

Official Copy

Fortifications

Esquimalt British Columbia, proposed defence of

Royal Engineer Office
Halifax N.S.

January 1887
5th February 1887

Approved
C. G. Russell
General

5th February 1887

Sir
With reference to Gen
Office letter General No. 5, 23
June 1886, I have the honor
to report that I left Halifax
on the 19th July with a detach-
-ment consisting of 1 Co Sappers
1 Corporal, and 1 Sapper R.E.
and arrived at Victoria
Bancovers Island, British
Columbia on 29th July. Lieut.
(Lang) Lang R.E., having obtained a
short leave of absence, joined me
a few days later.

As there were no
barracks available, and I
was strongly recommended
not to place the men under
Canvas, as the heavy autumnal
rains would prevent drawing
operations being carried on

The
Under Secretary of State
for War
War Office
S. J.

me

In tents, some little time was necessarily occupied in searching for a suitable house. This after some difficulty was found, and about the 2^d August the survey of the ground in the immediate vicinity of the Dockyard, was commenced. Inasmuch as I had placed myself in communication with the Lieut. Governor, in accordance with your instructions, and had recommended the sites proposed in the two War Office schemes for batteries.

In examining the ground two points impressed themselves very strongly on my mind.

1st
make plan
interval here

1st The impossibility of completing a regular trigonometrical survey of the surroundings of Esquimaux, in any reasonable time, owing to the rocky and irregular nature of the ground, and the masses of large forest trees that cover it in every direction.

All that appeared possible was to survey ~~the~~ the sites on which it has been proposed to place works and to connect these by a traverse survey of the coast line & roads. This has been done.

2^d That the positions of the new Dock and Naval Establishments have been so lamentably placed.

placed in Esquimalt harbour that to protect them from distant bombardment, as well as from actual capture, must be a difficult and most expensive operation, involving the construction of formidable batteries mounting heavy breech loading guns, one at the entrance of Victoria harbour (at the Couleays Point, the other on the commanding heights of Langsters Plains, recommended for occupation in the reports of Colonel Lovell A. B. and Colonel Sir H. Crossman.

In the latter opinion I was glad to find that Admiral Sir Michael Culme Seymour commanding the Pacific Squadron quite concurred.

To resist an attempt to capture the naval establishment by a land attack, Signal Hill must be occupied & entrenched so as to close the approach on this side.

Fortunately, so much naturally scarp'd rock exists on the land side of Signal Hill,

that

That comparatively little work is required to render it inaccessible against a Coup-de-Main -

The protection of the entrance Channel, and the mine field, must be guaranteed by guns placed on Brothers Island, Rodee Hill, and the rocks south of the Goehard -

From the reply of the Govt. Governor, herewith annexed, it would appear that the responsibility of engaging to pay for the construction of the works, and subsequently, to maintain and man them, are points which must be decided by the Dominion Government at Ottawa, and not ~~by~~ by the Provincial authorities of British Columbia -

It so happened that shortly after my arrival, Victoria was visited by Sir John A. MacDonnell, Premier of the Dominion, whom I called on, and who evinced much interest in the subject -

He

He seemed to be anxious that Canada should carry out her engagements to the full in these matters, and said that he thought it would be premature to submit this question until the Plans had been definitely made, and a somewhat accurate estimate of the cost and of the number of Dominion Troops ~~that would be required~~ to defend the place had been arrived at. It was my intention to have submitted these figures to him before forwarding my report to the War Office, but I find that the sum voted by the Dominion Government is at present only £20,000 a sum obviously insufficient for so large a work, especially when the difficult nature of the sites, and the unusually high price of Land, and Labor of all kinds, is taken into consideration.

Under these circumstances it is evident that if the sum mentioned is to be taken as the total available for their execution, some
 very

Very Considerable alterations
and deductions from my
Scheme must be made, and
it will be better that these
should be decided on
at the War Office before being
submitted to the Canadian
Government.

For a complete defence
of the Dockyard I consider
my entire scheme as now
put forward absolutely necessary
with one amendment namely,
that whereas I have taken the
guns mentioned in the
War Office Scheme as being
those ~~required~~ ^{required} for the defence
of this place, I should beg
most strongly to urge that
if more large guns could
possibly be spared they
should be granted for the
Batteries at St. Charles Point
and Saunders Plains, and
one for Brothers Island, as
on their fire alone, the ^{entire} safety of the Dockyard
from ^{disturbance} bombardment must
depend.

At the end of my report
I shall submit a scheme

Costing

Costing approximately the amount granted which will secure the Dockyard from capture, and act as a nucleus to the defense, ~~and~~ to which the other more expensive Batteries should be added in the future.

General Remarks on the Question of the
Defence of Esquimaux and Burwood Inlet.

Before proceeding to describe in detail the works and scheme of defence, I beg to submit a few remarks on the general question of the defence of the stream of British Commerce passing Esquimaux, and tending towards the terminus of the Canada Pacific Railway at Burwood Inlet.

The question as to whether Esquimaux or Burwood Inlet should be selected as the coaling station and naval depot, has been decided in favor of the former place. The dock is finished and naval workshops have been constructed.

In spite of the many advantages offered by the magnificent land-locked Fiord of Burwood Inlet it appeared to be the unanimous

opinion

9. 9.

opinion of Naval men, that the narrowness of the entrance to Burrard Inlet, the swiftness of the current, the intricate navigation between the small islands, in the straits of Georgia, and the prevalence of dense fogs combine to render it unsuitable as a Coal and Naval Depot, while the geographical position of Esquimalt, almost at the entrance to the straits of St. Juan de Fuca, and connected as it is by railway with the coal fields of Vancouver make its maintenance, and defence, of vital importance to our fleet in the Pacific.

I have already pointed out that owing to the wide opening of the bay, and the advanced position of the Esquimalt Dock and Naval Yard, bombardment can only be prevented by constructing two heavy and costly batteries, ^(at the anchorage point of the Gulf of Georgia) and of the terminus of the Canada Pacific Railway, and the

large

Remarks on the Scheme
of Defence proposed by the
Royal Colonial Defence
Committee -

effectually

With reference to the two
Schemes of Defence which were
forwarded to me for examination
and comparison on the spot
viz - Plan No 50.893 proposed
by the Colonial Defence
Committee, and Plan No 50.894
prepared at the War Office
I have the honour to report
that after carefully considering
the subject I am strongly
of opinion that it would
be a mistake to retain the
Batteries at Victoria Point and
Finlayson Point, as the guns
in them could as ~~effectively~~
defend the entrance to Victoria
Harbour if placed on the
western side of the Channel
on the rocks between Rose
Bay and Macaulay's Point -

In their present position
they rather draw the fire
on to the town, and their
proposed Ammunition for ^{the} _{the}
is not such as to prevent
a bombardment at long
range -

An inspection of Plan
No. will show at a glance

that

That nothing short of a large force and an extensive system of works commanding the entire coast for some miles could prevent a landing and the easy capture of the town, in which case the batteries at Finlayson's and Victoria Point being commanded by the ground in rear would at once be untenable -

It appears to me that the great defensive advantages of retiring the troops and defenses of Esquimaux behind the wide ditch formed by Victoria Harbour and Portage Inlet should not be thrown away and Victoria being left as an open town would probably be saved from bombardment -

As regards the rest of the Artillery defenses proposed I am of opinion that to check a bombardment of the Dockyard, a battery at Masculap Point is of the utmost importance

importance, and should be
 allotted a heavy armament
 than 4-7" R.M.L. Guns.

The New Dry Dock and
 the N.E. end of the Dockyard
 are placed in a hollow
 formed between Signal
 Hill and the Rocks ex-
 tending from Duntreth Head.

The prolongation of this
 depression falls on an area
 1000 to 1500 yards from Macaulay's
 Point. From this position the
 exact ^{reference point} position of the Dock can
 be clearly made out the high
 masonry chimney of the engine
 for working the Dock gates,
 being as an object to aim
 at. Ships manoeuvring in
 this area might keep within
 good Bombarding range, and
 yet ^{be} too far from the guns
 on Signal Hill + Duntreth Point.
 The fire of Macaulay's Point
 alone would prevent them.

For the above reasons I beg
 to urge that Macaulay's Point
 Battery be heavily armed and
 that the heavy guns proposed
 for Signal Hill be moved
 more to the front and placed

on Brothers Island -

Signal Hill is unquestionably
 a commanding position
 but its range of fire is not
 as great as is indicated in
 blue on the Colonial
 Defence Committee's plan.
 Brothers Island + Guntje
 Head shutting out a portion
 of the water from ^{its} view,
 and it is ^{marked over} somewhat too
 retired, several hundreds
 of yards of range being
 wasted over land or shallow
 water -

Some guns of the smaller
 Caliber are doubtless required
 for the close defence of the
 mine field and the entrance
 Channel, but as any guns
 on these rocks must bear
 fire on to the Dockyard, I
 submit this should be
 avoided if possible by
 moving the 2-6" B.L. Guns to
 a more suitable position
 for distant fire -

With regard to the 4-9" M.L.
 guns the same argument for
 removal exists and I think
 their fire will be more

generally

generally useful if they
are placed on Rodd Hill
as recommended in the
War Office Scheme - P. 5089.

Remarks on War Office
Scheme of Defence }

The Artillery defence
proposed in this Scheme
is, I consider much to be
preferred to the one already
reported on. Heavy B.L. Guns
are placed at Macaulay's
Point which will render
bombardment of the Naval
yard from this direction
more difficult, and the entrance
to Victoria Harbour and the
main battery will be flanked
by the more rapid fire of
64 P^s and 16 P^s placed on
the rocks in rear of Macaulay's
point.

The occupation of Rodd
Hill is also most desirable
as a good flanking fire
can be brought to bear
across the mine field and
in front of Brothers Island
towards Macaulay's Point.

Rodd

Rodd Hill itself is a rock that with a small expenditure can be rendered quite sufficiently inaccessible to assault.

There is however only room for 3 large guns on it, if placed at anything approaching the intervals shown in the latest copies of Batteries supplied by the War Office.

Rodd Hill is isolated and liable to be taken in reverse by Infantry fire from the ground in rear, which can however be prevented by ^{posting} the Infantry of the defence in the ^{strong} position indicated on Plan No. 1.

As regards the 9-2" B.L. Guns I cannot agree that the best position has been assigned to them - their fire would be impeded by Brothers Island, they would draw the hostile fire on to the Dockyard and they would occupy the best and almost only site for the movable Electric Light.

The Submarine Mines for the defence of Victoria Harbour are not I think necessary if a really powerful Battery well supported by lighter guns is constructed at Macaulay's Point, but should it be necessary to postpone the erection of these works then I think that it will be advisable to lay down ^{mines} the mechanical mines ~~as~~ shown in Captain Rawson's Scheme of Sub-Marine Mining Defence. These would be supported by the fire of Field and Machine Guns from the proposed emplacements amongst the rocks in rear of Macaulay's Point Battery and would only require the construction in some sheltered spot of a light wooden hut to serve as Test Room -

Electro contact ^{mines} to act as

Chart 101

Scheme of Defence now proposed -

n. 13

at a War office
 Town of Inspection

After carefully considering the two ~~above~~ schemes already discussed, and after consulting with Colonel Ellis R.E. and Major Barker R.E. who happened to visit on Esquimaux

I shall shortly after my arrival, I have the honor to submit for consideration the accompanying Scheme of Artillery Defences with contoured plans in detail on a scale of 40' to 1 inch of each of the works I propose —

Accompanying each plan is a contoured survey of the site, to facilitate the designing of other works at the War Office.

Should my schemes not be approved of — and I append a memorandum for each work giving the estimated cost, (by civil and by military labor) Area of land required, name of owner, and price demanded. Notes supply, means of bringing to the spot the guns and the building materials, and nature of foundations —

As regards the Submarine Mining defences, I determined on the spot what I considered the best positions for the general line of obstructions, and obtained the opinions

of

of the Rear Admiral
 Commanding in Chief on the
 position of the Friendly
 Channel - I also fixed on
 the site for the Test Rooms,
 Electric Light Engine House
 and Electric Light Station, as
 well as on the position
 near Signal Hill which
 appeared to be most suitable
 for a Submarine Mining
 Establishment -

Here however I felt that
 my power of doing useful
 work was at an end, as
 unfortunately neither Lieut.
 Lang R.R. nor myself had ever
 been through the I.M.M. course,
 and therefore were not so
 competent to design the
 detailed arrangements, as
 an officer would be who be-
 longed to a Submarine
 Mining Company -

I therefore brought the
 survey of the mine field, and
 the rough schemes for the
 Submarine Mining Establishment,
 Test Rooms and Observing
 Stations from Esquimaux
 to Halifax and placed the

matter

Matter in the hands of
 Captain Rawson who re-
 -questing him to draw up
 a scheme of Sub Marine
 Mining Defence, taking as
 a rough guide for the number
 of mines allotted to the place,
 the tracing sent with the
 scheme from the War Office.

After his suggestions had
 been made I have now
 drawn up the plan & estimates
 of the Sub Marine Establishment.

Captain Rawson's report
 and scheme of Sub Marine
 Mining Defence are forwarded
 herewith - Sketches etc
 will assist in giving an idea
 of the site -

I have already indicated
 my views in an earlier part
 of this report on the general
 question of the defence -
 I chiefly differ from the War
 Office scheme in considering
 that it is absolutely necessary
 to place a heavy battery at
 the N. end of Longues Pointes,
 to cross fire with Mocauley's
 Point

Point, and to prevent ships
from lying near Albert Head,
and bombarding from a position
too remote from either Macaulay
Point or Road Hill to suffer
from their fire —

I also suggest that Macaulay
Point should be strengthened
by the addition of another
B.L. Gun.

Description of Proposed
at Macaulay's Point

I should have preferred
3-9.2 B.L. guns for Macaulay's
Point and a similar ar-
-rangement for Longster Knoll,
and 1-9.2" B.L. gun for Brothers
Island, but having been
assured by Colonel Ellis Act.
of the impossibility of obtaining
so many heavy guns I agreed
with him that it would do,
if the ^{one} remaining 9.2" B.L.
gun allotted to the defence
were placed at Longster
Knoll and that it would be
necessary to ask for 2 additional
6" B.L. guns to complete the
armament of this battery —

These guns should be
mounted on disappearing
Carriages

Carrriages as the deep water
close in front of the battery
would enable ships to
approach sufficiently close
for the machine gun fire
from their tops, to cripple
the working of the gun detach-
ments.

A low wall so braced
as to be ~~protected~~^{screened} from fire
~~from the seaward side~~ by
the rocks, ^{from the sea} will answer the
purpose of protecting the
gorge from assault on the
right side of the battery.

Good cover can be obtained
for the barracks for the
Artillery garrison behind
the rocks in the centre -
on the left where the line
of the ships could be brought
against it. I propose an
earth parapet screened by some trees and protected in front
from view by an obstacle.
(Wire or Churns all this)

The emplacements are
designed as closely as
possible on the War Office
plans. In front the soil
being very deep at the point

is

is cut away so as to enable
the guns to depress on to the
water close in shore—

In this and other batteries
arrangements have only been
made for barracks for the
Artillery detachments it being
assumed that the Infantry
detachments for each place
can be encamped near at
hand when required—

Flanking Batteries

See Plan No.

I propose to construct
emplacements for 2.16 P's
among the rocks on the extreme
right rear of the battery,
and 2 alternative emplacements
on the rocks to the left, to
defend the entrance to
Victoria Harbour, which also
are placed the 2.64 P's to
flank the main battery and
protect the entrance.

See Plan

+ Sketch No. 2

The existing battery
of 3. 7" R.M.L. guns
must be demolished.
The guns are too crowded
cover insufficient &
the platforms practically
useless. The guns

I propose to ~~install~~
 elsewhere. New carriages
 being supplied ~~from~~
 to recalc them to fire
 over a 6 ft parapet

9.6 feet.

For this battery propose
 an armament similar
 to that for Macaulay's Point
 viz 19" B.L. and 2.6" R.L. and
 2.16 p^u and 2 Machine
 guns for defence on the
 land side -

Longspur Point Battery

The proposed work is
 situated at the north end
 of the plateau and at the
 crest of a steep slope to the
 sea -

The site is nearly level,
 is not commended for
 a considerable distance by
 higher ground and is covered
 by magnificent specimens of
 the Douglas Pine that will
 act as a perfect screen
 and back ground to the
 battery -

As the position of this
 battery is so isolated and
 as it blocks almost the
 only road of approach
 to Esquimaux for a hostile
 landing

See plan 10.

Landing party from
Cadder or Parry bays, it
must be securely closed
on the land side

I have shown barracks
for the Outillery garrison
in Casimatis under the gorge
parapets, and a low
masonry escarp, flanked
by koponies -

The front of the battery
is protected by the fire of
2 small counterescarp
galleries and by wire
entanglement on the slope.

The soil of on Sangster
Plain is sand of good
quality for concrete and
building purposes -

The only difficulties to
be apprehended in the
construction of this work
will be the water supply
which can only be obtained
by deep well boring or by
pumping the water up 250'
from some springs that run
out a little above the sea
level.

level and about $\frac{1}{4}$ of a
mile away -

An ample supply now
used by the shipping in
the Royal Roads would
then be obtained -

It is difficult to estimate
the amount of powder
that would be given by
the numerous roots of
these large huge trees, but
doubtless they will add
considerably to the cost
of the otherwise easy
excavations -

The War Office Types of
emplacement have been
followed for the 3 heavy
guns - The height of the
battery is such that dis-
-appearing Carriages need
not be employed -

The water is commenced
inside the 5 fathom line
by the guns as placed
with a depression of 9°
so that there is no hindrance
space for ships of any size,
and the plunging fire
of

of Guns at this height will
force hostile ships to stand
further out, and come under
the fire from Macaulay's
Point -

Road Hill

Implacements for 3-9"
R.M. L. Guns and a small
barrack for the Artillery
Garrison have been designed
for this battery.

It has found impossible
to place the guns at the
wide intervals that have
been proposed for Langsters
and Macaulay's Point, and
to fit in the requirements
of the Shell Rooms and
Magazines, to the cramped
space, which the rock
affords, was a matter of
some difficulty involving
a considerable departure
from the War Office Type
Plans -

It is proposed to scarp
the accessible parts of the
front and flanks of the
hill, and to provide

a defensible enclosure
well screened from fire
behind it -

The Battery being commanded
by rising ground in
rear, I propose to defilade
the gun detachments from
musketry fire by using
Rope Montlets in rear of
the emplacements -

The attack on the gorge
of the work can best be
met by posting Infantry
behind improvised cover
in the positions shown
by a red line on the survey
of the site -

See plan No.

The natural escarpments
of the rock in these places
give the defenders con-
siderable advantages -

A stream of water which
is now used to supply
the heavy guns close
under the back of the work
and will be available for
building purposes - Gravel
for concrete can be obtained
from the beach in front,
and -

And other materials brought
over in a flat bottomed
boat from the Dockyard -
Sand for this and other
works (Langsters alone
excepted) will be obtained
from the foot of the slope
under Langsters Plain, and
carried by water to the
various places -

The view of the Mine
Field, Brothers Island and
Macaulay's Point as seen
from this Battery is given
in Sketch No.

Proposed Battery on
Brothers Island -

It is proposed to
remove the existing
battery on this Island
which consist of 1.8" R.M.L.
gun (naval pattern) and
2.64 p. R.M.L. guns, and to
mount instead of them
1.9" R.M.L. gun and 2.7"
R.M.L. guns from Macaulay's Point
The former on a site
not previously occupied
from whence an arc of
fire from Macaulay's Point
to Ross Hill can be obtained
and

and the other 2 guns
on the site now occupied
by the 8" Naval Gun and
by the old Naval Cemetery,
long since disused —

I wrote to the Admiral
at Esquimaux suggesting
that the removal of the
bodies from hence to the
present Naval Cemetery
should be carried out
by the Naval Authorities
prior to the commencement
of the works, as it would
be necessary to dig up
the old grave yard —

I am not aware whether
any steps were taken.

The disadvantage of
Brother's Island as a site
for a Battery is its low
elevation, which must
either be met by mounting
the guns on disappearing
carriages, or by providing
that the guns be to fire
over a 6 foot parapet,
with under cover loading
arrangements —
Another defect is that

it

it necessarily interferes
with a portion of the area
illuminated by the
movable electric light on
Duntze Head -

Its advantages are
that it is well in advance
of the Dockyard and is
1500 yards nearer to Mowbray
Point than is Rodd Hill,
while its guns command
at close range the entrance
Channel, also its height,
the color of its rocks, &
trees and brushwood
on it so completely agree
with the background that
at a moderate distance
off it is most difficult
to distinguish the battery
or even the exact outline
of the island itself -

There is no water on
the island, so that tanks
must be provided both for
use during the construction
and afterwards for the
garrison -

As Brothers Island
is

is the property of the Imperial Government & a loan is effected by not having to purchase the site of the battery -

Huts are provided for the Artillery Garrison. The small force of Infantry required in case of attack could be accommodated in 2 or 3 tents -

The Rocks at Duntze Head rise abruptly from the water, affording few places where a landing could be effected - they are for the most part denuded of soil. tho' fortunately a few trees are growing on the higher levels, which serve as a useful screen to the Dockyard.

In connection with the S.M. defence, I propose to place the fixed Electric light

Site for fixed Electric light

Plan Nos

bearing

bearing on the Mine Field
at a point about ^{12 feet} above
sea level, on a small
projecting rock, close
to where it is proposed
to land the cables. —

Plan No. —

By cutting away a
small portion of the
rock on the Northern
side, fairly good pro-
tection from fire can
be obtained, and a small
clump of trees now growing
on the spot will completely
hide it from view by day.

Site for Test Room
and Engine House

Immediately above the
little cove formed by this
rock, a cleft in the rocks
occurs which at its upper
end is large enough to
accommodate a test
room and electric light
engine house, and
affording 10 or 12 feet of
cover for those buildings.

Plan No.

A detailed plan of
these buildings - Plan No.
is attached to the
Sub Marine Mining Defense
Report.

As I have no type of
Electric Light Emplacement
nor of an observing

Station

36

Station - I have merely indicated ~~included~~ the positions for these, and sketched in an observing station in what appears to be the most sheltered position.

To obtain the necessary cover, and to hide the Test and Engine Manacx from view, I have proposed to lower the floor levels considerably by blasting, but in the event of funds not being forth coming, temporary buildings of wood, with flat roofs, protected on the seaward side of the ravine by a substantial earthen traverse, would probably answer the purpose for a relatively small cost. Whatever earth is required must be carted to the spot.

Water for building, and for the Engine, can be obtained by connecting with the pipes of the Water Company, which are now being laid down for the supply of Esquimaux and the Dockyard.

See Plan No.

Moveable Electric Light

an alternative
position near the
point of the rock
is shown at a height
of 15 ft.

In advance of the
Engine Room and about
40 Yards away. I propose
to place the Moveable
Electric Light on a
slight mound of rock
at the level of 65 feet above
the water.

From this point a
clear arc could be obtained
for the light, from Macaulay
Point, to the place where
the illumination of the
Mine Field by the fixed
light begins, except for
a certain distance where
it will be necessary to
screen off the light to
prevent its illuminating
Brothers Island Battery
which unfortunately lies
immediately on the left
front of the light. Owing
to there being no guns in
the immediate vicinity, it
is hoped that the light
will not be much inter-
fered with by the smoke.

Guns to defend the Mine Field

It is
proposed to place 6
guns for this purpose
on the sites marked ⊕
on the Survey Plan
—

Two extra emplacements
being made for 16 P^l
to be brought from
Signal Hill or elsewhere
if necessary.

The sites chosen for
these guns, give a
complete command of
the Mine Field, and for
some distance beyond,
but being placed on the
reverse slope of the hill
and at different levels,
they are well screened
from view and from
distant fire. — The
trees growing round the
sites afford a good back
ground.

2. 64 P^l Guns

In the garden of the Naval 16 P^l
Storekeepers Quarters, —
Completely hidden from
ships until they have
almost reached the
Mine Field, I propose
to construct 4 Emplacements
for these guns — 2 Guns
to be permanently stationed
here, and 2 more to be
brought into action from
the moveable armament.

Hotchkiss

2
Koschki's Guns

As the fire of neither the 64 P^{rs} or 16 P^{rs} may perhaps be quick enough to deal with the rapid movements of torpedo boats, - I propose that 2 quick firing Koschki's Guns be asked for, to be placed at the Point in the Dockyard - Here they will be well away from the smoke caused by the firing of the other guns

2. Combined with the fire of 3-9" R.M.L. Guns from Round Hill, and with the fire of guns at Brothers Island I hope the defence proposed above may suffice for the Mine Field

The 2 Koschki's Guns are additional to those allotted in the W.O. Scheme,

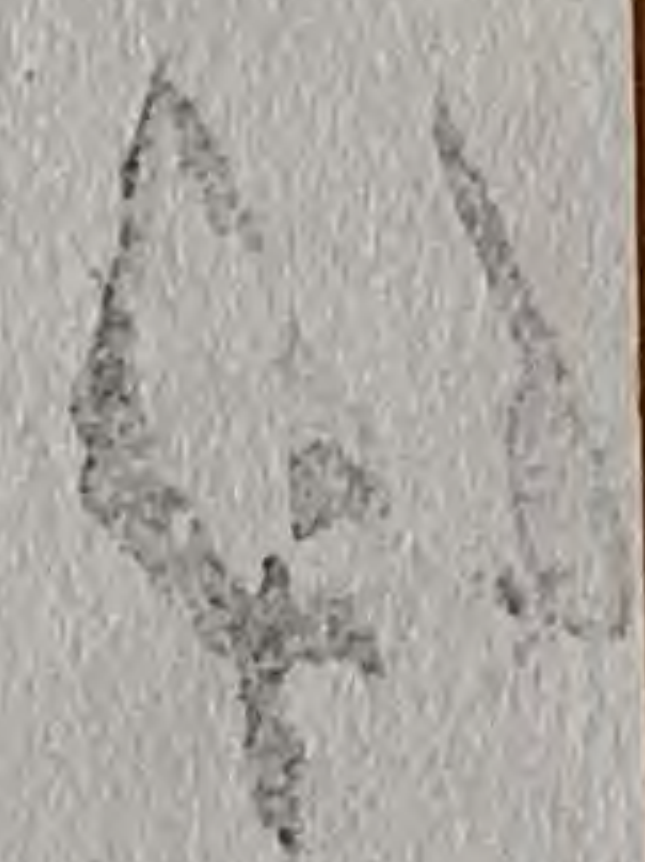
Proposed defences
on Signal Hill

Signal Hill, although a commanding position blocking the approach from the land side towards the Dockyard, and affording an excellent position from which the general conduct of the defence can be directed, is not a favorable site for

for emplacements for Heavy Guns. - The rocks which rise from the sea in a series of shallow terraces, having an immediate back ground of steep crags, ~~are~~ ^{are} almost every where denuded of soil - The small flat spaces near the crest of the hill, can however be utilized with advantage for a couple of guns, - one to fire over Brothers Island and across on the hills behind Road Hill Battery, would be of use in the event of a land attack on that work & would assist in the defence of the approach to the harbor

For this purpose I propose to utilize one of the 4" R.M.L. Guns from Macaulays Point, - It will require a new carriage to fire over a 6 foot parapet for undercover loading.

Another gun can be advantageously placed to enfilade the main road and fire on the



high ground in the direction of Victoria and yet assist by its fire on the sea between Macaulays Point & Brothers Island.

1. 64 P.

A 64 P. Emplacement has been designed for this site

At the foot of the hill 65 feet above the sea, and in a position which will not be much affected by the fire of the guns on the upper level. I have placed another 64 P. to cooperate with ~~the~~ the

Macaulays Point & Brothers Island

Emplacement for
16 P.

On the extreme summit of the hill, there is a small almost level space, with room for a couple of Field Guns. - I propose to lower the surface slightly and make a roadway to enable 2 Field Guns to be taken up for use either against a force advancing from Victoria or against troops that might attempt to occupy the higher ground at

Bladd Hill to face on the
Dockyard —

Scarping the Hill

To render the hill safe against an open assault by Infantry, I propose to scarp such portions on the land side as are not now 75 feet high. The debris from the scarping will be of use in forming a solid Pier for the Sub-Marine Mining Establishment — the distance is short for moving the rock and the destruction of timber wharves by the Teredo Navalis and other Marine insects is so rapid in these waters that it will be an economy to construct at once a permanent Causeway by throwing in the loose stones & masses of rock from the hill above.

The high price asked for the site, ^(from 400 to 500 per acre) is a great drawback to occupying Signal-hill, but it cannot be avoided, if any additional security is to be provided here, and possibly a more reasonable price may be arranged.

(from 400 to \$5000 dollars per acre)

arrived at by arbitration.

The prices asked vary from \$ 400 to \$ 5000 per acre

See statement of prices of land

See Plan

The Sub Marine Mining Establishment is a closely modelled on the N.O. Type Plans as the site will admit of. The position is conveniently situated with reference to the Dockyard, the coal sheds, and at no distance from the pipes of the water company which supplies Esquimaux.

As regards security from hostile fire, it is probably better protected than any spot in the harbour, being so immediately under cover of Signal Hill.

The price asked for this land is most exorbitant vizt \$ 5000 per acre, and would have to be reduced by Arbitration -

Done

Macaulay Point
 The Guns for this work should be landed at the Dockyard Wharf, and taken by road to the battery.

There is a sling waggon which would serve to transport the 6" Guns, but the 9.2" would have to be transported on rollers over a planked roadway.

Signal Hill & Dumbie Head
 The Guns being landed at the Wharf in Esquimaux could easily be taken to the batteries by pack-buckling.

Brothers Island
 The ~~guns~~ Guns should be transported from the vessel in which they arrive to a "Scow" (or large flat bottomed boat) towed to the island and landed on skidding.

Rodd Hill
 The "Scow" or lighter on which the guns are placed

Remarks on the facilities for Landing the Guns etc. and constructing the Works

placed from the ship should be run up at High Water spring tide ^{and the guns} landed at low water, & parbuckled to the foot of the Cliff, whence they must be lifted by shears

Sangsters Plains

The guns should be conveyed in a lightew & run up the shore at the south end of Sangsters Plain, and landed by means of skidding during low water. From this there is a road leading up to the main road on the top of the plain, up which the guns could with some difficulty be taken.

There are many large trees on each side of the road which would furnish excellent hold ^{fasts}

*

* The question of transport ~~which~~ is an item which it is difficult to estimate and cannot be given very accurately as tenders would have to be called for and there has been little work on a large scale going on to serve as a guide.

Supply of Materials

Supply of Bricks

The best bricks on the Island are made by Messrs Mason Coghlan & ~~Douglas~~, Douglas Street, Victoria, but the quality

quality of bricks generally in Vancouver Island is far inferior to that of those made in the Eastern Provinces. There is no bank clay, and consequently careful assortment is necessary.

Price per 1000 \$ 8.00
Do. delivered \$ 10.50

Supply of Lime

Good Lime can be obtained at from \$ 1.50 to \$ 1.00 per barrel of 4 bushels. It is obtained from the Island of St. Juan, from Saanich and from a place about 6 miles from the Naval Hospital

Supply of Sand

The sand used for the Dry Dock at Esquimalt was brought in a "Scow" from the foot of the slope on Langsters Plains - the quality is very good. There is also sand of fair quality (if washed to get rid of the earth with

with which it is mixed) at a pit about $\frac{3}{4}$ of a mile from Macaulays Point, at the back of a house belonging to Mr. Pooley M. P. P. Solicitor - Victoria. This has been used by the Esquimalt & Nanaimo Railway - Co. & would probably answer for the work at Macaulays point, and thus save the construction of a pier at that place.

In the case of the other batteries it will be best to have the sand brought direct to the spot, by water from the foot of Langsters Plain, or landed at the Esquimalt Pier & carted to the site.

Stone for concrete

The stone blasted from the rocks will make excellent concrete if broken fine enough.

There is a crusher belonging to the City Council of Victoria, now used for breaking stone for the streets which might be obtained

artificially by $\frac{5}{8}$ if Sapper
labour can be made avail-
-able

For many months i.e.
from May to October troops
could encamp with com-
fort, but in the heavy
rains in the winter, huts
should be provided.

The cost of hutting
the troops should not I
submit be counted against
the cost of this scheme,
as when ^{by an order in Council} the W.O. handed
over the ~~the~~ Dominion
of Canada in 1883 the
lands in Nova Scotia,
formerly used for defensive
purposes. - it was on
the understanding that
should Imperial troops
be sent at any time to
Canada, the cost of
providing them with
barracks would be
defrayed by the Dominion
Government.

To meet the unusually
high expenses of the
place, I consider that
some additional allowan-

should be paid as a
Colonial Allowance to
both Officers & Men.

The amount of
this would of course
have to be added to
the Cost of Military
labour, in making the
foregoing comparison,
but I must omit if
from my calculations
as the suggestion may
not be approved.

If Military labour were
employed all Tools (except
Axes) and plants should
be supplied from this
Station or from England.

Cost of Labour

Cost of Labour

The completion of the
C. R. Railway and consequent
influx of emigration has
not as yet produced any
appreciable diminution
in the cost of labour.

White labour of
all kinds is very dear
and unreliable.

Sho

The men generally are interested in excluding competition and in keeping up the present high rates, while the numbers of really good artificers amongst them are small.

The daily rate of wages of a white labourer is \$2 while white artificers get from \$3 to \$4.50 per diem.

Chinese Coolie labour has been employed largely by the Esquimaux and Nanaimo Railway and found to answer very well.

The pay of a Chinaman is 90 cents a day, to which must be added a small sum for the cost of encamping near the work. There is however a strong feeling amongst the white population against the employment of Chinese and I do not think it would answer to employ them with civilian white artificers. This difficulty would not occur if artificer work were performed by Sappers.

The

The following comparison of the relative cost of employing a Company of Sappers assisted by 100 Chinese labourers for 1 year and an equal number of white artificers and labourers at their minimum rates ~~shows~~ for the same time shows that an immense saving would be effected by employing the former.

Working pay 93 R.S. 300 days of 10 hours £ 2381

Pay 100 Chinese, 300 days at say \$1 a day £6000
£ 8381

Total for military labour say £ 9000

Wages of 92 white artificers at their lowest rate \$3 a day } £ 14198
300 days = \$ 83,400

100 white labourers at \$2 a day } £ 12320
for 300 days }
£ 29518

Total for civil white labourers say £ 30,000

From the above calculations it appears that Military Labour is about $\frac{3}{10}$ the cost of civilians - I consider that to meet the heavy expenses of the place a Colonial allowance

allowance should be made to both Officers and men which would somewhat alter the above figures but would still leave such a large balance in favour of Military and Chinese labour that I have no hesitation in recommending its employment for the construction of the Esquimaux Defences.

The question of hutting the troops has been omitted from the above calculations as when the W.O. by an order in Council handed over to the Dominion ~~Government~~ of Canada in 1883 the lands in Nova Scotia formerly reserved by the Imperial Government for defensive purposes it was on the understanding that should Imperial Troops at any time be sent to Canada the cost of providing them with barracks would be defrayed by the Dominion Government.

For the summer months troops could be encamped with comfort but in the rainy season huts should be provided.

If Military labour is employed all plant and tools (except axes) should be supplied from England.

I am

I am not aware at what rate the Canadian Railways would charge for freight of Government stores of all kinds to Victoria but if the rate is moderate it probably will be best if Portland Cement is supplied direct from England as is done at this Station.

As regards the probable time that would be required to complete the works now proposed it is difficult to form an accurate estimate -

The following figures will perhaps give it approximately -

Total estimated cost of	£ 99,800
the works exclusive of price of land as civilian rate.	
Deduct price of land	£ 1,000
Deduct estimated value of materials	£ 34,400
Estimated value of labour at civil rates ^{including Militiamen}	£ 62,400
Estimated value of labour of 1 Co. R.C. & 100 Chinese	£ 18,630
Estimated cost of labour	£ 9,000

The works would therefore take 2 years to complete if only 1 Coy R.C. can be spared and therefore I beg to recommend that 2 Companies be lent for this purpose to finish the work in say 1½ years

Probable time for Completion of works and numbers of R.C. ^{embarked} _{required}

Remarks

The armament ~~of~~ Garrison of the works will be as follows.

	Armament	Garrison				
		R.A.	R.C.	Infantry		
McCaulay's Point Main Battery	{ 1.9" B.L. 2.6" -- }	50	—	200		
Flanking Battery	{ 2.64 P's	20	—	100		
	{ 2.16 --	20	—	—		
Brother's Island	{ 1.9" R.M.L.	50	—	25		
	{ 2.4" --					
Rodd Hill	{ 3.9" R.M.L.	60	—	150		
	{ 2 machine guns					
Langster's Plains	{ 1.9" B.L.	50	—	325		
	{ * 2.6" "					
	{ 2.16 P's					
Signal Hill	{ 2 machine guns	30	—			
	{ 1.4" R.M.L.	50	—	100		
	{ 2.64 P's					
Field Force	{ 2.16 P's	50	90	100		
	{ 2.64 P's					
	{ * 2 Hotchkiss guns					
	{ 4.16 P's					
	{ 2 machine guns	40		600		
		450	90	1600		

For cost of works see enclosure no 3.

Guns marked * are additional to those in the W.O. Scheme

I have indicated in yellow a site on the Government Reserve that would appear suitable but it would require far more time than I had at my disposal to accurately determine on the best situation -

As Sequeimall harbour is liable to bombardment and is moreover very small, the necessity for having some such depot near at hand and yet safely placed is so great that I submit it is important that some arrangements be made for acquiring the land for this depot before its value is raised to an extravagant sum.

Alternative Scheme of Defence

Should it be found impossible to obtain funds for carrying out the Scheme of Defence I have proposed I beg to suggest that the available money should at once be spent in executing such portions of it as are essential for closing the harbour and securing the Dockyard from capture -

Protection from Bombardment can not in my opinion be obtained without constructing the batteries at
 M^cCauley's Point and Langster's
 Plains

Plains, but in default of these I would propose to utilize the 4 B.L. guns allotted to the defence by mounting them at Rodd Hill and Brother's Island

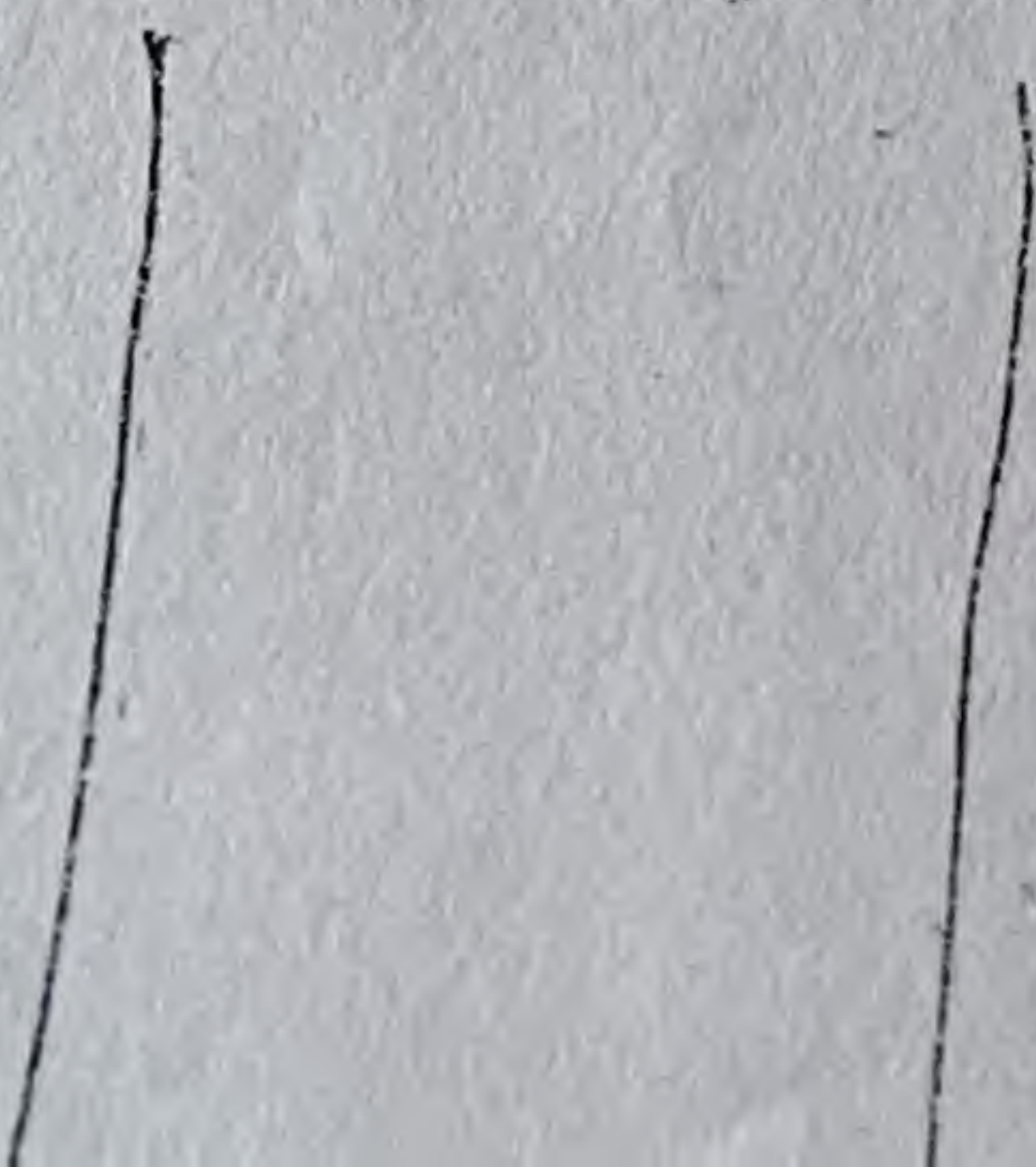
The construction of the S.M. M. Establishment and the possession of Signal Hill and carving it I consider essential

The construction of the emplacements for 7" and 64 P^{rs} at Signal Hill and for the 64 P^{rs} to defend the mine field must be deferred - the sites for these should be levelled to allow of field guns being used from them instead.

The construction of the bomb proof buildings for the Electric light Engine house and Test room in the Dockyard must also be deferred and I am informed that the necessity for having these buildings so close to the Electric light will in all probability be obviated at no distant date.

The armament, garrison and cost of these works will be as follows. -

Brother's Island



Brother Island

Garrison					Cost			
Armament	Description	R.A.	R.B.	Infantry.	£	s.	d.	
No. of Guns.								
2	29.2" Bl on disappearing carriages	40	nil	50	Battery	6790	0	0
1	64 P ^r					Land	nil	
<u>Road Hill</u>								
2	6" B.L.				Battery	12450	0	0
1	64 P ^r	45	nil	200		Land	410	0
1	Machine Gun							
<u>Dockyard</u>								
<u>Defence of mine field</u>								
2	6" B.L.				Batteries & Land	34460	0	0
4	16 P ^r s	40	50	150				
2	Matchless 7m guns							
<u>Signal Hill</u>								
4	16 p ^r s.				Scarp Battery	200	0	0
					Battery	200	0	0
1	Machine Gun	40	10	300	Land	9986	0	0

* Could largely be reduced by arbitration.

Submarine Mining
Establishment.

Cost £ 12800
 Land, see signal Hill £ —
 Total £ 12800

	R.A.	R.S.	Infantry
Total Garrison of Works.	165	90	600
Field force 4.16prs 4 machine guns	55	9	600
Total	220	90	1200

Total cost of minor scheme £23240-
 Probable time of completion } Say 1½ years
 with 2 Cos R.S. available for work
 Four 64prs. should be retained for
 future use.

The remainder of the armament
 allotted for Esquimault viz 3.4" R.M.K.
 and 4.9" R.M.L. Guns (now at McCauls
 Point) should be sent to Burrard Inlet
 to arm the one fort that will be
 necessary to defend the entrance

Remarks on the Defence of
 Burrard Inlet and suggestions
 for construction of a fort and
 of an Imperial Ordnance Depot

Although this subject was not
 comprised within ~~my~~ the scope
 of my instructions it is I
 consider so intimately connected
 with the question of the defence
 of Esquimault that I venture to submit
 the following remarks for consideration.
 I have.

I have already reported that I consider it necessary that a work should be constructed to defend the entrance to the harbour as otherwise in the absence of a sufficient Naval force, no amount of defences at Sequamalt would prevent a single hostile ship from destroying the terminus of the C.P. Railway with the accumulation of ships and stores that would probably be found there.

I regret that I was unable to remain long enough at this place to examine the ground, but nothing short of a contoured survey will give an accurate idea of its shape, for except the clearings that have been made for the town of Vancouver and near the Railway, the whole of the country visible from the harbour is covered with forest.

No contoured plans of the place exist and I was unable to obtain any map giving any better general idea of the country than the one from which tracing No 29 is taken.

On the South side of the 1st narrows the entrance is commanded by a rocky promontory about 120 feet high and having steep
inaccessibles

inaccessible sides towards the sea -
 from this the ground which is
 covered with trees appears to slope
 gradually towards False Creek
 and the town of Vancouver.

A Battery should be placed on
 this hill - Commanding the Narrows,
 firing into English bay and over
 Vancouver.

The work need not be a large one,
 and if only the lesser scheme I have
 proposed is to be carried out at once
 for Squimalt, I recommend the
 the 4. 9" R.M.L. Guns proposed to
 be sent for Rodd Hill and the
 3. 4" R.M.L. Guns now at McCaulay's
 Point, be mounted here. Many of
 the elaborate and expensive
 arrangements for magazine and
 shell accomadation requisite for
 other batteries might be temporarily
 dispensed with here as the site appears
 to afford such good natural cover.

I would strongly recommend
 that Lt. Lang R.E. who is now
 surveying at Squimalt, be directed
 to survey this Hill and submit a
 plan for the proposed work -

If it is intended to use the
 C.P. Railway as a line of Communications
 in time of War, with our possessions
 in the East, it appears to be necessary
 that

that the Imperial Government should at once acquire a site on the shore of Burrard Inlet which would serve as an Ordnance Depot and from which troops and stores could be embarked - It should be contiguous to the railway and at a point where deep water is obtainable for the transports to come alongside.

Such a depot is the more wanted as Esquimalt harbour our sole source of supply for Warlike stores for the Pacific Squadron is liable to be bombarded - and there is no site in it where such a depot could conveniently be made.

This brings me to a point which is perhaps an Admiralty rather than a War Office question but yet connected with the defence - viz Magazine accommodation.

A Bombproof Reserve powder magazine is required for reserve ammunition for the Fleet.

It is now stored in some light buildings on Magazine Island - but there is not a single bombproof building on it, and in the event of a land attack the whole stores might be blown up by a shell from the lightest field

field gun.

I had the island surveyed, see
plan No 24.

Plan No 24

There would be room for 2 or 3
large casemated chambers to be
made on this site.

If nothing is done for this purpose,
a reserve store magazine should be
made at Burrard Inlet -

There is one other point connected
with the military value of the C.P.
Railway as a line of communications
to which I would draw attention -
viz. the necessity of a regularly
organized force to be entirely
employed in guarding the
very numerous and important
bridges on this line -

Many of these structures are
of immense size, notably at
Jack Fish Bay (north of Lake
Superior), The Loop, and Ottertail
Bridge and Stony Creek Bridge
(in the Selkirk range) the latter
being supported on trestle work
240 feet high - they are all
constructed of timber and their
destruction as far as would be
necessary to interrupt traffic could
be most easily and rapidly
effected by one or two men and
a small quantity of Dynamite.

In.

In a war with Russia or indeed any Power anxious to prevent our using this line, it is not unreasonable to suppose that such action would be attempted by men coming from the United States ostensibly as miners.

An armed police to protect the line, would take several thousand men, but could probably be formed out of the men employed by the Railway on the different sections of the line.

The organization should however be determined on in peace time and the arms and equipment ready for issue before the declaration of war —

I have the honor to be

Sir

Your Obedient Servant

(S) E.D.C. O'Brien

Lt Col

5-2-84

C.R.E.

Cost of Works, Transport &c

	Cost of Works	Transport	Total
Macaulay's Point	16400	1200	17600
Rodd Hill	11600	840	12440
Saunders' Plains	30900	3862	34762
Brother's Island	6400	240	6940
Signal Hill	5100	300	5400
Mine Field	3300	250	3550
Sub-mining Establishment	12600	200	12800
Engine House	6000	300	6300
			£99822

Names and addresses of farms pland
recommended to be purchased by the Government

Where situated	Price per acre	Section or Lot.	Name of owner	Address.
Incaulay Point	\$500 ✓	S ² 11. Esquimalt District	The Puget Sound Agricultural Co. Agt. Alex ^o Munro Victoria	Victoria B.C.
Road Hill	\$200.	S ² 15	Mrs C. E. Young, owner. Paw & Peterson, Russell Drake, Helmekeu & Jackson.	Solicitors, Victoria.
Sauger's Plains	\$30	S ² 36.	J. Sauthey owner	Real Estate agt. Victoria
"	£13.	37, 38.	Lowenbuq & Karris, agt.	Victoria
"	£13.	35	A. Saunders, owner.	Victoria B.C.
"	\$50	" 16	J. J. Yates, agt.	Solicitor, Victoria.
\$25 or	\$12.50	" 34	W. Ward, owner.	Manager, Bank of B.C.
"	\$15	" 39	W. Helmekeu, owner.	Victoria
"	£13	" 38	A. Saunders, owner.	Victoria.
Signal Hill	\$750	Lot 19.	Donaldson, owner. Agt Alex ^o Munro.	Victoria, B.C.
no answer.	\$75	" 19	Mrs Seymour, agt. Drake, Jackson.	Solicitors, Victoria.
"	\$2000 ✓	" 32	Capt McKeau, owner. agt. W. Ward	Victoria B.C.
"	\$5,000 ✓	" 31	Williams	Victoria

Where Situated	Section or Lot.	Name of agent.	Address.
Signal Hill Continued	Lot 33 34.	C. Pasley, agt	Salicitor Victoria.
\$4000	29	Wm Rathwell owner.	Esquimalt B.C.
\$4000	29	Lowenburg & Harris	Real Estate Agents Victoria.
\$500	28	Lowenburg & Harris	Real Estate agents Victoria.

$$\begin{array}{r} 410 \\ 9980 \\ \hline 10,390 \end{array}$$

$$\begin{array}{r} 123 \\ 30 \\ \hline 3,690 \end{array}$$

128

$$\begin{array}{r} 200 \\ 10 \\ \hline 2000 \end{array}$$

$$\begin{array}{r} 4111 \\ 110 \\ \hline 41011 \end{array}$$

$$\begin{array}{r} 2700 \\ 21600 \\ \hline 24300 \end{array}$$

$$\begin{array}{r} 611210 \\ 61054 \\ 1235910 \\ 18910 \\ \hline 7692310 \end{array}$$

$$\begin{array}{r} 750 \\ 2000 \\ 5000 \\ 4000 \\ 4000 \\ 5000 \\ \hline 16250 \\ \hline 2708 \end{array}$$

$$\begin{array}{r} 986600 \\ 986300 \\ \hline 123599 \\ \hline 998659 \end{array}$$

Prices from Printed Report

		Cents
Excavation 1' to 2'	1/8 cube	35
Removal of same offside	"	40
Tunneling in Rock	"	\$600
Concrete	"	2.00
Brickwork	"	5.00
Granite	Cut foot	1.60
Sandstone	"	1.00
Timber piles	C foot	50
Portland Cement	Barrel	\$6.00
Blasting	per yard 2'	\$3.00
Lumber or Timber	per 1000	cup ft 1" thick
		10 to \$12.00

Prices from C.R. Men Books

Blasting in rock	C Yd	\$ 1.50
Excavation Hard gravel	"	.72
do Earth	"	.26
Coursed masonry	C Yd	\$ 11
Cement Concrete	"	\$ 7

Excavator	30 cents per hour
Foreman Mason	60
Masons	50
Bricklayer	50
Smith	50
Carpenter	50
do Laborer	40
Plumber	50
Painter	50
Stone Cut Drivers	75

Prices given
for
Maximum
Railway

Prices of Equipment
2.10

C. R. E.

Forwarded for information
of Lt Col O'Brien

By order

R. D. Lane

5/7/86

Lt Col
A. H. S.

[Faint, mostly illegible handwriting]

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[Faint handwriting]

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