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## STAFF REPORT

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TO: City Council FILE

FROM: Major Capital Projects Advisor – Ken Watson

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DATE: June 13, 2016

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**SUBJECT: Background Report Regarding Sewage Treatment Upgrade Initiative**

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**Issue:**

As requested by Council, this is an information report providing background on the City's sewage treatment facility with a focus on the Liquid Waste Management Plan, the Federal grant supporting sewage treatment upgrades, and the current status and cost estimates for completion of the treatment facility redevelopment.

**Sewer Lagoon History:**

The City's sewage treatment lagoon in the Somass estuary has generally provided effective, reliable and extremely cost effective treatment over the past 50 years.

The lagoon, its access road as well as the Wallace pumpstation and connecting forcemain was installed in 1958 by Rayner & Bracht Construction for a bid price of \$125,000 to specifications designed by Associated Engineering. Initially it was a facultative facility (no aeration) and it served what is now central Port Alberni.

The lagoon received its Operating Permit(PE- 297) from Provincial MOE in 1969 authorizing up to 34,100 m<sup>3</sup>/day discharge at maximum of 70mg/l each of TSS and BOD<sub>5</sub>. These discharge parameters are still in use today.

In 1970 aeration was added to the lagoon changing it to an extended aeration facility. This was undertaken to treat the additional flows being brought to the lagoon by construction of addition pumpstations and forcemains. Margaret pumpstation serving Alberni (1963); Argyle pumpstation serving southport (1971); Josephine pumpstation serving Westport (1977).

This configuration served the City well until 1995 when NovaTec Consulting was retained to provide recommendations to upgrade the treatment facility to accommodate new flows from the Port Fish Surimi plant, as well as anticipated flows from the landfill leachate and new provincial municipal sewage discharge criteria. NovaTec recommended biosolids removal, addition of curtain walls and source control at the fish plant.

Biosolids were removed in 1997 and curtain walls install in 1998. A series of upgrades to on-site treatment were also undertaken by Port Fish. Notwithstanding these improvements the seasonal surimi discharge caused significant compliance outages at the treatment lagoon and created periodic smell problems which were very upsetting to impacted neighborhoods. These issues recurred intermittently during the period the fish plant was operational.

In 2005 the City undertook the Northport Sewer Overflow Abatement project and in 2008 the Argyle Pumpstation was replaced. Both these projects reduced combined sewer overflows but also significantly increased flows to the lagoon. These projects as well as increased inflow and infiltration in our ageing collection system have contributed to frequent non-compliance with our treatment permit regarding sewage volume discharged.

Those issues noted above and frequent notifications from the Ministry of Environment regarding non-compliance made it a priority for the City to start planning for replacement of our aging treatment facility via adoption of a Liquid Waste Management Plan.

### **Liquid Waste Management Plan (LWMP) Background:**

The LWMP process is set out by the Province for municipalities to achieve a comprehensive, long term strategy for dealing with all aspects of liquid waste ensuring protection of public health and the environment and achieving compliance with both Provincial and Federal municipal sewage discharge criteria.

Public and stakeholder consultation must be included to ensure that multiple interests have been considered and that the LWMP is supported by the community. Stakeholders required to be involved and a recommended committee structure is set out by the Province.

The LWMP is required to be developed in three stages, with Provincial approval as each stage is completed. Stages are:

- Stage 1 - Existing conditions are examined, development projections estimated , and list of options developed
- Stage 2 – Detailed evaluation of options and selection of preferred option(s), and planning recommendations.
- Stage 3 - Plan summary with projected funding and implementation schedule.

More detailed information on the LWMP process can be found at the following Provincial Government web link:

<http://www2.gov.bc.ca/gov/content/environment/waste-management/sewage/liquid-waste-management-plans>

### **Port Alberni's LWMP:**

**Stage 1** - The City began its LWMP process in 1999 and retained Associated Engineering to undertake the technical evaluation needed and to coordinate the public and stakeholder input required. The Stage 1 document was completed and received Provincial MOE approval in 2001. This document is available for review on the City website in the documents library.

In summary, the Stage 1 document provided a comprehensive review including assembling background data, identifying wastewater management issues, estimating future populations and waste generation rates, documentation of our existing wastewater treatment and effluent disposal practices, identification and discussion of non-domestic wastewater discharges (fish plant and landfill leachate), discussion of source control issues, discussion of effluent and biosolids reuse options, discussion of wet weather flow management options, development and description of wastewater management options, discussion of future storm water management options and documentation of the Stage 1 public involvement process.

With regard to future wastewater treatment, three options were identified in Stage 1 as follows:

- Option 1 – Treatment facility remains where it is with upgrades to treatment and/or disposal, potentially including shared use of the Pacifica Papers (now Catalyst) lagoon, as required.
- Option 2 – Abandon the existing treatment facility and a new mechanical treatment plant be developed either on the southern foreshore (Plywoods site) or in an area adjacent to the Alberni Valley landfill.
- Option 3 – Existing treatment lagoons kept but they would only service the northern half of Port Alberni. The southern half of Port Alberni would be serviced by a new mechanical treatment plant located on the southern foreshore/dock area (Plywoods site).

**Stage 2** - The stage 2 process was undertaken by Associated Engineering beginning in 2001. The Stage 2 document included a comprehensive analysis of the options (and sub options) which were identified in the Stage 1 document. Input and direction was obtained from the City OCP as well as from the Technical and Public Advisory Committees of the LWMP. Rough cost estimates to facilitate comparison of options and sub-options were developed in the Stage 2 process. A “Draft Final Report LWMP Stage 2” was received from Associated Engineering in March 2003. This document is available for review on the City website in the documents library.

With regard to the three future wastewater treatment options identified in Stage 1, a summary of the analysis and cost comparisons provided in Stage 2 is as follows:

- Option 1 - Two sub-options were considered with option 1A being the most cost effective. Option 1A included upgrade of the existing lagoon for primary treatment with addition on site of a mechanical plant to provide screening and secondary treatment. An outfall was also included as well as primary treatment at each CSO. Total capital Cost was estimated at \$35.1 Million with annual O&M of \$0.63 for an estimated present value cost of \$43.5 Million.
- Option 2 – Replace the existing lagoon with a mechanical treatment plant located at either the Weyerhaeuser Shops (Sproat Division Shops) as option 2A or at the old plywood plant site as option 2B. Both options included primary treatment at CSO sites. Option 2B was most cost effective of the two with a capital cost estimated at \$42.5 Million with annual O&M of \$1.2 Million for an estimated present value cost of \$59.8 Million.
- Option 3 – A hybrid of Option 1A and 2B had two sub options of which option 3B was cheapest. This included retention of the existing lagoon with addition of screens, UV disinfection and an outfall to serve northport, plus construction of a new mechanical treatment plant at the old plywoods site to serve Southport. Capital cost was estimated at \$31.4 with annual O&M of \$0.76 for an estimated present value cost of \$41.7 Million.

Option 3B was therefore estimated to be the most cost effective and recommended by Associated Engineering as the preferred option. Option 1A was a close second (only 4% more) and had the advantage of not requiring the valuable and politically sensitive plywoods site to be used for a treatment plant.

Unfortunately, the Stage 2 draft plan completed in 2003 did not consider the use of the paper mill lagoons as an option even though this was contemplated as a possibility in Stage 1. This option was not contemplated in Stage 2 because discussions with Pacifica Papers indicated that they were not interested in any way in selling, renting, or sharing their lagoon even though it was a backup facility to their main treatment plant constructed on the mill site in 1992.

City staff, LWMP Advisory committee members and Associated Engineering all agreed that the utilization of the paper mill lagoon had the potential to be part of a much more cost effective option if it was to become available. Since Pacific Papers had sold the Port Alberni Paper Mill to Norske Skog Canada during the development of the Stage 2 report it was decided to put the Stage 2 recommendations on hold until negotiations with the new mill owner could be undertaken regarding use of their lagoon.

#### **Catalyst Lagoon Acquisition:**

Discussions with Norske (which became Catalyst Paper in 2005) were somewhat more encouraging but were protracted with senior staff changes on Catalyst's side requiring several new approaches. Discussions halted for a period of about 3 years while Catalyst and the City were in court regarding property tax issues.

An agreement in principle (AIP) was reached with Catalyst regarding the acquisition of the lagoon and other issues in 2010. This AIP did not specify the purchase price of the lagoon which was left for future negotiation.

The purchase price negotiation began in late 2010 with the two parties far apart on the expected price. To help move forward the parties jointly commissioned an appraisal of the lagoon facility by Cunningham & Rivard Appraisals Ltd. This report was received in May, 2011 with an appraised value of the facility determined to be \$13 Million. This evaluation was much more than the City had considered paying and reinforced Catalyst's position of a high value for the facility. The appraisal relied on report from Sandwell Engineering in determining the depreciated value of components of the facility. The City disagreed with some of the Sandwell's assumptions particularly regarding the value of earthworks on the site and hired EBA Engineering to review the report on our behalf.

The negotiation continued throughout 2011 with the inclusion of acquisition of industrial road lands to create a package agreement that was beneficial to both parties.

The negotiation concluded in early 2012 with the Mayor of Port Alberni and CEO of Catalyst agreeing on a package price for acquisition of the lagoon facility as well as acquisition of waterfront industrial road alignment and dedication of additional road to create a City owned waterfront road between Argyle Street and Redford Street. The total package price was \$5.75 Million with \$5 Million paid on the closing date (Sept 30, 2012) and \$0.75 Million paid one year later. In addition the agreement specified that the City not increase Catalyst's property taxes above the 2012 level for a period of 5 years (2013- 2017).

A breakdown of value of items in the package agreement is as follows:

• Lagoon and Infrastructure -	\$3,896,700
• Prepaid Sludge Disposal Agreement -	\$1,270,000
• Value of PAPA lease transfer -	\$ 155,000
• Land Lot A (Harbour Rd, Roundhouse, tracks)-	\$ 345,300
• Road Dedication (to Redford across mill lot)	<u>\$ 83,000</u>
Total Purchase Price	\$5,750,000

Catalyst also agreed under a separate but related agreement that they would accept all sludge that the City would remove from the lagoon facility up to September 30, 2016. This agreement was valued at \$1,270,000 in the transaction valuation. In February 2016 Council approved a contract with Terrapure Environmental to remove sludge from the old Catalyst lagoon at a cost of \$1.9 Million and truck it to Catalyst's Block 105 landfill. This work began in late April and is scheduled to be complete in late June.

### **Federal Grant Funding**

After the agreement in principal was reached with Catalyst paper (but before final agreement on the lagoon purchase price) the City made a grant application under the Federal Gas Tax Agreement's General Strategic Priorities Fund (GSPF). April 29, 2011 was the deadline for applications for that round of funding. The application contained information at a conceptual level of design for implementation of upgrades required to convert the Catalyst industrial lagoon to treat Port Alberni's municipal wastewater. Capital cost estimates included for this project were completed by Associated Engineering.

Total Cost for the project described in the application was \$14.2 Million with \$11.2 Million of that amount considered eligible for funding under the GSPF Program. The project cost was broken down as follows:

○ Pumpstation and Forcemain between Lagoons -	\$2,520,000
○ Aeration System Equipment Supply & Install -	\$2,550,000
○ Building for Equipment and Control Panels -	\$1,000,000
○ Effluent Outfall -	\$ 270,000
○ Overhead Power Transformers & Distribution	\$ 406,000
○ Initial Lagoon Dredging	\$1,050,000
○ Environmental Impact Assessment & Permitting	\$ 150,000
○ Catalyst Lagoon Acquisition (Civil, Buildings,Electrical)	<u>\$1,400,000</u>
▪ Sub Total	\$9,876,000
○ Contingency	\$2,469,000
○ Engineering	\$1,851,750
<b>Estimated Total</b>	<b>\$14,200,000</b>



In January 2012 it was announced that Port Alberni's application had been successful and the total eligible amount of \$11.2 Million would be provided for this project. This was the largest capital grant that has ever been received by the City of Port Alberni. Under the terms of the grant agreement the project must be completed by September 30, 2018 and all funds expended by December 31, 2018.

The Gas Tax Fund is a tripartite agreement between Canada, British Columbia and UBCM that delivers infrastructure funding to local governments primarily for capital projects that lead to cleaner air, cleaner water or reduced greenhouse gas emissions. UBCM administers the Gas Tax Fund in B.C. in collaboration with Canada and British Columbia.

### **LWMP Stage 2 – Continued:**

After the acquisition of the Catalyst Lagoon and the award of the GSPF Grant funding, the City re-engaged the LWMP Stage 2 process to complete the Liquid Waste Management plan with wastewater treatment undertaken incorporating the Catalyst Lagoon.

Due to committee membership overlap, the Technical and Public advisory committees were merged into one; the Wastewater Advisory Committee (WAC). This committee includes representatives from a spectrum of community organizations and stakeholders including; City, Regional District, Tseshaht First Nation, Hupacasath First Nation, Environment Canada, DFO, West Coast Aquatic, Somass Estuary Management Plan Committee, Alberni Valley Enhancement Association (AVEA), Catalyst Paper, Western Forest Products, Port Alberni Port Authority, Ministry of Environment, Ministry of Health, Ducks Unlimited, Chamber of Commerce, Worley Parsons, McGill & Associates Engineering and Associated Engineering.

Coordinated by City staff, and assisted by Associated Engineering's technical input, this committee has been working productively on the details of the LWMP, having met seven times as a group since re-engaging in 2013. Significant investigative work has also been undertaken to assist the Committee in its deliberations including an Environmental Impact Study and an Archeological Impact Study both of which are currently underway.

Additional information regarding the LWMP including minutes from WAC meetings is available on the City website at link: <http://www.portalberni.ca/liquid-waste-management-plan>

### **Environmental Impact Study (EIS)**

The EIS began in mid 2013 undertaken by Associated Engineering with assistance from Great Pacific Engineering & Environmental and ongoing monitoring by the WAC. The study investigated water quality and flow patterns, dilution processes and biodiversity in the Somass Estuary. Initially it was assumed that the discharge point being modeled would need to be at a minimum 10m depth (at low tide) in order to meet the most recent Ministry of Environment Municipal Wastewater Regulations (MWR) for discharge in an estuary.

Fisheries experts on the WAC reviewed the initial dilution modeling and determined that the 10m deep discharge mandated by the MWR would be below the halocline and have potentially negative impacts on salmon and that a shallower discharge above the halocline would be preferable. Based on this, additional scenarios were developed with shallower discharge points and additional fieldwork undertaken to model these scenarios.

In January 2015, the Ministry of Environment, based on input from our WAC and our ongoing EIS process, stated that a *substitution* would be considered for a shallower discharge depth provided the final EIS identified a scenario wherein human health & environmental effects could be

satisfactorily mitigated. During the remainder of 2015 additional engineering work was undertaken to locate a suitable outfall site that would meet both the MWR and fisheries protection criteria.

The recommended outfall discharge depth and location issue still requires finalization by the committee and then approval from senior government. The depth and therefore length of the outfall pipe have a significant impact on the estimate total capital cost of LWMP implementation .

**Treatment Facility Upgrade Components:**

Design of the upgrades to be implemented at the Lagoons site is well underway and can be broken down into a number of components as follows:

- Piping from existing treatment lagoon to new lagoon
- Influent Screening and solids removal
- Diffused fine bubble sub-surface aeration
- Effluent disinfection using Ultraviolet treatment (non-chemical)
- Pumping to Outfall
- Outfall across beach and seabed to approved discharge point

In addition, work of the LWMP Stage 2 WAC has determined that with incorporation of the former Catalyst Lagoon as the City's new treatment facility, the existing lagoon should be decommissioned and returned insofar as practical to its natural state.

The City made an application to the Federal Environment Canada National Wetland Conservation Fund in 2014 for the decommissioning and restoration of the existing sewage lagoon. This application was accepted in May 2015 and grant funding for \$164,030 awarded.

**Project Funding and Estimated Cost to Completion:**

The table below shows Project expenditures and funding to date as well as estimated costs through to project completion. A more detailed breakdown of future cost components is attached to the report for information.

<b>Project Component</b>	<b>Year</b>	<b>Expenditure</b>	<b>Revenue</b>	<b>Source of Funds</b>
Catalyst Lagoon Purchase	2012	\$5,321,700	\$5,321,700	Long Term Borrowing
Federal GSPF Grant	2012		\$11,200,000	Grant
Engineering, Environmental Impact Study, Archaeological and CSO monitoring(to date)	2013-2016	\$1,005,425		GSPF Grant
National Wetland Grant	2015		\$164,030	Wetland Grant
Lagoon Sludge Removal	2016	\$1,970,000		GSPF Grant
Lagoon Upgrade Capital Est.	2017	\$19,138,844		Partly GSPF
Decommission Old Lagoon	2018	\$355,530		Partly Wetland Grant
<b>Additional Funding Required</b>	<b>2018</b>		<b>\$11,105,770</b>	?
<b>TOTAL ESTIMATED COST</b>		<b>\$27,791,500</b>	<b>\$27,791,500</b>	

Based on the above, the total project cost is estimated to be \$27.8 million. Additional funds required to complete the project, beyond those already in hand, is estimated to be \$11.1 million

**Conclusion:**

Hopefully this report provides the background information Council requested regarding the Liquid Waste Management Plan, our sewage treatment facility, and its planned upgrading components and costs.

The following resolution is proposed:

*That the report from the Major Capital Projects Advisor dated June 13, 2016 providing information on sewage treatment upgrades and the Liquid Waste Management Plan, be received.*

Respectfully submitted



Major Capital Projects Advisor

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### Chronology of Sewage Treatment Lagoon Changes

- 1958 – Lagoon, access road and Wallace pumpstation and forcemain designed by Associated Engineering and installed by Rayner and Bracht Construction at a bid price of \$125,000.
- 1963 - Margaret St Pumpstation constructed connecting Alberni via a forcemain to Wallace pumpstation.
- 1964 - Lagoon heavily damaged by Tsunami repaired with Federal Disaster assistance.
- 1969 – Lagoon Operating Permit issued from Provincial MOE. PE-297 authorizing up to 34,100 m<sup>3</sup>/day discharge at maximum of 70mg/l each of TSS and BOD<sub>5</sub>.
- 1970 – Control Building and Aeration equipment first installed at lagoon.
- 1971 - Argyle pumpstation and forcemain under Somass River constructed connecting Southport.
- 1977 - Josephine pumpstation & forcemain under Somass River constructed connecting floodplain.
- 1995 – Lagoon upgrade study done by NovaTec to accommodate proposed new provincial wastewater regulations, addition of Fish Plant (surimi) and regional landfill effluent.
- 1995 - Port Fish Surimi plant wastewater added to Lagoon. Negative impact on effluent quality and smell issues arising periodically due to this input persisted during the entire time of its operation despite technical upgrades at the plant and at the lagoon.
- 1997 - Lagoon biosolids removed as recommended by NovaTec. 2600 dry tones removed by Trimax at cost of \$661,000. Biosolids disposed of at ACRD landfill at no cost.
- 1998 – Curtain walls installed at lagoon as recommended by NovaTec to increase retention time and improve treatment. Provincial grant of \$113,000 received towards this upgrade.
- 1999 - Effluent from ACRD landfill directed to lagoon.
- 2000 – Additional aeration units installed at lagoon to accommodate surimi impacts.
- 2004 - Lagoon biosolids removed 1000 dry tones removed by Global Dewatering at cost of \$255,000. Biosolids disposed of at ACRD landfill at no cost .
- 2005 – Northport Sewer Overflow Abatement project completed directing sewage from upper Northport to Lagoon by gravity with new forcemain under Somass River. This decreased CSO's and increased flow to the treatment facility.
- 2006 – Aeration equipment upgraded by replacement of old units.
- 2008 – Argyle Pumpstation replaced with increased capacity. This decreased CSO's and increased flow to the treatment facility.

**Estimated Capital Costs  
Project Port Alberni Wastewater Upgrades  
Revision 6-Jun-16**

**DIRECT COSTS  
Construction Cost Estimate (2017 Construction)**

Inlet Piping	\$584,832
Screening Facility	\$924,696
Piping to lagoon	\$900,002
Aerated Industrial Lagoon	\$3,434,742
Blowers and UV disinfection facility	\$1,845,427
Pumping System	\$1,437,329
Instrumentation & Control	\$160,225
Electrical	\$1,427,108
Outfall System	\$2,858,564
Contingency	\$3,070,798
Subtotal	\$16,643,722

**INDIRECT COSTS**

Environmental Impact Study Completion	\$65,000
Permitting including approval of LWMP	\$100,000
Engineering	\$1,664,372
Administration	\$332,874
Miscellaneous	\$332,876
Subtotal	\$2,495,122

**TOTAL ESTIMATED CAPITAL COST                      \$19,138,844**