Attachment B

STANDARD SPECIFICATIONS

SS-1 TO SS-127

RANCHO MURIETA
COMMUNITY SERVICES DISTRICT
STANDARD SPECIFICATIONS

SS-1. PRECONSTRUCTION PHOTOGRAPHS AND RECORD DRAWINGS

SS1-01, REQUIREMENT: Preconstruction photographs or record drawings are not required unless specifically set forth in the Special Provisions for the project.

SS1-02, PRECONSTRUCTION PHOTOGRAPHS SPECIFICATIONS: When preconstruction photographs are specified in the Special Provisions, the Contractor shall provide preconstruction color prints of the work. The photographs shall be taken by an acceptable photographer and the negatives shall be 135 mm or larger film size. The camera shall be of the type whereby each photograph shall be imprinted with the date. Each photograph shall also be marked to indicate the name of work, and the location where the photograph was taken. Before construction may start, two 3 ½ X 5" color prints of each exposure shall be delivered to the District. Preconstruction photographs shall be taken at an approximate average interval of 100 feet as designated by the District. Photographer shall be equipped at all times to take either interior or exterior exposures.

Prints shall be submitted in a three ring photo album binder with clear plastic covered filters, four photos each side, grouped according to street, lateral or line and in sequence. Each group of prints shall be identified by a label which projects beyond the edge of filler and is easily recognized. Negatives may be placed within the filler sleeves or submitted separately.

Approximately, 25 photographs shall be submitted to the District for their approval. This approval shall be obtained before proceeding with the remaining photographs.

All photographs which do not conform to these Specifications and/or which, in the District's estimation, are unsatisfactory shall be re-photographed.

SS1-03, RECORD DRAWINGS SPECIFICATIONS: The Contractor shall maintain a neat and accurately marked set of record drawings. The drawings shall show the exact location of all underground work. All underground components of sprinkler systems shall be located by field measured dimensions, either from fixed structures or triangulation. These measured dimensions shall be shown on the record drawings.

Drawings shall be subject to the inspection of the District at all times and shall be kept current weekly and with all work instructions, change orders, and construction adjustments shown thereon and initialed by the inspector. Progress payments or portions thereof may be withheld if drawings are not maintained as stated above. At the final inspection, the Contractor shall submit to the inspector, for review and comments by the District, two hardcopy sets, one pdf, and one CAD (if

available) of the record drawings. The work will not be formally accepted until record drawings are accepted by the District.

SS1-04, PAYMENT: The cost of the preconstruction photographs or record drawings shall be included in the price paid for other items of work in the Proposal, and no separate payment will be made therefore.

SS-2. MOBILIZATION

SS2-01, DESCRIPTION: Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment supplies, and incidentals to the site; for the establishment of all offices, buildings, and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.

SS2-02, PAYMENT: Payment for mobilization shall be made as follows:

A. Mobilization Not a Pay Item: When the contract does not include a pay item for mobilization, full compensation for any necessary mobilization required shall be considered as included in the contract lump sum price or as included in the prices paid for the various items of work in a unit price contract, and no additional compensation will be allowed therefore.

B. Mobilization a Pay item: When the contract includes a contract pay item for mobilization, the lump sum price item for mobilization shall include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization.

    1. The District shall pay no greater than five percent (5%) of the original contract amount as a separate pay item for mobilization. In the event the Contractor submits a mobilization pay item greater than five percent (5%) of the contract cost, the District shall pay any excess mobilization amount with the final progress payment.

    2. During the course of construction mobilization payment shall be paid as follows:

        a. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is five percent (5%0 or more of the original contract amount, fifty percent (50%) of the contract item price for mobilization or two and one half percent (2.5%) of the original contract amount, whichever is the lesser, will be included in said estimate for mobilization payment.

b. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is ten percent (10%) or more of the original contract amount, the total amount earned for mobilization shall be seventy percent (70%) of the contract item price for mobilization or three and one half percent (3.5%) of the original contract amount, whichever is the lesser, and said amount will be included in said estimate for mobilization payment.

c. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is twenty percent (20%) or more of the original contract amount, the total amount earned for mobilization shall be ninety percent (90%) of the contract item price for mobilization or four and one half percent (4.5%) of the original contract amount, whichever is the lesser, and said amount will be included in said estimate for mobilization payment.

d. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is fifty percent (50%0 or more of the original contact amount, the total amount earned for mobilization shall be one hundred percent (100%) of the contract price item for mobilization or five percent (5%) of the original contract amount will be included for payment in the final estimate made in accordance with Section G8-09 of these Specifications.

3. The District shall not pay additional mobilization compensation for change order work. Payment for mobilization shall be subject to retention per Section G8-07 of these Specifications.

SS-3. CLEARING AND GRUBBING

SS3-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a lump sum price for clearing and grubbing. If no item for clearing and grubbing is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for clearing and grubbing shall be made.

Unless otherwise specified in the Special Provision or shown on the plans, clearing and grubbing shall conform to Section 15 and 16 of the State Specifications and shall include, but not be limited to, all the work set forth herein.

SS3-02, DEBRIS: All objectionable materials such as weeds, grass, roots, stumps, trash, broken concrete, and other debris shall be removed from the right-of-way or easement area and disposed of by the Contractor.

SS3-03, SIGNS: The protection and maintenance of existing signs and the removal, protection, storage and resetting of the traffic signs that are affected by the work shall be the responsibility of the Contractor, as directed by the District or as specified in the Special Provisions. Attention is directed to Section G6-12 of these Specifications regarding detailed requirements for the maintenance of existing traffic control signs.

SS3-04, MAILBOXES: Removal and resetting of all mailboxes and newspaper tubes which are affected the construction is the responsibility of the Contractor. All mailboxes shall be maintained in an upright position adjacent to the construction area between the time the mailbox is removed and reset in its final location. Mailboxes shall be reset on 4" x 4" Douglas fir or redwood posts S4S, unless otherwise noted on plans. They shall be set a minimum of two (2) feet in concrete. Mailboxes which can be salvaged intact, including ornamental or iron supports, shall be salvaged and reset. The bottom of mailboxes shall be set at a height of 3'6" above the back of curb or edge of shoulder. The fact of the box shall be set on foot behind the back of sidewalk; or set one foot behind the back of curb should sidewalk not exist; or one foot behind the outside shoulder line should neither sidewalk nor gutter exist.

SS3-05, UNDERGROUND: All abandoned pipes, conduits and other abandoned structure which conflict with the structural sections of the roadway or underground installation are to be removed and disposed of. All other abandoned pipes indicated on the plans or directed by the District are to be plugged in accordance with Section SS3-14 of these Specifications.

SS3-06, SURVEY MONUMENTS: Survey monuments and markers shown on the plans or encountered along the line of the work must be preserved. The Contractor shall notify the District of monuments encountered, and shall not remove or damage said monument until t he monument can be cross referenced and tied out by the survey party. The Contractor shall allow a minimum of one working day for such referencing to be accomplished. When notified by the District that the ties have been completed the monument or marked can then be removed. The Contractor is not responsible for the replacement of a monument or marker, the removal of which is necessitated by the work to be performed and which has been referenced and tied as set forth herein. If, through negligence or carelessness on the part of the Contractor, notification is not made as provided above or markers are removed which are not in direct conflict with the construction, the Contractor shall be responsible for the cost of referencing, resurvey and replacement of the monument or marker. Such sums for the replacement shall be deducted from the final contract pavement.

SS3-7, DRAINAGE FACILITIES: The Contractor shall be responsible for maintaining existing drainage and irrigation facilities and to re-establish the drainage and irrigation ditches and facilities to their original location and condition as soon as possible after completion of the work in the area to the complete satisfaction of the District, except when such realignment or modification of the existing facilities are set forth on the plans and in other items of work.

SS3-08, SPRINKLERS AND LIGHTS: Sprinkler system pipes, heads, hose bibs, and yard lighting systems which interfere with the clearing and grubbing or excavation shall be cut and capped at the right-of-way line or easement line unless otherwise set forth on the plans and in Special Provisions.

On projects for underground construction of sewer or water facilities and on drainage projects in public utility easements or other easements, all sprinkler system pipes, heads, hose bibs and all yard lighting shall be replaced and reconstructed to their original location and condition, unless otherwise set forth in the Special Provisions.

SS3-09, TREES AND SHRUBBERY: On underground construction of all sewer and water facilities and on construction of underground and open channel drainage facilities when construction is to be performed in the vicinity of trees, shrubbery and lawns, the work shall be carried out in such a manner which will cause minimum damage to public and private property. Those trees which are to be removed and disposed of shall be so designated on the plans. Prior to the clearing and grubbing operation on a particular property, the District will designate to the Contractor those trees and shrubbery that may be removed. Trees and shrubbery which are not to be removed shall be protected from injury or damage to the Contractor's operations. Trees and shrubs which are to be removed and not specifically designated for disposal, shall be preserved by removing in a ball of natural material and the roots wrapped in burlap and kept moist until the work has progressed enough for the replanting of the tree and shrub. The replanting shall be performed in a careful and professional manner. Lawns which are disrupted during the course of the construction shall be regarded to match the existing lawn but not reseeded unless specifically stated otherwise on the plans or in the Special Provisions.

Work in the vicinity of trees shall conform to Section G11-01 of these Specifications.

The Contractor shall remove all trees, shrubbery, and lawns within the rights-of-way which interfere with the excavation, embankments, slopes, ditches, or structures, unless specifically indicated on the plans, or directed by the District to be saved. Tree branches which extend over the roadway shall be trimmed to provide a minimum clearance of 14 feet above finished grade unless specifically permitted otherwise in writing by the District. The tree branches shrubbery branches removed shall be removed by a tree trimmer certified by the International Society of Arborists.

SS3-10, FENCING: The Contractor shall be responsible for the placing, maintenance and removal of any temporary fencing that may be necessary along the line of work to confine or protect livestock or pets that may be confined in areas through which the work is to proceed. All existing fences that intersect a fenced easement line or a right-of-way line at an angle, shall be cut and a new end post equal to or better than the existing shall be set at the right-of-way line and existing fence attached thereto. An fences removed for the Contractor's convenience during construction shall be replaced in accordance with Section Ss-104 of these Specifications.

SS3-11, CONCRETE: Where a portion of a concrete structure, slab or curb is to be removed, the concrete shall be cut with a concrete saw so that the edge of the remaining concrete shall form a neat, straight line. Where concrete slabs, curbs, ornamental walls, brick work, or similar items are encountered in the course of the construction of underground facilities, except drainage facilities within road right-of-way, the structure of facilities shall be reconstructed to match the existing portion of the facility. On roadway project and drainage construction in highway rights-of-way, the

facility shall be removed to the right-of-way line and the end of the facility shall be reconstructed to provide a neat and workmanlike appearance.

SS3-12, DISPOSAL AND SALVAGE: All materials removed as provided herein shall become the property of the Contractor and shall be disposed of off the rights-of-way or easement unless otherwise set forth on the plans or in the Special Provisions. Existing public or private improvements, which are designated on the plans or in the Special provisions to be salvaged, shall be carefully removed and stockpiled in the District's corporation yard.

SS3-13, SILT CONTROL: During construction, provisions shall be made to prevent siltation of the downstream drainage system, both from winter runoff or from any dry season flow passing through the construction site. Such provision may include silt basins, silt fences, or other physical means. If the Contractor's methods fail to prevent siltation, or he/she fails to provide a protection against siltation, he/she shall clean the downstream drainage system to the satisfaction of the District and he/she shall be responsible for any damage which might result. The Contractor shall also comply with the requirements of SS-6 of these Specifications.

SS3-14, ABANDONMENT OF PIPES AND MANHOLES: Where the plans call for abandonment and plugging of a pipeline, the exposed end of the pipe shall be plugged with a minimum of 12 inches of concrete. Manholes to be abandoned shall be removed to a minimum of three (3) feet below the ground or street surface. The manhole shall then be filled with sand, crushed rock or gravel, compacted by wetting, tamping or shovel slicing. The base of such manholes shall be broken up and partially removed to allow drainage.

SS-4. EXCAVATION

SS4-01, ITEM: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for excavation. If no item or excavation is included in the Proposal, it shall be understood that such work will be done as herein specified and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for excavation shall be made.

SS4-02, PAYMENT: The requirements of this specification shall be as set forth in Sections 15 and 19 of the State Specifications, except that the contract lump sum until priced paid for excavation shall include full compensation for compacting natural and original ground, for sub-grade preparation, for all haul and overhaul, for excavation, for placing earth embankment as shown on the plans and as directed by the District, for excavation, backfill and disposal of unsuitable materials, and for furnishing all water necessary for the compaction of the material and sub-grade preparation. The bid price shall also include shaping and trimming slopes to solid material and to the lines and elevation shown on the plans. If no item for excavation is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work and that no additional compensation for excavation shall be made.

SS4-03, DITCHES, CHANNELS, SIDE SLOPES: Ditches and channels shown on the plans will be paid for as excavation as specified in the Special provisions and the Proposal. It shall also be required to adjust excavation and embankment side slopes to clear existing improvements, utility poles, and vegetation, as directed by the District.

SS4-04, SUB-GRADE PREPARATION: The requirements for sub-grade preparation shall be as set forth in Section 19-5, "Compaction" and Section 19-6, "Embankment Construction", of the State Specifications and in accordance with the following provisions:

A. Relative compaction of not less than 95 percent (95%) shall be obtained for minimum depth of 0.5 foot below the sub-grade grading plane for the width between the outer edges of shoulder whether in excavation, embankment, or at original ground level. All other material shall be compacted to a relative compaction of 90 percent (90%), including sub-grade under meandering sidewalks not adjacent to curb and gutter, except for embankment under structures and retaining wall footings which shall be as specified in Section 19-5.03 of the State Specifications.

B. When the next layer of material to be placed on the sub-grade is an asphalt concrete payment, asphalt concrete base, or asphalt concrete sub-base, the sub-grade grading plane at any point shall not vary more than 0.05 foot above or below the grade established by the District.

C. In addition to the above requirements, it will also be necessary to assure that the sub-grade or aggregate base is stable prior to paving. If there appears to be any question regarding stability, the Contractor will be required to proof roll the area prior to placing asphaltic concrete. The equipment used for this proof rolling shall be subject to the approval of the inspector. Payment for proof rolling shall be included in the cost for excavation.

D. Sub-grade preparation requirements as set forth in this section will be waived where the width of the sub-grade to be prepared is less than four (4) feet if the undisturbed sub-grade (grading plane) is firm and stable as determined by the District. The District may order mechanical tamping to obtain the desired firmness and stability. The District may order removal of soft and unstable material below the grading plane and backfill with acceptable import materials if the sub-grade (grading plane) is unsuitable to place the next layer of the structural section.

SS4-05, UNSUITABLE EXCAVATION AND BACKFILL: Any unsuitable material encountered within two (2) feet below the sub-grade or two (2) feet below original ground, whichever is lower, shall be brought to the attention of and removed at the direction of the Engineer and no additional compensation will be allowed therefore.

The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the District, the Contractor's methods for excavating are increasing

the amount of unsuitable material required to be excavated, the District will require the Contractor to take the necessary steps to correct the condition.

Backfill to replace the unsuitable material removed shall be placed and compacted to sub-grade as specified herein. Suitable backfill material shall be one of the following:

A. Pit run materials as specified in Section SS-15 of these Specifications.

B. Cobbles as specified in Section SS-16 of these Specifications.

C. Excavation material approved by the District.

D. Imported borrow as specified in Section SS-8 of these Specifications.

E. Any combination of “A”, “B”, “C”, and “D”.

The selection of the proper backfill shall be at the discretion o f the District. Backfill for unsuitable material excavated will be include in the contract price for excavation and no additional compensation will be allowed therefore.

SS4-06, UNSUITABLE MATERIAL IN EMBANKMENTS: Unsuitable material excavated as excavation, which, in the opinion of the District, cannot be worked into the embankment, shall be removed from the job site or wasted within the right-of-way as directed by the District. No additional compensation will be allowed for removing unsuitable material from the job site. Unsuitable material excavated as excavation, which in the opinion of the District can be used for embankment, shall be placed in embankment below a plane 30 inches below the finished grade and compacted to a minimum relative compaction of 90 percent (90%). No additional compensation will be allowed for placing unsuitable material I the embankment.

SS4-07, RELATIVE COMPACTION: Whenever relative compaction specified in these Specifications, the State Specifications or the Special Provision, the relative compaction will be determined by ASTM Test Method No. D1157-70.

SS4-08, SURPLUS MATERIAL DISPOSAL: The Contractor’s attention is directed to Section Ss-14 “Surplus Material Disposal” of these Specifications for disposal of excess excavation materials “outside of easements or right-of-way.

SS-5. DITCH AND CHANNEL EXCAVATION

SS5-01, ITEM: Under this item of the Proposal, the Contractor shall bid a lump sum unit price for ditch and channel excavation when such ditch and channel excavation is specifically indicated on the plans and in the Proposal. Ditches and channels shall be excavated to line and grade and be used in fill and embankment areas as shown on the plans; surplus excavated material shall become the property of the Contractor, and shall be disposed of as specified in Section Ss-14 of these

Specifications, unless otherwise shown on the plans or in the Special Provisions. No additional compensation shall be made for disposal of surplus excavated materials. Trees and shrubbery shall be protected as required in Sections G11-01 and SS3-09 of these Specifications. If no item for ditch and channel excavation is included in the Proposal, it shall be understood that such work will be done as herein specified and that the cost for such work will be included in the prices bid for the other items of work, and that no additional compensation for ditch and channel excavation shall be made.

SS5-02, GRADE CONTROL: For channels which are to be lined, the Contractor shall place grade control points at 25 foot intervals alone the invert of the shaped channel to control the grade and thickness of the concrete bottom. For channels 12 feet and over in width, which are to be lines, the Contractor shall place grade control points at 25 foot intervals along each edge of the bottom. Care shall be taken to prevent excavating below the channel grade line or beyond the slope lines. Areas excavated below grade or beyond the slope shall be filled with suitable materials and thoroughly compacted to 90 percent (90%) relative compaction by the Contractor at their own expense.

SS5-03, UNSUITABLE DITCH AND CHANNEL EXCAVATION AND BACKFILL: Any unsuitable material as determined by the District, encountered within two (2) feet below the sub-grade of the channel, shall be removed at the direction of the District and included in the contract lump sum unit priced bid for ditch and channel excavation and no additional compensation will be allowed therefore. The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the District, the Contractor's methods for excavating are increasing the amount of unsuitable material required to be excavated, the District will require the Contractor to take the necessary steps to correct the condition. Should the Contractor elect to place cobbles or other material in the channel bottom to provide a working surface, in lieu of dewatering channel, the cost of furnishing and placing such material shall be at the Contractor's sole expense.

Backfill of areas where unsuitable material was removed as channel excavation shall be placed and compacted to sub-grade as specified in Section SS7-04. A minimum relative compaction of 90 percent (90%0 is required. Suitable backfill material shall be one of the following:

A. Pit run materials as specified in Section SS-15 of these Specifications.

B. Cobbles as specified in Section SS-16 of these Specifications.

C. Channel excavation materials approved by the District.

D. Imported borrow as specified in Section SS-8 of these Specifications.

E. Any combination of "A", "B", "C", and "D".

The selection of proper backfill shall be at the discretion of the District. Backfill for unsuitable material excavation as channel excavation will be included in the contract price for ditch and channel excavation and no additional compensation will be allowed therefore.

SS5-04, UNSUITABLE OR SURPLUS MATERIAL DISPOSAL: unsuitable or surplus material excavated as channel excavation, which in the opinion of the District, cannot be worked into the required embankments, shall become the property of the Contractor and shall be disposed of as specified in Sections Ss-14 of these Specifications, unless otherwise shown on the plans or in the Special Provisions. No additional compensation shall be made for disposal of surplus material or of surplus unsuitable material.

SS5-05, CHANNEL BACKFILL: In those areas where the bottom of the existing channel is below the proposed grade or beyond the slope lines, the Contractor shall fill and thoroughly compact these areas to a minimum 90 percent (90%) relative compaction with suitable material. No additional payment will be made for this work, as it shall be considered as included in the price bid for channel excavation.

SS5-06, CHANNEL EMBANKMENTS: Embankments shall be placed as shown on the plans. Embankment areas shall be filed with suitable material, as determined by the District, resulting from channel excavation. The fill shall be placed in a neat and uniform manner, and shall be spread uniformly to the grades as shown on the plans. Where embankment is made on the existing channel or on other slopes, the existing slope shall be plowed or cut into as the embankment is constructed so as to tie the new embankment to the existing slope. All fill slopes shall be trimmed to give a neat and uniform appearance. Fill areas in unlined channels shall be compacted to a minimum relative compaction of 90 percent (90%) unless otherwise shown on the plans.

In lined channels, fill areas shall be compacted to a minimum relative compaction of 90 percent (90%) to an elevation one (1) foot above the top of the channel lining, unless otherwise shown on the plans.

Localized erosion, sloughing or other slight irregularities in the existing channel which may occur between cross-sections, may not be shown on the plans or cross-sections. Where the localized erosion, sloughing or irregularities extend beyond the limits of the channel cross-section, these areas shall be filed and compacted to conform to the design and channel cross-section. No additional payment will be made for these fills.

SS5-07, WATER: The method and rate of applying water shall conform to Section 17 of the State Specifications. The District shall determine the necessity for duty control, the areas in which the water is to be applied and the quantity of water to be applied. Unless specifically set forth in the Special Provisions and in the Proposal, no additional payments will be made for water and the cost involved for furnishing and applying water shall be included in the price bid for channel excavation.

SS5-08, PIPE ADJUSTMENTS: Side drain pipes less than 18” diameter shall be extended or shortened as required to discharge into the new channel, so that the pipe outlet is flush with the channel slope in conformance with the Standard Drawing R-19A. The pipe used for extending existing side drains shall be of the same diameter as the existing pipe, and shall conform to one of the options specified in these Standard Specifications.

Side drain pipes 18” diameter or greater shall be extended or shortened to conform with Standard Drawing R-19B. Access control racks shall conform to Standard Drawing R-15.

Method of placing pipe extensions shall conform to these Specifications and the Standard Drawings. Existing side drain pipes to be shortened shall be cut off parallel to the slope of the channel in a neat, workmanlike manner.

SS5-09, PAYMENT: The lump sum unit price paid for ditch and channel excavation shall include full compensation for earth berms, overhaul, channel fills, silver fills, access ramps, channel embankment, unstable material excavation, disposal of surplus channel excavation or unsuitable materials, dewatering, extending and shortening existing side drains and furnishing and applying water for compaction and dust control, and no separate payment will be made for any of these items.

SS5-10, FINAL PAY QUANTITIES: When the estimated quantities for a specific portion of the work are designated on the plans as final pay quantities, said estimated quantities shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the District. If such dimensions are revised, and such revisions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the changes in the dimensions. The estimated quantities for such specific portion of the work shall be considered as approximate only and no guarantee is made that the quantities which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantities. No allowance will be made in the event that the quantities based on computations do not equal the estimated quantities.

When portions of an item have been designated on the plans as final pay quantities, portions not so designated will be measured and paid for in accordance with the applicable provisions of these Specifications and the Special Provisions.

In case of any discrepancy as to final pay quantities, the final pay quantities shown on the plans shall prevail.

SS-6, EROSION CONTROL AND RESEEDING

SS6-01, ITEM AND PAYMENT: The Contractor shall provide all measures required to protect slopes and all other areas disturbed by his construction activities and to provide erosion control and reseeding during and after construction in accordance with the requirements of Section 20 of the State Standards Specifications and these Specifications. The Contractor shall endeavor to perform the most crucial work during the dry season to avoid the need for soil runoff measures during the rainy season. Cost for this work shall be included in lump sum unit price bid erosion control and reseeding. If no item for erosion control and reseeding is included in the Proposal, it shall be understood that such work will be done as herein specified and that the cost for such work will be

included in the prices bid for other items of work and that no additional compensation for erosion control and reseeding shall be made.

SS6-02, CONSTRUCTION MEASURES: The Contractor shall adhere to the Specifications to control erosion and to protect slopes during and after construction. The Contractor shall schedule and limit the extent of clearing, grading, trenching, etc., so as to assure completion of construction and soil stabilization prior to significant rainfall. Disturbed soils shall be protected with mulch and/or vegetation, as best suits the situation, and runoff velocities shall be controlled suing structural erosion control measures.

Up-slope diversion structures shall b used to reduce the volume of runoff across denuded areas and prepared drainage ways shall be constructed to handle the increased runoff due to placement of impervious coverage. The Contractor shall construct temporary or permanent sediment basins to capture suspended eroded material to prevent downstream siltation.

Areas with the highest erosion potential shall be scheduled for disturbance when significant rainfall is least likely to occur. If construction occurs during the rainy season, vehicle traffic shall be limited in the areas with high runoff potential. If the Contractor must work in an area with soil runoff potential during the rainy season, he shall submit to the District plans for runoff protection including, but not limited to, installation of plastic sheeting, temporary diversion ditches to divert water away from the exposed areas, controlled runoff ditches with straw barriers for water from the exposed material on slopes less than 30 percent (30%), and siltation fencing.

Excavated materials shall be stockpiled up slope of the excavation if any potential of rain before backfilling. In this way, the excavation will catch the soil runoff. All trenching and back-filing shall be completed and stabilized prior to the rainy season.

All incomplete cut and fill banks shall be left rough and shall not exceed a slope of 1 ½:1 (horizontal: vertical). Existing vegetation shall be retained, protected and supplemented whenever possible. When vegetation must be removed, the method used by the Contractor shall be one that shall minimize solid disturbances and shall be limited to the area required for immediate construction operations. All areas where runoff concentrates shall be protected by the Contractor from erosive forces by installing storm sewers, culvers, diversions, berms, drains, sediment traps, and grass or rip-rap lined channels as appropriate. Interceptor and roadside ditches shall be lined with rip-rap, asphalt concrete or other suitable material when ditch flow-line slope exceeds two (2) percent.

If scheduling should warrant, the Contractor shall “winterize” the site. If “winterizing” is required, the following measures shall be implemented by the Contractor as most appropriate:

A. Plastic Sheeting (i.e., “Visqueen”) or other suitable material shall be sued, if necessary, as an emergency measure to stabilize bare cuts and fill banks.

B. Temporary diversion ditches shall be constructed, if needed, to divert runoff away from exposed banks and towards protected drainage channels (e.g., pavement, grass, rip-rap lined channels, street gutters, etc.).

C. Straw, peat moss or wood chips shall be applied to bare soil and slopes as needed for soil stabilization. A one-inch layer of wood chips or three inches of straw or peat moss shall be worked into the top two (2) to three (3) inches of soil.

D. If increased runoff due to placement of impervious cover is anticipated to be substantial, then the Contractor shall construct temporary storm water retention/ detention basins and/or infiltration trenches to as appropriate to reduce storm runoff rates to control erosion.

E. Vehicle traffic shall be limited to as few routes as possible across the construction site. Whenever possible, temporary access routes shall be aligned where future roads or driveways are planned. In severe erosion hazard conditions, a few inches of crushed gravel shall be applied along temporary routes to provide additional protection.

The Contractor shall inspect the construction site frequently during periods of potential erosion to assure that erosion and sedimentation control measures are operating and properly maintained. The Contractor shall immediately repair any damage or inoperative erosion and sedimentation control measures and take any other corrective measures as directed by the Engineer.

SS6-03, DELIVERY: All seed shall be delivered to the site tagged and labeled in accordance with the California Food and Agricultural Code and shall be acceptable to the Engineer. Seed shall be delivered to the site in sealed bags with the vendor's certification attached.

SS6-04, MATERIALS: The following seed mix shall be used for reseeding unless otherwise specified on the plans or in the Special Provisions. Regardless of the intended purpose of reseeding, temporary ("Short Term Stand") or permanent ("Long Term Stand"), the Contractor shall utilize the appropriate erosion control seed mix ("Short Term Stand Mix" or "Long Term Stand Mix") in addition to utilizing the "Wild Flower Mix" as specified below:

Seed	Application Rate In #/1000 sq. ft.	Planting Date	Method of Application
SHORT-TERM STAND MIX (one to two years):			
Wimmera 62 Rygrass	1	September 15	Broadcast by
Or			hand or
Annual Ryegrass	1		use
or		to	mechanical
Barley	2		spreader
Or			(seed drill)
Wheat	2	October 15	

LONG-TERM STAND MIX:

Rose Clover	½	September 15	Broadcast
Or			by hand
Red Brome	½	to	or use
Or			mechanical
Blando Brome	1		spreader
		October 15	(seed drill)
Or			
Alta Tall Fescue	1	Prior to September 15	Ditto

WILD FLOWER MIX (Native to Sacramento Area):

25%	California Poppy	Eschscholzia California
25%	Pigmy Leaved Lupin	Lupine Bicolor
10%	Tidy Tips	Layia Platyglossa
15%	California Sunshine	Lasthenia
10%	Baby Blue Eyes	Nemophila Menziesti
5%	Farewell to Spring	Clarkia Elegans
10%	Dwarf Catchfly	Silene Armeria

Seed at rate of 7 lbs. per acre, mix with erosion control seeding.

SS6-05, VEGETATIVE COVER: The Contractor shall provide vegetative cover to disturbed areas as soon as possible. It is desirable to install a permanent vegetative cover initially, preferably with a long term stand of cover. Table 1 lists seeds and application rates. After application, seeds will be ranked lightly into the soil and fertilized uniformly with a minimum rate of two pounds (2 lbs.) of available nitrogen and two pounds (2 lbs.) of phosphoric acid per 100 square feet. Using a fertilizer composition of 10-10-0 (nitrogen-phosphorus-potassium), this would be the equivalent of twenty pounds (20 lbs.) per 100 square feet. As a substitute, ten pounds (10 lbs.) per 100 square feet application rate may be used for 16-20-0 fertilizer. In the more level areas, the soil may be tilled two (2) to four (4) inches deep to prepare a seed bed. The seeds could then be drilled to a depth not exceeding ½ inch with a range seed drill across the slope. Alternatively the seeds should be broadcast, followed by the use of a light harrow. Either method of seeding shall be followed with a seed bed roller.

After seeding, the Contractor shall apply straw mulch spread at a rate of approximately 100 pounds per 100 square feet. On the more steep slopes, the straw shall be anchored in place by “tucking” it into the soil with a spade or by securing with fiber netting. If a wood fiber mulch is applied, it shall be applied at a rate of 35 pounds per 100 square feet and may be applied simultaneously with seed and fertilizer in a slurry (hydro-mulching).

If a time shortage should occur, short-term vegetation stand shall be established on newly cleared areas by seeding with barley or wheat, raking the seeding lightly into the surface soil. A permanent cover vegetation, which takes longer to establish may be seeded simultaneously for long-term protection. The erosion control and wildflower seeding guide listed above shall be used. The areas shall be fertilized as listed above. Scraped topsoil from grading operations shall be stockpiled for later application to areas otherwise unsuited for establishing vegetation. Stockpiles shall be protected from erosion during the rainy season by plastic sheeting or equivalent protection.

If a vegetation cover is used for stabilizing cut and fill banks, slopes shall not be steeper than fifty percent (50%) (2:1 horizontal to vertical). Where sloped exceed thirty-three percent (33%) (3:1), seed beds with straw mulch shall be secured with heavy jute netting of ½ inch to 2 inch mesh. The mesh shall be stapled together and anchored to the slope.

SS-7. UNSUITABLE MATERIAL EXCAVATION

SS7-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for excavation of unsuitable material when such work is specifically indicated on the plans and in the Proposal. Unsuitable material, by definition, shall be that material determined by the District to be unsuitable in its natural location and condition for roadway, channel, or structural foundation. Unsuitable material shall be that material below a plane, said plant being two (2) feet below sub-grade of roadway, channel or foundation of structure as determined by the structural section, flow line or foundation or two (2) feet below original ground, whichever is lower.

SS7-02, APPROXIMATE QUANTITY: The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as maybe required by the District.

SS7-03, EMBANKMENT AND DISPOSAL: The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the District, the Contactor's methods for excavation are increasing the amount of unsuitable material required to be excavated, the District will require the Contractor to take the necessary steps to correct the condition. Unsuitable material excavation, which in the opinion of the District, cannot be worked into the embankments, shall be disposed of as set forth under Section SS-14 of the Specifications. Unsuitable materials, which in the opinion of the District can be used in embankments, shall be placed and compacted in the embankment as set forth in Section SS4-06 of these Specifications. No additional compensation will be allowed for the placing of unsuitable material in embankments as required herein.

SS7-04, BACKFILL: Backfill of areas excavated as unsuitable materials shall be placed and compacted to a minimum relative compaction of 95 percent (95%) within 30 inches of finished grade on roadways and structural foundations. Below 30 inches of finished grade on roadways below sub-grade in channels, compaction shall be not less than 90 percent (90%). Suitable backfill material shall be one of the following:

A. Pit run materials as specified in Section SS-15 of these Specifications.

B. Excavation, structural excavation, or channel excavation material approved by the District.

c. Imported borrow as specified in Section SS-8 of these Specifications.

D. Cobbles as specified in Section SS-16 of these Specifications.

E. Any combination of “A”, “B”, “C”, and “D”.

The selection of the proper backfill shall be at the discretion of the District. Backfill, when made with select material excavated from site, will be paid for at the same contract unit price paid for excavation or channel excavation, whichever applies, and the pay quantity will be the same as that computed for unsuitable material excavation as specified herein. Imported borrow, pit run materials, and cobbles, and the placing of such materials shall be paid for as set forth in these Specifications.

SS-8. IMPORTED BORROW

SS8-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a unit price per cubic yard for imported borrow compacted in place. Imported borrow shall consist of material required for the construction of embankments and shall be obtained from sources listed in the Special Provisions, or if no sources are listed, from sources the Contractor may elect. The Contractor’s optional sources shall be approved in advance by the District. Imported borrow shall be free of roots, vegetable matter, and other unsatisfactory material, and be of such character that it will readily bind to form a firm and stable embankment when compacted.

If no item for imported borrow appears in the Proposal, the project shall be considered balanced with no imported material required. If the District deems it necessary to place imported borrow due to actual field conditions or actual shrinkage and/or swell factors experienced, the imported material shall be furnished and placed as extra work in accordance with Section G8-03 of these Specifications.

SS8-02, AGREEMENTS: The Contractor shall enter into an agreement with the owner of any privately owned material site to hold said owner harmless from any claims for injury to persons or damage to property resulting from the Contractor’s operations on said property. The agreement shall contain provisions to relieve the District of any obligation to the owner or claims for injury or damage of persons or property. Before commencing operations at the material site, the Contractor shall deliver satisfactory written evidence of said agreement to the District. The Contractor’s attention is directed to Section 6.2 of the State Specifications in regard to local materials and their sources.

SS8-03, PLACEMENT: The imported borrow material shall have a sand equivalent of not les than the average sand equivalent of the native material that exists within the adjacent area of work, or as otherwise set forth in the Special Provisions and shall be placed and compacted as herein specified for roadway embankment.

SS-9. STRUCTURE EXCAVATION AND BACKFILL

SS0-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for structure excavation. Structure excavation shall conform to Section 19-3 of the State Specifications, except as herein modified. The contract unit price per cubic yard for structure excavation shall include full compensation for all necessary excavation, structure backfill and previous backfill within the limits set forth on the plans, Standard Drawings, and the Special Provisions. Structure and pervious backfill shall conform to Section 19-3.06 of the State Specifications. If no items for structure excavation are included in the Proposal, it shall be understood that such work will be done as herein specified and that the cost for such work will be included in the prices bid for other items or work and that no additional compensation for structure excavation shall be made.

SS9-02, JETTING: Jetting of structure backfill will not be allowed except when specifically set forth in the Special Provisions.

SS9-03, EXISTING STRUCTURES: When removing an existing structure which is to be replaced with a new structure, no payment will be made under this item for the area occupied by the existing structure.

SS9-04, PIPES AND MISCELLANEOUS STRUCTURES: Payment for and method of excavation and backfill for all pipes, manholes, and miscellaneous facilities shall be as set forth elsewhere in these Specifications.

SS9-05, UNSUITABLE MATERIALS: Unsuitable materials encountered at the grade elevation of the structural excavation which is directed by the District to be removed and backfilled shall conform to Section SS-4 or SS-7 of these Specifications, as applicable.

SS9-06, FINAL QUANTITY: The quantity of structural excavation shown o the plans and in the proposal shall be the final quantity for which payment will be made a s provided in Section 9-1.015 of the State Specifications.

SS-10. TRENCH EXCAVATION

SS10-01, ITEM: Trench excavation shall include the removal of all materials or obstructions of any nature, and the control of water necessary to construct the work as shown. Unless otherwise indicated on the drawings or permitted by the District, excavation shall be by open cut.

SS10-02, EXPLORATORY HOLES: An encroachment permit must be obtained from the District, other responsible agencies and Rancho Murieta Association (RMA) prior to any exploratory drilling or excavation within District boundaries. The exploratory holes shall be backfilled with sand or native excavated materials, which shall be mechanically compacted to prevent subsequent settlement, prior to nightfall of the same day that the exploratory drilling or excavation takes place.

SS10-03, TRENCH WIDTH: Minimum trench width shall be the outside diameter of the pipe plus 12 inches, except for cast-in-place pipe and plastic composite sewer pipe. Maximum trench widths at the top of the pipe shall be as shown on the plans for the designated tube bedding or as specified herein for plastic composite sewer pipe. For drainage pipe, if no maximum is shown, the Contractor shall conduct the Contractor's operation to limit top trench widths to pipe outside diameter plus 16 inches for pipe 33 inches or smaller, and pipe outside diameter plus 24 inches for pipe 36 inches and larger, except with the specific approval of the District. If trench widths at the top of the pipe as shown on the plans or as specified herein are exceeded by any amount for any reason, the Contractor shall provide stronger pipe or improved bedding and backfill conditions, as approved by the District, to meet the changed load requirements. If the trench width is exceeded for any reason within the Contractor's control, the strong pipe or improved bedding and backfill shall be provided at the Contractor's own expense.

As an alternative to vertical walled, flat-bottomed trench, the Contractor may shape the bottom of the trench to the exterior radius of the pipe to be placed, plus a minimum of 6 inches.

SS10-04, CUTTING OF PAVEMENT: When the trench is in an existing paved area, the pavement shall be saved or scored on neat lines parallel and equidistant from the trench centerline. Pavement between the lines shall be broken and removed immediately ahead of the trench operations. The width of pavement removed shall be sufficient that the trenching operation does not damage the edges of the pavement left in place. The extinguishing shall be sawed and removed in conformance with Standard Drawing H-36. Top backfill in existing paved areas shall conform to Standard Drawing H-36.

SS10-05, EARTH SAW TRENCHING: Trenches to be made by this method shall be cut by a machine that will produce smooth edge cuts in the pavement and will move at a speed in excess of four (4) feet per minute while cutting pavement. The trenching machine shall be shielded to prevent loose material from being thrown away from the machine.

The minimum trench depth shall be that which is necessary to provide for six (6) inches of cover between the top of the conduit and the finished pavement grade. Under sealed shoulder areas, the trench depth shall be that which is necessary to provide for eight (80 inches of covered between the top of the conduit and the finished shoulder grade. The trench section shall conform to Standard Drawing H-36.

Loose material deposited on the pavement behind the cutting machine shall be removed from the pavement immediately and the pavement cleared to allow the passage of traffic. Only those traffic

lanes occupied by the cutting machine and the cleanup operation shall be closed and they shall be opened as soon as the work has moved sufficiently to clear them.

The conduit shall be placed in the bottom of the trench and the trench shall be backfilled with Portland cement concrete to within one (1) inches of the pavement surface of traveled ways of existing pavements and to within five (5) inches of the shoulder surface of sealed shoulder. The concrete shall be Class C concrete or four (4) sack slurry with one (1) inch maximum size aggregate, one (1) inch slump and shall contain calcium chloride in an amount not to exceed 3 percent (3%) of the cement content. For electrical work, concrete shall be Class B or five (5) sack slurry. The concrete shall be tamped or vibrated to provide a dense material free from excessive voids and rock pockets.

The sides of the trench shall then be coated with an asphaltic emulsion and the remaining depth of the trench shall be backfilled with asphaltic concrete placed in one layer. The asphaltic concrete shall be manufactured with ½ inch maximum sized rock. The asphaltic concrete shall be compacted by any method that will produce a uniform dense mixture with a surface elevation slight higher than the adjacent pavement.

Once work is started on a trench, all work necessary to complete that trench shall be performed on the same day. This includes cutting, placing of conduit or cable, removing all spoils from work site, barricades, maintain a clean road surface for safety of vehicular and pedestrian traffic and backfilling trench with concrete or slurry mix.

All trenches or excavations across paved driveways or in paved rights-of-way which have not been resurfaced or repaved at the end of the day, shall be backfilled up to within one (1) inch of the adjacent surface. Temporary or same day paving maybe required for major streets.

Upon completion of all contract work, the trenches through existing pavement will be inspected, and if found necessary by the District, they will be brought to grade with an appropriate asphaltic concrete mix.

Trenching in the medians may be performed as specified above, except that the requirement that “all work necessary to complete the trench shall be performed on the same day” shall not apply. As an alternate, median trenches may be backfilled to the surface of the median with concrete colored to match the color of the median surface.

The permanent asphaltic concrete replacement shall be completed no later than the working day following placement of the concrete or slurry backfill, and shall be in accordance with these Specifications. Seal coats in accordance with Section SS28-04.c of these Specifications shall be placed to the full width of the pavement replacement plus 12 inches on each side of trench except that seals shall not overlap concrete curb and gutter.

2210-06, MAXIMUM LENGTH OF TRENCH OPEN: At the end of each working day, there shall be a maximum of 300 feet of open trench in unimproved areas, excluding manhole excavations, for each

operation unless otherwise authorized by the District. The remainder of the trench shall be backfilled and compacted and when in streets, opened to traffic as soon as possible. If set forth in the Special Provisions for the interest of public safety and convenience, the entire trench and all excavations shall be backfilled and equipment relocated as directed at the end of each working day. The maximum length of trench open for cast-in-place concrete pipe shall be as specified in Section SS-49 of these Specifications.

SS10-07, CONTROL OF WATER: When water is encountered, either ground water or surface runoff, the Contractor shall furnish, install, maintain, and operate all necessary machinery, appliances, and equipment to keep excavation reasonably free from water until the placing of the bedding material, laying and jointing of the pipe, pouring of concrete, and placing of the shading material has been completed, inspected, and approved and all danger of floatation and other damage is removed. Water pumped from the trench shall be disposed of in such manner as will not cause injury to public or private property or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the District. Water entering any pipe as a result of ground conditions, the Contractor's use in balling and flushing, storm waters, broken water pipes, or from any other condition shall not be allowed to enter the existing downstream system, except as specified in Section SS65-05 of these Specifications.

SS10-08, SPECIAL FOUNDATION TREATMENT: Whenever the bottom of the trench is soft or rocky, or, in the opinion of the District, otherwise unsuitable as foundation for the pipe, the unsuitable material shall be removed and replaced with crushed rock, gravel, or sand as directed by the District, so as to provide a stable and satisfactory base. When the trench bottom is cobbled or of any other material which might, in the opinion of the District, allow loss of sand backfill, the backfill material shall be crushed rock or gravel graduated so that 100 percent will pass the ¾ inch sieve and not more than 15 percent (15%) will pass the number 8 sieve. Sand backfill, when permitted, by the District, shall conform to the material for Type I bedding, as specified in Section SS12-01.1 of these Specifications. Such backfill material shall be compacted to a minimum relative compaction of 90 percent (90%). If material more than 24 inches below the normal trench bottom as required for proper bedding of the pipe is ordered removed by the District, the excavation below that point and the imported material required to backfill the trench to that elevation shall be paid for as extra work. Before excavation of the pipe trench in fill area or roadway embankments, the fill area or embankment shall be completed to a height above the pipe invert grade line of not less than twice the internal pipe diameter or to final fill or embankment sub-grade, whichever is lower, but in no case less than 12 inches above the top of the pipe. Such embankment shall be compacted to a minimum relative compaction of 90 percent (90%) fir a distance on each side of the pipe equal to at least two (2) pipe diameters. The remainder of the embankment shall be compacted to a minimum relative compaction specified in the Special Provisions for the type of construction being done, or as specified in the Special Provisions or on the plans. Special foundation treatment for cast-in-place concrete pipe shall be as specified in section SS-49 of these Specifications.

SS10-99, EXCAVATION METHOD: Methods used in excavation shall be such as not to cause damage to surrounding property or to unnecessarily damage pavement. Street pads for backhoe outriders

and other equipment to prevent unnecessary damage shall be utilized. Protection of trees and shrubbery shall conform to Sections G11-01 and SS3-09 of these Specifications.

SS10-10, PAYMENT: Full compensation for trench excavation as herein specified, including all equipment, labor, materials, dewatering, special traffic considerations and safety measures required, hall be included in the price bid per lineal foot of the respective sizes, grades and types of pipes and conduits listed in the Proposal, and not additional compensation will be allowed therefore.

SS-11. SHEETING, SHORING AND BRACING

SS11-01, ITEM: Under this item of the Proposal, the Contractor shall bid a lump sum price for sheeting, shoring and bracing of trenches and other excavations of five (5) feet or greater in depth. If no item for sheeting, shoring and racing is included in the Proposal, it shall be understood that such work shall be done as herein specified, and that the cost for such work shall be included in the prices bid for other items of work, and that no additional compensation will be made.

SS11-02, SPECIFICATIONS: The Contractor shall install sufficient shoring and bracing to insure the safety of workman, protect the work and protect adjacent improvements. Sheeting, shoring and bracing shall comply with the rules, orders, and regulations of the California Division of Industrial Safety. The Contractor shall submit a plan for protection of workers in accordance with Section G7-05 of these Specifications.

Insofar as possible, sheeting shall not exceed below the bottom of the pipe barrel. All sheeting timbering, lagging and bracing shall, unless otherwise required by the District, be removed during backfilling and in such a manner as to prevent any movement of the ground or damage to the piping or to other structures. When the District requires that sheet piling, lagging and bracing be left in place, such material shall be cut off where designated and the upper part withdrawn. If steel piling is utilized, it may be withdrawn with compacting of backfill to proceed as it is removed.

SS11-03, SUSPENSION OF WORK: Failure to comply with any of the rules, orders or regulations mentioned herein shall be sufficient cause for but shall not place any responsibility upon the District to immediately suspend the work. The Contractor shall be responsible for the adequacy of all shoring and bracing and compliance with the law and failure of the District to suspend the work or notify the Contractor of any inadequacy of shoring and bracing or non-compliance with the law shall not relieve the Contractor of this responsibility. No compensation for losses incurred by the Contractor for any such suspension will be allowed.

SS11-04, PAYMENT: The lump sum price bid for shoring and bracing shall include all labor, materials, equipment, and supplies required for placing and removal of shoring and bracing as herein specified.

SS-12. TRENCH BEDDING AND BACKFILL

SS12-01, BEDDING AND INITIAL BACKFILL (SEWER AND DRAINAGE): Unless otherwise indicated on the drawings and in the Special Provisions, the pipe shall be placed on a firm, prepared bed of imported materials. All loose material shall be removed from the new trench bottom before placing the bedding material. Bedding shall extend at least three inches (3") below the pipe barrel for pipe diameters ten inches (10") and smaller and four inches (4") below for larger diameters. Compaction of initial backfill around and over the pipe shall be accomplished by hand tamping. Use of mechanical means which could subject the pipe to possible damage shall not be allowed. Other requirements shall be as follows:

SEWER: pipe in sizes up to twelve inches (12") in diameter shall be bedded uniformly throughout their length to a width of at least fifty percent (50%) of the pipe's outside diameter. This bearing shall be achieved by shaping the bedding or by lightly "bouncing" the pipe to set it into bedding. The bedding material for pipes larger than twelve inches (12") in diameter shall be shaped to provide uniform support the full length of the pipe to a width of at least fifty percent (50%) of the pipe's outside diameter. In lieu of shaping the bedding materials, the Contractor may place bedding material to the spring line of the pipe, compacting it by shovel slicing if gravel or by light tamping is sand, to provide this support. Care shall be used not to disturb or displace the pipe.

DRAINAGE: the pipe shall be bedded uniformly through its length. The bearing shall be achieved by shaping the bedding or by lightly "bouncing" the pipe to set it into the bedding. The Contractor shall then place backfill material to the spring line of the pipe, thoroughly compacting it by shovel slicing if gravel or by light tamping if sand, to provide proper support under the pipe haunches. Care shall be used not to disturb or displace the pipe.

When the trench bottom or walls consists of dredge tailings or cobbles containing void spaces or of any other material which, in the opinion of the District, might allow migration of sand bedding material into the trench walls or bottom the bedding material used shall be crushed rock or gravel graduated so that one-hundred percent (100%) will pass the three-fourth inch (3/4") sieve and not more than fifteen percent (15%) will pass the No. * sieve.

Where solid rock is encountered and blasting is required near the pipe bottom, the rock shall be removed to a minimum depth of twelve inches (12") below the bottom of the pipe, and the trench backfilled with materials conforming to Section SS10-08 of these Specifications and compacted to a minimum relative compaction of ninety percent (90%).

Pipe shall not bear on bells or joints. The trench shall be excavated at the pipe joints as necessary to provide at least one and one-half inches (1-1/2") of bedding material below the bell. No welding or blocking of the pipe will be permitted.

Initial backfill shall be the material placed from the top of the bedding to a depth of twelve inches (12") above the top of the pipe and pipe bell. Initial backfill shall be placed only with approval of the District.

The required pipe bedding and initial backfill type (I, II, II Alternate, III, or IV) for sewer installations shall be designated on the plans and shall conform to the details specified on Standard Drawing No. S-4. If trench conditions vary from that shown on the plans, the required type of bedding and initial backfill shall be as directed by the Engineer in accordance with the provisions of Section SS10-03 of these Specifications. Pipe bedding and initial backfill for drainage pipes shall be as specified herein and as shown on Standard Drawing No. R-4A.

Unless otherwise noted on the plans, minimum requirements for bedding and initial backfill for rigid sewer pipe shall be Type 1 for ten inch (10") or smaller sewer pipe and Type II for twelve inch (12") and larger sewer pipe, with an unlimited trench width allowable, subject to the limitations of Section SS10-03 of these Specifications.

Bedding and initial backfill for flexible sewer pipe shall be Type II or Type II Alternate utilizing imported material to twelve inches (12") above the top of pipe bell. Placement of native material between spring line and twelve inches (12") above the top of pipe bell for Type II not be permitted. The minimum allowable trench width for pipe thirty-six inches (36") or less in diameter shall be pipe barrel O.D. plus twenty-four inches (24") and for pipe larger than thirty-six inches (36") in diameter shall be as specified on the drawings.

A. Type I Bedding and Initial Backfill (Sewer): Bedding material shall be imported crushed rock, gravel or sand, of which one-hundred percent (100%) shall pass the one-half inch (1/2") sieve. The imported bedding material shall have a minimum sand equivalent of fifty (50), as determined by Test Method No. Calif. 217.

   The initial backfill shall be either imported bedding material or job excavated (native) material as specified herein below.

   Imported material shall be compacted by shovel slicing and hand tamping if gravel or by light tamping if sand.

   Native material shall be selected from job excavated material so as to be finely divided and free from debris, organic matter and pieces larger than one inch (1"0. The material shall be placed immediately after pipe joints have been completed, inspected and approved by the District. The material shall be carefully placed so as not to disturb or damage the pipe and shall be brought up evenly on both sides. The material shall be shovel sliced to fill in around the pipe haunches and tamped to a relative density of at least ninety percent (90%).

B. Type II Bedding and Initial Backfill (Sewer): Bedding material shall be imported crushed rock, gravel or sand of which one-hundred percent (100%) shall pass the three-fourth inches (3/4") sieve and not more than ten percent (10%) will pass the No. 8 sieve, except that for pipe ten inches (10") or less in diameter, one-hundred percent (100%)

shall pass the one-half inch (1/2") sieve. The imported bedding material shall have a minimum sand equivalent of fifty (50) as determined by Test Method No. California 217.

The bedding material shall be placed to the spring line of the pipe, taking care to completely fill all spaces under the haunches. Compaction shall be obtained by shovel slicing if gravel or by light tamping if sand, using care not to disturb the pipe.

The initial backfill shall be either imported bedding material or job excavated (native) material as specified for Type I Initial Backfill. Import material shall be compacted by shovel slicing and hand tamping if gravel or by light tamping if sand. Native material shall be tamped to a relative density of at least ninety percent (90%).

C. Type II Alternate (Sewer): Bedding and initial backfill shall be crushed stone with a sieve analysis listed as Size #67 in ASTM Designation D448, except that one-hundred percent (100%) shall pass the three-fourth inches (3/4") sieve. Type II Alternate shall be allowed for pipe greater than thirty-six inches (36") in diameter only when field encountered construction conditions have resulted in the allowable trench width for Type II being exceeded. Approval of the Engineer is necessary for use of Type II Alternate for pipe installations greater than thirty-six inches (36") in diameter.

D. Type II and Type IV (Sewer): Type III and Type IV bedding and initial backfill shall normally be used only when field encountered construction conditions have resulted in the allowable trench width for Type II or Type II Alternate being exceeded. Written approval of the Engineer is necessary for use of Type III or Type IV bedding and initial backfill installations.

Bedding material for Type II and Type IV installations shall be the same as for Type II.

For Type III installations, a partial cradle of concrete slurry mix shall be placed between the bedding and t he top of the outside diameter of the pipe. The slurry mix shall be brought up evenly on both sides of the pipe, with care being taken not to disturb or damage the pipe. When a slurry mix is used, the mix shall conform to Section 28-1.02 of the State Specifications for Lean Concrete Base, except that the aggregate material test batch size and noncompliance payment provisions do not apply. When side fills have sufficiently cured, place twelve inches (12") of imported material over pipe bell before placing intermediate backfill.

For Type IV installations, bedding material shall be placed to springline of the pipe and a Class B concrete cap shall be poured extending from springline to a depth over the top of pipe bell equal to one quarter (1/4) of the inside diameter of the pipe bell or four inches (4"), whichever is greater.

E. Bedding and Initial Backfill Materials (Drainage) - RCP, CP, HPDE ~~VCP, CSP~~: Bedding and initial backfill materials for Reinforce Concrete Pipe (RCP), Concrete Pipe (CP), ~~Vitrified~~

~~Clay Pipe (VCP), or Corrugated Steel Pipe (CSP)~~, drainage pipes shall be crushed rock, gravel, or coarse sand of which one-hundred percent (100%) shall pass the three-fourth inch (3/4") sieve. The sand shall have a minimum sand equivalent of fifty (50), as determined by Test Method No. Calif. 217.

For pipes less than twenty-four inches (24") in diameter, bedding and initial backfill material, as specified herein, shall be placed to an elevation of six inches (6") above the top of the pipe barrel.

For pipes twenty-four inches (24") or larger in diameter, bedding and initial backfill material, as specified herein, shall be placed to the springline of the pipe. Initial backfill material above the springline of the pipe shall be either the herein specified initial backfill materials or selected job excavated materials, finely divided and free from debris, organic matter or pieces larger than one inch (1") in diameter. The initial backfill material shall be placed to an elevation six inches (6") above the top of the pipe barrel.

For a distance of three feet (3') from the open end of a pipe not protected by a headwall or inlet structure, the bedding and initial backfill shall consist of native select, finely divided materials.

Compaction of the bedding and initial backfill materials shall be accomplished by shovel slicing, tamping, or other means as directed by the District, to assure that all voices under the pipe haunches and round the pipe are filled. Shaping of the bedding material will not be required. Extra care shall be used in placing and compacting bedding and initial backfill so as not to displace the pipe.

F. <u>Bedding and Initial Backfill Materials (Drainage) – RSP, CPEP, PVCP</u>: Bedding and initial backfill materials for Ribbed Steel Pipe (RSP), corrugated Polyethylene Pipe (CPEP), and Polyvinyl Chloride Pipe (PVCP) (Drainage) shall be crushed rock, one-hundred percent (100%) of which shall pass the three-fourth inch (3/4") sieve. The specified bedding and initial backfill material shall be placed to an elevation of six inches (6") above the top of the pipe barrel. The initial backfill material shall be brought up uniformly on each side of the pipe to prevent distortion or displacement of the pipe, and shall be consolidated by rodding or shovel slicing to assure all voids under the pipe haunches are filled.

   For a distance of three feet (3') from the open end of a pipe not protected by a headwall or inlet structure, the bedding and initial backfill shall consist of native select, finely divided materials.

SS12-02, TRENCH PREPARATION AND BEDDING (WATER): Ductile iron or polyvinyl chloride pipe may be laid on the trench bottom if the soil condition permits (see Section SS10-08, Special Foundation Treatment). The trench bottom between joints shall be cut true and even to grade so as to provide continuous contact of trench bottom with the pipe. A bell hole shall be provided at each

joint with sufficient length, width and depth to permit proper assembly and provide a minimum clearance of two inches (2”) between the outside of the bell and undisturbed trench bottom.

Supporting pipe on blocks shall not be permitted.

When rock is encountered, the trench shall be undercut to a depth of six inches (6”) below the bottom of the pipe and refilled to grade with bedding material.

When the trench bottom is cobbled or of any other material which, in the opinion of the District, might allow loss of sand bedding, the bedding material shall be crushed rock or gravel graduated so that one-hundred percent (100%) will pass the three-fourth (3/4) sieve and not more than fifteen percent (15%) will pass the No. 8 sieve.

SS12-03, INITIAL BACKFILL (WATER): The trench shall be backfilled to a point six inches (6”) above the top of pipe using sand, fine earth or other finely divided materials free from debris, organic matter, or pieces larger than one inch (1”). The backfill may be selected from job excavated material meeting these requirements. The initial backfill shall be carefully placed so as not to disturb or damage the pipe and shall be brought up evening on both sides. It shall be placed in layers not exceeding four inches (4”) in depth and hand tamped to the springline of the pipe.

SS12-04, INTERMEDIATE BACKFILL: Trench backfill above the initial backfill and to a point two feet (2’) below the t op of the trench may be job-excavated material placed in any manner determined by the Contractor. However, until the total backfill above the top of the pipe exceeds three feet (3’), machine-placed backfill material shall not be allowed to “free-fall” more than two feet (2’). Intermediate backfill shall be placed only with the approval of the District. Intermediate backfill in existing paved areas shall conform to Standard Drawing H-36.

Backfill shall be placed and compacted by an approved mechanical method in layers not exceeding eight inches (8”), to a density of not less than ninety percent (90%).

The District may designate the use of “Imported Select Backfill” in lieu of job-excavated material. If imported select backfill is required, the material and methods of payment shall confirm to Section SS-13 of these Specifications unless specified otherwise on the plans or in the Special Provisions.

SS12-05, TOP BACKFILL: Unless otherwise approved by the District, the top two feet (2’) of backfill shall be placed and compacted to a minimum relative density of ninety percent (90%) by an approved mechanical method. Top backfill in existing paved areas shall conform to Standard Drawing H-36.

If the excavation is through an area used for horticulture, lawns or other cultivated areas, the top three feet (3’) of backfill shall be designated top backfill with the final twelve inches (12”) of backfill consisting of original topsoil which shall have been removed and stockpiled separately. The topsoil shall be placed over two feet (2’) of fill that has been compacted to a relative density of ninety percent (90%). The topsoil shall be compacted by wheel rolling or other suitable means and the

trench then refilled with topsoil as necessary to bring the backfill level even with the level of the surrounding ground.

SS12-06, OTHER BACKFILL REQUIREMENTS: The Contractor shall make any accommodations necessary for the District to test backfill compaction at any point throughout the entire depth of intermediate backfill. Such provisions as may be made by the Contractor to accommodate testing shall be a normal part of the work and no additional compensation will be allowed therefore up to a maximum of three (3) tests per one-thousand feet (1,000') of pipe except that not less than one (1) test shall be required for each pipe reach between manholes.

Where cribbing is used in the trench, the fill shall be carried to a height sufficient to prevent the surrounding ground from cracking or caving into the trench before the cribbing is removed. Backfill around manholes and the pipe excavated for boring operations shall be made in the same manner as above specified for trenches. However, whenever the excavated space between the outer wall of the manhole and the undisturbed earth is twelve inches (12") or less, the backfill shall be sand, well compacted.

In street rights-of-way or traveled areas where cover over the top of the pipe is twenty-four inches (24") or less, imported select material for all sizes of pipe shall be placed level across the trench to a point twelve inches (12") above the top of the pipe. Backfill above the initial backfill shall consist of aggregate material conforming to Section SS-19 or Ss-20 of these Specifications as applicable.

If, at any time, during a period of one (1) year from the date of final acceptance of the project there is any settlement of the trenches requiring repairs to be made, the District may notify the Contractor to immediately make such repairs at the Contractor's expense (see Section G4-15 of these Specifications).

SS12-07, PAYMENT: Full compensation for trench bedding and backfill as herein specified, including all equipment, labor and materials required, shall be included in the price bid per lineal foot for the respective sizes, grades, and types of pipes and conduits listed in the Proposal and not additional compensation will be allowed therefore.

SS-13 – IMPORTED SELECT MATERIAL

SS13-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a unit price per ton for furnishing and placing imported select material for pipe backfill as shown on the plans and in the Special Provisions or as directed by the District.

The quantity shown for this item is approximate and is indicated for bid comparison only and not guarantee is made or implied that the quantities shown will not be reduced, increased or deleted, as may be required by the District.

Imported select backfill, where required, shall be measured on horizontal planes from twelve inches (12") above the top of the pipe to two feet (2') below ground surface and for the width of

the trench not to exceed the minimum trench width for the size of the pipe being installed. No compensation will be made for select imported backfill outside the area specified herein.

SS13-02, MATERIAL: Imported select backfill shall be pea gravel or crushed rock, with one- hundred percent (100%) passing the three-fourth inch (3/4") sieve and not more than ten percent (10%) passing the No. 8 sieve. The material shall have a minimum sand equivalent of fifty (50), as determined by Test Method No. Calif. 217.

22-14 – SURPLUS MATERIAL DISPOSAL

SS14-01, ITEM: Surplus materials, resulting from excavations or trenching operations that are not required for backfill or embankment construction or to satisfy right-of-way agreements as set forth on the plans and in the Special Provisions, shall become the property of the Contractor, and he/she shall dispose of the surplus materials off the rights-of-way or easement unless permitted by the District to be disposed of otherwise.

SS14—02, AGREEMENT: When any materials are to be disposed of outside the rights-of-way or easements, the Contractor shall obtain written permission from the owner upon whose property the disposal is to be made before any materials are deposited thereon. The agreement shall contain provisions to relive the District of any obligation to the property owner for any injury or damage to persons or property. The agreement shall also include a sketch showing the location where the material is to be deposited. A copy of the agreement shall be furnished the District for approval a minimum of two (2) working days prior to placing the materials. Excess materials shall not be deposited in any location which will block or restrict a natural or artificial drain. No material shall be deposited within the dripline or any oak tree except as permitted by G11-01.

SS14-03, PERMITS: The Contractor or owner of property where excess material is to be deposited shall be responsible for obtaining all required permits from any agency which may have jurisdiction over the proposed disposal site.

Copies of any required permits shall be furnished to the District. No permits will be required if disposal sites are shown on the plans unless otherwise specified on the plans or in the Special Provisions.

Prior to placing any material within the one-hundred (100) year floodplain, the Contractor or property owner shall first obtain a Drainage Permit from the District.

SS14-04, PAYMENT: No separate payment will be made for disposal of surplus material and all compensation therefore is to be included in other earthwork items.

SS-15 – PIT RUN

SS15-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for clean granular pit run compacted in place. The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only and not guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the District.

If no item for pit run appears in the Proposal and the District deems it necessary to place pit run, the material shall be furnished and compacted as extra work in accordance with Section G8-03 of these Specifications. When pit run is used to backfill an unsuitable material excavation for which the Contractor has responsibility for the cost thereof, then no additional compensation will be allowed for pit run material.

SS15-02, MATERIALS: The pit run material is to be used to replace unsuitable material encountered as specified elsewhere in these Specifications or as directed by the District. The material shall have a minimum sand equivalent of twenty-five (25). The pit run material shall be compacted to a minimum of ninety percent (90%). No additional fill shall be placed over the pit run until the District has inspected the pit run, in place and given their approval for additional fill to be placed.

SS-16 – COBBLES

SS16-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for clean cobbles I place. The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the District.

If no item for cobbles appears in the Proposal and the District deems it necessary to place cobbles, the material shall be furnished and placed as extra work in accordance with Section G8-03 of these Specifications. When cobbles are used to backfill an unsuitable material excavation for which the Contractor has responsibility for the cost thereof, then no additional compensation will be allowed for cobble material.

SS16-02, MATERIALS: the cobble material is to be used to replace unsuitable material encountered as specified elsewhere in these Specifications or as directed by the District. The material shall have a minimum of four inches (4”) in its least dimension and maximum of twelve inches (12”) in its greatest dimension. Cobbles shall be inspected, placed and compacted to the satisfaction of the District.

SS-17 – QUARRY ROCK

SS17-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing and placing quarry rock as shown on the plans and as directed by the District.

SS17-02, MATERIALS: Quarry rock shall consist of quarried stones and sixty-five percent (65%) of the stones by weight shall be between eight-hundred (800) pounds and one-thousand four-hundred (1,400) pounds. No individual stone shall weight more than twenty-five hundred (2,500) pounds or less than twenty (20) pounds, except that eight-teen percent (18%) of the stones by weight may pass the three inch (3") screen. The stones shall be angular in shape so as to form a stable protection structure of the required section. Rounded boulders or cobbles shall not be used. Breadth or thickness of individual stones shall not be less than one-third (1/3) the length.

SS-18 – CLASS "C" SUBGRADE

SS18-01, LOCATION: Those areas of existing pavement as indicated on the plan or as directed by the District to receive an overlay of asphalt concrete shall be prepared as Class "C" subgrade. Class "C" subgrade shall apply to the subgrade prepared on an existing roadbed, subbase, base, surfacing or payment which was not constructed by the Contractor, and on which a layer of subbase, base, surfacing, payment or other specified material is to be placed.

SS18-02, PREPARATION: In advance of spreading the new subbase, base, surfacing or pavement material, the existing roadbed, subbase, base, surfacing or pavement shall be cleaned of all dirt and loose material and full compensation for such work shall be considered as included in the contract price or prices paid for the subbase, base, surfacing or pavement material being placed.

If ordered by the District, a leveling course of the material to be placed shall be spread upon the existing roadbed, subbase, base, surfacing or pavement, in accordance with the Specifications for the type of material being placed and no compensation other than the contract price or prices being paid for the material will be made for such work.

Where shown on the plans or specified or directed by the District, the existing roadbed, subbase, base, surfacing or pavement shall be scarified, waterbed and rolled in advance of placing new material thereon.

Broken, failed or other unsatisfactory portions of the existing roadbed, subbase, base, surfacing or pavement and sections interfering with new construction shall be removed and disposed of. The areas and depths to be removed shall be as ordered by the District. The area in the exposed spaces shall be watered and compacted, after which the space shall be filled with subbase, base, surfacing or pavement material as directed by the District.

SS18-03, PAYMENT: The excavation or disposal of existing pavement other than that shown on the plans to be excavated as a part of, or adjacent to, an area to be excavated to provide a new structural section, shall be paid for as extra work, unless set forth in the Special Provisions and on the Proposal as a separate pay item.

Excavation of pavement and materials shown on the plans necessary for preparation of Class "C" subgrade shall be paid for as excavation as set forth in Section SS-4.

Full compensation for furnishing all labor, material, tools, equipment and incidentals and for doing all work involved in preparing Class "C" subgrade, except excavation, as shown on the plans, specified in these specifications or as directed by the District, shall be included in the contract unit prices paid for the materials, in place, on the subgrade as specified on the plans, or directed by the District.

SS-19 – AGGREGATE SUBBASE

SS19-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing Class 1 aggregate subbase material in place as shown on the plans and specified herein.

SS19-02, MATERIAL AND PLACEMENT: Aggregate subbase material and method of placing shall conform to Section 25 of the State Specifications excepting modification as herein specified. The aggregate subbase shall conform to the grading provided for two and one-half inch (2 ½") or three inch (3") maximum grading at the Contractor's option, as shown herein.

Percentage Passing Sieve

Sieve Size	By Weight	
	2-1/2" Max	3" Max.
4"	100	100
3"	100	90-100
7-1/7"	90-100	80-100
No. 4	35-70	25-50
No. 200	0-10	0-10

The weight of material to be paid for will be determined by deducting from the weight of material, the weight of water in the material at the time of weighing, in excess of one percentage point more than the optimum moisture content as determined by Test Method No. Calif. 216 Dry Density Basis. The weight of water deducted as provided herein will not be paid for.

The aggregate subbase shall have sufficient moisture, in the opinion of the District, to prevent undue segregation during the spreading operation and shall be compacted immediately after delivery and the Contractor shall be responsible for maintaining the required moisture content until the next successive layer of materials is placed. No additional compensation will be allowed for water applied to the aggregate subbase after the material has been weighed.

SS-20 - AGGREGATE BASE

SS20-01. ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing Class 2 aggregate base material in place as shown on the plans and as specified herein.

SS20-02, MATERIAL AND PLACEMENT: Aggregate base material and method of placing shall conform to Section 26 of the State Specifications excepting modifications as herein specified. The aggregate base shall conform to the grading provided for one and one-half inch (1 /12") or three-fourth inch (3/4") maximum grading at the Contractor's option, as shown herein.

Percentage Passing Sieve

Sieve Size	By Weight	
	2-1/2" Max	3" Max.
2"	100	100
1-1/2"	90-100	100
3/4"	50-85	90-100
No. 4	35-45	35-55
No. 30	10-25	10-30
No. 200	2-9	2-9

The weight of material to be paid will be determined by deducting from the weight of material, the weight of water in the material, at the time of weighing, in excess of one percentage point more than the optimum moisture content as determined by Test Method No. Calif. 216. The weight of water deducted as provided herein will not be paid for.

The material shall be deposited on the roadbed in such a manner as to provide a uniform section of material within five percent tolerance of the predetermined required volume. Deposition shall be by spreader box or bottom dump truck to prevent segregation of the material. The material so deposited on the roadbed shall have sufficient moisture which, in the opinion of the District, is adequate to prevent excessive segregation. It shall then be immediately spread to its planned grade and cross section. Undue segregation of material, excessive drifting or spotting of material will not be permitted and any material in the opinion of the District to be unsuitable segregated, shall be removed from the roadbed or completely reworked to provide the desired uniformity of the material. When the required thickness is more than six inches (6"), the base material shall be spread and compacted in two or more layers of approximately equal thickness, the maximum compacted thickness of any one layer is not to exceed six inches (6"). Each layer shall be spread and compacted in the above manner.

The Contractor shall be responsible for maintaining the required moisture content until the next successive layer of material is placed. No additional compensation will be allowed for water applied to the aggregate base.

SS21 – ASPHALT CONCRETE – TYPE "B"

SS21-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing and placing asphalt concrete, Type "B". The grade of the liquid asphalt to be used shall be determined by the District. Asphalt concrete will be paid for at the contract unit price per cubic yard in place, and not separately as mineral aggregate and paving asphalt.

SS21-02, MATERIAL AND PLACEMENT: The asphalt concrete and the method of placing shall conform to Sections 39 and 92 of the State Specifications, except as herein modified. Asphalt concrete shall be placed when the atmospheric temperature is 50*F or above. When asphalt concrete is placed as a base course, the asphalt concrete may be placed when the ambient temperature is 40*F and rising, if the material is deposited directly into the paver hopper. The Contractor shall provide a twelve foot (12') straight edge for checking surface smoothness. The Contractor's attention is specifically directed to finished surface requirements under Section 39-6.03 of the State Specifications.

SS21-03, MISCELLANEOUS AREAS: The contract unit price shall include full compensation for placing overlay areas, driveways, asphalt gutters, spillways and other incidental areas as indicated in the plans and Specifications and as directed by the District.

SS21-04, PAVING AND ROLLING: Prior written approval of the District is required before the Contractor may place asphalt concrete without the use of a paving machine. When the hourly production rate is less than one-hundred-twenty-five (125) tons per hour, one (1) tandem roller will be required as set forth in Section 39-5.02 of the State Specifications. When the hourly production rate is greater than one-hundred-twenty-five (125) tons per hour, two (2) rollers will be required. When pickup machine or front end loader issued on the paving machine, the District may required the use of an additional twelve (12) ton steel tired rolled at the paving site. In lieu of the additional roller, the Contractor may furnish a water truck on stand-by for filling rollers. After compaction, the asphalt concrete shall have a density of not less than ninety-five percent (95%) of the maximum theoretical unit weight, as determined in the laboratory by Test Method No. Calif. 304 and No. Calif. 375.

SS21—05, LEVELING COURSE: In advance of spreading asphalt concrete over exiting pavement, the District may order, in writing, a surface course mixture spread to level irregularities, dips, depressions, sags, and excessive crown and to provide a smooth base of uniform grade and cross section in order what the surface course and/or subsequent layers of surfacing will be of uniform thickness and true to grade and cross section. The spreading shall be done with blading equipment acceptable to the District and such manner as directed by the District. Asphalt concrete so spread by blade method shall be compacted as provided herein. No additional compensation will be allowed for spreading asphalt concrete as herein specified, and full compensation for all work incidentals to such operations will be considered as included in the contract price paid for asphalt concrete.

SS21-06, PAVING AGGREGATE: Aggregate for asphaltic concrete structural sections of three inches (3") or greater shall be three-fourth inch (3/4") maximum. For all other asphaltic concrete structural

sections, one-half inch (1/2”) maximum aggregate shall be used, unless otherwise specified on the plans and/or in the Special Provisions. The District may require a lesser sized aggregate where special conditions exist.

SS21-07, EXISTING PAVEMENT: Cut lines made on the existing pavement, both longitudinally and transversely, for the placing of new structural section, shall be straight and smooth. Edges shall be clean and free of dirt and dust prior to placing tack coat. Asphaltic emulsion shall be used a s tack coat or paint binder on existing pavement that is to receive an asphalt concrete overlay and also along the exposed edges of abutting pavement and concrete curbs and gutters. Its use may also be required between subsequent layers of asphalt concrete placed by the Contractor when ordered by the District. Asphalt emulsion shall conform to Section SS-25 of these Specifications. If no item is included in Proposal for asphaltic emulsion, payment shall be included in the price bid for asphalt concrete.

The asphalt concrete structural section shall be brought to the elevation of the existing pavement before the overlay is placed. The overlay joints on the top lift shall overlap the joint between the new and existing pavement.

SS21-08, THICKNESS: The minimum compacted thickness of asphaltic concrete shall be the thickness shown on the plans. The tolerance for minimum thickness for all operations shall be 0.01 feet. The tolerance for maximum thickness for asphalt concrete less than 0.35 feet shall be 0.02 feet and for thickness more than 0.35 feet shall be 0.03 feet.

SS21-09, EQUIPMENT: On streets with more than two (2) lanes and major streets, as determined in Section G6-12 of Specifications, when placing the finish lift of asphaltic concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than thirty feet (30’) long. A twelve foot (12’) long straight edge shall be required on all paving machines.

SS21-10, JOINTS: Longitudinal pavement joints shall be on or as close as possible to the lane lines. The District shall determine the locations of the longitudinal joints. At the end of each working day, the distance between ends of the adjacent improved lanes shall be between five feet (5’) and ten feet (10’).

SS-22 – WATER

SS22-01, ITEM AND PAYMENT: The method and rate of application shall conform to Section 17 of the State Specifications and as specified in other sections of the Specifications. No separate payment will be made under this item for work necessary for developing a water supply, furnishing watering equipment, construction of embankment or to maintain the required moisture content in embankments, subbases, or base courses. No additional compensation will be allowed for applying water for dust control during working hours and during other than normal work hours on the approaches to and within the project limits, as directed by the District.

SS22-02, WATER SOURCE: In accordance with Section G7-07, arrangements for water needed for construction purposes must be made with the District. Proof of such arrangement, including method of reimbursement, shall be subject to inspection and approval by the District. Before drawing any water from a District owned or operated water system, the Contractor shall obtain a permit from the District and such water shall be paid for at the current rate established by the District.

SS-23 – SAND COVER

SS23-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying sand cover for prime coat. The sand, method, and rate of spreading and payment shall conform to Sections 36 and 39 of the State Specifications. If no item for sand cover is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be include in the prices bid for other items of work, and that no additional compensation for sand cover shall be made.

SS24 – LIQUID ASPHALT

SS24-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying the liquid asphalt. If no item for liquid asphalt is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for liquid asphalt shall be made.

SS24-02, GRADES: Liquid asphalt grade shall be determined by the Engineer. The liquid asphalt and the method of applications hall conform to Sections 36, 39, and 93 of the State Specifications.

SS24-03, RATES: The liquid asphalt shall be used as prime coat for the aggregate base and as a penetration treatment for the shoulder of the road and driveways. Prime coat shall be spread at the approximate total rate of 0.25 gallon per square yard of surface covered and penetration treatment shall be spread at a uniform ate not to exceed 0.50 gallon per square yard. The exact rate and number of applications will be determined by the Engineer.

SS25- ASPHALTIC EMULSION

SS25.01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying asphaltic emulsion. The asphaltic emulsion shall be used, as a paint binder on existing asphalt concrete pavement that will be given an asphalt concrete overlay, and when ordered by the District to be used on subsequent layers of asphalt concrete placed by the Contractor. If no item for asphaltic emulsion is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items or work and that no additional compensation for asphaltic emulsion shall be made.

SS25-02, GRADE AND RATE: The asphaltic emulsion shall be of the high viscosity type to be determined by the District, and the method and rate of spreading shall conform to Sections 37, 39, and 94 of the State Specifications.

SS-26 – SCREENINGS

SS26-01, ITEM AND PAYMENT: Under these items for the Proposal, the Contractor shall bid a price per ton for furnishing and placing screenings of the size shown in the Proposal. If no item for screenings is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost of such work will be included in the prices bid for other times of work and that no additional compensation for screenings shall be made.

SS26-02, GRADE AND RATE: The screenings will be used in a double seal cost for the shoulders of the road and for other seal coats as indicated on the plans. The screenings, method and rate of spreading and the payment shall conform to Section 37 of the State Specifications.

SS-27 – DUST PALLIATIVE

SS27-01, APPLICATION: Dust palliative shall be a applied to detours, temporary surfacing and construction sites when, in the opinion of the District, this type of dust control is required. Dust palliative shall be asphaltic emulsion as specified elsewhere in these Specifications and of the type as directed by the District.

SS27-02, PAYMENT: The price bid for asphaltic emulsion shall be the price paid for dust palliative, when ordered by the District. If no item for dust palliative is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items or work and that no additional compensation for dust palliative shall be made.

SS-28 – RESTORATION OF SURFACES

SS28-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a lump sum price for restoration of surfaces removed, damaged, or displaced by the construction of the underground facilities set forth in the contract. If there is no item for restoration of surfaces in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work and that no additional compensation for restoration of surfaces will be made.

SS28-02, GENERAL: All curbs, gutters, sidewalks, driveways, road shoulders, pavement, and similar items removed, damaged, or displaced shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of material and to not less than the original dimensions, subject to minim requirements specified herein, on the plans or in the Special Provisions. All work shall match the appearance of the existing improvements as closely as practicable.

SS28-03, PRIVATE ROADS: On private roads, the trench compaction shall meet the same requirements as that for public roads and streets. Where asphalt surfacing exists, the surface restoration shall be a minimum of four inches (4") aggregate base and two inches (2") asphalt concrete. Where gravel, stone, or crush rock surfacing exists, surface restoration shall consist of a minimum of four inches (4") aggregate base. The remaining gravel or stone roadway shall be reshaped to preconstruction cross section and given an application of a minimum of two inches (2") of three-fourth inch (3/4") maximum size gravel or crushed rock compacted into place. The surface restoration of private roadways under any circumstances shall be no less than existed in the preconstruction condition.

SS28-04, RESURFACING STREETS: Final asphalt concrete surfacing of roadways and parking lots shall not proceed until ten (10) days after completion of the backfill and placement of first lift surfacing, unless otherwise approved by the District. The trench area shall be kept level with the adjacent street or shoulder and continuously maintained to prevent a traffic hazard until the permanent pavement is placed.

Repaving of trench areas in bituminous pavement shall be in accordance with Standard Drawing H-36. The asphalt concrete shall be placed in two lifts. The first lift of pavement replacement shall be included in the sequence of construction as specified in Section SS65-04 of these Specifications. A single seal coat shall be applied after placement of the final lift of asphalt concrete. After placement of the seal coat, a "shiner" shall be placed in the undisturbed portion of the roadway two feet (2') beyond the edge of the pavement. In areas where the cut extends the full width of the street, the "shiner" shall be placed on the centerline of the street two feet (2') beyond the edge of the cut pavement. The month and year of the installation and the Contractor's firm name shall be the information stated on the "shiner".

SS28-04.1 **Aggregate Base** – The aggregate base materials and placement shall meet the requirements of Section SS-20 of these Specifications (except provisions for payment), three-fourth (3/4) maximum grading. The relative compaction of the base material shall be not less than ninety-five percent (95%).

SS28.04.2 **Asphalt Concrete** – Immediately prior to placing the pavement, the tip four inches (4") of base material, or more where greater depth of paving is indicated, shall be removed and the surface re-compacted to a minimum relative compaction of ninety-five percent (95%). Additional base or underlying material that is soft or spongy shall be removed and replaced with aggregate base material and compacted in layers not exceeding six inches (6") in depth to a minimum relative compaction of ninety-five percent (95%). Edges of trenches which are broken or damaged shall be removed and neatly trimmed back to stable and undisturbed base and surface materials.

The edges of the existing pavement shall be given a tack coat of asphaltic emulsion as directed by the District. The trench shall then be filled and

compacted, in layers not to exceed two inches (2") with asphalt concrete, Type "B", confirming to Section SS-21 of these Specifications (except provisions for payment), until the trench has been brought to approximately three-fourth inch 93/4") below the finish and cross section of the street. The Contractor shall immediately repair any settlement more than one inch (1") below finish grade.

Prior to placement of the second lift, the surface of the first list of pavement and the edges of the existing pavements shall be given a tack coat of asphaltic emulsion as directed by the District. The trench shall then be filled and compacted with asphalt concrete Type "B", one-half inch (1/2") maximum gradation, as specified above, until the pavement has been brought to the final grade and cross section of the street.

SS28.04.3 **Seal Coats** – Seal coat treatments shall be applied at locations herein specified or as indicated on the plans or as directed by the District. Seal coat shall not be placed until at least seventy-two hours after placement of final paving lift.

A. Single Seal

Alternate #1: The placement of slurry seal as set forth in Section 37-2 of the State Specifications, with the exception that the fifth (5^{th}) paragraph of Section 37-2.06, "Placing", shall be modified to provide that the thickness of application of slurry seal shall be adjusted to provide one (1) layer not less than one-eighth inch (1/8") thick, not greater than one-fourth inch (1/4") thick. The requirement for wetting surface prior to placement of slurry seal is waived.

Alternate #2: Sand seal shall be provided and placed in accordance with the general provisions of Section 37-1, "Seal Coats", of the State Specifications; however, the asphaltic binder and aggregate shall be as follows:

The asphaltic materials for the construction of sand seal shall be CRS 1 conforming to the requirements set forth in Section 94, "asphaltic Emulsions", of the State Specifications.

The rate of application of CRS 1 shall vary between 8.08 and 0.15 gallon per square yard as directed by the District, depending upon the surface condition and weather.

Aggregate for sand seal shall conform to the provisions of Section 37-2.02C, "Aggregate", of the State Specifications and shall be spread at the rate of six (6) to ten (10) pounds per square yard, as directed by the District.

Preparation for seal coat, applying bituminous binder, spreading and finishing shall be in accordance with Section 37 of the State Specifications, with the exception that steel

wheeled rollers for sand seal may be eliminated and the pneumatic roller used for all seal operations.

All bituminous pavement replacements and seal shoulders sealed under one of the above alternatives shall receive the seal cost for the full width of the trench or pavement replacement, plus a minimum of twenty-four (24") on each side of the trench except that seals shall not overlap concrete curb and gutter.

B. Double Seal

Those areas indicated on the plans or directed by the District shall receive a double seal coat treatment. The first seal coat of the double seal shall be the coarse seal coat specified in Section 37 of the State Specifications. The final seal shall be as outlined herein for single seal.

SS28-04.4 Shoulders – Surface restoration of trenches located in a shoulder within six feet (6') of the traveled way, shall consist of a structural section equal to the original, or as set forth on the plans, but with a minimum of five inches (5") of aggregate base compacted to a relative compaction of ninety-five percent (95%). This aggregate base shall then receive a double seal coat treatment as outlined herein, unless otherwise specified or directed by the District.

SS28-04.4A Cuts in New Pavement – Cuts in new pavement, three (3) years old or less shall be treated as follows:

The existing pavement around the cut shall be planed to a depth of one and one-half inches (1 ½") by a method approved by the District. The planed area shall extend on each side of the cut as shown in Standard Drawing No. H-36. The planed area shall be given a tack coat of asphaltic emulsion and paved with one and one-half inches (1 1/2") of asphaltic concrete, Type B, and compacted. The final grade of the paving shall be placed as described elsewhere in this section. No seal coat shall be placed on the final paving.

SS28-05, CONCRETE: Repairs to concrete curbs, gutters, sidewalks, driveways, and other concrete surfaces shall be made by removing and replacing the entire portions between joints or scores, and not merely by refinishing the damaged part, except as follows: 91) curb and gutter shall be replaced between saw cuts or that the remaining or new curb and gutter will not be less than two feet (2') in length; (2) the entire width of sidewalk shall be replaced between saw cuts for a length of not less than two feet (2') providing the remaining sidewalk shall not be less than two feet (2') in length; and (3) driveways shall be replaced as directed by the District, either completely or partially by saw cutting in the middle of the driveway. Replacement shall be in accordance with the applicable requirements, except provisions for payment, for the type and classification of work set forth in other sections of these Specifications. If an alternate pedestrian route is not provided in accordance with G6-12, compacted asphalt plant mix cutback shall be used to provide a temporary sidewalk until replacement is completed.

SS28-06, PAVEMENT MARKINGS: The Contractor shall be responsible for replacement of crosswalks and other permanent pavement markings and raised markers when disturbed, destroyed, or covered by the work. The Contractor shall be responsible for the replacement of the markers or markings on the completed surface. The Contractor shall be responsible for the replacement of utility markers as required by the Fire Department.

SS28-07, TEMPORARY PAVING: Temporary paving shall be placed at locations indicated on the plans or directed by the District. Asphalt concrete Type "B" conforming to Section SS-21, Asphalt Concrete Type "B", of these Specifications, shall be used as temporary paving on all streets. Temporary paving in all other paved areas may be asphalt plant-mix cutback unless otherwise directed by the District. Thickness of temporary paving shall be one and one-half inches (1 ½") unless otherwise specified on the plans. Temporary paving shall be maintained at the same level as the existing pavement until the permanent surfacing is placed.

Temporary paving shall be paid for as specified in Section SS-97 of these Specifications.

SS-29 – CLASS "A" PORTLAND CEMENT CONCRETE (STRUCTURES)

SS29-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing and placing Class "A" Portland cement concrete for structures as shown on the plans and as directed by the District. The contract unit price bid per cubic yard shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work necessary to form and place concrete as indicated in the plans and Specifications and as directed by the District.

The quantity of Class "A" Portland cement concrete (structures) shown on the plans and in the Proposal shall be the final quantity for which payment will be made, as provided in Section 9-1.015 of the State Specifications.

If no item is shown in the Proposal of Class "A" Portland cement concrete (structures) and concrete structures are shown on the plans and in the Proposal on a unit price or lump sum price basis, the requirements for Class "A" Portland cement concrete (structures) as set forth in this section shall apply except s to payment and full compensation for adherence to this section shall be included in the lump sum price or bid for the structures.

SS29-02, MATERIAL AND METHOD: Class "A" concrete and method of placing and finishing shall conform to Sections 51 and 90 of the State Specifications. Grading limits of combined aggregates shall conform to Section 90-3.04 of the State Specifications.

SS29-03, SLUMP: the slump cone method, ASTM Designation: C 143, may be substituted for Test Method No. Calif. 533 as specified in Section 90-6.06 of the State Specifications. When the slump cone method is used, the nominal and maximum slump shall be twice the nominal and maximum penetration given in the State Specifications.

SS29-04, TOLERANCE: All concrete structures which have a roadway deck shall have a smooth riding surface. The finished surface shall be tested by means of a straight edge twelve feet (12') long. The surface shall not vary more than 0.01 foot from the lower edge of the straight edge. All high areas in the hardened surface in excess of 0.01 foot as indicated by the test shall be removed by abrasive means. All low areas in excess of 0.01 foot as indicated by the test shall be cut out to a depth of one inch (1") below the straight edge and patched with epoxy concrete.

SS29-05, PATCHING: Epoxy concrete for patching bridge desk shall consist of a mixture of epoxy binder and aggregate. The epoxy binder and adhesive shall be a two component mixture confirming to Section 95-2.01 of the State Specifications "binder (Adhesive), Epoxy Resin Base". Aggregate shall conform to the aggregate for Portland cement concrete in Section 90, "Portland Cement concrete" of the State Specifications. The aggregate size and proportions shall be determined by the Contractor, subject to the approval of the District. Aggregate shall be thoroughly dry when mixed with binder.

When fine aggregate is used, the grout shall consist of one (1) part of binder to approximately five (5) parts fine aggregate, by volume. When both coarse and fine aggregate are used, the concrete shall consist of one (1) part of binder to approximately six (6) parts combined aggregate, by volume.

Prior to placing epoxy concrete, the entire area to be patched shall be cleaned free of all loose and deleterious materials by abrasive blasting or machine scarifying and clean aggregate exposed.

The areas shall be surface dry and the surface temperature shall be 50 degrees Fahrenheit, or above, when the epoxy concrete is applied.

The areas to be covered shall be coated with epoxy adhesive applied at the rate of one (1) gallon for each twenty-five (25) square feet of area.

Immediately after placing, the epoxy concrete shall be thoroughly tamped or rolled into place, to minimize air voids and struck off to the required grade. The final finish shall conform to Section 51-1.17, Finishing Bridge Decks, of the State Specifications.

SS29-06, ADMIXTURES: Admixtures shall be used only when specified in the Special Provisions or when permitted in writing by the District. When specified or permitted by the District, admixtures shall be governed as set forth in Section 90-4 of the State Specifications.

SS-30 – PORTLAND CEMENT CONCRETE

SS30-01, SPECIFICATION: Portland cement concrete shall conform to Section 90 of the State Specifications except as herein modified.

SS30-02, CLASS "A": Concrete shall conform to either the one inch (1") or one and one-half inch (1 ½") gradation at the option of the Contractor, unless otherwise specified in the Specifications or in the Special Provisions.

SS30-03 CLASS "B": Concrete shall conform to either the one inch (1") or one and one-half inch (1 ½") gradation at the option of the Contractor, unless otherwise specified in these Specifications or in the Special Provisions.

SS30-04 CLASS "C": Concrete shall conform to either the one inch (1") or one and one-half inch (1 ½") gradation at the option of the Contractor, unless otherwise specified in these Specifications or in the Special Provisions.

SS30-05, ADMIXTURES: Admixtures shall be used only when specified in the Special Provisions or when permitted in writing by the District. When specified or permitted by the District, admixtures shall be governed as set forth in Section 90-4 of the State Specifications.

SS30-06: CEMENT: Portland cement shall be Type II and all cement used on a project shall be the same brand.

SS30-07, CEMENT MORTAR OR GROUT: Mortar shall consist of one (1) part of Type II cement and two (2) parts of sand by volume. Grout shall be composed of one (1) part of Type II cement and one and one-half (1 1/2) parts of sand by volume. Admixtures of hydrated lime, fire clay, diatomaceous earth, or other approved inert material may be used to facilitate workability. Embeco pre-mixed grout or additive, when specified or permitted, shall be prepared and used in strict accord with the manufacturer's directions.

Mortar and grout shall be mixed in a revolving drum or revolving blade type mortar mixer or hand-mixed in a suitable watertight mixing box. When hand mixed, the material shall be thoroughly mixed dry and then sufficient water added to bring the mixture to a workable consistency. All mortar and grout must be used before it has taken an initial set, and no re-tempering with additional water will be permitted.

SS-31 – BAR REINFORCING STEEL

SS31-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per pound for furnishing and placing the type and grades of bar reinforcing steel as indicated in the plans and Specifications and as directed by the District.

If there is no item in the Proposal for bar reinforcing steel, it shall be understood that the steel shall be furnished and placed as specified on the plans and in the Specifications and that the cost for such work shall be included in the prices bid for other items of work and that no additional compensation will be allowed therefore.

S331-02, MATERIAL AND PLACEMENT: Bar reinforcing steel shown on the plans and Proposal shall e the final quantity for which payment will be made, as provided in Section 9-1.015 of the State Specifications.

SS-32 – NOT USED

SS-33 - NOT USED

SS-34 – NOT USED

SS-35 – NOT USED

SS-36 – NOT USED

22-37 – CHANNEL LINING

SS37-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per square foot of surface area for placing the various thicknesses of channel lining as indicated on the plans and in the Proposal. The price bid per square foot of surface area for channel lining shall include full compensation for all labor, materials, and equipment necessary to place the channel lining and ramp paving, as shown on the plans and as specified herein. The vertical legs of cut-off walls shall not be considered surface area, and no separate payment will be made therefore, except, if Option 1 of Standard Drawing R-21 is selected; the surface area for payment shall be considered the same as for Option 2.

SS37-02, MATERIALS: Materials for poured-in-place concrete lining shall be Class "B" concrete and shall conform to the one inch (1") maximum aggregate gradation as set forth in Section 90 of the State Specifications. Slump for concrete channel lining shall not exceed four inches (4") s determined by the slump cone method of ASTM Designation: C 143 or an equivalent slump as determined by Test Method No. Calif. 533. Lesser slumps may be required by the District if the concrete begins to develop surface cracks. Air blown mortar shall conform to Section SS-38 of these Specifications. Air blown mortar may be used for side lining only.

When specified on the plans or in the special provisions, grouted cobbles conforming to Section SS - 81 of the Specifications shall be used for side and/or bottom lining. Reinforcing and expansion and contraction joints will not be required in grouted cobble lining.

SS37-03, PLACEMENT AND THICKNESS: The thickness of the bottom lining in channels shall not be less than four inches (4") of poured-in-place concrete. The thickness of the side lining in channels shall not be less than three inches (3") of poured-in-place concrete or air-blown mortar.

Lining shall be placed as shown on the plans and Standard Drawing No. R-21, and as directed by the District.

The appearance of the lining shall be neat and uniform conforming to the lines shown on the plans or as directed by the District. A 2" x 4" header board placed along the top of the lining or other method approved by the District shall be used as a control while placing the lining.

The surfaces of those areas to be lined shall be evenly graded to the lines and grade and sections as indicated on the plans. The surfaces shall be moistened thoroughly to prevent moisture from being drawn from the freshly placed lining. All surfaces on which lining is to be placed shall be free from water, mud and debris, and shall be firm enough to prevent contamination of the fresh lining by earth or other foreign material. Prior to placing any lining, the Contractor shall secure the District's approval of the excavated channel.

Grade control points shall be placed in accordance with SS5-02.

SS37-04, REINFORCEMENT: the channel lining shall be reinforced with six inch by six inch by ten gauge (6" x 6" x 10 gauge) welded wire fabric conforming to ASTM Designation: A 185. The welded wire fabric reinforcement shall be embedded in the concrete so that it will be a minimum of one inch 91") clear from either face of the concrete unless otherwise noted. Furnishing and placing welded wire fabric shall be included in the price bid for channel lining and no additional compensation will be allowed.

SS37-05, CONSTRUCTION JOINTS: Construction joints shall be square and shall be edged with a one-fourth (1/4) inch radius edging tool. The edge shall be thoroughly wetted before the next section of lining is placed. Construction joints shall be constructed whenever the operation is halted for a period exceeding thirty (30) minutes. Welded wire fabric reinforcing shall extend through the construction joint.

SS37-06, EXPANSION JOINTS: Transverse expansion joints shall be constructed at intervals of fifty feet (50') and shall be fitted with pre-molded expansion joint filler material. The material shall have a minimum thickness of three-eighth inch (3/8") and shall conform to ASTM Designation: D 1751. Expansion joints shall be edged with a one-fourth inch (1/4") radius edging tool.

SS37-07, CONTRACTION JOINTS: Transverse contraction joints shall be constructed at intervals of ten feet (10') and shall be scored by troweling a groove five-eighth inch (5/8") in depth and one-fourth inch (1/4") in width. All joint shall be true to a uniform line and neat in appearance.

SS37-08, WEEP HOLES: On channels with side lining extending more than eighteen (18) inches vertically above the channel toe, weep holes shall be constructed at intervals of ten (10) feet midway between contraction joints on each side of the channel. The holes shall be backed by a minimum of one (1) cubic foot of aggregate material tied in a burlap bag. The aggregate shall extend at least six (6) inches above and below and to each side of the weep hole, and at least ten (10) inches into the side slope. The side and back of the burlap sack shall be protected from being coated by mortar or concrete during the placing operation by a suitable means approved by the District. On the day following the placing of the material each weep hole shall be rodded to assure that it has

not be blocked. All weep holes shall be two (2) inches in diameter and made of galvanized steel pipe, schedule 40 or greater, polyvinyl chloride pipe (PVC), schedule 40 or greater, acrylonitrile butadiene-styrene (ABS) pipe, schedule 40 or greater, or other material approved by the District. The pipe shall be cut to fit the channel slope and shall be placed at an elevation of one (1) foot above the toe of slope.

SS37-09, CUT-0FF WALLS: Cut-off walls shall be constructed around the perimeter at each end of the channel lining and at all locations where the new lining meets structures or existing lining and in other locations as shown on the plans. The cut-off walls shall be a minimum of six (6) inches thick and eighteen (18) inches in depth measured from the surface of the lining. The welded wire fabric shall be bent down into the cut-off walls.

SS37-10, FINISHING: Poured-in-place concrete lining shall be spread and tamped until it is thoroughly compacted and mortar flushes to the surface. After striking off to grade, the concrete shall be hand floated with wooden floats not less than four (4) inches in width and not less than thirty (30) inches in length. The entire surface shall then be broomed with a fine texture hair push-broom to produce a uniform surface. Brooming shall be done when the surface is sufficiently set to prevent deep scarring, and shall be accomplished by drawing the broom parallel to the expansion and contraction joints.

Air blown mortar channel lining shall be placed as early as practicable to prevent damage to the lining sub-grade material. The fresh poured concrete surface shall be checked with a minimum ten (10) foot length straight-edge and all low spots or depressions shall be filled to finish grade. The finished concrete surface shall be smooth and uniformly constructed to the design finish grade. The air blown mortar lining shall have a finish equivalent to a broomed concrete surface.

SS37-11, CURING: Channel lining shall be sprayed uniformly with a white pigmented or clear compound. The material, method and rate of application shall conform to Section 90-7.01B of the State Specifications.

SS-38 – AIR BLOWN MORTAR

SS38-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a unit price per square foot for air blown mortar of the various thickness shown on the plans and in the Proposal.

SS38-02, USES: Air blown mortar may be used for channel side slopes as bid under the items for channel lining. See Sections SS-37 of these Specifications.

SS38-03, MATERIAL AND PLACEMENT: Air blown mortar shall conform to Section 53 of the State Specifications, except that payment shall be made on the basis of unit price per square foot in place, in lieu of the price per cubic yard set forth in the State Specifications.

SS-39 – ASPHALT CONCRETE DIKE

SS39-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per lineal foot for placing asphalt concrete dike.

SS39-02, PLACEMENT: Dikes shall be shaped and compacted with an extrusion machine only and the machine shall be capable of shaping and compacting the material to the required cross section. Any machine which, in the opinion of the Engineer, is not doing a satisfactory job, shall be removed from the project. Asphalt concrete shall be as specified in Section SS-21 of these Specifications.

SS39-03, PAYMENT: Quantities of dikes constructed asphalt concrete will be paid for at the contract price per ton for asphalt concrete, and also at the contract price per lineal foot for placing asphalt concrete dikes. Full compensation for any necessary excavation and backfill involved in undercutting cut slopes for construction dikes, will be considered as include in the contract price paid per lineal foot for placing asphalt concrete dikes and no additional compensation will be allowed therefore.

SS – 40 - NOT USED

SS-41 – NOT USED

SS-42 – NOT USED

SS-43 – NOT USED

SS-44 – NOT USED

SS-45 – PIPE OPTIONS

SS45-01, ALTERNATES: Following are the alternates for drain pipe and sewer pipe. On Proposal items where pipe options are shown, the Contractor shall bid only one of the alternates specified.

A. Drain Pipe Alternates: The Contractor, at his option, may place cast-in-place concrete pipe, precast concrete pipe, corrugated steel pipe, ribbed steel pipe, vitrified clay pipe, corrugated polyethylene pipe or polyvinyl chloride pipe, according to the alternates shown on the plans and in the Proposal. After award of the contract, should t he Contractor elect to place an alternate type of pipe from that which is shown in the plans, the price bid shall remain in effect.

B. Sewer Pipe Alternates: The Contractor, at his option, may place vitrified clay pipe, ductile iron pipe, cast iron pipe, concrete cylinder pipe, cement mortar lined steel pipe, coated steel pipe, polyvinyl chloride pipe, acrylonitrile butadiene styrene pipe or polyvinyl chlorine composite pipe according to the alternates shown on the pans and in the Proposal. After award of the contract, should the Contractor elect to place an

alternate type of pipe from that which is shown in the plans, the price bid shall remain in effect.

C. Water Pipe Alternates: The Contractor, at his option, may place cast iron pipe, ductile iron pipe or polyvinyl chloride pipe, according to the alternates shown on the plans and in the Proposal. After award of the contract, should the Contractor elect to place an alternate type of pipe from that which is sown in the plans, the price bid shall remain in effect.

SS45-02, MEASUREMENT: The unit price for pipe will be paid only for the actual length of pipe placed except s noted herein. In locations where precast manholes or saddle type manholes are to be constructed, measurement for payment shall be made from center of the manhole. Measurement for payment shall include those portions of the pipeline included in special pipe fittings, except where such fitting are listed separately in the Proposal.

SS45-03, PAYMENT: The unit price bid for pipe per lineal foot shall include the furnishing of all materials, tools, labor, and equipment necessary to excavate the trench, connect to existing facilities, bed, place and joint the pipe fittings, backfill the trench, control dust, and perform all other work necessary to produce a complete installation in accordance with the plans and Specifications. The unit price bid shall be the average price for the respective size of pipe at all depths and for all types of surface conditions.

SS-46 – REINFORCED CONCRETE PIPE (RCP)

SS46-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classes of reinforced concrete pipe as indicated on the plans and in the Proposal.

SS46-02, SPECIFICATION: Reinforced concrete pipe shall conform to the Specifications of ASTM Designation: C76, latest version.

SS46-03, JOINTS FOR REINFORCED CONCRETE PIPE: Joints for concrete pipe shall be tongue and groove, bell and spigot, or other approved type and shall e of such a design that when properly laid, they shall have a smooth and uniform interior surface. Each joint shall be sealed to prevent leakage. Sealing materials shall consist of either cement mortar, rubber gasket joint or resilient materials conforming to Section 65-1.06A, 65-1.06B, and 65-1.06C of the State Specifications. Joints sealed with cement mortar or resilient materials shall be sealed both inside and outside.

If cement mortar is used in sealing the joint, the sealed joint shall be protected and cured in a manner approved by the District. If the sealing material will not adhere to the pipe or if a portion of the outside of the joint is inaccessible, the Contractor shall use a “diaper” or other method approved by the District to properly seal the joint.

Immediately prior to making a cement mortar joint, the tongue and inside of the groove shall be thoroughly wetted with clean water.

SS46-04, CURVED ALIGNMENT: Curved alignment shall be accomplished by one of the methods described herein. The method to be used shall be as shown on the plans or as approved by the District in writing.

A. Joint Deflection: Maximum permissible deflection for cement mortar or resilient material joint shall be one-half (1/2) of the bell or groove depth, providing that both the inside and outside of the joint gaps are properly filled with jointing material.

   Maximum permissible joint deflection for gasketed joints shall be as recommended by the pipe manufacturer and shall be approved by the District. The Contractor shall submit a copy of the pipe manufacturer's recommendations for approval prior to ordering any pipe. Any gasket jointed pipe ordered prior to the District's approval of the joint deflection recommendations shall be at the Contractor's own risk.

   Pipe sections of less than standard length to reduce angular deflection of joints will be allowed only with the District's approval.

B. Beveled Pipe: Sections of pipe with one or both ends beveled may be used for curved alignment. Beveled pipe shall have a maximum deflection of five (5) degrees from a plane perpendicular to the pipe axis unless otherwise shown on the plan or approved by the District.

SS-47 – NOT USED

SS-48 – NON-REINFORCED CONCRETE PIPE (CP)

SS48-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classes of non-reinforced concrete pipe as indicated on the plans and in the Proposal.

SS48-02, SPECIFICATION: Non-reinforced concrete pipe shall conform to the Specifications of ASTM Designation: C14, latest revision.

SS48-03, JOINTS FOR NON-REINFORCED CONCRETE PIPE: Joints shall conform to Section SS46-03 of these Specifications.

SS48-04, CURVED ALIGNMENT: Curved alignment shall conform to Section SS46-04 of these Specifications.

SS-49 – CAST-IN-PLACE CONCRETE PIPE (CIPCP)

SS49-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes of cast-in-place concrete pipe as indicated on the plans and in the Proposal.

SS49-02, DESCRIPTION: Cast-in-place concrete pipe shall consist of Portland cement concrete placed in a prepared trench at the locations shown on the plans, as specified in these Specifications and the Special Provisions.

SS49-03, PIPE MAKING EQUIPMENT: the pipe shall be constructed with equipment specially designed for constructing cast-in-place concrete pipe. The equipment shall be acceptable to the District and the Contractor may be required to furnish evidence of successful operation on other work for the equipment he/she proposes to use. Equipment not suitable to produce the quality of work required for the pipeline will not be permitted to operate on the work.

SS49-04, SPECIAL EXCAVATION: Trench excavation shall conform to Section SS-10 of these Specifications and as modified herein. The trench shall be excavated to the lines and grades necessary so that the lines and rages of the completed pipe will be as shown on the plans and within the tolerance specified in Section SS49-10. The trench shall be of the proper width and the bottom of the trench shall be shaped to the external diameter of the pipe to be constructed. The bottom of the trench shall be prepared to provide full, firm, uniform support by undisturbed earth or compacted fill over a minimum of the bottom 210 degrees of the outside of the pipe. Trench width at the top of pipe shall not exceed the outside diameter of the pipe at the spring line.

At the end of each working day, the maximum amount of trench open on any one portion of the project shall be one and one-half (1 ½) times the length of the open trench necessary for placing pipe the next working day, plus the trench in which pipe was placed during the previous twenty-four (24) hours, unless otherwise permitted by the District or set forth in the Special Provisions. The remainder of the trench shall be backfilled and compacted, and when in streets or highways, opened to traffic as soon as practicable.

SS49-05, SPECIAL FOUNDATION TREATMENT: Whenever the bottom of the trench is soft, rocky or in the opinion of the District, otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed to a depth such that when replaced with a suitable material, it will provide a stable and satisfactory foundation. Suitable material for backfilling the trench below the pipe shall consist of select material approved by the District and compacted to a relative compaction of not less than ninety percent (90%).

When the material below the normal trench bottom as required for a proper foundation for the pipe is ordered removed by the District, the excavation below that point and the material required to backfill the trench to that point, shall be paid for as extra work.

Section SS10-08 of these Specifications shall apply to the construction of cast-in-place concrete pipe in fill areas and embankments.

SS49-06, CONCRETE: Concrete shall be Class "A" and shall conform to the requirements of Sections SS-30 of these Specifications as modified herein.

A. Maximum Aggregate Size

Pipe Size	Maximum Aggregate
48" or less	1"
Over 48"	1 ½"

B. Slump shall not exceed two inches (2") as determined by the slump cone method of ASTM Designation: C143 or an equivalent slump as determined by Test Method No. California 533, unless otherwise permitted by the District.

C. The minimum wall thickness for the various size of pipe shall conform to the following table:

Internal Diameter	Minimum Wall thickness
24" thru 30"	3"
33" and 36"	3-1/2
42"	4"
48"	5"
54"	5-1/1"
60"	6"
66"	6-1/2"
72"	7"
78"	7-1/2"
84"	8"
90"	8-1/2"
96"	9"
108"	10
120"	12"
132"	14"
144"	15"

SS49-07, PLACING CONCRETE: The applicable provisions of Section 51-1.09 of the State Specifications shall govern the placing and vibration of the concrete. All surfaces against which concrete is to placed shall be free from water, mud, debris, and shall be firm enough to prevent contamination of the concrete by earth or other foreign material. Absorptive surfaces against which concrete is to be placed shall be moistened thoroughly so that the moisture will not be drawn from the freshly placed concrete.

An approved method or device shall be used when placing invert concrete to insure that thickness is maintained at not less than minimum wall thickness at any point. Approval of this method or device must be obtained in writing from the District prior to commencement of work.

The cast-in-place pipe shall be constructed in one placement around the complete periphery.

The temperature of concrete when it is being placed shall be not more than 90 degrees Fahrenheit and not less than 40 degrees Fahrenheit in moderate weather, not less than 50 degrees in weather during which the main daily temperature in the vicinity of the work site falls below 40 degrees Fahrenheit for more than one (1) day, the concrete shall be maintained at a temperature not lower than 50 degrees for at least seventy-two (72) hours after it is placed. Concrete shall be protected against freezing temperatures for three (3) days immediately following the seventy-two (72) hours of protection against 50 degrees Fahrenheit. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying. If concrete is placed in such that the temperature of the concrete would exceed 90 degrees Fahrenheit, the Contractor shall employ effective means, such as pre-cooling of the aggregates and mixing water and placing at night as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees Fahrenheit.

SS49-08 – START AND CLOSE SECTIONS: A starter section shall be used at the beginning of each run of cast-in-place concrete pipe; such as beginning from an existing structure, or from a manhole, at a change in size or from a manhole at an angle point. Starter sections shall be approximately six feet (6') in length and of the same inside diameter as the cast-in-place concrete pipe unless indicated otherwise on the plans or approved by the District.

A closing section shall be used where indicated on the plans or when directed by the District, or where it is not possible to complete a run of cast-in-place concrete pipe because of lack of clearance ahead in the trench.

Starting and closing sections may be either concrete pipe or corrugated steel pipe meeting the strength requirements indicated on the plans; however, if the combined length of the starting and closing sections exceeds twelve feet 912') in one reach between manholes, concrete pipe shall be used.

SS49-09, CONSTRUCTION JOINTS: If construction of the pipes stops short of a manhole, or for a period of time exceeding twenty (20) minutes, the resulting construction joint s hall be reinforced with a concrete collar. This collar shall extend one foot (1') either side of the joint and shall be of a minimum thickness equal to that of the pipe. The resulting end of pipe shall be securely closed by a heavy canvas or equal to prevent excessive dehydration of the concrete already placed.

Joints shall be clean and damp when covered with fresh concrete or mortar. Cleaning of construction joints shall consist of removing all laitance, loose or defective concrete, coating and foreign material.

SS49-10, FINISH: Invert elevations of the completed pipe shall not vary more than 0.05 feet from the design grade for pipe thirty-six inches 936") in diameter or less and 0.10 feet from the design grade for pipe greater than thirty-six inches (36") diameter. Variations in the internal diameter shall not exceed 1/32 inch per diameter inch. Offsets at form laps shall not exceed the limits specified in the following table:

Pipe Diameter	Maximum Offset
24" thru 30"	3/8"
33" thru 42"	1/2"
48 thru 66"	5/8"
72" thru 90"	7/8"
96" and 108"	1"
120" and larger	1-1/8"

The finished surface of the concrete pipe shall be substantially free of fractures, cracks, and interior surface roughness.

The Contractor shall hand trowel the bottom 90 degrees of the inside of the pipe unless alternate provisions are made to provide a smooth interior surface satisfactory to the District. The remaining interior surface of the pipe not covered by forms shall be equivalent to a steel screened finish. All extraneous concrete shall be removed from the interior surface a soon as possible after placing.

After removal of forms, the inside of the pipe shall be inspected and any required repairs shall be made. All porous and fractured concrete shall be removed by chipping and any holes cut: in pipe for inspection or to facilitate removing the forms shall be repaired b filling with concrete or dry pitching with mortar. Rough offsets at the form laps shall be smoothed by patching with mortar or by other suitable means. Forms shall be removed within one (1) working day after removal of forms.

SS49-11, FORMS: Forms shall be strong enough to withstand the vibrating of the concrete and to permit workmen to place the concrete without causing distortion at any point, and form support systems shall be constructed so that previously placed concrete shall not be damaged. Form structure bearing plate indentations shall not exceed one-eighth inch (1/8") and care shall be taken when removing the forms to prevent damage to the pipe.

The surfaces of the forms against which concrete is to be placed shall be cleaned of all dirt, mortar and foreign material. Forms shall be thoroughly coated with form oil prior to use. The form oil shall be commercial quality form oil or other equivalent coating which will permit the ready release of the forms.

SS49-12, CURING: Immediately after finishing exposed exterior surfaces, the curing of these surfaces shall be undertaken by any one or a combination of the following methods:

A. Pigmented curing compound, blanketing, cotton mat or water proof membrane as specified in Section 90-7.01 of the State Specifications.

B. A six inch (6”) layer of most earth may be backfilled over the pipe. Care must be taken to avoid damage to the fresh concrete while placing the backfill. This backfill shall be kept moist for not less than seven (7) days.

During the period following the placement of the concrete, the ends of the pipeline shall be covered with heavy canvas or other suitable material to maintain a humid condition within the pipe for a minimum of seven (7) days, except during periods when repair work is actually in progress on the inside of the pipe.

SS49—13, COVER: Where cast-in-pace concrete pipe is placed under roadways, driveways, parking areas or other locations used by public traffic, the following cover requirements shall control.

Where cover is twenty-four inches (24”) or less, backfill shall consist of aggregate base material, meeting the requirements of Section SS-20 of these Specifications. Concrete curing shall be by methods other than moist loose soil or sand.

SS49-14, SPECIAL BACKFILL: Depth of backfill over the top of cast-in-pace pipe shall not exceed six inches (6”) until the pipe has been in place at least twenty-four (24) hours. Loose backfill may then be completed after the pipe has been in place 24 hours. Under these conditions extra care must be taken so as not to damage the pipe during placement of the backfill material. To prevent possible damage to the pipe by placing backfill directly on the pipe, the backfill shall be sloped downward to the top of the pipe. Backfill material may then be placed at the top of the slope and allowed to roll down the slope onto the pipe. Until the height of the backfill exceeds three (3) feet, machine placed backfill shall not be allowed to “free-fall” more than one (1) foot. The Contractor will be responsible for any damage to the pipe caused by backfilling operations. Light traffic (axle loads less than 6,000 pounds) may be routed over the pipe 48 hours after the pipe has been in place. Unrestricted traffic may be permitted over the pipe after the pipe has been in place in at least 72 hours. Intermediate backfill shall be placed only with the approval of the District.

Initial backfill to .6 inches over the top of the pipe shall be selected job excavated materials, finely divided and free from debris, organic matter or pieces larger than one inch (1”) in diameter or may be imported material conforming to Section SS12-01.4.

SS49-15, PAYMENT RETENTION: Section G8-06 of these Specifications is modified to provide for the retention of twenty-five percent 925%) of the in-place value of cast-in-place concrete pipe until such time as the provisions of these Specifications have been complied with and the pipe is completed, finished and backfilled to the satisfaction of the District. This section shall not operate to authorize any progress payment in excess of ninety (90%) of the total value of the work done. In all other respects, the provisions of Section G8-06 shall apply.

SS49-16, SUITABILITY OF TRENCH: it shall be the responsibility of the Contractor to determine the suitability of the excavated trench for the placement of cast-in-place concrete pipe. The Contractor shall determine whether the trench walls will provide sufficient lateral support to prevent the

deflection and cracking of the pipe from backfill and live loads, and that the trench width at the tip of the pipe will be sufficiently narrow to preclude additional loading on the pipe.

If, after examining the sides of the trench, the Contractor elects to place cast-in-place concrete pipe, and the pipe subsequently develops longitudinal cracks exceeding five (5) feet in length, the Contractor at their own expense shall replace the pipe as directed by the District.

Should the Contractor decide not to place cast-in-place concrete pipe after examination of the trench sidewalls, he shall place one of the pipe alternatives shown on the plans in accordance with Section SS-45 of these Specifications and no additional payment will be made.

SS-50 - ~~CORRUGATED STEEL PIPE (CSP)~~Replaced with HDPE (ADS N-12 or equal)

SS50-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and thickness of corrugated steel pipe, as indicated on the plans and in the Proposal. When fittings are indicated in the proposal, the Contractor shall bid a unit price per each for the respective sizes, thickness and types of corrugated steel pipe fittings. The fittings shall be fabricated and installed as set forth on the plans, in these Specifications and in the Special Provisions. If no item appears in the Proposal for corrugated steel pipe fittings the cost for furnishing and installing the fittings shall be included in the price bid per lineal foot for corrugated steel pipe and said measurement to include the centerline length of the fittings installed.

SS50-02, SPECIFICATION: Corrugated steel pipe will be allowed to be installed only when the pipe has been designed for a maintenance free service life of fifty (50) years in accordance with the methods specified in Section 7-850 of the California Department of Transportation Highway Design Manual. Corrugated steel pipe shall conform to the material and fabrication method of Section 66 of the State Specifications except as modified herein. All corrugated steel pipe shall be fabricated with helical corrugations and with a continuous loc or weld seam extending from end to end of each length of pipe. Steel shall be zinc coated unless otherwise specified. Helically corrugated steel pipe shall be fabricated using corrugated profiles as shown in the following table:

Corrugation Profile

Diameter (inches)	Nominal Pitch (inches)	Maximum Pitch (inches)	Minimum Depth (inches)
8 and 10	1-1/2	1-7/8	1/4
12 thru 96	2-2/3	2-3/4	1/2
48 thru 120	3	3-1/4	1

The corrugation profile of 2-2/3” x 1/2", shall be used for all pipes from twelve inch (12”) diameter through ninety-six inch (96”) diameter, unless otherwise specified on the plans or in the Special Provisions.

Lock or welded seams shall develop the full strength of the pipe in accordance with the herein referenced Specifications.

Pipe which has been patched shall be rejected.

SS50-03, LATERAL CONNECTIONS: Lateral filed connections between metal pipes shall be welded and any galvanizing damaged by welding shall be repaired according to Section 66 of the State Specifications.

SS50-04, PROTECTIVE COATINGS: The pipe,, couplings and fittings shall be protected with a ~~bituminous coating (lined and coated) as specified in Section 66-1.03 of the State Specifications.~~a wrap of 5mil or greater polyethylene sheeting.

Corrugated steel products shall be shipped, handled and placed in such manner as to prevent scaling, bruising or breaking of the galvanized surface or protective coating.

SS50-05, COUPLINGS: Couplings for corrugated steel pipe shall be of durable gasketed design. Couplings shall consist of galvanized steel coupling banks fitted with gaskets fabricated from neoprene or butyl rubber or other durable resilient material approved by the District, and assembled in such a manner as to form a sealed joint. The District may require that the coupling design be submitted for their approval prior to placing and may require supporting data showing that the coupling is tight and durable. Heat-shrinkable plastic couplings will not be permitted.

SS50-06, FITTINGS: Corrugated steel pipe fittings shall be constructed of the thickness of steel indicated on the plans. The material and method of placing shall conform to the standards for corrugated steel pipe as stated elsewhere in these Specifications.

The fittings shall conform to Standard Drawing no. R-3 or as shown on the drawings.

Mitered joints shall be welded from the inside where practicable. Welded joints shall be as smooth and even as practicable. Welded joints shall be repaired according to Section 66-3.05 of the State Specifications.

All fabrication shall be done in accordance with generally accepted practice for good workmanship; The Contractor shall notify the District at least forty-eight (48) hours before delivery of the fittings so that the District may inspect the fittings at the fabrication plant.

Diameter of fittings will depend on the pipe option selected by the Contractor. Upstream diameter of fittings shall match upstream pipe diameter; downstream diameter of fittings shall match downstream pipe diameter.

If the size of the corrugated pipe fitting is too large to conveniently fabricate or transport in one piece, the fitting may be fabricated in two (2) or more parts which will then be jointed at the site

with couplings. The joint shall be located sufficiently distant from a welded joint so that there is no interference between the coupling and the welded joint.

SS50-07, CURVED ALIGNMENT: Curved alignment shall be constructed by reflecting the pipe joints, using shorter pipe lengths, using prefabricated elbows or by other means approved by the District. Joint deflection in excess of one-half inch (1/2") will not be permitted unless approved by the District.

SS50-08, DISTORTION: In advance of placing backfill material around circular pipes forty-eight inches (48") or larger in diameter, the full length of the pipe shall be distorted from a true circle to provide an increase in the vertical diameter of approximately five percent (5%). Distortion may be performed in the fabricating shop or in the field. If struts or other means are required to retain distortion prior to placing the pipe, they shall not be removed until after the intermediate backfill has been placed but shall be removed prior to plastic structures at the ends of the pipe.

SS50-09, METAL COLLAR: Excepting for arch pipe, all corrugated steel pipe shall enter concrete structures as perfect circle. On pipe forty-two inches (42") or larger in diameter, a galvanized steel collar, six inches (6") in width and a minimum of thickness of 0.109 inches shall be continuously welded to the pipe in such a location that the collar shall be at the approximate center of the wall of the structure. Arch pipe with a span of fifty inches (50") or greater shall also be provided with a metal collar as specified above.

22-51 – RIBBED STEEL PIPE

SS51-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and thickness of ribbed steel pipe, as indicated in the plans and in the Proposal. When fittings are indicated in the Proposal, the Contractor shall bid a unit price per each for the respective sizes, thickness and types of ribbed steel pipe fittings. The fittings shall be fabricated and installed as set forth on the plans, in these Specifications and in the Special Provisions. If not item appears in the Proposal for ribbed steel pipe fittings, the cost for furnishing and installing the fittings shall be included in the price bid per lineal foot for ribbed steel pipe, said measurements to include the centerline length of the fittings installed.

SS51-02, SPECIFICATION: Ribbed steel pipe will be allowed to be installed only when the pipe has been designed for a maintenance free service life of fifty (50) years in accordance with the methods specified in Section 7-850 of the California Department of Transportation highway Design Manual. Ribbed steel pipe shall meet the requirements for corrugated steel pope in Section 66 of the State Specifications except as modified herein. Steel shall be zinc coated unless otherwise specified. Ribbed steel pipe shall be fabricated to one of the following configurations.

A. The pipe shall be fabricated to meet the requirements for Type IR pipe as specified in ASTM Designation A760. Section 4, 7,8. And 10; or

B. The pipe shall consist of pipe with 3/4” x 3/4" inside dimension, outward protecting reinforcing ribs located on approximately 7-1/2” centers. These ribs shall be located symmetrically between lock seams which shall be on approximately 22-1/2” centers. All ribs shall be helical and continuous.

Ribbed steel pipe shall be fabricated with a continuous helical lock seam in accordance with the above mentioned Section 66. Lock seams shall develop the full strength of the pipe. Material for the pipe shall be galvanized steel in accordance with the above mentioned State Specification.

The pipe shall be furnished with re-rolled ends to produce a profile for connecting with the approved coupling band.

Any pipe which has been damaged either during fabrication; handling or construction shall be repaired to the satisfaction of the District or shall be rejected.

SS51-03, LATERAL CONNECTIONS: Lateral filed connections between metal pipes shall be welded and any galvanizing damaged by welding shall be repaired according to Section 66 of the State Specifications.

SS51-04, PROTECTIVE COATINGS: The pipe, couplings and fittings shall be protected with a bituminous coating (lined and coated) as specified in Section 66-1.03 of the State Specifications. Ribbed steel pipe shall be shipped, handled and laid in such a manner as to prevent bruising, scaling or breaking of the galvanized surface or protective coating.

SS51-05, COUPLINGS: Coupling bands for ribbed steel pipe shall be manufactured from 0.061 inch thick galvanized steel conforming to Section 66 of the State Specifications. The coupling bands shall be either a hat shaped band, winged band, annular band, or other approved design and shall be fitted with gaskets fabricated from neoprene or butyl rubber or other durable, resilient material approved by the District and assembled in such a manner as to form a sealed joint.

Hat Shaped Band and Winged Band Couples shall conform to the following table:

BAND COUPLER/RIBBED STEEL PIPE

(Dimensions are in inches)

Pipe Size	Band Type	Band Minimum Thickness	Flange Height	Band Width	Bolt Dia.
24-36	Hat	0.064	5/8	2-3/4	1/2
42-90	Winged	0.064	5/8	7 1/2	1/2*

SS51-06, FITTINGS: Ribbed steel pipe fittings shall conform to the requirements for corrugated steel pipe fittings specified on SS50-06, except material shall be ribbed steel.

SS51-07, CURVED ALIGNMENT: Curved alignment shall be constructed in accordance with SS50-07.

SS51-08, DISTORTION: When specified by the District, the full length of the pipe shall be distorted from a true circle to provide an increase in the vertical diameter of approximately five percent (5%) prior to placing backfill material round the pipe. Distortion may be performed at the fabricating stop or in the field. If struts or other means are required to retain distortion prior to placing the pipe, they shall not be removed until after the intermediate backfill has been placed but shall be removed prior to placing structures at the end of the pipe.

SS51-09, BEDDING AND BACKFILL: Bedding and backfill shall conform to Section SS12-01.5.

SS-52 – NOT USED

SS-53 – ~~VITRIFIED CLAY PIPE (VCP)~~ No Longer allowed

Left in for reference to past installations

~~**SS53-01, ITEM AND PAYMENT**: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes of vitrified clay pipe as indicated on the plans and in the Proposal.~~

~~**SS51-02, SPECIFICATION**: Vitrified slay pipe and fittings shall conform to and meet all of the requirements of ASTM Designation: C70, Standard Specifications for unglazed vitrified clay sewer pipe, extra strength and shall conform to all materials data contained in the current Clay Pipe Engineering Manual published by the National Clay Pipe Institute. A certification of compliance with these requirements must be furnished by the pipe manufacturer.~~

~~**SS51-03, JOINTS FOR VITRIFIED CLAY PIPE (SEWER & DRAINAGE)**: Joints in vitrified clay pipe shall be of a factory applied resilient-type plastic compression type which conforms to ASTM Designation: C425.~~

SS-54 – CORRUGATED POLYETHYLENE PIPE (CPEP), DRAINAGE

SS54-01, ITEM AND PAYMENT: Under items of the proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the sizes of corrugated high-density polyethylene (HDPE) pipe as indicated on the plans and Proposal. When fittings are indicated in the Proposal, the Contractor shall bid a unit price per each for the specified fittings. The fittings shall be manufactured and installed as set forth on the plans, in these Specifications, and in the Special Provisions. If no item appears in the Proposal for corrugated high-density polyethylene pipe fittings, the cost of furnishing and installing the fittings shall be included in the price bid per lineal foot for the pipe, said measurement to include the centerline length of the fittings installed.

SS54-02, SPECIFICATION: Type S corrugated polyethylene pipe shall be manufactured from high density polyethylene (HDPE) virgin compounds and shall conform to AASHTO Designation: M294, unless otherwise specified. The pipe wall shall be of either solid or hollow rib exterior construction with a smooth inner liner.

A. Dimensions: The dimensions given for the pipe are nominal inside diameters from which the average inside diameter shall not vary more than the following:

Pipe Diameter	Maximum
12” through 18”	1/4 inch
21” through 24”	3/8 inch
Over 24”	1/2 inch

B. Materials: The HDPE compounds shall conform to the following cell classifications as provided in ASTM Designation: D3350):

Property	Cell Classification
Density	3
Melt Index	2 (a), 3 or 4
Flexural Modulus	4, 5, or 6
Environmental Stress Crack Resistance	1, 2 or 3
Hydrostatic Design Basis	0, 1, 2, 3, or 4
Ultraviolet-Stabilizer	C (b)

1. The Melt Index for cell classification 2 material used to manufacture pipe shall not be greater than 0.6. Rotationally molded couplings and end fittings may be produced from material compounds having a melt index cell classification of 1.

2. HDPE resin shall contain not less than (2 ± 1/2) percent carbon black ultraviolet stabilizer.

C. Pipe Thickness, Stiffness and Unit Weight: Wall thickness of Type S corrugated polyethylene pipe shall be the thickness of the inner liner measured between corrugation valleys. The wall thickness of the polyethylene pipe, measured as specified above, shall equal or exceed the minimum wall thickness values in Table 1.

The pipe stiffness shall be determined in accordance with ASTMA Designation: D2412 at five percent (5%) deflection. Average pipe stiffness shall be determined for each manufactured run from three (3) test specimens. Test specimen length shall be one (1) pipe diameter or a maximum of thirty-six inches (36”), whichever is less. The average pipe stiffness shall equal or exceed the minimum pipe stiffness value for each size of HDPE pipe listed in Table 1.

The pipe unit weight for corrugated HDPE shall be computed as the average weight per foot for length determined form three (3) test specimens, taken from each manufactured run. Each test specimen for pipes twenty-four inches (24") in diameter and less shall be a minimum length of two (2) pipe diameters. Test specimens for pipes larger than twenty-four inches (24") in diameter shall be one (1) diameter or a maximum of thirty-six inches (36"), whichever is less. The weight of pipe specimens shall be determined with any suitable weighing device accurate to 0.10 pounds. The pipe unit weight for each size of polyethylene pipe shall equal or exceed the minimum unit weight value for each size of plastic pipe listed in Table 1.

TABLE 1

HDPE PIPE

Nominal Diameter (inches)	Minimum Wall Thickness (inches)	Minimum Pipe Stiffness (PSI)	Minimum Unit Weight (lbs. per Lineal foot)
12	0.035	45	2.7
15	0.035	42	4.0
18	0.050	40	6.0
21	0.050	38	*
24	0.050	34	10.2
27	0.050	31	*
30	0.050	28	15.0
33	0.050	25	*
36	0.050	22	18.1

Note: The asterisk (*) indicates that those pipe sizes either are not available from manufacturers or have not been approved for use.

SS54-03, JOINTS AND CONNECTION TO STRUCTURES: Polyethylene pipe joints shall conform to either standard or positive joint requirements in Section 61-1.02 of the State Specifications. Joints shall consist of a corrugated coupling with close-cell neoprene sponge gasket or heat-shrink polyethylene sleeve. Minimum length of split coupling or heat-shrink sleeve shall be twelve inches (12") or 2/3 diameter, whichever is greater.

Connections to manholes, drop inlets or other concrete structures shall be made by concrete packing a twenty-four inch (24") long stub into the structure per Section SS76-01 of these Specifications, flush with the inner wall and connecting the snub with a split or heat-shrink coupling.

SS54-04, END SECTIONS: Polyethylene pipe shall not be placed in any situation where it will be exposed to the sun's rays and/or possible vandalism. Channel and ditch outfall structures shall use alternative pipe materials, described in these Standard Specifications. Alternative pipe materials

shall be placed immediately upstream of the outfall structure to a distance of not less than three hundred feet (300'), terminating in a manhole or junction structure.

SS54-05, BEDDING AND BACKFILL: Bedding and backfill shall conform to Section SS12-01F.

SS54-06, CERTIFICATES: In accordance with Section 6-1.07 of the State Specifications, a Certificate of Compliance shall be submitted to the engineer for the polyethylene pipe furnished. Said certificate shall certify that the plastic pipe complies with the requirements of the Specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness and the date of manufacture.

HDPE pipe supplied shall also be approved for use by the California State Department of Transportation (CALTRANS). A letter of approval from CALTRANS for the proposed HDPE pipe shall be on file in the office of the General Manager.

SS54-07, DEFLECTION TESTING: Maximum allowable deflection (reduction in vertical inside diameter) of the installed pipe shall be five percent (5%). The Engineer may require the Contractor to furnish a properly sized "Go, No-Go" mandrel, sewer ball, deflectometer or other approved device to check the maximum allowable deflection of pipes twenty-one inches (21") in diameter and smaller. Deflection testing for pipe diameter larger than twenty-one inches (21") may be determined by other means approved by the Engineer. At any location where the pipe deflection is determined to be excessive by the Engineer, the Contractor shall remove, re-bed and, if required, replace the pipe.

SS-55 – DUCTILE IRON PIPE (DIP)

SS55-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and class of ductile iron pipe, as indicated on the plans and in the Proposal.

SS55-02 SPECIFICATIONS: Ductile iron pipe shall conform to ANS1 A21.51 (AWWA C151) for a minimum working pressure of 150 psi unless otherwise specified. Ductile iron castings shall conform to and be tested in accordance with ASTM A536. Casting grade for pipe shall be 60-41-10. Laying length shall be manufacturer's standard length, normally eighteen feet (18'). Shorter lengths may be used when required for closures and proper location of special sections.

The interior surface of all ductile iron pipe shall be cement-mortar lined and seal coated in conformance with AWWA C104 and the exterior surface shall have a bituminous coating of either coal tar or asphalt base, approximately 1 mil thick.

Fittings shall be push-on, mechanical, or flanged-type ductile iron or cast iron and shall conform to AMS1 21.10 (AWWA C110) or ANS1 21.11 (AWWA C111) designed for a working pressure of 250 or 350 psi. Coating and lining requirements shall be the same as specified for pipe.

SS55-03, JOINTS: Joints shall be push-on or mechanical type and shall conform to ANS1 21.11 (AWWA C111) with rubber gaskets unless otherwise specified.

SS55-05, PROTECTIVE COATING: When shown on the Plans or specified in the Special Provisions, ductile iron pipe, couplings and fittings shall be protected with eight (8) mil polyethylene encasements as specified in AWWA C 105, Method A or B. Flanged fittings, mechanical joints or other appurtenances with significantly different outside diameters form the pipe shall be double wrapped. The Contractor shall double wrap those additional areas as indicated on the plans or required in the Special Provisions. Seams and overlaps shall be continuously sealed with tape. Circumferential overlaps shall be sealed with two (2) turns of tape half lapped. The Contractor shall gather excess polyethylene on top of pipe so as not to block backfill material from getting under the bottom of the pipe. The Contractor shall use caution so as not to rip or cut the polyethylene fill during pipe installation and trench backfill operations. The Contractor shall securely seal any rips or cuts in the polyethylene film with acceptable tape.

SS-56 – CONCRETE CYLINDER PIPE AND CEMENT MORTAR LINED AND COATED STEEL PIPE (SEWER)

SS56-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and types of concrete cylinder pipe or cement mortar lined and coated steel pipe as indicated on the plans and in the Proposal.

SS56-02, SPECIFICATIONS: Concrete cylinder pipe shall conform to Federal Specifications SS-P-381a and cement mortar lined and coated steel pipe shall conform to Federal Specifications SS-P-385a, each subject to the following modifications:

A. Minimum steel cylinder thickness shall be 0.109”

B. Mortar coating shall cover all structural steel 3/4 inch minimum

C. Cement mortar lining, using Type II cement, shall be centrifugally applied. Minimum lining thickness shall be 1/2 inch. Diameter shown on the plans shall be the finished inside diameter of the lined pipe, and shall match the inside diameter of adjoining pipe sections within one percent (1%) of the diameter or 1/4 inch, whichever is greater.

D. Pipe shall be Class 100, unless otherwise indicated.

E. Deflection of the pipe cross section shall be limited to one percent (1%) of inside diameter when the pipe is placed under full external design load.

F. Pipe sections less than standard length may be used only with approval of the District.

SS56-03, JOINTS: Joints for concrete cylinder pipe and cement mortar lined and coated steel pipe shall be O-ring rubber gasket tube with grout "diaper" finish, bolted flange type, "Dresser" couplings or "Victaulic" couplings.

SS-57 – POLYVINYL CHLORIDE PIPE (PVC), WATER AND SEWER FORCE MAIN AND EXTRA STRENGTH GRAVITY SEWER (4 INCH THROUGH 12 INCH SIZE)

SS57-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classifications of polyvinyl chloride pipe as indicated on the plans and in the Proposal. The use of polyvinyl chloride sewer force mains and gravity pipelines shall be limited to locations specified in project plans and/or Specifications.

SS57-02, SPECIFICATION:

A. Four Inch (4") Through Twelve Inch (12") Diameter Sizes (All Applications): Polyvinyl Chloride pipe shall have a maximum dimension ratio (DR) of eighteen (18) (minimum Pressure Class 150), unless otherwise specified and shall conform to AWWA Standards C900 or C909. Outside diameter (OD) pipe dimension shall be manufactured to cast iron pipe (CIP) equivalent. Pipe shall be furnished in minimum standard lengths of twenty feet (20').

B. Fourteen Inch (14") Through Thirty-six Inch (36") Diameter Sizes (Sewer Force Main and Extra Strength Gravity Sewer Applications): Polyvinyl Chloride pipe shall have a maximum dimension ratio (DR) of twenty-five (25) (minimum Pressure Class 165), unless otherwise specified and shall conform to AWWA Standards C905. Outside diameter (OD) pipe dimension shall be manufactured to cast iron pipe (CIP) equivalent. Pipe shall be furnished in minimum standard lengths of twenty feet (20').

C. Fourteen Inch (14") Through Eighteen Inch (18") Diameter Sizes (Water Applications): Polyvinyl Chloride pipe shall have a maximum dimension ratio (DR) of eighteen (18) (minimum Pressure Class 235), unless otherwise specified and shall conform to AWWA Standards C905 unless otherwise approved by the Engineer. Outside diameter (OD) pipe dimension shall be manufactured to cast iron pipe (CIP) equivalent. Pipe shall be furnished in minimum standard lengths of twenty feet (20').

SS59-03 JOINTS: Polyvinyl chloride pipe shall have integral wall-thickened bell ends designed for joint assembly using elastomeric-gasket seals. The minimum wall thickness of the integral wall-thickened bell, at any point between the ring groove and the pipe barrel, shall conform to the DR requirements for the pipe barrel. The minimum wall thickness in the ring-groove and bell-entry sections shall equal or exceed the minimum wall thickness of the pipe barrel. The elastomeric-gasket seals shall conform to ASTM F 477.

The pipe shall have a pipe stop indicated on the barrel that will accurately position the pipe end within the joint. The pipe in place shall permit thermal expansion and contraction of the pipe ends.

SS59-04 FITTINGS:

A. Pressure Applications: Fittings for polyvinyl chloride pipe shall be those specified by the pipe manufacturer. All pressure pipe fittings for twelve inch (12”) diameter PVC and smaller shall be ductile iron compact fittings conforming to AWWA C153 Class 350. Fittings for PVC fourteen inches (14”) in diameter and greater shall be standard mechanical joint connections conforming to AWWA Standard C110 or restrained to the satisfaction of the Engineer. Adaptor ‘O” rings are not acceptable.

B. Gravity Applications: Fittings for polyvinyl chloride pipe shall be those specified by the pipe manufacturer. Fittings shall employ elastomeric-gasket seals with seal ring grooves.

SS-58 – POLYVINYL CHLORIDE PIPE (PVC), DRAINAGE

SS58-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the sizes, thicknesses and series of polyvinyl chloride pipe, as indicated on the plans and in the Proposal. When fittings are indicated in the Proposal, the Contractor shall bid a unit price per each for the specified fittings. The fittings shall be manufactured and installed as set forth on the plans, in these Specifications, and in the Special Provisions. If no item appears in the Proposal for polyvinyl chloride pipe fittings, the cost of furnishing and installing the fittings shall be included in the price bid per lineal foot for the pipe, said measurement to include the centerline length of the fittings installed.

SS58-02, SPECIFICATION: Polyvinyl chloride pipe for drainage shall conform to one of the following Specifications:

Diameter	Specifications
8 inches thru 15 inches	ASTM Designation: D3034, SDR35
18 inches through 27 inches	ASTM Designation: F2241, SDR51

SS58-03, JOINTS AND CONNECTION TO STRUCTURES: Joints shall consist of either an elastomeric gasket coupling or an integral bell and spigot with an elastomeric gasket. The joints shall have seal ring grooves or other approved means for positively holding the gaskets in place. The pipe shall have a stop indicated on the barrel or other approved means to accurately position the pipe end in the joint.

Connections to manholes, drop inlets or other concrete structures shall be made by utilizing manhole adapters or elastomeric seal rings embedded in the concrete.

SS58-04, END SECTIONS: PVC pipe shall not be placed in any situation where it will be exposed to the sun’s rays and/or possible vandalism. Channel and ditch outfall structures shall use alternative pipe materials, described in these Standard Specifications. Alternative pipe materials shall be placed

immediately upstream of the outfall structure to a distance of not less than three-hundred feet (300'), terminating in a manhole or junction structure.

SS58-05, BEDDING AND BACKFILL: Bedding and backfill shall conform to Section SS12-01F of these Specifications.

SS58-06, DEFLECTION TESTING: Maximum allowable deflection (reduction in vertical inside diameter) of the installed pipe shall be five percent (5%). On pipes twenty-one inches (21") in diameter and smaller the District may require the Contractor to furnish a properly sized "go, no-go" mandrel, sewer ball, deflectometer, or other approved device and check the pipe for maximum allowable deflection. For pipes larger than twenty-one inches (21") in diameter, deflection may be determined by other means. At any location where the deflection is determined to be excessive, the District may require the Contractor to remove, re-bed and if required, replace the pipe.

SS-59 – ACRYLONITRILE – BUTADIENE-STYRENE (ABS) OR POLYVINYL CHLORIDE (PVC) COMPOSITE PIPE (SEWER)

SS59-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes of ABS or PVC composite pipe as indicated on the plans and in the Proposal.

SS59-02, SPECIFICATIONS: ABS or PVC composite pipe and fittings shall conform to and meet the requirements of ASTM Designation D2680, Standard Specifications for ABS or PVC composite sewer pipe in sizes six inch (6") through fifteen inch (15"), if six inch (6") is not available, eight inch (8") diameter may be installed at no additional project costs. Each lot of pipe and fittings shall be inspected for defects and tested in accordance with ASTM D2680. The District may require certification by the manufacturer that the test results comply with specification requirements. The pipe shall have a home mark to indicate full penetration of the spigot when a joint is made. The date of manufacture shall be marked on the pipe. Pipe being installed shall have been manufactured within twelve (12) months of the date of installation. Unless otherwise shown in the contract documents, all composite pipe shall be furnished in standard 12.5 foot lengths.

Minimum trench width shall be pipe O.D. plus twenty-four inches (24") and maximum trench width shall be pipe O.D. plus thirty-six inches (36"0 as measured at the top of the pipe.

SS59-03, JOINTS: Joints for composite pipe shall be Type SC, solvent cemented per ASTM D2680. Prior to assemblage of the pipe joints, the exposed cross sectional ends of composite pipe shall be coated with the same solvent cement used for jointing the pipe. Manhole connections shall incorporate an approved steel band and rubber gasket waterstop, or steel bands and rubber boot, which allow the pipe to deflect while maintaining a watertight connection between pipe and manhole. Alternative methods of providing a flexible watertight connection will be considered but must be submitted to the District for approval.

SS-60 – CONDUCTOR PIPES

SS60-01, ITEM AND PAYMENT: Pipe used as a conductor of another conduit under a highway, railroad or other location shall be either welded steel pipe, corrugated steel pipe or reinforced concrete pipe, as specified herein. Payment for conductor pipe shall be as specified in Section SS64-01 of these Specifications.

SS60-02, CORRUGATED STEEL PIPE: corrugated steel pipe shall conform to and meet all the requirements of Section SS-50 of these Specifications. Corrugated steel conductor shall be not less than 0.138 inches of thickness for sizes up to thirty-six inches (36”) and 0.168 thicknesses for diameters to sixty inches (60”). The sections of pipe shall be especially prepared for making field joints by bolting with 3/8 inch diameter galvanized bolts.

SS60-03, REINFORCED CONCRETE PIPE: Reinforced concrete pipe shall conform to the requirements of Section SS-46 of these Specifications except for joints. The pipe must be designed to safely bear all loads imposed by lacking in addition to the design D-loads. Only pipe using double-rubber gasket, fiberglass reinforced epoxy collar, or approve equal type joints may be used.

SS60-04, WELDED STEEL PIPE: Welded steel pipe shall be manufactured of ASTM: Designation A 570 steel. All joints shall be butt welded. Welded steel conductor shall have a minimum wall thickness of 1/4 inch for sizes up to and including seventy-four inches (74”) in diameter and 5/16 inch for sizes twenty-seven inches (27”) to thirty-six inches (36”) in diameter.

SS-61 – NOT USED

SS-62 – FLARED END SECTIONS

SS62-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and placing each of the respective sizes of steel flared end sections and concrete flared end sections as indicated on the plans and in the Proposal. Flared end sections shall be constructed of the same material and shall be furnished with the same protective coating as the pipe connected thereto.

SS62-02, SPECIFICATION: Materials, method of placing and payment shall conform to Section 70 of the State Specifications.

SS-63 – PIPE FITTINGS AND MISCELLANEOUS PIPE FACILITIES

SS63-01, PAYMENT: Unless otherwise set forth in the Special Provisions, the cost of furnishing and placing all pipe fittings shall be included in the contract unit price bid per lineal foot of the

respective type, size and classification of pipe. The payment for fittings shall be included in the length of pipe and no fittings shall be measured separately unless herein specified.

SS63-02, JOINTING: All pipe fitting jointing, including the maximum deflection of joints in curved alignment, shall be in accordance with accepted best practices. Care shall be used to prevent chipping, cracking or deformation of either end of the pipe during installation. Adjacent pipes at each joint are to be concentric. Maximum allowable eccentricity is one percent (1%) of pipe I.D. or 3/16 inch, whichever is greater. Greater eccentricity shall be corrected.

SS63-03, TRANSITION JOINTS AND FITTINGS (WATER): Joints at rigid connections between asbestos cement pipe and steel or cast iron, pipe or fittings shall be made by means of an adapter fitting or short lengths of asbestos cement pipe with standard asbestos cement coupling and ring type joint on one end. Maximum length of asbestos cement pipe at rigid connections shall be as follows:

Pipe 6 inches or less in diameter – 39 inches maximum.

Pipe 8 inches or greater in diameter – 78 inches maximum.

SS63-04, TRANSITION JOINTS AND FITTINGS (SEWER): Transition joints between different pipe materials shall be made with an approved flexible coupling. Where necessary, proper adapters shall be used.

SS-64 – BORING AND JACKING

SS64-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing by boring and lacking the respective sizes and types of pipe shall be placed in a conductor. The unit price bid per lineal foot of bored and jacked pipe shall include the conductor pipe, if specified or if permitted, the pipe to be placed in the conductor, all excavation, backfill, and all other tools, material, labor and equipment to complete the installation in accordance with the plans and Specifications.

SS64-02, GENERAL: All conductor pipe, pipe to be conducted and fittings shall conform to the applicable portions of these Specifications.

The equipment, method and sequence of operation and conductor pipe grades shall be approved by the District before proceeding with the work.

Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing and shoring shall be adequate to protect workers and any adjacent structure or roadbed. Special backfill requirements may be specified for pipe installed in the area excavated for the boring operation.

Unless expressly specified otherwise, the Contractor may elect to either jack reinforced concrete pipe, directly or place it in a conductor in conformance with these Specifications.

SS64-03, DIRECT JACKING OF REINFORCED CONCRETE PIPE OR REINFORCED CONCRETE PIPE SEWER: Only pipe using double-rubber gasket, fiberglass reinforced epoxy collar or approved equal type joints may be lacked directly. The pipe must be designed to safely bear all loads imposed by lacking in addition to the design D-loads. Guide rails shall be accurately set to line and grade to insure installation within tolerances allowed. Maximum length of direct lacking shall be one-hundred feet (100'). The diameter of the hole shall not be more than 0.1 foot greater than the outside diameter of the reinforced concrete pipe or reinforced concrete pipe sewer.

SS64-04, INSTALLATION OF CONDUCTOR: The conductor shall closely follow the boring operation. The bored hole shall not be more than 0.1 foot larger in diameter than the outside diameter of the conductor. Guide rails shall be accurately set to line and grade to insure installation of the conductor within allowable limits. Conductor diameter shall be sufficient to allow adjustment of line and grade of the conductor and the conducted pipe. Minimum conductor diameter shall be six inches (6") larger than the outside diameter of the conducted pipe joints.

SS64-05, PLACING PIPE IN CONDUCTOR: Conductor VC sewer pipe, of which any part of the joint is larger in diameter than the barrel of the pipe, shall be strapped to two (2) redwood skids twenty-four inches (24) to thirty inches (30") in length with steel straps. The redwood skids shall be near the center of each pipe section and shall be large enough to prevent any part of the joint from bearing on the conductor. Each joint of conductor water pipe shall be strapped to two (2) pairs of redwood skids, twenty-four inches (24") to thirty inches (30") in length, centered at points approximately one-fifth (1/5) the pipe length from each end.

Conducted pipe with joints not larger than the pipe barrel shall be slid into place on two (2) redwood skids which have been securely fastened to the invert of the conductor or strapped to the barrel of the pipe, at locations hereinbefore specified.

Pipe sections shall be joined outside the conductor and then slid into place. The space between the conducted pipe and conductor shall be completely filled with clean, dry sand blown into place. The method of placing sand shall be subject to the District's approval. Necessary adjustments in grade shall be made by adjusting the height of the skids.

SS64-06, BACKFILL OF VOIDS: Whenever, in the opinion of the District, there is the likelihood of ground loss which would result in a greater space between the outer surface of the conductor or direct jacked pipe than herein allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least eighteen inches (18") from the grading edge of the conductor. The jacking head shall cover the upper two-thirds (2/3) of the conductor and project not more than one-half inch (1/2") beyond the conductor's outer surface. Excavation shall not be made in advance of this jacking head.

Voids greater than allowable shall be filled with sand, soil cement or grout as directed by the District. Where voids are suspected, the District may direct the Contractor to drill the conductor, to

pressure inject grout to refusal and then to repair the drilled hole. Grouting pressure shall not exceed 50 psi at the nozzle.

SS64-07, TOLERANCES: Extreme care shall be exercised by the Contractor to maintain line and grade during lacking operations. Maximum deviation from stated line and grade of conductor pipe shall be such that line and grade of the conducted pipe can be adjusted a sufficient amount within the conductor pipe to achieve the line and grade shown on the plans. This adjustment shall be made to all pipes deviating from line and grade and not merely to the sections of pipe nearest the end of the conductor.

Directly jacked reinforced concrete pipe will be allowed a maximum deviation of 0.25 foot per 100 feet from intended line and grade unless more stringent tolerances are shown on the plans or directed by the District.

SS64-08, DRY BORING UNDER CURB, GUTTER AND SIDEWALK: Portions of sanitary sewers, service sewers, drainage lines and water mains and services which pass beneath curbs and gutters, sidewalks and other obstructions may be placed by boring. If under the curb, gutter and sidewalk, the bore shall begin at the lip of the gutter and continue to slightly past the property line. For sewer services, the end of the pipe shall then be capped or plugged and the pipe pushed into the hole. To determine final line and grade and to install the cleanout or the location post, the property end of the bore for a service sewer shall be exposed.

If the pipe material is vitrified clay, the pipe shall be plain end connected with compressor type couplings. The bore shall be just large enough to pass the couplings and need not be backfilled. The maximum length of bore shall be fifteen feet (15’) unless otherwise specified.

Boring shall not be used on sewer services when the required slope is such that probable deviation of the bore from the intended line would result in a final slope of less than 1/4 inch per foot.

SS64-09, WET BORING OF SMALL DIAMETER PIPELINES: Where expressly specified in the contract documents, six inch (6”) and smaller pipelines may be installed by wet boring. Pipe material shall be ductile iron as specified in Section SS-55 of these Specifications, with push-on joints. PVC Pressure Class 200 (Dr-14) pipe conforming to the requirements of AWWA C900 may be used in lieu of iron pipe. The pipe joint for PVC joint for PVC pipe shall be as specified in Section SS57-03 of the Specifications.

If the diameter of the bored holes is more than 0.1 foot greater than the outside diameter of the pipe to be installed, the void shall be backfilled with sand, soil cement, or grout as directed by the District. The limitation on grade deviation as specified in Section SS67-01 shall apply.

SS-65 PIPE INSTALLATION (SEWER AND DRAINAGE)

SS65-01, PIPE LAYING: Sewer pipe shall be laid in strict conformity to the prescribed line and grade with grade bars set and each pipe length checked to the grade line. Three consecutive points on the

same rate of slope shall be used at all times to detect any variation from a straight grade. In case any discrepancy exists, the work shall be stopped and the discrepancy immediately reported to the District. In addition, when requested by the District, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The elevation of the pipe invert shall not deviate from the design elevation by more than $\pm$2 percent of the pipe size concerned or one inch (1") whichever is greater. The rate of deviation from grade or returning to grade shall be limited to 1/16 inch per foot of pipe.

For drainage pipes less than thirty-six inches (36") in diameter, allowable deviation in profile shall be 0.05 foot. For drainage pipes greater than thirty-six inches (36") in diameter, allowable deviation in profile shall be 0.10 foot; allowable deviation in slope shall be 0.15 foot in any ten feet (10') length of pipe.

Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe placed upstream. Each section of pipe shall be laid to line and grade as herein specified and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be clear of all dirt and debris and excess joint sealing material as the work progresses. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. All open ends of sewer pipe and fittings shall be adequately and securely closed whenever the work is discontinued for more than one-half (1/2) hour. If pipe with elliptical or quadrant or quadrant reinforcement is used, care shall be taken to properly orient the axis.

Where plain end vitrified clay pipe with the compression coupling is installed, the Contractor shall tighten the compression bands as pipe laying proceeds. The first length of pipe laid on any run, except where a connection is made to an existing line, shall be anchored securely to prevent movement when each succeeding length is pushed home. After each compression band is torqued, the Contractor shall replace and tamp any bedding material that may have been displaced under the pipe and particularly under the coupler before proceeding with the initial backfill.
All joint surfaces shall be cleaned before joints are made.

The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, by the District, prior to trenching for any pipe which may be affected. All cost of such excavation and backfill shall be included in the price paid for various items of work. Trench excavation, bedding and backfill shall conform to Section SS-10 and Sections SS-12 of these Specifications.

SS65-02, SEWER AND DRAINAGE PLUGS: Temporary plugs of brick or mortar shall be installed on all sewer projects at points of connection to existing facilities. These plugs shall remain in place until completion of the balling and flushing operation. The plugs, intended to prevent water from balling and flushing operation, drainage or any other condition from entering the existing system, shall be installed or removed in the presence of and under the direct supervision of the District. Until the system has been pumped clear of accumulated water, the plugs shall not be removed. This water must not be allowed to enter adjacent sewer or drainage systems.

SS65-03, EXISTING UTILITIES: All utility, service or other conflicting lines which are not in direct physical conflict with the facility under construction, are to be worked around by the Contractor and not additional compensation will be made therefore. However, the Contractor for their convenience may arrange with the owner of the utility to temporarily disconnect house service lines or other facilities along the line of work and the cost of disconnecting and restoring such utilities shall be borne by the Contractor.

Utility o r other lines which are in direct physical conflict with the structural section of the facility being constructed or appurtenant structure thereto, and which cannot be avoided by rerouting the facility being constructed or for which relocation is not provided for in t he plans and Specifications, will be relocated by the owner of the utility prior to or during construction of the project. If these relocations have not been accomplished at the time the contract is awarded, the Contractor shall schedule their work and cooperate with the owner of the utility for the relocation of the conflicting utility so as to cause a minimum of interference with the Contractor's operations.

Should it become necessary to reroute the facility being constructed to avoid an existing utility or other obstruction and such rerouting is ordered by the District, compensation for the installation of such rerouted line shall be made at the unit price bid for the installation of said facility and no additional compensation will be made except as provided for in Section G6-14 of these Specifications. In addition to the above, the Contractor's attention is directed to the other provisions of Section G6-14 of these Specifications.

SS65-04, SEQUENCE: In all sewer and drainage projects, excepting new subdivision improvements, no more than 3,000 lineal feet of pipe shall be installed before starting manhole construction, installation of service sewers on sewer projects, placement of first lift of pavement and cleanup with this sequence being maintained throughout the construction period unless otherwise directed by the District. The work set forth above at any given location is to be completed within fifteen (15) working days after starting construction at that location. No longer than thirty (30) calendar days shall elapse from the time the trench is backfilled until placement of final paving, unless delayed by weather.

SS65-05, INTERNAL INSPECTION: Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which in the opinion of the District resulted from the new installation, shall also be removed by the Contractor. Pipes up to and including twenty-four inch (24") diameter shall be cleaned by the controlled balling method, except where cover over the top of the pipe at the upstream manhole is three feet (3') or less, alternate means of cleaning may be used if approved by the District in writing. Pipes over twenty-four inch (24") diameter shall be cleaned as approved by the District. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt and debris from entering the existing facility. Temporary plugs for sewer systems shall also conform to Section SS65-02 of these Specifications. Water from the drainage system operations shall be routed through a suitable trap to collect any dirt and debris prior to discharging into any downstream facility. The

Contractor shall notify the District immediately after completion of the pipe cleaning operations. Cleaning of drainage pipes by the controlled balling method will not be required.

As soon as possible after the completion of the pipe cleaning and prior to placement of pavement, the District may make visual internal inspection of the new pipeline either manually or with television equipment.

SS65-06, MEASUREMENT AND PAYMENT: Measurement of pipe shall be the total distance along the centerline of the pipe as installed from center to center of manholes and shall include the straight run of all wyes and tees where used.

The price per lineal foot of pipe includes the furnishing of all materials for construction of the pipe, fittings and connections and all labor, materials and equipment necessary to excavate the trench, remove all obstructions, remove and replace all utilities where necessary, bed, place and joint the pipe, backfill the trench, restore the surfaces, test the pipe lines, connect to existing manholes or pipes, furnish preconstruction photographs when applicable, and do all other work necessary to provide a complete and finished job in accordance with the drawings and Specifications. The unit price shall be the average price for lines of all depths and bedding types of a given size.

SS-66 – PRECAST CONCRETE MANHOLES

SS66-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price each for constructing the various sizes and types of precast concrete manholes as indicated on the plans and in the Proposal.

SS66-02, DIMENSIONS: Precast manholes shall consist of cylindrical sections, all with joints and base construction as detailed on Standard Drawing No. S-1 or S-1A for sanitary sewer manholes and No.R-25 for drainage manholes.

SS66-03, SPECIFICATIONS: Precast manhole barrels, risers, cones, flat tops, and grade rings shall conform to ASTM Designation: C478 with the additional requirement that the cement used shall be Type II. Twenty-four inch (24”) manholes may be precast or cast-in-place as shown on Standard Drawing No. R-27. Manhole sections shall be manufactured without provision for steps.

Flat slab tops shall be constructed of Class A concrete with Type II cement and shall conform to Standard Drawing No. R-25 if Type A standard sixty inch (60”) manhole or S-2 Type B standard sixty inch 960”) manhole.

Manhole bases may be precast or cast-in-place. If precast, they shall be placed on a minimum of four inches (4”) of crushed rock of 3/4 inch maximum size. Elevation differentials of inlets and outlets must conform to the plans. Channelization shall conform to the detail on Standard Drawing No. S-1 and to Section SS66-08 of these Specifications. Stubs or couplings provided in precast bases shall be of the same material as the pipe to which they connect unless otherwise approved by the District. The use of a precast base with six inch (6”) stubs for the connection of four inch (4”) service

sewers is not allowed. If a precast base is installed with a manhole at the end of a cul-de-sac, it shall be manufactured with four inch (4”) stubs for the service sewers with the crown of the services a minimum of one inch (1”) above the crown of the exit pipe. Connection may be made using a resilient connector conforming to ASTM Standard C923 such as Kor-N-Seal, A-LOK or equal.

Mortar used in finishing the manhole and method of placing shall conform to Section 51 of the State Specifications. An ‘Ordinary Surface Finish’ as specified in said Section 51 will be required.

SS66-04, CONES: Standard concentric cones conforming to ASTM Designation: C478 shall be used on all manholes shown on the plans unless otherwise specified. Where the depth is insufficient for cones, flat slab tops shall be used. Eccentric cones shall be used where specified on the plants. An eighteen inch (18”) high cone, as shown on Standard Drawings No. $-25, may be used for a sanitary sewer manhole where the depth is less than four feet (4’). Lifting holes in precast cones and grade rings shall be plugged with dry-packed mortar.

SS66-05, JOINTS: Joints in precast manhole shafts shall be made by buttering the joint space previously laid with mortar or shall be made with preformed plastic sealing gaskets conforming to Federal Specifications SS-S-00210 and installed as recommended by the manufacturer. All joint surfaces shall be thoroughly cleaned prior to placing the sealing compound or buttering with mortar. Both the inside and outside of mortared joints shall be plastered with mortar and the inside brushed to a smooth finish with a wet brush. Special precautions shall be taken to see that the entire joint space is filled with mortar and is watertight.

SS66-06, FRAMES AND COVERS: Manhole frames and covers shall be of the type and size shown on the plans and shall conform to Standard Drawings No. R-24 or R-24B and Section SS-75 of these Specifications, unless otherwise stated on the plans or in the Special Provision. Drainage grate manhole covers shall conform to Standard Drawing R-23; if not subjected to vehicular traffic the cover may conform to Standard Drawing R024A. Frames and covers shall be set flush with the finish grade unless otherwise herein specified or otherwise stated on the plans or in the Special Provisions. In improved areas, there shall be a minimum of four inch (4”) width collar of concrete placed around the frame after it is set to final grade. The concrete shall extend from two inches (2”) below the top of the manhole cone to a point one inch (1”) beneath the top of the casting. The joint between the manhole frame and the cone or grade ring shall also be made by buttering the joint space with mortar, except that where a sewer manhole is constructed in a location to remain unpaved, the frame shall in addition to be bolted in place using four and one-half inch (4 ½”) diameter bolts or the joint shall be made using the epoxy adhesive. The adhesive shall be as described in Section 95-2.05 of the State Specifications for Pavement Marker Epoxy Adhesive, Standard Set (Spec. 8040-51 B-09) In such unimproved areas, the rim of the frame should be set twelve inches (12”) above existing ground level.

SS66-07, CONNECTIONS: Pipe connections to drainage manholes shall be made so that the pipe is flush with the inside face of the manhole. These connections shall be finished so that entrances are smooth. Unless the manhole is cast around the pipe, connections shall be dry packed with cement mortar as directed by the District.

Pipe connections shall be made into the cone section of the manhole unless approved by the District.

Pipe stubs for lateral sewers shall be built into the structures as shown on the plans. The outer ends of the stubs shall be sealed securely by a cap or stopper of material compatible with the pipe.

SS66-08, FLOW CHANNELIZATION: Unless otherwise indicated, flow channels shall be proved in the sanitary sewer manhole base by fillets as shown on Standard Drawings No. S-1. Special care shall be taken to form a smooth transition between inlets and outlets, with good hydraulic properties. Any sharp corners or significant department from the dimensions indicated shall be cause for reconstruction. Pipe may be laid continuously through straight run manholes and the top one-half (1/2) of the pipe subsequently cut out inside the manhole, prior to forming the channelization.

SS66-09, CAST PORTION: The Contractor may, at their option, cast the lower portion of drainage manholes in place. The cast-in-place portion shall not be placed higher than six inches (6”) above the outside tops of the main incoming and outgoing pipes. Concrete used for construction shall conform to Section SS30-03 of these Specifications. Slump shall not exceed two inches (2”) as determined by the slump cone method of ASTM Designation: C143 or an equivalent slump as determined by Test Method No. California 533. Minimum and maximum wall thickness for the cast in place sections shall conform to the following table:

Manhole Diameter	Minimum Wall Thickness	Maximum Wall Thickness
48”	5”	7”
60”	6”	8”
72”	7”	9”

Inside diameters of cast-in-place portions shall equal the diameter of the manhole specified. Standard precast manhole riser sections and/or cones shall be placed above the cast-in-place section to bring the manhole rim up to grade.

Maximum and minimum wall thickness for cast-in-place portion of manholes shall be strictly adhered to. Concrete on the cast portion may be placed neat against undisturbed earth provided wall thickness requirements are met; otherwise outside forms shall be required.

SS60-10, DROP CONNECTIONS: *Refer to SASD Standards and detail drawing MH-09*
~~Inside and outside drop sewer connections are detailed on Standard Drawing No. S-2 and shall be installed at all manholes where the plans show sewer connections to be placed. Outside drop connections shall be constructed only at manholes where the plans specifically indicate their construction.~~

SS66-11, CAST-IN-PLACE GRADE ADJUSTMENT: Grade adjustment may be made by utilization of precast grade rings or in new subdivision only by a cast-in-place ring. The latter shall have a

minimum height of four inches (4”) and a maximum of fifteen inches (15”). The concrete pour shall extend to one inch (1”) beneath the top of the casting. The minimum height of the precast rings shall be three inches (3”) and the maximum twelve inches (12”).

SS66-12, PAYMENT: The contract unit price paid for precast reinforced concrete manholes shall be paid at the unit price bid and shall include excavation, precast concrete items, pipe and fittings for stubs and stoppers and for inside and outside drop sewer connections as detailed on the Standard Drawings, flat top covers, cast iron frames and cover (bolt on type where specified), concrete, backfill, restoration of street surfaces, and all other labor, equipment and material necessary for completion of the structure in accordance with the drawings and Specifications. The unit price bid shall be the average price for manholes of all depths and types indicated on the plans and in the Proposal.

SS-67 – SADDLE MANHOLES

SS67-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price each for constructing the various types of saddle manholes as indicated on the plans and in the Proposal.

SS67-02, SPECIFICATION: Saddle manholes shall be constructed in accordance with Standard Drawing No. R-26. Risers, cones and grade rings, flat tops, eccentric cones and other features of the manholes shall be constructed in accordance with Section SS-68 of these Specifications.

Manhole frame and cover, Standard Drawing R-24 shall be used unless otherwise specified on the plans or in the special provisions.

Portland cement concrete and reinforcing steel shall conform to Section SS30-03 and Section Ss-31 of these Specifications.

SS67-03, PAYMENT: The contract unit price paid for saddle manholes shall be paid at the unit price bid and shall include excavation, concrete, precast items, flat top covers, cast iron frames and cover (bolt-on type where specified, concrete reinforcing backfill, restoration of street surfaces and all other labor, equipment and material necessary for completion of the structure in accordance with the drawings and the Specifications. The unit price bid shall be the average price for manholes of all depths as indicated in the plans and in the Proposal.

SS-68 – DROP CONNECTIONS EXISTING MANHOLES

SS68-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for constructing inside and outside drop connections at existing manholes.

SS68-02, SPECIFICATIONS: Drop sewer connections shall conform to Standard Drawing No. S-2 of these Specifications unless otherwise detailed on the plans. Outside drop connections shall be constructed only at manholes where the plans specifically indicate their construction.

SS68-03, PAYMENT: the cost of both inside and outside drop connections to all existing manholes shall be paid for at the unit price bid and shall include excavation, pipe and fittings, concrete, connections to existing pipes or structures, backfill, restoration of surfaces, and all other labor and equipment necessary for completion of the drop connection in accordance with the plans and Specifications. The cost of inside and outside drop connections constructed with new manholes shall be included in the unit price for precast reinforced concrete manholes as specified in these Specifications.

SS-69 – DROP INLET

SS69-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per each for constructing the respective types of drop inlets as indicated in the plans and the Proposal.

SS69-02, SPECIFICATION: Drop inlet types shall conform to the SASD Standard Drawings.

Concrete for inlets shall be Class "B" and conform to Section SS30-03 of these Specifications. Reinforcing steel shall conform to Section SS-31 of these Specifications. The concrete box portions of the drop inlet shall be cast to the proper grade in a maximum of two (2) placements of concrete. Use of grout to adjust the drop inlet frame to the proper grade will not be permitted without specific approval of the District.

Reinforcing bar supports or other approved means shall be used to hold the frame at proper grade during final placement of concrete. Broken pieces of concrete or other debris shall not be used for this purpose.

Concrete construction, including formwork, shall conform to Section 51 of the State Specifications. The interior of the drop inlet shall have an Ordinary Surface Finish: exposed top surfaces shall have a Class I Surface Finish. Grate and frame assemblies shall conform to Section SS-83 of these Specifications.

SS69-03, PAYMENT: The price bid per drop inlet shall be paid at the unit price bid and shall include all excavation and backfill, concrete, steel, grate, frame, and connections to place the complete unit as set forth on the plans and Specifications. The unit price bid shall be the average price for drop inlets of all depths for the type indicated in the Proposal. Cost of removal and replacement of the required amount of any existing curb and gutter to obtain the standard depression, as shown on Standard Drawing R-6, shall be included in the unit price bid per each drop inlet.

SS-70 – INLET AND OUTLET STRUCTURES

SS70-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price each for construction of inlet structures with trash racks and outlet structures with access control racks.

SS70-02, SPECIFICATION: Inlet structures with trash racks and outlet structures with access control racks shall conform to Standard Drawings R-15, R-16, R-17 and R-18. Concrete for inlet and outlet structures shall be Class "B" and shall conform to Section SS30-03 of these Specifications. Reinforcing steel shall conform to Section SS031 of these Specifications.

SS70-03, PAYMENT: The price bid each for construction of inlet and outlet structures with racks shall be paid at the unit price bid and shall include full compensation for all materials, labor, equipment, excavation, and backfill necessary to place the unit, complete, as shown on the plans and in the Specifications. The unit price bid shall be the average for all sizes of the type of rack shown on the plans.

SS-71 – EROSION CONTROL APRONS

SS71-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price each for constructing pipe or ditch erosion in those locations shown on the plans.

SS71-02, MATERIAL AND PLACEMENT: The materials for constructing erosion control aprons shall conform to Section SS-37 of these Specifications. Details of placement shall conform to Standard Drawings No. R-19 and No. R-20.

When specified on the plans or in the Special Provisions, erosion control aprons shall be constructed of grouted cobbles conforming to Section SS-82 of these Specifications. No reinforcing will be required in grouted cobble aprons.

SS71-03, PAYMENT: The unit price bid for pipe or ditch erosion control aprons shall be full compensation for all labor, materials, excavation, backfill and equipment necessary to lace the aprons, complete, in accordance with the Specifications and drawings. The unit price bid shall be the average price for all pipe or ditch erosion control aprons of the sizes and types indicated on the plans and in the proposal.

SS-72 – GUTTER DRAINS

SS72-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for construction of gutter drains.

SS72-02, SPECIFICATION: The gutter drain shall conform to Standard Drawing No. R-14.

SS72-03, PAYMENT: The unit price shall include full compensation for all excavation, backfill, concrete, frame, grate, connecting elbow and all other work necessary to complete the installation.

SS-73 – CASTINGS

SS73-01, MATERIALS: Castings for manhole frames and covers, drop inlet frames, gutter drain frames, open-back hoods, flushing branch frames and covers, or other purposes, shall be tough grey iron, free from cracks, holes, swells and cold sheets and be of workmanlike finish. A "Certificate of Compliance" signed by an authorized agent of the manufacturer or supplier shall be required and be delivered to the District as specified herein. Each certificate so furnished shall be accompanied by a copy of test results stating that the material has been sampled, tested and inspected in accordance with the provisions of the latest issue of AST< A-48, Gray Iron Castings. Test bar shall be cast and tested for the first lot of castings every four (4) months thereafter. If production is interrupted for any period long than four (4) months, test bars shall be cast and tested from the initial lot after production is resumed and every four (4) months thereafter. The first lot is defined as the first castings produced after January 1st of each year. The tension tests specified shall be performed and the results certified by an independent testing laboratory located in the United States of America. The cast iron shall meet the requirements of ASTM designation: A 48, class 25. The seating faces of manholes covers and frames shall be machined as shown on the drawings to assure a tight fit and prevent rocking. The name of the manufacturer shall be cast on the manhole cover and on the frame. In addition, the day, month and year of manufacture shall be cast on the frame and cover adjacent to the name of the manufacturer. Twenty-four inch (24") diameter manhole frames and covers shall conform to Standard Drawing No. R-23, R-24 or R-24A unless otherwise specified on the plans or in the Special Provisions. Thirty-six inch (36") diameter manhole frames and covers should conform to Standard Drawing R-24B.

When required by the District, proof –load tests shall be performed on manhole frames and covers in accordance with paragraph 4.7.1 and paragraph 3.11.1 of Federal Specifications RR-F-621C (August 10, 1977) or the latest issue.

When locking type covers are specified, they shall be standard covers drilled and tapped on 120° centers and bolted to the frame with 7/16" x 1 – ¼" bras hex head cap screws.

Exposed edges of castings shall be chamfered or rounded and all exposed surface shall be smooth unless otherwise shown.

Manhole frames and covers shall be clearly marked with the country of origin as specified in the Trade and Tariff Act of 1984.

At the Contractor's option, drop inlet frames and open back hoods may be fabricated from steel plate and structural shapes in lieu of cast iron. If the Contractor elects to use fabricated steel drop inlet frames or open back hood, he/she shall submit drawings of these items to the District for approval prior to fabrication. This submittal requirement does not apply to the drop inlet frame shown on Standard Drawing R-5.

SS73-02, PAYMENT: The cost of furnishing and placing manhole frames and covers, flushing branch frames and covers, drop inlet frames, gutter drain frames and hoods shall be included in the contract unit price bid for manholes, drop inlets, gutter drains and/or other items of work.

SS-74 – ADJUST MANHOLES TO GRADE

SS74-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per each for adjusting manholes and flusher branches to grade or elevation as indicated on the plans and as directed by the District. Adjustments may be made by utilization of precast grade rings or by a cast-in-place ring, in accordance with Section SS66-11 of these Specifications.

SS74-02, SPECIFICATIONS: Method and payment for adjusting manholes shall conform to Section 15-2.05A of the State Specifications, except that raising devices are not allowed and the unit price bid shall include all necessary excavation, backfill, sealing and concrete and that the unit price shall be the average of all depths and limits of adjustment required.

SS74-03, MANHOLES WITHIN TRAFFIC LANES: Adjusting manholes to grade within marked traffic lanes shall be completed, including placing paving material around and to the level of the ring and cover, by the end of the same day on which work started. If permanent pavement backfill cannot be completed by the end of the work day, the Contractor shall place temporary paving material to the level of the cover.

SS-75 – FLUSHING BRANCHES

SS75-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for flushing branches.

SS75-02, SPECIFICATIONS: Flushing branches shall be constructed as shown on Standard Drawing No. S-6 of these Specifications and at the locations shown on the plans. Size and kind of pipe and fittings shall be the same as the sewer which the flushing branch connects.

SS75-03, PAYMENT: The unit price bid for flushing branches shall include excavation, pipe, precast concrete items, cast iron frame and cover, concrete, backfill, restoration of surfaces and all other labor, equipment and materials necessary for completion of the structure in accordance with the plans and Specifications.

SS-76 – PIPE CONNECTIONS TO STRUCTURES

SS76-01, METHOD: Unless otherwise specified, pipe connections to existing manholes and other structures shall be made in a neat workmanlike manner. Removal of interfering portions of the concrete manhole or structure shall be made with a masonry saw or other acceptable cutting tools. The “cut-out” area shall not exceed an area greater than the outside connecting pipe diameter plus two inches (2”). Damage to an area greater than the outside connecting pipe diameter plus two

inches (2”) shall be repaired to the satisfaction of the Engineer and may require the replacement of the damager manhole barrel section.

The minimum spacing between pipes connecting into manholes or structures shall be ten inches (10”) outside pipe diameter to outside pipe diameter or six inches (6”) outside annular cutout edge to outside annular cutout edge, whichever is greater.

The annular space between the connecting pipe and manhole barrel or other structures shall be tightly packed with concrete. Concrete shall be Class “A” Portland Cement concrete aggregate gradation of fine aggregate, No. 16 sieve size per State Specification, Section 90-3, as directed by the Engineer. Surfaces in contact with the annular concrete seal around the connection pipe shall be thoroughly moistened and then scrubbed with Portland Cement paste. The concrete seal shall be toweled smooth and flush with the interior surface of the manhole structure.

All sewer pipes shall be connected to existing structures and manholes by means of a flexible joint within one (1) pipe diameter or two feet (2’) of the structure, whichever is greater, unless otherwise shown on the drawings or herein specified.

Channelizing of the flow through sanitary sewer manholes shall conform to the details shown on the standard drawing for new manholes.

The Contractor shall notify the District one (1) working day in advance before a connection is made to an existing structure or manhole. He shall schedule his work so that interruption of flow is held to a minimum.

SS76-02, PAYMENT: The cost for constructing connections to existing manholes or structures shall be included in the cost per lineal foot of the size and type of pipe to be connected and no additional compensation will be allowed therefore.

SS-77 – PIPE CONNECTIONS TO OTHER PIPES

SS77-01, FIELD CONNECTIONS: When a lateral drainage pipe is to be connected directly into a larger drainage pipe, the connection shall be made so that the lateral pipe is flush with the inside face of the larger pipe. Field connections between concrete pipes or concrete pipes and metal pipes shall be dry packed with cement mortar and a concrete collar shall be placed around the pipe as shown on Standard Drawing No. R-4. Field connections between metal pipes shall be made as specified in Section Ss-50 of these Specifications.

SS77-02, SERVICE SEWER: When a service sewer is to be connected to an existing lateral or trunk sewer, the Contractor shall make the tap into the existing sewer. Application should be made to the District and the required fees paid at least five (5) working days in advance of the time the tap is desired. All excavation, shoring and bracing, and backfill and the installation of the remainder of the service sewer shall be done by the Contractor. (*Note: The above applies only when the service sewer*

is constructed as part of an improvement contact. For rules regarding installation of an individual service sewer, contact the District.)

SS77-03, PAYMENT: No separate payment will be made for connections into existing pipe and the cost thereof shall be included in the price bid per lineal foot for the respective sizes, grades and types of pipe to be placed.

SS-78 – SERVICE SEWERS

SS78-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per each for the respective sizes of service sewers.

SS78-02, INSTALLATION: Service sewers shall be installed as detailed on Standard Drawing No. S-5 and at the location shown on the plans. Unless otherwise specified, they shall be four inch (4”) diameter and constructed to the property line or easement line. Service sewer material shall be the same as the lateral to which it is connected except that ABS-DWV (schedule 40, ASTM D266) may be connected to a VCP “T” or “Y” as shown on Standard Drawing No. S-5. A regularly manufactured “t” or “Y” fitting shall be used in the lateral sewer for each service sewer and shall be inclined upwards at a minimum angle of 10 degrees (10°) from the horizontal. The ends of all service sewers shall be securely sealed by stoppers in such a manner that the stoppers can be removed for extending the line without damage to the pipe. Unless otherwise noted on the plans, the depth of cover of the service sewer at the easement or property line shall be a minimum of four feet (4’) and a maximum of five feet (5’) below existing ground or edge of adjacent roadway, whichever is at the lower elevation, except that the minimum depth of cover shall be five feet (5’) and the maximum six feet (6’) where a water main is to be installed at back of sidewalk as part of the subdivision improvements. In such cases, as detailed on Standard Drawing No. S-5, the service shall also be extended to four feet (4’) back of curb or if sidewalk is to be constructed, two feet (2’) back of sidewalk. An elevation shown on the plans with a service sewer represents the house service invert elevation at the easement or property line. The elevation given shall be a maximum allowable elevation and the minimum slope of the service shall be one-fourth inch (1/4”) per foot. If the service is to be bored, the tolerance of the operation must be within these limits.

Service sewers entering a manhole shall be set to an invert to crown match with the outgoing pipe or internal drops shall be used, except at the end of cul-de-sacs as specified in Section SS66-03 of these Specifications. Standard Drawing No. S-3 indicates the required channelization.

Where the plans and Specifications require the reconnection of an existing service sewer to a pipe line to be installed with the improvements, only the inspection of that portion of t he construction within right-of-way or easement shall be the responsibility of the inspector for the improvements. The remainder of the work shall be inspected by the Building Inspection Division, subject to issuance of necessary permits.

SS78-03, CLEANOUT TO GRADE: Unless otherwise noted on the plans, cleanouts shall be provided for all service sewers which do not require a manhole at property or easement line. The cleanout

shall be installed two feet (2') back of the sidewalk or at the easement line if the service is located within a side or back of lot easement. A concrete or PVC box shall be set to finish grade of the property. The cleanout and service shall be of like material and diameter. For details, see Standard Drawing N. S-9.

Where the plans delete the requirement for the installation of the cleanout to grade with the improvement, a four inch by four inch (4" x 4") post shall be placed at the end of the service sewer, extending from the flow line to not less than twelve inches (12") above ground surface. If construction of the cleanout is deferred and ABS or PVC pipe and fittings are subsequently used, see Standard Drawing Nos. S-10 or S-11 for details.

SS78-04, LOCATION: Where curb and gutter exists, or is to be constructed concurrently with the sewer facilities, the location of each service sewer shall be permanently indicated by inscribing the letter 'S" in the curb directly above the line when the service is perpendicular to the street centerline. Otherwise, the 'S" mark for a skewed or angling service shall be placed at a right angle to the end of the service. When service sewers are installed in an existing street, the curb mark shall be placed at the time the service is installed to assure proper location.

The Contractor shall also furnish his information to the inspector. The Contractor may arrange with the Consulting Engineer for the subdivision, to resurvey and re-establish the end of each service before the curb and gutter is placed in lieu of the above requirements to insure that the "S" is properly placed.

SS78-05, PAYMENT: The unit price bid for service sewers shall include the furnishing of materials necessary for construction of the services and all labor and materials necessary to excavate the trench, connect to existing manholes or lateral sewers, bed, place, and joint the pipe and fittings, backfill the trench, restore the surface, inscribe the letter "S" on the curb, install the cleanout and all other work necessary to produce a complete installation in accordance with the drawings and Specifications. The unit price bid shall be the average price for service sewers of all lengths as indicated on the plans and in the Proposal.

SS-79 – SANITARY SERVICE SEWER RELOCATIONS

SS79-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a lump sum price for each relocating sanitary service sewer which would be in conflict with the structural section of drain lines or other features of the project. The lump sum price bid under this item shall include removal of existing sewer pipe and all labor, materials, equipment, and incidentals necessary for placing the new sewer pipe and connecting to the existing sewer. When specified on the Proposal that a new tap is to be constructed with the service, the price bid shall include the permit and construction cost for the new tap. If a new tap is required but is not specified in the Proposal, the permit and construction costs of the tap shall be paid for as extra work as specified in Section G8-03.

The exact locations of these services may not be known; therefore, quantities shown on the Proposal are approximate only and may be reduced, increased or deleted as required during construction.

SS79-02, INSTALLATION: Sanitary service sewer relocations shall be constructed in conformance with Sections SS-78 of these Specifications and other applicable sections of these Specifications and as directed by the District. When the relocation requires placing the service sewer above the storm drain line, ductile iron sewer pipe of the appropriate size, conforming to Section SS-55 of these Specifications, shall be placed in accordance with Standard Drawing No. S-7. PVC Pressure Class 200 (DR-14) pipe conforming to the requirements of AWWA C900 may be used in lieu of iron pipe. No additional payment will be made for the iron or PVC pipe.

Ductile sewer pipe or PVC pipe as above specified shall also be used when the service sewer is relocated beneath the drain pipe and clearance between the pipes is 0.5 foot or less.

If a service sewer relocation requires that a tap be made to an existing lateral or trunk sewer, such tap will be made by the Contractor in accordance with Section SS78-02 of these Specifications.

SS-80 – SANITARY SEWER CROSSINGS

SS80-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for replacement of each of the respective sizes of sanitary sewer pipe, including service sewers, which cross over the proposed utility or drain pipe, as indicated on the plans or in the Special Provisions and as directed by the District. The bid price per lineal foot shall include removal of existing sewer pipe and all labor, pipe, couplings and other material necessary for placing the pipe and connecting to the existing sewer pipe.

Quantities shown on the Proposal for these items are approximate only and may be reduced, increased or deleted as required during construction.

SS80-02, INSTALLATION: Sanitary sewer pipe crossings shall be constructed in accordance with Standard Drawing SS~~s~~-55 of these Specifications. PVC Pressure Class 200 (DR-14) pipe conforming to the requirements of AWWA C900 may be used in lieu of iron pipe.

SS-81 – GROUTED COBBLES (LANDSCAPE)

SS81-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per square foot of surface area for grouted cobbles (landscape) in place. The contract unit price paid for grouted cobbles shall include cobbles, grout and all labor, equipment and other materials, tools and equipment necessary for completion in accordance with the plans, Special Provisions and these Specifications.

SS81-02, MATERIALS AND PLACEMENT: Cobbles shall be sized between four inches (4”) and eight inches (8”) in dimension. Cobbles shall be rounded or well-rounded stones. Cobbles shall be relatively spherical; unacceptably flat or elongated stones shall be rejected. Cobbles shall be free of all clay, dirt or other deleterious material. Contractor shall submit a small representative sample of cobbles (six (6) to ten (10) cobbles) proposed to be used on the project a minimum of two (2) weeks prior to placement for District approval.

Grout shall consist of Class “B” Portland Cement Concrete conforming to the provisions of Section SS-30 of these Specifications. Aggregate for the grout shall conform to the provisions of section 90-3.03 of the State Specifications. Sand shall be free from clay or organic material and shall be of such size that from ninety percent (90%) to one hundred percent (100%) will pass a No. 4 sieve and not allow more than five percent (5%) shall pass a No. 200 sieve.

The grout shall be placed such that, after seating of cobbles, the finish grade of grout shall meet the grades indicated on the plans. The minimum thickness of grout prior to seating of cobbles shall be four inches (4”).

The cobbles (one (1) layer) shall be half seated in the grout and shall produce a neat appearance. The cobbles shall be placed touching so as to minimize areas of grout between cobbles. Cobbles shall be cleaned of any grout visible above the grout and thoroughly brushed and rubbed clean using burlap or other suitable material so that their top surfaces are exposed and clean.

Grouted cobbles shall be cured as provided in Section 90-7 of the State Specifications.

No deduction for areas of pullboxes or other utility facilities shall be made to the measured quantity of grouted cobbles (landscape). Within two feet (2’) of the end of medians, the median treatment shall be four inch (4”) P.C.C. on four inch (4”) Class II Aggregate Base and finished in a manner similar to sidewalk. These areas shall be measured and paid for as grouted cobbles (landscape).

SS-81A – GROUTED COBBLES (EROSION CONTROL)

SS81A-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per square foot of surface area for grouted cobble in lace as shown on the plans and in the Proposal. The vertical legs of cutoff walls shall not be considered as surface area for purposes of payment, but shall be included in the unit price bid for grouted cobbles.

SS81A-02, MATERIALS AND PLACEMENT: Cobbles shall conform to the following Specifications:

All retained on the one and one-half inch (1½”) sieve; not more than forty percent (40%) passing the four inch (4”) sieve; and ten inch (10”) maximum size.

Grout shall consist of Class “B” Portland cement concrete conforming to the provisions of Section SS-30 of these Specifications. Aggregate shall conform to Section 90-3.03 of the State Specifications.

The cobbles shall be placed in a neat, uniform manner to a thickness of approximately twelve inches (12”). Minimum penetration of the grout into the interstices of the cobbles shall be four inches (4”) measured from the outer surface of the cobble protection. The grout shall be used before it reaches a temperature of ninety degrees Fahrenheit (90° F). The water content of the grout shall be such as to permit gravity flow of the grout into the interstices with limited spading and brooming. The amount of water used may be designated by the District. Aggregate size will be limited to that necessary to obtain the required penetration as stated above and as directed by the District.

The surfaces of the cobbles to be grouted shall be cleaned of adhering dirt and clay and then moistened. The grout shall be placed in a continuous operation for any day’s run at any location. Grout shall be brought to the place of final deposit by use of chutes, tubes or buckets, or may be placed by means of pneumatic equipment or other mechanical methods. In no case shall grout be permitted to flow on the slope protection a distance in excess of ten feet (10’).

Immediately after depositing, the grout shall be spaded and rodded into place with suitable spades, trowels or other approved means until the minimum penetration is obtained.

After the grout has been placed, the rocks shall be thoroughly brushed and rubbed clean using burlap or other suitable material so that their top surfaces are exposed and clean. The outer rocks shall project one-third (1/3) to one-fourth (1/4) their diameter above the grout surface. After completion of any ten foot (10’) strip, no workman or load shall be permitted on the surface for a period of at least twenty-four (24) hours and longer if so ordered by the District. Grouted cobbles shall be cured as provided in State Specifications, Section 90-7.

SS81A-03, MEASUREMENT AND PAYMENT: Payment will be based on the number of square feet of surface area of cobbles grouted in place. No separate payment will be made for the concrete grout material. The contract unit price paid for grouted cobbles (erosion control) shall include cobbles and grout and all labor, equipment and other materials necessary for completion of the lining in accordance with the plans, Special provisions and these Specifications.

SS-82 – METAL DOWN DRAIN ASSEMBLIES

SS82-01, ITEM: Under this item of the Proposal, the Contractor shall bid a price per each for down drain assemblies complete in place at locations shown on the plans. Metal down drain assemblies shall be provided with protective coatings as specified in Section SS50-04 of these Specifications.

SS82-02, SPECIFICATIONS: The requirements for down drain shall conform to Section 69 of the State Specifications and Standard Drawing No. H-6, except as to payment.

SS82-03, PAYMENT: The unit price bid per each down drain assembly shall include but not be limited to all pipe, joints, inlets, reducers, slip joints, anchor assemblies, excavation and backfill.

SS-83 – GRATE ASSEMBLIES

SS83-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per each for the respective type grate assemblies complete in place.

SS83-02, SPECIFICATION: Type of grates and frames shall conform to the material and method of placing shall conform to the requirements of Section 70-1.02E of the State Specifications, except for payment which shall be as stated herein.

SS-84 – FIRE HYDRANT ASSEMBLIES

SS84-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for fire hydrant assemblies listed in the Proposal.

SS84-02, SPECIFICATION: Fire hydrants shall be wet barrel meeting the requirements of AWWA Standards C502. Hydrants shall be furnished with a break-off check valve.

The foot piece shall have an inlet size for connecting to pipe of not less than six inches (6”) and shall be suitable for push-on, mechanical joint or flanged end pipe.

The bury length shall be per Standard Drawings W-2A and 2-2B, unless otherwise shown on the drawings or required by the topography and approved by the District.

Delivery classification shall be two-hose and one-pumper nozzle, having “National Standard Fire Hose Coupling Screw Threads” in conformity with NFPA 194 and ANSI B 26. Hose nozzles shall be for two and one-half inch (2 ½”) hose and pumper nozzles shall be for four and one-half inch (4 ½”) hose. The operating nuts and nozzle caps shall be National Standard pentagon dimensions, open left (counter clockwise).

Hydrants are to be furnished without a drain opening in the base, if manufactured with such opening, it shall be plugged.

Even though not indicated on the plans, every fire hydrant installation shall have a six inch (6”) gate valve installed on the lateral from the main.

SS84-03, INSTALLATION: For installation details, see Standard Drawing No. W-2A or W-2B. In no case shall a fire hydrant be installed within three feet (3’) of a building or any other structure that would limit access. Fire hydrants shall stand plumb with the pumper outlet facing the street and at least eighteen inches (18”) above the sidewalk or finished ground surface, whichever is higher.

SS84-04, PAYMENT: The unit price bid for fire hydrants shall include excavation, furnishing and placing the tee in the main, the six inch (6”) lateral to the hydrant, the gate valve, the fittings and the hydrant, all as detailed on the drawings, blocking, backfill, restoration of street surfaces, and all other labor equipment and material necessary for installing the fire hydrant in accordance with the drawings and Specifications. The unit price bid shall be the average price for all fire hydrants indicated or required.

SS-85 – FIRE PROTECTION SERVICE ASSEMBLY

SS85-01, ITEM: Under these items of the Proposal, the Contractor shall bid a unit price per each assembly for the respective sizes of service listed in the Proposal.

SS85-02, SPECIFICATION: The Fire Protection Service Assembly shall include a valve, detector checked valve with by-pass meter, post indicator valve, wafer check, fire department connection, utility vault and piping as shown on Standard Drawing W-14.

Water valve shall be as specified in Section SS-86 of these Specifications. Valves shall be furnished with flanged ends.

Detector check valve shall be listed by Underwriters Laboratories, Incorporated and approved by Associate Factory Mutual.

By-pass water meter shall be five-eighths inch (5/8”) by three-fourths inch (3/4”), with a body conforming to AWWA C700. A bronze check valve shall be installed downstream of the by-pass meter. Bronze valves shall be installed to allow removal of the by-pass meter without affecting the fire protection system. All piping shall be Type “K” copper. See Standard Drawing W-10.

Water supply to sprinkler systems shall be controlled by means of a post indicator valve (PIV). Placement/location of post indicator valve shall be installed adjacent to a road or driveway and as directed by the Fire Department. Protective posts shall be installed as required by the fire department. Upon placing the system in service, these valves shall be fully opened and the handle (wrench) locked to the valve by means of a standard breakaway type lock.

The Contractor shall provide and install conduit for PIV tamper switch as shown on the plans and directed by the Fire Department.

The Fire Department connections shall be as shown on Standard Drawing W-10. One two and one-half inch (2 ½”) hose connection shall be provided for each 250 GPM demand, or any part thereof, but in no case shall there by less than two (2) to two and one-half (2 ½) inch connections provided. Appropriate piping, shall be installed to accommodate the maximum flow required. The fire department connection shall be located as directed by the Fire Department. In no case shall the connection be less than ten feet (10’) or more than forty feet (40’) from a hydrant. The fire department connection shall be a minimum of forty feet 940’) from any structure. Provide a sign indicating what structure the fire department connection supplies. Whenever deemed necessary by the Fire Department, protective posts shall be installed to protect the fire department connection.

Utility vault for the detector check valve shall be thirty inch (30”) by forty-eight inch (48”) pre-cast utility box of reinforced concrete extended from the bottom of the detector check valve to the surface. Utility vault cover shall be fitted with a hinged cast iron reading lid and provide with means for easy lifting.

Fire protection service assembly piping shall be flanged ductile iron Class 51 conforming to Section SS-55 of these Specifications.

SS85-03, INSTALLATION: Valve, detector check valve, by-pass meter, and utility vault shall be installed and set in a horizontal position as shown on Standard Drawing W-10. The utility vault shall be installed over the by-pass meter in such a manner that the meter may be easily read through the reading lid of the vault cover. The utility vault shall be installed and supported in such a manner as to prevent undue stress or loading on the meter, detector check valve or piping.

The top of the utility vault shall be set no lower than the highest finish grade immediately surrounding the box and supported to maintain that setting.

SS85-04, PAYMENT: The unit price bid for Fire Protection Service Assembly shall include excavation, furnishing and setting valve, detector check valve, by-pass meter, post indicator valve, wafer check, fire department connection, utility vault, connection to the water main piping, and all necessary fittings, backfilling, restoration of surface, and furnishing all other labor, equipment and material necessary for installation of the Fire Protection Service Assembly in accordance with the manufacturer's recommendation and in good workmanlike manner.

The unit price bid shall be the average price for all assemblies of a given service size.

SS-86 – WATER VALVES

SS86-01, ITEM: Under these items of the Proposal, the Contractor shall bid a unit p rice per each for the respective sizes of water valves listed in the Proposal.

SS86-02, SPECIFICATION: Unless otherwise specified on the plans, valves four inch (4") through eight inch (8") shall be gate valves. Valves twelve inches (12") and larger shall be butterfly valves. Ten inch (10") valves may be gate or butterfly valves. All valves shall open to the left (counter-clockwise). All installed valves shall be well fitted and operate smoothly with no more than twenty-five (250 foot-pounds torque. Valves operating at torques which exceed twenty-five (25) foot-pounds torque require approval by the Engineer.

SS86-03, GATE VALVES: Valves shall be iron body, with bronze stem nuts, glands and bushings, resilient-seated gate valve with resilient seat bonded or mechanically attached to the gate, non-rising stem (NRS), working water pressure of two hundred (200) psi, conforming to the requirements of AWWA Standards C509. The valve shall have a two inch (2") square operating nut. Unless otherwise specified or shown on the plans, valves shall be furnished with ends flanged, mechanical joint or bell, using an elastomeric-gasket seat and shall conform in dimensions and style to the pipe and/or fitting requirements.

SS86-04, BUTTERFLY VALVES: Valves shall be iron body, rubber seated, and tight-closure butterfly valve conforming to the requirements of AWWA Standards C504 Class 150B. Operating stem with

manual operators shall be provided with a two inch (2”) square operating nut unless otherwise specified or shown on the plans. Valves shall be furnished with ends flanged, mechanical joint or bell, using an elastomeric-gasket seal, and shall conform in dimensions and style to the pipe and/or fitting requirements.

SS86-05, BALL VALVES: Valves shall be Bronze body and ball with Teflon seats. The valve working water pressure shall be four hundred (400) psi. The valve shall be the lever operating type. Unless otherwise specified or shown on the plans, valves shall be furnished with threaded ends and shall conform in dimensions and style to the pipe and/or fitting requirements.

Valves shall be as manufactured by Jenkins 32A, Crane 2330TF or approved equal.

SS86-06, PLUG VALVES: Plug valves shall be of the non-lubricated eccentric type with resilient plugs faced with natural synthetic rubber suitable for service in sludge piping. The valves shall be as manufactured by DeZurik Corp., Keystone, Lehigh Valley, PA; WKM Div. of ACF Industries, Houston, Tex; or approved equal. Port areas shall be unobstructed when open and have smoothly shaped waterways of not less than eighty percent (80%) of full pipe area. Bodies shall be of semi-steel, suitable for one hundred and seventy-five pounds (175 lb.) water working pressure and shall have raised seats. The valves shall have seats of a welded-in overlay of not less than ninety percent (90%) pure nickel. The valves shall have permanently lubricated upper and lower stainless-steel bushings on plug journal ends. Valves shall have bolted bonnets and be designed so that they can be repacked under line pressure without removing the bonnet from the salve. Packing shall be adjustable.

Exposed valves up to six inches (6”) shall be lever operated unless otherwise indicated on the drawings and valves eight inches (8”) and larger shall be gear-operated with hand wheels. Buried valves shall be gear operated and shall be provided with a two inch (2”) square nut. Unless otherwise indicated, one (1) lever shall be provide for each group of twelve (12) valves. All gear operators shall be totally enclosed, worm-gear type, permanently lubricated and shall be watertight and dust-tight. The actuator mounting brackets shall be totally enclosed and shall have gasket seals, all exposed nut, bolts springs and washers shall be stainless steel.

Above ground gear operators shall be provide with adjustable stops for the open and closed position to prevent over travel and shall have a valve disk position indicator.

Plug valves four inches (4”) or larger shall be flanged ends faced and drilled in accordance with the one hundred and twenty-five pound (125 lb.) ANSI Standard. Three inch (3”) plug valves shall have screwed ends.

SS86-07, VALVE BOXES: Valve boxes shall be of a size and type designed for the appropriate size valve. Valve boxes for traffic service shall be of precast concrete and shall have a cast iron face and a cast iron traffic lid. Valve boxes out of traffic areas shall be of precast concrete, with a cast iron lid. Covers shall be marked “WATER” and shall have a loose fit in the box. Valve box risers shall be of PVC C900 and shall fit inside of valve box without slipping. See Standard Drawing W-6.

SS86-08, INSTALLATION: Valves shall be set plumb, supported on a concrete base and properly fitted to the adjacent sections of main. A valve box shall be installed over each valve, for below ground installation. The type of box and lid is dependent upon location, as specified herein. Valve boxes shall be set flush with the finish grade, pavement, or concrete and be supported by two (2) three-fourth inch (3/4") galvanized steel pipes extended into undisturbed earth. Where valves are placed in non-traffic areas, the valve boxes shall be provided with a concrete collar per Standard Drawing W-6. Where valves are placed in unimproved easement areas, the valve boxes shall be set six inches (6") above grade.

SS86-09, PAYMENT: the unit price bid for valves shall include excavation, furnishing and setting valves and valve boxes as detailed on the drawings, backfilling, restoration of street surfaces, and furnishing all other labor, equipment and material necessary for placing the valve in accordance with the drawing and Specifications. The unit price bid shall be the average price for all valves of a given size.

SS-87 – AIR VALVES

SS87-01, ITEM: Under these items of the Proposal, the Contractor shall bid a unit price per each of the respective sizes of air valves listed in the Proposal.

SS87-02, SPECIFICATIONS: Air valves shall be combination air valves. The body and cover of the air valve shall be cast iron unless otherwise approved by the District. Air valves shall be fully automatic and requiring no regular maintenance. A general guideline for air valve sizing is one inch (1") per one foot (1') diameter of pipe.

Valve shall consist of an air/vacuum portion an air release portion. The air/vacuum portion shall automatically exhaust large quantities of air during the filling of the pipeline and automatically allow air to re-enter the pipeline when the internal pressure of the pipeline approaches a negative valve due to column separation, draining of the pipeline, power outage, pipeline break, etc. The air release portion shall automatically release small pockets of air from the pipeline while the pipeline is in operation and under pressure.

SS87-03, INSTALLATION: Air valves shall be set plumb and properly fitted to the high points on water mains. Air valves will be required at other locations on long stretches of pipe as deemed necessary by the Engineer. A vault with adequate venting and drainage shall be provided as required by the Drawings and Specifications. A full ported shutoff valve should be installed below each air valve for servicing.

SS87-04, PAYMENT: The unit price bid for air valves shall include excavation, furnishing and installation of air valves as detailed on the drawings, backfilling, restoration of street surfaces, and furnishing all other labor, equipment and material necessary for placing the air valve in accordance with the drawings and Specifications. The unit price bid shall be the average price for all valves of a given size.

SS-88 – BLOWOFF ASSEMBLY (WATER DISTRIBUTION SYSTEMS)

SS88-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for the blowoff assemblies listed in the Proposal.

SS88-02, SPECIFICATION: Blowoff assemblies shall be of the materials and be installed as shown on Standard Drawing No. W-4. The location shall be such that there shall be no possibility of back-siphonage into the distribution system.

SS88-03, PAYMENT: the unit price for blowoff assemblies shall include excavation, furnishing and placing of blowoff piping, valve and valve box, all as detailed on the drawings, blocking backfilling, restoration of surfaces, and all other labor, equipment and material necessary for installing the blowoff assembly in accordance with the drawings and Specifications.

SS-89 – WATER SERVICE LINES

SS89-01, ITEM: Under this item of the Proposal, the Contractor shall bid a price per each for furnishing and installing water service lines.

SS89-02, MATERIALS: All water service lines shall be one inch (1”) in diameter unless otherwise specified. Water service pipe material up to and including two inches (2”) in diameter shall be ~~copper water tubing, “Type K”, soft tempered, meeting ASTM Designation B-88 and AWWA C800; or~~ copper pipe size polyethylene pressure pipe meeting standards of AWWA C901. Polyethylene pipe shall be high density, ultra-high molecular weight and meet all applicable requirements including testing, of Type III, Grade P33 or P34, Class C, designated as PE 3306 or 3406 in ASTM D2239 and D1248. The polyethylene pipe shall have a minimum pressure rating of two hundred (200) psi, shall be homogeneous throughout and free of cracks, holes foreign inclusions or other defects, shall be uniform in color, opacity, density and other physical properties. Polyethylene pipe shall be supplied with markings, at intervals of not more than five feet (5’), indicating nominal pipe size, designation, pressure class and manufacturer’s name or trademark. Polyethylene pipe shall be manufactured to ~~iron pipe size (IPS~~) copper tube size (cts). Installation shall be in accordance with the manufacturer’s recommendation. Material for service lines larger than two inches (2”) in diameter shall be as specified on the plans. When the size of the tap exceeds the manufacturer’s recommended limit for the size of the main, a special fitting shall be furnished. All underground copper services shall be protected from corrosion by wrapping or sleeving.

All services shall be equipped with a bronze corporation stop at the main. On services up to and including two inch (2”) diameter, a bronze curb stop shall be installed at the property line or easement line; on larger services a gate valve shall be furnished. Size of the corporation stop and curb stop or gate valve shall be the same as the service line. A meter box at the property line or easement line is required for all services. Meter boxes shall be of either: 1) precast concrete with a concrete lid; or 2) precast rigid plastic with a minimum average tensile strength of three thousand

(3000) psi and a minimum average impact strength of 1.98 ft-lb/in. in accordance with ASTM test methods D638 and D256, respectively.

SS89-03, LOCATION: Where curb and gutter exists, or is to be constructed concurrently with the improvements, the location of each service shall be permanently indicated by inscribing the letter "W" in the curb directly above the line when the service is perpendicular to the street centerline. Otherwise, the "W" mark for a skewed or angling service shall be placed at a right angle to the end of the service. When water services are installed in a street with existing curb, the curb maker shall be placed at the time the service is installed to assure proper location. In new subdivisions when the services are installed before the curb is constructed, it shall be the Contractor's responsibility to establish the exact location of each service and to furnish this information to the curb and gutter subcontractor, if any, in order that he may place the "W" in the curb after it is poured. In no case shall the "W" be placed more than six inches (6") from the service. No services shall be located in or under driveways unless approved by District.

The Contractor shall also furnish this information to the Inspector. The Contractor may arrange with the Consulting Engineer for the subdivision, to resurvey and re-establish the end of each service before the curb and gutter is placed in lieu of the above requirements to insure that the "W" is properly placed.

SS89-04, PAYMENT: The unit price bid for water services shall include all labor and materials necessary to excavate the trench, connect to the main, furnish and install the service saddle, corporation valve, pipe fittings, and curb stop or gate valve, bed, place and joint the pipe and fittings, backfill the trench, restore street surface, mark the curb, furnish and install a meter box, and all other work necessary to produce a complete installation in accordance with the drawings and Specifications. The unit price bid shall be the average price for all water services of a given size.

SS-90 – WATER METERS

SS90-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a unit price per each for the respective sizes of water meters listed in the Proposal.

SS90-02, SPECIFICATION: Water meters shall be furnished by the District after payment therefore is received from the customer requesting service. Except in the case of single family residential water services, the Contractor shall install the District furnished meter as shown on the plans and as required in these Specification. Meter is typically a Sensus Iperl 1" meter.

SS90-03, METER BOX: Meter box shall be of precast reinforced concrete designed for the appropriate size of meter assembly. Meter box lid outside of traffic area shall have a reinforced concrete cover with a one and three-fourths inch (1 ¾") TRPL hole and meter box lid for traffic

service shall have a steel checker plate traffic cover with a one and three-forth inch (1 ¾") TRPL hole. Covers shall have a loose fit in the box and shall be marked "WATER".

SS90-04, INSTALLATION: Water meters shall be installed and set in a horizontal position in accordance with the manufacturer's recommendation and as shown on Standard Drawing Nos. W-7A, 2-7B, 2-7C, OR W-9. A meter box shall be installed over each meter assembly in such a manner that the meter may be easily read through the touch read area of the cover. The meter box shall be installed in such a manner to prevent undue stress from normal or traffic load on the meter assembly, fittings and piping.

All buried steel or cast iron pipe shall be given a corrosion protection plastic wrapping. Pipe shall be spirally wrapped with Christy's ten (10) mil. or greater plastic tape, or equal, applied over a suitable primer. The plastic wrap shall have a nominal thickness of twenty (20) mils. All buried ferrous fittings and valves shall also be fully wrapped with a corrosion protection plastic wrapping, twenty (20) mil nominal thickness.

All ferrous material exteriors not buried shall be properly cleaned, primed and finished with two (2) coats of epoxy in green metallic aluminum of six (6) mil minimum total dry film thickness. The paint system and application shall be in accordance with the paint manufacturer's recommendation.

No coating shall be applied to any copper-alloy surface.

Meter box, with the appropriate lid for metering MXU, shall be set flush with the final finish grade, pavement or concrete.

SS90-05, PAYMENT: The unit price bid for water meter shall include excavation, furnishing and setting valves, meter, meter box, furnishing appropriate connectors to piping, and making all connections, backfilling, restoration of surface, and furnishing all other labor, equipment and material necessary for installation of the meter in accordance with the manufacturer's recommendation and in a good workmanlike manner.

The unit price bid shall be the average price for all meters of a given size.

SS-91 – NOT USED

SS-92 – NOT USED

SS-93 – WATER SYSTEMS INSTALLATION (WATER DISTRIBUTION SYSTEMS)

SS93-01, ALTERNATES: Pipe used in the construction of water distribution systems may be either concrete lined ductile iron or polyvinyl chloride (DR 18), unless a particular type is specified on the plans and in the Special Provisions. All pipes shall be the regular product of a firm which has successfully manufactured comparable pipe for at least three (3) years.

All pipes, valves, fittings, connections, and appurtenances thereto shall conform to the provisions of these Specifications or as specifically set forth in the Special Provisions. The District will maintain a listing of approved hydrants and water service material and fittings which establish a standard of material quality for the District water system. Material used shall be limited to those on this listing. Alternate material items may be added to this list upon review and/or test by the District.

SS93-02, TESTING OF MATERIAL: All testing requirements of the ASTM and AWWA Specifications shall be conducted by the pipe manufacturer of their representative within the State of California and the resulting tests shall be certified by an established reputable firm operating in the testing materials field. Such certification must accompany the delivery of the materials to the job site.

SS93-03, INSTALLATION: All pipes, valves, fittings and appurtenances shall be installed in accordance with the manufacturer's recommendations and according to accepted water works practice. Each section of pipe and each fitting shall be thoroughly cleaned out before it is installed. All pipe, fittings, valves, etc., shall be carefully lowered into the trench by suitable tools or equipment in such a manner as to prevent any damage, particularly to the pipe lining and coating. When required by the District, approved slings shall be used to lower the pipe. Under no circumstances shall pipe or accessories be dropped into the trench.

The pipe shall be laid true and uniform to line and grade, with no visible change in alignment at any joint unless curved alignment is called for on the plans, in which case the maximum deflection at any joint shall not exceed the manufacturer's recommendation for the type of pipe and joint being used.

The pipe shall have a minimum cover of thirty inches (30") and maximum of sixty inches (60") from the subgrade within roadways or from finish grade out of roadway areas, unless specifically set forth in the Special Provisions or shown on the Contract Drawings. All metallic parts including, but not limited to, valves, corporation stops, coupling nuts, service saddles, air release valves, joint restraints, elbows, tees, etc. shall be encased with six (6) mil plastic. Encasement shall be performed such that no soil is in direct contract with the parts.

Thrust blocks of Class "B" concrete shall be cast-in-place at all horizontal or vertical bends of eleven and one-fourth degrees (11 1/4°) angle or more, behind each plug, cap, tee or cross which is valved or plugged in such a manner that it can act as a tee or elbow, and at the back of each fire hydrant. The thrust block shall extend from the fitting to undisturbed soil, shall be kept clear of the joints, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. Size of blocking shall be in accordance with Standard Drawing No. W-3. In lieu of the above required thrust blocks, movement may be prevented by the use of restrained joints, which depend on the development of skin friction for a sufficient length of pipe to resist the thrust.

Whenever pipe is laying in discontinued for an hour or more, the open ends of all mains and fittings shall be closed with water-tight plugs or bulkheads. The plug or bulkhead shall not be removed unless or until the trench is dry and the Contractor is ready to proceed with the work. Pipe shall not

be laid when the condition of the trench or the weather is unsuitable or when there is the possibility of foreign material entering the pipe.

All pipe jointing, including the maximum deflection at joints in curved alignments, shall be in accord with accepted best practice and as detailed in the manufacturer's installation manual. Both joint surfaces shall be clean before joints are made. Materials used in jointing the pipe shall only be that furnished with the pipe or recommended by the manufacturer. Excess solvent that appears at the outer shoulder of the fittings shall be wiped off.

Where necessary to properly locate valves and fittings, the pipe shall be neatly and squarely cut to length, using methods recommended by the manufacturer.

When field cuts are made in polyvinyl chloride pipe, a pipe cutter or carpenter's miter box must be used. The cut ends shall be cut square and all burrs removed from the pipe's interior. The beveling of the pipe ends shall be as specified on the pipe in accordance with the manufacturer's specification.

On water systems, excepting water systems being installed as part of new subdivision improvements, no more than three thousand (3000) lineal feet of water main shall be installed before starting installation of the water services, with this approximate sequence maintained throughout the construction project.

SS93-04, CONNECTIONS TO EXISTING MAINS: Under no circumstances shall anyone other than a representative of the District open or close any valve in a District operated water system. When a water service or lateral is to be connected to an existing line, the Contractor shall make the tap into the existing main, unless otherwise set forth in the Special Provisions. All tapping sleeves must be approved by the District prior to commencing work. Application should be made to the District and the required fees paid at least five (5) working days in advance of the time the tap is desired. All excavation and backfill and the installation of the remainder of the water lateral or service shall be done by the Contractor. (*Note: The above applies only when the service is constructed as a part of an improvement contract. Fro rules regarding installation of an individual water service, contact the District.*)
In general, shutdowns shall b made only at times when there will be the least interference with consumer service. Connections shall be made only after complete and satisfactory preparation for such work has been made, in order that the shutdown may be of as short duration as possible. Notification to Fire Districts and to all consumers whose water service will be interrupted shall be made by the District unless otherwise set forth in the Special Provisions.

SS93-05, LOCATING WIRE: All runs of non-metallic water pipe, including services shall have a No. 10 gauge solid, soft drawn copper wire laid along the pipe to facilities locating the pipe at a later date. The wire shall be stubbed up inside each valve box, and be placed as shown on Standard Drawing No. W-5. Continuity test shall be conducted on each splice at all locations.

SS93-06, REGULATIONS RELATING TO SANITARY HAZARDS: All construction shall conform to applicable regulations relative to safeguarding the public health, particularly the regulations relating to cross connections as established by the California Administrative Code, Title 17, Chapter V, Sections 7583-7622.

In designing the distribution system, it was intended that ten feet (10') be the minimum horizontal distance between parallel water and sanitary sewer lines and services and that the water main be at least twelve inches (12") higher. No field changes shall be made that conflict with this requirement without the prior approval of the District. When crossing a sanitary sewer force main, the water main shall be a minimum of three feet (3') above the sewer line and encased in Class "B" concrete. Encasement shall extend ten feet (10') on each side of the force main or as specified or directed by the District.

SS93-07, INSTALLATION OF WATER SERVICES: Materials for water services shall be as specified in Section SS-89. Generally, a service shall consist of a bronze corporation stop in an all bronze saddle assembly (including straps, nuts and bolts) at the main, service line of approved material and a curb stop or gate valve at the property or easement line as required by the above referenced section. Non-metallic services shall have a locating wire as specified in SS93-05 of these Specifications. When utilized, tapping sleeve type must be approved by the District prior to commencing work.

The water main shall be tapped at the service locations shown on the plans and construction completed by the Contractor in accordance with Standard Drawing No. W-1. A minimum distance of eighteen inches (18") between taps must be maintained. The service line may be either laid in an open cut or placed through a hole produced by jacking or drilling. Water services to adjacent lots may be laid in a common trench, provided that a minimum center to center spacing of eighteen inches (18") is maintained, with no service at the right-of-way line less than nine inches (9") be allowed to enter the distribution main when tapping. The Contractor shall be responsible to remove any "plugs" which may enter the pipe.

Where water service lines are installed by the open cut method, the service line trench shall be backfilled in the same manner as the water main trench except, however; service line trenches crossing an existing street shall be completely backfilled with sand, to an elevation of six inches (6") minimum over the top of the service pipe.

Applicable codes prohibiting the laying of water pipe in the same trench as the service sewer shall be rigidly enforced.

SS93-08, DISINFECTION AND FLUSHING: After all other work has been completed, and prior to placing in service all water lines shall be completely disinfected in accordance with AWWA Standard C651.

The main shall be flushed as thoroughly as possible with the water pressure and outlets available, prior to chlorination. However, it calcium hypochlorite tablets are attached to the pipe at the time of installation for purposes of sterilization; it will not be possible to flush the main prior to

disinfection. It will therefore be necessary that extreme care be exercised in keeping the pipe clean during installation. The number of calcium hypochlorite tablets used shall be in accordance with the following table, which is based on five (5) gm tablets (approximately five (5) to six (6) tablets per ounce). Proportionately, more tablets will be required if they are of a smaller size.

Diameter:	2”	4”	6”	8”	10”	12”	14”	16”	18”	21”	24”
Length 13’	1	1	1	1	2	3	4	4	6	7	9
Length 18’	1	1	1	2	3	4	5	6	7	10	13
Length 20’	1	1	1	2	3	4	5	7	8	11	14

Based on 3.25 gm available chlorine per tablet.

Tablets shall be attached to the top of the pipe using permatex No. 1 as an adhesive. Adhesive shall be applied only to the surface of the tablet contacting the pipe.

Sampling for bacteriological tests shall be in accordance with Section 7 of AWWA C651. Prior to acceptance of the system by the District, all mains shall be thoroughly flushed.

SS93-09, ACCEPTANCE TEST: After completion of the installation, the Contractor shall test all piping to the pressure hereinafter specified. The Contractor shall furnish all material, equipment and labor for such testing. The system may be tested as a unit or in sections as directed by the District, but each unit shall successfully meet the requirements herein specified. The water services shall be considered as part of the main for test purposes.

In no case shall there be placement of permanent pavement prior to successful completing of the test. Joints and fittings must be backfilled to the horizontal diameter of the pipe and the pipe between joints backfilled to a depth necessary to hold the line securely during the test, but in no case less than eighteen inches (18”). Thrust blocks shall have been in place for at least thirty-six (36) hours if high-early-strength cement was used or at least seven (7) days if standard cement was utilized.

Each section of the pipe to be tested shall be slowly filled with water and all air shall be expelled from the pipe. The release of the air can be accomplished by opening hydrants and service line cocks at the high points of the system and the blow offs at all dead ends. The valve controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blow offs. After the system has been filled with water and all air expelled all the valves controlling the section to be tested shall be closed and the lines remain in this condition for a period of not less than twenty-four (24) hours.

The pipe shall then be refilled, if necessary, and subjected to a pressure of not less than one hundred and fifty (15) pounds per square inch or the service pressure plus fifty (50) pounds, whichever is greater for a period of two (2) hours.

The allowable leakage in the test section shall not exceed two (2) gallons per hour mile per inch diameter of pipe tested.

All leaks that are found shall be immediately corrected and the system again subjected to the same test for a period of one (1) hour. Even if the leakage is less than the allowable, all observed leaks shall be repaired.

The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipe lines and their appurtenances are being tested and shall, at their own expense, repair any damage to the pipes and their appurtenances or to any other structures resulting from or caused by these tests.

SS93-10, PAYMENT: The unit price per lineal foot of water main of the respective sizes and types set forth in the Proposal shall include the furnishing of all materials for construction of the water pipeline and the appurtenances and all labor, materials and equipment necessary to excavate the trench, remove all obstructions, remove and replace all utilities where necessary, bed, place and joint the pipe, place thrust blocks, backfill the trench, restore the street surface, disinfect, flush and test the pipe lines, make connections to existing facilities, furnish preconstruction photographs where specified in the Special Provisions and do all other work necessary to produce a complete and finished job in accordance with the drawings and Specifications. The unit price bid shall be the average price for all mains of all depths and appurtenances of a given size.

SS-94 – REDUCED PRESSURE BACKFLOW PREVENTER

SS94-01, ITEM: Under this item of the Proposal, the Contractor shall bid unit cost per each for furnishing and installing the reduced pressure backflow preventer as indicated on the plans and in the Proposal.

SS94-02, SPECIFICATION: Backflow preventers shall be USC approve. The Sacramento County Health Department has the most recent list of approved backflow preventers in accordance with S.C.C. 6.30.130.

SS94-03, INSTALLATION: The backflow preventer shall be installed so that flooding would not cause the device to become submerged. It shall be installed a minimum of twelve inches (12”) above grade. Installation to be as shown on Standard Drawing W-11.

SS94-04, PAYMENT: The unit price bid for the reduced pressure backflow preventer shall include excavation, furnishing and placing the vacuum breaker, including blocking, backfilling, concrete pad, restoration of surfaces, labor and material necessary for installing the unit.

SS-95 – STREET CLOSURES

SS95-01, REQUIREMENTS: When street closure is required or permitted for the construction of facilities on or under the street, the Contractor shall notify in writing, the occupants of all homes and businesses with access to that street of the proposed closure two (2) calendar days in advance of the closure. The Contractor shall be prepared to make access available at any time during the day to emergency type vehicles (fire trucks, ambulances, etc.). These requirements are in addition to those of Section G6-12 of these Specifications.

Following is the minimum delineation which is required at all locations where permission has been granted to temporarily close a street.

ROAD CLOSED – (C2) SIGNS RED TYPE N REFLECTIVE MARKER SIGNS

Type of Street	No.	Size	Location	No.	Size	Location
40 ft.	1	36” x 24”	Center of travelled way	2	24”	)
50 ft.	)					)
56 ft.	)1	48” x 30”	Center of travelled way	2	30”	Evenly spaced
60 ft.	)					between C-2
						) Signs and Ends
84 ft.	)2	48” x 30”	Center of each	4	30”	)of Fence
110 ft.)			half of travelled way			)Barricades

Additional delineation may be required by the District where roadway alignment and/or approach speed potential increase the need for notice to the driver. The Contractor will provide the signs required for street closure as provided for in Section G6-12 of these Specifications.

SS-96 – DEWATERING

SS96-01, PAYMENT: No separate payment will be made to the Contractor for dewatering or temporary drainage facilities unless specifically indicated in the Special Provisions and the provisions for removal and disposal of surface and sub-surface waters either natural or manmade regardless of whether industrial, agricultural or domestic in origin, or storm runoff. The Cost of all materials, labor and equipment required for the dewatering or temporary drainage facility shall be included in the price bid for other items of work.

SS-97 – TEMPORARY PAVING

SS97-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per ton for temporary paving which shall include furnishing, placing and removing temporary paving as set forth in Section SS-28 of these Specifications.

The quantity shown for this item is approximate and is indicated forbid comparison only and no guarantee is made or implied that the quantities shown will not be reduced or increased or deleted as may be required by the District.

SS97-02, PAYMENT: If no unit price is shown in the Proposal for temporary paving, all costs therefore shall be considered as included in the lump sum price bid for restoration of surfaces or other items of work.

SS-98 – ACCEPTANCE TESTS – SANITARY SEWERS

SS-98-01, REQUIREMENTS: All sewer lines shall be tested for obstructions and for leakage unless otherwise specified.

SS98-02, OBSTRUCTIONS: All sewer lines shall be tested for obstructions and cleaned balling and flushing in accordance with Section SS65-05. An approved commercial sewer cleaning ball shall be used, which shall be controlled by a tag line or rope or sewer rods, and permitted to move slowly through the sewer.

Any obstructions or irregularities shall be removed or repaired by the Contractor. All testing, cleaning and repairing shall be done to the satisfaction of the District. The Contractor shall provide all necessary materials and utilities for the tests and shall dispose of all waste, including water at their own expense. The water shall not be allowed to enter existing sanitary sewer systems.

SS98-03, LEAKAGE: Sewers may be tested for leakage upon completion of laying, backfilling and compacting at the option of the Contractor. However, as a condition to acceptance of the sewer system, a leakage test must be undertaken and passed subsequent to the installation of all utilities crossing any portion of the sewer system. In the event public utilities use approved crossings and their facilities are not completed prior to the completion of the subdivision, then the original Contractor will be required to retest and make any repairs after completion of those underground facilities at the cost of the developer. The program of testing must fit the condition as mutually determined by the District and the Contractor. The Contractor may use either an air or water test as specified below, and shall furnish all labor, tools, and equipment necessary to make the tests and to perform any work incidental thereto. The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipelines or their appurtenances are being tested. The Contractor shall, at their own expense, correct any excess leakage and repair any damage to the pipe and its appurtenances or to any structures indicated by or resulting from these tests.

A. Air Test for Leakage: The Contractor may test all sewers by means of the air test specified herein, except force mains shall be hydro-tested as specified in Section SS98-03B of these Specifications. Length of line tested at one time shall be limited to the length between adjacent manholes.

   Air test procedure shall be as follows:

Pressurize the test section to 3.5 psi and hold above 3.0 psi for not less than five (5) minutes. Add air if necessary to keep the pressure above 3.0 psi. At the end of this five (5) minute saturation period, note the pressure (must be 3.0 psi min.) and begin the time period. If the pressure drops 0.5 psi in less than the time given in the following table the section of pipe shall not have passed the test.

Lateral Size	Minimum Time in Seconds
4	122
6	184
8	245
10	306
12	367
15	460

For larger diameter pipe use the following formula:

Min. time in seconds = 370 x pipe diameter in feet.

When the prevailing ground water is above the sewer being tested, air pressure shall be increased 0.43 psi for each foot the water table is above the flow line of the sewer.

If the time for the pressure to drop 0.5 psi is one hundred and twenty-five percent (125%) or less of the time given in the table, the line shall immediately be repressurized to 3.0 psi and the test repeated.

For eight inch (8") and smaller pipe, only: if, during the five (5) minute saturation period, pressure drops less than 0.5 psi after the initial pressurization and air is not added, the section undergoing test shall have passed.

If the test is not passed, the leak shall be found and repaired to the satisfaction of the District and the length of repaired line retested.

House sewers shall be considered part of the lateral to which they are connected and no adjustment of test time shall be allowed to compensate for the smaller diameter of the house sewers.

The pressure gauge used shall be supplied by the Contractor, shall have maximum divisions of 0.10 psi and shall have an accuracy of 0.04 psi. Accuracy and calibration of the gauge shall be certified by a reliable testing firm at six (6) month intervals or when requested by the District. In addition, the District may compare the Contractor's gauge with a District owned gauge at any time. The pressure gauge shall be located such that it is completely visible from the exterior of the manhole.

B. Hydrostatic Test: The Hydrostatic test may be used in lieu of the air test. When the hydrostatic test is used, all sections of sewer shall be tested by inserting stoppers in the

lower end of the sewer, the inlet sewer of the upper manhole, and any side sewers at intervening manholes, and filing the pipe and manholes with water to a point in the upper manhole not less than five (5) feet above the crow of the pipe or prevailing ground water elevation, whichever is higher. The maximum length of section tested shall be one thousand (1,000) feet.

The line shall be filled for at least four (4) hours prior to testing. It shall be test for at least two (2) hours, maintaining the head specified above by measured additions of water. The sum of these additions shall be the leakage for the test period.

Maximum allowable head of water above any portion of sewer being tested shall be fifteen (15) feet. Where the difference in elevation between successive manholes exceeds fifteen (15) feet, at test tee shall be installed between manholes, and testing shall be carried on between the tee and the manhole.

For gravity pipelines, the allowable leakage shall not exceed 0.033 gallon per minute per inch diameter, per one thousand (1,000) feet of main line sewer being tested. This is equivalent to two-hundred and fifty (250) gallons per day, per inch diameter, per mile.

For sewer force mains, the allowable leakage shall not exceed 0.017 gallons per minute per inch diameter, per one thousand (1,000) feet of line being tested. This is equivalent to one hundred twenty-five (125) gallons per day, per inch diameter, per mile. Test pressure for force mains shall be ten (10) psi minimum unless otherwise stated in the Special Provisions.

Where the actual leakage in a section tested exceeds the allowable, the Contractor shall discover the cause and remedy it before the sewer is accepted. If the leakage is less than allowable and leaks are observed, such leaks shall be repaired.

Water used in testing shall not be permitted to enter the existing sanitary sewer system.

SS98-04, DEFLECTION/OUT OF ROUNDNESS TEST FOR FLEXIBLE GRAVITY SEWER PIPE: In addition to the requirements of SS98-01 through SS98-03, flexible gravity sewer pipe (including plastic composite pipe) shall be tested for deflection/out of roundness under one of the following applicable subsections. It is the intent of both subsections to limit the allowable maximum deflection of the installed pipe to three percent (3%). For the purposes of these specifications, ductile iron pipe (DIP) shall not be considered flexible.

A. Mandrel Test: Flexible sewer pipe less than thirty-six inches (36”) in diameter shall have a mandrel pulled through the pipe by hand to measure for deflections, joint offsets, and lateral pipe intrusions. The mandrel, which is to be provide by the Contractor, shall have a minimum length of its circular portion equal to the nominal diameter of the pipe and containing the effective circular cross section of at least ninety-sever percent (97%) of the maximum average inside diameter, which shall be equal to the average outside

diameter per applicable ASTM Standards minus two (2) minimum wall thicknesses per applicable ASTM Standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections. The mandrel shall have an odd number of nonadjustable blades, the minimum number being nine and it shall be clearly labeled as to its effective circular cross sections. The Contractor shall remove, replace and retest any pipe section through which the mandrel is unable to pass. The use of any rerounding device or method to correct or reduce any over deflection shall not be permitted. The deflection test must not be performed sooner than thirty (30) days after completion of placement and densification of backfill. Deflection testing will not be required for sewer services.

B. Alternate Testing Method: Flexible sewer pipe thirty-six (36) inches in diameter and greater, and section of flexible sewer pipe of lesser diameter which by judgement of the Engineer are appropriate for mandrel testing due to horizontal or vertical curves, manhole alignment, etc., shall be tested for deflection/out of roundness by specific means approved by the Engineer. Approved means of deflection testing shall be performed no sooner than thirty (30) days after completion of placement and densification of backfill. The Contractor shall remove, replace and retest any pipe section through which the mandrel is unable to pass. The use of any rerounding device or method to correct or reduce any over-deflection shall not be permitted.

SS-99 - SHOP DRAWINGS (SEWAGE & DRAINAGE PUMPING STATIONS)

SS99-01, ITEM AND PAYMENT: Seven (7) complete copies of shop drawings shall be submitted to the District for review of all power distribution, control, instrumentation and telemetry equipment including the following:

A. Main switchboard, motor controls, liquid level controls, and alarm systems.

B. Terminal cabinet for submersible pump cables.

As a minimum, shop drawings shall include a bill of materials, front view, assembly drawings, elementary diagrams, connection diagrams and inter connection diagrams. The contract price shall include the preparation and submittal of all shop drawings acceptable to the District and no additional payment shall be added to said contract price for the effort. The connection diagrams shall show all devices arranged geographically as they appear to a person who is service the equipment (wiring side). All connection diagrams shall be of the conventional type with lines showing point to point wiring. Connection diagrams of the wireless or wire schedule type will not be acceptable. All wiring on the diagrams shall have the corresponding wire labels show. The diagrams shall be drawn to scale or completely dimensioned (showing minimum clearance dimensions) for all equipment. Contact locations shall be clearly referenced by line numbers and all switching functions (level, pressure, timing, etc.) shall be clearly shown. All terminals shall be numbered on both connection and interconnection diagrams.

SS99-02, DISTRICT'S APPROVAL: Work requiring shop drawings shall not be initiated prior to receipt of the District's written approval.

SS-100 – OPERATION AND MAINTENANCE INSTRUCTIONS FOR SEWAGE AND DRAINAGE PUMPING STATIONS

SS100-01, ITEM AND PAYMENT: Unless otherwise set forth in the Special Provisions, the Contractor, before receiving payment for more than eighty-five percent (85%) of the work, shall submit to the District five (5) sets of manufacturer's or supplier's brochures, instruction, maintenance and overhaul manuals for each item of equipment and system supplied under the specific contact. The manufacturers' or suppliers' standard brochures and manuals supplied will be modified to reflect only the model or series of equipment supplied or installed under the specific contract including any modifications. All extraneous information will be crossed out or otherwise obliterated as acceptable to the District.

The operating and maintenance instructions shall include, as a minimum, the following data for each item of mechanical, electrical and instrumentation equipment:

A. An itemized list of the data provided.

B. Name and location of the manufacturer, the manufacturer's local representative and the nearest supplier.

C. Accepted submittal information applicable to operation and maintenance.

D. Recommendation installation, adjustment, start-up, calibration, and troubleshooting procedures.

E. Recommended lubrication points and schedules.

F. Complete internal and connection wiring diagrams.

G. Recommended preventative maintenance procedures and schedule.

H. Complete parts lists, by generic title and identification number and title, with exploded views of assemblies.

I. Recommended spare parts list.

J. Disassembly, overhaul and reassembly instructions.

Following the acceptable installation and operation of an item or system, the instructions and procedures shall be modified and supplemented by the Contractor to reflect all field changes or information.

The contract price shall include the preparation, organization, assembly and submittal of all operation and maintenance instructions and no additional payment shall be added to said contract price for this effort. The final contract payment may be withheld until acceptable operation and maintenance instructions are submitted to the District and a portion of progress payments may be withheld in accordance with Section G8-05 of these Specifications.

SS100-02, ORGANIZATION OF MATERIALS: Each set of operation and maintenance instructions shall be fastened into a three-ring (3) binder. A complete table of contents listing all items organized by type of equipment, i.e., mechanical, electrical, instrumentation, telemetry, miscellaneous, etc., and their location in the set shall be included in each binder. Each completed binder shall contain only material which can be clamped into it with the clamps in a fully closed position. A labeled table shall be used to separate and identify each section of the instructions. The cover of each binder shall contain a typed label showing the title of the project and the District contract number. The Contractor shall include in each binder a complete reference of each equipment item manufacturer's representative.

SS-100A – PAINTING AND COATINGS – MECHANICAL

SS100A-01, ITEM: the work included under this section consists of furnishing all material, supplies, equipment, tools,, transportation and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to complete painting and coasting of all piping, equipment and other surfaces throughout the entire project as described in this section of the Specifications, as shown on the Plans, or reasonably implied therefrom. Exposed shall mean not buried and shall include submerged items. Unless otherwise noted on the Special Provisions or the Proposal, no separate payment will be made for this item, the cost for this item shall be included in the bid price of other items of work.

SS100A-02, REQUIREMENTS: Painting shall include, but not limited to, the following items:

A. Exposed pipes, fittings, valves and backflow preventers.

B. Fire hydrants and fire protection assemblies (including Fire Department connections)

C. Equipment, electrical conduits and motors.

D. Miscellaneous metal.

Copper, bronze, stainless steel and aluminum shall not be painted or finishes, except as otherwise specified. If metal or any other surface to be finished cannot be put in proper condition for finishing by customary cleaning, sanding and puttying operations, the coating Contractor shall immediately notify the general Contractor in writing or assume responsibility for and rectify any unsatisfactory finish resulting.

The following area, articles and surfaces are excluded from this section:

A. Aluminum, unless in contact with concrete.

SS100A-03, MATERIALS: All materials used shall be exactly as specified in brand and quality. No claim by the Contractor as to the unsuitability or unavailability of any material specified or the Contractor's unwillingness to use same or their inability to produce first class work with same, will be entertained unless such claims are made in writing and submitted with his/her bid. All coatings, paints, enamels, paste fillers and similar materials must be delivered in the original containers, with the seals unbroken and labels intact.

All materials shall be used only as specified by the manufacturer's direction label on the container. All painting materials, such as linseed oil, shellac, turpentine, etc., shall be pure and of the highest quality, and shall bear on identifying label on the container.

Paint furnished under these specifications shall be manufactured by the Inertol Co., Newark, New Jersey, TNEMEC, North Kansas City, Missouri, Amercoat, or an approved equivalent. These Specifications are based on trade names and colors of TNEMEC to establish paint types, color and treatment unless otherwise noted.

All colors (including deep tones) shall be selected or approved by the Engineer. If required, three (3) samples for finish and color shall be prepared in advance, with the materials as specified, for the approval by the Engineer.

All materials used on the job shall be stored in a single place. Such storage place shall be kept neat and clean and all damage thereto of its surroundings shall be made good. Any oily rags, waste, etc., must be removed from the building every night and every precaution taken to avoid the danger of fire.

SS100A-04, EXECUTION: The workmanship shall be of the very best. All materials shall be applied under adequate illumination, evenly spread and smooth without runs or sags. All surfaces to be painted shall be cleaned, free of loose dirt and dust before painting is started. All necessary puttying of nail, cracks, etc., shall be done after the first coat, with putty of a color to match that of the finish. Putty shall be brought flush with the adjoining surface in a neat and worker-like manner.

Unless the situation warrants higher degree of surface preparation as specified herein, all metal surfaces shall first be washed with mineral spirits to remove any dirt or great, before applying materials. Where rust or scale is present, it shall be wire brushed or sand papered clean before

painting. Shop coats of paint that become marred shall be cleaned and touched up with the manufacturer's primer specified.

All undercoats of the paint and enamel shall be tinted to the same approximate shade of the final coat.

All coats shall be thoroughly dry before applying succeeding coats. Exterior painting shall not be done while the surface is damp or during rainy or frosty weather.

The painter shall not only protect their work at all times, but shall also protect all adjacent work and materials by suitable covering or other method during progress of their work. Upon completion of the work, the painter shall remove all paint and varnish spots from the floors, surfacing, glass and other surfaces. The painter shall remove from the premises all rubbish and accumulated materials of whatever nature not caused by other trades and shall leave the work area in a clean, orderly and acceptable condition. Specifically, all pumps and motors shall be protected from sand blasting debris by encapsulation or tenting the equipment while blasting is going on in the vicinity.

The contractor shall paint test areas on pumps and motors and other areas as requested by the Engineer. The test areas shall be prepared with the surface preparation technique specified herein and shall receive prime and final costs as specified. The prime coat and final coat shall be applied in the same manner as the entire pieces of equipment would receive. The drying time for the primer and the final costs shall be fully observed. The minimum time of the test shall be two (2) days after the final coat has been applied. In the event that the new coating system does not properly bond to the equipment, the Contractor shall consult with the manufacturer and the Engineer to develop a proper coating system for the piece of equipment.

Unless otherwise specified, before machinery or equipment is shipped from the manufacturer's shop, all metal work, subject to corrosion, shall be thoroughly cleaned of rust and scale, properly primed, filled and rubbed down. Primer shall be compatible with field panting specified herein, such as Tnemec's Epoxoine Primer, Series 69.

All bright metal surfaces which, by their nature, cannot be painted shall be property protected during shipment with an approved method. Equipment and surface on which enamel finish has been factory applied in an approved color need not be painted in the field unless damaged during shipment or installation.

If sections of the equipment have not received factory painting because of welding conflicts, the Contractor shall clean the surface in accordance with this Section and apply an appropriate filed primer and finish coat.

All equipment, machinery and pipes shall obtain at least one final coat in the color corresponding to their service in accordance with the Piping Identification Schedule, unless otherwise directed by the Engineer. All component parts (pipes, valves, motors, pumps, etc.) for each process shall be painted in the color assigned to that process.

A. Items Which Are Shop Primed; Field painting of machinery and equipment which has received a factory primer shall be as follows (or approved equal):

For Submerged Service (Epoxy-Polyamide System): System must be approved for use in drinking water service:

Surface Preparation:	Clean as specified above.
Field Primer:	Potax Pox Primer Series 20.5 mils DFT
Finish:	One (1) coat of Pota Pox Finished, 5 mils dry.

For Non-Submerged Service (Acrylic Polyurethane System):

Surface Preparation:	clean as specified above
Field Primer:	Potax Pox Primer Series 20, 5 mils DFT
Finish:	One (1) coat of Endura Shield, Series 75 (Semi Gloss), 3 mil DFT

If the factory prime coat is red primer, it shall be removed to SP10. If the system is compatible with the direct application of Endure shield or an epoxy coating, then the Contractor may omit the field primer listed above and provide a brush-off blast to SP7 before applying the finish coat.

B. Item Which Are Not Shop Primed: If machinery and equipment are delivered to the job without having received a factor prier, the Contractor shall clean and apply a field prime coat and finish as follows:

For Submerged Service (Epoxy-Polyamide System): System must be approved for use in drinking water service:

Surface Preparation:	SSPC-SP10
Field Primer:	Potax Pox Primer Series 20.5 mils DFT
Finish:	One (1) coat of Pota Pox Finished, 5 mils dry.

For Non-Submerged Service (Acrylic Polyurethane System):

Surface Preparation:	SSPC-SP6
Field Primer:	Potax Pox Primer Series 20, 5 mils DFT
Finish:	One (1) coat of Endura Shield, Series 75 (Semi Gloss), 3 mil DFT

C. Above Ground Pumps, Motors, Valves, Metallic Pipes, Fire Hydrants, Etc.: Pumps, motors, pipes, valves, fire hydrants, fire protection assemblies, fire department connections, backflow preventers, etc., delivered to the site shall have at least one (1) finish coat of paint applied to them in the color specified in the Paint Schedule. Coating shall be as follows:

Surface Preparation:	SSPC-SP10
Field Primer:	Potax Pox Primer Series 20.5 mils DFT
Finish:	One (1) coat of Endura Shielf, Series 75 (semi gloss), 3 mil DFT

If the factory prime coat is red primer, it shall be removed to SP10. If the system is compatible with the direct application of Endure Shield or an epoxy coating, then the Contractor may omit the field primer listed above and provide a brush-off blast to SP7 before applying the finish coat.

D. PVC Pipes: shall receive a primer coat and a final coat to facilitate operational identification.

Surface Preparation:	Solvent Cleaning
Primer:	Series 135, Chembuild, 5 mils DFt
Final Coat:	Series 69, 5 mils DFT

All machinery, equipment and pipes shall be given at least one final coat of paint I the color indicated in the painting schedule below. All component parts (pipes, valves, motors, pumps, etc.) for each process shall be painted in the color assigned to that process.

SS100A-05, PAINTING SCHEDULE:

System	Abbreviation	Main Color
Reclaimed Waste Water	RWW	OSHA Purple
Raw Water	RW	OSHA Green
Drinking Water	DW	OSHA Blue
Chlorine Gas or Solution	CLG or CL	OSHA Yellow
Air	A	Lt. Green
Polymer	P	Lt. Brown
Alum	AL	Orange
Powdered Activated Carbon	PAC	Black
Potassium Permanganate	PP	Purple
Lime	L	Grey
Zinc Orthophosphate	ZO	Red
Acid	Acid	Red
Caustic	COS	White
Handrails, Safety Barriers, Cranes		OSHA Yellow
Telephone/Communication Conduits		Lt. Blue
Concrete		Off White
Electrical Boxes, Conduits, Motors, etc.		As Director by the Engineer
Fire Hydrants		Ditto
Fire Protection Assemblies		Ditto
Backflow Preventers		Ditto

SS100A-06, PIPE AND EQUIPMENT IDENTIFICATION: the Contractor shall furnish and securely mount equipment labels for major pieces of equipment as identified in the drawings. These labels

shall be approximately three (3) by five (5) inches and shall be made of Lucite with process or equipment names engraved.

In addition to any other specified painting in the Painting Schedule for exposed interior piping, a pipe label showing the name of the contents and an arrow showing the direction of flow shall be applied to each exposed pipe of the systems. The pipe labels shall be specifically used in outdoor applications and shall be applied close to valves and adjacent to changes in direction, branched where pipes pass through walls or floors and at frequent intervals on straight pipe runs (sufficient to identify clearly) or as directed by the Engineer. Attention shall be given to visibility with reference to pipe labels. Where pipe lines are located above the normal line of vision, the lettering shall be in general accordance with American National Standard Institute Scheme for the Identification of Piping Systems, A13.1.

The pipe labels shall use the legend listed in the Painting Schedule and will conform to the following sizes:

Pipe Diameter	Label Width
Less than 1”	Legible Tag
1” to 3”	1-1/8”
Greater than 3”	1-¼”

The labels and arrows will be secured to the pipe by a band of tape that extends completely round the circumference of the pipe and matches the color of the field of the labels, except for the potable water system, will use black letters on a yellow field. The pipe labels and tape shall be of the pressure sensitive type as manufactured by T 7 B/Westline Division of Thomas and Betts Corp., Raritan, J.J.; W.H. Brady Co., Milwaukee, WI; Seaton Nameplate Co., New Haven, Ct. or approved equal.

SS100A-07, COATING OF CONCRETE: Used in drainage and sewer facilities.

A. Concrete walls shall receive a protective coating where indicated and shall be as follows:
   For Non-submerged Services:
   Surface Preparation: Brush-off blast cleaning, clean and dry
   First Coat: 66 Color Hi-Build Epoxoline, 6 mil dry
   Second Coat: 66 Color Hi-Build Epoxoline, 6 mil dry

   For Submerged Service:
   Surface Preparation: Brush-off blast cleaning, clean and dry
   First Coat: 46H Hi-Build Tneme-Tar, 20 mils

B. Concrete used in conjunction and exposed to drinking water shall receive a protective coating where indicated and shall be as follows:

Two coats of crystalline water proofing shall be applied. The material shall be as manufactured by XYPEX Chemical Corporation, Richmond; B.C. Coating shall be applied at 1.25 to 1/5 lbs/sq. yd. The first coating shall be made using the "XYPEX Concentrate", while the second coat shall have a sponge float finish to provide a smooth surface.

Application shall be in accordance with the manufacturer's recommendations. Special attention shall be given to the surface preparation, timing and application requirements of the second coat. Structural defects such as cracks, faulty construction joints and honeycombing should be routed out to sound concrete and repaired in accordance with the XYPEX specification manual repair procedures or as directed by the Engineer.

Curing shall be in accordance with the manufacturer's recommendations.

Curing shall be in accordance with the manufacturer's recommendation. Treated surfaces shall be fog sprayed a minimum of three (3) times a day for a two (2) day period, or may be covered with damp burlap for the prescribed time. Burlap shall be moistened periodically. Plastic sheeting shall not be used. As an alternative, "Gamma Cure", as manufactured by XYPEX may be used as a curing agent.

The tanks shall not be filled with water for a period of not less than fifteen (15) days.

SS-101 – PROPERTY FENCE AND GATES

SS101-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective types of property fence and a price per each for gates of the type and widths as indicated on the plans and in the Proposal.

SS101-02, TYPE BW PROPERTY FENCE: Type BW property fence shall consist of five (5) lines of barbed wire on metal posts placed at twelve (12) foot intervals unless wood posts are required on the plans or in the Special Provisions.

SS101-03, TYPE WM PROPERTY FENCE: Type WM property fence shall consist of thirty-two (32) inch wire mesh and three (3) lines of barbed wire on metal posts placed at twelve (12) foot intervals unless wood posts are required on the plans or in the Special Provisions.

SS101-04, SPECIFICATION: All property fence materials and construction methods shall conform to Section 80 of the State Specifications and Standard Drawings No. R-1.

SS101-05, MEASUREMENT: Quantities of property fence to be paid for shall be determined by the linear foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the complete fence, deducting the width of opening.

Quantities of gates shall be determined by actual count. When more than one (1) gate is placed in an opening, each single unit placed will be counted as a gate. A gate unit complete in pale shall include one (1) gate with all necessary fittings, hardware and gate posts with braces.

SS101-06, PAYMENT: Items of work, measured as specified shall be paid for at the contract price per linear foot, for property fence (Type BW or WM) and the contract unit price per property fence gate, if gates are required.

Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when wire mesh fence is being constructed, excavating and backfilling holes, disposing of surplus excavated material, and furnishing and placing concrete footings and deadmen, and connecting new fences to structures and existing cross fences, and constructing temporary fences for the protection of stock, shall be considered as included in the contract prices paid for the fence and no additional compensation will be allowed therefore.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in constructing property fences, complete in place, as shown on the plans, and as specified in these Specifications and the Special Provisions and as directed by the District.

SS-102 0 CHAIN LINK FENCE

SS102-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing chain link fence and a price per each for gates of the height and widths indicated on the plans and in the Proposal.

SS102-02, MATERIALS AND METHODS: All chain link fence, fabric, gates and posts shall conform to the materials and construction methods as set forth in Section 80 of the State Specifications and Standard Drawing R-1, except as specified herein.

SS012-03, POSTS: Gate posts for gate widths less than or equal to six (6) feet shall be a minimum of two and one-half (2 ½) inch outside diameter steel pipe weighing not less than 4.95 lbs. per lineal foot. Posts for gate widths greater than six (6) feet and less than or equal to twelve (12) feet shall be a minimum of four (4) inch outside diameter steel pipe weighing not less than 10.79 lbs. per lineal foot.

SS102-04, EXTENSION ARMS: When specified on the plans and in the Proposal, extension arms with three (3) lines of barbed wire shall be furnished and rigidly fastened to the posts. The extension arms shall be at an angle of approximately forty-five (45) degrees. The barbed wire shall conform to Section 80 of the State Specifications and shall be galvanized in conformance with ASTM Designation: A123. There extension arms with barbed wire are specified, the cost shall be included in the price bid for chain link fence.

SS102-05, MEASUREMENT: Quantities of chain link fence to be paid for shall be determined by the lineal foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the completed fence, deducting the width of openings.

Quantities of gates shall be determined by actual count. When more than one (1) gate is placed in an opening, each single unit placed will be counted as a gate. A gate unit complete in place shall include on gate with all necessary fittings, hardware and gate posts with braces.

SS102-06, PAYMENT: Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when chain link fence is being constructed, excavating and backfilling holes, disposing of surplus excavated material and furnishing and placing concrete footings and deadmen and connecting new fences to structures and existing cross fences, and constructing temporary fenced for the protection of stock shall be considered as included in the contract prices paid for the fence and no additional compensation will be allowed therefore.

The above prices and payment shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in constructing chain link fences, complete in place, as shown on the plans and as specified in these Specifications and the Special Provisions and as directed by the District.

SS-103 – CHAIN LINK FENCE WITH PLASTIC SLATS AND GATES

SS013-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing chain link fence with plastic slats including gates with plastic slats of the height and widths indicated on the plans and in the Proposal.

SS103-02, MATERIALS: The fencing fabric shall be woven from No. 9 gauge wire conforming to Section 3, 4, 7 and 8 of ASTM Designation: A 116, with Class III zinc coating. The fencing fabric shall be a chain link type fabric as defined in Section 3 of ASTM Designation: A 392 and shall be woven into a three and one-half (3-1/2) x five and one-half (5-1/2) inch wire mesh.

Plastic slats Model PVT as manufactured by Patrician Product, Inc., shall be installed in the fence fabric. The color of the plastic slats shall be selected at the time of the shop drawing review. Each plastic slat shall extend the full height of the chain link fiber. Plastic slats shall be securely fastened to the fence fabric with hog rings on the top and bottom.

SS103-03 POSTS: Line posts shall be two and one-half (2 ½) inch outside diameter steel pipe weighing not less than 3.65 lbs., per lineal foot. End, gate, pull, and corner posts shall be three (3) inch O.D. pipe weighing not les than 4.79 lbs., per lineal foot. Top rails and braces shall be one and five-eighth (1-5/8) inch O.D. steel pipe weighing not less than 2.27 lbs. per lineal foot. The posts, rails, and braces shall be galvanized and of a good quality weldable steel, with a minimum copper content of 0.20 percent. Galvanizing shall conform to ASTM Designation: A 123.

SS013-04, FITTINGS: The top of the fence shall be equipped with a top rail. The bottom tension wire shall be No. 7 gauge coil spring tension wire. Fittings including top and bottom couplings, finials, gate hinges, holders, locking devices, etc., shall be heavy malleable iron or pressed steel, hot dipped galvanized and designed to fit the members to which they are attached. Galvanizing shall conform to ASTM Designation: A 123.

SS103-05, GATES: Gates for chain link fence with plastic slats shall conform to the following special requirements.

Chain link gates with plastic slats shall be constructed of two (2) inch O.D. pipe, weighing not less than 2.72 lbs. per lineal foot. Pipe shall be constructed of pipe materials as specified in SS103-03 of these Specifications. The height of the gate shall be the same as the connecting fence unless otherwise specified.

Galvanized gate holders of heavy cast construction shall be provided for each gate section. They shall be of the counter-balanced type adjusted so they will automatically catch and hold the gate by Simply pushing the gate open and will release it by depressing the holder with the foot. The gate holder shall be anchored by a concrete post or a steel support set in concrete.

Gates shall be fitted with heavy hinges and lift bar locking devices arranged for two (2) padlocks. Gates shall e furnished complete with one (1) master keyed padlock as specified by the District.

SS103-06, EXTENSION ARMS: When specified on the plans and in the Proposal, extension arms with three (3) lines of barbed wire shall be furnished and rigidly fastened to the posts and gate frames. The extension arms shall be at an angel of approximately forty-five (45) degrees from horizontal. The barbed wire shall conform to Section 80 of the State Specifications and shall be securely fastened to the extension arms. The extension arms shall be of a good quality steel and shall be galvanized in conformance with ASTM Designation: A 123. Where extension arms with barbed wire are specified, the cost shall be included in the price bid for chain link fence with redwood pickets.

SS103-07, INSTALLATION: Construction methods shall conform to the applicable portions of Section 80-4 of the State Specifications and as modified herein.

Fence posts shall be set plumb and in true alignment and be embedded three (3) feet in a concrete base. The base shall have a diameter at least three (3) times that of the post, with an eight (8) inch minimum and a depth of at least thirty-nine 939) inches.

Concrete shall be Class “B” and allowed to cure not less than five 95) days before the wire fabric is placed. Gate, end and corner posts shall be located where indicated and the line posts adjusted for spacing accordingly, except that they shall be spaced not more than ten (10) feet apart.

Braces shall be installed in panels adjacent to gate openings and at corners or at alignment changes of more than thirty (30) degrees. They shall be located midway between top rail and ground and

extend from end, corner or gate post to the first adjacent line post. Compression bars and three-eighth (3/8) inch tension brace to rods with heavy turnbuckles shall be installed at each brace panel.

The fence shall be constructed with a continuous top rail and a bottom tension wire. Top rails shall pass through the line posts tops to form a continuous brace from end to end of each stretch of fence. Rail shall be provide with expansion couplings approximately every twenty (20) feet and be securely fastened to end, corner or gate posts by means of suitably pressed steel connections.

The bottom tension wire shall be stretched and secured to the posts six (6) inches from the bottom edge of the fabric. The fabric shall be secured to the top of rail and bottom tension wire every two (2) feet with No. 9 gauge tie wire.

The wire fabric shall be stretched taut and secured to the posts by means of aluminum bands spaced fourteen (14) inches on center. At terminal posts, the fabric shall be secured by a tension bar and adjustable clamps.

SS103-08, MEASUREMENT: Quantities of chain link, including gates with all necessary fittings, hardware and gate posts with braces, with plastic slats to be paid for will be determined by the lineal foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the complete fence, deducting the width of openings.

SS103-09, PAYMENT: Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when the fence being constructed, excavating and backfilling holes, disposing of surplus excavation material and furnish and placing concrete footings and deadmen, an connecting new fences to structures and existing cross fences for the protection of stock, shall be considered as included in the contract prices paid for the fence and no additional compensation will be allowed therefore.

The above prices and payment shall include full compensation for furnishing all labor, materials, tool equipment, and incidentals, and for doing all the work involved in constructing chain link fences with plastic slats, complete in place, as shown on the plans, and as specified in these Specifications and the Special Provisions, and as directed by the District.

SS-104 – RESET EXISTING FENCES

SS104-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price for removal and resetting existing fences and erecting of temporary fencing where the existing fencing is for security of property or containment as indicated in the plans and as directed by the District. IF there is no payment item in the Proposal for resetting fences, the cost for removal and resetting existing fences shall be included in other items of work.

SS104-02, MATERIALS: Materials removed from the existing fence which, in the opinion of the District, are unsuitable for use in the reconstructed fence, shall be replaced with material of a kind and quality equal to the best of the salvaged material to the extent that when the fence is

reconstructed in its new location, it will be equal in all respects to the best portions of the existing fence, using as much material from the salvaged fence as possible. Existing fences to be removed and not reset shall be included in the item for clearing and grubbing.

SS104-03, PAYMENT: Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts, excavating holes, disposing of surplus excavated material, and furnishing and placing Portland cement concrete footings, and connecting the fences to structures and existing cross fences, and constructing temporary fences for the protection of stock, shall be considered as included in the price paid for resetting existing fences and no additional compensation will be allowed therefore.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in the removal and resetting of the existing fence, complete in place, as shown on the plans, as specified in the Specification and as directed by the District.

SS-105 – NOT USED

SS-106 – NOT USED

SS-107 – NOT USED

SS-108 – NOT USED

SS-109 – LAWN PLANTING

SS109-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per square foot for lawn planting. The bid price shall include all labor, equipment and materials necessary to perform the work as indicated on the drawings and specified herein.

SS109-02, SOIL PREPARATION AND FERTILIZATION: Areas to be planted shall be cultivated until t he soil is missed thoroughly and in a loose and fine textured condition to a depth of six (6) inches. If hard pan is encountered, cultivated depth shall be eighteen (18) inches minimum. Further cultivation shall be provided until all lumps are broken up to the satisfaction of the District.

The top two (2) inches shall be cleared of all stones, stumps, dirt clods, debris, etc., larger than one (1) inch in diameter, that are brought to the surface as a result of cultivations.

Fertilizer shall be applied in two (2) stages:

A. Initial planting as specified in the Special Provisions.

B. During establishment period as specified in the Special Provisions.

SS109-03, SOIL SETTLEMENT: The Contractor shall settle the ground by irrigation to a moisture depth of not less than eight (8) inches to the satisfaction of the District, and shall be responsible to fill low spots as a result of the settlement. The work shall be so conducted that the existing flow line in the drainage ditches will be maintained. Materials displaced by the Contractor's operations which interfere with drainage shall be removed and disposed of as directed by the District.

SS109-04, RECULTIVATE AND FLOAT: After cultivation and spreading of topsoil, if topsoil is required, finish soil grades shall be flush with grades of walks, curbs, paved areas, and flush with catch basins in all cases, unless indicated otherwise on the plans and such that surface drainage shall be away from foundations of buildings in all cases. Finish surfaces in all cases shall be in uniform sloping planes to insure proper surface drainage.

SS109-05, FINISH GRADE: The Contractor shall then fine grade the entire area to smooth and even lines with no abrupt changes in grade or create areas that will pond after turf is established. The area shall have a natural and pleasing appearance, conforming to finished grades shown on the plans. No ridges or grooves over one and one-half (1 ½) inches shall be accepted.

Soil around sprinklers shall be graded to prevent damage to sprinklers and shall be graded to be even with the top of the sprinkler and feathered out six (6) to eight (8) feet.

SS109-06, SEEDING:

A. Inspection of Seed Bed Prior to Seeding: The Contractor shall notify the District forty-eight (48) hours prior to seeding for inspection of seed bed. The District shall provide the Contractor with written approval of acceptance or disapprove twenty-four (24) hours prior to schedule of seeding. If seed bed is not approved by the District, the Contractor shall continue soil preparation at Contractor's expense until the provisions of these Specifications are met. Seed bed shall be smooth and even with the top two (2) inches cleared of all stones, stumps, dirt clods, debris, etc., larger than one (1) inch in diameter.

B. Seeding Procedures: Fertilizer shall be applied at the rate as specified in Special Provisions for lawn areas prior to seeding. The fertilizer shall not be tilled into the ground any deeper than two (2) inches. The Contractor shall obtain from the District written approval of the rate of application, method of application, name of applicator or equipment and areas to which the material is to be applied.

C. Rate of Application (Seed Mixture): As specified in Special Provisions rate and variety. Immediately after seeing, provide water to moisten the ground.

The Contractor shall be responsible for any erosion or slippage of the soils caused by watering and such erosion or slippage and ridges, gullies, or valleys made by seeding equipment shall be repaired by the Contractor at their expense.

SS109-07, ESTABLISHMENT OF LAWN PLANTING: As part of this contract, there shall be a thirty (30) calendar day establishment period that shall commence after all planting has been completed in accordance with the plans and Specifications. Final approval of the completed project will follow the thirty (30) day establishment period unless the planting areas are not acceptable due to poor horticultural practice. If, during the establishment period, areas are lacking in sufficient grass seedling to insure an adequate lawn, these areas shall be recultivated and reseeded within twenty-four (24) hours after written notification from the District. The establishment period, in this case, will be continued until all work meets the requirements of the plans and Specifications. The establishment period shall include the continuous operation of watering, weeding, mowing, fertilizing, spraying, insect and pest control, and any other normal operation required to completely assure good growth. All work shall be regular and frequent enough to keep all planting areas in a neat and presentable condition at all times.

All lawn areas, when three (3) inches high, shall be mowed to a one and one-half (1 1/2) inch height, and cuttings picked up immediately. Mowing shall be repeated whenever the grass grows to a three (3) inch height.

All weeds, except broadleaf species, in planting areas shall be controlled or killed before they exceed two (2) inches in height as specified in the Special Provisions and as directed by the District. Where broadleaf weeks are in planting areas, they shall be killed or removed before they exceed four (4) inches in height. The method of removal shall be approved by the District. Insecticides, pesticides or herbicides shall be applied no sooner than sixty (60) days minimum following germination.

Where chemical weed control is permitted by the Special Provisions or the District, the method, type and recommended rates shall be approved by the District.

All seeded areas will receive fertilizer uniformly spread at the rate as specified in Special Provisions immediately after the second mowing. The District shall be notified at least five (5) days in advance of fertilizing.

During the installation and establishment periods, the Contractor shall continuously protect and maintain all planting areas and will be responsible for the repair and replacement of all damaged areas and materials.

Only healthy plants will be accepted at the end of the establishment period. All repairs or replacements shall be made prior to the final inspection and the Contractor shall continue to maintain all areas until the plants are approved and accepted.

The Contractor may utilize the existing water system during the execution of this contract for the establishment of lawn plantings. The sprinkler system is not designed to germinate seed and Contractor will be required to monitor seed-bed moisture and provide supplemental manual watering as required to develop an acceptable stand of grass. The Contractor shall be required to furnish his/her own hose and connecting devices.

SS109-08, MATERIALS:

A. Topsoil: Topsoil shall consist of fertile, friable soil of loamy character and shall contain an amount of organic matter normal to the region. If shall be obtained from well drained arable land and shall be reasonably free from subsoil, refuse roots, heavy or stiff clay, stones larger than one (1) inch in size, coarse sand, noxious seeds, sticks, brush, litter and other deleterious substances. Topsoil shall be capable of sustaining healthy plant life.

   Topsoil shall be obtained from sources within the project or shall consist of imported topsoil obtained from sources outside the limits of the project or from both such sources, whichever is provided in the Special Provisions.

   Topsoil obtained from sources within the limits of project shall be excavated to the lines and depths as directed by the District. All lumps or clods shall be broken up before the topsoil is spread. Imported topsoil shall consist of material obtained from sources outside the limits of the project.

B. Commercial Fertilizer: Commercial fertilizer shall be standard uniform pellet form, and shall comply with the chemical analysis specified in the Special Provisions and shall conform to the requirements of the California Food and Agricultural Code.

C. Superphosphate: Superphosphate shall be composed of finely ground rock as commonly used for agricultural purposes, containing not less than eighteen percent (18%) available phosphate acid. Superphosphate shall conform to the requirements of the California Food and Agricultural Code.

D. Soil Amendment: Soil amendment shall be a ground wood product such as Park or redwood fortified with nitrogen and treated to absorb water quickly, or a relatively dry organic compost derived from sewage sludge. Soil amendment shall be friable and shall be free of weed seed, dust and other objectionable materials. Substantially, all soil amendment shall pass a one (1) inch sieve. Soil amendment shall comply with the requirements in the California Food and Agricultural Code.
   All soil amendment shall be packaged so that compliance can be readily determined or shall be accompanied by a Certificate of Compliance in accordance with the provisions in Section 6-1.07, of the latest issue of the State of California, Department of Public Works, Standard Specifications, “Certificate of Compliance”, stating that the material substantially meets all pertinent specification requirements of the contract.

E. Seed: All seed shall be labeled in accordance with the California Food and Agricultural code and delivered to the site in sealed bags or containers with vendor's certificate attached.

All shipments of seed not accompanied by a valid California Nursery Stock Certificate shall be reported to the County Agricultural Commissioner at the point of destination for inspection and shall be held until released by the Commissioner.

Seed treated with mercury compounds shall not be used.

F. Water: (See Special Provisions.)

SS-110 – TREE, SHRUB, AND GROUNDCOVER PLANTING

SS110-01, ITEM AND PAYMENT: The Contractor shall bid a unit price per each for tree, shrub and per flat for groundcover planting. The bid price shall include full compensation for furnishing, installing and doing all necessary work to complete the tree, shrub and groundcover planting as detailed on the Standard Drawings and in accordance with the plans and Specifications.

SS110-02, PLANT SPECIFICATION:

A. All Plants: All plants shall be typical of their species or variety and shall have a normal habit of growth. Plants shall be sound, healthy, and vigorous, well branched, and densely foliated when in leaf. Plants shall be free of disease, insects, pests, eggs, or larvae and properly "hardened off" before planting. Plants shall have well developed root systems and not be pot bound. All plants shall be true to name and one (1) of each type shall be tagged.

B. Substitutions: When plants of specific variety or sizes specified are not available within a reasonable distance, substitutions may be made, upon request by the Contractor, subject to approval by the District.

C. Inspections: Plants shall conform to the accepted minimum standard size for container specified and shall be subject to inspection and approval by the District at the place of growth or upon delivery. Rejected plants shall be removed immediately from the site.

D. Special Provisions: The Contractor shall place an order for the required number of trees, shrubs and groundcover, within ten (10) working days after he has received notice of approval of the contract. A copy of the order showing the number of plants ordered, from whom ordered and the anticipated date of delivery as verified by the supplier, shall be submitted to the District.

SS110-03, TREE PLANTING INSTALLATION: Tree planting pits shall have holes drilled approximately two (2) times the diameter of the can and to a depth of three (3) feet. If holes are machine drilled, roughen sides of holes by hand before planting. See Standard Drawing No. L-1 for boring hole procedure.

The Contractor shall place fertilizer as specified in the Special Provisions and Section SS110-09 of these Specifications. Granular form fertilizer shall be slow release type and mixed thoroughly into backfill.

Backfill shall consist, by volume of fifty percent (50%) excavated soil removed from holes and fifty percent (50%) soil amendment thoroughly mixed. Trees shall be planted at three (30 inches above natural grade with firm backfill around roots to prevent settling. Immediately soak newly planted trees thoroughly.

Immediately after plant pit is backfilled, a shallow basin slightly larger than pit shall be formed with a ridge of soil to facilitate and contain watering. Mulch one (1) inch with soil amendment or peat moss, rake smooth and neatly outline.

Stake and tie trees immediately after planting. Locate stakes facing southwest (direction of prevailing wind). Stakes shall be rough redwood, Douglas fir, lodgepole or an approved equal. Tree ties shall le black rubber cinch ties nailed or stapled at know with three-fourth (3/4) inch U-nails or staples.

SS110-04, SHRUB PLANTING INSTALLATION: Shrubs shall be planted in holes twice the diameter of the can and one and one-half (1 ½) times depth of root ball and at natural growing depth. Backfill around roots shall be firmed to prevent settling.

Backfill shall consist, by volume of fifty percent (50%) excavated soil removed from holes and fifty percent (50%) soil amendment thoroughly mixed. The Contractor shall place fertilizer tablets as specified in the Special Provisions and SS110-09 of these Specifications. Granular form fertilizer shall be slow release type and mixed thoroughly into backfill.

SS110-05, GROUNDCOVER PLANTING INSTALLATION: All areas to be planted with groundcover shall be tilled to a depth of at least six (6) inches and soil amendment shall be incorporated as specified in Special Provisions. The soil amendment as specified shall be uniformly mixed in the soil. All rocks over two (2) inches in diameter and other debris shall be removed from the planting area and disposed of. If topsoil is needed, it shall be first incorporated in the existing soil before soil amendment is added.

The planting area shall be smooth, free of debris and rocks. The planting area shall not be too dry, too wet or in a condition not satisfactory to the District Planting areas that have been compacted for any reason, either before or after planting shall be recultivated by the Contractor at their expense.

Groundcover shall be planted on centers a specified. Rows shall be neat and parallel and not be planted closer than twelve (12) inches from curbs, walks, paved area and fences, and thirty-six (36) inches from trees and shrubs, unless otherwise shown on plans.

Mulch shall be applied at a rata shown on plans or as specified in the Special Provisions.

SS110-06, PLANT ESTABLISHMENT PERIOD: As a part of this contract, there shall be a thirty (30) calendar day establishment period that shall commence after all planting has been completed in accordance with the plans and Specifications. Final approval of the completed project will follow the thirty 930) day establishment period, unless the planting areas are not acceptable, due to poor horticultural practice. The establishment period in this case will be continued until all work meets the requirements of the plans and Specifications. The establishment period shall include continuous operation of watering, weeding, fertilizing, spraying, insect and pest control, and any other normal operation required to completely assure good growth. All work shall be regular and frequent enough to keep all planting areas in a neat and presentable condition at all times.

Weed control shall be as specified in Section SS109-07.

SS110-07, PLANT MATERIALS AND GUARANTEE: All plant materials shall be guaranteed to take root and grow when they have received normal care and maintenance. Plant materials shall be replaced promptly when they have died or have failed to grown properly during the thirty (30) day establishment period and any extensions thereof. Such replacements, including all planting, staking, etc., as originally specified, shall be without cost to the District. Trees shall be subject to one (1) year's guarantee.

Al materials shall meet the same Specifications as the original planting. The Contractor shall repair any damage created during the replacement operations, to the satisfaction of the District and this at no cost to the District.

SS110-08, WATER FOR ESTABLISHMENT: The Contractor shall be required to furnish their own hose and connecting devices. The Contractor may utilize the existing water system during the execution of this contract or as specified in Special Provisions.

SS110-09, MATERIALS:

A. Planting Tablets: Planting tablets shall be a tightly compressed, long lasting, slow release fertilizer tablet. See Special Provisions for rate and analysis. Plant tabs shall be twenty-one (21) grams.

B. Stakes: Shall be rough redwood or approved equal, construction grade or better, containing to sapwood conforming to Standard Detail no. L-1.

C. Soil Amendment: Soil amendment shall conform to the provisions in Section SS109-08 "Materials".

d. Lawn fertilizer: Fertilizer shall conform to the Special Provisions in Section SS109-08 "Materials".

E. Trees, Shrub and Ground Cover Fertilizer: Shall be granular form, slow release with a rate and analysis as specified in the Special Provisions.

SS-11 – QUICK COUPLING VALVES (SPRINKLER SYSTEMS)

SS111-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit price per each for furnishing and placing the quick coupling valves.

SS111-02, SPECIFICATIONS: The quick coupling valves shall be of brass or bronze construction with one (1) inch IPS female pipe connections.

The valve body shall be of two-piece construction consisting of an upper and a lower piece body. The upper valve body shall be easily removable for replacement. Each valve shall have four (4) stops or open position for regulation of flow.

All quick coupling valves shall be the type used on non-potable systems marked with special "Do Not Drink" warnings. Quick coupling valve shall have a durable locking rubber cover, red or purple in color.

All quick coupling valves shall be installed in accordance with Standard Drawing No. L-3 and L-4.

SS111-03, QUICK COUPLING VALVE KEYS: All quick coupling valve keys shall be of the same manufacturer as the quick coupling valve and shall be proper size to fit the valves as specified. The key shall be of brass or bronze construction.

SS111-04, VALVE BOX: Valve box for the quick coupling valves shall be of precast rigid plastic set flush with ground level as detailed in Standard Drawing No. L-3 and L-4. Precast rigid plastic box size shall be eight (8) inch diameter. Cover shall be lockable.

SS111-05, PAYMENT: The unit price for the quick coupling valves shall include excavation, furnishing and placing the quick coupler valves, swing joint, valve box, backfilling, connection to the water source, restoration of surfaces and all other labor, equipment and material necessary for installing the quick coupler valve.

SS-112 – ELECTRIC REMOTE CONTROL VALVE – ELECTRIC SOLENOID TYPE (SPRINKLER SYSTEM)

SS112-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and placing electric remote control valves as indicated on the plans and in the proposal.

SS112-02, SPECIFICATION: Glove type electric control valve shall be normally closed diaphragm type with slow opening and closing action. Actuation shall be by an encapsulated type solenoid with a minimum rating of twenty-four (24) volts, sixty (60) cycle; two-five (2-5) watts.

The valve body shall be constructed of heavy brass, bronze or cast iron or noncorrosive glass reinforced/filled nylon.

Construction shall provide for convenient accessibility of all operating parts without removal of valve from the system plumbing. Valves shall be constructed with a manual flow control adjustment with shut-off provisions. The valve shall have provision for external "bleed" of diaphragm chamber to enable manual operation.

SS112-03, VALVE BOX: Valve box for the remote control valve shall be of precast rigid plastic set flush with ground level as detailed in Standard Drawing No. L-5. Precast rigid plastic box size shall be seventeen (17) inch by eleven and three-fourth (11 ¾) inches by twelve (12) inch depth with three (3) inch by four (4) inch knock outs. Cover shall be hinged type and equipped with flex lock lift slot.

SS112-04, IRRIGATION CONTROL WIRE: All wiring to be used for connecting the remote control valves shall be Type UF-600V, with a minimum of 4/64 inch vinyl insulation. The size of the control wire shall be as recommended in writing by the manufacturer for the valve used and may be any color except white. Size of common wire shall be No. 10 and the color must be white.

Lay control wire from each remote control valve to the controller and control valve to the common ground. Lay wiring from the remote control valve to the controller beneath the mains where practicable and install wiring in conduit when passing beneath paving.

The wire shall be taped together at five (5) foot intervals. An eighteen (18) inch wire loop shall be provided at each valve. The splices shall be covered as follows: coat the bare wire with an epoxy cement; wrap a minimum of two (2) coats of vinyl electric tape around the splice; apply a second coat of epoxy cement overall or an approved connecting device.

SS112-05, PAYMENT: The unit price bid for remote control valves shall include furnishing and placing the respective size control valve, control wires, valve boxes to house the remote control valves as detailed in connection with Standard Drawing no. L-5.

SS-113 – AUTOMATIC CONTROLLER (SPRINKLER SYSTEM)

SS113-01, ITEM: under this item of the Proposal, the Contractor shall bid a price per each for the automatic controllers listed in the proposal.

SS113-02, SPECIFICATION: The automatic sprinkler controller shall be completely automatic in operation, and shall electrically start the sprinkling cycle and electronically time the individual stations. Timing of each stating shall be independently variable, with the capability of omitting a station from a watering cycle. It shall be capable of a fourteen (14) day programming and automatically starting a water cycle at any time on the hour. It shall be possible to operate the controller manually and to select and operate manually any station. The controller shall be equipped with a rain shutoff device. The device shall be mounted in a vandal resistant enclosure and surface mounted to exterior of controller or as specified.

There shall be no loose pins or other parts that can become detached and lost. All controls can be manipulated at any time and in any sequence without damaging the controller.

The controller shall be wall or pedestal mounted as designated on the plans. The Controller cabinet shall be weather proof and locking and constructed of heavy gauge steel with corrosion resistant enamel finish inside and out.

The controller shall have a standard built-in features: an electrical circuit to operate a master valve, a reset circuit breaker to protect the controller from damage due to excessive voltage surges, a master “on-off” switches for turning controller “off” during rainy weather while allowing day and hour clocks to continue in operation.

All wiring to and from the controller shall be through color-coded plugs and sockets.

Connect the remote valve to the controller in a clockwise sequence to correspond with the station setting beginning with Station 1, 2, 3, etc. Provide a schedule in the watertight container cover, showing valve connection to the controller.

The controller shall conform to NEC Class 2 requirements. (The controller output shall be les than 110 volt-amps, to qualify for direct burial of output wires.) The controller shall produce 26.5 volts A.C. output for continuous operation of 24 volt valves.

SS113-03, INSTALLATION: All wall mounted controllers will be mounted with the bottom of the controller case a minimum of four (4) feet from the floor or ground level and with the top of the controller case a maximum of six (6) feet from the floor or ground level. All pedestal mounted controllers shall be mounted on a suitable concrete base as designated by the detailed drawings.

All controller locations are essentially diagrammatic and shall be specifically located by the owner or their representative.

All local and applicable codes shall take precedence in the furnishing and/or connecting a 120 volt electrical service to the controller. A 15 amp rest circuit breaker in waterproof box shall be installed for each additional controller. If two (2) or more controllers are specified at the same location, only one reset circuit breaker shall be required. Each controller shall be wired separately with a weatherproof on and off switch and receptacle to each controller.

Adequate coverage and protection of the 24 volt service wire leading from the controller shall be in installed from the bottom of the controller as detailed in accordance with the Standard Drawing No. L-5 or L-6.

All electrical equipment, materials and workmanship shall be in strict accordance with the requirements of the National Electrical Code, the Electrical Safety Orders of the Industrial Accident Commission of the State of California, the National Electrical Manufacturers' Association, applicable County ordinances and the Sacramento Municipal Utility District requirements.

The Contractor shall give the District forty-eight (48) hours advance notice of any testing to be performed on the system. The Contractor shall furnish keys and incidentals to the District for operation of equipment.

SS113-04, PAYMENT: The unit price bid for the automatic controller shall include furnishing and placing the controller, necessary hookup to the remote control valves and connection to the power sources and all other labor, equipment and material to complete the work in accordance with the drawings and Specifications.

SS-114 – SPRINKLER HEADS

SS114-01, ITEM: Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and installing sprinkler heads as indicated on the plans and listed in the Proposal.

SS114-02, SPECIFICATION: Sprinkler heads shall be of the types and sizes with the diameter or radius of throw, pressure, discharge, and any other designations necessary to determine the types and size as indicated in the Special Provisions.

SS114-03, Installation: All sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the plans. The irrigation system as shown on the plans is diagrammatic only. The various components of the system shall be installed so as to provide complete and adequate coverage of the areas to be watered.

Additional heads may be required for adequate coverage and shall be as directed by t he Engineer.

Full compensation for adjusting and relocating the various types of sprinklers for proper rate of flow and coverage after installation, shall be considered as included in the prices paid for the various types of sprinklers involved and no separate payment will be made therefore.

SS114-04, SPRINKLER HEADS: All rotary pop-up sprinklers shall be installed as detailed in accordance with Standard Drawing No. L-7.

All pop-up lawn sprinklers shall be installed as detailed in accordance with Standard Drawing No. L-9.

All six (6) inch pop-up sprinklers shall be installed in accordance with Standard Drawing No. L-10.

All oscillating sprinklers shall be installed as detailed in accordance with Standard Drawing No. L-11.

SS114-05, PAYMENT: The unit price bid for sprinklers shall include furnishing and installing the sprinkler with the double swing joint or as detailed in accordance with the Standard Drawings. Bid price shall include full compensation for furnishing all labor, materials, tools, and equipment to install the sprinkler heads.

SS-115 – REDUCED PRESSURE BACKFLOW PREVENTER (SPRINKLER SYSTEM)

SS115-01, ITEM: Under this item of the Proposal, the Contractor shall bid a unit cost per each for furnishing and installing the reduced pressure backflow preventer as indicated on the plans and in the Proposal.

SS115-02, SPECIFICATION: The reduced pressure backflow preventer shall be a complete assembly, consisting of two (2) separate spring loaded check valves and a different relieve valve. These devices shall automatically reduce the pressure in the “zone” between the check valves.

Both check valves and the differential relief valve shall e so constructed that they may be serviced without removing the device from the line. The devices shall be rated to 175 psi working pressure.

The reduced pressure backflow preventer shall b AWWA or USC approved.

SS115-03, INSTALLATION: The reduced pressure backflow preventers shall be installed where it would be subject to continuous pressure service and may be subjected to back pressure. Reduced pressure backflow preventers shall be installed as protection on cross connection involving toxic substances. It shall be installed so that flooding would not cause the relieve valve to become submerged. It shall be installed a minimum of twenty-four (24) inches above grade. Installation to be as shown on Standard Drawing No.W-11.

SS115-04, PAYMENT: the unit price for the reduced pressure backflow preventer shall include excavation, furnishing and placing the vacuum breaker including blocking, backfilling, and restoration of surfaces, labor and material necessary for installing the unit.

SS-116 – MOISTURE SENSOR (SPRINKLER SYSTEM)

SS116-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per each for furnishing and installing a moisture sensor as indicated on the plans and in the Proposal.

SS116-01, INSTALLATION: The Contractor shall install one new sensor to the controller and wire sensor to a sensor control panel. Installation to be as shown on the Standard Drawing No. L-17l.

SS-117 – POLYVINYL CHLORIDE PIPE (PVC) SCHEDULE 40 (3/4" – 1 ½" SIZES)

SS117-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and lacing the respective sizes and classification of Schedule 40 Polyvinyl Chloride pipe as indicated on the plans and in the Proposal.

SS117-02, SPECIFICATION: Polyvinyl Chloride pipe shall be Schedule 40, and shall be manufactured of and shall conform to AST< Designation D1785-60T for rigid PVC compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform with the requirements of commercial standard 207-60. Pipe shall be manufactured to Iron Pipe Size (IPS) dimensions and furnished in minimum standard lengths of twenty (20) feet.

SS117-03, JOINTS: PVC pipe shall be solvent weld and shall be installed as recommended by the manufacturer. Use only the solvent supplied and recommended by the manufacturer. Clan pipe and fittings thoroughly of dirt, dust and moisture before applying solvent. Make solvent welds with a non-synthetic bristle brush and allow at least fifteen (15) minutes set-up time for each welded joint. When making plastic to steel connection, male adapters shall be used. Use Teflon tape on threaded plastic to steel joints.

SS117-04, FITTINGS: All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating greater than that of the pope and shall be of a type recommended by the pipe manufacturer.

SS117-05, INSTALLATION: Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square, in a sawing vise or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

SS-118 – POLYVINYL CHLORIDE PIPE (PVC) (RING TYPE)

SS118-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classifications of polyvinyl chloride pipe ad indicated on the plans and in the Proposal. The use of PVC pipe will only be allowed where specifically referred to in Special Provisions or contract drawings.

SS118-02, SPECIFICATION: Polyvinyl chloride pipe shall be minimum Class 200 and shall be manufactured to Type 1, Grade I or II, 2000 psi design stress compound designated as PVC 1120 or

1220 and shall conform to ASTM designation: D1784 for rigid PVC compounds. It shall bear the National Sanitation Foundation seal of approval and shall conform with the requirements of Commercial Standard 256 and ASTM D2241. Pipe shall be furnished in minimum standard lengths of twenty (20) feet.

SS118-03, JOINTS: the pipe joint for polyvinyl chloride pipe shall be of the gasketed O-ring type with seal ring grooves for positively holding the rubber ring in place against water pressure. It shall be a coupling sleeves o polyvinyl chloride, minimum Class 200, employing two rubber gaskets, which conform to ASTM D1869, an shall have an internal stop within the coupling. As an alternate to the coupling sleeve the pipe shall have a thickened wall bell end manufactured as an integral part of the pipe employing a triple edge sealing ring.

The pipe shall have a pipe stop indicated on the barrel that will accurately position the pipe end within the joint. The pipe in place shall permit thermal expansion and contraction of the pipe ends.

SS118-04, FITTINGS: Fittings for polyvinyl chloride pipe shall be those specified for use by the pipe manufacturer. The fitting shall employ a gasket O-ring as specified in these Specifications with seal ring grooves for positively holding the rubber ting in place against water pressure.

SS-119 – POLYVINYL CHLORIDE PIPE (PVC) CLASS 315 (2” SIZE AND LARGER)

SS119-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classification of Class 315 Polyvinyl Chloride pipe as indicated on the plans and in the Proposal.

SS119-02, SPECIFICATION: Polyvinyl Chloride pipe shall be Class 315, type I and shall be manufactured of and shall conform to ASTM designation 2241-64T for rigid PVC compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform with the requirements of commercial standard 256 and ASTM D 2241. Pipe shall be manufactured to Iron Pipe Size (IPS) dimensions and furnished in minimum standard lengths of twenty (20) feet.

SS119-03, JOINTS: PVC pipe shall be solvent and weld and shall be installed as recommended by the manufacturer. Use only the solvent supplied and recommended by the manufacturer. Clean pipe and fittings thoroughly or dirt, dust, and moisture before applying solvent. Make solvent welds with a non-synthetic bristle brush and allow at least fifteen (15) minutes set-up time for each welded joint. When making plastic steel connection, male adapters shall be used. Use Teflon tape on threaded plastic to steel joint.

SS119-04, FITTINGS: All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating equal to or greater than that of the pipe and shall be of a type recommended by the pipe manufacturer.

SS119-05, INSTALLATION: Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square, in a sawing vise or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

SS-120 – POLYVINYL CHLORIDE IPE (PVC) CLASS 200 (SPRINKLER SYSTEMS)

SS120-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classification of Class 200 polyvinyl chloride pipe as indicated on the plans and in the Proposal.

SS120—02, SPECIFICATION: Polyvinyl Chloride pipe used for sprinkler lines shall be solvent weld, minimum Class 200, and shall be manufactured of Type 1, grad I or II, 2000 psi design stress compound designated as PVC 1120 or 1220, and shall conform to ASTM designation D 1784 for rigid compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform with the requirements of commercial standard 256 and AST< D 2241. The pipe shall be furnished in minimum standard lengths of twenty (20) feet.

SS120-03, JOINTS: All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating equal to or greater than that of the pipe and shall be of a type recommended by the pipe manufacturer.

SS120-05, INSTALLATION: Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square in a sawing vice or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

SS- 121 – GALVANIZED STEEL PIPE (SPRINKLER SYSTEMS)

SS121-01, ITEM AND PAYMENT: Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes of galvanized steel pipe as indicated on the plans an in the Proposal.

SS121-02, SPECIFICATION: Galvanized steel pipe shall be Schedule 40 galvanized steel pipe, ASTM A 120 threaded, coupled and hot-dip galvanized. All buried galvanized steel pipe, joins and fittings shall be given a corrosion protection plastic wrapping. Pipe shall be spirally wrapped with WESTAPE, Inc., 10 mil plastic tape or equal, applied over a suitable primer. The Plastic wrap shall have a

nominal thickness of 20 mils. All buried ferrous fittings and valves shall also be fully wrapped with a corrosion protection plastic wrapping, 20 mil nominal thickness.

SS121-03, JOINTS: Galvanized steel pipe joints shall be threaded coupling, 150 psi. threaded joints shall be made by placing Teflon tape on the male threads only. Use of thread cement or caulking to make joints tight will not be permitted. All cut ends shall be reamed to full pipe bore before assembly.

SS121-04, FITTINGS: Galvanized steel pipe fittings shall be 150 psi galvanized malleable iron fittings, banded pattern. All nipples shall be of the same material as the pipe and galvanized. The fittings shall be joined to the pipe in the same manner as specified for joints using Teflon tape.

SS-122 – FLUSHING, DISINFECTING AND TESTING (SPRINKLER SYSTEMS)

SS122-01, ITEM: Pressure testing, disinfecting and flushing of the water main system shall be as specified in Section SS-92 of the Standard specifications.

SS122-02, PAYMENT: Full compensation for flushing, disinfecting and testing shall be included in other items of the Proposal and no additional compensation will be paid therefore.

SS122-03, TESTING: After installation and prior to backfilling, the sprinkler system including piping, fittings and sprinklers, valves, controllers and all appurtenances, shall be flushed and tested as follows:

A. Flushing: Prior to installation of sprinklers, all lines shall be flushed as necessary, so that foreign materials will not remain in pipe. Divert water to prevent ponding or soil erosion.

B. Pressure Test: All necessary equipment for pressure testing shall be provided by the Contractor. Test system as follows;

    1. Piping: test at normal operating pressure for a minimum of one (1) hour. Immediately correct any pipe joint or fitting showing a visible leakage or retest.

    2. After piping has been approved, trenches may be backfilled prior to adjustment and testing of sprinklers and valves.

C. Sprinkler Test: Test to determine that all sprinklers function according to manufacturer's data. Replace any sprinklers not functioning as specified; otherwise correct system to provide satisfactory performance and retest.

D. Controller Test: Test controller for automatic, semi-automatic and manual operation. Check automatic valves by manually operating controller.

E. Testing Notice: The Contractor shall give the District forty-eight (48) hours advance notice of any testing to be performed on the system.

SS-123 – HEAVY DUTY CONTROLLER ENCLOSURE

SS123-01, ITEM AND PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per each for furnishing and installing a heavy duty enclosure to house the automatic sprinkler controller and moisture sensor control panel. The enclosure shall be as detailed in accordance with Standard Drawing No. L-17.

The enclosure shall be constructed of cold rolled steel and be a minimum of thirty-six (36) inches high by twenty-four (24) inches wide and deep enough to enclose the controller and sensor control panel.

Enclosure shall be painted with a rust resistant product in either light green or beige.

SS123-02, INSTALLATION: The enclosure shall be mounted on a concrete pad with a minimum dimension of thirty-six (36) inches by thirty-six (36) inches by six (6) inches.

SS-124 – DROP IRRIGATION PRESSURE REGULATOR

SS124-01, ITEM: Under the item of the Proposal, the Contractor shall bid a unit cost per each for furnishing and installing the drip irrigation pressure regulator.

SS124-02, SPECIFICATION: Drip irrigation pressure regulators shall be constructed of durable, heat resistant plastic with pre-set outlet pressures of 15, 20, or 25 psi.

SS124-03, INSTALLATION: The pressure regulator shall be installed below grade. The pressure regulator shall be installed in a valve box. Installation to be as shown on Standard Drawing No. L-12.

SS124-04, PAYMENT: The unit price bid for drip irrigation pressure regulators shall include furnishing and installing the pressure regulator as detailed in accordance with the Standard Drawing L-12. Bid price shall include full compensation for furnishing all labor, materials, tools, equipment and valve box to install the pressure regulator.

SS-125 0 DRIP IRRIGATION Y – FILTER

SS125-01 ITEM: Under this item of the Proposal, the Contractor shall bid a unit cost per each for furnishing and installing the drip irrigation Y-filter.

SS125-02, SPECIFICATION: Drip irrigation Y-filter shall be a Y-patter filter constructed of durable, non-corrosive, polypropylene with replaceable and interchangeable polyester mesh filter screens.

SS125-04, INSTALLATION: The Y-filter shall be installed below ground in a valve box constructed of heavy duty green plastic and placed flush with grade. Installation to be as shown on Standard Drawing No. L-13.

SS125-04, PAYMENT: The unit price bid for drip irrigation Y-filter shall include furnishing and installing the Y-filter as detailed in accordance with Standard Drawing No. L-13. Bid p rice shall include full compensation for furnishing all labor, materials, tools, equipment, and valve box to install the Y-filter.

SS-126 – DRIP IRRIGATION EMITTERS

SS126-01, ITEM: Under this item of the Proposal, the Contractor shall bid a price per each for furnishing and installing the drip irrigation emitters as indicated on the plans and listed in the Proposal.

SS126-02,, SPECIFICATION: Drip irrigation emitters shall be of the types and sizes with the hourly discharge rate, number of outlets and any other designations necessary to determine the types and size, as indicated in the Special Provisions, plans and listed in the Proposal. The emitters shall be constructed of durable, UV-resistant polypropylene. Single outlet emitters shall have a single barb for use with drip tubing. Multi-outlets shall have either a single barb for use with drip tubing or a one-half inch (1/2”) female NPT inlet for use on P.V.C. risers.

SS126-03, INSTALLATION: The emitters shall be installed as detailed and in accordance with the District Standard Drawing unless otherwise indicated on the Plans. The drip irrigation system as shown on the plans is diagrammatic only. The various components of the system shall be installed so as to provide complete and adequate coverage of the areas to be watered.

Additional emitters may be required for adequate coverage and shall be as directed by the District.

Full compensation for adjusting and relocating the various types of emitters for proper rate of flow and coverage after installation, shall be installed after installation, shall be considered as included in the prices paid for the various types of emitters involved, and no separated payment will be made therefore.

All multi-outlet emitters shall be installed a minimum of four inches (4”) below grade in drip irrigation access sleeves. Discharged ends of tubing shall be held in place by plastic or metal tubing stakes and shall have insect plugs at each.

All drip irrigation lines shall be flushed to remove all debris from lines prior to installing emitters.

SS126-04, EMITTERS: All multi=outlet emitters shall be installed as detailed in accordance with Standard Drawing No. L-14.

SS126-05, EMITTER TUBING: Emitter tubing shall be virgin polyethylene plastic. Tubing size shall be as recommended by the manufacturer of the emitter.

SS126-06, PAYMENT: The unit price bid for drip irrigation emitters shall include furnishing and installing the emitter, emitter tubing, and tubing stakes at four feet (4') o.c. and access sleeve (if multi-outlet emitter) as detailed in accordance with the District Standard Drawing. Bid price shall include full compensation for furnishing all labor, materials, tools, and equipment to install the emitters.

SS-127 – PROTECTION OF EXISTING TREES

SS127-01, ITEM: Under this item of the Proposal, the Contractor shall bid a lump sum unit price for protection of existing trees. If no item for protection of existing trees is included in the Proposal, it shall be understood that such work will be done as herein specified and that the cost for such work will be included in the prices bid for other items of work and that no additional compensation for protection of existing trees shall be made.

SS127-02, SPECIFICATION: The Contractor shall comply with the requirements of Section GS-11 of these Specifications for protection of existing trees (ornamental and native oak trees).

SS127-03, PAYMENT: The unit price bid for protection of existing trees shall include full compensation for furnishing all labor and for furnishing and installing all materials, tools, and equipment necessary for the protection of existing trees and no additional compensation will be allowed therefore.