Report

Date	December 12, 2023	File:
Subject	Net New Staffing Request; Planning Engineer (Utilities/Drainage)	

PURPOSE

To consider hiring a Planning Engineer (Utilities/Drainage) to oversee asset management and capital project planning for utilities (water, sanitary and storm systems) within the Engineering Department.

BACKGROUND

The Engineering Department has been challenged in delivering the capital program. An assessment of the department's capacity was undertaken in 2020 and it concluded that additional capacity is required in order for the department to undertake more capital work. The Engineering Department also needs to have an infrastructure planning and analysis function created to provide the necessary capacity to properly plan, execute, and strategically assign our limited resources to undertake a capital program of the magnitude required to meet our asset management obligations. The Engineering Department also supports land development by processing referrals from the Planning and Building Department (Development Permits, Development Variance Permits, OCP Amendments, Rezonings, and Building Permits) as well as referrals from the subdivision staff.

In order to meet the demands faced by the department it was determined that seven additional staff would be required. The first two positions created were the Senior Manager of Engineering (Utilities/Drainage) (approved in 2021) and Senior Manager of Engineering (Transportation) (approved in 2022). These two senior managers require staff to assist them in undertaking their work, which is the rationale for the two new staffing requests for 2024: a Planning Engineer (Utilities/Drainage) and a Planning Technologist (Transportation).

This request addresses the Planning Engineer (Utilities/Drainage) position. The justification for requesting this position is the same rationale for the Senior Manager of Engineering (Utilities/Drainage) as this position is intended to support that role.

DISCUSSION

Alignment with Council's Strategic Plan

This position request aligns with Council's Strategic Plan as follows:

1. Environment:
    a. Strengthen environmental policy in all land use planning (Subdivision Bylaw Update, Engineering Standards).
    b. Relocate the Joint Utility Board Sewage Outfall (support Director with the implementation of special projects).

2. Economy:
    a. Attracting local businesses, and the requisite opportunities and talent, requires that there are basic municipal services available (water, sewage collection and treatment, roads, etc.) (Asset Management, Water & Sanitary Models Update, DCC Bylaw Update).
3. Community:
    a. Update subdivision bylaw (Subdivision Bylaw Update).
    b. Encourage appropriate development charges and amenities to support great development (Water & Sanitary Models Update, DCC Bylaw Update).
    c. Improve pedestrian safety on Boys Rd (support Director with the implementation of special projects).
    d. Continue to implement existing neighbourhood plans (support the Manager of Development Services with off-site impacts of development).

This position also aligns with two of North Cowichan's Operational Strategic Plan Strategic Pillars:

1. Work Planning: We develop corporate plans to prioritize and resource our work and ensure achievement of Council's Strategic Plan and other Master Plans.
2. Systems & Processes: We implement common and consistent approaches to analyzing and solving system and process problems, including formal project management.

Request Rationale: Asset Management

Asset management is an important part of what the Engineering Department does. The following services are considered core services of a municipality:

1. Water treatment and distribution.
2. Sewage collection and treatment.
3. Stormwater management and flood protection.
4. Transportation (provision of roads and active transportation infrastructure).

These services include extensive piping networks and pump systems, water reservoirs, water and wastewater treatment facilities, dikes, roads, and active transportation routes. All of these assets must be maintained and ultimately replaced. Better management of these assets extends their life and reduces long-term costs. Better planning of capital projects reduces costs and allows for more efficient allocation of our limited resources to those projects with the highest criticality. It positions North Cowichan to attract Federal and Provincial funding to help offset the cost of asset replacement and the provision of new assets. One of the key roles of this position is to advance a more comprehensive approach to asset management planning.

Referring to Figure 1, North Cowichan has assets with a replacement value in the order of $1,680M ($1,550M in linear assets; $130M in non-linear assets) (all valuations are in 2023 dollars). Further, North Cowichan has a $120M backlog of asset replacement work for linear assets alone that needs to be funded and addressed. To deal with the next 20 years of asset renewals, plus the backlog, North Cowichan needs to be saving $39M per year (Average Annual Life Cycle Investment - AALCI). However, year over year revenue (Average Annual Capital Savings - ACCS) is in the order of $7M. Figures 2 through 4 show the required annual capital outlay, AALCI and AACS for sanitary mains, water mains, and drainage mains, respectively.

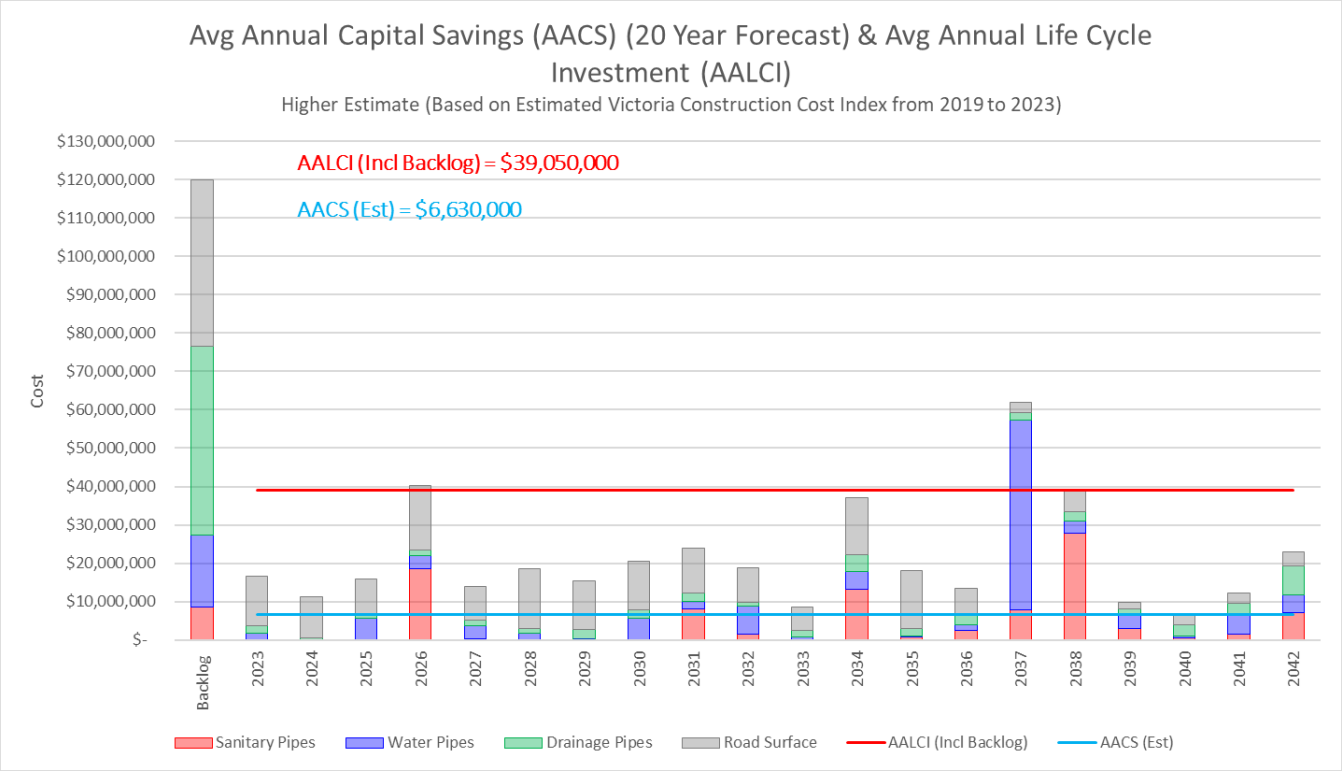

Figure 1 AACS and AALCI (all asset groups).

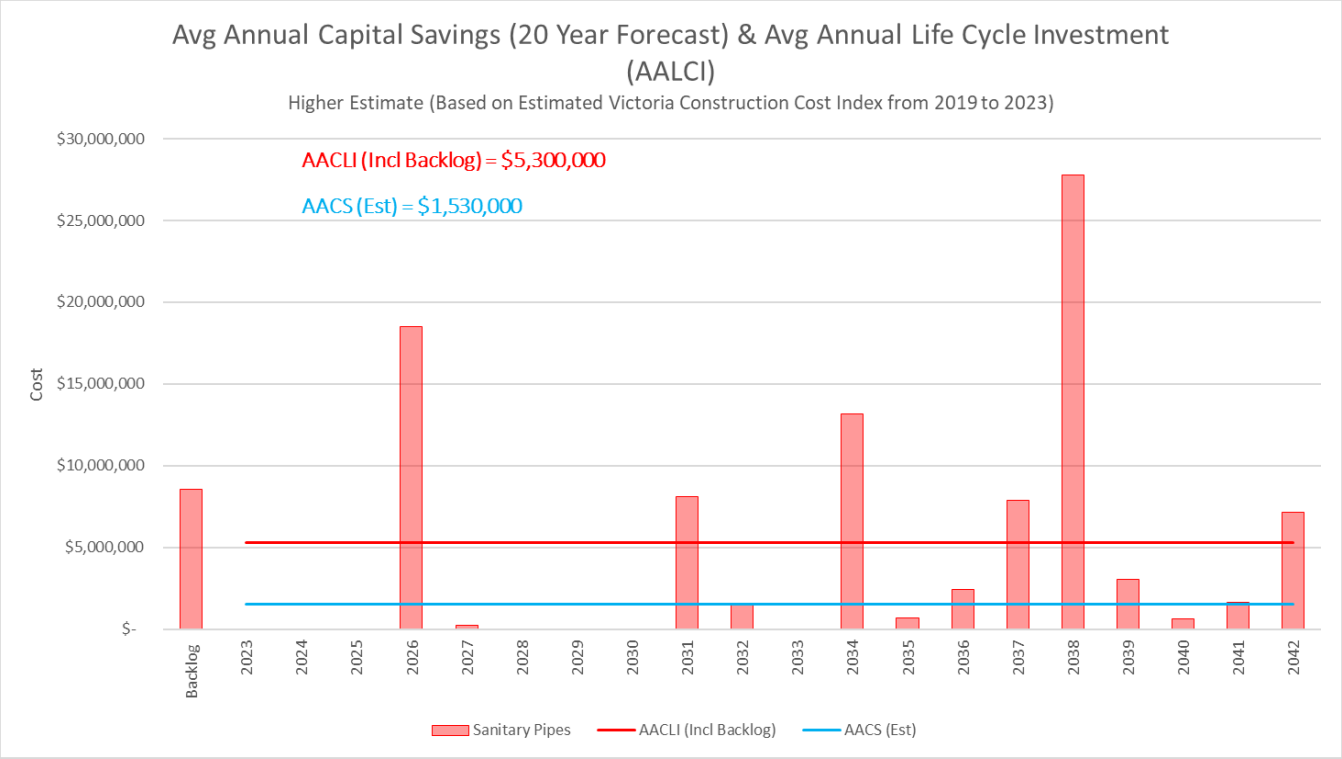

Figure 2 AACS and AALCI (sanitary).

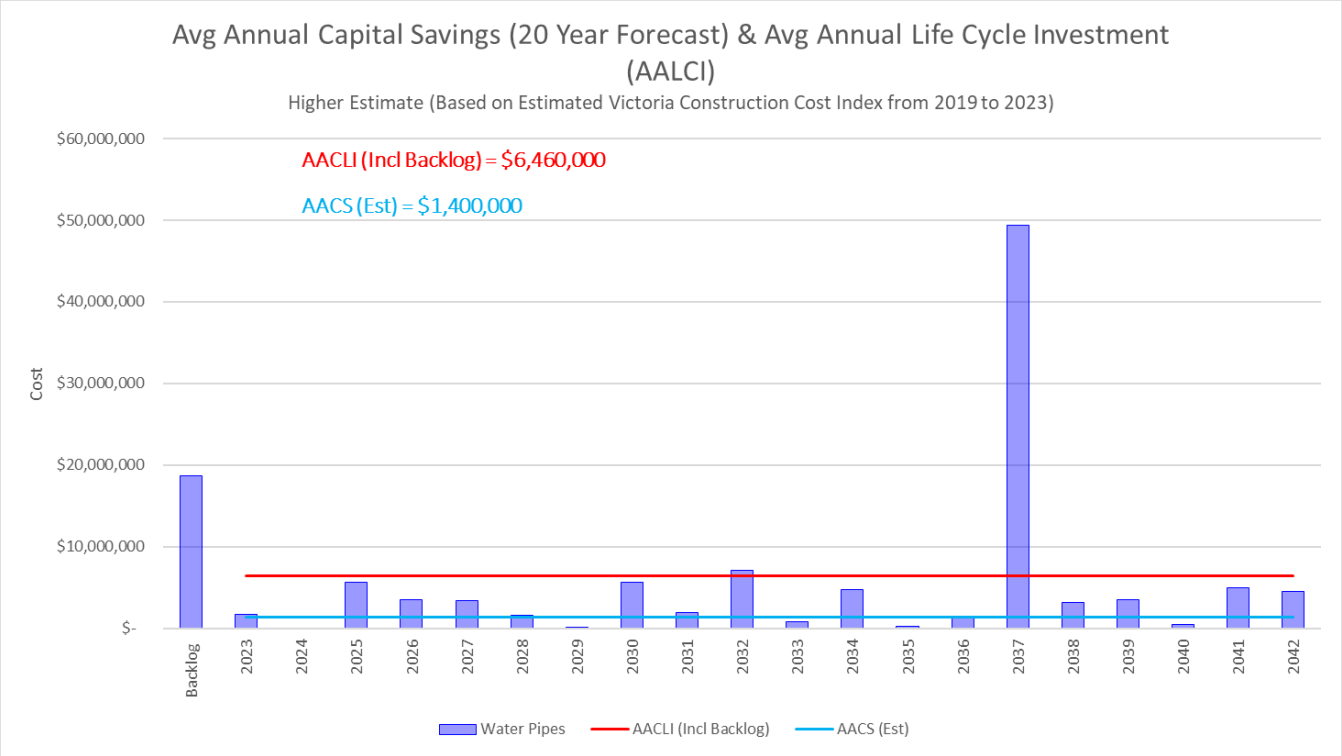

Figure 3 AACS and AALCI (water).

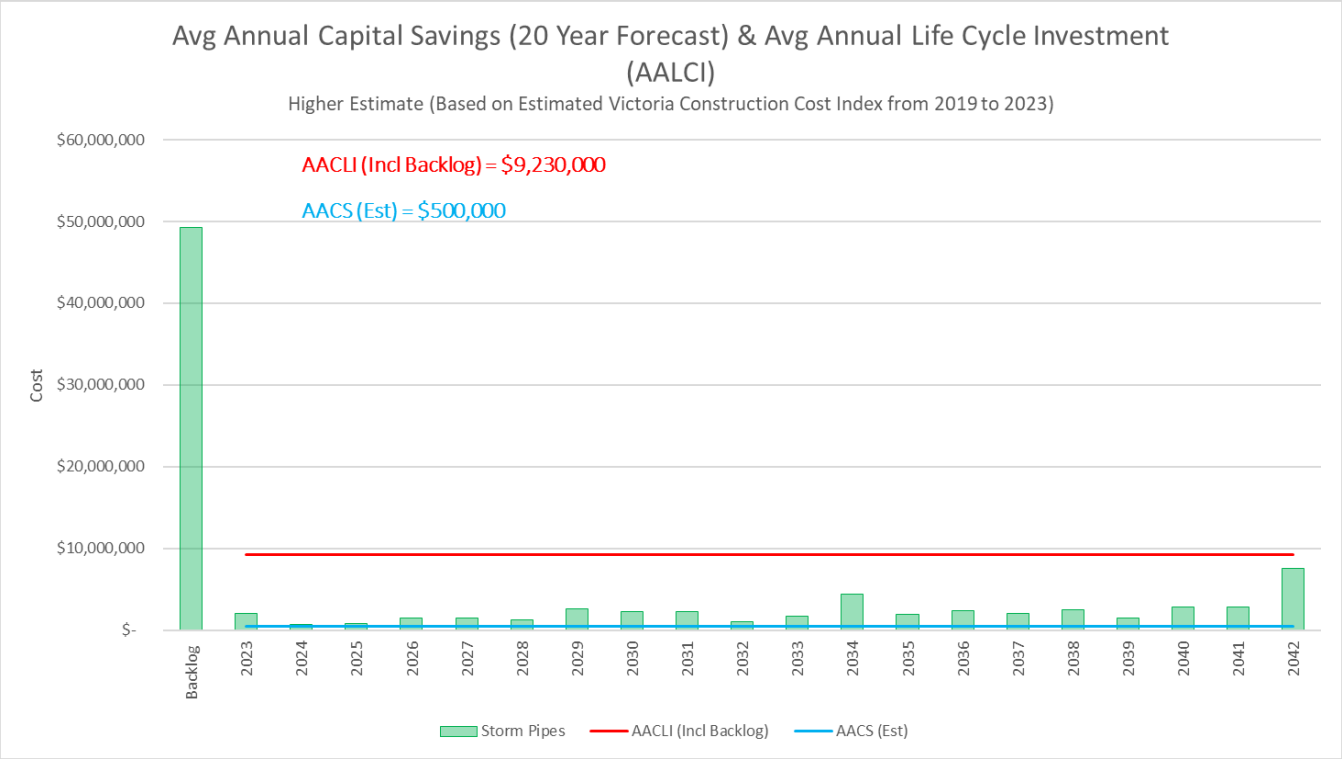

Figure 4 AACS and AALCI (drainage; excluding culverts).

A simple example of the work that needs to be done is shown in the next few figures.

Figures 5 through 8 shows sanitary, water, drainage mains, and drainage culvert linear assets for the entire Municipality. The ratings are based on Expected Useful Life (EUL). The EUL ratings are coloured as follows:

1) Red 0 yrs of EUL remaining.
2) Orange 0+ to 5 yrs of EUL remaining.
3) Yellow 5+ to 10 years of life remaining.
4) Green 10+ years of life remaining.

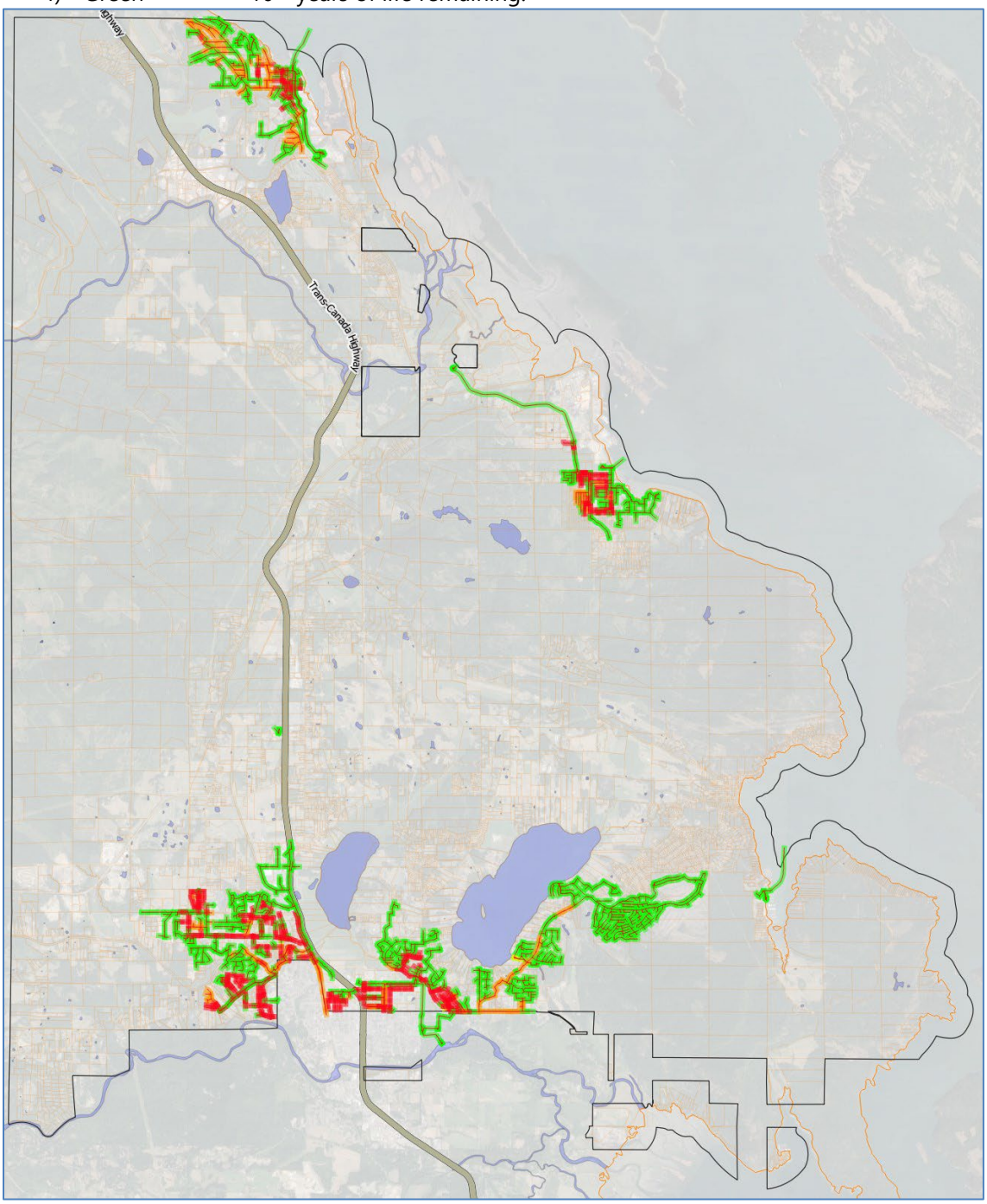

Figure 5 Sanitary assets and their life remaining based on Age vs EUL (Red = 0 yrs, Orange = 0+ to 5 yrs, Yellow = 5+ to 10 yrs, Green = 10+ yrs).

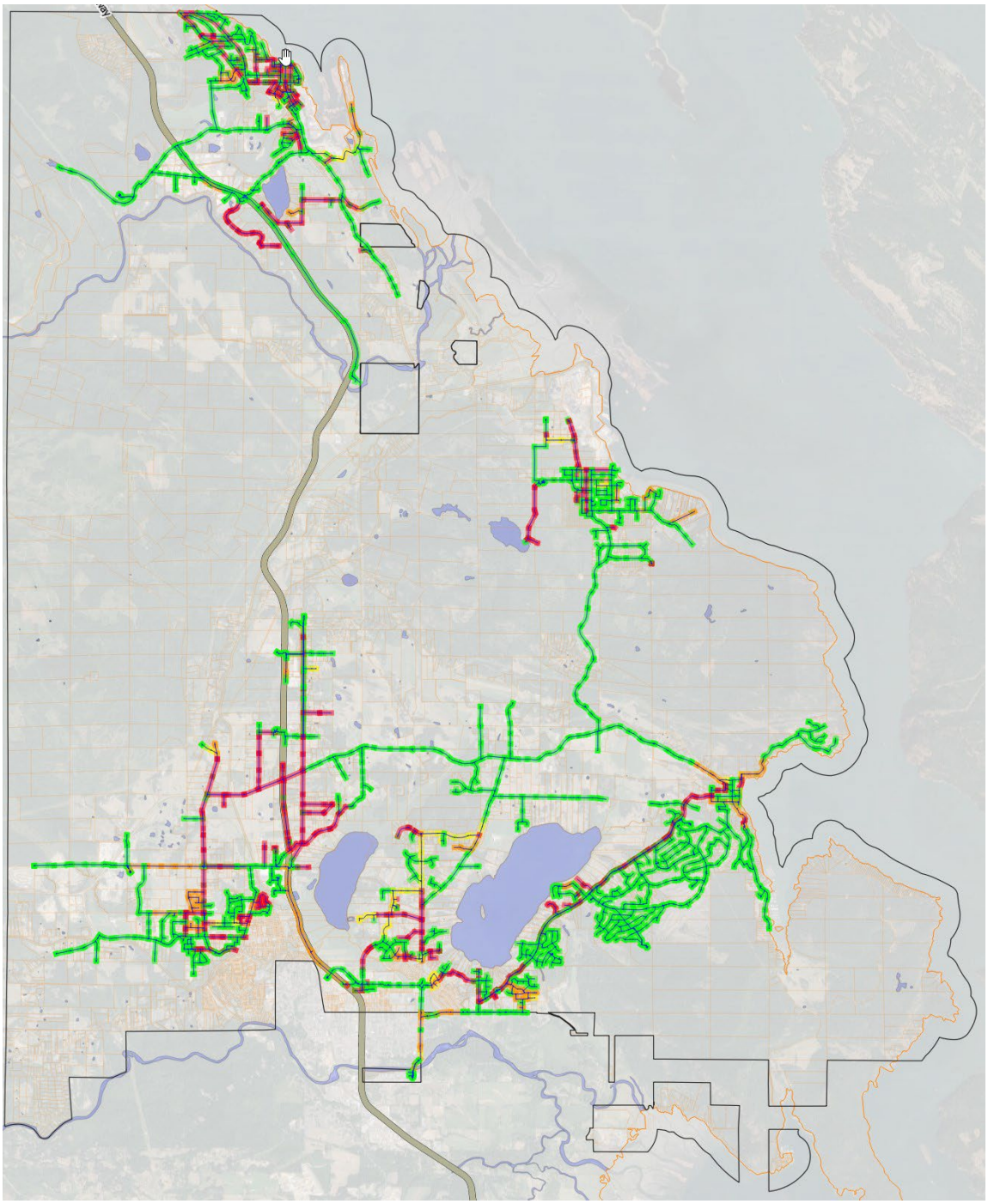

Figure 6 Water assets and their life remaining based on Age vs EUL (Red = 0 yrs, Orange = 0+ to 5 yrs, Yellow = 5+ to 10 yrs, Green = 10+ yrs).

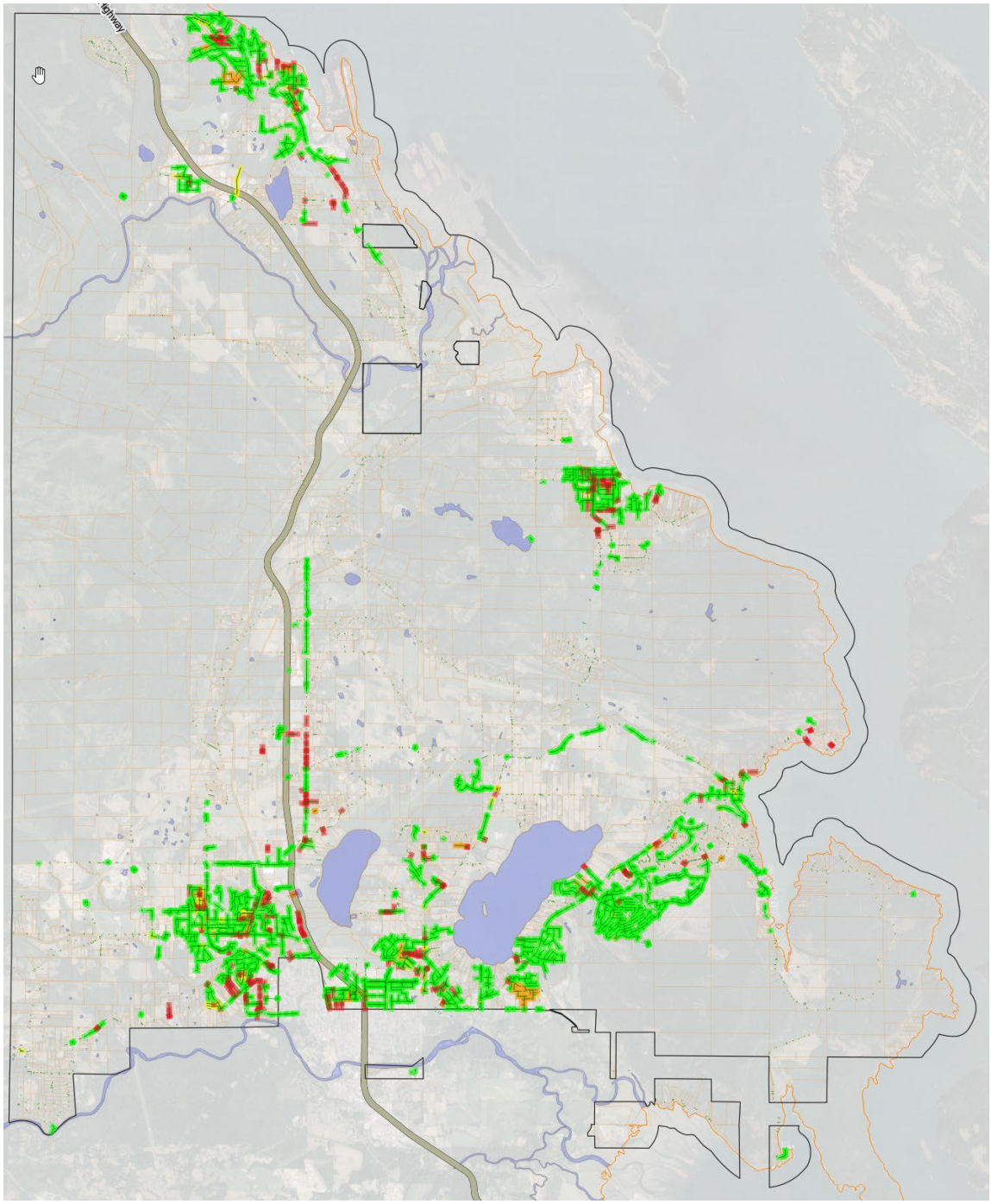

Figure 7 Drainage main assets and their life remaining based on Age vs EUL (Red = 0 yrs, Orange = 0+ to 5 yrs, Yellow = 5+ to 10 yrs, Green = 10+ yrs).

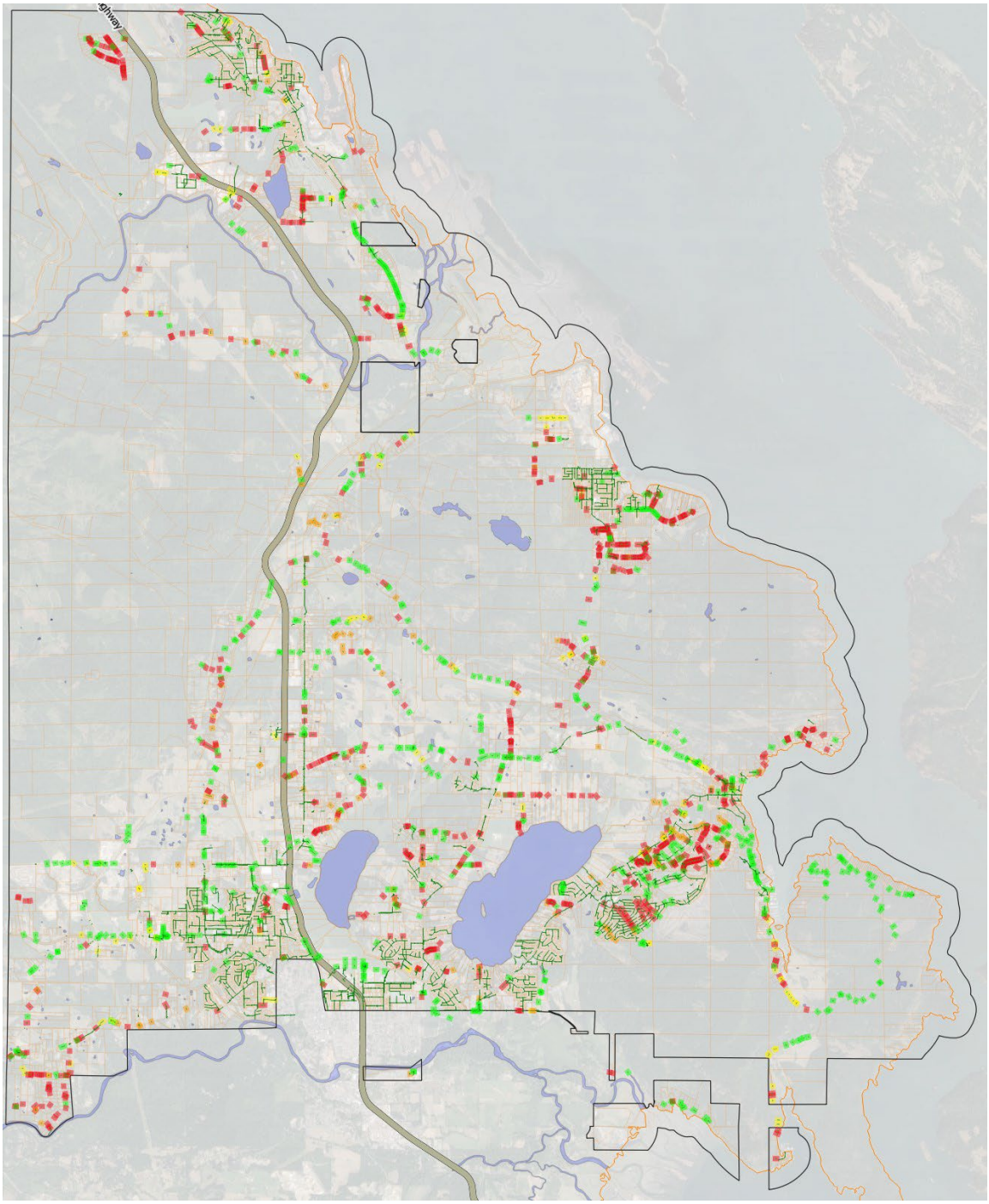

Figure 8 Drainage culvert assets and their life remaining based on Age vs EUL (Red = 0 yrs, Orange = 0+ to 5 yrs, Yellow = 5+ to 10 yrs, Green = 10+ yrs).

Figure 9 is an example of a tuberculated cast iron water main pipe. Tuberculation occurs due to iron bacteria, which form iron deposits on the inside wall of the pipe. This reduces the ability of the pipe to convey water, increasing pressure losses and reducing flows to the point where there may be insufficient pressure for firefighting. Further, due to the reduction in conveyance and during periods of high velocity, such as when water mains are being flushed or when a hydrant is in use, water quality can be degraded. In the case of cast iron pipe, it may be necessary to replace many pipes (particularly those of small diameter) sooner than their EUL for the stated reasons.

There is approximately 11 km of cast iron (CI) pipe in Chemainus whose age is in excess of its EUL. The estimated replacement cost is $17M. Based on the current AACS rate, it would take approximately 40 years to replace all of the CI pipe that is beyond its EUL, assuming every dollar of revenue was spent on only replacing cast iron pipe.

Figure 9 Examples of tuberculated cast iron pipe.

Figure 10 shows examples of corrugate metal pipe (CMP) culverts where the bottom has rusted out. This is a fairly common problem with CMP culverts particularly as they near the end of their EUL. When this happens, water can run outside and beneath the culvert, eroding away the soils and potentially triggering a wash-out and failure of the road under which the culvert is conveying water. Figure 11 shows what can happen when a cross-culvert fails.

Figure 10 Examples of failing Corrugated Metal Pipe (CMP) culverts.

Figure 11 Section of Mays Rd where flow diverted around a culvert ultimately resulting in the washout of the road.

Request Rationale: Climate Change and Adaptation

Regarding our drainage system, we need to update our drainage design standards to account for climate change, implement best management practices (green infrastructure), and control post-development runoff. In the urban areas, Engineering needs to examine what would be involved in updating our master drainage plan and potentially developing stormwater management models.

In terms of our sanitary systems, North CowichanI& needs to get Inflow and Infiltration under control. Not doing so will increase sanitary pump station overflows, pipes will reach capacity sooner than otherwise, and the performance of our treatment systems will be compromised due to hydraulic overloading. The effects of climate change, with the anticipated more frequent and intense storm events, will exacerbate the problem.

In terms of our water systems, we need to develop more aggressive water conservation measures due to high water use in the summer months. We need to look at xeriscaping to reduce water consumption. In some cases, we need to examine ways to increase the amount of available water where conservation measures are not enough. We also need to undertake a leak detection study in Chemainus where the data is showing high levels of water leakage.

In terms of our roads and bridges, we need to ensure that they are designed to withstand the more frequent and intense storms that are predicted.

Request Rationale: Procurement

The procuring of consulting engineering services is placing significant strain on the Engineering Department. In the past Engineering would utilize consultants to provide additional capacity to the department, with Engineering staff planning and overseeing the work. Engineering used accepted schedules of rates to assess whether the quotes supplied by consultants were reasonable for the work being performed. Consultants were selected to some extent based on price, past performance, proficiency in a particular field of expertise, and familiarity with our systems. This allowed for relatively quick retention of additional capacity.

With the implementation of our new procurement rules, Engineering has not been able to procure the additional support that the department needs as readily. This has put significant stress on the department, and the capital program has been cut as a result. Much of the work in executing our new procurement rules falls to Engineering staff; they prepare more formal scoping documentation and then evaluate all submissions. This can take a significant amount of time on the simplest of projects.

Moving forward, it will not be possible to undertake the amount of work that needs to be done without the support of consultants. Additional staffing is required to implement our procurement policy in order to obtain and then manage these consulting forces.

Request Rationale: Service to the Public

Engineering deals with a significant number of requests from the public. Some of which are relatively straightforward to deal with. Others are more significant. Currently, Engineering has 358 outstanding issues tracked in its Calls For Service (CFS) system. While many of the outstanding CFS items are related to roads and active transportation, 84 of the 358 items (or 33%) are related to utilities and other miscellaneous issues that need to be examined and addressed. This position will support the Senior Manager of Engineering (Utilities/Drainage) by addressing utilities and other various CFS items.

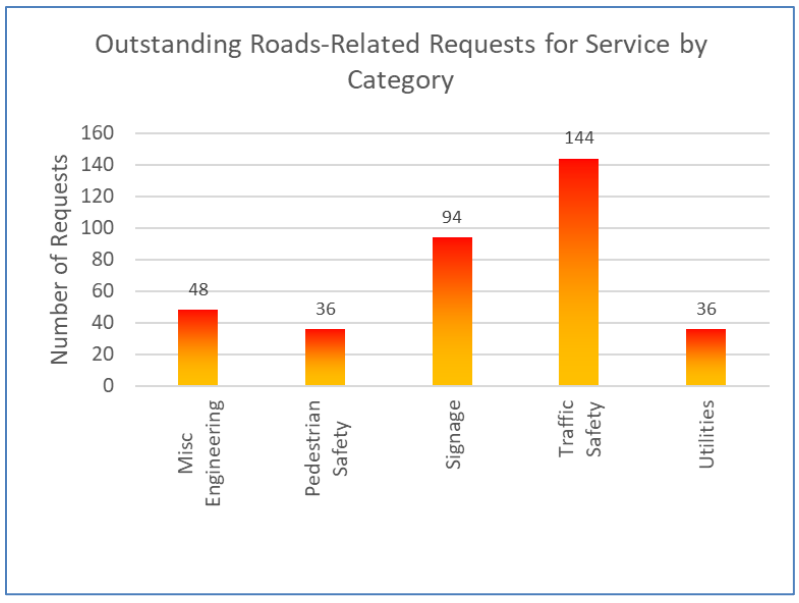

Figure 12 Calls for Service statistics.

Analysis of Resource Requirements

While North Cowichan needs to increase the amount of money being collected and deposited into Reserve fund accounts to fund the replacement of existing assets, this money cannot be effectively utilized if the Engineering Department is not sufficiently staffed to undertake/oversee the work. At current staffing levels, the department can execute approximately $4.0M to $7.0M of capital projects-related work, depending on the size and complexity of projects. That leaves no capacity for asset management planning and execution and for undertaking studies to set up future projects.

The Department has worked with Finance to put in place a Standing Offer Agreement for Professional Services, which includes Engineering Services, to help increase the amount of work the Department can undertake. However, undertaking this work still requires that the Department can retain and manage the consulting forces necessary to execute a proper asset management program and the capital program that flows from the asset management program and development-triggered projects.

A capacity assessment undertaken in 2020 determined that the Department needed in the order of seven staff including two new senior positions; a Senior Manager of Engineering (Utilities) and a Senior Manager of Engineering (Transportation) along with four engineering support positions to assist the two managers. The intent is to have these two new positions in place not only to help with the work that needs to be done but also to work with the Director to refine the analysis of future staffing needs and improve the business practices within the Department.

Approving the hiring of a Planning Engineer (Utilities/Drainage) will go a long way to helping with the following:

1. Planning and implementing future capital works.
2. Supporting/working with Finance around asset management planning and setting appropriate tax rates for the accumulation of monies for Reserve Funds to fund future asset replacements.
3. Supporting the Operations Department with operating our utilities and drainage systems.
4. Supporting the land development by establishing servicing requirements and assessing the impacts of land development on our roads and active transportation networks so that we can know what amenities we can seek from developers when they impact those assets.

The Role and Cost of This Position

This position will focus on the short and long-term planning of water, sanitary, drainage and flood protection infrastructure, support the infrastructure design team, and support the Operations Department with the operation and maintenance of all water, sanitary, drainage and flood protection assets. This position will be responsible for the following areas of expertise:

1. Water, sanitary, drainage and flood modelling.
2. Asset management processes.
3. Design of water, sanitary, drainage and flood protection infrastructure.
4. Sewage and water treatment.
5. Land development processes as they relate to servicing and servicing assessments.

The annual cost of this position is $143,000 (including benefits). The position will be funded from the following sources: 59% from utilities fees (sanitary and water) and 41% from general taxation (drainage). The budget impact for the 2024 operating budget is $104,000 due to the anticipated start date in April 2024.

OPTIONS

Recommended Option

THAT the Committee of the Whole direct staff to include a Planning Engineer (Utilities/Drainage) in the 2024 Operating Budget.

Alternative Option

THAT the Committee of the Whole direct staff to bring forward the request for a Planning Engineer (Utilities/Drainage) to a future budget process.

RECOMMENDATION

THAT the Committee of the Whole direct staff to include a Planning Engineer (Utilities/Drainage) in the 2024 Operating Budget.

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