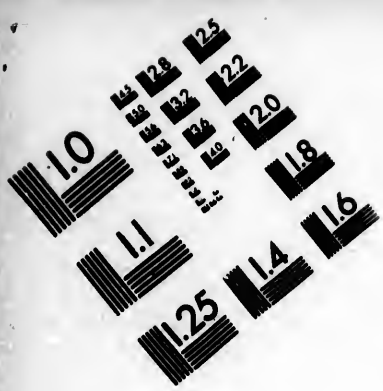

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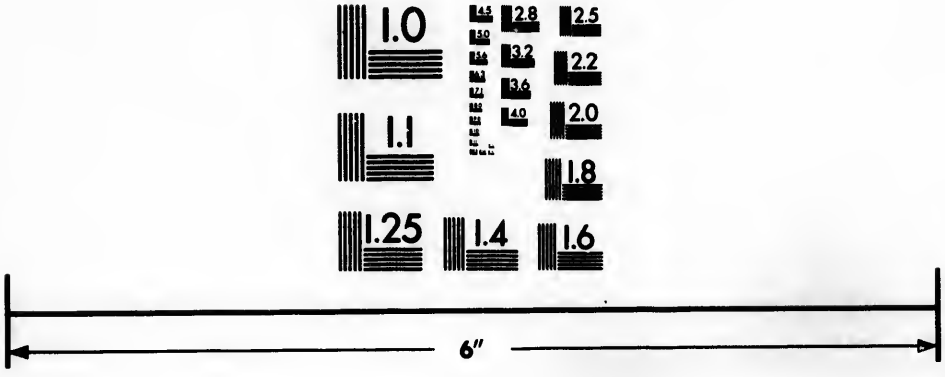

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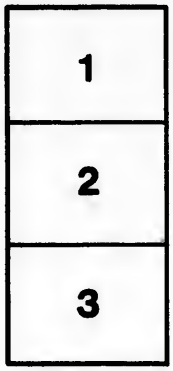

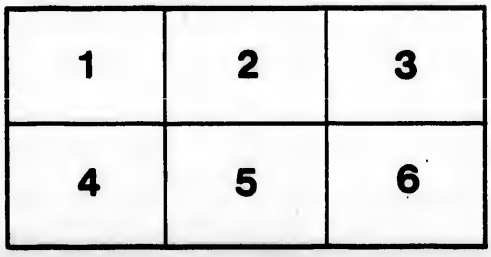

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NEW BRUNSWICK AND CANADA RAILWAY AND LAND COMPANY,

FROM WOODSTOCK ONWARDS.

Specification.

BAXTER, ROSE, NORTON, & SPOFFORTH,

6, *Victoria Street.*

NEW BRUNSWICK AND CANADA RAILWAY AND LAND COMPANY,

FROM WOODSTOCK ONWARDS.

1. SPECIFICATION for the Construction of that portion of the Line of Railway from Houlton Road, Woodstock, to the Canadian frontier, and thence to the Rivière du Loup, or the Grand Trunk Railway.

Work included in contract.

2. The contract shall include the whole of the work, labour, and materials requisite to construct and complete the line of Railway above mentioned, with all the requisite roads, bridges, stream diversions, culverts, and accommodation works, and also all requisite provision for the drainage, both of the line itself and of all lands, the drainage of which may be interfered with by the works of the Railway.

Finished work, guide for this.

Engineer's instructions.

3. Where the present specification does not apply to or describe any particular work which may be found requisite, the finished portion of the works already executed between St. Andrew's and Howard Settlement shall be taken as the standard. The levels, sections, plans of bridges, and other works, with all the necessary instructions, shall be given to the contractor by the engineer from time to time as the work proceeds, and the contractor will be bound to carry out all such instructions, and to execute the whole of the works to the entire satisfaction of the engineer, subject to the conditions contained in the contract.

Engineer right to alter works.

4. The engineer shall have the right to vary or alter the works at any time during their progress, or to substitute one kind of work or material for another.

Acceptance of work by Company.

5. Payments made on account of work executed shall not be considered as approval of the work done, or as acceptance on the part of the Company, and all improper materials brought upon the ground must, on receipt of the engineer's order, be removed.

Contractor responsible for stability.

6. The contractor will be responsible for the stability of the whole of the works, and for their maintenance in good condition, until completed to the satisfaction of the engineer, and finally accepted by him in writing.

Word Engineer.

7. EXPLANATORY.—In all cases where, in this Specification, the word "Engineer" is used without qualification, the engineer in charge of construction or resident engineer is meant, but the directions of any subordinate or assistant engineer, or any other recognised officer of the Company, shall be respected and complied with, when given with regard to any of the ordinary operations of the road, or when transmitting the order of a superior officer.

Word Contractor.

8. In cases where the word "Contractor" is used in this Specification, or otherwise, it will be understood as applying to and including any number of persons contracting jointly as one party or firm; and in all business transactions each contractor shall be considered the agent duly authorised to act for and in behalf of the firm to which he belongs, in all cases which may arise, including the adjustment of accounts, and receipts for moneys paid; and all instructions, directions, or notices given to one individual of the firm or duly recognised sub-contractor or agent by the engineer, shall be of the same force and effect as if given to all, and be received and acted upon accordingly.

Width cleared.

9. CLEARING AND GRUBBING, &c.—The line to be cleared for a full width of 100 feet, being 50 feet on each side of the centre stakes, and in the following manner, viz.:

Mode of clearing.

To be chopped clean to ground surface for a full width of 50 feet, being 25 feet on each side of the centre line; the remaining marginal widths of 25 feet each to be chopped down, so that no stump shall exceed 2 feet in height above ground-surface. In all cases where embankments and cuttings of not more than 3 feet in height or depth occur, all trees of more than 9 inches in diameter shall not be felled in the ordinary manner, but shall be grubbed at once, and the trunk severed from the root after the tree is down: these portions of the line will be pointed out by the engineer. No stumps, logs, or perishable materials shall be placed in the embankments or allowed to remain on any part of the works within the side-ditches; and any refuse that may have been casually left upon the centre

line after the operation of clearing and grubbing, shall be removed from the seat of all the embankments.

All trees after being felled shall be trimmed of their branches, but in no case by burning; and such branches, together with all brushwood and other small stuff, shall be piled in the centre of the chopping, and burnt up at such times as shall be most favourable for the burning. Trimming of timber.

All logs and other stuff available for mill manufacture, ship-timber, sleepers, cordwood, or other purposes, shall be rolled to either side of the line clear of all side-ditching, leaving a full clear width of way of at least 80 feet; and in no case shall the contractor be allowed to deteriorate any of the large merchantable timber by cutting up into short lengths. All timber to remain the Company's property. Timber to remain Company's property.

All cedar or other poles suitable for fencing, such as 18-feet lengths, and 3 inches at the point-end, shall be selected from the clearing, properly trimmed, and placed in piles of 50 and 100 feet each or more. Fencing timber.

10. EARTHWORK.—The road to be graded for a single track, that is, it will be 16 feet wide on embankment at formation-level or subgrade, but not less than 30 feet wide at the foot of slopes in earth excavations at the same level of subgrade. In rock-cutting, the road-bed will generally be 24 feet wide, and where rock to any extent occurs in earth excavation at subgrade, it will have to be taken out to the full gullet width of such cutting, so as not to interrupt the line of drainage on either side of the track. Widths of line.

Variations in the width of embankments and excavations, slopes and subgrade levels, to be made at the option of the engineer, should he hereafter consider such alterations necessary.

11. Side drains of sufficient capacity to be dug along the top of the cuttings, and also at the foot of embankments, where and when they are deemed requisite, as also drains throughout the cuttings on either side of the track; all of which will be usually 6 feet wide at surface, and 2 feet deep, or of such extra width and depth as the engineer shall approve of or direct. Headfalls and outfalls to culvert stream diversions shall also be excavated to such width and depth as shall, in the opinion of the engineer, be considered to be sufficient for the purpose. Side drains.

12. All the materials excavated in cuttings shall be carried to embankment; and when embankment is in excess, and extra material beyond that supplied from the ordinary widths of cutting, as specified, is required, the cuttings shall be evenly widened to such extra width as may be necessary, Excavation of cuttings to be carried to embankment.

and no side cuttings or borrowing pits shall, under any circumstances, be opened, except by the engineer's express approval and consent.

Side cutting, where required.

13. But where side trenchings or ditching is resorted to for the purpose of procuring material for the formation of the banks on this section of the line, a space or berm of not less than 5 feet must be left between the foot of the slope of embankment and the side ditch, which must be sloped off on each side, and have such sectional area that one yard forward of ditching shall make one yard of banking. This work must not be commenced without being first staked out by the engineer.

Trimming earthwork.

14. All slopes of cuttings and embankments must be neatly trimmed and soiled, and at such times as directed by the engineer, before the ballast is laid on, the formation or subgrade surface must be accurately trimmed to the prescribed form.

Faggoted base for embankment.

15. When found necessary for the better support of the bank bog so traversed, the space occupied by the base of the embankment shall be laid with poles, packed close together butt and joint, and transversely to the line of road; in addition to which a layer of brushwood shall be spread over the poles to bind the earthwork, and secure as uniform a subsidence as possible.

Permanent way for temporary purposes.

16. The contractor will not be allowed to use more than 10 per cent. of permanent way materials for temporary purposes, which, after temporary use, must be carefully straightened and reserved for sidings.

FENCING AND ACCOMMODATION WORKS.

Fencing.

17. The fencing of the line must be such as is erected on other parts of Railway, the work to be executed in neat and substantial manner.

All requisite accommodation works must be executed according to the custom of the country.

Owners of land to erect fences.

18. Should the Company find it desirable, in certain cases, to employ the owners of the land through which the line may pass for the erection of the fencing, they shall have the right so to do, and to make a deduction from this present contract, at the rate of one dollar per rod of fencing erected.

Cattle guards.

19. Cattle guards shall be constructed at all road crossings; they will usually be for level crossings 15 feet in length, 4 feet in width, and 3 feet in depth; side walls to be 3 feet thick; tie-walls under line of track, 18

inches thick, having openings at foot to allow passage of drainage water; the whole will be covered on top with 5×4-inch scantling, 10 feet long, placed 3 inches apart, and hewed or planed to a chisel edge on top.

20. CULVERTS.—The culverts will be of two kinds—viz., wood and stone; when of wood, according to the following clause, No. 21; and when of stone, according to the following clauses, Nos. 22 to 32:— Culverts.

21. Wooden culverts will be made of longitudinal sticks of cedar or pine timber, squared to 12×12 inches, if of pine, or 10×10 inches if of cedar, and dowelled together at every 6 feet with 2-inch hacmatac dowels entering 3 inches into each stick, the bottom course to be notched down three inches into 9×9-inch sleepers placed transversely 6 feet apart, the ends projecting about 12 inches beyond the outside of the wall; the covering is to be of timber 8 inches thick, hewed square, and laid close together at intervals of every 6 feet; along the culvert top there shall be a 10-inch stick inserted, notched down 3 inches, and trenailed on the side walls with 1-inch hacmatac trenails. There are likewise to be vertical pieces of hacmatac or cedar, 3×6 inches on each side of the culvert, at every 6 feet set flush in the side walls with a dovetailed notch, and driven down from the top into the notch cut into the cross side to receive the side wall. The space between the sills to be fitted up to a level bed throughout the extent of the culvert with suitable materials, such as stone spaul, &c.; the top of the subsills must be level with the natural bed of the stream, so as not in any way to cause a backwater at lowest water level; and, when the culvert is completed, the material from excavation, if of earth or clay, puddle must be thrown in at the back of the walls, and properly rammed down and punned to prevent leakage. The ends of these culverts shall be neatly stepped off, being sawed square according to the number of sticks in height. Wooden culverts.

22. The square or box culverts will be of dry rubble masonry; they will be from 2 to 4 feet span, and from 2 to 5 feet high; the walls and covering of the different sizes of culverts will not be less than the following thickness:— Box culverts.

23. The 2 feet and 2½ feet culverts, the thickness of walls will be the same as the height, covers 1 foot thick.

24. 3 feet to 4 feet culverts, the walls will be 3 feet thick, and the covers 15 inches thick.

The stones of which they are built shall be sound, strong, and durable, laid dry or without mortar, well shaped, and form a perfect bond throughout, for which purpose one-half shall be of a sufficient size to extend through the walls when not exceeding 3 feet in thickness; they will be

covered with split granite lapping 1½ feet upon each side wall, fitting closely together, so that the embankment shall not run through into the culvert. The top stones of the walls which receive the covers must extend in full across the walls, but, in default of such stone being obtained, a dry rubble arch may be substituted of such thickness as may be directed; but when even this stone cannot be obtained, cedar covers may be used, to be hewed to not less than 7 inches either in thickness or width; the timber to extend fully across the walls. The ends of the culvert walls will be neatly finished to a square face, set with mortar, for one yard in length, or having square wings 3 feet in length on either side, at right angles with the side walls, and of the same thickness, set with mortar, and surmounted with a string course or coping.

Culverts 6 feet and upwards.

25. Culverts of 6 feet span and upwards will be arched, turned upon proper centreing, and set with mortar containing a mixture of cement. For a 6 feet culvert there shall be an 18 inch ring, and for an 8 feet and 10 feet culvert there shall be a 2 feet ring; the height of the culvert from the pavement to the crown of the arch will not exceed the span; the culverts shall be included under the head of second-class masonry, with the exception of the facework at the ends and the wings, which belong to the first-class. The ring-stones shall have beds to conform to the radius of the arch, with the end joints vertical, and be made to set smoothly on the centreing; each stone must extend through the whole thickness of the arch, the courses must be parallel throughout, and no spauls or punners will be admitted.

26. The quoin stones or face of the arch shall be dimension work, the beds and joints being truly dressed, but the face may be left rough punched, with the exception of a chisel-dressed margin round the arrises of each stone: they shall be laid as header and stretchers alternately, and be of sufficient length to bond strongly with the rest of the arch.

Waterproofing arches.

27. The whole top of all arches shall be well plastered with a good coating of cement or asphaltum, to prevent leakage.

28. The centreing shall be such as the engineer approves of, and shall not be removed until he so directs.

Foundations.

29. The clauses respecting foundations of bridges will apply to culverts.

Rip rap.

30. Rip rap, whether used in foundations or elsewhere, is understood to mean heaps of rough stone, furnished by the contractor, not dressed to shape, or deposited in place with mechanical skill, but handled and disposed

of by common labourers to suit the required purpose; such, for instance, as forming blind drains, protecting the bottom of piers and abutments, and foot of slopes against the abrasion of water, or for forming foundations on which to build.

31. Culvert pavements shall be made by excavating one foot or more in depth of that portion of the bed of the stream to be paved, which shall then be fitted with a pavement of good flat stone, not less than one foot in width, set on edge close together, and made to present an even upper surface.

32. The specification for cement, mortar, and grout for bridges will apply to culverts, and all other masonry or brickwork.

33. BRIDGES.—Bridges will be built of stone or timber, as may be directed by the engineer; any of the following descriptions of works must be used as directed by him:—

34. FOUNDATIONS.—When the nature of the ground is such as to be unfit for the direct support and permanent stability of the masonry, artificial foundations shall be made of timber; concrete, or rip rap, or piling may also be adopted as circumstances shall require; when, however, the character of the excavation is such as not to require the forementioned, the first or footing courses of masonry shall be laid with large flat stones, from 6 inches to 1 foot in thickness, and, if mortar or cement be used, shall be well bedded therein, and full laid. The foundation pits shall be excavated to such depths as the engineer shall deem proper for the permanent stability of the structure to be erected. Foundations.

All foundations must be kept perfectly clear of water during the execution of the work.

35. The arches of bridges to be coated as described for culverts. Waterproofing arches.

36. TIMBER FOUNDATIONS, where required, will consist of bearing piles driven to the required depth at equal distances between centre, say 3 feet and double cross planked, a bed or pitching of stone, concrete, or other material being laid round the pile heads for a depth of at least 12 inches; or they will be constructed of square timber of large dimensions, and laid in such manner as the plans shall indicate, well bedded and wrought to an even upper surface, the spaces between them being filled, and well rammed with such material as the engineer may direct. On these timbers planking shall be laid, and trenailed or spiked as required. For further particulars of piling, see "Pile Bridging." Timber foundations.

37. All bearing piles shall be driven and cut off so far below the lowest water surface, that any timber foundations laid on them shall be at all times entirely immersed.

Cement.

38. CEMENT, when used, shall be of the best quality of hydraulic Rosendale, to be properly housed or preserved until required for use. The proportion of sand and cement for construction, shall be one of cement to two of clean, sharp sand, to be used immediately after being mixed, and no greater quantity to be mixed than shall be required for a day's work.

Lime mortar.

39. LIME MORTAR, so called, though always required to contain a certain portion of cement, will consist, in general, of two parts of best quick lime—one of cement, and five of sand; the ordinary mortar of lime and sand being first properly made, and the cement then thrown in, and thoroughly mixed before being used.

Grout.

40. GROUT, when permitted to be used, shall be made by adding to the mortar as much water as shall be necessary to give it the required fluidity.

41. CONCRETE shall be made of one part of cement and two of sand, mixed to the consistency of thin mortar, after which broken stone, egg size, and in sufficient quantity to be immersed, shall be thrown in and thoroughly mixed; it shall be applied by means of moulding, until sufficiently set to retain its form, and it shall otherwise be thrown into place from such a height of scaffolding as the engineer shall direct, to assist the proper consolidation of the whole.

42. FIRST-CLASS MASONRY—under which head is included abutments and piers, head-walls, and wing-walls of arched culverts, and large bridges—will be of the kind commonly called "Rock-face," with hammer-dressed beds and joints throughout the walls, the beds and joints of the facework to be dressed to half an inch, the joints to extend 6 inches in from the face, the beds to be once and a half the build, and in no case less than 14 inches with one header, not less than 2 feet 4 inches in length to every two stretchers, properly disposed with a view to a good bond in the alternate courses. All principal stones, whether of face or backing, to be laid with their broadest beds down.

The whole must be thoroughly bonded, and no more spauls introduced than is necessary to fill up the unavoidable intervals amongst the large stones, and make a solid mass of the whole; but none of these can be admitted in the facework. The work will be coursed and carried up in such a manner, that there shall not be more than two unfinished courses in the

work at the time; the stones must be dressed, and the beds well prepared, before being brought on the wall, and must not be disturbed, when cement or mortar is used, after being once properly laid; the cement or mortar shall be mixed thin, and the stone laid full, so that all interstices shall be completely filled, and the wall made a solid mass, the stone being kept clear from dirt or foreign substances which may prevent adhesion.

The coping and string courses shall be built of stone, neatly tooled, and truly laid.

Second-class masonry.

43. SECOND-CLASS MASONRY — such as is applicable to bridges of moderate height, farm or cattle passes, &c.—shall be built of sound, durable stone, of good size and proportion, properly shaped by the hammer, and laid according to the principles specified for first-class masonry (though uncoursed), with horizontal beds and vertical joints, exhibiting a neat and workmanlike appearance on the face, without the introduction of clinkers or spauls.

Third-class masonry.

44. THIRD-CLASS MASONRY is the kind proper for box and open culverts, spandril backing of arches, &c. The stones shall have beds with a fair bearing surface, the face joints neatly fitted, and the ends and square wings neatly finished, the material of the whole being of good quality and fair size. Spandril backing for arches shall have fair beds, and laid according to the plans and directions of the engineer.

Fourth-class masonry.

45. FOURTH-CLASS MASONRY, of the kind proper for slope and retaining walls, the walls of cattle guards and culverts, pavements shall be built of large stone, generally with good natural or made beds, so laid and bonded as to give the greatest degree of strength in preference to a good appearance, and, usually, with header and stretcher to secure the bond.

Pile bridging.

46. PILE BRIDGING.—Piling may be used either as bearing piles for foundations, before-mentioned, or for piled bridges. The piles in either case may be matured red pine hæmatac, or straight and sound, not less than 10 inches diameter at the point end, barked and properly banded with an iron ring, and pointed for driving, when found necessary: they will be properly shod with an iron shoe of approved weight and pattern, they shall be driven in such places and to such depths as may be required by the engineer, the heads cut off square after driving, or finished with a tenon to receive cap, &c. All mortices and tenons to be put together with white lead. The remaining portion of the bridge will comprise caps, corbels, stringers, and cross ties of the best white pine timber.

This class of bridge shall not have less span than 10 feet, and shall

not exceed 20 feet. The width of these bridges and of all other bridges shall not be less than 15 feet.

Trestle bridges.

47. TRESTLE BRIDGES will consist of squared material, well hewed or mill manufactured; the trestle work will be raised on stone foundations, which will usually be carried three feet above ground, and to such depths as shall insure a solid foundation.

48. The whole of the material used shall be of the best white pine timber.

49. TRUSS BRIDGES.—This class will be of the kind known as the ordinary queen post truss—Howe truss or M'Cullum's truss, as shall be decided on hereafter. These will involve abutments and piers of masonry.

Brickwork.

50. BRICKWORK.—Should brickwork be used in arches, culverts, bridges, &c., it shall be built in a good and workmanlike manner, of the best, sound, hard, burnt brick, no soft or broken bricks being admitted, and for all brickwork regular bricklayers must be employed.

PERMANENT WAY, OR SUPERSTRUCTURE.

Ballasting.

51. BALLASTING.—The seat for the ballast having been properly trimmed, as directed for earthwork, the ballast shall then be spread. It shall be composed of the best material that can be procured, free from all loam and clay mixtures. In opening any ballast pits, the top soil, where any exists, must, in all instances, be thrown to spoil, and not used in the work.

The quantity of ballast to be spread shall not be less than 1 yard and a quarter to the yard forward. No ballast must be laid on until the cuttings and embankments are completed in that district of the line, and earth excavation must not on any account be allowed to pass over any ballasted portions of the line.

When bottom ballast is spread during the progress of the works, the first thickness must not be less than 7 inches, leaving the remaining 5 inches for top boxing and packing the track to the required level of grade proper.

Permanent way materials.

52. The permanent way materials to be sent out from England will consist of rails of the form  about 56lbs. to the yard, 18 feet in length,

fish plates, bolts, spikes, switches, crossings, and wrought-iron turntables, all of which must be of a description and quality according to instructions, to be furnished by the Directors, and will be subject to the inspection of the Company's engineer, and his certificate, which must be obtained previous to shipment.

53. The sleepers must be of hacmatac or black ash, and not of any other timber, unless expressly approved by the engineer in writing; they must measure 9 feet in length, 7 inches in breadth, on the upper surface, and be flatted to 7 inches in thickness, nine sleepers being laid under each 18 feet length of rail.

54. The permanent way shall be perfectly adjusted both as regards line and level, and the ballast shall be properly boxed up and trimmed before being handed over by the contractor and accepted by the engineer.

Stations, where required.

55. STATIONS.—Stations will be required at various points on the line, and must be constructed in every respect according to the instructions which will be given by the engineer; but the following Specification for stations between Howard Settlement and Woodstock may be taken as a general guide for the probable requirements:—Stations will be required at Eel River, at Mackenzie's Corner, at one other locality at present undefined, and also a terminal station at the Houlton Road, with the requisite houses, sheds, platforms, roads, approaches, fencing, and all other appurtenances to render the line fit for traffic.

Five through sidings will be required to be placed where directed, in addition to those at the stations.

Eel River station.

56. The station at Eel River will consist of one framed station-house, clap-boarded and shingled, fitted complete for occupation, to contain six rooms, to be built according to the engineer's plans, but not to exceed in cost £300.

A goods shed to be clap-boarded and shingled-built, of the dimensions —200 feet in length, 30 feet in width, and 30 feet in height to plate, with steep, pitched roof. Pent houses to be constructed in each side of the goods sheds to span the sidings in the usual manner. A proper platform to be constructed in the shed, and all the work to be done to the satisfaction of the Company's engineer. Four pairs of large sliding doors to be fitted on each side, and a small office in such part as may be determined upon.

A passenger platform, to be constructed of timber, 350 feet × 12 feet.

A through siding will be required of clear length of 1,200 feet, the

width between lines being 6 feet. In addition to this, two sidings will be required, one on each side the goods shed, and also other sidings as directed, with the necessary turnouts, connections, and other arrangements, the total clear length not to exceed 3,600 feet, exclusive of the through siding of 1,200 feet as above.

Other intermediate stations.

Similar stations will be required at M'Kenzie's corner, and at a point as yet undefined.

Terminal station.

57. The terminal station at Houlton-road will require a house of ten rooms, the cost not to exceed £600; goods shed, equivalent to three times the accommodation specified for Eel River; engine-house, with shop, smith fire, ash-pits, and all the requisite accommodation for cleaning engines and doing the ordinary repair. A 50 foot turntable to be included within the house. The house to contain three engines on the proper sidings.

Passengers platforms to be 400 feet × 20 feet, properly constructed of timber.

A woodshed of the usual construction, 200 feet × 25 feet × 16 feet, to plate high pitch roof.

Sidings to be constructed to hold 40 square trucks, in addition to those specified for the Eel River.

The requisite cattle pens to be erected with a loading wharf.

58. Three watering places, with tanks of the same size as those in the engine-house at St. Andrew's, to be constructed where directed, in addition to one of double capacity to be fixed in the engine shed at the terminus, with the engines, mains, and all requisite apparatus for water supply, as the circumstances may require.

59. Turnouts will be required every three miles, with a clear length of 1,200 feet, with a width of 6 feet clear of the main line, and a lay-by siding of 300 feet clear length; "clear length" in all these cases will be measured from the point where the siding first becomes 6 feet clear of the other lines.

Walter M. Buck
Engineer

HENRY CARR,
FREDERICK C. BRADLEY,

24th March, 1860.

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