APPENDIX B

PHOTOS

Photo 1. Substrate of north shoreline.

Photo 2a and 2b. Substrate of south shoreline.

Photo 3. Path of outlet stream over large cliff. Photo taken from base of cliff.

Photo 4. Path of outlet stream through mossy area at base of large cliff. Photo taken from bay.

Photo 5. Cobble/boulder substrate at shoreline of Telik Inlet.

APPENDIX C

STAKEHOLDER CONSULTATION

Cape Dorset Sewage Treatment System – Agencies Contacted With Regard to Feasibility of Using P Lake Lagoon System

Regulatory Agency	Date	Phone Number	Contact	Comment
Department of Fisheries and Oceans (DFO)	March 17, 2005	Ph. 867-979-8007 Fx. 867-979-8039 GordanierT@DFO-MPO.GC.CA	**Tania Gordanier** *Habitat Biologist*	- Authorization under section 35 (2) of the Fisheries Act - Policy of Net Gain, compensate for lost habitat. Must include a work plan describing area to be enhanced and monitoring program. - Engineering drawings should be included with position letter. Traditional knowledge is always beneficial as well. - DFO will need to assess any stream crossings that might occur during construction of road to P Lake - Once application is made to DFO they will initiate the CEA screening process under the Canadian Environmental Assessment Act.
Department of Health and Social Services	March 17, 2005	Ph. 867-975-4817 Fx. 867-975-4830	**Wanda Joy** *Public Health Officer*	- There is no application required, but the construction must meet the guidelines set out under the Public Health Act: *Public Sewage Systems Regulations* - They require that a copy of the work plan and associated drawings be sent to them
Environment Canada (EC)	March 18, 2005	Ph. 867-6694730	**Craig Broome** *Head Enforcement*	- There are no requirements from the enforcement division right now. - Should contact Colette Meloche in Iqaluit

Agency	Date	Phone Number	Contact	Comment
Environment Canada (EC)	March 21, 2005	Ph. 867-975-4639 Fx. 867-975-4645	**Colette Meloche** *Environmental Assessment Specialist*	- EC will get involved once the application to DFO and the NWB has been submitted. - Enforcement officers will be notified of the situation and will complete inspections once work is initiated - There are no permits or approvals required from EC at this time
Department of Indian and Northern Affairs (DIAND)	March 21, 2005	Ph. 867-975-4298 Fx. 867-975-6445	**Constantine Bodykevich** *Water Resources Officer*	- Requirement to meet CCME guidelines re: Discharge into Salt Water - DIAND will review work plan once application to NWB has been submitted

APPENDIX D

POPULATION STATISTICS

Nunavut: Community Population Projections

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Nunavut	27,688	28,410	29,154	29,885	30,601	31,317	32,036	32,774	33,530	34,311	35,114
Arctic Bay	730	747	763	782	801	819	837	855	876	894	916
Arviat	1,690	1,736	1,784	1,833	1,883	1,929	1,982	2,033	2,088	2,142	2,198
Baker Lake	1,470	1,501	1,534	1,563	1,594	1,624	1,655	1,683	1,712	1,745	1,777
Bathurst Inlet	X	X	X	X	X	X	X	X	X	X	X
Bay Chimo	X	X	X	X	X	X	X	X	X	X	X
Cambridge Bay	1,418	1,449	1,484	1,517	1,550	1,581	1,609	1,642	1,679	1,715	1,752
Cape Dorset	1,213	1,240	1,268	1,298	1,327	1,354	1,382	1,412	1,441	1,471	1,501
Chesterfield Inlet	372	382	391	401	409	420	431	443	452	465	476
Clyde River	771	789	812	830	848	867	890	913	937	959	982
Coral Harbour	845	865	888	911	933	955	978	1,003	1,024	1,049	1,078
Gjoa Haven	984	1,005	1,023	1,045	1,063	1,084	1,102	1,117	1,136	1,154	1,173
Grise Ford	145	146	147	146	146	147	149	151	151	153	155
Hall Beach	635	656	677	696	714	734	754	771	790	810	829
Igloolik	1,379	1,417	1,456	1,495	1,529	1,562	1,594	1,627	1,660	1,701	1,736
Iqaluit	4,762	4,930	5,108	5,278	5,438	5,606	5,768	5,936	6,108	6,289	6,477
Kimmirut	450	461	474	485	496	506	519	530	546	560	573
Kugaaruk	582	601	616	631	648	664	682	701	719	737	756
Kugluktuk	1,389	1,422	1,456	1,490	1,522	1,556	1,585	1,618	1,653	1,686	1,720
Nanisivik	230	225	224	226	225	223	222	220	221	221	220
Pangnirtung	1,506	1,539	1,575	1,613	1,651	1,687	1,722	1,756	1,792	1,831	1,870
Pond Inlet	1,314	1,361	1,405	1,443	1,489	1,532	1,574	1,624	1,668	1,714	1,761
Qikiqtarjuaq	522	537	551	566	582	599	614	629	641	654	668
Rankin Inlet	2,277	2,327	2,376	2,432	2,483	2,527	2,576	2,629	2,683	2,734	2,791
Repulse Bay	615	630	648	664	682	702	720	738	757	777	797
Resolute Bay	243	246	247	249	251	253	252	255	257	260	263
Sanikiluaq	702	722	740	758	776	796	816	834	853	873	896
Taloyoak	804	825	847	866	886	904	925	947	968	992	1,016
Whale Cove	312	321	328	336	344	351	358	367	378	388	397

Notes: Population projections produced by Statistics Canada and the Nunavut Bureau of Statistics include people in the population who are residents of Nunavut and do NOT have a home elsewhere in Canada from which they are temporarily absent. Therefore, temporary residents such as construction crews, residents in mining camps, etc. are not included in the population projections.

Data are suppressed for (a) communities with a population of 50 or less and (b) 'unorganized areas' -- but they are included in the Nunavut total.

Released by the Nunavut Bureau of Statistics *March 2000*

Nunavut: Community Population Projections

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Nunavut	35,114	35,937	36,773	37,619	38,471	39,335	40,217	41,106	42,001	42,904	43,824
Arctic Bay	916	939	960	980	1,003	1,019	1,033	1,049	1,065	1,078	1,094
Arviat	2,198	2,256	2,320	2,381	2,449	2,517	2,584	2,658	2,721	2,791	2,855
Baker Lake	1,777	1,808	1,843	1,882	1,918	1,957	1,996	2,036	2,072	2,108	2,148
Bathurst Inlet	X	X	X	X	X	X	X	X	X	X	X
Bay Chimo	X	X	X	X	X	X	X	X	X	X	X
Cambridge Bay	1,752	1,790	1,828	1,865	1,900	1,939	1,979	2,018	2,057	2,095	2,137
Cape Dorset	1,501	1,536	1,570	1,600	1,632	1,662	1,692	1,726	1,757	1,793	1,829
Chesterfield Inlet	476	486	498	509	519	528	539	549	563	572	583
Clyde River	982	1,007	1,028	1,050	1,072	1,095	1,121	1,144	1,167	1,190	1,214
Coral Harbour	1,078	1,101	1,128	1,158	1,187	1,219	1,250	1,281	1,312	1,345	1,376
Gjoa Haven	1,173	1,194	1,217	1,242	1,266	1,290	1,317	1,345	1,375	1,405	1,435
Grise Ford	155	157	160	160	163	165	166	168	169	172	173
Hall Beach	829	850	870	890	912	934	957	982	1,008	1,029	1,052
Igloolik	1,736	1,773	1,807	1,842	1,883	1,922	1,960	2,001	2,043	2,086	2,131
Iqaluit	6,477	6,669	6,866	7,064	7,276	7,456	7,637	7,814	7,997	8,178	8,391
Kimmirut	573	589	601	612	624	636	649	662	675	688	706
Kugaaruk	756	779	802	823	844	867	889	911	934	957	979
Kugluktuk	1,720	1,760	1,793	1,827	1,859	1,893	1,928	1,965	2,000	2,041	2,076
Nanisivik	220	218	215	215	209	205	202	200	196	195	191
Pangnirtung	1,870	1,905	1,955	1,995	2,032	2,074	2,117	2,160	2,202	2,243	2,280
Pond Inlet	1,761	1,808	1,851	1,904	1,951	1,999	2,047	2,093	2,137	2,184	2,233
Qikiqtarjuaq	668	683	697	711	724	737	752	765	780	795	811
Rankin Inlet	2,791	2,848	2,907	2,970	3,030	3,120	3,213	3,314	3,429	3,537	3,633
Repulse Bay	797	818	838	858	881	903	928	949	970	990	1,012
Resolute Bay	263	266	269	270	272	275	279	281	283	287	288
Sanikiluaq	896	918	939	963	987	1,008	1,029	1,050	1,069	1,090	1,108
Taloyoak	1,016	1,039	1,065	1,094	1,119	1,147	1,179	1,209	1,236	1,265	1,294
Whale Cove	397	405	412	422	432	442	450	458	469	481	491

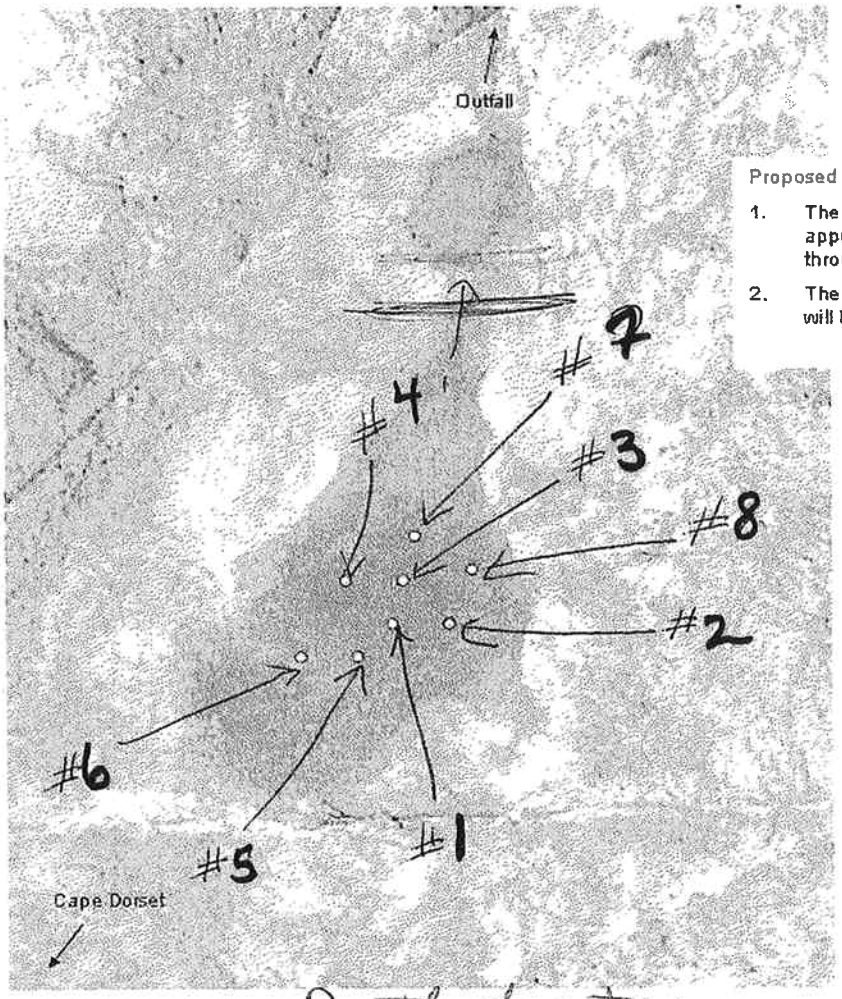
Notes: Population projections produced by Statistics Canada and the Nunavut Bureau of Statistics include people in the population who are residents of Nunavut and do NOT have a home elsewhere in Canada from which they are temporarily absent. Therefore, temporary residents such as construction crews, residents in mining camps, etc. are not included in the population projections.

Data are suppressed for (a) communities with a population of 50 or less and (b) 'unorganized areas' -- but they are included in the Nunavut total.

Released by the Nunavut Bureau of Statistics *March 2000*

APPENDIX E

P LAKE BATHYMETRY AND VOLUME



Proposed Drill Points:

1. The yellow spots indicate the approximate locations for drilling through the ice
2. The depth of the ice and water will be required.

P Lake

	Depth of Ice	Depth of water	Total Depth from Top to Bottom
1	4'	5'	9'
2	4'	5'	9'
3	4'	5'	9'
4	4'	1.5'	5.5'
5	4'	4'	8'
6	4'	2'	6'
7	4'	Ø	4'
8	4'	Ø	4'

APPENDIX F

DETERMINATION OF P LAKE WATER RECHARGE RATES

Tributary Area & Runoff Calculations

Condition: 10 Year Return Period
Location: "P" Lake Catchment area (Cape Dorset)

Date: 14-Apr-05
P.O.C. P Lake

Area No.	Cover or Dev. State	Approx. Grade (%)	Area (m^2)	Area (ha)	R*	A X R	Comments:
1	Undeveloped	34	118507	11.85	0.85	10.0731	Steep, solid rock
2	Undeveloped	4	108010	10.80	0.50	5.4005	Flat. Silt-soil. Storage
3	Undeveloped	30	67303	6.73	0.80	5.3842	Steep. Channeled rock
4	Undeveloped	10	58242	5.82	0.70	4.0770	Moderate, small storage
		ΣAreas=	352063	35.21	Total ΣAXR=	24.9348	

* R values were estimated using Table 2-26 "Watershed Characteristics for Determining Runoff Coefficinent..." (U.S. Soil Conservation Service)

Tc=Ts + Tr where,

Ts=Saturation Time (Inlet Time)
Tr=Running or system flow time

NOTE: For frozen or highly impervious surfaces, the value for Ts is near zero (0).

Method of Tr determination: Overland Flow Nomograph
Drop from Remote Point to Outlet: **25** m (From Topographic Map) Average Slope (%) = 5.2
Length of Overland Travel: **480** m (AutoCAD drawing - Figure 6)
Time Correction Factor: **1** (For Bare Earth)

Tr = **13** minutes (Overland Flow Nomograph)

Preliminary check: Velocity (average) = L/t **0.615 m/s**

CALCULATED FLOW (Qc):

Qc = (A · R · I) / 360 = (Total AR · I) / 360

Return Period: **10 years**
Drainage Area: **35.2** (AutoCAD drawing - Figure 6)
Total AR: **24.9** (See above)
Running Time (Tr): **7** (Overland Flow Nomograph - attached)
Saturation time (Ts): **3** (near 0 for frozen/impervious surfaces)
Concentration Time (Tc): **10** (minutes)
Intensity: **18** (mm/hr) - IDF curves for Cape Dorset

$$Q_{10} = \frac{24.9 \times 18}{360}$$

Q_{10} = **1.2467 m^3/s**

DESIGN FLOW:

$Q_d = Q_{10} \cdot (1+A\%)(1+R\%)(1+I\%)(FOS)$

Where: FOS 0.10
A%= 0.05
R%= 0.20
I%= 0.05

Q_d= 1.81 m^3/s

Cape Dorset A, NU WATER BUDGET MEANS FOR THE PERIOD 1980-1993

P' LAKE CATCHMENT AREA CALCULATIONS

LAT.... 64.23 WATER HOLDING CAPACITY... 5 MM HEAT INDEX... 3.42
LONG... 76.53 LOWER ZONE..... 3 MM A..... .553

MONTH	TEMP °C	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P	AREA (m3)	AREA (ha)	AVRG Q (m^3/week)	AVRG Q (m^3/day)	AVRG Q (m^3/hr)	AVRG Q (m^3/sec)	AVRG Q (L/min)
01-Jan	-24	4	0	0	0	0	0	0	94	5	113	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Jan	-24.9	5	0	0	0	0	0	0	99	5	117	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Jan	-24.3	6	0	0	0	0	0	0	105	5	123	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Jan	-25.4	3	0	0	0	0	0	0	109	5	127	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-Feb	-27.3	4	0	0	0	0	0	0	112	5	131	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Feb	-26	2	0	0	0	0	0	0	114	5	133	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Feb	-25.5	6	0	0	0	0	0	0	120	5	139	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Feb	-24.5	5	0	0	0	0	0	0	125	5	144	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-Mar	-25.4	3	0	0	0	0	0	0	128	5	146	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Mar	-23.6	6	0	0	0	0	0	0	134	5	153	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Mar	-22.9	4	0	0	0	0	0	0	138	5	157	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Mar	-20.4	5	0	0	0	0	0	0	143	5	161	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-Apr	-18.5	5	0	0	0	0	0	0	148	5	166	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Apr	-18.4	5	0	0	0	0	0	0	153	5	171	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Apr	-16.7	7	0	0	0	0	0	0	160	5	177	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Apr	-13.9	8	0	0	0	0	0	0	168	5	184	352063	35.21	0.00	0.00	0.00	0.0000	0.00
05-Apr	-10.6	6	0	0	0	0	0	0	173	5	189	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-May	-8.9	8	0	0	0	0	0	0	182	5	197	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-May	-7.7	6	0	0	0	0	0	0	188	5	204	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-May	-5.6	4	0	4	1	1	0	3	188	5	209	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
04-May	-3.7	8	1	6	2	2	0	5	189	5	217	352063	35.21	1760.31	251.47	10.48	0.0029	174.63
01-Jun	-1.3	8	2	18	4	4	0	15	177	5	224	352063	35.21	5280.94	754.42	31.43	0.0087	523.90
02-Jun	-0.1	7	5	14	5	5	0	15	164	5	231	352063	35.21	5280.94	754.42	31.43	0.0087	523.90
03-Jun	1.6	5	5	32	13	12	0	25	133	4	236	352063	35.21	8801.57	1257.37	52.39	0.0146	873.17
04-Jun	3.3	5	4	59	21	18	-4	46	75	4	242	352063	35.21	16194.89	2313.56	96.40	0.0268	1606.64
01-Jul	5.7	3	3	59	29	18	-11	45	16	3	245	352063	35.21	15842.82	2263.26	94.30	0.0262	1571.71
02-Jul	6.3	6	6	10	31	12	-19	6	6	1	251	352063	35.21	2112.38	301.77	12.57	0.0035	209.56
03-Jul	8.4	5	5	6	35	7	-28	5	0	0	257	352063	35.21	1760.31	251.47	10.48	0.0029	174.63
04-Jul	7.6	8	8	0	32	8	-25	0	0	0	265	352063	35.21	0.00	0.00	0.00	0.0000	0.00
05-Jul	7.8	11	11	0	32	11	-20	0	0	0	275	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-Aug	6.3	8	8	0	27	8	-19	0	0	0	283	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Aug	6.3	14	14	0	26	13	-13	1	0	1	297	352063	35.21	352.06	50.29	2.10	0.0006	34.93
03-Aug	6	16	16	0	24	13	-11	3	0	1	314	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
04-Aug	5.3	17	17	0	21	11	-10	6	0	2	331	352063	35.21	2112.38	301.77	12.57	0.0035	209.56
01-Sep	3.7	15	15	0	16	9	-7	6	0	2	347	352063	35.21	2112.38	301.77	12.57	0.0035	209.56
02-Sep	3.3	11	11	0	14	8	-7	3	0	2	358	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
03-Sep	1.9	6	6	1	10	4	-5	2	0	2	365	352063	35.21	704.13	100.59	4.19	0.0012	69.85
04-Sep	0.7	17	16	0	6	5	-1	9	1	4	382	352063	35.21	3168.56	452.65	18.86	0.0052	314.34
05-Sep	-1.4	7	5	0	2	2	0	3	3	4	390	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
01-Oct	-2.3	9	4	1	1	1	0	3	8	5	10	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
02-Oct	-2.9	8	2	2	0	0	0	3	12	5	18	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
03-Oct	-4.6	10	1	1	0	0	0	2	19	5	28	352063	35.21	704.13	100.59	4.19	0.0012	69.85
04-Oct	-5.8	10	2	2	0	0	0	3	26	5	39	352063	35.21	1056.19	150.88	6.29	0.0017	104.78
01-Nov	-8.4	7	0	0	0	0	0	1	33	5	46	352063	35.21	352.06	50.29	2.10	0.0006	34.93
02-Nov	-9.5	12	0	0	0	0	0	0	45	5	58	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Nov	-13.7	10	0	0	0	0	0	0	54	5	68	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Nov	-13.7	13	0	0	0	0	0	0	67	5	80	352063	35.21	0.00	0.00	0.00	0.0000	0.00
01-Dec	-14.8	7	0	0	0	0	0	0	74	5	87	352063	35.21	0.00	0.00	0.00	0.0000	0.00
02-Dec	-18.3	5	0	0	0	0	0	0	79	5	92	352063	35.21	0.00	0.00	0.00	0.0000	0.00
03-Dec	-20.2	6	0	0	0	0	0	0	86	5	99	352063	35.21	0.00	0.00	0.00	0.0000	0.00
04-Dec	-22.4	7	0	0	0	0	0	0	93	5	106	352063	35.21	0.00	0.00	0.00	0.0000	0.00
05-Dec	-24.2	6	0	0	0	0	0	0	99	5	112	352063	35.21	0.00	0.00	0.00	0.0000	0.00

Cape Dorset

STANDARD DEVIATIONS FOR THE PERIOD 1980 - 1993

MONTH	TEMP °C	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P
01-Jan	4.3	2	0	0	0	0	0	0	38	1	26
02-Jan	3.8	3	0	0	0	0	0	0	37	1	27
03-Jan	4.3	4	0	0	0	0	0	0	38	1	28
04-Jan	5.9	3	0	0	0	0	0	0	38	1	28
01-Feb	3.5	3	0	0	0	0	0	0	40	1	29
02-Feb	5.5	1	0	0	0	0	0	0	40	1	29
03-Feb	4.3	3	0	0	0	0	0	0	40	1	30
04-Feb	4.7	4	0	0	0	0	0	0	40	1	30
01-Mar	6	3	0	0	0	0	0	0	40	1	31
02-Mar	5.2	6	0	0	0	0	0	0	43	1	33
03-Mar	4.3	3	0	0	0	0	0	0	44	1	34
04-Mar	5.5	4	0	0	0	0	0	0	43	1	34
01-Apr	4.6	4	0	0	0	0	0	0	44	1	35
02-Apr	2.4	4	0	0	0	0	0	0	44	1	36
03-Apr	3.7	6	0	0	0	0	0	0	45	1	37
04-Apr	3.9	7	0	0	0	0	0	0	45	1	40
05-Apr	3.8	5	0	0	0	0	0	0	44	1	40
01-May	2.2	7	0	0	0	0	0	0	50	1	46
02-May	2.9	6	0	1	0	0	0	0	53	1	49
03-May	3.4	3	1	11	3	3	0	9	58	1	51
04-May	2.8	8	2	11	3	3	0	9	60	1	48
01-Jun	2.1	6	3	28	7	7	0	23	82	0	51
02-Jun	1.1	7	7	17	5	5	0	15	87	0	48
03-Jun	2.2	8	8	23	9	8	1	17	94	2	52
04-Jun	1.6	6	5	39	7	8	8	31	86	2	51
01-Jul	1.9	4	4	67	6	13	14	55	50	3	51
02-Jul	1.4	9	9	26	4	10	11	23	24	2	51
03-Jul	2.9	5	5	24	7	8	13	19	0	1	51
04-Jul	2.4	8	8	0	6	6	11	1	0	1	50
05-Jul	2	9	9	0	5	8	11	0	0	0	53
01-Aug	1.5	7	7	0	4	7	9	0	0	0	52
02-Aug	2	10	10	0	4	8	11	2	0	2	55
03-Aug	1.8	14	14	0	4	8	11	7	0	2	53
04-Aug	1.9	19	19	0	4	8	10	14	0	2	61
01-Sep	1.7	15	15	0	4	6	9	10	0	2	63
02-Sep	1.4	11	11	0	4	6	8	6	0	2	65
03-Sep	1.8	7	7	2	5	3	6	4	0	2	63
04-Sep	1.5	12	10	0	4	4	2	8	4	2	66
05-Sep	1.9	6	6	1	3	3	1	5	4	2	64
01-Oct	1.6	7	5	2	2	2	0	4	7	1	7
02-Oct	1.5	5	2	2	1	1	0	4	11	1	7
03-Oct	2.1	7	3	4	1	1	0	4	11	1	10
04-Oct	3.1	6	4	5	1	1	0	9	16	1	11
01-Nov	4	4	1	1	0	0	0	1	18	1	12
02-Nov	3.1	6	0	0	0	0	0	0	17	1	11
03-Nov	3.8	8	0	0	0	0	0	0	23	1	17
04-Nov	3.2	7	0	0	0	0	0	0	27	1	21
01-Dec	4.5	4	0	0	0	0	0	0	27	1	22
02-Dec	5.1	3	0	0	0	0	0	0	26	1	21
03-Dec	5.4	4	0	0	0	0	0	0	27	1	22
04-Dec	4.4	5	0	0	0	0	0	0	28	1	24
05-Dec	4.4	6	0	0	0	0	0	0	28	1	26

APPENDIX G

GEOTECHNICAL INVESTIGATION

APPENDIX H

DETERMINATION OF CULVERT PEAK DESIGN FLOW

Tributary Area & Runoff Calculations

Condition: 10 Year Return Period **(using HIGHER "R" values)** **Date:** 14-Apr-05
Location: Catchment area affecting new sewage lagoon access Rd **P.O.C.** New Culvert

Area No.	Cover or Dev. State	Approx. Grade (%)	Area (m^2)	Area (ha)	R*	A X R	Comments:
5	Undeveloped	8	19838	1.98	0.50	0.9919	Relatively flat. Silt-like soil
6	Undeveloped	25	38582	3.86	0.85	3.2794	Fairly Steep, No storage
7	Undeveloped	30	79812	7.98	0.70	5.5869	Moderate slope, with storage
8	Undeveloped	9	52582	5.26	0.60	3.1549	Moderate slope, with storage
9	Undeveloped	6	73192	7.32	0.60	4.3915	Moderate slope, with storage
10	Undeveloped	7	153084	15.31	0.60	9.1850	Moderate slope, with storage
		∑Areas=	417089	41.71	Total ∑AXR=	26.5896	

* R values were estimated using Table 2-26 "Watershed Characteristics for Determining Runoff Coefficinent..." (U.S. Soil Conservation Service)

Tc=Ts + Tr where,

Ts=Saturation Time (Inlet Time)
Tr=Running or system flow time

NOTE: For frozen or highly impervious surfaces, the value for Ts is near zero (0).

Method of Tr determination: Overland Flow Nomograph
Drop from Remote Point to Outlet: **85** m (From Topographic Map) Average Slope (%) = 6.7
Length of Overland Travel: **1270** m (AutoCAD drawing - Figure 6)
Time Correction Factor: **1** (For Bare Earth)

Tr = **13** minutes (Overland Flow Nomograph)

Preliminary check: Velocity (average) = L/t **1.628 m/s**

CALCULATED FLOW (Qc):

Qc = (A · R · I) / 360 = (Total AR · I) / 360

Return Period: **10 years**
Drainage Area: **41.7** (AutoCAD drawing - Figure 6)
Total AR: **26.6** (See above)
Running Time (Tr): **13** (Overland Flow Nomograph - attached)
Saturation time (Ts): **2** (near 0 for frozen/impervious surfaces)
Concentration Time (Tc): **15** (minutes)
Intensity: **16** (mm/hr) - IDF curves for Cape Dorset

$$Q_{10} = \frac{26.6 \times 16}{360}$$

Q_{10} = **1.1818 m^3/s**

DESIGN FLOW:

$Qd = Q_{10} \cdot (1+A\%)(1+R\%)(1+I\%)(FOS)$

Where: FOS 0.10
A%= 0.05
R%= 0.20
I%= 0.05

Q_d= 1.72 m^3/s

Catchment Area for culvert Calcs. (Total = 41.7 ha)

Watershed Characteristics

TABLE 2-26. WATERSHED CHARACTERISTICS FOR DETERMINING RUNOFF COEFFICIENT IN THE RATIONAL FORMULA

(Source: U.S. Soil Conservation Service)

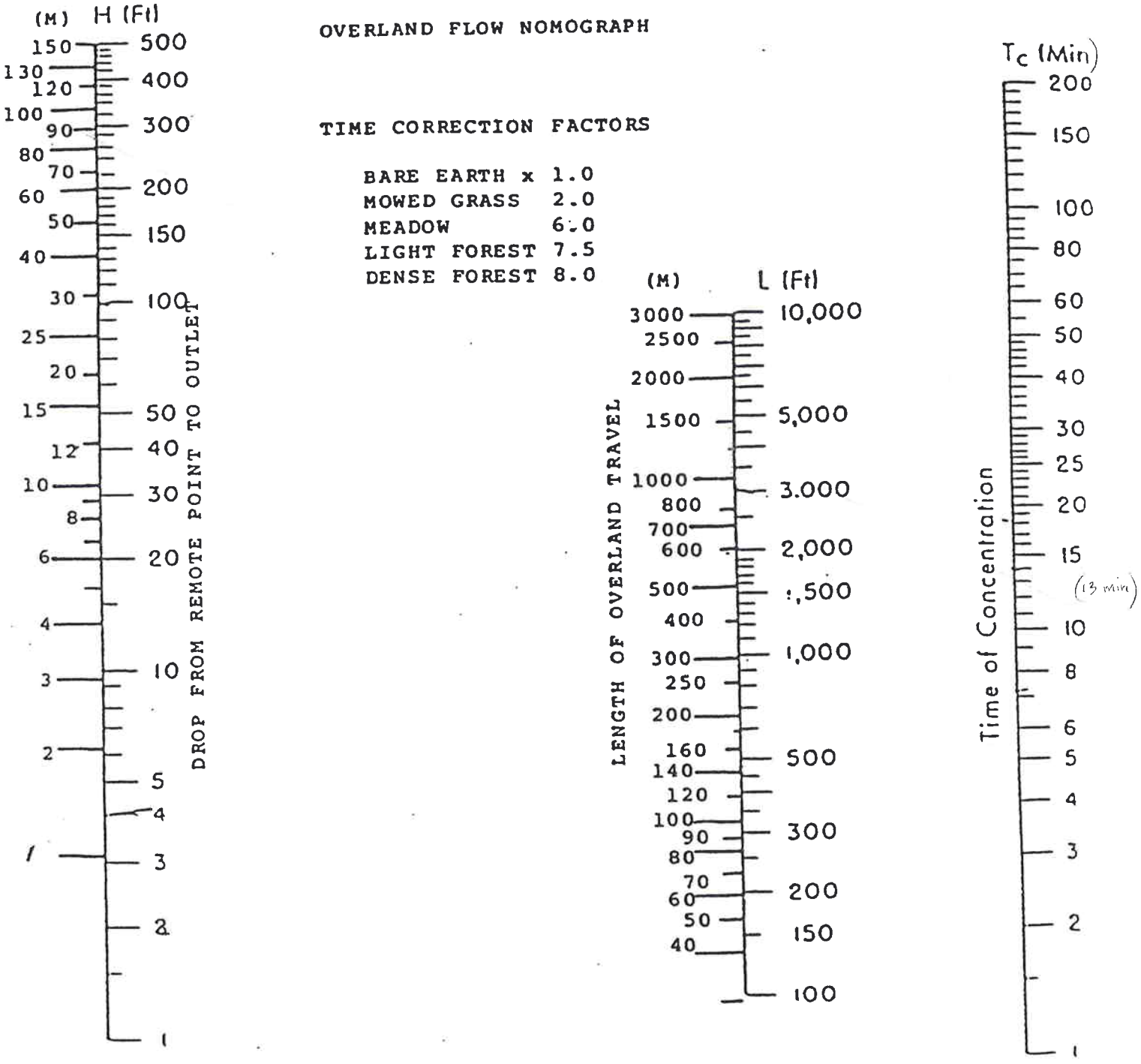
[For each watershed characteristic in left column select appropriate descriptive box; add four numerical values given in parentheses to obtain runoff coefficient as a percentage.]

Designation of watershed characteristics	Runoff-producing characteristics			
	100 extreme	75 high	50 normal	25 low
(A) Relief	(40) Steep, rugged terrain, with average slopes generally above 30%	(30) Hilly, with average slopes of 10 to 30%	(20) Rolling, with average slopes of 5 to 10%	(10) Relatively flat land, with average slopes of 0 to 5%
(B) Soil infiltration	(20) No effective soil cover, either rock or thin soil mantle of negligible infiltration capacity	(15) Slow to take up water; clay or other soil of low infiltration capacity, such as heavy gumbo	(10) Normal; deep loam with infiltration about equal to that of typical prairie soil	(5) High; deep sand or other soil that takes up water readily and rapidly
(C) Vegetal cover	(20) No effective plant cover; bare or very sparse cover	(15) Poor to fair; clean-cultivated crops or poor natural cover; less than 10% of drainage area under good cover	(10) Fair to good; about 50% of drainage area in good grassland, woodland, or equivalent cover; not more than 50% of area in clean-cultivated crops	(5) Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent cover
(D) Surface storage	(20) Negligible; surface depressions few and shallow; drainage-ways steep and small; no ponds or marshes	(15) Low; well-defined system of small drainage-ways; no ponds or marshes	(10) Normal; considerable surface-depression storage; drainage system similar to that of typical prairie lands; lakes, ponds and marshes less than 2% of drainage area	(5) High; surface-depression storage high; drainage system not sharply defined; large flood-plain storage or a large number of lakes, ponds or marshes

* Note: Areas are defined on Figure 6

Area # 5	Area # 6	Area # 7	Area # 8	Area # 9	Area # 10
(A): 20	(A) 30	(A) 30	(A) = 20	(A): 20	(A) = 20
(B): 5	(B) = 20	(B) = 10	(B) 10	(B) 10	(B) = 10
(C) 20	(C) = 20	(C) = 20	(C) = 20	(C) = 20	(C) = 20
(D): 5	(D) = 20	(D) = 10	(D) = 10	(D) = 10	(D) = 10
50	90	70	60	60	60

Cape Dorset (05-4319-2000)
New sewage treatment lagoon Road - Culvert Design.



OVERLAND FLOW CORRECTION FACTOR NOMOGRAPH

SHORT DURATION RAINFALL INTENSITY-DURATION FREQUENCY DATA FOR- CAPE DORSET AIRPORT NWT

DONNEES SUR L'INTENSITE,LA DUREE ET LA FREQUENCE DES CHUTES DE PLUIE DE COURTE DUREE A

GUMBEL-METHOD OF MOMENTS BASED ON RECORDING RAIN GAUGE DATA FOR THE PERIOD- 1971 - 1990 17 YEARS/AN

METHODE DES MOMENTS BASEES SUR LES DONNEES DU PLUVIOGRAPHES POUR LA PERIOD

INTENSITY - MM/HOUR INTENSITE EN MM/HEURE

1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100 200 300 400 500 600 700 800 900

5 10 15 20 30 60 2 6 12 24

MINUTES HOURS HEURES

DURATION DUREE

LATITUDE 60 ° 13'

LONGITUDE 75 ° 32'

ELEVATION/ALTITUDE 45 M

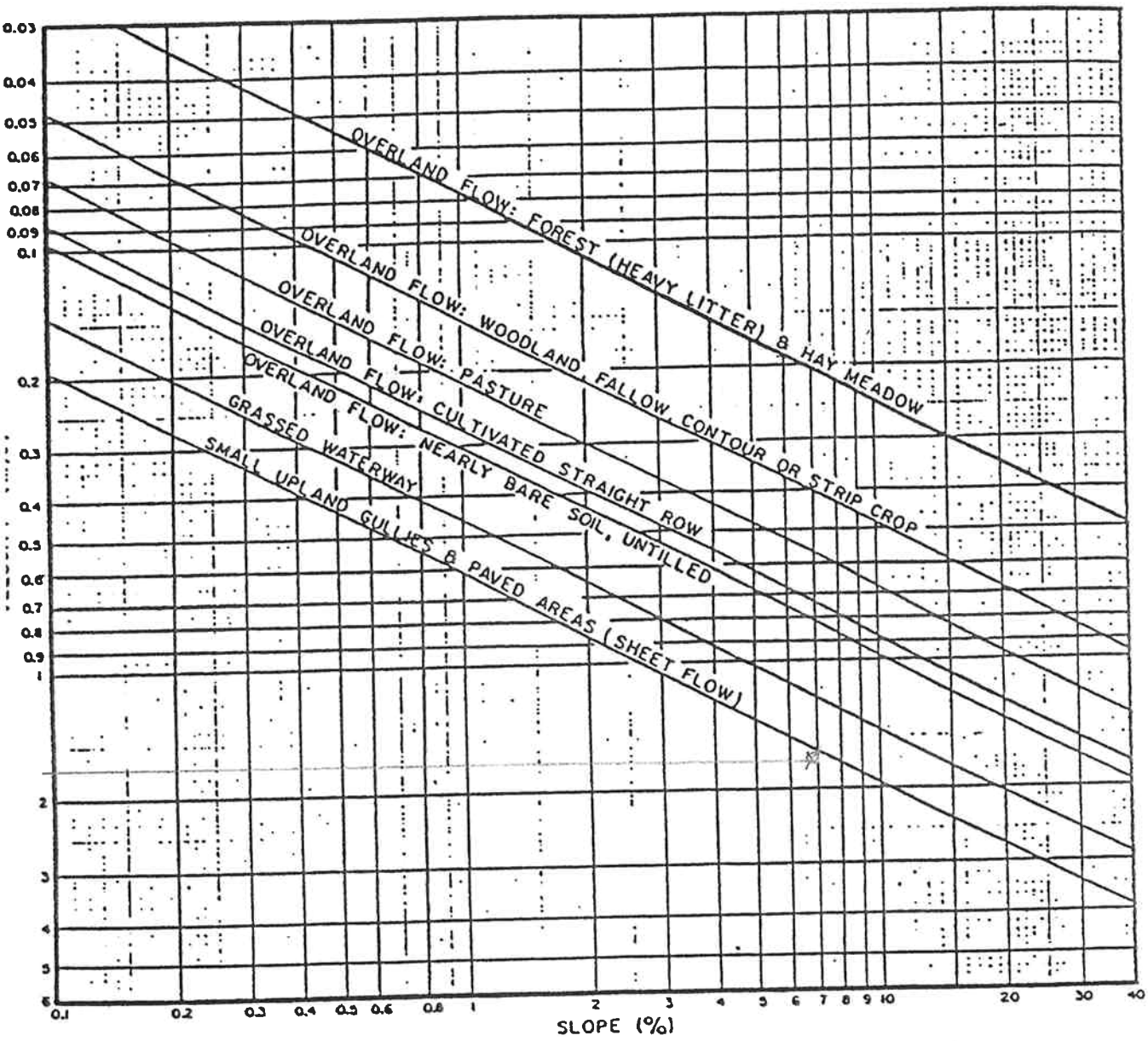
UNRELIABLE ESTIMATES - - - SUJET A CAUTION

RETURN PERIODS PERIODE DE RETOUR YEARS/ANS

2 5 10 25 50 100

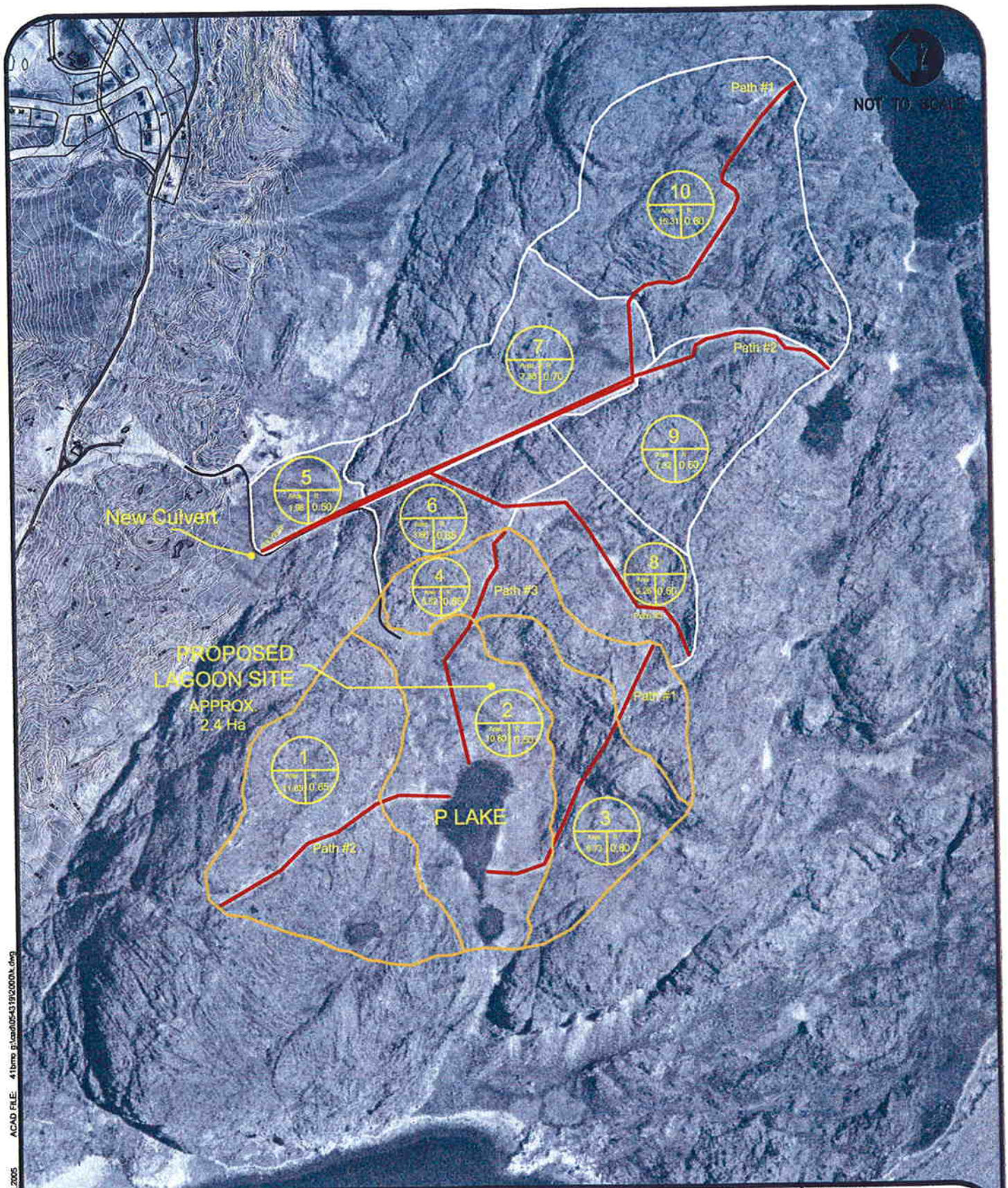
PREPARED BY - PREPARE PAR LE

ATMOSPHERIC ENVIRONMENT SERVICE - ENVIRONMENT CANADA
SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE - ENVIRONNEMENT CANADA



(~ 6.7% slope)

OVERLAND FLOW SURFACE VELOCITY NOMOPGRAPH



DILLON CONSULTING

PROJECT	Cape Dorset Sewage Treatment System
TITLE	Lake - P and Lagoon Site Catchment Areas
PROJECT NUMBER	05-4319-2000
DATE	May 05
FIGURE NUMBER	K

EDIT DATE: 30.05.2005 ACAD FILE: 41bmp p:\ae\05431920001k.dwg

APPENDIX I

ORGANIC LOADING CALCULATIONS

Year	Population	MACA Predicted Sewage Production (L/d)	BOD (mg/L)	Organic Loading (Kg/d)	Lagoon Area (ha)	Areal Organic Loading (Kg/ha/d)
2000	1213	1.40E+05	625	87	3.1	28
2001	1240	1.43E+05	625	90	3.1	29
2002	1268	1.47E+05	625	92	3.1	30
2003	1298	1.52E+05	625	95	3.1	31
2004	1327	1.56E+05	625	97	3.1	31
2005	1354	1.60E+05	625	100	3.1	32
2006	1382	1.64E+05	625	102	3.1	33
2007	1412	1.68E+05	625	105	3.1	34
2008	1441	1.73E+05	625	108	3.1	35
2009	1471	1.77E+05	625	111	3.1	36
2010	1501	1.82E+05	625	114	3.1	37
2011	1536	1.87E+05	625	117	3.1	38
2012	1570	1.92E+05	625	120	3.1	39
2013	1600	1.97E+05	625	123	3.1	40
2014	1632	2.02E+05	625	126	3.1	41
2015	1662	2.07E+05	625	129	3.1	42
2016	1692	2.12E+05	625	132	3.1	43
2017	1726	2.17E+05	625	136	3.1	44
2018	1757	2.22E+05	625	139	3.1	45
2019	1793	2.28E+05	625	142	3.1	46
2020	1829	2.34E+05	625	146	3.1	47
2021	1848	2.37E+05	625	148	3.1	48
2022	1879	2.42E+05	625	151	3.1	49
2023	1910	2.47E+05	625	155	3.1	50
2024	1941	2.53E+05	625	158	3.1	51
2025	1971	2.58E+05	625	161	3.1	52
2026	2002	2.63E+05	625	164	3.1	53

APPENDIX J

LETTER TO HUNTERS AND TRAPPERS ASSOCIATION

April 14, 2005

Qavaroak Qatsiya
Chairperson
Aiviq HTA
P.O. Box 300
Cape Dorset, Nunavut
X0A 0C0

Dear Qavaroak,

At our recent meeting, the Nunavut Wildlife Management Board (NWMB or Board) reviewed your application for funding for *Fish lakes and Rivers Restoration* project. The project was approved for funding in the amount of $29,216, subject to the following conditions:

1. The proponent should be encouraged to seek other sources of funding. This should be confirmed in writing.

2. Funding should be conditional on clarification of the budget line items A- $9,000 for 2 hunters/boat owners for 6 trips
   B- Specify what is included in the 5K in-kind from the HTO

3. Funding should be conditional on the Aiviq HTO being up to date and in satisfactory standing with NWMB for receiving regular funding from NWMB.

Conditions must be met before a contribution agreement will be established. The deadline for meeting these conditions is **30 June, 2005**. If you do not fulfil these conditions by that date, funding will not be provided for this year and a new application must be submitted for next year. Please let us know if you anticipate any problems in meeting this deadline.

Once you have met these conditions, a contribution agreement will be forwarded to the HTA for your review and signature.

I wish you success with this project.

Yours sincerely,

Josée Galipeau
A/Director Wildlife Management

cc. QWB
DFO Iqaluit