0000108819

Exhibits for

SW-03575A-03-0586
And W-03576A-03-0586

PART 2 OF 2
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UTILITIES DIVISION

MEMORANDUM

TO: Docket Control

FROM: Ernest G. Johnson
Director
Utilities Division

DATE: May 28, 2004

RE: **SUPPLEMENTAL** STAFF REPORT FOR SANTA CRUZ WATER COMPANY AND PALO VERDE UTILITIES COMPANY - APPLICATIONS FOR EXTENSIONS OF THEIR EXISTING CERTIFICATES OF CONVENIENCE AND NECESSITY FOR WATER AND WASTEWATER SERVICES (DOCKET NOS. W-03576A-03-0586 AND WS-03575A-03-0586)

Attached is the **Supplemental** Staff Report for Santa Cruz Water Company and Palo Verde Utilities Company applications for Extension of their existing Certificates of Convenience and Necessity for water and wastewater services as ordered in the March 31, 2004, Procedural Order.

EGJ:JEF:LAV:rdp

Originator: Jim Fisher

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Docket Nos. W-03576A-03-0586 and SW-03575A-03-0586

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SUPPLEMENTAL
STAFF REPORT
UTILITIES DIVISION
ARIZONA CORPORATION COMMISSION

SANTA CRUZ WATER COMPANY
and
PALO VERDE UTILITIES COMPANY

DOCKET NOS. W-03576A-03-0586
and
SW-03575A-03-0586

APPLICATIONS FOR EXTENSIONS
OF EXISTING CERTIFICATES
OF CONVENIENCE AND NECESSITY

MAY 2004

STAFF ACKNOWLEDGMENT

The Supplemental Staff Report for Santa Cruz Water Company and Palo Verde Utilities Company (Docket Nos. W-03576A-03-0586 and SW-3575A-03-0586) was the responsibility of the Staff members listed below. Jim Fisher was responsible for the review and analysis of the Companies application. Lyndon Hammon was responsible for the engineering and technical analysis.

Jim Fisher
Executive Consultant

Lyndon Hammon
Engineering Consultant

EXECUTIVE SUMMARY
SANTA CRUZ WATER COMPANY AND PALO VERDE UTILITIES, INC
DOCKET NOS. W-03576A-03-0586 AND SW-03575A-03-0586

On August 18, 2003, Santa Cruz Water Company, L.L.C. and Palo Verde Utilities Company, L.L.C. ("The Utilities") filed with the Arizona Corporation Commission ("ACC" or "Commission") applications for extensions of their existing Certificates of Convenience and Necessity ("CC&N") to provide water and wastewater services in portions of Pinal County, Arizona.

During consideration of the Recommended Order and Opinion, the Commission determined that it needed additional information in the record regarding Global Water Resources', LLC ("GWR") acquisition of the Utilities. A procedural order was subsequently issued on March 31, 2004, ordering the Utilities to file at a minimum the structure and qualifications of GWR, underlying ownership interests of other individuals and companies, willingness to abide by reasonable on-going oversight of GWR and the Utilities operations, and other relevant issues related to the ownership and operations of Palo Verde and Santa Cruz.

On April 14, 2004, the Utilities filed the testimony of Ms. Cindy Liles, the Applicants' General Manager and Chief Financial Officer of GWR, and a "corporate profile" of GWR as its response to the March 31, 2002, Procedural Order. On April 30, 2004, Staff met with Mr. Hill, President of the Utilities and GWR. Staff described some issues that required additional information. On May 14, 2004, the Utilities filed additional information in the docket.

In Decision No. 66394 (October 6, 2003) the Commission required the Utilities to obtain performance bonds totaling $500,000 each. On October 29, 2003, the Utilities filed a notice of compliance. However, the bonds were canceled by the underwriter that same day. On January 21, 2004, the Court of Appeals of the State of Oregon affirmed the trial court's $34.5 million judgment against Mr. Reinbold. On January 30, 2004, Mr. Reinbold resigned as President of the Utilities. On February 5, 2004, the Applicants disclosed that GWR had acquired 100 percent of the Applicants membership interests. GWR/Utilities replaced the bonds subsequent to the acquisition.

The GWR Board of Directors consists of William S. Levine, Daniel Cracchiolo, and Trevor T. Hill. Mr. Levine is described as one of the founders of Outdoor Systems and U-Lok Storage Company, as well as being associated with numerous real estate development projects. Mr. Cracchiolo is described as a co-founder of the law firm Burch & Cracchiolo and belonging to numerous associations. Mr. Hill is described as a co-founder of Hill, Murray & Associates ("HMA"), co-founder of Algonquin Water Resources and a co-founder of GWR.

GWR is owned by Mr. Levine, Mr. Cracchiolo, Mr. Hill and Mr. Leo Commadeur, its Secretary and Treasurer. GWR ownership structure is described as 48.5 percent Levine Investments, 7 percent Dan Cracchiolo, 29.67 percent Trevor Hill, and 14.83 percent Leo Commander.

Three of the principles in GWR, Mr. Hill, its President, Mr. Commandeur, its Secretary and Treasurer, and Mr. Graham Symmonds, its Vice President of Compliance, were previously associated with HMA. During their tenure at HMA, the company had initial success in the design and construction of small wastewater treatment plants ("WWTP"). In addition, HMA was also directly responsible for the construction of problematic wastewater treatment plants in Powell River, British Columbia and Iqaluit, Nunavut. One WWTP was never completed after $7 million in payments to HMA. The other WWTP required in excess of $5 million in payments to HMA, violated environmental standards and resulted in litigation between the municipality and HMA.

In response to Staff's concern with the Powell River and Iqaluit WWTPs, GWR/Utilities assert that everything was done to ensure completion of the projects.

Subsequent to their association in HMA, Mr. Hill, Mr. Commandeur and Mr. Symmonds were employed by Algonquin Water Resources, and all three individuals left its employment at the same time, in the fall of 2003.

Ms. Liles, the CFO, describes GWR as a builder and acquirer of utilities and utility holding company, not subject to Commission regulation, that seeks to "aggregate and consolidate small and medium size water and wastewater utilities in the Southwestern United States."

According to Ms. Liles, GWR purchased all of the ownership interest in the Utilities from Phoenix Capital Partners, LLC and Phoenix Utility Management, LLC, in a transaction that closed February 2, 2004. Ms. Liles assured the Commission that Mr. Reinbold had resigned as president of the Utilities. On April 28, 2004, GWR/Utilities filed articles of amendment to the LLCs, naming Mr. Trevor Hill as the President and manager for both Palo Verde and Santa Cruz. On May 4, 2004, the Utilities provided Staff with a compliance filing in this docket evidencing the ownership amendment to the LLCs.

Staff is concerned that the Applicants failed to fully disclose information requested by the Commission. Only after Staff's discovery, and subsequent discussion with the Applicant, did GWR/Utilities disclose materials related to Iqaluit and Powell River. The discovery of certain information which questions managerial fitness, may be disconcerting, insightful and instructive, however, that same information, when taken in whole, may not necessarily be conclusive as to the ultimate issue of whether the instant application should be granted. Nonetheless, the information discovered in this proceeding requires a reassessment of Staff's previous recommendations.

The ultimate obligation of the Commission is to protect the public interest, to that end the imposition of reasonable conditions to ensure the Applicants are conducting their business operations in a manner which will not compromise the interests of its customers should be required.

Staff recommends:

1. That the Commission require Palo Verde and Santa Cruz post performance bonds having a total value of $750,000, for each system, for a period of not less than two (2) years.
2. That the Commission require Palo Verde and Santa Cruz to evidence the required bonds are maintained by forwarding a letter of bond confirmation to the Director of Utilities, each calendar quarter. The letter should be filed by each January 15, April 15, October 15 covering the preceding calendar quarter.
3. That the Commission require that failure of Palo Verde and/or Santa Cruz to maintain the required performance bonds will result in Utilities Division Staff issuing an Order to Show Cause as to why the Applicants should not be fined, face suspension or revocation of the CC&N or any other sanctions should not be imposed.
4. That the Commission require Palo Verde and Santa Cruz to submit quarterly compliance reports, signed under oath by two officers of Global Water Resources attesting to the Applicants compliance status with the Arizona Department of Environmental Quality, the Arizona Department of Water Resources, and the Arizona Corporation Commission's Corporations Division. The report shall be filed each calendar quarter. The report should be filed by each January 15, April 15, October 15 covering the preceding calendar quarter.
5. That the Commission require that any change in the ownership of the memberships of the Palo Verde and Santa Cruz L.L.C.s require Commission approval.
6. That the Commission require Global Water Resources to file a report, every six months, by two officers of Global Water Resources, signed under oath, for each utility owned by Global Water Resources, (except for Palo Verde and Santa Cruz):
   a. the financial terms of the acquisition of the particular utility,
   b. the resulting capital structure of the utility,
   c. the terms of any utility debts, and;
   d. the dollar amounts transferred from the utilities to Global Water Resources.

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Introduction

On August 18, 2003, Santa Cruz Water Company, L.L.C. ("Santa Cruz" or "Water Company") and Palo Verde Utilities Company, L.L.C. ("Palo Verde" or "Wastewater Company") (collectively, "Utilities" or "Applicants") filed with the Arizona Corporation Commission ("ACC" or "Commission") applications for extensions of existing Certificates of Convenience and Necessity ("CC&N") to provide water and wastewater services in portions of Pinal County, Arizona.

On December 8, 2003, a hearing on the application was held. On January 22, 2004, a Recommended Opinion and Order was issued recommending approval of the application. On February 5, 2004, in Docket No. SW-0375A-03-0586 et. al., the Applicants disclosed Mr. Reinbold had resigned as president of the Utilities and that Global Water Resources L.L.C. ("GWR") had acquired 100 percent of the Applicants membership interests.

On March 30, 2004, the Commission discussed the Recommended Opinion and Order in Open Meeting and directed the Hearing Division to conduct additional hearings regarding GRW's structure and qualifications. On March 31, 2004, a Procedural Order was issued which ordered Applicants to file, "at a minimum, the structure and qualifications of GWR, underlying ownership interests of other individuals and companies, willingness to abide by reasonable ongoing oversight of GWR and the Applicants' operations, and other relevant issues related to the ownership and operations of Palo Verde and Santa Cruz."

The March 31, 2004 Procedural Order further ordered Staff to file "a response to the Applicants' testimony, as well as any other information or recommendations that may be relevant to the Commission's consideration of GWR's acquisition of the Utilities membership interests for the Applicants."

On April 14, 2004, GWR/Utilities filed the testimony of Cindy Liles, its general manager and a brief description of Global Water Resources. On April 30, 2004, Staff met with the GWR/Utilities and informed them of various issues that should be addressed to ensure a complete record for the Commission.

On May 4, 2004, Staff and GWR/Utilities filed a Joint Stipulation to provide GWR/Utilities time to respond to Staff's issues, and for Staff to file its report in this matter. On May 14, 2004, GWR/Utilities filed the testimony of Mr. Trevor Hill, Ms. Cindy Liles, two binders with supporting documents, and a compliance filing to respond to issues raised by Staff.

Background

Palo Verde and Santa Cruz are Arizona Limited Liability Companies ("LLCs") engaged in providing wastewater and water utility services to approximately 2,200 water customers and

2,100 wastewater customers. The Commission authorized Palo Verde Utilities Company, an Arizona Corporation, and Santa Cruz Water Company, an Arizona Corporation ("The Corporations"), CC&Ns in Decision No. 61943 (September 17, 1999). The Corporations were initially incorporated by Mr. Michael Reinbold, a principle in Pecan Investments L.L.C. Mr. Reinbold is also a principle of RHS Properties, Inc. which, in conjunction with El Dorado Holdings, Inc., and Phoenix Capital Partners, L.L.C. is involved in the development of Rancho El Dorado located in an area directly northeast of the Town of Maricopa in Pinal County.

On October 6, 2003, the Commission issued Decision No. 66394 which authorized Santa Cruz and Palo Verde to extend its service territories to include approximately 3,226 acres consistent with the associated conditions required by the Commission. The Commission approved the transfer of the CC&Ns from the Corporations to the Utilities. The Commission required Santa Cruz and Palo Verde to, within 30 days of the decision, provide a list of the assets, approvals, liabilities and management arrangements transferred to the Utilities. The Commission required the Utilities to obtain performance bonds totaling $500,000 each related to Mr. Reinbold's Oregon Circuit Court $60 million judgment for financial fraud, as well as any pleadings or correspondence of the pledge agreement.

On October 29, 2003, the Utilities filed a notice of compliance with Decision No. 66394. The Utilities provided an amended legal description, amended county franchise, a curtailment tariff, the required performance bonds and a list of the members in the Pecan Valley Investment LLC and El Dorado Pecan LLC. The Utilities also filed evidence of the required bonds for each utility.

On October 27, 2003, Mr. Thomas Moore of Hartford Fidelity & Bonding contacted Staff for information on the Utilities requirement to obtain the performance bond. Staff provided a copy of Decision No. 66394. On October 29, 2003, Hartford Fidelity & Bonding canceled the bonds.

On January 21, 2004, the Court of Appeals of the State of Oregon affirmed the trial court's $34.5 million judgment against Mr. Reinbold for shareholder liability based on "milking" of corporate assets. On January 30, 2004, Mr. Reinbold resigned as President of the Utilities.

On February 5, 2004, the Applicants disclosed Mr. Reinbold had resigned as president of the Utilities, and that GWR had acquired 100 percent of the Applicants membership interests.

As of February 6, 2003, GWR/Utilities continued to represent the bonds were in place. On March 11, 2004, the Utilities and Legal Division Staff jointly filed a proposed amendment to authorize GWR/Utilities to request, subsequent to November 2004, that the Commission approve reduction of the bonds back to the original amount in February 2005.

On March 30, 2004, the Commission discussed the Recommended Opinion and Order in Open Meeting and directed the Hearing Division to conduct additional hearings regarding GWR's structure and qualifications. On March 31, 2004, a Procedural Order was issued which ordered the Applicants to file, "at a minimum, the structure and qualifications of GWR, underlying ownership interests of other individuals and companies, willingness to abide by reasonable ongoing oversight of GWR and the Applicants' operations, and other relevant issues related to the ownership and operations of Palo Verde and Santa Cruz."

Utilities' Filings to Evidence Acquisition

According to the pre-filed testimony of Ms. Liles, GWR purchased all of the ownership interest in the Utilities from Phoenix Capital Partners, LLC and Phoenix Utility Management, LLC, in a transaction that closed February 2, 2004. Ms. Liles assured the Commission that Mr. Reinbold had resigned as president of the Utilities.

The Applicants and their owners are limited liability companies. According to Staff's understanding of ARS 29-633, an LLC is required to file with the Commission an amendment of its articles of organization within 30 days of a change in the members or managers that own 20 percent or more of the LLC.

Staff reviewed the articles of organization of Palo Verde Utilities, LLC, Santa Cruz Water Company, LLC, Phoenix Capital Partners, LLC, Phoenix Utility Management, LLC and Pecan Valley Investments, LLC. As of April 26, 2004, Staff found the articles had not been amended to reflect any ownership, by GWR. In fact, Mr. Reinbold continued to be listed as Phoenix Utility Management, LLCs statutory agent. Staff informed the Utilities of this issue.

On April 28, 2004, GWR/Utilities filed articles of amendment to the LLC's, naming Mr. Trevor Hill as the President and manager for both Palo Verde and Santa Cruz. On May 4, 2004, the GWR/Utilities provided Staff with a Compliance filing in this docket evidencing the amendment to the LLCs.

Utilities Initial Filing

On April 14, 2004, GWR/Utilities filed the testimony of Ms. Cindy Liles, its General Manager and the Chief Financial Officer of GWR. Included in the filing was a corporate profile of GWR as its response to the March 31, 2004 Procedural Order.

According to the testimony of Ms. Liles, GWR purchased all of the ownership interest in the Utilities from Phoenix Capital Partners and Phoenix Utility Management in a transaction that closed February 2, 2004. Ms. Liles asserts GWR is a utility holding company, which is 100 percent investor/manager owned and operated. Ms. Liles describes GWR as a builder and acquirer of utilities.

According to Ms. Liles, GWR "recognizes the Commission's interest in ensuring continuity of management within the regulated utilities and its interest in understanding the control and ownership of the companies which own the membership interests in the regulated utilities." Ms. Liles further offers the Commission that "GWR would be happy to provide the Commission with information if any change of ownership or management of the (Utilities) takes place in the future."

GWR "Corporate Profile"

Attached to the two-page April 14, 2004 testimony of Ms. Liles, is a GWR "Corporate Profile" which describes GWR as founded to "aggregate and consolidate small and medium size water and wastewater utilities in the Southwestern United States." GWR represents the company has been initially capitalized with $50 million of equity.

GWR ownership structure is described as 48.5 percent Levine Investments, 7 percent Dan Cracchiolo, 29.67 percent Trevor Hill, and 14.83 percent Leo Commander.

The GWR Board of Directors consists of William S. Levine, Daniel Cracchiolo, and Trevor T. Hill. Mr. Levine is described as one of the founders of Outdoor Systems and U-Lok Storage Company, as well as being associated with numerous real estate development projects. Mr. Cracchiolo is described as a co-founder of the law firm Burch & Cracchiolo and belonging to numerous associations. Mr. Hill is described as a co-founder of Hill, Murray & Associates, a co-founder of Algonquin Water Resources and a co-founder of GWR.

GWR describes an executive management team of Trevor T. Hill, President and Chief Executive Officer; Leo Commandeur, Vice President of Business Development; Cindy Liles, Chief Financial Officer and Vice President Operations; Graham Symmonds, Vice President Regulatory and Compliance; and Larry Braud, Vice President Engineering.

According to public sources, Mr. Levine founded Outdoor Systems, Inc., in 1980, and held approximately 80 billboards in 1984. The company went public in 1996. In 1999, Outdoor Systems, Inc., held approximately 112,000 billboards and 125,000 New York City subway displays. The company was acquired by in 1999 by Infinity Broadcasting for $6.5 billion in stock plus the assumption of $1.8 billion in debt. Infinity Broadcasting is a subsidiary of CBS Broadcasting, Inc., which is owned by Viacom. Mr. Levine and his partner, Mr. Moreno, held approximately 26 percent of Outdoor Systems, Inc. when it was acquired.

Mr. Levine's real estate holdings include Pacific Partners LLC. Pacific Partners LLC has been a material shareholder of Del Webb Corporation. According to published reports, Mr. Levine sought to place three nominees on the Del Webb Corporation board of directors in 2000 in response to concerns with debt load and shareholder value.

Mr. Cracchiolo, according to public reports, is a graduate from the University of Arizona Law School, served in the United States Air Force, was a Deputy County Attorney, began private practice and co-founded the firm of Burch & Cracchiolo. Mr. Cracchiolo is a Regent of Brophy College Preparatory, past president of COMPAS, and President of the Steele Foundation. He also served on the Arizona State University Presidential Search Committee.

Mr. Cracchiolo was a previously owner of Bella Vista Water Company and Nicksville Water Company prior to the sale of the utilities in 2000.

Utilities Supplemental Filing

On April 30, 2004, Staff met with Mr. Hill, president of the Utilities and informed him of Staff's concern that the GWR/Utilities' April filing was non-responsive to a number of issues Staff had discovered in the course of reviewing GWR's acquisition of the LLC membership interests in the Utilities per the instruction of the Commission.

Staff's review of GWR found that Mr. Hill had previously been the president of Hill, Murray and Associates, ("HMA") a wastewater facilities design and build firm based in Vancouver Canada. Staff discovered that while Mr. Hill had achieved recognition as a good businessman, he had also been a central figure in the construction of two problematic wastewater facilities designed to serve Powell River and Iqaluit, two separate communities in rural Canada. Staff informed Mr. Hill of its findings and requested he address the issues in the docket.

On May 14, 2004, the GWR/Utilities filed the testimony of Mr. Hill and Ms. Liles and numerous documents, with summaries, regarding Mr. Hill's history in HMA, which included an environmental award for his work on a wastewater treatment plant serving a ski resort in British Columbia, two nominations for entrepreneurship, and an industry award from his largest vendor.

GWR/Utilities also included a disclosure of the principle individuals in GWR. The Utilities disclosed that Graham Symmonds, Vice President Regulatory and Compliance of GWR, was also previously employed with HMA. However, GWR/Utilities did not disclose that Mr. Leo Commandeur, the Secretary and Treasurer of GWR, was previously HMA's Chief Financial Officer. (See Applicants' Supplemental Filing, Appendix 1, Tab Q, page 7.) Neither the GWR corporate profile, nor the Supplemental Pre-filed Testimony of Ms. Liles disclosed Mr. Commandeur's prior employment with HMA.

Staff's Filing Requirements

On March 31, 2004, Staff was ordered to file "a response to the Applicants testimony, as well as any other information or recommendations that may be relevant to the Commission's consideration of GWR's acquisition of the LLC membership interests for the Applicants." By

Procedural Order of May 10, 2004, the Hearing Officer required Staff to file its report by May 28, 2004.

Algonquin Water Resources

Staff became aware of Mr. Hill in his actions with Algonquin Water Resources ("AWR") in acquiring utilities in Arizona during the past couple of years. AWR is part of Algonquin Power Income Fund, ("APIF") a Canadian investment income fund which owns and operates hydroelectric plants and small utilities. The fund has grown from approximately $80 million of assets managed to $800 million.

AWR's Arizona utility holdings also include Litchfield Park Service Company, Bella Vista Water Company and Black Mountain Sewer Company. By ownership of those four utilities, AWR currently provides service to approximately 29,000 Arizona customers.

Gold Canyon is an Arizona corporation engaged in providing wastewater utility service to customers east of Apache Junction, within portions of Pinal County, Arizona. Gold Canyon is a wholly-owned subsidiary of AWR.

On April 15, 2004, Staff spoke with Mr. Dave Kerr, one of the principles with the APIF, regarding Mr. Hill's tenure with AWR. Mr. Kerr informed Staff that Mr. Hill initially approached APIF with a business idea for owning and operating a wastewater plant in Arizona. The fund entered into a business agreement with Mr. Hill and other utilities were purchased. Mr. Kerr informed Staff that Mr. Hill is very capable of acquiring assets through structuring the transaction. Mr. Kerr assured Staff that Mr. Hill and AWR parted as friends.

During Staff's April 30, 2004 meeting with Mr. Hill, Staff was provided an April 29, 2004 letter from Mr. Kerr, which corroborated much of the prior conversation with Staff.

Hill, Murray & Associates

GWR lists Mr. Hill as a 29.67 percent owner of the company, as well as President and CEO. According to GWR's corporate profile, and Staff's independent review, prior to working for AWR, Mr. Hill was the President of Hill, Murray and Associates ("HMA"), an engineering design firm based in Vancouver, British Columbia. According to GWR's corporate profile Graham Symmonds, the GWR Vice President Regulatory & Compliance, joined HMA in 1995. In addition, Leo Commandeur, the Secretary and Treasurer of GWR, was previously HMA's Chief Financial Officer.

Based on Staff's review of available materials and interviews with experts in wastewater engineering in Canada, HMA initially designed small site specific wastewater treatment plants for bed-and-breakfasts, small rural hospitality inns and an early warning radar installation in the

Canadian Arctic. According to the June 6, 1998 Time Colonist, HMA was one of seventeen companies nominated for the Vancouver Island entrepreneur of the year award.

During that same timeframe, HMA sought to use advanced wastewater technology on larger municipal projects. HMA was able to obtain contracts to design and build wastewater facilities in Iqaluit, Nunavut and Powell River, British Columbia. According to the industry experts interviewed by Staff, HMA failed to complete either wastewater plant in accord with applicable engineering requirements. In June 2000, the District of Powell River, British Columbia cancelled the $5.4 million HMA contract and began litigation against the firm. In July 2000, according to an investigation into the WWTP, HMA effectively abandoned the $7 million Iqaluit plant in response to the City demanding HMA repair construction defects.

Powell River Waste Water Treatment Plant

Powell River District is composed of four small communities in western British Columbia, approximately 84 miles northwest of Vancouver. Powell River discharges treated effluent to the Strait of Georgia and is allowed to discharge Secondary Treatment. On June 2, 1997, HMA submitted a proposal to Powell River to upgrade an existing wastewater treatment plant ("WWTP").

HMA's proposal provided that the existing plant would be upgraded with membrane bioreactor ("MBR"), it would have the capacity to handle all flows from the sewered areas, and to treat all the flow anticipated to year 2016.

On August 29, 1997, HMA forwarded its $5.2 million upgrade of the existing Westview Wastewater Treatment Plant to the Province of British Columbia on behalf of Powell River. On September 3, 1997, the British Columbian Ministry of Municipal Affairs and Housing ("MMAH") approved HMA's proposal to upgrade the Powell River Westview Treatment Plant. (See Applicants' Supplemental Filing Tab D of Appendix 2) Powell River received approval to use government grant funds for the project. Material to the approval was a "substantial completion" date of June 1, 1998. The MMAH approval stated in part:

> We have received a letter dated August 29, 1997, from Hill, Murray and Associates, Inc., forwarded on your behalf, explaining a proposed modification to the above project with a total budget of $5,218,263 plus GST.
>
> This proposal to upgrade the Westview Treatment Plant falls within the scope of the original project approval, and is an acceptable modification to it. No further formal approvals are required. The substantial completion date of June 1, 1998 is noted. This appears to satisfy earlier concerns that the project might not fit within program time constraints. You are reminded that the program will not share in any costs incurred after October 31, 1998.

On September 12, 1997, HMA and Powell River executed a design build contract for the upgrade of its WWTP. (See Applicants' Supplemental Filing Tab E of Appendix 2) HMA accepted contract terms that included:

> 2.7 (g) the Contractor has investigated and satisfied itself of every condition affecting the Work, including the labour and materials to be provided, the Permit, and the Performance Specifications, but excluding Work Site conditions;
>
> 2.7 (h) the Contractor's investigation described in GC2.7 (g) has been based on its own examination, knowledge, information and judgment and upon the information given by the Owner to the Contractor as described in Schedule H;
>
> 2.7 (j) the Contractor acknowledges that it has the responsibility for informing itself of all aspects of the Project and all information necessary to perform the Work;

Powell River retained Reid Crowther & Partners, Ltd, ("Reid Crowther") an engineering firm to review HMAs completion of the WWTP consistent with the related approvals and financial terms contained in the September 3, 1997 MMHA approval letter. On October 19, 1998, Reid Crowther issued a draft report on HMA's completion of the WWTP. On November 6, 1998, HMA responded to the issues raised. (See Applicants' Supplemental Filing Tab N of Appendix 2) On November 18, 1998, Reid Crowther issued its final report which found in part:

> We confirm that the deficiencies and areas of concern listed in our report are both substantial and serious. However, we note that the Contractor has made progress in correcting many of these deficiencies. Once again, we recommend that the Contractor be given every reasonable opportunity to address the remaining deficiencies prior to Final Completion. (See Applicants' Supplemental Filing Tab M of Appendix 2)

On February 14, 2000, according to the Minutes of a Regular Council Meeting of Powell River District, the Council instructed "the District solicitors to prepare and file a Writ of Summons in the British Columbia Supreme Court, at Vancouver, British Columbia, to preserve all potential claims against all potential defendants in respect to the upgrade to the Westview Wastewater Treatment Plant." (See Attachment 17 to this report)

On April 24, 2000, Reid Crowther provided another report on contract review of HMA for Powell River. The report finds in part:

> Hill, Murray and Associates, has made significant progress towards correcting many of the deficiencies noted by District staff, as well as the two consulting firms acting on the Districts behalf... However, there are still several issues that

> have not been resolved to the District's satisfaction. Some of these issues are not in compliance with the Contract between the District and Hill Murray and Associates, while other represent work that does meet commonly accepted engineering standards for municipal wastewater treatment facilities. (See Attachment 2 of this report.)

On May 12, 2000, Powell River's legal council, Lidstone, Young and Anderson, provided HMA's attorney's, Blake, Cassels & Graydon, LLP, with a list of twenty-one (21) deficiencies remaining on the contract with Powell River. (See Applicants' Supplemental Filing Tab Q of Appendix 2.)

According to the Utilities' Supplemental filing of May 14, 2004 timeline (included in Appendix 2), the summary of Powell River issues, on June 15, 2000, HMA stopped providing services at the WWTP.

According to the June 26, 2000 Minutes of a Regular Council Meeting of Powell River District, the Council will "instruct the District solicitors to seek termination of the Contract between the District of Powell River and Hill, Murray and Associates Inc. for the Design/Build of the Westview Wastewater Treatment Plant." (See Attachment 18 of this report.)

On November 29, 2000, Powell River signed a Release of HMA and GCNA from "any and all actions, causes of action, claims, proceedings, suits, debts, contracts, demands, and damages of any nature" which Powell River has against the HMA WWTP contract, the operation of the plant and the performance bond. The Release also canceled the HMA contract. (See Attachment 3 of this report.)

According to public news reports:

> After three years of escalating costs, a long list of deficiencies, and repeated failures to meet provincial permit requirements, Powell River municipal officials have said goodbye to Hill, Murray and Associates, the company which upgraded the Westview wastewater-treatment plant.
>
> All outstanding legal actions between the Victoria-based firm and the municipality have been settled, said Councillor Russell Storry, chairman of the public works committee.
>
> Hill Murray had placed a $1.9 million builder's lien against the facility to recover the cost of additional work. The municipality's solicitors filed a writ of summons to protect its right to sue the contractor for failing to complete the contract, including rectification of $662,000 worth of deficiencies.

The municipality paid Hill, Murray $27,000 for consumables, Storry said.

(See Attachment 11 of this report, Split Final Laura Walz, The Powell River Peak, December 27, 2000.)

On March 31, 2004, Staff contacted Mr. Gino Francescutti, engineering supervisor of Powell River WWTP and informed him that Mr. Hill was being reviewed for Commission approval to own and operate utilities in Arizona and that Staff was requesting information on HMA's actions in Powell River.

According to Mr. Francescutti, very early on in the construction it was recognized that HMA had not designed an adequate WWTP. The HMA design specifications were subsequently doubled in an effort to ensure proper operation. Additional treatments resulted in further operational problems. According to operational staff, the plant was designed with inadequate capacity and the membrane filtration caused the peak wastewater flows to back up and bypass filtration for direct discharge of raw sewage into the Strait of Georgia.

According to public news reports the Powell River WWTP has been out of environmental compliance.

> The ministry of water, land, and air protection released the 21st environmental protection non-compliance report last week. It covers an 18-month period from October 1, 1999 to March 31, 2001.... The Westview wastewater treatment plant exceeded permit limits for biochemical oxygen demand by up to 213 percent in 13 of 78 tests. It also exceeded total suspended solids by up to 120 percent in nine of 78 tests. As well it did not optimize the secondary treatment works 160 out of 548 days during the reporting period.

(See Attachment 12 of this report, Low marks for high pollution Laura Walz, Powell River Peak, August 14, 2001.)

Independent Engineer's Review of HMA

On April 2, 2004, Staff contacted Dr. Rabinowitz of CH2MHill, a wastewater engineering design expert that had been hired by Powell River and the city of Iqaluit to separately review the HMA Powell River and HMA Iqaluit wastewater plants. (Iqaluit WWTP is discussed below.) Dr. Rabinowitz is very familiar with both HMA projects and informed Staff that it was his opinion that both plants were improperly engineered, used existing membrane technology inappropriately and constructed insufficient treatment capacity to meet system requirements. Dr. Rabinowitz was employed with the engineering firm of Reid-Crowther when he authored some of the reports critical of HMA.

On May 14, 2004, GWR/Utilities filed summaries of HMA's Powell River history. In the summary GWR/Utilities describe Reid-Crowther as having "a history of adversarial relationships with design-build firms," "a significant conflict of interest" and "employed questionable business practices."

GWR/Utilities provide that HMA's problems at Powell River were the result of Reid-Crowther's improper calculation of sewage flows, and a belief that "Reid Crowther encouraged Powell River to attempt to blame (HMA) for this problem in an attempt to protect themselves."

Iqaluit Waste Water Treatment Plant

Iqaluit, Nunavut is a city of 6,000 residents on Baffin Island, 40 miles south of the Arctic Circle, adjacent to Koojesse Inlet. Nunavut is Canada's newest territory, created on April 1, 1999, as part of the largest Aboriginal land claim settlement in Canadian history. The Canadian government also agreed to pay $1.2 billion in compensation to the Inuit of Nunavut.

On February 21, 1998, the City of Iqaluit issued a request for proposals ("RFP") to design and construct a WWTP to serve the capital of Nunavut. On March 18, 1998, HMA provided a proposal to the City for the design and construction of the WWTP. On July 22, 1999, HMA signed a Design-Build Stipulated Price Contract for the City of Iqaluit Water Reclamation Facility.

The Contract identified that HMA and the City of Iqaluit had entered into five previous Service Contracts totaling $4.3 million, which were to be deducted from the $7.1 million contract price.

The Contract also included Section GC 1.6 Confidentiality, which required the parties to keep confidential "all matters respecting technical, commercial, and legal issues relating to or arising out of the work."

During construction of the facility, the city hired a third party engineer to review the work of HMA. On November 11, 1999, HMA informed the City of Iqaluit:

> During our meeting with Gary Strong and Tanya Smith of Dillon Consulting of Friday afternoon November 5, 1999, we agreed that it would be prudent to back out the building portion of our October draw until we had an opportunity to investigate potential structural problems that this honey combing could cause and assure ourselves that all issues would be resolved to the complete satisfaction of Hill Murray consultants, thereby assuring the interests of the Municipality would be satisfied. (See Applicant's Supplemental Filing Tab S of Appendix 1)

In January 2000 the tanks were tested again. The test showed that critical portions of the WWTP were not water tight.

On February 18, 2000, HMA wrote to the City of Iqaluit to propose repairs and compensation.

> In order for Quigg Construction to proceed, we will require your approval and returned signed copy of the attached no-charge change order #002rev.
>
> To remove the lien placed on the structure we are preparing an irrevocable direction to pay Quigg Construction at substantial completion, which will be issued upon application of the CIM membrane and a successful hydrostatic test. (See Applicant's Supplemental Filing Tab W of Appendix 1)

On March 29, 2000, HMA informed Iqaluit:

> We are currently incapable of resolving this issue with Quigg Construction. As a result, we are executing our right to take over completion of the Quigg contract. The technical plan involves the application of a membrane liner material to the interior of the tank walls... The financial plan is to issue the membrane supplier Quadro Coating, Inc. a "Direction to pay." I have enclosed the documents for your review. (See Applicant's Supplemental Filing Tab Y of Appendix 1)

On April 6, 2000, Mr. Paul Fraser, the Senior Administrative Officer of the City of Iqaluit informed HMA:

> On behalf of the Municipality of Iqaluit, upon request of a representative of the Government of Nunavut, and on the recommendation of Dillon Consulting, I have decided to have the structural integrity of the tank walls studied by an independent consultant. The objective of this study is to assess the number of displaced rebar in the walls of the tanks and to determine if this displaced rebar detrimentally impacts upon the strength of the tanks.
>
> (See Applicants' Supplemental Filing, Tab Z of Appendix 1.)

Investigation of Iqaluit Waste Water Treatment Plant

On March 31, 2004, Staff contacted the City of Iqaluit and was provided a copy of the Iqaluit Sewage Treatment Plant Investigation report by Earth Tech, a professional engineering firm with offices throughout Canada and the United States.

The City of Iqaluit commissioned an investigation of the HMA design and construction of the WWTP after the plant had been left unfinished by HMA. The investigation was done in part to evaluate Iqaluit's opportunities to improve the plant to a useable standard. An inspection was conducted in January 2002. The investigation report dated December 17, 2003 found if the city elected to finish construction with HMA's existing design the city would be immediately faced with inadequate treatment capacity for the estimated population base of 2002 and would result in "significant bypass events to the existing sea outflow." (See Attachment 4 of this report at page 5.)

Iqaluit Investigation Overview

"The City of Iqaluit, has to date, invested an estimated $7 million to design and construct a viable and cost effective sewer treatment plant to conform with more stringent effluent discharge requirements as established by the Nunavut Environmental Authority. Unfortunately, construction of the plant was ordered to a stop due to numerous construction code violations, questionable engineering, poor selection of process equipment, impractical layout of plant piping and mechanical equipment, and various concerns regarding expected costs to operate the facility over an extended period of time." (See Attachment 4 of this report at page 59)

Iqaluit Investigation Findings

Some of the significant findings of the investigation include that the plant is inoperable with a number of safety issues that must be resolved before any attempt to finish the plant. The investigation found that the plant is 60 to 70 percent complete in terms of remaining effort and costs to make design and construction changes necessary to meet minimal building code standards and acceptable levels of engineering practice. (See Attachment 4 of this report at page 2.)

Most electrical motors and related switch gear are not rated for duty within high hazard areas of the plant and have been installed in violation of the CEC. Fire alarms are not found in critical plant locations which are subject to possible combustible influent contaminants.

The project plans and specification provide little, or in some cases, no information regarding the performance, operation, and control of the process mechanical equipment and HVAC system. As a result, the performance and operational characteristics of the overall treatment process and support equipment cannot be assessed with any level of confidence. It is uncertain if the plant can be adequately heated during extended winter operations or provide for proper air circulation in areas of the plant subject to contaminated and combustible air flow. Additionally, the existing system has no redundant heating pumps creating the possibility of periodic plant shutdowns due to the lack of heated air circulation within the plant during winter weather conditions. (See Attachment 4 of this report at Pages 4 and 5.)

Iqaluit Insufficient Capacity

The Iqaluit RFP requested a WWTP designed to meet service for current and future customers. The HMA design criteria was based on the current population, rather than sized for any growth. According to the investigation: "Sizing and building the system to meet current average day flows means that consideration must be given to expanding the plant the day construction is finished as there is no room for growth. In addition, good engineering practice would dictate that wastewater treatment plants are designed to treat at least the current peak hour flows." (See Attachment 4 of this report at Page 13.)

Iqaluit Structural Defects

According to the investigation report, within a few months of initiating the plant's construction, significant problems began to arise concerning the placement of concrete within major structural and process basin walls. As discovered during an inspection of ongoing plant construction, it was noted that the contractor's use of a concrete-wall forming technique resulted in significant honeycombing of concrete and the misalignment of structural steel. To effectively deal with the problem, the City suspended all construction activities and solicited the services of CH2M Gore & Storrie Limited (CGSL) to complete the necessary structural investigations and make recommendations as appropriate. In accordance with the stated directive, CGSL recommended shotcrete be applied to all honey-combed wall sections. (See Attachment 4 of this report at page 2.)

Although the shotcrete recommendation was completed per CGSLs specifications, all construction on the treatment plant had stopped when the initial contractor and design engineer effectively abandoned the project. During the inspection of the concrete walls, the City became aware of other, more significant, problems with the plant's overall design and construction. (See Attachment 4 of this report at Page 2.)

Iqaluit Inadequate Ventilation

There are a number of concerns pertaining to ventilation system design and the use of ordinary classification electric motors and mechanical equipment controls. "Use of equipment that is not protected could present potential fire and explosion hazards. Due to the lack of physical separations between areas, it is our interpretation that the entire facility should be ventilated to the required 12 air change level and all mechanical equipment." (See Attachment 4 of this report at Page 27.)

Iqaluit Inadequate Controls

The investigation also found electrical problems with the heating circuit, Canadian Electric Code violations and incomplete plant operation systems. (See Attachment 4 of this report at Page 44.)

Utilities Response to the Iqaluit Investigation

GWR/Utilities' Supplemental filing provided a response to issues identified by Staff which included HMA's work at Iqaluit. The GWR/Utilities Appendix 1 Summary at page 5, stated in part:

> This project should be characterized as an extremely complicated and ambitious project taken on by the Municipality of Iqaluit. The project was hard to support logistically and a project of this type and size had never been undertaken in the Artic.... (HMA) met the numerous challenges with flexibility and dedication and despite significant odds, delivered the facilities to substantial completion. A relatively small sub-contractor deficiency became a large problem for the Municipality when 3rd party engineers attempted to earn themselves some work and make a project for themselves out of the tank fix.... The Earth Tech report... is nothing more than a proposal to garner work and point out "deficiencies" which they hope to be contracted to correct. There are numerous false and misleading statements in the documents that they produced.

HMA Relation with Zenon

The HMA Iqaluit WWTP and the Powell River District's WWTP were designed to utilize Zenon membrane technology to filter the influent. Zenon is a Canadian corporation founded in 1980, by Dr. Andrew Benedek. The company manufactures its filtration technology in Canada and Hungary. The technology is installed in thousands of water and wastewater plants including the City of Scottsdale and the community of Anthem as well as 40 countries. Zenon enjoys annual sales in excess of $180 million.

In the May 14, 2004 Supplemental filing by GWR/Utilities, Mr. Hill provided pre-filed testimony on the HMA relationship with Zenon. Mr. Hill provided that:

> Zenon Environmental, Inc. a publicly-traded Canadian corporation, developed a wastewater treatment process built around Membrane Bioreactor technology, or MBR. This effective new technology was in its infancy when Hill Murray was getting started. Together, Hill Murray and Zenon refined the process and were selected for some of the largest projects ever attempted at the time. Hill Murray was responsible for permitting, facilities design, buildings, post-treatment,

commissioning and operations. Zenon would perform the process design and supply membranes and process equipment through Hill Murray to the clients.

On April 7, 2004, Staff contacted Dr. Benedek, Chief Executive Officer of Zenon, with a request for information on Mr. Hill's performance with Zenon. On April 12, 2004, Dr. Benedek provided Staff the following information:

> In response to your request the following is my recollection of our dealings with Hill Murray and Associates:
>
> We used to be fond of Trevor Hill, we watched him start a successful company, and as they lacked municipal experience we supported him in developing the market for our product. Since the product, in the early phases had shortcomings we had problems on both sides.
>
> We lent Mr. Hill $1 Million dollars to fix the problems and to shore him up financially. He did not fix his end of the problems, spent the money in appropriately, in my opinion and could not and would not pay the money back, after that point we stopped dealing with him. On our side we had fixed the problems as they came up, from their side they did not.
>
> We hope this information helps you to resolve your task.

On April 30, 2004, Mr. Hill informed Staff that Zenon had invested $1 million into HMA, but that Zenon "forgave the note."

Unpaid Subcontractor

On April 6, 2004, Staff contacted Mr. Collin O'Neil, President of Baffin Building Systems, a subcontractor on the HMA Iqaluit plant. Staff had been informed by Iqaluit city officials that Mr. O'Neil was a subcontractor for HMA in Iqaluit.

According to Mr. O'Neil, Baffin Building Systems was contacted by Mr. Hill to perform contract work and provide contract labor on the Iqaluit wastewater plant. Specifically, Mr. Hill hired Baffin Building Systems to construct water and sewer connections from the existing pumping station to the HMA Iqaluit wastewater plant.

According to Mr. O'Neil, HMA failed to compensate Baffin Building Systems in excess of $230,000 for the material and labor provided to assist in constructing the HMA Iqaluit wastewater plant. Mr. O'Neil further informed Staff that he has pursued litigation against the City of Iqaluit for the debts associated with the HMA Iqaluit WWTP.

GWR/Utilities' Supplemental fling included a copy of an April 4, 2001, memorandum by Mr. Hill to Matthew Hough of the City of Iqaluit, regarding outstanding construction and financial issues. Mr. Hill wrote:

> The hydrostatic failure of the tanks has resulted in significant delays in payment and significant costs for Hill –Murray. As a result, we have not been able to pay many of the subcontractors for the work performed at the site. All of these subcontractors should be paid directly from monies remaining in project funds, and we understand that in fact some contractors may have already been paid.
>
> The outstanding contract amount, net of GST is $579,600. This is exclusive of any delay claims or soft costs which I estimate in the order of $125,000 to $175,000. A detailed list of outstanding third-party HM/CWC payables is attached.

The memo includes payables from the concrete subcontractor and HMA to Baffin Building Systems of $129,657.53, and $152,234.76, respectively. (See Attachment 5 of this report.)

Public News Reports

Staff has located a number of articles discussing the HMA Iqaluit and Powell River WWTPs. Staff recognizes that news reports can be subjective in nature, however, news reports often provide information otherwise unavailable. Staff is attempting to provide the Commission with relevant information and is satisfied that the Commission will provide the appropriate weight to these materials in its review.

Provided below are excerpts from various articles. The full article is attached to this Staff Report.

> "Town officials say the plant is a must because of tough new environmental laws that govern the type of waste water that can be pumped into the ocean. If the plant is not built the town could be charged with violating any number of environmental laws and face heavy fines."
>
> "While the town hasn't signed any large overarching contract for the project yet, it has picked the company it wants (Hill Murray and Associates) and has spent about $1.5 million on smaller "service contracts for the plants design and building materials."

(See Attachment 6 of this report, Sewage plant faces setback, Sean McKibbon, Nunatsiaq News, June 18, 1999)

> "Iqaluit's new $7.1 million sewage plant is now three months overdue and as many as four months away from completion after springing several leaks within the concrete tank system. Iqaluit officials discovered leaks in the concrete walls of some of the system's tanks after the tanks were filled with water during a test early this year.
>
> Fraser said he expects any extra costs to be covered by the contractor's bond or insurance."

(See New Iqaluit sewage plant still isn't working as planned, Michaela Rodrigue, Nunatsiaq News, May 12, 2000)

> Some Iqaluit town councilors say they were left out of the loop when the Town's administrator made two payments to a contractor for a new sewage treatment plant that still isn't operational.
>
> Two payments were made to engineering firm Hill Murray in November and December, against the advice of another engineering firm that the Town hired to oversee the project. In September 1999, engineering firm Dillion Consulting Ltd. raised concerns over the structural integrity of the building and recommended the Town seek legal advice.
>
> Iqaluit's mayor Jimmy Kilabuk refused to comment on the fiasco, citing the confidentiality clause in the main contract, which he says prevents him or other councilor's from speaking publicly about the sewage treatment plant project. "They could take us to court," Kilabuk said, through an interpreter.

(See Attachment 8 of this report, Iqaluit Town administrators ignored advice on faulty new sewage plant, Sean McKibbon, Nunatsiaq News, July 21, 2000)

> Hill Murray had hired a B.C. based company, Quigg Construction Ltd., to build the tanks. After the flaw was discovered, Quigg proposed a quick $120,000 solution to mend the tanks, which involved spraying the inside structure of the tanks with a rubber seal to ensure they remain water-tight. But a third party, Dillon Consulting- originally brought in by the town to oversee the paper work- said the repair wouldn't work.
>
> Hill Murray president Trevor Hill insisted the most economically viable descision had to be made. "Our proposed mend costs $120,000" he said. "(Dillon's proposal) costs $500,000."

> In April of this year, the town brought in yet another engineering firm who agreed with Dillon's proposal. Still, Hill Murray and Quigg don't want to mend the tanks to the more elaborate specifications.

(See Attachment 9 of this report, Sewage plant up the creek, Jorge Barrera, Northern News Services, August 7, 2000)

> In 1997, Hill Murray and Associates were awarded a contract to upgrade the Westview Wastewater Treatment Plant at a cost of $6.3 million. Substantial completion was agreed to and final payment was made on July, 27, 1998. The plant became the municipality's when substantial completion was agreed to; however, it did not meet permit requirements. Hill Murray was given two opportunities to correct mutually agreed upon deficiencies.

(See Attachment 10 of this report, Waste-Treatment Debacle, The Powell River Peak, October 21, 2000)

> After three years of escalating costs, a long list of deficiencies, and repeated failures to meet provincial permit requirements, Powell River municipal officials have said goodbye to Hill, Murray and Associates, the company which upgraded the Westview wastewater-treatment plant.
>
> All outstanding legal actions between the Victoria-based firm and the municipality have been settled, said Councillor Russell Storry, chairman of the public works committee.
>
> Hill Murray had placed a $1.9 million builder's lien against the facility to recover the cost of additional work. The municipality's solicitors filed a writ of summons to protect its right to sue the contractor for failing to complete the contract, including rectification of $662,000 worth of deficiencies.
>
> The municipality paid Hill, Murray $27,000 for consumables, Storry said.

(See Attachment 11 of this report Split Final Laura Walz, The Powell River Peak, December 27, 2000)

> It's going to cost the City of Iqaluit $550,000 to finish repairs to its sewage treatment plant, which was supposed to be up and running two years ago, and another $3.2 million to increase its capacity to handle all the city's waste.

> The plant, which is intended to replace Iqaluit's sewage lagoon, has been flawed from the beginning. In 2000 when the plant was built, engineers discovered leaks in the walls of the concrete tanks. Following that, work on the sewage treatment plant stopped cold.
>
> ...
>
> The engineer's report, released this week, shows there are some defects in the plant's design, major improvements are needed and it doesn't meet all the safety requirements.

(See Attachment 14 of this report, Major repairs needed for sewage plant, engineer's report shows, Denise Rideout, Nunatsiaq News, August 2, 2002

> One of the engineers who worked on Iqaluit's nonfunctioning sewage treatment facility has resurfaced in a small U.S. Community. And perhaps coincidentally, the sewage treatment plant in Pinal County, Arizona, is experiencing many of the same seepage and smell problems that plagued Iqaluit's plant.
>
> ...
>
> It's a tale all too familiar to Iqaluit residents, and sadly to residents of the small Britsh Columbia community of Powell River as well.
>
> Both communities suffered years of escalating costs, long lists of deficiencies and repeated failures to meet safety and permit standards.
>
> Hill Murray and Associates never saw the inside of a court room as a result of their bungled work in Powell River or Iqaluit. Powell River municipal officials settled their outstanding contractual matters and moved on.
>
> But Iqaluit municipal administrators, in the fall of 1999, cut a $2.8 million cheque to Hill Murray, despite a report from Dillon Consulting Ltd, that cited serious structural flaws in the company's Iqaluit treatment plant.

(See Attachment 16 of this report, Iqaluit sewage plant debacle spreads south, Charlotte Petrie, Nunatsiaq News, April 11, 2003)

Summary

The Commission clearly voiced concerns on the Utilities, GWR, its background and ownership of utilities in Arizona. The Commission required additional information on GWR and issues relevant to its acquisition of the Utilities.

Staff has found that three of the principles in GWR, Mr. Hill, its President, Mr. Commandeur, its Secretary and Treasurer, and Mr. Graham Symmonds, its Vice President of Compliance, had all been previously associated with HMA. HMA was responsible for the construction of problematic wastewater treatment plants in Powell River British Columbia and Iqaluit, Nunavut. These same individuals were later employed by Algonquin Water Resources, and left its employment at the same time, in the Fall of 2003.

GWR's Chairman of the Board is Mr. William S. Levine, one of the founders of Outdoor Systems and a longtime state resident. Mr. Dan Cracchiolo is a part owner of GWR, an attorney and former owner of Bella Vista Water Company. GWR ownership structure is described as 48.5 percent Levine Investments, 7 percent Dan Cracchiolo, 29.67 percent Trevor Hill, and 14.83 percent Leo Commander.

GWR has obtained the membership interests of the Utilities, retained its operational staff and secured the services of Mr. Hill, Mr. Commandeur and Mr. Symmonds. The May 14, 2004 testimony of GWR/Utilities asserts that day to day operations will be carried out by other personnel.

Staff is concerned that the Applicant failed to fully disclose information requested by the Commission. Only after Staff's discovery and subsequent discussion with the Applicant, did GWR/Utilities disclose materials related to Iqaluit and Powell River. The discovery of certain information which questions managerial fitness, may be disconcerting, insightful and instructive, however, that same information, when taken in whole, may not necessarily be conclusive as to the ultimate issue of whether the instant application should be granted. Nonetheless, the information discovered in this proceeding requires a reassessment of Staff's previous recommendations.

The ultimate obligation of the Commission is to protect the public interest, to that end the imposition of reasonable conditions to ensure the Applicants are conducting their business operations in a manner which will not compromise the interests of its customers should be required.

Recommendations

Staff recommends:

1. That the Commission require Palo Verde and Santa Cruz post performance bonds having a total value of $750,000, for each system, for a period of not less than two (2) years.
2. That the Commission require Palo Verde and Santa Cruz to evidence the required bonds are maintained by forwarding a letter of bond confirmation to the Director of

Utilities, each calendar quarter. The letter should be filed by each January 15, April 15, October 15 covering the preceding calendar quarter.

3. That the Commission require that failure of Palo Verde and/or Santa Cruz to maintain the required performance bonds will result in Utilities Division Staff issuing an Order to Show Cause as to why the Applicants should not be fined, face suspension or revocation of the CC&N or any other sanctions should not be imposed.
4. That the Commission require Palo Verde and Santa Cruz to submit quarterly compliance reports, signed under oath by two officers of Global Water Resources attesting to the Applicants compliance status with the Arizona Department of Environmental Quality, the Arizona Department of Water Resources, and the Arizona Corporation Commission's Corporations Division. The report shall be filed each calendar quarter. The report should be filed by each January 15, April 15, October 15 covering the preceding calendar quarter.
5. That the Commission require that any change in the ownership of the memberships of the Palo Verde and Santa Cruz L.L.C.s require Commission approval.
6. That the Commission require Global Water Resources to file a report, every six months, by two officers of Global Water Resources, signed under oath, for each utility owned by Global Water Resources, (except for Palo Verde and Santa Cruz):
   a. the financial terms of the acquisition of the particular utility,
   b. the resulting capital structure of the utility,
   c. the terms of any utility debts, and;
   d. the dollar amounts transferred from the utilities to Global Water Resources.

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THE CORPORATION OF
THE DISTRICT OF POWELL RIVER

WESTVIEW WATER RECLAMATION PLANT STAGE 1 - CONTRACT AND COMPLETION REVIEW FINAL REPORT

Prepared for:

The Corporation of the District of Powell River
Municipal Hall
6910 Duncan Street
Powell River, BC
V8A 1V4

Prepared by:

Reid Crowther & Partners Ltd.
Consulting Engineering Worldwide
300 - 4170 Still Creek Drive
Burnaby, BC
V5C 6C6

Phone: (604) 298-6181
Fax: (604) 294-8597

October 31, 1998

Project No. 3292906

Reid Crowther

Reid Crowther

Refer to File: 32929-06
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November 17, 1998

The Corporation of the District of Powell River
Municipal Hall
6910 Duncan Street
Powell River, BC
V8A 1V4

Attention: Mr. Gino Francescutti, A.Sc.T.
Development Services Manager

Dear Gino:

Re: Westview Water Reclamation Plant
Stage 1 Contract and Completion Review
Final Report Submission

Please find attached four copies of our Final Report for Stage 1 of the above project. The report is an update of the Draft Report submitted on October 19, 1998, and presented to Council on October 20, 1998.

The Final Report details the status of the project as of October 16, 1998, and lists several deficiencies that need to be addressed by the Contractor prior to Final Completion. Since issuing the Draft Report, we have been involved in the following activities:

1. Met with the Contractor in the District offices on October 20, 1998.
2. Responded in writing to a letter from Michael Holmes of Jones Emery Hargreves Swan & Hall dated October 26, 1998, to Michael Quattrocchi of Lidstone Young & Anderson regarding the above project.
3. Reviewed the comments on our Draft Report by the Contractor in a letter dated November 6, 1998.
4. Attended a meeting at the District offices with the Contractor on November 10, 1998 to discuss their proposed completion schedule for correcting the deficiencies noted.
5. Met with the Contractor in their offices on November 16, 1998 to provide input into their plan for correcting the deficiencies noted.

Reid Crowther & Partners Ltd.
Suite 300, 4170 Still Creek Drive, Burnaby, British Columbia V5C 6C6 Phone: (604) 298-6181 Fax: (604) 294-8597 www.reid-crowther.com

It should be noted that since October 16, 1998, progress has been made correcting some of the deficiencies and areas of concern listed in our Draft Report. The following table summarizes, to the best of our knowledge, areas where significant progress has been made by the Contractor to date:

Deficiency Noted by Reid Crowther in Stage 1 Report	Contractor's Action	Comments
Plant had not proven capable of reliably meeting contractual design flows while remaining within normal operating parameters	Significant progress has been made in this regard. A flow equalization basin has been commissioned.	Performance testing to be carried out during 30 day monitoring period.
Influent auger screens do not appear to function as intended; they do not remove sufficient screenings quantities.	Screw auger mechanism has been modified to improve transportation of screenings. Other modifications to the equipment are planned.	Screenings removal efficiency and hydraulic capacity testing to be carried out during 30 day monitoring period.
The grit removal system does not appear to function as intended; grit quantities removed from the wastewater are substantially less than would be anticipated	Contractor to provide details of proposed modifications to system and revised operating procedures for review by District.	Issue remains unresolved.
The membrane system has not satisfactorily demonstrated the ability to treat the flows stipulated in the Contract	A rigorous membrane cleaning schedule has been implemented and additional membrane cassettes have been provided. System now appears to be capable of exceeding average design flows, but has not been proven capable of meeting peak flows for sustained periods.	Performance testing to be carried out during 30 day monitoring period
Sludge quantities generated are expected to be substantially greater than indicated in the design information provided.	Contractor and plant operators to monitor sludge wastage rates.	Sludge quantities and operation of sludge press to be evaluated during 30 day testing period.

Deficiency Noted by Reid Crowther in Stage 1 Report	Contractor's Action	Comments
Odour control biofilters are too small and are unlikely to effectively control odours from the headworks area and sludge press room.	Contractor has made a minor modification buy adding 150 mm layer of activated carbon underneath biofilter media.	Issue remains unresolved.
Disinfection not provided for bypass flows.	MOELP to issue amended permit which requires disinfection of tertiary treated flows only.	Issue has been resolved, subject to receipt of amended permit.
No containment is provided for sodium hypochlorite storage containers in the main process building, as required by WCB regulations.	Contractor to provide spill containment vessels.	Issue resolved, subject to District approval.
No emergency eyewash/shower, with a 20 minute supply of tempered water, is provided at the sodium hypochlorite storage area, as required by WCB regulations.	Contractor to provide required facility.	Issue resolved, subject to District approval.
No gas detection sytem has been installed in either the headworks or the membrane treatment area, as required by NFPA 820.	Contractor to provide required gas detection equipment.	Issue resolved, subject to District approval.
Electrical components do not appear to satisfy exposure requirements for a Class 1 Division 1, or Class 1, Division 2 area classification, as required by NFPA 820 and the Canadian Electrical Code.	Contractor to provide plan of remedial action.	Issue remains unresolved.
Record drawings have not been submitted.	Contractor to provide all required record and as-built drawings.	Issue resolved, subject to District approval of drawings provided.

Deficiency Noted by Reid Crowther in Stage 1 Report	Contractor's Action	Comments
Operating manuals, maintenance manuals, and/or operation & maintenance manuals have not been submitted for review by District.	Several manuals for individual pieces of equipment have been provided and are in use at the plant. Contractor to provide complete set of manuals for review by the District.	Issue resolved, subject to District approval of manuals provided.
Substantial changes and modifications have been made without record of the District approving the change or modification.	Contractor has submitted technical information on replacement screw augers. Contractor has submitted letter from Zenon explaining change in bioreactor configuration.	Contractor to provide justification for all substantial changes made to plant design, and all replacement equipment provided.
Seismic bracing in main process building appears minimal.	Contractor has provided letters of assurance by the engineers responsible for supplying the precast panels and roof cross-bracing.	Reid Crowther has recommended to the District that a review of all structures and cranes be carried out by an independent professional engineer prior to final completion.
Ventilation rates in the headworks area may not be sufficient as evidenced by the condensation that occurs when the doors are closed.	Contractor has agreed to evaluate ways of increasing ventilation rates in headworks and sludge press room to 12 air changes per hour.	Issue is resolved, subject to District approval.
The control system may not incorporate sufficient equipment protection as evidenced by the operation of one of the new 100 hp blowers at well below the manufacturer's published flow rate., i.e. under surge conditions.	No remedial action has been proposed.	Equipment protection provided by control system to be evaluated during 30 day testing period.

We confirm that the deficiencies and areas of concern listed in our report are both substantial and serious. However, we note that that the Contractor has made progress in correcting many of these deficiencies. Once again, we recommend that the Contractor be given every reasonable opportunity to address the remaining deficiencies prior to Final Completion. Meanwhile, we will endeavour to provide the District with the assistance it requires to verify that the plant is able to meet its contractual performance requirements, and that the Contractor rectifies all physical deficiencies in a timely manner. We remain committed to providing the District with the high level of service required to bring this project to a satisfactory completion.

Should you have any questions regarding our report, please contact the undersigned or our Mr. M. Kim Fries, P.Eng., at any time.

Sincerely,

REID CROWTHER & PARTNERS LTD.

Barry Rabinowitz, Ph.D., P.Eng.
Senior Environmental Engineer

cc M. Kim Fries, P.Eng., RCPL Winnipeg

Net gal/m³

1/usg

3.785

103

WESTVIEW WASTEWATER TREATEMENT FACILITY CONTRACT REVIEW FINAL REPORT

Prepared for:

District of Powell River
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Powell River, BC V8A 1V4

Prepared by:

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April 24, 2000

Project No. 32929-08 (03)

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THE DISTRICT OF POWELL RIVER

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Reid Crowther

SECTION 6.0
CONCLUSIONS AND RECOMMENDATIONS

6.1 General

Findings of the Phase 1 Contract and Completion Review of the Westview Wastewater Reclamation Facility are presented in this report. These findings were discussed at a meeting with District of Powell River Staff on March 30, 2000 and will be presented to a meeting of the District Mayor and Council on April 25, 2000.

It is clear that during the past 18 months, the Contractor, Hill, Murray and Associates, has made significant progress towards correcting many of the deficiencies noted by District staff, as well as the two consulting engineering firms acting on the District's behalf, Reid Crowther and Partners Ltd., and CH2M Gore and Storrie Ltd. However, there are still several issues that have not been resolved to the District's satisfaction. Some of these issues are not in compliance with the Contract between the District and Hill Murray and Associates, while others represent work that does not meet commonly accepted engineering standards for municipal wastewater treatment facilities.

This Contract is covered by $4,878,056 of bonding. However, it should be noted that the bonding company may not be willing to pay for correcting work which the Owner has already certified and paid for as complete, and action under the bonds must be instituted before expiration of two years from the date of Substantial Completion. Bonds do not cover engineering nor design, nor plant performance, nor any guarantee thereto. The Bonding company is not liable for events discovered more than one year after Substantial Completion Further, a long time period (over 18 months) will have elapsed between the Substantial Completion and Completion Date and this may affect the warranties on various items of equipment.

The fundamental issues with the facility are its ability to treat the Contractual flows while meeting the requirements of the MOELP permit, and the facility must provide a safe working environment for the operators.

Southwestern Flowtech & Environmental Ltd. (SFE) were commissioned by the District in April 2000 to conduct an independent flow monitoring study as part of this Contract Review. To date this study is ongoing. However, preliminary indications are that the membrane system is capable of meeting the

contractual flows on a continuous basis with 30 membrane cassettes in operation. Final data from this study is anticipated by mid-May 2000.

6.2 Conclusions

Specific issues which are not in compliance with the Contract include the following:

- A primary flow measuring device in the headworks area was indicated in the Contract but not provided. This primary flow measuring device is required to accurately control the wastewater flow being directed to the membrane process, and the flow which bypasses secondary treatment. The consequence of this issue is that the plant may bypass partially treated effluent during low flow periods in contravention of the MOELP permit;

- The Contract specifies a "highly automated system" for screening the wastewater in the headworks. The system provided is extremely labour intensive. The consequence of this issue is that the plant operators spend an excessive amount of time manually handling raw wastewater screenings on an ongoing basis;

- The Contract is based on the provision of a membrane system with 16 membrane cassettes. The system provided has 32 membrane cassettes. The District needs to resolve issues related to additional ongoing costs for the extra electrical power, manpower, chemicals and membrane replacement over the life of the system with the Contractor and supplier of the membrane process. The consequence of this issue is that the District may be faced with unanticipated operating costs related to replacement of the extra membranes;

- The Membrane system requires significantly more cleaning by operators than District was lead to believe in the Contract. The Contract is based on recovery cleaning of 16 membrane cassettes a maximum of once every 3 months. The system provided has 32 membrane cassettes which require recovery cleaning once every 3 weeks, i.e. approximately 8 times as much operator attention. The consequence of this issue is that the District will be faced with unanticipated operating costs related to cleaning of the membranes;

- The 72-lamp UV disinfection system specified in the Contract was replaced with a 48-lamp system without the required authorization from the

District. An appropriate credit for the difference in value between these two units has not, to date, been provided to the District;

- The Contractor is contractually obliged to satisfy the requirements of the MOELP permit. The plant as designed and constructed is incapable of meeting the effluent disinfection requirements of the MOELP permit at any time when flows are bypassed between May 1 and October 15. The consequence of this issue is that the District will be listed in the MOELP Environmental Protection Noncompliance Report;
- The 3 m^3/d in-vessel composter specified in the Contract was replaced with a trough style compost turner without the required authorization from the District. An appropriate credit for the difference in value between these two units has not been given to the District. The consequence of this issue is that the District is faced with the high costs associated with exporting sludge from the facility for disposal;
- The Contract states that the facility will be designed and constructed in accordance with all applicable codes and standards. A recent electrical inspection by a Provincial Electrical Inspector identified work that was carried out in contravention to the Electrical Safety Act. The consequence of this issue is that the District may be faced with expensive remedial measures in order to operate the facility.
- The Contractor submitted as-built drawings in December 1998. An updated set of as-built drawings to reflect changes to the plant made after December 1998 has not, to date, been submitted.

Unit processes in the plant which do not meet commonly accepted standards for municipal wastewater treatment facilities, but are not necessarily out of compliance with the Contract, include the following:

- The grit removal system does not remove sufficient quantities of grit. A mechanical device for removing, washing and conveying grit has not been provided. The consequence of this issue is that the accumulated grit will be difficult and expensive to remove from the membrane bioreactor and may result in excessive wear and tear on the downstream unit processes;
- The rotary drum screens create a very humid atmosphere in the headworks building. The screens should be fitted with purpose-build lightweight covers to contain spray from spray bars. The consequence of this issue is that there will be an accelerated corrosion potential of equipment located in

the headworks, and operator safety may be compromised by unnecessary exposure to airborne pathogens;

- Local Hand Off Auto (HOA) switches have not been provided for the inlet screens, the rotary drum screens and the influent pumps. These units must be manually controlled at times during routine maintenance and when the PLC control system malfunctions. It is standard practice to provide local HOA switches for all mechanical equipment that must be operated during PLC failures, and all equipment that must be run during inspection, adjustment and cleaning. The consequence of this issue is that critical equipment could be shut down during malfunction of the central control system, as well as creating inefficient routine maintenance practices;
- Hour meters have not been provided for major items of mechanical equipment such as the aeration blowers, sludge press, etc. Generally, all motor drives have their "hours run" recorded by the central control system. The consequence of this issue is that it will be difficult to schedule routine maintenance of several major equipment items;
- No provision has been made to disinfect bypass flows between May and October, as required by the Discharge Permit issued by MOELP. The Contract states that bypass flows will not be disinfected. The consequence of this issue is that there will be a violation of the MOELP permit under high flow conditions between May and October;
- There are reports of surcharging of the effluent manhole on the southwest corner of the main process building and flooding of certain structures within the plant during peak wet weather flows. The consequence of this issue is a public health risk associated with the surface discharge of partially treated raw wastewater in areas accessible to the public;
- There are no magnetic flowmeters on the waste activated sludge lines to allow the operators to monitor the flow rate to the sludge press and the total volume of sludge wasted from the membrane process daily. The consequence of this issue is that it is difficult to control the membrane bioreactor sludge age and sludge dewatering press operation;
- The PLC central control system, consisting of the HMA Envirosmart operating system and the ZenoGEM control logic, must be reviewed and any necessary modifications made to the system. Observed deficiencies with the system include the lack of an alarm to report a failure of the west plant wet well pump, and failure of the ZenoGEM control system to initiate an aerated flush cycle which resulted in a shut down of one train of the

system. Standard practice is that duty equipment failures or faults should always generate an alarm. Furthermore, there are no back-up disks and documentation for the control system software. These backups are required in the event of a data loss on the system that it is presently installed on. The consequence of this issue is that faults may go undetected and a computer failure could result in a shut down of the system as there is no back-up capability;

- There is no sludge storage tank or back-up sludge dewatering unit. As a result, when the sludge dewatering press is out of service, excess sludge must be stored in the membrane bioreactors. If the unit is out of service for several days, the MLSS concentration in the membrane bioreactors may increase to the point where it has a negative effect on the performance of the membrane system. The consequence of this issue is that treatment performance could be impacted; and
- The new biofilter on the north side of the headworks building appears to have been only filled with coarse woodchips and an alkalinity source (reportedly zeolite). Ingredients such as compost, tree bark and sawdust, which are normally included in biofilter media, do not appear to have been included. The absence of these organic materials in the biofilter media may render it ineffective at treating odorous compounds such as hydrogen sulphide, which is expected in the foul air from the headworks building during the summer months. The consequence of this issue is that public complaints about foul odours may be received by the District in the future.

6.3 Recommendations

Previous sections of this report contain recommendations for specific action to be carried out by the District. Several issues require further investigation before the facility can be certified as being complete under a Professional Engineering seal. The following is an overall summary of the recommendations identified in this review:

- In the event of an unresolved dispute the District and HM&A are required to enter into an arbitration process. It is recommended that the District appoint an arbitrator, and an alternate, in consultation with their Legal Council.
- The majority, but not all, of the Drawings and Specifications submitted to the District have been sealed by Professional Engineers (PE's). It is

recommended that the District put all identified PE's on notice that there are concerns related to the design of the facility.

- The Contractor is obliged to obtain and maintain appropriate insurance coverage. It is recommended that the District confirm that the Contractor has maintained the required insurance coverage.

- It is recommended that the District enter into discussions with Zenon Municipal Systems Inc. regarding the membrane process warranties, membrane replacement costs and on-going technical support.

- The hydraulic capacity of all unit processes in the facility under high flow conditions should be verified by an independent third party prior to Final Completion. For example, the capacity of the membrane process should be tested under full flow conditions for 12 hours in each of several consecutive days. During the other 12 hours of each test day, the system could be operated at the AAF specified in the contract.

- It is recommended that the design of the plant hydraulics be reviewed and certified by a qualified PE to ensure that all critical units and interconnecting pipework are capable of handling peak wet weather flows.

- It is recommended that a new vortex grit removal system, or equivalent, and grit classifier be provided to conform with standard engineering practice for domestic wastewater treatment plants.

- It is recommended that the membrane bioreactors be drained and inspected to determine the extent of grit accumulation and to ensure that there is no damage to the aeration system.

- The dissolved oxygen probes on the east side cannot be used to represent the entire membrane bioreactor as a result of reported imbalances in the feed rate and MLSS concentrations between the two sides. It is recommended that DO probes be provided for the west side of the membrane process.

- It is recommended that the hydraulic design of the effluent pipework between the plant and the outfall be evaluated in order to establish the hydraulic capacity of this system and correct the root causes in the manhole surcharging and other reported overflows in the plant. If necessary, all

sections of pipe creating a hydraulic restriction are to be twinned or replaced with larger pipe sections.

- It is recommended that the accuracy of the treated effluent magnetic flowmeters be verified by an independent third party. This will be conducted as part of SFE's ongoing flow study commission.
- Local HOA switches should be installed on all equipment items that must be manually controlled at times, e.g. inlet pumps, inlet screens, rotary drum screens etc.
- It is recommended that the effectiveness of the biofilter in treating odours generated in the headworks and sludge handling areas be tested during the summer months;
- It is recommended that the design and construction of the main process, the blower/control and the headworks building be reviewed and certified by a qualified structural engineer to ensure that they conform to all applicable codes and standards;
- It is recommended that the design and installation of the electrical system be reviewed and certified by a qualified electrical engineer; and
- It is recommended that all deficiencies noted by the plant operators, CH2M G&S, and Reid Crowther be resolved prior to Final Completion.

R E L E A S E

KNOW ALL MEN BY THESE PRESENTS that the Corporation of the District of Powell River (the "Releasor"), for and in consideration of Hill Murray & Associates Inc. releasing the Releasor in respect of the subject matter of an action in the British Columbia Supreme Court issued out of the Powell River Registry under No. S. 1299, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby remise, release, and forever discharge Hill Murray & Associates Inc., CWC Canadian Wastewater Corporation, the Guarantee Company of North America, their directors, officers, servants, employees, agents, and assigns (collectively the "Releasees") of and from any and all actions, causes of action, claims, proceedings, suits, debts, contracts, demands, and damages of any nature or kind whatsoever which the Releasor now has against the Releasees arising out of, or connected with, any cause, matter, or thing in relation to, or in any way connected to:

1. the contract dated September 1, 1997, between Hill Murray & Associates Inc. and the Releasor for the design and construction of an upgrade to the existing municipal wastewater treatment plant known as the Westview Wastewater Treatment Plant (the "Plant");

2. the Plant, including the assessment, construction, repair, remediation, and operation of the Plant, whether such claim or cause of action be in contract, tort, equity, or otherwise; and,

3. performance bond no. VS6006020 dated November 17, 1997, issued by the Guarantee Company of North America in respect of the contract between Hill Murray & Associates Inc. and the Releasor dated September 12, 1997.

IT IS UNDERSTOOD AND AGREED that the Releasor will not at any time hereafter commence, maintain, continue, or assign any action, suit, complaint, or proceeding of any kind whatsoever in any court of law or equity or before any regulatory body, board, or tribunal or before any arbitration tribunal or arbitrator against the Releasees in respect of the subject matter of this Release, and if the Releasor should do so, this Release may be raised as a complete bar.

IT IS UNDERSTOOD AND AGREED that nothing contained in this Release shall be deemed to be an admission of liability on the part of the Releasees.

IT IS FURTHER UNDERSTOOD AND AGREED that, for the consideration expressed herein, the Releasor, or any person on its behalf, shall not make any claim or take any proceeding against another person or corporation who might claim contribution or indemnity from the Releasees with respect to the subject matter of this Release, and, if such a claim is made or proceeding taken, the Releasor shall indemnify and hold harmless the Releasees in relation to such claim or proceeding, including the costs of the Releasees in defending against the same.

IT IS FURTHER UNDERSTOOD AND AGREED that the contract dated September 1, 1997, between Hill Murray & Associates Inc. and the Releasor for the design and construction of an upgrade to the Plant is hereby terminated.

IT IS FURTHER UNDERSTOOD AND AGREED that the Releasor is under no legal disability, and has read this Release and fully understands the terms of this settlement and it voluntarily accepts the terms hereof for the purposes of making a full and final compromise and settlement of all such claims against the Releasees. It is hereby acknowledged that the Releasor has consulted with, and has been advised by, its solicitor before entering into this settlement.

IT IS FURTHER UNDERSTOOD AND AGREED that this Release contains the entire agreement between the Releasor and the Releasees, and the terms of this Release are contractual, and not mere recitals.

IN WITNESS WHEREOF, the Releasor has hereunto set its hand and seal this 29th day of November 2000, at the District of Powell River, in the Province of British Columbia.

The Corporate Seal of Powell River was hereunto affixed in the presence of:)

Stewart B. Carey)
Mayor:) C/S

Clerk:)

Iqaluit

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Sewage Treatment Plant Investigation

Prepared for:
City of Iqaluit
P.O. Box 460
Iqaluit, N.W.T.
X0A 0H0

Prepared by:
Earth Tech (Canada) Inc.

December 2002

Project No. 52333

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SECTION 1.0
EXECUTIVE SUMMARY

1.1 INTRODUCTION

This report has been prepared to provide a comprehensive assessment of the existing operational status and physical condition the City of Iqaluit's newly constructed Sewer Treatment Plant. This report also includes appropriate recommendations to bring the idle plant online taking into consideration a number of critical economic, environmental, engineering design and construction issues that can be associated with the overall plant development and operation.

Specific elements of the report include:

A written evaluation of the overall physical condition of the existing STP with a focus on building code deficiencies, the layout and performance of electrical and mechanical equipment according to established design/performance requirements, and various deficiencies that can be associated with the overall integrity of the plant's architectural and structural design.

An accounting of all electrical, instrumentation, mechanical, structural, and architectural equipment or features found within the existing plant versus equipment and features shown on the facility design documents.

Presentation of recommendations to replace, or modify, electrical, instrumentation, mechanical, and structural elements of the existing facility expected to create severe operational problems during the plant's commissioning and operation over an extended period of time. These problems are generally associated with plant hydraulic capacity; limited process efficiency; overall durability against extreme cold weather conditions and a corrosive plant environment; ability of plant personnel to operate and maintain a complex and highly automated facility in a safe, efficient, and practical manner; and various considerations applied to plant operational costs.

An evaluation of the general quality of all design and vender installation documents against accepted standards for good engineering practice as applied to the overall wastewater treatment industry.

An evaluation of the plant's overall capability to meet minimal treatment expectations including recommendations to implement optional schemes to increase the existing plant's hydraulic and process capacity.

The presentation of costs to complete the existing plant's construction in accordance with existing building codes, operational expectations, and fulfillment of contractual treatment requirements.

The presentation of costs to modify, or expand, existing plant facilities and equipment necessary to implement less complex (and more stable) process options. These options are developed with the goal of providing for an immediate increase in plant hydraulic and treatment capacity, while

at the same time, reducing additional plant construction and extended operation and maintenance costs to the lowest amount possible.

1.2 BACKGOUND

The consulting firm of Hill, Murray & Associates (HMA) was selected by the City of Iqaluit in mid 1998 to complete all design documents and manage the construction of the City's existing STP. HMA completed the plant's design and began the construction phase of the project by mid 1999. Within a few months of initiating the plant's construction, significant problems began to arise concerning the placement of concrete within major structural and process basin walls. As discovered during an inspection of ongoing plant construction, it was noted that the contractor's use of a concrete-wall forming technique, or methodology, (described as Octaform) resulted in significant honeycombing of placed concrete and the misalignment of structural steel. To effectively deal with the problem, the City suspended all construction activities and solicited the services of CH2M Gore & Storrie Limited (CGSL) to complete the necessary structural investigations and make recommendations as appropriate. In accordance with the stated directive, CGSL recommended that shotcrete be applied to all honey-combed wall sections.

Although the shotcrete recommendation was completed per CGSL's specifications, all construction on the treatment plant has stopped with the initial contractor and design engineer effectively abandoned the project. During the inspection of the concrete walls, the City became aware of other, and more significant, problems with the plant's overall design and construction. These issues are addressed in this report including various discussions aimed at providing recommendations and related costs to bring the existing plant into service within a reasonable period of time.

1.3 SCOPE OF STUDY

The recommendations and costs presented herein reflect improvements and modifications to the existing plant in full conformance with appropriate construction and building codes. The indicated improvements and modifications are also recommended to provide for the most feasible treatment of the City's domestic sanitary sewage in full conformance with established, and mutually acknowledged, effluent discharge standards.

During January of 2002 the existing treatment plant was inspected by a team of process, mechanical, electrical, and structural engineers employed by Earth Tech (Canada) Inc. The inspection included a complete audit of all existing mechanical equipment, electrical distribution equipment and control systems, process and facility support piping, overall building superstructure, miscellaneous process systems and equipment, and the overall plant layout to assess issues relating to the long term operation and maintenance of the entire facility.

Earth Tech's on-site inspection generally confirms that the existing plant is inoperable with a number of safety issues that need to be resolved before any attempt is made to finish the plant's construction in accordance with HMA's initial design. The existing plant is roughly 60 to 70 percent complete in terms of remaining effort and costs to make design and construction changes necessary to meet minimal building code standards and acceptable levels of engineering practice.

The original design and actual facility construction was evaluated against various building codes and design standards normally applied to the design, construction, and operation of wastewater treatment facilities. These codes and standards include the Canadian Electrical Code (CEC), National Building Code-1995 (NBC), National Fire Protection Association Standard for Fire Protection within Wastewater Treatment and Collection Facilities-1995 Edition (NFPA 820), American Concrete Institute Standard for Hydraulic Structures (ACI 350), WBC Industrial Health and Safety Standards, and Canadian Plumbing Code (NPC).

1.4 FINDINGS

Although the plant is inoperable and in need of significant modifications and improvements, the structural and architectural elements of the facility are nearly 100 percent complete and in general conformance with the various building codes cited above. Remaining structural and architectural issues include:

The floor of the electrical room was constructed with shallow (38 mm as opposed to the specified 75 mm) rib decking resulting in excessive sagging of the finished deck. The obvious aesthetic problem notwithstanding, the sagging deck is structurally sound but will create localized drainage problems during extended plant operations.

Questionable fire rating of the building's roof, exterior walls, and various doors separating more fire and explosion prone areas of the plant.

Consideration should be given to constructing more substantial walls to better confine or manage potential fires and explosions within the influent screening and anoxic mixing areas of the overall plant.

Miscellaneous improvements include better plant ventilation effectively reducing corrosion potential for all galvanized structural steel found inside the existing building, replace damaged insulation and backfill around concrete footings were necessary, and provide for the installation of all bracing shown for attachment to existing roof purlin flanges according to the original building design.

The floor of all reinforced concrete process tanks should be refinished and sloped to provide for better drainage during inspection and maintenance.

The existing plant's substantial, and most critical, code violations and engineering problems are primarily associated with the specifying, construction, installation, and projected operation of mechanical and electrical systems. Most of the code and engineering issues involve the installation and operation of electrical equipment in high hazard (fire and explosion) rated areas of the plant and the general lack of capacity and effectiveness for the HVAC system. Specific issues include:

Limited capacity with the existing electrical power distribution system (estimated full load demand at 386 amps with the existing system rated at 400 amps).

Standby generator rated at slightly more than half of the stated plant full load capacity and will require the implementation of a power load control scheme to effectively come online during a plant-wide power outage. Additional issues include: the generator is expected to operate without a battery charger, the generator room has poor ventilation allowing for the outside migration of combustion air, the actual generator performance is unknown because the overall unit has never been tested to full load.

Numerous inconsistencies between electrical design schematics (HMA's design and major vendor wiring diagrams) and the actual installation and wiring of motor control centres (MCCs), related switch gear, miscellaneous control panels, plant lighting, HVAC controls, etc.

Most of the electrical motors and related switchgear are not rated for duty within high hazard areas of the plant and have been installed in violation of the CEC.

Fire alarms not found in critical plant locations subject to the ignition of combustible air from volatilized of combustible influent contaminants.

No electrical utility meter found within the existing plant.

The existing PLC system is incomplete due to a missing second processor module and access to documentation stating the function and purpose of the overall system.

Switch gear and attaching power cables are place on a recessed pad within the lower plant electrical and blower room creating an operational hazard in the event adjacent floor drains fail to adequately remove drainage from surrounding and upper floors of the plant.

Electrical power and control cables should be separated from instrumentation, control and monitoring cables/wires.

It appears that the plant was designed to be highly automated which may result in a number of operational problems given the plant's remote location and accessibility to personnel with the training and technical skills to deal with periodic malfunctions and/or adjustments to the overriding control system software, processor modules, logic and control panels, process monitoring sensors, etc.

The overall arrangement, or layout, of plant piping and equipment has resulted in a number of situations where it would be extremely difficult, if not impossible, for City personnel to operate and maintain the plant's electrical and mechanical equipment.
The project plans and specification provide little, or in some cases, no information regarding the performance, operation, and control of the process mechanical equipment and HVAC system. As a result, the performance and operational characteristics of the overall treatment process and support equipment cannot be assessed with any level of confidence. It is uncertain if the plant can be adequately heated during extended winter operations or provide for proper air circulation in areas of the plant subject to contaminated and combustible air flow. Additionally, the existing system has no redundant heating pumps creating the possibility of periodic plant shutdowns due

to the lack of heated air circulation within the plant during freezing conditions winter weather conditions.

Mechanical equipment shown on HMA's design but not found in the existing plant includes an exhaust fan and hood at the auger screening room, miscellaneous outside air intake louver and hoods, blower and ventilation room controls, heating pipe insulation, a domestic water storage tank, and an operational boiler heating circulator.

An adequate fire and air seal needs to be constructed to enclose the existing coarse screening room from the remainder of the plant. The recommended enclosure would mitigate the potential for the spread of a major fire or explosion in adjacent plant areas.

The cost to implement the structural, architectural, mechanical, and electrical modifications cited above and as further documented in the remaining sections of this report is estimated at slightly over $820,000. An itemized breakdown of the stated construction cost is given in Section 3.7 of the report.

In the event the City of Iqaluit elects to finish the construction of the existing STP according to HMA's existing design, the completed plant will be faced with immediate capacity and process issues regarding future growth and related increase in domestic sewage flows. The most recent population count in 1996 put the City's population base at 4,220. Considering an estimated growth rate of 3.4 percent and an average per capita indoor water demand at 400 lpcd, the current average day domestic wastewater flow rate can be determined at 2,100 M^3/day for an estimated 2002 population base of 5,200. By comparing the current estimated wastewater flow rate with the stated plant capacity of 1,800 M^3/day, it becomes apparent that the newly constructed plant will be unable to accommodate immediate average day flow rates or future increases in wastewater flow without significant bypass events to the existing sea outfall. This type of plant operation will result in repeated violations to the established water quality agreement with the Nunavut Water Board.

1.5 RECOMMENDATIONS

To address the expected plant capacity problem, the City can pursue a number of options to increase the current plant's hydraulic capacity while, at the same time, making the plant less complex to operate by modifying the current process scheme. Viable options to increase plant capacity and improve on the design process scheme may include a conversion to primary treatment only, conventional activated sludge process with secondary clarification, non-conventional activated sludge process with limited filtration, or a conversion to a sequence batch reactor scheme.

After an evaluation of effluent quality standards, long range economic impacts, and general issues concerning process reliability and complexity of plant operations, the conventional activated sludge process appears to be the best option to implement at the Iqaluit STP.

Primary treatment is the least expensive option to pursue in terms of initial construction costs and long range operation and maintenance costs. However, the resulting effluent quality would

only be marginally improved over the existing lagoon system. As a result, the Nunavut Water Quality Board would have to relax their established effluent standards for the plant's sea outfall.

A non-conventional activated sludge plant would require the use of filtration media in lieu of conventional secondary clarifiers for sludge removal. Although the non-conventional activated sludge option would be easier (in terms of time to make necessary plant modifications) to implement, the overall process requires slightly more labour and related operational costs as compared with a conventional activated sludge plant. The additional costs can be associated with the ongoing, or day-to-day, operation and maintenance of the filtration media equipment and/or system.

A sequencing batch reactor process is a viable option to expand the hydraulic capacity of the existing plant to whatever level is dictated by appropriate population growth projections. However, operation of a batch reactor plant requires continuous monitoring of a number of parameters effecting effluent quality. The monitored data and information is further used to make repeated changes, or modifications, to the ongoing process or operation of the plant's bioreactors. The operation of the plant would require more labour and staff with considerable technical training to monitor and interpret critical biochemical data and make appropriate changes in the overall plant operation. A facility operator with the level of training to manage the daily operations of a sequencing batch reactor plant may be difficult for the City to employ over an extended period of time. In the event the City cannot employ a skilled plant operator, it would be very difficult, if not impossible, for untrained staff to operate the plant with any level of efficiency in terms of consistently producing acceptable effluent water quality.

The conversion to a conventional activated sludge plant is recommended at Iqaluit primarily because of its relative simplicity of operation and proven process reliability. The conversion will require the installation of aerators within the existing anoxic basins and the construction of new secondary clarifiers outside the existing plant building. As stated, the conversion is simple and straightforward as compared with other options providing an acceptable level of treatment. The overall process is primarily based on steady-state flow and does not require continuous effluent monitoring or process adjustments. Plant maintenance is less demanding given that filters and/or media are not required for sludge removal.

Implementation of the full secondary treatment options presented above are expected to have a range in construction costs from $4.01 to $ 8.61 million depending on the final plant hydraulic capacity and level of treatment. In consideration that the City has expressed an interest in bringing the existing plant online over an extended period of time, a recommendation will be made to pursue a phased completion of the existing treatment facility base on a number of assumptions regarding projected population growth and per capita indoor water use.
When completed according to the original design, the existing plant process scheme is said to allow for an average day hydraulic capacity of 1.8 Ml/d and produce effluent meeting water quality standards established by the Nunavut Water Board of 10.0 mg/l BOD_5 and 10.0 mg/l TSS. ETC's assessment of the existing facility indicates that the existing bioreactors can be converted to aeration basins with air distribution piping and aeration equipment typically used in a conventional secondary activated sludge plant. However, the average day hydraulic capacity would be 1.6 Ml/d which is slightly less than the stated capacity for the existing plant design.

The slight reduction in capacity is due to a limited Sludge Retention Time (SRT) in the converted aeration basins. Once the existing bioreactors are converted to aeration basins, secondary clarifiers can be constructed outside the existing plant to complete the overall plant conversion to conventional full secondary treatment. Although the conversion will provide the City with a stable secondary treatment facility, the hydraulic capacity will only accommodate an estimated population base of 4,000 full time residences; which is substantially less than the current estimated population base of 5,100 full time residences.

The estimate of serviceable population is based on the assumption of 400 litres per capita per day of indoor culinary water use. This level of domestic water demand was evaluated as a reasonable planning number from the City's recent master plan of the water treatment. The master plan was completed by ETC during March of 2002.

To provide wastewater treatment capability for the City's current population base and allow for some level of future growth, it is recommended that the City pursue a phased expansion of the existing treatment plant. Phase 1 would include the conversion of the existing bioreactors to aeration basins as described above. The conversion would be done in conjunction with all other modifications to bring the entire plant up to code in terms of the structural, mechanical, electrical, and instrumentation deficiencies stated in this report. The estimated cost to complete Phase 1 is $1.01 million including the installation of a small centrifuge to facilitate the land disposal of secondary sludge per recommendations made in the attached report (reference Section 3.7).

Phase 2 would include the design and construction of a 12.0 metre secondary clarifier to match the hydraulic capacity of the aeration basins completed in Phase 1. The completion of the secondary clarifiers will provide for a fully functional (all basic treatment elements in place) secondary treatment plant capable of treating 1.6 Ml/d of average daily influent flow with a peak day flow factor of between 2.0 and 3.0. The cost of the clarifier is estimated at $3.0 million including removable covers to eliminate freezing during the winter months of operation.

Phase 3 would include the design and construction of additional aeration basins with the hydraulic capacity of the converted bioreactors completed in Phase 1. The cost of the additional aeration basins is estimated at $1.60 million.

Phase 4 would include the design and construction of the final 12.0 metre secondary clarifier resulting in a final plant average day flow capacity of 3.2 Ml/d. The stated capacity would service an estimated 8,000 residences before more expansion is warranted. By making a number of simplifying assumptions it can be shown that the Phase 4 plant would provide adequate wastewater treatment at Iqaluit until the planning year of 2013. These assumptions include a current (2002) population base of 5,100 residences, a projected population growth rate of 3.7 percent per year, an average per capita indoor water demand of 400 lpcd, all construction for Phase 1 completed by the end of 2003 with each subsequent Phase completed in a 12.0 month period of time ending in 2006.

The recommended phased construction approach would cost a total of $8.61 million (sum total of all costs as presented above with no present worth adjustment utilizing an acceptable discount

SECTION 2.0
DOCUMENT REVIEW

2.1 DESIGN/PERFORMANCE

2.1.1 Civil

The civil engineering aspects of a treatment plant's construction typically includes the drainage, grading, and possible surfacing of parking lots and access roads to various, and surrounding, treatment facilities and related operation and maintenance buildings. The civil engineering design also includes potable water service to the overall plant site for both indoor and outdoor uses.

The Hill Murray & Associates design of the Iqaluit sewage treatment plant does not provide detailed drawings or specifications for the stated civil-site improvements. Additionally, an on-site audit and inspection indicates that the area immediately surrounding the plant has not been paved. The area has been improved to some extent by the placement of gravel typical of most sites in Iqaluit, to accommodate periodic parking for City maintenance personnel and/or miscellaneous visitors to the plant.

Potable water for the plant is provided by truck service. The gravity sanitary sewer enters the lift station adjacent to the treatment plant building. Drawing D-0199-G002 is a site plan that indicates a general alignment (in plan) for both an existing 300 mm sewer and a proposed 300 mm sewer outfall. The drawing shows a general sewer alignment that is not tied to any existing horizontal survey control. As a result, it would be difficult, perhaps impossible, to locate existing sewer lines without probing (temporary trench excavations across an assumed pipe alignment).

2.1.2 Structural/Architectural

The design drawings for the building (excluding electrical and mechanical) are by and large complete and professionally prepared in CAD format. There are thirty-three (33) structural drawings and nine (9) architectural drawings, plus two (2) formwork drawings that show typical details for the somewhat contentious concrete wall forming (Octaform) system.

Comments with respect to tank design and construction are included below only for completeness. A report prepared by CH2M Gore and Storrie in April 2000 discusses this aspect of the project in detail.

Structural Design

In some cases, the level of structural detail is beyond what would normally be included in a tender package, probably because many of the details are for apparent shop use. For example, steel details include connection and weld details that are often left to the fabricator. It is

recommended that the design files be obtained from the original designers for use in any future renovation work.

In general, structural design performance has been met, based on the fact that the drawings are well detailed and the structures are substantially complete (indicating that the contractor was able to build what was detailed). The specified 75 mm Q deck was substituted with a 38 mm deck, which created concrete floor deflections during the pour. However, this is not a design issue (discussed in Section 3.3 as a variance from contract documents).

A detailed design check was not performed during this review; however, the structural member sizes seem to be appropriate for the expected vertical loads, and there appears to be significant redundancy in the lateral load carrying elements.

Architectural Design

Architectural design and details are also adequately treated, to a lesser extent than structural. However, this is normal for an industrial facility. In some cases, it is apparent that the architectural layout followed the process layout, because some of the usable space is compromised by problematic access routes. For example, the mezzanine above the office/washroom is accessible only via cat ladder, due to the fact that any other type of stair would interfere with internal access on the upper floor. There may be a way to incorporate a spiral stair, which would at least allow a user to carry objects to the mezzanine level.

Architectural design performance has been met with the drawings and details provided, and the code analysis discussed below.

2.1.3 Process

A number of documents have been both referenced and generated to design and construct the sewage treatment plant. The documents relating to the development of the treatment process are reviewed and assessed in this section of the report.
Documents Reviewed
The following documents have been reviewed for content and level of detail related to the process systems within the Iqaluit Sewage Treatment Plant. The abbreviated form of the document name is shown in (brackets). This document abbreviation is used throughout the subsequent text.

Document	Abbreviated Name	Prepared by
RFQ – Requirements – January 21, 1998	IRFQ-1/21/98	City of Iqaluit
Response to Request for Qualifications and Proposals for Sewage Treatment Option for the City of Iqaluit-March 18, 1998	HMAP-3/18/98	Hill Murray and Associates March 19, 1998
Revised Proposal for a Fully Integrated Sewage Treatment Facility for the City of Iqaluit-June 12, 1998	HMAP-6/12/98	Hill Murray and Associates June 12, 1998
Design-Build Stipulated Price Contract for the City of Iqaluit Water Reclamation Facility-July 22, 1999	DBSPC-7/22/99	Hill Murray and Associates July 22, 2999
Project Process Drawings included in the Contract: Process Drawings M001 - M004 M001: Influent Tank Fabrication dwg. M002 and M003: Auger Tank Fabrication dwg. M004: Fournier Press Layout dwg.		Hill Murray and Associates Fournier Industries Inc.

Documents Not Included In The Contract But Reviewed During The Site Visit

Construction Drawings: D-0199- M001 to D-0199- M003 and D-0199- M010 to D-0199-M013		Hill Murray and Associates
Process and Instrumentation Drawings (P&IDs) and Installation Drawings:		Zenon Environmental Systems Inc. Fournier Industries Inc. Sanitaire
Operation and Maintenance Literature		Zenon Environmental Systems Inc. Fournier Industries Inc.

Iqaluit Request for Qualifications Requirements

The original IRFQ-1/21/98 provides the outline of the basis for design for the sewage treatment plant. Key elements are the design flows and loads, as described in the following paragraph.

The population in 1996 was 4,220 people. The twenty year projected population to the year 2017 was 8,500 people. The IRFQ-1/21/98 stipulates that an average daily flow of 400 liter per capita per day (Lcd) should be used for the design. The 1996 average daily flow and the projected 20-year average daily flow are 1,688 m3/day and 3,400 m3/day, respectively.

The design parameters for the raw wastewater characteristics and design maximum average effluent concentration based on the future treatment requirements are presented in the following table:

Parameter	Raw Wastewater Characteristics	Max. Average Effluent Concentration
Ave. Daily Flow, Design Year 2017	**3,400 m^3/day**	N/A
BOD_5	220 mg/L	80 mg/L
TSS	220 mg/L	70 mg/L
Feacal Coliform	9,000,000 FCU/100 mL	100,000 CFU/ 100 mL
pH		6 to 9
Oil and Grease		No visible sheen

Hill Murray Proposal Submissions and Contract Documents

Hill Murray submitted a Response to the Request for Qualifications and Proposals for the Sewage Treatment Options on March 19, 1998 and a revised proposal on June 12, 1998. A Design –Build Stipulated Price Contract for the City of Iqaluit Water Reclamation Facility was signed July 22, 1999 between the City of Iqaluit (the Owner) and Hill Murray. Design parameters identified by the Owner in Annex F of the Contract are presented in the following table along with effluent criteria stipulated by the Nunavut Water Board, as presented in Appendix I of the Contract.

Parameter	Raw Wastewater Characteristics *Appendix F*	Hill Murray & Assoc. Guaranteed Effluent Concentration	Max. Average Effluent Conc. Stipulated by City of Iqaluit in Appendix F of the Contract	Max. Average Effluent Conc. Stipulated by Nunavut Water Board in Appendix I of the Contract
Design Flow (1) (2)	**1,800 m^3/day**			
BOD_5	≤ 500 mg/L	≤ 10 mg/L	≤ 10 mg/L	≤ 30 mg/L(3)
TSS	≤ 500 mg/L	≤ 10 mg/L	≤ 10 mg/L	≤ 35 mg/L(3)
Alkalinity	≥ 100 mg/L			
Temperature	≥ 10°C			
Feacal Coliform		≤ 1,000 MPN/ 100 mL Complete nitrification of ammonia	≤ 1,000CFU/ 100 mL	≤ 10,000 CFU /100 mL(3)

Notes:
(1) The Contract documents indicate that the piping is sized for 2,500 m^3/day
(2) Appendix F requires that the treatment plant be expandable to 3,500 m^3/day with the addition of tankage, equipment, and extension of the building.
(3) Effluent criteria based on 150 – 600 lcd.

The design parameters have changed significantly compared to the original IRFQ-1/21/98. The raw wastewater characteristics are generally much higher than in the original IRFQ-1/21/98 whereas the effluent criteria are much more stringent. In addition, the effluent design criteria stipulated by the Owner (Appendix F of the Contract Documents) are also more stringent than those stipulated by the Nunavut Water Board (Appendix I of the Contract Documents). Of significant note is the change in average daily design flow and design year, which has changed from 3,400 m^3/day in 2017 to 1,800 m^3/day in the construction year. Sizing and building the system to meet current average day flows means that consideration must be given to expanding the plant the day construction is finished as there is no room for growth. In addition, good engineering practice would dictate that wastewater treatment plants are designed to treat at least the current peak hour flows. Good engineering practice is further discussed in Section 3.5 of this report.

Hill Murray's proposed process train to meet effluent criteria included the following equipment and tanks:

- Two channels with screens and inclined augers and an influent by-pass channel.
- Two anoxic tanks, including one mixer per tank, in which influent screened wastewater is mixed with return activated sludge.
- Two aeration tanks in which a suspended growth activated sludge system are followed by the ZENON ultra filtration membrane system, to be located at the downstream end of the aeration tanks. The membrane is a vacuum driven system whereby the wastewater is drawn through the surface of the membrane that rejects the insoluble material.
- Filtered wastewater is then discharged to the bay.
- The insoluble material, or sludge which includes bacteria, is collected at the end of the aeration tank in a sump and returned to the start of the process (return activated sludge) to mix with the incoming screened sewage in the anoxic tanks.
- A portion of the return activated sludge is wasted on a daily basis to maintain the biomass concentration in the aeration tanks at the desired level. The waste activated sludge (WAS) is dewatered in a rotary press to reduce the volume of sludge to be sent to disposal. Dewatering requires the addition of polymer for flocculation and wood pellets that provide structure to the dewatered sludge.
- Filter cake is disposed at the landfill which the filtrate is pumped to the start of the process train.

Process Description

The proposed process is described in the following paragraphs.

Wastewater flows enter the plant by immediately discharging to the influent tank located in the screening room. Wastewater then flows through one of two channels through coarse screens with more openings. Inclined screw augers remove debris from the face of the screens and convey it through a compaction zone to discharge into an underdrain. A by-pass channel is also provided. Screened influent discharges into one of two anoxic tanks located below the influent tank. Two mixers in each anoxic tank provide mixing to ensure that solids do not settle. Return activated sludge from the aeration tank is pumped to this tank and is mixed with screened wastewater. Hatches are provided for access into these tanks. The hatches extend along the length of the anoxic tanks, thus cradling both the screening room and the aeration room. A sump is provided below the hatches in the event that a submersible pump must be dropped into the tank to empty the tank.

Mixed liquor flows from the anoxic tanks to the aerations tanks. Aeration grids are provided in each aeration tank. At the end of each tank, ZENON membranes cassettes are provided.
Two membrane cassette cleaning tanks are provided.
The pumping and piping system, including two backwashing tanks, are provided on the main floor of the building. The main floor also includes the electrical room, the sludge dewatering room, the office and the washroom.

The main floor sludge dewatering room includes the Fournier rotary press, the polymer addition system, and the wood chip bin used to introduce wood chips into the sludge dewatering process.

The membrane cassette cleaning tanks extend to an intermediate floor.

The blower room, the generator room, and the dewatered sludge collection room are situated at ground level.

Hill Murray proposed to provided process equipment for 2000 m^3/day, expandable on an as required basis in the March 19, 1998 Proposal. The design flow was decreased to 1668 m^3/day in the revised proposal dated June 12,1998 and increased to 1800 m^3/day in the contract documents. Hill Murray estimated that at a design flow rate of 1800 m^3/day, 40 m^3/day of sludge would be wasted daily from the secondary treatment system. This volume would be reduced using the filter press. According to Hill Murray, two to three man-hours would be required for sludge dewatering. It was also estimated that 16 tons of wood pellets would be required on an annual basis for the sludge dewatering process.

Contract documents indicate that the piping is sized to handle a flow rate of 2500 m^3/day whereas the tankage has been designed for a build out capacity of 3400 m^3/day.

Plant Equipment Capacity

A summary of major equipment size and rated capacity is presented in the following table.

Description	Size	No of Units	Rated Capacity	Total Capacity
Plant			20.8 l/s	1,800 m^3/day
Influent Pipe	200 mm	1		2,500 m^3/day
Influent Tank				1,800 m^3/day
Bar Screen	2.5 mm openings	2		1.800 m^3/day
Screw Auger		2	77 l/s each	m 1,800 M^3/day
Anoxic Tank – Original size	198 m3 to 277 m3	2		HRT: 2.4 to 3.2 hrs
Aeration Tank – Original dedicated aeration area and assuming RAS rate equals influent rate		2		HRT: 3 to 4.2 hrs
Aeration Blowers	20 kW	3	200 l/s @48 kPa	600 l/s @ 48 kPa
Membrane System Cassettes	510 m^2/cas	10	<1.8 ml/d avg. 3.6 ml/d peak	
Membrane System Blowers	40 kW	3	536 l/s @ 48 kPa	1,608 l/s
Process Vacuum Pumps		3	14.4 l/s @ 15.24 m Hg Vacuum	430.2 l/s
Vacuum Pumps for Priming	*1	2	0.25 ml/d @ 0.45 m Hg Vacuum	5.8 l/s
Mixed Liquor Recycle Pumps	10 kW	2	7.5 ml/d each	170 l/s
Citric Acid Metering Pumps	*1	1	0.02 l/s @ 103 kPa	0.02 l/s
Citric Acid Dip Tank Pump	*1	1	3.4 l/s @ 7.62 m	3.4 l/s
Backpulse Sodium Hypochlorite Metering Pumps	*1	2	5.4 l/hr @ 103 kPa	10.8 l/hr
CIP Sodium Hypochlorite Metering Pumps	*1	1	0.027 l/s @ 103 kPa	0.027 l/s
Sodium Dip Tank Pump	*1	1	3.4 l/s @ 7.62 m	3.4 l/s
Air Compressor	5.62 kW	2	1.7 mm3/min @ 610 k Pa	11.24 cfm
Fournier Press	1.5 m^2 filtration surface			Expandable to 3 m^2
Flocculator	100 l			
Progressive Cavity Pump	*1	1	10 m^3/hr	1.0 m^3/hr

*1 Table Note: Data not readily attainable from construction drawings/specifications.

The process drawings that were provided in the Contract documents are limited to the fabrication drawings for the influent tank and auger tanks and layout drawings for the Fournier Press. The general plant layout is presented in the structural drawings.

There is no information in the contract documents with respect to acceptable manufacturers for products, design standards, acceptable valve suppliers, piping material or the requirement to provide an operator friendly system. This information should have been included to provide quality control.

2.1.4 Mechanical

The following documents have been reviewed for content and level of detail related to the mechanical systems within the Iqaluit Sewage Treatment Plant. This document abbreviation is used throughout the subsequent text.

Document	Prepared by
3/18/98 Project Proposal	Hill, Murray & Assoc.
Plant Mechanical Drawings M-1 through M-8	F&Y Engineering Concepts Ltd.

The design/performance of the facility's mechanical HVAC and control systems are not specifically referenced in the HMAD-3/18/98 document. The document does however reference the level of plant automation and redundancy.

The Proposal document does not present any further information on the design performance of the mechanical HVAC or control systems to be provided within the facility.

Project "Issued for Construction" drawings have been provided as described in the Documents Reviewed section. The specification included on the drawings is incomplete in the controls section as no sequence of operation, setpoints or control components other than thermostats are indicated. Redundant secondary heating supply pumps have not been provided in the design, requiring a pump replacement in the event of failure.

2.1.5 Electrical and ICA

The following documents have been reviewed for content and level of detail related to the electrical systems within the Iqaluit Sewage Treatment Plant. The abbreviated form of the document name is shown in (brackets). This method of document abbreviation is used throughout the remainder of this report.

Document	Abbreviated Name	Prepared by
Response to Request for Qualifications and Proposals for Sewage Treatment Option for the City of Iqaluit	HMAD-3/18/98	Hill Murray and Associates March 18, 1998
Revised Proposal for a Fully Integrated Sewage Treatment Facility for the City of Iqaluit	HMAD-6/12/98	Hill Murray and Associates June 12, 1998
Design-Build Stipulated Price Contract for the City of Iqaluit Water Reclamation Facility	DBSPC-7/22/99	Hill Murray and Associates July 22, 1999
Project Electrical Drawings in 3 Portions:		Hill Murray and Associates
1. Plant Electrical Drawings E001 through E008		Zenon Environmental Systems Inc.
2. Plant Control Systems Drawings D-0199-E030 through D-0199-E060		Fournier Industries Inc.
3. Dewatering System Power and Controls Drawings D-0199-E070 through D0199-E082		
Operation and Maintenance Literature		Zenon Environmental Systems Inc. Fournier Industries Inc. ProAqua Engineering Canadian Wastewater Corp.

Electrical and ICA Design/Performance

The design/performance of the facility's electrical and control systems are not specifically referenced in any of the documents referenced in the Table. However the DBSPC-7/22/99 does however reference two key points for further review in this report: First, the level of plant automation and the method of providing this automation.

The Proposal document does not present any further information on the design performance of the electrical or control systems to be provided within the facility. Electrical and controls design/performance criteria are referenced in Annex A and Annex E of the Contract.

Annex A outlines the project scope of work. Items listed that would be considered electrical or controls work are as follows:

- Lighting
- Diesel generator
- All electrical wiring and testing
- All instrument wiring and testing
- All PLC software and testing
- Electrical service for the treatment plant
- Transformers, switchgear for primary power service
- Lift station
- Control panel
- Back-up power from plant system
- Electrical service for lift station

A key item not listed in Annex A is the provision of a motor control centre (MCC) and the related connections and testing of all process and mechanical equipment.
Annex E contains an operation and maintenance cost summary and a letter from the Canadian Wastewater Corporation outlining the operation and maintenance services that they could provide. A large portion of the letter is dedicated to the capabilities and functions of the SMART computerized process monitoring and O & M data logging system.

Site investigation revealed that the project was being constructed to include the field infrastructure to support the SMART system.
Project drawings have been provided in three packages as described in the Documents Reviewed section. Packages provided by Zenon and Fournier detail only the configuration of equipment provided by these vendors. The package provided by Hill Murray shows the overall electrical scheme for the facility. There are no drawings indicating the necessary controls scheme for the facility such as overall instrument wiring diagrams, block schematics, instrument loop drawings, or an instrument index.

Drawings for the Fournier package are complete and comprehensive. The package includes:

- Block system layout drawing.
- Control panel layouts for each panel complete with components lists.
- Analog wiring diagrams.
- Discrete wiring diagrams complete with terminal block wiring numbers.

- Motor drive wiring diagrams complete with terminal block wiring numbers.
- Current to pressure (I/P) transducer layout diagram.

Drawings for the Zenon package detail include:

- Layout of the Zenon PLC cabinet.
- All PLC input and output wiring within the PLC cabinet (with connection to field devices to be "by others").
- Two pages of single line diagrams.

PLC input/output wiring diagrams are set up to show the wiring for each PLC module mounted within the PLC rack. Each drawing details I/O addresses and wiring numbers within the PLC cabinet and provides blank spaces for the contractor who provides the field wiring to record the field wiring identification numbers. Field wiring is also shown to be terminated in field junction boxes, but there are no drawings that indicate the locations of these field junction boxes. Review of the PLC drawings and the plant Piping and Instrument Diagrams (P&ID's) reveal a number of discrepancies, such as differences in instrument identification tag numbers and a number of instruments appearing on the P&ID but not in the I/O scheme.

Single line diagrams included in the overall electrical design show the MCC line-up for the process motors that are part of the Zenon process equipment. MCC single line information is also included in the Hill Murray single line drawing, with a number of additional motors shown on the Hill Murray drawing. The Zenon single line drawings are incomplete as they do not include sizing of the overcurrent protective devices or sizing of the motor feed conductors. The Zenon single line drawings also include notes indicating the configuration of the MCC to be "Zenon's standard" and a number of features to be included in the MCC. The project documentation includes no definitions of "Zenon's standard" MCC configuration and no other MCC specification information.

The Hill Murray drawings package includes drawings E001 through E008.

- Drawing E001 ELECTRICAL NOTES & CODE LOAD. This drawing shows 16 points of project specification information. In our review of the project documentation as defined in section 2.1.5 of the report, this is the only electrical specification information that appears in the project documents. A number of items in this specification information are of concern to the project design/performance. Use of non metallic sheathed cable is allowed under specification point 7 c) but can not be used for applications greater than 300 volts, or in hazardous locations unless it is installed in threaded metal conduit. The aforementioned CEC requirements render the product useless for this facility. Item 9 indicates bonding and grounding to be as required by code. The project documentation does not indicate how to achieve the required bonding and grounding for the facility. Item 10, a) indicates the mains service interrupting capacity (fault current) is to be coordinated with the utility. There is no

documentation that the required coordination with the utility has been completed or provided the contractor. Specification notes 13 and 14 describe the installation of underground ducts for the NWT Power Corp. service, and the Northwest Tel. Service. Project documentation provides no further information regarding routing of the location of service connection points. This drawing also includes a load calculation, which is used to determine the size of the electrical service to the facility. This calculation indicates a full load operating current for the facility of 386 Amps, and subsequently specifies a 400 Amp service to the facility. This leaves an excess design capacity for this service of 3.5% or 12 Amps. With the service entry equipment installed as specified, the facility will not have any available capacity in the electrical distribution system to allow for expansion. Should the Just – In –Time infrastructure approach, as outlined in Hill Murray's documentation, result in any expansion that requires electrical power, the facility's electrical service will immediately require upgrade.

- Drawing E002 ELECTRICAL POWER. This drawing shows the facility's single line power distribution diagram. The intended design of the facility is shown with the incoming electrical service routed through a 400A 100% rated breaker, a 400A transfer switch, to a main distribution panel with three major branches of power distribution. The three major branches are: to the MCC, to the Fournier Press and building ventilation, and the 120/208 Volt distribution panel. The configuration of the Single Line Diagram presents several performance issues. These items will be discussed in sequence, from the incoming service connection to the point of use.

    - The incoming service equipment is not fitted with any provision for metering.

    - The transfer switch is shown with a power loss sensor to the PLC. PLC drawings do not indicate an input from the power loss detection device.

    - The incoming service is shown with a "HM&A" power meter with an output to the PLC. PLC drawings do not indicate an input from the power meter.

    - Interrupting capacities and buss fault current ratings for the main breaker, transfer switch, the main distribution panel, or any of the other distribution equipment is not indicated.

    - The MCC overcurrent protective devices for 3 membrane blowers, 3 lift station pumps, 2 anoxic mixers, and 2 air extraction pumps are undersized.

    - Motor feed conductors for the 3 lift station pumps are undersized.

    - Motor disconnects for 3 membrane blowers and 3 process blowers are undersized and the sizing shown is inconsistent with the drawing note to provide hp rated equipment isolation disconnect switches.

- The single line diagram indicates a 100 Amp breaker to feed the Fournier press equipment and the building ventilation system via a splitter. Conductor sizing is not indicated for the feed to the building ventilation system.

- The drawing indicates the feed to the Fournier press equipment to be controlled by a Hand, Off, Auto selectable contactor. The contactor location, wiring, and the required control scheme are not indicated on any other project drawing or document.

- The 120/208 panel 'A' is fed from a 45 kVA transformer. From this panel a sub-panel 'B' is fed with a 100 Amp breaker. The drawing indicates the feed to panel 'B' to be controlled by a Hand-Off-Auto selectable contactor. The contactor wiring, and the required control scheme are not indicated on any other project drawing or document.

- A number of the circuit breakers in panels 'A' and 'B' are not sized on the drawing.

- An issue of general concern with the entire drawing is that the load management scheme for the emergency generator is not clearly defined. The generator is capable of providing approximately 250 Amps, and the load control scheme to limit the equipment operated under emergency power conditions is not indicated on the drawing or elsewhere in the project documentation. A load management scheme that shuts down one half of the building load would be required to prevent the generator from shutting down due to an overload condition.

- Drawings E003 and E004 FIRST FLOOR LIGHTING PLAN, and SECOND FLOOR LIGHTING PLAN. Both plans indicate lighting layout, conduit routing and luminaire switching provisions.

  - The circuiting (panel & circuit number) of the luminaries is not indicated on the lighting plans.

  - The Symbols legend indicates five different luminaire types, only three of which are specified in the fixture schedule shown on drawing E001.

  - The incandescent light and the Class I Zone II fixtures have no specification in the project documentation.

  - The Class I Zone II Luminaire symbol is shown on the drawings in spaces that also contain non-rated luminaries. Class I Zone II areas should only be fitted with equipment suitable for use in such atmospheres. This reference to lighting fixtures is the only reference in the reviewed documents to indicate a requirement for any portion of the space to be constructed as a hazardous location. Further discussion of this issue can be found in the Code Review portion(s) of this report.

  - The lighting drawings also are used to show the receptacle and telephone locations, as well as the provision of power for the generator battery charger and block-heater. The

circuiting (panel & circuit number) of the receptacles and support equipment is not indicated on the lighting plans.

- Drawings E005 and E006 FIRST FLOOR EQUIPMENT - ELECTRICAL, and SECOND FLOOR EQUIPMENT - ELECTRICAL. Both of these drawings show the locations of process equipment and control devices. While the two plans show the locations of devices, the corresponding wiring, conduit, and power feed (from a 120/208V circuit or the MCC) requirements are not indicated on the drawings. Some devices such as valve actuators may be pneumatically operated and require only low voltage control signals, however this is not clearly indicated on the drawings.

    - The number, type and location of control devices shown are inconsistent with those shown on the process drawings provided by Zenon.

    - The first floor drawing does not indicate power to mechanical louvers, required to regulate the heat generated within the room. When the generator is running. This control is essential for the unit to operate.

    - The first floor drawing shows the electrical disconnects for the anoxic mixers to be located on this level of the building. These disconnects should be shown on the level 2 drawing, in an accessible, dry location.

    - The Second floor drawing shows the layout of the electrical room. This layout shows two items that are inconsistent with what is shown on the single line drawing. First, this drawing shows provision of utility CT's (Current Transformers). This would indicate that provisions were to be included for utility metering. Second, the transformer to feed the 120/208 volt panels is shown to be sized as 75kVA (45kVA sizing is shown on the single line).

    - The Electrical room layout does not show the location of the splitter indicated on the single line diagram.

    - The two contactors, indicated on the single line diagram, are shown located in the electrical room. Notes describe their function that are inconsistent with the functions shown on the single line diagram. One of these contactors is indicated as remote lighting relay. The relay wiring, control scheme, or the lights to be controlled are not indicated on any other project drawing or document.

    - The function of the relays is further confused by the symbol shown in the legend as a Lighting Relay (PLC Controlled). The PLC control schemes for these relays is not outlined on any other project drawing or document.
    - The second floor drawing shows gas detection, as well as audible and visual alarm indicators. The type of detected gas is not indicated nor is the configuration of the alarm circuit. (How is the alarm acknowledged, silenced or reset?)

- The second floor drawings also indicate the installation of motor disconnects for the 3 process pumps in the pumping area to be located on the tank wall behind the process piping and related equipment. This location places the disconnects out of practical reach for either service or operational use.

- Drawings E007 and E008 FIRST FLOOR ELECTRICAL SLAB AND WALL PENETRATION, and SECOND FLOOR ELECTRICAL PENETRATIONS. These two drawings indicate locations and sizes of conduits to penetrate the first and second floor slabs and the wall penetrations for both interior and exterior wall mounted electrical equipment.

  - The first floor drawing indicates three conduits to penetrate the floor and be routed to the lift station. The drawing does not indicate the number or type of conductors to be installed or the intended purpose of the 3 conduits.

  - The drawing shows two first floor penetrations for grounding conductors, a conductor size and a length. The project documents provide no further information on the installation of the main electrical service ground or the grounding of the Emergency Generator.

The operations and maintenance literature has been provided by Fournier, Pro Aqua Engineering, and Zenon. Documents provided by Fournier (Dewatering Equipment), and Pro Aqua Engineering (Trash Augers) are complete and relevant to the equipment provided for the facility. These manuals are consistent with those we routinely approve at the close of a project of this type. The manual information provided by Zenon is incomplete and in some cases, provides incorrect information. Some examples are:

- the PLC control system documentation includes a user manual for two of the module types, but only a data sheet or information sheet for the balance of the modules.

- The MCC documentation includes information on only one half of the entire MCC line up. The sizing information for the MCC components related to the Lift Station pumps is incorrect as the motors are of a larger size than noted. The O&M documentation does not include any information on the main distribution panel board, the transfer switch, or the emergency generator.

2.2 REGULATORY/CODE

2.2.1 Structural/Architectural

The design drawings were prepared in 1999 and therefore the applicable code is NBC 1995 with respect to general building requirements. Design parameters for anoxic and aerobic tanks for the wastewater process, as well as some of the ancillary building requirements are also covered in part by NFPA 820.

It is usual for a design/build project to include specifications with the drawing package, and this method was used here. In this case, the design codes in effect are noted on the first structural

sheet (Specifications - S001) for structural requirements and again on the first architectural sheet (Code Check / Notes – A001).

As discussed in process below, Table 3 of NFPA 820 identifies the Trash Augers room as potentially requiring Class I Zone II classification (Class I Zone II if 12 air changes are provided). As this area may be considered to be a 'Critical Unit Processes' (6-3.3.2), it would require a 3-hr fire rating. This rating would apply to not only the partition walls separating this area from the rest of the plant, but also the roof structure. At present, the roof structure is not rated, being exposed steel, and the walls are constructed using prefabricated panels on galvanized. steel studs. Although good from the point of view of cleaning, to our knowledge, these panels have no tested fire rating. In addition, the door is of the sliding barn-type, also without rating or air seal.

In the worst case, flammable gases would collect, ignite and blow out the partition walls and possibly the roof if the explosion were substantially powerful. Because the roof structure is reinforced for some uplift, the walls would go first in a minor explosion, exposing staff to some danger. Given that only a reinforced block wall might prevent explosion into the remainder of the building, it would be prudent to provide ventilation as well as gas detection. These requirements are discussed further in Mechanical Section. The combustible construction materials in this room are minor and fire protection to 3 hours is attainable only with a 190 mm block wall either filled with concrete/perlite or covered with fire rated drywall. In addition, improving the roof structure rating to 3 hours will entail considerable cost. The definition of what constitutes a Critical, Essential or Other Unit Processes is debatable and when it is considered that an explosion will not be prevented by a 3-hr fire rating, some compromise would be appropriate here. If the danger of an explosion occurring in the area above the anoxic tanks is eliminated, the concrete floor slab could be argued as a form of protection from an explosion in the head space above the tank. For this reason, we recommend that the areas of checker plate covering the anoxic tank outside of the Trash Auger room be removed and replaced with concrete so as to confine a head space explosion to this room. An argument can be made to leave the sliding door in place as a type of explosion relief that might keep the partition walls from blowing out in the event of gas ignition.

In Process Section it is proposed that an opening through the north wall (concrete) of the Trash Auger room be provided, allowing collected trash to be dumped directly into a bin rather than wheeling it through the plant. Use of an awning swinging door may provide dual function as an insulated trapdoor and blow out panel (from minor explosions; the partition walls would likely not resist a large explosion even with a blow-out panel).

Structural Codes

In addition to NBC 1995 and NFPA 820, ACI 350 is normally used in the design of concrete wastewater tanks. The Cold Regions Utilities Monograph, although not mandatory, is often used a design guideline for Northern regions. As indicated in the CH2M Gore and Storrie report, it appears that ACI 350 was not used as a reference document. The designers may have considered the PVC octaform liner as sufficient reason to discard leakage concern, although any one of the many PVC webs may have provided a potential leak path through the wall, and particularly if the

surface of the PVC was contaminated. Normal PVC waterstop forces the water to follow a tortuous path to be effective.

NBC 1995 specifies loads for use and occupancy, wind, snow, rain and seismic loading to employ in the design. The second section in the first column on Drawing S001 (CODE Loads) suggests that designs were prepared with the correct input data except for the seismic loading. Iqaluit is in a zone where $Z_a = 1$ (acceleration - related) and $Z_v = 0$ (velocity - related). There is no reference to these parameters on the drawings, however if the facility was designed under Part 9 (small buildings), this is not unusual. It is however a slight omission because Part 9 specifically refers to Part 4 when wood framing is not being used.

Architectural Codes

Requirements for exiting, numbers of doors, fire separations, etc. normally fall under this category. In addition, the exterior building envelope would normally be considered an architectural design requirement. The mandatory requirements of the Model Energy Code require an R value of 15.3 (2.7) or 21.6 (3.8) for oil and electric heat respectively, for walls and roofs. The assembly is specified to be R20 and R28 for these two components, and with the few number of windows and doors, this would be close to the required effective R values since the insulation is a wrap system (rigid).

Given that large volumes of water enter this plant continuously basis, building envelope insulation becomes less of a concern, except for the aspect of durability. The exterior walls are very durable (rigid insulation on PVC on concrete, with the odd void). The use of 30R rigid insulation on the roof is appropriate, particularly with the use of a potentially less than perfect vapour barrier (6 mil polyethylene).

The building area is under 600 m^2. even if the tanks are included. Application of Section 2.1 of NBC indicates that the building would fall under Part 9 if designated F2 or F3 (intermediate or low hazard industrial respectively). This is a debatable point, because the presence of combustible gases might suggest that the building be rated as F1 (high hazard industrial). We however concur with either the F2 or F3 designation, which does not require sprinklers.

2.2.2 Process

The proposal indicates that design and construction will be in accordance with, or governed by, the Canada Building, Plumbing and Electrical codes, and the WCB Industrial Health and Safety Standards, in addition to the:

- Nunavut Water Board Letter – Appendix I in the Contract Documents
- GN Contribution Agreement
- Municipal and Capital Standards and Criteria referring to:
  - Fire Protection
  - Solid Waste Management Facilities
  - Water and Sewerage Facilities

Based on the effluent concentrations guaranteed by Hill Murray in the Contract Documents, the Nunavut Water Board and Town of Iqaluit effluent concentrations for BOD_5, TSS and Fecal coliform could be met.

The National Fire Protection Association (NFPA) 820 standard, "Fire Protection in Wastewater Treatment and Collection Facilities" was developed by NFPA's Technical Committee on Wastewater Treatment Plants. This standard includes the hazard classification of specific areas and processes common to most wastewater collection and treatment facilities and is widely used within Canada to assist in the design of wastewater treatment plants. NFPA 820 outlines the potential fire and explosion hazards in each process area, and based on the ventilation and physical separation provided between each process area, NFPA 820 dictates the extent of the classified area, the electrical classification, the required material of construction and the required fire protection measures.

The designer must ensure that the appropriate level of protection and suitable equipment is provided in each classified area. It should also be noted that it is often more cost effective to alter the atmosphere, thereby changing the area classification, than providing equipment to meet a more stringent area classification.

Following the NFPA 820 guidelines, if sufficient physical separation and ventilation were provided in the facility, the process areas Iqaluit water reclamation facility could be divided into three functional areas as follows:

- The coarse screening facilities
- The aeration basin
- The sludge dewatering room

Coarse Screening Facilities

All coarse screening facilities are considered Class 1, Group D due to the possible ignition of flammable gas produced when volatile flammable liquids enter the sewer system and the flammable gas evolves into the air. Because flammable gas concentrations can only be controlled by exhausting them from the building envelope, only the ventilation rate can influence the Division classification.

At the Iqaluit plant, the screenings equipment is enclosed in the main building and would include the influent chamber, screening and trash auger system and the anoxic tanks that are directly below. Providing less than 12 air changes per hour would result in an area classification of Class 1, Zone I; providing at least 12 air changes per hour would result in an area classification of Class 1, Zone II. In either scenario, the entire enclosed space is considered classified and electrical equipment must be suitable for use in these classification requirements.

As discussed in more detail in the mechanical section, the screening area has been provided with less than 12 air changes per hour and therefore the area Classification would be Class 1, Division I. In addition, the room is poorly sealed, thereby influencing the classification of the

aeration basin area. Neither the structural, mechanical or electrical design meets the requirements of a Class I, Zone I area.

Aeration Basin
Aeration basins that are not preceded by primary treatment are considered Class 1 due to the possibility of ignition of flammable gas released in the air and floating flammable liquids that may be transferred from the screening facility directly to the aeration basin. If primary treatment is provided, aeration basins are deemed to be in an "unclassified" area, since floating material will be removed during the primary treatment process.

At the Iqaluit plant, although primary treatment is not provided, the possibility of transferring flammable gas and/or floating flammable liquids from the anoxic tank to the aerobic tank is minimal due to the submerged connection between the two tanks. Flammable gas would likely volatilize either in the influent and screening tank or in the anoxic tanks. Thus, to ensure that flammable gas does not escape to the aeration tank zone, the physical barrier between the two areas must be maintained, including sealing of anoxic tank hatches that straddle the screening and aeration basin areas. Inherent in this recommendation is the understanding that floating debris, scum, and oil regularly will have to be removed from the anoxic tank using a manual technique.

Liquid transfers between the anoxic tanks and aeration tanks through pipes located close to the tank floor. Thus, floating flammable liquids likely would be released in the anoxic tank.

If the coarse screen area were completely sealed from the aeration area and adequate positive pressure were provided in the aeration basin area, the aeration basin area, including the toilets, the office, and the pump area, would be considered "unclassified." However, the existing facility does not provide adequate physical separation between the two areas and the trash room classification envelope would extend beyond the door into the aeration basin area. The area extending 3 m beyond the door into the aeration basin area would be classified Class I, Zone II and the rest of the area would be unclassified.

Sludge Dewatering Room
Stand alone sludge dewatering buildings containing filter presses are "unclassified". However, when the sludge dewatering process room is contained within the plant, as is the case in Iqaluit, the surrounding atmosphere influences the room classification. At Iqaluit, the adjacent areas are rated unclassified; therefore, so is the sludge dewatering room.

2.2.3 Mechanical

Mechanical documentation listed in section 2.1.4 has been reviewed for its conformance with the National Building Code, National Plumbing Code and NFPA 820 (1995) "Standard for Fire Protection in Wastewater Treatment and Collection Facilities". There are a number of concerns pertaining to ventilation system design and the use of ordinary classification electric motors and mechanical equipment controls, as discussed in the process portion of this report. Use of equipment that is not protected could present potential fire and explosion hazards. Due to the lack of physical separations between areas, it is our interpretation that the entire facility should

be ventilated to the required 12 air change level and all mechanical equipment be equipped with classified electric motors and control components.

Course Screening Facilities-Trash Auger Room

The potential hazard in the coarse screening facilities is due to the possibility of ignition of flammable gas produced in the sewer system and released into the air at the wastewater treatment facility and floating flammable liquids. NFPA 820 indicates these areas are to be electrically classified as Class 1, Zone I provided with a minimum of 12 air changes of ventilation. Electric motors have to be rated for use in this classification.
The current installation incorporates a 850 M^3/hr inline cabinet exhaust fan which will only provide approximately 8.5 air changes. The hydronic unit heater located in the space is equipped with an ordinary motor which is not suitable for this area. The room is not equipped with dedicated makeup air as the design utilizes transferred air from the rest of the facility thereby creating a migration path of hazardous contaminants to adjacent areas in the event of exhaust fan failure.

2.2.4 Electrical

Electrical documentation listed in section 2.1.5 has been reviewed for its conformance with the Canadian Electrical Code (CEC) 1998, the National Building Code, and NFPA 820 (1995) Standard for Fire Protection in Wastewater Treatment and Collection Facilities. A number of the concerns raised in Section 2.1.5 related to design performance concerns with HMA Drawing E002 also are CEC variances. The correct sizing of motor feed breakers, motor feed conductors, and motor disconnect switches are all clearly defined within the code. The project documentation does not indicate any specific electrical design considerations to address the potential fire and explosion hazards within individual process areas, or within the facility as a whole. However the designer has indicated a least an awareness of these concerns in that there are Class I Zone II Luminaire, and gas detector symbols placed on the drawings. As discussed in the process portion of this report the following areas could present a potential for fire and explosion hazards.

- The coarse screening facilities
- The aeration basin
- The sludge dewatering room

The potential hazard in the coarse screening facilities are due to the possibility of ignition of flammable gas produced in the sewer system and released into the air at the wastewater treatment facility and floating flammable liquids. NFPA 820 indicates these areas are to be electrically classified as Class 1 Zone I. Section 18 of the CEC describes locations where explosive gas atmospheres are present as Class 1, and further defines the spaces where these atmospheres occur as three basic types. (The NFPA document uses the same definitions and indicates the spaces as Division 0, Division 1, and Division 2).

- Zone 0, explosive atmospheres are present continuously or for long periods.
- Zone 1, explosive atmospheres are likely to occur during normal operation
- Zone 2, explosive atmospheres are not likely to occur during normal operations, and if they

do occur the duration of exposure will be for a short period of time

The installation requirements for electrical equipment installed in a Zone 1, or Zone 2 space is clearly defined in Section 18 of the CEC and includes requirements for both the construction of energized equipment and the wiring techniques required to connect that equipment. NFPA further requires that course screening facilities be fitted with a combustible gas detection system. The gas detector shown on the drawings is not shown at or near this portion of the process. As discussed in the process and mechanical portions of this report the potential for explosive atmospheres in the balance of the facility would most sensibly be addressed by providing the required ventilation to these spaces. There is a further reference in the NFPA document that is of interest to the electrical design and construction of the facility. NFPA 820 indicates the requirement for a fire alarm system to be provided in spaces where combustible materials are generated or stored. This facility has two such areas; course or fine screenings storage areas, and dewatering facilities. The dewatering process used in the facility also requires wood chips, therefore, all wood chip storage and handling areas should be fitted with fire detection devices.

The project documentation does not indicate any fire alarm system.

The National Building Code requirements for illuminated exit signage are met within the documents. The requirement for lighting to illuminate the route to exit doors is indicated by "essential lighting" on the single line diagram; however the luminaries to be powered in this manner are not indicated on the floor plans.

The last regulatory item of note is that the IRFQ-2/21/98, HMAD-3/18/98, HMAD-6/12/98, DBSPC-7/22/99, and Drawings do not include any reference to a registered professional whose discipline of practice is Electrical Engineering. Annex N indicates certification is to be provided by the firm of Saldon Engineering, and Mr. Paul Salvian P. Eng. (APEGNWT). A check with the Association of Professional Engineers, Geologists, and Geophysicists of Alberta indicates that Mr Salvian's discipline of practice is Mechanical Engineering. Mr Salvian's stamp and signature are affixed to the electrical, structural, and mechanical drawings for this project. The process and mechanical drawings for the project are unsigned.

2.3 CONTRACTUAL OBLIGATIONS

2.3.1 Civil

The site audit, or inspection, conducted by the Earth Tech (Canada) Inc. indicated that adequate culinary water service has been provided to the plant. The site audit also indicated that little or no effort has been made to grade the site immediately surrounding the plant to accommodate parking or to remove surface drainage from the overall plant site. Although there is no specific contractual obligation to provide for site drainage, it is incumbent on the designer to allow for the removal of surface runoff and adequate parking accommodations within the area immediately surrounding the physical plant. The final effort to finish all plant construction should include grading to discharge surface runoff to a point of discharge that is compatible with the overall City drainage system or to a natural drainage channel. All points of discharge should have adequate capacity to drain the overall plant site without severely flooding other areas of the City.

As a minimum, consideration should also be given to place a compacted gravel surface within designated parking areas to allow for limited light vehicle traffic in-and-out of the site during periods of wet weather.

2.3.2 Structural/Architectural

The facility is substantially complete with respect to structural and architectural disciplines. A few minor deficiencies were noted, which are
addressed below and in the cost summary.

Prior to this detailed review of the facility, a number of investigations and several reports were produced with respect to the viability of the four tank walls, both structurally and from a containment perspective. This aspect of the project will not be addressed here in detail other than to confirm that the walls have been repaired and the tanks tested for leakage. Ignoring monetary impacts of the inappropriate method of wall construction, the only real impact of these earlier contractual problems is that the volume of all of the tanks has been reduced by approximately 5% due to the added thickness of shotcrete on the wall surface.

While this report was being prepared, plans were underway by the City to conduct a simultaneous complete fill of all tanks, which is recommended as a final check on not only wall strength and containment, but also as a necessary check on foundation veracity.

The drawings provided satisfy the intent of the contract insofar as the structural design of the facility appears to be virtually complete. Structural contractual obligations also include constructing the building to the plans and specifications, and in some cases this was not done. For example, the metal deck was specified to be 75 mm deep however the contractor / builder chose to use the more readily available 38 mm deep deck, with the result that the floor for the electrical room deflected considerably during the pour. This has resulted in a cosmetic and possibly operational problem in that water will not drain from the depressions directly below several of the MCCs. The metal deck was primarily used as a form for the 5 inch concrete topping but it also has structural function because the floor slab reinforcing was called up as crack control reinforcing only. When comparing the capacity of 75 mm and 38 mm deep composite metal decks of the same gauge, we typically find little difference in their load carrying capacity after concrete set. In fact the 38 mm deck has a greater shear capacity due to the increased average depth of concrete.

The beams supporting the second floor were specified to have nelson studs at every flute or at 300 o.c. Given the deck substitution observed, it is possible that these studs were not installed. A review of the beam layout on drawing S005 (and S004) indicates that most of these beams are somewhat self or mutually bracing and therefore this is not a concern.

Notwithstanding the omitted reference to seismic design parameters, the facility appears to satisfy most contractual obligations. Exceptions to this include the following:

- Missing bracing to bottom flange of roof purlins. Note 5 on Drawing S007 indicates a need for stabilizer rods, which are used to brace the long spanning purlin bottom flanges, under negative wind pressure (uplift).
- Exterior backfill (details 1, 2, 5 and 12 on S021)
- Floor drain in Blower room (buried under housekeeping pads). The facility can function without this drain due to the proximity of the floor drain in Cake Bin Room.
- Floor deflections in the electrical room (due to use of wrong deck material)
- No floor slope in the tanks. This was shown on the drawings and allows for easier cleaning, when necessary; however the lack of slope should not affect the process.

2.3.3 Process

The Contract Documents do not reference the Request for Proposal prepared by the Owner or the proposal and revised proposal submitted to the Owner by Hill Murray in March and June 1998.

The Contract Documents provide limited information on the specific requirements of the project, such as standards for equipment. As noted in Section 2.1, there are only four process mechanical drawings included in the Contract Document. Three drawings are the fabrication drawings for the influent tank and screenings and auger tank. The fourth drawing is a layout drawing for the Fournier filter press equipment. The structural drawings included in the Contract Documents provide the proposed layout for the rest of the facility and equipment.
A list of equipment and services to be provided is included in Annex A of the design/build contract. Base design criteria are provided in Annex F and the Nunavut Board effluent criteria are provided in Annex I for reference, as the effluent criteria required by the City of Iqaluit are more stringent.

The operations and maintenance proposal for the plant, including operations and maintenance services to be provided by the Canadian Wastewater Corporation and the estimated operations and maintenance costs for the facility, are briefly outlined in a letter in Annex E.

2.3.4 Mechanical

The design does not specifically indicate how the building mechanical systems are to be controlled and monitored therefore it does not comply with the full automation requirement of plant control and monitoring. Furthermore, the heating system is provided with single heating pumps for each circuit which does not comply with the redundancy requirement of the project.

2.3.5 Electrical

The contract document makes a limited number of references to the electrical requirements for the facility. Electrical requirements are described in Annex A, Scope of Work; Annex N, Quality Control Plans; and Annex P, Preliminary drawings. Of the 11 line items listed as the electrical scope of work in Annex A, there are a number that have no further documentation. These

include; The PLC software and testing, the transformers, switchgear for the primary power service, and the lift station control panel. Relevant Codes and standards related to the electrical installation for the facility are not referenced in the contract. The IRFQ-2/21/98, HMAD-3/18/98, and HMAD-6/12/98 documents are not referenced in the DBSPC-7/22/99 and therefore this report does not discuss issues such as the lack of excess capacity in the buildings electrical service as a contractual issue.

SECTION 3.0
SITE INVESTIGATION

3.1 EQUIPMENT INVENTORIES

Code and regulatory issues relating to site work are discussed in Section 2.1.1.

3.1.1 Structural/Architectural

Foundations

- Insulated shallow foundations founded on grade. The perimeter insulation was left exposed (not backfilled) and some of it will require replacement.

- Partially tested during tank leak tests. This would represent conditions where most of the differential loads that these foundations would see may occur, however the filling of all tanks at once is still to occur.

Tanks

- Design volumes reduced by approximately 5%. Following simultaneous filling of all tanks, they should be ready for use.

Walls

- Concrete walls predominate and work as both structure and fire separation. The plastic liner (the Octaform system) will produce noxious gases if allowed to burn however this is not considered a significant risk.

- Remaining walls are typically 90 mm steel stud and drywall, in some cases load bearing for small mezzanine or storage areas. Washroom partition walls are 152 mm steel stud and drywall.

Superstructure

- Roof support is provided by load bearing walls, interior columns and beams, the latter being galvanized structural steel.

Roof Structure
Beams

- Galvanized – suitable for enclosed wastewater treatment plant use only if adequate air changes provided (galvanized steel does not stand up well to H_2S).

- Bolted connections installed.

Purlins
- Cold formed sections – cold rolled from galvanized steel sheet, generally 12 to 14 gauge. Similar comments to beams and columns apply.

- Bottom flange bracing was not installed.

Wind and Seismic Bracing
- Generally provided by concrete walls, which in some cases are full height, to bring lateral loads to grade.

- Roof bracing is provided by cables and turn-buckles. Although the turnbuckles are galvanized, the cables themselves are not, which will create maintenance problems.

Miscellaneous Structures
- Dip tanks and supports. It is not known if they have been leak tested.

Mezzanines
- Various types of structures including light gauge steel framing or galvanized grating.

Gratings and Access Covers
- Galvanized – generally located over aerobic tanks where removal required.

- Checkered plate – generally located over anoxic tanks where removal required.

Hoists
- Monorail beam provided down the spine of the building for removal of cassettes. The trolley and chain hoist are manual with an apparent capacity of 1.4 Metric Tons.

- The two small derrick swing-type hoists (for pump removal) are 230 kg capacity. The adjacent pumps weight approximately 154 kg. They are installed in a questionable location however.

Guard Rails
- Various combinations of aluminum and galv. pipe rails. They generally appear to have adequate stiffness, except for a short length between the two aerobic tanks.

Stairs
- Exterior stairs – galvanized structural steel.
- Stairs to lower floor – Steep ship type, not suitable as a fire exit (and not required as such).
- Stairs to pump area – galvanized structural steel.

3.1.2 Process

The Contract Drawings, along with Hill Murray's process mechanical drawings and the Supplier installation drawings listed in the Table in Section 2.1.3 were used to determine the extent of equipment provided on site and installed.

Almost all of the equipment shown on the drawings and P&IDs was found in the Water Reclamation Facility. There were several large storage containers outside and inside the main floor garage, which presumably contained the ZENON membrane cassettes as many of the crates were of identical weight and dimension.

Installation of equipment on-site was compared to the process drawings and P&IDs. Again, most of the piping has been installed. Equipment shown on the drawings had been installed with some minor deviations from the contract, as described in the following list:

Screening System:

- Slide gates on auger influent.
- 250 mm auger discharge lines into anoxic tank.

Anoxic Tanks

- Two mixers.
- Two Miltronics probes.
- 250 mm piping from the screening effluent chamber into the anoxic chambers
- 300 mm piping between Anoxic 1 and Aerobic 1.
- Two D.O. probes.

Aerobic Tanks

- Four sluice gate stems/operators on the pipes between the anoxic tanks and the aerobic tanks.
- Aeration grids in both aeration tanks.
- Complete installation of the aeration supply line to aeration grid.
- ZENON cartridges (including vacuum, backwash and aeration piping) x 10 cartridges.
- Instruments: four float switches, two level sensors, two D.O. probes, and two temperature sensors

Mixed Liquor Recycle System

- Mixed Liquor Recycle pumps.
- 200 mm Mixed Liquor Recycle line between aerobic 1 tank and boiler room.

Blower System

- Blowers
- One flow transmitter on the air supply line into each tank (two flow transmitters in total).
- 75 mm air supply line to sodium hypochlorite tank.
- 50 mm PVC air supply line to the acid dip tank was installed instead of a 75 mm schedule 40.

General Comments on the Piping

- Complete installation of discharge piping to effluent magnetic meter.
- Sample valves.
- Aeration piping to Zenon equipment slightly different than P&ID, but still acceptable.
- Additional valves and interconnecting piping was provided on RAS lines to allow recycling from either aerobic tank into either anoxic tank.
- Missing site glass on both air separation tanks.
- Vent piping on back pulse line does not extend above air separator.

Chemical Systems

- Drains on tanks.
- Isolation valves on hypochlorite pump discharge line.
- Some isolation valves may be missing on back pulse tank influent lines.
- Seal water piping back pulse tanks to vacuum pumps not found. Seal water taken directly from pump casing.
- Additional 50 mm line comes with isolation valves provided between backwash tanks.

Cassette Cleaning (Dip Tanks)

- The common drain line from hypochlorite and citric acid pumps should be separated.
- Complete piping into dip tanks from floor.
- Install pressure indicators on pump suction lines.
- Of significance, rusting of the dip tanks is already noticeable at the weld locations. Dip tanks would either have to be re-welded or replaced. The latter option is the more likely of the two.

Compressors

- Drain lines on air dryer and air compressor.

Sludge Dewatering System

- Ball valve on the diaphragm/pressure indicator line on the flocculator.
- A 25 mm ball valve installed instead of a 38 mm check valve from the polymer supply line into the flocculator (not sure if ball check valve installed).
- Connection of air hose lines required.

In addition, it should be noted that the actual anoxic and aeration tank dimensions are less than those indicated in the original contract documents due to structural problems and subsequent remediation encountered during construction. As such, the original design capacity has been reduced somewhat. Original design and existing dimensions for the tanks are provided in the following table. Note that the height indicated is to top of concrete.

Tank	Original Contract Dimensions	Existing Dimensions
Anoxic	2.692 m wide x 12.065 m long x4.877m high [158.4 M^3 Volume]	2.442 m wide x 11.815 m long x 4.877 m high [140 M^3 Volume]
Aerobic	5.182 m wide x 18.288 m long x 4.877 m high [462.2 M^3 Volume]	4.931 m wide x 18.038 m long x 4.877 m high [433.8 M^3 Volume]

3.1.3 Mechanical

The "Issued for Construction" mechanical HVAC drawings listed in Section 2.1.4 were used to determine the extent of equipment provided on site and status of installation. The following equipment was not installed or visible during our site review:

- Trash Auger Room Exhaust Fan EF-1
- All intake/exhaust exterior weather hoods
- Boiler system controls
- Ventilation system controls
- Heating system piping insulation
- Domestic water storage tank

3.1.4 Electrical

Equipment installed and items indicated within the project documentation that remain outstanding are listed below on a system by system basis.

Power Distribution

- Building service equipment is installed and energized.
- No provisions for utility metering within the distribution equipment.
- Owner's metering is installed and operational.
- Automatic Transfer switch is installed (No evidence that it has been tested or operated).
- Main distribution breakers installed and energized.
- 45kVA 120/208 volt transformer installed and energized.
- 120/208 distribution panel A installed and energized.
- Branch circuit wiring installed 120/208 volt devices complete (Power provided from this panel to numerous loads not indicated on the drawings).
- No H.O.A. contactors installed.
- No 120/208 volt distribution panel B installed.
- Motor control center installed as indicated on drawings and energized.
- Motor wiring, motor disconnects and terminations complete as indicated on drawings (No evidence that motors have been tested or operated).

Emergency Generator

- Generator in place.
- Room ventilation and controls incomplete.
- Battery charger not installed.
- Unit has not been run or tested.

Lighting

- Exterior lighting installed.
- Illuminated exit signage installed.
- Interior fluorescent lighting installed and energized.
- Interior High Intensity Discharge (HID) lighting installed and energized.
- Switching provisions for the above lighting complete and operational.
- Incandescent and Class I Zone II Luminaires not installed.

Communications Systems

- Building telephone system is installed and operational.

- Zenon PLC cabinet installed.
- Field wiring to Zenon PLC cabinet installed.
- Wiring identification not yet complete.
- PLC power supply DIN rail, input modules, Output modules, and communications module installed.
- Processor module not installed and not found on site.
- Panelview operator terminal remotely mounted outside of the office/lab area.
- A second PLC cabinet found located below the incoming telephone service.
- Cabinet contains a second Allen Bradley SLC 500 series PLC, associated Input modules, Output modules and communications module.
- The second PLC does not have a processor module.
- The second PLC does not have any documentation to indicate its function or purpose.

3.2 REAL PROGRESS VS CLAIMED PERCENT COMPLETE

3.2.1 Civil

As noted in Subsection 2.3.1, the site-civil aspects of the project design are significantly complete. The plant has adequate culinary water service and enough site grading has been completed to provide for surface drainage away from the constructed plant building. Site-civil work remaining would include the identification of points of discharge for all surface drainage and a more refined grading scheme to provide for direct runoff to effectively discharge to an existing storm sewer system or drainage channel adjacent to the overall plant site. Consideration may also be given to placing a gravel surface adjacent to the plant building allowing for a more durable parking surface during wet weather conditions. The site-civil work is considered 70 percent complete given the stated site deficiencies.
Code and regulatory issues relating to site work are discussed in Section 2.1.1.

3.2.2 Structural/Architectural

The structural and architectural components are substantially complete, and for the sake of quantifying the progress, it can be stated that completion is at the 99% stage.

3.2.3 Process

As discussed in the previous section, almost all of the equipment has been accounted for. Installation of equipment on-site was compared to the process drawings and P&IDs and most of

the piping has been installed. However, since commissioning of the equipment has not yet been started, the quality of the installation has not yet been verified. For example, pressure testing the piping system would provide proof that the piping has been properly installed. In general, process systems, without completing some of the minor installations and trouble shooting and commissioning stage, can be estimated at a maximum of 90 percent complete.

A list of work and estimated cost to complete, excluding remediation of any deficiencies, is presented in Section 6.0.

3.2.4 Mechanical

Based upon our site review of the status of the mechanical installation, lack of O&M material, training, test reports, asbuilts and commissioning we would estimate the progress of the mechanical trade to be no more than 75%. Boiler heating circuit circulator is not operational due to an electrical problem.

3.2.5 Electrical

Based upon our site review of the status of the electrical installation, lack of O&M material, training, test reports, as-built drawings and commissioning we would estimate the progress of the electrical trade to be no more than 80%. This level of completion is related to the execution of work indicated in the project drawings. Should the rectification of Canadian Electrical Code issues (to comply with Note 3a on drawing D-01999-E001) be considered, we would estimate the progress of the electrical trade to be no more than 60%.
Based upon our site review of the status of the controls installation, incomplete installation status of a number of measurement and control devices, the incomplete status of both of the Plant PLC systems, lack of O&M material, training, test reports, as-built drawings and commissioning we would estimate the progress of the controls to be no more than 50%.

3.3 VARIANCES FROM THE CONTRACT DOCUMENTS

3.3.1 Structural/Architectural

The following items are in variance from contract documents:

Structural Items
- Missing sag rods (purlin braces)
- Truck fill attachment onto lift station has not been installed.

Architectural Items
- Missing floor bases on upper level walls (office, washroom)
- Paint touch-up required throughout plant
- Minor damage to cabinetry should be repaired.

3.3.2 Process

Due to the problems encountered with the Octoform, the size of the anoxic and aeration tanks is less than that originally proposed. Otherwise, variances of the equipment installation compared to contract drawings are limited and are listed below:

- Aeration piping to Zenon equipment slightly different than P&ID, but still acceptable.
- Additional valves and interconnecting piping provided on RAS lines to allow recycling from either aerobic tank into either anoxic tank.
- Seal water piping flow back pulse tanks to vacuum pumps not found. Seal water taken directly from pump casing.
- Additional 50 mm line with isolation valves provided between backwash tanks.
- A 25 mm ball valve installed instead of a 38 mm check valve from the polymer supply line into the flocculator (not sure if ball check valve installed).

3.3.3 Mechanical

Primarily, the building mechanical contractor has followed the Issued for Construction drawings with the exception of the ventilation system. The air handling unit is installed in a different orientation than was depicted on the drawings and its installed location has created access problems. Filter removal, which will be required frequently, is almost impossible without damage to the filters. Coil removal will not be possible without dismantling the return/exhaust section of the unit air handling or installing an additional coil access door on the opposite side of the unit. Fresh air ductwork to the unit has been modified to suit available space and will create large static pressure losses for which the unit was not designed. Ventilation ductwork distribution has been modified, which has left some areas without ventilation or heat; the main lower vestibule is one of these spaces.

3.3.4 Electrical

There are a number of variances where the electrical installation does not conform with the contract documents. One variance is that the main service distribution equipment is rated at an interrupting capacity if 18 kAIC, making the distribution equipment more robust than what has been specified on the drawings. There are a number of items indicated on the drawings which have not been installed. These include the two contactors and 120/208 volt Panel B. The lift station piping within the structure is fitted with electric heat tracing. Heat tracing (while essential) has not been included in the electrical load calculation for the facility and may cause difficulties related to the facility's electrical service size.

3.4 CODE VARIANCES

3.4.1 Civil

Typically, national building and structural codes do not apply to civil-site construction. The construction of water lines, sanitary sewers, storm drains, and site drainage improvements are generally governed by standards established by the municipality in which the construction takes

place. Accordingly, a review of all record project design documentation has not produced reference standards for general civil-site construction. The completed civil-site work can only be assessed for standards considered to be good engineering practice. In this regard, there is no information or details shown on the project construction drawings that indicate the size of line, piping materials, or location of appurtenant fittings/valves for the existing water line. Until this information is determined, an assessment of whether the existing culinary water line was done according to good engineering practice is impossible. It is recommended that the existing water line be exposed in enough locations to determine the indicated information.
Code and regulatory issues relating to site work are discussed in Section 2.1.1.

3.4.2 Structural/Architectural

Structural-Seismic design – not indicated in structural notes. Although this is an omission, it is not considered serious for a structure of this type.

Architectural-Separation between Trash Auger room and remaining plant areas; This may not be an NBC variance however reference to NFPA requirements would suggest it is a Fire Code variance. Refer to discussions in previous subsections.

3.4.3 Process

As discussed in Section 2.2.3, the Iqaluit Sewage Treatment Plant can be divided into several functional areas according to NFPA 820 as follows:

- The coarse screening facilities
- The aeration basin.
- The sludge dewatering room

Presently, the coarse screening area does not meet structural, mechanical or electrical requirements identified in NFPA 820. Refer to the appropriate section for further comments.

Ventilation requirements in the aeration basin area are also inadequate and as such electrical requirements identified in NFPA 820 are likely deficient.

3.4.4 Mechanical

The following code variances were noted during our site investigation and are categorized by system:

Fuel Oil System
The outdoor self contained fuel oil storage tank is supported by a steel frame which is not 2 hour fire rated as per the NFC Part 4.

The fuel oil daytank has not been provided with secondary containment as per code.

Plumbing System

Floor drains serving the washroom and Main plant floor discharge directly into the Anoxic Tanks with a short tailpiece and no trap. The tailpieces should be extended below the normal water level within the Anoxic tanks to prevent vapours from migrating to the areas above.

Domestic water tank located on the mezzanine above the office and washroom must have the temperature and pressure relief valve piped to a safe discharge drain.

Heating System

Combustion air ductwork has been provided with a volume control damper and is physically too small to serve the mechanical room appliances.

Unit heater fan motors and thermostats are not suitable for area classifications.

Boiler flues are not insulated and the boiler chimney condensate drain is not piped to suitable drain.

Ventilation System

Ventilation system must be revised to suit NFPA 820 requirements. Fire dampers are required at all fire separations as per the National Fire Code (NFC).

3.4.5 Electrical

Code variances have completely been incorporated into the construction of the facility as described in the previous Documents Review Portion of this report. From a Canadian Electrical Code variance perspective the facility has been built to what is shown on the drawings and not to the HMA drawing E001, Note 3. Standard of Work, item a) which states "All the electrical work shall be installed in accordance with the Canadian Electrical Code as revised and adopted in the Northwest Territories and shall be the satisfaction of the inspector of Electrical Energy and the Electrical Engineer." There are additional Canadian Electrical Code considerations arising from the manner in which the existing construction has been completed. The most significant item is conduit supports. The facility contains vast amounts of seal tight flexible conduit that is not supported and where it is supported, the manner in which the support is provided is unacceptable. Other tech cables and PVC conduit installations do not comply with the conduit support requirements. The manner in which the facility ground is provided is not indicated in the project documentation and is now encased below the building slab. The verification process required to ensure the existing ground is acceptable may be more expensive than the installation of a new grounding system that has been reviewed and accepted by the local code authority. Code considerations related to NFPA 820 have not been addressed during construction and the Class I Zone II Luminaires, and gas detector shown on the drawings have not been installed. The requirement for a fire alarm system will need to be addressed, and by doing so the owner will gain a measure of asset protection (as well as code compliance) as the building does not require sprinklers.

3.5 DEVIATION FROM GOOD ENGINEERING PRACTICE

3.5.1 Civil

As stated in Subsection 3.4.1, there is no information or details shown on the existing project construction drawings to determine pipe sizing, piping materials, appurtenant fittings/valves, and overall trench installation to assess whether or not the existing culinary water line has been installed in accordance to any standard or code. The existing line would have to be exposed and inspected to assess the condition of the existing line and to make a determination of the overall adherence to accepted engineering standards and/or practice.

3.5.2 Structural/Architectural

- Purlin bottom flange bracing – structure is incomplete without these braces.

- Stair access, jib hoists – jib hoists poorly located for their functional use.
- Ladder access to mezzanine –poor access due to ship ladder access venders.

- Lack of galvanizing to roof bracing cables, AHU bracing – maintenance issue.
- Curbs around chemical tanks – tank leakage is uncontained, and could find its way into electrical room and/or blower room below.

- Fuel containment (refer also to mechanical) – containment lacking.

- Gratings over the cassettes probable does not extend far enough south (there is enough room for a foot to enter gap) – potential user hazard.

- Guards handrails/guards between the two aerobic tanks is too flexible (spans too far) and should be reinforced.

- Access – from Trash Auger to Fournier Press (see Process comments).

- Arch rating 3hr to screening – discussed in detail previously.

3.5.3 Process

Plant Capacity

Since flows fluctuate over the course of the day (diurnal fluctuations) and over the course of the year (seasonal fluctuations), design of any wastewater treatment plant should not be based on average day flows but rather consideration must be given to the minimum and maximum day and peak hour flows seen in the system. Maximum day and peak hour water demands are two and three times higher than the average day flows, based on information derived for the Water Treatment Plant Design Brief (Earth Tech, October 2001). For a system such as Iqaluit, water demand will closely match wastewater production. Thus, the 1998 construction year average day

flow of 1,800 m^3/day would required that the wastewater plant be designed. for a peak treatment capacity of at least 3,600 m^3/day.
The City of Iqaluit provided the average day flows in the IRFQ-2/21/98. Good engineering practice would dictate that the designer, Hill Murray, take into account the maximum day flows in designing the wastewater treatment plant. Having based the design of the wastewater treatment plant on current average day flow, the existing system is already under designed to accept even current peak flows, and no buffer or peak shaving storage is provided. Therefore, during peak flow periods, insufficient treatment and/or direct release of untreated sewage may be the result.

In addition to deviating from general plant capacity design philosophy and sizing of equipment, comments on specific equipment items and general operability of the plant are provided in the following paragraphs.

Trash Room

Grout was not provided under the screening/auger tank. Consequently, as liquid levels in the tank are likely to fluctuate, the floor of the tank will likely be subjected to metal fatigue due to flexing. The intent for disposal of the collected screenings unclear. Based on the layout of the plant, two scenarios are envisaged, as follows:

- The screenings will be collected in a bin in the screening room. To dispose of the screenings, the bin will have to be rolled through the aeration tanks area, over grating and either through the double doors near the front entrance and onto the grating outside. A removable chain would allow the bin's contents to be dumped two stories down into an awaiting container.

- Alternatively, the bin could be rolled into the sludge dewatering room and the bin's contents disposed through the roll-up garage door into a bin or truck below.

Neither option is operator friendly. In addition, both options would require that the Trash Room door be opened on a regular basis, thus allowing potentially hazardous gas to escape into the main area of the plant.

To make the collection and disposal of screening more operator friendly, it is proposed that a door be added to the outside wall so that the screenings could be dumped directly from the trash room into an outside container. Not only would this minimize the time and facilitate the operation of removing screenings from the trash room, but this would also minimize the number of times per day that the door between the trash room and main plant area must be opened.

Aeration System

The fine bubble diffusers have been sitting uncovered in the plant and the diffusers are completely covered with dust. The equipment supplier was contacted to provide comment on storage requirements. The supplier indicated that although the present diffuser storage is less than ideal, as long as the diffusers have been stored in a heated environment, protected from the elements, the diffusers should still be usable.

Zenon Membrane System

Zenon estimates that the cleaning frequency of the cartridges in each tank would be required every three to six months. However, the cleaning frequency is likely more frequent. At another membrane plant in Powell River, membrane cassettes have to be cleaned every two to three weeks. Consequently, we expect that two operators will be required two hours per day, five days a week just to clean the modules. This would significantly increase the estimated annual operating costs for the facility.

Removal of a module for cleaning consists of the following steps:

- The floor grating must be opened. Normally, temporary guardrails should be provided to ensure operator safety so that there is no risk of falling into the aeration tank during this process. None has been provided.

- The module must then be removed from the aeration tank using a manual hoist. The approximate weight of the module is 2 tons. Considering the weight of the module, an electric hoist would be easier to operate.

- No walkway space allowances have been provided to permit the operator to walk around the module, once the module has been removed from the aeration tank.

- Two operators are required to pull the module toward the dip tanks. The module will have to be carefully steered to ensure that the piping leading to the modules is not damaged.

RAS System

A hoist has been provided in the event that the RAS pumps must be removed from the aeration tank for maintenance or repair. However, actual removal of the pump and access to the pump is nearly impossible. Once the RAS pumps are hoisted out of the tank, the hoist reach only allows for the pumps to be set on the tank wall. The piping systems on either side of the tank wall prevent access to the pumps.

Piping System

Many of the actuated valves are difficult to access and an insufficient amount of isolation valves has been provided. In addition, normally consideration is given to future disassembly requirements of a piping and pumping system and flexible couplings or victaulic joints are provided to facilitate disassembly. However, no such provisions have been included in a systematic manner for this piping system. The piping material is also inconsistent and is likely defined by the limits of the various supply contracts. In general, there is very little, if any, piping or equipment support.

Pumping Systems

Removal of the pumps is made difficult for several reasons: flexible couplings to remove the pumps have not been provided; there is insufficient space to remove the pump motors, due to the mixing tank or the backwash tank; and it is difficult to provide an A-frame crane for some of the pumps due to the lack of headspace and room taken up by the HVAC system.

It is not clear how the small vacuum pumps provided for priming the system will be controlled for shut off.

Fournier Filter Press

The progressive cavity pump supplied with the Fournier equipment has been installed on the wall. Aside from the fact that such an installation is unconventional, maintenance of the pump is made difficult as there is no room to remove the pump shaft.

The sludge dewatering system includes a requirement of 16 tons of woodchips per year. Considering Iqaluit's climate, availability of woodchips is minimal. Thus woodchips would have to be shipped to Iqaluit on a yearly basis, and dry storage provided. In addition, the wood chips are to be dumped into a hopper located on the main operating level. The top of the hopper is approximately 1.5 m. No provisions to facilitate dumping the woodchips into the hopper, such as a ladder and platform for the operator, have been included.

Fournier Polymer System

The use of recycle flush water for the polymer system, current design, is not recommended since the polymer will react with constituents in the recycle water thereby increasing polymer dosing requirements.

Blowers

According to the nameplate, the Aerzen blowers are 25 hp blowers rated for 16.9 m^3/min, with a backpressure of 0.7 bar and operating at a speed of 4800 rpm. However, the drawings indicate that the blower should run at 1800 rmp. It was not obvious on site or clear from the O&M equipment whether speed reducers have been provided. The noise produced from the blowers running at 4800 rpm will require protective hearing. The blowers should be sized to run at 1800 rpm to minimize noise levels. In addition, acoustic enclosures around the blower are recommended to minimize noise levels.

Chemical Feed Systems

The citric acid and hypochlorite chemical feed systems are being stored adjacent to each other without any containment.

Laboratory

The laboratory is located above the office and washroom and is approximately 2.43 m above the operating floor level. Access is by ship's ladder. Carrying samples up the ladder will prove precarious. As a minimum, a spiral type staircase should be provided.

3.5.4 Mechanical

Fuel oil supply line from outdoor fuel oil storage tank is a gravity feed line and, based on our experience, should be increased to 50mm to provide adequate fuel supply during cold weather

conditions. The installed location of the daytank is inappropriate due to its height. It appears that when the level of the outdoor storage tank drops below 50% the achievable level of the also daytank decreases. The supply line enters the bottom of the daytank which will create problems with sludge accumulation. The main supply line is currently sloped towards the main storage tank.

3.5.5 Electrical

The project drawings are incomplete in that, good engineering practice dictates that a number of other items should be detailed and specified in the project documents. Examples of this are:

- Grounding details, including the layout of the ground, type size and location of ground rods, type and size of ground conductors.
- Circuiting of all equipment, lighting and receptacles.
- Motor control schematics and MCC elevations.
- Emergency generator load control schematics.
- Equipment installation and connection details.
- Contactor control schematics.

The project drawings do not show a sufficient level of coordination between the Hill Murray, Fournier, and Zenon packages. This is particularly evident with respect to the facilities control systems, where there is an entire PLC system installed that does not appear on any drawing or in any document.

This project was also of the magnitude that would warrant a three part specification. The specification should outline General Requirements, Product Details, Installation Execution instructions, for all major electrical and controls assemblies or systems.

Good engineering practice would dictate a different approach to the "Code Load Calculation" shown on the drawings. The recommended calculation would be performed as follows:

A = the sum of all required motor loads at 100%, except the largest motor.
B = the starting load of the largest motor.
C = the sum of all electric heating loads at 100%
D = the base building load at 25 W/m sq. (as per Table 14 C.E.C.)
Additional 25% capacity for future expansion.

Minimum service size = (A+B+C+D)+ (A+B+C+D)*.25

Inspection of the facility has revealed further deviations from good engineering practice. The Electrical room location and the installation of equipment within the room will be problematic. The electrical room location is such that it sits within a recessed containment area with all the

membrane process pumps, piping, two large back pulse tanks, and two large chemical storage tanks (show as PUMPS AREA on the drawings). Any piping or equipment failure, or maintenance activities will result in fluids on the floor in the recessed area. Should the volume of fluid exceed the capacity of the 2, 4" floor drains there will be fluid in the electrical room. This problem is made worse by the fact that the electrical equipment is mounted directly on the floor, and not on a 2" housekeeping pad. The MCC configuration is such that all MCC control wiring is routed in a chase along the bottom of the unit. It will take very little fluid in the electrical room to get this control wiring wet.

Good engineering practice would also dictate that the facility would be fitted with a conduit and wiring system that will enable access to both the equipment and all local motor disconnect switches. The sealtight flexible conduit has been run randomly from the field terminations to a local controls junction box or disconnect switch mounted on the wall behind all of the process equipment. In this installation the disconnects are inoperable, the junction boxes are inaccessible for service work and any process work that requires removal of piping will have to contend with moving the conduit. The design should have included a separate tray network for power and controls systems. The disconnect switches should be located at each pump motor for ease of operation.

The lighting levels on the second floor of the facility are acceptable at the present time, however as the facility ages and the reflectance levels of the interior surfaces diminishes the lighting levels may be poor.

The installation of the generator has not been completed in that the support equipment for the generator set is either incomplete or requires revision. The numerous problems with the fuel handling and room ventilation systems are documented in the mechanical portion of the report. The battery charging system is yet to be installed. The emergency power system will require a load management scheme be devised, approved by an engineer, and implemented in order to have the unit function.

The last item we have reviewed with respect to deviations from good engineering practice is the level of automation to be implemented in this facility. Although not well documented, a review of the installed equipment and the nature of the membrane process indicates that this was to be a highly automated facility. Implementation of any automation scheme in Iqaluit should be undertaken with care, as the skills required to troubleshoot, or repair failures of the automation system itself may not always be available on site. This may place the facility in a compromised state while knowledgeable personal or required repair parts are brought in from the south. The facility design has not included any redundancy in systems or provisions to operate the process manually.

3.6 PROPOSED/RECOMMENDED MODIFICATIONS

3.6.1 Civil

Recommended modifications for the civil-site design would include possible improvements to the existing grading and surfacing of parking or service areas immediately surrounding the existing

plant building. Depending on the extent, or quantity, of potential storm runoff from the overall plant site and capacity of the surrounding drainage system, an attempt should be made to grade the parking area surrounding the existing plant to allow for the proper collection and discharge of storm water runoff from the overall plant area. Gravel surfacing should also be placed to facilitate the general accessibility to the plant from parked vehicles and to lessen the extent of deep rutting by light vehicle traffic during wet weather conditions.

3.6.2 Structural/Architectural

These will be largely process driven. All items in 3.3.2 and 5.2 above should be addressed. In addition, exterior work is required such as backfilling and general cleanup.

3.6.3 Process

More recent population projections were presented by Earth Tech in the Water Treatment Plant Design Brief (October 2001). The year 2021 design population is estimated at 9,788 with a drinking water demand of 4,520 m^3/day and a net capacity of 9,040 m^3/day to meet maximum day demands. The peak hour demand was estimated at 13, 560 m^3/day in the report.

Trash Room

To make the collection and disposal of screening more operator friendly, it is proposed that a door be added to the outside wall so that the screenings could be dumped directly from the trash room into an outside container. Not only would this minimize the time and facilitate the operation of removing screenings from the trash room, but this would also minimize the number of times per day that the door between the trash room and main plant area is opened.

3.6.4 Mechanical

Fuel Oil System

Provide the outdoor self contained fuel oil storage tank with a certified 2 hour fire rated support as per the NFC Part 4.

Relocate the fuel oil daytank and provide secondary containment.

Increase fuel oil supply line to 50mm and slope towards daytank.

Heating System

Increase combustion air ductwork size, remove volume control damper and provide cold air trap at discharge to prevent freezing conditions in mechanical room.

Replace Unit heater fan motors and thermostats that are not suitable for area classifications.

Insulate boiler flues and pipe the boiler chimney condensate drain to suitable drain.

Insulate heating piping.
Pipe boiler PRV's to glycol storage tank.

Provide source of heat in lower floor vestibule.

Plumbing System
Extend tailpieces of floor drains serving the washroom and Main plant floor below the normal water level within the Anoxic tanks to prevent vapours from migrating to the areas above.

Pipe domestic water tank T&P relief valve to a safe discharge drain to alleviate safety hazard.

Install potable water storage tank level controls.

Ventilation System

Ventilation system must be redesigned to suit NFPA 820 requirements. Fire dampers are required at all fire separations as per the NFC of Canada. Additional ventilation equipment is required to meet requirements of NFPA 820.

Install new exhaust fan in Trash Auger room to meet the 12 air change requirement.

3.6.5 Electrical

Modifications to the buildings electrical and controls systems should be undertaken to achieve the following three goals:

- Provide an electrical distribution system that is of a correct size and configuration to ensure the operability of the facility in both normal and emergency power modes.
- Ensure the facility's electrical systems meet or exceed the code requirements discussed in this report.
- Provide electrical and controls systems that are revised to match the requirements of any modifications to the wastewater treatment process.

Should the Zenon membrane treatment system be implemented, the facility will require an additional electrical service in order to accommodate the new air handling equipment required to meet the code dictated ventilation requirements. Should the wastewater treatment process be revised to a less pumping/ blower intensive scheme, the reduced requirement for process motors will free up capacity in the existing service.

3.7 COST ESTIMATE TO COMPLETE PER EXISTING CONTRACT DOCUMENTS

The cost to bring the existing plant into operation in accordance with the initial design and specifications has been estimated at slightly over $820,000. The stated cost is completely assigned to making modifications and upgrades to structural, mechanical, electrical, and instrumentation components of the existing plant to satisfy code violations and to generally make the existing plant operable.

Four optional process schemes were also evaluated to complete the existing within a reasonable period of time. The goal of the evaluation was to apply alternative treatment processes to the existing plant design that would minimize additional construction costs, while at the same time, adhere to effluent quality standards established by the City of Iqaluit and the Nunavut Environmental Authority.

The initial option is to finish all plant construction in general accordance with the existing design. However, the existing facility including all structural features, in addition to all electrical and mechanical equipment, will have to be replaced or brought up to code according to the findings and recommendations presented in the previous sections of this report. This option will most-likely result in the quickest and most direct solution to the problem of providing acceptable treatment to the community's domestic wastewater. The completion of the plant in general conformance with the existing design will also result in a number of operational problems that need to be addressed before this option is selected.

A membrane treatment process typically results in considerable operation and maintenance costs. Based on actual data collected at other plants, annual maintenance and operational costs at the Iqaluit plant are expected to reach $900,000 per year for the first few years of operation. In addition to general plant operations, the stated cost also includes all labour, materials, and equipment to clean and replace membrane cassettes according to the manufacturer's recommendations.

Membrane processes are complex and require a significant level of training to properly operate and maintain. Given the plant's remote location, size of community, and limited access to training opportunities, there is a concern as to whether the City's public works staff can acquire and maintain the expertise needed to operate the system.

The Fournier rotary press is generally a viable equipment option to effectively dewater activated domestic sludge. However, the process requires a considerable volume of wood chips, or pellets, to operate. These chips or pellets are not available locally and will have to be shipped by sea from the lower Province. Accordingly, the cost of shipping and storing the indicated amendment material is expected to be expensive and further add to excessive operation and maintenance cost of the plant.

Based on stated design and membrane manufacturer criteria, it is apparent that the existing plant is undersized in terms of both process and hydraulic capacity. As noted in Section 2.1.3, the estimated current population base is 5,200. By applying the established per capita water use rate of 400 lpcd to the indicated population base, the immediate average day influent flow is estimated at 2.1 ML/d; which exceeds the stated plant hydraulic capacity of 1.8 ML/d. The membrane manufacturer's process design criteria guarantees the established effluent water quality of 10 mg/L for both TSS and BOD given an influent contaminate level of around 220 mg/L. The average measured influent contaminate level is 350 mg/L.

3.8 COST ESTIMATE TO COMPLETE ALTERNATE PROCESS OPTIONS

In addition to completing the existing plant's construction with the current process equipment and facilities in-place, four other options were considered that would allow for various levels of treatment and process schemes that would significantly reduce annual plant operation and maintenance costs. These options include the plant's conversion to primary treatment, an activated sludge process, a non conventional activated sludge process, and a sequence batch reactor process.

Conversion to Primary Treatment Only. The conversion to primary treatment would effectively remove the existing bioreactors, blowers, and attached aeration system from service. The aeration system would be removed from the existing bioreactors which would be converted to primary clarifiers. Primary sludge would be removed from the newly converted bioreactors by mechanical means, thickened, then pumped to a holding tank for final disposal at the City's existing landfill. This option would provide the City with a simplified and relatively inexpensive solution to the problem bringing the existing plant online within the shortest possible period of time. However, the level of treatment would not be much improved over the existing lagoon system now in service. For this option to be implemented, the Nunavut Environmental Authority would have to relax the established water quality standard established for the new plant and sea outfall.

The conversion to primary treatment would require the installation of new sludge pumps, related piping, and mechanical equipment to remove settled sludge in addition to making modifications to the existing plant to correct code violations and to improve on overall plant operations. The costs to install the indicated new equipment and related plant modifications are presented as liquid stream capital costs in the following table with similar costs associated with other process options.

Conversion to Conventional Secondary Treatment. Converting to a conventional activated sludge process would require considerable mechanical and structural modifications to the existing plant. The primary change would include a conversion from a membrane to an activated sludge removal process utilizing newly constructed secondary clarifiers. The new clarifiers would have to be constructed outside the existing plant building; which, due to extreme cold winter temperatures, would need to be covered or place inside a new building. It is anticipated that the entire tankage (anoxic basins plus the existing bioreactors) of the existing plant would have to utilized as aeration basins in the activated sludge conversion. The effluent quality with this option is expected to meet and exceed the newly established water quality standard for a localized sea outfall. The stated treatment performance is based on the need for a minimum 15 day sludge retention time (SRT) in the newly constructed clarifiers. The costs associated with the design and construction of the new secondary clarifiers has been estimated at $3.3 million as shown on the following cost summary table.

Conversion to Limited Conventional Treatment with Filtration. A less conventional process can be incorporated into the existing plant effectively eliminating the need for secondary clarification as described for the previous conventional activated sludge option. The existing anoxic basins and bioreactors could be operated in series as opposed to the current, or as designed, parallel flow scheme. The series operation of the existing process tanks, or basins, would allow for an increase in SRT and a marked improvement with sludge removal efficiency

and the overall treatment process. Sludge removal would be accomplished by utilizing Kaldnes or Evirosim filtration media at the terminal point of flow within the last bioreactor. This is a simplified option requiring significant mechanical and structural modifications to the existing plant. The option proposes the use of filtration media which typically requires more labour and related expenses to operate and maintain. The effluent quality is expected to meet and exceed established standards, closely approximating the previous activated sludge process option. The costs associated with the design and construction of the described conversion to limited secondary filtration has been estimated at $3.5 million as shown on the following cost summary table.

Conversion to Sequencing Batch Reactor. Incorporating a sequencing batch reactor process-approach to the existing layout of anoxic and aerated bioreactor tanks is a viable option to improve the plant's level of treatment. However, this option would require the construction of a second set of bioreactors with the same volume and general configuration as found in the existing plant. The operation of a time sequencing versus a continuous flow plant is significantly more complex requiring additional training of operational personnel. This option, like the conventional activated sludge option, will require that the proposed additional bioractor(s) to be covered or enclosed within a new building. Effluent quality is expected to meet and exceed established standards for a sea outfall. The costs associated with the design and construction of the new bioreactors has been estimated at $4.0 million as shown on the following cost summary table.

The projected costs to operate, maintain, and complete the various construction requirements that can be associated with the process alternatives discussed above are summarized in the following table:

Option	EPCC[1]	LSCC[2]	SMCC[3]	AO&M[4]	15 YPW[5]
Operate Existing Plant	$820,000	NA	$300,000	$900,000	$10,000,000
Primary Treatment	$500,000	$250,000	$300,000	$200,000	$3,000,000
Conventional AS	$710,000	$3,300,000	$300,000	$300,000	$7,200,000
Non-Conventional AS	$634,000	$3,500,000	$300,000	$350,000	$7,800,000
Sequential Batch Reactor	$750,000	$4,000,000	$300,000	$300,000	$8,000,000

Table Notes:

1. EPCC: Capital costs to bring the existing plant to code and operational as recommended for the stated plant option.

2. LSCC: Liquid stream capital costs including all concrete structures, pumping and piping systems, aeration equipment, mechanical equipment, electrical and instrumentation systems, etc. needed to modify the existing plant and implement the process scheme associated with the stated option.

3. SMCC: Solids management capital costs including sludge thickening and/or dewatering equipment and all related piping and electrical control systems for all options.

4. AO&M: Annual operations and maintenance costs for all options.

5. 15 YPW: Present worth of all costs for a 15 year project life at a 7.0 percent discount rate.

6. The costs shown for solids management improvements include the replacement of the Fournier Rotary Press with a thickening centrifuge. The justification for the recommended replacement is due to the anticipated excessive costs and general unavailability of wood chips or pellets to operate the Fourier press per the manufacturer's recommendations.

3.9 RECOMMENDATIONS AND SUMMARY OF FINDINGS

The City of Iqaluit has to date invested an estimated $7.0 million to design and construct a viable and cost effective sewer treatment plant to conform with more stringent effluent discharge requirements as established by the Nunavut Environmental Authority. Unfortunately, construction of the plant was ordered to a stop due to numerous construction code violations, questionable engineering, poor selection of process equipment, impractical layout of plant piping and mechanical equipment, and various concerns regarding the expected costs to operate the facility over an extended period of time.

The objective, or goal, of work presented in this report was to assess the condition of the existing facility and carefully evaluate feasible options to put the plant in service at the earliest possible date. With the exception of converting the existing plant to primary treatment, the various process and construction options presented above will allow for effluent quality in full conformity with established water quality standards.

The general scope of this report requires the completion of a comprehensive plant audit to establish all deficiencies in terms of applicable building/construction code violations to further assess the scope of all additional work to bring the plant operational according to original performance criteria. This is interpreted as allowing for a completed treatment facility with an average day hydraulic capacity of 1.8 Ml/d with the capability to reduce regulated contaminants contained in raw domestic sanitary sewage to meet effluent water quality standards established by the Nunavut Water Board.

The problem with the stated interpretation of the report scope of work is that 1.8 Ml/d will, in all likelihood, be less than adequate to service the City's population base by the time the existing plant is brought up to code in accordance with the recommendations made in this report. Therefore, additional consideration must be given to address the issue of plant requirements to meet projected growth over a reasonable planning period. To address this issue, and from various discussions with City officials, it has been tentatively agreed to that the City needs to pursue a phased construction approach to bringing the existing plant on-line over an extended period of time. The phased approach would allow the City to fund the additional plant construction over several years as opposed to spending a considerable amount of money to finance a much larger project within the immediate future.

The remaining discussions will attempt to outline a feasible program to phase the reconstruction of the existing wastewater treatment plant. However, a number of basic and critical, design parameters will have to be assessed based on very limited data and information. The contaminant levels of existing sanitary sewage has been estimated at 200 mg/l to 300 mg/l for both BOD_5 and TSS. The accuracy of this data is questionable due to the limited number of samples taken to arrive at the stated range of concentrations. Per capita indoor water demand has been estimated at between 200 lpcd to nearly 600 lpcd according to historical records taken at the Iqaluit Water

Treatment Plant from 1978 to 2000. The range of the stated basic design parameters is considerable and will have a significant impact on the scope of work, and related cost, to reconstruct the existing wastewater treatment facility. For the purpose of making a reconnaissance level effort to outline a possible phased approach to reconstructing the existing plant, it is assumed that BOD_5 and TSS contaminant levels will not exceed the 300 mg/l level and average day indoor water demand will not exceed 400 lpcd. It is further assumed that a conventional secondary activated sludge process will be incorporated into the design and operation of the final treatment facility.

Phase 1 of an extended reconstruction project would include all work to bring the existing plant up to code for all structural, mechanical, electrical, and instrumentation deficiencies as identified in this report. The scope of work would also a conversion of the existing two bioreactors to aeration basins compatible with a conventional activated sludge treatment process. The completed Phase 1 work, as described, would allow for a hydraulic capacity of 1.60 Ml/d through the entire plant including the converted conventional activated sludge aeration basins. It must be noted that the completion of this reconstruction Phase would not allow for the treatment of wastewater influent. The plant will not be capable of treating raw sanitary sewage until secondary clarifiers have been constructed and included in the overall liquid treatment train in addition to the newly converted aeration basins. The plant would remain out-of-service until the completion of Phase 2. Engineering and construction costs to complete Phase 1 is estimated at $1.01 million.

Phase 2 would include the design and construction of one 12.0 metre secondary clarifier with a hydraulic capacity of 1.60 Ml/d. The new clarifier would match the hydraulic capacity of the aeration basins completed in Phase 1 of the overall reconstruction project and would allow the plant to go on-line for the first time. The Phase 2 plant would have the capability to treat raw sanitary sewage to the standards established by the Nunavut Water Board for a population base of 4,000 full time residences. Engineering and construction costs to complete Phase 2 is estimated at $3.0 million. The stated cost does not include an insulted building to totally enclose the new clarifiers. Freeze protection will be provided by removable-insulted covers to be placed over the newly constructed clarifier during cold weather operations.

Phase 3 would include the design and construction of two additional aeration basins (same geometry and hydraulic characteristics as the basins converted in Phase 1). The construction of the new aeration basins would add an additional 1.60 Ml/d for a total of 3.20 Ml/d of liquid stream hydraulic capacity through the aeration phase of the overall process scheme. However, the plant would only have a treatment capacity of 1.60 Ml/d due to the existence of only one 12.0 metre secondary clarifier. Engineering and construction costs to complete Phase 3 is estimated at $1.6 million including insulted basin covers for cold weather operations.

Phase 4 would include the design and construction of a final 12.0 metre secondary clarifier. The plant would have a total hydraulic capacity of 3.2 Ml/d allowing for the treatment of raw domestic sewage from a population base of 8,000 residences. Engineering and construction costs to complete Phase 4 is estimated at an additional $3.0 million including insulated covers for cold weather operations.

Making a few basic assumptions, the completion of all four phases of the reconstruction project would allow for adequate raw sewage treatment to the planning year of 2012. The basic assumptions would include 1) the population growth rate for Iqaluit averages 3.7 percent over the

foreseeable future, 2) raw sewage contaminant levels remain at or below current levels over the stated planning period, and 3) the average per capita indoor water demand stabilizes at or below 400 lpcd. Assuming that each of the described project phases can be completed within a 12 month time frame starting in 2003, the final plant can be on-line by late 2006 allowing for an additional 6 years of operation without further expansions or modifications to the existing facility. This time frame would also allow for the City to acquire better operational data/information to more accurately assess the need and timing of future plant expansions.

GLOSSARY OF TERMS/ACRONYMS

ACI 350:	American Concrete Institute Standard for Hydraulic Structures.
BOD_5:	Five day Biological Oxygen Demand for influent/effluent contaminants.
CAD:	Computer Aided Design.
CEC:	Canadian Electrical Code.
CGSL:	The consulting firm of CH2M Gore & Storrie Limited.
DBSPC-7/22/99:	Design-Build Stipulated Price Contract for the Municipality of Iqaluit Water Reclamation Facility as prepared by Hill, Murray & Associates dated July 22, 1999.
DO:	Dissolved Oxygen concentrations.
ETC:	Earth Tech Canada, Inc.
HDD:	High Density Discharge.
HMA:	The consulting firm of Hill, Murray & Associates.
HMAP-3/18/98:	Response to Request for Qualifications and Proposals for Sewage Treatment Options for the Municipality of Iqaluit as prepared by Hill, Murray & Associates dated March 19, 1998.
HMAP-6/12/98:	Revised Proposal for Fully Integrated Sewage Treatment Facility for the Municipality of Iqaluit as prepared by Hill, Murray & Associates dated June 12, 1998.
HVAC:	Heating, Ventilation, and Air Conditioning.
IP:	Input Program.
IRFQ-1/21/98:	Request for Qualifications and Proposals for Sewage Treatment Options as prepared by the Municipality of Iqaluit dated January 21, 1998.
MCC:	Motor Control Center.
NBC:	National Building Code-1995.
NFPA:	National Fire Protection Association.
NPC:	Industrial Health and Safety Standards and Canadian Plumbing Code.
NWT:	Northwest Territories.
P&ID:	Process and Instrumentation Diagram.
PLC:	Process Logic Control.
RAS:	Return Activated Sludge.

SMART:	Unspecified proprietary term used for system control software as proposed by Hill, Murray & Associates. Actual definition of the acronym not given in the design or contract documentation.
SRT:	Sludge Retention Time.
TSS:	Total Suspended Solids.
WAS:	Waste Activated Sludge.

04 April 2001

Our File: Iqaluit

Via Facsimile (867-979-5910)

Matthew Hough
Director of Engineering and Public Works
Municipality of Iqaluit
P.O. Box 460
Iqaluit, NU
X0A 0H0

Re: Iqaluit Work Plan

Dear Matthew:

Thank you for the copies of the tender documents for review. In response to your specific queries, I have provided the following information in as much detail as possible.

The Iqaluit WRF project has been significantly delayed for a number of reasons, including: the failure of the tanks to meet the hydrostatic specifications; the acceptance and subsequent rejection of Change Order #2; and the time taken by the Municipality and its consultants to evaluate various repair options. While Quigg Construction and its consultants and suppliers would appear to be responsible for the initial failure of the tanks, the impact on the schedule has been exacerbated by the time taken by the Municipality to evaluate various repair options. Moreover, the repair specifications that were ultimately developed far exceed what in our view is reasonably required. In any event, the costs associated with the delays to this project caused by both Quigg and the Municipality have made it impossible for us to complete the commissioning phase without additional compensation.

Finances

As you are aware, the hydrostatic failure of the tanks has resulted in significant delays in payment and significant costs for Hill-Murray. As a result, we have not been able to pay many of the sub-contractors for the work performed at the site. All of these subcontractors should be paid directly from monies remaining in the project funds, and we understand that in fact some contractors may have already been paid.

The outstanding contract amount, net of GST, is $579,600. This is exclusive of any delay claims or soft costs which I estimate in the order of $125,000 to $175,000. A detailed list of outstanding third-party HM/CWC payables is provided as attached. The outstanding payables from our end is $600,778.94, the delta ($21,778.94) representing some of the costs associated with mobilization/demobilization charges for the stalled commissioning process, legal costs, and the aborted Change Order #2, originally approved by Denis Bedard.

From the amounts listed, Quigg Construction has outstanding payables, as we understand, in the order of $204,000, which includes:

Clean Seal	$51,360.00 (Approved Change Order #2)
Hill Murray Mob/Demob	$20,932.42
BBS – Quigg Deficiencies	$50,000.00
BBS	$79,657.53
Nunavut Constructors	$ 2,573.00

Outstanding Items Construction Items

On completion of the repair to the tanks, the plant can be moved to the set-to-work/wet-testing phase, and then to the commissioning phase. The Zenon system commissioning has been fully paid, and indeed their commissioning staffs are currently attempting to schedule the start-up for the summer period (subject to the successful completion of the tank repairs). All the ancillary systems (HVAC etc) have already been commissioned by HM/CWC. There are some issues that need to be addressed, and I provide the following information in as much detail as possible.

System	Requirements
Influent Dump Station	The proposed diversion to the lagoons has never been approved, and as such no materials have been ordered. There is presently a cement plug installed in the gravity line to the dump station, and an inflatable pig installed on the downstream side of the new valve. Removal of this plug assembly is required prior to allowing raw sewage into the plant. The new lift station has been supplied with a 4" steel and victaulic line to facilitate dumping of raw sewage. A 4" victaulic nipple (4" MIPT x groove), one 400D Kamlock (4" FIPT x female kamlock) and a 4" #31 victaulic coupling are required to complete the dumping assembly. The 3" pipe nipple welded to the inlet of the strainer box needs to be changed to 4".
Lift Station	The diverter valve has been installed, but as yet no actuator has been supplied (part of unapproved change order) 2 runs of 150ft ¼" OD air tubing is required to actuate this proposed valve. A ¾" kitec conduit has been installed from the mechanical room for this purpose. The required compression fittings for this tubing are on site. The tubing is not. The solenoid valve located on the wall behind then staircase requires a change to the actuator coil. The original supply was 230V (Numatics Model L238A4520 coil 237-507B), and this needs to be changed to a 115V coil.
Trash Room	The trash augers have been bumped and verified. The recycled water supply to the augers requires a ¾" Boshart Industries Valve with FIPT ends.
Anoxic Mixers, Sludge Recirculation Pumps	These units require lifting cables to be fitted (combined requirement of 150ft 3/16" stainless steel wire rope. Clamps and thimbles are also required. The mixers are required to be placed at the height specified in the drawings with the appropriate angle offset.
Aerobic Tanks	The aerator assemblies have been removed for the tank repair. Depending on any elevation changes to the floor of the tank, it may be necessary to change the downcomer height to accommodate. Similarly, if there is substantial changes to the width or length of the tank, this may affect the lateral assemblies. This material is 4" PVC sewer/drain pipe, and it would be appropriate to have on hand several 4" PVC caps and couplings as a contingency plan. Sludge Recirculation Pumps have been removed for the tank repair. The lifting davit in the trash room is used to remove/replace these units. The pedestal bases are installed for both pumps and one lifting cable needs to be installed on one pump (the other exists).
Zenon	Alignment of the permeate pumps has not been completed. This is required prior to wet testing.
Soaking Tank Recirc System	Both pump systems with NaOCl, Citric Acid and heating system are complete. The new suction header and discharge terminations are also complete. A priming assembly has been installed (3-way valve). During normal operation, the

System	Requirements
	pumps will draw through the soaking cassette and return to the soak tank. To prime, move the ball tot he alternate position. This pi[ping is connected to vacuum pumps P-36 A & B and will evacuate the air within the suction piping, pump and hoses. Once the air is removed, move the 3-way valve to the original position prior to energizing pump.
Cassette modifications	In order to accommodate the depth of the soaking tank, PVC tees are to be installed on the Zenon cassette header at the top of the membranes. These PVC fittings, hoses and cam-lock fittings are on site.
Sludge Pressing Module	The Fournier press requires one ¾" plastic line connection to the flocculator. This will require the supply of one ¾" FIPT/FIPT PVC coupling. The flexible chute for cake to the lower floor has not been supplied, but will be required. 1 x 6" ABS cap and 1 x 4" ABS cap are required to close off floor can in the press room. A 1.5 yd3 self-tilting trash bin is on site. The intent is to have this placed under the Fournier chute. Once full, the bin gets moved under the hoist and lifted (lifting straps and eye-bolts are on-site but need to be installed). The truck is backed under the bin, and the bin lowered for transport to the disposal site.
Emergency Diesel Generator	A 24V-trickle battery charger is required. The generator has been fired, and has completed an ABT test. The full load trials of the generator have not been completed.
HVAC	Circulation to all unit heaters through the boilers has been completed. Both boilers have been fired. Not that the thermostats on the boilers have not been staggered, rather, it is a manual function to switch between the boilers (say, every 2 weeks) 2 x 1/8" MIPT Maid o' Mist air release valves are required to replace leaking units on the boilers. Ventilation ducting was near complete for the air-handling unit. This unit has not been run. Two actuators from silent air are still owing. There is some shipping damage (noted via fluorescent orange paint). The damage should be repaired prior to commissioning of these units. Exhaust fan and ducting for the trash room has not been completed. An exhaust fan has yet to be ordered. Insulation for the 2" line to the air-handling unit is partially complete. 160 ft of insulation is required. There is one in-line circulating heating pump (Grundfos UPS 40-160 115V 60 Hz) that causes the circuit breaker to trip after approximately 30 seconds of operation. This pump needs to be replaced. This is a warranty item with Westburne Victoria. Currently the main circulating pump is sufficient to maintain the appropriate circulation in the heating system.
Office/Washroom/Lab	Office counter top and painting complete. Phone jack is energized. Baseboards are required (extruded plastic) – 65 ft plus two molded corners. Washroom shower and sink are operational. Presently, the P-trap in the sink has been disconnected until the anoxic tanks are in operation (system drains to these tanks). The shower drain is temporarily connected to the outside. This will need to be disconnected PRIOR TO THE COMMISSIONING OF ANOXIC TANK #1. Once this tank is full, there will be no access to this temporary line. The potable water system is operational. In order to empty the tank, the low-level float was raised and tied. This float must be released for normal operation of the system. The interior lift station has been tested but is currently shut down. The 3" ABS transport line (located at eye level on the mezzanine deck above the boilers) has been disconnected. A temporary shower drain runs through this line to the outside. A FEMCO rubber coupling is there to allow for reconnection.

System	Requirements
Control	For commissioning, temporary wiring has been installed as follows, to bypass the PLC: A single float switch in the lift station will activate one pump only and start the trash augers (and the associated washwater solenoids – note that the backpulse tanks supply this water). Water from the hydrostatic test should be used to fill the recycle water system (this system is currently bypassed to allow one pump to run from a pressure switch indication) On completion of the set-to-work and wet testing, and commissioning this temporary wiring is to be reconnected to the PLC (this wiring has been labeled at the panel for reconnection to the terminal block)
General	Final grading needs to be completed.

Set-to-Work/Wet testing

For hydrostatic testing, the lay-flat hose needs to be connected from the hydrant adjacent the Mariner Lodge to the newly installed AV. The downstream side of the piping will need to have the pig removed, which will allow water into the lift station. The temporary float switch will allow the pump and trash auger to energize.

For wet testing, the effluent discharge upstream of the flow meter has been disconnected and turned 180 degrees. A flange and an elbow allow for proper orientation of the flow back to the MBR. On completion of wet testing, this assembly needs to be returned to its original position.

Seeding and Commissioning

For seeding, the plan is to provide trucked sewage to the new lift station, feed the reactor in batches, aerate and operate in a similar fashion to an SBR until a viable biomass is obtained. Nitrifying and BOD reduction organisms in a dried state are on-site to assist this process. Zenon has the responsibility for commissioning of the membrane and biological systems.

Conclusion

I trust the foregoing answers your specific questions in sufficient detail. Should you have any further questions, please feel free to contact me at your convenience.

Sincerely,

HILL, MURRAY & ASSOCIATES, INC.

Trevor T. Hill, P.Eng.
President

HM/CWC Third Party Payables

Item	HM Amount	CWC Amount	Total	Net of GST
Aco Containers	3,072.29	-	3,072.29	2,871.30
Agra	3,260.97	-	3,260.97	3,047.64
Air Canada Cargo	1,798.27	-	1,798.27	1,680.63
Baffin Building Systems	152,234.76	-	152,234.76	142,275.48
Baffin Energy Systems	7,442.91	-	7,442.91	6,955.99
Bartle & Gibsons	5,487.53	-	5,487.53	5,128.53
Canadian Airlines	27,578.50	-	27,578.50	25,774.30
Canadian Freightways	1,409.05	-	1,409.05	1,316.87
Candrill Limited	27,714.82	-	27,714.82	25,901.70
Columbia Fire & Safety	1,864.05	-	1,864.05	1,742.10
Columbia Valve & Fitting	-	186.98	186.98	174.75
Bradley Air Services	41,565.13	815.50	42,380.63	39,608.07
Eastern Arctic TV	35.90	-	35.90	33.55
Emco Ltd	583.34	-	583.34	545.18
F&Y Engineering Concepts	1,605.00	-	1,605.00	1,500.00
F3 Consultants	-	299.60	299.60	280.00
Factotum Steel	865.27	-	865.27	808.66
Hansen Trucking	3,031.51	-	3,031.51	2,833.19
Inmate welfare fund	770.40	-	770.40	720.00
Millenium	7,215.51	-	7,215.51	6,743.47
Municipality of Iqaluit	2,865.23	-	2,865.23	2,677.79
Northwest Power	11,516.33	-	11,516.33	10,762.93
Norwest Tel	2,706.23	-	2,706.23	2,529.19
Norwheels Enterprises	2,961.23	-	2,961.23	2,767.50
OMM	6,857.13	-	6,857.13	6,408.53
Quigg Construction	290,813.90	-	290,813.90	271,788.69

Item	HM Amount	CWC Amount	Total	Net of GST
Receiver General	10,272.05	-	10,272.05	9,600.05
Silent Aire Mfg Inc	18,832.00	-	18,832.00	17,600.00
Uqsuq Corporation	4,202.73	-	4,202.73	3,927.79
Western Engineering	2,969.35	-	2,969.35	2,775.09
Totals	648,572.00	1,302.08	649,874.08	600,778.97

NUNATSIAQ NEWS

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June 18, 1999

Sewage plantfaces setback

SEAN MCKIBBON
Nunatsiaq News

IQALUIT — A shortage of money may force the Town of Iqaluit to postpone completion of a proposed new sewage treatment plant by one year.

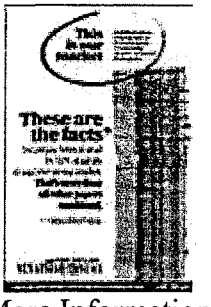
The $1.8 million the Nunavut Government gave Iqaluit for the project in this year's budget won't cover the plant's $7 million price tag.

Nunavut's deputy minister of Community Government, Mike Ferris told Iqaluit Town Council this week the town may have to build part of the plant now and wait for more funds from the territory next year.

'There has to be a recognition there are less dollars than in the past," said Ferris.

Town officials say the plant is a must because of tough new environmental laws that govern the type of waste water that can be pumped into the ocean.

If the plant is not built the town could be charged with violating any number of environmental laws and face heavy fines, Town Engineer Denis Bedard



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said.

But Ferris told the council Tuesday night that regulatory bodies such as the Department of Fisheries and Oceans and the Nunavut Water Board may be lenient with the town if they can see progress is being made with the treatment plant.

Bedard said the Town will receive $800,000 in infrastructure funding from the federal government and the town plans kick in $500,000 of in-kind donations of labor and services to the contractor, but that still leaves a short-fall.

The other option being explored is for the Territory to borrow money — between $2.7 and $3.1 million — to bridge that shortfall and finish the project, Ferris said.

While the town hasn't signed any large over-arching contract for the project yet, it has picked the company it wants (Hill Murray and Associates) and has spent about $1.5 million on smaller "service contracts" for the plant's design, and building materials. But Hill Murray is getting impatient and wants to begin construction this summer.

Ferris said his department along with Hill Murray had been talking with Toronto Dominion which handles Hill Murray's asset management about getting the loan.

He said a decision should be made this week on which option the government will take.

Classifieds

Poll

What should become the new Nunavut government's most urgent priority?

- Economic development and job creation
- Housing and homelessness
- Crime, corrections and the justice system
- Inuit language and culture
- Education and training
- Mental health services and suicide

Vote

This online poll is provided solely for the entertainment of our readers. It reflects the opinions of only those Internet users who have chosen to participate and its results do not necessarily represent the opinions of the public as a whole or the publishers

and staff of
Nunatsiaq News.

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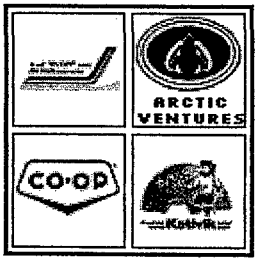


May 12, 2000

New Iqaluit sewage plant still isn't working as planned

MICHAELA RODRIGUE
Nunatsiaq News

IQALUIT — Iqaluit's new $7.1-million sewage plant is now three months overdue and as many as four months away from completion after springing several leaks within its concrete tank system.

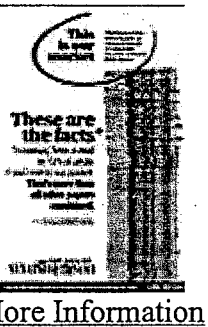
Iqaluit officials discovered leaks in the concrete walls of some of the system's tanks after the tanks were filled with water during a test early this year.

"There is a delay in the project. We are working with the contractor to resolve the issues," said Paul Fraser, Iqaluit's acting senior administrative officer.

Fraser said he expects any extra costs to be covered by the contractor's bond or "insurance." The $7.1-million sewage treatment system filters human waste through a series of membranes and is supposed to replace Iqaluit's smelly sewage lagoon.

The cost of the plant is split between the Town of Iqaluit and the Nunavut government. In a water licence issued late last year, the Nunavut Water Board imposed a deadline of Feb. 15 for the system to be up and running ó three months ago.

Fraser was scheduled to give a report to town



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council on the project after Nunatsiaq News press-time. But he confirmed there are problems with the "integrity" of the system's walls.

"We have a new plan for the remediation of the leaks that existed," Fraser said.

The Town commissioned an independent study of the plant in March, which suggests that the plant be repared.

Last week the town sent the report to the project's contractors, Hill Murray, and is now awaiting a response.

"Hill Murray are looking at it right now and they're going to advise us on how they're going to address those issues," Fraser said. Fraser would not describe the technical problems that have stalled the project.

The structural study cost $15,000 but was covered by the Nunavut government, said Coun. Matthew Spence, chair of Iqaluit's development, works and public safety committee.

The leaks, Spence said, were created by large pieces of gravel that were trapped on top of plastic interlacing when poured into molds used to form the tank's walls.

"When they poured the concrete, some of the granular sources were large and couldn't fit, would get lodged between these criss-cross plastic pieces and would leave an air pocket above the stone," Spence said.

"Originally we thought it was just a leak. It turned out that because of the voids in the walls, there is a need to increase the thickness of the walls to improve the structural integrity."

Spence says the holes now need to be filled and the walls strengthened, but he said the tools needed are

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expensive to fly in and may have to wait for the sealift.

Both Fraser and Spence said they're confident the problem can be fixed

"This is a problem, no doubt about it. And it's disappointing that we've got a problem, but it's not necessarily unusual," Spence said.

"This contract is still alive and well," Fraser stressed.

Both Fraser and Spence said any extra cost to repair the system should be paid by the contractor.

"I'm not worried that the town is going to incur anymore cost at this point," Spence said.

While the project hasn't been completed, Spence was unsure how far the company's responsibility goes.

Meanwhile, the municipality is already in breach of one of the terms of its water licence, and once the leaks are repaired the system's membrane still has to be installed.

Spence said the Town has written to the water board to notify it of the delay and the Town's actions to correct the problems.

Iqaluit's one-year water licence comes up for review this fall.

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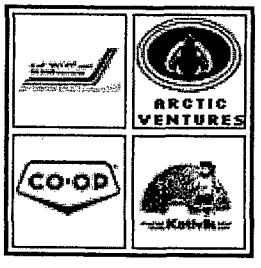


July 21, 2000

Iqaluit Town administrators ignored advice on faulty new sewage plant

Iqaluit administrators were told last fall that Iqaluit's new $7.1 million sewage treatment plant was flawed. But they never brought the information to Town Council.

SEAN McKIBBON
Nunatsiaq News

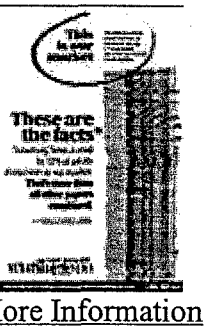
IQALUIT — Some Iqaluit town councillors say they were left out of the loop when the Town's administration made two payments to a contractor for a new sewage treatment plant that still isn't operational.

Two payments were made to engineering firm Hill Murray in November and December, against the advice of another engineering firm that the Town hired to oversee the project.

In September of 1999, engineering firm Dillon Consulting Ltd. raised concerns over the structural integrity of the building and recommended the Town seek legal advice.

But that recommendation never made it to council.

"Council may not have been fully apprised of those concerns," said Paul Fraser, the Town's former acting senior administrative officer, this week.



The hint of a break in communication between the council and administration was first revealed in a management letter written to the town by Philip Clark, a partner with the accounting firm MacKay Landau, who audited the town's 1999 finances.

"The town engaged a third party engineer in Sept. 1999 to oversee the project. Against the advice of the consulting engineer, progress claims were paid to the contractor in November and December," the management letter states.

Clark wrote that the Town should document the reasons why the consultant's advice was overridden by the administration. He said that administration staff told MacKay Landau that they had been relying on bonding documents to protect the town if the third party engineer's concerns proved to be "significant."

Fraser said the fact that council was not made aware of the engineer's misgivings is not necessarily abnormal.

"That may, from municipality to municipality, in different municipalities, may be not that un-ordinary in the sense that it would be an administrative issue where you'd have consultants providing administration with information and not all that specific information would be shared," said Fraser.

He said that council has to trust administration to conduct the day-to-day business of the municipality.

Frustrated councillors

But Coun. Matthew Spence expressed frustration at being kept in the dark.

"The reason I recommended that the Town hire an engineering firm to project manage this was because I felt they would give council better advice

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in terms of scrutinizing the project, having the time to actually manage it properly," Spence said.

"They did that. They were hired by council and yet administration, when this third party engineering firm made some recommendations, administration didn't accept them. In fact they didn't even bring them to council. That's extremely frustrating."

Spence says that he has never seen correspondence from the third party engineering firm.

"How are we supposed to make good decisions?" he asked.

Spence isn't alone in his frustration. Coun. Linda Gunn said that a councilor who gets too involved in the work of administration is liable to be branded a "micro-manager."

"Unless you are made aware that there is any reason to ask a question of the senior manager or mayor, or if you address it through committee, there's nothing you can do," Gunn said. She said the concerns of the third party engineering firm came as a surprise to council.

One-page contract

Coun. John Matthews said the payment of funds already budgeted for on a contract that had already been approved by council normally wouldn't go back to council, but he said the concerns raised by Dillon Consulting should have been brought before a committee of council at the very least.

"If they weren't going to follow the advice of the engineers then it probably should have come before us — unless they had compelling reasons to override the third party," said Matthews.

The letter also reveals that some of the work on the $7 million sewage treatment plant was contracted using a one-page service contract.

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A service contract states the dollar value of the work to be performed and has a brief description of the work to be done. The management letter from MacKay Landau said that one such service contract, for $2,871,164.35, was issued with the description "completion of the Iqaluit sewage facility" written on it, and no other detail.

The management letter says that the one-page contracts put the municipality in a precarious position. "The Town is placing itself at financial risk if there is a contract dispute and the town needs to rely on the contract to enforce performance," the letter states.

Now there is a contract dispute. According to Coun. Matthew Spence the Town has hired lawyer Joe Dillon to help sort out who is responsible for fixing the sewage treatment plant's structural problems.

Gag order

"The problem I have right now is that there is a gag order in the contract. We signed a contract that says we're not allowed to talk about this publicly," he said.

"This is a problem with the building, the construction of the building. We're not at the stage really where we're talking about their technology because we don't know. We're not going to know until the tanks can actually be filled with either water or sewage and we're not going to be able to do that until we fix these walls," said Spence.

"We're hoping that these guys are looking at a cost-effective way of bringing the materials in on the boat and that part of the delay is because they need to bring it up on the boat and they can get busy fixing it in September."

Fraser said the plant would be operational by the end of the year.

Iqaluit's mayor Jimmy Kilabuk refused to comment on the fiasco, citing the confidentiality clause in the main contract, which he says prevents him or other councilors from speaking publicly about the sewage treatment plant project.

"They could take us to court," Kilabuk said, through an interpreter.

But when he was told that questions would not be about Hill Murray's performance, but about why the town paid the company after Dillon Consulting told the Town not to, the mayor said, "I don't want to be interviewed right now."

He said he would be available for interviews on the topic in August.

Pressure from water board

Fraser said that there was a significant amount of pressure to get the sewage treatment plant operational and some of the accounting problems identified in the management letter were a result of that pressure.

"There was some perceived necessity for fast-tracking this," said Fraser.

The town was issued a water licence last year by the Nunavut Water Board that stipulated the sewage treatment plant should be operational by Feb. 15.

Spence said he hopes that the water board members understand that the town is having problems with the treatment plant and will grant the municipality some leeway in meeting the conditions of the licence.

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Sewage plant up the creek

Town presses for repair on $7.1 million project

Jorge Barrera
Northern News Services

Iqaluit (Aug 07/00) - It's an unremarkable building beside the sewage lagoon, off the road to the dump.

It certainly doesn't look like a modern $7.1 million sewage treatment plant that's been sitting idle for almost a year.

The reason? The cement tanks leak.

The Town of Iqaluit has spent most of its budgeted $7.1 million on the plant -- except for $590,000 -- the amount leftover to fix the problem.

But town manager Rick Butler says he isn't worried. The town has taken the case to the bonding company which insured the project and he expects the necessary repairs will be done.

"We have a pretty good case," said Butler. "Nothing in life is guaranteed, but I think it will work out in our favour."

The treatment plant was built by engineering firm Hill Murray from Victoria, B.C.

Construction began in June of 1998, but ran into trouble last fall after the faulty cement was discovered.

Hill Murray had hired a B.C.-based company, Quigg Construction Ltd., to build the tanks. After the flaw was discovered, Quigg proposed a quick $120,000 solution to mend the tanks, which involved spraying the inside structure of the tanks with a rubber seal to ensure they remained water-tight.

But a third party, Dillon Consulting -- originally brought in by the town to oversee the paper work -- said the repair wouldn't work.

Hill Murray president Trevor Hill insisted the most economically viable decision had to be made.

"Our proposed mend costs $120,000," he said. "(Dillon's proposal) costs $500,000."

In April of this year, the town brought in yet another engineering firm who agreed with Dillon's proposal. Still, Hill Murray and Quigg don't want to mend the tanks to the more elaborate specifications.

In a letter to Hill dated July 26, the town accused Hill Murray of being in default of its contract and pressed them to fix the tanks.

"The municipality requires the design builder to correct the default in accordance with the specifications (outlined by the outside firms)," stated the letter.

But Hill said Quigg and Hill Murray were not bound to fix the tanks according to the suggested specifications because the opinions came from sources not bound by the contract.

The town -- because their contract with Hill Murray is in default -- has taken the case to the bonding company, which insures the contract for $1.3 million. But time is not on the town's side. They need to resolve the bond issue before the ice freezes, otherwise sealift vessels won't be able to bring the necessary equipment in to repair the tanks.

"Our plan is to get the treatment plant done by the end of the year," said Matthew Hough, town engineer and administrator. "We are working to have the bonding issue resolved before September."

Butler said the town does have another plan should the bond not come through in a timely manner, but he refused to comment on the second option.

"We do have a plan B, but there's no sense in talking about hypotheticals right now."

"The taxpayer will not have to foot this bill," added Butler, promising that problems like this will never happen again.

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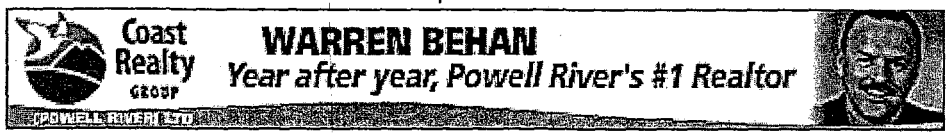

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Waste-Treatment Debacle

By: 10/21/2000

It's back to square one in the quest to solve Powell River's wastewater treatment problems, said the councillor in charge of finding a solution to mounting costs and facilities which do not meet their permits.

"In a nutshell, $6.3 million and three years later, we are back to where we started, with the added burden of direct and indirect related legal entanglements and six times the previous operating cost," Councillor Russell Storry, chairman of the public-works committee, said on a special address on Shaw TV 10 last week. "We have a plant [Westview] struggling to meet current guidelines, two [Wildwood and Townsite] that don't meet current regulations, and a regulatory requirement forming part of the Westview Wastewater Treatment Plant permit mandating that a LWMP [liquid wastewater management plan] be submitted for approval to MELP [ministry of environment, lands, and parks] outlining how and when we as a community intend to bring all our sewage treatment up to current regulations."

In 1997, Hill Murray and Associates were awarded a contract to upgrade the Westview Wastewater Treatment Plant at a cost of $6.3 million. Substantial completion was agreed to and final payment was made on July 27, 1998. The plant became the municipality's when substantial completion was agreed to; however, it did not meet permit requirements. Hill Murray was given two opportunities to correct mutually agreed upon deficiencies.

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"After almost doubling the process equipment, the plant just meets permit with process elements requiring labour-intensive manual cleaning, potentially reducing their service life. Our staff advise the plant is 'unstable.'"

The cost of operating the Westview plant is $1,030,065, or $3,000 a day. The plant exceeded permit levels 50 times in a year.
Hill Murray has placed a $1.9 million builder's lien against the facility to recover the cost of additional work. The municipality's solicitors have filed a writ of summons to protect its right to sue the contractor for failing to complete the contract, including rectification of $662,000 worth of deficiencies, including sludge- and grit-handling issues.

Storry noted that the increase in sewage fees to meet the cost of operating the plant are calculated by frontage and have resulted in a disproportionate jump in fees for a family on a rural lot in Wildwood compared to a similar household in Westview with the same usage.

Storry noted that the municipality continues to work on the problems, including reducing ground and surface water into the sewer system, cooperating with the RCMP commercial crime unit investigation into the possible misuse of public funds, and proposing a forest fertilization pilot project for the sludge which has the potential of reducing operating costs by more than $100,000 a year.

The municipality is also working on implementing a fairer sewage fee structure and is moving ahead on an accelerated LWMP.

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Top Stories

Split Final

By Laura Walz - Editor 12/27/2000

A dream of showcasing new wastewater-treatment technology on the west coast never materialized for two young businessmen from Victoria.

Neither did a promise by the company's president to drink a glass of the treated effluent from the plant.

After over three years of escalating costs, a long list of deficiencies, and repeated failures to meet provincial permit requirements, Powell River municipal officials have said goodbye to Hill, Murray and Associates, the company which upgraded the Westview wastewater-treatment plant.

All the outstanding legal actions between the Victoria-based firm and the municipality have been settled, said Councillor Russell Storry, chairman of the public-works committee.

"The contract has been settled," he said. "There are no contractual matters or disputes outstanding. There was no court action."

Hill, Murray had placed a $1.9 million builder's lien against the facility to recover the cost of additional work. The municipality's solicitors filed a writ of summons to protect its right to sue the contractor for failing to complete the contract, including rectification of the $662,000 in deficiencies.

The municipality paid Hill, Murray $27,000 for consumables, Storry said, items such as chemicals and wood chips used in operating the plant.

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The settlement means the municipality can move ahead on making changes or corrections to the plant.

There was very little chance the municipality could have recovered any money from the performance bonds which were part of the contract because substantial completion for the upgrade was issued, Storry also said. "The cost of pursuing it also has to be balanced in."

While the plant is currently meeting its permit, a long list of deficiencies has been identified. The municipality can correct them, Storry said, and it is beginning with the safety-oriented ones first.

"We're now looking at other options where we can address the deficiencies."

It costs more than $1 million a year to operate the plant, or $3,000 a day.

However, at the direction of municipal council, staff have developed ways of reducing the operating costs. The public-works committee passed a motion at the December 14 meeting accepting a proposed plan to save $983 a day, or $358,715 from this year's operating costs. Council will have to accept the recommendation for it to be put into action.

The municipality has also entered into an accelerated liquid-waste management plan to find a solution for all its sewage needs. The first phase of that project is expected to be completed by the middle of January. The province has given the municipality a $10,000 grant for the study.

As well, the municipality is continuing to cooperate with a RCMP commercial crime unit investigation into the possible misuse of public funds.

Trevor Hill could not be reached by The Peak before deadline.

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Low marks for high pollution

By Laura Walz * Editor 08/14/2001

Powell River has made a strong showing on the provincial government's latest list of polluters.

The ministry of water, land, and air protection released the 21st environmental protection noncompliance report last week. It covers an 18-month period from October 1, 1999 to March 31, 2001. The Wildwood lagoon appeared on the list for the first time, joining theWestview wastewater treatment plant and Pacifica Papers, Inc. The Wildwood lagoon exceeded permit limits for biochemical oxygen demand by up to 64 per cent in five of 18 tests, and total suspended solids by up to 30 per cent in two of 18 tests. Terry Peters, president of the Wildwood Ratepayers' Association, said the fact that the Wildwood lagoon is on the noncompliance report forecasts more sewer woes for the municipality.

"Hold onto your seats, because the worst is yet to come if they don't do something about it now," said Peters. "The writing is on the wall that they're killing this facility. It's going to be a huge blow to this municipality if that ever goes anaerobic, not to mention the smell would be outrageous." Peters said his group has recommended to the municipality to disallow the dumping of septage into the lagoon. But Councillor Russell Storry, chairman of the public works committee, said septage wasn't the problem with the lagoon. "The total amount of solids is in the order of one or two per cent," said Storry. "We're being told it's not significant in the overall operation. If we stopped dumping that in there, it won't get us into compliance." There was money in the 2001 budget for the Wildwood lagoon and Storry said he was waiting for municipal staff to outline how the money was going to be spent.

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The Westview wastewater treatment plant exceeded permit limits for biochemical oxygen demand by up to 213 per cent in 13 of 78 tests. It also exceeded total suspended solids by up to 120 per cent in nine of 78 tests. As well, it did not optimize the secondary treatment works 160 of 548 days during the reporting period. This is the third time on the report for the Westview plant. Storry said the municipality was waiting for the provincial government in order to proceed with a proposed upgrade to the plant. (See Hydroxyl story on page 3).

Pacifica is cited for exceeding its permit limit for total reduced sulphur from "other sources" six out of six times during the reporting period, based on data supplied by the company. It is the second time the mill has been on the report for emissions under Pacifica Papers' ownership. An upgrade project to address noncompliance was completed in June. Pacifica environmental chemist Kevin Gertken said data from monitoring stations and other test sites indicate the company is now well within its permit levels.

"Testing we've completed for the second quarter has shown we're well in compliance with our permit now," he said. "We're at about a third of our permit level now." Gertken also said air quality has improved since an emergency vent in the new system which had been left open was closed. "We have had a few higher readings at the Townsite station, but the readings that we traced back had nothing to do with the valve. In general, especially in Cranberry and Wildwood, air quality has improved dramatically."

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Reader Opinions

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Name: Dawn **Date: Aug, 02 2003**

I have to completely agree with Tom Moore. There is a terrific web site called Waste Busters. There you can write letters to any department in B.C. Government and offer suggestions or post complaints about certain situations. I myself have just submitted an article to the Ministy of Water, Land, and Air protection,stating that any company over compliance limits get fined. A big fine at that. Maybe making them pay up will make them check for these "errors" more often to at least ensure they won't be paying anymore fines, if not just for our health. You do not have to leave personal information if you don't want to. I suggest everyone check it out.

Name: Tom Moore **Date: Aug, 02 2003**

30 times the level of pollutants measured "due to an error in a spreadsheet formula" is what we all live with here in Powell River.
Does anyone realize what a permit entails? This means that the mill is allowed to over pollute, and has been allowed (by our all-knowing government(s) since 1976.
Fine. One might say, 'Well, that's the smell of money'; but, do any sentient beings out there realize what ramifications result from exposure to organochlorines, furans, dioxin, and a myriad of estrogen-mimmicking substances do to a population?
Here's an observation- it stinks really bad- the stink-mill is gross- I can't even play tennis- and I'm damn sick of it!

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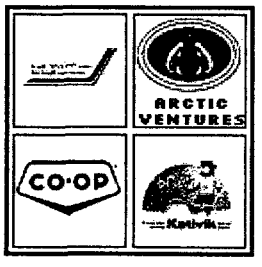


November 16, 2001

City tries to keep sewage plant alive

Council awaits engineering firm's review.

Iqaluit residents have been waiting a long time to get their sewage treatment plant up and running.

(FILE PHOTO)

DENISE RIDEOUT

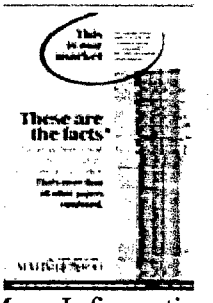
The City of Iqaluit is taking another crack at getting its bungled $7-million sewage treatment plant up and running.

The plant, which will filter human waste and is intended to replace Iqaluit's smelly sewage lagoon, is almost two years overdue.

Officials discovered leaks in the walls of the concrete tanks in 2000. Following that, work on the sewage plant stopped cold.

But now, Iqaluit's engineering department wants to see if it can breathe life back into the stalled project.

Matthew Hough, director of engineering for the city, said the sewage treatment plant isn't a writeoff yet.



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At this week's council meeting, Hough recommended the city embark on a major review of the sewage plant.

The leaks have been fixed and the tanks are now water tight, he said. But the study is required to determine just how much more work is left before the plant can be opened.

There's also the question of money. Hough said the review will spell out exactly how much it'll cost every year to run the sewage treatment plant — and then the city will have to figure out if it can still afford it.

"The council wants to know where they stand before they flick the switch. They want to minimize their risk as much as possible," Hough said in an interview.

Years of setbacks

The sewage treatment plant has been tangled in a mess for years.

In 1997 the city determined the sewage lagoon wouldn't have the capacity to deal with waste produced by the rapidly growing population.

They hired a B.C.-based engineering firm, Hill Murray and Associates, to build a zeon microfiltration treatment plant. Construction began in 1999, with completion expected in 2000.

But during construction, officials discovered leaks in the walls of the four concrete tanks. It appeared that when engineers poured the concrete, some of the granular bits were too large and got lodged in the walls. They left air pockets in the structure, making the tank walls unstable.

An Iqaluit engineering firm, hired to oversee the project, had alerted city administrators that the work Hill Murray was doing at the plant wasn't

Classifieds

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What should become the new Nunavut government's most urgent priority?

Economic development and job creation

Housing and homelessness

Crime, corrections and the justice system

Inuit language and culture

Education and training

Mental health services and suicide

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sound. They suggested the city seek legal advice, but that didn't happen.

In fact, the administration continued to pay Hill Murray even though it knew about the flaws in the tanks.

"The contractor made some errors and we've had to fix a number of them up," Hough said.

Contractors had to spend eight months repairing the tanks. The city paid for the repairs with $550,000 that an insurance company paid out after the project fell apart.

"That's now provided us with water-tight tanks, and it's provided us with a sewage treatment plant that we can look at completing," Hough said.

Reviewing the plant

The upcoming review will determine the future of the plant.

First, contractors will visit the plant to gauge what work is left to complete.

Then, the more pressing question will be dealt with. In particular, city officials want to see if Hill Murray and Associates was correct when it said it would cost $400,000 a year to operate and maintain the plant.

Hough said the review will look at all costs associated with running the plant.

"We'll bring in contractors whose job it is to tell us how many people we need to put in that plant to run it, how often we need to change the filters, how many chemicals we need to replace each year, how much water we'll use, how much power we'll use and what the telephone bills will be," Hough said.

Hough's recommending the city hire Earth Tech, a B.C. engineering firm, to conduct the review. He's

and staff of Nunatsiaq News.

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keen on that firm because it studied a similar sewage plant in B.C. that also went awry after the Hill Murray company worked on it.

Hough said the Iqaluit city council is worried the review will come back with a negative response: that it'll cost more than $400,000 to run the plant.

"We are cash-strapped," Hough said. "We have had such sudden growth in the community and there are so many demands that just lumping on a $400,000 cost is a big burden."

Council will have a major decision to make if it turns out the plant will cost more than expected. Hough said they may have to look at using other, cheaper technologies to run the plant.

Representatives from the Earth Tech firm will meet with city councillors next week to outline exactly what they want to do in their review of the sewage treatment plant.

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ARCTIC VENTURES
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August 2, 2002

Major repairs needed for sewage plant, engineer's report shows

City must pay almost $4 million, on top of the $7 million already paid, to get plant running

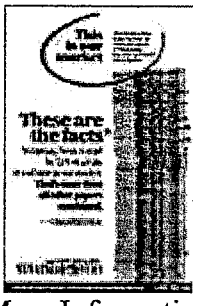
DENISE RIDEOUT

It's going to cost the City of Iqaluit $550,000 to finish repairs to its sewage treatment plant, which was supposed to be up and running two years ago, and another $3.3 million to increase its capacity to handle all the city's waste.

The plant, which is intended to replace Iqaluit's sewage lagoon, has been flawed from the beginning.

In 2000 when the plant was built, engineers discovered leaks in the walls of the concrete tanks. Following that, work on the sewage treatment plant stopped cold.

Since then, city council has been struggling to find a way to get the plant, which comes with a $7-million price tag, finally working.



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This January, council commissioned engineers from Earth Tech Inc. of B.C. to inspect the sewage treatment plant to spell out how much work is left to complete it — and how much it will cost the city every year to run it.

The engineer's report, released this week, shows there are some defects in the plant's design, major improvements are needed and it doesn't meet all the safety requirements.

The floor of the electrical room is sagging and may cause drainage problems, some of the electrical systems don't meet Canadian electrical codes and better ventilation should be installed, the engineers say.

But the flaws come as no surprise to Iqaluit's mayor. "I think, from council's perspective, those defects are not that important because we knew it wasn't working," John Matthews said.

On top of that, it turns out that running the facility will cost more than council anticipated.

"Six hundred thousand dollars is just too onerous on the city," Matthews said.

But the key, the mayor says, is the significant discovery that the plant might not have the capacity to treat all of the sewage that is generated in Iqaluit.

"The plant wasn't designed to meet the needs of Iqaluit at its peak times, especially given its rapid growth over the past few years," Matthews explained.

The plant was built to handle 1,800 cubic metres of waste a day, but the current population is producing about 2,100 cubic metres of waste daily.

To get the plant up to par, the city would have to put another $3.3 million worth of work into it.

Classifieds

Poll

What should become the new Nunavut government's most urgent priority?

- Economic development and job creation
- Housing and homelessness
- Crime, corrections and the justice system
- Inuit language and culture
- Education and training
- Mental health services and suicide

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Council will have to vote on whether to go with the engineer's recommendations. The mayor said no date for the vote has been set.

In 1997, after determining the sewage lagoon wouldn't have the capacity to deal with waste produced by the growing city, council hired Hill Murray and Associates to build a treatment plant.

But the company's work on the plant was flawed, causing leaks in the concrete tanks. The city stopped construction and spent eight months repairing the damage.

Council then undertook this major review of the plant, wanting to see if there was any way to breathe life back into the failed project.

"I think the reality is that we'll be using the sewage lagoon for another season," the mayor said.

But he's confident that Iqaluit residents will see the sewage plant up and running, possibly sometime next year.

"It's right and proper to treat the sewage with a way other than the sewage lagoon," Matthews said. "It's definitely a priority, so we're going to have to come up with the money somehow to make it happen."

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NUNATSIAQ NEWS

Bring Nunavut To You

August 2, 2002

City of Iqaluit fined $100,000 for sewage spills

Five separate spills during 2001 labour dispute were caused by lift station malfunctions

KIRSTEN MURPHY

The City of Iqaluit was fined $100,000 on July 30, after pleading guilty to one count of discharging sewage into Koojesse Inlet under the Fisheries Act.

An estimated 822,000 litres of human waste overflowed into the inlet on five separate occasions between April 23 and July 4, 2001.

Malfunctioning lift stations caused the "deleterious" matter to flow into the bay, home to fish and marine mammals, the court heard. The public was unaware of the incidents until they were reported by the media.

Marine life was not harmed by spills, an Environment Canada investigation determined.

The spills were caused by several malfunctions, ranging from rags in the pipes to a broken belt.

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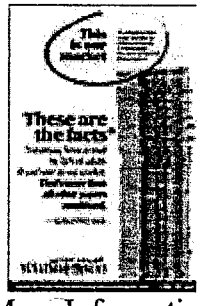

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Three of five spills were due to mechanical malfunctions at sewage lift station No. 1. The two other spills were caused by problems at lift station No. 2.

A demure Mayor John Matthews and acting chief administrative officer Okalik Curley appeared in court with Yellowknife Lawyer Charles Thompson.

"The city fell short of the standards required and did not exercise due diligence, but it was not deliberate," Thompson said. "There was no attempt to cover up or hide the discharges had taken place."

Thompson noted the inlet's important proximity to the city, but minimized it's environmental value.

"It's not an untouched area of pristine Arctic wilderness," he said.

The sentence was a joint submission between Thompson and Crown lawyer John Cliffe.

The largest spill — as much as 750,000 litres — went unnoticed for several hours on June 16 when an alarm failed to notify municipal employees. The suspected cause of the alarm's failure was a power outage. In addition, the city was short-staffed because of a labour dispute between municipal workers and city management, the court heard.

"The city did not have the personnel to conduct routine maintenance and inspections on the lift stations and pumps as often as happens during normal operations, nor did the city have the personnel to react to problems with the pumps as quickly as they normally would. These factors contributed to the sewage discharges," Cliffe said.

The $100,000 fine is broken into three areas, with $65,000 going to the Environmental Damages Fund administered by Environment Canada. The money will fund the promotion and protection of fish and fish habitats in Nunavut. The city has until March

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31, 2003 to pay. The city must spend $25,000 to create a policy and procedure manual for employees. The manual must be complete by May 31, 2003. The remaining $10,000 is a court fine due Aug. 31, 2002.

In handing down his sentence, Justice Robert Kilpatrick noted the case's significance.

"This is the first prosecution of its kind since the creation of Nunavut," Kilpatrick said.

Mayor Matthews said money has been set aside to pay the fines.

"It's always a relief of sorts to get resolution at the end of the day. This has been hanging over our heads for several months, so we did get that resolution today," Matthews said.

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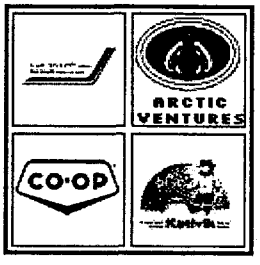

April 11, 2003

Iqaluit sewage plant debacle spreads south

Engineer on bungled sewage facility raises stink in Arizona

CHARLOTTE PETRIE

One of the engineers who worked on Iqaluit's non-functioning sewage treatment facility has resurfaced in a small U.S. community. And, perhaps coincidentally, the sewage plant in Pinal County, Arizona, is experiencing many of the same seepage and smell problems that plagued Iqaluit's plant.

The City of Iqaluit is still searching for a solution to its sewage woes after hiring Hill Murray and Associates in 1999 to build a state-of-the-art microfiltration treatment plant.
Instead of a brilliant new system the city ended up with one serious mess on its hands.

After spending more than $7 million, residents were left with a facility incapable of treating the amount of sewage generated. It had serious design defects, problematic and possibly dangerous electrical systems and needed at least $3.3 million worth of repairs.

While the plant sits collecting dust, the city

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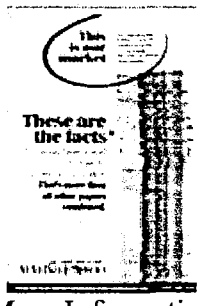

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continues to use its old sewage lagoon, which has caused serious discharges of untreated effluent into the sea for years.

But Trevor Hill, an engineer and partner in Hill Murray and Associates, is now the president of Algonquin Water Resources of America (AWAR).

The new firm has owned and managed the Gold Canyon wastewater treatment facility in Pinal County, Arizona, since July 2001. The facility serves the community of Gold Canyon and several other smaller communities in the vicinity.

Residents have been complaining for months about the abominable stench, alleged illegal discharge of effluent, unacceptably high levels of nitrogen in the wastewater, and a proposal to expand the facility to twice its current operational size.

AWAR has received notices of violation from the Arizona Department of Environmental Quality (ADEQ) on two separate occasions for allegedly discharging more than half a million gallons of wastewater since January.

It's not certain either violation will hit AWAR in the pocketbook, but Steven Owens, the director of the ADEQ, told a newspaper in Pinal County last month that "there is a high probability [the company] will be fined."

Patrick Gibbons, a spokesperson for ADEQ, echoed Owens' concern, but pointed out that if the expansion proposal is approved the issue of illegal discharging will end.

"If the facility expansion is approved [it could] deal with that water through processing in reuse," Gibbons said.

It's a fairly typical development in Arizona, where sewage facilities are often built to minimum standards in rapidly growing areas. As a result,

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Crime, corrections and the justice system

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communities are always playing catch-up with the infrastructure, Gibbons explained.

The facility has changed ownership three times, making AWAR the latest owner-operator, while many of the facility's challenges precede AWAR by many years, Gibbons added.

"Their original plan was to do three things," Gibbons explained, to reuse water for a nearby golf course, recharge water in some recharge basins and discharge any residue into a nearby wash.

"The problem is the facility has not been able to keep up with that plan. In times when the flow is very high because of rainstorms, the flow can be much higher than works within their plan. As a result, they don't need to go to reuse, their recharge basins can't hold it all and they're forced to discharge.

"Really, they need to come up with a better plan for controlling that."

If the expansion proposal goes through, Gibbons said it will force the company to invest in major improvements to the facility, ultimately improving the situation for local residents.
But residents fear an expansion, coupled with illegal dumping, will attract gnats, mosquitoes and sewer rats. Some people living within 1,000 feet or less of the facility are already complaining about the smell, saying it has prevented them from enjoying their backyards.

The fear has united a good chunk of the community in protest. They have seen for themselves the grayish, foamy wastewater being discharged into their local environment.
It's a tale all too familiar to Iqaluit residents, and sadly, to residents of the small British Columbia community of Powell River as well.

Both communities suffered years of escalating

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costs, long lists of deficiencies and repeated failures to meet safety and permit standards.

Hill Murray and Associates never saw the inside of a courtroom as a result of their bungled work in Powell River or Iqaluit.

Powell River municipal officials settled their outstanding contractual matters and moved on.

But Iqaluit municipal administrators, in the fall of 1999, cut a $2.8-million cheque to Hill Murray, despite a report from Dillon Consulting Ltd. that cited serious structural flaws in the company's Iqaluit treatment plant.

Trevor Hill did not return a telephone message left by *Nunatsiaq News*.

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DISTRICT OF POWELL RIVER

Minutes of a Regular Council Meeting held in the Council Chambers of the Municipal Hall on Monday, February 14, 2000 at 1930.

THOSE PRESENT

Mayor S. B. Alsgard
Councillor H. A. Beauchesne
Councillor D. B. Gabelhouse
Councillor D. F. Gemmell
Councillor L. M. Misner
Councillor J. R. Storry
Councillor J. K. Wilson

Ian Fremantle, Chief Administrative Officer
Isabell Hadford, Municipal Clerk/Personnel Officer
Members of the public
Media representatives

OPENING OF MEETING

Mayor Alsgard opened the Council meeting at 1930 and wished everyone a Happy Valentines Day.

Mayor Alsgard expressed his appreciation and thanks to the public for taking time to pick up litter found lying aroun the streets.

Mayor Alsgard informed the citizens about a B.C. 2000 Book reception held last week and extended a special thanks to Cathy Bartfai of the Powell River Chamber of Commerce for organizing the event.

Councillor Gemmell reported on the success of B.C. Transit Day held February 12, 2000 when members of the public were given free ridership. He complemented the bus drivers and felt that they were great ambassadors to the District. He credited the success of the B.C. Transit Day to Gerry Woods. He also advised that today, Februar 14, 2000, B.C. Transit has provided the drivers with free chocolates to give out to the public.

ADOPTION OF MINUTES

Minutes of Regular Council Meeting held 24 January 2000
RES #00-030

Moved by Councillor Wilson, seconded by Councillor Storr that the minutes of the Regular Council Meeting held January 24, 2000 be adopted. CARRIE

BUSINESS ARISING FROM

THE MINUTES

CORRESPONDENCE

W. H. Crysler, Powell River Community Health Council re Council appointment to Powell River Community Health Council	Doctor David Gabelhouse accepted the invitation from W. H. Crysler of the Powell River Community Health Council t sit as a non-voting participant on the Powell River Community Health Council.
Powell River Association for Community Living re Council representation on Committee for investigating Partnerships in the Community	Mayor Alsgard felt that Council should look int participating on the Committee for Investigatin Partnerships in the Community. Councillor Gabelhous advised he was willing to contact the group to see ho things are progressing.
Linda Florence, Chair, Powell River Public Library Association re Council's endorsement of Association's action re GATS negotiations RES #00-031	Moved by Councillor Wilson, seconded by Councillor Misner that Council endorse the Powell River Public Librar Association's action regarding General Agreement on Trade in Services negotiations. CARRIED

REPORTS

Minutes of a Planning Committee meeting held January 24, 2000	Councillor Storry reported on the meeting of the Planning Committee held on January 24, 2000.
Development Variance Permit No. 99 – 4511 Joyce Avenue RES #00-032	Moved by Councillor Storry, seconded by Councillor Wilso that Development Variance Permit No. 99 be issued to 597297 B.C. Ltd., owners of the parcel located at 4511 Joyce Avenue, legally described as Lot 1, Ex. Part on Plar LMP 29256; Lot B, Block 37, District Lot 5306, Group 1 NWD Plan 7461, to vary the provisions of the Zoning Bylav by changing the required front yard setback from 7.5 metres to 2.4 metres and the side yard setbacks from 3 metres to 1.8 metres. CARRIED
Development Permit No. 98 – 4511 Joyce Avenue RES #00-033	Moved by Councillor Storry, seconded by Councillc Beauchesne that Development Permit No. 98 be issued to 597297 BC Ltd., owners of the parcel located at 4511 Joyce Avenue, legally described as Lot 1, Ex. Part on Plan LMP 29256; Lot B, Block 37, District Lot 5306, Group 1 NWD Plan 746 to permit construction of a two story dental/orthodontist

building. CARRIED

Official Community Plan Amendment (Schedule B) 5987 Lund Street RES #00-034

Moved by Councillor Storry, seconded by Councillc Gabelhouse that Council amend Schedule "B" to the *Official Communit Plan of the Corporation of the District of Powell River Byla No. 1676, 1996* by redesignating the parcels owned by M Frank Hughes, legally described as Lot C, Block A, D.I 4173, Plan 15615, and by Chuckwagon Inn Ltd. (Inc. Nc 393293) at 5987 Lund Street, legally described as Lot E Block 2, D.L. 4173, Plan 8078, from "Low Densit Residential" to "Commercial" with no obligation on the pa of the District to perform works and services upon hi private lands, both current and propose configurations. CARRIED

Zoning Bylaw Amendment (Schedule A) – Re 5987 Lund Street RES #00-035

Moved by Councillor Storry, seconded by Councillc Gabelhouse that Council amend Schedule "A" of th *District of Powell River Zoning Bylaw No. 1851 1999* t rezone vacant parcel owned by Mr. Frank Hughes, legall described as Lot C, Block A, D.L. 4173, Plan 15615, fror RA1 to C1, with no obligation on the part of the District t perform works and services upon his private lands, bot current and proposed configuration. CARRIED

Zoning Bylaw Amendment - Re Gravel Pits RES #00-036

Moved by Councillor Storry, seconded by Councillor Wilso that the *District of Powell River Zoning Bylaw No. 185 1999,* be amended by deleting "gravel pits" as a permitte use within A2 (Rural) and M1 (General Industrial) Zone and by clarifying the definition of "natural resourc utilization" to mean "any forestry or agricultural us excluding any mineral or aggregate processing such a crushing".
CARRIED

Proposed Zoning Bylaw Amendment re Home Occupations RES #00-037

Moved by Councillor Storry, seconded by Councillor Beauchesne that the *District of Powell River Zoning Bylaw No. 1851, 1999,* be amended by adding a clause to permit the sale of goods not produced on the lot within A2 (Rural) zones only, provided that it is a part of the licensed home occupation, "agriculture-related" as defined under definitions; and within an area less than 20 square metres (213 sq. ft.).
CARRIED

License Agreement for off-site parking with Mr. Robert Whyte RES #00-038

Moved by Councillor Storry, seconded by Councillor Gemmell that the Licence Agreement with Mr. Robert Whyte for off-site parking on the land legally described as Lot F, Block 47, District Lot 5306, Plan 18007 owned by th Corporation of the District of Powell River be renewed for

the periods of February 1st, 1999 to January 31st, 2000, and February 1st, 2000 to January 31st, 2001, for a fee of $625 per year, and that the Mayor and Clerk be authorizec to execute the agreement on behalf of the Municipality.
CARRIED

Annual licence Agreements
RES #00-039

Moved by Councillor Storry, seconded by Councillc Beauchesne that in future the matter of establishin occupancy licence and/or rental rates be referred to th Finance Committee for determination.

CARRIED

Powell River Ferry Terminal Class D estimate
RES #00-040

Moved by Councillor Storry, seconded by Councillc Gabelhouse that Council support the preparation of a Clas D estimate for a ferry terminal at the waste transfer site at cost of $1,200 to be funded from the "Special Projects account in the year 2000 Planning Department provisiona budget. CARRIED
OPPOSED: Councillors Wilson and Gemmell

Transfer of Hospital Lands

Councillor Wilson reported to Council on a meeting sh had with Shelley Halliday concerning the transfer c hospital lands. Councillor Wilson asked Ms. Halliday fc specific information to refer to the Planning Committe meeting and asked that the information include the exac cost and the legal relationship the District would hav concerning the transfer of lands.

Zoning Bylaw Amendment - re parking space requirements
RES #00-041

Moved by Councillor Storry, seconded by Councillc Beauchesne that the *District of Powell River Zoning Byla No. 1851, 1999,* be amended by changing the parkin requirement in Part 5.3.3 (h) for medical and dental office from 1 space per 22 square metres (240 sq. ft.) to 1 spac per 35 square metres (375 sq. ft.) of gross floc area.
CARRIED

Protective Services Committee Meeting

Councillor Gabelhouse reported on a Protective Service Committee meeting held on January 27, 2000.

Catholic Women's League – Escort Service Advertising
RES #00-042

Moved by Councillor Gabelhouse, seconded by Councillc Storry that a resolution be forwarded to the Union of B.C Municipalities and Association of Vancouver Islan Municipalities with concerns regarding escort servic advertisements in local telephone directories and furthe that a survey be conducted of other municipalitie regarding offensive advertisements in telephon directories.
CARRIED

Emergency Social Services Director and Assistant Provincial Emergency Coordinator Appointments
RES #00-043

Moved by Councillor Gabelhouse, seconded by Councillc Gemmell that Council appoint Leonine Evalyn Lorenzen t the position of Emergency Social Services Director for th year 2000 and John James Veenhof to the position c Assistant Provincial Emergency Coordinator for the yea 2000.
CARRIED

Finance Committee Meeting

Councillor Beauchesne reported on a meeting of a Financ Committee of the Whole Meeting held on February 1, 200(

Three Phase Power at the Powell River Municipal Airport
RES #00-044

Moved by Councillor Beauchesne, seconded by Councillc Gemmell
that Council authorize the expenditure of approximatel $30,000 for the installation of three phase power at th Powell River Municipal Airport and that the expenditure b funded from the Airport Reserve Fund. CARRIED

Committee Room Renovations
RES #00-045

Moved by Councillor Beauchesne, seconded by Councillc Gabelhouse that Council authorize $32,000 of unexpende 1999 Municipal Hall building renovation expenditures b carried over to the Reserve for Future Expenditures for th funding of Municipal Hall Committee Room renovations fc Councillor office space and that $5,000 of the 200 contingency fund be utilized to fund the required offic furniture.
CARRIED

New Fire Truck Quint Apparatus
RES #00-046

Moved by Councillor Beauchesne, seconded by Councillc Wilson that Council approve the proposal submitted b Smeal Fire Apparatus for the replacement of the 197 aerial Platform fire truck at a cost of $809,400 and that thi replacement fire truck be subject to the Director c Financial Services choosing the funding plan which suit the best interest to the District. CARRIED

Mayor Alsgard vacated the Chair at 2035 and Councillc Gabelhouse assumed the Chair.

Non-refundable registration fee
RES #00-047

Moved by Councillor Beauchesne, seconded by Councillc Gemmell that when a member of Council has registered t attend an approved conference or seminar and is unable t attend because his or her presence is required elsewher for Municipal business the cost of any non-refundabl registration fee will be borne by the District and not th member.
CARRIED

Mayor Alsgard resumed the Chair at 2040.

Industrial Health & Safety WHMIS Program RES #00-048	Moved by Councillor Beauchesne, seconded by Councillc Gabelhouse that Council approve the purchase of Wor Hazardous Materials Information System software for th Industrial Health and Safety Program at an approximat cost of $4,000 to be funded from the Computer Reserv Account. CARRIED
Industrial Health & Safety Policy Manual Rewrite RES #00-049	Moved by Councillor Beauchesne, seconded by Councillc Storry that Council approve the rewrite of the Industri Health and Safety Policy Manual at a cost of $2,000 plu GST as required by the Workers' Compensation Boar Audit, to be funded from the 2000 Budget. CARRIED
Transit Promotion RES #00-050	Moved by Councillor Beauchesne, seconded by Councillc Gabelhouse that Council approve free bus fares all day o Saturday, February 12, 2000 for Municipal bus rout passengers as part of a special trans promotion. CARRIED

Public Works Committee

Councillor Storry reviewed the minutes of a Public Work Committee meeting held February 8, 2000.

22 Red Knight Squadron – Annual Invitational Jock Gall Memorial Shoot	Councillor Storry advised that an application for a grant-ir aid has been sent to Captain Boyd of the 22 Red Knigl Squadron Royal Canadian Air Cadets for the provision c barriers, bleachers and an extra dumpster for the Annu Jock Gall Memorial Shoot to be held May 5 – 7, 2000.
McGuffie Creek Bridge RES #00-051	Moved by Councillor Storry, seconded by Councillor Gemmell that based upon the recommendation of the Municipal Engineering Department, $500,000 be placed in the 2000 Provisional Capital Budget for the rehabilitation o McGuffie Creek Bridge. CARRIED
Legal Proceedings with respect to Westview Wastewater Treatment Plant RES #00-052	Moved by Councillor Storry, seconded by Councillor Beauchesne that Council instruct the Districts solicitors to prepare and file a Writ of Summons in the British Columbi Supreme Court, at Vancouver, British Columbia, to preserve all potential claims against all potential defendants in respect of the upgrade to the Westview Wastewater Treatment Plant. CARRIEI

BYLAWS

Bylaw No. 1870
RES #00-053

Moved by Councillor Misner, seconded by Councillc Wilson that Bylaw No. 1870, 2000 cited as "Willingdo Beach Campsite Bylaw No. 1756, 1997, Amendment Bylav No. 1870, 2000" be read three times. CARRIED

Bylaw No. 1871
RES #00-054

Moved by Councillor Wilson, seconded by Councillor Storr that Bylaw No. 1871, 2000 cited as "The District of Powe River Zoning Bylaw No. 1851, 1999, Amendment Bylav No. 1871, 2000" be read two times. CARRIED

Bylaw No. 1872
RES #00-055

Moved by Councillor Gemmell, seconded by Councillc Beauchesne that Bylaw No. 1872, 2000 cited as "District c Powell River Procedure Bylaw No. 1872, 2000" be rea three times and that a Special Council Meeting b scheduled at 1450 on February 17, 2000 at Municipal Ha in order to adopt this bylaw. CARRIEI

NEW BUSINESS

Notice of Motion re Development Variance Permit No. 99 re 4511 Joyce Avenue

Notice is given under Section 922 (4) of the *Municipal Ac* this 25th day of January, 2000, that Municipal Council giv notice of its intention to issue Development Varianc Permit No. 99 at their meeting on Monday, February 28tl 2000 in the Council Chambers of the Municipal Hall.

Councillor Wilson read a Notice of Motion which states:

"that Development Variance Permit No. 99 be issued t 597297 B.C. Ltd., owner of property located at 4511 Joyc Avenue, legally described as Lot 1, Ex. Part on Plan LM 29256; Lot B, Block 37, District Lot 5306, Group 1 NWI Plan 7461, to vary the provisions of the *"District of Powe River Zoning Bylaw No. 1851, 1999"* by changing th required front yard setback from 7.5 metres to 2.4 metre and the side yard setbacks from 3 metres to 1.8 metres."

Copies of the proposed Development Variance Permit may be examined at the Municipal Hall, 6910 Duncan Street, Powell River, B.C. during office hours of 0830 to 1630, Monday to Friday, during the period February 15th to February 28th, 2000.

Municipal Clerk Hadford regarding Progressive Disciplinary Policy
RES #00-056

Municipal Clerk Hadford presented a report regarding a proposed Progressive Disciplinary Policy.

Moved by Councillor Misner, seconded by Councillor

Gabelhouse that Council adopt a "Progressive Disciplinary Policy" for use throughout the District. CARRIED

Canadian Radio-Television and Telecommunications Commission TV licenses for satellite coverage in the Powell River area

Councillor Wilson reported on two applications submitted through the Canadian Radio-Television Telecommunications Commission for television licenses which will cover the Powell River area. She asked that the staff obtain a copy of the application and send a letter to the applicant inviting them to meet with Council to discuss using Powell River as a satellite area.

In-Camera Meeting
RES #00-057

Moved by Councillor Storry, seconded by Councillor Wilson that Council hold an In-Camera (Closed) meeting immediately following this meeting to discuss items to be considered under Section 242.2(1)(h) and (1) of the *Municipal Act.* CARRIED

ADJOURNMENT
RES #00-058

Moved by Councillor Beauchesne that the meeting adjourn at 2115.

CERTIFIED CORRECT:

Stewart B. Alsgard, Mayor

Municipal Clerk

DISTRICT OF POWELL RIVER

Minutes of a Regular Council Meeting held in the Council Chambers of the Municipal Hall on 26 June 2000 at 1930.

THOSE PRESENT

Mayor S. B. Alsgard
Councillor H. A. Beauchesne
Councillor D. B. Gabelhouse
Councillor D. F. Gemmell
Councillor L. M. Misner
Councillor R. J. Storry
Councillor J. K. Wilson

ALSO PRESENT

Ian Fremantle, Chief Administrative Officer
Maggie Knox, Interim Municipal Clerk (Minute Taker)
Stan Westby, Director of Financial Services
Members of the Public
Media representatives

OPENING OF THE MEETING

Mayor Alsgard opened the meeting by announcing that today is Council's 14th Regular Meeting, 203rd day in office for the current Council and the 41st Municipal Government since the incorporation on 15 October 1955.

Mayor Alsgard reported that the "Municipal Act" had been renamed the "Local Government Act".

The Mayor further reported that the Oceans Day celebrations had been a tremendous success, with over 400 students participating.

Mayor Alsgard advised that the Powell River transit system had been held up as an example of excellence at a recent BC Transit conference, and commended Gerry Woods and the transit staff.

The Mayor also commended Brad Bombardir, Powell River native and member of the Stanley Cup champion New Jersey Devils.

Mayor Alsgard remarked on the community pride evident from the efforts of homeowners and businesses in preparing their properties for Kathaumixw.

ADOPTION OF MINUTES

Moved by Councillor Misner, seconded by Councillor Beauchesne that the minutes of the Regular Council

Minutes of Regular Council Meeting held 12 June 2000
Res: #00-260

Meeting held 12 June 2000 be adopted. CARRIED

BUSINESS ARISING FROM THE MINUTES

Council Policy – Committee Minutes Distribution
Res: #00-261

Moved by Councillor Misner, seconded by Councillor Beauchesne that Council Policy No. 90-002 be amended to read as follows:
"Whereas Municipal taxpayers and others depend on news media reports to follow Council's activities;

Be it resolved that as a matter of policy, minutes of all committee meetings, except Personnel or Closed Meetings be available to authorized representatives of the media;
And further be it resolved that said copies be distributed immediately before opening of regular Council meetings;
And it is further resolved that Committee agenda briefing material which is excepted from disclosure under the Freedom of Information and Protection of Privacy Act, including information harmful to personal privacy or to the business interests of a third party, will not be circulated to anyone other than Committee members."
CARRIED

DELEGATIONS

1998 BC Adolescent Health Survey

Mr. David Paul, teacher at Max Cameron Secondary School, reported on a recent community youth health workshop attended by students who were given the task of identifying priority issues and solutions.

Students Leah Lisberg and Dan Salmond of Brooks School, and Billy-Jean McRae and Brodie D'Angio of Max Cameron School indicated the following:

- Drinking and driving, drug abuse, teen pregnancy and vandalism were the problems needing to be addressed;

- Boredom, a lack of activities for youth and a lack of attention to youth were causing the problems;

- Suggestion that improved transit at night, cheaper taxi fares and a designated driver program would

reduce the incidence of drinking and driving;

- The need for a forum whereby youth would be represented in formulating community policy.

Karen Peel of the Coast Garibaldi Health Board indicated that consideration of a youth advisory council would be pursued in the Fall of 2000.

CORRESPONDENCE

Nil

REPORTS

MINUTES OF AIRPORT, HARBOURS AND TRANSPORTATION COMMITTEE MEETING HELD 17 MAY 2000

Councillor Gemmell reported on an Airport, Harbours and Transportation Committee meeting held 17 May 2000.

Council Policies
Transit Rates
(Policy #91-004)
Res: #00-262

Moved by Councillor Gemmell, seconded by Councillor Beauchesne that the following transit rates be retained:

Child	Free	
Wheelchair Attendant	Free	
Adult	$ 1.25	Per ride
	$ 2.75	Per day
	$12.00	Per 10 tickets
	$40.00	Per month
College Student	$11.50	Per 10 tickets
Student/Senior	$ 1.00	Per ride
	$ 2.25	Per day
	$ 9.50	Per 10 tickets
	$25.00	Per month

CARRIED

South Harbour Moorage Rate Commercial Fishing Vessels
Res: #00-263

Moved by Councillor Gemmell, seconded by Councillor Wilson that Council Policy #97-005 be amended as follows:
That the following rates be established for commercial fishing vessels:

Daily rate: $0.30 per meter plus GST
Monthly Rate: $5.45 per meter per month
Quarterly Rate: $4.75 per meter per month

CARRIED

South Harbour Moorage Rates – Pleasure Craft
Res: #00-264

Moved by Councillor Gemmell, seconded by Councillor Beauchesne that Council Policy #97-006 be amended as follows:
That the following rates be established for pleasure craft/non-fishing commercial vessels:

Daily rate: $1.83 plus GST per meter
Monthly Rate: $11.00 per meter per month in advance
Quarterly Rate: $9.90 per meter per month for three months or more in advance.

Late Payment:
That when prepaid monthly moorage for pleasure craft in the South Harbour is received after the cut off date, the monthly moorage will be calculated at half of the daily rate. CARRIED

Councillor Wilson abstained from discussion and voting.

Harbours Grid Fees
Res: #00-265

Moved by Councillor Gemmell, seconded by Councillor Beauchesne that Council Policy #90-023 be amended as follows:
That the following fees be established for the use of the North and South Harbour grids:
South Harbour Grid - $25.00 plus GST for all boats
North Harbour Grid - $20.00 plus GST for all boats
and further that these fees be paid at the time of reservation and be non-refundable.
CARRIED

South Harbour Moorage Rate – Loading Zone
Res: #00-266

Moved by Councillor Gemmell, seconded by Councillor Gabelhouse that Council Policy #97-004 be reaffirmed as follows: That we establish a moorage rate of $50.00 for every hour or portion thereof in excess of the two hour limit for vessels berthed in the moorage space designated as a "Loading Zone" in the South Harbour and that the appropriate signage be posted. CARRIED

South Harbour – Parking Permit
Res: #00-267

Moved by Councillor Gemmell, seconded by Councillor Misner that Council Policy #99-016 be reaffirmed as follows:

1. Effective June 1, 1999, any vessel owner who pre-pays his South Harbour moorage, either monthly or quarterly, shall be issued one parking permit, valid only for the time period of the pre-paid moorage.
2. Such permit will indicate the date for which it is

valid.

If a permit is lost or misplaced, a replacement will not be issued. The permit must be displayed on the dashboard of the vehicle or a parking ticket will be issued. CARRIED

South Harbour – Live Aboard
Res: #00-268

Moved by Councillor Gemmell, seconded by Councillor Gabelhouse that that Council Policy #89-009 be reaffirmed as follows:

That persons living aboard their vessel in the South Harbour be charged an annual fee of $350.00 (effective January 1, 1990) and that the definition of "live aboard" be as follows:

"A live aboard is a person who uses Powell River as a resident base and lives aboard his or her vessel more than ten days in any 30 day period."
CARRIED

South Harbour Live Aboard – Wood Burning Stoves
Res: #00-269

Moved by Councillor Gemmell, seconded by Councillor Wilson that Council Policy #97-003 be reaffirmed as follows:

That live aboard vessels moored in the South Harbour which contain wood burning stoves for heat be required to pass a fire inspection by the Municipal Fire Department prior to their occupying a moorage space on a live aboard basis and that further inspections are required once a year. CARRIED

Harbours – Power Washing Rate
Res. #00-270

Moved by Councillor Gemmell, seconded by Councillor Beauchesne that Council Policy #91-003 be rescinded.
CARRIED

South Harbour – Courtesy Moorage Fees
Res. #00-271

Moved by Councillor Gemmell, seconded by Councillor Gabelhouse that Council Policy #80-001 be rescinded.
CARRIED

North Harbour – Removal of Floats
Res. #00-272

Moved by Councillor Gemmell, seconded by Councillor Beauchesne that Council Policy 86-001 be amended as follows:
Where the removal of floats is requested to accommodate an applicant, and if the District is willing to remove the float, the applicant will be advised of the estimated cost and the District will remove the float if the applicant agrees to absorb the cost.

CARRIED

North Harbour Tie Up Area
Res. #00-273

Moved by Councillor Gemmell, seconded by Councillor Gabelhouse that Council Policy #89-001 be reaffirmed as follows:

That a $25.00 daily charge be levied to vessels parking in the tie up area at the launching ramp for longer than the 15 minute limit, and further that appropriate signs be erected. CARRIED

North Harbour Sublease Contracts
Res. #00-274

Moved by Councillor Gemmell, seconded by Councillor Misner that Council Policy #99-015 be reaffirmed as follows:

1. Effective June 1, 1999, upon entering into a subcontract for moorage in the North Harbour, the subcontractor shall be issued a parking permit for parking in the Municipal Marina Parking Lot.

2. The parking permit shall be valid only for the time period of the subcontract.
CARRIED

North Harbour – Dinghy Storage
Res. #00-275

Moved by Councillor Gemmell, seconded by Councillor Wilson that Council Policy #90-024 be reaffirmed as follows:

That a site be established for dinghy storage either by mooring in a 16 foot berth or by rental of storage space located on the concrete pad by the northern gate at the North Harbour, at a rental rate of $50.00 per year (to be pro-rated for a portion of a year). CARRIED

North Harbour – Live Aboard
Res. #00-276

Moved by Councillor Gemmell, seconded by Councillor Gabelhouse that Council Policy #94-002 be rescinded.
CARRIED

Air Performance Bond – Air Carriers

This item was postponed pending receipt of additional information regarding the reasons for the policy and whether other classes of business were subject to similar requirements.

MINUTES OF ECONOMIC DEVELOPMENT COMMITTEE MEETING HELD 15 JUNE 2000

Councillor Storry reported on an Economic Development Committee meeting held 15 June 2000.

MINUTES OF PLANNING COMMITTEE ROUND TABLE ON FUTURE GROWTH HELD 14 JUNE 2000

Councillor Wilson reported on a Planning Committee Round Table on Future Growth meeting held 14 June 2000.

MINUTES OF PLANNING COMMITTEE MEETING HELD 14 JUNE 2000

Councillor Wilson reported on a Planning Committee meeting held 14 June 2000.

OCP/Zoning Amendment Application – Kamloops Street and Westview Avenue
Res.#00-277

Moved by Councillor Wilson, seconded by Councillor Misner that Schedule A of the "District of Powell River Zoning Bylaw No. 1851, 1999" be amended so that the vacant parcel at the northwest corner of Kamloops Street and Westview Avenue, legally described as Lot 18, Block B, District Lot 5105, Plan 13581, be rezoned from R2 to RM1.
CARRIED

Res. #00-278

Moved by Councillor Wilson, seconded by Councillor Beauchesne that consideration of Development Permit No. 105 be postponed pending finalization of rezoning. CARRIED

Res. #00-279

Moved by Councillor Wilson, seconded by Councillor Beauchesne that Schedule C to the "Official Community Plan of the Corporation of the District of Powell River Bylaw No. 1676, 1996" be amended so that the vacant parcel at the northwest corner of Kamloops Street and Westview Avenue, legally described as Lot 18, Block B, District Lot 5105, Plan 13581, be added to Development Permit Area #1. CARRIED

MINUTES OF PUBLIC WORKS COMMITTEE MEETING HELD 13 JUNE 2000

Councillor Storry reported on the Public Works Committee meeting held 13 June 2000.

MINUTES OF PUBLIC WORKS COMMITTEE MEETING HELD 15 JUNE 2000

Councillor Storry reported on the Public Works Committee meeting held 15 June 2000.

Wildwood Ratepayers Association – Wildwood Lagoon Res. #00-280	Moved by Councillor Storry, seconded by Councillor Misner that the Regional District be put on notice that the Municipality will be considering non-acceptance of liquid waste at the Wildwood Lagoon as part of its Liquid Waste Management Plan. CARRIED
Malaspina Strait Sewer Outfall Agreement Res. #00-281	Moved by Councillor Storry, seconded by Councillor Gemmell that the revised agreement for tenure over Crown Land for the purpose of maintenance of the Malaspina Strait Sewer Outfall be renewed for the sum of $1.00. CARRIED
Wildwood Water Supply Over District Lot 2358	Moved by Councillor Storry, seconded by Councillor Gabelhouse that the item be postponed pending a report on the impact on the watershed. DEFEATED
Res. #00-282	Moved by Councillor Storry, seconded by Councillor Gabelhouse that approval be given to the clearing of trees from Block 4 of District Lot 4901, Plan 5711 to ensure the protection of overhead power lines and that the Wildwood Ratepayers Association be notified in writing accordingly. CARRIED
Capital Budget 2000 – Reallocation of Funds Res. #00-283	Moved by Councillor Storry, seconded by Councillor Misner that the watermain replacement portion of Fernwood Avenue from Glacier to Field be removed from the 2000 capital list (watermain replacement – Fernwood Avenue, Kemano to Field) estimated at the sum of $69,000 and be reallocated to the watermain replacement on Hazelton Street from Fernwood to Ontario. CARRIED
Westview Wastewater Treatment Plant Res. #00-284	Moved by Councillor Storry, seconded by Councillor Beauchesne that the Council instruct the District solicitors to seek termination of the Contract between the District of Powell River and Hill, Murray and Associates Inc. for the Design/Build of the Westview Wastewater Treatment Plant. CARRIED
MINUTES OF COMMITTEE OF THE WHOLE MEETING HELD 14 JUNE 2000	Councillor Beauchesne reported on the Committee of the Whole meeting held 14 June 2000 to discuss Cranberry School Site.
Transfer of Cranberry School	Discussion occurred regarding the following:

Properties to District

- Heritage value of the properties;
- Refurbishment of similar properties in Gibsons;
- Possibility of extending deadline for property transfer;
- Other capital requirements, i.e. new No. 1 Fire Hall, new library, waterfront development;
- Under utilization of existing municipal facilities;
- High operating costs in comparison to revenue generated;
- Other options for siting portable hospital and PEP;
- Need to set goals and values and identify needs of the community.

Res. #00-285

Moved by Councillor Beauchesne, seconded by Councillor Misner that the District not proceed with the acquisition of the Cranberry School properties.
DEFEATED

Councillors Wilson, Gabelhouse, Gemmell and Mayor Alsgard opposed.

Res. #00-286

Moved by Councillor Wilson, seconded by Councillor Gabelhouse that the District proceed with the acquisition of the Cranberry School properties.
CARRIED

Councillors Storry, Beauchesne and Misner opposed.

MINUTES OF SPECIAL FINANCE COMMITTEE OF THE WHOLE MEETING HELD 14 JUNE 2000

Councillor Beauchesne reported on the Special Finance Committee-of-the-Whole meeting held 14 June 2000.

Powell River Kings Hockey Club Society
Res. #00-287

Moved by Councillor Beauchesne, seconded by Councillor Storry that staff be authorized to negotiate an agreement with the Powell River Kings Hockey Club Society with a view to enable the team to remain in Powell River for at least the remaining two years of their three year business plan. CARRIED

Signing Authority on Behalf of the Corporation of the District of Powell River
Res. #00-288

Moved by Councillor Beauchesne, seconded by Councillor Gemmell that council Policy #99-004 be ratified as follows: That persons elected and appointed to fulfill the duties of Mayor, Chief Administrative Officer, Municipal Clerk, Director of Financial Services and Manager of Accounting Services have signing authority on behalf of the

Corporation of the District of Powell River and that any two of these signatories must endorse all cheques and negotiable instruments on behalf of the District and that facsimile signatures for the Mayor and the Director of Financial Services may be used. CARRIED

Tax Incentive Policy
Res. #00-289

Moved by Councillor Beauchesne, seconded by Councillor Misner that Council Policy #98-011 be rescinded. CARRIED

MINUTES OF PARKS, RECREATION AND CULTURE COMMITTEE MEETING OF 20 JUNE 2000

The Minutes of the Parks, Recreation and Culture Committee meeting held 20 June 2000 were not available at this time and will be brought forward at the meeting of 17 July 2000.

Grant in Aid – Powell River Curling Club
Res. #00-290

Moved by Councillor Beauchesne, seconded by Councillor Gabelhouse that Council approve the Grant In Aid to Powell River Curling Club in the amount of $2,500 for the July 2000 Summer Bonspiel.
CARRIED

Willingdon Beach Park/Campsite (Cabin Roof and Garbage Containers)
Res. #00-291

Moved by Councillor Misner, seconded by Councillor Gabelhouse that approval be given for $12,000 from General Operating Contingency Fund for the Willingdon Beach Caretaker building roof replacement and for bear proof containers at Willingdon Beach Campsite.
CARRIED

STAFF REPORTS

Annual Financial Statements and Report of Remuneration and Expenses

The Director of Financial Services presented the 1999 Audited Financial Statements and the 1999 Report of Remuneration and Expenses.

Res. #00-292

Moved by Councillor Beauchesne, seconded by Councillor Wilson that Council receive the 1999 Financial Statements and the 1999 Report of Remuneration and Expenses. CARRIED

MOTIONS

Council Policies:

Bylaws – Legal Description and Street Address
Res. #00-293

Moved by Councillor Wilson, seconded by Councillor Beauchesne that Council Policy #56-002 be reaffirmed as follows:

Whenever Bylaws, Rezoning Plans, Subdivision, etc., are presented to Council, street address must be given in addition to legal description.
CARRIED

Subdivision Approvals Waiving the Frontage Perimeter Ratio Requirement for Panhandle Lots
Res. #00-294

Moved by Councillor Wilson, seconded by Councillor Beauchesne that Council Policy #94-006 be reaffirmed as follows:
That in the interests of streamlining the municipality's subdivision approval process, the Municipal Council delegate the authority to waive the frontage perimeter ratio requirement for panhandle lots to the Approving Officer. CARRIED

Land Sales
Res. #00-295

Moved by Councillor Wilson, seconded by Councillor Misner that Council Policy #80-002 be amended to read as follows:
Whereby if local government owned lands, exempt from local tax assessment are sold, the successful bidder shall make a proportional payment to the District in lieu of taxes for that tax year. The payment amount shall be set by Council and be based upon equivalent properties sharing comparable use and similar character.

CARRIED

Easements
Res. #00-296

Moved by Councillor Wilson, seconded by Councillor Gabelhouse that Council Policy #81-002 be amended to read as follows:
That the payment to property owners for municipal water, sewer and storm utility easements across their private property not exceed $200.
CARRIED

Easement and Right-of-Way Documents – Execution
Res. #00-297

Moved by Councillor Wilson, seconded by Councillor Gemmell that Council Policy #89-002 be reaffirmed as follows:
That where municipal water, sewer or drainage services are located on public or private property, the Mayor and Municipal Clerk are authorized to execute and affix the Corporate seal to an easement agreement or statutory right-of-way agreement under Section 214 of the *Land Title Act* or a License of Occupation under Section 36 of the *Land Act* with the owner of that property.
CARRIED

Encroachment
Res. #00-298

Moved by Councillor Wilson, seconded by Councillor Storry that Council rescind Policy #90-015 regarding delegation of authority to the Approving Officer to enter

into encroachment agreements.

CARRIED

Development Variance Policy – Minimum Lot Area Requirement
Res. #00-299

Moved by Councillor Wilson, seconded by Councillor Storry that Council Policy #93-002 be rescinded. CARRIED

Development Permit Applications – Renovations
Res. #00-300

Moved by Councillor Wilson, seconded by Councillor Gabelhouse that Council Policy #90-013 be rescinded. CARRIED

BYLAWS

Bylaw No. 1894, 2000

Res. #00-301

Councillor Gemmell read the contents of Bylaw No. 1894, 2000.

Moved by Councillor Gemmell, seconded by Councillor Storry that "District of Powell River Officers Bylaw No. 1894, 2000" be reconsidered, finally passed and adopted. CARRIED

Bylaw No. 1895, 2000

Res. #00-302

Councillor Wilson read the contents of Bylaw No. 1895, 2000.

Moved by Councillor Wilson, seconded by Councillor Gabelhouse that "Official Community Plan of the Corporation of the District of Powell River Bylaw No. 1676, 1996, Amendment Bylaw No. 1895, 2000" be read a first and second time. CARRIED

Bylaw No. 1896, 2000

Res. #00-303

Councillor Wilson read the contents of Bylaw No. 1896, 2000.

Moved by Councillor Wilson, seconded by Councillor Beauchesne that "District of Powell River Zoning Bylaw No. 1851, 1999, Amendment Bylaw No. 1896, 2000" be read a first and second time.
CARRIED

NEW BUSINESS

Notice of Public Hearing

Councillor Wilson read a Notice of Public Hearing

advising the public that Council would be meeting 17 July 2000 to consider Bylaws 1895 and 1896.

Proposed Development Variance Permit No. 102 (3936 Victoria)

This matter was postponed pending receipt of a recommendation from the Planning Committee.

In Camera Motion

Res #00-304

Moved by Councillor Beauchesne, seconded by Councillor Storry that Council hold an In Camera (Closed) meeting immediately following this meeting to discuss items to be considered under Section 241. 2 (1) of the Municipal Act. CARRIED

ADJOURNMENT

Res #00-305

Moved by Councillor Gemmell that this meeting adjourn at 2150.

CERTIFIED CORRECT:

Stewart B. Alsgard, Mayor

Maggie Knox, Interim Municipal Clerk

The next Regular Meeting of the

Council of the District of Powell River will be held at 1930, 17 July 2000 in the Council Chambers of Municipal Hall.