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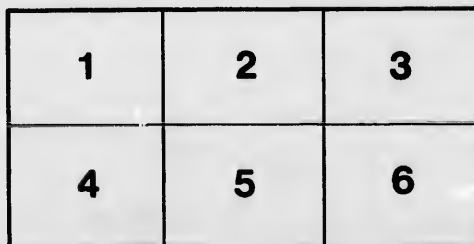
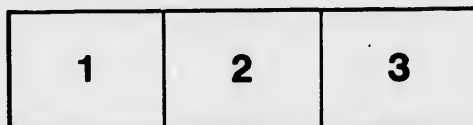
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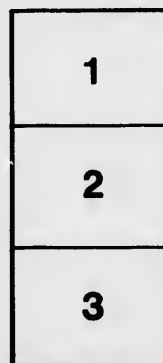
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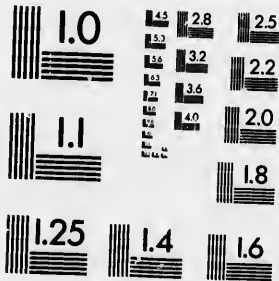
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CAPE BRETON RAILWAY.

SPECIFICATION FOR THE CONSTRUCTION OF THE WORK.

GENERAL.

1. This specification refers to the works of construction and materials required in making and building the railway as comprehended by the contract, comprising clearing, close cutting, grubbing, cross-logging, fencing, excavation, draining, ditching, foundation works, waterways, public road crossings, farm road crossings, road and stream diversions, embankments, bridges, viaducts, culverts and retaining walls, concrete, paving, pitching, rip-rap, crib-work, stream tunnels, ties and track spikes, taking delivery of the rails, fish plates and bolts at ship's rail at ballasting, track-laying, points, crossings, switches, signals, turnouts, sidings, station buildings, engine houses, turntables, water tanks, and water services, with the requisite machinery and fittings, and all other works of every description which may be necessary for the entire completion of the work according to the following specification, profiles and drawings hereto attached, and also the maintenance of all the works during their construction and until the final estimate is issued and the works formally accepted as complete by the Minister of Railways and Canals. The Contractor shall enclose all the ground as delivered to him by the Minister of Railways and Canals for the purposes of this contract with a good fence, and shall keep the same enclosed during the progress of the works until the termination of the contract, including the period for maintenance of the works, so as effectually to preserve the adjoining land from trespass and prevent any injury whatever to any parties by reason of the want of sufficient fences to separate their lands from the works, and the Contractor shall be wholly responsible for all damages to crops and all the consequences of insufficient fencing. Directions will be given at the proper time, as to the extent of ground required to be cleared, close cut and grubbed.

CLEARING, &c.

2. Where the railway passes through wooded sections, the land shall be cleared to the width of 66 feet on each side of the centre line, or such further width as may be ordered by the Engineer; also, for a width of 300 feet on each side of the centre line at stations, for a length of 2,000 feet, or such other dimension as may be

Clearing.

ordered by the Engineer. The clearing shall be done so that all the brush, logs and other loose material within its limits shall be burned or removed. No case shall any of the brush or logs be cast back upon the adjacent timber lands; they shall invariably be made into piles near the centre of the space to be cleared, and if not removed for fuel or otherwise used, they shall be entirely consumed. All brush or trees accidentally or otherwise thrown into the adjacent woods, shall be dragged out and burned or removed. The land shall be left in a clean condition.

Close
cutting.

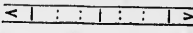
3. Where embankments are to be formed less than 4 feet or more than 2 feet in height, all the standing timber and stumps shall be chopped close to the ground, within the limits of the embankment, and burned.

Grubbing.

4. Where excavation other than borrow pits and ballast pits will not exceed three feet in depth, or embankments two feet in height, all stumps shall be grubbed out, and if possible, burnt; those that will not burn shall be carried beyond the limits of the cuttings and embankments, and there piled.

FENCING.

Fencing.

5. The Contractor shall construct a barbed wire fence in wooded portions of the line, and an Everett lath and wire fence in cleared parts, throughout the line of the railway grounds, as per drawing No. 3. Sills shall be of round cedar, 6 inches at the smallest end, 9 feet long, and sunk in the ground 6 inches. Posts shall be of round cedar, 6 inches at the smallest end and 5 feet long. Braces shall be of round cedar, 5 inches at the smallest end and three and a half feet long. The posts shall be placed 10 feet apart between centres, dovetailed 2 inches into the side of sills and fastened with two 6-inch spikes. The small end of post shall be placed uppermost. The braces shall be let into the posts and sills 2 inches, and fastened with two 6-inch spikes at each end. There shall be a top board 5 inches wide and one and one-half inches thick, spiked vertically to the top of the posts, on the side farthest from the track, for the barbed wire fence, and behind the second wire from the top for the Everett fence, which board shall be let into the posts the thickness of itself, and secured with two 4-inch cut spikes in each post. The top boards shall be 20 feet long, and shall be fastened as above, or they may be 15 feet long and spliced on one side, with a 1-inch piece 2 feet long fastened with eight $3\frac{1}{2}$ inch steel nails clinched thus:  Four best galvanized barbed wires shall be stretched on the farthest side of the post from the track, and properly secured with staples to each post. Each wire shall be of two twisted strands, and each barb shall have four points. Straining posts shall be put in every 200 feet, and the fence drawn up tightly; these posts shall be sunk in the ground not less than 4 feet; they shall be braced both ways from the top of the post to the foot of the adjoining posts, with 5-inch round cedar braces, and shall be fastened with two 6-inch spikes at each end. The gate posts shall be placed on sills and braced in one direction to the foot of the nearest post. The Contractor shall remove the bark from posts, sills and braces, and burn the same on railway lands.

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GRADING.

6. Under this term is included all excavations, embankments and surface Grading, forming, whatever may be the materials, and whether the same be required for the line of railway, or for the diversion of forming or water-courses, roads, approaches to bridges or level crossings, draining and off-take ditches, station grounds and all other works, contingent upon, or relating to excavations and embankments, as required by the nature of the contract or described in this specification.

7. In woodland the grading shall be commenced after the clearing, close-cutting and grubbing required is completed to the satisfaction of the Engineer. Time of commencement.

8. The red line on the profile exhibited, according to drawing No. 2 indicates Profile. the formation level, that is, the surface of the tops of embankments and the bottoms of cuttings previous to the laying and ballasting of the permanent way. The black undulating line represents the present surface of the ground, and the blue line the level of the top of the rail which is 22 inches above formation level.

9. The cuttings shall be formed to the cross section exhibited, according to drawings Nos. 4 and 5. The width at formation level shall be 22 feet, and the inclination of the slopes in earth shall be, as a rule, one and a half horizontal to one perpendicular. In gypsum and other rock cuttings the slopes shall be, as a rule, one horizontal to four perpendicular. In cuttings partly earth and partly rock, a berm of four feet shall be left on the surface of the rock. But these proportions may be varied by the Engineer to suit the nature of the materials to be excavated and insure the stability of the slopes. The Contractor shall not take out nor be paid for rock, nor any other excavation beyond the specified slopes, without an express order, in writing, from the Engineer. In the event of a slide in a cutting after it is formed, the Contractor shall remove the debris, and be paid for it as loose rock or as earth, according to the class to which it may appear to the Engineer to belong. Cuttings.

10. The whole of the grading shall be carefully formed to the levels given and the roadway in cuttings shall invariably be rounded and left at not less than six inches lower at the sides than in the centre. There shall be a side ditch at the foot of each slope throughout the whole length of the earth cuttings, the bottom of which shall be kept 12 inches below the roadway on the centre line, and lower if necessary, with a fall towards the ends of the cuttings so as to thoroughly drain the same. The cuttings shall be widened a little at the ends, and these ditches shall be carried into the ditches at the sides of the embankments, so as not to injure the latter. In rock cuttings a water channel about two feet wide and eight inches deep shall be formed at the foot of each slope. Side ditches in cuttings.

11. In very wet cuttings, arising from springs or soakage, drains shall be formed at the foot of the slopes, averaging not less than four feet deep, formed with a bed of three cedar poles not less than two inches in diameter at the small end, laid breaking joint in the bottom of the trench and then filled up with coarse gravel or broken Drains in cuttings.

stone the size of ordinary road metal. In level cuttings the trenches shall be dug to a greater depth than four feet at the ends, so as to give sufficient flow for the water.

Catch water drains.

12. Ditches shall be formed at one or both sides of the cuttings, as the inclination of the ground may require, so as to exclude from them any water draining off or flowing from the adjoining lands. They shall not be nearer than twenty feet from the top of the slopes, unless otherwise ordered by the Engineer, and shall be graded to such depths as to carry the water clear of the cutting and into the ditches at the sides of the embankments, or to the nearest water course.

Slope drains.

13. The cuttings shall, in all cases, during the progress of the work as well as afterwards, be kept perfectly dry; and whenever the slopes are wet and the material seriously affected by springs, soaks, heavy rains or thaws, they shall be thoroughly drained by forming oblique drains up the slopes, not less than three feet deep, and at such intervals as the Engineer may direct; such drains shall be filled with broken stone or coarse gravel the size of ordinary road metal.

Excavation.

14. All excavation in cuttings and all open ditches in cuttings or elsewhere, and all excavations required for turning, making, or changing water-courses or off-take ditches, stripping of ballast pits and all other excavations such as may be required for public road crossings or diversions, or in grading depot grounds, sidings, turnouts or branches, and so much of ordinary foundation pits for bridges and culverts as are not under the level of the water, shall be considered as a necessary part of the excavation for the formation of the road-bed, and shall be executed and the material deposited according to the direction of the Engineer, and will be paid for at the same rate per cubic yard as the ordinary excavation, according to its class. In foundation pits where pumping becomes necessary, all the excavation under water level shall be measured, and reckoned at three times the price of earth excavation.

Classification.

15. Excavation will be classed under five heads, viz: Solid rock, gypsum rock, loose rock, borrow pits and earth and will be paid for according to the following definitions:

1st. Stones and boulders, except in borrow pits, measuring more than twenty-seven cubic feet, and all solid quarry rock, shall be termed solid rock excavation.

2nd. Solid quarry gypsum, except in borrow pits, shall be termed gypsum rock.

3rd. Stones and boulders, except in borrow pits, measuring more than fourteen cubic feet and less than twenty seven cubic feet, and all bed rock *in situ* that can, in the opinion of the Engineer, be removed with facility by hand, pick and bar without the necessity of blasting shall be termed loose rock excavation.

4th. All excavations in borrow pits will be classed as borrow pit excavation.

5th. All other excavation of whatever kind shall be termed earth excavation.

Haul.

16. The contract prices in the schedule for these several classes of excavation, except such as are moved by engine and cars, shall be taken to include the whole cost of haul up to twelve hundred feet. For every hundred feet of haul over twelve

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hundred feet the Contractor will be allowed at the rate of $\frac{1}{4}$ of a cent per cubic yard. The contract prices in the schedule for these several classes of excavation as are moved by engine and cars, shall be taken to include the whole cost of haul.

17. The contract price for loose rock includes the cost of piling it in the cuttings in proper and suitable form for measurement. All stones and boulders classed as loose rock shall be piled in the cuttings and there measured by the Engineer previously to being removed by the Contractor, and in the event of the Contractor removing any such stones and boulders without their having been previously piled and measured, he shall forfeit all claims to payment for the same as loose rock. Piling loose rock.

18. The embankments shall be made up with the materials from the lime cuttings, from foundations of structures, from road diversions and from side ditches, except where otherwise directed, when these are insufficient, the line cuttings will be widened, or materials procured from borrow pits. No materials shall be placed in the embankments unless approved by the Engineer; no stumps, logs or other perishable or unsuitable material shall be used, and no material shall be supplied without his concurrence until the cuttings are completed. All borrow pits shall, if required by the Engineer, be dressed to a good slope and properly drained. Borrow pits.

19. The ditches at the sides of the embankments shall be cut with slopes not steeper than one and half horizontal to one perpendicular. The top of the slopes nearest the railway shall not be less than six feet from the foot of the embankments. These ditches shall be graded so as to carry off the water to the next natural water course, and where there is so much water as to form a strong current, the ditch shall be formed as far from the embankment as the Engineer may deem necessary for the safety of the latter. In some cases where the land is subject to a shallow overflow borrow pits may be dug at intervals, but not nearer to the embankment than 25 feet. No continuous ditch with be allowed. Side ditches.

20. Where drainage cannot be conveniently carried off by the side ditches, it will be necessary to excavate off-take ditches to a considerable distance beyond the limits of the railway grounds. These off-take ditches shall be of such widths and depths as may be required and directed by the Engineer. They shall be sloped not steeper than one and half horizontal to one perpendicular, and the materials shall be cast out so as to leave a berm of 4 feet between the deposit and the top of the slopes of the ditches. The contractor shall also construct all other drains and ditches which the Engineer may deem necessary for the perfect drainage of the railway and works; he shall also make all necessary diversions of roads and streams as directed by the Engineer. Off takes.

21. The embankments shall be formed according to drawing No. 6. No materials taken from the cuttings, foundation of structures, ditches, road diversions or borrow pits shall be placed in the embankments and road approaches or road diversions unless approved by the Engineer; ice and snow shall be excluded. Embankments.

Logging embankments.

22. In places where the natural surface of the ground upon which the embankment is to rest, is covered with vegetable matter which cannot be burned off in clearing, and which would, in the opinion of the Engineer, impair the work, the same must be removed to his entire satisfaction. In the event of the line crossing swampy ground, it may be deemed expedient by the Engineer that a platform of logs shall be formed under the embankment, of such width as will extend through and to not less than 6 feet beyond the side slopes, and from 8 to 24 inches deep as may be directed by the Engineer in each case. The logs to range from 6 inches to 15 inches in diameter, and be laid close together laterally and also longitudinally and covered with a mat of spruce or cedar brush.

Under drains.

23. Where the embankment is to be formed on side hill ground covered with pasture, the ground shall be deeply ploughed before the work is commenced; and where the slope is so steep as to endanger the slipping of the embankment, benches shall be cut in such manner as the Engineer may direct. If the ground is wet or spongy, it shall first be thoroughly underdrained as the Engineer may see expedient. These drains shall be constructed in the following manner: a trench shall first be dug to a minimum depth of four feet, and in the bottom of this trench, four or five cedar poles, about two inches in diameter at the small end, shall first be laid breaking joint; over the poles will then be placed not less than three feet of small broken stone, of the size of ordinary road metal, over which shall be deposited such material, convenient to the place, as the Engineer may approve of. These drains shall always be made with a sufficient longitudinal fall for the easy flow of the water.

Allowance for shrinkage.

24. The embankments shall be sixteen feet wide at formation level, and the slopes will have an inclination of one and a half horizontal to one perpendicular, but in their formation, whether for the railway or approaches to bridges or level crossings, ample allowance shall in the first instance be made by the Contractor, for all subsequent settlement or shrinkage, and particularly in the top width; and for this purpose the top, besides being kept higher than the levels given, shall be formed in the first instance wider than the specified dimensions, to such extent as may be deemed necessary, according to the height of the embankment and the nature of the materials of which it is formed, so that when it is thoroughly consolidated it will stand the full width required.

Wasting.

25. Where the excavation in a cutting exceeds what may be required to make the embankment of the specified width, the engineer may direct that the embankments shall be increased in width with the surplus material and when this is done to his satisfaction, the remainder, if any, may be wasted; but in any case where either borrowing or wasting is resorted to, the materials shall be taken and deposited as he may direct.

Building material in excavation.

26. In cases where pitching or riprapping will be required for the protection of embankments, all stone suitable for this work found in excavations may be removed and deposited in some convenient place until required, and all good building stone which may be found in rock excavations may, with the approval of the Engineer, be

upon which the embankment is to be commenced; and the ground is wet or may see expedient. The trench shall first be dug to a depth of four or five feet, and be laid in a breaking joint; and shall be broken stone, of such material, convenient to the water.

ground covered with a layer of earth, and the embankment, benches the ground is wet or may see expedient. The trench shall first be dug to a depth of four or five feet, and be laid in a breaking joint; and shall be broken stone, of such material, convenient to the water.

level, and the slopes of the embankment, one perpendicular, to bridges or level the Contractor, for top width; and for even, shall be formed to the extent as may be required, and the nature of the consolidated it will

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preserved and piled along the side of the line as directed. But any material so found and used shall not be paid for twice, the quantity shall form a deduction from the quantity of excavation as measured in the cutting.

27. Roads constructed to and from any point on the line of railway for the convenience of the Contractor, for the conveyance of material or otherwise, shall be at his own risk, cost and charges, but the Contractor will not be required to purchase land for the railway track, for branches, for borrow pits, for ballast pits and approaches thereto.

28. Wherever the line is intersected by public or private roads, or runs along or near a public or a private road, the Contractor shall keep open, at his own cost, convenient passing places, and he shall be held responsible for keeping all roads affected by the railway, during the progress of the works, in such condition as will enable the public to use them with perfect safety, and such as will give rise to no just ground for complaint. The Contractor will be held liable for any damages resulting from negligence on his part or that of his men.

29. At all public roadways crossed by the railway at rail level, cattle-guards of cedar timber with white pine stringers shall be constructed. The roadway between the cattle-guards shall be planked and the approaches properly graded and gravelled with grades not exceeding 1 in 25. Under this heading shall be embraced every thing necessary to complete the crossing, the bridging of side ditches, fences from cattle-guards to the line fences of the railway, also cedar posts and pine sign-boards, finished, painted and lettered. The fences connecting cattle-guards with right-of-way fences, shall be of cedar posts and pine or spruce boards, as per drawing No. 7.

30. When public roadways are passed over the railway above rail level, overhead bridges shall be constructed in accordance with drawing No. 9 and special specification.

31. Farm crossings shall be established wherever directed by the Engineer. They shall be graded so as to form easy and convenient passages for farm traffic across the rails with grades not exceeding 1 in 12, and planked to the full extent of the railway ties. The ditches shall be properly bridged, and gates with proper fastenings shall be placed in the fences, according to drawing No. 8.

32. Where farm roads are passed over the railway above rail level, overhead bridges shall be constructed in accordance with drawing No. 10 and special specification.

33. Whenever any material is met with in the excavations which the Engineer shall consider suitable and required for ballast, the same shall, at his discretion, be reserved for that purpose.

34. The measurement of quantities shall invariably be made in excavation, unless in special cases, if any, where this may be found impossible by the Engineer; in such cases the Engineer shall measure the quantities in embankment.

Prices.

35. The prices stipulated for excavation of the several denominations, together with the price for haul and the price for work in foundation pits under water level, shall be the total prices for excavating, loading, removing and depositing all the material. In a word, the rates and prices stipulated in the contract shall be understood to cover every contingency; the furnishing of all labor, material, power and plant; the cost of finishing up cuttings and embankments, the dressing and draining of borrow pits, when required; the dressing of slopes to the required angles, and the completion of everything connected with the grading of the road-bed, in a creditable and workmanlike manner, in accordance with the directions and to the satisfaction of the Engineer, together with the maintenance of the same until the completion of the contract.

TUNNELS.

Stream tunnels.

36. The tunnelling will consist of "stream tunnels." These tunnels shall be driven through the solid rock which, in some places, forms the sides of ravines, they shall be formed in the manner to be pointed out in each case. Open cuttings at the ends shall be excavated, to give an easy flow to the water; these open cuttings may be slightly curved, but the tunnels proper shall be perfectly straight from end to end, unless otherwise ordered by the Engineer, with the sides as smooth as practicable. The up-stream end of each tunnel shall generally be one foot lower than the bed of the stream opposite, and the tunnels shall be driven with such inclination as the Engineer may direct. Care shall be taken to leave a solid pillar of rock between the tunnel and the side of the ravine, equal (except in special cases) to not less than double the diameter of the tunnel. The thickness of solid rock over the tunnel shall be similarly proportioned. The excavation in open cuttings which form the outlets and inlets of tunnels shall be paid for as ordinary excavation, according to classification, the material excavated from them shall be placed in the embankments, or as may be directed by the Engineer. The tunnels shall be paid for by the lineal foot and the price shall cover all the cost of pumping, draining, &c., which may be necessary. The tunnels may be of the following dimensions:—

Sectional Areas.		Lineal Foot of Tunnel.	
20 feet tunnels, equal 12 cubic yards.			
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12	do	do	4 do
8	do	do	2 do
6	do	do	1 do

Crib work.

37. Crib work, when ordered by the Engineer, shall be executed according to general drawing No. 12. Cribs shall be built of round cedar logs, not less than 9 inches diameter at the small end, well fastened at each bearing with $\frac{3}{4}$ inch round iron rag bolts 18 inches long, filled with stone. Where the foundation is solid they will rest on a ballast floor of 6-inch cedar poles. Where the bottom is soft, they will rest on brush and poles, 2 feet thick. The Engineer shall in each case decide which description of bed shall be adopted.

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38. Whenever the slopes of the embankments are liable to wash, they shall be protected by a rip-rap wall of stones, carefully laid by hand to such thickness and height as may be directed by the Engineer, generally about 18 inches above high water level. It will be measured and paid for by the cubic yard.

BRIDGES AND VIADUCTS.

39. The superstructure of all bridges of over 30 feet span, will be of steel, supported on masonry abutments and piers, as shown in drawings Nos. 13 to 23, and in accordance with special specification. The superstructure of spans from 15 to 30 feet will be of iron rails, in accordance with drawings Nos. 24 to 28, and special specification.

40. Steel trestle bridges shall be constructed in accordance with drawing No. and special specification.

PILE BRIDGES.

41. Whenever the circumstances of the case require the adoption of bridges on piles, they shall be erected according to drawing No. 30. Each bent shall be composed of piles, as shown in the drawing. The piles shall be of sound tamarac timber, and of sufficient size at the butt or larger end to square not less than 12 inches, and for long piles, 14 inches. They shall be perfectly sound and straight, and be of such lengths as circumstances may require. The piles shall be driven by a hammer weighing 1,800 pounds or upwards, until they reach perfectly firm ground. They will generally be tested by the hammer falling 24 feet at the last blow, under which they must not yield more than 2 inches. Care shall be taken to have them driven truly, so that the caps and braces which shall be of sound white pine or tamarac can be properly framed and bolted to them. The spur piles shall be curve pointed, so that as they are driven they will gradually come to the proper inclination. Before being driven, the piles shall be sawed or chopped off square at the butt, and tapered to a blunt point at the smaller end. The heads shall be bound with iron hoops, the cost of which shall be included in the price of the piles, and if necessary, the points be properly shod. The stringers shall be of sound white pine, bolted together and to the corbels and caps; they shall be of sufficient length to reach over two spans and break joints alternately inside and out. The bank stringers will be 12 inches square. The whole shall be covered by special ties of white pine timber 9 inches by 8 inches, by 12 feet.

TRESTLE BRIDGES.

42. Where trestle structures are required, they shall be built in accordance with the general drawings No. 31 to 35. The bents shall be on piles unless ordered by the Engineer to be set on mud sills placed in trenches. The timber used in these bents may be white pine or tamarac and of the dimensions shown on the drawing. The stringers shall be of sound white pine. The piles shall be of tamarac timber averaging not less than 12 inches diameter at mid length and shall be driven home so as to afford a secure foundation.

Cedar log
culverts.

43. Where ordered by the Engineer cedar log culverts shall be built according to the general drawings No. 34.

FOUNDATIONS.

Foundation
pits and
cofferdam.

44. Foundation pits shall be sunk to such depths as the Engineer may direct they shall in all cases be sunk to such depths as will prevent the structures being acted on by the frost. The material excavated therefrom shall be deposited in embankment, unless the Engineer directs otherwise. In the case of piers in large rivers or lakes, a special price must be given in the tender for cofferdams and an extra expense involved.

Timbering.

45. Foundation timbers where ordered will be either flatted or square of such dimensions as the Engineer may direct. The timber employed shall be tamarac, hemlock, or pine.

Iron.

46. All spikes, bolts, straps or other iron work found necessary to be used in timber foundations, must be of the best quality of iron usually employed for similar purposes.

Piling.

47. Whenever the Engineer may direct piling in foundations to be done, the timber shall be of sound tamarac, pine or hemlock and of sufficient size at the butt end to square not less than 12 inches and for long piles 14 inches. Where the Engineer may think it necessary, trial piles shall first be driven.

How to be
driven.

48. The piles shall be carefully and truly pointed, and hooped with iron, the cost of which shall be included in the price of the piles, and if necessary, the point shall be properly shod. They shall be driven, to any depth the Engineer may deem expedient, and the weight of the hammer shall be 1,800 lbs. or upwards. They shall generally be tested by the hammer falling 24 feet at the last blow, under which they shall not yield over 1 inch. The greatest care shall be taken to drive the piles plumb or battered in such position and distances apart as are shown on the plan and as the Engineer may direct; any pile that may be damaged, or too short, or out of proper line when driven shall be taken up and replaced by another at the contractor's expense; the heads of the piles shall not be injured in driving.

Creosoted
timber.

49. All piles or timber requiring to be creosoted shall be of North Carolina yellow pine of the best quality, sound and green, straight and free from shakes and knots. Before being creosoted the piles or timber must be heated through at a temperature of 212 to 250 degrees of Fahrenheit, all the air and moisture must be exhausted and in that condition they must receive the creosote. Each cubic foot of timber creosoted must contain not less than 16 lbs. of the best dead oil of coal tar creosote, injected under a pressure of 120 to 160 lbs. per square inch. The creosoting shall be done in the most approved manner and to the satisfaction of the Engineer or Inspector, who shall have full power to reject any creosote or timber whether before or after treatment. A price per lineal foot must therefore be placed in the schedule for this class of work, which price will include the cost of the timber.

Masonry.

50. The masonry shall not be started at any point before the foundation has been properly prepared nor until it has been examined and approved by the Engineer, nor until the Contractor has provided a sufficient quantity of proper materials and plant to enable the work to be proceeded with regularly and systematically. The foundation must be kept free from water during the progress of the work until the masonry is brought above the level of the water. Masonry when to be commenced.

51. The stone used in all masonry on the line of railway shall be of a durable Stone, character, large, well proportioned and well adapted to the construction of substantial and permanent structures; parties tendering must satisfy themselves as to where fitting material for the masonry can be most conveniently procured.

52. Bridge masonry and retaining wall masonry with a batter less than $\frac{1}{4}$ horizontal to 1 vertical on the face, shall be in regular courses, of large, well shaped stone laid on their natural beds; the beds and vertical joints shall be dressed so as to form quarter inch joints; the vertical joints shall be dressed back square 9 inches; the beds shall be dressed perfectly parallel throughout. The work will be left with the "quarry face," except the outside arrises, strings and coping, which shall be chisel dressed. Bridge masonry retaining wall masonry with nearly vertical face.

53. The courses shall not be less than 12 inches, and they shall be arranged in preparing the plans to suit the nature of the quarries; courses may range up to 24 inches, and the thinnest courses shall invariably be placed towards the top of the work. Courses.

54. Headers shall be built in every course not farther apart than 6 feet, they shall have a length in line of wall of not less than 24 inches, and they must run back or upwards. They must at least three times their height, unless when the wall will not allow this proportion, in which case they shall pass through from front to back. Stretchers shall have a minimum length in line of wall of 30 inches, and their breadth of bed shall at least be one and a half times their height. The vertical joints in each course shall be arranged so as to overlap those in the course below at least 10 inches. The above dimensions are for minimum courses of 12 inches, the proportions shall be the same for thicker courses. Headers and stretchers.

55. The quoins of abutments, piers, &c., shall be of the best and largest stones, and shall have chisel drafts properly tooled on the upright arrises, from two to six inches wide, according to the size and character of the structure. Quoins.

56. Coping stones, string courses and outwaters shall be neatly dressed in accordance with plans and directions to be furnished during the progress of the work. Coping.

57. The bed stones for girders shall be the best description of sound stone, free from dries or flaws of any kind, they shall be not less than 12 inches in depth for the smaller bridges and eight feet superficial area on the bed. The larger bridges will require bed stones of proportionately greater weight; these stones shall be solidly and carefully placed in position, so that the bridge will sit fair on the middle of the stones. Girder seats.

Backing and
bond.

58. The backing shall consist of flat bedded stone, well shaped, having an area of bed equal to four superficial feet or more. Except in high piers or abutments, the thicknesses of backing stone, but not more, will be allowed in each course, and the joints shall not exceed that of the face work. In special cases, where deemed necessary by the Engineer, to insure stability, the backing shall be in one thickness and the beds shall, if necessary, be scabbled off, so as to give a solid bearing. Nip and pinning will be admitted. Between the backing and face stones there shall be a good square joint, not exceeding one inch in width, and the face stones must be scabbled off to allow this. In walls over three feet in thickness, headers shall be built in front and back alternately, and great care shall be taken in the arrangement of the joints as to give perfect bond.

Culvert
masonry.

59. Culvert masonry shall be built of good, sound, large, flat bedded stones, laid in horizontal beds. It may be known as random, or broken coursed work. The stones employed in this class of masonry shall generally be not less in area of bed than three superficial feet, nor less in thickness than eight inches, and they shall be dressed so as to give good beds with half-inch joints. In smaller structures and in cases where stones of good size and thickness cannot be had, they may, if in other respects suitable, be admitted as thin as five inches. All stones shall be laid on their natural beds. This masonry shall be laid dry or in mortar, as may be directed by the Engineer.

Headers and
stretchers.

60. Headers shall be built in the wall, from front and back alternately, at least in every five feet in line of wall, and frequently in the rise of the wall. In the smallest structures headers shall not be less than 24 inches in length, and the minimum bearing allowed for stretchers shall be 12 inches. In the larger structures all stones must be heavier in proportion. Every attention must be paid to produce a perfect bond, and to give the whole a strong, neat, workmanlike finish.

Wing walls
coping and
curves.

61. Wing walls shall generally be finished with steps, formed of sound, durable stone, and not less than from 10 to 12 inches thick, and 6 feet superficial area; other walls shall be covered with coping of a similar thickness, and of seven feet or upwards superficial area. These coverings shall be neatly dressed as may be directed by the Engineer. The walls of the box culverts shall be finished with stone the full thickness of the wall, and the covers shall be from 10 to 15 inches thick, according to the span; they must have a bearing of at least 12 inches on each wall, and they shall be fitted sufficiently close together to prevent the earth from falling through.

Paving.

62. The bottoms of culverts shall be paved with stones set on edge, to a moderate even face, packed solid, the interstices being also well packed. The paving shall be from 12 to 16 inches deep. When ordered by the Engineer a solid block of masonry shall be substituted for the paving, as shown on drawing No. 39.

Retaining
wall with
sharp batter.

63. Retaining walls with a batter of over $\frac{1}{4}$ horizontal to 1 vertical on the face shall be built of dry masonry, and shall be formed of large, well-shaped stones, hammered to form good beds, and carefully laid to bond as in bridge masonry, but without mortar.

ARCHES.

64. A distinction will be made between arches of 10 feet span and upwards and those of 8 feet span and under, the former will be classed as first class arch masonry, and the latter as second class arch masonry, although they may be constructed on walls of second class work, they will be classed as first class arch masonry. Arches of 8 feet span and under will be classed and paid for as second class arch masonry. Arches of 10 feet span and upwards will generally be semi-circular.

65. First class arches shall be constructed of stones cut so that when laid, their joints will radiate truly from the centre of the circle, the depth of stones will of course be in proportion to the span, but will never exceed thirty inches, they shall not be less in length than 27 inches and they shall break joint 10 inches; their thickness on the face must be at least 9 inches and it shall be dressed to the circle. All the stones must be dressed to the full depth of bed so as to give truly radiated joints from the face to the back of an inch, they shall be set without pinning of any kind and the end joints shall be properly squared. Each stone shall be full bedded in cement, and each course afterwards thoroughly grouted. The outer ring stones shall be neatly worked with a chisel and draft around their edges.

66. Second class arches shall be constructed of suitable flat bedded stones, ranging from 16 to 24 inches deep and with a minimum length of from 16 to 24 inches, and 5 to 6 inches in thickness on the soffit, they shall invariably extend through the entire thickness of the arch. Each stone shall be well and closely fitted so as to give half inch joints and shall break joint with its fellow 7 to 9 inches. The whole shall be laid in thin mortar, and each course shall be well grouted immediately after being laid. The outer arch stones shall be as nearly uniform in thickness as possible, of large size and neatly incorporated with the perpendicular face of the masonry. The key stones shall be 10 or 12 inches on the soffit, shall have a chisel draft around their edges, and shall project beyond the face of the wall 2 or 3 inches.

67. Arches of each class shall be built in cement, and before being covered with earth or the centering removed, they shall be thoroughly flushed on the back, levelled and rounded to a moderately even and smooth surface with cement.

68. Centering for arches shall in all cases be well formed, of ample strength, securely placed in position and in every respect to the satisfaction of the Engineer. The ribs shall not be placed farther apart than 3 feet in any case. The laggings shall be cut to a scantling of 3 inches square. The supports of centres shall be substantial and well constructed, and they must be provided with proper wedges for easing centres when required. Structures having more than one arch shall be provided with as many centres as the Engineer may deem proper, and in no case shall the centres be struck without his sanction. Centering and scaffolding of all kinds shall be provided by the Contractor and the cost must be covered by the price for the masonry.

69. All masonry shall be neatly and skilfully pointed, but if done out of season or if from any other cause it may require repointing before the expiration of the

contract, the Contractor shall make good and complete the same at his own cost. Work left unfinished in the autumn shall be properly protected during the winter by the Contractor at his risk and cost.

Punning and filling.

70. After the masonry of a structure has been completed for a period of four or five weeks, the formation of the embankment around it may be proceeded with. The earth shall be carefully punned in thin layers around the walls, and in this manner the filling shall be carried up simultaneously on both sides. The Contractor must be extremely careful in forming the embankments around culverts and bridges, as he will be held liable for any damages to the structures that may arise. The punning shall be carefully attended to, and the whole filling shall invariably be done in uniform courses from the bottom to the top of the embankment, without loading on the side of the masonry more than another.

Mortar.

71. Mortar shall be of Portland cement and common lime.

Cement.

72. Portland cement shall be used in building all masonry, from the foundations up to a line two feet above the freshet level of the stream. It shall be used also in turning arches, in laying girder-beds, coping, covering of walls generally, in lipping and in pointing. The Portland cement shall be fresh ground, of the best brand, and shall be delivered on the ground, and kept till used in good order. Before being used satisfactory proof shall be afforded the Engineer of its hydraulic properties, and no inferior cement will be allowed.

Lime.

73. Common lime mortar shall be made of the best common lime and shall be employed in all masonry (except dry) where cement is not directed to be used.

Mortar how made.

74. Both cement and lime must be thoroughly incorporated with approved proportions of clean large-grained sand. The general proportions shall be one part of lime to two parts of sand. Mortar shall be only made as required, and it shall be prepared and used under the immediate direction and to the satisfaction of an Inspector failing which the Inspector may employ men to prepare the mortar, and any expense incurred thereby shall be borne by the Contractor. Grout shall be formed by adding a sufficient quantity of water to well tempered and well proportioned mortar.

Grouting.

75. When mortar is used, every stone must be set in a full bed and beaten solid the vertical joints shall be perfectly level and thoroughly grouted.

Lipping.

76. In all walls built in common lime, the exposed faces shall have a 4-inch lipping of cement.

Concrete.

77. Whenever concrete is employed, it shall be composed of Portland cement, clean, sharp sand, and broken stone of quality, size and proportions approved by the Engineer. The proportion of sand and cement shall be about the same as in mortar and in making the concrete a sufficient quantity of cement mortar shall be used with the broken stone to fill up the interstices and render the mass, when set, perfectly solid and compact.

TRACK.

he same at his own cost
protected during the winter.

78. Before track-laying and ballasting is commenced, the Contractor shall fill up all hollows in the road bed arising from settlement, or from being raised as temporary roads by the Contractor, or from other causes, and trim the surface to the formation level, rounded as before described.

79. The ties shall be of tamarac, hemlock or cedar, smoothly hewed, free from all score-hacks, and chopped or sawed square at the ends, 8 feet long, flattened on two opposite sides to a uniform thickness of 6 inches, the flattened surface being not less than 8 inches on either side, at the small end. They shall be placed at a uniform distance of 24 inches between centres, and at right angles to the rails. Joint ties shall have both an upper and under surface bearing of at least 10 inches, and shall be placed directly under the joint according to drawing No. 50.

80. The spikes shall be made from the best refined iron, five-eighths of an inch square, and shall, on test, be equal to being bent to a double without fracture, and they shall have pressed heads of the usual size and form, and the points chisel-sharp. They shall be 6 inches long over all, and similar to sample to be seen in the office of the Engineer.

81. The points, crossings, switches and signals shall be well and truly made of the best materials of their several kinds in accordance with the drawings Nos. 46 to 49, and the points and crossings shall be made out of the steel rails supplied by the Minister of Railways and Canals.

82. The rails shall be laid to a gauge of 4 feet 8½ inches clear between their heads and they shall be well and carefully fastened at the joints, which shall be opposite each other and on the same tie. To accomplish this it will be necessary to cut and rebore the Rails, the cost of which must be included in the price for tracklaying; special care shall be taken at points and crossings to have the rails laid to a tight gauge. The rails shall be full-spiked, and on curves the Rails shall be curved before being laid to suit the degree of curvature and the outer rail shall be elevated according to the degree of curvature as follows, that is to say, on one degree curves 0.05 feet, on two degree curves 0.10 feet, on three degree curves 0.15 feet, on four degree curves 0.20 feet, on five degree curves 0.25 feet, on six degree curves 0.30 feet, the cost of which must be included in the price for tracklaying. The rails shall be handled with care, and before being run over by either engine or cars shall be full-sleepered, packed and surfaced. Every precaution shall be taken to prevent them getting bent.

83. The Contractors shall lay all sidings and put in all points and crossings complete, embracing frogs, wing and guard rails, connecting rods, head blocks, switch, signal frames, signal gearing and lamps. The sidings shall be of such length as may be directed by the Engineer.

84. The Contractor shall, at his own cost, remove from the track and straighten all bent and damaged rails, and make good all injuries done before the works are finally accepted; and further, he will be held responsible for all materials furnished to him, and give a receipt for the same upon taking delivery.

BALLASTING.

Stripping
pits.

85. The surface of ballast pits shall be stripped of soil other than gravel, where such exists, and the stripping hauled away by horse and cart to a spoil bank as may be directed by the Engineer, invariably keeping the pit stripped 10 feet back from the face, and no material whatever shall be placed on the road-bed, but good clean gravel, free from earth, clay, loam, or loamy sand, and shall not average less than 2,500 cubic yards per mile. The maximum size of gravel shall not be greater in diameter than 3 inches. In unloading, the train shall be kept moving, and so as to thoroughly mix the different qualities of ballast, until a sufficient quantity is deposited. The track shall then be raised so that there will not be less than 12 inches beneath the ties, and the ballast shall be well beaten and packed under and around them. As the raising proceeds, the end of the lift shall extend over not less than three rail lengths, and before trains are allowed to pass over the inclined portion of track, it shall be made sufficiently solid to prevent bending the rails, or twisting the rail joints. After the lift, the track shall be centred, lined, topped, surfaced and trimmed off to a proper form and width, according to drawing No. 50 and all surplus gravel shall be picked up and removed at the Contractor's cost to such point as the Engineer may direct.

STATION BUILDINGS, &c.

Way stations.

86. A combined passenger and freight house shall be erected at such points as may be directed by the Engineer, in accordance with drawing No. 51 and special specification.

Terminal
station.

87. A passenger station in accordance with drawing No. 53 and a freight house in accordance with drawing No. 54 and special specifications shall be erected at the terminus at

Water
service.

88. An ample supply of good water shall be provided at such points as the Engineer may direct, with frost proof elevated tank fitted up with the requisite machinery, pumps, pipes, valves, and all other necessities, and in complete running order in accordance with drawing No. 55 and special specification. When ordered by the Engineer stand pipes will be provided and erected in accordance with drawing No. 56.

Turntable.

89. Turntables shall be constructed and erected complete at such points as may be directed by the Engineer, in accordance with drawing No. 57 to 58 and special specification.

Engine
house.

90. Engine houses shall be erected in accordance with drawing No. 59 to 61 and special specification at such points as may be ordered by the Engineer.

GENERAL PROVISIONS.

Finishing
track.

91. The track shall be left by the Contractors with everything complete, and well surfaced. The ballast shall average not less than 2,500 cubic yards per mile and shall be dressed off to the form required by drawing No. 50 and the whole shall be executed according to the directions and to the approval of the Engineer.

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92. All station grounds shall be cleared to the extent heretofore mentioned, Station ground to be cleaned.

93. Before the works are finally accepted, the Contractor shall at his own cost Maintenance. make good all defects, and shall finish up all cuttings and embankments, repair all damages by frost, freshets or other causes; dress slopes to the required angle; clean out all ditches and drains, and complete all the works connected with the formation of the railway and covered by the contract in a creditable and workmanlike manner, in accordance with the directions and to the entire satisfaction of the Engineer.

94. The works shall be commenced and proceeded with as soon as practicable, Works to be completed. after the person or persons whose "Tender" may be accepted, shall have entered into the contract. The whole of the works shall be completed and the line in good running order by the day , one thousand eight hundred and eighty .

95. Should any class of work be ordered in writing by the Engineer to be Days' labor. executed by days' labor which does not come within the class of work to be measured in this contract the Contractor shall execute the same and be paid for the actual labor at current rates with ten per cent. added for use of tools.

TENDERS, &c.

96. No tender will be entertained unless on one of the printed forms prepared Tendering. for the purpose, with the schedule of prices filled in; nor unless a bank cheque, marked good by the bank, for \$10,000 accompanies the tender, which shall be forfeited if the party tendering, declines or fails to enter into a contract for the works when called upon to do so, upon the tender being accepted. In the event of a tender not being accepted, the cheque will be returned.

97. For the due fulfillment of the contract, satisfactory security will be required Security. immediately on a tender being accepted, by deposit of money or accepted bank cheque, to the amount of \$50,000, of which the sum sent in with the tender will be considered a part.

98. The person or persons whose tender is accepted shall execute at once a contract under seal, similar in its provisions to the form of indenture hereto annexed, and which may further contain such special provisions as the Minister may determine.

COLLINGWOOD SCHREIBER,

*Chief Engineer and General Manager
of Government Railways.*

OFFICE OF THE CHIEF ENGINEER,
AND GENERAL MANAGER OF GOVERNMENT RAILWAYS,
OTTAWA, 1st December, 1886.

CAPE BRETON RAILWAY.

LIST OF DRAWINGS.

No	1—Plan of location.		
	2—Profile.		
	3—Fencing.		
	4—Earth cutting.		
	5—Rock cutting.		
	6—Embankment.		
	7—Public road crossing on the level.		
	8—Farm road crossing on the level.		
	9—Overhead public road crossing.		
	10—Overhead farm road crossing.		
	11—Stream tunnels.		
	12—Crib-work.		
	13—Steel superstructure, span 25 feet and 30 feet.		
14	do	do	40 do
15	do	do	50 do
16	do	do	60 do
17	do	do	70 do and 75 feet.
18	do	do	80 do
19	do	do	100 do
20	do	do	125 do
21	do	do	150 do
22	do	do	175 do
23	do	do	200 do
24	Old rail bridge span,	10.	
25	do	do	12.
26	do	do	15.
27	do	do	16.
28	do	do	20.
29	Steel trestle bridges.		
30	Pile bridge.		
31	Trestle bridging, bents 10 feet apart.		
32	do	do	15 do
33	do	do	20 do
34	Cedar log culvert.		

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- 35—Bridge masonry, 30 to 60 feet span.
- 36 do 80 to 100 do
- 37 do 125 to 150 do
- 38 do 175 to 200 do
- 39—Box culverts.
- 40 do (double).
- 41—Large beam culvert.
- 42—Small beam culvert.
- 43—Arch culverts.
- 44—Iron pipe culverts.
- 45—Vitrified double-strength earthenware pipe culverts.
- 46—Crossings—double throw.
- 47 do three throw.
- 48—Switch gear for double throw.
- 49 do for three throw.
- 50—Track and ballast.
- 51—Combined passenger and freight house.
- 52—Flag Station.
- 53—Passenger station at Sydney.
- 54—Freight house.
- 55—Water tank.
- 56—Stand pipe and attachment.
- 57—Turntable.
- 58—Turntable pit.
- 59—Engine house, Plan.
- 60 do Elevation.
- 61 do Water and Heating service.

COLLINGWOOD SCHREIBER,

Chief Engineer and General Manager

of Government Railways.

OFFICE OF THE CHIEF ENGINEER

AND GENERAL MANAGER OF GOVERNMENT RAILWAYS,

OTTAWA, 1st December, 1886.

CAPE BRETON RAILWAY.

ADDENDA TO SPECIFICATION.

It having been decided to adopt the Servis Tie Plate on the section of Railway between Grand Narrows and Sydney, the Government will provide the plates and deliver them to the contractor, at Mulgrave Wharf Station, on the Eastern Extension Railway.

The contractor will be required to lay these plates, which shall be driven home on each tie in such position as to squarely set under each rail, and admit of their being fully spiked through the holes punched in the Servis Tie Plate, as shown in Drawing No. 50.

The price in the Schedule for track-laying, must include the cost of laying the tie plates, as above described, together with the cost of loading at the point of delivery, the transport to and distribution over the works.

COLLINGWOOD SCHREIBER,

*Chief Engineer and General Manager
of Government Railways.*

OFFICE OF THE CHIEF ENGINEER

AND GENERAL MANAGER OF GOVERNMENT RAILWAYS,
OTTAWA, 15th December, 1886.

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hereafter called "the Contractor" of the first part, and Her Majesty Queen Victoria, represented herein by the Minister of Railways and Canals of Canada, of the second part, WITNESSETH, that in consideration of the covenants and agreements on the part of Her Majesty hereinafter contained, the Contractor covenant and agree with Her Majesty as follows:

1. In this Contract the word "work" or "works" shall, unless the context Work. require a different meaning, mean the whole of the work and materials, matters and things required to be done, furnished and performed by the Contractor under this Contract. The word "Engineer," shall mean the Chief Engineer and General Engineer. Manager of Government Railways, and shall extend to and include any of his assistants acting under his instructions, and all instructions and directions, or certificates given, or decisions made by any one acting for the Chief Engineer and General Manager of Government Railways, shall be subject to his approval, and may be cancelled, altered, modified and changed, as to him may seem fit.

The word "Minister," means the Minister or acting Minister of Railways and Minister. Canals for the time being, and extends to and includes his lawful Deputy.

This Contract is made upon the distinct understanding that the Contractor has satisfied himself respecting the nature of the country through which the works are to be built, the character and formation of the soil, both on the surface and underneath, the climate and kind of weather to be expected, the quantities of the various embankments, excavations, foundations and all other works whatsoever; the means of access and egress, to and from the works, the nature, kinds, qualities and cost of the various

materials, plant and labor required for the works, and generally, respecting every matter or thing which may in any way affect the carrying out of this Contract or the cost of the works contracted for. No information obtained by or for the Contractor from any of Her Majesty's Ministers, Officers, Engineers, Agents or Servants, or from any other person, shall relieve the Contractor from any risks or from the entire fulfilment of this Contract, or shall give him any claim or right, equitable or otherwise, against Her Majesty in addition to his claims and rights under the express provisions of this Contract.

On whom
binding

2. All covenants and agreements herein contained shall be binding on and extend to the Executors and Administrators of the Contractor and shall extend to and be binding upon the successors of Her Majesty, and wherever in this contract Her Majesty is referred to, such reference shall include her successors, and wherever the Contractor is referred to, such reference shall include Executors and Administrators.

Labour, plant
and material.

3. The Contractor will, with the exceptions hereinafter named, at own expense, provide all and every kind of labour, machinery, plant, lands for temporary purposes, required in connection with the works or in the construction thereof, and materials, articles and things whatsoever necessary for the due execution and completion of all and every the works set out or referred to in the Specifications hereunto annexed, and set out or referred to in the plans and drawings prepared and to be prepared for the purposes of the work, and will execute and fully complete the respective portions of such works and deliver the same complete to Her Majesty, on

Time of
completion.

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Material and;
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The said work to be constructed of the best materials of their several kinds, and finished in the best and most workmanlike manner, in the manner required by and in strict conformity with the said specifications and drawings now prepared and which may from time to time be furnished, and to the complete satisfaction of the Engineer.

Exceptions.

4. The exceptions above alluded to are (1) the land for the right of way, station grounds, borrow pits and ballast pits, (2) the rails, fish plates, bolts and Servis Tie Plates for the track. The said land is to be procured by Her Majesty from time to time as the Engineer may think it is required for the prosecution of the works, and the rails and fish plates and track bolts are to be delivered to the Contractor at the Intercolonial Railway Wharf at Richmond, Halifax, from time to time, as the Engineer may think they are required for the works.

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5. The aforesaid specification, plans and drawings, prepared and to be prepared, and the several parts of this Contract shall be taken together, to explain each other, and to make the whole consistent; and if it be found that anything has been omitted or mis-stated, which is necessary for the proper performance and completion of any part of the work contemplated, the Contractor will execute the same as if it had been properly described, and the decision of the Engineer shall be final as to any such error or omission, and the correction of any such error or omission shall not be deemed to be an addition to, or deviation from, the works hereby contracted for.

Omissions to be made good.

6. The Engineer, with the sanction of the Minister, but not otherwise, shall be at liberty at any time, either before the commencement or during the construction of the works or any portion thereof, to order any work to be done, and to make any changes which he may deem expedient in the grades, the width of cuttings and fillings, the dimensions, character, nature, location, or position of the works, or any part or parts thereof, or in any other thing connected with the works, whether or not, such changes increase or diminish the work to be done, or the cost of doing the same, and the Contractor shall immediately comply with all written requisitions of the Engineer in that behalf, but the Contractor shall not make any change in or addition to, or omission, or deviation from the works, unless directed by the Engineer, with the sanction of the Minister, and shall not be entitled to any extra payment by reason of any change, addition, or deviation, and should the deviation contain work of a class not specified in the schedule, such unspecified work shall be calculated according to a rate therefor to be fixed by the Engineer.

Changes and extra work.

7. That all the clauses of this Contract shall apply to any changes, additions or deviations, in like manner, and to the same extent, as to the works at present projected, and no changes, additions, deviations or variations shall annul or invalidate this contract.

Changes shall not invalidate the contract.

8. That the Engineer shall be the sole judge of work and material in respect of both quantity and quality, and his decision on all questions in dispute with regard to work or material, as to the meaning and intention of this Contract and the plans, specifications and drawings shall be final, and no works, or extra or additional works or changes shall be deemed to have been executed, nor shall the Contractor be entitled to payment for the same, unless the same shall have been executed to the satisfaction of the Engineer, as evidenced by his certificate in writing, which certificate shall be a condition precedent to the right of the Contractor to be paid therefor.

Engineer to be sole judge of work, material, &c.

9. It is hereby distinctly understood and agreed, that the respective portions of the works set out or referred to in the schedules of rates or prices for the different kinds of work, include not merely the particular kind of work or materials mentioned in said schedule, but also all and every kind of work, labor, tools, and plant, materials, articles and things whatsoever necessary for the full execution and completing ready for use, of the respective portions of the works to the satisfaction of the Engineer.

Schedule of prices.

And in case of dispute as to what work, labor, materials, tools, and plant are or are not so included, the decision of the Engineer shall be final and conclusive.

Foreman.

10. A competent foreman is to be kept on the ground by the Contractor during all the working hours, to receive the orders of the Engineer, and should the person so appointed be deemed by the Engineer incompetent, or conduct himself improperly, he may be discharged by the Engineer, and another shall at once be appointed in his stead; such foreman shall be considered as the lawful representative of the Contractor, and shall have full power to carry out all requisitions and instructions of the said Engineer.

Unsuitable material or imperfect work

11. In case any material, or other things in the opinion of the Engineer not in accordance with the said several parts of this Contract, or not sufficiently sound, or otherwise unsuitable for the respective works, be used for or brought to the intended works, or any part thereof, or in case any work be improperly executed, the Engineer may require the Contractor to remove the same, and to provide proper material or other things, or properly re-execute the work, as the case may be, and thereupon the Contractor shall and will immediately comply with the said requisition, and if twenty-four hours shall elapse and such requisition shall not have been complied with, the Engineer may cause such material, or other things, or such work, to be removed; and in any such case the Contractor shall pay to Her Majesty all such damages and expense as shall be incurred in the removal of such material, materials, or other things, or of such work; or Her Majesty may, in her discretion, retain and deduct such damages and expenses from any amounts payable to the Contractor.

All plant and material to become property of Her Majesty.

12. All machinery and other plant, materials and things whatsoever, provided by the Contractor for the works hereby contracted for, and not rejected under the provisions of the last preceding clause, shall from the time of their being so provided become, and until the final completion of the said works, shall be the property of Her Majesty for the purposes of the said works, and the same shall on no account be taken away, or used or disposed of except for the purposes of the said works, without the consent in writing of the Engineer, and Her Majesty shall not be answerable for any loss or damage whatsoever which may happen to such machinery or other plant, material or things, provided always that upon the completion of the works and upon payment by the Contractor of all such moneys, if any, as shall be due from to Her Majesty such of the said machinery and other plant, material and things as shall not have been used and converted in the works, and shall remain undisposed of shall, upon demand, be delivered up to the Contractor, but if the Contractor be indebted to Her Majesty, the same may be held by Her Majesty as security for such indebtedness, and may be sold and disposed of, and the proceeds applied towards payment of such indebtedness.

Insufficient plant.

13. If the Engineer shall at any time consider the number of workmen, horses, or quantity of machinery or other plant, or the quantity of proper materials, respectively employed or provided by the Contractor on or for the said works, to be

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insufficient for the advancement thereof towards completion within the limited time,
or that the works are, or some part thereof is not being carried on with due diligence,
then in every such case the said Engineer may, by written notice to the Contractor, require
to employ or provide such additional workmen, horses, machinery or other plant, or materials, as the Engineer may think necessary, and in case the Con-
tractor shall not thereupon within three days, or such other longer period as may
be fixed by any such notice, in all respects comply therewith, then the Engineer
may, either on behalf of Her Majesty, or if he see fit, may, as the agent of and on
account of the Contractor, but in either case at the expense of the Contractor,
provide and employ such additional workmen, horses, machinery and other plant, or
any thereof, or such additional plant and materials respectively, as he may think
proper, and may pay such additional workmen such wages, and for such additional
horses, machinery or other plant, and materials respectively, such prices as he may
think proper, and all such wages and prices respectively, shall thereupon at once be
repaid by the Contractor, or the same may be retained and deducted out of any
moneys at any time payable to the Contractor; and Her Majesty may use in the
execution or advancement of the said work not only the horses, machinery, and other
plant, and materials so in any case provided by any one on Her behalf, but also all
such as may have been or may be provided by or on behalf of the said Contractor.

Material or
labour to be
increased.

14. In case the Contractor shall make default or delay in diligently continuing
to execute or advance the works to the satisfaction of the Engineer, or in case the
Contractor shall become insolvent, or make an assignment for the benefit of credi-
tors, or neglect either personally or by a skilful and competent agent to superintend
the works, then in any of such cases Her Majesty may take the work out of the
Contractor's hands and either stop the same or employ such means and at such times
as she may see fit to complete the work, and in such cases the Contractor shall
have no claim for any further payment in respect of the works performed, but shall
nevertheless remain liable for all loss and damage which may be suffered by Her
Majesty by reason of the non-completion by the Contractor of the works; and all
materials and things whatsoever, and all horses, machinery and other plant provided
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for the purposes of the works, shall remain and be considered
as the property of Her Majesty for the purposes and according to the provisions and
conditions contained in the twelfth clause hereof.

Delay in
execution.

Work may be
taken out of
Contractors
hands.

15. The Contractor shall be at the risk of, and shall bear, all loss or damage
whatsoever, from whatsoever cause arising, which may occur to the works, or any
of them, until the same be fully and finally completed and delivered up to and
accepted by the Minister; and if any such loss or damage occur before such final
completion, delivery and acceptance, the Contractor shall immediately at
own expense, repair, restore and re-execute the work so damaged, so that the whole
works, or the respective parts thereof, may be completed within the time hereby
limited.

Contractor to
take risk of
loss or
damage.

Contractor to have no claim for delay.

16. The Contractor shall not have or make any claim or demand, or bring any action or suit or petition against Her Majesty for any damage which may be sustained by reason of any delay in the progress of the work, arising from the acts of any of Her Majesty's agents, and it is agreed that in the event of any such delay the Contractor shall have such further time for the completion of the works as may be fixed in that behalf by the Minister.

Contractor not to make assignment.

17. The Contractor shall not make any assignment of this contract, and in the event of any assignment being made, Her Majesty may take the work out of the Contractor's hands, and either stop the same or employ such means and at such times as she may see fit to complete the same; and in such case the Contractor shall have no claim for any further payment in respect of the works performed, but shall nevertheless remain liable for all loss and damage which may be suffered by Her Majesty by reason of the non-completion by the Contractor of the works; and all materials and things whatsoever, and all horses, machinery, and other plant provided by the Contractor for the purposes of the works, shall remain and be considered as the property of Her Majesty for the purposes and according to the provisions and conditions contained in the twelfth clause hereof.

Work may be taken out of Contractor's hands.

18. Time shall be deemed to be of the essence of this contract.

Contractor responsible for damage.

19. The Contractor shall be responsible for all damages claimable by any person or corporation whatsoever, in respect of any injury to persons or to lands, crops, buildings, ships or other property, or in respect of any infringement of any right whatsoever, occasioned by the performance of the said works, or by insufficient fencing or otherwise, or by any neglect or misfeasance or non-misfeasance on the part, and shall and will at her own expense, make such temporary provisions as may be necessary for the protection of persons, or of lands, crops, buildings, ships or other property, or for the uninterrupted enjoyment of all rights of persons or corporations, in and during the performance of the said works, and whenever the Contractor fails promptly to settle and discharge any claim for such damage, Her Majesty may, and so far as she thinks such claims just, settle and discharge the same and deduct any amount so paid by her in discharge thereof, from any moneys, at any time, payable by Her Majesty to the Contractor.

Failing to pay salaries or wages.

20. If the Contractor fail at any time in paying the salaries or wages of any person employed by her upon or in respect of the said works, or any of them, and any part of such salary be one month in arrear, or if there be due to any such person one month's wages or salary, the Engineer may notify the Contractor to pay such salary or wages, and if two days elapse and the same be not paid in full up to the date of payment or to such other date as may be in accordance with the terms of employment of such person, then Her Majesty may pay to such person salary or wages from any date to any date, and to any amount which may be payable, and may charge the same to the Contractor, and the Contractor covenant with Her Majesty to repay at once any and every sum so paid.

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21. The Contractor will protect and will not remove or destroy or permit to be removed or destroyed, the stakes, buoys and other marks placed on or about the said works by the Engineers of the works, and shall furnish the necessary assistance to correct or replace any stake or mark which through any cause may have been removed or destroyed. Stakes and marks to be protected.

22. Any notice or other communication mentioned in this Contract to be notified or given to the Contractor shall be deemed to be well and sufficiently notified or given, if the same be left at the Contractor office, or mailed in any Post Office to the Contractor or foreman, addressed to the address mentioned in this Contract or to the Contractor last known place of business. Contractors address.

23. And Her Majesty, in consideration of the premises, hereby covenants with the Contractor, that subject to the terms of this contract, will be paid for and in respect of the works, and in the manner set out in the next clause hereof, the several prices or sums following, viz.:-

SCHEDULE OF PRICES REFERRED TO IN THE ANNEXED CONTRACT.

	DESCRIPTION OF WORK.		PRICE.	
			\$	c.
1	Clearing.....	Per acre.		
2	Close cutting.....	"		
3	Grubbing.....	"		
4	Cross logging, including Brushing, 8 in. thick, exclusive of brush.....	"		
5	" 12 "	"		
6	" 16 "	"		
7	" 20 "	"		
8	" 24 "	"		
9	Fencing..... <i>Barbed wire</i> <i>Twisted 2 1/2" & 3" wire</i>	Per Lin. ft.		
10	Solid Rock excavation.....	Per cub. yd.		
11	Gypsum Rock. ".....	"		
12	Loose Rock ".....	"		
13	Earth Excavation, including off-takes and diversions.....	"		
14	Borrow pit excavation.....	"		
15	Under drains.....	Per Lin. ft.		
16	Stream Tunnels 20 ft. = 12 cubic yards per lineal foot.....	"		

	DESCRIPTION OF WORK.		PRICE.		
			\$	c.	
17	Stream Tunnels 16 ft. = 8 cubic yards per lineal foot...	Per Lin. ft.			45
18	" " 12 " = 4 " "	"			46
19	" " 8 " = 2 " "	"			47
20	" " 6 " = 1 " "	"			48
21	Masonry, 1st class arches.....	Per cub. yd.			49
22	" 2nd " "	"			50
23	" 1st "	"			51
24	" 2nd "	"			52
25	" Dry.....	"			53
26	Paving and pitching.....	"			54
27	Concrete.....	"			55
28	Rip-rap.....	"			56
29	Cast Iron pipes 3 ft. diam., 1 in. thick, laid in concrete, (the concrete not included in the price for this item).....	Per Lin. ft. laid.			57
30	Vitrified double strength earthenware pipe, 18 inches diam.	"			58
31	" " 12 "	"			59
32	" " 9 "	"			60
33	" " 6 "	"			61
34	Galvanized Iron pipe with screw ends, 3 in. diam.....	"			62
35	Steel Viaduct. Special Drawing	Each.			63
36	Steel Bridge Superstructure, span 200 ft. complete and in place, including Timber work.....	Per span.			64
37	" " 175 " "	"			65
38	" " 150 " "	"			66
39	" " 125 " "	"			67
40	" " 100 " "	"			68
41	" " 80 " "	"			69
42	" " 75 " "	"			70
43	" " 60 " "	"			71
44	" " 50 " "	"			72

	PRICE.		DESCRIPTION OF WORK.		PRICE.	
	\$	c.			\$	c.
Lin. ft.			45 Steel Bridge Superstructure, span 40 ft. complete and in place, including Timber work	Per span.		
"			46 " " 30 " "	"		
"			47 " " 25 " "	"		
"			48 Old Rail Bridge Superstructure 20 " "	"		
cu. yd.			49 " " 16 " "	"		
			50 " " 15 " "	"		
			51 " " 12 " "	"		
			52 " " 10 " "	"		
			53 Old Rail Overhead Public Road bridge. Special Drawing	"		
			54 " Farm " "	"		
			55 Crib-work, including Stone Filling	Per cub yd.		
laid.			56 White Pine Timber in Trestles and other Structures, 16 x 14	Per Lin. ft. in structure.		
			57 " " 16 x 12	"		
			58 " " 16 x 8	"		
			59 " " 12 x 15	"		
			60 " " 12 x 11	"		
			61 " " 12 x 12	"		
			62 " " 12 x 9	"		
			63 " " 12 x 8	"		
			64 " " 12 x 6	"		
			65 " " 12 x 3	"		
			66 " " 9 x 15	"		
			67 " " 9 x 9	"		
			68 " " 9 x 6	"		
			69 " " 6 x 15	"		
			70 " " 6 x	"		
			71 " " "	"		
			72 " " x 4	"		

	DESCRIPTION OF WORK.		PRICE.	
			\$	c.
73	White Pine Timber in Trestles and other Structures, 5 x 8.....	Per Lin. ft. in structure.		
74	" " 3 x 10	"		
75	North Carolina Yellow Pine, <i>creosoted</i> , 12 x 12 and under..	"		
76	Hemlock or Pine plank, 12 in. face, 8 in. thick.....	"		
77	" " 8 " "	"		
78	Cedar Log Culverts.....	Lin. ft. of culvert.		
79	Piles, <i>creosoted</i> and driven, of North Carolina Yellow Pine	Per Lin. ft. in work.		
80	" driven			
81	Oak or Black Birch plank	B. M. Per M. in work.		
82	White Pine plank	"		
83	Iron, wrought	Per lb.		
84	" cast.....	"		
85	Ties.....	Each.		
86	Track Spikes	Per ton of 2,000 lbs.		
87	Track-laying	Per mile.		
88	Ballasting.....	Per cub. yd.		
89	Points and Crossings.....	Per set.		
90	Switch Gear and Signals.....	"		
91	Public Road Crossings, at Rail Level, comprising Cattle Guards, Planking, Culverts, Fencing and Notice Boards, complete.....	Each.		
92	Farm Road Crossings, at Rail Level, comprising Posts and Gates, Planking and Culverts, complete	"		
93	Passenger Station	as per Drawing..		
94	Freight Station	"		
95	Combined Passenger and Freight House	"		
96	Flag Station, as per Drawing	"		
97	Water Tank on Masonry, as per Drawing	"		
98	" on Piles	"		
99	" 20 ft. Eclipse Windmill with 45 ft. Tower and Attachments complete.....	"		
100	" Steam Pump, complete <i>with Boiler &c.</i>	"		
	<i>Fuel House</i>			

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PRICE.		DESCRIPTION OF WORK.		PRICE.	
\$	c.			\$	c.
		101 Stand-pipe and Fittings	Each.		
		102 6 Stall Engine House, including Turntable, pits, &c., as per Drawings	"		
		103 Coffor Drums	<i>Lump sum</i>		
		104 Ploughing Foundation of Embankments.....	Per acre.		
		105 Turnpiking Public Highway... <i>including Culverts</i>	Per rod.		

24. Cash payments equal to about ninety per cent. of the value of the work done approximately made up from returns of progress measurements and computed at the prices set out on the schedule hereto annexed, or fixed by the Engineer for work not specified in said schedule will be made to the Contractor monthly on the written certificate of the Engineer that the work for or on account of which the certificate is granted, has been duly executed to his satisfaction, and stating the value of such work computed as above mentioned and upon approval of such certificate by the Minister, and the said certificate, and such approval thereof shall be a condition precedent to the right of the Contractor to be paid the same ninety per cent. or any part thereof. The remaining ten per cent. shall be retained until the final completion of the whole work to the satisfaction of the Engineer and acceptance thereof by the Minister, and within two months after such completion and acceptance the remaining ten per cent. will be paid. And it is hereby declared that the written certificate of the Engineer certifying to the final completion of said works to his satisfaction shall be a condition precedent to the right of the Contractor to receive or be paid the said remaining ten per cent., or any part thereof. Payments.

25. It is intended that every allowance to which the Contractor fairly entitled, will be embraced in the Engineer's monthly certificates; but should the Contractor at any time have claims of any description which consider are not included in the progress certificates, it will be necessary for to make and repeat such claims in writing to the Engineer, within fourteen days after the date of each and every certificate in which allege such claims to have been omitted. Monthly estimates.

26. The Contractor in presenting claims of the kind referred to in the last clause must accompany them with satisfactory evidence of their accuracy, and the reason why think they should be allowed. Unless such claims are thus made during the progress of the work, within fourteen days, as in the preceding clause, and repeated in writing, every month, until finally adjusted or rejected, it must be clearly understood that they shall be forever shut out, and the Contractor shall have no claim on Her Majesty in respect thereof. Claims.

Progress
measurements.

27. The progress measurements and progress certificates are not to be taken as binding upon the Engineer or as final measurements, or as fixing final amounts, they are to be subject to the revision of the Engineer when making up his final certificate, and they shall not in any respect be taken as an acceptance of the work or a release of the Contractor from responsibility in respect thereof.

Operations
may be
suspended.

28. Her Majesty shall have the right to suspend operations from time to time at any particular point or points or upon the whole of the works, and in the event of such right being exercised so as to cause any delay to the Contractor, then an extension of time equal to such delay or detention, to be fixed by the Minister

as above provided for, shall be allowed to complete the Contract, but no such delay shall vitiate or void this Contract or any part thereof or the obligation hereby imposed or any concurrent or other bond or security for the performance of this Contract, nor shall the Contractor be entitled to any claim for damages by reason of any such suspension of operations. And at any time after operations have been suspended either in whole or in part such operations may be again resumed and again suspended and resumed, as Her Majesty may think proper. And upon the Contractor receiving written notice on behalf of Her Majesty that the suspended operations are to be resumed, the Contractor shall at once resume the operations and diligently carry on the same.

Appropriation
by
Parliament.

29. Should the amount voted by Parliament and applicable towards payment for the work hereby contracted for, be at any time expended previous to the completion of the works, the Minister, for the time being, may give the Contractor written notice to that effect. And upon receiving such notice, the Contractor may, if think fit, stop the work—but in any case shall not be entitled to any payment for work done, beyond the amount voted and applicable as aforesaid—unless and until the necessary funds shall have been voted by Parliament in that behalf. And in no event shall the Contractor have or make any claim upon Her Majesty for any damages or compensation by reason of the said suspension of payments, or by reason of any delay or loss caused by the stoppage of work.

Spirituous
liquors.

30. The Contractor shall not sell or permit to be sold any spirituous liquors on or near the works.

No Sunday
labour.

31. No work whatever shall at any time or place be carried on during Sunday, and the Contractor shall take all necessary steps for preventing any foreman, or agent, or men from working or employing others on that day.

Chief Engineer
to be
arbitrator.

32. It is hereby agreed that all matters of difference arising between the parties hereto, upon any matter connected with or arising out of this contract, the decision whereof is not hereby especially given to the Engineer, shall be referred to the award and arbitration of the Engineer, and the award of such Engineer shall be final and conclusive; and it is hereby declared that such award shall be a condition precedent to the right of the Contractor to receive or be paid any sum or sums on account or by reason of such matters in difference.

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33. It is distinctly declared that no implied contract of any kind whatsoever, by or on behalf of Her Majesty, shall arise or be implied from anything in this contract contained, or from any position or situation of the parties at any time, it being clearly understood and agreed that the express contracts, covenants and agreements herein contained and made by Her Majesty, are and shall be the only contracts, covenants and agreements upon which any rights against Her are to be founded.

34. This contract is hereby, pursuant to the provisions of the 8th section of the Statute 41st Victoria (1878), chapter 5, made subject to the express condition that no Member of the House of Commons of Canada shall be admitted to any share or part of such contract, or to any benefit to arise therefrom.

35. In the event of it becoming advisable in the interests of the public to suspend the work hereby contracted for, or any portion thereof, at any time before its completion, and to put an end to this contract, the Minister shall have full power to stop the work and to cancel this contract, on giving due notice to that effect to the Contractor. The Contractor, however, will be entitled to receive payment for all sums then due for work already done, materials used or delivered, or ready to be used, or in course of preparation, and for tools and plant in use or delivered upon the work for use, as may then be agreed upon; or, in case of disagreement, as may be determined by the Official Arbitrators of the Dominion of Canada; it being understood, however, that no compensation will be allowed to or claimed by the Contractor for materials procured for the works, after the date of the service of the notice above referred to, or for any loss of anticipated profits, either in respect of the works so suspended as aforesaid, or of the materials then procured for said works. Contract may be cancelled.

36. It is distinctly declared and agreed that none of Her Majesty's Ministers, officers, engineers, agents or servants, have or shall have power or authority in any way whatever to waive on the part of Her Majesty any of the clauses or conditions of this contract, it being clearly understood that any change in the terms of this contract to be binding upon Her Majesty must be sanctioned by order of the Governor General in Council.

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IN WITNESS whereof, the Contractor has hereto set hand
 and seal and these presents have been signed and sealed by the said Minister, and
 countersigned by the Secretary of the Department of Railways and Canals, on behalf
 of Her Majesty.

Signed, Sealed and Delivered by
 the Contractor in presence of

Signed, Sealed and Delivered by
 the Minister, and countersigned
 by the Secretary of Railways
 and Canals in the presence of

RECEIVED
 10th Nov 1884

hand
no said Minister, and
nd Canals, on behalf

