SPECIFICATION NO. 1906

# SPECIFICATION FOR THE IMPROVEMENT OF "E" STREET BETWEEN THE NORTH CURB LINE OF FORTY-FOURTH STREET AND THE SOUTH CURB LINE OF FORTY-EIGHTH STREET, IN THE CITY OF SAN BERNARDINO, CALIFORNIA.

## PLANS - ETC.

The work herein provided for is to be done in accordance with the Resolution of Intention and the plans, profiles and detailed drawings on file in the office of the City Engineer of the City of San Bernardino and all work shall, during its progress and upon its completion, conform to the lines, elevations and grades in accordance with said plans, profiles and detailed drawings.

## WORK

The work to be done under these specification shall include the furnishing of all labor, material and equipment necessary for or appurtenant to the construction and completion of said improvement as shown on and in accordance with said plans, profiles and detailed drawings and the Resolution of Intention therefore.

## GRADING

Grading shall include the removal of all earth, stone and all other materials that may be encountered and shall include also all fillings, trimming or other work that may be necessary in bringing the surface to the required subgrade.

When mud, sand or other soft materials below the subgrade is encountered, it shall be taken out and the space refilled with good earth or gravel which shall be tamped until solid or rolled until the surface of the subgrade ceases to sink under or creep in front of the roller. The contractor, however, shall not be required to excavate the mud or other soft materials in such cases to a greater depth than two feet below the subgrade.

After a section has been graded, as above specified, it shall be watered sufficiently for the moisture to penetrate all the loose earth and the surface shall then be either thoroughly tamped or rolled with the roller having an effective compressive weight of not less than 325 pounds to the lineal inch of tire, until the surface is firm and unyielding.

All depressions developing under traffic on the subgrade, or in connection with the rolling, shall be filled with suitable material. Rolling shall then be continued until the subgrade is uniformly compacted, properly shaped and true to line and grade.

The Contractor shall notify the City Engineer when a section has been brought to subgrade, when the latter will check the elevations of the same and if the work is found to be in accordance with the specifications and grades given, the contractor shall proceed as hereinafter mentioned.

## CEMENT

All cement used shall be Portland Cement and must conform to the following requirements and subject to the following test, which will be open at all times to the contractor.

(a) FINENESS. The residue on a 200 mesh screen shall not exceed twenty-two (22) per cent by weight.



(b) SOUNDNESS. A pat of cement paste about three (3) inches in diameter and one-half (½) inch in thickness at the center, tapering to a thin edge, stored in moist air for twenty-four (24) hours, and then kept in an atmosphere of steam of ninety-eight (98) to one hundred (100) degrees centigrade for five (5) hours, shall show no signs of distortion, cracking, checking or disintegration.

(c) TIME OF SETTING. The cement shall not develop initial set in less than forty-five (45) minutes when tested with a Vicat needle, nor in less than sixty (60) minutes when tested with a Gilmore needle. Final set shall be attained within ten (10) hours.

(d) TENSILE STRENGTH. The average tensile strength in pounds per square inch of not less than three (3) mortar briquettes, composed of one (1) part by weight of cement and three (3) parts by weight of sand shall not be less than the following.

| Age at Test | Storage of Briquettes | Pounds Per Square Inch |
|---|---|---|
| 7 days | 1 day in moist air, 6 days in water | 200 |
| 28 days | 1 day in moist air, 27 days in water | 300 |

The average tensile strength in twenty-eight (28) days shall be greater than the average tensile strength in seven (7) days.

The City Engineer shall have the authority to require any lot of cement to be held in storage until seven (7) days test can be completed where the cement is of a brand not previously tested by him or where previous samples of the same brand tested by him have fallen below the requirements herein set forth. The City Engineer shall have the authority to require the reconstruction of the work in which



cement has been used which subsequent tests show to be not in conformity with the requirements.

Cement shall be received on the job in sacks filled at the cement factory, each containing not less than ninety-four (94) pounds net weight of cement.

## SAND

Sand shall be washed, shall consist of water worn particles of granite or porphyritic rock reduced by natural causes and must be free from oil or organic matter and must not contain more than 3% by weight of clay or silt; not less than ninety (90) per cent by weight; shall pass a one-quarter (¼) inch screen, and at least fifty (50) per cent or not more than eighty-five (85) per cent by weight, shall be retained on a thirty (30) mesh screen. The sand shall not contain more than five (5) per cent by weight of mica.

An average of three mortar briquettes, one (1) inch square in cross-section, made of one (1) part Portland Cement conforming to these specifications and three (3) parts sand, shall attain a minimum tensile strength in seven (7) days equal to 200 pounds.

## COARSE AGGREGATE

Coarse aggregate shall consist of clean water worn pebbles, crushed granite boulders, porphyritic rock or both, free from loam, clay or organic matter and shall all pass through a two (2) inch and not less than thirty-five (35) per cent and not more than fifty (50) per cent by weight, shall pass a three-quarter (3/4) inch and not more than five (5) per cent shall pass a one-quarter (¼) inch screen.



## WATER

Water shall be clean, free from oil, acid, alkali or vegetable matter.

## MEASURING CONCRETE MATERIALS

All materials shall be accurately measured for each batch of concrete, both coarse and fine aggregate shall be measured loose without compacting or shaking, cement in sacks shall be dumped directly into mixer or upon other materials previously measured when mixed upon a mixing platform.

## FORMS

Forms of good, sound lumber shall be used which shall not be less than two (2) inches of thickness and of width not less than the thickness of the concrete. Forms shall be free from warp and all mortar and dirt shall be removed from the forms before they are used. The top edges of the form shall conform to the grades and cross-sections of the surface and the cement forms shall be held in place by stakes of such size and length and set at such angles as may be necessary to insure rigidity. The top of the stakes shall be flush with the upper edges of the forms and the entire form shall be constructed in a substantial and workmanlike manner.

## MIXING

A mechanical batch mixer shall be used for mixing the concrete, except as hereinafter provided, in which the materials, including the water, shall be precisely and regularly proportioned and thoroughly mixed. The mixer shall be charged with one (1) or more sacks



of cement and sufficient sand and coarse aggregate to conform with the proportions herein stated. Sufficient water shall be added to produce a concrete of the consistency hereinafter specified. The concrete materials shall then be thoroughly mixed. The minimum speed of the mixer drum shall be thirteen revolutions per minute. For each batch of concrete the minimum continual mixing time shall be one (1) minute.

## RETEMPERING

Retempering of concrete which has partially hardened, that is remixing with or without additional materials or water, shall not be permitted.

## CONSISTENCY

The concrete materials shall be mixed with only sufficient water to produce a concrete which will hold its shape when struck off with a template. The consistency of the concrete shall not be such as to cause a separation of the mortar from the gravel in handling. The consistency of the concrete shall be determined by the following test:

A frustrum of metal cone, four (4) inches in diameter at the top, eight (8) inches in diameter at the bottom, and twelve (12) inches in length, shall be filled with concrete which shall be worked with a metal rod until all voids are filled and a slight film of mortar appears on the surface. The frustrum of the metal cone shall then be removed and the vertical settlement of "slump" of the concrete noted. This settlement shall not exceed three (3) inches.



## PLACING CONCRETE

After mixing as specified above, all concrete shall be deposited in its proper place without delay in a continuous operation. The subgrade shall be thoroughly wetted immediately ahead of the placing of the concrete, but no pools of water or chopped up subgrade will be permitted.

By means of a template the concrete is to be brought to a true, uniform, hard and dense surface, conforming to grades and cross-sections. The surface shall be free from any unevenness greater than one-fourth (1/4) inch, measured from a straight edge fifteen (15) feet in length.

## STOPPING CONCRETE

Whenever it is necessary to stop the pouring of the concrete for any length of time greater than forty-five (45) minutes, the work must be completed up to a form placed across the concrete and at right angles to the center line thereof. At all lines of junction of fresh concrete with that which has become set, the edges of the fresh concrete shall be finished with an edging tool having the radius of 1/4 inch.

## CURBS

All cement concrete curbs shall be made of a concrete base or core composed of Class "A" Portland Cement Concrete containing six (6) sacks of Portland Cement per cubic yard and shall be of the size and design shown upon the plan. All cement concrete curbs shall be plastered on the outer or gutter face and over the whole top as



shown on the plan, with a one-quarter (1/4) inch finishing coat of cement mortar composed of one (1) part Portland Cement and two (2) parts sand.

## FINISHING

The finishing coat shall be well floated, smoothly troweled and finished and marked off into blocks not longer than three (3) feet.

A sufficient quantity of coloring matter shall be mixed with the finishing coat to give it a dark slate color.

## COVERING THE WORK

The surface of all finished curb shall be covered with sand or earth and kept covered for seven (7) days. Said covering of sand or earth shall be kept thoroughly wet during said seven (7) days.

## EXPANSION JOINTS

Expansion joints shall be a composition board of asphalt and felt, and shall be placed at intervals of approximately fifty (50) feet. All joints shall be one-half (1/2) inch in thickness unless otherwise specified.

## SIDEWALKS

All cement concrete sidewalks shall be made of a concrete base composed of Class "A" Portland Cement Concrete containing six (6) sacks of Portland Cement per cubic yard and shall be of the size and design shown upon the plan. All cement concrete sidewalks shall be well tamped and shall have a one-quarter (1/4) inch finishing coat of cement mortar over the whole top composed of one (1) part Portland Cement and two (2) parts sand.