden (2019-2023)	$325	$358	$374	$392	$408
Second Phase Tax Burden (2024-2039)	$365	$338	$351	$247	$261
20 Year NPV (3% discount rate)	**$5561**	**$5418**	**$5637**	**$4573**	**$4803**
Tax Burden Affordability Score ($200 =5, $600 =0)	**2.43**	**2.52**	**2.38**	**3.05**	**2.90**

Of note is that the tax burden, per property parcel, changes with time for each of the phasing combinations. For a phased approach, the second phase was modelled to occur in 2023, when the Village has grown from 1500 to 1792 properties, causing the average dry weather wastewater flow to exceed the Permit limit of 910cu.m/day. It's assumed that these additional properties have all paid wastewater DCC's, which are used to pay part of the cost of the second phase. For the two cases where a complete project (Ph1 +2A) was done in 2019, the tax burden is recalculated in the year 2023, with the DCC's paying down part of the debt.

For calculating the Sustainable Tax Burden score of 1-5, it was assumed that an annual parcel tax burden of $200/year was "ideal", and would score five, and $600/year was "unsustainable" and would score zero. It should be noted that these various assumptions had to be made to calculate the tax burden, and the purpose is to assess the ***relative difference*** in tax burden of the various Options. Different assumptions could be used, but provided they are applied equally to all Options, the relative order of highest to lowest tax burden will remain the same.

To complete the "affordability" scoring, the tax burden score is added to the "attract grant funding score" (calculated in Technical Memo #14 – Grant Funding Opportunities) and together they comprise 40% of the evaluation

With the Affordability scoring completed, the Committee scored the "Benefits" categories, and the results are summarized as follows:

Phasing Combinations for 2019 project	**Ph1 Only**	**Ph 1+ Wetland**	**Ph 1 +Wetland +Reed Bed**	**Ph1 +2A (incl Wetland)**	**Ph1 +2A (incl Wetland) +Reed Bed**
Affordability (40%)	19.3	20.1	21.5	23.9	25.3
Economic Benefits (20%)	5.6	9.1	12.3	9.1	12.3
Environmental Benefits (20%)	6.3	10.7	13.9	10.7	13.9
Social Benefits (20%)	5.3	10.2	12.3	10.2	12.3
Total Score (100%)	**36.6**	**50.0**	**59.9**	**53.8**	**63.7**

These scores were then used to guide the decisions on both the Biochar Reed Bed and the Phasing Strategy

Effluent Polishing by Biochar Reed Bed (Jan 25, 2018)

The evaluation system confirmed that the Biochar Reed Bed delivers a lot of benefits relative to its additional cost. It improves affordability due to its strong potential for attracting grant funding. The Committee was asked to make a recommendation to adopt, delete, or do further study on this component.

Recommendation: The Committee recommends adopting the Biochar Reed Bed as part of the preferred long-term Treatment Option, subject to further study and successful pilot testing.

Note – In voting, Committee member Ken Barth was opposed to this approach, preferring that the biochar reed bed be implemented as a separate project in the future.

Funding and Phasing Strategy (Jan 25, 2018)

The evaluation system was not designed specifically to compare a phased project with a complete one. The additional cost of a two-phase project is reflected in the tax burden, assuming the first phase gets two thirds funding, and the second phase does not. The second phase is not as strong a candidate for grant funding as the complete project, as it represents "expansion" which is intended to be paid for by DCC's, not grants.

All other benefits were deemed to remain the same for phased or complete project, though the delivery of some benefits are delayed in a phased approach.

Recommendation: The Committee recommends pursing a complete project, rather than a phased one, for all grant applications, and only execute a phased project if there is insufficient grant funding obtained for a complete project.

Implementation (Jan 25, 2018)

To implement the project, two authorizations are needed – regulatory and borrowing. If the LWMP is completed to Stage 3, and approved by the Minister of Environment, both regulatory and borrowing authority are conferred, but it will take up to two more years to complete this process The existing Discharge Permit confers regulatory authorization, but borrowing authorization will need to come from an elector approval process. A future regulatory authorization – either LWMP or an MWR registration – will be needed when the average flow condition of the Permit is exceeded – expected to be between 2023 and 2029.

Recommendation: the Committee recommends moving to implementation of a project using the regulatory authority of the Discharge Permit, and seeking elector approval for any borrowing.

Remaining Stage 2 LWMP tasks

Regardless of whether the implementation is via Permit or LWMP, it is prudent to complete the Stage 2 LWMP, for the dual purpose of capturing all the 2016 and 2107 work in one document, and keeping the option open of future Stage 3 LWMP completion. The tasks required to complete a Stage 2 report are

- Complete remaining Technical Memos – no decisions are required on any of these.
    - Biosolids Management
    - Integrated Resource Recovery
    - Servicing Options for Comox Lake Area
    - Water Conservation
    - Combined Sewer Separation Status
- Complete Draft Stage 2 LWMP report for Committee and Council review
- Complete Final Stage 2 LWMP Report for Committee and Council endorsement
- Submission to Ministry of Environment.

The Stage 2 report can be used as a long term Wastewater Plan in its own right, but if the regulatory and borrowing authority of an LWMP are required or desired in the future, then it will need to be completed to Stage 3, submitted and approved by the Minister.

Implementation Planning

In moving to the implementation phase, there is a shift in focus from “study” to “preparation”. After completion of the Stage 2 LWMP, there are several work areas to be completed before a capital project can be commenced. The following scenario assumes that the Village is going to be moving ahead with a project in time to meet the January 2021 Federal compliance timeline regardless of receiving grant funding. Council will need to confirm this as the search for funding takes place.

Based on this scenario, the implementation process can be summarized as;

Time	Mode	Tasks
2018	Secure Funding	– Complete Stage 2 LWMP – Apply for GMF grants – Study and pilot test for Biochar Reed Bed – Apply for infrastructure funding – Public consultation and elector approval process for borrowing
2019	Plan & Procure	– Finalize scope of project – Complete project, or Phase 1 only - depending on funding success. – Retain Project Manager & Owner's Engineer – Finalize procurement method(s) – Preliminary design and site work (survey, geotechnical) – RFP/Tendering
2020	Design and Build	– Detailed design, construction, commissioning. – Project completed - ***Permit Compliance achieved.***

There are many more details to be considered in planning the project, and a separate report on the implementation road map will be brought to Council.

The items of action for 2018 are discussed below

1. Grant Funding

Securing grant funding is essential to being able to implement the Preferred Option as a complete project, rather than as two phases, since Cumberland does not have sufficient reserves or borrowing capacity to fund the project by itself. There needs to be sufficient time allocated to secure grant funding, but equally, Cumberland cannot wait indefinitely as the BC Ministry of Environment is requiring corrective action, and there is the Federal regulations timeline of Jan 1, 2021.

The range of available funding sources was described in Technical Memo#14 – Grant Funding Opportunities. For 2018, there will be a Joint Federal-Provincial grant opportunity in the fall of 2018, and the FCM Green Municipal Fund "GMF" has intakes for capital projects in April and September 2018, and again in 2019. There may be another Gas Tax intake in 2019, but this has not been determined.

There is already sufficient technical information, and has been sufficient public consultation, to make applications to these funds, though each fund has their own process that may require some extra specific information.

Applying to GMF for the April 2018 intake has the advantage that a decision would likely be know before applying for the Federal program in the fall. Given that GMF goes through a peer review process, a successful application effectively gives a stamp of approval of the as an environmental leadership one. This validates the innovations and increases the chances of obtaining other infrastructure funding.

Overall, it is recommended that grant funding be pursued for the one year period from spring 2018 to spring 2019, and if no funding has been obtained by the middle of 2019, then a phase 1 ($5.6M) project be implemented in 2020, to satisfy the regulatory requirements.

2. Elector Approval for Borrowing

Regardless of how much grant funding (if any) is received, there will still need to be some borrowing for the project, and any borrowing will require elector approval. The major considerations for this are;

- When applying for grant funding, it is highly desirable to have the elector approval already in place. This eliminates the risk of a project not proceeding because a of a later failed approval process, as happened with the CVRD South Sewer Project. It also signals that the project is closer to being "shovel ready".
- It is easier to gain elector approval for borrowing when grant funding has already been received.
- There is a logical time to go for elector approval at the October election.
- The earliest likely time for a decision to be known on a fall grant application would be early 2019.
- If borrowing authority is sought before grant funding is received, thought should be given to asking for approval to borrow enough funding to proceed with a phase 1 project if grant funding is not received.

There is clearly need for more though and discussion on this, and it is recommended that Village staff bring forward a separate report to Council on the process, options and timing for seeking elector approval for borrowing authority.

3. Further Study on the Biochar Reed Bed

While this project component delivers lots of benefits, there is not yet enough information to define exactly how it would be implemented, or how well it will perform. The technical consultant recommends further desktop study and a limited scale field test to define the hydraulic parameters before designing a full scale system. Given this requirement, the WAC made the recommendation that the biochar reed bed be included, but subject to further study and successful field testing.

This study can be carried out in summer 2018 to give information on the design, performance and costing of a full scale implementation. Site investigations will be needed to study the hydrogeology (groundwater flow conditions) of the area to the north of lagoons. A small scale pilot test of various reed bed configurations, and biochar type and content will also be needed. A similar process was followed by the Port of Tacoma (Washington State) for the development of their successful biochar reed bed for stormwater treatment. An ideal pilot would run for 12 months, to give four seasons worth of performance data. However, most of the information needed for the design of the full scale project would be obtained in the first three months, by fall of 2018.

This pilot test would be eligible for application to GMF, which would cover 50% of the costs. GMF will require 12 month trial, to observe seasonal variations in treatment performance. GMF have confirmed that this application can be made in parallel with an application to GMF for the capital project. In the event if an unsuccessful pilot, the capital project would need to

submit for a scope change. Given the documented performance of biochar for wastewater contaminant removal, and the Port of Tacoma application in a reed bed configuration, the pilot is considered a good chance to be successful.

The land area adjacent to the lagoons is part of the "Eco-Gift" lands, and Environment Canada has already approved their use as wastewater treatment wetland.

A separate report will be brought Council with a proposed budget and funding options for the Biochar Reed bed component.

The Proposed Treatment System from a "Natural Asset" Perspective

An emerging methodology for viewing natural systems is the "natural assets" approach, that classifies and values natural systems where they provide a municipal service, that could otherwise be provided by an engineered solution. A common example is the use of natural areas for stormwater detention and settling. In the case of Cumberland, the existing wetlands in the southern Maple Lake Creek (downstream of the lagoons) are an example of a natural asset, as they have been providing a polishing function for the existing wastewater discharge, and protecting the habitat of the lower Trent River.

The proposed wastewater treatment system can viewed from a natural asset perspective

Treatment Element	Asset Classification	Comments
Lagoons	Engineered	
Solids separation	Engineered	
Disinfection	Engineered	Last point of complete process control, compliance point for effluent quality regulations.
Biochar Reed Bed	Naturalised Engineered	A constructed system mimicking natural process of vertical flow through vegetated soil.
Augmentation of North MLC Wetlands	Enhanced Natural	This asset is currently "unused". Treated water will be applied to the existing wetland, with some modifications for flow distribution/control and public access.
Flow through South MLC wetlands	Natural	Unmodified, will continue to receive all flow, and will see a significantly reduced contaminant load.

As the water moves through the treatment process and becomes cleaner, the assets (treatment elements) become more naturalized. This results in a graduated change as the water moves to the natural receiving environment, in comparison to the current "hard boundary" where the water leaves the lagoon and enters the receiving water via the "end of the pipe".

The polishing functions provided by the Reed Bed and North and South Wetlands represent a valuable addition to the treatment process, that are an alternative to hard engineered treatment functions. Once the treatment process is in operation and the quality of the water is established,

it will be possible to value the treatment function of these natural and naturalized assets by comparing them to the cost of achieving the same results via engineered assets. There are additional social and environmental benefits accrued as a result of the habitat enhancement of the north wetland that could not be achieved by engineered treatment, so this is a real-world example of a "co-benefit".

Overall, the proposed approach represents an interesting combination of the two asset types that achieves a result that is difficult to achieve using either engineered or natural assets alone.

Policy References

When the WAC developed the Evaluation System, the intent was to capture the Village's policies and aspirations into a system that compared how well each option achieved these various goals. The WAC reviewed this system before using it to evaluate the options. Now that a Preferred Option has been chosen, using this system, it is prudent to look at how many policies and goals are being achieved by the Preferred Option.

The preferred treatment option, including the biochar reed bed and wetlands augmentation, , actions numerous specific objectives of the 2014 Cumberland Official Community Plan, including:

- 5.3.6.4 (p41) As resources allow, prepare a "made in Cumberland" growth management framework that is supported by the following principles;
    - (e) improved natural resources, **in particular water**, and
    - (i) Protection and **restoration of ecological systems.**
- 5.5.2.5 (p47) Ensure sanitary sewage collection, treatment and disposal facilities are maintained to appropriate standards, and **mitigate any detrimental environmental effects** from these systems.
- 5.5.3.5 (p48) **Seek maximum funding** for infrastructure development from senior levels of government by taking advantage of **special financing opportunities available for innovative efficient infrastructure development**.
- 5.5.3.7 (p48) **Incorporate greenhouse gas reduction criteria** in infrastructure projects for valuation/modeling and procurement.
- 5.5.6.4 (p50) Protect, **restore, and where appropriate enhance the natural stream and wetland habitats** that support fish and wildlife resources.
- 6.1.2.5 (p57) Expand, preserve and promote the Village's working forest land, **environmentally sensitive areas, and natural amenities** as integral part of the Village's economy.
- 7.1.2.1 (p61) **Protect and enhance the integrity** of the natural environment including the surrounding landforms, forests, **streams, wetlands**, lakes, and quality of the air, while preserving the associated recreation opportunities and respecting the natural constraints.
- 7.1.3.1 (p62) identify opportunities and actions for **improving water quality, wildlife connectivity, aquatic and terrestrial habitat, and recreational access**

- 7.3.3.1 (p65) Continue to meet the British Columbia Climate Action Charter commitments by reducing greenhouse gas (GHG) emissions in the community and **investing in local climate action projects that reduce emissions and build adaptive capacity**.
- 8.2.2.2 (p72) Provide accessible and quality parks, greenways, open spaces, and recreational corridor systems that: (a) Protect, **restore or enhance biodiversity, environmentally sensitive areas** and provide an ongoing supply of ecosystem services.

Additionally, the (Provincially mandated) Comox Valley Sustainability Strategy has the objective for wastewater as;

- By 2050, All wastewater treatment in the Comox Valley will be to tertiary or reuse level.
- Rationale – Tertiary treatment provides a higher level of environmental protection and creates opportunities to reuse water rather than further use of the fresh water supply. (page 7).

The water produced is to a reuse level of "Moderate Exposure Potential", so this goal is actioned, though the system is not tertiary treatment in the traditional sense of using filtration. However, the Biochar Reed Bed provides polishing – by carbon treatment – that most tertiary systems do not. The removal of man-made contaminants like pharmaceuticals makes the water more acceptable for reclaimed water use, including and especially food production. Constructed wetlands also provide some level of a filtering function, but the degree to which this approximates mechanical tertiary filtration varies with wetland type and water quality, and can only be definitively assessed once in operation.

An additional goal of this CVRD strategy is that;

- By 2050, 70% of degraded ecosystems that are critical for the health of watersheds, riparian areas and endangered species habitats are restored.
- Rationale: Humans will have an impact on the habitats of other species through our presence; however, we can also restore and carefully manage degraded ecosystems to an improved level of health and biodiversity. (page 8)

The North Wetlands augmentation project actions and achieves this goal, and the improved water quality produced by the treatment system protects the south MLC wetlands and the lower Trent River.

Overall, the preferred treatment option, with the inclusion of the biochar reed bed and wetland augmentation provide an outstanding opportunity to action many of the aspirational goals within the Cumberland OCP and CV Sustainability Strategy. It is a real-world example of leveraging "grey infrastructure" (wastewater treatment) to achieve a range of broader community and environmental goals.

FINANCIAL IMPLICATIONS

1. Capital Cost of the Preferred Option

The preferred option has the lowest capital cost of any of the long term treatment options. If grant funding is obtained for at least 50% of the project, and the project is implemented as one complete project, this results in the lowest overall tax burden.

A two phase project runs the risk of not getting grant funding for the second stage, which is primarily "capacity expansion" rather than "improvement", and thus is not a very good funding candidate. Put simply, if grant funding is going to be obtained, it is best if it is for the whole project.

The fact that the Preferred Option has the lowest capital cost also makes it easier if grant funding is not obtained for the first phase, as the second phase is much cheaper than the other options. If the second phase must also be implemented without outside funding, the Preferred Option of Phase 2A is the most affordable for the Village.

As stated earlier, the cost model for this project is as follows;

	With 2/3 Grant for Complete Project	No Grant Funding for Either Phase
Phase 1 capital cost (2019-2020)	$9.7M	$5.6M
Phase 2 capital cost (2023)	-	$3.9M
Annual Operating Costs	$375k	$350k (Ph1), $375k (Ph2)
Tax Burden 2019-2023, $/parcel/year, incl. operating costs	$408	$508
Tax burden 2023-2039 $/parcel/year	$261	$559
20 year Net Present Cost	$4803	$8564

The tax burden calculations used in the analysis are preliminary only, and should be used only for the purposes of comparing the ***relative impact*** of the various options and phasing scenarios. The actual tax burden will depend on a combination of factors, some of which are within Council's control, including:

- The amount of grant funding,
- Borrowing timeframes and interest rates,
- Allocation of wastewater DCC's between treatment and storm-sewer separation projects,
- Future wastewater user rate restructuring, and
- The actual project costs.

The capital costs are substantially less than earlier versions (2011, 2016) of a treatment plant project, but are still a major cost relative to the size of the Village.

2. 2018 Budget Considerations

The Stage 2 LWMP is already funded from the 2017 LWMP budget. The unused portion of this budget will be carried forward to 2018, to complete the Stage 2 LWMP, and no additional funds are needed to complete this work.

With regards to implementation of the project, the proposed timeline (secure funding in 2018, plan and procure in 2019, construct in 2020) is laid out to minimize project spending in budget year 2018.

For 2019, the capital project will commence, with cost incurred for planning and procurement, and then the bulk of the cost in 2020 for construction.

Year	Complete Project	Phase 1 Only
2018	Funding applications and other - $50k Biochar Reed Bed Study - $25k	Funding applications and other - $50k Biochar Reed Bed Study - $25k
2019	Planning and procurement - $1M	Planning and Procurement - $1M
2020	Construction - $8.7M	Construction - $4.6M

The five year financial plan brought forward at the Committee of the Whole budget meeting and Village Hall Public Meeting included a $7M wastewater treatment project (based on 2017 information for a first phase). With the updated information and the WAC's recommendation to pursue the complete project, the capital project is now $9.7M. This has been included in the proposed Five Year Financial Plan bylaw, for first reading, later in this Council agenda.

For budget year 2018, it was originally contemplated to be completing Stage 3 LWMP and there is a budget placeholder of $50,000. With the proposed change to implementation, the 2018 work is preparing funding applications and potentially the elector approval process and associated public consultation. There may also be some additional technical work relating to Ministry of Environment. This $50,000 budget is considered more than sufficient to cover the costs of these activities.

An unplanned cost for 2018 is that of doing the additional study and pilot testing for the Biochar Reed Bed, prior to project implementation in 2019. It is highly desirable to commence the study on the biochar reed bed in spring/summer 2018 so that confirmation of the reed bed being in the project scope can be made before any infrastructure funding applications.

The detailed workplan and cost for this study has not yet been defined, but is expected to be in the order of $25,000 to $50,000, depending on the scope and level of detail required.

An application was made in January to the Provincial Infrastructure Planning Grant Program for $10,000 for the study of the biochar reed bed concept, and notification of this is expected by the end of March.

Application can also be made to the Green Municipal Fund for a Pilot Study for this project. GMF requires a minimum 12 month monitoring period for pilot studies, so this will increase the scope and cost, but GMF then provides 50% funding of that cost.

A separate report will be brought to Council in March 2018 about the Biochar Reed Bed study, detailing the workplan, funding options and budget requirement. It is proposed that costs for this project will come from Sewer Accumulated Surplus.

OPERATIONAL IMPLICATIONS

The Village operations staff, through the Manager of Operations, have been involved in the Committee decision making process. The Preferred Treatment Option selected by the Committee – the lagoon based upgrade Phase 1+2A - is also the preferred the preferred option of the Operations staff. The main reason is that it is the least mechanically, and biologically, complex option, which leads to numerous operational benefits:

- The lowest requirements in terms of EOCP operator level
- The lowest requirements for daily operator-hours needed
- Lowest electricity consumption leading to smaller equipment and smaller standby generator
- Simple biological process with minimal intervention
- Least amount of new equipment and buildings to maintain
- Least amount of computerized control and instrumentation
- Avoidance of regular mechanical sludge dewatering

The Operational staff also prefer the simplicity of one, complete project execution, rather than a two-phased approach, if at all possible.

The implementation phase in 2019 will require active involvement of the wastewater operator in the planning and design process, and during construction and commissioning in 2020.

STRATEGIC OBJECTIVE

This work is all in accordance with the 2017 Corporate Strategic Priority of "Developing an environmentally sustainable method of treating the liquid waste that is generated by the Village".

It is also advances the Official Community Plan policies for infrastructure of;

> 5.5.3 (2) Support opportunities for Federal, Provincial, and First Nation partnerships for infrastructure to manage costs and risk to the Village and tax payers.

And, (especially)

> 5.5.3 (5) Seek maximum funding for infrastructure development from senior levels of government by taking advantage of special financing opportunities available for innovative efficient infrastructure development.

ATTACHMENTS

Reports to Wastewater Advisory Committee;

1. WAC Open House #4 (Nov 30, 2017)

2. WAC Treatment Options (Nov 30, 2017)
3. WAC Grant Funding and Tax Implications (Jan 25, 2017)
4. WAC Treatment Upgrade Implementation Options (Jan 25, 2017)

Minutes of Wastewater Advisory Committee Meetings

Meeting #14, November 30, 2017

Meeting #15, January 25, 2018

CONCURRENCE

1. Michelle Mason, Financial Officer
2. Rob Crisfield, Manager of Operations

OPTIONS

i. THAT Council receive the 2018 LWMP Wastewater Treatment Options report.

ii. THAT the following recommendation of the Technical Consultant and the Wastewater Advisory Committee be adopted for the preferred Discharge Option:

1. *With the exception of future reuse applications, discharge shall continue to be to the Maple Lake Creek watershed;*
2. *A second (indirect) discharge location to the Maple Lake Creek watershed via the North Wetland be established; and,*
3. *Any future reuse applications take into consideration maintaining minimum dry weather flows in Maple Lake Creek.*

AND THAT Option 1, Phase 2A – Upgraded Lagoon to MEP quality, with discharge to the North Wetland – be adopted as the preferred long term Treatment Option;

AND THAT the Biochar Reed Bed be adopted as part of the long-term Treatment Option, subject to further study and successful pilot testing;

AND THAT a complete project, rather than a phased one, be pursued for all grant applications, and only execute a phased project if there is insufficient grant funding obtained for a complete project;

AND THAT Cumberland moves to implementation of a project using the regulatory authority of the Discharge Permit, and seeking elector approval for any borrowing, rather than waiting for authorizations by completion of Stage 3 of the LWMP;

AND THAT Council direct staff to provide a report summarizing the risks and opportunities associated with seeking elector approval for borrowing in advance of securing grant funding.

iii. Any other action as deemed appropriate by Council

Respectfully submitted,

Paul Nash
LWMP Project Coordinator
Village of Cumberland

Sundance Topham
Chief Administrative Officer

COMMITTEE REPORT

REPORT DATE: November 29, 2017
MEETING DATE: November 30, 2017

TO: LWMP Wastewater Advisory Committee (WAC)

FROM: Paul Nash, Project Coordinator

SUBJECT: Report on LWMP Open House #4, November 23, 2017

RECOMMENDATION

THAT the Committee receive the Report on LWMP Open House #4, November 23, 2017 for information.

Purpose

Public engagement is an important and mandatory part of the LWMP process. In addition to all the Committee meetings being open to the public, this Open House was the fifth public event in the 2016-17 LWMP process, the preceding ones being:

1. The Wastewater Lagoon tour of May 28, 2016.
2. Open House #1 on Goal setting and Evaluation system, July 14, 2016.
3. Open house #2 short List of Discharge Options, September 22, 2016
4. Open House #3 Treatment Options and Funding Opportunity, November 1, 2016

Following the news in March 2017 that the November funding application as unsuccessful, all the treatment opens were put back on the table for study in 2017. Additional study was done on the lagoon performance and the environmental conditions in Maple Lake Creek and the Trent River. The overall goal for 2017 being to come up with a set of viable Treatment Options, including a phased approach, allowing for an affordable first phase project.

The purpose of Open House #4 was to:

1. Update where we are at in the LWMP process.
2. Show the results of the 2017 studies
3. Gather feedback on the preferred Treatment Options, and potential phasing
4. Gather feedback on the LWMP process in general

Run of Order

The agenda for the evening was;

- 6:00-6:45 Posterboard viewing

- 6:45– 7:40 Presentation
- Presentation by;
    - Matt Ishoy, Chair of the Wastewater Advisory Committee
    - Paul Nash, Project Coordinator
    - Larry Sawchyn, Technical Consultant
- 7:40-9:00 Public Q&A

The event was attended by;

- 11 members of the public
- Mayor Baird
- Councillors Sullivan, Sproule and Kishi (each only for part of the Open House)
- WAC Committee Members at Large;
    - Ken Barth
    - Mike Tymchuk
    - Dennis Cassin
- Village of Cumberland Director of Operations Rob Crisfield

Posterboards

Six posterboards were set up for viewing, displaying the five Treatment Options and the Technical and Cost Comparison.

Summary of Presentation

Since many of the public are now well versed in the LWMP process, the presentation was primarily focused on what was done in 2017. It included;

- The LWMP process, history and current status.
- A review of the regulatory situation, and with emphasis on explaining the Discharge Permit compared to the current Provincial and Federal regulations.
- A review of the Village's goals for wastewater treatment.
- A review of the field work done in 2017 – what has been learned about the lagoon performance, phosphorus and flows in Maple Lake Creek.
- Explanation of how the only viable discharge option is now to Maple lake Creek,
- A complete run-through of the five treatment Options.
- Explanation of the comparative costs
- Explanation of the grant funding process
- The preliminary tax burden for the various options.
- Timeline of LWMP process, for remainder of 2017.

Summary of public Q&A period

The discussion period opened at just after 7:45 pm, and there were many questions from all members of the audience – public, Councillors and Committee members. The discussion continued until Chair Matt Ishoy formally closed the open house at 9:00 pm.

Examples of questions and comments received include the following;

- Can we do nothing and use the existing treatment?
- Can the upgrade be phased?
- Concern about the Trent River and the restoration of the Trent River with the impact of the sewage over the years.

Overall, people seemed satisfied with the Options as displayed, and a preference for the lagoon based options, and the phased approach was highlighted in the response forms received at the open house.

Feedback Forms

As with previous open houses, a feedback form was distributed which asked the people to;

1. Score the Treatment Options on a scale of 1-5 (5=best)
2. Give their preference for a phased or complete project
3. Give any other comments they have.

Three forms were received on the night with three more being submitted to the Village office on November 27 & 28.

There was a clear preference for doing a phased approach, with the preferred endpoint being Option 1A – the Upgraded Lagoon to MWR MEP quality with distribution to the North Wetlands.

Treatment Option	**Public Preference, Nov 23, 2017**		
	Av. Score 1-5 5=best	%	rank
Phase 1 Lagoon upgrade for Permit Compliance	4.0	80%	**1**
Option 1A Upgraded Lagoon to MWR MEP Quality and Distribution to North Wetland	3.6	73%	**2**
Option 1B Upgraded Lagoon to MWR GEP Quality	1.9	37%	**3**
Option 2 Baseflow Mechanical to MWR GEP Quality	1.2	23%	**4**
Option 3 Full flow Mechanical to MWR GEP Quality	1	20%	**5**

The attendees thanked the Village, Committee and the consultants for their efforts. The attendance was lower than expected, partially due to the Cumberland downtown businesses having a "customer appreciation night". When the date for the Open house was set in April, it was not known that this event would be on the same night.

Attachments

1. Feedback Forms
2. Posterboards and the powerpoint presentation can be viewed on the LWMP website

Respectfully submitted,

_____

Paul Nash
Project Coordinator
Liquid Waste Management Planning
Village of Cumberland

COMMITTEE REPORT

REPORT DATE: November 29, 2017
MEETING DATE: November 30, 2017

TO: LWMP WASTEWATER ADVISORY COMMITTEE (WAC)

FROM: Paul Nash, Project Coordinator

SUBJECT: Wastewater Treatment Options

RECOMMENDATIONs

1. THAT the Committee receive the Report on Wastewater Treatment Options for information.
2. That the Committee evaluate the four long-term treatment options (1A,1B, 2 and 3) and select a Preferred Option for recommendation to Council
3. That the Committee evaluate the phased approach and make a recommendation to Council on pursuing a phased approach or a single complete project.

Summary

The main objectives for the LWMP for 2017 were to;

1. Study the current treatment and environmental conditions
2. Develop a set of wastewater treatment and discharge options that meet Cumberland's long term needs
3. Develop a "phased approach" to split the long-term options into two parts, to create the most affordable first phase.

This work has largely been completed, and is captured in the series of Technical Memos 1-8 presented to the Committee for meeting #13, November 2,2017.

Technical Memos 7A and 7B have been revised and updated and presented to the committee TM7A-Rev2 and TM7B-Rev2, for meeting #14, November 30, 2017. These updated memos will allow the Committee to evaluate and select a Preferred Wastewater Treatment Option.

The purpose of this report is to consider the phasing, financing and tax implications of these Options, to allow the Committee to evaluate and a Preferred Phasing and Funding Strategy.

Grant Funding and Phasing

The Village of Cumberland has limited financial capacity for wastewater treatment expansions, which has an impact on what can be done, and when. This was detailed in Technical Memo#2 – Financial Framework, Nov 1, 2017, and is summarized below in point form:

1. Cumberland has $650k in Wastewater Reserves
2. $500k of this is committed to projects
3. Wastewater DCC is set at $9.4k per house, collected as houses are approved
4. Cumberland has a maximum borrowing capacity of $7.1M
5. Cumberland would like to leave some borrowing capacity for other projects
6. There are regular grant funding opportunities
7. There are ***no guarantees*** of receiving grant funding

But Cumberland ***must*** make upgrades to meet Permit Compliance in the short term (2019-2020). As detailed in TM7A-Rev2 and 7B-Rev2, it is possible to do either a complete project for any of the long term options, or split them into two phases, with the first phase being to achieve Permit compliance. Table 1 below is reproduced from TM7B-Rev2;

Table 1. Cost Comparisons for all Treatment Options.

	Option 1			**Option 2**	**Option 3**
	Phase 1 *Permit Compliance*	**Phase 2A**	**Phase 2B**		
Capital Cost for one-phase execution	n/a	$8.7M*	$10.6M	$ 9.3 M	$14.8 M
Capital cost for two-phased execution	$5.6 M	$9.5M*	$ 11.7M	$10.2M	$16.3M
Capital cost for two phases, with wetland	$6.6M	$9.5M	$12.7M	$11.2M	$17.3M
Operating Cost	$350k	$375k	$425k	$450k	$500k

* Includes the wetland as this is integral to Option 1A

Table 1 shows that all the "one-phase" projects are much more than $7.1M, thus;

- Any project greater than $7.1M must wait until reserves have built up and/or grant funding is received
- With current reserves and borrowing capacity, the only project Cumberland can decide to undertake, without grant funding, is Option 1-Phase 1 for Permit Compliance.

In order to pursue grant funding, applications must be quite specific about the project scope. In this case, it means an Option must be selected before applying for funding.

It is obvious that if a grant for a complete project is applied for, and not received, that Option1, Phase 1 can still be implemented. What is less obvious is that Cumberland could decide to apply only for funding of Phase 1.

This situation is represented graphically in Figure 1, with Cumberland decisions in blue, and financial decisions in red.

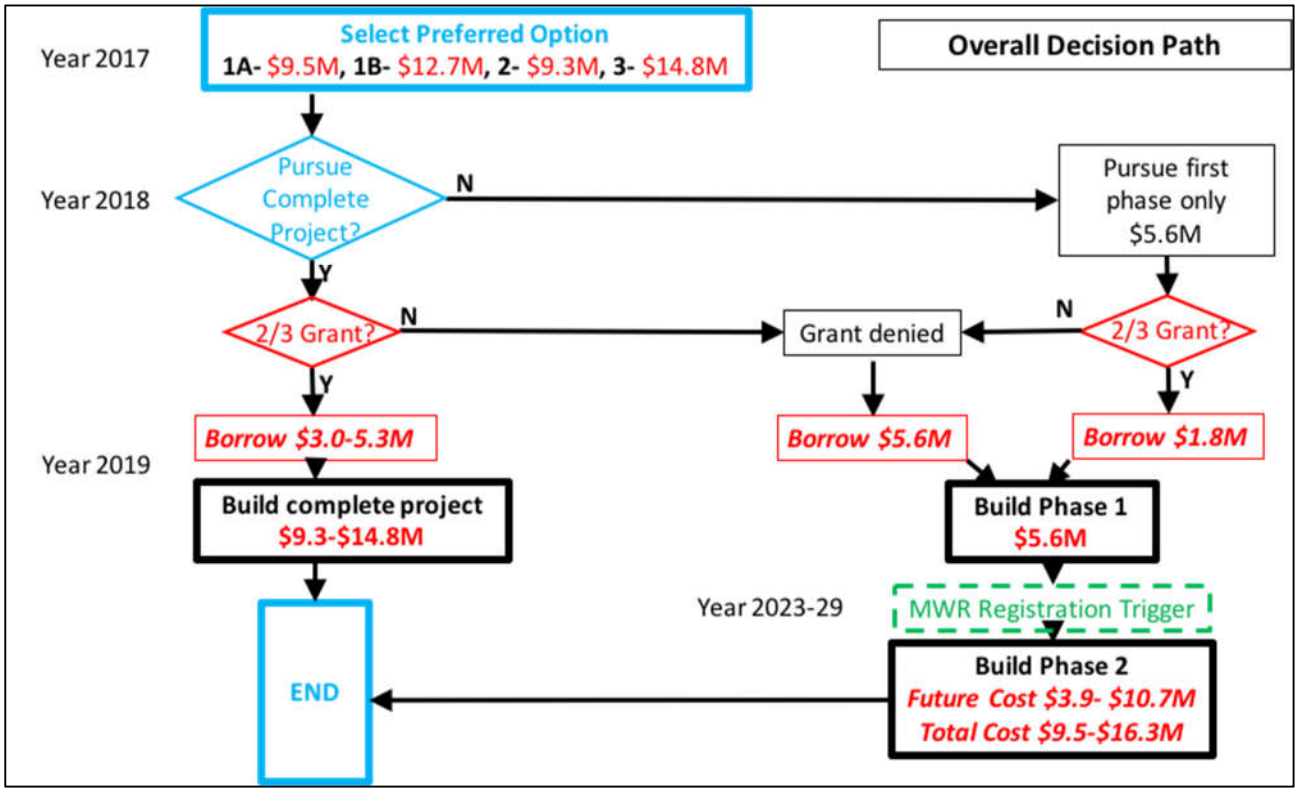

Figure 1. Decision Path for Grant Funding and Phasing

It should be noted that the "future costs" are in today's terms and may be different 5-10 years into the future.

The decision path shows that the only decisions within Cumberland's control are;

1. The preferred long term option, and
2. Whether to pursue grant funding for a complete project, or Phase 1.

While there are many technical criteria for securing grants, there is also a "value for money" component, and the smaller the ask, the more likely it is to be successful.

There is a secondary benefit of pursuing a grant for Phase 1 only - if successful, the least amount of Cumberland borrowing capacity is used.

The "Registration Trigger" is the point at which the current Discharge Permit is exceeded or no longer valid, and Cumberland will need to meet the BC Municipal Wastewater Regulation. Primarily, this would be when the dry weather flow exceeds 910cu.m/day, or 1001 if a 10% increase is approved. A secondary reason could be that Cumberland wishes to start using reclaimed water, which can only be authorised by an MWR registration of a completed Liquid Waste Management Plan.

Tax Implications

The overall affordability of any project is a critical factor in decision making. The increase in taxes needed to pay for the wastewater project – the "tax burden" is the single most important component of the Evaluation System devised by the WAC in July 2016.

Preliminary tax burdens have been calculated for the various combinations of Treatment Options, phasing and grant funding, and are show in Table 2.

Notes about the Tax Burden:

1. The tax burden is in dollar per house, per year, and represents the increase over current taxes and wastewater user fees.
2. Tax calculations are for comparison purposes only,
3. The Tax Burden calculation assumes borrowing for 20 years, at 4% interest, this cost is distributed among the existing 1500 properties in 2017
4. 2023 costs are distributed amongst 1800 properties, and assume no grant funding
5. Grant funding for a second phase is still possible
6. *Future replacement cost is not included*, but should be considered in future rate/tax structures. Note that there is no funding for replacement costs

Table 2. Preliminary Tax Burden Calculations

		Option 1			**Option 2**	**Option 3**
Scenario		**Phase 1**	**Phase 2A**	**Phase 2B**		
1 Pursue and receive grant for Phase 1 only	First Phase in 2019, with 2/3 Grant	$325	-	-	-	-
	Second Phase in 2023		$365	$524	$501	$755
2 Pursue and receive grant for Complete Option of choice	Complete Project in 2019, 2/3 Grant		$397	$474	$468	$591
3 Grant Denied	First Phase in 2019, No Grant	$508				
	Second Phase in 2023		$518	$677	$654	$908

Conclusion

The analysis of the tax burden as made complicated by the range of treatment options, phasing possibilities and financial limitations, and grant funding opportunities. The decision path maps out these possibilities, and the decisions that are, and are not, within Cumberland's control.

The major conclusions from this analysis are;

1. For all Treatment Options, the Capital cost is lower if they are executed as a single project
2. Cumberland's limited reserves and borrowing capacity ($7.1M) mean that ***none*** of the long-term Options can be implemented as a single project ***unless*** grant funding is received first.

3. Cumberland can also choose to pursue grant funding only for Phase 1.
4. The lower the grant amount, the more likely it is to be successful.
5. If funding is denied, Cumberland can still afford to implement Option 1, Phase 1 within its borrowing capacity.
6. The lowest overall tax burden is if funding is pursued and received for Phase 1.
7. The next lowest is if funding is pursued and received for a complete project.
8. The highest tax burden is if funding is denied, in which case Phase 1 must be funded entirely from borrowing.
9. The lowest overall impact on Cumberland borrowing capacity is if a grant is received for a Phase 1 project only.

OPTIONS

This report contains the analysis of funding, financing, phasing and tax implications for the various wastewater Treatment Options.

Once the preferred long term treatment option is selected, the committee then has two options for phasing and grant funding:

1. Pursue funding for a complete project of the Preferred long-term Treatment Option
2. Pursue Funding just for Phase 1 only.

Respectfully submitted,

_____

Paul Nash
Project Coordinator
Liquid Waste Management Planning
Village of Cumberland

COMMITTEE REPORT

REPORT DATE: January 19, 2018
MEETING DATE: January 25, 2018

TO: LWMP WASTEWATER ADVISORY COMMITTEE (WAC)

FROM: Paul Nash, Project Coordinator

SUBJECT: Grant Funding and Tax Implications

RECOMMENDATIONs

1. THAT the Committee receive the Report on Grant Funding and Tax Implications for information.
2. That the Committee make a recommendation to Council on a grant funding and phasing strategy for pursuing either phased approach or a single complete project.

Summary

An initial report on Grant Funding and Tax implications was presented to the Wastewater Advisory Committee meeting of Nov 30, 2017. It was determined that there was insufficient information about grant funding to make a decision about a preferred phasing approach, as the two are closely linked. The Committee requested a report on grant funding opportunities, which has been provided as Technical Memo #14 – Grant Funding Opportunities (18 Jan 2018).

Additional information has been provided to the committee in Technical Memo 8 – Emerging Contaminants and Technical Memo 9 – Effluent Polishing by Biochar Reed Bed, as these are relevant to potential grant applications.

This report re-examines the phasing, financing, grant funding and tax implications, taking into account the information within TM's 8, 9 and 14, to allow the Committee to evaluate and recommend a Preferred Phasing and Funding Strategy.

Grant Funding

The Village of Cumberland has limited financial capacity for wastewater treatment expansions, which has an impact on what can be done, and when. This was detailed in Technical Memo#2 – Financial Framework, Nov 1, 2017, and is summarized below in point form:

1. Cumberland has $650k in Wastewater Reserves, and $500k of this is committed to projects
2. The wastewater DCC is set at $9.4k per house, collected as houses are approved

3. Cumberland has a maximum borrowing capacity of $7.1M – this is currently under review as part of the 2018 Financial Plan
4. Cumberland does not want to use all the borrowing capacity for the wastewater project, as there are numerous other projects to be funded by borrowing.
5. There are regular grant funding opportunities
6. There are ***no guarantees*** of receiving grant funding

But Cumberland ***must*** make upgrades to meet Permit Compliance in the short term (2019-2020). As detailed in TM7A(Rev2) and 7B (Rev2), it is possible to do either a complete project for any of the long term options, or split them into two phases, with the first phase being to achieve Permit compliance, and Table 1 is based on the project costs in TM7B-Rev2;

Table 1. Cost Comparisons for all Treatment Options.

	Option 1 Upgraded Lagoon			**Option 2 Baseflow Mechanical to GEP quality**	**Option 3 Full Flow Mechanical to GEP quality**
	Phase 1 *Permit Compliance*	**Phase 2A to MEP quality**	**Phase 2B to GEP quality**		
Capital Cost for one-phase execution	$5.6M	$8.7M*	$11.6M	$ 9.3 M	$14.8 M
Capital cost for two-phased execution	N/A	$9.5M*	$ 11.7M	$10.2M	$16.3M
Operating Cost	$350k	$375k	$425k	$450k	$500k

* Includes $1M for the Wetland Augmentation as this is integral to Option 1A

Table 1 shows that all the "complete" projects are much more than $7.1M, thus;

- Any project greater than the borrowing capacity must wait until reserves have built up and/or grant funding is received.
- With current reserves and borrowing capacity, the only project Cumberland can decide to undertake, without grant funding, is Option 1-Phase 1 for Permit Compliance.

Technical Memo 14 – Grant Funding Opportunities details the various grants that are available and gives a subjective assessment of the attractiveness for grant funding of the various Treatment Options. These results are summarized in Table 2, reproduced from TM 14.

When pursuing grant funding, applications must be quite specific about the project scope. In this case, it means an Option must be selected before applying for funding. But the decision on which Option to select is also partly influenced by its ability to attract grant funding.

And some optional components, like the Wetland Augmentation, and the Biochar Reed Bed could be added, which increase cost but also increase the likelihood of receiving certain grant funding.

On Nov 30, the Committee recommended that Option 1, Phase 2A be the Preferred Long-Term Treatment Option. Table 3 considers the various combinations of phasing and add-ons to implement this Option.

Table 2. Summary of Grant Funding Likelihood for all Options and add-ons, from TM#14

		Option 1			Option 2	Option 3	Add-ons	
		Phase 1 Lagoon to Permit Compliance	Phase 2A Lagoon to MEP (including wetland score)	Phase 2B Lagoon to GEP	Base Flow Mechanical to GEP	Full Flow Mechanical to GEP	Additional points to be added to the Options score	
Fund	Monetary Contribution						Wetland Augmentation	Biochar Reed Bed
Joint Prov/Fed	67% typical	2.5	3.25	2.5	3	1	0.25	0.5
Gas Tax	100% to $6M max	2.5	3.25	2.5	3	2	0.25	0.5
Green Municipal Fund	Loan to $5M +15% grant	N	1	1	N	1	1	2
Municipal Climate Innovation Program	80% to $1M max	N	1	1	1	1	1	1
Island Coastal Economic Trust	33% to $400k max	N	1	N	N	N	1	N
Habitat Conservation Trust Fund	50% to $100k max	N	3	N	N	N	3	1
Habitat Stewardship Program	50% to $100k	N	3	N	N	N	3	1
National Wetland Conservation Fund	TBD	N	3	N	N	N	3	1
Overall Ranking		**2.0**	**2.7**	**2.2**	**2.5**	**1.8**	**0.6**	**1.0**

Note 1. The Overall Ranking score is a composite achieved by multiplying the score for each option by the money available for each fund, adding the results for each Option, and normalizing to a score out of 5. This is intended to be used for the "Ability to Attract Grant Funding" category in the Options Evaluation System.

Note 2. The score for the wetland and/or reed bed can be added to any option to improve its score, but cannot take it over 4.5

Table 3. Summary of Grant Funding Likelihood for all combinations of Option 1 leading to Phase 2A, the Preferred Treatment Option.

		Phase 1 (from Table 2)	Phase 1 + Wetland	Phase 1 + Wetland + Reed Bed	Phase 2A (incl Wetland) (from Table 2)	Phase 2A (incl Wetland) + Reed Bed
Fund	Monetary Contribution					
Joint Prov/Fed	67% typical	2.5	2.75	3.25	3.25	3.75
Gas Tax	100% to $6M max	2.5	2.75	3.25	3.25	3.75
Green Municipal Fund	Loan to $5M +15% grant	N	1	3.5	1	3.5
Municipal Climate Innovation Program	80% to $1M max	N	1	2	1	2
Island Coastal Economic Trust	33% to $400k max	N	1	1	1	1
Habitat Conservation Trust Fund	50% to $100k max	N	3	4	3	4
Habitat Stewardship Program	50% to $100k	N	3	4	3	4
National Wetland Conservation Fund	TBD	N	3	4	3	4
Overall Ranking		**2.0**	**2.5**	**3.1**	**2.9**	**3.5**

Note 1. The Overall Ranking score is a composite achieved by multiplying the score for each option by the money available for each fund, adding the results for each Option, and normalizing to a score out of 5. This is intended to be used for the "Ability to Attract Grant Funding" category in the Options Evaluation System.

The major conclusions from Tables 2 &3 are;

- Of the "complete" Options, Option1, Ph2A is the best candidate for funding
- Adding the biochar reed bed and wetland improve the chances of any project getting funding, and open up additional funding opportunities.
- Of the various phasing combinations to achieve Option 1, Phase 2A, the one most likely to attract grant funding is Ph2A with the reed bed.

The biochar reed bed is particularly good value in terms of grant attractiveness as it has four desirable characteristics for grant programs – it;

1. is innovative
2. removes the emerging contaminants
3. is carbon negative
4. can be replicated at any wastewater treatment plant with available land area

Regardless of which phase project Cumberland pursues, if grants are not received, then Cumberland will still be required to implement Phase 1, and it can do this within its borrowing capacity.

Based on all the information in TM14 and this analysis, the following are the recommended Grant Strategies;

Strategy	**Reason**
Use the construction authorization contained within the existing Discharge Permit rather than wait for completion of the LWMP process	Removes the major time risk in grant evaluations
Pursue elector approval for borrowing, rather than waiting to gain borrowing authority by completing Stage 3 LWMP	Removes the major financing risk in grant evaluations
Include the wetland augmentation and biochar reed bed with any application	Gains a lot of evaluation points for relatively low extra cost. The wetland and/or reed bed can still be deferred if funding is not obtained.
Allow a one year period for securing funding	Allows numerous sources to be pursued before the project is started
Allow extra time for securing wetland funding before commencing the wetland project	The wetland specific funding programs may not be available at the same time and may take longer to secure. This also gives more time for the involvement of community and environmental groups in the project, which, in itself, helps to secure funding.
If a Phase 1 application is pursued, clearly identify how it is part of the longer-term plan	Shows that future requirements have been considered, and that this was determined to be the best value path forward.

Phasing

The Committee has chosen to have the wetland augmentation as part of any project, and has chosen Option 1, Phase 2A as the preferred long term option. A decision on phasing has not yet been made.

Assuming Option1, Phase 2A is confirmed by Council then the grant and phasing possibilities are as Shown in Table 4 below, along with some technical comparisons. For a full evaluation, the Evaluation Matrix can be used, but it must be remembered that this matrix assumed all Options delivered the same population capacity, which is not the case between Phase 1 and 2A. This must be considered when comparing the Evaluation results.

Table 4. Summary of Phasing Possibilities for Option 1, Phase 1 and 2A

Project	Phase 1			Phase 1+2A	
Regulatory Level	Permit Compliance			MWR GEP	
Add-ons	None	Wetland	Wetland and Biochar Reed Bed	Includes Wetland	Biochar Reed bed
Design Effluent Quality (BOD-TSS)	25-25	25-25	25-25	25-25	25-25
Target Effluent Quality	20-20	15-15	10-10	15-15	10-10
Treatment of emerging contaminants and trace organics	minimal	good	excellent	good	excellent
Carbon footprint	neutral	neutral	negative	neutral	negative
Regulated Population capacity	5000	5000	5000	7000	7000
Years before Second Phase is required	5-10	5-10	5-10	20	20
Cost (as single project)	$5.6M	$6.6M	$7.6M	$8.7M	$9.7M
Project cost if 2/3 grant funding received	$1.9M	$2.2M	$2.5M	$2.9M	$3.2M
Future cost for Phase 2A	$3.9M	$2.9M	$2.9M	-	-
Total cost for two-phase project				$9.5M	$10.5M-

If a Phase 1 project is implemented, Phase 2A will be required when the current Discharge Permit is exceeded or no longer valid, and Cumberland will need to meet the BC Municipal Wastewater Regulation. Primarily, this would be when the dry weather flow exceeds 910cu.m/day, or 1001cu.m/day if a 10% increase is approved, and this is expected to be reached in five to ten years. A secondary reason could be that Cumberland wishes to start using reclaimed water, which can only be authorized by an MWR registration of a completed Liquid Waste Management Plan.

There is a cost penalty for doing a two-phase execution of Option 1, Ph2A, and TM 7B(Rev2) has this as $0.8M. This represents all the "indirect" costs for establishing a second project for Phase 2A years after the Phase 1 project team has been and gone. There will need to be an owner's engineer, project manager, tendering process, contractor mobilization/demobilization. Additionally, there will be a new learning curve for everyone involved, which always costs some amount of time and money.

While a phased approach defers $3.1M (assuming the wetland is part of Phase 2A) for five to ten years, it has also cost about $0.8M to do so.

Thus, the phased approach saves short term cost but increases overall cost.

Tax Implications

The overall cost of a project – net capital cost after grants, and increased operating costs, are ultimately paid for by the village taxpayers, and this is the "tax burden". It the single most important component of the Evaluation System devised by the WAC in July 2016, comprising 23% of the scoring of any option.

Preliminary tax burdens were calculated for all Options in the November 30, 2017 Report to Committee. On Grant Funding and Tax implications. With Option 1, Phase 2A being the preferred long term Treatment Option, the tax burden calculations have been made only for the various permutations of implementing this Option, and are shown in Table 4.

Notes about the Tax Burden:

1. The tax burden is in dollar per house or land parcel, per year, and represents the increase over current taxes and wastewater user fees.
2. Tax calculations are for comparison purposes only, and are not "official" parcel tax rates
3. The Tax Burden calculation assumes borrowing for 20 years, at 4% interest, this cost is distributed among the existing 1500 properties in 2017, and re-calculated in 2023.
4. 2023 costs are distributed amongst 1800 properties, and assume no grant funding for 2023 spending.
5. by 2023, $2.6M in wastewater DCC's have been collected, and use 75% of this for treatment (remaining 25% to collection system). If no phase 2 project, DCC's can be paying down the loan for Phase 1.
6. Grant funding for a second phase is still possible.
7. *Future replacement cost is not included*, but should be considered in future rate/tax structures. Note that there is no grant funding for replacement costs.
8. Operating costs – over and above the current lagoon operation are included in all tax burden calculations.
9. Carbon taxes – and credits - have not been calculated.

Table 4. Preliminary Tax Burden Calculations for Option 1, to Phase 2A

Scenario		**Phase 1, no wetland**	**Phase 1 + Wetland**	**Phase 1 + Wetland + Reed Bed**	**Phase 2A**	**Phase 2A + Reed Bed**
	Capital Cost of phase	$5.6M	$6.6M	$7.6M	$8.7M	$9.7M
	Operating cost of phase (per year)	$350,000	$375,000	$375,000	$375,000	$375,000
#1. Pursue and receive 2/3 grant for project of choice in 2019	2019, First Project, Net capital cost (after grant), $M ***$ per parcel per year***	$1.9M, ***$325***	$2.2M, ***$358***	$2.5M, ***$374***	$2.9M, ***$392***	$3.2M, ***$408***
	2023, Implement Phase 2A, no reed bed, no grant, but use $1.9M accumulated DCC's	$1.9M, ***$365***	$0.9M, ***$338***	$0.9M, ***$351***	[No Project] ***$247***	[No project] ***$261***
	2023, Implement Phase 2A with reed bed, no grant but use $1.9M in accumulated DCC's	$2.9M, ***$406***	$1.9M, ***$379***	$0.9M, ***$351***	[No Project] ***$275***	[No Project] **$261**
# 2 Grant funding denied, implement Phase 1 in 2019	First Phase in 2019, No Grant	$5.6M, ***$508***				
	Second Phase in 2023, no grant but use $1.9M in accumulated DCC's				$3.9M, ***$518***	$4.9M, ***$559***

Conclusion

The analysis of the tax burden is made complicated by the range of treatment options, phasing possibilities and grant funding opportunities.

Given that the Committee has chosen Option1, Phase 2A as the preferred long term treatment option, the only remaining decisions are;

a) is whether to pursue a grant for the entire project, or just a first phase, and
b) whether to include the biochar reed bed

The major conclusions from this analysis are;

1. For all Treatment Options, the Capital cost is lower if they are executed as a single project
2. Cumberland's limited reserves and borrowing capacity ($7.1M) mean that ***none*** of the long-term Options can be implemented as a single project ***unless*** grant funding is received first.
3. Cumberland has a desire to leave as much borrowing capacity for other projects as possible
4. Cumberland can also choose to pursue grant funding only for Phase 1.
5. Of all the long-term Options, Option1 Phase 2A is assessed as having the best chance of receiving grant funding, from the most sources.
6. Of the combinations for phasing Option1, Ph2A, implementing it in a single phase, with the biochar reed bed, has the best chance of receiving the most grant funding
7. Of these combinations, Phase 1 without the
8. The lowest overall tax burden is if funding is pursued and received is for Phase 1 only, without the wetland or reed bed.
9. The difference between the lowest and highest tax burden, assuming a 2/3 grant is received, is only an $83/yr difference
10. The highest tax burden occurs if funding is denied, in which case Phase 1 must be funded entirely from borrowing, and the parcel tax would increase further when Phase 2A is implemented.

OPTIONS and RECOMMENDATIONS

This report contains the analysis of funding, financing, phasing and tax implications for the various wastewater Treatment Options.

With the Preferred long term treatment Option being selected as Option 1, Phase 2A, the committee now has five possible phasing combinations to choose from, for grant applications and a first project execution.

Selecting the preferred phasing strategy is neither a technical or financial decision alone. The LWMP Project Coordinator thus recommends that the Committee

1. Use the Goals and Evaluation system to score the five phasing combinations,
2. Use these results as a guide for selecting the preferred phasing strategy for recommendation to Council, and,
3. Recommend that if grant funding is not secured within an expedient timeframe, that Option1, Phase 1 be implemented using borrowing by the Village of Cumberland.

Respectfully submitted,

_____

Paul Nash
Project Coordinator
Liquid Waste Management Planning
Village of Cumberland

COMMITTEE REPORT

REPORT DATE: January 19, 2018
MEETING DATE: January 25, 2018

TO: LWMP WASTEWATER ADVISORY COMMITTEE (WAC)

FROM: Paul Nash, Project Coordinator

SUBJECT: Implementation Options

RECOMMENDATIONs

1. THAT the Committee receive the Report on Implementation Options for information.
2. That the Committee make a recommendation to Council on either;
    a. Moving towards implementation of a project using the regulatory approval of the existing Permit and by seeking elector approval for borrowing, or
    b. Cary on with the LWMP to complete stage 3 LWMP, and use the regulatory and borrowing authorizations conferred by

Background

The LWMP is a three stage process that can be summarized as;

1. Study the problem
2. Study the potential Options and choose the best one
3. Work out how to implement and finance the chosen Option

The original Stage 1 LWMP report was submitted to, and approved by Ministry of Environment in 2001.

The Stage 2 report has been through several iterations with MoE in 2003, and 2008, where the constructed treatment wetland was the preferred option.

The current LWMP work in 2016 and 2017 is officially still within Stage 2, and has been focused on;

- updating information (flow, population, community goals, etc) to the present day, and
- identifying treatment and discharge options that meet current and future community and regulatory needs.

With the selection of the Preferred Option (Option 1, Phase 2A), Cumberland is nearing the end of Stage 2, and it is planned to complete the remaining Stage 2 work items (resource recovery, water conservation etc) in early 2018. This would allow for a completed Stage 2 Report to be submitted to the Ministry of Environment in mid 2018.

The focus will then turn to how to implement the Preferred Option, and there are two major elements required

A. Regulatory approval
B. Financing plan and Borrowing Authority.

Regulatory Approval.

The processes for regulatory approval are described in detail in Technical Memo #1 – Regulatory Framework.

There are normally two pathways for regulatory approval;

1. A completed, Minister approved, Stage 3 LWMP
2. A registration under the Municipal Wastewater Regulation

In the case of Cumberland, there is a third (and unusual) pathway for regulatory approval, which is the existing Discharge Permit. This Permit ***already authorizes*** Cumberland to do upgrade works to meet its permit requirements for treatment quality. It is possible to do further works, within the permit, to provide capacity beyond the permit conditions (i.e. flow of 910 cu.m/day or about 5000 7000 people) but this capacity cannot actually be used without an increase in the authorized flow. This increase can only be authorized by the two means above – a completed LWMP or MWR registration.

The presence of the Permit authorization is advantageous as it allows works to proceed at any time – the limiting factor then becomes the financing plan

The regulatory pathways each have their own characteristics, which are summarized in Table 1 below.

Regulatory Pathway	**LWMP**	**MWR**	**Permit**

Work required to complete process.	• Submit Stage 2 Report
	• Wait for approval (6 months)
	• Submit Stage 3 report containing
	  ○ Implementation Plan
	  ○ Financing Plan
	  ○ Operational plan
	  ○ Preliminary design
	• Wait for approval (12 months)
		• Discharge EIS
		• Operational Plan
		• Preliminary Design (for approval)
		• Wait for approval (6-12 months)
			• Preliminary Design (for review)
			• Wait for approval (3-6 months)

Authorized Flow and population capacity	1800 cu.m/day, 7000pp	1800 cu.m.day 7000pp	910 cu.m/day, ~4,500-5000pp

Relative Cost to complete authorization	$$$	$$	$
Further Public consultation	Yes	No	No
Earliest expected date of authorization	Mid 2020	End of 2019	End of 2018
Future authorization required	No	No	Yes

The Permit process is the one that is most within Cumberland's control, and allows the earliest implementation, but a future authorization will be required to accommodate village growth.

Financing Plan and Borrowing Authority

A project cannot be built unless it can be paid for, and the Financing Plan lays out how this will happen. The issues around financing are detailed in Technical Memo #2 – Financing Framework.

There are five major sources of funds for financing a wastewater project;

A. Municipal Reserve Funds both wastewater specific and General reserve can be used
B. Municipal revenue – wastewater user fees and parcel taxes
C. Developer Contribution Charges (DCC's)
D. Senior government grants
E. Municipal borrowing.

For Cumberland, the reserves are insufficient to cover the cost of a project, or even the municipal matching component for grants, so some form of borrowing will be required.

The Local Government Act requires that any long-term borrowing (term of greater than five years) requires elector approval via a referendum or Alternate Approval Process. There is one exception to this rule – where there is a completed, approved LWMP – discussed later.

If Cumberland wants to implement a wastewater project using either the MWR or Permit regulatory approval, then elector approval will be required. The approval must be for a certain (maximum) amount of money, for a specified term. If grants are subsequently obtained, or costs decrease, then not all the money needs to be borrowed. But if costs or scope changes and additional money must be borrowed, then additional approval is required.

Grant funding programs are discussed in Technical Memo 14 – Grant Funding opportunities. One of the evaluation criteria for Federal/provincial programs is the "risk" of financing delays. Specifically, where the municipality proposes to borrow for the project, does it already have the elector approval to do so? Having the approval in place prior to making an application makes the application much stronger, and the project more likely to succeed.

The Comox Valley Regional District "South Sewer Project" is an example of a project that received grant funding before it had elector approval, and then the electors did not give their approval for the borrowing.

Thus, if elector approval is required for borrowing for matching grant funding, it is preferable to obtain the approval before applying for funding.

It is expected that there will be some sort of Federal/Provincial grant program open for applications in the second half of 2018. If Cumberland is wishing to move forward with implementation (rather than completing the LWMP) then it would be desirable to have borrowing approval before making the application, or at least, in the process when the application is made.

For Cumberland, there is an opportunity to have a referendum question on borrowing at the October 2018 election. It may also be possible to do an Alternate Approval Process before then.

Borrowing approval via the Liquid Waste Management Plan

The LWMP is a unique process in that, when completed, it confers both regulatory and borrowing authority on the municipality, and then ***requires*** the municipality to implement the Plan. The LWMP is the sole exception allowed to the elector approval requirements of the Local Government Act. The rationale for this is twofold;

1. There is extensive public consultation mandated as part of the LWMP development, so elector approval has been deemed to occur.
2. Where the LWMP has been approved (and sometimes required) required by the Ministry of Environment, the borrowing authority allows the municipality to implement the Plan's works. If the borrowing authority had to then be approved by the electors, and was rejected, it would effectively allow them to overrule the Provincial government!

For Cumberland, completing the LWMP will provide a long-term plan, with the regulatory and borrowing authorizations, such that the exercise will not need to be repeated for another 20 years. It will however, require more time and money to complete this Plan.

OPTIONS & RECOMMENDATIONS

This report contains the analysis of the regulatory and borrowing authorizations required to implement the wastewater treatment upgrade.

With the preferred long term treatment Option now selected, and with the regulatory authorization contained within the existing Discharge Permit, Cumberland has an unusual opportunity to move quickly towards implementation, without need of completing the LWMP.

Thus, the Committee then has two options for proceeding, after completing the Stage 2 LWMP, and is requested to make a recommendation on a preferred Implementation pathway;

1. Proceed to implementation using the regulatory authorization of the Discharge Permit, and pursue elector approval for borrowing authority, and
2. Continue with the LWMP process to complete Stage 3, using both the conferred regulatory and borrowing authority.

Respectfully submitted,

_____

Paul Nash
Project Coordinator
Liquid Waste Management Planning
Village of Cumberland

Corporation of the Village of Cumberland

2673 Dunsmuir Avenue
P.O. Box 340
Cumberland, BC V0R 1S0
Telephone: 250-336-2291
Fax: 250-336-2321
cumberland.ca

File No. 0540-20

Wastewater Advisory Committee
Agenda, Meeting #14
Thursday, November 30, 1 pm to 4 pm
Council Chambers

Invitees

Name	**Representing**	**Present?**
Matt Ishoy	Chair, Public member at Large	Y
Ken Barth	Public member at large	N
Dennis Cassin	Public member at large	Y
Vig Schulman	Public member at large	N
Mike Tymchuk	Public member at large, Alternate Chair	Y
Anya Macleod	Public member at large	Y
Sean Sullivan,	Council Representative	Y
Jesse Ketler	Alternate Council Representative	N
Nicole Rempel	K'omoks First Nation	N
Sundance Topham	Chief Administrative Officer	Y
Rob Crisfield	Manager of Operations	Y
Paul Nash	LWMP Project Coordinator	Y
Larry Sawchyn	TetraTech, Technical Consultant	Y
Troy Vassos	Troy David Vassos Inc.	Y
Dave Cherry	Vancouver Island Health Authority	N

Item	**Description**	**Owner**
14.1	• Call to Order, Meeting was called to order at 1:04 • Approval of Agenda Moved Mike, second Dennis, Carried	Chair

14.2	Approval of Minutes, Business Arising • Review of Minutes Motion to adopt, moved Sean, Seconded Dennis • Review of Action list and Parking Lot These items were passed over to move into the next agenda item • Business Arising None	Chair
14.3	Evaluation and Selection of Discharge Options Paul explained the evolution of the various discharge options, and why Maple Lake Creek remain the discharge option • There is no practical alternative in winter, when dealing with such large flow volumes • In summer, when there is no other flow in Maple Lake Creek, the creek needs the effluent flow • Discharge can be direct to MLC or Indirect via North wetlands Thus, the Technical Consultant makes the following recommendations on Discharge Options; *In considering the importance of maintaining summertime flows in Maple Lake Creek, it is recommended that:* 1. *With the exception of future reuse applications, discharge shall continue to be to the Maple Lake Creek watershed.* 2. *A second (indirect) discharge location to the Maple Lake Creek watershed via the North Wetland be established.* 3. *Any future reuse applications take into consideration maintaining minimum dry weather flows in Maple Lake Creek* The Committee discussed and agrees with this recommendation **Motion: That the Wastewater Advisory Committee accept the Technical Consultant recommendations on Discharge, and recommends adoption of these to Council.** Moved Anya, seconded Dennis, **CARRIED**	Paul

14.4	Review of revised Technical Memo 7A-Rev2 - Treatment Options • Option1 - Upgraded Lagoon a. Phase 1 for Permit Compliance b. Phase 2A for MWR MEP and North Wetland c. Phase 2B for MWR GEP • Option 2 - Baseflow Mechanical for MWR GEP • Option 3 - Full Flow Mechanical for MWR GEP • The phased approach – how Option 1-Phase 1 enables all other lagoon and mechanical options In discussion, it was noted that; 1. with a phased approach followed by the mechanical options (2 & 3) some of the phase one work becomes redundant. 2. All the options provide secondary treatment, and full disinfection to the wet weather flows over 3600 cu.m/day 3. It is impractical to provide full tertiary treatment to all the flows over 3600 cu.m/day	Troy
14.5	Review of revised Technical Memo 7B-Rev2 - Treatment Options Cost Comparisons • Technical comparison of treatment systems • Cost comparisons for phased and single stage projects • Operating Cost Comparisons In discussion, it was noted that; 1. the capital costs are partly dependent on the phasing – there is an extra cost of $0.8 to $1.5M for splitting a project into two phases. 2. The operating costs increase with the increasing effluent quality of the various options. This is primarily due to the increasing mechanical complexity of the tertiary treatment options	Larry
1.6	Review of Committee Report – Grant Funding and Tax Implications – How funding and phasing impact the Tax Burden In discussion, it was noted that; • Only Phase 1 can be implemented without grant funding • There are varying opinions on which of the options are most likely to receive grant funding – this needs to be studied further • Phase 1 may be ineligible for some grant programs as while it meets Cumberland's Permit requirements, it does not treat to current best practice • The tax burden range from $325 to $908 is not unreasonable, though the lowest is still preferred	Paul

14.7	Review of Committee Report – LWMP Open House#4 Matt took the Committee through the Open House report. The feedback from the public can be summarized as; 1. The preferred "endpoint" Option is Option1, Phase 2A – Upgraded Lagoon to MEP quality 2. There is a strong – but not unanimous – preference for a phased approach. 3. Some people prefer a complete implementation of phase 1 and 2A, but only if grant funding is received to do so.	Matt
14.8	Evaluation and Selection of Preferred Treatment Option Paul led the Committee through the Evaluation Matrix for the four endpoint Options. The tax burden calculation used was the phased approach, assuming no grant funding for either first or second phases. The full results are in the attached table and are summarized as; • Option 1, Ph2A Upgraded lagoon to MEP, Score 80% • Option 1, Ph2B Upgraded lagoon to EGP, Score 66% • Option 2 Base flow mechanical to GEP, Score 59% • Option 3, Full Flow mechanical to GEP, Score 46% ***Recommendation to be made to Council on Preferred Long-Term Treatment Option*** **Motion: That, following the results of the evaluation system, the Committee recommends Option 1, Phase2A – Upgraded Lagoon to MEP quality, with discharge to the North Wetland – as the preferred long term Option.** **Moved Mike, seconded Dennis. CARRIED** Note Anya had to leave the meeting before the vote was called but had indicated her vote was for Option 1, Ph2A ***Recommendation to be made to Council on Preferred Phasing and Grant Pursual Strategy*** With the long term option decided, the Committee discussed the two major pathways to both phasing and grant funding; 1. Choose the phased approach and apply for grants for Option 1 - Phase 1 only 2. Apply for grants for the complete project (Option 2, Ph2A) and implement just Option 1 - Phase 1 if grants are denied The Committee concluded that more information was needed before a decision could be made.	Paul

	Accordingly, a decision on the phasing and grant funding was deferred to the next meeting pending more information on grant opportunities and eligibility **Action item**: Paul to prepare a report on grant funding opportunities, and likelihood of success for the various Options, for the next meeting	

14.9	Completing Stage 2 LWMP
	
	• Council meeting Dec 11th – WAC to make a Recommendation
	
	In discussion on making recommendations, the Committee decided that;
	
	1. It was better for a complete set of recommendations – preferred option and phasing and grant strategy - to go Council.
	2. No recommendations would go to the Dec 11th Council meeting, with another WAC meeting to be held in January 2018 to finalize the recommendations
	
	• Completing remaining Stage 2 studies
	  ○ Biosolids
	  ○ Integrated Resource Recovery
	  ○ Water Conservation
	  ○ Servicing Comox Lake area
	  ○ Infiltration Reduction
	
	These studies are still in progress, and will be discussed at future WAC meetings in 2018. They do not have any influence on the decisions about preferred options or phasing.
		Paul

14.10	Review of Committee Report – Implementation Options 1. Direct implementation, or 2. Complete stage 3 LMWP in 2018, then implement ***Recommendation to be made to Council on Preferred Implementation Pathway*** The Committee deferred both discussion and decision of this item until after the decisions have been made on the phasing and grant strategy	Paul
14.11	Wrap up Next Meeting – to be held Thursday January 25th, 1-4pm Recommendations to go to council on 13 February Adjournment Motion to Adjourn – Moved Mike, seconded Dennis, Carried Meeting adjourned at 4:25pm	Chair

	Public Q&A There were no members of the public remaining at the time of adjournment	Chair

Attachments to Minutes of Meeting #14

- Evaluation Results Table

Category	Goal	Category Value	Scoring			
			Option 1, Ph 2A Upgraded Lagoon to MEP Quality	**Option 1, Ph2 B** Upgraded Lagoon to GEP Quality	**Option 2** Base Flow Mechanical to GEP Quality	**Option 3** Full Flow Mechanical to GEP Quality
Affordability	Sustainable Tax Burden (incl capital and operating cost)	23	22.9	15.5	16.5	4.6
	Ability to Attract Grant Funding	17	13.7	12.0	10.3	6.9
	Subtotal Affordability	**40**	**36.6**	**27.5**	**26.7**	**11.4**
Economic Benefits	Productive use of reclaimed water	7	2.6	4.0	4.0	4.0
	Reduce Energy Use and GHG's	5	5.5	4.9	2.2	2.7
	Attract industry and tourism through innovation	5	3.2	1.1	1.1	1.1
	Artist based beautification	3	1.6	1.6	1.6	1.6
	Subtotal Economic Benefits	**20**	**12.9**	**11.5**	**8.8**	**9.3**
Environmental Benefits	Innovation/Environmental leadership	5	3.9	3.9	2.9	3.9
	Support health of waterways with robust treatment	4	3.3	2.9	2.9	3.3
	Use of existing ecosystems to control cost including low tech solution and or bio solutions plus beneficial use of produced biosolids	4	4.1	2.5	2.5	2.5
	Sustainability, Climate Change resilience/adaptation/robustness	4	2.9	2.9	2.5	2.9
	Clean air	2	1.1	1.1	1.1	1.1
	reduce manmade toxins	2	1.3	1.0	1.1	1.0
	Subtotal Environmental Benefits	**20**	**16.5**	**14.1**	**12.9**	**14.5**
Social Benefits	Inclusivity of Cumberland to create an identity and or positive legacy adding to the social license	8	8.3	5.0	3.3	3.3
	Inclusive costing/metered sewer	3	2.0	2.0	2.0	2.0

	Purple pipe ready	3	0.5	2.7	2.7	2.7
	Aesthetics	2	1.4	1.1	0.7	0.7
	Public Education	2	1.1	1.1	1.1	1.1
	Garden/Zen/all year green lawns	2	0.4	0.4	0.4	0.4
	Strengthen Comox Valley relationship	0	0.13	0.18	0.18	0.2
Social Benefits	**Subtotal Social Benefits**	**20**	**13.9**	**12.4**	**10.4**	**10.4**
	Total	**100**	**79.8**	**65.6**	**58.8**	**45.7**

Corporation of the Village of Cumberland

2673 Dunsmuir Avenue
P.O. Box 340
Cumberland, BC V0R 1S0
Telephone: 250-336-2291
Fax: 250-336-2321
cumberland.ca

File No. 0540-20

Wastewater Advisory Committee
Minutes, Meeting #15
Thursday, January 25, 1 pm to 4 pm
Council Chambers

Invitees

Name	**Representing**	**Present?**
Matt Ishoy	Chair, Public member at Large	Y
Ken Barth	Public member at large	Y
Dennis Cassin	Public member at large	Y
Vig Schulman	Public member at large	Y
Mike Tymchuk	Public member at large, Alternate Chair	N
Anya Macleod	Public member at large	N
Sean Sullivan,	Council Representative	Y
Jesse Ketler	Alternate Council Representative	Y
Nicole Rempel	K'omoks First Nation	N
Sundance Topham	Chief Administrative Officer	Y
Rob Crisfield	Manager of Operations	Y
Paul Nash	LWMP Project Coordinator	Y
Larry Sawchyn	TetraTech, Technical Consultant	N
Troy Vassos	Troy David Vassos Inc.	Y
Dave Cherry	Vancouver Island Health Authority	N

Item	**Description**	**Owner**
15.1	• Call to Order, Approval of Agenda Meeting called to order at 1:03 • Approval of Agenda Motion to approve - moved Vig, seconded Dennis, Carried	Chair

15.2	Approval of Minutes, Business Arising • Review of Minutes Motion to Adopt – moved Dennis, seconded Vig, Carried • Review of Action list and Parking Lot Paul reviewed the shrinking action list. Some parking lot items will be held over to Stage 3 of LWMP • Business Arising Rob updated the Committee about the visit from BC MoE, following up from their non-compliance letter. Troy explained about the interpretation of non-compliance for flow reporting. The Permit states a maximum annual average flow of 910 cu.m/day, which can only be calculated once per year. Up until now, any individual day over 910 cu.m had been reported as non-compliant. MoE has given Cumberland until 2026 to get the stormwater flows down to the permit level. Until that is done, the calculation of annual average flow is not representative, as it is heavily influenced by stormwater flows. This is one of the reasons why modern regulations work in Average Dry Weather Flow, as by definition, there is no impact from wet weather flows.	Chair
15.3	Review of WAC Meeting #14 • Decision on Preferred Discharge Options No changes were made to the decision on Discharge options • Decision on Preferred Long Term Option – Review of evaluation results No changes were made to the evaluation scoring or decision on the preferred long term treatment options, which remains as Option 1, Phase 1+2A – Upgraded Lagoon to MEP quality, with integral wetland augmentation.	Paul

15.4	• Review of Technical Memos
	  • TM#8 Emerging Contaminants
	  • TM#9 Effluent Polishing by Reed Bed
	Troy went through the TM's. While all treatment systems achieve some level of treatment for emerging contaminants, there are very few places that do specific treatment for them. The wetland augmentation will remove some, by the action of the wetland and flow through peat. The biochar reed bed will remove even more, by the adsorption action of the biochar. A decision on adding the Biochar Reed Bed is to be made using the evaluation system under Item 15.7 .
		Troy

	It was noted that while the Committee can make a decision to adopt the Reed bed, there would need to be further study, and some field pilot testing, to determine the design basis and make a cost estimate.	
15.5	• Review of Technical Memo 14 - Grant Funding Opportunities. Paul reviewed the TM and the implications for; • Phasing • Wetland augmentation • Biochar reed bed	Paul
15.6	Review of Committee Report – Grant Funding Strategy and Tax Implications With the long term option decided as Option 1, Ph1+2A, the Committee discussed the various phasing combinations as presented in the Report. It was agreed by all that regardless of what phase was to be pursued for grant funding, that if no funding was received in a reasonable time frame, then Cumberland's only course of action (based on receiving approval for borrowing) would be to proceed just with Phase 1. Given that Cumberland is receiving non-compliance attention from MoE, the reasonable timeframe is thought to be a year. A phased project defers some capital cost to the future, which is modelled as five years, according to the 3% growth rate. At the five year mark, the Village has grown from 1500 to 1800 parcels, and collected DCC's, so the tax burden is recalculated at this time. There is also a cost penalty for implementation and management of a second phase project. This is estimated to be $0.8M on top of the $3M for the deferred works. The five different phasing combinations were run through the Evaluation System. The initial evaluation for affordability was based on the tax burden for the first five years only, since all but Phase 1 see a decrease in the tax burden after five years. At the request of the Committee, the affordability was re-calculated based on the 20 year net present value of the tax burden, and this was used for the final scoring of the tax burden category. There was discussion about the fact that the Evaluation system was developed to compare various long term options against each other, rather than first and second phases of the same option. The scoring does not explicitly reflect the fact that a first phase (only) project does not serve the 20 year needs of the community, and needs a second phase in five years. The tax burden is the only evaluation category that captures a difference between a phased and completed project, and the Committee decided to evaluate on this basis.	Paul

The evaluation assumes that each of the phase alternatives receives 2/3 grant funding, as if they don't then only phase 1 is implemented. The Evaluation Results are detailed in the attached table and are summarized below:

First Phase	**Ph1**	**Ph 1+ Wetland**	**Ph 1 +Wetland +Reed Bed**	**Ph1 +2A (incl Wetland)**	**Ph1 +2A (incl Wetland) +Reed Bed**
Affordability (40 %)	19.3	20.1	21.5	23.9	25.3
Economic Benefits (20%)	5.6	9.1	12.3	9.1	12.3
Environmental Benefits (20%)	6.3	10.7	13.9	10.7	13.9
Social Benefits (20%)	5.3	10.2	12.3	10.2	12.3
Total Score	**36.6**	**50.0**	**59.9**	**53.8**	**63.7**

There was discussion about the fact that most of the environmental and social benefits accrue due to the add-ons of the wetland and reed bed, rather than the phasing. This illustrates that these components address many of the community aspirational goals that were the basis for the environmental and social goals, and the simple Phase 1 project does not.

While the evaluation system was not designed to compare partial and full projects, it did result in a 3.8 point benefit for a single, complete project over a two-phased execution, and this was deemed sufficient difference. The advantage for the complete project results from gaining 2/3 funding for a complete project, whereas a phased project gets 2/3 funding for the first phase, but not the second phase.

It was also noted that while the use of the 20 year NPV tax burden changed the scores compared to the original use of the tax rate for the five years only, it did not change the resulting order of which phasing options scored the highest or lowest.

15.7 Decisions and Recommendations

Considering all the information presented, the Committee is requested to make recommendations to Council to

1. ***Confirm the Preferred Discharge Option and Preferred Long Term Treatment Option***

	The Committee saw no reason to change the recommendations of meeting #14, that the preferred discharge option is to Maple lake Creek, via the wetlands, and the Preferred long term treatment option is the Upgraded Lagoon to "Moderate Exposure Potential" quality, Option 1, Phase 1+2A 2. ***Indicate a preference for the Biochar Reed Bed – adopt, further study, or delete*** **Motion: That the Committee recommend adopting the Biochar Reed Bed as part of the project, subject to further study and successful pilot testing.** Moved Vig, Seconded Dennis. Carried, with Ken opposed. Ken explained that his preference is to exclude the Reed Bed from the treatment project, as it is not essential for meeting regulatory needs, and pursue this as a separate project ***3. Indicate a preferred strategy for phasing and grant funding.*** **Motion: That the Committee recommend pursing a complete project, rather than a phased one, for all grant applications, and only execute a phased project if there is insufficient grant funding obtained for a complete project.** Moved Dennis, Seconded Vig, Carried.	

15.7	Completing Stage 2 LWMP
	
	• Council Feb 13th – Consider Recommendation
	• Complete remaining Stage 2 studies
	  ○ Biosolids
	  ○ Integrated Resource Recovery
	  ○ Water Conservation
	  ○ Servicing Comox Lake area
	  ○ Infiltration Reduction
	
	The Committee decided there will be two more meetings – first to review the draft LWMP Stage 2 report, and the second to then make a recommendation on the final report. Probable dates are mid-March and mid-April, to be confirmed.
		Paul

15.8	Review of Committee Report: Treatment Upgrade Implementation Pathways. There are two options, after completing Stage 2 in 2018; 1. Move to implementation, using the regulatory authority of the existing Discharge Permit and seeking elector approval for borrowing, or	Paul

	2. Complete stage 3 LMWP in 2019-20, then implement using LWMP regulatory and borrowing authority There was discussion about how, if option 1 is chosen, elector approval would be gained – by a Referendum at the October municipal election, or by an Alternate Approval Process during the summer. The earlier process allows approval to be confirmed as part of any grant applications made in summer/fall of 2018. It was decided that Village staff should look into this further before Council makes a decision on which route to proceed with. ***Recommendation to be made to Council on Preferred Implementation Pathway*** **Motion: That the Committee recommends moving to implementation of a project using the regulatory authority of the Discharge Permit, and seeking elector approval for any borrowing.** Moved Ken Seconded Dennis Carried.	
15.9	Wrap up • Next Meeting Meeting dates for the next two meetings are to be determined. • Adjournment Motion to adjourn – moved Vig, second Dennis, Carried Meeting adjourned at 5pm	Chair
	Public Q&A	Chair

Attachments:
Evaluation Results
Action Items List
Parking Lot List

Phasing Evaluation Results for Option1, Phase 1+2A, 25 January 2018.

- The Tax Burden assumes 2/3 grant funding for the first phase, and no grant funding but use of DCC contributions for the second phase.
- The Tax Burden score is calculated based on 20 year NPV of estimated parcel taxes and operating costs. An ideal tax burden (score 5) was deemed to be $200/parcel/year, and an unaffordable tax burden (score 0) was deemed to be $600.
- The tax burden for the "last resort" of a phased implementation with no grant is $518 for years 2019-2023, and $559 for years 2024-2039

Tax Burden Evaluation

Project Phasing	Two Phase	Two Phase	Two Phase	Complete Project	Complete Project
First Phase Description	Phase 1 (no Wetland)	Phase 1 +Wetland	Phase 1 + Wetland + Reed Bed	Phase 1+2A (incl wetland)	Phase1+ 2A +Wetland +Reed Bed
First Phase Capital Cost	$5.6M	$6.6M	$7.6M	$8.6M	$9.6M
Second Phase Capital Cost	$3.8M	$2.8M	$2.8M	-	-
Total Capital Cost	**$9.4M**	**$9.4M**	**$10.4M**	**$8.6M**	**$9.6M**
Net Cost, first phase (2/3 grant)	$1.9M	$2.2M	$2.5M	$2.9M	$3.2M
Net Cost, Second Phase (Use $1.9M in DCC's)	$1.9M	$0.9M	$0.9M	-	-
First Phase Tax Burden (2019-2023)	$325	$358	$374	$392	$408
Second Phase Tax Burden (2024-2039)	$365	$$338	$351	$247	$261
20Year NPV (3% discount rate)	**$5561**	**$5418**	**$5637**	**$4573**	**$4803**
Affordability Score ($200 =5, $600 =0)	**2.43**	**2.52**	**2.38**	**3.05**	**2.90**

Overall Evaluation

Evaluation Category	Goal	Category Value	Phase 1 (no Wetland)	Phase 1 +Wetland	Phase 1 + Wetland + Reed Bed	Phase 1+2A (incl wetland)	Phase1+ 2A +Wetland +Reed Bed
Affordability	Sustainable Tax Burden (Incl capital and operating cost)	**22.9**	11.1	11.5	10.9	13.9	13.3
	Ability to Attract Grant Funding	**17.1**	8.2	8.6	10.6	9.9	12.0
	Subtotal Affordability	**40.0**	**19.3**	**20.1**	**21.5**	**23.9**	**25.3**
Economic Benefits	Productive use of reclaimed water	**6.6**	1.3	2.6	2.6	2.6	2.6
	Reduce Energy Use and GHG's	**5.5**	2.2	2.2	4.4	2.2	4.4
	Attract industry and tourism through innovation	**5.3**	1.1	3.2	4.2	3.2	4.2
	Artist based beautification	**2.6**	1.1	1.1	1.1	1.1	1.1
	Subtotal Economic Benefits	**20.0**	**5.6**	**9.1**	**12.3**	**9.1**	**12.3**
Environmental Benefits	Innovation/Environmental leadership	**4.8**	1.0	1.9	2.9	1.9	2.9
	Support health of waterways with robust treatment	**4.1**	1.6	2.5	3.3	2.5	3.3
	Use of existing ecosystems to control cost including low tech solution and or bio solutions plus beneficial use of produced biosolids	**4.1**	0.8	2.5	2.5	2.5	2.5
	Sustainability, Climate Change resilience/adaptation/robustness	**3.6**	1.4	2.1	2.9	2.1	2.9
	Clean air	**1.8**	1.1	1.1	1.1	1.1	1.1
	reduce manmade toxins	**1.6**	0.3	0.6	1.3	0.6	1.3
	Subtotal Environmental Benefits	**20.0**	**6.3**	**10.7**	**13.9**	**10.7**	**13.9**
Social Benefits	Inclusivity of Cumberland to create an identity and or positive legacy adding to the social license	**8.3**	1.7	5.0	6.7	5.0	6.7

	Inclusive costing/metered sewer	**3.4**	2.0	2.0	2.0	2.0	2.0
	Purple pipe ready	**2.7**	0.5	0.5	0.5	0.5	0.5
	Aesthetics	**1.8**	0.4	1.1	1.1	1.1	1.1
	Public Education	**1.8**	0.4	1.1	1.4	1.1	1.4
	Garden/Zen/all year green lawns	**1.8**	0.4	0.4	0.4	0.4	0.4
	Strengthen Comox Valley relationship	**0.2**	0.04	0.09	0.18	0.1	0.2
	Subtotal Social Benefits	**20.0**	**5.3**	**10.2**	**12.3**	**10.2**	**12.3**
	Total	**100**	**36.6**	**50.0**	**59.9**	**53.8**	**63.7**

Cumberland LWMP - Action List Jan 25 2018							
Date Initiated	**Agenda Item**	**Initiative/Issue**	**Action**	**Who**	**By When**	**Status**	**Update/Resolution**
28-May-16	1.9	Document Handling	Investigate web based system (dropbox, etc)	Paul Nash	June 30, 2016	Ongoing	Most documents to be archived on LWMP website.
30-Jun-16	3.2	Updated minutes after approval by committee	Ensure updated and approved minutes are posted to website	Paul	Ongoing	Ongoing	Paul to manage
30 Nov 2017	14.8	Grant Funding	Prepare report on current and near future grant funding opportunities	Paul	Jan 25, 2018	Completed Jan 18	Completed as TM 14
25 Jan 2018	*15.8*	*Elector approval for borrowing*	*Staff report on options*	*Sundance*	*Mid March, 2018*		

Cumberland LWMP - Parking Lot Jan 25 2017					
Date Added	**Initiative/Issue**	**Description**	**Action**	**Who**	**Status**
28-Jul-16	Houses on Septic	Update information on where and how many houses/places are on septic. What is the future management plan for these?	Include in Stage 1 as an item to be addressed in Stage 2	Paul	In Progress, TBC with Stage 2 in April 2018
28-Jul-16	Uptake of Phosphorus by wetland plants	What sorts of plants do this best, can they be prevented from releasing P?	Include as part of study of Biochar Reed Bed	Paul/ Troy	Start in May 2018
28-Jul-16	How have other communities paid for their projects?	Give some examples of financing and funding strategies used	Is actually a Stage 3 item – financing plan, but may include in Stage 2 for information	Paul	hold
28-Jul-16	What are wastewater user rates in other communities?	Comparison of rate structures, particularly metered rates for wastewater	Is actually a Stage 3 item – financing plan, but may include in Stage 2 for information	Paul	hold
28-Jul-16	Reclaimed water uses	Identify all the feasible consumptive uses of different qualities of reclaimed water	Part of the Integrated Resource Recovery Study to be reported in TM#11	Paul, Troy	In Progress, TBC with Stage 2 in April 2018
25-Aug-16	Reclaimed water user rates	How have other towns charged for reclaimed water, what portion of treatment costs are covered?	Defer to Stage 3	Paul	hold
08-Sep-16	Stormwater	Status of stormwater management in Cumberland	Summary report to be included in Stage 2	Paul + Staff	In Progress
06-Oct-16	Shellfish industry	What are their concerns about MLC	Further study in Stage 2	Paul	Hold