Liquid Waste Management Plan - Stages 1 & 2

Technical & Public Advisory Committee Meeting #3

December 11th, 2018

Effluent Discharge Criteria

- Provincial standards are based on what is needed to protect the receiving environment on a case-specific basis
- Each receiving environment is characterized in an Environmental Impact Study (EIS) – this includes modeling of the proposed discharge
- Regardless of the EIS, secondary treatment standards must be achieved *at a minimum* (i.e., even if the EIS shows that a lesser standard would do)
- The EIS may dictate additional requirements (e.g. effluent filtration, nutrient removal), depending on the specific characteristics of the receiving environment

Effluent Discharge Regulations

	Provincial Regulations for Discharges to a **Marine** Environment	Provincial Regulations for Discharges to a **Freshwater** Environment	Federal Regulations
Total Suspended Solids (TSS)	Maximum 45 mg/L	Maximum 45 mg/L	Average 25 mg/L
Biochemical Oxygen Demand (BOD)	Maximum 45 mg/L	Maximum 45 mg/L	Average 25 mg/L
Disinfection	Shellfish: 14 Fecal Coliforms/100 mL Recreation: 200 Fecal Coliforms/100 mL		N/A
Ammonia Toxicity	Chronic: non-toxic outside Initial Dilution Zone Acute: non-toxic in undiluted effluent		
Advanced or Tertiary Treatment	Additional requirements may be imposed depending on results of an EIS	Total Phosphorus < 1 mg/L Phosphate <0.5 mg/L	N/A

Reclaimed Water Regulations

	Indirect Potable Reuse	Greater Exposure	Moderate Exposure	Lower Exposure
Uses	Replenishing a potable water source, like an aquifer	Public might be directly exposed Eg. irrigating a golf course	Public probably won't be exposed Eg. irrigating a silviculture operation	Industrial uses, public not at risk of exposure Eg. use at treatment plant
Total Suspended Solids, TSS (mg/L)	5	10	25	45
5-Day Biochemical Oxygen Demand, BOD_5 (mg/L)	5	10	25	45
Turbidity (NTU)	<1	2	n/a	n/a
Disinfection	Fecal coliforms <1 100 mL Chlorine residual required	Fecal coliforms <1 /100 mL Chlorine residual required	Fecal coliforms <100 /100mL Chlorine residual required	Fecal coliforms <200 / 100mL Chlorine residual required

Planning Horizons

- Important to preserve space for key sewerage infrastructure into the future
- Integrate sewerage infrastructure planning with OCPs
- LWMPs typically have a 10 to 20 year horizon and should be updated on a 5 year cycle
- Wastewater Treatment Plants
  - Site plant for 50 to 100 year buildout if possible
  - Room to double capacity of the plant is ideal
  - Facility upgrades in 10 to 20 year increments
- Pipelines
  - Protect utility corridors for 50 to 100 year buildout
  - Size corridors for pipe twinning, access and repair
  - Corridors must be maintainable
  - Design for 20 to 40 year capacity
  - Outfall capacity for ~40 years

LIQUID WASTE MANAGEMENT PLAN (LWMP)
for the
COMOX VALLEY SEWERAGE SYSTEM (CVSS)

Joint Technical Advisory Committee and Public Advisory Committee (TACPAC)

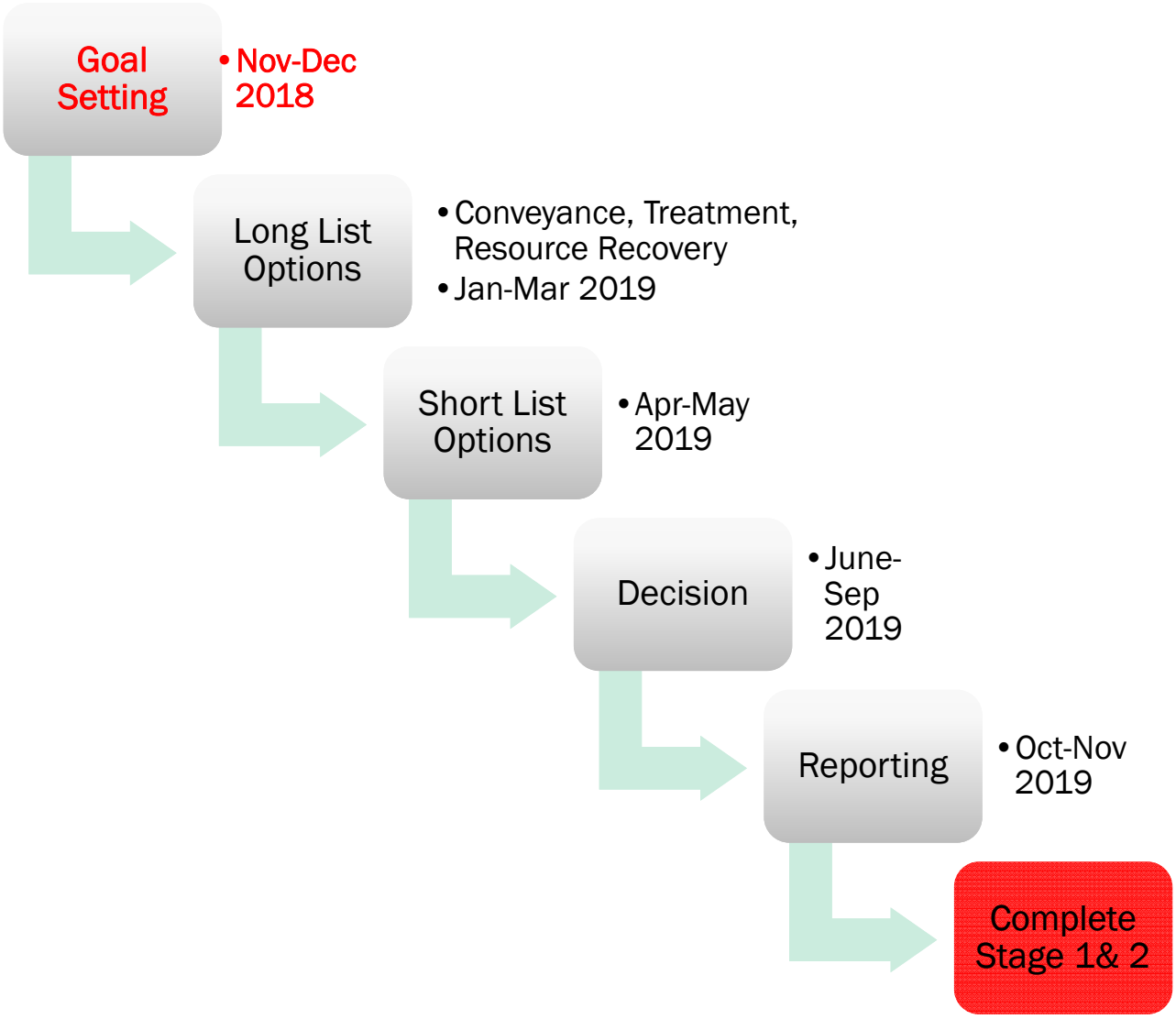
Meeting #3

December 11, 2018

Review of Goal Setting and Evaluation System

Comox Valley
REGIONAL DISTRICT

LWMP Road Map – CVSS Stage 1 & 2



Today's Agenda

- Technical update
- Review of Goals and Voting
- Review of public & online feedback
- Review of consolidated goals
- Adjust goals and weightings
- Review of evaluation system
- Possibly - Recommend finalized Goals and Evaluation system

Wastewater 101

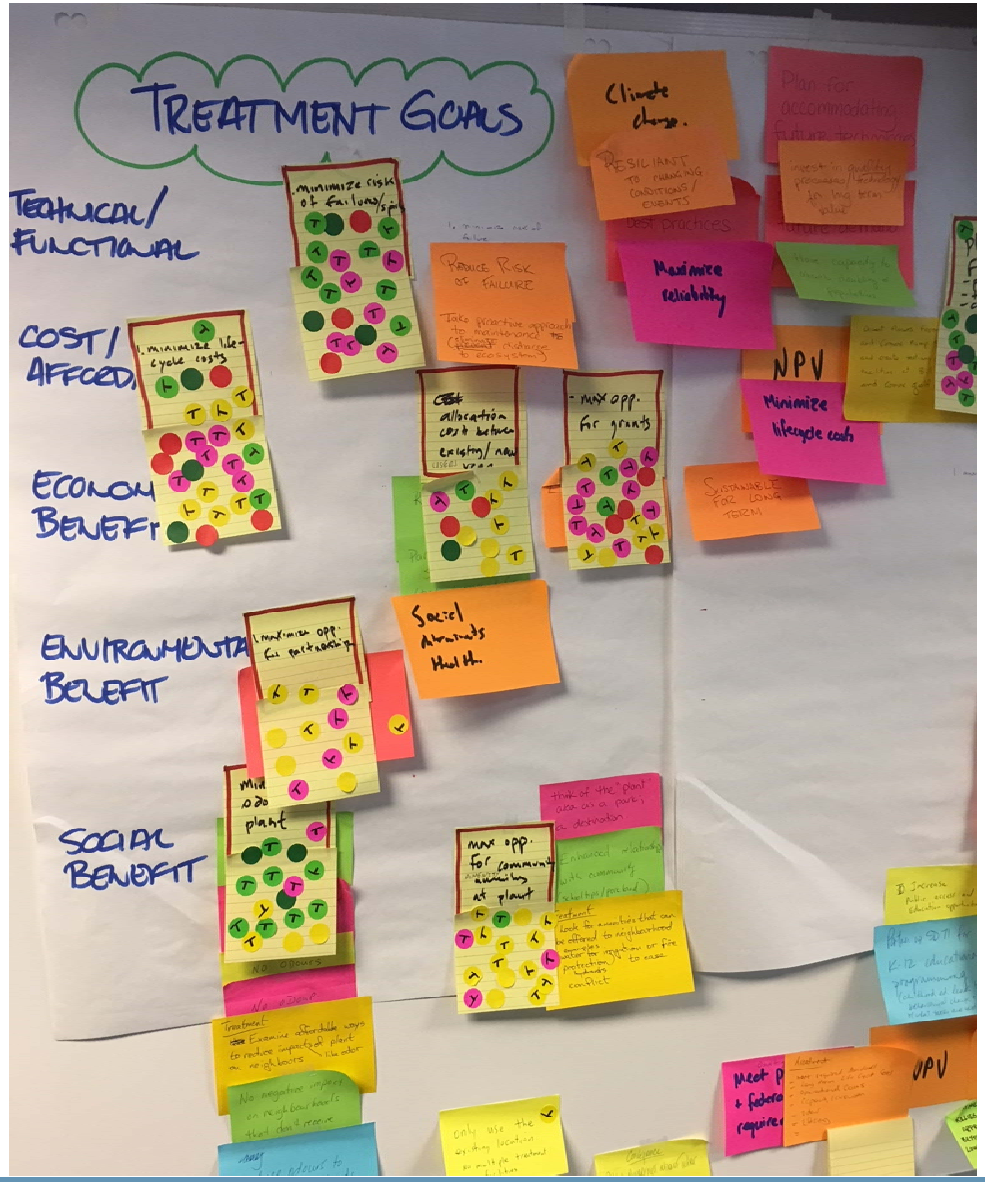
[WSP]

Results of Goal Setting from TACPAC 2

[Paul]

What we did

- Explanation of terminology – Options, Goals, Actions,
- “brainstorming exercise” to develop ideas for each of the three components
- Group the ideas
- Score (vote) on the ideas


TREATMENT GOALS
TECHNICAL/ FUNCTIONAL
COST/ AFFORD
ECONOM BENEFI
ENVIRONMENTA BENEFIT
SOCIAL BENEFIT
Climate change.
RESILIANT TO CHANGING CONDITIONS / EVENTS
Maximize reliability
NPV
Minimize lifecycle costs
REDUCE RISK OF FAILURE
Social
Treatment
No negative impact on neighbourhoods that don't receive
NPV

Goals

- These are things we ***want*** to achieve, also called ”Aspirational” goals
- Goals are grouped into five categories
  - Technical
  - Affordability
  - Economic Benefit
  - Environmental Benefit
  - Social Benefit

Actions

- Actions are things we can do to achieve a Goal
- An Option will contain several Actions
- We might add additional Actions to an Option achieve more Goals

Conveyance – Initial Results

Category	*Grouping as written*	*% of total*	*% of total*
Technical	Resiliency to Climate Change, Natural Disasters and Seasonal Impacts	11	12
	Enhance operational resilience	9	15
	Maximize use of existing infrastructure	9	10
	Plan for long term	7	21
	Innovation in Design	3	2
Technical Total		*38*	*61*
Affordability	Minimize lifecycle costs	9	8
	Long Term financial Implications	8	2
Affordability Total		*17*	*10*
Economic Benefits	Maximize local economic benefits	3	1
Economic Total		*3*	*1*
Environmental Benefits	Minimize impacts to sensitive environment	12	7
	Mitigate climate change impacts	7	9
Environmental Total		*19*	*16*
Social Benefit	Minimize noise and odour impacts	12	3
	Maximize community and recreational infrastructure	8	2
	Maximize public health benefit	3	8
Social Total		*23*	*13*
Grand Total		*100*	*100*

Summary of Category Scoring, Conveyance

	Conveyance		Treatment		Resource Recovery	
Category	PAC	TAC	PAC	TAC	PAC	TAC
Technical	*38*	*61*				
Affordability	17	10				
Economic B.	3	1				
Environment B.	19	16				
Social B.	23	13				
Total	100	100				

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Treatment – Initial Results

Category	Grouping as written	PAC %	TAC %
Technical	Minimize risk of failures/spills	15	14
	Meet regulatory standards, but don't go much higher	0	0
	Plan for future - population, technology, climate	17	16
	Treatment relies on an eco-asset approach to achieve better treatment at a lower cost with env benefits.	0	0
Technical Total		*32*	*30*
Affordability	Minimize lifecycle costs	11	17
	Asset management	0	10
	Allocation of costs between existing and new users	3	8
	Maximize opportunity for grants	11	8
Affordability Total		*26*	*43*
Economic Benefits		0	0
Economic Total		*0*	*0*
Environmental Benefits	Public awareness about what" not to flush"	0	0
	Maximize opportunity for partnership	4	2
	Maximize effluent quality	19	13
Environmental Total		*24*	*15*
Social Benefit	Reduce odour from plant	12	10
	Only use existing location - no multiple treatment facilities	1	0
	Maximise opportunity for community amenity at plant	6	2
Social Total		*19*	*12*
Grand total		*100*	*100*

Summary of Category Scoring, Treatment

	Conveyance		Treatment		Resource Recovery	
Category	PAC	TAC	PAC	TAC	PAC	TAC
Technical	*38*	*61*	*32*	30		
Affordability	17	10	26	*43*		
Economic B.	3	1	0	0		
Environment B.	19	16	24	15		
Social B.	23	13	19	12		
Total	100	100	100	100		

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Resource Recovery – Initial Results

Category	Grouping as written	PAC	TAC
Technical	Like Cranbrook, focus on technologies that are reliable	4	2
	meet provincial regulatory requirements	1	9
	Anticipate future demand for recovered resources	1	1
	Ostara (struvite) nutrient recovery	1	0
	Build capacity for options and partnerships to recover in future	5	0
	Invite medical cannabis greenhouses on-site public-private-partnership	1	2
	Microbial lab that could conduct research (research centre)	3	0
Technical Total		16	14
Affordability	To be cost neutral as a minimum	1	7
	Use life cycle costs/NPV	10	19
	Energy/Heat recovery	22	11
	Economically productive use of reclaimed water	21	10
	Reduce costs, efficiency in operations, reuse resources at plant	2	0
	Grant Funding eligibility	9	9
Affordability Total		64	56
Economic Benefits		0	0
Economic Total		0	0
Environmental Benefits	Reduce GHG/carbon neutrality	6	6
	Incorporate plans that work in our climate (for storage)	0	0
	Recovery for bio-plastics and resins	2	2
	Third party utilization (EOI requests)	2	7
Environmental Total		10	14
Social Benefit	Public health issues considered for any reclaimed water	0	8
	Partnership with university for research recovery	7	4

Summary of Category Scoring, Resource Recovery

	Conveyance		Treatment		Resource Recovery	
Category	PAC	TAC	PAC	TAC	PAC	TAC
Technical	*38*	*61*	*32*	30	16	15
Affordability	17	10	26	*43*	*64*	*56*
Economic B.	3	1	0	0	0	0
Environment B.	19	16	24	15	10	14
Social B.	23	13	19	12	9	15
Total	100	100	100	100	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Summary of Category Scoring, Resource Recovery

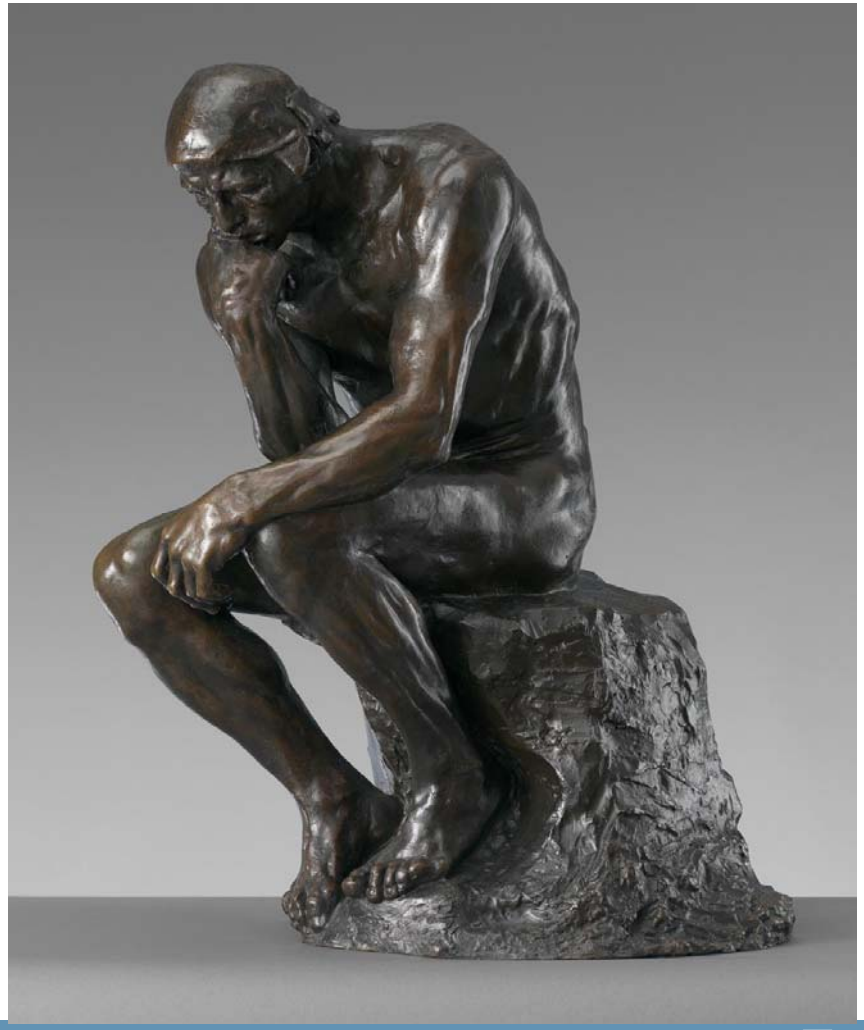
	Conveyance		Treatment		Resource Recovery	
Category	PAC	TAC	PAC	TAC	PAC	TAC
Technical	*38*	*61*	*32*	30	16	15
Affordability	17	10	26	*43*	*64*	*56*
Economic B.	3	1	0	0	0	0
Environment B.	19	16	24	15	10	14
Social B.	23	13	19	12	9	15
Total	100	100	100	100	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Public feedback on the Goals

[Christianne]

Consolidating the Goals



Comox Valley
REGIONAL DISTRICT

OCP, RGS and CVSS Plans

Category	Goal	
Technical	• Alternate Trunk Sewer Networks • Treatment to tertiary or reuse level (by 2050) • Waste to resources	
Affordability	• Reduce capital cost • Low Operating Costs • Funding Through DCC's	

OCP, RGS and CVSS Plans

Category	Goal
Economic Benefit	• Vibrant Local Economy • Increased Agriculture
Environmental Benefit	• Reduce GHG's • Renewable Energy, Energy from Waste • Energy Conservation • Protect, conserve and restore Ecosystems • Green Buildings
Social Benefit	• Public Health Needs • Recreation Trails as part of new developments

How do we use the Goals?

- Weight the Goals according to importance
- Create an evaluation system based on the Goals
- Knowing what the Goals are, tweak the Options to try and achieve more Goals
- Evaluate each Option to see what Goals it achieves

Evaluation system

Two stage process

1. Mandatory pre-requisites, with pass/fail scoring.
   - Fail on any one and the Option is ruled out
2. Numerical evaluation by weighted Goals
   - Highest scoring options are preferred.

Stage 1- Screening

Mandatory pre-requisites for screening potential Long List options	Determined by:
Meet **Basic Objectives** for the Component	Technical Consultants and Staff
Meet minimum planning horizon	Technical consultants and TACPAC
Meet Min. of Env. standards	As set by MoE in regulations
Meet public health protection standards	As set by MoE (and MoH) in existing regulations
Technically feasible	Technical Consultants
Follows good engineering practice	Technical Consultants
Is not astronomical cost	Technical Consultants

Stage 2 Weighted Evaluation

Numerical evaluation by weighted Goals

- Evaluate each goal the same way for each option
- Affordability goals by best cost/revenue estimates
- Highest scoring options are preferred.

Who Evaluates What?

Category	Evaluated By
Technical	TAC (incl Tech. consultants)
Affordability	Objective (Staff & Tech. consultants)
Economic Benefit	PAC
Environment Benefit	PAC and TAC
Social Benefit	PAC

Consolidated Scoring, Conveyance

Category	PAC	TAC	Public	Online	Proposed
Technical	*38*	*61*	*44*	*42*	*45*
Affordability	17	10	15	19	20
Economic B.	3	1	0	0	0
Environment B.	19	16	19	19	15
Social B.	23	13	22	20	20
Total	100	100	100	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Initial Conclusions -Conveyance

Observations

- Technical aspects are the most important
- Affordability is the least important

Conclusion

- Optimize for Technical
- We are prepared to pay more for a lower risk/more robust/longer term solution!

Consolidated Scoring, Treatment

Category	PAC	TAC	Public	Online	Proposed
Technical	*32*	30	*41*	*40*	*30*
Affordability	25	*43*	14	17	30
Economic B.	0	0	0	0	0
Environment B.	19	13	27	25	20
Social B.	22	13	22	18	20
Total	100	100	104	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Initial Conclusions –Treatment

Observations

- Technical & Affordability about equally important
- Environmental protection higher than for other components (Conv. and RR)

Conclusion

- Strike a balance of treatment quality and cost

Resource Recovery – Consolidated Results

Category	Proposed Revised Goals	%	Description, Comment
Technical	Commercially available technology	10	Want to avoid "inventing" something, but some RR technologies may still require pilot testing
	Resiliency to internal factors	5	Operational simplicity and reliability, minimise risk of failure/spills
	Anticipate future demand of resource	5	Part of the "market study" for the RR opportunities
	Improve performance of treatment plant	5	Some reclaimed water treatment processes may help achieve other performance goals
Technical Total		25	
Affordability	Maximise revenue	10	Dependent upon future demand - may not exist at present
	Minimize life cycle cost	20	Net present value of capital, operational and replacement cost, period is to the planning horizon
	Potential for Grant Funding	10	Will require a detailed assessment of current and likely grant opportunities, to then assess Options
	Potential for external partnerships	10	The partner is more than just a pay-for product customer, they contribute to the capital cost of the project
Affordability Tot.		50	
Economic B.	Grow the local economy	5	Potential for new or increased local economy
Economic Tot.		5	
Environment Benefits	Energy efficiency and GHG reductions	5	Most energy reductions reduce GHG's, but not all GHG reductions reduce energy.
	Habitat restoration or enhancement	5	Use of reclaimed water for this purpose
	Displacement of potable water	5	By the use of reclaimed water
Environment Tot.		15	
Social Benefit	Ability to maintain irrigation of public parks during water restrictions	5	By the use of reclaimed water
Social Total		5	
Grand Total		100	*Total is 80 for non-reclaimed water projects*

Consolidated Scoring, Resource Recovery

Category	PAC	TAC	Public	Online	Proposed, Water	Proposed, Non-water
Technical	14	17	31	30	25	25
Affordability	*72*	*46*	20	22	*50*	*62.5*
Economic B.	0	0	8	11	5	6.25
Environment B.	14	8	22	22	20	6.25
Social B.	0	11	20	26	5	0
Total	100	100	100	100	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Initial Conclusions –Resource Recovery

Observations

- LOTS of ideas on what to do with water and heat! (these are Options, not Goals)
- Affordability more important than everything else combined

Conclusion

- Optimize for Affordability
- It is only worth doing, if it is worth doing.

Consolidated Scoring, Overall Scoring

Category	Conveyance	Treatment	Proposed, Water	Proposed, Non-water
Technical	*45*	30	25	25
Affordability	20	30	*50*	*62.5*
Economic B.	0	0	5	6.25
Environment B.	15	20	20	6.25
Social B.	20	20	5	0
Total	100	100	100	100

Red = Highest value, Blue = Lowest (other than Economic Benefit)

Initial Conclusions –Overall

- Technical focus greatest for conveyance, least for RR
- Affordability focus least for conveyance, greatest for RR
- PAC is more community focused, TAC is more technical focused

Example Conveyance Option

Trucked Wastewater

- Replace pump stations and pipelines with a fleet of tanker trucks
- Trucks are electric powered and self driving
- Major benefits;
  - *Decommission entire forcemain and both pump stations*
  - *Zero disruption to anywhere during construction*
- Real World Examples
  - Yellowknife, NWT
  - Dubai (outer areas)

Example Conveyance Option

Trucked Wastewater

- Major drawbacks
  - Uses more energy overall
  - ~300 trucks/day = slight increase in traffic on Dike Road
  - Double/Tripling of traffic in wet weather

Trucked Wastewater - Screening

Mandatory pre-requisites for screening potential Long List options	Pass/Fail
Meet **Basic Objectives** for the Component	Pass
Meet minimum planning horizon	Pass
Meet Min. of Env. standards	Pass
Meet public health protection standards	Pass
Technically feasible	Pass
Follows good engineering practice	*Fail*
Is not astronomical cost	TBD

Example Scoring – Trucked Wastewater

Category	Proposed Revised Goals	Proposed %	score 1-5	%
Technical	Resilience to External Factors	15	1	3
	Resilience to Internal Factors	15	1	3
	Long term solution	10	5	10
	Flexibility to accommodate future changes	5	5	5
Tech. Total		**45**		**21**
Affordability	Minimize Lifecycle Cost	15	1	3
	Long term Value	5	1	1
	Attract Grant funding	0	1	0
Afford. Tot.		**20**		**4**
Environment Benefits	Minimize risk of impacts to sensitive environment	10	1	2
	Mitigate climate change impacts (Energy, and GHG's)	5	1	1
Env. Total		**15**		**3**
Social Benefit	Minimize noise, odour and visual impacts in operation	10	1	2
	Minimize community disruption during construction	*5*	*5*	*5*
	Maximize community and recreational amenity value	5	1	1
Social Total		**20**		**8**
Grand Total		**100%**		**36**

End Result

- Did we capture the TAC and PAC's intentions for goals evaluation?
- What categories do we want to change?
- Are we ready to recommend to Comox Valley Sewerage Commission?

After meeting # 3…

- Staff Forward Goals & Evaluation to CVSS

Or

- TACPAC to finalise at meeting #4?

For meeting # 4…

Start thinking about Options

- Where could conveyance go?
- What treatment upgrades and why?

Resource Recovery *and Reuse*

- Without reuse, what is the point?
- Tech. consultants will work out how to recover the resource
- Community needs to identify ***where & how*** the resources could be reused;
  - Water
  - Heat
  - Nutrients (biosolids, phosphorus)
  - Other?
- Goal of LWMP is to identify those worthy of detailed study

Developing your Option

- Description of the Option
  - How it works, standout features
- Why is it good – what Goals does it achieve?
- What are the potential drawbacks?
- Do not worry about cost/affordability at this stage.

Round Table

[Allison]