C. ROADWAY AND STORM SEWER IMPROVEMENTS

SECTION 1

General Conditions

1.01. Applicability of General Conditions:

The General Conditions specified under this Section shall apply to all work to be performed for the construction of Roadway improvements and Storm Sewers and their appurtenances. The General Conditions specified under Section S (Sanitary Sewer Specifications), and Section W (Water Specifications), these Specifications shall apply only for the construction of sanitary sewers, water system and their appurtenances.

1.02. Work to be Done:

The work to be done consists of furnishing all labor, methods and processes, implements, tools, machinery and materials which are required to construct and put in complete order for use, the Roadway Improvements and Storm Sewers, together with the necessary appurtenances, all as shown on the plans and specified in these specifications, and to leave the grounds in a neat condition.

1.03. Final Cleaning Up:

Upon completion of the work, and before acceptance and final payment will be made, the Contractor shall clean all property occupied by him, in connection with the work of all rubbish, excess materials, falsework, temporary structures and equipment. Insofar as the operations of the Contractor shall be concerned, all parts of the work shall be left in a neat and presentable condition.

1.04. Control of Work:

a. Drawings: The Contract Drawings show the general features of the construction. Before proceeding with any of the work, the Contractor shall carefully check these drawings and shall be responsible for all errors that should have been discovered by such a check. All authorized alterations affecting the requirements and information given on the Contract Drawings shall be in writing. No changes shall be made on any drawing after it has been approved by the Engineer except by permission of the Engineer.

b. Coordination of Drawings and Specifications: These Specifications, the Contract Drawings, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative, to describe and provide for a complete work.

c. Interpretation of Drawings and Specifications: Should it appear that the work to be done or any of the matters relative thereto are not sufficiently shown on the drawings, or explained in these Specifications, or anything not expressly set forth in either, but which is reasonably implied, the Contractor shall apply to the Engineer for such explanations as may be necessary and shall conform to the same as part of the Contract, so far as they

may be consistent with the original Specifications, without any extra charge. In the event of any doubt or question respecting the true meaning of the Drawings and/or specifications, reference shall be made to the City Engineer, whose decision shall be final.

Where State Specifications are referred to, it shall mean the current edition of State of California, Business and Transportation Agency, Department of Transportation, Standard Specifications, except as noted.

In the event of any discrepancy between any drawing and the figures thereon, the figures shall be taken as correct.

d. Superintendent and Supervision: The Contractor shall keep on this work, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the City Engineer. The Superintendent shall not be changed except with the City Engineers consent, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the contractor.

The Contractor shall give personal supervision to the work, using his best skill and attention.

e. Layout of Work:

1) Curbs. gutters, sidewalks and plant mixed pavement

The Engineer will set grade and line stakes for these roadway improvements. The grades set on these stakes, unless otherwise noted, shall be finished top of curb grades. The Contractor shall perform all his work, using these grades and line stakes and interpolating for intermediate points following the profiles and cross sections shown on the Plans.

The Contractor shall notify the City Engineer's office at the beginning of work and when the subgrade is finished and ready for checking. He shall also notify the City Engineer's office when the rolled and compacted rock base and subbase is ready for the rock base or the subbase to the subgrade or with the surfacing of plant mixed to base, as the case may be, until permission has been given by the City Engineer's office. The Contractor shall notify the City Engineer’s office when the curb and gutter forms are ready for inspection and shall not pour the curbs and gutters until the forms have been approved.

All work done and all materials furnished shall be subject to the inspection and approval of the City Engineer's office.

2) Storm Sewers and Appurtenances

The Engineer will set grade and line stakes for the storm sewers and appurtenances. The grades set on the stakes shall be flow line grades of the invert of the pipe. The Contractor shall perform all his work, using these grade and Tine stakes and shall interpolate for intermediate points following the profiles and cross section shown on the Plans. All work is to be approved by the City Engineer's office.

The line and grade stakes referred to in paragraphs 1 and 2 above shall be preserved by the Contractor. Any further staking required by the Contractor or the restating of stakes destroyed on the job, shall be at the expense of the Contractor. Two copies of all cut sheets shall be furnished to the City Engineer by the Engineer prior to start of any work.

f. Removal of Defective Work and Unauthorized Work: All work which has been rejected shall be remedied, or removed and replaced in an acceptable manner, by the Contractor at his own expense, and no compensation will be allowed him for such removal or replacement.

1.05. Control of Material:

Defective Materials: All materials not conforming to the requirements of these specifications shall be considered as defective and all such materials shall be rejected and shall be removed immediately from the site of the work, unless otherwise permitted by the City Engineer.

1.06. Legal Relations and Responsibility to the Public:

a. Laws to be Observed: The Contractor shall keep himself fully informed of all State and National laws, municipal and county ordinances and regulations, and orders of the California Public Utilities Commission which in any manner affect those engaged or employed in the work, or the materials or appliances used in or on the work, or which in any way affect the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. He shall at all times himself observe and comply with, and shall cause all his agents and employees to observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees and shall protect and indemnify the Owner against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself or his employees, insofar as they relate to this work.

If any discrepancy or inconsistency is discovered in the Drawings, Specifications or Contract for the work in relation to any law, ordinance, regulation, order or decree, he shall forthwith report the same to the Engineer in writing.

b. Permits and Licenses: The Contractor shall procure all permits and licenses, pay all charges and fees in connection therewith, and give all notices necessary incident to the due and lawful prosecution of the work.

c. Responsibility for Damage: The Owner and/or the Engineer shall not in any manner be accountable for any loss or damage that shall or may trapper, to the work or any part thereof, respectively, or for any of the materials or the other things used-or employed in finishing and completing the work; or for injury to any person or persons, either workmen or the public; or for damage to adjoining property from any cause which might have been prevented by the Contractor or his workmen, or by anyone employed by him, against all of which injuries or damages to persons and property the Contractor, having control over such work, shall properly guard, and shall make good all damages from whatever cause, being strictly responsible for the same. The Contractor shall be responsible for any damages to any person or property resulting from defects or obstructions or from any cause whatever during the progress of the work or at any time before its completion and final acceptance.

d. Contractor's Responsibility for Work: Except as herein provided, until the formal acceptance by the Owner of all the work under this contract, the Contractor shall have the charge and care thereof and shall take every necessary precaution against injury or damage to any part thereof by the action of the elements or from any other cause whether arising from the execution nor non-execution of the work. Except as noted below, the Contractor shall repair and make good all injuries or damages to any portion of the work, occasioned by any of the above causes, before its completion and acceptance, and shall bear the expense therefor.

1.07. Extra Work:

The Contractor shall do such extra work and furnish such materials and equipment therefore as may be required in writing by the Engineer, but he shall do no extra work except upon written order, he shall not be entitled to payment for such work. For duly authorized extra work, the Contractor shall receive compensation at the price previously agreed upon in writing by the Owner and Contractor.

1.08. Datum

All elevations shown on the Plans or herein referred to as based on U.S.G.S. Datum, using the bench mark described on the Plans.

1.09. Definition of Terms:

Whenever any work or expression defined below, or pronoun used in its stead, occurs in these contract documents, it shall have, and is mutually understood to have, the meaning given:

"Engineer" shall mean the Engineer engaged by the Owner, acting within the scope of the particular duties assigned by the Owner.

"City Engineer" shall mean the City Engineer of the City of Milpitas, acting personally or through assistants acting within the scope of the particular duties entrusted to them.

“Inspector” shall mean the engineering or technical inspector or inspectors duly authorized and appointed by the City Engineer, limited to the particular duties entrusted to them.

“Contractor” shall mean the party entering into contract for the performance of the work covered by this contract and his authorized agents or legal representatives.

"Owner" shall mean the party entering into the contract for whom the performance of the work covered by this contract is being done.

"State Specifications" shall mean the current edition of State of California, Business and Transportation Agency, Department of Transportation, Standard Specifications, except as noted.

1.10. Changes in Work:

If, in the opinion of the City Engineer, the strict application of these specifications is impractical and will not provide the results desired, then the City Engineer may prescribe such alternate methods deemed necessary.

1.11. Public Utilities Scheduling:

Owner shall be responsible for arrangement with public utilities to place their construction so pavement will not have to be cut.

1.12. Abandoned Pipes, Wells, etc:

When in the course of the work, a Contractor encounters or discovered in the work area any abandoned pipes, conduits, Bumps, septic tanks, wells or any condition that could cause failure to any part of the work, or constitute a threat to the public health or safety, that condition shall be rendered harmless by the contractor to the satisfaction of the City Engineer.

SECTION 2 CONSTRUCTION PROCEDURE

2.01. Clearing and Grubbing in Street Right of Way

“Clearing and Grubbing" shall conform to Section 16 of the State Specifications except as herein specified.

The area above the natural ground surface, within the following limits shall be cleared and grubbed of all vegetable growth such as trees, logs, upturned stumps, roots of down trees, brush, heavy growth of grass and weeds, buried junk piles, and other objectionable material. None of the aforementioned material shall be permitted to remain in or under embankments.

The area on each side of the roadway center line to a width five feet (5') outside of cut and embankment slope lines, or in flat areas to a width of five feet (S') outside edge of improvement area, or to the property line whichever is greater, shall be so cleared and grubbed.

2.02. Removal and Disposal of Materials:

All material removed as above specified shall be hauled off the job and otherwise disposed of by the Contractor.

2.03. Roadway Excavation:

"Roadway Excavation" shall conform to Section 19 of the State Specifications except as specified and shall be made to the final subgrade elevation as shin on the plans.

Excavation shall consist of performing all operations necessary to excavate earth from the roadway prism or adjacent thereto, to place fill in the locations to the elevations and form planned, all as shown on the plans and to furnish all equipment necessary for these operations; and to perform all incidental work of whatsoever nature that may be required to build the roadway and approaches to it, and maintain them in form specified until the completion and acceptance of the contract.

2.04. Subqrade Preparation:

Subgrade shall be compacted to a relative compaction of 9S percent and to a depth of 0.5 foot below the final subgrade elevations as shown on the plans in accordance with Section 19-1.03 and Section 19-5 of the State Specifications except the grading plane shall not vary more than 0.05-foot above or 0.10-foot below the grades planned.

SECTION 3 LIME TREATED SUBBASE

"Lime Treated Subbase" (LTSB) shall conform to Section 24 of the State Specifications except as herein specified.

The lime used shall be commercial hydrated lime or slurry lime conforming to the following requirements.

When sampled by the City Engineer at the point of delivery, the sample of hydrated lime shall contain not less than 85 percent of calcium hydroxide (Ca,OH), as determined by California Test Method No. 414. The hydrated lime shall be added to the existing material at the approximate rate of 3 percent minimum by weight of the dry material, the percentage to be determined by the City Engineer.

The Slurry lime material shall be tested at the source and at the time of mixing as specified above.

The supplier of lime shall furnish with each load the dry net weight, or for slurry lime sufficient data necessary to compute the rate of application.

The completed Lime Treated Subbase course shall have a minimum "R" value of 70 and a relative compaction of 95% as determined by California Test Method Nc. 231.

The lime treated subbase course shall be mixed and placed only when the atmospheric temperature is above 50°F. Should atmospheric temperature remain below 38°F for a considerable length of time before application of the wearing surface specified, a 3/4" single seal or equal may be required as a

temporary wearing surface. Any temporary wearing surface shall be approved by the Engineer prior to application.

The scarifying and mixing operations shall be performed in such a manner as to produce a homogeneous, uniform mixture of the lime and the material to be treated. -

The completed mixture when spread shall consist of material below one inch (1") in maximum dimension except for pieces of rock and asphalt concrete surfacing which must not be larger than 3" in maximum dimension. Streaks or pockets of lime shall be considered as evidence of inadequate mixing. The mixing operations shall be such that the variations in lime content in samples taken from the completed mixture spread on the roadbed shall not have a variation above or below the lime content specified herein of more than O.S of a percentage point based on the weight of the treated material as determined by Test Method No. Calif. 338. Mixing may be performed in one or more layers; however, the capacity of the mixing equipment shall be such that it shall be capable of mixing a layer 50 percent thicker than the layer being placed.

The completed mixture may be spread by any method which will produce uniform layers of material.

The surface of the compacted material shall be kept moist or prevented from drying out by some method approved by the City Engineer until covered by the next layer.

The use of steel tired rollers or pneumatic tired rollers for initial compaction will not be permitted.

The finished surface shall not deviate at any point more than 0.03 foot from the bottom of a 10-foot straight edge, laid in any direction. However, surface indentations such as those produced by sheepsfoot rollers will be permitted.

During spreading and compacting operations, if the finished surface exceeds the above tolerance, the excess material shall be trimmed, removed and disposed of. No loose material shall be left on the subbase.

After trimming, the subbase shall be rolled with pneumatic tired rollers conforming to the requirements of Section 39-5.02 of the State Specifications.

The thickness of the finished lime treated subbase shall not vary more than 0.1-foot from the planned thickness at any point.

The contractor will be responsible for providing a sufficient volume of material to construct the lime treated base to the planned grade and cross section.

Water added during the mixing process shall be applied in such a manner as to produce a completed mixture with a uniform moisture content.

The amount of water added shall be under the control of the City Engineer a. all times. .

A certificate of compliance with specifications shall be supplied with each delivery of lime and shall be submitted to the City Engineer along with a certificate copy of weight of each delivery.

The contractor shall moist-cure the completed Lime Treated Subbase for a minimum of ~ days before allowing any traffic on the compacted surface. The contractor shall be responsible for repairing any damages to the compacted layer.

SECTION 4 Aggegate Subbase

Aggregate Subbase material shall be Class 2 and shall conform to Section 25 of the State Specifications with a Sand Equivalent of 20 minimum and an "R" Value of 50 minimum.

SECTION 5 AGGREGATE BASE

"Aggregate Base" material shall be Class 2 and shall conform to Section 26 of the State Specifications for one and one-half (1-1/2") inch maximum combined grading, except as herein specified.

Equipment used in lieu of Section 26-1.04 of the State Specifications shall be approved by the City Engineer prior to construction.

SECTION 6 CEMENT TREATED BASE

Cement treated base shall conform to Section 27 of the Standard Specifications and these Special Provisions.

Cement treated base shall be Class A plant mixed, cement treated base.

Portland Cement to be added to aggregate for Class 'A' CT8 shall be between 3-1/2 and 6 percent by weight of the dry aggregate. The exact percentage will be determined by the City Engineer.

Curing Seal for Cement Treated Base shall be liquid asphalt, MC-50, in conformance with Section 93 of the State Specifications.

Spreading of Curing Seal shall be in accordance with Section 27-1.10 of the State Specifications.

SECTION 7 ASPHALT CONCRETE SURFACING

7.01 Asphalt Concrete

“Asphalt Concrete Surfacing" shall conform to Section 39 of the State Specifications for Type B Asphalt Concrete except as herein specified. Aggregate grading shall conform to 3/4" maximum, Medium.

Asphalt concrete for resurfacing and overlays shall have aggregate grading conforming to 1/2" maximum, Medium.

The asphaltic binder to be mixed with the aggregate shall be paving asphalt, AR-4000 viscosity grade conforming to Section 92 of the State Specifications, as ordered by City Engineer. A certificate guaranteeing compliance of asphalt with specification shall be furnished.

7.02 Construction

Placing of tack coat, spreading and compaction methods and miscellaneous details of asphaltic construction shall be in accordance with applicable portions of Section 37 and 39 of the State Specifications.

Asphalt Concrete Surfacing' shall be constructed in two courses, each course shall have a compacted thickness of one-half the nominal thickness, or as otherwise specified herein. The maximum compacted thickness of one course of Asphalt Concrete shall be 0.20 foot. The minimum compacted thickness of one course of Asphalt Concrete shall be 0.10 foot.

Asphalt Concrete Overlay shall be constructed in one course on existing pavements as shown on the plans and directed by City Engineer. All adjustments, transitions in-thickness and conforms shall be as directed by the City Engineer. Existing pavement to receive A.C. overlay shall be swept and cleaned of foreign materials before spreading paint binder.

In making successive passes with the paving machine, there shall be an overlap of 0.25+ feet on the edge of the previously laid lift. Extreme care shall be taken to avoid a disconformity of street cross sections at paving joints.

7.03 Prime Coat and Paint Binder:

For new asphalt concrete surfacing; prime coat of liquid asphalt SC-70 conforming to Sections 39 and 93 of the State Specifications shall be applied over aggregate base in one application at a rate of between 0.2 and 0.3 gallons per square yard. Prime coat shall be allowed to absorb before asphalt concrete is placed. Exact rate of prime coat application shall be determined by the City Engineer.

For overlay of existing asphalt surfacing; paint binder of SS-1 conforming to Sections 39 and 94 of the State Specifications, minimum rate of one-tenth (0.10) gallon per square yard shall be applied to the broom-cleaned existing pavement and permitted to absorb before Asphalt Concrete Surfacing Overlay is placed. Exact rate of spread shall be determined by the City Engineer.

7.04. Fog Seal:

A fog seal of SS-1 Emulsion cut 50 percent shall be applied at one-tenth (0.10) gallon per square yard to all finished asphalt surfacing.

SECTION 8 FINISHING ROADWAY

After the earthwork has been completed and the surfacing has been placed, the entire roadway shall be finished as specified herein.

The shoulders shall be trimmed and shaped to the finished cross section.

Dragging, pushing or scraping material across or along the finished surfacing or paving will not be permitted.

The slopes of embankments, excavations, road approaches, road connections, ditches, etc., shall be trimmed and finished to the lines and grades called for by the plans; ditches occurring within or adjacent to the roadway shall be cleared of debris and obstructions and the slopes and beds of side ditches trimmed smooth and true to line and grade. All loose stones, roots, or other waste matter exposed on embankment or side slopes of the roadway shall be removed and the entire roadway shall be left in a neat and presentable condition.

All work specified by the City Engineer in this Chapter for finishing roadway is required by the Owner for finishing earthwork on lots.

SECTION 9 CUB, GUTTERS, SIDEWALKS, AND DRIVEWAYS

9.01. Description:

Curbs and gutters and walks of the form and dimension shown on the plans shall be constructed of Class "A" concrete conforming to Section 90 of the State Standard Specifications which shall contain five hundred sixty-four (564) pounds (6 sacks) of Portland Cement per cubic yard. Contractor shall provide the City Engineer with certified delivery tickets stating the weight of the separate aggregate and water content of each individual load of concrete used. Curb shall be dipped for driveway entrances where indicated by the Engineer in the field.

In lieu of above, the contractor may furnish at his option concrete as follows:

Concrete shall be proportioned and mixed to develop strength of 3,000 pounds per square inch at 28 days, as tested in accordance with the State of California Test Method No. 521.

Mix Design shall be designed by an approved laboratory employee and paid for by the contractor. The basic proportions of the mix shall be determined by weight o' loose dry material, and all proportioning of the ingredients for each batch shall be done by weighing the fine and coarse aggregate separately. Water and cement shall be separately measured and introduced to the mix by such methods that the proportions thereof car, be accurately controlled and easily checked at any time.

Approval of the mix shall be by the City Engineer, who shall determine accuracy by making tests.

Batch tickets to be provided the City Engineer with each load.

9.02. Subqrade Preparation:

Curb and gutter shall be placed over a minimum of six inches (6") of base or over a base the lower surface of which is a continuation of the subgrade line, whichever is greater. -

The base shall be constructed true to grade and cross-section as shown on the plans. It shall be rolled and watered or hand tamped to 95% relative compaction before placing concrete. The complete base shall be tested for grade and cross-section by means of a template extending the full depth of the curb and gutter and supported between side forms. The base and forms shall be thoroughly watered in

advance of placing concrete. Sidewalks shall be placed on a minimum of 4" of compacted base rock or sand-gravel material as shown on Standard Drawings.

9.03. Forms:

The depth of forms shall he-equal to the full depth of curbs or gutters. Timber forms shall be surfaced top and bottom and on the side which is placed next to the concrete and shall not be less than one and five-eighth (1-5t8") inches thick after being surfaced. Warped forms and forms not having a smooth, straight upper edge shall not be used.

a. Sidewalk Forms: (Concrete) Forms shall be set with the upper edge true to line End grade and shall be held rigidly in place by stakes placed on the outside of the forms and set flush with the top edge of the form. The side forms shall not be removed in less than twelve (12) hours after the finishing has been completed.

b. Curb Forms: Rigid forms shall be provided for all curbs, except that benders or thin plank forms, rigidly placed may be used for curbs or curb returns with a radius of thirty (30') feet or more where there are grade changes in the returns, or where the central angle is such that a rigid form with a central angle of ninety degrees (DOG) cannot be used.

   Back forms for curb-returns may be of one-half inch (1/2") benders for the full height of the curb cleated together. Curb forms shall be carefully set to alignment and grade and to conform to the dimensions of the curb. Forms shall be held rigidly in place by use of pairs of iron stakes placed at intervals not to exceed four feet (4').- Clamps, spreaders and braces shall be used where required to insure rigidity in the forms. The form on the front of the curbs shall not be removed in less than one (1) hour after the concrete has been placed. In no event, shall the forms be removed while the concrete is sufficiently plastic to slump upon removal of the form.

c. Outside Forms and Temporary Forms: Outside forms and temporary forms contiguous to curbs shall be set with the upper edges true to line and grade,-and shall be held rigidly in place by stakes placed on the outside of the forms and set flush with the top edge of the forms. Temporary forms shall be removed immediately after striking off and tamping the surface of the gutter and the space left thereby immediately filled and finished true to grade and cross-section. Outside forms shall remain in place not less than four (4) hours after the finishing has been completed.

   All forms shall be cleaned thoroughly and each time they are used, coated with a light oil.

   Score marks and weakened plain joints shall conform to requirements of standard drawings or as directed.

9.04. Finished Concrete:

Concrete walks and curbs shall be brought true to grade with a trowel, scored and brush finished and ramps roughened, as directed by the City Engineer-.

All gutters shall be water tested to assure proper flow. Ponding or standing water shall be cause for rejection of work.

9.05. Curing Concrete:

Unless otherwise specified on the plans, concrete shall be cured by means of the impervious membrane method, or by water cure.

a. Water Curinq: The surface of the concrete and forms shall be kept' continuously moist for a period of 72 hours.

b. Membrane Curinq: The concrete pavement shall be cured with an approved coating of approved emulsions of paraffin or silicone applied in quantities to insure a uniform protective coating on all surfaces and exposed edges. The application shall be made immediately upon the completion of the concrete pour and disappearance of the free surface moisture. In the event the application of the curing membrane is delayed, the concrete surface shall be moistened and kept damp, but care shall be taken that free surface moisture is not present when the curing compound is applied.

   After the membrane has been applied, care shall be taken that the surface film is kept intact and undamaged, and any section of the concrete surface damaged by rain or otherwise during the curing period (7 days) shall be retreated.

9.06. Drivewavs:

Concrete driveways constructed shall be in accordance with City Standards available from the office of the City Engineer and will be inspected as part of this work.

9.07. Utility Markings:

The letter "S" shall be stamped on the face of curb where the sanitary sewer house laterals intersect the curb, and the letter "W" shall bestamped on the face of curb where the water services intersect the curb.

SECTION 10 STORM DRAINS AND STRUCTURES

10.01. General:

Pipe culverts and storm drains shall be constructed to the sizes, lines and grades shown on the plans. Unless otherwise indicated on the plans, the construction of pipe culverts and storm drains shall include excavation, encasement and backfill, the preparation of subgrade, the construction of drainage structures and appurtenances for drainage, the furnishing and placing of drainage pipe, the removal and/or restoration of existing improvements and all other work in accordance with plans and specifications.

10.02. Materials:

Concrete drainage structures shall be constructed as shown on the plans and in accordance with these specifications. Reinforced concrete pipe shall be of the size shown on the plans and shall be in accordance with these specifications.

10.03. Excavation, Encasement and Backfill

Definition of Terms:

a. Basement Soil shall mean natural cut ground as exposed by trenching

b. Bedding shall mean material placed on basement soil to support and protection for the pipe.

c. Encasement shall mean material placed in the trench around and over the pipe to a height of six inches (6") above the top of the pipe

d. Backfill shall mean the material placed above encasement to fill the trench.

10.04. Pipe Laying and Jointing Methods

No stakes for pipe grades shall be placed until clearing and grubbing has been completed according to specifications. The contractor shall advise all utility companies before beginning earth work so they may have their representatives locate their underground structures. Then the ground shall be excavated to the required depth. Width of trench shall allow a clearance of six inches (6") on each side of the pipe. Earth taken from the trench shall be deposited along the side in a manner to keep street obstructions to a minimum and a clear space shall be left for the Engineer's established points.

The Contractor's attention is directed to- the provisions of Section 6705 of the Labor Code relating to excavation of any trench or trenches five feet or more in depth. The Contractor shall comply with the applicable requirements of the Labor Code and shall submit to the City for approval in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during excavation of such trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety, the plan shall be prepared by a registered civil or structural engineer at the Contractor's expense.

All trenches shall be in a reasonably dry condition or otherwise drained or pumped free of water before laying of pipe. Soft spots shall be replaced with select subbase material, compacted, or with 2" maximum size drain rock.

All sanitary and utility lines which cross or lie along the trench shall be adequately supported and such supports left in place. The contractor shall be held liable to the Owner of utility facilities and other improvements-for any damage or interference with service resulting from his operations.

Each pipe of the diameter called for in the plans is to be laid on a firm bed and have a true bearing of its entire length. The pipe shall be laid in conformity to prescribed lines and grades which must be obtained for each pipe by measuring down from a tightly stretched line running parallel to the trench and above adjacent existing ground level. All pipe shall be laid up grade.

In laying the pipe, a shallow excavation shall be made underneath the pipe at the joint, this space to be filled with mortar into which the end of the second pipe beds. The groove end of the first pipe must be thoroughly cleaned with a wet brush and a layer of soft mortar applied to the lower half of the groove.

The tongue end of the second pipe must be thoroughly cleaned with a wet brush and while in a horizontal position, a layer of soft mortar applied to the upper half of the tongue. The tongue end of the second pipe shall then be inserted into the groove end of the first pipe until the mortar is squeezed out on the interior and exterior surface. The interior surface of the pipe at the joint shall then be brushed smooth. The mortar used shall be composed of one (1) part Portland Cement and two (2) parts clean sharp sand, by measure.

External bands of mortar are required in the laying of tongue and groove pipe. The outer surface of the pipe at the joint must be thoroughly cleaned with a wet brush to assure proper bond of the mortar with the -concrete surface. This banding operation must be carried out four or five pipe lengths behind the laying operation in order to prevent movement of the pipe and loosening of the band. As the band is carried around the lower half of the pipe an earth support should be provided to prevent its falling off. At a point somewhat below the spring line this operation may be discontinued. The band on the upper half requires no support but the upper band should be covered with a band of craft paper or roofing felt. The mortar band should have a thickness of at least one-half the thickness of the pipe shell and a width of four (4) to six (6) inches.

Concrete drain pipe shall be placed directly on solid native material, free from rocks. Encasement shall be placed and tamped by hand to a depth of six inches (6") above the top of the pipe. The encasement material shall qualify as imported backfill material consisting of clean quarry waste, clean natural sand or gravel, free of organic matter, and of such size that at least ninety-five percent (9SX) will pass a one-half inch (1/2") sieve, and not in excess of fifteen percent (15X) will pass a number two hundred (200) sieve when tested in accordance with the "Methods of Mechanical Analysis of Soils," American Society for Testing Material, Serial Designation D 422. The minus two hundred portion of the material expressed as percentage multiplied by the Plasticity Index shall not exceed one hundred (100). The material shall compact to a relative compaction of ninety percent (BOX) by tamping methods. The relative compaction is to be determined by the California Test Method No. 231.

The encasement shall either be placed immediately upon the still plastic covered mortar joints of the pipe, or if encasement is not placed immediately, it shall not be placed until a minimum of thirty (30) hours shall have elapsed after placing of the joint mortar.

10.05. Reinforce Concrete Pipe

Storm drain pipe shall conform with American Society of Testing Materials Designation C-76. Class III or as required by the City Engineer for reinforced concrete culvert pipe. Wall design shall be at the option of the supplier.

10.06. Curb Inlets

All curb inlets shall be constructed in accordance with Standard Drawing Ho.460 with Class 'A' concrete or as shown upon the plans and detail sheets. Accuracy in forming depression and floor lines will be required in order that no water will stand in the inlets. Iron castings shall be included in the curb inlet price, and pipe connection with sewer or manhole will be paid for as price bid per linear foot of pipe.

10.07. Castings

All castings shall conform accurately to the form and dimensions shown on the detailed drawings or Standard Drawings. They must be free from blow and sand holes or defects of any kind, and shall be made from a superior quality of rough, even Drained gray iron, and shall possess a tonsil strength of not less than sixteen thousand (16,000) pounds per square inch.

Before leaving the foundry they shall be thoroughly cleaned and coated with asphalt applied in such a manner as to provide a firm, durable and tenacious coating. Wrought iron for steps shall be three quarter inch (3/4") round galvanized and the steps shall be constructed in accordance with the plans for same.

10.08. Reinforcing Steel

Reinforcing steel for the concrete structures shall be intermediate grade billet steel thoroughly cleaned of mill and rust scale, mortar, oil, dirt and of coatings of any character that will destroy or reduce the bond.

When reinforcing steel is spliced, it shall have a lap of forty (40) diameters.

10.09. Ditch Excavation

Ditch excavation shall conform to appropriate provisions of Section 19-4 of the State Specifications. No debris, exposed tree roots or unstable ground will be permitted in the final ditch section. All large roots shall be removed two feet (2') below finished grade. Care must be exercised to prevent excavation below grade, and all areas over excavated shall be brought to grade by the Contractor at his own expense. The finished ditch shall be bladed on the sides and bottom to a smooth surface and grade that conforms with the lines as shown on the construction drawings.

10.10. Concrete Encasement

All concrete used as encasement shall be Class B (5 sack mix) conforming to Section 90 of the State Specifications.

10.11. Concrete Sack Rip-Rap

Sacked concrete rip-rap required on the plans shall -3 of the State Specifications.

As shown on the plans all sacked rip-rap shall be laid against undisturbed soil, any over-excavated areas shall be filled with sack rip-rap at the contractor's expense. No structural backfill will be permitted in cutoff wall trenches, or in any portion of the rip-rap work.

10.12. Temporary Drainage Berms

Drainage berms shall be constructed at the location and to the grades and elevations as shown on the improvement plans and as staked by the Engineer.

a. Materials and Workmanship: Berms shall be graded to sections as shown on the improvement plans. All brush, roots, and/or debris shall be removed from within the berm section. Care shall be exercised to prevent cutting trees during excavation or compacting backfill in order to bring the berms up to grade.

Section 11 Street Shade Trees

"Street Shade Trees" shall be planted as called for on the plans and shall conform to City of Milpitas Standard Drawing No. 448. All Streetscape shall be consistent with Engineering Guidelines and more particularly but not limited to “Section IX Streetscape, and Section XV Landscape Plans.”

11.01. Materials:

a. Trees with a minimum diameter of 3/4" measured above the ground planting line and a height of 6' to 7' measured vertically from ground to the top of the tree after planting shall be furnished.

b. Stakes for supporting the trees shall be of sound redwood with no side measuring less than 2" and shall be 10' long.

c. Tree ties shall consist of a rubberized band at least 3/4" wide, 1/4" thick and 18" long as manufactured by Gro-Strait or approved equal. Tree tie shall be fastened to tree stakes with 1-1/4" galvanized roofing nails.

11.02. Planting:

a. Bare root trees may be planted only during the months of November, December, January and February. Trees in containers may be planted any time of the year. .

b. Holes shall not be less than 18t' in diameter and shall be 1" deeper than the tree roots to allow for loose dirt under the roots.

c. Support stakes shall be driven approximately 12" into the undisturbed ground at the bottom of the hole.

d. The trees shall then be carefully placed in the hole and held in such a manner that their roots shall not be planted more than 2" deeper than grown in nursery. The hole shall

then be filled to within 3" of the ground level and a ridge of soil formed around the edge of the hole to hold water.

e. Trees shall be tied to the support stakes with the approved ties material in a figure eight to prevent the growing trees from being cut by the tie. Care shall be taken to prevent damage to the bark of the tree during planting or tying.

f. The trees shall be watered as needed to keep them healthy and assume a normal rate of growth between the time of planting and acceptance by the City of Milpitas.

11.03. Location:

Trees shall be located to the satisfaction of the City Engineer and in accordance with the following requirements.

Three feet (3') back of contiguous walk (unless directed otherwise) or as per Standard Drawing No. 202.

A minimum of 10 feet (10') from sewer laterals.

At least 5 feet (5') from edge of driveways.

11.04. Types:

The type of tree to be planted on each street shill be as shown on the improvement plans. No change of designated tree type shall be made except by written permission of the City Engineer.

SECTION 12 STREET LIGHTING SYSTEM

The work includes the furnishing and installation of all street lighting facilities shown on the contract drawings in compliance with City of Milpitas Standard Drawing No. 441, and 442 and shall conform to Section 86 of the State Specifications except as herein specified.

The electroliers shall be complete with luminaire and lamp, wired for connection and service connected.

The conduit for underground circuit shall be rigid PYC, Electric Plastic Conduit (EPC) Sch 40 or approved equal. Conduit constructed under roadway shall be rigid galvanized steel with bonded 40 mil (nom.) P.Y.C. exterior coating or approved equal and shall be at a minimum depth of thirty (30") inches.

SECTION 13 SURVEY MONUMENTS AND MARERS

13.01. Street Monuments:

a. Street Monuments shall be constructed as per Standard Drawing No. 446 in locations approved by the City Engineer.

b. Surveyor shall determine by accurate survey the exact point to be clearly punched in monument marker; R.E. or L.S. number shall appear on the marker.

13.02. Survey Markers:

a. All exterior subdivision boundary points not common to points in previously established subdivisions are to be monumented by 3/4" iron pipes at least 3 feet long buried approximately 1 foot below ground level.

b. All subdivision lots not fenced will be marked by wood hubs and nails, markers in concrete sidewalks or other suitable markers sufficient for a homeowner to locate lot boundaries.

SECTION 14 GRADING ON PRIVATE LAND

This section contains specifications for work to be performed for the Developer but not included in the bonded agreement between the Developer and the City of Milpitas.

14.01. WORK ON LOTS:

a. General: The contractor shall grade all lots in accordance with the lot grading plan as shown on the plans.

The placing of fill on the lots and for house pads shall be performed in accordance with the improvement plans. Fill material shall be obtained by using the material excavated from the roadway prism and from lot grading within the subdivision. The Contractor will not be required to excavate drainage swales between lots or to perform finish grading.

b. Clearing, Grubbing and Preparing Areas to be Filled:

1. All timber, logs, trees, brush and other rubbish shall be removed, piled and burned or otherwise disposed of So as to leave the areas that have been disturbed with a neat and finished appearance free from unsightly debris.

2. All vegetable matter shall be removed from the surface upon which the fill is to be placed, and the surface shall then be plowed o' scarified to a depth of at least Six inches (6") and until the surface is free from ruts, hummocks or other uneven features which would tend to prevent uniform Compaction by the equipment to be used.

3. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply, or where, in the opinion of the Engineer, the nature of the ground justifies taking greater precaution for binding the fill to the original ground, steps shall be cut into the original ground before filling is begun.

4. After the foundation for the fill has been cleared, plowed or scarified, it shall be disced or bladed until it is uniform and free from large clods, brought to the proper moisture Content and compacted to lot less than ninety percent (90~) of maximum density in accordance with AASHO Test No. T-99-49 or other density test methods which will obtain equivalent results.

c. Placing, Spreading and Compacting Fill Material:

1. Fill material shall be placed in layers which when compacted shall not exceed Six inches (6"). Each layer shall be spread to insure uniformity of material in each layer.

2. When the moisture content of the fill material is below that specified by the Engineer, water shall be added until the moisture content is as specified by the Engineer to assure thorough bonding during the compacting process.

3. When the moisture content of the fill material is above that specified by the engineer, the fill material shall be Berated by blading or other satisfactory methods until the moisture content is as specified by the Engineer.

4. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than ninety per cent (90%) of maximum density in accordance with AASHO Test No. T-99-49 or other density tests which will obtain equivalent results. Compaction shall be by means of tamping or sheepsfoot rollers, multiple wheel pneumatic tired rollers or other types of rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is at the specified moisture content. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to insure that the desired density has been obtained.

5. Field density tests shall be made by the Engineer after the compacting of each layer of fill. Where sheepsfoot rollers are used the soil may be disturbed to a depth of several inches. Density readings shall be taken in the compacted material below the disturbed surface. No additional layers of fill shall be spread until the field density tests indicate that the specified density has been obtained.

6. The fill operation shall be continued in six-inch (6") compacted layers, as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

d. Supervision: Supervision by the Engineer shall be continuous during all fill and compacting operations.

e. Interpretations: It is the intent of these specifications and they shall be so interpreted by the contractor, that all fills placed in the building area of each lot shall meet the requirements of the City for -controlled fills.