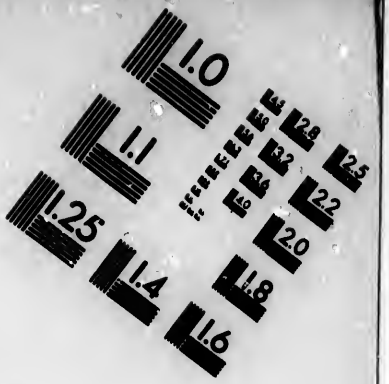
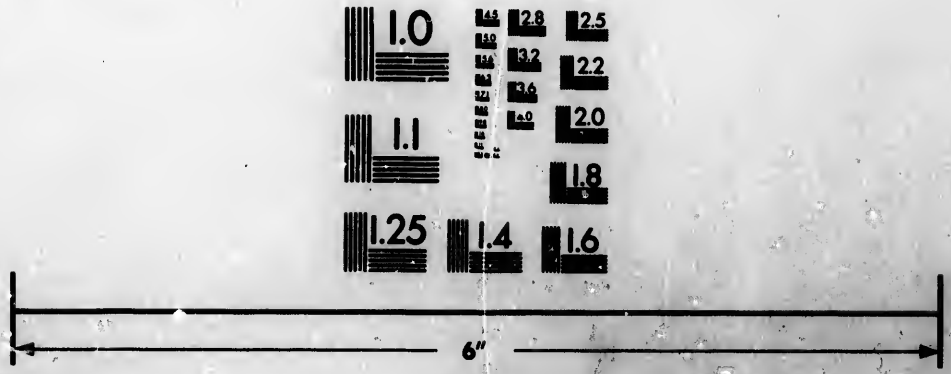


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☐ Bound with other material/ Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distortion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- ☐ Additional comments:/ Commentaires supplémentaires:

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☐ Includes supplementary material/ Comprend du matériel supplémentaire
- ☐ Only edition available/ Seule édition disponible
- ☐ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
					X						

The copy filmed here has been reproduced thanks to the generosity of:

Library of the Public Archives of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol → (meaning "CONTINUED"), or the symbol ▽ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:

L'exemplaire filmé fut reproduit grâce à la générosité de:

La bibliothèque des Archives publiques du Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole → signifie "A SUIVRE", le symbole ▽ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

REPORT

OF THE

SURVEY OF THE PROJECTED LINE

OF

RAIL ROAD

STANSTEAD TO MONTREAL;

WITH

ESTIMATES OF THE COST OF CONSTRUCTION.

BY WILLIAM P. CROCKER, CIVIL ENGINEER.

Montreal:

PRINTED BY LOVELL & GIBSON, SAINT NICHOLAS STREET.

1845.

REPORT

OF THE

SURVEY OF THE PROJECTED LINE OF RAIL ROAD

FROM

STANSTE[redacted] MONTREAL,

VIA

SHERBROOKE AND ST. HYACINTHE.

THE undersigned Engineer, employed in the Survey and Estimates of the proposed Rail Road from the Province Line at Stanstead to Montreal, has the honor to Report that, agreeably to the instructions received from the Provisional Committee, he proceeded to the exploration and survey of the route in question on the 25th July last, and succeeded in successfully completing the work at the St. Lawrence, at Longueuil, opposite Montreal, on the 28th October.

His instructions were, in the first instance, to commence his work on the line previously surveyed from the River Connecticut to Derby, at the Province Line; and to select the most favorable point for entering the Province, from thence, proceeding *via* Sherbrooke to Montreal.

An examination of the general features of the country between Stanstead and Sherbrooke, satisfied him that no insuperable natural obstacles need be anticipated; the country possessing a regular feature of gradual slopes, with vallies, affording favorable and very direct lines. To an Engineer it was evidently a country which would admit of the construction of a Rail Road, without objectionable grades—and though the undersigned has endeavoured to perfect his work as much as circumstances would admit, and has succeeded in tracing a practicable, and by no means a very expensive route—yet he is bound to admit that he believes, when the work is ultimately undertaken, a more elaborate investigation may relieve the work, as now estimated, of a very considerable charge.

The Eastern Townships appear in their natural features to be a gradual sinking down of the mountainous regions of Vermont and New Hampshire, on their approach to the great valley of the St. Lawrence. The range of the White Mountains extends about thirty miles into the Province east of Stanstead, ending in the great Megantic Mountain, and similarly on the west, the chain of the Green Mountains finds its terminus in the Orford range likewise extending about thirty miles to the northward. The district in Canada, lying between these respective high-lands, strikes from Stanstead northward to the St Francis at Sherbrooke, and though undulating in its character, appears to afford the most practicable line for avoiding the mountainou[redacted]s. Experience has shown that routes may be traced thro[redacted]ts as unfavorable as the Green Mountain range to the v[redacted]of the line drawn by the undersigned; but, in general, it is [redacted]ctice in the construction of Rail Roads, rather to choose that route which will pass through an easy and fertile country, even at the sacrifice of many miles distance, than to endeavor to overcome those obstacles which nature has interposed. The undersigned did not, therefore, consider himself required to draw the attention of the Committee to the propriety of exploring the shortest possible route, either generally, or in mere local cases, but has endeavored to select that which he believes will, on its construction, prove the most advantageous to the capitalist who may assume the inv[redacted]ment; with every confidence that proper management and judi[redacted]us economy will prove the attention and accuracy with which he has endeavored to determine the line.

Commencing about two and a half miles within the State of Vermont, the line of the Rail Road proceeds towards Canada at a grade of about 40 feet to the mile, crossing the Province Line at Rock Island near Stanstead, thence nearly straight through the Township of Barnston to Hatley, a distance of about twelve miles. This part of the line, as traced, is the most difficult and expensive of the entire route, but the undersigned has no hesitation in stating his belief, that a more favorable and much less expensive route can be traced by a short deviation to the westward.

On crossing the Province Line are found the flourishing villages of Rock Island and Stanstead Plain, both places of considerable importance, and carrying on an extensive and increasing trade, both with the States and the Provinces. The line passes through a highly cultivated country, and by the proposed alteration, it is presumed this section may be reduced to an average not exceeding that of the succeeding fifty miles of the line. The Estimates, framed strictly on the route as actually surveyed, will be found annexed, together with the different planes.

Passing into Hatley, the village of Charlestown is passed through from whence the line passes a distance of 11 miles to

Waterville, in Compton, a thriving and business-like place; from Waterville to Sherbrooke, a distance of 10 miles. This route is easy and not expensive.

Sherbrooke,—the capital of the Eastern Townships,—is at present a town of minor importance, as respects inhabitants, but a large and rapidly increasing business is carried on there. It possesses vast unemployed water-power, capable of almost unlimited extension, and must be an important station for the profitable operations of any Railway designed for the development of the resources of the Eastern Townships. It is most centrally situated at the junction of the only two rivers of importance in the country, and is the point where the leading [illegible] from Montreal, Sorel, Port St. Francis and Quebec, cent[illegible] ultimate prosperity must be great, and even now its business [illegible]d form a considerable item in the aggregate of that of the Eastern Townships.

Leaving Sherbrooke, the undersigned endeavoured to trace a line as nearly as practicable to the northern spur of the Green Mountains—known as the Orford Range; but finding expensive work would be required, if he considered saving of distance only, he finally decided on following the valley of the River St. Francis sufficiently to the northward to enable him to strike the almost table land extending from the rear of the Township of Melbourne to Montreal. With this view the line was continued through Orford and Brompton into Melbourne, (about fifteen miles,) from whence it curved off through Ely in nearly a straight direction for 35 miles to the external boundary of the Township of Milton and the Seigniory of St. Hyacinthe.

This portion of the line is very favourable in its general features, and by no means expensive in its construction.

From the Township of Milton to the Town of St. Hyacinthe, and thence to Longueuil, about 40⅔ miles, the line is nearly level, and highly favourable. The Town of St. Hyacinthe is a place of considerable importance, containing over 300 inhabited houses; it appears to be the centre and market town of a highly fertile and extensive agricultural district, and is also the terminus of a practicable steam navigation of over 20 miles, extending through the most densely peopled section of Canada. This place will, it is believed, be an important station for the Rail Road, and the undersigned feels himself warranted in having caused a slight deviation from the direct line, to subserve what he conceives to be an important object.

From St. Hyacinthe to Longueuil, crossing the River Richelieu at a favourable point near St. Hilaire, the line passes through a level and densely inhabited country, where the Rail Road can be constructed with the greatest facility and economy, and where it cannot fail to bring a beautiful agricultural district prominently before the notice of the public. At the point where it crosses the River Ri-

chelieu, it will be conneected with an important river navigation, communicating direct to New York and Quebec.

A general consideration of the results of the survey of the undersigned, will shew that the entire distance from the Province line at Stanstead to Longueuil is 123¾ miles, the estimated cost of which is £558,764 16s. 1d., and with no objectionable grade which cannot be avoided, while for many miles, the undersigned confidently asserts, that no Railway has been undertaken, shewing greater, if equal, facilities for its construction and support.

The undersigned has constructed his estimates on the scale of the best finished Rail Road in the United States, making due allowance for the difference in the cost of the [illegible]ral materials. Although at present but one line is designed, yet the necessary estimates are made for a double line. The wood and iron work has also been estimated at the cost of the most superior works of the kind; the T rail of 56lbs. to the yard has been adopted, being that now in use in the great English Rail Roads, and the best of those in the United States. Had the undersigned been desirous to restrict himself merely to the constructing of a Rail Road sufficient for a limited amount of traffic, he could have presented a much lower estimate; but in his opinion, it would be a most unwise course, to make so considerable an investment as must be required under any circumstances in an undertaking of such magnitude, without securing the construction of such a work as will be adequate to the vast amount of business which all merchants in New England anticipate must immediately ensue between two such rising cities as Montreal and Boston; the one, the terminus of the natural as well as artificial navigation of the St. Lawrence and the great lakes; the other, the connecting port between Great Britain and her Colony, and indisputably the mercantile capital and manufacturing centre of New England.

All which is respectfully submitted.

Wm. P. Crocker,
Civil Engineer, U. S.

ESTIMATES

OF THE

COST OF CONSTRUCTION.

TOWNSHIP OF STANSTEAD.

The line in this Township can be changed, so as to avoid the high summit near Peasley Pond, by taking a more westerly route, thereby avoiding a grade greater than 60 feet to a mile, and also the deep cutting at the summit. If the country is studied as it should be, in this the most difficult part of the route, a line may be obtained that will not cost more than three-fourths of the present estimates for this Township and the Township of Barnston.

Length of Line in this Township, 9.8 miles.

Substructure.

	£	s.	d.
Amount of excavation, 1,082,378 cubic yards, at 1s.* per yard,	54,118	18	0
Bridge over the Tomifobi River, 2,619 cubic yards masonry, at 12s. per yard,	1,571	8	0
7 culverts, 470 cubic yards masonry, at 9s. per yard,	211	10	0
6 cattle guards, 80 cubic yards,	36	0	0
10 do. passes, 300 do. do.	135	0	0
	£56,072	16	0

Superstructure.

20,342 cedar sleepers, at £1 10s. per 100,	305	2	7
78,450 feet 3-inch plank, at £3 per M.	235	7	0
5,812 chairs, at 16 lbs. a-piece, 92,992 lbs at 1d. per lb.	387	9	4
1,952,832 lbs. rail road iron, at 1d. per lb.	8,136	16	0
44,100 lbs. spikes, at £25 per ton,	980	0	0
Laying the superstructure,	492	3	9
Timber for 6 cattle guards and 10 cattle passes,	1	0	0
6,272 rods fence, at 6d. per rod,	156	16	0
Land damages, including land for the station-house at Stanstead, quantity 84 acres,	420	0	0
	£67,187	10	8

Average cost per mile, £6,855 17s. 5d.

*To cover the contingency of undiscovered rock, the mean cost of earth excavation is about 7½d. per yard.

Gradients.

				Feet.
2 level planes,				5,800
1 plane of 0.50 in 100, or 26.4 feet to a mile,				1,500
1	do.	0.75 in 100, or 39.6 do.	do.	3,400
1	do.	1 in 100, or 52.8 do.	do.	14,000
1	do.	1.5 in 100, or 79.2 do.	do.*	28,200

TOWNSHIP OF BARNSTON.

Length of Line in this Township, 2.386 miles.

Substructure.

	£	s.	d.
Amount of excavation, 500,000 cubic yards, at 9d. per yard,	18,750	0	0
Bridge over Nigger River, 3000 cubic yards common masonry, and 400 cub. yds. arched masonry,	2,100	0	0
2 culverts, 426 cubic yards masonry, 9s. per yard,	191	14	0
2 cattle guards, 30 cubic yards,	13	10	0
1 do. pass,	13	10	0
	£21,068	14	0

Superstructure.

Timber for 2 cattle guards and 1 cattle pass,	0	5	0
4,900 cedar sleepers, at £1 10s. per 100,	73	10	0
18,900 feet 3-inch plank, at £3 per M.	56	14	0
1,400 chairs, at 16 lbs. a-piece, 22,400 lbs. at 1d. per lb.	93	6	8
10,737 lbs. spikes, at £25 per ton,	119	16	8
470,400 lbs. rail road iron, at 1d. per lb.,	1,960	0	0
Laying the superstructure,	238	12	0
1,527 rods fence, at 6d. per rod,	38	3	6
Land damages,	20	0	0
Clearing the land,	30	0	0
	£23,699	1	10

Average cost per mile, £9,932 18s.

Gradients.

				Feet.
1 plane of 1.25 in 100, or 66 feet to a mile,				9,600
1	do.	0.75 in 100, or 39.6 do.	do.†	3,800

* May be avoided.

† This plane is partly in the Township of Hatley.

TOWNSHIP OF HATLEY.

Length of Line in this Township, 4.431 miles.

Substructure.

	£	s.	d.
Amount of excavation, 303,301 cub. yds. at 9s. per yd.	11,373	15	9
10 culverts, 543 cubic yards masonry, at 9d. per yard,	244	7	0
8 cattle guards, 140 cubic yards masonry, . .	63	0	0
4 do. passes, 120 do. do. . .	54	0	0
	£11,735	2	9

Superstructure.

Timber for 8 cattle guards and 4 cattle passes, .	0	15	0
9,331 cedar sleepers, at £1 10s. per 100, . .	139	19	3
36,000 feet 3-inch plank, at £3 per M. . .	108	0	0
2,666 chairs, at 16 lbs. a-piece, 42,656 lbs., at 1d. per lb.	177	14	8
19,939 lbs. spikes, at £25 per ton, . . .	222	10	8
895,776 lbs. rail road iron, ...	3,732	8	0
Laying the superstructure, ...	443	2	0
2,826 rods fence, at 6d. per rod, . . .	70	13	0
Land damages, 35⅓ acres, ...	176	13	4
	16,806	18	8
Incidental expenses, contingencies, &c., 10 per cent.	1,680	13	10
	£18,487	12	6

Average cost per mile, £4,172 6s. 8d.

Gradients

2 level planes,*	8,400
1 plane of 0.75 in 100, or 39.6 feet to a mile,	2,700
1 do. 1 in 100, or 52.8 do. do.	11,000

TOWNSHIP OF COMPTON.

Length of Line in this Township, 8.579 miles.

Substructure.

Amount of Excavation 970,462 cubic yards, at 9d. per yard, ...	36,392	6	6
13 culverts 1,050 cubic yards masonry, at 9s. per yard,	472	10	0
Protection walls at the Coaticook River, 1200 cubic yards masonry, at 12s. per yard, . .	720	0	0
4 cattle guards, 60 cubic yards, ...	27	0	0
4 do passes, 120 do do	54	0	0
Clearing land, ...	25	0	0
Amount carried over,	£37,690	16	6

* The last level plane is partly in the Township of Compton.

Superstructure.

	£	s.	d.
Amount brought over,	£37,690	16	6
Timber for 4 cattle guards and 4 cattle passes,	1	2	6
17,888 cedar sleepers, at £1 10s. per 100,	268	6	5
68,850 feet 3-inch plank, at £3 per M,	206	11	0
5,111 chairs, at 16 lbs. a-piece, 81,776 lbs., at 1d. per lb.,	340	14	8
38,605 lbs. spikes, at £25 per ton,	430	17	2
1,717,296 lbs. Rail Road Iron,	6,155	8	0
Laying the superstructure,	857	18	0
5,490 rods fence, at 6d. per rod,	137	5	0
Land damages, including land for station-house at Waterville,	350	0	0
	£46,438	19	3
Incidental expenses, contingencies, &c. 10 per cent,	4,643	17	11
	£51,082	17	2

Average cost per mile, £5,954 8s.

Gradients.

	Feet.
2 level planes,	4,400
1 plane of 0.50 in 100, or 26.4 feet to a mile,	1,800
1 do 0.75 in 100, or 39.6 do do	5,700
2 do 1 in 100, or 52.8 do do	12,500
1 do 1.35 in 100, or 71.28 do do	20,300

TOWNSHIP OF ASCOT.

Length of Line in this Township, 8.6+ miles.

Substructure.

Amount of earth excavation 252,862 yards, at 9d. per yard,	9,482	6	6
Amount of rock excavation 1600 cubic yards, at 5s. per yard,	400	0	0
Masonry in the bridge over Coaticook River, 1,035 cubic yards, at 12s. per yard,	621	0	0
Masonry in the bridge over Salmon River, 130 do do.	78	0	0
Ditto do do Massawippi do, 500 do do.	300	0	0
Masonry in 17 culverts, 1,002 cubic yards, at 9s. per yard,	450	18	0
Masonry in 18 cattle guards, 270 do do do.	121	10	0
Masonry in 8 cattle passes, 240 do do do.	108	0	0
Turning the road,	100	0	0
Clearing land,	25	0	0
Amount carried forward,	£11,686	14	6

Superstructure.

	£	s.	d.
Amount brought forward,	£11,686	15	6
18,356 cedar sleepers, at £1 10s. per 100, . .	275	6	10
70,800 feet plank, at £3 per M, ...	212	8	0
5,245 chairs, at 16 lbs. a-piece, 83,920 lbs., at 1d. per lb., ...	349	13	4
1,762,134 lbs. Rail Road Iron, at 1d. per lb., .	7,342	4	6
38,700 lbs. spikes, at £25 per ton, . . .	431	18	4
Laying the superstructure, ...	860	0	0
Bridge over the Coaticook River, . . .	425	0	0
Ditto do Salmon River, ...	300	0	0
Ditto do Massawippi River, . . .	680	0	0
Timber for 18 cattle guards and 8 cattle passes, .	2	17	6
5,500 rods fence, ...	137	10	0
Land damages, ...	375	0	0
	£23,078	13	0
Incidental expenses, contingencies, &c. 10 per cent,	2,307	17	4
	£25,386	10	4

Average cost per mile, £2,951 18s. 2d.

Gradients.

	Feet.
7 level planes, ...	16,500
3 planes of 0.50 in 100, or 26.4 feet to a mile,	4,800
8 planes of 0.75 in 100, or 39.6 do do	24,100

TOWNSHIP OF ORFORD.

Length of Line in this Township, 4.299 miles.

Substructure.

Amount of Excavation 202,000 cubic yards, at 9d. per yard, ...	7,575	0	0
Masonry in the bridge over Magog River 1,100 cubic yards, at 12s. per yard, ...	660	0	0
Masonry in 22 culverts, 1,025 cubic yards, at 9s. per yard, ...	461	5	0
Masonry in 14 cattle guards, 210 do do .	94	10	0
Masonry in 7 cattle passes, 210 do do .	94	10	0
Amount carried over,	£8,885	5	0

Superstructure.

	£	s.	d.
Amount brought over,	£8,885	5	0
Timber for 14 cattle guards and 7 cattle passes,	2	5	0
34,050 feet 3-inch plank, at £3 per M,	102	3	0
9,058 cedar sleepers, at £1 10s. per 100,	135	17	5
2,588 chairs, at 16 lbs. apiece, 41,408 lbs., at 1d. per lb.,	172	10	8
19,345 lbs. spikes, at £25 per ton,	215	18	1
869,866 lbs. rail road iron, at 1d. per lb.,	3,624	8	10
Laying the superstructure,	429	18	0
Bridge over the Magog River,	900	0	0
7,102 rods fence, at 6d. per rod,	177	11	0
Land damages,	560	3	10
	£15,286	0	10
Incidental expenses, contingencies, &c. 10 per cent,	1,520	12	1
	£16,726	12	11

Average cost per mile, £3,890 16s. 8d.

Gradients.

	Feet.
4 level planes,	6,700
5 planes of 0.50 in 100, or 26.4 feet to a mile*	14,200
2 planes of 0.75 in 100, or 39.6 do do	2,500

TOWNSHIP OF BROMPTON.

Length of Line in this Township, 11.098 miles.

Substructure.

Amount of Excavation 1,183,000 cubic yards,	59,150	0	0
2 large culverts 700 cubic yards, at 12s. per yard,	420	0	0
5 common do 461 do 9s. do	207	9	0
Clearing land,	225	0	0
Grubbing,	100	0	0
	£60,102	9	0

Superstructure.

49,941 lbs. spikes, at £25 per ton,	557	7	6
2,184,000 lbs. rail road iron, at 1d. per lb.,	9,100	0	0
Laying the superstructure,	1,109	16	0
Land damages,	67	10	0
Amount carried forward,	£70,937	2	6

* The last plane is partly in the Township of Brompton.

	£	s.	d.
Amount brought forward,	£70,937	2	6
22,750 cedar sleepers, at £1 5s. per 100, . .	284	7	6
87,900 feet 3-inch plank, at £3 per M, . .	263	14	0
6,500 chairs, at 16 lbs. apiece, 104,000 lbs., at 1d. per lb., ...	433	6	8
	£71,918	10	8
Incidental expenses, contingencies, &c. 10 per cent,	7,191	17	1
	£79,110	7	9

Average cost per mile, £7,128 7s.

Gradients.

	Feet.
2 level planes, ... ; .	5,400
2 planes of 0 50 in 100, or 26.4 feet to a mile,	2,400
1 plane of 0.75 in 100, or 39.6 do do .	1,500
3 planes of 1 in 100, or 52.8 do do .	18,600
1 plane of 1.15 in 100, or 60.72 do do .	4,300
1 plane of 1.35 in 100, or 71.28* do do .	16,000
1 plane of 1.50 in 100, or 79.20† do do .	17,300

TOWNSHIP OF MELBOURNE.

Length of Line in this Township, 11.685 miles.

Substructure.

Amount of excavation 1,183,769 cubic yards, at 1s.‡ per yard, ...	59,188	9	0
Masonry in the Bridge over Salmon River 500 cubic yards at 12s. per yard, ...	300	0	0
Do do Miller Creek 324 do do do	194	8	0
Do do Mill Creek 145 do do do	87	0	0
Do do Mud Brook 40 do 9s. p. yd.	18	0	0
Masonry in 25 culverts, 1870 cub. yards at 9s. per yd.	841	10	0
Do do 14 cattle guards, 210 cubic yards at 9s. per yard, ...	94	10	0
Clearing land, ...	225	0	0
Grubbing, ...	150	0	0
Amount carried over,	£61,098	16	0

*This plane is partly in the Township of Melbourne.

†The route in this Township can be made less expensive by crossing Key and Wakefield Hill Brooks, farther to the south, and then proceeding to the northward of the present line to a much lower summit than has been obtained, thereby reducing the grade to about 60 feet to a mile.

‡ To cover the contingency of undiscovered rock.

Superstructure.

	£	s.	d.
Amount brought over,	£61,098	16	0
93,450 feet 3-inch plank at £3 per M.,	280	7	0
24,227 cedar sleepers at £1 5s. per 100,	302	16	9
6,922 chairs at 16 lbs. a piece, 110,652 lbs. at 1d. per lb.	461	9	4
52,582 lbs. spikes at £25 per ton,	586	17	0
2,325,792 lbs. rail road iron at 1d. per lb.	9,690	16	0
Laying the superstructure,	1,168	10	0
Bridge over Salmon River,	200	0	0
Do do Miller Creek,	100	0	0
Do do Mud Brook,	10	0	0
Timber for 14 cattle guards,	1	10	0
300 rods fence at 6d. per rod,	7	10	0
Land damages,	71	5	0
	£73979	18	1
Incidental expenses, contingencies &c. 10 per cent,	7,397	19	10
Average cost per mile £6,964 6s.	£81,377	17	11

Gradients.

	Feet.
4 level planes,	9,800
3 planes of 1 in 100 or 52,80 feet to a mile,*	15,300
1 plane of 0.50 in 100 or 26.4 feet to a mile,	800
1 do do 1.15 in 100 or 60.72 feet to a mile,	8,300
5 planes of 0.75 in 100 or 39.6 feet to a mile,	11,900
1 plane of 1.25 in 100 or 66 feet to a mile,	8,300

TOWNSHIP OF ELY.

Length of Line in this Township, 7.538 miles.

Substructure.

Amount of Excavation 167,300 cubic yards at 1s. per yard,	8,365	0	0
Masonry in the Bridge over Moose River, 410 cubic yards at 12s. per yard,	246	0	0
Masonry in tthe Bridge over the south branch of the Lamoile River, 136 cubic yards,	81	12	0
Masonry in the Bridge over Lamoile River, 250 cubic yards,	150	0	0
Masonry in 10 culverts, 549 cub. yards at 9s. per yd.,	247	1	0
Clearing land,	150	0	0
Grubbing,	150	0	0
Amount carried forward,	£9,389	13	0

* Partly in the Township of Ely.

Superstructure.

	£	s.	d.
Amount brought forward,	£9,389	13	0
59,700 feet 3-inch plank at £3 per M.,	179	2	0
15,470 cedar sleepers at £1 5s. per 100,	193	7	6
4,420 chairs at 16 lbs. a-piece, 70,720 lbs. at 1d., per lb.,	294	13	4
33,921 lbs. spikes at £25 per ton,	378	11	8
1485,120 lbs. rail road iron at 1d. per lb.,	6188	10	0
Bridge over Moose River,	10	0	0
Do do the south branch of the Lamoile River,	10	0	0
Do do Lamoile River,	15.	0	0
Laying the superstructure,	7,153	16	0
Land damages,	45	0	0
	£18,457	13	6
Incidental expenses contingencies &c. 10 per cent,	1746	05	4
Average cost per mile, £2547 14s.	£9,0203	10	0

Gradients.

	Feet.
4 level planes,	11000
1 plane of 0.50 in 100 or 26.4 feet to a mile	4400
2 planes of 1 in 100 or 52.8 feat to a mile	5500
2 do do 1.15 in 100 or 60.72	17900

TOWNSHIP OF ROXTON.

Length of Line in this Township, 10,145 miles.

Substructure.

Amount of Excavation 664,300 cubic yards at 1s. per yard,	33,215	0	0
Masonry in the Bridge over Lamoile River, 750cubic yards at 12s. per yard,	450	0	0
Masonr in the Bridge over Black River, 3,424 cubic yards. , ,	2054	8	0
Masonry in the Bridge over White River, 61 cubic yards,	36	12	0
Masonry in 11 culverts, 960 cub. yds. at 9s per yd.,	432	0	0
Do do 6 cattle guards, 90 cubic yards at 9s. per yard,	40	10	0
Clearing land,	202	10	0
Grubbing,	150	0	0
Amount carried over,	£36,581	0	0

Superstructure.

	£	s.	d.
Amount brought over,	£36,381	0	0
Bridge over Lamoile River,	15	0	0
Do do Black River	250	0	0
Do do White River,	3	0	0
Timber for 6 cattle guards,		15	0
81,247 feet plank at £3 per M.,	243	14	10
21,063 cedar sleepers at £1 5s. per 100,	263	5	9
6,018 chairs at 16 lbs. a piece, 98,288 lbs. at 1d. per lb.,	401	4	0
45,652 lbs. spikes at £25 per ton,	509	10	2
1348,032 lbs rail road iron at 1d. per lb.,	5616	16	0
Laying the superstructure,	1014	10	0
Land damages,	60	15	5
	£44,959	10	1
Incidental expenses, contingencies, &c., 10 per cent,	4,495	19	1
Average cost per mile £4,874 17s. 1d.,	£49,455	9	10

Gradients.

	Feet.
3 level planes,	5200
1 plane of 0 75 in 100 or 39 6 feet to a mile,	5700
2 planes of 1 in 100 or 52.8 do do	13,100
5 planes of 1 15 in 100 or 60.72 do do	20,300
3 plane of 1.25 in 100 or 66, do do	84,00

TOWNSHIP OF MILTON.

Length of Line in this Township, 6.014 miles.

Substructure.

Amount of Excavation, 298,526 cubic yards, at 9d. per yard,	11,194	14	6
Masonry in the Bridge over Black River, 500 cubic yards, at 12s. per yard,	300	0	0
Masonry in 2 culverts, 102 cubic yards,	45	18	0
Clearing land,	96	0	0
Grubbing,	50	0	0
Amount carried forward,	£11,686	12	6

Superstructure.

	£	s.	d
Amount brought forward,	£11,686	12	64
Bridge over Black River, ...	800	0	0
48,690 feet, 3-inch plank, at £3 per M, . .	146	0	0
12,614 cedar sleepers, at £1 5s. per 100, . .	157	13	6
3,604 chairs, at 16 lbs. a piece, 5,7664 lbs. at 1d. per lb.	240	5	4
27,063 lbs. spikes, at £25 per ton, . . .	302	0	10
1,210,944 lbs. rail-road iron, at 1d. per lb. . .	5,045	12	0
Laying the superstructure, ...	601	8	0
Land damages, ...	36	0	0
	19,015	10	2
Incidental expenses, contingencies, &c.,10 per cent,	1,901	11	0
	£20,917	1	2

Average cost per mile, £3,478 0s. 1d.

Gradients.

	Feet.
1 level plane, ...	2,700
3 planes of 0.75 in 100 or 39.6 feet to a mile,	20,000
1 plane of 0.65 in 100, or 34.32,* . .	14,500

SEIGNIORY OF ST. HYACINTHE.

Length of Line in this Seigniory, 23.64 miles.

Substructure.

Amount of Excavation, 343,367 cubic yards, at 9d. per yard, ...	12,876	5	3
Masonry in the Bridge over Yamaska River, 700 cubic yards, at 12s. per yard, . . .	420	0	0
Do in 9 culverts, 410 cubic yards, at 9s. per yard, ...	184	10	0
Do in 40 cattle guards, 600 cubic yards, at 9s. per yard, ...	270	0	0
Do in 20 do passes, 600 do do do	270	0	0
Amount carried over,	£14,020	15	3

* Partly in the Seigniory of St. Hyacinthe.

Superstructure.

	£	s.	d.
Amount brought over, £	14,020	15	3
Bridge over the Yamaska River, ...	1,500	0	0
Timber for 40 cattle guards and 20 cattle passes, .	7	3	0
188,128 feet, 3-inch plank, at £3 per M, . .	564	7	8
48,776 cedar sleepers, at £1 10s. per 100, . .	731	12	10
106,380 lbs. spikes, at £25 per ton, . . .	1,187	5	6
13,936 chairs, at 16 lbs a piece, 222,976 lbs at 1d. per lb,	929	1	4
4,682,309 lbs. rail road iron, at 1d. per lb., . .	19,509	12	5
Laying the superstructure, ...	236	8	0
15,129 rods fence at 1s. per rod, ...	756	9	0
Land damages, ...	725	0	0
	40,167	15	0
Incidental expenses, contingencies, &c. 10 per cent,	4,016	15	6
	44,184	10	6

Average cost per mile, £1869 1s. 2d.

Gradients.

	Feet.
7 level planes, ...	21,900
1 plane of 0.05 in 100 or 2.64 feet to a mile,	2,000
2 planes of 0.075 in 100 or 3.96 do do	7,000
4 do 0.1 in 100 or 5.28 do do	9,000
2 do 0.15 in 100 or 7,92 do do	2,000
1 plane of 0.225 in 100 or 11.88 do do	1,000
2 planes of 0.25 in 100 or 13.20 do do	4,200
1 plane of 0.50 in 100 or 26.40 do do	3,300
3 planes of 0.75 in 100 or 39.60 do do *	9,400
3 planes of 1 in 100 or 52.80 do do	21,900

SEIGNIORY OF ST. CHARLES.

Length of Line in this Seigniory, 0.761 miles.

Substructure.

Amount of excavation, 36,884 cubic yards at 9d. per yard, ...	1,383	3	0
Masonry in the Bridge over Huron River, 20 cubic yards at 9s. per yard, ...	9	0	0
Do do 4 cattle guards 60 cubic yards, at 9s. per yard, ...	27	0	0
Do do 2 cattle passes, ...	27	0	0
Amount carried forward,	1446	3	0

* The last plane is partly in the Seigniory of St. Charles.

Superstructure.

Amount brought forward,	£1446	3	0
Timber for the Bridge over Huron river and 4 cattle guards and 2 cattle passes, . . .	0	15	0
60283 feet 3 inch plank, at £3 per M, . . .	180	18	11
1563 cedar sleepers, at £1 15s. per 100, . .	27	7	0
446 chairs, at 16 lbs. a piece, 7136 lbs. at 1d. per lb.	29	14	8
150,043 lbs. rail road iron, at 1d. per lb. . .	625	3	7
Laying the superstructure, ...	76	2	0
487 rods fence, ...	24	7	0
Land damages, ...	22	5	0
	2432	16	2
Incidental expenses, contingencies, &c., 10 per cent.	243	5	7
	2,676	1	9

SEIGNIORY OF ROUVILLE.

Length of Line in this Seigniory, 4.82.

Substructure.

Amount of excavation, 96,000 cubic yards, at 1s. per yard.	4,800	0	0
Masonry in the bridge over Richelieu river, 1,900 cubic yards at 12s. per yard, . . .	1140	0	0
Crib work for the piers, ...	100	0	0
Masonry in 8 cattle guards, 120 cubic yards at 9s. per yard, ...	54	0	0
Do do 4 do passes, do do do	54	0	0
Do do 7 culverts, 794 cubic yards do do	357	6	0
	6,505	6	0

Superstructure.

Bridge over the Richelieu river, ...	4,000	0	0
Timber for 8 cattle guards and 4 cattle passes, .	1	10	0
38,170 feet 3-inch plank at £3 per M., . . .	114	10	0
9,898 cedar sleepers, at £1 15s. per 100, . .	173	4	3
21,690 lbs. spikes, at £25 per ton, ...	242	1	6
2,828 chairs at 1 6 lbs a piece, 45,248 lbs at 1d. per lb.	188	10	8
950,021 lbs. rail road iron, ...	3,958	8	5
Laying the superstructure, ...	482	0	0
3,084 rods fence, ...	154	4	0
Land damages, ...	145	0	0
	15964	14	10
Incidental expenses, contingencies, &c. 10 per cent,	1,596	9	6
	17,561	4	4

Average cost per mile, £3,643 8s.

Gradients.

					Feet.	£	s.	d.
2 level planes,					6,000			
1 plane of 0.05 in 100 or 2.64 feet to a mile,					2,000			
1	do	0.075 in 100 or 3.96	do	do*	3,000			
1	do	0.30 in 100 or 15.84	do	do	3,000			
1	do	0.5 in 100 or 26.40	do	do	1.300			
1	do	1 in 100 or 52.8	do	do	10,300			

SEIGNIORY OF BELŒIL.

Length of Line in this Seigniory—1.95 miles.

Substructure.

Amount of Excavation, 26,778 cubic yards, at 1s. per yard,	1,338	18	0
Masonry in 3 culverts, 176 cubic yards, at 9s. per yard,	79	4	0
Masonry in 4 cattle passes, 120 cubic yards, at 9s. per yard,	54	0	0
Masonry in 4 cattle guards, 60 cubic yards, at 9s. per yard,	27	0	0
	1,499	2	0

Superstructure.

Timber for 4 cattle guards and 4 cattle passes,	1	0	0
81,623 feet, 3-inch plank, at £3 per M.,	24	9	8
4,228 cedar sleepers, at £1 15 per 100.	73	19	10
1,208 chairs, at 16lbs a piece, 19,328 lbs, at 1d. per lb.	80	10	8
8,775 lbs spikes, at £25 per ton,	97	18	8
406,425 lbs rail road iron,	1,693	8	9
Laying the superstructure,	195	0	0
1,246 rods fence, at 1s. per rod,	62	6	0
Land damages,	70	0	0
	3,797	15	7
Incidental expenses, contingencies, &c., 10 per cent,	379	15	7
	4,177	11	2

Average cost per mile, £2,142 6s. 8d.

* This plane is partly in the seigniory of St. Charles.

Gradients.

	Feet.
2 level planes,	7,800
1 plane of 0,15 in 100, or 7.92 to a mile,	1,000
1 do of 0,25 in 100, or 13.20 do	1,200
1 do of 0,75 in 100, or 39.60 do	1,400

SEIGNIORIES OF CHAMBLY, MONTARVILLE AND LONGUEUIL.

Length of line in these Seigniories, 13.95

Substructure.

	£	s.	d.
Amount of Excavation, 146,832 cubic yards, at 1s. per yard,	7,341	12	0
Masonry in 3 culverts, 60 cubic yards, at 9s. per yard,	27	0	0
Masonry in 12 cattle guards, 180 cubic yards at 9s. per yard,	81	0	0
Masonry in 6 cattle passes, 180 cubic yards, at 9s. per yard,	81	0	0
	7,530	12	0

Superstructure.

Timber for 12 cattle guards and 6 cattle passes,	1	17	6
111,400 feet plank, at £3 per M.	334	4	0
28,882 cedar sleepers, at £1 15 per 100,	505	8	8
8,252 chairs at 16 lbs a piece, 132,032 lbs at 1d. per lb.,	550	2	8
62,775 lbs spikes, at £25 per ton,	700	12	3
2,772,672 lbs rail road iron, at 1d. per lb.	11,552	16	0
Laying the superstructure,	1,395	0	0
8,930 rods fence,	446	10	0
Land damages,	420	0	0
	23,437	3	1
Incidental expenses, contingencies, &c., 10 per cent,	2,343	14	4
	25,780	17	5

Average cost per mile, £1,848 1s. 10d.

Gradients

	Feet.
9 level planes	28,200
3 planes of 0.05 in 100, or 2.64 feet to a mile,	3,000
1 plane of 0.075 in 100, or 3.96 do do.	6,000
3 planes of 0.1 in 100, or 5.28, do do.	8,600
1 plane of 0.14 in 100, or 7.392 do do.	1,000
3 planes of 0.15 in 100, or 7.92 do do.	4,000
1 plane of 0.25 in 100 or 13.20 do do.	1,000
1 do do 0.30 in 100 or 15.84 do do.	1,000
1 do do 0.35 in 100 or 18.48 do do.	1,000
3 planes of 0.40 in 100 or 21.12 do do.	8,000
2 planes of 0.50 in 100 or 26.40 do do.	3,200
1 plane of 0.60 in 100 or 31.68 do do.	4,000
1 plane of 0.65 in 100 or 34.32 do do.	1,000
1 plane of 0.75 in 100 or 39.60 do do.	2,600

SUMMARY.

	£	s.	d.
Cost of construction of the Rail-Road through the Township of Stanstead, ...	67,187	10	8
Do. do. Township of Barnston,	23,699	1	10
Do. do. do. Hatley,	18,487	12	6
Do. do. do. Compton,	51,082	17	2
Do. do. do. Ascot,	25,386	10	4
Do. do. do. Orford,	16,726	12	11
Do. do. do. Brompton,	79,110	7	9
Do. do. do. Melbourne,	81,377	17	11
Do. do. do. Ely,	19,203	8	10
Do. do. do. Roxton,	49,455	9	10
Do. do. do. Milton,	20,917	1	2
Do. do. Seigniory of St. Hyacinthe,	44,184	10	6
Do. do. do. St. Charles;	2,676	1	9
Do. do. do. Rouville,	17,561	4	4
Do. do. do. Belœil,	4,177	11	2
Do. do. Seigniories of Chambly, Montarville, and Longueuil,	25,780	17	5
Amount carried forward,	£537,014	16	1

FURNITURE OF THE ROAD.

	£	s.	d.
Amount brought forward,	£537,014	16	1
6 locomotive engines, ...	10,500	0	0
Cars, ...	5,250	0	0
Station Houses, ...	6,000	0	0
Total outlay of capital, . . .	558,764	16	1

Respectfully submitted by

Wm. P. Crocker,

Civil Engineer, U. S.