Industrial Development Subsidiary Agreement

A TIDEWATER LOG HANDLING FACILITY STUDY for the COWICHAN VALLEY REGIONAL DISTRICT

February 1981

Research Report

Province of British Columbia
Ministry of Industry and Small Business Development

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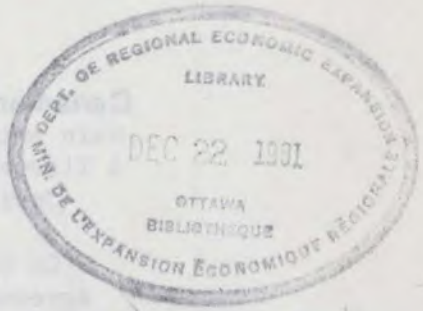
Expansion Économique Régionale



A TIDEWATER LOG HANDLING FACILITY STUDY for the COWICHAN VALLEY REGIONAL DISTRICT

February 1981

Prepared for

Cowichan Valley Economic Development Commission

Prepared by

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Victoria, B.C.

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The responsibility for the content of this report is the consultant's alone, and the conclusions reached herein do not necessarily reflect the opinions of those who assisted during the course of this investigation or the Federal and Provincial governments which funded the study.

STAGE I REPORT
COMPARING AND RANKING
SIX PROPOSED SITES
FOR A TIDEWATER
LOG HANDLING FACILITY
IN THE
COWICHAN VALLEY REGIONAL DISTRICT

R8015

File: 655

Prepared for the
Cowichan Valley Economic Development Commission

by

T.M. Thomson & Associates Ltd.
1006 Government Street
Victoria, B.C.
V8W 1X7

October, 1980

October 20, 1980

File No: 655

Cowichan Valley Economic Development Commission
#3 - 259 Craig Street
Duncan, B.C.
V9L 1W2

Attention: W. A. Fraser, Economic Development Officer

Dear Sirs:

Re: Site Determination Study for a Tidewater Log Handling Facility in the Cowichan Valley Regional District

Enclosed is our Stage I report for the above noted study, as required in Section C of the Terms of Reference, dated July 18, 1980. This report covers the first two main evaluation criteria:

(a) Determination of Necessity: Identification of the volume and kinds of logs the facility will have to handle, presently and in the future, incoming and outgoing.

(b) Comparison of Alternative Sites: The ranking of the six proposed sites on the basis of social, environmental and broad economic factors in order to produce a shortlist for more detailed economic analysis.

After a great deal of study, thought and consultation, we conclude that Sites #6 at Bamberton, #5 at Verdier Point, and #2 at Cowichan Bay Central are more suitable for the proposed tidewater log handling facility than the other three sites. We recommend that these three sites be subjected to the detailed economic analysis and operating pro forma required to finalize this study.

cont'd

We have maintained the schedule and methodology outlined in our August 8, 1980 study proposal and trust this report provides you with the necessary information and analysis. We would like to take this opportunity to thank you for your co-operation and assistance to date. We look forward to your early consent for us to carry out the final stage of this interesting and worthwhile project.

Yours very truly,

T. M. THOMSON & ASSOCIATES LTD.

Per: *W.A. Hopwood.*

W. A. Hopwood, R.P.F.

WAH:jl

Enc.

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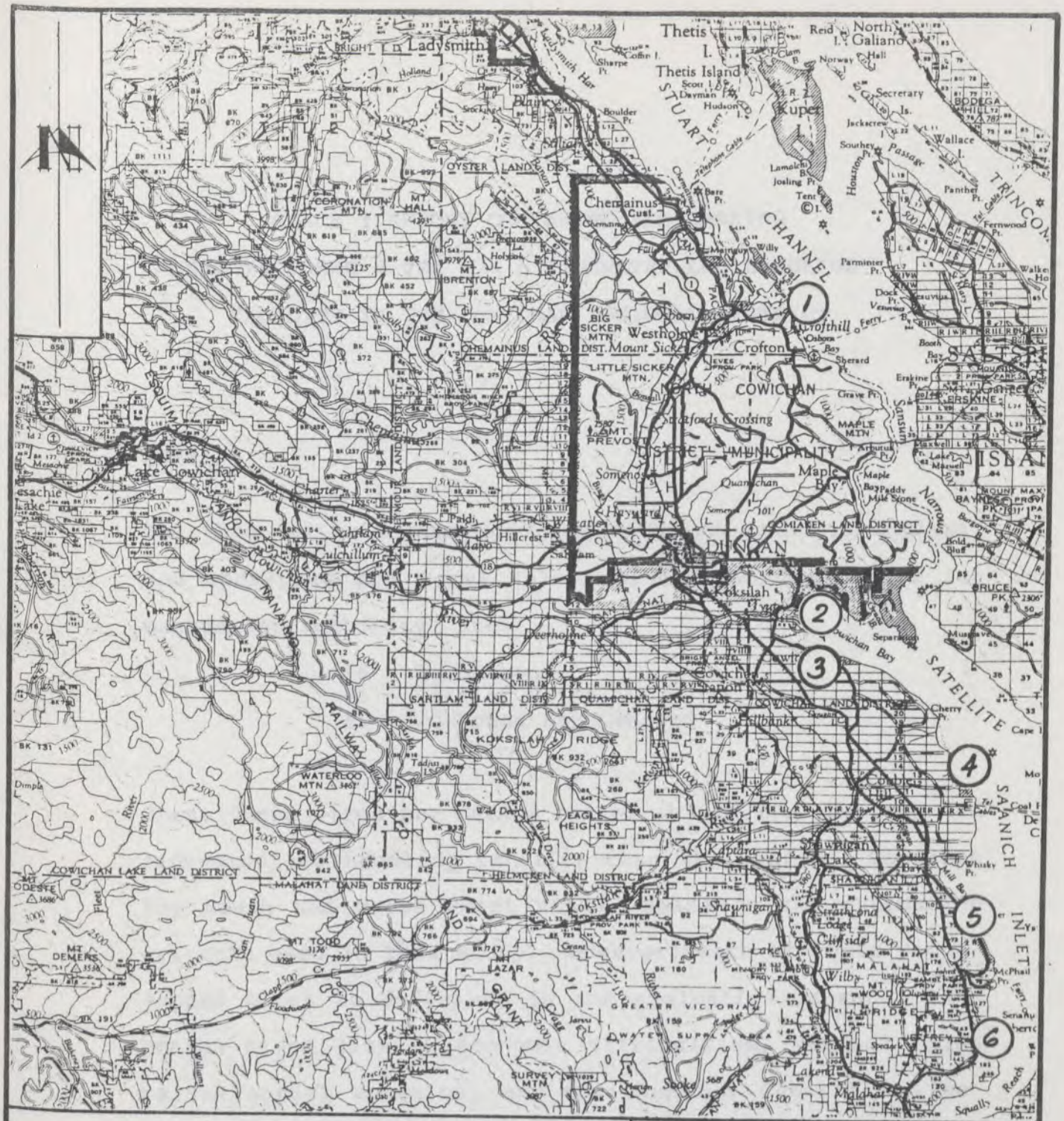
STAGE I REPORT



LEGEND

(1) PROPOSED LOG HANDLING FACILITY SITE

COWICHAN VALLEY ECONOMIC DEVELOPMENT COMMISSION

KEY MAP SHOWING FACILITY SITES

DATE 1980-10-16	SCALE Hor. 1:250 000	
DESIGNED	CHECKED	
DRAWN HMM	CHECKED	
APPROVED		
MAP REF. No.	DRAWING No. 655-6	REV.
AIR PHOTO No.		
FILE No. 655		

T.M. Thomson & Associates Ltd.
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1006 Government St., Victoria, B.C. V8W 1X7 Phone (604) 385-4468

STAGE I REPORT COMPARING AND RANKING SIX PROPOSED SITES FOR A TIDEWATER LOG HANDLING FACILITY IN THE COWICHAN REGIONAL DISTRICT

I. SUMMARY

The three sites recommended for detailed economic analysis and operating pro forma (along with a recommendation for management authority) are:

#6 - Bamberton
#5 - Verdier Point
#2 - Cowichan Bay Central

These three sites are deemed better suited for the proposed tidewater log handling facility than the Crofton, Cowichan Bay South and Hatch Point sites, based on the evaluation criteria used in this study. However, each of these recommended sites is deficient in one evaluation aspect. Bamberton gives rise to economic difficulties, Verdier Point raises social concerns, and Cowichan Bay Central has environmental problems.

With respect to necessity, an annual haul-out (incoming) volume of 38,800 cunits (110,000 m^3) is anticipated by 1985. This is a sufficient volume by itself to support

the proposed facility. Sufficient out-going log volume for trading and from independent loggers is anticipated to make it worthwhile to include a log dump in the facility.

The methodology employed in this study quantifies the evaluation criteria in a matrix format with ranking indices. It should be emphasized that the rating and ranking processes are, perforce, to a degree, subjective. Emphasis and importance are in the eye of the beholder. It will be noted that fairly heavy emphasis has been placed on economic factors. If increased emphasis had been placed on social and environmental factors, the Bamberton and Verdier Point sites would still have been shortlisted, while the Cowichan Central site would have been replaced by the Crofton site.

II. INTRODUCTION

This Stage I report is prepared in accordance with the Terms of Reference and the consultant's proposal* for this study.

The motivation for carrying out this study is the need for a tidewater log handling facility, expressed by the Vancouver Island Association of Specialty Mills and Independent Loggers (V.I.A.S.M.I.L.) whose members consider their economic viability could be greatly enhanced by access to a common log handling facility. Such a facility would give them (and other independent mills and loggers in the Cowichan Valley Regional District) much greater flexibility in buying, selling and trading logs. See Appendix I for an overview of the V.I.A.S.M.I.L.

The overall objective of this study is to evaluate the suitability, for a log handling facility in the Cowichan Valley Regional District, of the six locations listed in the Terms of Reference (see the prefaced Key Map and Appendix IV) and to determine the economic viability of these selected locations.

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*Proposal P8022 for a Site Determination Study for a Tidewater Log Handling Facility in the Cowichan Valley Regional District, August, 1980, T. M. Thomson and Associates Ltd.

The required objective of this report is to analyse the first two evaluation criteria:

(a) Determination of Necessity: Identification of the volume and kinds of logs the facility will have to handle, presently and in the future, incoming and outgoing;

(b) Comparison of Alternative Sites: The ranking of the six proposed sites on the basis of social, environmental and broad economic factors.

The final stage in this study will be a more detailed economic analysis, an operating pro forma, and a recommendation for a management authority.

Each site has been visited four times: once on the ground to look at the overall practicality of each site; a second time, on the ground to collect social and environmental data; a third time by helicopter, for an overview of all considerations; and a fourth time to formulate an operating plan and development cost estimate.

The study, as anticipated in the consultant's proposal, relied heavily upon previously collected environmental data. Since the Cowichan Estuary Task Force report has not

yet been released, information relating to the six study sites has been derived from Task Force members and relevant publications.

The social (public) assessment check lists in Appendix VI have been utilized to determine social impacts, with reliance on Regional Board representatives to provide background information to assist with identification of the social and environmental concerns at each site.

A bibliography and individual references are presented at the end of this report, immediately preceding the Appendices. Applicable references appear by number in brackets at the end of the paragraph to which they apply.

III. DETERMINATION OF NECESSITY

1. Data Collection

The questionnaire presented in Appendix V, was prepared to determine the need or extent of use of the proposed facility. A meeting of the V.I.A.S.M.I.L. was attended to allow distribution of the questionnaire, explanation of its purpose, and instruction on its completion. Later meetings were held with a representative of each of the 19 mills and independent loggers listed in Appendix II to fill out the questionnaires and to discuss at length the proposed facility.*

Three categories of companies were identified as being involved in this study:

(a) Loggers (Pacific Surfe Logging, Aljim Enterprises Ltd., Big Foot Cedar, Warren Logging Ltd., M. C. Simard Logging Ltd., Cobble Hill Logging Ltd.);

(b) Primary Manufacturers - Makers of blocks for use in the shake and shingle mills (Quenco Cedar Industries, Nit-Nat Cedar Salvage);

(c) Secondary Manufacturers - These companies, their products, and production outputs are listed in Table I.

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*Three companies' questionnaires were completed over the telephone when it was determined that the proposed facility would not be of use to them.

TABLE I

SUMMARY OF MANUFACTURED OUTPUT AND LOG INPUT REQUIREMENTS WITH AND WITHOUT A LOG HAUL-OUT FACILITY (For Secondary Manufacturers Only)

COMPANY	PRODUCTS	PLANNED PRODUCTION - NO HAUL-OUT				LOG VOLUME (cunits) - NO HAUL-OUT				PLANNED PRODUCTION - WITH HAUL-OUT			LOG VOLUME (cunits) - WITH HAUL-OUT			NET VOLUME (cunits) - FROM HAUL-OUT		
		1980	1981	1985	1995	1980	1981	1985	1995	1981	1985	1995	1981	1985	1995	1981	1985	1995
Shawnigan***	Lumber	1,600,000 fbm	2,000,000 fbm	2,000,000 fbm	2,000,000 fbm	8,727	10,909	10,909	10,909	2,000,000 fbm	2,000,000 fbm	2,000,000 fbm	10,909	10,909	10,909	-	-	-
Evergreen	Shakes	4,400 sq.	4,400 sq.	4,400 sq.	4,400 sq.	800	800	800	800	4,400 sq.	4,400 sq.	4,400 sq.	800	800	800	-	-	-
	Blocks & Blanks	(250 cd)	(250 cd)	(250 cd)	(250 cd)	N/A	N/A	N/A	N/A	(250 cd)	(250 cd)	(250 cd)	N/A	N/A	N/A	N/A	N/A	N/A
Hem-Mc	Shakes	10,000 sq.	15,000 sq.	15,000 sq.	15,000 sq.	1,818	2,727	2,727	2,727	15,000 sq.	20,000 sq.	20,000 sq.	2,727	3,636	3,636	-	909	909
Confederate	Shakes, Shingles	20,000 sq.	20,000 sq.	40,000 sq.	60,000 sq.	3,636	3,636	7,273	10,909	40,000 sq.	80,000 sq.	100,000 sq.	7,273	14,545	18,182	3,637	7,272	7,273
Rooftop*	Shakes, Shingles	11,300 sq.	11,300 sq.*	5,750 sq.*	5,750 sq.*	2,091	2,091	1,045	1,045	18,000 sq.	18,000 sq.	18,000 sq.	3,636	3,636	3,636	1,545	2,591	2,591
	Lumber	-	-	-	-					200,000 fbm	200,000 fbm	200,000 fbm						
Pt. Renfrew	Shakes, Shingles	16,000 sq.	16,000 sq.	16,000 sq.	16,000 sq.	3,055	3,055	3,055	3,055	16,000 sq.	20,000 sq.	20,000 sq.	3,091	3,818	3,818	36	763	763
	Lumber	80,000 fbm	80,000 fbm	80,000 fbm	80,000 fbm					100,000 fbm	100,000 fbm	100,000 fbm						
Hidden Valley**	Lumber	3,750,000 fbm	4,800,000 fbm	6,000,000 fbm	6,000,000 fbm	6,818	8,727	10,909	10,909	12,000,000 fbm	15,000,000 fbm	15,000,000 fbm	21,818	27,273	27,273	13,091	16,364	16,364
		(5,000,000 fbm)	(12,000,000 fbm)	(15,000,000 fbm)	(15,000,000 fbm)	(9,091)	(21,818)	(27,273)	(27,273)									
Dogwood*	Lumber	1,000,000 fbm	1,000,000 fbm	2,000,000 fbm	2,000,000 fbm	1,818	1,818	3,636	3,636	2,000,000 fbm	4,000,000 fbm	4,000,000 fbm	3,636	7,273	7,273	1,818	3,637	3,637
	Remun. Lumber	4,500,000 fbm	4,500,000 fbm	4,500,000 fbm	4,500,000 fbm	N/A	N/A	N/A	N/A	4,500,000 fbm	4,500,000 fbm	4,500,000 fbm	N/A	N/A	N/A	N/A	N/A	N/A
Fiika**	Lumber	1,000,000 fbm	1,000,000 fbm	1,000,000 fbm	1,000,000 fbm	1,818	1,818	1,818	1,818	2,000,000 fbm	5,000,000 fbm	5,000,000 fbm	3,636	9,091	9,091	1,818	7,273	7,273
		(2,000,000 fbm)	(2,000,000 fbm)	(2,000,000 fbm)	(2,000,000 fbm)	(3,636)	(3,636)	(3,636)	(3,636)									
Kendon	Lumber	2,000,000 fbm	2,000,000 fbm	2,000,000 fbm	2,000,000 fbm	3,636	3,636	3,636	3,636	2,000,000 fbm	2,000,000 fbm	2,000,000 fbm	3,636	3,636	3,636	-	-	-
Danielson	Lumber, Panelling	750,000 fbm	1,000,000 fbm	1,000,000 fbm	1,000,000 fbm	1,364	1,818	1,818	1,818	1,000,000 fbm	1,000,000 fbm	1,000,000 fbm	1,818	1,818	1,818	-	-	-
TOTALS						35,581	41,035	47,626	51,262				62,980	86,435	90,072	21,945	38,809	38,810

* Expansion depends on rezoning approval.
** 50% of 1980, 1981, 1985, 1995 production will come from tidewater somewhere in the Sooke to Crofton area, whether or not this study's proposed haul-out is established.
***Lumber recovery is low due to pulp grade logs used, therefore modified conversion factor used.
* Present log supplies are in jeopardy; not likely to be sustained fully for more than 1 more year.
** 60% of 1981, 1985, 1995 production will come from tidewater somewhere in the Sooke to Crofton area, whether or not this study's proposed haul-out is established.

AH:jl 8655-6-07

2. Haul-Out Requirements

Table I lists and compares planned production levels for the 11 secondary manufacturing companies for the years 1981, 1985 and 1995, with and without a tidewater log handling facility. The conversion factors presented in Appendix III are used to translate these planned production levels into log supply requirements; Table I indicates that by 1985 an additional 38,809 cunits* of logs could be utilized by the seven mills** able and desiring to expand their production.

The data in Table I may be questioned, as they are derived solely from the manufacturers themselves. However, where any doubt existed about data presented in replies to the questionnaire, a conservative approach was taken by the consultant. Certainly, all the mills are capable of meeting the planned 1981 production levels because most of them are now operating at below rated capacities and they also have the opportunity to expand to two shifts/day. Present indications are that there will be a sufficient demand for the lumber, shake

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*1 cunit = 100 cubic feet of sound wood volume.

**Ham-Mc, Confederate, Rooftop, Pt. Renfrew, Hidden Valley, Dogwood and Filka.

2. Haul-Out Requirements (cont'd)

and shingle production levels planned for 1985 by these manufacturers and that they are capable of meeting these anticipated production levels provided there are sufficient log supplies.

It is interesting to note that only one mill (Rooftop) anticipates a reduction in its present log supplies by 1985, although two other mills (Hidden Valley and Filka) already bring in substantial portions of their log supplies from outside the Cowichan Valley Regional District.

The 1980 log supply sources for the 11 manufacturers in Table I can be broken down as follows:

Outside the Cowichan Valley Regional District	12%
Logs purchased from large integrated companies	61%
Local independent loggers (mostly non-salvage)	11%
Salvage logs from large integrated companies	12%
Salvage logs from Crown timber sales	4%
	100%

Present log quality and species requirements for the seven mills anticipating using the log haul-out facility are as follows:

2. Haul-Out Requirements (cont'd)

Cedar, Shake & Shingle Grade	50%
Cedar, Sawlogs	46%
Fir, Sawlogs	3%
All other species, Sawlogs	1%
	100%

Since really only two types of logs (cedar shake and shingle; and cedar sawlogs) are under consideration and since these seven mills can utilize a variety of sizes and grades within these two basic log types, log acquisition and distribution through the proposed haul-out facility should be relatively uncomplicated.

Because each of these seven mills has plenty of log storage capacity, and because of the minimal number of species and grade sorts, only a small area (as little as 1 acre) for dryland sorting will be required for the log haul-out section of the proposed facility.

Almost all current supplies of salvage logs from Crown timber sales (4% of total log supplies) come from the Loup Creek Firebreak. This area of old growth timber is expected to become part of B.C. Forest Products Ltd.'s Tree Farm License (as a result of land trades related to the Pacific Rim Park). There is currently a

2. Haul-Out Requirements (cont'd)

dispute with the Ministry of Forests over what should be classified as "decadent timber" in these Loup Creek salvage sales. The Ministry of Forests anticipates phasing out these Loup Creek salvage sales and making other supplies available to local mills and loggers through the Ministry's Small Business Program. However, the shortage of Crown old growth stands in the Cowichan Timber Supply Block may cause a shortage of shake and shingle grade logs. (26)

The Ministry of Forests' yield analysis for the Cowichan Timber Supply Block (part of the Quadra Timber Supply Area) indicates that current supplies of Crown timber available to small, independent mills and loggers will be sustained or increased in the future. The types of logs available could, however, change, as most of the available timber will come from second growth stands which have a low percentage of large cedar logs. (8), (9)

The independent mills that can accommodate small logs and species other than cedar (i.e. most of the sawmills) can anticipate continued log supplies. The independent mills which must have large cedar logs (i.e. shake and shingle or large sawlog grades) will

2. Haul-Out Requirements (cont'd)

have to look to the large integrated companies for additional log supplies or else resort to sources outside the Regional District.

3. Log Dump Requirements

Most of the independent logging companies answering the questionnaire indicated that they would be willing to sell their logs through or to the proposed tidewater log handling facility, provided fair prices could be realized. This was also the attitude of other independent loggers canvassed more informally.

A tidewater log dump would become a valuable negotiating tool for these independent loggers, possibly to the detriment of the independent mills because local log prices might rise.

The independent mills themselves indicated that only a very minor amount of logs would be traded through the facility by them, because most types of logs are already in such short supply in the region.

3. Log Dump Requirements (cont'd)

There is little doubt that the facility would benefit from having a log dump incorporated with the haul-out capability. As the volume of second growth logging in the study area increases, there should be an increasing need for access to outside log markets; this need could be filled by the proposed facility.

IV. COMPARISON OF ALTERNATIVE SITES

A. Social and Environmental Impacts

1. Methodology

Site selection from a social viewpoint involves analysis of the project's desirability rather than its feasibility. The interaction of the community and the facility must be considered. Environmental considerations add another dimension to the process. Complete information for analysis of these sensitive issues is not always easily attainable and sometimes reports and opinions demonstrate conflicting positions.

Environmental and social concerns are frequently inseparable, as enjoyment of home life and many recreational activities, depends on the condition of the environment. For example, an adverse effect on water quality can be detrimental to marine life and therefore fishing.

In order to assess the social and environmental concerns each site was inspected to study the available haul routes, the physical characteristics

A. Social and Environmental Impacts (cont'd)

of the area and its relationship with the surrounding community. Based on these preliminary observations an initial estimate of impact was made using checklists from Dr. J. Mater's book Citizens Involved: Handle With Care! (see Appendix VI). With the knowledge gained from this estimate, elected representatives of the Electoral Districts involved were then interviewed. These people were able to describe the major concerns of area residents about the proposal and also suggest other groups and individuals who might provide additional material or who might have a special interest in this study.

To augment the data collected through the check lists, other relevant environmental information was drawn from the following reference sources: (1), (2), (3), (6), (10), (12), (19), (24) and (25).

Once the information from all these sources had been gathered, the checklists were re-evaluated. The various impacts were then assessed and the sites ranked according to their social and environmental suitability for the proposed facility.

A. Social and Environmental Impacts (cont'd)

Assessing the magnitude of impact is, of necessity, subjective to some degree; comparison matrices are employed to provide a quickly discernible ranking and to account for the interrelations between the determinants.

By combining, in a matrix format, Dr. Mater's public impact assessment method with a review of environmental and social background data, the study has:

- determined the impacts of the proposed facility on the public and the physical environment at each site;
- isolated those factors (impacts) which can be altered or avoided.

2. Social Impact Assessment

Exhibit 1 presents a comparison matrix for the proposed tidewater log handling facility sites. Five determinants are ranked numerically and then the magnitude of impact at each site assessed.

A. Social and Environmental Impacts (cont'd)

		MAGNITUDE OF IMPACT											
		Crofton (Site #1)		Cow. Bay Central (Site #2)		Cow. Bay South (Site #3)		Hatch Pt (Site #4)		Verdier Pt (Site #5)		Bamberton (Site #6)	
Determinant	Importance	UW	W	UW	W	UW	W	UW	W	UW	W	UW	W
Public Safety	10	5	50	2	20	8	80	8	80	8	80	2	20
Area Residences	8	3	24	4	32	8	64	7	56	7	56	2	16
Existing Land Use	6	3	18	3	18	7	42	10	60	1	6	5	30
Recreational Activities	8	1	8	4	32	5	40	3	24	5	40	1	8
Tourism and Fishing	6	2	12	6	36	8	48	5	30	5	30	7	42
Totals		-	112	-	138	-	274	-	250	-	212	-	116
Ranking Index		1.0		1.2		2.4		2.2		1.9		1.0	

Notes - Determinant Importance: 1 (least important) to 10 (most important)
- Magnitude of Impact: 1 (smallest magnitude) to 10 (largest magnitude)
- UW (Unweighted); W (Weighted)

Exhibit 1

(a) Public Safety

The magnitude of impact assigned to the various sites reflects the potential hazard to the public of a log handling operation. Safety problems stem from the proximity of residential areas to haul routes and the physical characteristics of the road, since the log handling facilities themselves are normally isolated from public access.

Both the Bamberton and Cowichan Bay Central sites are serviced by private haul roads to Highway #1. As a result, low impact factors of 2 are ascribed to these sites. Crofton is given a factor of 5 to account for the low standard of the road and, to a much lesser extent, the few residences along the haul route. The impact is reduced somewhat by the large volume of heavy vehicles currently using the road. Should the improved Crofton access road be built, a lower impact would be possible. (6), (13), (14), (15), (16), (17), (18), (21), (23), (24), (25)

A. Social and Environmental Impacts (cont'd)

At each of the Cowichan Bay South, Hatch Point and Verdier Point sites, the impact on public safety is significantly greater, as the available haul routes pass through residential areas. Logging truck traffic travelling through these areas is assessed as unacceptable to local residents and consequently factors of 8 are ascribed. Should an alternative haul route be identified for any site, the magnitude of impact could be substantially reduced. (6), (16), (18), (20), (22), (23), (24), (25)

An importance factor of 10 is ascribed to the determinant of Public Safety to reflect the seriousness of this issue as viewed by local residents.

(b) Area Residences

For this determinant, the effect of noise, the proximity of industry, and the visual impact of the proposed development on area homes are considered.

Because there are only a few homes in the vicinity of the Bamberton site and haul route, a magnitude of impact factor of 2 is ascribed. At Crofton the impact is slightly more, but in light of the extensive existing wood product operations a factor of 3 is considered appropriate. Cowichan Bay Central requires a factor of 4 to account for the impact of noise on the surrounding area. Noise is of particular concern during night operations, which would be necessitated by operating during high-tide periods. (6), (13), (14), (16), (21), (23), (24), (26)

At the Cowichan Bay South location, noise is reportedly of great concern due to the proximity of dwellings. The visual impact will also be significant as the site is one of the few undeveloped stretches along the south shore. The magnitude of impact is reduced somewhat by the background effect of existing operations. A factor of 8 is ascribed. (16)

At Hatch Point, the increased disturbance from trucking operations is considered unacceptable by area residents. This results in a factor of 7

A. Social and Environmental Impacts (cont'd)

being assigned. A factor of 7 is also ascribed to Verdier Point where noise is a primary consideration, followed by some visual impact. (6), (14), (20), (22), (25)

A high importance factor of 8 is ascribed to this determinant since local residents have already shown that they react strongly to these issues.

(c) Existing Land Use

The magnitude of impact on existing land use due to the proposed construction is generally small. Most sites are in locations of former or existing industrial activity.

At present, the Crofton, Cowichan Bay Central and Bamberton sites are on land zoned industrial. Verdier Point is in the Malahat Indian Reserve while the Hatch Point site is on land zoned agricultural. The Cowichan Bay South site is zoned waterfront and waterfront storage. (3), (4), (6)

The two Cowichan Bay sites and the Crofton site would interfere with existing industrial activities and add additional traffic to haul routes. The Cowichan South site would most seriously affect the adjoining log handling and storage operations and, in addition, affect the development of commercial and residential areas. A factor of 7 is ascribed to Cowichan Bay South while the other two mentioned above are given a factor of 3. (15), (23)

The Hatch Point site is not in the Agricultural Land Reserve and it may be re-zoned from its present agricultural category, if the proposed oil tank farm is approved. However, approval of the tank farm is predicated on limiting other industrial use of the site, so in this case the log handling facility would have an extreme effect on proposed land use. Thus a factor of 10 is tentatively ascribed. (6), (18), (20), (22)

Development of a log handling facility at Verdier Pt. should not affect present land use.

A. Social and Environmental Impacts (cont'd)

Establishment of a log handling facility at Bamberton, under present operating conditions, would be disruptive since truck traffic would be increased and some structures would have to be removed to permit log storage and dumping. The future of the present industrial operation is in doubt, but by no means decided at the present time. A factor of 5 is assessed. (17)

An importance of 6 is ascribed for this determinant.

(d) Recreational Activities (excluding fishing)

The magnitude of impact on activities such as pleasure boating, camping, hiking, hunting, beach walks and swimming is accounted for in this category.

Relatively high impacts are found at Verdier Point and along the south side of Cowichan Bay - popular recreation areas. A factor of 5 is ascribed to each. The shoreline along Mill Bay Road gives many boaters the opportunity to launch their craft while others enjoy beach walks and swimming. Local residents would be concerned about danger to their boats from stray logs and deadheads should a log handling facility locate in the area. The Cowichan Bay South site is adjacent to a well-used boat ramp. (14), (16)

The Cowichan Central site is little used for recreation, except at the extreme west end of the causeway and for boating. Thus a factor of 4 is warranted.

To the north of the Hatch Point site is Cherry Point Beach, a popular summer recreation spot. A factor of 3 is ascribed to reflect possible impact on this area. (6), (20)

The sites at Bamberton and Crofton have almost no recreational activity at present and therefore are given factors of 1. (6), (13), (14), (21)

A high importance of 8 is ascribed to the effect on recreation because of the limited areas suitable for such activities.

A. Social and Environmental Impacts (cont'd)

(e) Tourism and Fishing

Included in this determinant are the effects of a log handling facility on both recreational and commercial fishing, and on tourism. These activities are often closely associated in this area. Log handling sites require a small, confined area and should not interfere extensively with fishing activities.

The smallest magnitude of impact would occur at Crofton where the site is an area already devoted to log handling. Due to the large size of the existing operation, compared with the proposed facility, a factor of 2 is ascribed. (13), (21)

Hatch Point is a more sensitive fishing area with its kelp beds attracting herring and seal populations. In addition, Boatswain Bank and Cherry Point Beach to the north are popular fishing and tourist areas which would be affected. A factor of 5 is ascribed for Hatch Point to reflect this impact. The same factor is given for Verdier Point due to its popularity with tourists and area residents for fishing. (6), (14), (20)

Bamberton, with its constant fleet of small boats fishing just off the shore, is assigned a 7. (6)

Cowichan Bay is a very important tourist and fishing centre, with hotel and marina facilities on the south shore. It is difficult to determine just how much impact on these activities would be due to the proposed operation, because of the already prevalent impact from existing log handling activities. Therefore, a factor of 6 is applied to the Cowichan Central site, while an 8 would apply to the Cowichan South site due to its proximity to tourist facilities.

A moderate importance of 6 is ascribed for tourism and fishing to reflect their importance to the area economy and the large role fishing plays in the leisure activities of residents.

3. Environmental Impact Assessment

Exhibit 2 presents a comparison matrix for the proposed sites based on environmental concerns for these areas. Five determinants are ranked numerically and then the magnitude of impact at each site is assessed.

		MAGNITUDE OF IMPACT											
		Crofton (Site #1)		Cow. Bay Central (Site #2)		Cow. Bay South (Site #3)		Hatch Pt (Site #4)		Verdier Pt (Site #5)		Bamberton (Site #6)	
Determinant	Importance	UW	W	UW	W	UW	W	UW	W	UW	W	UW	W
Impact on Marine Environment	10	3	30	4	40	8	80	5	50	2	20	5	50
Impact on Birds	6	4	24	7	42	7	42	2	12	2	12	2	12
Impact on Vegetation	5	2	10	5	25	5	25	4	20	2	10	2	10
Impact on Water Quality	10	4	40	6	60	6	60	7	70	4	40	4	40
Impact on Surrounding Land	8	7	56	7	56	7	56	4	32	4	32	4	32
Totals		-	160	-	223	-	263	-	184	-	114	-	144
Ranking Index		1.4		2.0		2.3		1.6		1.0		1.3	

Notes - Determinant Importance: 1 (least important) to 10 (most important)
- Magnitude of Impact: 1 (smallest magnitude) to 10 (largest magnitude)
- UW (Unweighted); W (Weighted)

Exhibit 2

(a) Impact on Marine Environment

The highest importance, 10, is ascribed to the impact on the marine environment because of the significant role it plays in the economy and culture of the area. The magnitude of impact on the marine environment from a log handling facility depends on the sea life supported by each area and the availability of alternative sites for this function.

The greatest impact is felt in the Cowichan Estuary as it has been identified by the Federal

A. Social and Environmental Impacts (cont'd)

Department of Fisheries as one of the most valuable fish rearing grounds on Vancouver Island. A factor of 8 reflects this vital role, with regard to the current level of industrial activity. According to statistics compiled by the Department of Fisheries, sea life in Cowichan Bay has declined sharply as industrial use of the estuary has increased. (1), (2)

However, it is anticipated that the unpublished Cowichan Estuary Task Force will recommend mitigating measures, improved log handling techniques, and consolidation of log handling onto the central causeway. Implementation of these recommendations would, in fact, substantially reduce the overall impact of log handling on the estuary with a concomitant reduction in the impact factor assessed to Site #2 to a factor of 4, or half the impact anticipated if this recommendation is not implemented. (12), (19)

The Crofton site is at the eastern edge of the Chemainus River Estuary and as a result encroaches slightly on a valuable fisheries area. A factor of 3 describes the fact that its impact on that estuary should be small. (1), (2)

At Bamberton, the deep water and prolific fishing suggests that this is a valuable area for sea life. A magnitude of impact of 5 is given to reflect this significance. (6)

Hatch Point is given a factor of 5 to reflect the ecological sensitivity of Boatswain Bank. In addition, Hatch Point itself supports populations of herring and seals. (6)

At Verdier Point there would be a lower impact on sea life. This location is given a magnitude of impact factor of 2. It has no particular characteristics to distinguish it as a unique area for sea animals.

(b) Impact on Birds

The magnitude of impact on birds is greatest in the estuaries which provide favourable habitats. (1)

A. Social and Environmental Impacts (cont'd)

Since it would be necessary to do a small amount of filling at the Cowichan Bay sites to provide area for a dryland sort, a high factor of 7 is ascribed for these sites.

At Crofton, the impact on birds is much less severe, however, some portion of estuary would be disturbed: a factor of 4 is assigned. (1)

For the remaining three sites, a factor of 2 is ascribed to account for the small predicted impact on bird populations.

A moderately high importance of 6 is used for this determinant due to the special ecological conditions necessary for bird habitat and the importance of maintaining suitable areas.

(c) Impact on Vegetation

Log storage and handling have caused damage to the bed of the Cowichan estuary in the past. Careful attention to timing and technique should reduce the problem significantly. A factor of 5 is ascribed to the sites in Cowichan Bay to account for this situation and the loss of intertidal environment to landfill. (3)

At Hatch Point, beds of kelp will be disturbed by log handling, consequently a factor of 4 is ascribed. The impact at other locations will be smaller and therefore a factor of 2 is used.

A moderate importance factor of 5 is assigned to this determinant, since the impact on vegetation is already partially reflected in the marine environment and water quality determinants.

(d) Impact on Water Quality

Water quality is of paramount concern. This is reflected in the highest importance, 10, being allocated. Water quality affects most other environmental and social considerations.

Any deterioration in water quality in Cowichan Bay would be objectionable to local residents as it

A. Social and Environmental Impacts (cont'd)

affects the ability of the estuary to support the marine life, which in turn supports commercial and recreational activities. (2), (3)

To account for the environmental sensitivity of the area and the control over water quality which must be exercised in this project, a high factor of 8 would normally be selected, but the existing log storage and the treated sewage outflow on the south side indicate that a new log handling facility would have only a moderately high impact of 6 under present conditions.

Seven is chosen for Hatch Point due to its proximity to Boatswain Bank, identified by the Cowichan Estuary Task Force as environmentally important. (6)

The magnitude of impact on water quality should be somewhat lower at Crofton, Bamberton and Verdier Point. At Bamberton and Verdier Point, concern stems from the recreational use of the areas which requires clean water. Crofton's impact factor of 4 reflects the position of the site on the Chemainus Estuary but within the area of existing development.

(e) Impact on Surrounding Land

The sites requiring landfill or dredging will have the largest impact under this category. The Cowichan Bay sites and the Crofton site require the greatest amount of fill, given the limited land available, and the greatest amount of dredging: they are given factors of 7.

Verdier Point would need some material to restore the existing causeway to working condition. At Bamberton and Hatch Point, some work would be necessary to provide room for a dryland sort, however, it is unlikely that much fill into the ocean would be needed. At all these sites a factor of 4 is ascribed.

Because wetland fill is an important issue, especially in the estuaries, a high importance factor of 8 is used.

B. Broad Economic Analysis

Exhibit 3 presents a comparison matrix for the proposed sites based on broad economic considerations. Four determinants are ranked numerically and then the magnitude of impact at each site is assessed:

		MAGNITUDE OF IMPACT											
		Crofton (Site #1)		Cow. Bay Central (Site #2)		Cow. Bay South (Site #3)		Hatch Pt (Site #4)		Verdier Pt (Site #5)		Bamberton (Site #6)	
Determinant	Importance	UW	W	UW	W	UW	W	UW	W	UW	W	UW	W
Development Costs	10	10	100	5	50	5	50	6	60	5	50	7	70
Log Hauling Distance	10	10	100	6	60	6	60	7	70	7	70	8	80
Operating Costs	10	7	70	7	70	7	70	5	50	5	50	6	60
Land Acquisition	8	9	72	4	32	4	32	9	72	5	40	9	72
Totals		-	342	-	212	-	212	-	252	-	210	-	282
Ranking Index		1.6		1.0		1.0		1.2		1.0		1.3	

Notes - Determinant Importance: 1 (least important) to 10 (most important)
- Magnitude of Impact: 1 (smallest magnitude) to 10 (largest magnitude)
- UW (Unweighted); W (Weighted)

Exhibit 3

Development Costs

Since the initial capital requirement is often the deciding factor in a project such as the one under study, this determinant is given a factor of 10.

The following estimates of development costs for each site are based on the assumption that a reasonably efficient, long-term facility will be installed which will operate in an environmentally sound manner. The cost estimates are approximate but are reliable for comparative purposes.

B. Broad Economic Analysis (cont'd)

Site #1 - Crofton

• Unloading - 966 Front End Loader Push off • Scaling - Stick scale on dryland • Sorting - Dryland sort with 966	$100,000 (fill)
• Dumping - Bundles from bunk onto skidway	30,000
• Booming - Extensive dredging for 2 pockets, plus piling	50,000
• Load-Out - Extensive dredging to bring in logs	30,000
• Storage - Extensive dredging or frequent towing	40,000
• Materials, Supervision and Services	50,000
Total	$300,000 (10 impact)

- Rail access available
- Shallow water with some rock bottom could make dredging very expensive
- No fill material on site other than dredgeate. Costly rock fill required.
- Limited room for storage of incoming and outgoing booms - expensive development
- High maintenance costs due to shallows
- Bad exposure for weather
- Extensive surveying and engineering required

B. Broad Economic Analysis (cont'd)

Site #2 - Cowichan Bay Central

• Unloading, • Scaling, • Sorting — Develop an alternate site (old airport 2 miles west of causeway)	$ 5,000*
• Dumping - A-Frame or gin pole parbuckle	30,000
• Booming - Extensive dredging for 1 pocket	36,000
• Load-Out - Extensive dredging for 1 pocket	36,000
• Storage - Deep water lease	5,000
• Materials, Supervision and Services	40,000
Total	$152,000 (5 impact)

- Rail access available
- Very limited room for water handling
- Extensive dredging to bring booms in and out
- Material for fill must be hauled in
- Continuing dredging maintenance

*Development of a 1-1/2 acre dryland sort area at the extreme west end of causeway (rather than handling logs twice via an alternate dryland sort site) could add almost $145,000 to this cost.

B. Broad Economic Analysis (cont'd)

Site #3 - Cowichan Bay South

• Unloading, • Scaling, • Sorting — Develop an alternative site (possible locations unknown)	$ 10,000
• Dumping - A-Frame or gin pole parbuckle	25,000
• Booming - Extensive dredging for 1 pocket	36,000
• Load-Out - Extensive dredging for 1 pocket	36,000
• Storage - Deep water lease	5,000
• Materials, Supervision and Services	30,000
Total	$142,000 (5 impact)

- Extremely limited water and land space
- Extensive dredging to bring booms in and out
- Material for fill must be hauled in
- Continuing dredging maintenance

B. Broad Economic Analysis (cont'd)

Site #4 - Hatch Point

• Access Road - Assuming no tank farm	$ 20,000
• Unloading - 966 Front End Loader push off • Scaling - Stick scale on dryland • Sorting - Dryland sort with 966	30,000 (fill)
• Causeway - Dumping - Bundles from bunks onto skidway	30,000
- Load-Out - Line Grapple Loader	30,000
• Booming - 3 alley booming ground (piling)	15,000
- Tie-up for sorted booms (piling)	10,000
• Storage - Tie-up for incoming booms (piling)	10,000
• Materials, Supervision and Services	40,000
Total	$185,000 (6 impact)

- Deep water
- No dredging required.
- Material for fill readily available
- Room for expansion on land and water sides
- Room for tie-up for incoming and outgoing booms

B. Broad Economic Analysis (cont'd)

Site #5 - Verdier Point

• Unloading - 966 Front End Loader push off • Scaling - Stick scale on dryland • Sorting - Dryland sort with 966	$ 15,000 (fill)
• Dumping - Bundles from bunks onto skidway	30,000 (causeway)
• Booming - 3 alley booming ground (piling) Tie-up for sorted booms (piling)	15,000 10,000
• Load-Out - Line Grapple Loader	30,000 (causeway)
• Storage - Tie-up for incoming booms (piling)	10,000
• Materials, Supervision and Services	40,000
Total	$150,000 (5 impact)

- Deep water
- No dredging required.
- Material for fill available on side of site
- Room for expansion, both water and some land
- Room for tie-up for incoming and outgoing booms

B. Broad Economic Analysis (cont'd)

Site #6 - Bamberton

• Unloading - 966 Front End Loader push off • Scaling - Stick scale on dryland • Sorting - Dryland sort with 966	$ 5,000
• Dumping - Bundles from bunks onto skidway	5,000 (bunks)
• Booming - 2 alley booming ground (deep anchors and piling)	50,000
- Tie-up for sorted booms (deep anchors and piling)	50,000
• Load-Out - Line Grapple Loader	10,000
• Storage - Removal of buildings	50,000
• Materials, Supervision and Services	35,000
Total	$205,000 (7 impact)

- No dredging required
- Extremely deep water
- Very exposed to storms
- Access road may have to be modified to reduce steep adverse
- If cement operations continue, the two activities will be disruptive to each other

B. Broad Economic Analysis (cont'd)

Log Hauling Distance

Table II lists the weighted average log haul distance to each site from the seven mills expressing a need for a tidewater facility, as isolated in Table 1, column 18. The locations of these seven mills, in relation to the six study sites, are shown on the map in Appendix IV.

The six sites were ranked in relation to the weighted average hauling distance to Crofton, the furthest site, based on anticipated 1985 log haul-out demand.

For interest's sake, the weighted average log haul distance was also calculated excluding Hidden Valley's mill to see what effect this large manufacturing facility had on the overall analysis.

Since log hauling distance is a very important determinant, a rank of 10 is ascribed.

Operating Costs

An importance of 10 is also attributed to this determinant because of its obvious effect on the feasibility of any site.

Since the same basic operating system for each site would be employed, operating cost for each site should be quite similar. However, the two Cowichan Bay sites and the Crofton site will be more expensive because of anticipated dredging maintenance once or twice per year. These three sites are given a factor of 7.

Maintenance and operation of a facility located at Verdier or Hatch Point would be "normal", so a magnitude of 5 is ascribed. The Bamberton site would be slightly more expensive to operate and maintain due to the very deep water and other industrial activity present, so a magnitude of impact of 6 is warranted.

Land Acquisition

This is a relatively important determinant which is difficult to assess until a purchase or lease is negotiated. An importance of 8 is indicated.

TABLE II

CALCULATION OF WEIGHTED AVERAGE LOG HAULING DISTANCE FROM EACH SITE

Company	Year	Estimated Haul-Out Volume (cunits)	Distance to Site (Miles)					
			1	2	3	4	5	6
Ham - Mc	1981	-	33.4	29.0	29.8	36.2	39.0	41.4
	1985	909						
Confederate	1981	3,637	27.9	23.6	25.2	30.8	33.6	36.0
	1985	7,272						
Rooftop	1981	1,545	31.5	27.2	28.0	34.4	37.2	39.6
	1985	2,591						
Pt. Renfrew	1981	36	6.0	15.7	15.5	22.9	25.7	28.1
	1985	763						
Hidden Valley	1981	13,091	25.2	13.2	10.6	6.8	7.4	7.0
	1985	16,364						
Dogwood	1981	1,818	13.9	9.6	10.4	16.8	19.6	22.0
	1985	3,637						
Filka	1981	1,818	17.6	5.7	4.3	8.6	11.4	13.8
	1985	7,273						
Weighted Average (excluding Hidden Valley)	1981	8,854	23.4	17.6	18.3	24.0	26.8	29.2
	1985	22,445	22.2	15.9	16.2	21.7	24.5	26.9
Weighted Average (All Companies)	1981	21,945	24.5	15.0	13.7	13.7	15.2	15.9
	1985	38,809	23.5	14.8	13.8	15.4	17.3	18.5
Rank			10	6	6	7	7	8

B. Broad Economic Development (cont'd)

The Crofton, Bamberton and Hatch Point sites are all privately held by companies whose own industrial activities would be somewhat disrupted by an adjoining log handling facility. An impact factor of 9 is applied to each of these sites. (17), (22), (23)

The two Cowichan Bay sites would involve Crown leases which should be reasonably easy to acquire once all the necessary governmental approvals are received. An impact factor of 4 is assigned.

The Verdier Point site will require a lease from the local Indian Band. Since the Band has already made application for the site to be developed as a log handling facility, a factor of 5 is ascribed.

V. CONCLUSION

Exhibit 4 presents a comparison matrix for the proposed tidewater log handling facility sites. The three evaluation criteria are ranked numerically and then the magnitude of impact at each site is assessed.

Economic Factors rated the highest importance because they are the ultimate determinants. If a site is not economically viable, then it matters not whether it is socially or environmentally acceptable.

Environmental Impact is a vital concern in any development study and so is given a high factor of 7. As illustrated elsewhere herein, environmental impact can often be mitigated or reduced once the area of environmental concern is identified.

Social Impact is of moderately important concern as reflected in the importance factor of 6. Again, social concerns can often be isolated, altered or avoided once identified.

		MAGNITUDE OF IMPACT											
		Crofton (Site #1)		Cow. Bay Central (Site #2)		Cow. Bay South (Site #3)		Hatch Pt (Site #4)		Verdier Pt (Site #5)		Bamberton (Site #6)	
Determinant	Importance	UW	W	UW	W	UW	W	UW	W	UW	W	UW	W
Social Impact	6	1.0	6.0	1.2	7.2	2.4	14.4	2.2	13.2	1.9	11.4	1.0	6.0
Environmental Impact	7	1.4	9.8	2.0	14.0	2.3	16.1	1.6	11.2	1.0	7.0	1.3	9.1
Economic Factors	10	1.6	16.0	1.0	10.0	1.0	10.0	1.2	12.0	1.0	10.0	1.3	13.0
Totals		-	31.8	-	31.2	-	40.5	-	36.4	-	28.4	-	28.1
Rank		4		3		6		5		2		1	

Notes - Determinant Importance: 1 (least important) to 10 (most important)
- Magnitude of Impact: 1 (smallest magnitude) to 10 (largest magnitude)
- UW (Unweighted); W (Weighted)

Exhibit 4

Exhibit 4, representing the initial assessment, identifies Site #6 at Bamberton, Site #5 at Verdier Point, and Site #2 at Cowichan Bay Central as better suited for the proposed facility.

WAH:jl * 655-6-07

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INDIVIDUAL REFERENCES

	NAME	POSITION/COMPANY	TEL. #	REMARKS
12.	Bell-Irving, Mr. R.	Pacific Chief of Foreshore Management, Fisheries & Environment Canada	666-3545	Member of Cowichan Estuary Task Force
13.	Bruce, Mr. G.	Regional Board Representative for N. Cowichan	748-2412	Mayor of N. Cowichan Municipality
14.	Burke, Mr. D.	Regional Board Representative for Area A	743-9134	
15.	Cafferata, Mr. W.	Manager of Shawnigan Division, MacMillan Bloedel Ltd.	746-4121	
16.	Campbell, Mr. L.	Regional Board Representative for Area D	748-3156	Member of Cowichan Estuary Task Force
17.	Chance, Mr.	Production Manager, Inland Cement Co. Bamberton	743-5511	
18.	Fraser, Mr. A.	Cowichan Valley Economic Development Officer	746-6158	
19.	Gates, Mr. B.	Environment & Land Use Committee	387-6757	Chairman of Cowichan Estuary Task Force
20.	Giles, Mrs. G.	Regional Board Representative for Area C	743-5466	
21.	Hollett, Mr. R.	Regional Board Representative for N. Cowichan	246-4731	Chairman of Cowichan Valley Economic Development Commission and Alderman of N. Cowichan Municipality
22.	Houlden, Mr. G.	Property Division of Chevron Oil Co.	668-5454	
23.	Mihalicz, Mr. E.	Manager of Shoal Isle. Dryland Sort, B.C. Forest Products Ltd.	246-3264	
24.	Modeste, Mrs. D.	Band Manager, Cowichan Indian Band	748-3196	
25.	Smith, Mr. R.	Director of Planning, Cowichan Valley Regional District	746-4485	Member of Cowichan Estuary Task Force
26.	Walker, Mr. T.	District Manager, Ministry of Forests	746-5123	

APPENDIX I

PROPOSAL TO THE MINISTER OF FORESTS

PROVINCE OF BRITISH COLUMBIA

By: Vancouver Island Association of Specialty Mills

and Independent Loggers

December, 1979

PROPOSAL

TO

THE MINISTER OF FORESTS

PROVINCE OF

BRITISH COLUMBIA

By: Vancouver Island Association
of Specialty Mills and Independent
Loggers.

December, 1979.

INTRODUCTION

The Vancouver Island Association of Specialty Mills and Independent Loggers is an organization registered under the Societies Act in the Province of British Columbia. The Association boundaries are those of the Cowichan Valley and Capital Regional Districts.

Representing a growing number of small businessmen in the forest industry, the organization is intent on assisting in developing high standards of resource utilization in co-operation with the large mill operators, and the Ministry of Forests.

To this end, we present the following material as the basis for both developing sound policy, and safeguarding the future of the small operator.

We wish also to be perfectly clear in our objectives of a strong desire to work <u>with</u> the large companies and the Ministry of Forests as a team so that everyone benefits.

PROPOSAL

The small operators forming the Association have developed their companies from the utilization of salvage cedar in previously logged over areas, specified salvage sales and areas allotted to them by the large mills.

In many cases, logs have been located and successfully harvested, and made into product from areas previously logged by the major companies. This is not meant to be an indictment against these companies, rather than to show that with their inherent flexibility and ingenuity, these small operators can actually enhance the already active high utilization practises of the larger companies.

The forest industry in B.C. has historically been one of some magnitude. Huge trees, huge equipment, huge commitments of capital and, thus, when small proposals are brought forward, some considerable adjustment of thought is required. If this adjustment is accepted, we feel that the whole forest industry, and the people of British Columbia will profit.

The labour intensive small operator could in fact offer a tremendous service to the large companies, and to the Forest Service. To achieve these goals, we therefore, propose the following:

1. Stumpage rates:
   We suggest that stumpage and scaling be made consistent with market trends, and that rates be established by the Ministry of Forests.

   Under present regulations, the original license holder can determine ownership of logs which, by virtue of inconvenience, have been left in the license area following the initial cut, and the area abandoned in preparation for slash burning or re-planting. The small operator can make use of this discarded and uncatalogued inventory, however, as soon as it is brought to a landing 'Presto!' it is suddenly of consequence, and a premium is placed on the logs - logs which hitherto were disowned and abandoned to be destroyed or allowed to rot.

   We propose that 'harvesting time frames' be set so that when an area has undergone the initial clear cut and prior to further treatment i.e. slash burn, re-planting, that it be re-investigated for remaining inventory potential, and that in cases where suitable logs for manufacturing into product are available, that these be assigned to the specialty mills, and that this be done again in specific cases <u>following</u> slash burns, and that stumpage rates be established according to sound fiscal and resource policy.

2. Salvage Pre-logging:
We propose that the small independent specialty mills, in co-operation with the large mills and the Forest Service, be allowed to log 'dead and down', and specific defective trees in areas which have been assigned to clear cutting.

Presently, a large amount of useful cedar is destroyed when trees are felled over these 'dead and downs', or bring 'defective' trees down with them. If specialty mills were allowed to harvest these trees, the areas could, in fact, be made more accessible to the large companies which, in turn, gives them added benefits. The program would be implemented under clearly understood terms by all parties.

3. Special Areas:
While not intending to impinge on the established principles of resource assignment, we, nevertheless, feel that special attention should be given to the small operators.

We, therefore, respectfully request that the Loop Creek - Gordon River Fire Break be assigned to the small mill operators. It is our understanding that the terms of the proposed 'Nitinat Exchange' which assigns this area to B.C.F.P. is not a popular negotiation. If, however, this was retained for the small operator, it could keep a series of small labour intensive mills operating for 10 - 15 years vs. one large 'clear-cut' operation an estimated 6 - 8 months.

4. Saw Log Salvage:
Many areas contain not only salvage cedar, but waste which can be readily harvested as saw logs. In many cases, these logs have been left on site following 'normal' logging operations, however, when these logs are brought to the landing, or even in transport, they are assigned higher costs than originally for the main harvesting program.

We propose as in 1.) that when initial logging has been completed, these areas are 'signed off' so that they can be re-assigned for clean up, and salvage opportunity without recourse to unrestricted price assignments. It would be our recommendation that appropriate fees be determined by the Forest Service when the area is re-assigned for salvage.

Further activity in the area, i.e. clean-up and/or re-aforestation could be undertaken following this program. It is foreseeable that the small operators could be hired to assist in the re-aforestation if mutually agreeable.

SUMMARY:

The foregoing proposal is presented in the hope that the small mill can, through concerted effort and co-operation, become recognized as a viable part of the forest management and utilization team, alongside the large companies and the Ministry.

We are of the opinion that the small operator is a vital part of the industry which can survive and create employment in an environment which is difficult for the larger companies, and yet, we also feel that we can supply a vital service to this team.

The proposal is presented in full recognition that adjustments will have to be made, however, we also feel that these adjustments are for the good of the industry and people of British Columbia, and to the betterment of a forest resource program which could not be matched world wide.

On behalf of the Association, please accept our appreciation for the opportunity to make this overture.

Allan E. Peters.

A. Peters,
President.

APPENDIX II

LIST OF MEMBERS OF VANCOUVER ISLAND ASSOCIATION OF SPECIALTY MILLS AND INDEPENDENT LOGGERS AND SELECTED ADDITIONAL MILLS AND LOGGERS

LIST OF
MEMBERS OF VANCOUVER ISLAND ASSOCIATION OF SPECIALTY MILLS & INDEPENDENT LOGGERS
AND SELECTED ADDITIONAL MILLS AND LOGGERS
OCTOBER 20, 1980

NAME	COMPANY NAME	ADDRESS	CITY	P. CODE
Mr. J. Crawford	Pacific Surfe Logging	P.O. Box 366	Lake Cowichan, B.C.	V0R 2G0
Mr. A. Crawford	Aljim Enterprises Ltd.	P.O. Box 264	Lake Cowichan, B.C.	V0R 2G0
Mr. G. Quenville	Quenco Cedar Industries	P.O. Box 218	Lake Cowichan, B.C.	V0R 2G0
Mr. L. Ferguson	Big Foot Cedar	P.O. Box 1224	Lake Cowichan, B.C.	V0R 2G0
Mr. J. Danielson	Danielson's Sawmill	973 Cherry Point Road R.R. #3	Cobble Hill, B.C.	V0R 1L0
Mr. A. Bobcik	Flika Lumber Co. Ltd.	3820 Hillbank Road	Cowichan Station, B.C.	V0R 1P0
Mr. K. V. Williams	Kendon Recovery Ltd.	4870 Marshall Road	Duncan, B.C.	
Mr. H. Berrow	Evergreen Shake & Shingle Ltd.	P.O. Box 809	Lake Cowichan, B.C.	V0R 2G0
Mr. R. Berrow	Port Renfrew Shake & Shingle Ltd.	General Delivery	Port Renfrew, B.C.	V0S 1K0
Mr. A. Peters	Rooftop Shake & Shingle Ltd.	P.O. Box 672-158E Sahtlam Ave.	Lake Cowichan, B.C.	V0R 2G0
Mr. R. Woodward	Warren Logging Ltd.	P.O. Box 269	Lake Cowichan, B.C.	V0R 2G0
Mr. M. Simard	M.C. Simard Logging Ltd.	Thain Road	Cobble Hill, B.C.	V0R 1L0
Mr. J. Well	Nit-Nat Cedar Salvage	P.O. Box 904	Lake Cowichan, B.C.	V0R 2G0
Mr. G. Hamilton	Ham-Mc Cedar Products Ltd.	P.O. Box 1162	Lake Cowichan, B.C.	V0R 2G0
Mr. M. Couturier	Confederate Shake & Shingle Ltd.	P.O. Box 642	Lake Cowichan, B.C.	V0R 2G0
Mr. V. Beiling	Dogwood Lumber Co. Ltd.	R.R. #2	Duncan, B.C.	V9L 1N9
Mr. R. Williams	Cobble Hill Logging Ltd.	P.O. Box 105	Cobble Hill, B.C.	V0R 1L0
Mr. R. Day, B. Perry	Hidden Valley Sawmill	P.O. Box 48	Shawnigan Lake, B.C.	V0R 2W0
Mr. E. Rumney	Shawnigan Timber Ltd.	Waters Road, Box 778	Duncan, B.C.	

APPENDIX III

CONVERSION FACTORS USED IN THIS REPORT

CONVERSION FACTORS USED IN THIS REPORT*

Logs to Lumber

1.00 cunit (2.83 m^3) = 550.00 fbm

Logs to Shakes and Shingles

1.00 cunit (2.83 m^3 or 550.00 fbm) = 5.50 squares

Logs to Shake and Shingle Blocks

1.00 cunit (2.83 m^3 or 550.00 fbm) = 1.18 cords

*Sources: Dobie, J. & D. M. Wright. 1975. Conversion Factors for the Forest Products Industry of Western Canada. Environment Canada, Forestry Service. 92 pp.

Pt. Renfrew Shake & Shingle Ltd.

Evergreen Shake & Shingle Ltd.

Rooftop Shake & Shingle Ltd.

Ham-Mc Cedar Products Ltd.

Confederate Shake & Shingle Ltd.

APPENDIX IV

MAP OF PROPOSED SITES FOR A COWICHAN VALLEY LOG HANDLING FACILITY AND LOCATIONS OF MILLS REQUIRING SUCH A FACILITY

LEGEND

MILL SITES — CO. NAME

PROPOSED LOG HANDLING FACILITY SITE — SITE #

No.	DATE	REVISION	BY	APP'D

COWICHAN VALLEY ECONOMIC DEVELOPMENT COMMISION

MAP SHOWING PROPOSED SITES FOR A COWICHAN VALLEY LOG HANDLING FACILITY & LOCATIONS OF MILLS REQUIRING SUCH A FACILITY

DATE 1980-10-16	SCALE Hor. 1:125000	
DESIGNED AH	CHECKED	
DRAWN HMM	CHECKED	
APPROVED		
MAP REF. No. 92-B.C.F&G	DRAWING No. 655-7	REV.
AIR PHOTO No.		
FILE No. 655		

APPENDIX V

QUESTIONNAIRE TO DETERMINE THE NEED FOR A LOG HANDLING FACILITY

COWICHAN VALLEY TIDEWATER

LOG HANDLING FACILITY QUESTIONNAIRE

COMPANY NAME: _____

ADDRESS: _____

_____

PERSON TO CONTACT: _____

POSITION: _____

TELEPHONE NO.: _____

1. Type of Products Manufactured (Describe in detail)

_____

_____

2. Mill Production

(a) Rated Capacity/Shift: _____

(b) Anticipated 1980 Output: _____

(c) Average Annual Output 1975-79: _____

(d) Anticipated - 1981 Output* _____

- 1985 Output* _____

- 1995 Output* _____

* Based on available wood supply sources in the Cowichan Valley Regional District only.

3. Would you want to, or be able to, expand your mill production if a log haul-out facility were available as a source of extra log supplies? _____

4. If you answered "yes" to question 3, assuming a log haul-out facility were available, what then would be your:

Anticipated - 1981 mill output* _____

- 1985 mill output* _____

- 1995 mill output* _____

* Based both on available wood supply sources in the Cowichan Valley Regional District and on anticipated wood supplies available through the proposed log haul-out facility.

5. Log Supplies:

Please fill in the following table to help us determine present and anticipated log usage in the Cowichan Valley Regional District.

	Volume	Specie By %								% that is Decadent	Grades or Sizes
		F	C	H	B	Cy	P	Decid.	S		
(a) No Log Haul-Out Available - Present 1980 Log Input - Anticipated 1981 Log Input - Anticipated 1985 Log Input - Anticipated 1995 Log Input											
(b) Assume Log Haul-Out Available - Anticipated 1981 Log Input - Anticipated 1985 Log Input - Anticipated 1995 Log Input											

6. (a) Listed by percent, what are your present sources of log supply? (Break down by species, grades and/or sizes, if possible.)

e.g. Government timber sales; private lands; trades; purchases from large, integrated companies; purchases from smaller, independent loggers; any others.

_____

_____

(b) What type of wood (by percent) makes up your log supply? (e.g. dead and down, defective, logs, blocks, cants, etc.)

_____

7. Log Dump Necessity - Assuming the proposed log handling facility could handle log dumping as well as log haul-out, what volume of logs would you plan to dump (ship out) in a year? _____

What % of these logs would be for trade _____? sale _____?

(Assume that there would be no minimum or maximum volume necessary to make make use of the potential log dump.)

8. Do you anticipate that indepenent loggers would make use of a log dump to market their logs? _____ To what extent? _____

What are your comments about the possibility of setting up a log buying station in conjunction with the proposed log handling facility, including a log sort and storage area for a log storage (inventory) area? _____

_____

_____

9. What is the area of your present log storage yard? _____

What volume of logs will yor present log yard hold? _____

If necessary, would you be able to expand the size of your log storage yard? _____ If yes, to what total size? Area: _____;

Volume: _____.

10. If an independent log handling facility was established in the Cowichan Bay area, who do you recommend should manage and operate it? _____

_____

11. Any other comments: _____

_____

_____

_____

Date: _____

This questionnaire completed by:

NAME: _____

POSITION: _____

SIGNED: _____

N.B. All of the data collected in this survey will be kept confidential and used only to prepare regional statistics and averages.

WAH:jl * 655-6-03

APPENDIX VI

SOCIAL (PUBLIC) IMPACT ASSESSMENT CHECK LISTS

Public Acceptance Assessment For Project:

CHECKLIST I (For Step 1: Describe the Project)

DESCRIPTION OF THE PROPOSED PROJECT

Instructions:

1. Check appropriate items.
2. Consult engineers, planners, specialists for answers.

1. What the project is: _____

2. What the project involves:

a. New industrial plant _____
b. Industrial plant expansion _____
c. New construction _____
d. Agricultural land development _____
e. Institutional construction _____
f. Resource conversion _____
g. Transportation _____
h. Commercial installation ____
i. Residential construction ___
j. Recreation land development _____
k. Other _____

3. Location of project (City, County) _____

4. Description of present land use (check)

a. Residential _____
b. Commercial _____
c. Institutional _____
d. Industrial _____
e. Transportation _____
f. Resource conversion _____
g. Open space/recreation _____
h. Wetland _____
i. Water resource _____
j. Woodland _____
k. Agriculture _____
l. Other _____

Present zoning _____

Zoning authority (City, County, State) _____

5. Size of project:

Number of acres: _____

Length and width in miles or yards _____

Construction cost estimate _____

Building size _____

_____

CHECKLIST I (continued)

Parking Lots _____

Warehouses _____

Vehicular traffic generated per day _____
(average daily traffic ADT)

Transportation network involved _____

6. Jurisdictional government agencies:

Local _____

_____

_____

7. Description of land:

a. Barren _____

b. Bare rock _____

c. Streams _____

d. Lakes _____

e. Reservoirs _____

f. Wetland _____

g. Woodland _____

h. Rangeland _____

i. Agricultural crops _____

j. Orchards _____

k. Tree farms _____

l. Other _____

_____

_____

m. Historic or archaeological values _____

_____

n. Present buildings on land _____

_____

_____

o. Other natural features _____

_____

Use of present buildings

Scheduled for use _____

Scheduled to be demolished _____

Other features (if any) _____

_____

CHECKLIST I (continued)

8. Construction activities in project: (Describe) _____

_____

_____

Involving:

a. Surfacing or paving _____
b. Blasting and drilling _____
c. Cutting and filling _____
d. Surface excavation _____
e. Subsurface excavation _____
f. Terracing _____
g. Landscaping _____
h. Culverting _____
i. Canalization _____
j. Retention ponds _____
k. Well drilling _____
l. Dredging _____
m. Landfill _____
n. Septic tanks _____
o. Other _____

_____

9. Site presently used by:

a. Forest industry _____
b. Hikers, backpackers, campers _____
c. Hunters _____
d. Fishermen _____
e. Four wheel vehicles _____
f. Picnickers _____
g. Snowmobiles _____
h. Recreational vehicles _____
i. Naturalists _____
j. Farmers _____
k. Hang-gliders _____
l. Other _____

_____

10. Utilities

a. Water supply _____

_____

b. Sewage and waste disposal _____

_____

c. Electric power requirements and sources _____

d. Fuel requirements and sources _____

Date: Evaluator:

Public Acceptance Assessment For Project:

CHECKLIST II (For Step 2: Determine the impacts of the project on the public)

HOW THE PROJECT IMPACTS ON THE PUBLIC

Instructions:

1. If activity not included in project or will have no affect, check no.
2. If activity will have impact, mark, using weighting code, under positive those impacts which are beneficial, e.g. increasing employment opportunities. Mark under negative, using weighting code, impacts which may be adverse, e.g. increasing the noise level.
3. Weighting code:
   Insert 1 if the impact is imperceptible.
   Insert 2 if the impact is moderate.
   Insert 3 if the impact is significant.

Project Activities Having Potential Impact on	No.	How Affected Yes — Positively	How Affected Yes — Negatively
LAND USE.			
Change in existing land use patterns			
Use of agricultural land			
Recreational activities:			
Vacation homes.			
Sport fishing.			
Pleasure boating.			
Dune buggies.			
Trail hiking.			
Snow-mobiling.			
Shell fishing.			
Camping.			
Hiking.			
Bicycling.			
Swimming.			
Board walks.			
Other _____			
_____			
_____			
Construction activities:			
Steep slopes			
Flood plains			
Other _____			
_____			
_____			

HOW TO MAKE A PUBLIC ACCEPTANCE ASSESSMENT

Public Acceptance Assessment For Project:

CHECKLIST II (continued)

Project Activities Having Potential Impact on	No.	How Affected Yes — Positively	How Affected Yes — Negatively
Soil Alteration			
Surfacing or paving.			
Blasting and drilling.			
Cut and fill.			
Surface excavation.			
Subsurface excavation.			
Erosion control.			
Terracing.			
Landscaping.			
Chemical stabilization of soil.			
Other _____			
_____			
_____			
Groundwater Alteration			
Creation of impervious surfaces.			
Culverting.			
Relocating and channeling streams.			
Alterations of drainage patterns.			
River control and flow modifications.			
Canalization.			
Irrigation.			
Well drilling.			
Dredging.			
Wetland fill.			
Channelization.			
Wetland drainage.			
POLLUTION			
Air Quality			
Burning.			
Weather modification.			
Stack/exhaust emission.			
Industrial parking.			
Venting.			
Air cooling.			
Heating.			
Dust, fumes, smoke, odors.			
Herbicide application.			
Herbicide disposal.			
Use of toxic chemicals.			
Other _____			
_____			

Public Acceptance Assessment For Project:

CHECKLIST II (continued)

Project Activities Having Potential Impact on	No.	How Affected Yes — Positively	Negatively
Alteration of vegetation			
Logging.			
Weed control.			
Reforestation.			
Clear Cutting.			
Other _____			
_____			
NATURAL RESOURCES			
Vegetation removal.			
Forestry.			
Mining.			
Commercial fishing.			
Commercial hunting.			
Grazing.			
Watershed.			
Potential recycling activity.			
ARCHAEOLOGICAL FEATURES			
COMMUNITY AND REGION			
Alteration of residential density.			
Commercial activity.			
Retail/entertainment activity.			
Industrial development.			
Public services.			
Sewage capacity.			
Water, gas, electricity demand/supply.			
Solid waste disposal.			
Public safety.			
Fire protection.			
Population growth.			
Change in transportation pattern.			
TRANSPORTATION			
Railways.			
Automobiles.			
Shipping.			
River and Canal.			
Trails.			
Trucking.			
Aircraft.			
Pleasure boating.			
Cables and lifts.			
Pipelines.			
Ocean shipping.			
Other _____			

Public Acceptance Assessment For Project:

CHECKLIST II (continued)

Project Activities Having Potential Impact on	No.	How Affected Yes — Positively	Negative
Water Quality			
Liquid effluent discharge			
eepwell emplacement.			
Septic tanks.			
Waste discharge.			
Spray irrigation.			
Ocean dumping.			
Emplacement of tailings.			
Undergroung storage.			
Cooling waste discharge.			
Stabilization ponds.			
Oxidation ponds.			
Junk disposal.			
Other _____			
_____			
Noise level			
Solid Waste			
Waste recycling.			
Landfill.			
Spoil and overburden.			
Junk disposal.			
THE ECOSYSTEM			
Insect controls.			
Biological controls.			
Introduction of flora.			
Introduction of fauna.			
Removal of flora.			
Removal of fauna.			
Flora and/or fauna			
Utilization of wilderness.			
Utilization of open spaces.			
Utilization of Wetlands.			
Utilization of:			
Forests.			
Grazing land.			
Refuge beaches.			
Dunes.			
Shorelines.			
Lakes.			
Streams.			
Breeding or nesting place for wildlife.			
Ocean frontage.			

Public Acceptance Assessment For Project:

CHECKLIST II (continued)

Project Activities Having Potential Impact on	No.	How Affected Yes — Positively	Negative
POSSIBILITY OF ACCIDENTS			
Explosions.			
Spills and leaks.			
Operational failures.			
Other _____			
_____			
SOCIO-ECONOMIC STRUCTURE			
Social			
Substantial population changes.			
Change in number of families or family size.			
Alteration of age, income, or racial mix.			
Housing type and quality.			
Housing density and number.			
Change in land and housing costs.			
Displacement of people or families.			
Modification of social fabric or community structure.			
Historical or traditional qualities.			
Visual qualities of an area or site.			
Opportunities for socializing.			
Cultural opportunities.			
Recreational facilities/playgrounds.			
Effects that may cause stress.			
Possibility for criminal activity.			
Convenience of services.			
Compatibility with existing community policies.			
Alteration of government structure.			
Alteration of government responsiveness.			
Economic			
Effect on basic economy.			
Effect on existing firms, industries.			
Employment income opportunities.			
Substantial public expenditures.			
Change in taxation.			
Excessive burdening of a particular group or sector.			
Population growth.			
Adequacy of necessary local resources.			

Date: _____ Evaluator: _____

Public Acceptance Assessment For Project:

CHECKLIST III (For Step 3: Determine which publics care about the impacts)

IDENTIFICATION OF PUBLIC SEGMENTS WHO CARE ABOUT PROJECT IMPACTS

(1) Public Segment Identification*	(2) Description / (3) Qualitative	Quantitative	(4) Source(s)

Date: _____ Evaluator: _____

Public Acceptance Assessment For Project:

CHECKLIST IIIa

TABULATION OF PUBLIC SEGMENTS IDENTIFIED
(Based on Checklist III)

(1) Public Segment* Identified	(2) Evaluation Identifying Each Segment	(3) If a Public Segment is not Considered Further Note Reason

* Mark with * all public sigments whose perceptions will be evaluated in further steps.

Analysis by: _____

Date: _____

Public Acceptance Assessment For Project:

CHECKLIST IV (For Step 4: Find out how the public perceives these impacts)

HOW THE PUBLIC PERCEIVES THE IMPACTS

(1) Anticipated Impacts (as Determined by Evaluators: See Checklist II)	(2) Degree of Anticipated Impact (as determined by Evaluators: See Checklist II)*		Public Segment (3) Weighted Perception*		(4) Source(s)**
	Pos.	Neg.	Pos.	Neg.	

Note: Use separate sheet and continuation sheet, if necessary for each public segment identified with * in IIIa.

* Weighting code:
1. Imperceptible 2. Moderate 3. Significant
Adverse Impact = Negative
Beneficial Impact = Positive

** Sources on which evaluation based, i.e., letters to editor (where, date); observation at meeting (where, date) interviews; trend analysis, intuitive, etc.

Date: Evaluator:

Public Acceptance Assessment For Project:

CHECKLIST IVa

TABULATION OF IMPACT PERCEPTIONS OF PUBLIC SEGMENTS (Based on Checklists IIIa & IV)

Weighted Perceptions of Public Segment

(1) Anticipated Impacts (as determined by Evaluators: same as Checklist IV*	(2) Degree of Anticipated Impact (as determined by Evaluators: same as Checklist IV		(3) Public Segment		(4) Public Segment		(5) Public Segment		(6) Public Segment		(7) Public Segment	
	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Totals												

1. Maximum possible impact. 14 x 3 = 42** (Number of impacts multiplied by maximum impact value) _____.
2. Percent impact (totals ÷ maximum possible impact) _____.
3. ✓ Totals equal or exceeding 50% of maximum, should be considered further.
4. Circle O all perceived impacts weighted 3.

* Identify each public segment from Checklist IV.

** Number of impacts x 3.

Analysis by: _____

Date: _____

Public Acceptance Assessment For Project:

CHECKLIST V (For Step 5, Find out why they care)

DETERMINE WHY THE IMPACTED PUBLIC CARES

Evaluation of Values-Beliefs-Attitudes

Generating Negative Reaction

(Complete Separate Sheet for Each Public Segment)

Public Segement*_____

(1) Negative Impacts rated significant (3) (circled O in IVa)	(2) Values-Beliefs Attitudes Identification**	(3) Source(s) ***	(4) Identification of individuals or groups evaluated ****

* From Checklist IVa.

** Code
V Basic values
B Beliefs
A Attitude
S Self-interest

*** Note sources, such as letters to Editor, participant observations, speech, interviews, others.

**** Identification, such as, B.Y. Smith, Editor, Smalltown Times: Mrs. Beulah Jones, Chairman, Citizens Group, etc.

Evaluator: _____ Date: _____

Public Acceptance Assessment For Project:

CHECKLIST Va

DETERMINE WHY THE IMPACTED PUBLIC CARES

Evaluation of Values-Beliefs-Attitudes

Generating Negative Reactions

Negative Impacts rated significant (3) (circle O on IVa) from columns 3,4,5, 6,7	Public Segment **	Public Segment **	Public Segment **	Public Segment **

* Identify each public segment * from Checklist IVa.

** Code
- V Basic value
- B Belief (subject to change)
- A Attitude (deep seated)
- S Self-interest

Analysis by: _____ Dated: _____

Public Acceptance Assessment For Project:

CHECKLIST Vb

SUMMARY

Values-Beliefs-Attitudes

Instructions: List value, beliefs and attitudes from columns (2),(3),(4) and (5) in Checklist Va under appropriate headings in column (1), Checklist Vb. List Evaluators by name and any qualifying comments from Checklist V in column (3), (4), Checklist Vb.

(1) (From Checklist Va)	(2) Shared by Publics as follows:	(3) Evaluators by name	(4) Qualifying Comments

Analysis by: _____ Date: _____

Public Acceptance Assessment For Project:

CHECKLIST VI (For Step VI: Evaluate how much they care)

Evaluation of Probable Action of the Publics Opposing the Project

(1) Public Segment (From Checklist Va)	(2) Probable Action*	(1) Sources(s)**
Total		

Maximum weighting:_____ Percent opposition:_____

* Code:
1. Probably take no action
2. Probably only speak at public hearings
3. Probably only enter a formal protest
4. Probably initiate a petition
5. Probably institute legal action

** Sources: i.e. previous actions, interviews, organization of action group, speeches, etc.

Evaluator: _____ Date: _____

Public Acceptance Assessment For Project:

CHECKLIST VIa

SUMMARY

Evaluation of Probable Action of the Public

Opposing the Project

(Based on Checklists VI Compiled By Several Evaluators)

Instructions: List probable action, column (2) Checklist VI from all Evaluators under appropriate heading in column (1), Checklist VIa. Public segment as listed by each Evaluator from column (1), Checklist VI. Note any comments in column (4).

(1) Probable Action	(2) Public Segment	(3) Evaluators (By Name)	(4) Qualifying Comments

Analysis by: _____ Date: _____

Public Acceptance Assessment For Project:

CHECKLIST VII (For Step 7: Analyze whether those who care have sufficient influence to affect the outcome)

EVALUATION OF PROBABLE INFLUENCE OF PUBLICS OPPOSING THE PROJECT

(1) Public Segment (from Checklist Va)	(2) Identification of Influentials *	(3) Probable Influence**	(4) Sources***
Total: ****			
Maximum (Number of public groups x III)			
Percent influence (Total maximum)			

* By name such as: Mrs. B. Jones, Sammy Smith, etc.

** Weighting code:
I Imperceptible influence
II Moderate influence
III Significant influence

*** Sources, i.e., interviews, previous action, speeches, position in the community (political, civic, influential business, club) etc.

**** List for each public segment as the highest number listed for anyone in the group, i.e. Mrs. X=I, Mr. Y=I, Mr. Z=III: therefore use III.

Evaluator _____

Date _____

Public Acceptance Assessment For Project:

CHECKLIST VIIa

SUMMARY
PROBABLE INFLUENCE OF PUBLIC OPPOSING THE PROJECT
(Based on Checklist VII)

Instructions: List name from column (2), Checklist VII, under appropriate headings in column (1). For columns (2), (3) list public segment and Evaluator from each Evaluator in Checklist VII. Note any qualifying comments in column (4).

(1) Probable Influence	(2) Public Segment	(3) Evaluators (By Name).	(4) Comments

Analysis by: _____

Date: _____

HOW TO MAKE A PUBLIC ACCEPTANCE ASSESSMENT

Public Acceptance Assessment For Project:

CHECKLIST VIII (For Step 8: Decide which impacts you can alter.)

WHICH IMPACTS CAN BE ALTERED OR CONTROLLED

	Controllability				
(1) Perceived Impact (from Checklist IVa	(2) Readily Controlled*	(3) Controllable within project budget	(4) Controllable with additional budget	(5) Not Controllable ≠	(6) Source(s) ∅

* Readily controlled, i.e. will be controlled for compliance, requires change in site layout, can substitute, can be altered by communication, etc.

≠ Not controllable, i.e. value judgment, nature of process or plant, sacrifice efficiency.

∅ Source(s), i.e. project budget, engineer's estimate, planner's judgment, etc.

Evaluator: _____

Date: _____

Public Acceptance Assessment For Project:

CHECKLIST VIIIa

SUMMARY

WHICH IMPACTS CAN BE ALTERED OR CONTROLLED

Instructions: List controllability from columns (2), (3), (4), (5). Checklist VIII under appropriate headings in column (1) Checklist VIIIa. For columns (2) and (3) list for each Evaluator in Checklist VIII. Note any qualifying comments in column (4).

(1) Controllability	(2) Result of alteration	(3) Evaluator	(4) Qualifying Comments

Analyzed by: _____

Date: _____

STAGE II REPORT
ECONOMIC ANALYSIS/
RECOMMENDED MANAGEMENT AUTHORITY

FOR A TIDEWATER
LOG HANDLING FACILITY
IN THE
COWICHAN VALLEY REGIONAL DISTRICT

R8015

File: 655

Prepared for the

Cowichan Valley Economic Development Commission

by

T.M. Thomson & Associates Ltd.
1006 Government Street
Victoria, B.C.
V8W 1X7

February, 1981

March 30, 1981

File No: 655

Cowichan Valley Economic Development Commission
Media House
#3 Queen's Road
Duncan, B.C.
V9L 1W2

Attention: Mr. W. A. Fraser, Economic Development Officer

Dear Sirs:

Re: Site Determination Study for a Tidewater Log Handling Facility in the Cowichan Valley Regional District

Enclosed are twenty copies of our Stage I and Stage II reports for the above-noted study.

In the Terms of Reference, dated July 18, 1980, and as articulated in the Proposal for Services dated August 8, 1980, this study has been conducted in a phased process.

Phases I, II and III of the study, which included Study Preparation, Determination of Necessity, and Preliminary Comparison of Alternative Sites respectively, were completed and submitted in our Stage I report, dated October 20, 1980. The Stage I report, based upon conclusions reached in Phases I, II and III of the Study, recommended three selected sites for more detailed analysis.

Subsequently, it was resolved that the three recommended sites and a fourth site be subjected to a detailed review, based upon the following final two evaluation criteria:

> Phase IV - Economic Analysis - a more detailed operating cost pro forma and preliminary capital cost estimate, based upon formulated operating techniques, types of equipment, log haul-out/dumping systems to be employed, and perceived site layouts. Factors such as waste disposal, suppression of air, water, noise and visual pollution and land-side infrastructure requirements are to be reviewed.

Phase V - Management Recommendations - a recommendation regarding the type of management authority that should be used to operate the common facility.

This Stage II report covers the detailed review required under Phase IV and Phase V of the study. In accordance with the Terms of Reference, no site priorization has been included.

Since this Stage II report is restricted to economic and management concerns emanating from the Stage I report content, no attempt has been made to address the possible implications of current, on-going events.

We thank you for the opportunity to have participated in this most interesting assignment. We trust the information provided will serve a useful purpose in your deliberations.

Yours very truly,

T. M. THOMSON & ASSOCIATES LTD.

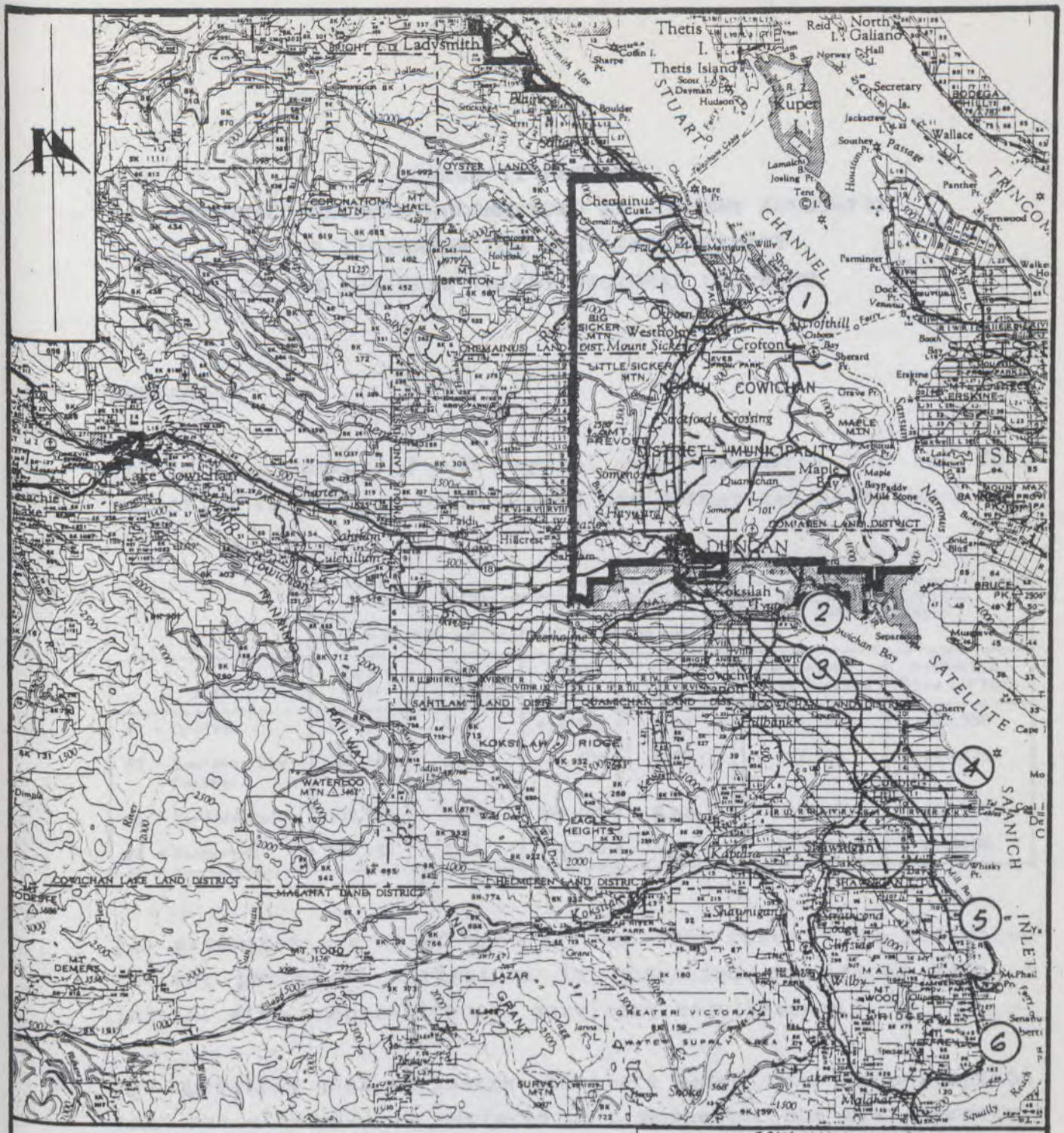
Per: 

W. A. Hopwood, R.P.F.

WAH:jl

Enc.

CONTENTS
STAGE II REPORT



LEGEND

(1) PROPOSED LOG HANDLING FACILITY SITE

(3) SITES ELIMINATED FOLLOWING INTERIM REPORT

COWICHAN VALLEY ECONOMIC DEVELOPMENT COMMISSION

KEY MAP SHOWING FACILITY SITES

DATE 1980-10-16	SCALE Hor. 1:250 000	
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APPROVED		
MAP REF. No.	DRAWING No. 655-6	REV. A
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FILE No. 655		

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THOMSON

STAGE II REPORT
ECONOMIC ANALYSIS/RECOMMENDED MANAGEMENT AUTHORITY FOR A TIDEWATER LOG HANDLING FACILITY IN THE COWICHAN VALLEY REGIONAL DISTRICT

I. SUMMARY

Preliminary operating and capital cost estimates for the four potential facility site locations are summarized as follows:

	ANNUAL OPERATING COST ESTIMATES				PRELIMINARY CAPITAL COST ESTIMATES	
	Vol. = 40,000 cu m/t		Vol. = 70,000 cu m/t			
Site	Cost ($)	Cost ($/Cu m/t)	Cost ($)	Cost ($/Cu m/t)	Gravelled Site Surface	Asphaltic Site Surface
#1 - Crofton	327,300	8.18	412,500	5.89	354,100	400,500
#2 - Cowichan Bay Central	337,100	8.43	423,600	6.05	397,800	441,700
#5 - Verdier Point	306,900	7.67	393,400	5.62	393,800	440,800
#6 - Bamberton	305,100	7.63	390,300	5.58	203,500	211,400

All estimates are based upon assumed 1981 costs. The estimates reflect perceived variations in operating conditions and in initial site preparation and servicing requirements.

The operating cost estimates above are based upon the assumption that the site will be surfaced with asphaltic hot mix concrete. The increased capital costs associated with an asphaltic surface course are offset by the anticipated increased operating costs associated with a gravelled site surface. In addition, a paved surface improves conditions for satisfactory and economical disposal of debris. The operating estimates demonstrate the cost variations anticipated for different volume through-put by the facility.

No attempt is made to rank the sites based upon pure economic considerations. The Stage I report (October 20, 1980) ranks all site locations based upon a broad economic analysis and other social and environmental factors.

With respect to a management authority for a common log handling facility, the recommendation is that directly affected parties from both the private and the public sector be represented through formation of an independent "Cowichan Tidewater Log Handling Facility Association." This Association would exercise management and control of the facility through its Board of Directors comprised of:

- an elected representative member actively involved in a logging enterprise;
- an elected representative member actively involved in a small mill enterprise;
- an elected representative member from the independent regional business community;
- an appointed representative from the Regional District staff.

Ownership of the facility would remain with the Regional District or, perhaps, with a management authority such as a Cowichan Valley Regional District Coastal Harbour Management Authority.

In addition, an operating budget criteria is presented with hypothetical operating budget calculations for all four sites, at the upper and lower volume projections. Based upon the preliminary capital and operating costs presented in the report, a "minimum user unit fee" could range from $6.35/cunit to $10.68/cunit, dependent upon the site location and upon the actual volume of logs handled at the facility. A higher volume will effectively decrease the required "minimum user unit fee".

II INTRODUCTION

This Stage II report, which has been prepared in accordance with the Terms of Reference and the Consultant's proposal* for this study, constitutes completion of the second, and final, step in the study process for a tidewater log handling facility in the Cowichan Valley Regional District.

As indicated in the Stage I report, the primary motivation for conducting this study is the need for a common log handling facility for use by small independent mill and logging operators in the Cowichan Valley Regional District. The Vancouver Island Association of Specialty Mills and Independent Loggers considers the economic viability of these types of operations to be contingent upon establishment of such a facility.

Funding of the study is provided through the federal Department of Regional Economic Expansion and the provincial Ministry of Industry and Small Business Development, under the terms of the Research Program of the Canada/British Columbia Industrial Development Subsidiary Agreement (IDSA).

The initial stage of the study culminated in submission of a Stage I report, dated October 20, 1980. That report addressed the following study phases:

Phase I	STUDY PREPARATION
Phase II	DETERMINATION OF NECESSITY
Phase III	SITE COMPARISON

* Proposal P8022 for a Site Determination Study for a Tidewater Log Handling Facility in the Cowichan Valley Regional District, August, 1980, T. M. Thomson & Associates Ltd.

In addition, the Stage I report identified and recommended three selected sites for more detailed economic analysis and operating pro forma:

Site No. 2 - Cowichan Bay Central
Site No. 5 - Verdier Point
Site No. 6 - Bamberton

The Economic Development Commission, in a letter dated January 20, 1981, instructed that, in addition to the recommended three sites, Site #1 (Crofton) also be included for further study. Accordingly, this Stage II report includes a review of all four selected site locations (refer to Key Map).

Concurrent with and subsequent to submission of the Stage I report, a series of on-going, possibly related events have evolved. These events are summarized as follows:

(1) The Cowichan Estuary Task Force Report, dated September 15, 1980, was released by the Environment and Land Use Committee Secretariat. Communications with the Secretariat staff were maintained throughout preparation of the Stage I report, and based upon the communication at that time, the two reports are essentially compatible.

(2) Pacific Forest Products Ltd. has proposed a private dryland sort facility at Crofton, immediately adjacent to the site considered for the Cowichan log handling facility.

(3) Inland Cement Industries Ltd. has announced that production operations at the Bamberton Cement Plant have been permanently suspended. No announcement has been made as to the intended use of the site.

Both of the latter two events continue to be of an on-going nature, consequently their possible effects upon the Cowichan log handling facility are not addressed in the Stage I report. This Stage II report, which is a continuation of Stage I report information, similarly does not address their possible implications.

In accordance with the original terms of reference, the Stage II review encompasses the following study phases:

Phase IV - Economic Analysis

This is a statement of formulated operating techniques, required equipment types, log haul-out and dumping systems and perceived site layouts. Preliminary operating and capital cost estimates are included with due regard to associated factors such as waste disposal, suppression of air, water, noise and visual pollution, and land-side infrastructure requirements.

Phase V - Management Recommendations

A recommendation as to the type of management authority that should be used to operate the common facility is made.

A site inspection of all four site locations has been conducted in order to assess existing conditions, serviceability from existing access and utility facilities, and other site limitations that will affect capital cost improvements and operations procedures.

A bibliography and individual references are presented at the end of this report, immediately preceding the Appendices. Applicable references appear by number in brackets at the end of the paragraph to which they apply.

III ECONOMIC ANALYSIS

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS

1. Operating Techniques and Required Equipment

The October 20, 1980 Stage I report concluded (p. 10):

> "Since really only two types of logs (cedar shake and shingle; and cedar sawlogs) are under consideration and since these seven mills can utilize a variety of sizes and grades within these two basic log types, log acquisition and distribution through the proposed haul-out facility should be relatively uncomplicated.
>
> Because each of these seven mills has plenty of log storage capacity, and because of the minimal number of species and grade sorts, only a small area (as little as 1 acre) for dryland sorting will be required for the log haul-out section of the proposed facility."

In addition (p. 13):

> "There is little doubt that the facility would benefit from having a log dump incorporated with the haul-out capability. As the volume of second growth logging in the study area increases, there should be an increasing need for access to outside log markets; this need could be filled by the proposed facility."

Accordingly, preliminary site lay-out sketches have been prepared for each site (refer to Appendix I) based upon the broad criteria stated above. All sites, although individually adapted to conditions unique to each site, have similar operational features, and would function in a similar fashion. These operational features, common

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

to all sites, are illustrated on Plate No. 1. They are:

On Land
- A log unloading area on the land-side of the site, near the entry point to the site.
- A log scaling area, located mid-way on the site.
- A log sort and storage area along one side of the site.
- A "Dewatering" area (i.e. log handling area) from a water side of the site.
- A log dump and banding area for out-going logs near a water side of the site, immediately adjacent to the "bull pen" area.
- A burn area.

On Water
- A bull pen area for incoming log bundles.
- A bull pen area for out-going log bundles.
- An area of booming alleys for out-going log booms.
- A tie-up area for incoming log booms.

Plate No. 1 shows, in schematic form, all potential common log movements at the site facility. Internal site movements are designated by dashed lines and incoming and out-going movements are designated by solid arrows.

The equipment requirements for this typical site facility are also designated on Plate No. 1. The function of the various equipment pieces will be:

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

- Front End Loader (980 Cat or equivalent): This loader will assist trucks in unloading and loading operations and will function as the prime mover on all internal log movements on land.

- Line Grapple Loader (one and a half yard or equivalent): This loader will transfer all incoming logs from the water (bull pen area) to land.

- Boom Boat: The boom boat will handle all water-side log movements.

The number and classification of personnel required on site will vary somewhat, dependent upon the volumes and log movements required at any one time. However, for normal day-to-day operations, the following work force is considered adequate:

- 1 Foreman

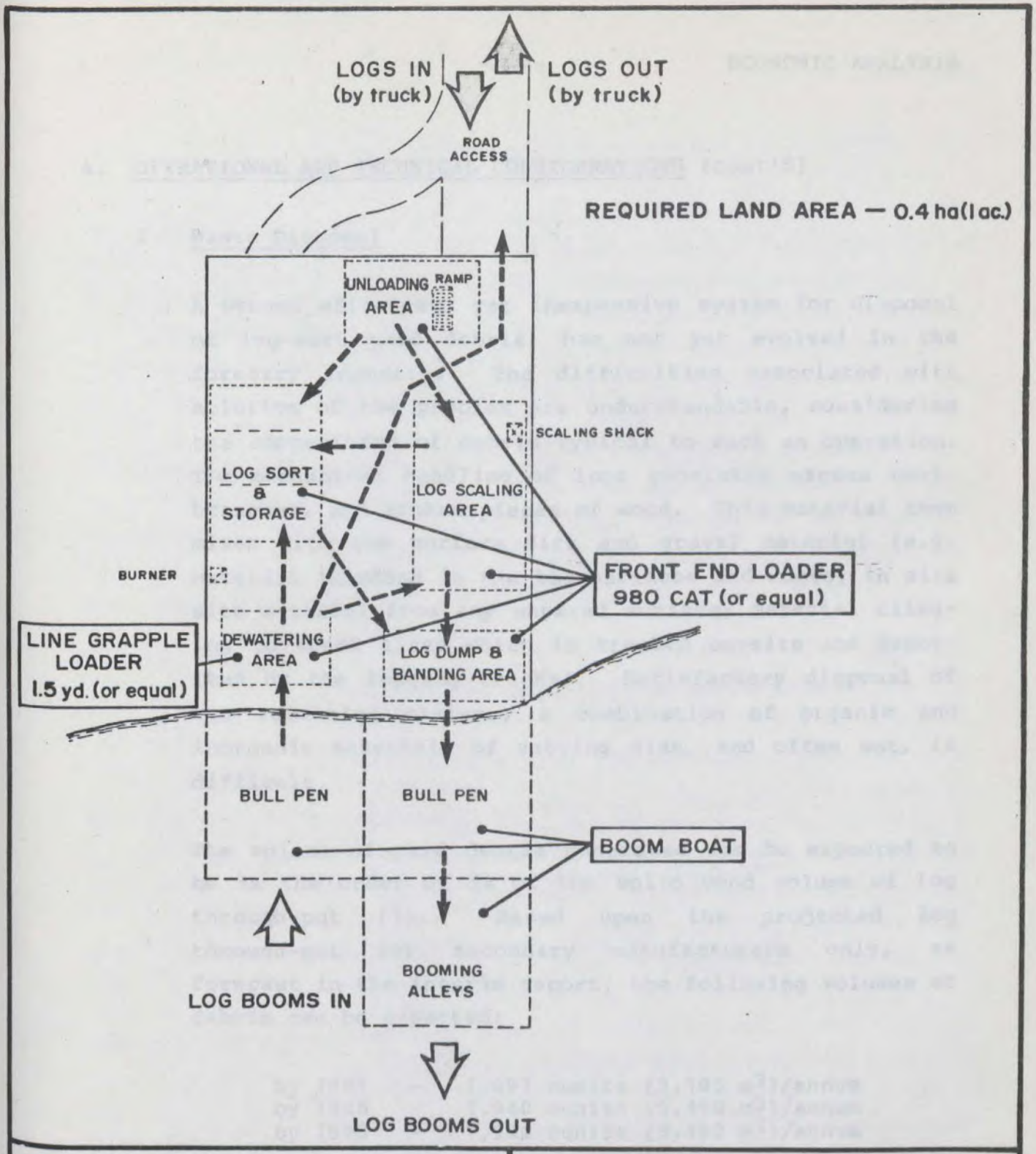
- 1 Front End Loader operator

- 1 Boom boat operator

- 1 Scaler

- 1 Helper or "utility man". This individual would be responsible primarily for banding of log bundles, however, would provide assistance, as required, in other operations such as loading/unloading trucks, trimming logs, scaling, sorting and possibly operating the Line Grapple Loader on an intermittent basis.

- 1 Line Grapple Loader operator. This conceivably, could be a part-time requirement only, dependent upon the volumes of incoming logs by water, and other concurrent site activities.



LEGEND

- LOGS IN
- LOGS OUT
- INTERNAL LOG MOVEMENTS
- EQUIPMENT REQUIREMENTS

PLATE No. I — TYPICAL LAY-OUT

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE - N.T.S.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

2. Waste Disposal

A proven efficient, yet inexpensive system for disposal of log-sort yard debris, has not yet evolved in the forestry industry. The difficulties associated with solution of the problem are understandable, considering the composition of debris typical to such an operation. The mechanical handling of logs generates excess bark, branches, and broken pieces of wood. This material then mixes with the surface dirt and gravel material (e.g. material imbedded in the log surfaces and roots; in situ site material from any unpaved surface; material clinging to truck tires which is tracked on-site and deposited by the logging trucks). Satisfactory disposal of the resulting mixture, a combination of organic and inorganic materials of varying size, and often wet, is difficult.

The volume of yard debris generated can be expected to be in the order of 5% of the solid wood volume of log through-put (1). Based upon the projected log through-put for secondary manufacturers only, as forecast in the interim report, the following volumes of debris can be expected:

by 1981 - 1,097 cunits (3,105 m^3)/annum
by 1985 - 1,940 cunits (5,490 m^3)/annum
by 1995 - 1,940 cunits (5,490 m^3)/annum

Of these volumes, the proportions of water, bone-dry organic and inorganic materials will be approximately equal, assuming the site surface is paved, so that no

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

site materials are added to the mixture (1). The fraction of debris less than 2 inches (5.1 cm) in size (longest dimension) carries a significantly higher proportion of inorganic material and water than does the larger sized fraction. The larger sized fraction has a significantly higher wood content (1).

Understandably, the small-size material is amenable to landfill disposal, as it is easily loaded and transported and difficult to burn. The larger sized material, conversely, is more suitable for burning or salvage, as it is inefficient to transport and takes much space in fill.

The alternatives for debris disposal are:

(a) Dispose of all debris in a land-fill site.

(b) Separate the material on site. Burn or haul the large-sized fraction to a burning facility, or donate and haul the material as hog fuel to an agreeable recipient. Dispose of the small-size fraction in a land-fill site.

(c) Burn all debris, then dispose of the residue in a land-fill site.

There are inherent physical and environmental problems associated with all three alternatives:

- Since the log handling facility will primarily handle cedar logs, the debris will have a high cedar wood content. Disposal of cedar wood debris in a land-fill site is considered environmentally unacceptable since cedar wood contains

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

toxic resins and will not decompose nearly as readily as other types of wood. Approval to dispose of the material in any land-fill site will be difficult to obtain. Existing land-fill sites within the Regional District either do not have the capacity to handle increased volumes for a sustained period of time, or the operators have restricted utilization to themselves. A new land-fill site would probably have to be developed and approved for use, should alternative (a) be attempted.

- If alternative (b) is considered, then effective separation of the smaller wood chips from the small size fraction of the debris, must be achieved in order to avoid disposal of cedar wood material in a land-fill site. Site separation of the material can be achieved either by simple manual means (increased operating costs with ineffectual separation of the smaller wood chips) or by some form of untried mechanical means (improved separation of the smaller wood chips, but increased capital and operating costs).

- With respect to alternative (c), regulations regarding clean burning of wood debris are stringent. (Refer to Appendix II). Sophisticated multiple chamber burners with adequate oxygen injection and control features are required for so-called "clean" burning to Level "A" standards. Modified "teepee" burners do not meet environmental criteria. Burn piles on site,

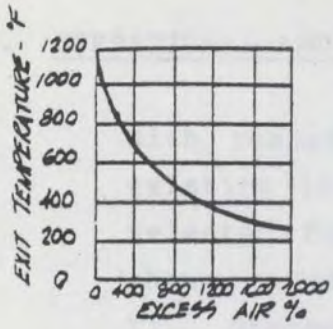
A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

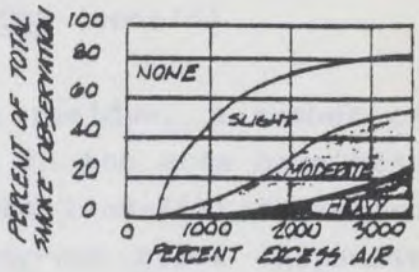
characteristically have poor combustion, and generate smoke and particle fall-out, both of which are environmentally and socially objectionable.

Disposal of residue from an on-site burning operation should not pose a difficult problem since the residue will be virtually clean of organics, small in volume and can be handled with ease. An existing land-fill site could be utilized, if acceptable to the operator, and if distance permits, or a private land-fill site could be developed close to the log handling facility.

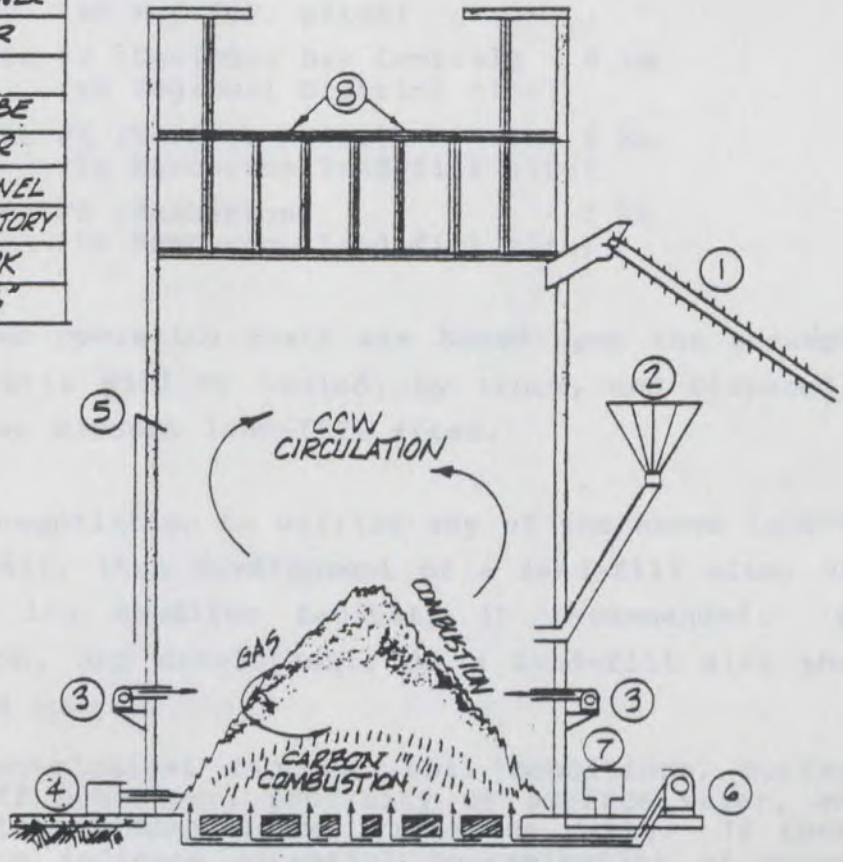
If haul distance to an environmentally acceptable burner is not cost prohibitive, then the owner or operator of the burner must be prepared to accept debris with a relatively high inorganic content. That is improbable.

Alternative (c) - burn all debris and dispose of the residue in a land-fill site - is considered more practical than either (a) or (b). Accordingly, capital and operating cost estimates are prepared on the basis that alternative (c) will be the plan of operation for disposal of debris. The estimates include an allowance for installation and operation of an efficient burner on site (refer Plate No. 2). If permission can be obtained to open-pit burn, then capital and operating costs can be reduced accordingly.





UNIT	MACHINE COMPONENTS
1	FEED CONVEYOR
2	CYCLONE BLOWER
3	OVERFIRE AIR
4	IGNITER
5	TEMP. PROBE
6	UNDERFIRE AIR
7	CONTROL PANEL
8	TYPICAL REFRACTORY
	MODULAR BLOCK
	2'-6" × 6'-0" × 6"



1. OUTLETS ON 4' MAXIMUM SPACING
2. EACH OUTLET DELIVERS 200 CUBIC FEET PER MINUTE

NOTE:

SOURCE OF SKETCH- OLIVINE CORP.
BELLINGHAM, WASH.

PLATE No. 2

TYPICAL SMOKELESS BURNER

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

With respect to disposal of the residue, a number of existing land-fill disposal sites in the area have been selected for consideration. These land-fill sites are shown on the preliminary site lay-out plans (Appendix I). Distances, by road, to the nearest existing land-fill sites, from each potential log handling facility site are:

Site #1 (Crofton) - 1 km
(to B.C.F.P. sites)

Site #2 (Cowichan Bay Central) - 6 km
(to Regional District site)

Site #5 (Verdier Point) - 6 km
(To Bamberton land-fill site)

Site #6 (Bamberton) - 1 km
(to Bamberton land-fill site)

Estimated operating costs are based upon the assumption that debris will be hauled, by truck, and disposed, at the above closest land-fill sites.

Should negotiation to utilize any of the above land-fill sites fail, then development of a land-fill site, close to the log handling facility is recommended. Site selection, and development, of a land-fill site should be based upon:

> "hydrogeological factors, soil conditions, surface run-off behaviour, proximity of surface water, and location of domestic or irrigation wells. If these factors indicate potential contamination of ground or surface water, the choice then must be either to find a more suitable site, or to provide means for protection of surface water or adjacent aquifers. It is also recommended that a land-fill be located such that its appearance will not constitute an aesthetic nuisance." (2)

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

Considering the complexities involved, development of an acceptable land-fill site location should be the subject of further investigation only after the log handling facility site location has been resolved, and only if disposal at existing land-fill sites is unacceptable.

3. Air, Water, Noise and Visual Pollution Suppression

(a) Air Pollution

Air pollution can be caused by a number of activities associated with a log handling facility. These are:

- Pollution from burning of debris. As discussed in the previous section, poor combustion of the materials will result in environmentally unacceptable waste products. This form of air pollution should not occur if burning is done in a suitable burner.
- Pollution from internal combustion of gasoline and diesel fuels in the motor vehicles and equipment utilized on site. All such motor vehicles and equipment should comply with required environmental standards for manufacture and operation.
- Pollution through dust generation on all gravel-surfaced roads and on the site areas. This poses a potential problem in populated areas.

The only location within close proximity to any of the four sites that could pose a dusting problem is on the access roadway to the Crofton site. The

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

roadway passes adjacent to a farmstead. Increased traffic volume on this roadway may cause surface dusting and a dust preventative treatment may be necessary. An allowance has been included in the operating cost estimate for a dust control program.

There are essentially two common effective methods of dust preventative treatments that can be applied to a gravelled road surface. These are:

(i) Application of Calcium Chloride

Calcium chloride is a deliquescent agent i.e., it readily absorbs moisture from the air. Because of this chemical property, calcium chloride, if applied to a road surface, tends to hold the fine dirt particles in place. In wet weather conditions, this treatment can result in a slippery road surface. In areas of relatively high humidity, however, lower maintenance costs can result and it is an effective dust control measure.

(ii) Oil Bound Surfacing

This form of treatment involves spraying, and preferably mixing of a cut-back liquid asphalt or an emulsion asphalt onto or into the road surface.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

Either of the above treatments would be effective in the study area.

(b) Water Pollution

Water pollution standards, as outlined in Pollution Control Objectives for the Forest Products Industry of British Columbia, "... do not embrace either debris arising during storage and transportation of logs, or silt and debris entering water-courses from logging operations" (2). The objectives do, however, provide guidance with respect to:

- Quality of receiving waters (Appendix IV).

- Settleable, floatable solids: "Minimum treatment for all wastes to be discharged to any water, fresh or marine, should be removal of settleable and floatable solids from the total suspended-solids fraction" (2).

The receiving water standards apply particularly where toxic wastes are a concern. Wood chips and bark are not toxic in their natural state. However, in the presence of water (salt water particularly), the organic components (resins and lignants) react anaerobically with dissolved oxygen to form hydrogen sulphide, a toxic product. The presence of the toxic product and the decreased

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

oxygen content in the water are detrimental to marine life.

The most effective safeguards to minimize these detrimental effects are to locate the site where tidal flows tend to "flush" the area, and to maintain clean land and water sites through a systemized programme of removal of settleable and floatable solids. The Crofton, Verdier Point and Bamberton sites are all exposed to strong tidal flushing action. Natural water flushing will be less effective at the Cowichan Bay site.

With respect to the land site improvements, an encircling drainage swale can be constructed, at minimum grade, on its periphery. This swale will collect surface water run-off, permitting the settleable solids to be collected in the swale. In addition, wood chips, bark and larger wood waste can be collected. Periodic cleaning and maintenance of the swale will be necessary.

Water-logged debris that settles in the bull-pen and booming areas should be removed annually by dredging.

The cost estimates include an allowance for construction of a periphery swale, and an operating allowance for regular land-side maintenance and annual dredging of the area of operations.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

(c) Noise Pollution

Noise pollution will result from the vehicular and equipment activities required for the log handling operation. Equipment-generated noise sources are:

- vehicle and/or equipment engines
- other vehicle and/or equipment systems (transmissions, braking systems)
- vehicle and/or equipment contact with road and site surfaces.

An evaluation of the impact of increased noise generation upon adjacent properties has not been attempted due to a limited available data base. Such an evaluation requires site measurement of the relative change in noise levels rather than a comparison of the absolute level to a standard scale. A subjective judgement is that none of the sites and routes under consideration will pose severe or noticeable negative noise impacts to neighbouring properties, with the exception of the Verdier Point site (see commentary below).

Mitigation or suppression of noise pollution is achieved through attenuation of all equipment-generated noise (i.e. equipment selection and/or modifications) and through site or operations modifications. Policing and control of selective equipment standards for logging trucks will be

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

difficult, if not impossible, to achieve, considering the potential numbers and variety of users of the log handling facility.

Noise attenuation of the site equipment is possible and achievable. Equipment manufacturers can effectively lower equipment noise levels through certain engine silencing and vibration reduction devices.

Site modifications or operations control are more readibly controllable as effective noise reduction measures. These measures include:

- Erection of properly designed berms or noise barriers at selected locations.

- Realignment of roadways away from buildings or occupied properties.

- Modification of roadway and site surfaces to effect less noise generation at the point of contact with equipment.

- Establishment of roadway vehicle speed limits through occupied areas (typically 60 k.p.h.).

- Provision for and enforcement of regulations governing vehicle acceleration and deceleration close to occupied areas.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

Specific comments relating to the various haul routes and site locations under consideration are:

- An allowance has been included to cover the construction cost of a new haul road to the Verdier Point site so that the populated areas along the existing shoreline highway to Mill Bay will be by-passed. The tentative roadway alignment for this road is shown on the preliminary site lay-out plan - Appendix I.

- It is unlikely that noise generation would become a problem at the farmstead location on the access road to the Crofton site. However, if complaints were received, a tree barrier could be erected along the roadway and/or posting and enforcement of a speed zone in the area could also be effected. No allowance for a tree barrier has been included in the capital cost estimates.

- Asphaltic pavement on the surface of the site will generate less noise than will a gravelled surface. Estimates for both paved and gravelled surfaces are included.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

(d) Visual Pollution

Visual pollution may be evident in either of the following forms:

- through dust or smoke generation. If all procedures for suppression of dust and smoke, as discussed in previous sections, are followed, then this problem will be minimized.

- through operation of a poorly maintained and unsightly facility. This adverse visual impact can be minimized, of course, through an efficient, organized operation. In populated areas, tree barriers or aesthetically pleasing fence barriers can be installed at selected locations to shield the public from direct views of the site. Fortunately, all sites are either shielded from view or are sufficiently clear of populated areas, that visual pollution should not be a problem.

4. Site Preparation

(a) Site Grading

Effective surface water drainage on the site is imperative. Surface gradients on the working area should therefore be maintained between 2% and 3%.

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

(b) Sub-grade and Surface Structure

Structural design of a surface structure for the various sites is dependent upon the anticipated surface loading, and upon the bearing capacity of the site sub-grade.

Maximum on-site surface loads will be transmitted through the front axle wheels of the front end loader. A Caterpillar Model 980 (or equivalent) front end loader will be required for the site operation (refer to Section III - A.1 - Operating Techniques and Required Equipment). For purposes of establishing a "design" surface load, a larger Caterpillar Model 988 front end loader (or equivalent) has been assumed.

Normal operating loads with a Caterpillar Model 988 would be:

Operating Weight	42,480 kg	(93,650 lbs)
Maximum Recommended Operating Lift	9,600 kg	(21,200 lbs)
Total Maximum Load	52,080 kg	(114,850 lbs)

Assuming 80% of the total maximum load is transmitted through the front axle, then the "design" single-wheel load will be 20,932 kg (46,000 lbs).

The following commentary refers to existing and anticipated site grading materials. Comments are made based upon aerial photography interpretation

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

and site inspections on all but one site. Bamberton site was not authorized for inspection by the owner.

- The Crofton site is located on the "Shoal Islands" (refer to preliminary site lay-out plan - Appendix I). Although a large volume of dredged material from off-shore is anticipated, little, if any, of this material will be needed for the site preparation work. These Shoal Islands are composed of sandstone/conglomerate bedrock materials which can be blasted, or otherwise removed, and used as fill in the site levelling process. This will provide an excellent sub-grade structure.

- The Cowichan Bay Central site is located in the Cowichan Bay estuary, and, as such, in situ materials will be primarily sand/silt in nature, with clay materials at depth. Site grading will be accomplished with dredged material from the waterway entry to the site. This material will provide an adequate sub-grade for the site, however, rock rip-rap will be required along the water's edge to prevent erosion of the finer materials.

- The Verdier Point site is size restrictive in its present state. Additional fill materials must be placed outwards from the

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

existing shore-line. This fill material will be predominantly shot-rock fill, since little, if any, dredged material from the site area is anticipated. The site is a previous log haul-out site, consequently, the access road from the highway and the existing site, on shore, should provide a good sub-structure for the proposed site improvements.

- The Bamberton site was not available for inspection, consequently the following commentary is made based upon an analysis of aerial photographs. Area limitations are severe at this site, insofar as potential for expanding the useable area. The existing plant site work area is paved, with a number of substantial building structures located through-out the plant site (refer to Preliminary Site Lay-out Plan - Appendix I).

  The log handling facility area selected, for purposes of this study, requires a minimal additional area for expansion and utilizes the existing paved surface at the extreme south end of the plant site.

In addition to the site grading and sub-grade preparation of all sites, a "sub-base" structure must be added to the sub-grade surface to provide the structural strength and surface uniformity needed for placement of either an asphaltic or a

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

granular surface structure. For purposes of this analysis, the assumed "sub-base" structure material is shot-rock with a maximum rock dimension of 300 mm. The thickness of this "sub-base" structure will vary, depending upon the sub-grade condition and upon the type of surface structure selected for the site.

A "California Bearing Ratio"* of 20 for the sub-base on all sites was assumed for purposes of determining the required thickness of surface structure. The resulting minimum required surface structures for the anticipated "design" load are:

- Asphalt and Granular Base Alternative
  - Asphaltic Concrete Surface Course
    150 mm (6 inches)
  - Granular Base Course
    230 mm (9 inches)
- Granular Structure Alternative
  - Granular Surface Course
    150 mm (6 inches)
  - Additional Shot-rock Sub-base
    450 mm (18 inches)

Note that the granular surface course material provides minimal structural strength but serves

* California Bearing Ratio: A comparative measure of the shearing resistance of a soil. A recognized testing procedure consists of measuring the load required to cause a plunger of standard size to penetrate a soil specimen at a specified rate. (4)

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

primarily as a filler to the surface of the shot-rock material. Placement of additional surface material is unwarranted.

Estimated capital construction costs are based upon the structural requirements outlined above. Structural components could vary somewhat from the above following a thorough soils testing program, bearing capacity analysis, and detailed engineering design.

5. Roadways Considerations

The interim report projects that log haul-out volumes through the facility, to secondary manufacturers, will be:

by 1981 - 21,945 cunits/annum
by 1985 - 38,809 cunits/annum
by 1995 - 38,810 cunits/annum

In addition, the facility will handle log movements from island loggers.

For purposes of this report, it is therefore assumed that volumes in and out of the facility will be approximately equal and that total volumes handled could vary from 40,000 cunits/annum to 70,000 cunits/annum. At 70,000 cunits/annum the facility would be operating at maximum capacity.

Based upon these assumed lower and upper operating volumes, the following load frequencies can be anticipated:

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

Projected Volume	Projected Vehicle Loads (one-way)	
(cunits/annum)	Per Annum*	Per Day**
40,000	5,714	28.6
70,000	10,000	40

* Assumed: vehicle load = 7 cunits for on-highway units.

** Assumed: 200 working days for 40,000 cunits/annum;

250 working days for 70,000 cunits/annum.

Log hauling units may be either "on-highway" units or "off-highway" units, depending upon the origin, destination, and route travelled on each trip. Access to all four sites under consideration is restricted to "on-highway" vehicles, because public roads must be travelled to reach them.

Roadway access improvements to the various sites must therefore accommodate the following:

Potential Vehicle Width (Loaded): 3.2 m (10 ft, 6 in.)

Potential Maximum Axle Load: 17.3 tonnes (19.25 tons)

Based upon the above load criteria and assuming a low sub-grade bearing capacity, the existing road beds in the area should be adequate as is. New access roads

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

should be constructed with a minimum of 600 mm (2 feet) of granular base and 300 mm (12 inches) of crushed granular surfacing (40 mm or 1-1/2 inches minus).

Roadway widths must accommodate anticipated loaded vehicle movements in both directions simultaneously. Accordingly, road widths should be at least an equivalent of 10 m, shoulder to shoulder.

Vertical alignment standards are considered crucial to ensure uninterrupted haul vehicle movements. Loss of vehicle traction occurs with excessive vertical gradients. In such situations special measures, such as installation of tire chains, must be taken to overcome the problem. This can become very costly in terms of time lost, increased labour costs, increased maintenance and operating costs, and increased equipment costs. Experience on forestry roads has proven that sustained road grades in excess of 5% can adversely affect efficient vehicle movements in wet weather conditions, resulting in significant increased operating costs.

Sections of roadway with gradients in excess of 5% are:

- Access roads in and out of the Verdier Point site, from the existing highway, are presently in excess of 10%. Grade re-construction to lower this gradient would necessitate encroachment onto the existing site area, thereby also necessitating costly site expansion. Fortunately, these extreme grades extend only short distances and

A. OPERATIONAL AND TECHNICAL CONSIDERATIONS (cont'd)

should not present any major difficulties insofar as operating costs are concerned.

- Internal access roads at the Bamberton site are apparently well in excess of 5% and useable shore area for improved roadway alignments is apparently non-existent. The existing roadways serve the present site development areas as efficiently as possible. Accordingly, it is reasonable to assume that effective roadway improvements are not economically feasible and that higher operating costs are inherent to this site.

6. Utilities Considerations

Required site utilities common to all sites under consideration are:

(a) Water Supply

Water will be required for normal domestic consumption by the on-site staff and possibly for cooling water supply to logging truck units. Therefore, a small capacity water well can be drilled and pumping equipment installed to provide potable water to any one of the sites. It is assumed that the Bamberton site has water facilities available for use.

For cost estimating purposes, an average water well depth of 100 m has been assumed.

(b) Sanitary Sewerage

Treatment and disposal of sanitary sewage can effectively be accommodated, at minimum cost, in a conventional manner, utilizing a septic tank and disposal field.

An allowance for such an installation is included in the cost estimates. Again, in this instance, it is assumed that the Bamberton site has sanitary facilities available for use.

(c) Electricity Service

All sites will require a single-phase power source. Approximate distances to connecting points on the nearest B.C.H.P.A. transmission lines are:

Site No. 1 (Crofton) - 1.1 km
Site No. 2 (Cowichan Bay Central) - 0.1 km
Site No. 5 (Verdier Point) - 0.1 km
Site No. 6 (Bamberton) - plant hydro facilities existing

Capital cost estimates, based upon the above estimated distances, are included in the next following section of this report.

B. PRELIMINARY CAPITAL COST ESTIMATES

The bases for preparation of all capital cost estimates are as discussed in the previous sections. Conceivably, certain items can be eliminated, or modified, through a detailed design exercise. In addition, new critical control criteria will become apparent as the review of all sites continues and as the development process proceeds. For comparative and budgetary considerations, however, the estimates provided are considered reliable.

The preliminary capital cost estimates are summarized, in detail, on Tables I, II, III and IV for Sites 1, 2, 5 and 6 respectively.

A summary of comparative capital cost estimates for the four sites follows:

		Site No. 1 Crofton	Site No. 2 Cowichan Bay Central	Site No. 5 Verdier Point	Site No. 6 Bamberton
1.	Site Preparation				
	Gravelled Site	221,100	247,900	131,400	116,900
	(or Paved Site)	(261,400)	(286,100)	(172,300)	(123,800)
2.	Site Equipment	60,000	60,000	60,000	60,000
3.	Landside Infrastructure	26,800	38,000	151,000	-
4.	Engineering and Contingencies	46,200	51,900	51,400	26,600
		(52,300)	(57,600)	(57,500)	(27,600)
Totals:	**Gravelled Site**	354,100	397,800	393,800	203,500
	(or Paved Site)	(400,500)	(441,700)	(440,800)	(211,400)

B. PRELIMINARY CAPITAL COST ESTIMATES (cont'd)

Site preparation costs for the Verdier Point and Bamberton sites are significantly lower than comparative costs for the Crofton and Cowichan Bay Central sites. The higher costs are attributable primarily to high dredging volumes at the latter two sites.

Landside infrastructure costs for Verdier Point, are much higher than for any of the other three sites. This high cost is attributable to the projected cost for a new 2.0 km roadway to the site.

TABLE I

PRELIMINARY CAPITAL COST ESTIMATE - COWICHAN LOG HANDLING FACILITY

SITE NO. 1 - CROFTON

Item No.	Item	Quantity	Unit	Unit Cost ($)	Amount ($)* Alter. "A"	Amount ($)* Alter. "B"
1	SITE PREPARATION					
	(a) Clearing & Grubbing	0.9	ha	$ 2,500.00	$ 2,300	$ 2,300
	(b) Dredging					
	- Excavate and Dispose - Excavate and Place	19,200	m^3	6.00	115,200	115,200
	(c) Site Excavation					
	- Site Blasting	2,500	m^3	3.50	8,800	8,800
	- Excavate and Dispose	300	m^3	1.00	300	300
	- Excavate and Place	2,500	m^3	2.00	5,000	5,000
	(d) Shot Rock Sub-Base (300 mm minus)	4,000	m^3	8.00	32,000	32,000
	(e) Additional Shot Rock (for Alternative "A"*)	2,000	m^3	8.00	16,000	-
	(f) Granular Crush (50 mm minus)					
	- Alternative "A"*	600	m^3	9.50	5,500	-
	- Alternative "B"*	1,200	m^3	9.50	-	8,600
	(g) Hot Asphaltic Surface Course (150 mm depth)	1,400	Tonne		-	53,200
	(h) Pile Driving					
	- Materials	1,200	m	10.00	12,000	12,000
	- Installation				12,000	12,000
	(i) Booming Installations					
	- Chains	60		50.00	3,000	3,000
	- "Sticks"	60		150.00	9,000	9,000
	- Anchors, Hardware				-	-
	- Installation				-	-
	Sub Total - SITE PREPARATION				221,100	261,400
2	SITE EQUIPMENT					
	(a) Burner	1		40,000.00	40,000	40,000
	(b) Unloading Bunks	2		10,000.00	20,000	20,000
3	LANDSIDE INFRASTRUCTURE					
	(a) Access Roads	.15	km	70,000.00	10,500	10,500
	(b) Utilities					
	- Water				5,000	5,000
	- Sanitary				5,000	5,000
	- Hydro				6,300	6,300
	(c) Scaling Shack**				-	-
4	ENGINEERING AND CONTINGENCIES (15%)				46,200	52,300
	GRAND TOTALS				$354,100	$400,500

* Alternative "A" - Granular Surface Alternative
Alternative "B" - Asphaltic Surface Alternative

**Included under "Operating Costs" as "Trailer Rental"

TABLE II

PRELIMINARY CAPITAL COST ESTIMATE - COWICHAN LOG HANDLING FACILITY

SITE NO. 2 - COWICHAN BAY CENTRAL

Item No.	Item	Quantity	Unit	Unit Cost ($)	Amount ($)* Alter. "A"	Amount ($)* Alter. "B"
1	SITE PREPARATION					
	(a) Clearing & Grubbing				-	-
	(b) Dredging					
	- Excavate and Dispose				-	-
	- Excavate and Place	16,000	m^3	$ 8.00	$129,000	$129,000
	(c) Site Excavation					
	- Site Blasting				-	-
	- Excavate and Dispose				-	-
	- Excavate and Place	2,500	m^3	2.00	5,000	5,000
	(d) Shot Rock Sub-Base (300 mm minus)	6,000	m^3	8.80	52,800	52,800
	(e) Additional Shot Rock (for Alternative "A"*)	2,000	m^3	8.80	17,600	-
	(f) Granular Crush (50 mm minus)					
	- Alternative "A"*	600	m^3	8.50	5,100	-
	- Alternative "B"*	1,200	m^3	8.50	-	7,700
	(g) Hot Asphaltic Surface Course (150 mm depth)	1,400	Tonne	38.00	-	53,200
	(h) Pile Driving					
	- Materials	900	m	10.00	9,000	9,000
	- Installation				9,000	9,000
	(i) Booming Installations					
	- Chains	60		50.00	3,000	3,000
	- "Sticks"	60		150.00	9,000	9,000
	- Anchors, Hardware				-	-
	- Installation				-	-
	(j) Shoreline Rip-Rap	700	m^3	12.00	8,400	8,400
	Sub Total - SITE PREPARATION				247,900	286,100
2	SITE EQUIPMENT					
	(a) Burner	1		40,000.00	40,000	40,000
	(b) Unloading Bunks	2		10,000.00	20,000	20,000
3	LANDSIDE INFRASTRUCTURE					
	(a) Access Roads					
	- Road re-alignment	0.3	km	90,000.00	27,000	27,000
	(b) Utilities					
	- Water				5,000	5,000
	- Sanitary				5,000	5,000
	- Hydro				1,000	1,000
	(c) Scaling Shack**				-	-
4	ENGINEERING AND CONTINGENCIES (15%)				51,900	57,600
	GRAND TOTALS				$397,800	$441,700

* Alternative "A" - Granular Surface Alternative
Alternative "B" - Asphaltic Surface Alternative

**Included under "Operating Costs" as "Trailer Rental"

TABLE III

PRELIMINARY CAPITAL COST ESTIMATE - COWICHAN LOG HANDLING FACILITY

SITE NO. 5 - VERDIER POINT

Item No.	Item	Quantity	Unit	Unit Cost ($)	Amount ($)* Alter. "A"	Amount ($)* Alter. "B"
1	SITE PREPARATION					
	(a) Clearing & Grubbing				-	-
	(b) Dredging					
	- Excavate and Dispose				-	-
	- Excavate and Place				-	-
	(c) Site Excavation					
	- Site Blasting				-	-
	- Excavate and Dispose				-	-
	- Excavate and Place	2,500	m^3	$ 2.00	$ 5,000	$ 5,000
	(d) Shot Rock Sub-Base (300 mm minus)	4,500	m^3	9.20	41,400	41,400
	(e) Additional Shot Rock (for Alternative "A"*)	2,000	m^3	9.20	18,400	-
	(f) Granular Crush (50 mm minus)					
	- Alternative "A"*	600	m^3	11.00	6,600	-
	- Alternative "B"*	1,200	m^3	11.00	-	9,900
	(g) Hot Asphaltic Surface Course (150 mm depth)	1,400	Tonne	40.00	-	56,000
	(h) Pile Driving					
	- Materials	600	m	10.00	6,000	6,000
	- Installation				8,000	8,000
	(i) Booming Installations					
	- Chains				15,000	15,000
	- "Sticks"	100		150.00	15,000	15,000
	- Anchors, Hardware	-			6,000	6,000
	- Installation	-			10,000	10,000
	Sub Total - SITE PREPARATION				131,400	172,300
2	SITE EQUIPMENT					
	(a) Burner	1		40,000.00	40,000	40,000
	(b) Unloading Bunks	2		10,000.00	20,000	20,000
3	LANDSIDE INFRASTRUCTURE					
	(a) Access Roads	2.0	km	70,000.00	140,000	140,000
	(b) Utilities					
	- Water				5,000	5,000
	- Sanitary				5,000	5,000
	- Hydro				1,000	1,000
	(c) Scaling Shack**				-	-
4	ENGINEERING AND CONTINGENCIES (15%)				51,400	57,500
	GRAND TOTALS				$393,800	$440,800

* Alternative "A" - Granular Surface Alternative
Alternative "B" - Asphaltic Surface Alternative

**Included under "Operating Costs" as "Trailer Rental"

TABLE IV

PRELIMINARY CAPITAL COST ESTIMATE - COWICHAN LOG HANDLING FACILITY

SITE NO. 6 - BAMBERTON

Item No.	Item	Quantity	Unit	Unit Cost ($)	Amount ($)* Alter. "A"	Amount ($)* Alter. "B"
1	SITE PREPARATION					
	(a) Clearing & Grubbing				-	-
	(b) Dredging					
	- Excavate and Dispose				-	-
	- Excavate and Place				-	-
	(c) Site Excavation					
	- Site Blasting				-	-
	- Excavate and Dispose				-	-
	- Excavate and Place				-	-
	(d) Shot Rock Sub-Base (300 mm minus)	5,000	m^3	9.20	$ 46,000	$ 46,000
	(e) Additional Shot Rock (for Alternative "A"*)	400	m^3	9.20	3,700	-
	(f) Granular Crush (50 mm minus)					
	- Alternative "A"*	100	m^3	12.00	1,200	-
	- Alternative "B"*	150	m^3	12.00	-	1,800
	(g) Hot Asphaltic Surface Course (150 mm depth)	250	Tonne	40.00	-	10,000
	(h) Pile Driving					
	- Materials	900	m	10.00	9,000	9,000
	- Installation				4,000	4,000
	(i) Booming Installations					
	- Chains	-			16,000	16,000
	- "Sticks"	100		150.00	15,000	15,000
	- Anchors, Hardware	-			7,000	7,000
	- Installation	-			15,000	15,000
	Sub Total - SITE PREPARATION				116,900	123,800
2	SITE EQUIPMENT					
	(a) Burner	1		40,000.00	40,000	40,000
	(b) Unloading Bunks	2		10,000.00	20,000	20,000
3	LANDSIDE INFRASTRUCTURE					
	(a) Access Roads				-	-
	(b) Utilities					
	- Water				-	-
	- Sanitary				-	-
	- Hydro				-	-
	(c) Scaling Shack**				-	-
4	ENGINEERING AND CONTINGENCIES (15%)				26,600	27,600
	GRAND TOTALS				$203,500	$211,400

* Alternative "A" - Granular Surface Alternative
Alternative "B" - Asphaltic Surface Alternative

**Included under "Operating Costs" as "Trailer Rental"

C. PRELIMINARY OPERATING COST ESTIMATES

For purposes of this study, operating costs have been classified as either:

"Common" Costs: those costs considered common, and unchanging, for any of the four sites under study.

"Site Specific" Costs: those costs considered unique to each site.

Operating costs per unit of materials handled will, naturally, vary depending upon the total volume handled. As indicated previously in Section III, A5, Pages 27 - 28, the assumed lower and upper operating volumes for the facility are 40,000 cunits/annum and 70,000 cunits/annum respectively. Based upon these assumed volumes, the estimated annual operating costs are summarized as follows:

Annual Operating Cost Estimates

Site	FOR 40,000 CUNITS/ANNUM (Refer to Table V-A) Cost ($)	Cost ($/cunit)	FOR 70,000 CUNITS/ANNUM (Refer to Table VI-A) Cost ($)	Cost ($/cunit)
#1 - Crofton	327,300	8.18	412,500	5.89
#2 - Cowichan Bay Central	337,100	8.43	423,600	6.05
#5 - Verdier Point	306,900	7.67	393,400	5.62
#6 - Bamberton	305,100	7.63	390,300	5.58

Note that all estimates are based upon the assumption that all sites will be surfaced with asphaltic concrete, similar to existing conditions on the Bamberton site.

C. PRELIMINARY OPERATING COST ESTIMATES (cont'd)

It is anticipated that operating costs, for a gravel-surfaced site, would increase from $0.09/cunit, at 70,000 cunit annual volume, to $0.15/cunit, at 40,000 cunit annual volume. By comparison, the corresponding amortized cost to place an asphaltic surface course on the Crofton, Cowichan Bay Central and Verdier Point sites would be in the order of $0.10 /cunit to $0.18/cunit (refer to Table VII, Page 49).

Both the Cowichan Bay Central and Bamberton sites could be subject to "user's fees" charged by owners, since the assumption is made that existing access roads and facilities will be utilized as fully as possible. No budget allowance has been included to cover such costs.

TABLE V-A

PRELIMINARY OPERATING COST ESTIMATES - COWICHAN VALLEY LOG HANDLING FACILITY

ASSUMED ANNUAL THROUGH-PUT = 40,000 CUNITS

Site	Cost Item	Annual Quantity	Unit	Unit Cost ($)	Annual Cost ($)	Comments
1. Crofton						
	1. "Common" Costs				$296,700	Refer Table V-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	1,900*	m^3	1.90	3,600	
	(b) Dredging - Equipment Rentals	250	hour	100.00	25,000	
	(c) Access Road Dust Control				2,000	
	Total - Site No. 1				$327,300	$8.18/cunit
2. Cowichan Bay Central						
	1. "Common" Costs				296,700	Refer Table V-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	1,900*	m^3	2.85	5,400	
	(b) Dredging - Equipment Rentals	350	hour	100.00	35,000	
	Total - Site No. 2				$337,100	$8.43/cunit
5. Verdier Point						
	1. "Common" Costs				$296,700	Refer Table V-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	1,900*	m^3	2.85	5,400	
	(b) Dredging - Equipment Rentals	60	hour	80.00	4,800	
	Total - Site No. 5				$306,900	$7.67/cunit
6. Bamberton						
	1. "Common" Costs				$296,700	Refer Table V-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	1,900*	m^3	1.90	3,600	
	(b) Dredging - Equipment Rentals	60	hour	80.00	4,800	
	Total - Site No. 6				$305,100	$7.63/cunit

* Ref. (1)
40,000 cunits/annum total log volume yields 2,000 cunits debris (i.e. 5%)
2,000 cunits debris yields 700 cunits (1,900 m^3) ± inorganics

TABLE V-B

ESTIMATED COMMON OPERATING COST FOR COWICHAN VALLEY LOG HANDLING FACILITY

ASSUMED ANNUAL THROUGH-PUT = 40,000 CUNITS

	Annual Quantity	Unit	Unit Cost ($)	Annual Cost ($)	Comments
1. Equipment					
(a) Boom Boat	200	days	180.00	$ 36,000	
(b) Loader	200	days	350.00	70,000	
(c) Grapple	150	days	200.00	30,000	
2. Labour (including fringe benefits & expenses)					
(a) Foreman	200	days	220.00	44,000	
(b) Scaler	200	days	180.00	36,000	
(c) Utility Man	200	days	120.00	24,000	
3. Materials, Repairs & Operating					
(a) Banding	20,000	cunit	0.80	16,000	
(b) Boom Chains	20,000	cunit	0.30	6,000	
(c) Bunk Repairs				2,000	
(d) Site Repairs/Maintenance				2,000	Assumed - Paved surface; gravelled surface costs would be approximately $8,000/annum.
(e) Electrical				300	
(f) Trailer Rental				2,400	
(g) Miscellaneous				2,000	
4. Management, Overhead					
(a) Board Compensation & Expenses				15,000	
(b) Clerical, Office Expenses				6,000	
(c) Legal, Accounting				5,000	
Total				$296,700	

TABLE VI-A

PRELIMINARY OPERATING COST ESTIMATES - COWICHAN VALLEY LOG HANDLING FACILITY

ASSUMED ANNUAL THROUGH-PUT = 70,000 CUNITS

Site	Cost Item	Annual Quantity	Unit	Unit Cost ($)	Annual Cost ($)	Comments
1. Crofton						
	1. "Common" Costs				$379,200	Refer Table VI-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	3,300*	m^3	1.90	6,300	
	(b) Dredging - Equipment Rentals	250	hour	100.00	25,000	
	(c) Access Roads Dust Control				2,000	
	Total - Site No. 1				$412,500	$5.89/cunit
2. Cowichan Bay Central						
	1. "Common" Costs				379,200	Refer Table VI-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	3,300*	m^3	2.85	9,400	
	(b) Dredging - Equipment Rentals	350	hour	100.00	35,000	
	Total - Site No. 2				$423,600	$6.05/cunit
5. Verdier Point						
	1. "Common" Costs				$379,200	Refer Table VI-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	3,300*	m^3	2.85	9,400	
	(b) Dredging - Equipment Rentals	60	hour	80.00	4,800	
	Total - Site No. 5				$393,400	$5.62/cunit
6. Bamberton						
	1. "Common" Costs				$379,200	Refer Table VI-B
	2. "Site Specific" Costs					
	(a) Refuse Haul and Dispose	3,300*	m^3	1.90	6,300	
	(b) Dredging - Equipment Rentals	60	hour	80.00	4,800	
	Total - Site No. 6				$390,300	$5.58/cunit

* Ref. (1)
70,000 cunits/annum total log volume yields 3,500 cunits debris (i.e. 5%)
3,500 cunits debris yields 1,200 cunits (3,300 m^3) ± inorganics

TABLE VI-B

ESTIMATED COMMON OPERATING COST FOR COWICHAN VALLEY LOG HANDLING FACILITY

ASSUMED ANNUAL THROUGH-PUT = 70,000 CUNITS

	Annual Quantity	Unit	Unit Cost ($)	Annual Cost ($)	Comments
1. Equipment					
(a) Boom Boat	250	days	180.00	$ 45,000	
(b) Loader	250	days	350.00	87,500	
(c) Grapple	250	days	200.00	50,000	
2. Labour (including fringe benefits & expenses)					
(a) Foreman	250	days	220.00	55,000	
(b) Scaler	250	days	180.00	45,000	
(c) Utility Man	250	days	120.00	30,000	
3. Materials, Repairs & Operating					
(a) Banding	30,000	cunit	0.80	24,000	
(b) Boom Chains	30,000	cunit	0.30	9,000	
(c) Bunk Repairs				2,000	
(d) Site Repairs/Maintenance				2,000	Assumed - Paved surface; gravelled surface costs would be approximately $8,000/annum.
(e) Electrical				300	
(f) Trailer Rental				2,400	
(g) Miscellaneous				2,000	
4. Management, Overhead					
(a) Board Compensation & Expenses				15,000	
(b) Clerical, Office Expenses				6,000	
(c) Legal, Accounting				5,000	
Total				$379,200	

IV MANAGEMENT RECOMMENDATIONS

A. MANAGEMENT AUTHORITY

The Management Authority for this log handling facility will be responsible, essentially, for the following:

(a) Maintenance of efficient day-to-day operations, that will improve present operating conditions for the majority of all small log handling and mill operations in the "market" area.

(b) Preparation of annual budget projections and control of that budget to ensure:

- an adequate operating budget consistent with the needs outlined in (a) above.
- an adequate operating margin to enable possible future capital expenditures for expansion of the facility or for improvements required to improve efficiency or to lower operating costs.

(c) Maintenance of a system of operation that is consistent with the interests of the public at large, i.e. environmental concerns such as:

- suppression of air, water, noise and visual pollution;
- suppression of detrimental effects to fish and wildlife;
- provision for adequate waste disposal;
- conformance with approved land use and zoning;
- conformance with safety standards and practices for the well-being of the public;

A. MANAGEMENT AUTHORITY (cont'd)

Items (a) and (b) may be considered items of primary concern to the users of the facility while item (c) is of importance to the public at large.

Items (a) and (b) are crucial to the acceptance and ultimate survival of the facility, as potential users must be convinced, through actual experience, that there are economic benefits to their individual operations. It is logical, therefore, that the users of the facility have an active role in the management and ultimately in the day-to-day operations of the facility, since their vested interests will be best protected in this manner. It is also logical that the interests of the public at large be protected through public authority representation in the management and operations of the facility.

Accordingly, the following recommendation for a management authority for the facility is made:

> An independent "Cowichan Tidewater Log Handling Facility Association" should be formed. The Association would be responsible for the management of the facility i.e., items (a), (b), and (c) above. Ownership of the facility would remain with the Regional District or, perhaps, with a management authority such as a Cowichan Valley Regional District Coastal Harbour Management Authority.
>
> The Association membership would be open to users of the facility and those who apply for future use of the facility.

A. MANAGEMENT AUTHORITY (cont'd)

The Association activities would be the responsibility of a "Board of Directors" comprised of:

- an elected representative member actively involved in a logging enterprise;
- an elected representative member actively involved in a sawmill enterprise;
- an elected representative member from the independent regional business community;
- an appointed representative from the Regional District staff.

Board members would be elected and/or appointed on a two or three year staggered basis to ensure continuity. The Board of Directors would be empowered to act, by whatever means necessary, to meet the basic objectives summarized in (a), (b), and (c) above.

Care would be required in the formulation of a charter such that the interests of all parties are protected and a clear statement is made as to corporate policies and management objectives.

B. OPERATING BUDGET CRITERIA

With respect to the day-to-day operations, the Board will decide to either operate the facility directly or to contract the site operations. Regardless of that decision, certain budget criteria must be applied to ensure a self-sufficient operation.

A "minimum user unit fee" will be required to cover capital cost amortization, operating costs, and a budgetary surplus, which could be set, firstly, as a hedge against inflation, and secondly, as a sinking fund for planned capital improvements. Utilizing this basic concept, "minimum user unit fees" for all four sites have been calculated. For calculation purposes, the following assumptions were made:

(a) Capital costs will be amortized over a 15 year pay-out period with average interest charges at 14% per annum.

(b) A budgetary surplus of 5% over and above capital cost amortization and operating cost has been selected. The Board may adjust this budget factor from time to time, to accommodate policies and certain planned objectives.

Based upon estimated capital and operating costs, "Minimum User Unit Fees" are summarized on Table VII.

This method of establishing an annual minimum user fee can be used and modified, as required, by the Board annually. The range of minimum unit fees presented is considered a reasonably reliable indication of operating costs for the various potential situations. The Board, of course, will

B. OPERATING BUDGET CRITERIA (cont'd)

subsequently establish a unit fee based upon updated design estimates and established operating conditions.

RN:jl * 655-6-11

TABLE VII

MINIMUM USER UNIT FEES - COWICHAN VALLEY LOG HANDLING FACILITY

	#1 CROFTON (Est. Capital Cost = $400,500*)		#2 COWICHAN BAY CENTRAL (Est. Capital Cost = $441,700*)		#5 VERDIER POINT (Est. Capital Cost = $440,800*)		#6 BAMBERTON (Est. Capital Cost = $211,400*)	
ANNUAL VOLUME (cunits)	40,000	70,000	40,000	70,000	40,000	70,000	40,000	70,000
Amortized Capital Cost	62,700	62,700	69,200	69,200	69,100	69,100	33,100	33,100
Operating Cost	327,300	412,500	337,100	423,600	306,900	393,400	305,100	390,300
Budget Surplus	19,800	24,100	20,700	25,000	19,100	23,500	17,100	21,300
Total Annual Budget	$409,800	$499,300	$427,000	$517,800	$395,100	$486,000	$355,300	$444,700
Minumum User Unit Fees ($/cunit)	$10.25	$7.13	$10.68	$7.40	$9.88	$6.94	$8.88	$6.35

* Estimated Capital Costs include an allowance for asphaltic surface pavement. The annual amortized costs for surface pavement are:

1. Crofton - $46,400 @ 14% (15 years) = $7,270
2. Cowichan Bay Central - $43,900 @ 14% (15 years) = $6,877
5. Verdier Point - $47,000 @ 14% (15 years) = $7,363
6. Bamberton - $ 7,900 @ 14% (15 years) = $1,237 (Site Expansion only)

In terms of volume through-put, for Sites 1, 2 and 5 the annual amortized cost for a paved surface would range from $0.10/cunit at an annual volume of 70,000 cunits, to $0.18/cunit at an annual volume of 40,000 cunits.

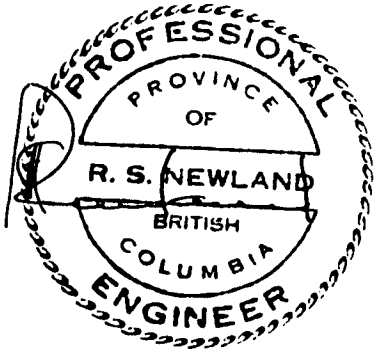
REPORT ON .
COWICHAN VALLEY
TIDEWATER LOG HANDLING FACILITY

Respectfully submitted

T. M. THOMSON & ASSOCIATES LTD.

Approved by:

Prepared by:



W. A. Hopwood, R.P.F.
Associate

R. S. Newland, P.Eng.

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PERSONAL REFERENCES

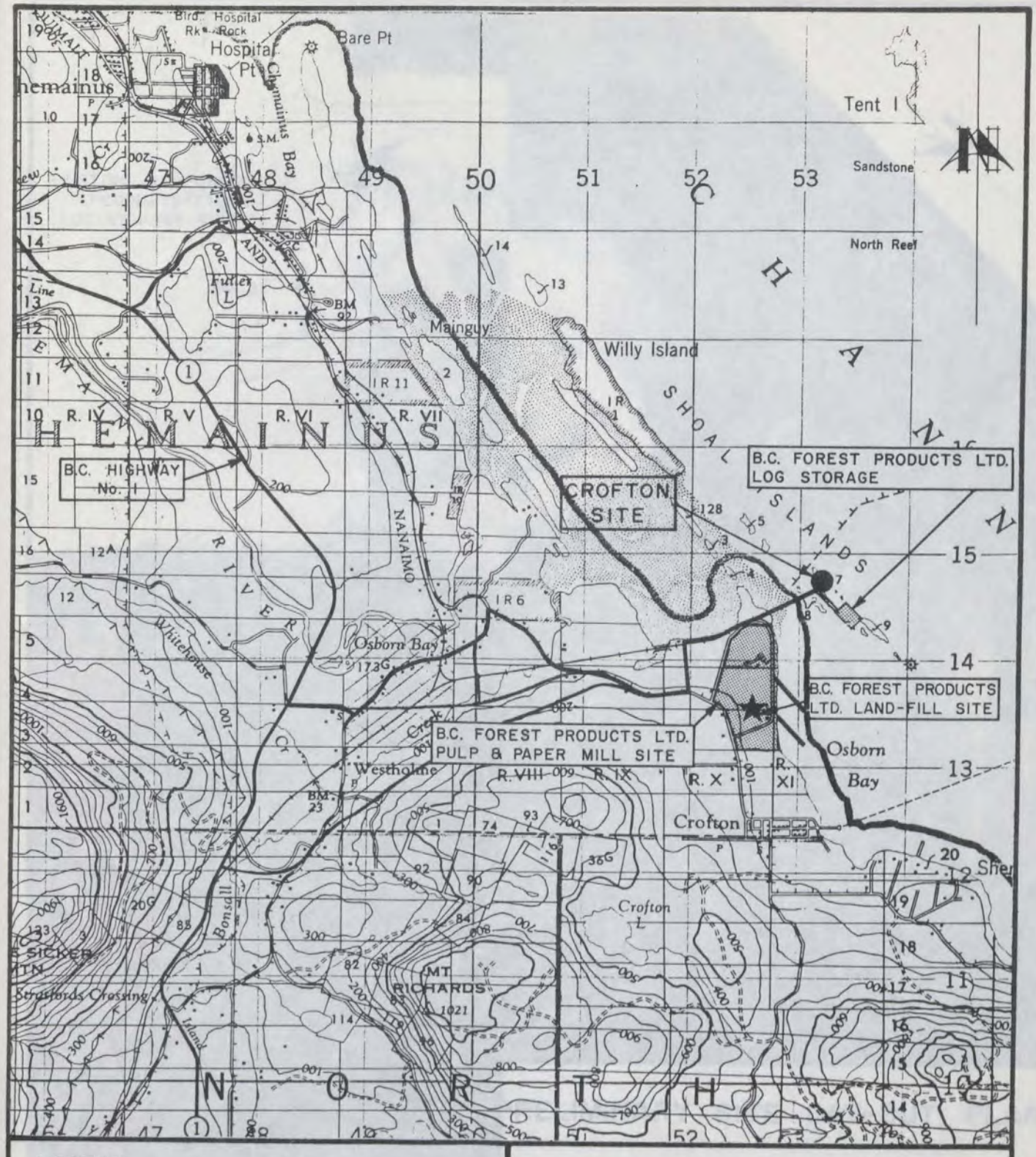
NAME	COMPANY	TEL. #
BOYDEN, Mr. C.	Ministry of Transportation & Highways, Koksilah	746-4034
DAMAN, Mr. R.	MacMillan Bloedel, Nanaimo	753-1112
DIAS, Mr. J.	Development Officer, Municipality of North Cowichan, Duncan	746-7101
FORREST, Mr. A.	Hillbank Gravel Supplies, Cobble Hill	743-2467
GLASSFORD, Mr. J.	Genstar Western Development Co., Victoria	388-6643
HANNA, Mr. T.	MacMillan Bloedel, Chemainus	246-3221
HARRISON, Mr. A	B. C. Hydro, Duncan	746-6111
HASLAM, Mr. W.	Chevron Canada, Vancouver	668-5385
LEE, Mr. J.	Pat Carson Bulldozing, Cobble Hill	743-5501
MANSON, Mr. W.	B. C. Hydro, Duncan	746-6111
MURRELL, Mr. P.	Duncan Paving Ltd., Duncan	748-2531
OLDHAM, Mr. T.	Ministry of the Environment, Victoria	387-5321
QUARIN, Mr. J.	Chevron Canada, Vancouver	668-5385
SALA, Mr. S.	Inland Cement, Vancouver	270-8521
SMITH, Mr. C.	Olivine Corporation, Bellingham, WA.	(206) 733-3332
SMITH, Mr. D.	Forest Engineering Research Institute of Canada, Vancouver	732-3711
THOMAS, Mr. W.	Ministry of the Environment, Victoria	387-5321

PERSONAL REFERENCES

NAME	COMPANY	TEL. #
THURSTON, Mr. F.	Beggs Brothers Contractors Ltd., Chemainus	246-3713
TURNER, Mr. G.	British Columbia Forest Products Ltd., Crofton	246-3264
VANGER, Mr. A.	Nanoose Forest Products, Chemainus	246-3284

APPENDIX I

LOCATION AND PRELIMINARY SITE LAY-OUT PLANS



LEGEND

FACILITY SITE ●

NEAREST LAND-FILL SITE ★

EXISTING ACCESS ROUTE ———

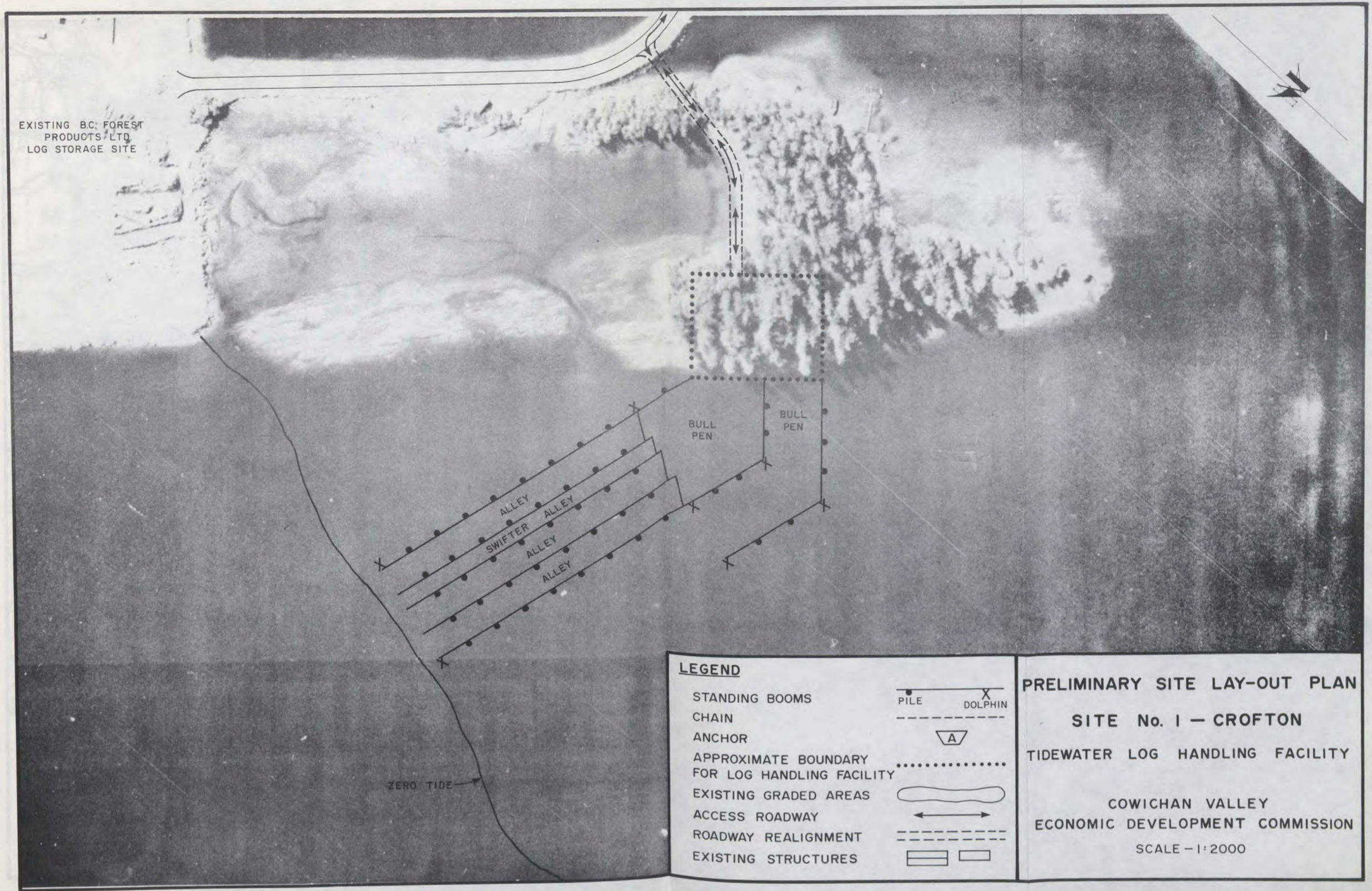
LOCATION PLAN

SITE No. I — CROFTON

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE – 1:50 000



LEGEND

STANDING BOOMS	PILE — DOLPHIN
CHAIN	
ANCHOR	A
APPROXIMATE BOUNDARY FOR LOG HANDLING FACILITY	
EXISTING GRADED AREAS	
ACCESS ROADWAY	
ROADWAY REALIGNMENT	
EXISTING STRUCTURES	

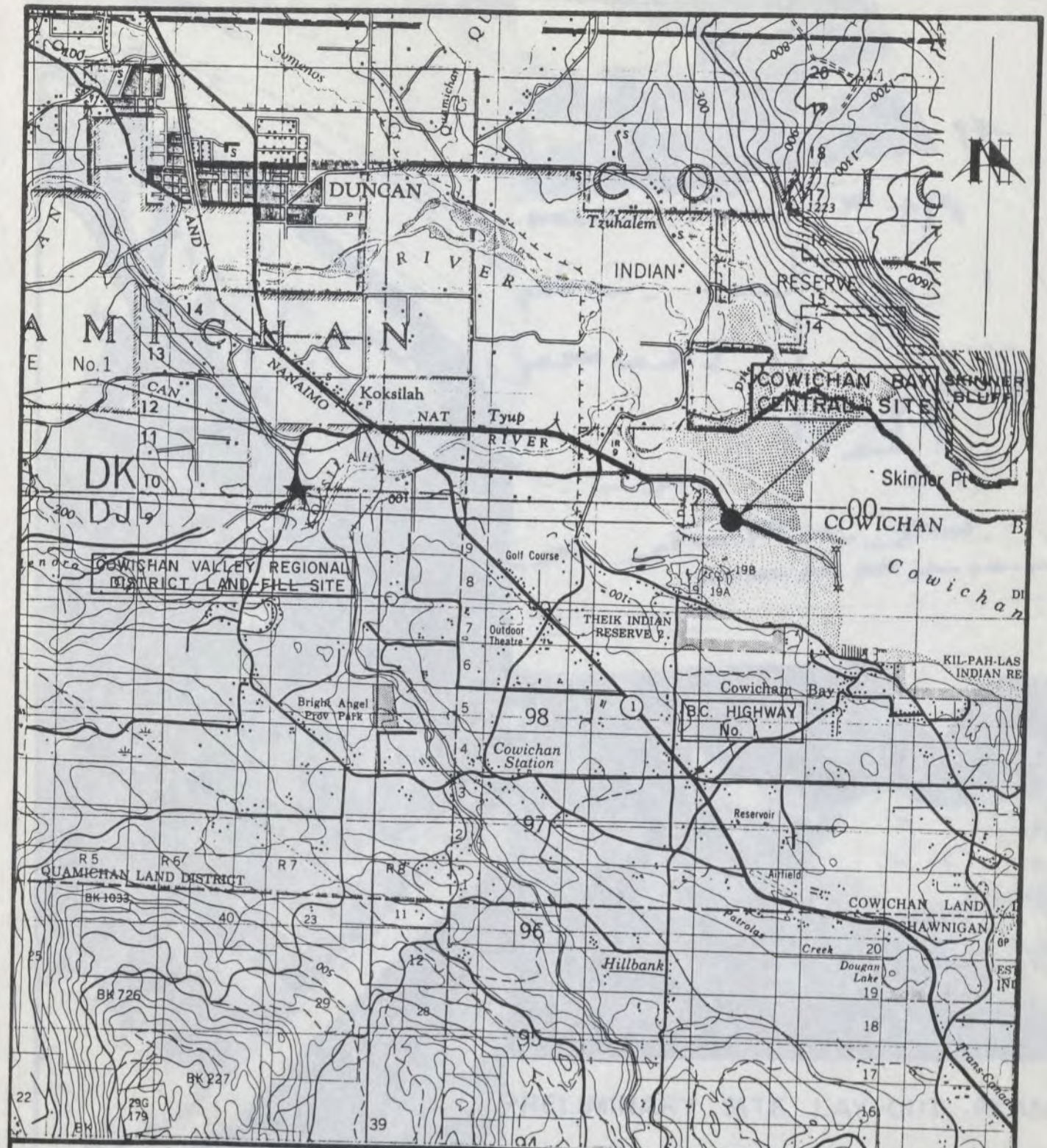
PRELIMINARY SITE LAY-OUT PLAN

SITE No. 1 — CROFTON

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE — 1:2000



LEGEND

FACILITY SITE ●

NEAREST LAND-FILL SITE ★

EXISTING ACCESS ROUTE ———

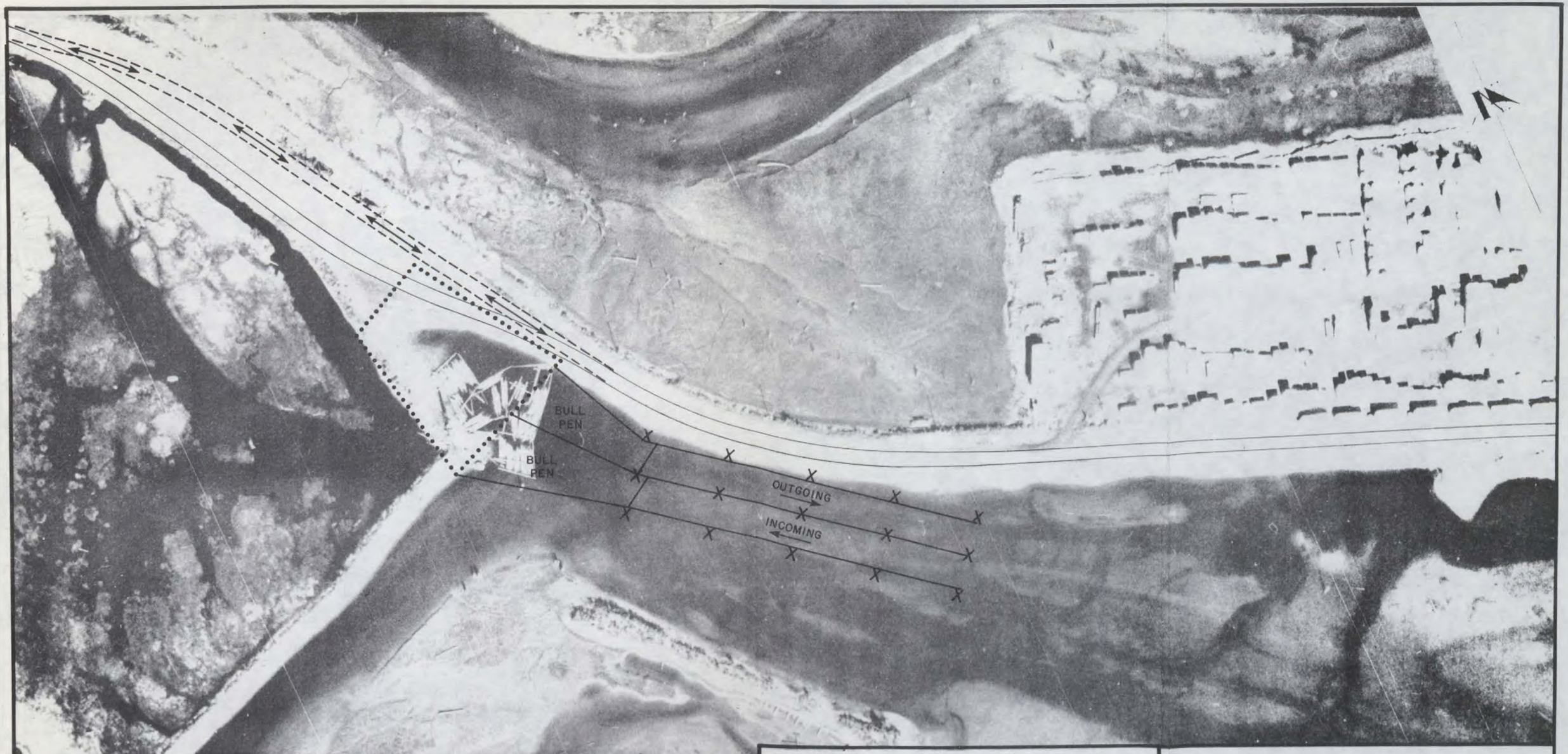
PRIVATE ROUTE ———

LOCATION PLAN

SITE No. 2 — COWICHAN BAY CENTRAL TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE - 1:50000



LEGEND

- STANDING BOOMS — PILE / DOLPHIN
- CHAIN
- ANCHOR — A
- APPROXIMATE BOUNDARY FOR LOG HANDLING FACILITY
- EXISTING GRADED AREAS
- ACCESS ROADWAY
- ROADWAY REALIGNMENT
- EXISTING STRUCTURES

PRELIMINARY SITE LAY-OUT PLAN

SITE No. 2 – COWICHAN BAY CENTRAL

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

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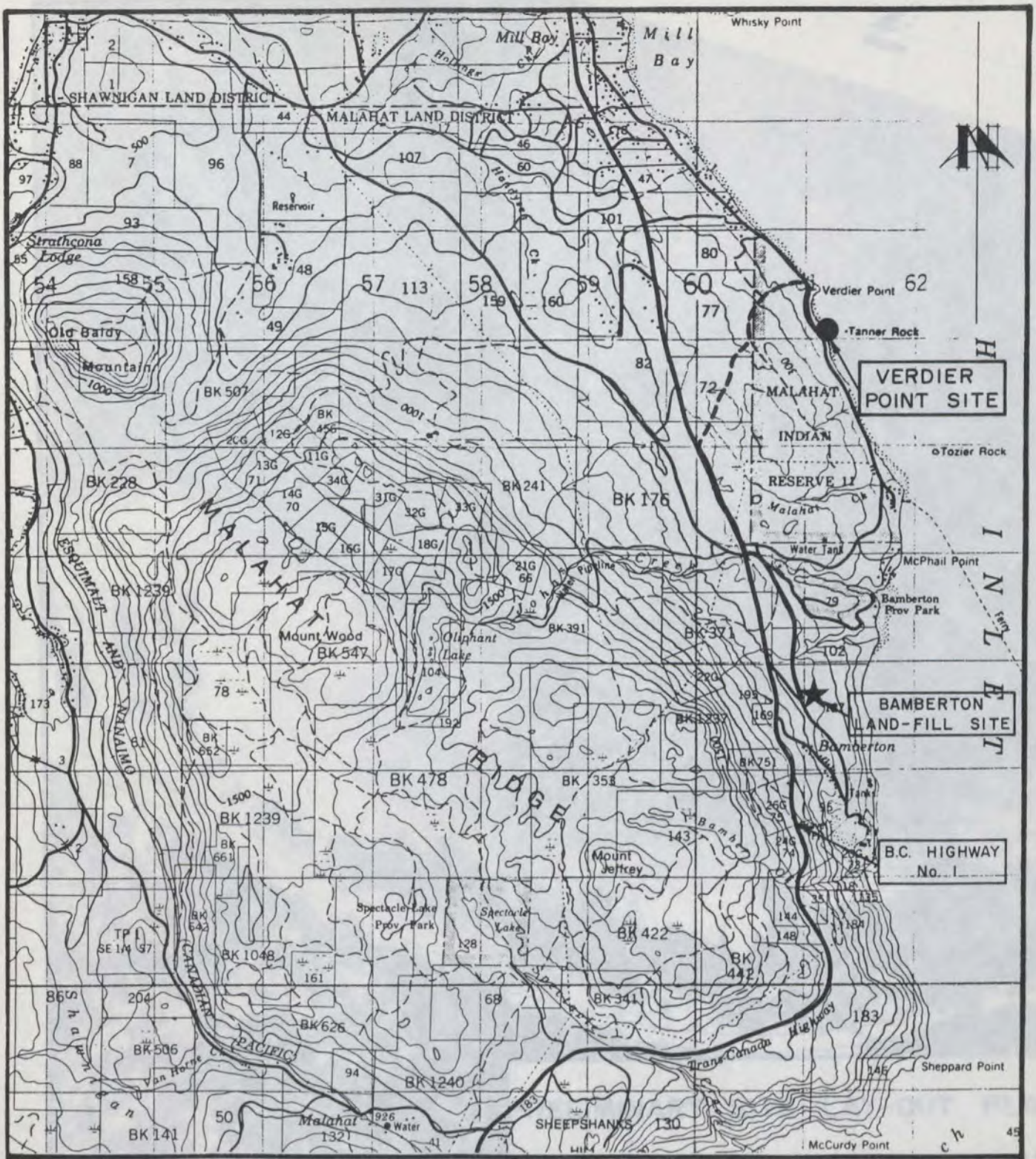


LEGEND

- FACILITY SITE ●
- NEAREST LAND-FILL SITE ★
- EXISTING ACCESS ROUTE ——————
- PROPOSED ACCESS ROUTE – – – – – –

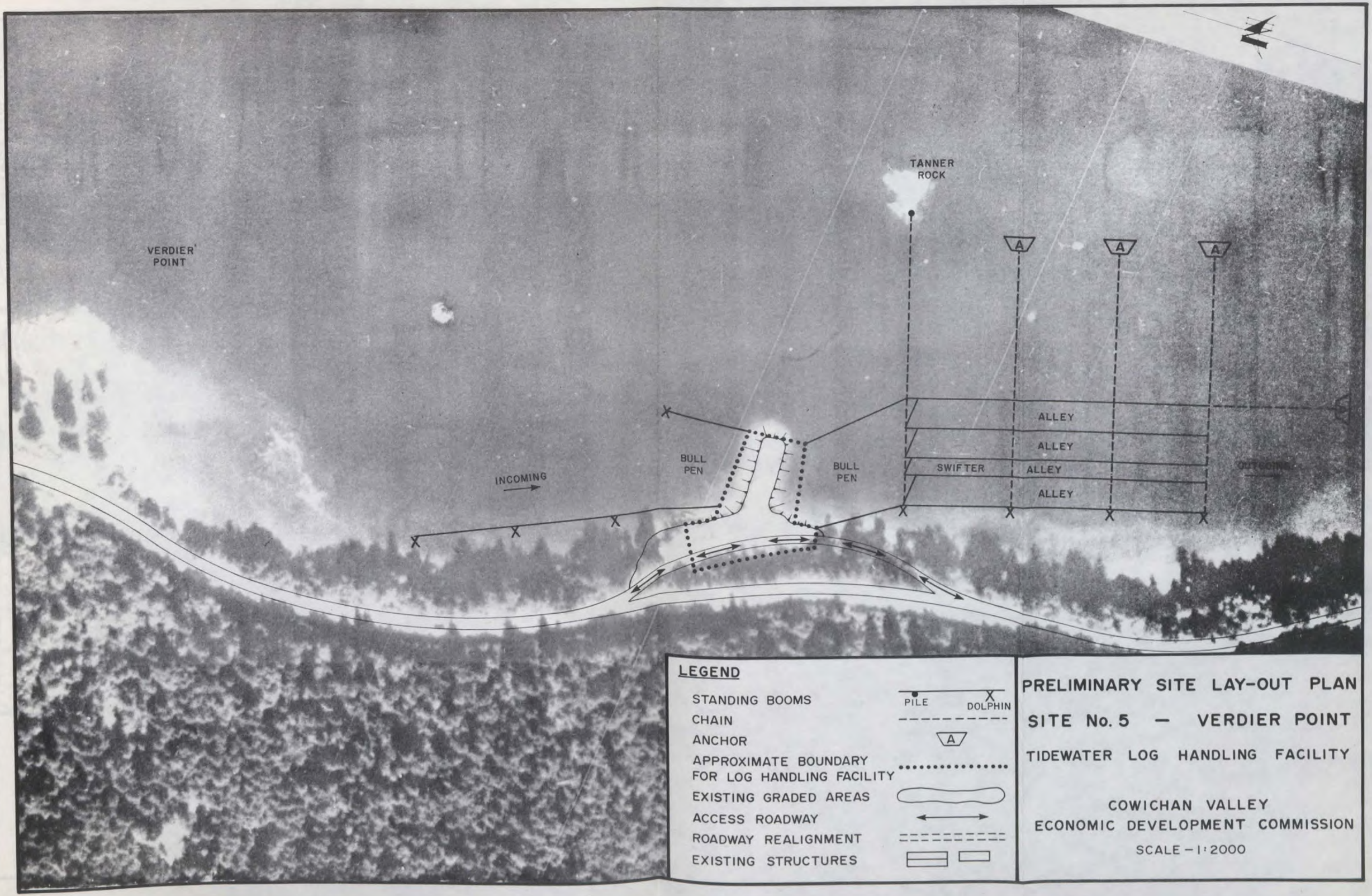
LOCATION PLAN

SITE No. 5 — VERDIER POINT

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE – 1:50 000



LEGEND

- STANDING BOOMS — PILE — DOLPHIN
- CHAIN
- ANCHOR — A
- APPROXIMATE BOUNDARY FOR LOG HANDLING FACILITY
- EXISTING GRADED AREAS
- ACCESS ROADWAY
- ROADWAY REALIGNMENT
- EXISTING STRUCTURES

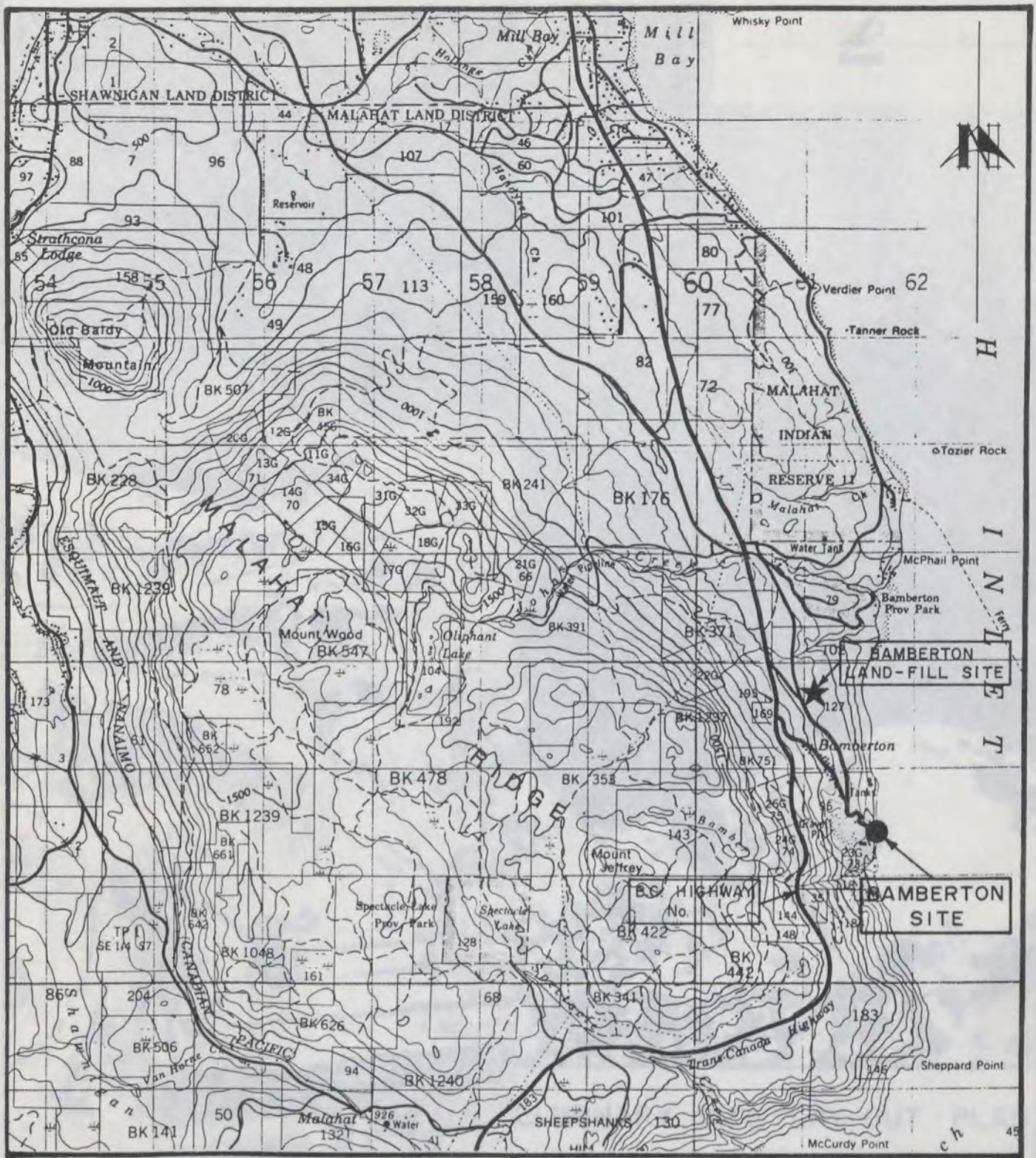
PRELIMINARY SITE LAY-OUT PLAN

SITE No. 5 — VERDIER POINT

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE — 1:2000



LEGEND

FACILITY SITE ●

NEAREST LAND-FILL SITE ★

EXISTING ACCESS ROUTE ———

PROPOSED ACCESS ROUTE - - - - -

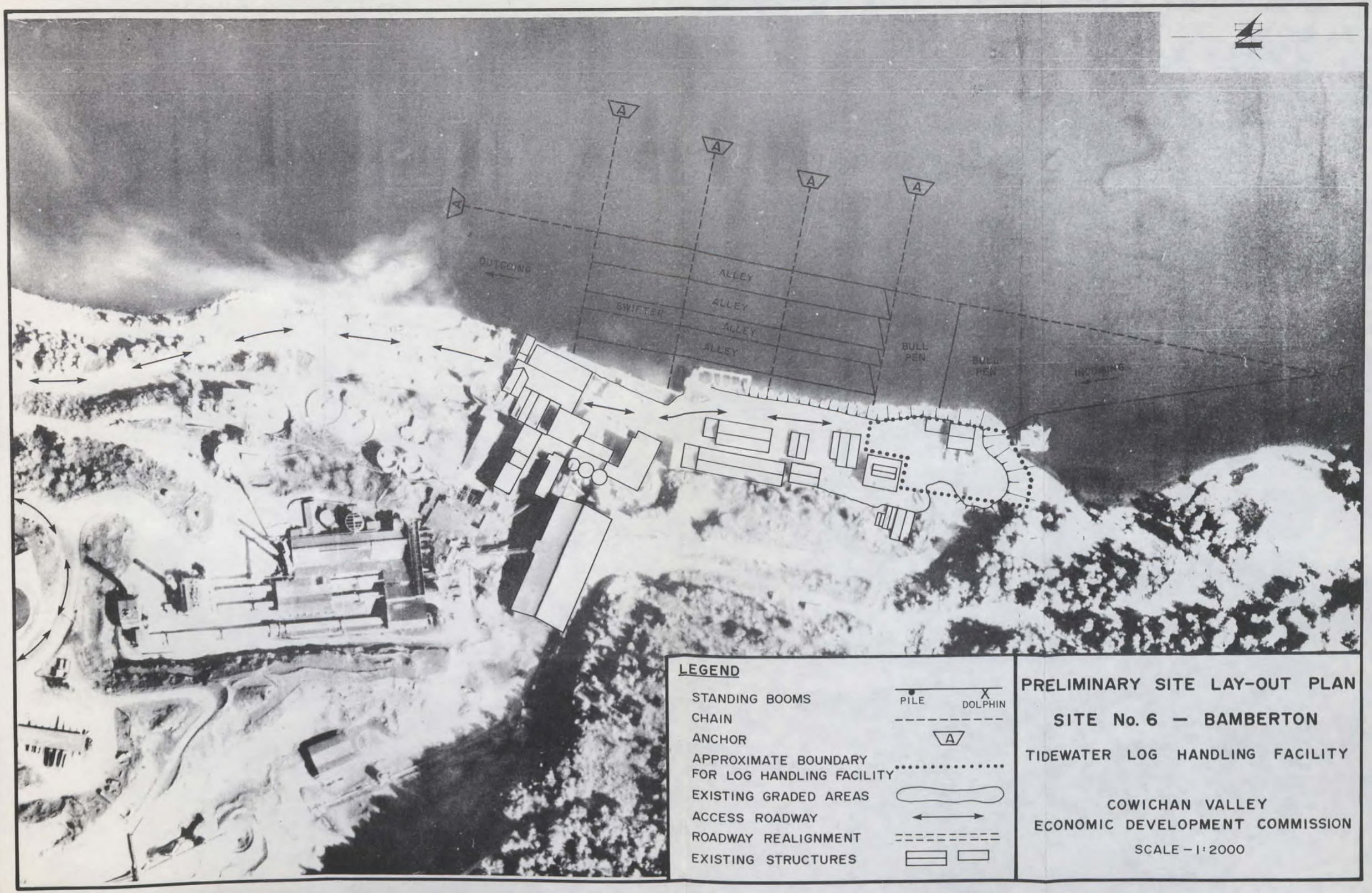
LOCATION PLAN

SITE No. 6 — BAMBERTON

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE - 1:50 000



LEGEND

- STANDING BOOMS — PILE — DOLPHIN
- CHAIN
- ANCHOR — A
- APPROXIMATE BOUNDARY FOR LOG HANDLING FACILITY
- EXISTING GRADED AREAS
- ACCESS ROADWAY
- ROADWAY REALIGNMENT
- EXISTING STRUCTURES

PRELIMINARY SITE LAY-OUT PLAN

SITE No. 6 — BAMBERTON

TIDEWATER LOG HANDLING FACILITY

COWICHAN VALLEY
ECONOMIC DEVELOPMENT COMMISSION

SCALE — 1:2000

APPENDIX II

OBJECTIVES FOR GASEOUS EMISSIONS FROM .... WOOD-BURNING POWER BOILERS AND TEEPEE BURNERS

APPENDIX II

OBJECTIVES FOR GASEOUS EMISSIONS FROM .... WOOD-BURNING POWER BOILERS AND TEEPEE BURNERS

(Report of the Pollution Control Branch - Table 2)
(Reference #2)

NATURE OF CONTAMINANT	OBJECTIVE LEVELS A	B	C	TIME PERIOD	SUGGESTED MONITORING
Wood-Burning Power Boilers					
Particulate matter - gr/st'd cu. ft. (12% CO_2)	0.100[1]	0.150[1]	0.250[1]	24-hr. avg.	Continuous
Teepee Burners					
Opacity[3] at exit - equivalent Ringelmann number	(2)	2	3	Maximum	Continuous optical or once/hr. by chart
Opacity[3] variance at exit - equivalent Ringelmann number	(2)	3*	4**	Maximum	Continuous optical method or Ringelmann chart
Particulate material[4] - tons/sq. mile/month		15	20	Avg. over two weeks	Collected over two-week period

(1) 100, 150 and 250 grains/1000 scf, respectively.

(2) Same as for wood-burning power boilers Level A (0.100 grains/scf).

(3) Ringelmann 1 equivalent to 20% opacity.
Ringelmann 2 equivalent to 40% opacity.
Ringelmann 3 equivalent to 60% opacity.

(4) Emission from entire mill operation, measured at suitably located sites along mill's property boundary line.

* Variance allowed for 10% of operating time.
** Variance allowed for 15% of operating time.

APPENDIX III

OBJECTIVES FOR QUALITY OF RECEIVING WATERS

APPENDIX III

OBJECTIVES FOR QUALITY OF RECEIVING WATERS

(Report of the Pollution Control Branch - Table 9)
(Reference #2)

PARAMETER		MARINE WATERS	FRESH WATERS
Dissolved oxygen	mg./1	90 per cent of seasonal natural value	90 percent of seasonal natural value.[1]
pH		No change	No change.
Turbidity	APHA units	+5	+5.
Colour[2]	APHA units		
Settleable solids	mg./1	Negligible	Negligible.
Floatable solids		None	None.
Dissolved solids	mg./1		+100.
Toxicity		Below detectable limit	Below detectable limit.
Fecal coliforms[2]	MPN/100 m		
Aesthetic		No decrease	No decrease.

1. Excluding lake stations, which should be assessed individually.
2. To be reviewed.