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THIRTEENTH ANNUAL REPORT

OF THE

Commissioner of Public Roads

FOR THE YEAR ENDING OCTOBER 31

1906

TRENTON, N. J.
MacCrellish & Quigley, State Printers.
1907

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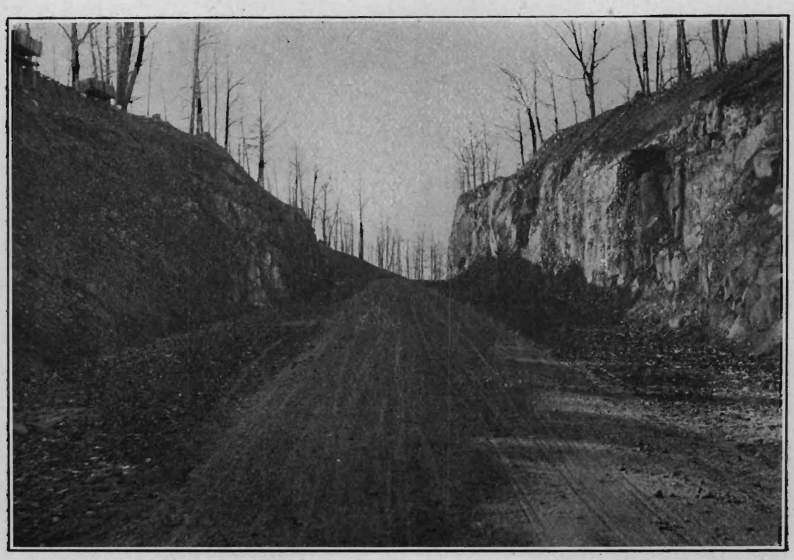
Bradford Avenue, Western Slope, Essex County, Before Improvement.



Bradford Avenue, 33-ft. Cut, Essex County, After Improvement.

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OFFICE OF COMMISSIONER OF PUBLIC ROADS,
TRENTON, NEW JERSEY, January 18, 1907.

To His Excellency, Edward C. Stokes, Governor, and the Legislature of New Jersey:

I have the honor to submit the thirteenth annual report of the Commissioner of Public Roads for the fiscal year ending October 31, 1906, with such comments, quotations and suggestions as existing circumstances seem to require.

E. C. HUTCHINSON,
Commissioner of Public Roads.

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REPORT.

Road Improvement in New Jersey for the Year 1906.

The following is a brief resume of the work done in the several counties of the State during the year 1906 under the provisions of the Act to Provide for the Permanent Improvement of Public Roads in this State.

Atlantic county has commenced grading the road from Hammonton to Atsion, 6.41 miles, and is surveying the Mays Landing and Downstown road, 13.50 miles in length.

Bergen, as usual, did nothing as a county, but Hillsdale township extended and connected the improvements already made on West Hillsdale, East Hillsdale, Magnolia and Washington avenues, the total length of road improved being .42 miles. Hohokus township has awarded the contract for the improvement of a portion of Franklin turnpike, 1.59 miles. When completed, it will extend the macadamized roads of Bergen county to within two miles of the New York State line.

Burlington county completed the Newbold's Corner and Eayrestown road, 2.51 miles, and a portion of the Westfield and Camden turnpike, 1.20 miles. The Red Lion and Tabernacle gravel road, 3.65 miles, is nearly completed. Surveys have been made and plans and specifications prepared for the remainder of the Westfield and Camden turnpike, 3.12 miles, and the Medford and Lumberton road, 3.90 miles. The bids received were so high that the Board of Freeholders rejected them, and, in consequence, nothing has been done.

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Camden county has under construction these roads, none of which are entirely completed: King's Highway, 1.55 miles; a portion of the Blackwoodtown turnpike, 2.53 miles; Linden avenue, Laurel Springs, .98 miles, and Haddonfield and Coffin's Corner, 3.15 miles. On the latter road nothing but the rough grading will be done this year. Plans and specifications have been prepared and approved for the Berlin and Milford gravel road, 4.05 miles, and the Cove road, 1.78 miles. The purchase of the Camden and Haddonfield turnpike has not been made, but the matter is still under consideration.

Cape May county is working away at the Sea Isle City turnpike, 2.61 miles, which it purchased last year. The work is fast approaching completion and would have been finished but for the storm tides which have materially retarded the work. The authorities of this county are surveying Cape May Court House and Dennisville, and the Palermo and Tuckahoe roads, together about 15 miles in length.

Essex county nearly completed two very heavy pieces of work; namely, Bradford avenue, 1.46 miles long, through the First Watchung mountain, and Mount Pleasant avenue, 1.07 miles, through the Second mountain. Some idea of the size of these undertakings may be gleaned from the fact that the depth of the rock cut on Bradford avenue was thirty feet and on Mount Pleasant avenue was twenty-seven feet. The importance of the first avenue lies in the fact that it connects the county institutions at Overbrook with the thickly populated eastern section of the county. The second avenue furnishes an outlet for the dairies of the Passaic valley to the Oranges and Newark, and completes one more through east and west line across the county. Contracts have been let for the Horseneck road, 2.50 miles, and the Westville road, 1.50 miles. In addition to these, surveys have been made and plans and specifications prepared and approved for Harrison street, Livingston, 1.30 miles; Watchung avenue, Bloomfield, .88 miles; Central avenue, Caldwell, 3.14 miles, Gregory avenue, West Orange, 1.70 miles; High street, Nutley, .99 miles, and Clinton avenue, West Orange, 2.23 miles.

Hudson county has at last completed a piece of work which, like all improvements on the salt meadows, cost much more than

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was anticipated, owing to the excessive settling of the embankment. Belleville turnpike, 2.32 miles long, is completed across the meadows, and the most expensive part of an improved highway from Jersey City to northern New Jersey is finished, but its usefulness is destroyed because Bergen county, which owns one-half of the road from the end of the present macadam to the Belleville bridge, will not unite with Hudson in finishing this important work.

Hunterdon county has completed its first State aid road, Old York, 5.55 miles long. It begins at Lambertville and extends towards Ringoes. The improvement is now being extended to Flemington, a distance of 5.37 miles, and by next summer Hunterdon's largest borough will be connected with the county seat.

Mercer county, having improved over 16 miles last year, rested this year, but is getting ready for active work in 1907 by making surveys and preparing plans and specifications for the Upper River, East State street, Hopewell and Stoutsburg, Princeton avenue, Spruce street and Brunswick avenue, Lalor street and Cedar lane, Hamilton avenue, and Quaker Bridge roads, a total of 8.13 miles.

Middlesex county completed the Landing Bridge and Stelton road, 2.05 miles, and the Applegarth and Prospect Plains gravel road, 2.93 miles. It is also working on the Cranbury Neck stone road, 2.27 miles long; the Jamesburg and Dayton stone road, 2.86 miles long, and has awarded contracts for the River road, 2.97 miles; the Port Reading road, .96 mile, and the Cheesequake Creek road, 1.97 miles.

Monmouth county finished the first section of the Allentown and New Egypt road, 3.36 miles, and is rapidly pushing to completion the second section of the Freehold and Colt's Neck road, 2.18 miles. The latter is a continuation of a cross state road from Trenton to the seashore. No new work for the coming year has as yet been mapped out in this county, because the members of the old Board of Freeholders all retire from office and a new Board of five members, elected from the county at large, take their places on the first day of January.

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Morris county built five roads, as follows: The Morristown and New Vernon, 1.96 miles, Montville and Mountain View, 2.87 miles, the remainder of the Sussex turnpike, .69 mile, Mountain avenue, Mendham, .75 mile, and Hamburg turnpike, .36 mile. The last is of far more importance than its length would indicate, because it connects the extensive improvements, over 24 miles in length, made upon the famous old turnpike from Paterson to Hamburg by Passaic county.

Ocean county is extending the Main Shore road through Berkeley township to Toms River, a distance of 6.91 miles. When completed, it will connect the county seat with Tuckerton, the most southerly town in the county, and, in conjunction with the township road to Lakewood, will connect the two famous resorts of Lakewood and Atlantic City.

Passaic county completed two roads commenced in previous years, the Mountain View and Singac, 2.46 miles, and the Goffle Hill, 1.42 miles, and is making the preliminary survey for the improvement of East Twenty-second street, Paterson, Midvale and Greenwood Lake road and the Butler and Echo Lake road, the combined lengths of which are about 8 miles. The improvement of these roads, together with the completion of the cut-off, built to avoid two grade crossings in the Paterson and Hamburg turnpike, comprises the county's new work for 1907.

Salem county has surveyed the Salem and Alloway Creek road, 3 miles, and has prepared plans and specifications for its improvement, but has not as yet let the contract for the work.

Somerset county completed the Rocky Hill road, 5.60 miles, and nearly finished the North Branch road, 3.12 miles. It has surveyed and is preparing plans and specifications for the extension of the North Branch road to Hunterdon county line, a distance of 2.34 miles. Bernards township prepared plans and specifications for the improvement of one mile of road from Bernardsville towards Liberty Corner, but has done nothing further as yet.

Union, as a county, did nothing, but Cranford township macadamized Springfield and Centennial avenues, 1.79 miles, and Orange avenue, South Twenty-first street, Orchard street, Brookside place and Division street, 2.22 miles.

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Warren county built no roads during the past year, but confined its efforts to the surveying of the Harmony township road. This is an extension of the macadamized road from Belvidere toward Phillipsburg. The length of the portion proposed to be improved is 5.50 miles.

The year's work in brief is as follows:

Roads completed, 40.46 miles, approaching completion, 37.52 miles; under contract, 20.09 miles, surveyed, 79.56 miles, a total of 177.63 miles.

The first three divisions may be properly classed as this year's work, while the last is preparatory for next year's work.

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In compliance with the act of March 27, 1905, we make a statement of cost of roads, as follows:

COST OF ROADS.

Bergen County.

West Hillsdale, East Hillsdale, Magnolia and Washington avenues,		.42 mile
Cost,	$2,719 26	
State's share,	906 42	
Total number of miles,		.42
Total paid the township,		$906 42

Burlington County.

Newbold's Corner and Eayrestown road,		2.51 miles
Cost,	$17,911 11	
State's share,	5,970 37	
Westfield and Camden turnpike,		1.20 miles
Cost,	$9,374 40	
State's share,	3,124 80	
Total number of miles,		3.71
Total paid the county,		$9,095 17

Hudson County.

Belleville turnpike,		2.32 miles
Cost,	$93,572 00	
State's share,	31,190 67	
Total number of miles,		2.32
Total paid the county,		$31,190 67

Hunterdon County.

Old York road,		5.55 miles
Cost,	$48,622 71	
State's share,	16,207 57	
Total number of miles,		5.55
Total paid the county,		$16,207 57

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Middlesex County.

Landing Bridge and Stelton road,		2.05 miles
Cost,	$14,022 68	
State's share,	4,674 23	
Applegarth and Prospect Plains road,		2.93 miles
Cost,	$7,342 62	
State's share,	2,447 54	
Total number of miles,		4.98
Total paid the county,		$7,121 77

Monmouth County.

Allentown and New Egypt road, First section,		3.36 miles
Cost,	$23,245 95	
State's share,	7,748 65	
Total number of miles,		3.36
Total paid the county,		$7,748 65

Morris County.

Morris and New Vernon road,		1.96 miles
Cost,	$20,252 65	
State's share,	6,750 88	
Montville and Mountain View road,		2.87 miles
Cost,	$13,688 36	
State's share,	4,562 79	
Mountain avenue, Mendham,		.75 mile
Cost,	$5,953 95	
State's share,	1,984 65	
Hamburg turnpike,		.36 mile
Cost,	$3,255 68	
State's share,	1,085 23	
Sussex turnpike,		.69 mile
Cost,	$7,802 82	
State's share,	2,600 94	
Total number of miles,		6.63
Total paid the county,		$16,984 49

Passaic County.

Mountain View and Singac road,		2.46 miles
Cost,	$21,183 81	
State's share,	7,061 27	
Goffle Hill road,		1.42 miles
Cost,	$17,472 62	
State's share,	5,824 20	
Total number of miles,		3.88
Total paid the county,		$12,885 47

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Somerset County.

Rocky Hill road,		5.60 miles
Cost,	$33,109 15	
State's share,	11,036 38	
Total number of miles,		5.60
Total paid the county,		$11,036 38

Union County.

Springfield and Centennial avenues,		1.79 miles
Cost,	$11,329 52	
State's share,	3,776 50	
Orange avenue, South 21st street, Orchard street, Brookside Place and Division street,		2.22 miles
Cost,	$13,298 42	
State's share,	4,432 81	
Total number of miles,		4.01
Total paid the township,		$8,209 31
Total number of miles accepted in 1906,		40.46
Total paid on contracts November 1, 1905–January, 1907,		$270,802 36
Total paid supervisors,		6,586 40
Total paid out,		$277,388 76
Appropriation,		400,000 00
Balance, against which contracts have been filed,		122,611 24

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The following roads are approaching completion, but were not finished in time to be reported in the preceding list:

	No. of Miles.	Cost.
Burlington County.		
Red Lion and Tabernacle road,	3.65	$8,366 10
Camden County.		
King's Highway,	1.55	$16,400 00
Blackwoodtown turnpike,	2.53	28,390 00
Linden avenue, Laurel Springs,	.98	7,589 13
	5.06	$52,379 13
Cape May County.		
Sea Isle City turnpike,	2.61	$26,964 59
Essex County.		
Bradford avenue,	1.46	$80,018 76
Mount Pleasant avenue,	1.07	33,344 65
	2.53	$113,362 41
Hunterdon County.		
Old York road, second section,	5.37	$39,826 62
Middlesex County.		
Cranbury Neck road,	2.27	$22,517 12
Jamesburg and Dayton road,	2.86	23,112 78
Port Reading road,	.96	7,893 00
	6.09	$53,522 90
Monmouth County.		
Freehold and Colt's Neck road, second section,	2.18	$23,617 00
Ocean County.		
Berkeley Township Main Shore road,	6.91	$26,263 68
Somerset County.		
North Branch road, Bridgewater section,	3.12	$29,979 30
Total number of miles approaching completion,		37.52
Total cost,		$374,281 73
State's share,		124,760 58

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The total amount expended by the State and the number of miles paid for in each county since the passage of the State Aid Law are as follows:

County.	*Miles.*	*Amount.*
Atlantic,	75.51	$76,367 35
Bergen,	13.035	22,894 89
Burlington,	175.231	267,349 97
Camden,	72.18	133,195 46
Cape May,	22.454	33,041 55
Cumberland,	1.22	14,773 23
Essex,	89.014	199,401 63
Gloucester,	74.895	85,128 27
Hudson,	4.76	40,135 27
Hunterdon,	5.55	16,207 57
Mercer,	116.544	295,619 76
Middlesex,	121.55	216,009 93
Monmouth,	87.58	151,762 85
Morris,	67.135	136,075 03
Ocean,	32.86	35,493 59
Passaic,	53.117	87,730 32
Salem,	22.227	30,980 47
Somerset,	65.765	108,679 26
Sussex,	7.598	15,416 58
Union,	10.213	17,005 81
Warren,	33.332	63,558 25
	1,151,770	$2,046,827 04

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The following table shows the number of miles of road built in each county, in each year, since the passage of the State Aid Law. Also the number of miles built each year and the total number of miles built in each county:

COUNTY.	1892 No. Miles	1893 No. Miles	1894 No. Miles	1895 No. Miles	1896 No. Miles	1897 No. Miles	1898 No. Miles	1899 No. Miles	1900 No. Miles	1901 No. Miles	1902 No. Miles	1903 No. Miles	1904 No. Miles	1905 No. Miles	1906 No. Miles	Total No. Miles Built.
Atlantic,	.....	.....	.....	.....	12	10	6.84	4.03	.....	7.03	20.10	13	1	1.51	.....	75.51
Bergen,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.02	.....	9.375	2.22	.42	13.035
Burlington,	.....	10.54	20.46	9.75	11.02	10.48	15.03	18.36	8.93	17.36	19.131	27.98	2.48	.....	3.71	175.231
Camden,	.....	13.62	.....	8.25	.....	4.125	12.79	2.23	1.00	4.48	8.80	9.50	5.985	1.40	.....	72.18
Cape May,	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	5.394	6.20	2.23	2.63	.....	22.454
Cumberland,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.22	.....	.....	.....	1.22
Essex,	.....	.....	.....	6.50	6	4.91	9.276	12.07	9.60	9.36	8.723	5.79	8.545	8.24	.....	89.014
Gloucester,	.....	.....	.....	7.75	6	5.50	7.59	11.40	4.61	17.44	6.875	7.73	.....	.....	.....	74.895
Hudson,	.....	.....	.....	.....	.....	.....	.....	.....	2.44	.....	.....	.....	.....	.....	2.32	4.76
Hunterdon,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.55	5.55
Mercer,	.....	.....	9.46	6.40	10.95	4.75	2.704	10.83	9.16	10.37	15.89	12.30	7.55	16.18	.....	116.544
Middlesex,	10.55	3.18	2.36	7.68	8.43	4.75	6.164	13.10	9.01	6.12	14.95	9.52	12.42	8.335	4.981	121.55
Monmouth,	.....	.....	.....	.....	3.75	5.00	5.10	14.46	5.64	6.67	13.25	17.67	5.21	7.47	3.36	87.58
Morris,	.....	.....	.....	.....	.....	6.13	6.30	10.46	6.53	4.306	10.079	7.13	5.98	3.59	6.63	67.135
Ocean,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.90	9.97	11.83	7.16	.....	32.86
Passaic,	.....	.....	.....	.....	.....	4.79	5.48	8.67	6.73	3.987	6.57	6.09	1.54	5.38	3.88	53.117
Salem,	.....	.....	.....	.....	2.67	.....	.....	2.17	2.05	.....	3.25	4.61	7.477	.....	.....	22.227
Somerset,	.....	.....	.....	.....	.....	6.23	7.27	6.60	6.65	7.93	5.88	6.24	10.68	2.685	5.60	65.765
Sussex,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.893	.....	4.03	1.695	.98	.....	7.598
Union,	.....	.....	.....	.....	.....	.....	.....	.....	3.432	.....	2.141	.....	.63	.....	4.01	10.213
Warren,	.....	.....	.....	.....	.....	.....	.....	.08	.....	7.43	8.792	3.94	13.09	.....	.....	33.332
Total built each year,	10.55	27.34	32.28	46.33	60.82	66.665	84.544	114.46	75.782	109.376	154.745	152.92	107.717	67.78	40.461	1,151.770

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Westfield and Camden Turnpike, Burlington County, Before Improvement.

Westfield and Camden Turnpike, Burlington County, After Improvement.

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Description of Roads Improved in 1906.

Bergen County.

West Hillsdale, East Hillsdale, Magnolia and Washington Avenues, .42 Mile Long.

The work on West Hillsdale avenue consisted in extending the macadam a short distance further toward the township line, while the work on the other streets consisted in connecting improvements formerly made, thus enhancing the value of the work already done. The width of the macadam pavement is fourteen feet and its depth six inches.

John C. Gardenier, Hillsdale, New Jersey, was the contractor.

The maximum grade was reduced from 7.75 per cent. to 3.50 per cent.

The price per contract, lump sum, was $2,719.26.

The total cost was $2,956.76.

Burlington County.

Westfield and Camden Turnpike, 1.20 Miles Long.

This is an extension of the macadam pavement on the Camden and Westfield turnpike into and through the town of Westfield. By means of this telford pavement, fourteen feet wide and ten inches deep, it is hoped this famous pike will soon be restored to its former importance, and once more become the thoroughfare over which the products of the fields and orchards of northern Burlington are conveyed to the markets of Camden and Philadelphia.

J. Roosevelt Shanley, New York city, was the contractor.

The maximum grade was reduced from 6 per cent. to 2.94 per cent.

The price per contract, lump sum, was $9,300.

The total cost was $9,855.88.

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Newbold's Corner and Eayrestown Road, 2.51 Miles Long.

Pine street, Mount Holly, was macadamized to the Pemberton road in 1896. The present work begins on Pine street at the old macadam and extends southward through Newbold's Corner to Eayrestown. The rich farms on each side cause one to wonder why the farmers have been content to wallow through the heavy sand for so many years. The labor of carrying the products to market was as great as that required to produce the crop. Now all this is changed. In place of a deep, rutted, sandy road we have a hard, smooth, macadam pavement, fourteen feet wide and six inches thick, over which it is a pleasure, and not a task, for a team to haul a loaded wagon.

J. Roosevelt Shanley, New York City, was the contractor.

The maximum grade was reduced from 2 per cent. to 1 per cent.

The price per contract, lump sum, was $16,900.00.

The total cost was $19,464.82.

Essex County.

Braford Avenue, 1.46 Miles Long.

This engineering work commences at Mountain avenue, Upper Montclair and cuts through the First Watchung mountain. It passes through the borders of Cedar Grove and crosses three improved highways, Ridge road, Pompton turnpike and Grove avenue, and ends at the entrance to the grounds of the Essex County Hospital for the Insane at Overbrook. The graded width of the roadway is forty feet, through the center of which is constructed a telford pavement sixteen feet wide and eight inches thick.

This improvement might properly be termed the building of a new road across the First mountain, the object of which is to avoid a detour of two miles in either direction between Upper Montclair and the northwestern section of Essex county. As

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this region is developing rapidly, the demand for an outlet became so insistent that it could no longer be denied. The mountain presented a very formidable obstacle, and to obtain a suitable grade it was necessary to make a very heavy cut through it, the maximum depth of which is thirty-two feet. The materials encountered during the excavation varied from loam through gravel and brown sandstone to trap rock. Owing to the nature and quantity of the materials moved, this road was, in proportion to its length, the most expensive built this year.

The Osborne and Marcellis Company, Montclair, New Jersey, was the contractor.

The maximum grade was reduced from 17.04 per cent. to 9.45 per cent.

The total cost was $80,018.76.

Mount Pleasant Avenue, 1.07 Miles Long.

This telford road, sixteen feet wide and eight inches thick, fills the last gap in the road which begins at Cook's bridge, on the Passaic river, and extends across Livingston township to the Second mountain, and thence to the Oranges. The briefest inspection of the road will at once afford an answer to the question, why has it not been improved before. The deep cuts through gravel, shale and trap, in many places exceeding twenty feet in depth, furnish the conclusive answer, as this short stretch of highway is built through the top of the Second Watchung mountain. Its importance is by no means to be measured by its length. It affords an outlet to a section that is becoming so thickly populated that it will soon be compelled to look for more room.

Donato Fusco, Montclair, New Jersey, was the contractor.

The maximum grade was reduced from 11.61 per cent. to 7.48 per cent.

The total cost was $33,344.65.

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Hudson County.

Belleville Turnpike, 2.32 Miles Long.

The improvement of this old turnpike across the Hackensack meadows was begun last year. Although the bottom appeared to be solid, it was found, after the fill had been partially completed, that the settlement was far more than had been expected. Owing to this, and the further fact that the completed embankment was covered with water during the time of the heavy floods, it was found necessary to increase the amount of the fill by many thousand yards. The result is that we have a road two feet higher than was originally designed, and which, consequently, will always be free from the danger of flooding.

This highway is one which was very much needed and has been earnestly sought for, particularly by the automobilists, who have been very anxious to procure a good road from Jersey City to Belleville and northern Essex and Passaic counties.

It is constructed of telford, twenty feet wide, ten inches thick.

The contractor was John A. Sinclair, of New York City, who later made an assignment to the United States Fidelity and Guaranty Company, and by them it was completed.

The maximum grade was reduced from 6.30 per cent. to .50 per cent.

The total cost was $157,320.78.

Hunterdon County.

Old York Road, 5.55 Miles Long.

Hunterdon county's first stone road under the State Aid Act commences at the borough line of Lambertville and extends to Ringoes, where it joins the old stage road to Flemington.

After passing through all of the vicissitudes to which innovations are subject, not excepting the courts, this great improvement is an accomplished fact, and its advantages are so obvious that opposition to it is now only ancient history.

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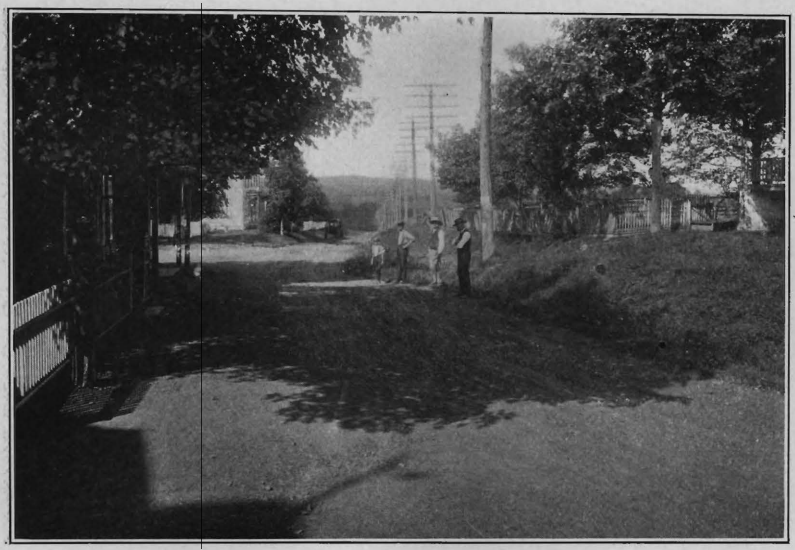
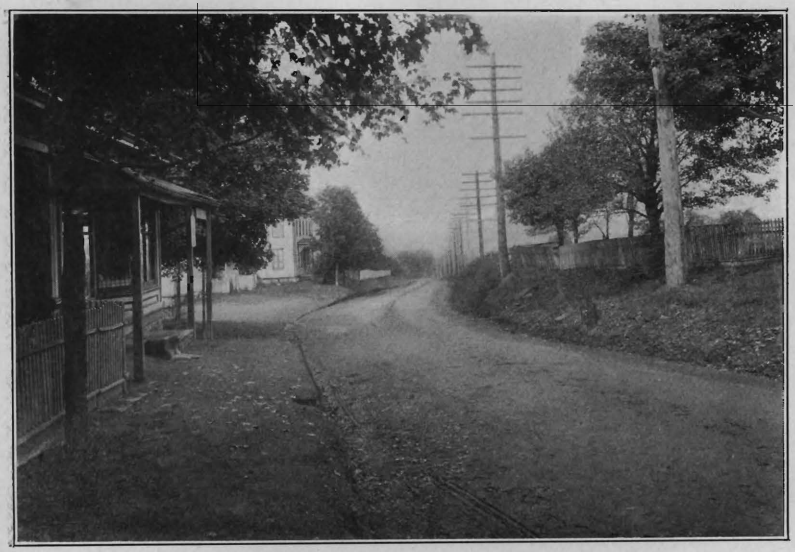


Old York Road, Hunterdon County, Before Improvement.



Old York Road, Hunterdon County, After Improvement.

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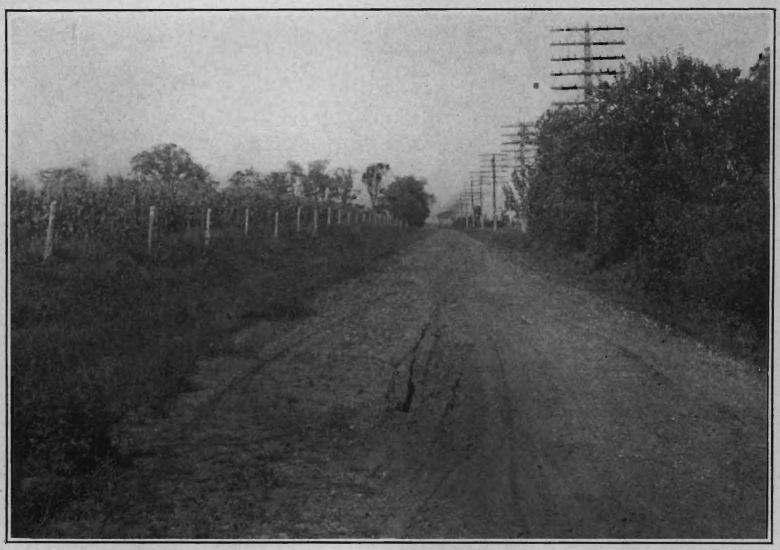
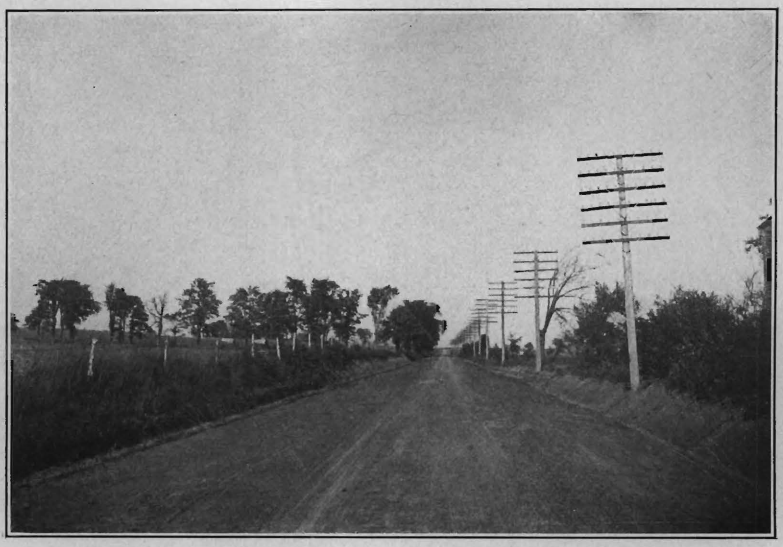


Landing Bridge and Stelton Road, Middlesex County,
Before Improvement.



Landing Bridge and Stelton Road, Middlesex County,
After Improvement.

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This road is the beginning of a through line across the county from its largest town to the county seat. Hunterdon has long had the reputation for the quality of the products of its fields and orchards. Its peaches in particular are famed for their quality and flavor. The scenery, once viewed, is long remembered. The busy toiler in counting-house, store, factory and mill may here gain some of the inspiration that nature imparts to those who come in close communion with her, and thereby be inspired to higher thoughts, nobler deeds and greater achievements.

Our State is fast becoming a great factory, and if we wish to breathe the pure air and view the green hills, we must go to those parts remote from the hives of industry. No more beautiful portion of New Jersey can be found than Hunterdon county, and all it needs to make this known to the outside world is good roads, which it is hoped it will soon have, as the citizens of the county are awake to the advantages to be derived from improved highways.

The road just finished is fourteen feet wide and six inches deep, except about three-quarters of a mile over bad bottom, which is of fourteen-inch telford.

The maximum grade was reduced from 8 per cent. to 5.66 per cent.

Delaware River Quarry and Construction Company, Jersey City, New Jersey, was the contractor.

The price per contract, lump sum, was $47,900.49.

The total cost was $50,352.91.

Middlesex County.

Landing Bridge and Stelton Road, 2.05 Miles Long.

Commencing where last year's work stopped, the macadamizing of this road for a width of twelve feet and a depth of eight inches has been completed to the New Market and Stelton stone road. This section, like that improved last year, was built through a dairy country, and, as the owners of these farms are compelled to use the road every day, its improvement is a great

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blessing to them. In addition to this, the road has a further value in that it forms a more direct route to New Market, Dunellen and the many cities and towns lying north of New Brunswick.

The maximum grade was reduced from 4.50 per cent. to 2.43 per cent.

Clarence M. Liddle, Woodbridge, New Jersey, was the contractor.

The price per contract, lump sum, was $14,293.97.

The total cost was $15,663.56.

Applegarth and Prospect Plains Road, 2.93 Miles Long.

This is a continuation of the gravel road built in 1903. Commencing at Applegarth, where the first road ends, it extends northerly to Prospect Plains. It is built of gravel, twelve feet wide and six to ten inches thick.

This might properly be termed an object-lesson road, especially in the matter of grading. The original surface was a succession of hills and hummocks, in traveling over which the principal occupation seemed to be climbing over one hill in order to find another. These have been cut down and the intervening hollows filled until the maximum grade has been reduced from eight to two and one-half per cent. As the entire roadbed has been graded for a width of twenty-six feet, the changed appearance of the road is very marked.

Butcher and LeCompte, Ardena and Lakewood, New Jersey, were the contractors.

The price per contract, lump sum, was $6,413.22.

The total cost was $7,849.62.

Monmouth County.

Allentown and New Egypt Road, First Section, 3.36 Miles Long.

This, the first stone road in western Monmouth, begins at the Allentown borough line, and extends southerly to Davis station. In connection with the improved road from Newtown, the

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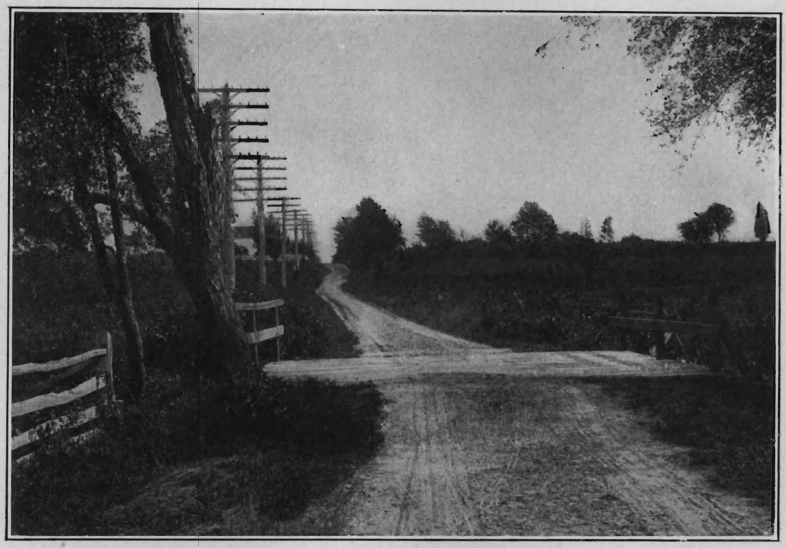

Middlesex County, Applegarth and Prospect Plains Road, Before Improvement.

Middlesex County, Applegarth and Prospect Plains Road, After Improvement.

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farmers of this region now have a good outlet to the Trenton markets, and are no longer dependent upon the weather for permission to move their crops. The width of the macadam is fourteen feet and its depth six inches, and, in addition, the road is graded to a width of thirty-three feet.

The change from a country road to a first-class macadamized highway has altered the whole appearance to such an extent that the oldest inhabitant fails to remember when such a change has been wrought in western Monmouth.

The maximum grade was reduced from 4.16 per cent. to 2.00 per cent.

Butcher and LeCompte, Ardena and Lakewood, New Jersey, were the contractors.

The price per contract, lump sum, was $22,640.00.

The total cost was $24,335.75.

Morris County.

Morristown and New Vernon Road, 1.96 Miles Long.

This improvement starts from the old macadam at the Morris township line, and extends to the village of New Vernon. It gives the people a good road to the county seat, which is also the nearest railroad station; in other words, the main outlet for this community is now for the first time in first-class condition. It is built of macadam, fourteen feet wide and six inches thick.

The maximum grade was reduced from 8.50 per cent. to 5.00 per cent.

John S. Dickerson and William Gill, Rockaway, New Jersey, were the contractors.

The price per contract, lump sum, was $20,740.65.

The total cost was $21,525.50.

Montville and Mountain View Road, 2.87 Miles Long.

Beginning at the end of the former macadam at Montville, this road follows the sweep of the mountain to Mountain View.

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Beside it, first on one side, then on the other, is the Morris canal. The completion of this stretch of macadam gives the people of Boonton and the surrounding region a stone road to Paterson and Jersey City; in other words, an improved outlet to the best markets. The width of the macadam is twelve feet and its depth six inches.

The maximum grade was reduced from 5.10 per cent. to 4.70 per cent.

Jeremiah B. Salmon, Hackettstown, New Jersey, was the contractor.

The price per contract, lump sum, was $14,346.85.

The total cost was $15,542.32.

Mountain Avenue, Mendham, .75 Mile Long.

This is the only road from Mendham to the railroad station, and therefore means much to the residents of the town. The hill up which all of the freight formerly had to be hauled was very steep and rough; consequently, considerable grading was required to give the road an easy and gradual ascent from the station to the town. The finished road is one such as some of the townspeople had dreamed of but never expected to see. It is smooth, hard and convenient for travel for both light and heavy vehicles. It is built of telford, fourteen feet wide and eight inches thick.

The maximum grade was reduced from 8.50 per cent. to 5.00 per cent.

Jeremiah B. Salmon, Hackettstown, New Jersey, was the contractor.

The price per contract, lump sum, was $6,993.95.

The total cost was $7,549.09.

Hamburg Turnpike, .36 Mile Long.

This improvement begins and ends at the Passaic county line. Paradoxical as this may sound, it is nevertheless true. The Paterson and Hamburg turnpike follows the Pequannock river,

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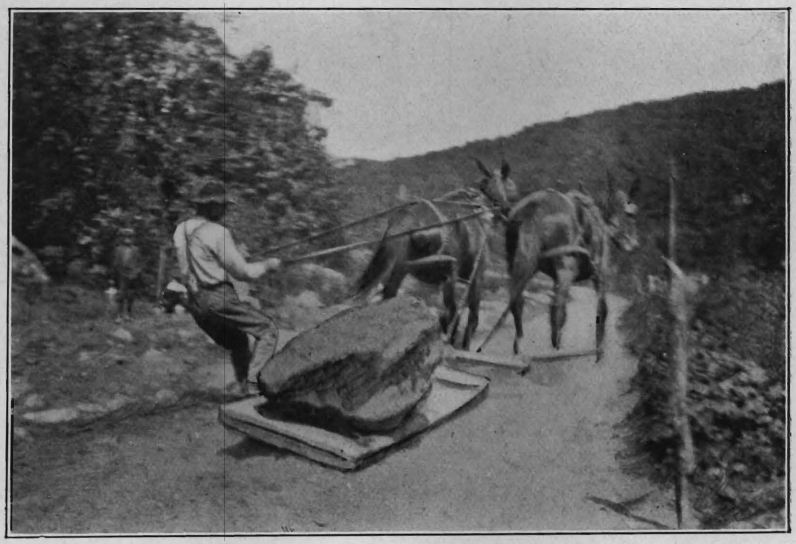
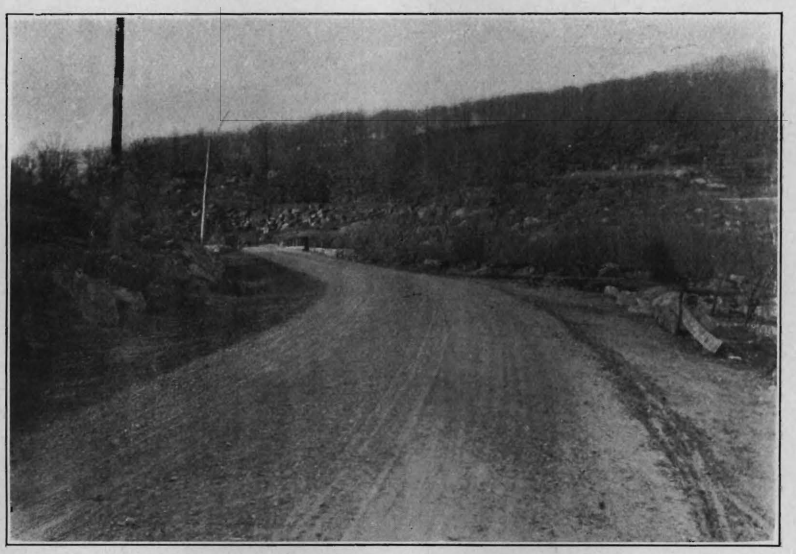


Hamburg Turnpike, Morris County, During Improvement.



Hamburg Turnpike, Morris County, After Improvement.

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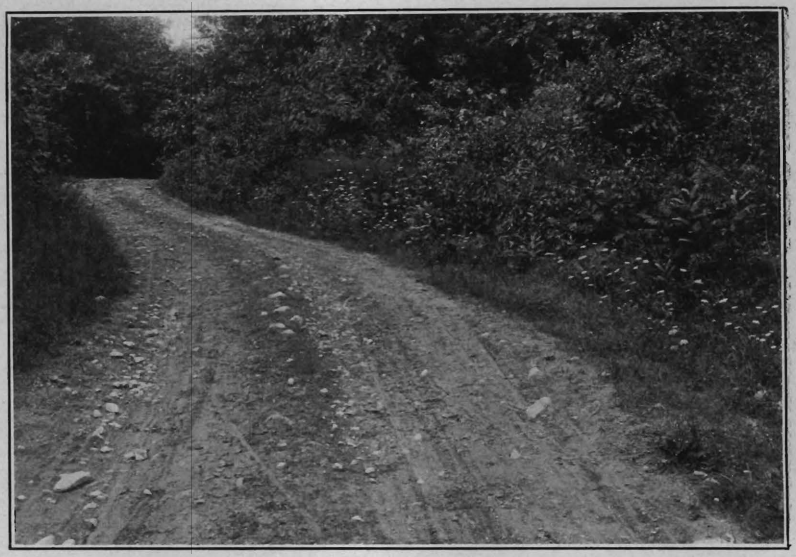
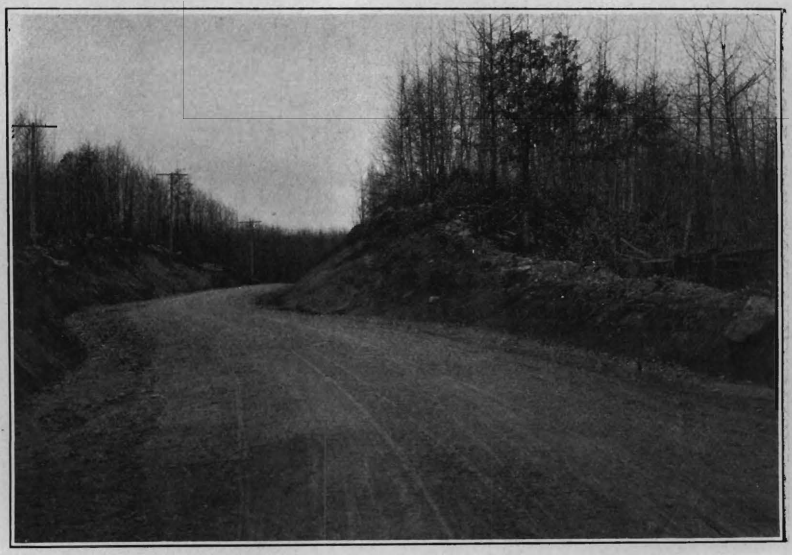


Sussex Turnpike, Morris County, Before Improvement.



Sussex Turnpike, Morris County, After Improvement.

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now on the south, then on the north side of the stream. As the river is the boundary line, the road lies first in one county, then the other, the greater portion of it being in Passaic, and, as it is nearly all improved, the importance of this portion lies in the fact that it is the last link in the continuous line of improved roads from the Hudson river to the Sussex county line. It is built of macadam, fourteen feet wide and six inches thick.

The maximum grade was reduced from 8.00 per cent. to 2.85 per cent.

George W. Colfax and William C. Steele, of Pompton, New Jersey, and Samuel E. Cotter, of Echo Lake, New Jersey, were the contractors.

The price per contract, lump sum, was $3,648.18.

The total cost was $4,135.58.

Sussex Turnpike, .69 Mile Long.

The improvement of this direct road from Succasunna to Netcong was begun in 1903 and finished a little more than half way that year. Since then the remainder remained unimproved until this year, owing to lack of funds. The completion of this work reduces the distance between Netcong and the eastern part of the county one and one-half miles. The road is constructed of telford, fourteen feet wide and eight inches thick.

The maximum grade was reduced from 10.40 per cent. to 6.28 per cent.

Jeremiah B. Salmon, Hackettstown, New Jersey, was the contractor.

The price per contract, lump sum, was $8,621.87.

The total cost was $9,187.10.

Passaic County.

Mountain View and Singac Road, 2.46 Miles Long.

This road begins where the present macadam ends, and extends the improvement to the Paterson and Hamburg turnpike in the township of Wayne. It is constructed of macadam, four-

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teen feet wide and four inches thick. It is another of the connecting roads which we are now building, in order that the inhabitants of the more remote districts may obtain quick and easy access to the main thoroughfares, and thus share in the benefits which their more centrally located neighbors have long enjoyed.

The aim of the State Aid Law is to provide good, smooth, hard highways for the inhabitants of the State of New Jersey. Keeping this end and aim in view, we are constantly endeavoring to extend these benefits to all portions of our State as rapidly as a wise economy will permit.

William and Arthur Bunn, Little Falls, New Jersey, were the contractors.

The maximum grade was reduced from 9.2 per cent. to 3.0 per cent.

The total cost was $25,176.81.

Goffle Hill Road, 1.42 Miles Long.

This road begins at the Godwinville turnpike and climbs the mountain to the Bergen county line. It is constructed of macadam, sixteen feet wide and four inches thick. From a grading standpoint, this was one of the worst roads we had to encounter in 1905. The ascent for the first mile was continuous, hence the grade could not be reduced as much as it should. The maximum grade before improvement was 15.41 per cent. This was reduced to 8.24 per cent.

Owing to the long, steep grade of the road, it was found necessary to pave the gutters on each side. Although this added considerably to the expense, it will aid materially in prolonging the life of the road.

James S. Sowerbutt, Paterson, New Jersey, was the contractor.

The total cost was $21,318.17.

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No. 1 McFarlane Section of Rocky Hill Road, Somerset County, Before Improvement.

No. 1 McFarlane Section of Rocky Hill Road, Somerset County, After Improvement.

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Somerset County.

Rocky Hill Road, 5.60 Miles Long.

The grading and macadamizing of this road, twelve feet wide and eight inches thick, commenced at the Mercer county line and was carried over the mountain, through Rocky Hill and Bridgepoint, to the stone road at Harlingen. The completion of this road fills the only gap in the improved stone road system between Morristown and Trenton, and provides Somerset county with a good, hard road through its center from north to south.

One of the most striking features of the work just completed is the elimination of a number of short, sharp hills. The maximum grade was reduced from 13 per cent. to 7.50 per cent. These figures do not tell half of the tale, as the present maximum grade is only 225 feet long, whereas the old grades of ten and twelve per cent. were several hundred feet in length. The change is so marked that the farmers of this and the adjacent township are seriously considering the advisability of devoting their entire township road tax to the work of cutting down the hills and filling up the hollows on their township roads.

Augustus Munson and Company, Rockaway, New Jersey, were the contractors.

The price per contract, lump sum, was $33,339.66.

The total cost was $35,479.15.

Union County.

Springfield Avenue, 1.18 Miles Long.

The macadamizing of this road begins at Beadle's bridge, over the Rahway river, and extends northwesterly to the township line. It is a continuation of the work done by the township in the thickly-settled portion, and may be properly classed as a country road. As its name indicates, it is a portion of the road from Cranford to Springfield. It is constructed of macadam, sixteen feet wide, four and six inches thick.

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The maximum grade was reduced from 8.00 per cent. to 4.16 per cent.

Edwin C. Humphrey, Hackensack, New Jersey, was the contractor.

The price per contract, lump sum, was $7,492.15.

The total cost was $7,797.70.

Centennial Avenue, .61 Mile Long.

This is a continuation of the macadam laid in 1904, and completes the work to the township line on the south. It is Cranford's portion of the road to Rahway. The width of the macadam is fourteen feet and its depth four and six inches.

The maximum grade was reduced from 4.60 per cent. to 3.00 per cent.

Edwin C. Humphrey, Hackensack, New Jersey, was the contractor.

The price per contract, lump sum, was $3,420.82.

The total cost was $3,783.82.

Orange Avenue and South Twenty-first Street, .94 Mile Long.

The improvement of these streets connects Cranford proper with its new suburb of New Orange, thus bringing the two systems of development together and hastening the growth of each. The construction is of macadam, sixteen feet wide, four and six inches thick.

The maximum grade was reduced from 1.87 per cent. to 1.27 per cent.

James Caldwell Park, Cranford, New Jersey, was the contractor.

The price per contract, lump sum, was $5,543.20.

The total cost was $5,666.07.

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Orchard Street, Brookside Place and Division Street, 1.28 Miles Long.

These streets form a continuous line from North avenue, near the railroad station, to the township line of Westfield. The completion of the roads built this year connects the outlying sections of the township with the railroad station and business centre. In fact, Cranford township has adopted the same system with reference to its road improvement that the leading counties have, namely, the radial—the improved roads starting from the town's centre and extending to its boundaries. The streets are constructed of macadam, sixteen feet wide and six and four inches thick.

The maximum grade was reduced from 3.10 per cent. to 1.95 per cent.

James Caldwell Park, Cranford, New Jersey, was the contractor.

The price per contract, lump sum, was $7,645.62.

The total cost was $7,945.85.

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Road Repairs.

In my last report I made some suggestions in reference to road repairs, which I am pleased to say have been followed by the majority of the counties. During the past year I have given a great deal of time and thought to this important subject, and have closely observed the condition of our roads, and, in this connection, I wish to congratulate the Boards of Freeholders and the different County Supervisors upon the results they have attained. I know some of them have taken a particular pride in their roads and have endeavored to make them the best in the State.

Under the automobile law passed last year we will have about $55,000 to distribute among the different counties as the State's contribution toward repairs. This will lighten considerably the burden imposed upon them for the maintenance of their improved roads.

The past year twenty counties expended for repairs of roads the sum of $472,574.50. This amount, though quite large, will increase year by year, as our mileage of improved roads grows; therefore, the importance of protecting our roads and of seeing to it that the several counties elect their best men for county supervisors of roads, so that the money will be judiciously spent, becomes greater and greater.

In order that the residents of the different counties may know what has been done and the amount of money that has been spent by their neighbors, and that they may be thus incited to greater diligence and more painstaking effort, I propose to briefly recount what has been reported to me from each county.

Atlantic county is constructing 6.41 miles of road through the pines, and, in addition thereto, has expended $11,308.36 for repairs to roads heretofore improved. The fine condition of this

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county's roads is an eloquent testimonial to the efficient work done.

Bergen county built .42 of a mile of new road, and for road repairs expended $6,748.50. Bergen, as a county, is not doing any work under the State Aid Law; hence, there is a lack of continuity and uniformity in the road improvement undertaken in this county. Several of the townships, boroughs and villages have expended large sums of money in improving their roads, but as their interests do not extend beyond their own boundaries the result is a woeful lack of continuous main lines of county roads, a very unfortunate thing for Bergen county.

Burlington county has just finished two very fine roads. Another, known as the Red Lion and Tabernacle, is said to be finished, but, in my judgment, is far from it. This county has 171.50 miles of improved roads, and spent last year for repairing the same $25,651.64, but I am sorry to say that their condition is far from what it should be. It is impossible to keep stone roads in good repair by spreading dirt instead of stone over their surface.

Camden county has under construction six roads which it hopes to complete early next year. This county has a very thorough and systematic method of road supervision and repair. Quality and not quantity has been Camden county's motto; therefore, the $25,703.16 expended for road repairs has produced the best of results.

Cape May county is working at the Sea Isle City turnpike, and hopes to have it finished in the early spring. The amount spent during 1906 for the repair of the roads in this county was $1,537.15, a sum far too small. The county officials should visit some of their neighbors and observe what they are doing. If they will only do this, we feel sure that their roads will be in far better condition one year from now than they are at present.

Cumberland county has only built one road under the State Aid Act; namely, the Mauricetown Bridge road, 1.22 miles long. Unfortunately, it selected a very difficult and expensive piece of road construction for its first experiment, the cost of which was more than double the original estimate. The road is well and thoroughly built and of great value to that portion of Cumberland

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county, saving, as it does, a detour of nearly nine miles. That the road was well built is attested by the fact that only $19.65 was expended upon it during the year 1906. Our department hopes that Cumberland county will soon enter the list of active road builders, and place itself abreast, if not ahead, of its neighbors in mileage and quality of improved roads.

Essex, the first of the stone-road counties, has added two very fine roads this year to its already extensive mileage and has two more under contract, while specifications for the improvement of six others have been approved. The amount expended for repairs during 1906 was $54,204.43. The roads bear mute but eloquent testimony to the judicious and conscientious manner in which they have been cared for, and are a monument to the county's enterprise.

Gloucester county has not constructed any roads during the past two or three years. It has, however, improved about seventy-five miles under the State Aid Act, and expects to take care of them for $9,000. This is an impossibility, because the county is on the main line of travel to Camden and Philadelphia, and over its roads must be hauled hundreds of tons of truck and farm produce; therefore, it is only a question of time when the good-road system of the county will become a thing of the past, and it will lose its reputation for smooth, hard highways. The old proverb "a stitch in time saves nine" applies to the improved roads of Gloucester county more aptly, if possible, than to any other in the State at the present time.

Hudson county has at last finished the Belleville turnpike, 2.32 miles long, at a cost of $139,639.60, and has expended in repairs $141,924.37, the larger portion of the latter amount being used on the famous Hudson County Boulevard. The roads are in good condition, and, in order that they may become of greater value to the State at large, we would like to see the Belleville turnpike completed to the Passaic river, where it would connect with the Essex system, and then, through this, with the improved roads of Passaic and Morris, thereby connecting the improved roads of northern New Jersey with Jersey City.

Hunterdon county has just finished its first road from Lambertville to Ringoes, 5.55 miles long, and as it is still under the

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control of the contractor, the county has spent no money upon it for repairs. The continuation of this improvement is being pushed forward rapidly toward Flemington, and it is confidently believed that this goal will be reached before mid-summer.

Mercer county built no new roads the past year, but devoted its time and money to the repair of those previously constructed, and for this purpose spent $31,504.51. The result is that with the exception of two or three its roads are in fine shape. One of this county's most notable departures in repair work is that of widening the macadam, and, where possible, the entire graded portion of the road, removing therefrom all brush and weeds. The effect of this work is already noticeable, and we feel sure that it will greatly reduce the future cost of repair work on the roads thus improved.

Middlesex county completed two roads during the year 1906, has under construction two others and three more have been contracted for to be commenced in the early spring. The county has expended for repairs the sum of $28,000, an amount considerably less than that spent last year; nevertheless, their roads are in fine condition. I want to especially congratulate Middlesex county upon the great improvement noticeable on its roads.

Monmouth county, in completing the first section of the Allentown and New Egypt road, has conferred a great boon upon the farmers of the upper part of the county, and, while doing this, has not forgotten its seashore section, as it has pushed the Colt's Neck road more than two miles onward toward the shore. The county expended for repairs during the past year $36,767.98, and, as a result, its roads are in fairly good shape. Monmouth county, having an extensive shore line, which in summer is thickly populated by visitors from our own and neighboring States, who spend a great proportion of their time in riding and driving over its improved roads, has a very expensive task to perform in keeping them in good condition. The wear to which its long stretches of level roads are subjected by rapidly moving vehicles during the summer months is equal to that of many city streets; consequently, the cost of maintenance and repair of these roads is that of a city street rather than of a country or suburban road and it will be necessary for Monmouth county

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to spend more for repairs to its roads in the future than it has in the past.

Morris county has just accepted five roads as the result of its year's work under the State Aid Act. The most noticeable change in the character of its improvement is the increased width of the graded roadway as well as of the macadam. This not only adds greatly to the appearance, but is of material advantage in the matter of drainage, and thus the county will be saved hundreds of dollars in the future repair and maintenance of these roads. The county expended $27,763.85 during the year 1906 for labor and material used in resurfacing and otherwise repairing its may miles of improved roads. The result attained redounds to the credit of the county.

Ocean county is building one of the finest gravel roads in the State through Berkeley township. It commences at the iron bridge, Toms river, and ends at the bridge over Cedar creek, at which point it connects with the improved gravel road to Tuckerton. The county has thirty-three miles of roads, upon which it has expended during the past year only $2,000 for repairs, and I am surprised to find them in such good condition, but it does not seem possible, under the present conditions of travel, that they will be able to maintain them in their present first class condition without a greater expenditure of money, and I think that it would be economy on the part of the county officials to protect the fine roads of which they and we are so justly proud.

Passaic county has added two more roads to its already extensive system in such a manner as to render the work previously done of greater value, and they are fast pushing toward completion a new road which abolishes two grade crossings and completes its road improvements to the Sussex county line. The county has spent $30,998.13 since January, 1906, for filling in washouts, trimming shoulders and spreading crushed stone upon its improved roads, with the result that the roads to-day are in elegant shape. The joint work of this county and Morris county upon the Paterson and Hamburg turnpike is worthy of especial mention, because their joint efforts have put the most beautiful and picturesque drive in New Jersey in first class condition.

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Salem county did not improve any new roads the past year, and expended only $1,316.48 for repairs. It has about twenty-two miles of roads, and, considering the condition into which they have been allowed to fall, the amount is not sufficient to put them in first class shape.

Somerset county completed the Rocky Hill and nearly finished the North Branch road during the past year. The latter road is one of the most important in the county, being a part of the old Easton turnpike or main highway across the State from New Brunswick to Easton. This county expended the past year for repairs $7,436.19 on its over sixty miles of improved roads, some of which are in fairly good shape while others are in great need of attention. It will be necessary for the county of Somerset to spend considerably more annually in the future than it has in the past to keep them in proper condition.

Sussex county did not spend anything for building new roads the past year and has never taken any great interest in road improvement. It has about seven miles of macadamized roads and on them it spent $1,349.79 for repairs, and some of the so-called repairs would better not have been made, as they consisted in spreading a layer of dirt over the stone until the latter was buried out of sight, leaving nothing but a dirt road to travel over.

Union county has availed itself of the benefits of the State Road Act on only two pieces of roads, aggregating a little over three miles in length, both of them being the completion of county roads built under the bonding act. This work was done in the year 1900, since which time the county has done no new work. Cranford township, however, has taken advantage of the State Aid Act prior to and again this year, and has expended on the stone roads of the township so constructed $1,790.35 for repairs, and their roads are in good condition. The county at large spent $21,000 for repairs the past year, out of which amount over $500 was used in experimenting with oils for the protection of the road surface. We hope to be in position to speak authoritatively of the effect of this experiment next year.

Warren county rested from its road building during the year 1906, but expended for repairs the sum of $6,549.96, and its roads are in fairly good shape.

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There has been considerable inquiry in regard to protecting the surface of our roads in general by the use of tar or oil. From what we can learn, the application of an oil containing not less than fifty per cent. of asphaltum has proved a decided success. The great obstacle seems to be its cost. We are following the matter up and hope to be in a position next year to recommend some application to our roads that will prevent dust and preserve the surface intact.

We have had another year's experience with the automobile and the law passed last year for its regulation and control is, I think, as a whole, a very good one, but there is one weak spot; that is, the failure to make provision for inspectors enough to properly enforce the law. The number of inspectors assigned to any particular district should be in proportion to the number of automobiles driven over the roads of that district. A few arrests of reckless auto drivers will stop it and I know all good thinking automobilists want it stopped.

If this were done, the many complaints made against automobiles in general would cease and to that end the State should appropriate the means required for the protection of the public, in order that everyone may feel safe on the public roads.

The amount spent by the several counties for road repairs during the year 1906 is as follows:

County.		*Amount.*
Atlantic,		$11,308 36
Bergen,	$4,747 00	
Westwood borough,	490 83	
Hillsdale township,	510 67	
Ridgefield Park village,	1,000 00	
		6,748 50
Burlington,		25,651 64
Camden,		25,703 16
Cape May,		1,537 15
Cumberland,		19 65
Essex,		54,204 43
Gloucester,		9,000 00
Hudson,		141,924 37
Mercer,		31,504 51
Middlesex,		28,000 00
Monmouth,		36,767 98
Morris,		27,763 85

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Ocean,		$2,000 00
Passaic,		30,998 13
Salem,		1,316 48
Somerset,		7,436 19
Sussex,		1,349 79
Union,	$21,000 00	
Cranford township,	1,790 35	
		22,790 35
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The County Supervisor.

BY ROBERT A. MEEKER, STATE SUPERVISOR OF ROADS.

The questions are often asked, What are a county supervisor's duties? How many miles of road can one take care of?

The first question is a very large one, and can be answered only in outline. First, a supervisor's duty is to superintend, oversee and direct the work. This does not mean that he must do the manual labor of road repairing. As soon as a man's eyes and mind are engaged on one small piece of work that he can do himself he loses sight of many other and more important things that should be attended to, and very soon his men are standing idle, either for lack of material or of knowledge of what to do next. Thus while he may be doing more hard work than anyone of his men, eight or ten others are idle or doing something that will have to be undone. It is an old and very true saying that "It is a very poor job that cannot afford one boss," and, like many of these old sayings, this contains a mint of hard common sense. Someone must plan, someone must foresee, someone must direct, or much time, labor and material will be wasted. In other words, the county supervisor must live up to that great and only title of nobility permitted to the American citizen—Boss. He must be boss not only in name, but in fact. How well he fills the position depends upon the man himself. Such, in brief, being the duties and responsibilities of a county supervisor, it behooves the chosen freeholders of every county to be very careful in the selection of the man to fill this important position, for upon him depends in a great measure the condition of the roads and the cost of maintaining them. He may save the amount of his salary many times over in the course of a year, or he may squander hundreds of dollars in damaging the roads under his control.

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The supervisor's first care must be the drainage of all his roads. To this end side ditches, cross drains, underdrains and culverts must be kept clear and open, so that the water may escape quickly from the foundation of the road. Then the cross section must receive attention, in order that the rain shall flow freely off of the surface. Roads are often made too round in cross section, with a mistaken idea of keeping them dry and also to allow for greater wear in the middle, but there is no danger of a road with little convexity wearing hollow in the centre or retaining the water if the surface is properly attended to. Smoothness of surface promotes the flowing off of the water much more than a high crown and, if the surface is neglected and allowed to wear into ruts, no amount of crown will clear it of water.

The supervisor's second duty is to replace the wear and maintain the strength of the road covering. It is impossible to do this on an improved road with dirt. Dirt is ground up or worn out material which in wet weather makes mud, and in dry, dust. The wear of a stone road should only be replaced with stone of as good quality as that used in the original construction. This stone should be thoroughly consolidated, because, when materials are loose, there is a displacement of them by the wheels and horses' feet, accompanied by a rubbing together of the stones themselves that causes great wear and waste of material. This consolidation of a coat of two or more inches is best accomplished by the use of a steam roller and sprinkling wagon. These should always be used together to obtain the best results. Coatings of less thickness may be applied by a man using a wheelbarrow, pick, shovel and rake, the necessary material being deposited at convenient places along the line of the road. Telford says: "A certain number of laborers ought always to have the care of the surface of the road and never quit it for a single day to do anything else; they will always have sufficient to do in spreading fresh materials in ruts and hollows, in scraping the road, in cleaning the side channels and keeping open the water courses, and generally in maintaining the road in a clean and sound state. A few men constantly so employed will do a great deal toward the preservation of a road, while the greater number of workmen

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should be as constantly employed in providing materials by contract work."

This description of the nature and character of work to be done in maintaining a road in good order is as true to-day as it was eighty years ago. The best results have always been attained by assigning certain sections to one or more men, furnishing them with the necessary materials and tools, and then holding him or them responsible for the condition of that section of road. Where it is impossible to obtain the kind of men required or where the wear is too great, or where roads have been permitted to fall into a very bad condition, it becomes necessary to let the work by contract. In that case specifications must be prepared in which the quantity and quality of the materials to be used, the amount of work to be done and the time within which it must be completed, are accurately stated.

Whether the repairs are made by days' labor or under contract the county supervisor must have the constant care and supervision of them. He must know what is being done, how it is being done, how much is finished and what amount of money has been spent upon each road. To this end he should carry a record book with him at all times, in which he should enter, on the spot, with the date, a clear and distinct measurement of any work or materials which are to be paid for by measurement, and the quantity of work done and the materials used on all other repair work.

As far as circumstances permit, account should be kept of the actual quantity of material spread on every mile of road and the amount of labor employed. An account of all tools and other property belonging to the road work, where and in whose charge they are, and an annual statement of this account should be filed with the Board of Chosen Freeholders. An estimate of the cost of road materials should be made in detail, showing the number of tons of stone or yards of gravel, the price per unit, the total cost of the road materials intended to be used, the cost of labor and any miscellaneous expenditures that may be required, beyond ordinary maintenance, for every mile of road. This estimate would not bind the board, but it would promote systematic maintenance and prevent many questionable things from being done.

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Such being in outline the duties of the county supervisor, the second question naturally follows, how many miles of road can one take care of. The answer to this depends in the main upon the relative location of the roads, whether they are close together or distributed over a large area. If the latter be the case then the supervisor must have a horse and wagon, or some other means of conveyance, constantly at his command. With a good horse he can look after one hundred to one hundred and fifty miles of road, visiting each road at least once a week. This means that he must devote his entire time and attention to the work; therefore, the supervisor's remuneration should be gauged accordingly. In other words, the county should furnish him with a conveyance, or pay such a salary that he can afford to keep one for the sole purpose of road inspection.

At the St. Louis Exposition our methods of road construction attracted the attention of the road builders and engineers of all the principal road building countries. The consensus of opinion expressed by them was that in construction we were in every way their equal, but in repairs we were far behind them.

From this criticism we should learn what is incumbent upon us, and that is, a greater attention to the matter of road maintenance and repair.

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Use of Tar and Other Materials for the Repair of Roads.

By James Owen, County Engineer of Essex.

It has become apparent, from the increased wear due to the growth of the automobile travel, that other methods than those of the ordinary repair system now in vogue will have to be resorted to in order to keep up the standard of excellence of our improved highways. This matter has been taken up by the road experts of Europe and this country, and, although their efforts have so far been experimental, the success achieved, up to the present time, in the use of extraneous material gives reason to believe that in the near future the present system of road maintenance will have to be changed, especially in the case of heavily traveled roads.

The principal experimental materials thus far used are tar and crude petroleum to which may be added Westrumite, which latter has been used with good results in France.

About the year 1880 French engineers began experiments with tar, which, from that date to the present time, have proved so satisfactory that the continued use of this substance seems to be fully warranted.

In England experiments with tar have also produced very satisfactory results.

In America the question of using tar, or some other substance, for the protection and preservation of our improved roads, has aroused a great deal of interest, and many experiments have been made to prove the claims of the various advocates of their use. At Jacksonville, Tennessee, the French system was successfully followed. This method is simply to heat the tar to a temperature of 210 degrees and spread, while hot, over the road, through a

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one and one-half inch hose with a one-inch nozzle. This tar is then thoroughly broomed into and over the surface until it is evenly distributed. A light coating of clean sand and screenings is next applied, after which the whole surface is thoroughly rolled with a steam roller. This coating, as described above, lasted about seven months, and a cross section of the pavement showed that the tar had penetrated about two inches.

One of the few tar experiments made in this State was at Montclair on a street with a heavy grade. The macadam was coated with a mixture of tar and screenings. This road, after one year's wear, presents an almost unbroken surface. This coating was applied in 1904, and at the present writing the surface is still in fair condition, though showing patches of the original road in a few places. Made sanguine by this success, the town later covered about one mile of roads, of varying grades, with the mixture, and the resulting surface on all gives universal satisfaction, being smooth and clean, free from mud in rainy and dust in dry weather. The cost of the second treatment was about thirty cents per lineal foot, or seventeen cents per square yard. This included three hundred yards of cracked stone and screenings. The last item was the most costly one of the experiment; hence, the use of tar alone will lower the cost to about 5.66 cents a square yard.

It will not be wise, however, to be so satisfied with the success of the tar treatment as to exclude all other materials from competition, because there are now in the market other substances which demand serious consideration. The foremost in the list is crude petroleum, which, though it is exceedingly useful in allaying dust where there is little rainfall, is very objectionable where the rainfall is heavy, because the oil and water form an emulsion which is very disagreeable to both pedestrians and the driving public, damaging, as it does, the clothes of the people and the paint of wagons and carriages, and, last, but far from least, making the surface of the road mushy.

A sprinkling mixture, known as Westrumite, is free from the objections of crude petroleum, as it is simply a mineral tar dissolved in water with the aid of ammonia or other cheap medium. It is used in a two to ten per cent. solution, and is sprinkled from

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ordinary street sprinklers. One essential factor to the success of this treatment is the thorough cleansing of the surface of the street before the solution is applied. After the surface is cleansed the application may be made as frequently thereafter as may be deemed advisable, the only exception being that after a very heavy rain the surface must be again thoroughly cleansed before the Westrumite is applied. The method of applying this solution at the present time is to first sweep the street thoroughly clean and then sprinkle it, following the first sprinkling with another in twenty-four hours, and after that a bi-weekly treatment with a five per cent. solution. This keeps the surface in an excellent state. The cost for three months would be about three cents per square yard. It must be remembered, however, that Westrumite merely lays the dust, and does not protect the wearing surface of the road as does the tar treatment.

There is another dust laying material which has been brought forward under the name of Coudrogenit, but thus far its application has been so very limited that the results are too meagre for tabulation.

The vital question in the employment of these extraneous materials for road repairs is that of cost, and when this is accurately ascertained the problem that confronts us is what amount of travel shall determine the necessity for changing the customary plan to the more up-to-date procedure.

A slightly traveled road can, of course, be kept in continuous repair by the old method to the satisfaction of the traveling public, and with an economical expenditure of money, but with a growing appreciation of the benefits derived from the suppression of the dust nuisance a clamor will probably arise for the more extended use of tar, petroleum or kindred substances. In that event, strict economical administration would warrant the change, thus necessitating a larger appropriation for road repairs and a consequent increased taxation.

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Road Maintenance.

By John J. Albertson, County Engineer of Camden.

Dirt is defined as matter in the wrong place and nowhere is this more evident than upon a public road. The very materials which are essential for a good road in some localities are ruinous in others. For example, clay on sand makes an excellent road in that section of the United States south of the frost line, particularly in Florida where it has been extensively used with splendid results.

In New Jersey clay is one of the worst substances with which we have to contend in road construction, except in very limited quantities when it is used as a binder. In the sandy portions of our State clay and stone, as they are mixed in the proper proportions, as so often found in our gravel beds, make an ideal, cheap summer road. As these gravel roads are comparatively little used in winter, the State made a happy departure from its original plan when the Legislature so amended the State Aid Law that gravel roads could be built under it. Several of our counties of large area and sparse population could not enjoy the benefit of good roads were it not for our gravel deposits placed by nature contiguous to the very locality where wanted. The economy of transporting gravel long distances is very questionable. If we have to pay railroad freight we might as well, in the majority of cases, build stone roads of trap rock.

As previously stated, good clay gravel makes an ideal road if built on a sand foundation, while it is just the reverse if built on a clay foundation.

Drainage is the important thing in road maintenance as well as in road making. This is especially true of roads built over a clay soil. In the spring of the year a gravel road on such a sub-

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The Future of Our Road Improvement System.

BY PETER FORMAN, COUNTY ENGINEER OF MONMOUTH.

At this time, when probably the greater number of our people have seen and become convinced of the great possibilities which the present system of road improvement opens up for our nation at large, it may be said that the first step toward the final success of that cause has been achieved. If this be true, if the people of this day and generation are coming into true sympathy with this important movement, and are really ready and willing to bear their quota of the cost and do their share of the work, not merely from a selfish appreciation of their present advantages, but also from the more generous and patriotic motive of transmitting something to posterity which may prove a valuable heirloom, then it becomes the duty of all those having the direction and administration of the work of road improvement to correct every flaw or weakness in the system as soon as it appears. Nor must they wait for its appearance, but must endeavor to anticipate every possible contingency under which trouble may arise, and be prepared to meet it. Forewarned is forearmed in road work as well as in every branch of human effort. This consideration should receive particular attention at the present time when we have just passed beyond the threshold of this important subject. It is far better to direct an enterprise to a proper issue from its very beginning than to drastically correct its errors and shortcomings after they have become established by custom.

In pursuing this inquiry it may be asked, Are there any visible points in our present road laws and regulations that may in the future act as a bar or hindrance to carrying the work into effect, and are there any special features in the administration of the law that should be particularly guarded and enforced in order to

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obtain the best results, both as to usefulness and durability? Such an inquiry naturally opens a wide field for discussion and suggestion for many of our citizens. There is a prevalent belief in some localities that the cost of our State macadam roads is excessive, owing chiefly to the difficulty of procuring proper paving material at a reasonable cost. The items entering into the cost of stone are many, but may be classed under three heads, material, labor and transportation. The first is very small until labor is applied to it, then its cost increases rapidly, and is further augmented by the charges for transportation. The first two items are practically uniform, while the third varies with every road. Transportation is the expensive factor in all macadam work. From the quarry to the crusher, from the crusher to the car, from the shipping station to the receiving station, then from the car to the road, every step is attended with expense. The greater the distance between these points the more the cost. The southern half of our State must depend upon gravel or pay the heavy transportation charges for stone, although the trap-bearing hills on the north are plainly in view. It may be safely assumed, under such conditions, that the places lying within easiest access to the quarries will naturally be first improved, then those more remote. As the work of road improvement is carried further and further away from the sources of supply one begins to inquire when will the increase in expense become so great that the cost of road building will be prohibitive. A candid consideration of this matter shows us that upon the correct answer to this question depends the future of the general extension of our road improvement.

The writer finds himself here in a situation similar to that of the typical Yankee, who, being required to make answers to his catechism, demurred on the ground that he could best answer by first asking a few questions himself. Applied to the subject in hand, it may be presented in this way: Can the State, by utilizing the labor under its control, and by the engagement of other labor, if necessary, furnish this road-making material, from the inexhaustible supply on hand, at a lower rate than now charged? Can the transportation companies who derive their rights of car-

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riage and transportation from the State (the people) be induced, in this public behalf, to reduce their transportation rates to the lowest possible figures of reasonable profit? And, finally, is this a proper subject for Legislative action?

There are many other vital points, in the present and future administration of our road improvement laws and regulations, which will always require the closest study and application, as many of them practically include the welfare of the whole system and might become a future hindrance to the stability and perpetuity of the expensive roads we have already built and hereafter propose to build.

In reviewing this matter it would appear that we should go first to the foundation principles of road construction. A careful study of them leads us to the conclusion that if the foundation is not well contrived and laid all it bears will be weak and liable to disaster at any time. Much of the perpetuity and usefulness of our improved roads will depend upon how well they are located, constructed and maintained.

The best practice in road building requires that they shall be located over and on the easiest, shortest and most economical lines of travel. While it is true that under present conditions we are generally compelled to build our stone roads upon the established lines of travel, which have heretofore been set out by fancy or custom for lines of public communication between towns, hamlets, or points of some commercial activity, with no thought or forecast whatever as to the economics of location, yet much can be done to improve this condition in the future, under the road laws, by re-locating short sections where desirable, by easing the angular places and curves as much as possible and removing all obstructions to clear view ahead at these points. An observance of these rules in building roads now and in the future is rendered absolutely necessary in consequence of the swifter and, in some cases, reckless rate of driving over them, which is made possible by the motor car. We are, of course, obliged to accept this condition as it exists, but something, at least, can be done towards its correction by a careful study of all the governing circumstances. The errors of location in many of

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our roads are serious, and when these roads are improved without correcting these errors the injury becomes fixed and can never be eliminated and the consequent loss and disadvantages thus entailed will always continue and accumulate.

Much care and thought has been given to the theory and practice of road construction and such proper laws, rules and regulations laid down regarding it that but little can be added. It is believed that the science of road construction as now known, if honestly applied, will produce good, serviceable, enduring roads. It may be here said with propriety that to insure the work for future use none but the best of materials should be used and the most thorough system of drainage should be everywhere carried out. The future stability and value of the road will greatly depend upon thorough drainage. Where this has not been done, it will become imperatively necessary to introduce it, or else entirely re-build the road.

It is acknowledged that road maintenance is the chief factor, the key of our success in providing a good and enduring system of improved roads. The guiding principle in this seems to be that it is vastly cheaper to keep a road in good order all the time than to restore it to that condition after a period of neglect, during which it has been worn into ruts and depressions and covered with mud. To carry this into effect it will be found necessary to be ready and to instantly repair with the best materials every sign of weakness or loss of form. This cannot well be done but by constant watchfulness and care, and to that end it is well to apportion suitable sections to the daily and continual care of some well instructed person. It is believed that such a system is more economical than any other and will secure the most satisfactory results. This work will consist in preserving the hardness, smoothness and form of the surface and depth of covering by a minute and systematic restoration of the materials worn away by traffic and removed by the action of the wind and water, and by maintaining thorough drainage. Any system of road maintenance that does not keep intact the form and depth of an originally well built road, and also does not gradually lessen the cost of such maintenance is either poorly founded or badly administered.

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Here, therefore, seems to be the key to determine whether we are now building roads at heavy public cost that shall endure for future use, or whether they shall be allowed to fall to gradual decay, and thus defeat the large public benefits justly expected to be derived from them.

In preparing this very brief article upon such a voluminous subject, the writer has endeavored to always bear in mind the relation which our present efforts in road building bears, not only to our present public profit and advantage, but also to the advantages that will accrue to the future by contributing to the prosperity and comfort of those who shall follow us in the walks of life, and to mark an important footstep in the onward march of the development of the resources of our great nation.

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Construction and Maintenance of Oyster-Shell Roads.

BY JOSIAH MILLER, COUNTY ENGINEER, SALEM, NEW JERSEY.

Oyster-shell roads have been in use in Salem county for about thirty years. They have given satisfaction for many years, but the time has come when the cost of this material makes it necessary for the road builder of to-day to look well into its merits, and to take advantage of those methods of construction which will give the best results. The usual—in fact, almost the only method of building a shell road in our section is to "ridge" the road to the limit, and then place on top of this ridge as few shells as is possible, and allow travel to "break them down."

The shell road, as usually constructed, rarely has a depth of eight inches of loose shells, and seldom has a width of eight feet when first laid down. I think it will be found that these are the extremes of depth and width used by our township officials on ordinary roads. The width usually increases slightly during the process of "breaking down," and the depth will, of course, decrease likewise, depending upon the care exercised by the official in charge. The road must be carefully attended to during the breaking down period, keeping it free from ruts, and the shells raked in and in proper shape.

It has been found by experience that the life of shells is materially increased by keeping the roadbed dry. This accounts for the unusual amount of crown given to our shell roads. This crown grows rapidly less in a short time, owing to the breaking down and consolidation of the material. The sub-grade is never compacted in any manner, except by ordinary traffic, and this also helps to relieve the situation as it settles into place. If the road to be improved has been a gravel or shell road, the shells are dumped and spread on the road without preparing it in any way for their reception, except to give the road a crown where

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it happens to be flat, and this is often done by using more shells in the low places.

In fact, the same methods of construction and maintenance that have been followed for generations back by township officials in construction and repair of ordinary roads have been and are still followed in the construction and maintenance of shell roads. When shells are first placed on a road, the traveling public will naturally use the sides of the road as long as possible, and it seems to me that I have known them to refuse to drive on the shells for a longer time than this, if such a condition can be conceived. In time they are forced by stress of weather to drive on the shells. In the meanwhile they have "nibbled" at the edges of the shell bed, more or less, and have driven on the main body of shells for short distances here and there along the line of the road. This has naturally widened out the shell bed in places, and when the road surface is broken down into a really fit condition to travel on, there are places where the shell bed is noticeably thin. These places are in most cases filled up immediately, and in from three to six months after construction, depending on the time of year and the character of the soil on which it is built, the road is in a more or less fit condition to travel over with comfort. Shell roads, when once in good condition, are undoubtedly more satisfactory to travel over, both for horse and man, than the great majority of our roads. They are almost noiseless, and seem to possess a resiliency that I have never seen equalled by any material that can be considered by a rural road district.

Dampness will cause shells to become soft and useless for road purposes in a short time. A few years ago I removed some shells from the abutment of a bridge, where they had been used as filling in the days when shells were to be had almost for the asking. They had been subjected to the ebb and flow of the tides for many years. When taken out they were, to the eye, in almost the same condition as when placed there. The laborers usually use forks in handling shells, but in this case they were obliged to resort to shovels because the forks pierced the shells so easily that it forced them to abandon their use. These shells were placed on the approach to the bridge, and in less than a year the road at that point was in almost the same condition as before. The

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shells were soft and had also lost all the cementing qualities they possessed, and practically disappeared in that length of time. Shells possess the power of cementation to a very great degree, and in this lies their chief value as a road material. They are not hard nor will they stand much wear, but when cemented together they present a smooth, firm surface, and will then give an extraordinary amount of wear, when the actual softness of the material would lead to their condemnation by one who was ignorant of their other good qualities.

In 1896 our first shell road under the provisions of the State Aid Act was laid down. It was in the township of Mannington, on a portion of the "King's Highway" that was laid out from Salem to Burlington in 1682. This had always been considered one of the best roads in the county. It was on a fairly heavy clay loam soil, which had been coated with a sandy gravel so many times that it was practically a sand road when it was decided to improve it. The shell bed on this road was laid ten feet wide and twelve inches deep, as have been all our shell roads built under State aid. A portion of this road was built with a shoulder, and this raised such a storm of protest that the balance of the road was built in the usual manner, by placing the shells on the prepared surface without backing them up. The first repairs to this road were made on the shouldered portion, and consisted of a thin coating of shells down the centre of the shell bed. This was done within the first two or three years after the construction of the road. The other portion of the road has since been repaired from time to time. Four years ago I measured the shells on this road and found the shells on the shouldered portion to be fully one inch deeper than those on the other portion of the road, with no appreciable difference in the quality and soundness of the shells. On this particular road the shouldering or backing up of the shells with earth was beneficial rather than detrimental. On the other hand, the township of Lower Penns Neck built a shell road, about thirty years ago, on a clay loam bottom. This was backed up, and in a comparatively short time the road was completely worn out. This was then re-surfaced in the usual manner, and was for many years a good piece of road.

It will be seen from the foregoing sketch of the history of

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shell roads, that while the material has been in use for thirty years, there has been no intelligent application of the experience gained. Shells, as well as all other road materials, have their peculiarities, and these have not been intelligently studied. Shells and limestone are, in my opinion, about on equal ground as a road material. Both are comparatively soft, both have excellent cementing qualities, and both make a firm, smooth road when at their best. How dampness affects limestone, I am unable to say, but should be inclined to the opinion that it affected the cementing quality to a great extent.

Shell roads have been repaired in Salem county by simply dumping shells on the surface of the road wherever, in the opinion of the official in charge, they are needed, and allowing travel to grind them into the road. In fact, oyster shells have never had a fair, full trial as a road material in Salem county, because all roads have been built in practically the same manner, without proper regard to the different conditions which affect their life and usefulness. There has been no intelligent attempt to improve the method of maintenance and repair in any manner during all the time they have been in use. They are scraped occasionally, and then a few shells are dumped on the unprepared surface where necessary.

Shells, like gravel, can be placed on the surface of a road to fill up a hole or depression, and will in time wear down comparatively smooth, and will improve the condition of the road for a time. I have never seen a shell road repaired in any other manner. A shell road, like a stone road, has a smooth surface while the body of the bed is made up of comparatively coarse particles. I think that some preparation of the road surface is absolutely necessary when repairing or re-surfacing a shell road, if the full value of the new material is to be received. Otherwise it is placed on a hard, firm surface, and much of the material is ground to powder and wasted before it can unite with the surface below, and when united (if it ever does unite), the bond is certainly much weaker than it would be if the old surface was properly prepared. The practice of allowing travel to consolidate a shell road is not, in my opinion, to be at all recommended as economical or efficient. It saves the expense of rolling, but

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whether this will offset the ill effects of the usual method is a question to be considered. Rolling will consolidate the shells at once in the place in which it is intended they shall remain, and, if the roller is properly proportioned in weight, will bring them to a compact mass with a minimum amount of breakage. Consolidation by travel spreads the material during the operation, and the wheels form ruts which crush the shells almost to the bottom of the bed and certainly drive some of them into the sub-grade when possible, and when the sub-grade is an old road, as is often the case, will surely crush the material out of all semblance to an oyster shell. It is then necessary to fill up these ruts by raking in from the edge of the bed or by using new material which then receives the same treatment. This makes a road bed of fine material entirely, whereas a roller will grind the surface of the road into a condition that will enable the cementing qualities of the shells to act and leave the lower or bottom portion of the bed to be grouned up and cement itself as needed.

While shell roads and stone roads are entirely different in many respects, the same methods of construction and repair, properly modified to suit the difference in material, are undoubtedly those that should be followed. At the present time the price of shells is almost prohibitive. They are costing now five cents per bushel, which makes the cost of material alone on our State aid roads, which are usually built to a depth of twelve inches, practically four cents per square foot for material on board of a boat at the nearest wharf, not on the road, the expense of unloading and delivery on the work to be added. This brings the cost of material to about the same as would be required for a six-inch macadam road which would give more years of wear than the softer shell road, and the chances are that the bills for repair and general maintenance would not equal those of the shell road.

I do not suppose there is any practical difference in the force required to move a given load over a shell road when compared with a macadam road, although what difference there is is probably in favor of macadam. For light travel the shell road is much superior when comfort to man and wear and tear on horse flesh are considered.

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I do not believe that automobiles injure a shell road as much as they do a macadam road, because of the finer texture of the surface, which should make it less likely to be affected by the suction of the rubber tire. The dust question is about as serious on one road as the other, with very little difference from a practical point of view. It would seem that the question of the advisability of building shell roads is still open to discussion, but in Salem County there can be no question raised as to which road to build. Public opinion is at present all on the side of shell roads wherever gravel is not available, and it will take some years to convince our people that there is any material in existence that in all respects equals the oyster shell as a road material.

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Meadow Roads in Cape May County.

BY R. FENDALL SMITH, COUNTY ENGINEER OF CAPE MAY.

For several years past Cape May county has directed its attention, in the line of road improvement under State aid, to the construction of public roads, connecting the various sea-shore resorts with the mainland of the county.

These well known summer resorts are located on the various beaches skirting the Atlantic coast line, and are separated from the mainland of the county by a wide expanse of salt marsh and inland water-ways.

These marsh lands consist of vast deposits of soft mud, frequently twenty-five feet in depth, overlaid by a sod or crust of sedge or grass roots, and in many places this crust is not sufficiently strong to support a horse.

To construct a roadway across this expanse of marsh land that will be adequate for the travel to and from these resorts, as well as up to the standard required by the State, is by no means an easy task, and the problem is made more difficult by the fact that materials must be used that will not overload the meadow crust and cause settlement, and at the same time will withstand the wash of storm tides, as these roads and marsh lands are frequently overflowed by them.

The first of this class of roads, constructed under State aid, was the Rio Grande and Holly Beach road, followed later by the Marmora and Ocean City road, and, on the 13th of June, 1906, the work of constructing the road from Ocean View to Sea Isle City was begun.

This is the third road of this class, and was built on the line of an old causeway, which had been used as a roadway for more

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than twenty years, and comprises two miles of meadow and six-tenths of a mile of upland roadway.

The principle on which these roads are constructed is as follows:

First, a foundation is laid of poles and stringers of sufficient area to support the weight of filling soil and pavement, together with the added weight of travel without breaking down the meadow crust.

Second, the sides are protected from wash by curbing and bulkheading throughout the entire length, on both sides of roadway, and also by a continuous line of mud banks solidly compacted against the outer side of the curbing.

Third, a new feature introduced into the construction of the Sea Isle road is a "tie" placed every eight feet under the pole foundations at right angles to the centre line of road.

These ties are securely spiked or bolted to the piling supporting the side curbing or bulkheading, and thus they securely bind the two lines of curbing together, prevent spreading of the roadway, and, at the same time carry a part of the weight of the roadbed to the piling, and they in turn assist in carrying the weight, forming, in reality, an underground trestle on which the stringers and poles are then placed, the same as in the two preceding roads.

After the pole foundations are properly laid, upland soil is filled in on the same, between the lines of curbing, until the required elevation is reached, after which the pavement of shells and gravel is spread over the roadway, bringing the finished surface up to an elevation of two feet above the mean high water-line.

The most satisfactory materials for pavement found thus far are oyster shells spread five inches deep and covered with four inches of good gravel.

This forms a pavement, light in weight, which withstands the wash of storm tides, and does not rut up badly when the roadway is soft from storm tides or the effects of frost.

It was our intention to complete the Sea Isle road this year (1906), but from the outset the work of construction was handicapped by excessive rains and exceptionally high tides, which seriously delayed the work.

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The old meadow causeway was frequently covered with water at each high tide for days in succession, resulting in a bed of mud and slush, in which it was almost impossible to get men to work in preparing the foundations of the new roadway, and, owing to the soft condition of the old causeway, the work of construction could only be carried on from the Ocean View or mainland terminus of the road.

By patience and perseverence the many difficulties were finally overcome. The roadway is now ready for the pavement of shells and gravel, and will be completed during the spring of 1907.

The carrying capacity of the road foundations has far exceeded our expectations, and when the road is finally completed we will have one of the "finest" of drive roads, second to none in the county—one of which the citizens of Cape May county will have just cause to be proud, and the residents of Sea Isle City will hail with delight.

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Quarries in New Jersey Producing Road Metal.

BERGEN COUNTY.

Location of Quarry.	*Owners.*	*P. O. Address.*
Edgewater,	Cody Bros.,	Edgewater, N. J.
Linwood,	Carpenter Bros.,	Linwood, N. J.
Shady Side,	Brown & Fleming,	Englewood, N. J.
Fairview,	Fairview Stone Crushing Co.,	1996 Chambers St., N. Y.

ESSEX COUNTY.

Montclair,	Osborne & Marcellis,	Upper Montclair, N. J.
Montclair,	F. J. Marley,	Little Falls, N. J.
Orange,	Geo. Spottswood & Co.,	Orange, N. J.
Millburn,	G. A. Lightpipe & Son,	Millburn, N. J.
Cedar Grove,	F. J. Marley,	Little Falls, N. J.
Montclair,	Francisco Bros.,	Orange, N. J.
Short Hills,	Stewart Hartshorn,	Orange, N. J.
Caldwell,	P. A. Matthews,	Caldwell, N. J.

HUDSON COUNTY.

Bergen Hill,	B. M. & J. F. Shanley,	Newark, N. J.
Palisades,	Palisade Construction Co.,	No. 1 Montgomery St., Jersey City, N. J.
Palisades,	Hudson County Contracting Co.,	No. 367 Communipaw Ave., Jersey City, N. J.
Guttenberg,	Clinton Point Stone Co.,	Guttenberg, N. J.
Granton,	Wagner & Duff,	Granton, N. J.
Granton,	F. J. Marley,	Little Falls, N. J.
Woodcliff,	John S. Lane & Sons,	Guttenberg, N. J.
Shady Side,	Bull's Ferry Land Co.,	Guttenberg, N. J.

HUNTERDON COUNTY.

Byram Station,	B. M. & J. F. Shanley,	Newark, N. J.
Byram Station,	Trenton Stone and Construction Co.,	Trenton, N. J.
Lambertville,	W. N. Ireland, Agent,	1241 Filbert St., Phila., Pa.
Middle Valley,	Middle Valley Trap Rock Co.,	Middle Valley, N. J.

MERCER COUNTY.

Moores,	Delaware River Quarry and Construction Co.,	Lambertville, N. J.
Goat Hill,	B. M. & J. F. Shanley,	Jersey City, N. J.
Hopewell,	J. S. Cope,	Hopewell, N. J.
Titusville,	Trenton Stone and Construction Co.,	Trenton, N. J.
Belmont,	Mercer County Workhouse,	Trenton, N. J.

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MIDDLESEX COUNTY.

Location of Quarry.	*Owners.*	*P. O. Address.*
Deans,	James & George Law,	Monmouth Junction, N. J.

MORRIS COUNTY.

Nearly all road-building material in this county is of native rock, gneiss, granite and shale. The traps are mostly imported from other counties.

Millington,	Morris County Crushed Stone Co.,	Morristown, N. J.
Mountain View,	Standard Paving Co.,	Mountain View, N. J.

PASSAIC COUNTY.

Garret Mountain,	Francisco Bros.,	Little Falls, N. J.
Paterson,	F. J. Marley,	Little Falls, N. J.
Paterson,	Paterson Crushed Stone Co.,	Paterson, N. J.
Paterson,	New Jersey Stone Co.,	Rutherford, N. J.
Paterson,	McKiernan & Bergen,	Paterson, N. J.
Notch Road,	F. J. Marley,	Little Falls, N. J.
Notch Road,	Dowling Construction Co.,	Paterson, N. J.
Haledon,	R. M. Torbet,	Haledon, N. J.
Hawthorne,	Daniel & D. Stanley,	Hawthorne, N. J.
Preakness,	Colfax & Steele,	Pompton, N. J.
Great Notch,	Wright & Lindsley,	Orange, N. J.
Paterson,	Preakness Stone Crushing Co.,	Paterson, N. J.

SOMERSET COUNTY.

Dunellen,	Garrison & Gray,	Dunellen, N. J.
North Plainfield,	N. B. Smalley,	Plainfield, N. J.
Bernardsville,	Somerset Stone Crushing Co.,	Bernardsville, N. J.
Mine Brook,	James Freeman,	Mine Brook, N. J.
Plainfield,	J. H. Wilson & Co.,	Plainfield, N. J.
Millington,	Millington Stone Co.,	Millington, N. J.
Chimney Rock,	Bound Brook Crushed Stone Co.,	Bound Brook, N. J.
Somerville,	William Hardgrove,	Somerville, N. J.
Rocky Hill,	Delaware River Quarry and Construction Co.,	Rocky Hill, N. J.
Bernardsville,	Frank S. Tainter,	Morristown, N. J.
Far Hills,	Grant Schley,	Far Hills, N. J.
Bernardsville,	Mine Brook Stone Co.,	Bernardsville, N. J.

SUSSEX COUNTY.

Newton,	Newton State Quarry,	Newton, N. J.

UNION COUNTY.

Scotch Plains,	Hatfield & Weldon,	Scotch Plains, N. J.
Murray Hill,	Commonwealth Company,	Murray Hill, N. J.
Summit,	A. A. Potter,	Summit, N. J.
West Summit,	Victor G. Smythe,	West Summit, N. J.
Springfield,	Stewart Hartshorn,	Springfield, N. J.

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Gravel Pits in New Jersey Used for Road Building.

ATLANTIC COUNTY.

Location of Pits.	*Owners.*	*P. O. Address.*
May's Landing,	Estate of Wm. Post,	May's Landing, N. J.
May's Landing,	D. E. Izard,	May's Landing, N. J.
Estelville,	A. E. Bourgeous,	Estelville, N. J.
Tuckahoe,	Henry D. & Wm. G. Moore,	Haddonfield, and 931 Chestnut St., Phila., Pa.
May's Landing,	J. E. P. Abbott,	May's Landing, N. J.
May's Landing,	Samuel Champion,	May's Landing, N. J.
Pleasantville,	West Jersey and Seashore Railroad,	Camden, N. J.
Pleasantville,	P. & A. C. Railroad,	Pleasantville, N. J.

BURLINGTON COUNTY.

Riverton,	Lewis Connor,	Riverton, N. J.
Westfield,	Enoch Evans,	Westfield, N. J.
Westfield,	Estate of Wm. R. Lippincott,	Westfield, N. J.
Palmyra,	Isaac Evaul,	Palmyra, N. J.
Palmyra,	Wm. F. Morgan,	Palmyra, N. J.
Burlington,	Frank Warren,	Burlington, N. J.
Riverton,	Franklin T. Hunter,	Riverton, N. J.
Bridgeboro,	Edwin M. Brock,	Bridgeboro, N. J.
Moorestown,	Michael Flynn,	Moorestown, N. J.
Hartford,	John Warrick,	Hartford, N. J.
Rancocas,	James W. Stokes,	Rancocas, N. J.
Columbus,	Thomas A. Bunting,	Columbus, N. J.
Columbus,	Thomas H. Rogers,	Columbus, N. J.
Kinkora,	C. G. Kinsley,	Kinkora, N. J.
Columbus,	Edward Wilson,	Columbus, N. J.
Columbus,	Charles Sharp,	Columbus, N. J.
Florence,	George Bowne,	Florence, N. J.
Georgetown,	John P. Hutchinson,	Georgetown, N. J.
Jobstown,	Charles Black,	Jobstown, N. J.
Centerton,	Allen Austin,	Centerton, N. J.
Willingboro,	Mrs. John Buzby,	Willingboro, N. J.
Beverly,	J. H. Comb,	Beverly, N. J.
Burlington,	Samuel Johnson,	Burlington, N. J.
Beverly,	William Baggs,	Beverly, N. J.
Beverly,	Joshua Fenimore,	Beverly, N. J.
Moorestown,	Samuel C. Decou,	Moorestown, N. J.

CAPE MAY COUNTY.

Belle Plain,	West Jersey and Seashore Railroad,	Camden, N. J.

CUMBERLAND COUNTY.

Millville,	John Golder,	Millville, N. J.

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MIDDLESEX COUNTY.

Old Bridge,	I. Biddle Herbert,	Old Bridge, N. J.
Helmetta,	Geo. W. Helme,	Helmetta, N. J.
Jamesburg,	James Buckelew's Sons,	Jamesburg, N. J.
Englishtown,	Charles Hoffman,	Englishtown, N. J.

MONMOUTH COUNTY.

Hopping,	D. G. Campbell,	Middletown, N. J.
Navesink,	D. R. G. Andrews,	Navesink, N. J.
Hopping,	Peter L. Conover,	Atlantic Highlands, N. J.
Leonardville,	John T. Hopping,	Leonardville, N. J.
Red Bank,	Mrs. Henry Field,	Red Bank, N. J.
Red Bank,	James Hubbard,	Red Bank, N. J.
Red Bank,	John L. Applegate,	Red Bank, N. J.
Chapel Hill,	Geo. T. Hopping,	Chapel Hill, N. J.
Middletown,	J. D. Conover,	Middletown, N. J.
Farmingdale,	Manasquan Gravel Co.,	Asbury Park, N. J.
Allenwood,	Manasquan Gravel Co.,	Asbury Park, N. J.
Shark River,	Manasquan Gravel Co.,	Asbury Park, N. J.
Navesink,	Webster Swan,	Navesink, N. J.
Holmdel,	William Crawford,	Holmdel, N. J.
Red Bank,	Red Bank Gravel Co.,	Red Bank, N. J.

OCEAN COUNTY.

Stafford,	Staffordville Gravel Co.,	Staffordville, N. J.

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Statements by Engineers and Supervisors.

November 22d, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of West Hillsdale, East Hillsdale, Magnolia and Washington avenues, township of Hillsdale, county of Bergen, State of New Jersey. Total length, 2,310 feet, or .42 mile.

Width of stone-bed, 14 feet.
Length of stone-bed, 2,310 feet.
Depth of stone-bed, 8 inches.

Macadam, { 1,416 square yards, at 59 cents; 1,969 square yards, at 56 cents; } total, ...	$1,938 08
Telford, 210 square yards, at 59 cents; total, ...	123 90
Earth excavation, 2,528 cubic yards, at 26 cents; total, ...	657 28
Total, ...	$2,719 26
Supervisor's salary, ...	37 50
Engineering expenses, ...	200 00
Total cost of road, ...	$2,956 76
Lump sum, contract price, ...	$2,719 26
Total allowed by the State, ...	2,719 26
One-third of above amount paid by the State, ...	906 42

Maximum grade before, ...7.75 per cent.
Maximum grade after, ...3.50 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 7 inches.

Respectfully yours,

H. G. HERING, JR.,
Engineer.

WILLIAM W. BANTA,
Supervisor.

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January 20th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Westfield and Camden turnpike road, townships of Delran and Cinnaminson, county of Burlington, State of New Jersey. Total length, 6,385 feet, or 1.20 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 6,385 feet.
Depth of stone-bed, 10 inches.
Width of gravel shoulder, 10 feet, 5 feet each side.
Length of gravel shoulder, 6,385 feet.

Macadam, 328⅓ square yards, at 53 cents; total, ...	$9,300 00
Telford, 9,932²/₉ square yards, at 91 cents; total, ...	
Shoulder, 1,792 square yards, at 24 cents; total, ...	
Extra earth excavation, 310 cubic yards, at 24 cents; total, ...	74 40
Total, ...	$9,374 40
Supervisor's salary, ...	294 00
Engineering expenses, ...	187 48
Total cost of road, ...	$9,855 88
Lump sum, contract price, ...	$9,300 00
Total allowed by State, ...	9,374 40
One-third of above, amount paid by the State, ...	3,124 80
Maximum grade before, ...	6 per cent.
Maximum grade after, ...	2.94 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the the depth of finished pavement was 10 inches.

Respectfully yours,
HOWARD PARRY,
Engineer.
WALLACE L. GENNETT,
Supervisor.

PEMBERTON, N. J., July 23d, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Newbold's Corner and Eayrestown road, townships of Lumberton and Northampton, county of Burlington, State of New Jersey. Total length, 13,276 feet, or 2.51 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 13,276 feet.
Depth of stone-bed, 6 and 10 inches.

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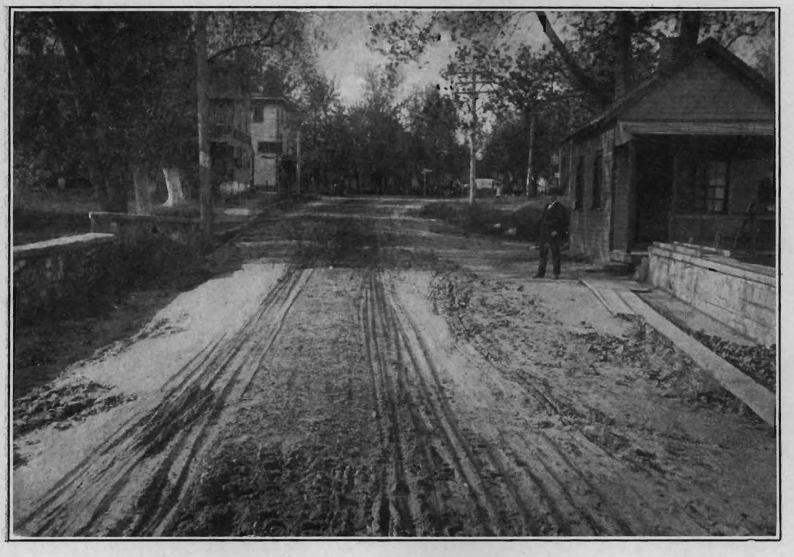
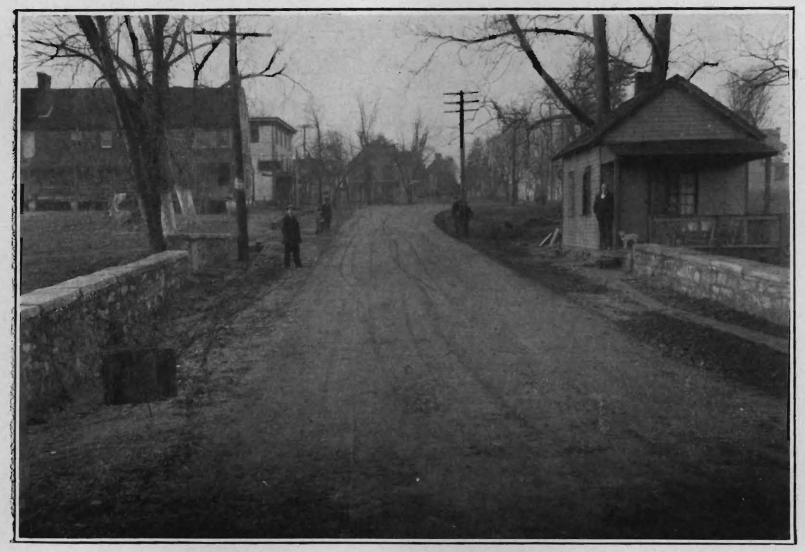


Westfield and Camden Turnpike, Burlington County,
Before Improvement.



Westfield and Camden Turnpike, Burlington County,
After Improvement.

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Macadam, 18,629.3333+ square yards, at 81834+ cents; total,....	$15,245 13
Telford, 2,022.2222+ square yards, at $1.31834+ cents; total, ...	2,665 98
Earth excavation, extra township failed to do, 3,522 cubic yards, at 20 cents; total, ...	
Total, ...	$17,911 11
Supervisor's salary, ...	477 00
Engineering expenses, ...	372 31
Extras, paid by county, ...	704 40
Total cost of road, ...	$19,464 82
Lump sum, contract price, ...	$16,900 00
Total allowed by the State, ...	17,911 11
One-third of above, amount paid by the State, ...	5,970 37
Maximum grade before, ...	2 per cent.
Maximum grade after, ...	1 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches for macadam, 10 inches for telford.

Respectfully yours,

FRANK EARL,
Engineer.

WM. P. YOUNKER,
Supervisor.

March 1st, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Bellville turnpike road, county of Hudson, State of New Jersey. Total length, 12,251 feet, or 2.32 miles.

Width of stone-bed, 20 feet.
Length of stone-bed, 12,251 feet.
Depth of stone-bed, 10 inches.

Telford, 26,965 square yards, at 80 cents; total, ...	$21,572 00
Earth excavation, 146,522 cubic yards, at 80 cents; total, ...	117,217 60
Two bridges, ...	850 00
Total, ...	$139,639 60
Supervisor's salary, ...	2,094 00
Engineering expenses, ...	7,656 98
Extras, paid by county—inspectors, printing and advertising, etc., ...	7,930 20
Total cost of road, ...	$157,320 78

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Total allowed by the State,	$93,572 00
One-third of above, amount paid by the State,	31,190 67

Maximum grade before,	6.30 per cent.
Maximum grade after,	.50 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 10 inches.

Respectfully yours,

RALPH D. EARLE, Jr.,
Engineer.

CHARLES HAFSTROEM,
Supervisor.

August 28th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

Dear Sir—Below find an exact detailed statement of the cost of the Old York road, townships of West and East Amwell, county of Hunterdon, State of New Jersey. Total length, 29,323 feet, or 5.55 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 29,323 feet.
Depth of stone-bed—Telford, 14 inches; macadam, 6 inches.

Macadam, 39,822 square yards, at 65 cents; total,	$25,844 30
Telford, 5,791 square yards, at 95 cents; total,	5,501 45
Extra macadam, 353.6 square yards, at 32½ cents; total,	114 92
Earth excavation, 32,966 cubic yards, at 50 cents; total,	16,483 00
Excavation (approaches),	353 70
Drain, 4-in., 60 lineal feet, at 20 cents; total,	12 00
Concrete, 30.2 cubic yards, at $8.00; total,	241 60
Cobble Stone gutter, 358.7 square yards, at 20 cents; total,	71 74
Total,	$48,622 71
Supervisor's salary,	660 00
Extras, paid by county,	1,070 20
Total cost of road,	$50,352 91
Lump sum, contract price,	$47,900 49
Total allowed by the State,	48,622 71
One-third of above, amount paid by the State,	16,207 57

Maximum grade before,	8 per cent.
Maximum grade after,	5.66 per cent.

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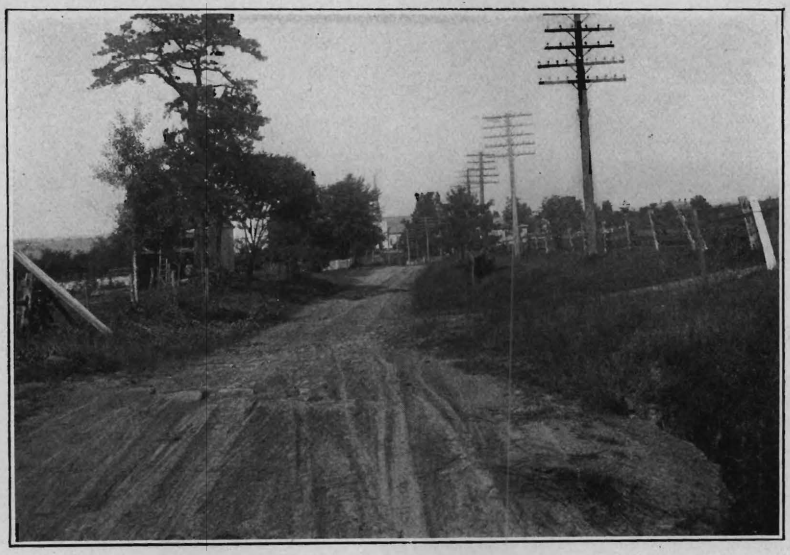
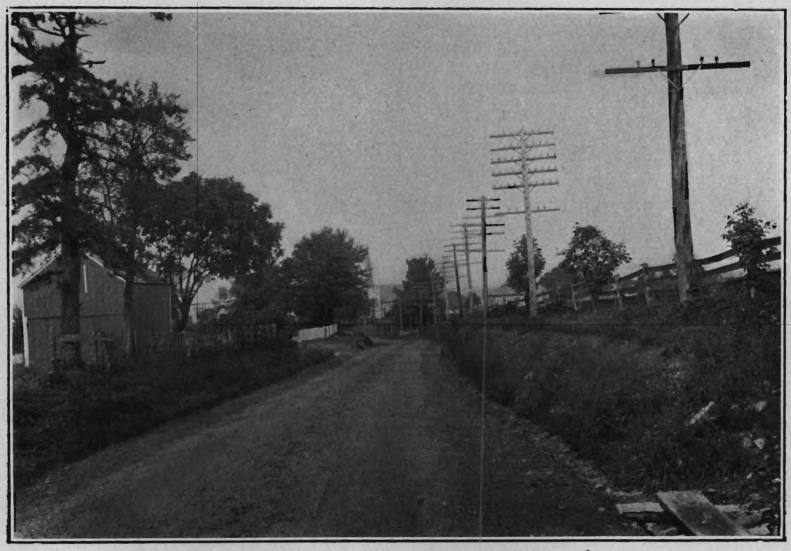


Old York Road, Hunterdon County, Before Improvement.



Old York Road, Hunterdon County, After Improvement.

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We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 14 inches.

Respectfully yours,

A. J. COOPER,
Engineer.

R. H. RUNKLE,
Supervisor.

September 20th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Landing Bridge and Stelton road, township of Piscataway, county of Middlesex, State of New Jersey. Total length, 10,830 feet, or 2.05 miles.

Width of stone-bed, 12 feet.
Length of stone-bed, 10,830 feet.
Depth of stone-bed, 8 inches.

Macadam, 14,440 square yards, at 72 cents; total,	$10,396 80
Earth excavation, 5,937.97 cubic yards, at 55 cents; total,	3,265 88
Drain, 2,000 lineal feet, at 18 cents; total,	360 00
Total,	$14,022 68
Supervisor's salary,	702 00
Extras, paid by county,	938 88
Total cost of road,	$15,663 56
Lump sum, contract price,	$14,293 97
Total allowed by the State,	14,022 68
One-third of above, amount paid by the State,	4,674 23
Maximum grade before,	4.50 per cent.
Maximum grade after,	2.43 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

L. C. N. BROGGER, JR.,
Engineer.

GEORGE W. CORIELL,
Supervisor.

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October 29th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Applegarth and Prospect Plains road, township of Monroe, county of Middlesex, State of New Jersey. Total length, 15,470 feet, or 2.93 miles.

Width of gravel-bed, 12 feet.
Length of gravel-bed, 15,470 feet.
Depth of gravel-bed, average 8 inches.

Gravel, 4,610.3 cubic yards,	$3,227 21
Earth excavation, 17,703.1 cubic yards,	3,186 01
Drain, 4,647 lineal feet, at 20 cents; total,	929 40
Total,	$7,342 62
Supervisor's salary,	507 00
Total cost of road,	$7,849 62
Lump sum, contract price,	$6,413 22
Total allowed by the State,	7,342 62
One-third of above, amount paid by the State,	2,447 54
Maximum grade before,	8 per cent.
Maximum grade after,	2.5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

L. C. N. BROGGER, JR.,
Engineer.

S. E. VAN DENBERGH,
Supervisor.

October 22d, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Allentown and New Egypt road, first section, township of Upper Freehold, county of Monmouth, State of New Jersey. Total length, 17,762 feet, or 3.36 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 17,762 feet.
Depth of stone-bed, 6 inches.

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Macadam, 27,629 7/9 square yards, at 70 cents; total,	$19,340 85
Earth excavation, 15,000 cubic yards, at 18 cents; total,	2,700 00
Drain (stone), 2,000 lineal feet, at 25 cents; total,	500 00
Total,	$22,540 85
Add excess of lump-sum bid over calculation by quantities,	99 15
Supervisor's salary,	523 80
Engineering expenses,	566 00
Extras, paid by county, for stone approaches and extra drains,	605 95
Total cost of road,	$24,335 75
Lump sum, contract price,	$22,640 00
Total allowed by the State,	23,245 95
One-third of above, amount paid by the State,	7,748 65

Maximum grade before, ...4.16 per cent.
Maximum grade after, ...2 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

PETER FORMAN,
Engineer.

JOHN W. BURTIS,
Supervisor.

MORRISTOWN, N. J., Dec. 27th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Morristown and New Vernon road, township of Passaic, county of Morris, State of New Jersey. Total length, 10,350 feet, or 1.96 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 10,350 feet.
Depth of stone-bed, 6 inches.

Macadam, 17,148 square yards, at 85 cents; total,	$14,575 80
Macadam driveways, 494 square yards, at 40 cents; total,	197 60
Earth excavation, 11,770 cubic yards, at 45 cents; total,	5,296 50
Drain, 25 lineal feet, at 25 cents; total,	6 25
Cobble Stone gutter, 353 square yards, at 50 cents; total,	176 50
Total,	$20,252 65

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Supervisor's salary,	360 00
Engineering expenses,	424 85
Extras, paid by county (pipes),	488 00
Total cost of road,	$21,525 50
Lump sum, contract price,	$20,740 65
Total allowed by the State,	20,252 65
One-third of above, amount paid by the State,	6,750 88
Maximum grade before,	8.5 per cent.
Maximum grade after,	5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was six (6) inches.

WM. E. KING,
County Engineer.
E. FRANK OLIVER,
Supervisor.

MORRISTOWN, N. J., Dec. 27th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Montville and Mountain View road, Township of Pequannock, county of Morris, State of New Jersey. Total length, including bridges, 15,570 feet, or 2.94 miles.

Width of stone-bed, 12 feet.
Length of stone-bed, 15,150 feet, or 2.87 miles.
Depth of stone-bed, 6 inches.

Macadam, 19,741 square yards, at 48 cents; total,	$9,475 68
Earth excavation, extra, 2,885 cubic yards, at 50 cents; total,	1,442 50
Earth excavation, 7,210 cubic yards, at 36 cents; total,	2,595 60
Rock excavation, 235 cubic yards, at 36 cents; total,	84 60
Drain, stone, 450 lineal feet, at 20 cents; total,	90 00
Total,	$13,688 38
Supervisor's salary,	675 00
Engineering expenses,	520 47
Extras, paid by county,	658 47
Total cost of road,	$15,542 32
Lump sum, contract price,	$14,346 85
Total allowed by the State,	13,688 38
One-third of above, amount paid by the State,	4,562 79

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Maximum grade before, ...5.10 per cent.
Maximum grade after, ...4.70 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was six (6) inches.

Respectfully yours,
WM. E. KING,
County Engineer.
H. W. ZELIFF,
Supervisor.

MORRISTOWN, N. J., Dec. 27th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of Mountain avenue, township of Mendham, county of Morris, State of New Jersey. Total length, 3,945 feet, or 0.747 mile.

Width of stone-bed, 14 feet.
Length of stone-bed, 3,945 feet.
Depth of stone-bed, 8 inches.

Macadam driveways, 370 square yards, at 40 cents; total, ...	$148 00
Telford—macadam, 6,275 square yards, at 65 cents; total, ...	4,078 75
Earth excavation, 5,080 cubic yards, at 34 cents; total, ...	1,727 20
Drain, 18" iron pipe, 400 lineal feet, at $2.60; total, ...	1,040 00
Total, ...	$6,993 95
Supervisor's salary, ...	324 00
Engineering expenses, ...	231 14
Extras, paid by county, ...	1,040 00
Total cost of road, ...	$7,549 09
Lump sum, contract price, ...	$6,993 95
Total allowed by the State, ...	5,953 95
One-third of above, amount paid by the State, ...	1,984 65

Maximum grade before, ... 8.5 per cent.
Maximum grade after, ... 5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was eight (8) inches.

Respectfully yours,
WM. E. KING,
County Engineer.
JOHN TIGER,
Supervisor.

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MORRISTOWN, N. J., Dec. 27th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Hamburg turnpike road, township of Jefferson, county of Morris, State of New Jersey. Total length, 1,875 feet, or .36 mile.

Width of stone-bed, 14 feet.
Length of stone-bed, 1,875 feet.
Depth of stone-bed, 6 inches.

Macadam, 2,917 square yards, at 54 cents; total,	$1,575 18
Earth excavation extra, 1,435 cubic yards, at 50 cents; total,	717 50
Earth excavation, 560 cubic yards, at 30 cents; total,	168 00
Rock excavation, 530 cubic yards, at $1.50; total,	795 00
Total,	$3,255 68
Supervisor's salary,	243 00
Engineering expenses,	244 40
Extras, paid by county, iron pipe,	392 50
Total cost of road,	$4,135 58
Lump sum, contract price,	$3,648 18
Total allowed by the State,	3,255 68
One-third of above, amount paid by the State,	1,085 23

Maximum grade before, ...8 per cent.
Maximum grade after, ...2.85 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was six (6) inches.

Respectfully yours,
WM. E. KING,
County Engineer.
CHARLES A. MONKS,
Supervisor.

MORRISTOWN, N. J., Dec. 27th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Sussex turnpike road, township of Roxbury, county of Morris, State of New Jersey. Total length, 3,625 feet, or .69 mile.

Width of stone-bed, 14 feet.
Length of stone-bed, 3,625 feet.
Depth of stone-bed, 8 inches.

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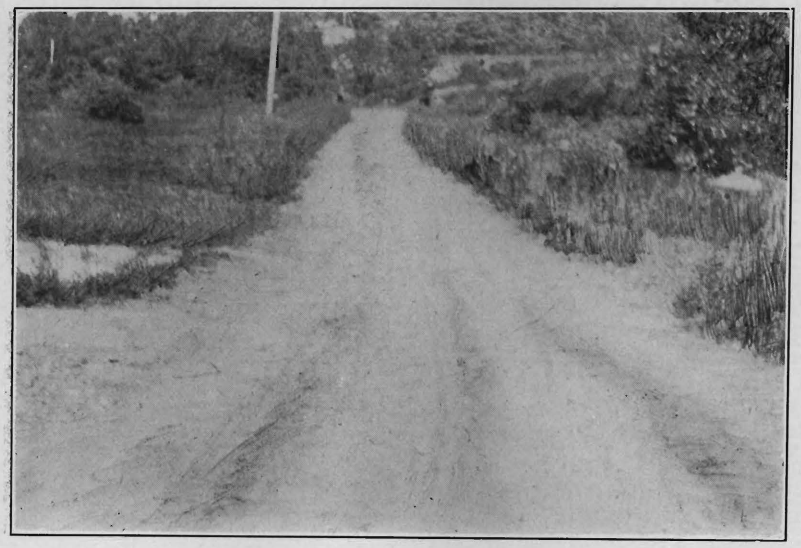

Hamburg Turnpike, Morris County, Before Improvement.

Hamburg Turnpike, Morris County, After Improvement.

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Macadam driveways, 14½ square yards, at 40 cents; total, ...	$5 80
Telford—macadam, 5,639 square yards, at 55 cents; total, ...	3,101 45
Earth excavation, 13,530 cubic yards, at 33 cents; total, ...	4,464 90
Rock excavation, 135 cubic yards, at $1.50; total, ...	202 50
Cobble Stone gutter, 80½ square yards, at 35 cents; total, ...	28 17
Total, ...	$7,802 82
Supervisor's salary, ...	324 00
Engineering expenses, ...	241 23
Extras, paid by county, iron pipe, ...	819 05
Total cost of road, ...	$9,187 10
Lump sum, contract price, ...	$8,621 87
Total allowed by the State, ...	7,802 82
One-third of above, amount paid by the State, ...	2,600 94

Maximum grade before, ...10.4 per cent.
Maximum grade after, ...6.28 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was eight (8) inches.

Respectfully yours,
WM. E. KING,
County Engineer.
GEO. W. KING,
Supervisor.

PATERSON, N. J., October 3d, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Mountain View and Singac road, township of Wayne, county of Passaic, State of New Jersey. Total length, 12,993 feet, or 2.46 miles.

Width of stone-bed, 14 feet.
Length of stone-bed, 12,993 feet.
Depth of stone-bed, 4 inches.

Macadam, 20,233 square yards, at 21 cents; total, ...	$4,248 93
Earth excavation, 12,256 cubic yards, at 21 cents; total, ...	2,573 76
Rock excavation, 11,488.9 cubic yards, at $1.25; total, ...	14,361 12
Total, ...	$21,183 81
Supervisor's salary,.....	1,644 00
Extras, paid by county, ...	2,349 00
Total cost of road, ...	$25,176 81
Total allowed by the State, ...	$21,183 81
One-third of above, amount paid by the State, ...	7,061 27

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Maximum grade before, ...9.2 per cent.
Maximum grade after, ...3.00 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches.

Respectfully yours,

COLIN R. WISE,
Engineer.
PETER EARL,
Supervisor.

PATERSON, N. J., September 19th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Goffle Hill road, township of Manchester, county of Passaic, State of New Jersey. Total length, 7,483 feet, or 1.42 miles.

Width of stone-bed, 16 feet.
Length of stone-bed, 7,483 feet.
Depth of stone-bed, 4 inches.

Macadam—roadbed, 13,525; driveways, 290—13,815 square yards, at 42 cents; total, ...	$5,802 30
Earth excavation, 15,395 cubic yards, at 38 cents; total, ...	5,850 10
Rock excavation, 858.5 cubic yards, at $2.25; total, ...	1,931 62
Rubble stone gutter, 6,481 square yards, at 60 cents; total, ...	3,888 60
Total, ...	$17,472 62
Supervisor's salary, ...	743 00
Extras, paid by county, culverts, pipes, etc., ...	3,102 55
Total cost of road, ...	$21,318 17
Total allowed by the State, ...	$17,472 62
One-third of above, amount paid by the State, ...	5,824 20

Maximum grade before, ...15.41 per cent.
Maximum grade after, ... 8.24 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches,

Respectfully yours,

COLIN R. WISE,
Engineer.
CHARLES W. NELKE,
Supervisor.

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No. 2 McFarlane Hill, Rocky Hill Road, Somerset County,
Before Improvement.

No. 2 McFarlane Hill, Rocky Hill Road, Somerset County,
After Improvement.

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July 17th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of the Rocky Hill road, township of Montgomery, county of Somerset, State of New Jersey. Total length, 29,583 feet, or 5.60 miles.

Width of stone-bed, 12 feet.
Length of stone-bed, 29,583 feet.
Depth of stone-bed, 8 inches.

Macadam, 39,444 square yards, at 64 cents; total,	$25,244 16
Extra excavation at Drake's drive,	100 00
Extra stone at hotel,	38 83
Extra work at Bolmers Corner,	111 98
Earth excavation, 21,112 cubic yards, at 25 cents; total,	5,278 00
Rock excavation, 1,358 cubic yards, at $1.25; total,	1,697 50
Drain, 4,562 lineal feet, at 14 cents; total,	638 68
Supervisor's salary,	870 00
Engineering expenses,	1,500 00
Total,	$35,479 15
Lump sum, contract price,	$33,339 66
Total allowed by the State,	33,109 15
One-third of above, amount paid by the State,	11,036 38

Maximum grade before, ... 13 per cent.
Maximum grade after, ... 7.50 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,
JOSHUA DOUGHTY, JR.,
Engineer.
E. B. HOAGLAND,
Supervisor.

October 29th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of Springfield avenue, township of Cranford, county of Union, State of New Jersey. Total length, 6,240 feet, or 1.18 miles.

Width of stone-bed, 10 ft. of 6-inch, 6 ft. of 4-inch; total, 16 feet.
Length of stone-bed, 6,240 feet.
Depth of stone-bed, 6 and 4 inches.

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Macadam, 6-inch, 7,014 square yards, at 55 cents; total,	$3,857 70
Macadam, 4-inch, 4,160 square yards, at 40 cents; total,	1,664 00
Earth excavation, 5,420 cubic yards, at 40 cents; total,	2,168 00
Manhole-heads reset, 3, at $1.00; total,	3 00
Total,	$7,692 70
Supervisor's salary,	105 00
Total cost of road,	$7,797 70
Lump sum, contract price,	$7,492 15
Total allowed by the State,	7,692 70
One-third of above, amount paid by the State,	2,564 23
Maximum grade before,	.8 per cent.
Maximum grade after,	4.16 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 4 inches.

Respectfully yours,

J. L. BAUER,
Engineer.

ISAAC WINANS,
Supervisor.

October 3d, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of Centennial avenue, townwship of Cranford, county of Union, State of New Jersey. Total length, 3,237.9 feet, or .61 mile.

Width of stone-bed, 14 feet.
Length of stone-bed, 3,237.9 feet.
Depth of stone-bed, 10 ft. of 6-inch, 4 ft. of 4-inch.

Macadam, 6-inch, 3,598 square yards, at 50 cents; total,	$1,799 00
Macadam, 4-inch, 1,439 square yards, at 38 cents; total,	546 82
Earth excavation, 4,270 cubic yards, at 30 cents; total,	1,281 00
Ten manhole and slush-tank heads reset, at $1.00; total,	10 00
Total,	$3,636 82
Supervisor's salary,	147 00
Total cost of road,	$3,783 82
Lump sum, contract price,	$3,420 82
Total allowed by the State,	3,636 82
One-third of above, amount paid by the State,	1,212 27

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Maximum grade before, ...4.6 per cent.
Maximum grade after, ...3.0 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 4 inches.

Respectfully yours,
J. L. BAUER,
Engineer.
ISAAC WINANS,
Supervisor.

October 29th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of Orange avenue and South 21st street, township of Cranford, county of Union, State of New Jersey. Total leength, 4,970 feet, or .94 mile.

Width of stone-bed, 16 feet.
Length of stone-bed, 4,970 feet.
Depth of stone-bed, 10 ft. of 6-in, 6 ft. of 4 inches.

Macadam, 6-inch, 5,501 square yards, at 56½ cents; total, ...	$3,108 07
Macadam, 4-inch, 3,301 square yards, at 40 cents; total, ...	1,320 40
Earth excavation, 3,690 cubic yards, at 29 cents; total, ...	1,070 10
Manhole heads reset, 5, at $5.00; total, ...	25 00
Total, ...	$5,523 57
Supervisor's salary, ...	142 50
Total cost of road, ...	$5,666 07
Lump sum, contract price, ...	$5,543 20
Total allowed by the State, ...	5,523 57
One-third of above, amount paid by the State, ...	1,841 19

Maximum grade before, ...1.87 per cent.
Maximum grade after, ...1.27 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 4 inches.

Respectfully yours,
J. L. BAUER,
Engineer.
CHAS. NICK,
Supervisor.

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November 17th, 1906.

Mr. E. C. Hutchinson, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—Below find an exact detailed statement of the cost of Orchard street, Brookside Place and Division street, township of Cranford, county of Union, State of New Jersey. Total length, 6,760 feet, or 1.28 miles.

Width of stone-bed, 16 feet.
Length of stone-bed, 6,760 feet.
Depth of stone-bed, 10 ft. of 6-inch, 6 ft. of 4-inch.

Macadam, 6-inch, 7,694 square yards, at 57½ cents; total, ...	$4,424 05
Macadam, 4-inch, 4,567 square yards, at 40 cents; total, ...	1,826 80
Earth excavation, 4,725 cubic yards, at 32 cents; total, ...	1,512 00
Manholes reset, 4, at $3.00; total, ...	12 00
Total, ...	$7,774 85
Supervisor's salary, ...	171 00
Total cost of road, ...	$7,945 85
Lump sum, contract price, ...	7,645 62
Total allowed by the State, ...	7,774 85
One-third of above, amount paid by the State, ...	2,591 62

Maximum grade before, ...3.10 per cent.
Maximum grade after, ...1.95 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 4 inches.

Respectfully yours,

J. L. BAUER,
Engineer.

GIDEON E. LUDLOW,
Supervisor.

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APPENDICES.

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Appendix A.

Standard State Aid Specifications for Stone Roads.

SPECIFICATIONS.

For a STONE ROAD in.....County, New Jersey, known as.....

Beginning at.....

Extending to.....

A distance of.....Feet or.....Miles

Stone,.....Feet Wide.....Inches Deep

Earth,.....Feet Wide. Total Width.....Feet

WORK TO BE PERFORMED

1. The work to be performed will consist in furnishing all material, tools, machinery and labor necessary for the efficient and proper grading of roadway, side ditches and side banks, laying, spreading and rolling of road metal, and leaving the roadway complete in every manner ready for immediate use.

PLANS AND DRAWINGS.

2. The plan, profile and cross-sections on file in the office of the State Commissioner of Public Roads and at the office of..... County Engineer,.....New Jersey, show general location, profile, details and dimensions. The work will be constructed in all respects according to the above-mentioned plan, profile and cross-sections, which form part of these specifications.

3. Any variation of location, profile, size and dimensions from that shown on the plan, as may be required by the exigencies of construction, will, in all cases, be determined by the Engineer, but the contractor shall not, on any pretense, save that of the written order of the contracting parties and the State Commissioner of Public Roads, deviate from the intent of the plan or specifications.

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4. On all drawings, figured dimensions are to govern in cases of discrepancy between scale and figures.

GRADING.

5. Under this head will be included all excavation and embankment required or the formation of the highway, cutting all ditches or drains about or contiguous to the road, removing all fences, walls, buildings, trees, poles or other encumbrances, the excavation and embankment necessary for reconstructing cross or branch roads or entrances to dwellings in cases where they are destroyed or interfered with in the formation of the roadway, and all other excavations and embankments connected with or incidental to the construction of the said road.

EXCAVATION.

6. The roadway to the widths and depths as shown on plans must be excavated or built to the same curvature as that of the surface of the road when finished. The grade, from center to sides, must be as shown on plans.

7. The earth taken from any cut or ditch shall be deposited where the engineer may direct, either within or without the line of the road, but no earth shall be removed from the line of the road without the order of the engineer.

8. The grading shall be completed for the full width of the road, from gutter to gutter, before any macadamizing is commenced.

EMBANKMENT.

9. Material taken from the excavations, except when otherwise directed by the engineer, shall be deposited in the embankments, either on the roadway or sidewalks. Rejected or excess material will be used to increase the width of the embankments or deposited in spoil banks or waste piles, as and where the engineer may direct.

10. When there is not sufficient material in the excavations of the road to form the embankments, the deficiency must be supplied by the contractor from without the road. The character of said material and place of excavation must be approved by the engineer.

11. The embankments will be formed in layers of such depth, generally one (1) foot, and the material deposited and distributed in such a manner as the engineer may direct, the required allowance for settling being added. Each layer shall be carried across the entire width of the embankment and completed before commencing another, and this method shall be followed with each succeeding layer until the established grade is reached.

SLOPES.

12. Slopes in both embankment and excavation shall be one and one-half (1½) horizontal to one (1) vertical, when the width of the road will permit; if the road is too narrow to allow the full slope within its side lines, the engineer shall not calculate the quantities, either in embankment or excavation.

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beyond said side lines, unless the required ground shall be first dedicated to the public in writing by the owner or owners thereof.

WIDTH AND DEPTH.

13. The construction to be.....inches deep and..... feet wide, as shown on plan and detail sheet.

ROADWAY.

Sub-Foundations.

14. When the excavations and embankments have been brought to a proper depth below the intended surface of the roadway, the cross-section thereof conforming in every respect to the cross-section of the road when finished, the same shall be rolled with a.....ton roller until it is .....inches below the intended surface of the road and is approved by the engineer and supervisor. If any depressions form under such rolling, owing to improper material or vegetable matter, the same shall be removed and good earth substituted, and the whole re-rolled until thoroughly solid and to above-mentioned grade. Water must be applied in advance of the roller when, in the opinion of the engineer and supervisor, it is necessary.

STONE CONSTRUCTION.

Telford Foundations.

15. After the roadbed has been formed and rolled, as above specified, and has passed the inspection of the engineer and supervisor, a bottom course of stone, of an average depth of.....inches, is to be set by hand as a close, firm pavement, the stones to be placed on their broadest edges lengthwise across the road in such manner as to break joints as much as possible, the breadth of the upper edge not to exceed four (4) inches. The interstices are then to be filled with stone chips, firmly wedged by hand with a hammer, and projecting points broken off. No stone of greater length than ten (10) inches or width of four (4) inches shall be used, except each alternate stone on outer edge, which shall be double the length of the others and well tied into the bed of the road. All stones with a flat, smooth surface must be broken. The whole surface of this pavement must be subjected to a thorough settling or ramming with heavy sledge-hammers, and thoroughly rolled with a.....ton.....roller. No stone larger than two and one-half (2½) inches shall be left loose on top of telford.

MACADAM.

First Course of Broken Stone.

16. After the roadbed has been formed and rolled, as above specified, and has passed the inspection of the engineer and supervisor, the first layer of broken stone, consisting of two and one-half (2½) inch stone, or stone that

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will pass through a ring three (3) inches in diameter, shall be deposited in a uniform layer, having a depth of.....inches, and rolled repeatedly with a.....ton.....roller until compacted to the satisfaction of the engineer and supervisor. No stone in this course shall be less than two (2) inches in length.

17. The depth of loose stone in this and all other courses must be measured by blocks the required thickness of the said loose stone. These blocks must be placed at frequent intervals amid the loose stone when being spread.

BINDER BETWEEN FIRST AND SECOND COURSE FOR TELFORD OR MACADAM.

18. On the first course of stone a quantity of..... binder shall be spread in a uniform layer, and the whole rolled until the stones cease to sink or creep in front of the roller. The quantity and quality of this and all other binding shall be subject to the approval of the engineer and supervisor. Water must be applied in advance of the roller, if ordered by the engineer or supervisor.

SECOND COURSE OF BROKEN STONE FOR MACADAM OR TELFORD.

19. The second course of broken stone shall consist of one and one-half (1½) inch stone; that is, every piece of stone shall be broken so that it can be passed through a ring two (2) inches in diameter, and no stone shall be more than two (2) inches or less than one (1) inch long. This course shall be spread in a uniform layer.....inches in depth and rolled until thoroughly settled into place to the satisfaction of the engineer and supervisor. Water must be applied as ordered by the engineer or supervisor.

BINDER ON SECOND COURSE OF STONE.

20. Binder on this course of stone must be applied in the same manner as binder on first course of stone (see Art. 18), as directed by engineer and supervisor.

SURFACE.

21. When the two courses are rolled to the satisfaction of the engineer and supervisor, a coat of fifty (50) per cent. of three-quarters (¾) inch stone and fifty (50) per cent. of screenings, properly mixed, is to be spread of sufficient thickness to make a smooth and uniform surface to the road, then again rolled until the road becomes thoroughly consolidated, hard and smooth.

22. Rolling must be done by the contractor with a.....ton..... roller, approved by the engineer.

23. Any depressions formed during the rolling, or from any other cause, are to be filled with one and one-half (1½) inch stone, or three-quarter (¾) inch stone, or both, and screenings, approved by the engineer, and the roadway brought to the proper grade and curvature as determined by him.

24. Water must be applied in such quantities and in such manner as directed by the engineer or supervisor.

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MANNER OF ROLLING.

25. In the rolling the roller must start from the side lines of the stone bed and work towards the center, unless otherwise directed. The rolling shall at all times be subject to the directions of the engineer and supervisor, who may, from time to time, direct such methods of procedure as in their opinion the necessities of the case may require.

QUALITY OF MATERIAL.

26. All stone must be as nearly cubical as possible, broken with the most approved modern stone crushing machinery, free from all screenings, earth and other objectionable substances, of uniform size, and the same kind and quality, or equally as good in every particular, as that shown in the engineer's office. The one and one-half (1½) inch stone, three-quarter (¾) inch and screenings for binder and final finish must be of the best trap-rock, free from loam or clay.

27. The contractor must furnish samples to the engineer of the kind of stone to be used in the work before the opening of the bids, and to the State Commissioner of Public Roads before the approval of the contract by him.

ENTRANCES TO DWELLINGS.

28. All driveways leading to dwellings along the road shall be macadamized with the second course and finished in the same manner as prescribed for the main road. The macadamizing shall be carried to a distance of not more than six feet beyond the gutter line of the road, as indicated by the engineer's stakes, but in no case shall the macadamizing be carried beyond the side line of the road as indicated by the fences.

SHOULDERING.

29. A shoulder of firm earth or gravel is to be left or made on each side, extending at the same grade and curvature of road to side ditches or gutters. This shoulder is to be rolled according to the directions of the engineer.

COBBLE GUTTERS.

30. Cobble gutters shall be laid from station number.....to station number..... The cobbles used must be good, hard, sound stone. Medium-sized stone, not over five-inch face on its longest diameter, must be used, except for centers or sides, where eight-inch cobbles may be used. The cobbles must be bedded in not less than six inches of good, sharp sand or gravel, and laid with the longest diameter of stone parallel with the road, and thoroughly rammed into shape and place. All stone broken in ramming must be removed and replaced with perfect stone.

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SIDE DITCHES OR GUTTERS.

31. The side ditches or gutters are to be excavated as per stakes furnished by engineer, in order to give an easy flow of water, so that no water shall be left standing on the road or in the ditches, for which no extra payment will be made.

UNDERDRAINS.

32. Underdrains, if found necessary, shall be constructed by the contractor of good.....inch.....tile, laid upon a board of not less than one (1) inch in thickness and six (6) inches in width. The top of the tile shall be at least.....inches deep, unless otherwise directed by the engineer, the joints shall be covered with salt hay, or material equally as good, and the trench filled with pervious earth. These drains must be constructed whenever and wherever the engineer and supervisor shall decide.

33. When directed by the engineer, a stone drain may be used in place of the tile drain. A trench one foot wide and one foot six inches deep shall be excavated below the sub-grade, said excavation to be filled with loose broken stone to a depth required by the engineer.

BROAD TIRE WAGONS.

34. All wagons and carts used during the construction for hauling stone, earth or any other material must have tires not less than three and one-half (3½) inches in width.

NO EXTRA PRICE.

35. No allowance in measure of depth of pavement will be made on account of any material which may be driven into the roadbed by rolling. The pavement, when completed, must conform to the grade and the cross-sections, and be satisfactory to the engineer and State Commissioner of Public Roads, whose decisions shall be final.

36. No extra work will be paid for unless the price has been agreed upon between the contracting parties, including the State Commissioner of Public Roads, and endorsed upon the agreement, witnessed by the engineer.

37. All clay or gravel for shouldering or binder and all extra hauling is to be done at the contractor's expense.

BIDS.

38. Bids will only be received under these specifications for the road complete. The prices per yard for excavation, telford, macadam, &c., are intended for the use of the engineer in making estimate to the Board of Chosen Freeholders of work done. No bid will be received in which all of the following items are not filled out:

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(1) Price per cubic yard for earth excavations, without classification, as per cross-sections throughout the length and width of the road.

(2) Price per cubic yard for any necessary earth excavations and removing material without classification and measured in excavation, not included in the length and width of the road.

(3) Price per square yard for macadam driveways to dwellings.

(4) Price per square yard for telford road complete.

(5) Price per square yard for macadam road complete.

(6) Price per square yard for cobble gutters complete.

(7) Price per lineal foot for under-drains, furnishing all labor and material.

(8) Price (lump) for the whole road complete, according to above specifications and plans.

ESTIMATE OF QUANTITIES.

39. (1) Excavation, earth, ...cubic yards.
(2) Extra excavation, ...cubic yards.
(3) Macadam driveways, ...square yards, as specified.
(4) Telford, ...square yards, as specified.
(5) Macadam, ...square yards, as specified.
(6) Cobble gutters, ...square yards, as specified.
(7) Under-drains, ...lineal feet.
(8) .....

40. These quantities are the result of calculation, but are to be considered as approximate. The county will not be responsible for any excess in above quantities, should any occur. The contractor is expected to satisfy himself as to the nature, character and quantity of the labor and material required by a personal examination of the work contemplated.

CHECK ACCOMPANYING BIDS.

41. Bids shall be accompanied with a certified check, payable to the order of the Director of the Board of Chosen Freeholders, in the sum of one thousand dollars ($1,000), as a guarantee that if the contract shall be awarded to him he will, when required by said board, execute an agreement in writing to perform the work according to the specifications. Upon failure by the contractor to enter into said agreement with the said Board of Chosen Freeholders, said certified check shall be forfeited and considered as liquidated damages.

LIABILITIES OF CONTRACTOR.

42. He shall maintain sufficient guards by day and night to prevent accidents from travel, and will be liable for any damage which may arise from his neglect to do so, or from any omission on his part.

43. He shall keep the road sprinkled until the certificate of completion by the engineer is given.

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44. He is to commence and prosecute the work upon the road at the end farthest from the source of supply of broken stone, unless otherwise ordered by the engineer, within.....days from and after the signing of the contract, and shall continue work thereon until completion, except as herein provided.

45. He further agrees to complete the same on or before the.....day of.....A. D..... Twenty dollars for each day that the work shall remain uncompleted, after the time allowed by contract, may be deducted, as liquidated damages, from any moneys due the contractor, unless otherwise agreed upon by the Board of Chosen Freeholders, after presentation of certificate of the engineer recommending the extension of the time limit of completion.

46. The contractor shall keep the finished roadway, earthwork, side ditches and under-drains in repair for the period of one year from the date of its completion and acceptance, and, in addition thereto, for as much longer as for any period or periods during said year it shall be out of proper condition. If, during that time, the roadway or any part of the work shall, in the judgment of the engineer and the Board of Chosen Freeholders, require repairing, and they shall duly notify the contractor to make such repairs as required, and the contractor should refuse or neglect to do so to the satisfaction of the said engineer and the Board of Chosen Freeholders, within five days from the date of service of notice, then the said engineer and the Board of Chosen Freeholders shall have the right to have the work done properly by other parties and recover the cost for the same from the said contractor or his surety.

47. The contractor will be required to preserve all stakes and bench-marks made and established on the line of work until duly authorized by the engineer to remove the same. All stakes or bench-marks disturbed or removed by the contractor or his agents without the permission of the engineer shall be replaced at the expense of the contractor.

48. The contractor shall not disturb the position of title stones (the corners of properties adjacent to the road), but where they appear he will either lift or lower them, under the personal supervision of the engineer.

49. The contractor must also preserve the roadway on which he is working from needles obstruction, and where necessary he must construct safe and commodious crossings, to be maintained in good order. He shall afford all proper and reasonable means for the accommodation of the public, and leave the roadway complete in every manner ready for immediate use.

50. All loss or damage arising from the nature of the work to be done, or from any unforseen or unusual obstruction or difficulty which may be encountered in the prosecution of said work, or from the action of the elements, shall be sustained by the contractor.

PROVISION FOR DRAINAGE.

51. If it is necessary in the prosecution of the work to interrupt or obstruct the natural drainage of the surface, or the flow of artificial drains, the contractor shall provide for the same, during the progress of the work, in such

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a way that no damage shall result to either public or private interest. He shall be held liable for all damages which may result from any neglect to provide for either natural or artificial drainage, which he may have interrupted.

RIGHT TO BUILD BRIDGES, CULVERTS, ETC., AND SUSPENSION OF WORK.

52. The right of the county to build bridges, culverts, lay pipes or other appurtenances in said road during the progress of the work, is expressly reserved, as well as suspending the work, or any part thereof, during the construction of the same, for the purposes above stated, without further compensation to the contractor for such suspension than an extension of time for completing the work as much as it may have been delayed.

STOPPING WORK ON ACCOUNT OF WEATHER.

53. The State Commissioner of Public Roads, engineer or supervisor may stop any portion of the work, if, in their judgment, the weather is such as to prevent the same being done properly. No allowance of any kind will be made for such stoppage, except an extension of the time for the completion of the work as herein provided.

ABANDONMENT OF CONTRACT.

54. If at any time the work under contract should be abandoned, or if at any time the engineer should judge and so certify in writing that said work, or any part thereof, is unnecessarily delayed, or that the contractor is willfully violating any of the conditions or covenants of this contract, or is executing the same in bad faith, then, in that case, the Board of Chosen Freeholders shall notify the said contractor to discontinue all work under this contract. They may employ other parties to complete the work in such manner as they may decide, and use such material as may be procured upon the line of aforesaid work, and if necessary, procure other material for its completion, and charge the expense of the said labor and material to the contractor, which expense shall be deducted from any moneys due him under contract. In case these expenses shall exceed the sum which would have been payable under contract, if the same had been completed by said contractor, he or his bondsmen shall pay the amount of the excess to the Board of Chosen Freeholders, on notice from the Engineer.

ENGINEER.

55. The engineer shall be selected or appointed by the Board of Chosen Freeholders and paid by it. He shall furnish all surveys, profiles, plans, specifications and estimates of quantities of all kinds before specifications are signed, and in such a clear manner that lump bids can be made upon the work. He shall furnish all lines and grades required for the completion of the work.

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He shall furnish estimates for quantities of work done before partial payments can be made, the quantity of road laid being determined by surface measurements. Should any difference arise between the contracting parties as to the meaning or intent of these specifications, his decisions on these matters are to be final and conclusive. The work is to be done according to his directions, and if any material of which he does not approve is brought upon the road, it is to be removed at the expense of the contractor. If the contractor fails or neglects to do any part of the work as specified or as directed by the engineer, then, in that case, all other work shall be discontinued, on notice from the engineer to the contractor, or to the superintendent or foreman in charge of the work for the contractor, until such time as the work complained of has been done to the satisfaction of the engineer, and the contractor will not be entitled to or allowed any compensation or extension of time for such discontinuation or suspension of the work.

SUPERVISOR.

56. Nothing in these specifications relating to the duties of the engineer shall be taken or construed in any manner to conflict with the duties of the supervisor, as specifically set forth in the act entitled "An act to provide for the permanent improvement of public roads in this State," approved March 27th, 1905, but they shall co-operate as far as practicable.

INCOMPETENT WORKMEN.

57. The contractor shall employ competent men to do the work, and whenever the engineer and supervisor shall inform him, or his representative in charge, in writing, that any man on the work is unfitted for the place, or is working contrary to the provisions of the specifications or the instructions of the engineer and supervisor, he shall thereupon be discharged.

INSPECTION.

58. All directions and determinations necessary to give due and full effect to any of the provisions of these specifications shall be given by the engineer and supervisor.

59. All material and workmanship of any kind shall be subject at all times to the inspection of the engineer and supervisor. Whenever unfaithful and imperfect work is discovered, it shall be immediately repaired or replaced by the contractor, after due notification from the engineer and supervisor.

SUB-LETTING OF CONTRACT.

60. The contractor shall not assign or sub-let any portion of this contract without the consent of the Board of Chosen Freeholders and the State Commissioner of Public Roads.

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PAYMENTS.

61. .....monthly payments will be made by the Board of Chosen Freeholders to the contractor for work performed, upon presentation by him of the proper certificates of the engineer and supervisor, in a sum not to exceed eighty per cent. of the amount then due, together with releases from all liens, if rquired. Fifteen per cent. will be paid at the completion of the work and the acceptance of the same in writing by the Board of Chosen Freeholders and the State Commissioner of Public Roads. The remainder, or five per cent., will be retained by the Board of Chosen Freeholders for a period of one year as security for the faithful performance of Article 46.

BOND OF CONTRACTOR.

62. The contractor will be required to execute, within thirty days of giving of contract, a bond in such sum and with such securities as shall be approved by the Board of Chosen Freeholders, conditioned for the faithful performance of the contract, to indemnify and save harmless the Board of Chosen Freeholders from all suits or actions of any name or description brought against them on account of any act or omission of the contractor or his agents, and for the faithful performance of the contract by the contractor. Said bond shall be in a sum of not less than the estimated cost of the road when completed. Any change made in the plans, specifications, agreements or quantities without the consent of the bondsmen shall in no way vitiate said bond. The contractor hereby further agrees that so much of the money due him, under and by virtue of this agreement, as shall be considered necessary by the Board of Chosen Freeholders, may be retained by them until all such suits or claims for damages aforesaid shall have been settled, and evidence to that effect furnished to the satisfaction of the Board of Chosen Freeholders.

CONTRACTOR TO INSURE PAYMENT FOR LABOR, MATERIAL, ETC., ON FINAL ESTIMATE.

63. The contractor must also furnish the engineer with satisfactory evidence that all persons who did work, or furnished material for this contract, or who have sustained damage or injury by reason of any act, omission or carelessness on his part or his agents in the prosecution of the work, have been duly paid or secured. He shall also give notice to the engineer within ten days after the completion of the work, and before final estimate is made, that any balance for such work or materials, or compensation for such damages due, has been fully paid or released.

64. The right is reserved to reject any or all bids, if deemed to the interest of the county or State.

.....

County Engineer.

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Approved this....., A. D....., by resolution of the Board of Chosen Freeholders of the county of.....

.....
Director of Board of Chosen Freeholders.

.....
Clerk of Board of Chosen Freeholders.

OFFICE STATE COMMISSIONER OF PUBLIC ROADS, TRENTON, N. J.

I have this day carefully read and examined the foregoing specifications, and the same are hereby approved.

Any departure from these specifications must have the written consent of the State Commissioner of Public Roads.

Given under my hand, this ....., A. D. 190

.....
State Commissioner of Public Roads.

PROPOSALS.

To the Board of Chosen Freeholders, County of.....and State of New Jersey:

GENTLEMEN—The undersigned hereby declare... that....he....ha.... carefully examined the annexed specifications and the drawings therein referred to, and will provide all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all the material called for by said specifications in the manner prescribed by the specifications and the requirements of the engineer and supervisor under them, for the following prices:

(1) Price per cubic yard for earth excavations, without classification, as per cross-sections throughout the length and width of the road.

(2) Price per cubic yard for any necessary earth excavations and removing material without classification and measured in excavation, not included in the length and width of the road.

(3) Price per square yard for macadam driveways.

(4) Price per square yard for telford road complete.

(5) Price per square yard for macadam road complete.

(6) Price per square yard for cobble gutters.

(7) Price per lineal foot for under-drains, furnishing all labor and material.

(8) Price (lump) for the whole road complete, according to the specifications and plans.

Accompanying this proposal is a certified check for the sum of one thousand dollars ($1,000), payable to the order of the Director of the Board of

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Chosen Freeholders of.....county, which check is to be forfeited as liquidated damages if, in case this proposal is accepted, the undersigned shall fail to execute a contract with said Board of Chosen Freeholders, under the conditions of this proposal, within the time provided for by the foregoing advertisement for proposals; otherwise, said check is to be returned to the undersigned.

Signed, ...

Address, ...

.....N. J., ...

CONTRACT.

This agreement, made the.....day of....., in the year of our Lord one thousand nine hundred....., between THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., party of the first part, and....., party of the second part,

Witnesseth, That the said party of the second part, for and in consideration of the payments hereinafter specified and agreed to be made by the party of the first part, hereby covenant and agree to furnish and deliver all the materials and to do and perform all the work and labor required to be furnished and delivered, done and performed in and about the macadamizing of.....beginning at.....and extending to.....in the township of .....a distance of.....in strict and entire conformity with the plans on file in the engineer's office and with the specifications hereto annexed and duly approved by resolution of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....adopted the day of.....in the year of our Lord one thousand nine hundred.....and approved by the State Commissioner of Public Roads on the.....day of.....in the year of our Lord one thousand nine hundred.....which said plans and specifications are hereby made part of this agreement as fully and with the same effect as if the same had been set forth at length in the body of this agreement.

In consideration of the premises the party of the first part hereby agrees to pay to the party of the second part for said work, when completed in accordance with the said specifications, the sum of.....payments to be made as provided in said specifications upon presentation of the proper certificates of the engineer and supervisor and upon the terms set forth in the annexed specifications.

This contract to be binding upon THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., their successors or assigns, and upon.....the party of the second part.....

In Witness Whereof, The director of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., by authority of a resolution of said board, hath hereunto set his hand and affixed the corporate seal of the said board and

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the said party of the second part ha.. hereunto set.....hand.. and seal.. the day and year first above written.

.....

Director of the Board of Chosen Freeholders of the County of.....

.....

.....

.....

Signed, sealed and delivered in the presence of

.....

This contract approved this.....day of....., 190..

.....

State Commissioner of Public Roads.

KNOW ALL MEN BY THESE PRESENTS, That we,.....
.....and.....of the county of.....
and State of New Jersey, are held and firmly bound unto THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., in the sum of.....
dollars, lawful money of the United States, to be paid to the said THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., their successors or assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, jointly and severally, firmly by these presents.

Sealed with our seals and dated this.....day of.....A. D. nineteen hundred and.....

The Condition of this Obligation is such, That if the above bounden.....
shall well and truly perform his part of the contract hereto annexed, and all the covenants and conditions therein perform, then this obligation to be void, otherwise to remain in full force and virtue.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF

.....

This Bond approved this.....day of.....A. D. 190..

.....

Director.

.....

.....

.....

.....

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Be it Remembered on this.....day of.....in the year of our Lord one thousand nine hundred and.....before me, a Master in Chancery of the State of New Jersey, personally appeared.....and..... who acknowledged that they signed, sealed and delivered the foregoing bond as their voluntary act and deed for the uses and purposes therein expressd.

.....

JUSTIFICATION OF SURETY.

STATE OF NEW JERSEY, }
COUNTY OF..... } *ss.*

On this.....day of.....A. D. 190.., before me, a Notary Public in and for the county and State aforesaid, personally appeared.....who, being duly sworn, on his oath declares that he is a resident of the county of....., in the State of New Jersey; that he is a freeholder in said county, and that he owns real estate in said county, in his own right, to the amount of.....over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....A. D. 190... I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

STATE OF NEW JERSEY, }
COUNTY OF..... } *ss.*

On this.....day of.....A. D. 190.., before me, a Notary Public in and for the county and State aforesaid, personally appeared.....who, being duly sworn, on his oath declares that he is a resident of the county of....., in the State of New Jersey; that he is a freeholder in said county, and that he owns real estate in said county, in his own right, to the amount of.....over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....A. D. 190... I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

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Standard State Aid Specifications for Gravel Roads.

SPECIFICATIONS.

FOR A GRAVEL ROAD IN.....COUNTY, NEW JERSEY, KNOWN AS.....

BEGINNING AT ..... AND

EXTENDING TO .....

A DISTANCE OF.....FEET, OR.....MILES.

GRAVEL.....FEET WIDE.....INCHES DEEP.

SHOULDERS.....FEET WIDE. TOTAL WIDTH OF ROAD.....FEET.

WORK TO BE PERFORMED

1. The work to be performed will consist in furnishing all material, tools, machinery and labor necessary for the efficient and proper grading of roadway, side ditches and side banks, laying, spreading and rolling of road material, and leaving the roadway complete in every manner ready for immediate use.

PLANS AND DRAWINGS.

2. The plan, profile and cross-sections on file in the office of the State Commissioner of Public Roads and at the office of..... County Engineer,.....New Jersey, show general location, profile, details and dimensions. The work will be constructed in all respects according to the above-mentioned plan, profile and cross-sections, which form part of these specifications.

3. Any variation of location, profile, size and dimensions from that shown on the plan, as may be required by the exigencies of construction, will, in all cases, be determined by the Engineer, but the contractor shall not, on any pretense, save that of the written order of the contracting parties and the State Commissioner of Public Roads, deviate from the intent of the plan or specifications.

4. On all drawings, figured dimensions are to govern in cases of discrepancy between scale and figures.

GRADING.

5. Under this head will be included all excavations and embankments required for the formation of the highway, cutting all ditches or drains about or contiguous to the road, removing all fences, walls, buildings, trees, poles or other encumbrances, the excavation and embankment necessary for recon-

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structing cross or branch roads or entrances to dwellings in cases where they are destroyed or interfered with in the formation of the roadway, and all other excavations and embankments connected with or incidental to the construction of the said road.

EXCAVATION.

6. The roadway to the width of.....feet as shown on plan must be excavated or built to the same curvature as that of the surface of the road when finished; the grade, from center to sides, must be as shown on plans.

7. The earth taken from any cut or ditch shall be deposited where the engineer may direct, either within or without the lines of the road, but no earth shall be removed from the line of the road without the order of the engineer.

EMBANKMENT.

8. Material taken from the excavations, except when otherwise directed by the engineer, shall be deposited in the embankments, either on the roadway or sidewalks.

9. When there is not sufficient material in the excavations of the road to form the embankments, the deficiency must be supplied by the contractor from without the road. The character of said material and place of excavation must be approved by the engineer.

10. The embankments must be formed in layers of such depth, generally twelve (12) inches, and the material deposited and distributed in such manner as the engineer may direct, the required allowance for settling being added. Each layer must be carried across the entire width of the embankment and completed before commencing another, and this method shall be followed with each succeeding layer until the established grade is reached.

SLOPES.

11. Slopes in both embankment and excavation shall be one and one-half (1½) horizontal to one (1) vertical, when the width of the road will permit; if the road is too narrow to allow the full slope within its side lines, the engineer shall not calculate the quantities, either in embankment or excavation, beyond said side lines, unless the required ground shall be first dedicated to the public in writing by the owner or owners thereof.

ROADWAY.

Sub-Foundations.

12. When the excavations and embankments have been brought to a proper depth below the intended surface of the roadway, the cross-section conforming in every respect to the cross-section of the road when finished, the same shall, if ordered by the engineer, be rolled until approved by him. If any depressions form under such rolling, owing to improper material or vegetable matter, the same shall be removed and good earth substituted, and the whole re-rolled until thoroughly solid and to above-mentioned grade.

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SHOULDERING.

13. A shoulder of firm earth or gravel is to be left or made on each side of the gravel bed, extending at the same grade and curvature of road to side ditches or gutters. This shoulder is to be rolled according to the directions of the engineer.

UNDERDRAINS.

14. Underdrains, if found necessary, shall be constructed by the contractor (at prices named in bids) of good inch tile, laid upon a board of not less than one (1) inch in thickness and six (6) inches in width, whenever and wherever the engineer shall decide; top of tile or pipe must be at least inches deep, unless otherwise directed by the engineer; the joints of the tile or pipe must be covered with salt hay, or material equally as good, and trench filled with pervious earth.

15. When directed by the Engineer a stone drain may be used in place of the tile drains. A trench one foot in width and one foot six inches in depth shall be excavated below the subgrade, said excavation to be filled with loose broken stone to a depth required by the engineer.

MATERIALS.

16. The material to be used in surfacing the road is to be furnished by the contractor.

17. The Road Committee, in conjunction with the engineer and State Commissioner of Public Roads, will pass upon and approve all gravel to be used in surfacing the road. The contractor is to dig, cart and place upon the road, in accordance with the specifications, the gravel selected and use no other. Should any objectionable material be used, he is to remove the same at his own expense.

18. The contractor must furnish to the Engineer and State Commissioner of Public Roads samples of the kind of gravel to be used in the work before the opening of the bids.

19. The gravel is to be placed upon the road in such manner as shall be approved by the engineer, and be thoroughly rolled and solidified until it is consolidated, firm and approved by the engineer. The gravel shall be of such thickness that when it is thoroughly compacted and approved, it shall be inches deep in the center and slope at a regular grade to inches in depth at a distance of feet on each side of the center line.

20. Should any depressions appear these are to be carefully filled with gravel, so that the finished road will conform to the approved profile.

21. The contractor is to be paid by the cubic yard, as per depths above named, for the compacted gravel that he puts on the road, at the price named in the accepted bid, which shall include finishing the road and shaping the shoulders as above specified.

22. The contractor is to place sufficient gravel on the road to allow it to shrink thirty-three per cent. in rolling and settling.

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SIDEWALKS.

23. The contractor will also be required, when the engineer so directs, to grub and remove from a strip of land feet on outside of curb-lines all material objectionable to the engineer, such as trees, stumps, roots and brush, and refill the holes with earth, thereby completing the opening of the entire road to a width of feet, which shall be feet on each side of the center line.

24. The grubbing and removing of such objectionable material that is ordered by the engineer shall be styled as "grubbing," and paid for by the acre at price named in accepted bid.

OPEN DITCHES.

25. The contractor is to grade the shoulders and open all necessary side ditches (as per stakes furnished by the engineer) so that there will be no water allowed to stand by the side of the road or upon it, for which no extra payment will be allowed.

EXTRA DEEP.

26. Should the engineer and State Commissioner of Public Roads so order, the contractor is to build in all respects, as already specified, the gravel bed to a greater depth or thickness than that already named. The contractor is to do the same at a price named per square yard for each extra inch in depth.

NO EXTRA PRICE.

27. No allowance in measure of depth of pavement will be made on account of any material which may be driven into the roadbed by rolling. The pavement, when completed, must conform to the grade and cross-section and be satisfactory to the engineer and State Commissioner of Public Roads, whose decision shall be final.

28. No extra work will be paid for unless the price has been agreed upon between the contracting parties, including the State Commissioner of Public Roads, and endorsed upon the agreement, witnessed by the engineer.

BROAD TIRE WAGONS.

29. All wagons and carts used during the construction for hauling stone, earth or any other material must have tires not less than three and one-half (3½) inches in width.

BIDS.

30. Bids will be received under these specifications for the road complete as follows:

(1) Price per cubic yard for earth excavation, without classification, as per plans and cross-sections throughout the length and width of the road.

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(2) Price per acre for grubbing and removing objectionable material from sidewalks.

(3) Price per lineal foot for completed tile drain.

(4) Price per cubic yard for compacted gravel as specified.

(5) Price per square yard for each ordered inch in depth in excess of thickness named.

(6) Price (lump) for the whole road complete, according to the specifications and plans prepared by the engineer.

No bid will be received in which all the above items are not filled out.

ESTIMATE OF QUANTITIES.

31. (1) Earth excavation, ...cubic yards.
(2) Grubbing, ...acres.
(3) Tile drain, ...lineal feet.
(4) Compacted gravel, ...cubic yards.
Total estimated cost of the road, $.....

32. These quantities are the result of calculation, but are to be considered as approximate. The county will not be responsible for any excess in above quantities, should any occur. The contractor is expected to satisfy himself by a personal examination of the work contemplated, about the nature, character and quantity of the labor and material required.

CHECK ACCOMPANYING BIDS.

33. Bids shall be accompanied with a certified check, payable to the Director of the Board of Chosen Freeholders, for the sum of one thousand dollars ($1,000), as a guarantee that if the contract shall be awarded to him he will, when required by said Board, execute an agreement in writing to perform the work according to the specifications, and upon failure by the contractor to enter into said agreement with the said Board of Chosen Freeholders, said certified check shall be forfeited and considered as liquidated damages.

LIABILITIES OF CONTRACTOR.

34. He shall keep up sufficient guards by day and night to prevent accidents from travel, and will be liable for any damage which may arise from his neglect to do so, or from any omission on his part.

35. He is to commence and prosecute the work upon the road at such points as may be directed by the engineer, within days from and after the signing of the contract, and shall continue work thereon until completion, except as herein provided.

36. He further agrees to complete the same on or before the day of A. D.

37. Twenty dollars for each day that the work shall remain uncompleted, after the time allowed by contract, may be deducted, as liquidated damages, from any moneys due contractor, unless otherwise agreed upon by the Board of Chosen Freeholders, after presentation of certificate of the engineer recommending the extension of the time limit of completion.

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38. The contractor shall keep the finished roadway, earthwork, side ditches and underdrains in repair for the period of one year from the date of its completion and acceptance, and, in addition thereto, for as much longer as for any period or periods during said year it shall be out of proper condition. If, during that time, the roadway or any part of the work shall, in the judgment of the engineer and the Board of Chosen Freeholders, require repairing, and they shall duly notify the contractor to make such repairs as required, and the contractor should refuse or neglect to do so to the satisfaction of the said engineer and Board of Chosen Freeholders, within five days from the date of service of notice, then the said engineer and Board of Chosen Freeholders shall have the right to have the work done properly by other parties and recover the cost for the same from the said contractor or his surety.

39. The contractor will be required to preserve all stakes and bench-marks made and established on the line of work until duly authorized by the engineer to remove the same.

40. The contractor shall not disturb the position of title-stones (the corners of properties adjacent to the road), but where they appear he will either lift or lower them, under the personal supervision of the engineer.

41. The contractor must also preserve the roadway on which he is working from needless obstruction, and where necessary construct safe and commodious crossings, to be maintained in good order. He shall afford all proper and reasonable means for the accommodation of the public, and leave the roadway complete in every manner ready for immediate use.

42. All loss or damage arising from the nature of the work to be done, or from any unforeseen or unusual obstruction or difficulty, which may be encountered in the prosecution of said work, or from the action of the elements, shall be sustained by the contractor.

PROVISION FOR DRAINAGE.

43. If it is necessary in the prosecution of the work to interrupt or obstruct the natural drainage of the surface, or the flow of artificial drains, the contractor shall provide for the same during the progress of the work in such a way that no damage shall result to either public or private interests. He shall be held liable for all damages which may result from any neglect to provide for either natural or artificial drainage, which he may have interrupted.

RIGHT TO BUILD BRIDGES, CULVERTS, ETC., AND SUSPENSION OF WORK.

44. The right of the county to build bridges, culverts, lay pipes or other appurtenances in said road during the progress of the work, is expressly reserved, as well as suspending the work, or any part thereof, during the construction of the same, for the purposes above stated, without further compensation to the contractor for such suspension than an extension of time for completing the work as much as it may have been delayed.

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STOPPING WORK ON ACCOUNT OF WEATHER.

45. The State Commissioner of Public Roads, engineer or supervisor may stop any portion of the work if, in their judgment, the weather is such as to prevent the same being done properly. No allowance of any kind will be made for such stoppage, except an extension of the time for the completion of the work as herein provided.

ABANDONMENT OF CONTRACT.

46. If at any time the work under contract should be abandoned, or if at any time the engineer should judge and so certify in writing that said work, or any part thereof, is unnecessarily delayed, or that the contractor is willfully violating any of the conditions or covenants of this contract, or is executing the same in bad faith, then, and in that case, the Board of Chosen Freeholders shall notify the said contractor to discontinue all work under this contract. It may employ other parties to complete the work in such manner as it may decide, and use such material as may be procured upon the line of aforesaid work, and, if necessary, to procure other material for its completion, and charge the expense of the said labor and material to the contractor, which expense shall be deducted from any moneys due him under contract. In case these expenses shall exceed the sum which would have been payable under contract, if the same had been completed by said contractor, he or his bondsmen shall pay the amount of the excess to the Board of Chosen Freeholders, on notice from the engineer.

ENGINEER.

47. The engineer shall be selected or appointed by the Board of Chosen Freeholders and paid by it. He shall furnish all surveys, profiles, plans, specifications and estimates of quantities of all kinds before specifications are signed, and in such a clear manner that lump bids can be made upon the work. He shall furnish all lines and grades required for the completion of the work. He shall furnish estimates for quantities of work done before partial payments can be made, the quantity of road laid being determined by surface measurements. Should any difference arise between the contracting parties as to the meaning or intent of these specifications, his decisions on these matters are to be final and conclusive. The work is to be done according to his directions, and if any material of which he does not approve is brought upon the road, it is to be removed at the expense of the contractor. If the contractor fails or neglects to do any part of the work as specified or as directed by the engineer, then, in that case, all other work shall be discontinued, on notice from the engineer to the contractor, or to the superintendent or foreman in charge of the work for the contractor, until such time as the work complained of has been done to the satisfaction of the engineer, and the contractor will not be entitled to or allowed any compensation or extension of time for such discontinuation or suspension of the work.

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SUPERVISOR.

48. Nothing in these specifications relating to the duties of the engineer shall be taken or construed in any manner to conflict with the duties of the Supervisor, as specifically set forth in the act entitled "An act to provide for the permanent improvement of public roads in this state," approved March 27, 1905, but they shall co-operate as far as practicable.

INCOMPETENT WORKMEN.

49. The contractor shall employ competent men to do the work, and whenever the engineer and supervisor shall inform him, or his representative in charge, in writing, that any man on the work is unfitted for the place, or is working contrary to the provisions of the specifications or the instructions of the engineer and supervisor, he shall thereupon be discharged.

INSPECTION.

50. All directions and determinations necessary to give due and full effect to any of the provisions of these specifications shall be given by the engineer and Supervisor.

51. All material and workmanship of any kind shall be subject at all times to the inspection of the engineer and supervisor. Whenever unfaithful and imperfect work is discovered, it shall be immediately repaired or replaced by the contractor, after due notification from the engineer and supervisor.

SOB-LETTING OF CONTRACT.

52. The contractor shall not assign or sub-let any portion of this contract without the consent of the Board of Chosen Freeholders and the State Commissioner of Public Roads.

PAYMENTS.

53. .....monthly payments will be made by the Board of Chosen Freeholders to the contractor for work performed, upon presentation by him of the proper certificates of the engineer and supervisor, in a sum not to exceed eighty per cent. of the amount then due, together with releases from all liens, if required. Fifteen per cent. will be paid at the completion of the work and the acceptance of the same in writing by the Board of Chosen Freeholders and the State Commissioner of Public Roads. The remainder, or five per cent., will be retained by the Board of Chosen Freeholders for a period of one year as security for the faithful performance of Article 38.

BOND OF CONTRACTOR.

54. The contractor will be required to execute, within thirty days of giving of contract, a bond in such sum and with such securities as shall be approved by the Board of Chosen Freeholders, conditioned for the faithful performance

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of the contract, to indemnify and save harmless the said Board of Chosen Freeholders from all suits or actions of any name or description brought against them on account of any act or omission of the contractor or his agents, and for the faithful performance of the contract by the contractor. Said bond shall be in a sum of not less than the estimated cost of the road when completed. Any change made in said plans, specifications, agreements or quantities without the consent of the bondsmen shall in no way vitiate said bond. The said contractor hereby further agrees that so much of the money due him, under and by virtue of this agreement, as shall be considered necessary by the Board of Chosen Freeholders, may be retained by it until all such suits or claims for damages aforesaid shall have been settled, and evidence to that effect furnished to the satisfaction of the said Board of Chosen Freeholders.

CONTRACTOR TO INSURE PAYMENT FOR LABOR, MATERIAL, ETC., ON FINAL ESTIMATE.

55. The contractor must also furnish said engineer with satisfactory evidence that all persons who did work, or furnish material for this contract, or who have sustained damage or injury by reason of any act, omission or carelessness on his part or his agents in the prosecution of the work, have been duly paid or secured; he shall also give notice to said engineer within ten days after the completion of the work, and before final estimate is made, that any balance for such work or materials, or compensation for such damages due, has been fully paid or released.

56. The right is reserved to reject any or all bids, if deemed to the interest of the county or State.

.....

County Engineer.

Approved this.....day of....., A. D. 190 , by resolution of the Board of Chosen Freeholders of the county of.....

.....

Director of Board of Chosen Freeholders.

.....

Clerk of Board of Chosen Freeholders.

OFFICE STATE COMMISSIONER OF PUBLIC ROADS, TTENTON, N. J.

I have this day carefully read and examined the foregoing specifications, and the same are hereby approved.

Any departure from these specifications must have the written consent of the State Commissioner of Public Roads.

Given under my hand, this.....day of, A. D.....

.....

State Commissioner of Public Roads.

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PROPOSAL.

To the Board of Chosen Freeholders, County of.....and State of New Jersey:

GENTLEMEN—The undersigned hereby declare... that....he....ha.... carefully examined the annexed specifications and the drawings therein referred to, and will provide all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all the material called for by said specifications in the manner prescribed by the specifications and the requirements of the engineer and supervisor under them, for the following prices:

(1) Price per cubic yard for earth excavation, without classification, as per plans and cross-sections throughout the length and width of the road .....per cubic yard.

(2) Price per acre for grubbing and removing objectionable material from sidewalks.....per acre.

(3) Price per lineal foot for completed tile drain.....per lineal foot.

(4) Price per cubic yard for compacted gravel as specified.....per cubic yard.

(5) Price per square yard for each ordered inch in depth in excess of thickness named.....per square yard.

(6) Price (lump) for the whole road complete, according to the specifications and plans prepared by the engineer.....

Accompanying this proposal is a certified check for the sum of one thousand dollars ($1,000), payable to the order of the Director of the Board of Chosen Freeholders of.....county, which check is to be forfeited as liquidated damages if, in case this proposal is accepted, the undersigned shall fail to execute a contract with said Board of Chosen Freeholders, under the conditions of this proposal, within the time provided for by the foregoing advertisement for proposals; otherwise, said check is to be returned to the undersigned.

Signed, ...

Address, ...

.....N. J., ...

CONTRACT.

This agreement, made the.....day of....., in the year of our Lord one thousand nine hundred....., between THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., party of the first part, and....., party of the second part,

Witnesseth, That the said party of the second part, for and in consideration of the payments hereinafter specified and agreed to be made by the party of the first part, hereby covenant and agree to furnish and deliver all the

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materials and to do and perform all the work and labor required to be furnished and delivered, done and performed in and about the graveling of.....beginning at.....and extending to.....in the township of .....a distance of.....in strict and entire conformity with the plans on file in the engineer's office and with the specifications hereto annexed and duly approved by resolution of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....adopted the.....day of.....in the year of our Lord one thousand nine hundred.....and approved by the State Commissioner of Public Roads on the.....day of.....in the year of our Lord one thousand nine hundred.....which said plans and specifications are hereby made part of this agreement as fully and with the same effect as if the same had been set forth at length in the body of this agreement.

In consideration of the premises the party of the first part hereby agrees to pay to the party of the second part for said work, when completed in accordance with the said specifications, the sum of.....payments to be made as provided in said specifications upon presentation of the proper certificates of the engineer and supervisor and upon the terms set forth in the annexed specifications.

This contract to be binding upon THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., their successors or assigns, and upon.....the party of the second part.....

In Witness Whereof, The director of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., by authority of a resolution of said board, hath hereunto set his hand and affixed the corporate seal of the said board and the said party of the second part ha.. hereunto set.....hand.. and seal.. the day and year first above written.

.....

Director of the Board of Chosen Freeholders of the County of.....

.....

.....

.....

Signed, sealed and delivered in the presence of

.....

This contract approved this.....day of....., 190..

.....

State Commissioner of Public Roads.

KNOW ALL MEN BY THESE PRESENTS, That we,.....
.....and.....of the county of.....
and State of New Jersey, are held and firmly bound unto THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., in the sum of.....

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dollars, lawful money of the United States, to be paid to the said THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF....., their successors or assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, jointly and severally, firmly by these presents.

Sealed with our seals and dated this.....day of.....A. D. nineteen hundred and.....

The Condition of this Obligation is such, That if the above bounden..... shall well and truly perform his part of the contract hereto annexed, and all the covenants and conditions therein perform, then this obligation to be void, otherwise to remain in full force and virtue.

.....

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF

.....

This Bond approved this.....day of.....A. D. 190..

.....
Director.

.....

.....

.....

Be it Remembered on this.....day of.....in the year of our Lord one thousand nine hundred and.....before me, a Master in Chancery of the State of New Jersey, personally appeared.....and..... who acknowledged that they signed, sealed and delivered the foregoing bond as their voluntary act and deed for the uses and purposes therein expressd.

.....

JUSTIFICATION OF SURETY.

STATE OF NEW JERSEY, }
COUNTY OF..... } *ss.*

On this.....day of.....A. D. 190.., before me, a Notary Public in and for the county and State aforesaid, personally appeared.....who, being duly sworn, on his oath declares that he is a resident of the county of....., in the State of New Jersey; that he is a freeholder in said county, and that he owns real estate in said county, in his own right, to the

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amount of.....over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....A. D. 190... I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

STATE OF NEW JERSEY, }
COUNTY OF..... } *ss.*

On this.....day of.....A. D. 190.., before me, a Notary Public in and for the county and State aforesaid, personally appeared.....who, being duly sworn, on his oath declares that he is a resident of the county of....., in the State of New Jersey; that he is a freeholder in said county, and that he owns real estate in said county, in his own right, to the amount of.....over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....A. D. 190... I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

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Appendix B.

CHAPTER 58.

An Act to provide for the permanent improvement of public roads in this state (Revision of 1905). With amendment of 1906.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The board of chosen freeholders of any county in this state may, at any time, by resolution, direct that any public road or section of road, located within said county, being at least thirty-three feet in width and at least one mile in length, or, being less than one mile in length, is an extension of or connection with some permanently improved or paved road or street, be improved by the construction of a macadamized road, or a telford or other stone road, or a road constructed of gravel, oyster shells or other similar materials, in such manner that the same, of whatever materials constructed, shall, with reasonable repairs thereto, at all seasons of the year, be firm, smooth and convenient for travel. When more roads are applied for than can be constructed in any one year, the board of chosen freeholders and state commissioner of public roads shall have power and authority to select from the roads petitioned for the ones first to be constructed, having first regard to the most important roads and the distribution of the benefits of this act to all parts of their counties. The board of chosen freeholders may, before approval of any road, require as a condition of said approval that the township or townships or other municipality, through which said road runs, shall pay ten per centum of the cost of said improvement, said payment to be applied to the improvement of roads constructed under this act.

Improvements of roads by freeholders.

Selection of roads.

Township assistance.

2. The said board, after the passage of the resolution, shall cause a survey of said road so to be improved to be

Survey made.

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made, and plans, cross sections and specifications of the work to be done on the same to be prepared. The survey shall indicate the width and length of said road, and shall also show how much of said road may be improved by deviation from the then existing lines, but no survey shall be commenced until the consent of the state commissioner of public roads shall have been first obtained. When the said plans, cross sections and specifications shall have been prepared, they shall be submitted to the board of chosen freeholders for its approval or rejection. If such board shall approve the same, they shall then be submitted to the state commissioner of public roads for his approval or rejection, whose duty it shall be, before approving of said plans, cross sections and specifications, to ascertain, by personal inspection or otherwise, the natural character of the soil upon which such road is proposed to be constructed, and any and all other facts that he may deem important. If, after examination of the plans, cross sections and specifications, and an inspection of the road, as aforesaid, he shall be satisfied as to the advisability of the improvement of the road as contemplated, and that one-third of the cost of the construction of said road, together with one-third of the cost of the construction of all other roads or sections of roads in this state, under plans and specifications previously approved by him, will not in any one year exceed the sum of four hundred thousand dollars, or such sum as shall in each year be appropriated for that purpose, then he shall approve said plans, cross sections and specifications, otherwise he shall reject the same.

Approval by board and commissioner.

Limit of State expenditure.

Proposals invited.

3. Within thirty days after approval of the plans, cross sections and specifications by the commissioner of public roads, it shall be the duty of the board of chosen freeholders to advertise for bids for said work in two or more of the public papers printed in said county, and in at least one engineering journal published in the city of New York, for three weeks successively, at least once in each week. This advertisement shall state the place where bidders may examine said plans, cross sections and specifications, and the time and place where bids for said work will be received by the board of chosen freeholders, or a committee of said board. Each bidder must accompany his bid with a certified check, payable to the director of the board of chosen freeholders, for one thou-

Bidder's guarantee.

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sand dollars, as a guarantee that if said work is awarded to him he will enter into a contract with said board for the same. This contract must be executed, together with a bond of the successful bidder, in the penal sum of at least the estimated cost of said work, with two or more sureties, freeholders of the county, or a surety or trust company created by this state, or a surety or trust company of another state, authorized to transact business within this state, to be approved by the director of the board of chosen freeholders, conditioned for the faithful performance of said work in strict conformity with the plans, cross sections and specifications for the same, within thirty days from the awarding of the contract. The contract, before any work is done thereunder, must be exhibited to the state commissioner of public roads for his approval, in writing, thereon, and said commissioner is hereby authorized, whenever, in his judgment, the best interests of the county require him so to do, to reject the same, in which case he shall write upon said contract the word "rejected" and append thereto his signature and official title of office, and said contract and the bond required to accompany the same shall, from the time of such rejection, be absolutely null and void, but such rejection shall in nowise operate to prevent said board from readvertising for bids and proceeding thenceforth under the provisions of this act; *provided,* such action is taken within four months after such rejection, otherwise said approval shall be null and void. The time and manner of payment for work done under any contract awarded under this act shall be set forth in said contract, and at least five per centum of the contract price shall not be paid to the contractor until after the expiration of one year from the completion of the work and acceptance thereof in writing by the commissioner of public roads.

Contract.

Approved by commissioner.

May reject contract.

Proviso.

As to payment under contract.

4. The estimated amount of all contracts for road improvements awarded in any one year by the board of chosen freeholders, together with the estimated cost of repairs of roads already constructed, shall not exceed one-half of one per centum of the ratables of the county, as reported to the state comptroller for the preceding year, exclusive of the state appropriation for road purposes apportioned to any county.

Limit to county expenditures.

5. A true copy of the specifications, bid, contract, bond and justification of surety, certified to be such by

Copy of specifications, etc., filed with commissioner.

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the director of the board of chosen freeholders, shall, immediately after the awarding of any contract, be furnished by the board of chosen freeholders to the State commissioner of public roads, to be filed and remain of record in the office of such commissioner.

Supervisor appointed by commissioner.

6. Immediately after the awarding of any contract under the provisions of this act, the state commissioner of public roads shall appoint a competent supervisor to take charge of the work required to be performed under said contract, who shall receive for his services the sum of three dollars per day, to be paid to the said supervisor, out of the sum hereinafter appropriated for the one-third of the cost of all roads constructed under this act, on the approval of the state commissioner of public roads. Such supervisor, before assuming the duties of his office, shall make and subscribe an oath or affirmation, before any officer authorized to administer the same, that he will faithfully and to the best of his ability and understanding perform all the duties of his office. The state commissioner of public roads may, however, summarily discharge any supervisor and may appoint a new supervisor in the place of the one so discharged. Where any contract provides for partial payments based upon the amount of work done, it shall be the duty of the supervisor, as each payment becomes due, to present to the board of chosen freeholders a certificate, signed by such supervisor and the engineer, in which certificate shall be stated, as near as can be, the amount of work done for which payment is to be made, and that the same has been done, in all respects, in strict conformity with the contract, plans and specifications. When the work done under any contract shall have been fully completed, the supervisor and engineer shall prepare a detailed and itemized statement, in quadruplicate, of the cost of the improvement, one copy whereof shall be filed with the board of chosen freeholders, one with the clerk of the county and two with the state commissioner of public roads.

Per diem.

Oath.

May be summarily dismissed.

Certificate of partial payments.

Final statement on completion of contract.

State appropriation.

7. One-third of the cost of all roads constructed under this act, not exceeding in any one year the sum of four hundred thousand dollars, shall be paid out of the State treasury, out of any moneys not otherwise appropriated, if the same be first appropriated in the annual appropriation act. The governor and state commissioner of public roads shall certify from time to

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time to the state comptroller the amount to be paid to any county, township, town, borough, village or other municipality for such year, and the state comptroller shall draw his warrant on the state treasurer in favor of the county collector or collector of the township, town, borough, village or municipality, as the case may be, for the amount so certified, and the state treasurer shall thereupon pay the same.

Payments to various municipalities.

8. On or before the day fixed by law for the meeting of the county board of assessors in any county in each year, the board of chosen freeholders of such county shall certify to the said county board of assessors, either in the annual tax budget or separately, two-thirds of the estimated cost of all work contracted for under the provisions of this act since the day fixed by law for the meeting of the board of assessors in the year next preceding. The county board of assessors shall include in their assessment of county taxes the sum so certified, and the same shall be collected and paid over to the county in the same manner and at the same time that other county taxes are collected and paid over; if a deficiency shall exist, in consequence of the cost exceeding the estimate, or in consequence of the receipt of less than one-third of the cost from the state, the board of chosen freeholders shall have authority to borrow, on temporary loans, such deficiency, and the said board shall certify to the county board of assessors the total amount of such deficiency, which shall be included in the next annual tax levy, and shall be assessed, collected and paid over as other taxes are assessed, collected and paid over. If there be a surplus, by reason of the estimate exceeding the cost, the same shall be retained and used in the construction of other roads under this act, or in repairs to roads constructed under this act.

Notice to county board of assessors.

Assessment and collection of road moneys.

If deficiency.

If surplus.

9. The board of chosen freeholders may, instead of certifying to the county board of assessors the two-thirds cost of any work done under this act, as required by the eight section of this act, by resolution, adopted by a vote of at least two-thirds of all its members, issue bonds of the county for two-thirds of the estimated cost of said work. These bonds shall be designated as "road improvement bonds," and shall be for such sums and in such amounts, payable in not less than six nor more than thirty years from date thereof, with interest at a rate not exceeding five per centum per annum, payable annually

Bonds instead of tax.

Amount, rate, time.

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or semi-annually, as said board of chosen freeholders, by said resolution, may determine. The said bonds shall be signed by the director of the board of chosen freeholders and by the county collector, sealed with the seal of the board, properly numbered, and a registry thereof kept by the board, and may be either coupon or registered bonds; if coupon bonds, the coupons shall be signed by the director of the board, and shall be numbered to correspond to the several bonds to which they shall be severally attached. The board of chosen freeholders shall, when bonds are issued under the provisions of this section, certify to the county board of assessors, in each and every year, so long as any of said bonds remain outstanding, a sum sufficient to pay the interest accruing on said bonds for said year and the principal of any bond or bonds that shall mature in said year, and the said county board of assessors shall include the said sum in the annual tax levy or assessment for said year, and the same shall be collected and paid over in the same manner and at the same time as other county taxes.

Amount annually raised.

Improved roads to be county roads.

10. Any road constructed under the provisions of this act or of any previous act bearing the same title shall forever hereafter be a county road, and the duty of keeping the same in repair shall devolve exclusively upon the board of chosen freeholders and the county supervisor, as hereinafter mentioned, and all other powers and duties respecting such road shall be imposed upon and vested in the said board of chosen freeholders to the exclusion of all township, town, borough, village or other municipal officers. If any such road shall become out of repair, and shall not be repaired within sixty days after notice in writing so to do, given by the state commissioner of public roads to the board of chosen freeholders or to its director, the said commissioner of public roads shall certify such neglect or refusal to the state comptroller, who shall withhold payment to such county of any moneys already apportioned, or that may thereafter be apportioned to such county by the state, and no payment shall be made to said county until the state commissioner of public roads shall certify to the state comptroller that said road has been placed in a good state of repair.

Maintenance.

Payment withheld upon failure to maintain roads.

County supervision of roads.

11. After the first county road shall have been constructed under this act in any county, it shall be the duty of the board of chosen freeholders to appoint some suitable person as county supervisor of roads, who, before

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assuming the duties of his office, shall make and subscribe an oath or affirmation that he will faithfully perform all the duties of his office to the best of his ability and understanding. Such supervisor shall hold his office for three years and until his successor is appointed and qualified. He shall give bond to the board of chosen freeholders in the penal sum of one thousand dollars, conditioned for the faithful performance of the duties of his office, with such surety or sureties as the board shall approve, and shall receive such compensation for his services as the said board shall determine. Said supervisor may be summarily dismissed at any time by the board of chosen freeholders or the state commissioner of roads, whenever in their or his judgment such supervisor is incompetent or neglectful in the performance of his duties, in which event the board of chosen freeholders shall immediately appoint a new supervisor to hold for the unexpired term of the supervisor so discharged. The said board of chosen freeholders shall appropriate all moneys necessary to keep any and all roads constructed under this act in good repair, and free from obstructions, and if the board shall have no money which may be lawfully used for such purposes, it shall have the power to borrow the same, on the credit of the county, until the next annual taxes shall have been levied and collected. The cost of all repairs and removal of obstructions shall be paid by the county collector upon the order of the board of chosen freeholders, and all bills for repairs and removal of obstructions shall be verified by affidavit and shall be certified to be correct by the county supervisor of roads.

Term.

Bond.

Subject to dismissal.

Moneys for maintenance and repairs.

Cost of repairs paid by county collector.

12. Whenever it is deemed advisable by the board of chosen freeholders of any county of this state to acquire land for the purpose of laying out, widening, changing or straightening any road to be made or improved under the provisions of this act, said board is hereby authorized to agree with the owner or owners of any land or lands required for that purpose as to the compensation to be paid by said board for a conveyance of said land or lands, and to make compensation therefor out of any moneys applicable for road improvement purposes, or, if there be no money on hand for such purpose, said board may borrow the necessary sum or sums on temporary loans, on the credit of the county, until the next annual taxes shall have been levied and collected. In case said board

Acquire lands for road purposes.

By purchase.

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By condemnation.

cannot agree with the owner or owners of any land for the acquisition of the same by the said board for road improvement purposes, said board shall have the power to acquire said land by condemnation, in the manner prescribed by law, and shall have authority and power to pay all necessary costs and expenses from any moneys applicable for road improvement purposes, or may borrow so much as may be necessary on temporary loans, on the credit of the county, until the next annual taxes shall have been levied and collected; nothing in this act contained, however, shall be so construed as to prevent said board from acquiring any land for road improvement purposes by gift.

Improvement of road by abutting owners.

13. If all the owners of property abutting on any road or highway, in any county, which has not been improved, or is not undergoing improvement, desire said road, or any section thereof, to be improved, and shall certify, in writing, to the board of chosen freeholders, that they are willing to bear the entire expense of such improvement, the county engineer, or other competent engineer, shall prepare plans, cross sections and specifications for the work to be done on such road or any section thereof, so to be improved, and shall submit the same to the owners, and, if satisfactory to such owners, they are hereby authorized to enter into contract for such work, said contract to be first submitted to the board of chosen freeholders for its approval. Upon the completion of the work to the satisfaction of the county supervisor and the board of freeholders, and upon the submission to said board of proper receipts showing full payment for all work done, the said board of chosen freeholders may, by resolution, declare that said road, or any portion thereof, be thereafter a county road. The location of any portion of said road may be changed, if deemed desirable, upon acquiring the consent, in writing, of the owner or owners of land abutting on such portion of road so to be changed, and upon acquiring, without expense to the county, the land necessary for such change. The county supervisor shall be paid the sum of twenty-five dollars for supervising said work, to be paid by said owners.

Such road to be a county road.

Change of location of road.

Improve approaches to dwellings.

14. The board of chosen freeholders shall have full power to lay out, open, construct and improve all necessary approaches to any dwelling along the line of such road which may have been destroyed or damaged by any

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alteration in the existing grade, whether within or without the line of such road, and all costs and expenses incurred therefor shall be paid by the said board of chosen freeholders in the same way and manner as other work done under this act is paid for.

Improvement of roads bordering on State property.

15. Whenever any public road is sought to be improved under the provisions of the thirteenth section of this act, upon which road any lands or real estate owned by the state of New Jersey may front or border, the board of managers, or other body having the control and management of said lands and real estate, are hereby authorized to consent to the improvement of said road and to enter into contract for the same in the manner directed by said section, and to pay for said improvement out of any moneys appropriated to said board of managers, or other governing body.

Boundary line roads.

16. The provisions of this act shall extend to the improvement of any road, or section of road, constituting the boundary line between two counties, whenever said improvement shall be agreed to by the board of chosen freeholders of both counties.

Act not to apply to cities.

17. The provisions of this act shall extend to townships, towns, boroughs, villages or any municipality or municipalities, except cities. The common council or other governing body, the assessor or assessors, the mayor or other chief executive officer, the clerk and collector, respectively, of any township, town, borough, village, or other municipality, shall have the power and shall perform all the duties as are in this act cast upon the board of chosen freeholders, the county board of assessors, the director of the board of chosen freeholders, the county clerk and county collector, respectively.

Right of municipalities to improve roads.

Any of said municipalities may raise, by taxation, funds with which to pay for the cost of the construction of any road or roads, or may issue bonds for the payment of the same, in the same manner, as nearly as may be, as the board of chosen freeholders may do under this act, it being the expressed intention of this section to confer upon townships, towns, boroughs, villages, or other municipalities, full power to improve any road, or section of road, under the provisions of this act, all proceedings conforming, as nearly as may be practicable, to the provisions of this act. Any such road, or section of road, so constructed by any township, town, borough, village, or other municipality, other than by

Control thereof.

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the county, shall be exclusively under the jurisdiction and control of such township, town, borough, village, or other municipality, and shall be repaired and maintained by such municipality. Nothing, however, contained in section four of this act shall be held to apply to any township, town, borough, village or other municipality.

Exception.

As to roads in cities.

18. Whenever any road, or section of road, constructed by the board of chosen freeholders, shall lie within the corporate limits of any city, such city may enter into an agreement, in writing, with the board of chosen freeholders for the repair and maintenance of said road, or section of road, and from and after the making of said agreement and the approval thereof by the state commissioner of public roads, said road shall be exclusively under the jurisdiction and control of such city, and shall be repaired and maintained by the same.

Repealer.

Proviso.

19. All acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed; *provided,* that this repealer shall not revive any act heretofore repealed, nor shall any proceeding for the improvement of any public road entered into before the passage of this act abate, but such proceeding shall continue as prescribed in the act under which the improvement was commenced.

20. This act shall take effect immediately.

Approved March 27, 1906.

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CHAPTER 38.

An Act to enable boards of chosen freeholders of two or more counties of this State, where such counties now are or hereafter may be charged by law with the maintenance and repair, or now are or hereafter may be in the possession and control, of any road or roads lying wholly in one or partly in one and partly in other such county or counties, to rebuild, reconstruct, change the grade of, widen and improve such road or roads, and to acquire lands for such widening by gift, devise, purchase or condemnation, and to agree as to the proportion of the total expense thereof to be borne by each, and to issue bonds for the payment of the same, and to agree with any street railway company using or hereafter using such road or roads as to the share of the expenses thereof to be borne by it for and towards such improvement.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Joint improvement and maintenance of roads by counties.

1. Whenever two or more counties of this State now are or hereafter may be charged by law with the maintenance and repair, or now are or hereafter may be in the possession and control, of any road or roads lying wholly in one or partly in one and partly in other such county or counties, it shall be lawful for such counties to jointly rebuild, reconstruct, change the grade of, improve and widen such road or roads, and to acquire lands for such widening by gift, devise, purchase or condemnation, and agree as to the proportion of the total expense thereof to be borne by each. And it shall and may be lawful also for such boards to agree with any street railway company using or hereafter using such road or roads as to the share of the expense thereof to be borne by it for and towards such improvement.

Agreement with street railway companies.

Plans and cost.

2. If such boards shall determine to make the improvements and do the work authorized by this act, it

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shall have prepared plans and specifications of such work; and if the cost thereof is in excess of one thousand dollars, shall advertise for bids, for two weeks, in at least two daily newspapers, or four weeks in two weekly newspapers, in each of such counties; and the contract shall be awarded to the lowest responsible bidder who shall furnish satisfactory security, to be approved of by said boards; and said boards, voting separately, shall approve of the plans and specifications, and award the contract.

Award of contract.

Receipt and opening of bids.

3. In order to receive the bids each board shall appoint certain of its members, who together shall constitute a joint committee, and such joint committee shall receive the bids at the time and place specified in the advertisement, and shall open the bids, in open meeting of such committee, and publicly announce the amount or items comprising each bid, and the members of the committee from each county shall forthwith report the bids to their board for action thereon.

Proportionate cost.

4. The contract for said work shall specify the share or proportion of the cost thereof to be borne and paid by each county, and each county shall be severally liable only for such share or proportion.

Bonds may be issued.

5. If in the opinion of said boards, or either of them, to be determined by a resolution passed by either of said counties separately for the purpose, to place in the tax levy for any one fiscal year its share or proportion of the cost of acquiring said lands, doing the work and making the improvements herein authorized, would be too burdensome on the taxpayers of such county or counties, then it shall be lawful for such board to issue the bonds of such county, to raise the funds wherewith to defray the cost aforesaid, which bonds shall run for a period not exceeding fifty years, shall bear interest at not exceeding four per centum per annum, and shall be sold for not less than par, and shall be signed by the director of the board and the county collector, under the corporate seal of the county; and the board so issuing such bonds shall annually thereafter place in the tax levy a sufficient sum to meet the interest on said bonds, and a further sum to be deposited in a sinking fund, to be created for the purpose, to pay and discharge said bonds at maturity.

Time and rates.

Sinking fund.

6. This act shall take effect immediately.

Approved March 27, 1906.

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CHAPTER 138.

An act to amend an act entitled "An act to enable the board of chosen freeholders of any county in this State to erect, construct and maintain a viaduct between two or more municipalities in such county, connecting streets or roads of such county or municipalities, and to extend roads to connect with such viaduct, and to acquire lands for the same, and to issue bonds for the payment of the cost of the erection, construction and acquisition thereof," approved March twenty-eighth, one thousand nine hundred and four.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Section five of the act to which this is an amendment be and the same is hereby amended so as to read as follows:

Section amended.

5. The total expense of viaducts contracted to be built under this act in any one year shall not exceed one-fifth of one per centum of the ratables of such county, as ascertained for the then current fiscal year; nor shall there be issued for the erection of viaducts under this act in any period of five years bonds in the aggregate to exceed one-fifth of one per centum of the ratables as aforesaid.

Total expense allowable for viaducts.

2. This act shall take effect immediately.

Approved April 20, 1906.

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CHAPTER 185.

An Act relative to past due assessments under an act entitled, "An act to provide for the permanent improvement of public roads in this State," approved March twenty-second, eighteen hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Satisfaction of assessment by county clerk.

1. It shall be the duty of the collector or receiver of taxes in any city, township, borough or other municipality in which may lie the lands assessed for the amount of peculiar benefits conferred thereon in the manner prescribed by the act of the Legislature of this State entitled "An act to provide for the permanent improvement of public roads in this State," approved March twenty-second, one thousand eight hundred and ninety-five, to accept the amount due thereon, both of principal and all interest, as prescribed by the said statute, in full satisfaction of such assesments, and to give a receipt for the amount paid in satisfaction thereof to the person paying the same, which receipt, signed by such collector or receiver of taxes, shall be sufficient evidence of the payment and satisfaction of such assessments, and upon presentation thereof to the clerk of the county in which such land is situate, he shall satisfy the assessment and other record or records in his office relating to such unpaid assessments so far as relates to the payment of the said assesment on payment to him of a fee of twenty cents for his services.

Fee.

2. This act shall take effect immediately.

Approved May 2, 1906.

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CHAPTER 189.

Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this State" (Revision of 1905), approved March twenty-seventh, one thousand nine hundred and five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Joint improvement of road lying in different municipalities.

1. Wherever any road or portion thereof is on the dividing line between two or more counties of this State and part of the width thereof is in one county and part in another, or part of the length and part of the width thereof is in one county and part in another, and (*a*) the boards of chosen freeholders of such counties, or (*b*) the board or boards of chosen freeholders of such county or counties together with one or more of the municipalities of such county or counties abutting on said road or any part thereof, or (*c*) the municipalities of different counties abutting on said road or any part thereof, desire the said road or a portion thereof should be improved within the limits of said counties, in accordance to the act to which this is a supplement and the supplements thereto and the amendments thereof, it shall and may be lawful for such board or boards of chosen freeholders and municipalities, or any of said municipalities acting together, or such municipalities of different counties abutting on said road, or any part thereof, acting together, to improve said road for its entire length, or any portion thereof, within the limits of such counties, regardless of whether or not a portion or portions thereof may be wholly in one county or more counties, and agree upon the proportion of the expense thereof to be borne by such board or boards of chosen freeholders and the municipality or municipalities undertaking said improvement.

Resolutions of intent.

2. If said boards of chosen freeholders and said municipalities, or such of them as are authorized to make

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said improvement under the first section of this act, desire to undertake said improvement, such board or boards of chosen freeholders shall pass a resolution in accordance to the act to which this is a supplement and any supplement thereto and amendment thereof; and if such municipality or municipalities desire to make said improvement either in conjunction with or without such board or boards of chosen freeholders, the governing body of such municipality or municipalities shall pass a resolution in the form and in accordance with the terms of the act to which this is a supplement and any supplement thereto and amendment thereof; which said resolution or resolutions shall be passed and approved (if approval is necessary) in the same manner that resolutions are passed and approved by such board or boards of chosen freeholders or governing body of such municipality or municipalities.

Surveys made and plans prepared.

3. That after the passage of said resolutions the board or boards of chosen freeholders and municipality or municipalities undertaking said improvement shall cause surveys to be made, and plans, cross-sections and specifications of the work to be done on the road to be prepared, and do and cause to be done the various acts and things required to be done under the act to which this is a supplement and the supplements thereto and amendments thereof, in the same manner as if such road or portion thereof lay wholly within one county and the improvement was undertaken by the board of chosen freeholders of such county.

Joint committee.

4. In order to receive bids, the board or boards of chosen freeholders or municipality or municipalities undertaking said improvement shall each appoint certain of its members, who together shall constitute a joint committee, and such joint committee shall organize by electing a chairman and clerk; said joint committee shall advertise for bids under the terms, conditions, and in the manner specified in the act to which this is a spplement and the supplements thereto and the amendments thereof, which advertisement shall have at the foot thereof the names of the chairman and clerk of said joint committee, and said bids shall be received at the time and place specified in the advertisement and opened in open meeting of such joint committee, and the amount or items composing each bid shall be publicly announced, and the members of the committee from said board or boards

Invite proposals.

Opening of bids.

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of chosen freeholders or municipality or municipalities appointing them shall forthwith report the bids to the board or body so appointing them for action thereon; and thereupon the board or boards of chosen freeholders and the governing body or bodies of such municipality or municipalities undertaking said improvement, voting separately, shall by resolution award the contract for said improvement in the same manner provided in the act to which this is a supplement and the supplements thereto and amendments thereof as if said road lay wholly in the body of one county and the improvement was undertaken by the board of chosen freeholders of such county.

Award contract.

5. The contract for said work shall specify the share or proportion of the cost of such improvement to be borne and paid by the county or counties and municipality or municipalities engaging in said improvement, and each of the respective boards or bodies engaging in said improvement shall be liable for such share or proportion, and no more.

Proportionate cost.

6. If in the opinion of any board of chosen freeholders or any municipality joining in or undertaking such improvement, to be determined by a resolution passed by such board of chosen freeholders or the governing body of such municipality in the manner that resolutions are passed and approved (if such approval is necessary) by such board or body, to place in the tax levy for any one fiscal year the proportion of the expense of said improvement to be borne by it, would be too burdensome on the taxpayers of such county or municipality, then it shall be lawful for such board or municipality to issue bonds for its proportion of the expense of said improvement to be borne by it; these bonds shall be designated as "road improvement bonds," and shall be for such sums and such amounts, payable in not less than six nor more than thirty years from the date thereof, with interest at a rate not exceeding five per centum per annum, payable annually or semi-annually, as such board of chosen freeholders or governing body of such municipality by resolution may determine; said bonds may be either registered or coupon and interchangeable from registered to coupon or coupon to registered, at the will of the holder thereof; and shall be signed, sealed and executed in the manner that bonds of such county or municipality are usually signed, sealed and executed, or as such board of chosen freeholders or governing body of such munici-

May issue bonds to meet expense.

Title of bonds.

Time and rate.

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pality may by resolution direct; that annually after the issue of such bonds there shall be placed in the tax levy of such board or municipality issuing said bonds, a sum sufficient to pay the interest accruing on said bonds, and likewise a sum which with interest and accumulations thereon will be sufficient to pay off and discharge said bonds at maturity, which said sums of money collected for the discharge of principal, together with the accumulations and interest, shall be deposited and kept in a sinking fund, to be used for the payment of said bonds at maturity.

Payment at maturity.

Maintenance of improved road.

7. After the completion of said improvement the said road or portion of road so improved shall be maintained by the board or boards or municipality or municipalities joining in the improvement, who shall bear and pay the same share and cost of maintenance and repair that they severally bear towards the cost of the improvement.

Act construed.

8. This act shall not be taken or construed to repeal any existing act.

9. This act shall take effect immediately.

Approved May 2, 1906.

CHAPTER 322.

An Act concerning roads.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Repair and maintenance of roads.

1. Whenever any road or section of road which has been or shall be constructed by the board of chosen freeholders of any county, with or without State aid, shall lie within the corporate limits of any borough, town, township or other municipality, such borough, town, township or other municipality except cities may enter into an agreement in writing with said board of freeholders, whereby said borough, town, township or other municipality shall hereafter assume the repair and maintenance of said road or section of road, and from and after the making of said agreement, and the approval thereof by the State Commissioner of Public Roads, said road or section thereof, shall cease to be a county road and shall be exclusively under the jurisdiction and control of said borough, town, township or

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other municipality, and shall thereafter be repaired and maintained by the same under the supervision of the State Commissiner of Public Roads.

2. All acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed.

3. This act shall take effect immediately.

Approved June 26, 1906.

CHAPTER 239.

A Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this state," approved April first, one thousand nine hundred and three.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Wherever any road in this state runs in or through two or more counties, and said counties engage in the maintenance and operation thereof in its entirety, at joint expense, it shall and may be lawful for the boards of chosen freeholders of such counties, by resolution to be passed separately by each board, to declare their intention to cause such road, in its entirety, or any portion thereof, to be improved under the provisions of the above entitled act and the supplements thereto and amendments thereof as well as this supplement; and to cause all necessary surveys to be made and specifications to be prepared; and after said specifications shall be approved by such boards of freeholders, by resolutions passed separately by each board, the said specifications shall be certified to the state commissioner of public roads, for his approval or rejection, and if approved by him, such boards are authorized to appoint members from the board, to comprise a joint committee, to advertise for bids for said improvement; which bids shall be furnished in sealed envelopes and presented to the committee in open meeting, at the time called for in the advertisement, and the

Joint improvement of roads.

Specifications and proposals.

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amount of each of said bills shall, in open meeting, be publicly announced, and thereafter the members of the committee from each county shall report the amount of the bids to their respective boards, with their recommendations, and the contract shall be awarded, on resolution of each board voting separately, to the lowest responsible bidder, who shall furnish satisfactory security, to be approved of by said boards; that the contract for such improvement shall specify the proportion of the cost that each county will bear of said improvement, as between themselves, and neither county shall be liable for a greater amount than the proportion so specified; and the joint committee shall advertise for bids in at least two daily newspapers, printed and circulating in each county, for the period of two weeks, or in at least two weekly newspapers, printed and circulating in each of said counties, for at least four weeks; and all proceedings touching and concerning the improvement of such road shall conform as nearly as possible to the proceedings mentioned in the act to which this is a supplement, or any supplement thereto, or amendment thereof, except as modified by this act; and such counties taken together shall be entitled to receive one-third of the cost of the improvement set out in the specifications presented to the state road commissioner, as aforesaid, or as modified with his consent, in the manner specified in said act for the payment to any county for improving a road wholly within its limits; *provided, however,* that of said one-third so paid by the state each county shall receive the same proportion as it bears or is charged with on account of the cost of said improvement.

Awarding contract.

Apportion cost.

Advertising.

Proceedings.

State aid.

Proviso.

2. If in the opinion of either of such boards, to place in the tax levy for any one fiscal year the moneys necessary to pay for the work aforesaid, would be too burdensome on the taxpayers of such county, then, in order that each county may raise the funds wherewith to pay its share of the cost of such improvement, either board being of the opinion aforesaid may, by a resolution adopted by a vote of at least two-thirds of all its members, borrow such sum or sums of money as may be necessary for the payment of its share or proportion of such cost, by the sale of the bonds of such county, issued in the name of the board of chosen freeholders thereof, and in such sum as the board may deem proper,

Meeting cost.

May issue bonds.

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said bonds to bear interest at a rate not exceeding five per cent. per annum, and to be sold for not less than par, and said bonds shall not exceed in the aggregate the cost of the improvement to said board, and shall be so divided that one-tenth of the account of the bonds issued shall fall due in one year from their date and one-tenth each succeeding year thereafter, for the period of ten years from their date, and shall be either coupon or registered bonds, as the board of freeholders may determine; the principal and interest thereof shall be made payable at the office of the county collector of such county; said bonds shall be signed by the director of such board and the county collector, and shall be sealed with the seal of the county, and the county collector shall keep a record thereof; it shall be the duty of the board of chosen freeholders each year to place in the tax levy for such county, in each year, so long as said bonds shall run, a sufficient sum to pay the interest accruing thereon for said year and the principal of the bonds that shall mature in said year.

When payable.

Interest and principal.

3. Whenever the character of the soil or foundation of any road, or any part thereof, sought to be improved, and the traffic over the same, are such that in the opinion of any board seeking the same, if the road lies wholly within one county, or in the opinion of the boards jointly engaged in the maintenance and operation of a road in its entirety, running through two or more counties, ascertained by resolution passed by such boards separately for such purpose, it is necessary to build a foundation for such road and pave the same with a block or other substantial pavement other than that specifically mentioned in the first section of the act to which this is a supplement, it shall be lawful for such boards to include such work in the specifications for said work to be presented to the state commissioner of public roads as aforesaid.

Paving public roads.

4. This act shall take effect immediately.

Approved April 8, 1903.

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CHAPTER 231.

Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this State," approved April first, one thousand nine hundred and three.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Cause portions of road to conform to altered grade.

1. Whenever any public road has been or shall hereafter be improved under the provisions of the act to which this is a supplement, in the course of improving such road the grade of the roadbed shall have been or shall be changed so that it shall not conform to the grade of the remaining portion of the road, including the sidewalks, it shall be lawful for the municipal authorities of each municipality through which such road passes to cause the remaining portion of such road within the limits of their several municipalities to be graded and formed so as to conform in grade to that established for the roadway constructed under the provisions of the act to which this is a supplement, and to cause such work to be done under the same proceedings and in the same manner as may be provided by law in their several municipalities for the grading of the streets of such municipalities.

Proceedings.

Municipalities may improve road.

2. The proper municipal authorities of any municipality through which any such road may run shall have full power and authority to make any municipal improvement upon or within any such road within the limits of their several municipalities which may be authorized by law to be made in any of the other public streets or roads of such municipalities; *provided, however,* no such improvement shall be made by such municipal authorities which may in any way interfere with or impair the roadway improved under the provisions of the act to which this is a supplement, without the approval and consent of the board of chosen freeholders of the county within which such road may be located.

Proviso.

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3. The cost and expense of any of the public improvements authorized by this act shall, so far as the same can be, be assessed upon the lands and real estate specially benefitted by the improvement in proportion to the benefit received; and no lot or parcel of land shall be assessed more than it is so specially benefitted, and such assessment shall be made in the same manner and under the same procedure as is directed by law for the making of other assessments for street improvements within every such municipality. Assessment for benefits.

4. Nothing in this act contained shall be construed to in any way impose upon any such municipality therein referred to any part of the cost of the maintenance and repair of the roadway of any road improved under the provisions of the act to which this is a supplement. Maintenance of road.

5. This act shall take effect immediately.

Approved April 8, 1903.

CHAPTER 61.

An Act to authorize the board of chosen freeholders of any of the several counties of this state to straighten, change the location of and vacate any portion of any public road or highway heretofore or hereafter acquired, constructed and improved in any such county by the board of chosen freeholders thereof, and to improve the portion included in such changed location; provided, any owner or owners of real estate along such portion is or are willing to contribute the whole cost and expense thereof; *and provided further,* every owner of land upon that part of said road proposed to be vacated under this act shall consent in writing to such change of location and vacation.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The board of chosen freeholders of any of the several counties of this state shall have the power and authority to straighten, change the location of and Change and improve roads.

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vacate any portion of any public road or highway heretofore or hereafter acquired, constructed and improved in any such county by the board of chosen freeholders thereof, and to improve the portion included in such changed location; *provided,* any owner or owners of real estate along such portion is or are willing to contribute the whole cost and expense thereof; and *provided further,* every owner of land upon that part of such road or highway proposed to be vacated under this act shall consent in writing to such change of location and vacation.

Proviso.

Presentation by owners.

The property owner or owners desiring such straightening, change of location and vacation, and the improvement of the portion included in such changed location, may present to the board of chosen freeholders of any such county a petition therefor, which shall be accompanied by a map and specifications showing the proposed straightening, change of location and vacation, and in what manner the portion included in such changed location is to be improved, and offering to contribute the whole cost and expense thereof; and said board, if it approve of the same, and is satisfied that every owner of land upon that part of said road or highway proposed to be vacated consents thereto, shall authorize the same; and thereupon it shall be lawful for said board to acquire the land necessary for said change of location, by gift, grant for nominal consideration, or by exchange of said portion so vacated for said portion necessary to be acquired; and said board is empowered, if required in any such exchange, to make, execute and deliver a deed or deeds of conveyance, conveying in fee-simple the title, if any, of any such board to the land so conveyed by it; and it shall be further lawful for said board, upon such terms as it shall determine or as shall be agreed upon with such owner or owners, either to proceed and make the said improvement itself, the whole cost and expense thereof to be paid by said owner or owners or to allow the said owner or owners to make the same themselves, subject to the approval of said board, and after the completion of the same, the portion which shall be superseded by said changed location shall be deemed and taken as vacated as a part of said county or public road or highway.

Map and specifications.

Power of freeholders.

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3. All acts and parts of acts inconsistent with this act be and the same are hereby repealed, and this act to be deemed and taken as a public act, to take effect immediately.

Repealer.

Approved March 24, 1903.

CHAPTER 114.

An Act to enable boards of chosen freeholders to accept as county roads, roads or sections of roads, in townships, which have been or shall hereafter be permanently improved without state or county aid.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Whenever any public road or section of road, located in any township of this state, has been or shall hereafter be permanently improved, without state or county aid, by the construction thereon of a macadamized road, or telford or other stone road, so that the same is or shall be, with reasonable repairs thereto, firm, smooth and convenient for travel at all seasons of the year, and approved by the state commissioner of public roads, such public road or section of road may, upn the petition in writing of the township committee of the township wherein such public road or section of road so improved lies, addressed to and filed with the board of chosen freeholders of the county within which such township is situate, accompanied by a map or survey of the public road or section of road so improved and a copy of the specifications under which such improvements were made, together with proofs showing full payment to the contractor or contractors for all work done, be, by said board of chosen freeholders, by resolution, accepted as and declared to be a county road, if in the judgment of said board of freeholders said road is of sufficient public importance; and such public road or section of road shall, upon such acceptance, forever thereafter be a county road and subject to the exclusive jurisdiction of said board of chosen freehold-

Roads imprved by townships may be transferred to county on petition.

Becomes a county road.

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ers, in the same manner as roads built by state aid, and the duty of keeping the same in repair shall devolve exclusively upon such board of chosen freeholders.

Petition may include.

2. More than one public road or section of road in the same township may be included in one petition.

3. This act shall take effect immediately.

Approved March 28, 1904.

CHANGING LOCATION OR IMPROVING.

CHAPTER 75.

An Act to amend an act entitled "An act to provide for the permanent improvement of public roads in this state," approved March twenty-second, one thousand eight hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The eighteenth section of the said act shall be amended so as to read as follows:

Property-owners to contribute whole expense of improvement.

18. That if any property owners or owner along any road in any county of this state which has not been improved or is not undergoing improvement under the previous sections of this act shall desire any section of any road in such county to be improved or to be changed in location and improved, and are or is willing to contribute the whole expense of such improvement, and provided every owner of land upon that part of the road proposed to be vacated under this act shall consent in writing to such vacation, the supervisor of roads of such county shall, upon a written request of such owners or owner, make a plan of such sections of roads so to be improved or changed in location and improved, in which shall be given the levels and distances, and also specifications stating the materials that may be used and the manner of using them; and a copy of such plan, location, change of location, specifications and of any bids to do such work shall then be submitted by such owners or owner to the board of chosen free-

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holders, and if such board shall approve them and any change of location which may be proposed, it shall then be lawful for such owners or owner to accept any bid or bids so approved from among the bidders, or at their own expense to proceed to build such section of road according to such plan, location and specifications, and such owners or owner shall have control of the expenditure of moneys used to make such improvements, subject to the approval and supervision of the supervisor of such county; and, upon the completion of the improvement to the satisfaction of the said supervisor and said board of chosen freeholders, and upon the submission to said board of receipts showing full payment for materials furnished and work done under the plan and specifications, such section of road so improved shall, if the board of chosen freeholders shall so declare, thereafter be a county road, but otherwise shall remain an ordinary public highway, and any and all portions of any road now existing which may have been rendered unnecessary or be superseded by the new road so constructed shall be vacated and abandoned as a public road, without other action or proceedings than the approval of the board of chosen freeholders as hereinbefore provided; and the said supervisor shall be paid by the aforesaid owners or owner the sum of ten dollars for making the plan, the sum of five dollars for drawing the specifications, and the sum of five dollars for the supervision of the work, and in case such supervisor is not a civil engineer and actual survey is necessary, then such owners or owner, at their or his expense, shall procure a survey, which shall be subject to the approval of such supervisor, which survey shall take the place of the plan before mentioned, and shall include all the new roads proposed to be constructed and all the old roads proposed to be abandoned.

Owner to have control of expenditures.

Old road vacated.

Approved March 23, 1896.

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INCREASED POWER TO BORROW.

An Amendment to an act entitled "A supplement to an act entitled 'An act to enable boards of chosen freeholders to acquire, improve and maintain public roads,'" approved March nineteenth, one thousand eight hundred and eighty-nine, which supplement was approved April ninth, one thousand eight hundred and ninety-two.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Section be amended.

1. The first section of an act entitled 'A supplemtnt to an act entitled 'An act to enable boards of chosen freeholders to acquire, improve and maintain public roads,'" approved March nineteenth, one thousand eight hundred and eighty-nine, which supplement was approved April ninth, one thousand eight hundred and ninety-two, be amended so as to read as follows:

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Amount authorized to raise and bonds issued.

1. In counties of the second class it shall be lawful to raise a sum not to exceed four hundred thousand dollars for which bonds may be issued by the board of chosen freeholders of any such county, under the act to which this is a supplement or any supplement or amendment thereof; *provided, however,* that if work under said act and supplements or amendments has already been done to an amount exceeding said sum, bonds under said act and supplements may be issued to an amount sufficient to raise and pay for such work; *and provided also,* that no county road bond shall be issued to such an amount as, in addition to existing debt, shall raise the debt of the county for all purposes above three per centum of the assessed value of the real estate therein; and in case any such bonds shall be issued in excess of the limit aforesaid, all such bonds so issued in excess shall be void in the hands of any person or

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party, notwithstanding any recitals therein or any representations that may be made concerning the same; in case application has already been made to the circuit court and a certificate shall have been recorded and filed, as required by said act, such application need not be repeated in case of any subsequent issue of such bonds where the original certificate on file shows that the new issue of bonds will not exceed three per centum of the assessed value of the real estate in said county as limited by this act.

2. The second section of said act be amended so as to read as follows:

Board not to use money raised except to grade, etc.

2. In any county of the second class wherein the board of chosen freeholders thereof shall heretofore or may hereafter isue bonds under said act and supplements, that such board of such county shall not use any of the money so raised for any other purpose except to grade, macadamize or improve any road in any such county, under the provisions of the act to which this is a supplement and the several supplements and amendments thereof; *provided,* nothing herein shall prohibit the doing of the necessary repair of any road heretofore graded, macadamized or improved by any such board or that may be hereafter graded, macadamized or improved under said act and supplements.

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3. All acts and parts of acts inconsistent herewith be and the same are so far only as they conflict herewith, repealed, and that this act shall take effect immediately.

Approved March 24, 1897.

CHAPTER 93.

POWER OF FREEHOLDERS TO BORROW.

A Supplement to an act entitled "An act in relation to county expenditures," approved April second, one thousand eight hundred and seventy-eight.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Repair of roads damaged by freshets.

1. In case of the injury or destruction by freshets or otherwise of any of the roads or sections of roads in

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this state that have become county roads under and by virtue of any law of this state whereby it shall be deemed necessary for the board of chosen freeholders, within the limits of whose county such roads or sections of roads so injured or destroyed may lie, to repair or rebuild the same, the said board of chosen freeholders may order and cause such roads or sections of roads to be repaired or rebuilt, notwithstanding the expense of repairing or rebuilding the same shall exceed the limit of the appropriations made for that year; and such board of chosen freeholders may borrow money on temporary loans for that purpose in anticipation of the next tax levy; and in the said tax levy there shall be incorporated a special appropriation under the head of "debts and interest, special deficiency," to pay for such temporary loans.

Special charge.

2. This act shall take effect immediately.

Approved April 2, 1902.

CHAPTER 132.

An Act to provide for the acquirement of turnpike roads for free public use, and for the permanent improvement and maintenance of the same.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Acquirement of turnpike road for free public use.

1. Whenever there shall be presented to the state commissioner of public roads a petition signed by the owners of at least two-thirds of the land and real estate fronting or bordering on any turnpike road, praying that said road may be acquired for free public use, and setting forth that they are willing that the peculiar benefits conferred on the lands fronting or bordering on said road shall be assessed thereon to an amount not exceeding ten per centum of the entire purchase price of the said road, together with the amount necessary to resurface, rebuild or improve the said road in the manner prescribed for other roads in the act entitled "An act to provide for the permanent improvement of

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the public roads in this state," approved March twenty-second, anno domini one thousand eight hundred and ninety-five, and the supplements thereto, said commissioner shall thereupon notify the governor of such action, and the governor shall thereupon appoint five commissioners from the county or counties through which the said road runs; the said commissioners when appointed shall take an oath or affirmation faithfully and fairly to perform their duties, and shall thereupon proceed to estimate and determine the fair and just value of the said road and of the portions thereof in each county in which the same is located, having given ten days' notice of the time and place when and where they will meet to hear any representation in behalf of the said corporation or of the board or boards of chosen freeholders of the various counties through which the said road runs, or of the applying freeholders in the said matter; said notice shall be served upon the president or other chief officer of the turnpike company, upon the director of the said board or boards of chosen freeholders, and shall be published at least one week prior to the time of meeting in one newspaper published in each county through which said turnpike runs; such meeting shall be adjourned from time to time at the discretion of the said commissioners; when the said commissioners shall have arrived at a price or value of the said turnpike road satisfactory to themselves they shall report the same to the state commissioner of public roads, who may thereupon ratify the same and report it to the board or boards of chosen freeholders of the counties through which the said road runs, which said board may thereupon purchase the same or whenever the board of chosen freeholders of any county in this state shall agree with the owner or owners of any turnpike road or toll road within such county upon the price to be paid for such turnpike road or toll road, and shall by resolution accept the same, and said proceeding be approved by the state commissioner of public roads in writing, said board may thereupon purchase the same and said road shall be paid for and maintained as a county road as hereinafter provided for; and they are hereby empowered to make temporary loans upon the credit of the said county or counties for the acquirement of the said roads as aforesaid.

Appointment of commissioners by governor.

Hearing.

Report to state commissioner of roads.

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One-third paid from state appropriation.

2. One-third of the cost of all roads so acquired, together with one-third of the amount expended in improving the same as aforesaid, which improvement shall be made in the manner prescribed for the roads under the aforesaid act, shall be paid for out of the state road appropriation; *provided,* that the amount so paid shall not in one year exceed the amount of forty thousand dollars; if one-third of such cost shall exceed the sum of forty thousand dollars, the said sum of forty thousand dollars shall be appropriated by the governor and state commissioner of public roads among the counties of this state in proportion to the cost of the roads acquired by them for such year as shown by the statement of cost filed in the office of the state commissioner of public roads; the governor and the said commissioner shall, between December fifteenth and thirty-first in each year, certify to the state comptroller the amount to be paid to each county for such year, and the state comptroller shall thereupon draw his warrants in favor of the respective county collectors for the sums certified to as aforesaid upon the state treasurer, who shall pay the same out of any moneys in the state treasury not otherwise appropriated; *provided further,* that the cost of all turnpike roads acquired under this act in any county in any one year, together with all roads built or repaired, shall not exceed one-half of one per centum of the ratables of such county for the last preceding year.

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Duty of county board of assessors.

3. On or before August first in each and every year it shall be the duty of the board of chosen freeholders to certify to the county board of assessors, either in the annual tax budget or separately, the two-thirds of the cost of purchasing and improving of all turnpike roads acquired and improved as aforesaid during the year, and the county board of assessors shall include the sum so certified in the county tax assessed for such year, and the same shall be assessed, collected and paid over to the county in the same manner and within the same time that other county taxes are assessed, collected and paid over; if a deficiency shall exist in consequence of the receipt of less than one-third of the cost from the state treasury, the board of chosen freeholders shall have authority to borrow on temporary loans to the amount of such deficiency until the next

Loan to meet deficiency.

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annual taxes shall be assessed, collected and paid over to the county.

When turnpike in two or more counties.

4. If the said road shall run through more than one county, the petition to the state commissioner of public roads shall be signed by at least two-thirds of the owners of the land and real estate bordering on said road in each county before the governor shall be required to appoint the five commissioners mentioned in the first section of this act; and each of the said counties shall bear the expense of the acquirement of the said road in proportion to the value thereof within the said counties, and all proceedings after the appointment of the said five commissioners that may be required by virtue of this act shall be had separately and independently in each of the said counties.

Maintenance.

5. Any road so acquired shall forever thereafter be a free county road, and shall be kept in good order and repair and in the same manner as are other county roads.

Assessment of benefits.

6. When the said turnpike roads shall have been so acquired and improved by petition as aforesaid the board of chosen freeholders shall apply to the circuit court of the county for the appointment of commissioners to estimate and to assess the peculiar benefits conferred by such acquirement and improvement upon the lands and real estate bordering on the road so acquired and improved, of the time and place of which application notices shall be given by ten days' publication in two daily newspapers printed and circulating within the said counties, or by four weeks' publication in two weekly newspapers printed and circulating therein, at which time and place, or such other time and place as the court shall designate, shall, without unnecessary delay, appoint three commissioners, who shall be freeholders and residents of the county in which the application is made, to assess the benefits aforesaid; the said court shall have power to remove any commissioner and appoint another in his place, and also fill any vacancy that may occur in the office of any commissioner at any time.

Manner of assessment.

7. The said commissioners shall then proceed in like manner as the commissioners appointed to assess the benefits conferred by the improvement of the public roads of this state under and by virtue of an act of the legislature entitled "An act to provide for the permanent improvement of the public roads of this state,"

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approved March twenty-second, one thousand eight hundred and ninety-five, and supplements thereto, and the report of the said commissioners when filed and approved shall be a lein upon the properties assessed in like manner, and the said assessment shall be collected in like manner as the assessment in the said act last before mentioned.

Report a lien.

Approved March 22, 1901.

VACATION OF TURNPIKE.

SUPPLEMENT.

Approved February 13, 1884.

Deed of cession and transfer of turnpike road, how executed and filed.

Sec. 1. That whenever any turnpike company of this state shall execute to any city, township or other municipality of this state, a deed of cession and transfer of all or any part of any turnpike road lying within the limits of any such city, township or other municipality, and shall have the same duly proven in the manner required for the proof of deeds or conveyances of lands, and shall deliver the same, together with a map or survey of the road, or of the part of road so ceded and transferred to the common council, township committee or other governing board of such city, township or other municipality, and the said common council, township committee or other governing board shall accept the said deed of cession and transfer, by a writing indorsed thereon, the said deed, proof, map or survey and acceptance shall then be recorded in the office of the clerk of the county in which the road so ceded and transferred lies, in the book containing the records of public roads for said county, and after being so recorded shall be filed in the office of the secretary of state; *provided,* that where the charter or act of incorporation of any city or other municipality prescribes the manner in which deeds of dedication of lands for public highways or streets shall be accepted, the proceedings for the acceptance of any deed of cession and transfer by a turnpike company as aforesaid shall, in any such city or other municipality, be the same as is

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required for the acceptance of a deed of dedication of lands for a public highway or street.

Company released from control, etc., of part of road ceded when deed is filed in office of secretary of state.

Sec. 2. That any turnpike company making a cession and transfer of any part of their turnpike road in the manner aforesaid, shall from the date of filing the deed of cession and transfer in the office of the secretary of state, be released and discharged from all authority and control over the part or parts of their road so ceded and transferred, and from all liability on account of the same, and the same shall thereafter be to all intents and purposes a public road or highway in such city, township or other municipality, and be subject to the same jurisdiction, authority and control by such city, township or other municipality as it has over other public roads or highways within the limits thereof.

An Act authorizing turnpike companies to vacate or dispose of a portion of its road and property.

Approved April 20, 1885.

When turnpike company may vacate or dispose of portion of road.

Sec. 1. That when any turnpike company in this state may deem it advisable to dispose or vacate any portion of their road not in exces of one-half of its entire length, they shall hereby have the power and privilege of so doing at any time when the same may be favored by a vote represented by those owning two-thirds of the capital stock of said company, to be voted at a special meeting of said stockholders called by the officers of said company, and the notice of said meeting being published in at least one newspaper in each county where said road is located, for the space of thirty days, once in each week, said notice to state the time and object of said meeting; the said stockholders may by a vote represented by those owning two-thirds of the capital stock of said company, authorize and empower their president and secretary to sell or vacate to the freeholders of the county or counties the portion so desired; and if vacated without compensation, a committee of the board of freeholders of the county or counties may view the same and report to the said board upon what terms they have agreed to take said road, and the action of a majority of said board of freeholders in accepting or rejecting said report shall be final.

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An Act to authorize turnpike companies to abandon a portion of their roads and property.

Passed June 1, 1886.

Turnpike companies may abandon portion of road.

Sec. 1. That any turnpike company in this state may abandon any portion of their road not exceeding two-thirds of the entire length of the road, when the same may be favored by a vote of those owning a majority of the capital stock of said company; the resolution to abandon a portion of said turnpike shall describe the part so abandoned, and shall be signed by the president and secretary of said turnpike company, duly acknowledged before an officer authorized to take the acknowledgment of deeds in this state, and shall thereupon be recorded in the office of the clerk of the county wherein such turnpike company is situated; *provided,* that the part of said turnpike so abandoned shall be in all respects in as good repair as when the said company began operating the same.

BROAD TIRES.

CHAPTER 76.

An Act to amend an act entitled "An act to enable township committees to encourage the use of broad tires on wagons and carts by a rebatement of taxes."

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey,* That section one of an act entitled "An act to enable township committees to encourage the use of broad tires on wagons and carts by a rebatement of taxes," approved March sixteenth, one thousand eight hundred and ninety-three, which reads as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey,* That township committees be and they are hereby authorized, when in

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their judgment it is for the public good, to pass an ordinance allowing a rebate of taxes for township or road purposes to all owners or possessors of wagons and carts used in said township for transportation of goods, wares, merchandise, produce, passengers, and for general farm, freight and express purposes, having tires of not less than four inches in width; *provided,* the said rebate shall not exceed fifty cents for each wheel in use in any one year," be and the same is hereby amended so as to read as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey,* That township committees be and they are hereby authorized, when in their judgment it is for the public good, to pass an ordinance allowing a rebate of taxes for township or road purposes to all owners or possessors of wagons and carts used in said township for transportation of goods, wares, merchandise, produce, passengers, and for general farm, freight and express purposes, having tires of not less than four inches in width; *provided,* the said rebate shall not exceed one dollar for each wheel in use in any one year.

2. That this act shall take effect immediately.

Passed March 24, 1896.

CHAPTER 63.

A Supplement to an act entitled "An act to provide for the acquirement of turnpike roads for free public use," approved May eleventh, one thousand eight hundred and ninty-seven.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

1. The pay of the commissioners heretofore or hereafter appointed under said act shall be a sum not exceeding five dollars per day, and necessary expenses not exceeding two dollars per day, for actual number of days employed in such service. **Compensation.**

2. If the freeholders of the county or counties fail to accept the turnpike roads appraised under the act **Settlement when road not accepted.**

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to which this is a supplement within twelve months after the commission have submitted their award to the state road commissioner, the bill of said commissioners, upon the approval of the state road commissioner and the signature of the governor, shall be presented to the comptroller of the state, who thereupon shall draw his warrant therefor upon the state treasurer, who shall pay the same out of the annual state appropriation for roads.

3. This act shall take effect immediately.

Approved March 20, 1900.

CHAPTER 133.

A Supplement to an act entitled "An act to provide for the acquirement of turnpike roads for free public use, and for the permanent improvement and maintenance of the same," approved March twenty-second, one thousand nine hundred and one.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

1. When any commissioner heretofore or hereafter appointed under the act to which this act is a supplement shall die pending the proceedings under the said act to which this act is a supplement or shall be disqualified or shall be unable to act or shall fail or refuse to act and perform the duties of his appointment, the other four commissioners appointed under said act shall proceed to perform the duties of their appointment with the same powers and effect as if all the commissioners were acting, and a report signed by the other four of said commissioners shall have the same force and effect as a report signed by all of the commissioners appointed under the said act, and a majority of said commissioners shall have the power to adjourn their meetings from time to time.

2. When any commissioner heretofore appointed under the act to which this act is a supplement shall have died pending the proceedings under the said act, or

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shall have been disqualified or unable to act or shall have failed or refused to act and to perform the duties of his appointment or to attend the meetings of the commissioners appointed under the said act, all the proceedings heretofore had and acts heretofore performed by the other four of the commissioners appointed under the said act are hereby confirmed and made valid, legal and effectual to the same extent that the same would have been valid, legal and effectual if all the commissioners appointed under the said act had taken part in all of said proceedings.

3. This act shall take effect immediately.

Approved March 28, 1904.

CHAPTER 138.

A further Supplement to an act entitled "An act to provide for the control and operation of roads and bridges owned or claimed to be owned by any plank road company whose charter has expired or may expire," approved March twenty-second, one thousand nine hundred and one.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Widening plank roads acquired by county.

1. After such road shall have been acquired and taken possession of by any board or boards of chosen freeholders of any county or counties in this state, such road may be widened to any width not exceeding one hundred feet, providing the board or boards of chosen freeholders of the county or counties in which said road may lie and be situate shall adopt a resolution determining that such widening is of public importance, and setting forth the width proposed and the location of said widening, and the points between which such widening is to be made; such resolution, in case said road lies in two or more counties, shall receive the approval of each of said counties before the same shall be valid and operative.

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Acquirement of lands.

2. The title to the lands required for such widening may be acquired by gift, devise, purchase or condemnation, and shall vest in the county corporation of the county or counties within the territorial limits of which the lands acquired may lie, respectively, and the cost and expense of acquiring such lands shall be paid by the county within which the same shall lie; but nothing in this act contained shall be construed to alter or in any wise affect the provisions of law under which such road, including the bridges thereof, are or shall be constructed, renewed, repaired or maintained.

3. This act shall take effect immediately.

Approved March 28, 1904.

CHAPTER 98.

Further Supplement to an act entitled "An act concerning roads," approved April sixteenth, eighteen hundred and forty-six.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Highway must be kept clear of weeds, etc.

1. The owner or occupant of land abutting on any highway in any township in this sate shall, during the month of September of each year, cut and remove all brush, briers and weeds growing in or upon such portion of such highway as his or her lands abut upon, and in case such owner or occupant shall fail to perform the duty imposed hereby, the township committee of the township in which such lands abut as aforesaid shall cause such work to be done and the owner of such lands shall pay the expense thereof, with costs, to be recovered in an action upon contract before any justice of the peace of the county at the suit of such township committee.

2. This act shall take effect immediately.

Approved March 23, 1900.

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An Act for the better protection of travelers, pedestrians, vehicles and animals on the public streets and highways.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

Penalty for placing glass, bottles, etc., upon public highways.

1. Whoever places upon the surface of any public street, highway or other way customarily and lawfully used for public travel, or upon any sidewalk appurtenant to such way, any broken glass, bottle, metal, loose stones, earthenware, or other substance of a nature likely to cause injury to travelers or pedestrians, or to carriages, bicycles or other vehicles traveling or moving on said way, or which might wound, disable or injure any horse or other animal, or which might injure, cut or puncture any pneumatic tire, shall forfeit for each offense five dollars, to be sued for and recovered in an action of debt by any person who will sue for the same.

Broken stone of dimension one inch or more placed on highways to be covered.

2. Any overseer of the highways, committeeman, contractor, or other person whomsoever, who shall place or spread broken stone on any of the highways of this state, for the purpose of improving or repairing the same, shall, if such stone be of the dimension of an inch and one-half or more in diameter, cause the same to be covered with fine stone, earth or screenings, within such period of time as it shall be possible to obtain such fine stone, earth or screenings after said broken stones are spread upon said road, unless prevented by causes beyond his control, under a penalty of twenty dollars for each offense, to be sued for in an action of debt and recovered with costs by any person who shall be injuriously affected by the willful neglect or failure to cover said stone as herein provided

3. This act shall take effect immediately.

Approved May 12, 1896.

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LAYING OUT ROADS.

Receiving many inquiries how to proceed to lay out roads, change location, etc., to save correspondence we give the following quotations from the statutes:

Laying out Roads by Freeholders after General Election.

It shall be lawful for the board of chosen freeholders of any of the several counties of this state when said board deem it for the best interests of such county, to lay out, construct and maintain public roads extending through such county in any direction, to submit, by resolution, the question whether or not such public roads shall be laid out, to the electors of said county, at an election, to be held at the same time and place of holding the general election in and for said county for members of the general assembly of this state, by the same officers, but in separate ballot-box, and if, at such election, a majority of the electors shall vote "against public roads," nothing in this act shall apply or be effective in said county; but if a majority of the electors vote "in favor of public roads," then the board shall proceed as directed by the act entitled "An act to authorize the board of chosen freeholders of any of the several counties of this state to lay out, open, construct, improve and maintain a public road therein," approved April 7th, 1888. P. L. 1888, page 397.

LAYING OUT, VACATING OR ALTERING PUBLIC ROADS BY SURVEYORS OF HIGHWAYS. (Revised Statutes, page 2828-119, Sec. 1.)

That when ten or more persons, being freeholders, shall think a public road necessary, or any public road which hath been or shall be laid out unnecessary, or any alteration in such road necessary in any part of the county in which they reside, it shall be lawful for the said persons to make application in writing to the in-

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ferior court of common pleas of the said county, in open court, having given previous notice for at least ten days of such intended application, and also of the day on which such application is intended to be made, by advertisements under their hands, and set up at three of the most public places in the township in which the said road is proposed to be laid out, vacated or altered, and if there be more townships than one through which the said road may run, by advertisements to be set up at three of the most public places in each township; and the said court, when applied to as aforesaid, on due proof being made that the advertisements have been set up according to law, on which the judgment of the court shall be final and conclusive, are hereby authorized and required to appoint six of the surveyors of the highways of the said county, ever having regard to the appointment of the surveyors of the highways of the township or townships where the said road shall be so applied for to be laid out, vacated or altered; *provided,* that no surveyor shall be appointed through whose land the road may run, or who for any other reason which the court in their discretion shall deem sufficient, think ought not to be appointed; and the said surveyors shall meet at such time and place as the said court shall direct, a copy of which appointment shall be served on each of the said surveyors at least six days prior to the time of their meeting; and two of the said applicants shall, at least twelve days prior to the said time, sign and set up advertisements at three of the most public places in the said township or townships, setting forth the time and place of the meeting of the surveyors agreeably to the directions of the court, and designating the points or places from and to which the said road is proposed to be laid out, vacated or altered. (See Secs. 138 and 168, *post.*)

VACATING AND RELAYING OF PUBLIC ROADS BY FILING CONSENT WITH CLERK AND RECORDING.

138. Sec. 1. That whenever ten or more persons, being freeholders, shall think any alteration of any public road necessary in any part of the county wherein they reside, by having such road or a portion thereof

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vacated, and the same relaid or another road substituted therefor, they may make application in writing to the inferior court of common pleas of such county, or to one of the judges thereof, setting forth in writing the road or portion thereof as aforesaid which it is proposed to have vacated, describing the same by courses and distances, and also describing the road as it is to be relaid, or the road which is to be substituted therefor, to which description there shall be attached a map showing the location of the road or portion of the road to be vacated and the road as relaid, or the road which is to be substituted therefor; and if within ten days aften such application shall have been made as aforesaid, or if at the time of making such application there shall be presented to said court or judge the consent in writing of the owners of all the lands intersected by such old road or portion thereof proposed to be vacated, and of all the property intersected by the road as proposed to be relaid, or by the road which it is proposed to substitute therefor, and also the written consent of the township committee of the township wherein such road or roads do lie, that said application shall be granted, then it shall be lawful for said court or judge to cause said application, with the accompanying survey, map and return, and the written consents of the owners of lands as aforesaid, and of the township committee, to be filed with the clerk of the county, to be by him recorded in the book of roads for said county; and when said application and other papers shall have been so filed, such old road or portion thereof shall thereupon and thereby be deemed to be vacated, and the road as relaid, or the new road substituted therefor, shall thereupon and thereby be deemed and taken to be a public road.

VACATION OF PUBLIC ROADS BY CONSENT AND FILING WITH COUNTY CLERK.

186. Sec. 1. That whenever ten or more persons being freeholders, shall think the vacation of a part of any public road necessary in any part of the county wherein they reside, they may make application in writing to the inferior court of common pleas of such county or to one of the judges thereof, setting forth in writing

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the road or portion thereof which it is proposed to have vacated, describing the same by courses and distances, to which description there shall be attached a map showing the location of the road or portion thereof to be vacated, and if within ten days after such application shall have been made as aforesaid, or if at the time of making such application, there shall be presented to said court or judge the consent in writing of the owners of all the lands by such old road or portion thereof proposed to be vacated, and also the written consent of the township committee of the township wherein such lands do lie, that such application shall be granted, then it shall be lawful for said court or judge to cause said application, with the accompanying survey, map and return, and the written consents of the owners of lands as aforesaid, and of the township committee to be filed with the clerk of the county, to be by him recorded in the book of roads for said county, and when said application and papers have been so filed, such portion of such old road shall thereupon and thereby be deemed to be vacated; *provided,* that no portion of any old road proposed to be vacated under this act shall exceed one thousand yards in length.

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Appendix C.

NUMBER OF TONS OF STONE PER MILE REQUIRED TO BUILD THE FOLLOWING DEPTHS AND WIDTHS.

For the information of intending road builders, we have compiled the following tables, which approximate the number of tons of thoroughly rolled stone necessary to construct each mile at the designated depths and widths.

The basis is 3,000 tons of loose stone or 3,500 tons of compressed stone for a road one mile long, sixteen feet wide and eight inches deep. A road eight inches deep, when finished, will have required at least ten inches of stone. It should be placed in two layers of five inches each, and each layer rolled down to four inches. Then the application of the three-quarter inch and screenings will bring the road to the prescribed depth; for other thickness the stone should be placed in proportion to the intended finished depths.

An observance of this rule will insure the contract thickness for the roadbed, and save the sometimes necessary expense of resurfacing before acceptance from the contractor.

A road	8	feet wide	and	4	inches deep	will require	875	tons	of stone	per mile.
"	8	"	"	6	"	"	1,312½	"	"	"
"	8	"	"	8	"	"	1,750	"	"	"
"	8	"	"	10	"	"	2,187½	"	"	"
"	8	"	"	12	"	"	2,625	"	"	"
"	9	"	"	4	"	"	984⅜	"	"	"
"	9	"	"	6	"	"	1,476 9/16	"	"	"
"	9	"	"	8	"	"	1,968¾	"	"	"
"	9	"	"	10	"	"	2,460 15/16	"	"	"
"	9	"	"	12	"	"	2,953⅛	"	"	"

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A road	10	feet	wide and	4	inches deep	will require	1,093¾	tons	of stone per mile.
"	10	"	"	6	"	"	1,640⅝	"	" "
"	10	"	"	8	"	"	2,187½	"	" "
"	10	"	"	10	"	"	2,734⅜	"	" "
"	10	"	"	12	"	"	3,281¼	"	" "
"	11	"	"	4	"	"	1,203⅛	"	" "
"	11	"	"	6	"	"	1,804 11/16	"	" "
"	11	"	"	8	"	"	2,406¼	"	" "
"	11	"	"	10	"	"	3,007 13/16	"	" "
"	11	"	"	12	"	"	3,609⅜	"	" "
"	12	"	"	4	"	"	1,312½	"	" "
"	12	"	"	6	"	"	1,968¾	"	" "
"	12	"	"	8	"	"	2,625	"	" "
"	12	"	"	10	"	"	3,281¼	"	" "
"	12	"	"	12	"	"	3,937½	"	" "
"	13	"	"	4	"	"	1,421⅞	"	" "
"	13	"	"	6	"	"	2,132 13/16	"	" "
"	13	"	"	8	"	"	2,843¾	"	" "
"	13	"	"	10	"	"	3,554 11/16	"	" "
"	13	"	"	12	"	"	4,265⅝	"	" "
"	14	"	"	4	"	"	1,531¼	"	" "
"	14	"	"	6	"	"	2,296⅞	"	" "
"	14	"	"	8	"	"	3,062½	"	" "
"	14	"	"	10	"	"	3,828⅛	"	" "
"	14	"	"	12	"	"	4,593¾	"	" "
"	15	"	"	4	"	"	1,640⅝	"	" "
"	15	"	"	6	"	"	2,460 15/16	"	" "
"	15	"	"	8	"	"	3,281¼	"	" "
"	15	"	"	10	"	"	4,101 9/16	"	" "
"	15	"	"	12	"	"	4,921⅞	"	" "
"	16	"	"	4	"	"	1,750	"	" "
"	16	"	"	6	"	"	2,625	"	" "
"	16	"	"	8	"	"	3,500	"	" "
"	16	"	"	10	"	"	4,375	"	" "
"	16	"	"	12	"	"	5,250	"	" "
"	17	"	"	4	"	"	1,859⅜	"	" "
"	17	"	"	6	"	"	2,789 1/16	"	" "
"	17	"	"	8	"	"	3,718¾	"	" "
"	17	"	"	10	"	"	4,648 7/16	"	" "
"	17	"	"	12	"	"	5,578⅛	"	" "

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A road	18	feet wide and	4	inches deep	will require	1,968¾	tons of stone	per	mile.
"	18	" "	6	"	"	2,953⅛	"	"	"
"	18	" "	8	"	"	3,937½	"	"	"
"	18	" "	10	"	"	4,921⅞	"	"	"
"	18	" "	12	"	"	5,906¼	"	"	"
"	19	" "	4	"	"	2,078⅛	"	"	"
"	19	" "	6	"	"	3,117 3/16	"	"	"
"	19	" "	8	"	"	4,156¼	"	"	"
"	19	" "	10	"	"	5,195 5/16	"	"	"
"	19	" "	12	"	"	6,234⅜	"	"	"
"	20	" "	4	"	"	2,187½	"	"	"
"	20	" "	6	"	"	3,281¼	"	"	"
"	20	" "	8	"	"	4,375	"	"	"
"	20	" "	10	"	"	5,468¾	"	"	"
"	20	" "	12	"	"	6,562½	"	"	"

TABLES.

As many persons interested in the construction of stone roads are asking questions about their cost, we enclose a table to show at a glance the number of square yards at different widths in a mile of road; also the cost at different widths and various prices per square yard. Any variations from these prices can be quickly ascertained by adding, subtracting, multiplying and dividing for a less or greater width. For example, a road eight feet wide has 4,693⅓ square yards in one mile. To obtain the number of square yards in a road having a width of nine feet, add one-eighth to the foregoing figures, and in one having a width of seven feet, subtract one-eighth; in one of twice the width given in the table multiply by two.

SQUARE YARDS IN ONE MILE OF

8	feet in width,	4,693⅓	square yards.
10	"	5,866⅔	"
12	"	7,040	"
14	"	8,213⅓	"
16	"	9,386⅔	"
18	"	10,560	"

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8	feet wide, or	4,693⅓	square yards, at	25c.	per yard,	.....	$1,173 33⅓
10	"	5,866⅔	"	25c.	"	.....	1,466 66⅔
12	"	7,040	"	25c.	"	.....	1,760 00
14	"	8,213⅓	"	25c.	"	.....	2,053 33⅓
16	"	9,386⅔	"	25c.	"	.....	2,346 66⅔
18	"	10,560	"	25c.	"	.....	2,640 00
8	"	4,693⅓	"	30c.	"	.....	1,408 00
10	"	5,866⅔	"	30c.	"	.....	1,760 00
12	"	7,040	"	30c.	"	.....	2,112 00
14	"	8,213⅓	"	30c.	"	.....	2,464 00
16	"	9,386⅔	"	30c.	"	.....	2,816 00
18	"	10,560	"	30c.	"	.....	3,168 00
8	"	4,693⅓	"	35c.	"	.....	1,642 66⅔
10	"	5,866⅔	"	35c.	"	.....	2,053 33⅓
12	"	7,040	"	35c.	"	.....	2,464 00
14	"	8,213⅓	"	35c.	"	.....	2,874 66⅔
16	"	9,386⅔	"	35c.	"	.....	3,285 33⅓
18	"	10,560	"	35c.	"	.....	3,696 00
8	"	4,693⅓	"	40c.	"	.....	1,877 33⅓
10	"	5,866⅔	"	40c.	"	.....	2,346 66⅔
12	"	7,040	"	40c.	"	.....	2,816 00
14	"	8,213⅓	"	40c.	"	.....	3,285 33⅓
16	"	9,386⅔	"	40c.	"	.....	3,754 66⅔
18	"	10,560	"	40c.	"	.....	4,224 00
8	"	4,693⅓	"	45c.	"	.....	2,112 00
10	"	5,866⅔	"	45c.	"	.....	2,640 00
12	"	7,040	"	45c.	"	.....	3,168 00
14	"	8,213⅓	"	45c.	"	.....	3,696 00
16	"	9,386⅔	"	45c.	"	.....	4,224 00
18	"	10,560	"	45c.	"	.....	4,752 00
8	"	4,693⅓	"	50c.	"	.....	2,346 66⅔
10	"	5,866⅔	"	50c.	"	.....	2,933 33⅓
12	"	7,040	"	50c.	"	.....	3,520 00
14	"	8,213⅓	"	50c.	"	.....	4,106 66⅔
16	"	9,386⅔	"	50c.	"	.....	4,693 33⅓
18	"	10,560	"	50c.	"	.....	5,280 00
8	"	4,693⅓	"	55c.	"	.....	2,581 33⅓
10	"	5,866⅔	"	55c.	"	.....	3,226 66⅔
12	"	7,040	"	55c.	"	.....	3,872 00
14	"	8,213⅓	"	55c.	"	.....	4,517 33⅓
16	"	9,386⅔	"	55c.	"	.....	5,162 66⅔
18	"	10,560	"	55c.	"	.....	5,808 00

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8	feet wide, or	4,693⅓	square yards, at	60c.	per yard,	.....	$2,816 00
10	"	5,866⅔	"	60c.	"	.....	3,520 00
12	"	7,040	"	60c.	"	.....	4,224 00
14	"	8,213⅓	"	60c.	"	.....	4,928 00
16	"	9,386⅔	"	60c.	"	.....	5,632 00
18	"	10,560	"	60c.	"	.....	6,336 00
8	"	4,693⅓	"	65c.	"	.....	3,050 66⅔
10	"	5,866⅔	"	65c.	"	.....	3,813 33⅓
12	"	7,040	"	65c.	"	.....	4,576 00
14	"	8,213⅓	"	65c.	"	.....	5,338 66⅔
16	"	9,386⅔	"	65c.	"	.....	6,101 33⅓
18	"	10,560	"	65c.	"	.....	6,864 00
8	"	4,693⅓	"	70c.	"	.....	3,285 33⅓
10	"	5,866⅔	"	70c.	"	.....	4,106 66⅔
12	"	7,040	"	70c.	"	.....	4,928 00
14	"	8,213⅓	"	70c.	"	.....	5,749 33⅓
16	"	9,386⅔	"	70c.	"	.....	6,570 66⅔
18	"	10,560	"	70c.	"	.....	7,392 00
8	"	4,693⅓	"	75c.	"	.....	3,520 00
10	"	5,866⅔	"	75c.	"	.....	4,400 00
12	"	7,040	"	75c.	"	.....	5,280 00
14	"	8,213⅓	"	75c.	"	.....	6,160 00
16	"	9,386⅔	"	75c.	"	.....	7,040 00
18	"	10,560	"	75c.	"	.....	7,920 00
8	"	4,693⅓	"	80c.	"	.....	3,754 66⅔
10	"	5,866⅔	"	80c.	"	.....	4,693 33⅓
12	"	7,040	"	80c.	"	.....	5,632 00
14	"	8,213⅓	"	80c.	"	.....	6,570 66⅔
16	"	9,386⅔	"	80c.	"	.....	7,509 33⅓
18	"	10,560	"	80c.	"	.....	8,448 00
8	"	4,693⅓	"	85c.	"	.....	3,989 33⅓
10	"	5,866⅔	"	85c.	"	.....	4,986 66⅔
12	"	7,040	"	85c.	"	.....	5,984 00
14	"	8,213⅓	"	85c.	"	.....	6,981 33⅓
16	"	9,386⅔	"	85c.	"	.....	7,978 66⅔
18	"	10,560	"	85c.	"	.....	8,976 00
8	"	4,693⅓	"	90c.	"	.....	4,224 00
10	"	5,866⅔	"	90c.	"	.....	5,280 00
12	"	7,040	"	90c.	"	.....	6,336 00
14	"	8,213⅓	"	90c.	"	.....	7,392 00
16	"	9,386⅔	"	90c.	"	.....	8,448 00
18	"	10,560	"	90c.	"	.....	9,504 00

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8	feet wide, or	4,693⅓	square yards, at	95c.	per yard,	.....	$4,458 66⅔
10	"	5,866⅔	"	95c.	"	.....	5,573 33⅓
12	"	7,040	"	95c.	"	.....	6,688 00
14	"	8,213⅓	"	95c.	"	.....	7,802 66⅔
16	"	9,386⅔	"	95c.	"	.....	8,917 33⅓
18	"	10,560	"	95c.	"	.....	10,032 00
8	"	4,693⅓	"	$1.00	"	.....	4,693 33⅓
10	"	5,866⅔	"	1.00	"	.....	5,866 66⅔
12	"	7,040	"	1.00	"	.....	7,040 00
14	"	8,213⅓	"	1.00	"	.....	8,213 33⅓
16	"	9,386⅔	"	1.00	"	.....	9,386 66⅔
18	"	10,560	"	1.00	"	.....	10,560 00

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TABLE FOR GRAVEL

Table showing number of cubic yards of gravel required in the construction of one mile of gravel road, of widths varying from 6 feet to 20 feet, and depths from 6 to 12 inches. The within quantities should be multiplied by 1½ to give the number of cubic yards of loose gravel required to make the within depths o compact gravel.

One Mile in Length.	Number of feet in width.	Number of cubic yards in road 6 inches deep.	Number of cubic yards in road 7 inches deep.	Number of cubic yards in road 8 inches deep.	Number of cubic yards in road 9 inches deep.	Number of cubic yards in road 10 inches deep.	Number of cubic yards in road 11 inches deep.	Number of cubic yards in road 12 inches deep.
One mile,	6 feet wide,	$586\frac{2}{3}$	$684\frac{4}{9}$	$782\frac{2}{9}$	880	$977\frac{7}{9}$	$1,075\frac{5}{9}$	$1,173\frac{1}{3}$
One mile,	7 feet wide,	$684\frac{4}{9}$	$798\frac{14}{27}$	$912\frac{6}{27}$	$1,026\frac{2}{3}$	$1,140\frac{20}{27}$	$1,254\frac{22}{27}$	$1,368\frac{8}{9}$
One mile,	8 feet wide,	$782\frac{2}{9}$	$912\frac{16}{27}$	$1,042\frac{26}{27}$	$1,173\frac{1}{3}$	$1,303\frac{19}{27}$	$1,434\frac{2}{27}$	$1,564\frac{4}{9}$
One mile,	9 feet wide,	880	$1,026\frac{2}{3}$	$1,173\frac{1}{3}$	1,320	$1,466\frac{2}{3}$	$1,613\frac{1}{3}$	1,760
One mile,	10 feet wide,	$977\frac{7}{9}$	$1,140\frac{20}{27}$	$1,303\frac{19}{27}$	$1,466\frac{2}{3}$	$1,629\frac{17}{27}$	$1,792\frac{16}{27}$	$1,955\frac{5}{9}$
One mile,	11 feet wide,	$1,075\frac{5}{9}$	$1,254\frac{22}{27}$	$1,434\frac{2}{27}$	$1,613\frac{1}{3}$	$1,792\frac{16}{27}$	$1,971\frac{23}{27}$	$2,151\frac{1}{9}$
One mile,	12 feet wide,	$1,173\frac{1}{3}$	$1,368\frac{8}{9}$	$1,564\frac{4}{9}$	1,760	$1,955\frac{5}{9}$	$2,151\frac{1}{9}$	$2\ 346\frac{2}{3}$
One mile,	13 feet wide,	$1,271\frac{1}{9}$	$1,482\frac{26}{27}$	$1,694\frac{22}{27}$	$1,906\frac{2}{3}$	$2,118\frac{14}{27}$	$2,330\frac{10}{27}$	$2\ 542\frac{2}{9}$
One mile,	14 feet wide,	$1,368\frac{8}{9}$	$1,597\frac{1}{27}$	$1,825\frac{5}{27}$	$2,053\frac{1}{3}$	$2,281\frac{13}{27}$	$2,509\frac{17}{27}$	$2\ 737\frac{7}{9}$
One mile,	15 feet wide,	$1,466\frac{2}{3}$	$1,711\frac{1}{9}$	$1,955\frac{5}{9}$	2,200	$2,444\frac{4}{9}$	$2,688\frac{8}{9}$	$2,933\frac{1}{3}$
One mile,	16 feet wide,	$1,564\frac{4}{9}$	$1,825\frac{5}{27}$	$2,085\frac{25}{27}$	$2,346\frac{2}{3}$	$2,607\frac{11}{27}$	$2,868\frac{4}{27}$	$3,128\frac{8}{9}$
One mile,	17 feet wide,	$1,662\frac{2}{9}$	$1,919\frac{7}{27}$	$2,216\frac{8}{27}$	$2,493\frac{1}{3}$	$2,770\frac{10}{27}$	$3,047\frac{11}{27}$	$3\ 324\frac{4}{9}$
One mile,	18 feet wide,	1,760	$2.053\frac{1}{3}$	$2,346\frac{2}{3}$	2,640	$2,933\frac{1}{3}$	$3,226\frac{2}{3}$	3 520
One mile,	19 feet wide,	$1,857\frac{7}{9}$	$2,167\frac{11}{27}$	$2,477\frac{1}{27}$	$2,786\frac{2}{3}$	$3,096\frac{8}{27}$	$3,405\frac{25}{27}$	$3,715\frac{5}{9}$
One mile,	20 feet wide,	$1,955\frac{5}{9}$	$2,281\frac{13}{27}$	$2,607\frac{17}{27}$	$2,933\frac{1}{3}$	$3,259\frac{7}{27}$	$3.585\frac{5}{27}$	$3.911\frac{1}{9}$

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