

STANDARD SPECIFICATIONS

**FOR
STATE ROAD
AND BRIDGE
CONSTRUCTION**

METRIC VERSION



**Kansas Department
of
Transportation**

Edition



1990

DIVISION 900

**ROADSIDE IMPROVEMENT, PLANTING
AND SEEDING**

SECTION 901

EQUIPMENT

Unless otherwise noted, equipment shall conform to the requirements specified in Division 150.

SECTION 902**FURNISHING AND PLANTING PLANT MATERIALS****902.01 DESCRIPTION.**

(a) This work shall consist of the furnishing and planting, or of the transplanting of trees, shrubs, vines or other plants of the type, class, species, grade and size specified on the Plans or in the Contract, at locations in reasonable close conformity with those designated on the Plans or by the Engineer and in accordance with these Specifications.

(b) The planting shall include the preparation of the ground, necessary storage of plants in heel-in grounds, mulching around plants, watering, staking, guying, pruning, wrapping of plants and the clean-up of planting areas.

BID ITEMS

* (**) (***)

Transplanting Existing Trees and Shrubs.****

* Kind of trees, shrubs, perennials, etc.

** Grade of plant.

*** Size.

**** Specific plant as shown on the Plans.

902.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Plants	Section 2100
Topsoil	Section 2100

902.03 CONSTRUCTION REQUIREMENTS.**(a) Time of Planting Trees and Shrubs.**

The general planting time for deciduous balled and burlapped and bare-root plants shall be between November 15 and April 15. The temperature shall be above freezing whenever bare-root plants are shipped or planted and the soil shall be in a satisfactory workable condition. Planting operations shall be suspended during exceptionally wet periods or when there is frost in the soil. Balled and burlapped (B & B) evergreens may be planted between October 1 and April 15. Deciduous bare-root plants shall have been subjected to a hard killing frost prior to digging and shipping to the project. In

some localities, the digging of deciduous plants may have to be delayed until after November 15.

(b) Anti-Transpirant.

All evergreens, broadleaf evergreens or deciduous plants that may be planted partially in leaf shall be treated with an anti-transpirant at the nursery of origin prior to digging, or in the case of potted material prior to delivery to Contractor. The nursery of origin shall supply a certificate that the plants have been treated or in the case of potted material, the treating agency shall supply the certificate. All deciduous plants that break dormancy after delivery but prior to planting, shall be treated by the landscape Contractor. The material shall be a polyvinyl chloride complex liquid and may be applied by dipping or spraying in accordance with the manufacturer's recommendation. This treatment is subsidiary to planting trees.

(c) Shipment.

The Contractor shall notify the Engineer at least 24 hours in advance of the delivery of materials, setting out the time of delivery. All plants shall be packed in a manner to assure proper protection against drying, freezing, breaking or other injury. Plants with bare-roots shall be packed in wet packing material and covered with either canvas or a tarpaulin while in transit. Covering with canvas alone is insufficient protection against wind and sun. Where it is necessary to transport plants more than 40 kilometers from the packing shed or nursery field, the plant roots shall be carefully puddled before being packed for delivery. The Contractor shall provide the Engineer with every opportunity to inspect all plants upon delivery to the project. Planting or heeling-in is prohibited until the plants have been inspected.

(d) Protecting Bare-Root Plants.

All bare-root plants shall be kept covered with canvas or the plants heeled-in while at the planting site. Plants shall not be kept under canvas for more than ten hours. Plants that cannot be planted within ten hours shall be heeled-in and properly maintained until planted. Puddling of bare-root plants shall be required as soon as the plants reach the planting site or heel-in ground. Plants taken from the heel-in storage or other storage may require re-puddling before delivery to the planting site when the Engineer finds this practice desirable.

(e) Trees and Shrubs.

An area within a three meter radius around each tree shall be cleared of weeds, brush and other undesirable material. After trees are planted, an area 2.4 meters in diameter shall be cultivated 250 millimeters deep around each tree. The minimum dimensions of excavation pits for trees and shrubs shall be as follows:

Small trees -	21 mm caliper or less; pits to be 1 m dia. × 500 mm deep.
Large trees -	25 mm—62 mm caliper; pits to be 1.2 m dia. × 500 mm deep.
Large trees -	larger than 62 mm caliper; pits to be 1.2 meters in diameter plus 150 mm for each 12 mm caliper and the depth will be a minimum of 65 percent of the diameter of the pit.
Large Shrubs -	Pits to be 750 mm dia. × 450 mm deep.
Vines -	Pits to be 450 mm dia. × 30 mm deep.

B & B Trees - Pits to have a diameter of at least 600 millimeters greater than the ball of the trees to be planted. The depth of the pit before backfilling to be at least 150 millimeters deeper than the thickness of the ball. Where topsoil is specified, the pit shall be of ample size to hold the required amount of topsoil.

Shrub Beds - The entire area for shrub beds shall be cultivated 250 millimeters deep. An area 750 millimeters wide around the perimeter row of shrubs shall also be cultivated.

When a back-hoe or other equipment is used to excavate holes for shrubs planted in beds, it shall be the responsibility of the Contractor to maintain the existing grade or new grade shown on the Plans. All pits for plants shall be large enough to admit the roots without crowding or bending.

Plants shall be spaced ample distance apart according to variety and growth requirements. Spacing plants close together to reduce the shrubbed area will not be acceptable. Plants shall be placed at the proper planting depth and spaced in accordance with planting distances shown on the Plans.

All evergreen plants, and other plants that are transplanted B & B shall have a firm ball of the size specified on the Plans or in the Contract. When ball sizes are not listed the size of ball shall be governed by "American Standard for Nursery Stock".

(f) Excavating and Placing the Backfill.

The topsoil obtained from the excavation of pits for trees and shrubs shall be placed in a pile separate from the subsoil. In

the process of backfilling, the best topsoil shall be placed around the roots. With B & B plants, the best topsoil shall be placed around the middle $\frac{1}{3}$ of the ball. Topsoil adjacent to the pit, if acceptable may be used to finish the backfill, provided pits or scars are not left by the taking of this soil. Good soils shall be obtained from this source to finish the backfill when there is no bid item for furnishing topsoil. When topsoil is called for in the Contract, it shall be applied as specified.

All trees and shrubs shall be planted plumb. Topsoil shall be carefully firmed about the roots of the plant so as to exclude all air pockets. The backfill shall be placed and firmed in layers of 75 to 100 millimeters in depth. The backfill shall be firmed by trampling or by the use of a tamping tool.

In planting B & B trees special care shall be taken in lowering the ball into the pit. The proper amount of backfill must be made prior to lowering the ball. The soil placed around the lower $\frac{1}{3}$ of the base of the ball shall be tamped firmly in order to keep the tree plumb after a thorough watering.

(g) Planting.

The Contractor will be required to use a tree derrick or a satisfactory windlass or other methods approved by the Engineer in moving B & B trees weighing approximately 270 kilograms or more. Improper attachment of derricks or windlass to B & B trees may crush the balls or bark the tree. Careless handling while moving, such as rolling or dropping, may also crush the ball. The solidity of the ball of B & B plants shall be carefully preserved.

The utmost care shall be exercised in the loading, unloading, or handling of all plants. B & B trees and shrubs shall be carefully lifted or carried by the ball; never carried or handled by the top or trunk.

In the transplanting of established plants from one place to another on a project, plants injured through Contractor negligence shall be replaced by the Contractor with plants equal in grade, size, and quality to those that were injured.

The Engineer shall approve the grade, size, and quality of replaced plants.

Pots shall be removed from plants prior to planting regardless of pot composition. B & B plants shall have all the twine around the base of the plant and from around the ball removed after planting.

Trees and shrubs shall be planted so that their elevation will be slightly lower with reference to the surface of the existing

ground than they were when growing in the nursery row. The Contractor shall be required to remove and replant plants that are determined to be planted too deep in the hole.

The soil shall be left slightly cupped around trees and shrubs to catch the rainfall, and to provide a basin for watering plants.

All perennial plants and shrubs planted in beds shall be planted slightly deeper than they grew in the pot or nursery row. The soil shall be carefully prepared and pulverized. All clods and stones of more than 75 millimeters in diameter shall be removed.

(h) Top Pruning.

Top pruning requirements vary with different species. Generally deciduous trees and shrubs, with heavy tops, shall have from $\frac{1}{2}$ to $\frac{1}{3}$ of the twig growth removed. Care shall be taken in pruning to preserve the natural character of the plants. Broken or badly bruised branches shall be removed with a clean cut. All cut surfaces over 25 millimeters in diameter shall be painted with an approved tree paint, or some other approved dressing. To avoid excessive transpiration, during warm or windy weather, plants shall be pruned the same day that they are planted.

The side branches of shade trees (25 mm to 37 mm caliper) or less should not be removed. Leaving the side branches aids the trees to caliper more rapidly.

(i) Root Pruning.

The ends of all roots of 12 millimeter diameter or larger shall be pruned with a clean cut. Broken roots and badly barked roots shall likewise be pruned, removing the injured portion.

(j) Staking and Guying.

All trees shall be staked, guyed, and tied according to descriptions below except when otherwise shown on the Plans. Bare-root shade trees of 62 millimeter diameter or under shall be supported with stakes 50 mm \times 50 mm \times 2.4 meters long, driven approximately 750 millimeters deep. Small shade trees 2.4 meters tall or less shall require 50 mm \times 50 mm \times 1.8 m stakes. Trees shall be tied to the top of the stakes with wire enclosed in pieces of fabric-lined rubber hose. Rotten hose that breaks when bent shall not be used. The trees shall be fastened firmly and securely to the stake so that the trunk will not be injured by rubbing either the wire or the stake. Tying material shall be heavy, soft iron wire (minimum size 3.75 mm diameter) run through the hose, twisted around the trees and securely

fastened to the tree stake. Commercial tree tie materials may be used. Ample room shall be provided in the ties so that the trees will not be restricted in growth during the following growing season. Stakes shall be placed at the same time that the tree is planted. The stakes shall be driven before bare-root trees are planted. The roots of each tree shall be properly placed around the stake before completing the backfill.

B & B trees larger than 50 millimeters in caliper will require support with three to five guy wires. Each guy wire shall be 3.75 diameter (galvanized), shall be doubled and twisted and shall be tied to the trees with rubber hose or eye bolts attached to the trunk approximately $\frac{2}{3}$ the height of the tree. Stakes of a length appropriate to size of tree, to anchor the guy wires, should be placed so that the angle between the wire and ground is approximately 40 to 45 degrees.

(k) Wrapping and Protecting Tree Trunks.

All shade trees planted shall be wrapped from 25 millimeters below the soil line upward well into the upper branches of the trees with an approved waterproof paper having double thickness with an asphaltic center. The wrapping shall be securely fastened with 6-ply (maximum) loose twist cotton twine at the top. The twine shall run spirally down to the bottom in the opposite direction to the spiral of the paper wrapping and be tied at the bottom. In addition to the ties at the top and bottom of the wrapping, two ties will be required between the top and bottom ties. Care shall be taken not to draw the twine too tightly around the tree trunk. The Contractor shall examine each tie to see that the twine is loose enough to accommodate a normal season's growth. Masking or scotch tape or other approved methods may be used in lieu of twine. Binder twine or heavy hard twist cord shall not be used.

(l) Shrub Bed Protection.

50 millimeter by 50 millimeter by 1.2 meter stakes shall be placed at the terminal ends of all shrub beds and at six meter intervals along the sides of the shrub bed. Stakes shall be driven 300 to 350 millimeters deep.

(m) Watering.

Trees, shrubs and other plants shall be watered immediately after planting and as needed thereafter during the establishment period, as deemed necessary by the Engineer.

(n) Mulching.

A layer of straw mulch, free of noxious weeds, approximately 150 millimeters loose measurement in thickness, shall be placed around each tree, shrub bed or other plants. The mulch shall extend slightly beyond the cultivated area around each tree and cover the entire area of tree pits or shrub beds. The straw mulch shall be covered with sufficient soil to keep it from being displaced by the wind. The mulch shall be placed around the trees and shrubs within 24 hours after planting. Other mulch may be used as noted on the Plans.

(o) Clearing and Disposal of Surplus Material.

All areas surrounding the plants or areas shown on the Plans shall be cleared by the Contractor. All sticks, stones, unusable subsoil and other unsightly materials shall be removed and disposed of as directed by the Engineer.

(p) Plant Establishment Period and Replacement.

The acceptability of the plant material furnished and planted as specified shall be at the end of a period of establishment during which the Contractor shall employ all possible means to preserve the plants in a healthy growing condition. Care during the establishment period shall include necessary watering, cultivating, weeding, pruning, spraying, repairing and adjustment of guys and stakes, and such other work as ordered by the Engineer. Dead or unsatisfactory plants shall be promptly removed from the project. The establishment period will end ten days following the end of the planting season or any extension of the planting season approved by the Engineer. A final inspection will be held within ten days after the end of the establishment period. All rejected plants shall be removed and replaced with healthy plants of the size and type required by the Contract during the following planting season. All costs of replacement will be borne by the Contractor.

If a tree or shrub is found to be dead prior to the end of the current planting season, it shall immediately be replaced and considered as the original planting and the criteria for the establishment period as described above will be followed.

A ten day establishment period shall be required for replacement plants planted after the end of the original establishment period. Care shall be given the replacement plants during this period as required in the original establishment period.

No working days will be charged during either establishment period except as required for other work on the Contract.

902.04 METHOD OF MEASUREMENT.

This work shall be measured lump sum or according to the number of each kind, size and grade of plants accepted, furnished, delivered and planted or transplanted, whichever method is shown on the Plans.

902.05 BASIS OF PAYMENT.

The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit prices "Lump Sum" or per each for the various kinds, sizes and grades of plants furnished and planted, or per each for transplanting plants. These prices shall be full compensation for furnishing and planting or transplanting all plants and shall include all excavation, tree stakes, guy wire, wrapping material, hay or straw mulching around trees and plants, watering and maintaining the planting throughout the duration of the Contract and for all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 903

SEEDING

903.01 DESCRIPTION.

This work shall consist of the furnishing and planting of seed at the locations, in reasonable close conformity with those shown on the Plans or designated by the Engineer and in accordance with these Specifications. The work shall also include the preparation of the ground for the seedbed.

BID ITEM

* Seed.

* Denotes kind of seed.

903.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Seeds	Section 2100
Nitrogen-Fixing Bacteria	Section 2100
Bags for Packaging	Section 2100

903.03 CONSTRUCTION REQUIREMENTS.

(a) Preparation of the Seedbed.

The entire area to be seeded shall be properly prepared prior to seeding. Unless otherwise noted on the Plans, this area shall be the entire right-of-way except the road surface. The soil preparation shall be accomplished by disking, harrowing and firming. Plowing will also be required if so indicated on the Plans. The minimum depth of soil preparation shall be 50 millimeters, except on newly constructed shoulders, where the maximum depth of soil preparation should be 50 millimeters. Existing weed stubble, small weeds and grass that can be disked shall be cut by the disk and partially incorporated into the soil. Several diskings and harrowings over some areas may be required to provide a satisfactory seedbed. Areas too steep or otherwise inaccessible for disking shall be prepared by hand methods.

The soil preparations on all slope areas shall be performed with disks and harrows unless demonstration shows such methods impracticable and that hand methods must be used except for the following:

In urban situations on lawns and other small, similar areas a rotary tiller or other similar approved equipment shall be required for seedbed preparation. A landscape box will be required for proper leveling of the seedbed when designated by the Engineer. Tractor mounted equipment may, however, be used in urban areas which are of sufficient size to facilitate use of such equipment when approved by the Engineer. The seedbed shall be firm, smooth and reasonably free of rocks, clods and other debris sufficiently to permit subsequent mowing with lawn maintenance type equipment.

During the process of soil preparation, extreme care shall be exercised to avoid injury to small trees that have been designated by the Engineer to be saved.

The Engineer may designate local areas of desirable native perennial grasses to be saved during the soil preparation. Areas of annual grasses such as cheat, crab grass, triple-awn, etc., shall be destroyed by thorough disking prior to seeding.

Whenever it is necessary for such work as cutting weeds, filling washes, picking up miscellaneous debris, etc., to be done before the areas are ready for soil preparation prior to seeding, this work shall be done by the Department. This shall not be construed to mean that the grading Contractor will be relieved of any work in connection with the grading Contract.

(b) Seeding.

In rural areas seeds and fertilizers shall be uniformly distributed with acceptable drills and other equipment (such as an easy flow) approved by the Engineer. Broadcasting with a standard grass seeder will be required on areas where it is impractical to operate a drill and this method shall also be required for certain small seeds. In lieu of broadcasting with a standard grass seeder the hydraulic slurry method of seeding may be used, when approved by the Engineer on areas where it is impractical to operate a drill. Immediately following hydro-seeding operations the seed shall be harrowed in.

On lawn areas and small areas in urban situations, seed and fertilizer shall be applied with equipment suitable for the size of the area involved. When deemed necessary by the Engineer, manual operated drop seeders, cyclone spreaders or other similar equipment may be required in these areas. The equipment shall be approved by the Engineer. Seed varieties used shall, as near as practicable, conform to the type of lawn existing on the various properties. Seeding rates and varieties shall be as shown on the Plans. Hand raking may be required for final

finish on lawn areas after seeding has been completed and prior to mulching.

When a standard drill with fertilizer attachment is used, certain mixed seeds may be placed in the seed box and the fertilizer placed in the fertilizer compartment. Both may be applied during one operation, unless in special instances notes on the Plans require separate applications. Broadcasting fertilizers is permissible on rough, rocky slopes where drills cannot operate.

All drills shall be fully adjustable so that they will deliver the seeds and fertilizer at the rates specified on the Plans or ordered by the Engineer. Drills that are in poor repair or that do not deliver the seeds and fertilizer uniformly in each drill furrow, shall not be used. Drills shall be adjustable so that the seeds can be planted and covered not to exceed 12 millimeters deep. Under some conditions it may be necessary to remove downspouts on drills to prevent clogging with wet soil.

Kentucky bluegrass, Dutch clover "White", blue grama grass, sand lovegrass, Bermuda grass and seeds of similar size shall not be mixed with the coarse types of seeds. These small seeds shall be broadcast either before the final cultipacking or just prior to drilling the coarse types of seed as determined by the Engineer. These seeds may be broadcast with certain drills by removing the seed tubes or they may be broadcast with hand seeders. Broadcast seeding shall be performed when the weather is reasonably calm so that the seed will lodge on the prepared areas.

Italian ryegrass, bromegrass, mixed native grass, western wheatgrass and similar types of seeds may be mixed prior to drilling.

If the Contractor elects to have the seed company mix the seed prior to delivery, then the seed mixture will be mixed as indicated on the Plans, by Special Provisions or Standard Specifications, and the specified mixture shall be a uniform blend of approved designated seeds, proportioned by weight as specified. The mixture shall be bagged and tagged indicating the amounts of each type of seed and total kilograms contained in the bag. The seed company shall certify that the seeds being furnished were mixed from individual lots previously approved for Kansas Department of Transportation use and were proportioned in accordance with the weights specified. The blending certification shall be supplied to the Engineer prior to commencing of seeding operation. Basis of acceptance on the individual seed, within the mixture will be in accordance with Section 2103.

If the Contractor mixes the seed himself, the mixing shall be in the presence of the Engineer's representative. When required, seeds shall be inoculated as specified in Section 2103.

The seedbed for alfalfa shall require firming with a cultipacker prior to drilling unless the Engineer finds that firming is not desirable. Firming the seedbed shall also be required after drilling seeds and fertilizer. (The alfalfa seed shall be treated with inoculating media just prior to placing in the seed drill.)

Most of the above seeds should be drilled about 12 millimeters deep in a well-prepared and firm seedbed. When the fertilizing and seeding operations start on an area, that area shall be completed as soon as possible. Firming the soil shall be accomplished by using a cultipacker. Rocks and debris uncovered or kicked up during the seeding operation which may interfere with mowing shall be cleaned up as directed by the Engineer.

(c) Seeding Season.

The two general seeding seasons shall be Spring Seeding Season, February 15 to April 20, and Fall Seeding Season, August 15 to September 30.

The permissible seeding seasons for individual seeds or combinations of seeds may be determined by the Engineer. The seeding period may be extended a few days in special cases when mulching is specified to follow the drilling of seeds and fertilizer.

The Engineer reserves the right to delay the drilling or seeding of any seeds or to vary the permissible seeding seasons listed above due to weather or soil conditions or for other causes.

(d) Construction Sequence.

In order to protect finished grading work from erosion, the seeding Contractor may be required to perform the seeding and mulching work on a project at several different periods of time.

At the discretion of the Engineer, if the grading work has progressed sufficiently, the work order for the permanent seeding Contract may be issued and the Contractor will be expected to start the work of seeding and mulching on the back-slopes, ditches and fill slopes or other areas as directed by the Engineer. All permanent seeding work shall be performed within the requirements of the "Seeding Season" as specified in subsection 903.03(c).

After the above mentioned portion of the seeding and mulching work has been completed, the Contractor will be issued a "Temporary Suspension of Work" in accordance with Section 108, until such time as the surfacing or other construction work has been completed or the seeding Contractor is ordered to resume work. The Contractor will then be expected to complete the balance of the seeding Contract.

903.04 METHOD OF MEASUREMENT.

This work shall be measured by the kilogram of the various kinds and grades of seeds furnished and planted.

903.05 BASIS OF PAYMENT.

The amount of seeds furnished and planted shall be paid for at the Contract unit prices per kilogram for the various kinds and grades of seed, which prices shall be full compensation for the preparation of the ground for the seedbed, for furnishing and planting all seeds, nitrogen fixing bacteria and for all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 904

EROSION AND POLLUTION CONTROL

904.01 DESCRIPTION.

This work shall consist of temporary control measures as shown on the Plans or ordered by the Engineer during the life of the Contract to control water pollution, through use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features specified else where in the Contract to the extent practical to assure economical, effective and continuous erosion control throughout the construction and post construction period.

BID ITEMS

Temporary Project Water Pollution Control (Soil Erosion). *
Water Pollution Control (Soil Erosion) (Lump Sum).

* Denotes individual Bid Items as set forth on the Plans.

904.02 MATERIALS.

(a) Temporary Project Water Pollution Control (Soil Erosion).

Seeds	Section 2100
Nitrogen Fixing Bacteria	Section 2100
Fertilizers	Section 2100
Sods	Section 2100
Mulching	Section 2100

All other materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

(b) Water Pollution Control (Soil Erosion) (Lump Sum).

All materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

904.03 CONSTRUCTION REQUIREMENTS.

At the preconstruction conference or prior to the start of the applicable construction, the Contractor shall submit for acceptance his schedules for accomplishment of temporary and per-

manent pollution control work, as are applicable for clearing and grubbing, grading, bridges and other structures at water courses, construction and paving. He shall also submit for acceptance his proposed method of pollution control on haul roads and borrow areas and his plan for disposal of waste materials. No work shall be started until the pollution control schedules and methods of operations have been accepted by the Engineer.

The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds or other areas of water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains and use of temporary mulches, mats, seeding or other control devices or methods as necessary to control erosion. Cut slopes shall be seeded and mulched as the excavation proceeds to the extent considered desirable and practicable.

The Contractor will be required to incorporate all permanent pollution control features into the project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent pollution control features can follow immediately thereafter if the project conditions permit; otherwise, temporary pollution control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing, exceed 70,000 square meters per equipment spread without approval by the Engineer.

The Engineer will limit the area of excavation, borrow and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding and other such pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unreal-

istic, temporary pollution control measures shall be taken immediately to the extent feasible and justified.

Under no conditions shall the amount of surface area of erodible earth material exposed at one time by excavation, borrow or fill within the right-of-way exceed 70,000 square meters per equipment spread without prior approval by the Engineer.

The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time as determined by his analysis of project conditions.

In the event of conflict between these requirements and pollution control laws, rules or regulations of other Federal, state or local agencies, the more restrictive laws, rules or regulations shall apply.

In the event that temporary pollution control measures are required due to the Contractor's negligence, carelessness or failure to install permanent controls as a part of the work as scheduled and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense. Temporary pollution control work required, which is not attributed to the Contractor's negligence, carelessness or failure to install permanent controls, will be performed as ordered by the Engineer.

Temporary pollution control may include construction work outside the right-of-way where such work is necessary as a result of roadway construction such as borrow area operations, haul roads and equipment storage sites.

The pollution control features installed by the Contractor shall be acceptably maintained by the Contractor.

904.04 METHOD OF MEASUREMENT.

(a) "Temporary Project Water Pollution Control (Soil Erosion)" shall be measured in accordance with the details and units set forth in the Plans.

(b) The item of "Water Pollution Control (Soil Erosion) (Lump Sum)" shall be measured on an extra work basis.

904.05 BASIS OF PAYMENT.

(a) "Temporary Project Water Pollution Control (Soil Erosion)" shall be paid for at the contract unit price for the various items and the unit prices will govern even though quantities of the various items may be increased or decreased.

(b) The item of "Water Pollution Control (Soil Erosion) (Lump Sum)" shall be paid for on an extra work basis in accordance

with the Standard Specifications except that no change order will be required prior to starting work.

Payment for "Water Pollution Control (Soil Erosion)" in the amount of and not to exceed the amount of money set forth in the Contract as a "Lump Sum" may be made by the Engineer to the Contractor without prior approval.

Prior approval will be required to exceed the amount set forth in the Contract.

(c) Nitrogen Fixing Bacteria used shall not be paid for directly but shall be subsidiary to other items of the Contract.

SECTION 905

SODDING

905.01 DESCRIPTION.

This work shall consist of the furnishing and placing of living sod in reasonable close conformity with the locations indicated on the Plans or as designated by the Engineer and in accordance with these Specifications.

BID ITEMS

* Sod.**

* Variety.

** Form of sod such as roots, plugs or strips.

905.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Sods Section 2100

905.03 CONSTRUCTION REQUIREMENTS.

(a) Soil Preparation.

The area to be sodded shall be prepared prior to placing the sod by thorough cultivation, smoothing, removal of clods, surface stones 25 millimeter in diameter or larger and weeds. The soil shall be thoroughly watered immediately prior to placing the sod.

Grades established by the grading Contractor shall be maintained. Cultivation on backslope areas and on compacted areas shall consist of pulverizing the soil to a minimum depth of 25 millimeter, prior to smoothing, finishing, moistening the soil and placing the sod.

Whenever it is necessary for such work as cutting weeds, filling washes, picking up miscellaneous debris, etc., to be done before the areas are ready for soil preparation prior to sodding, this work shall be done by the Department. This shall not be construed to mean that the grading Contractor will be relieved of any work in connection with the grading Contract.

(b) Placing and Cultivation of Sod.

Sod placed on slopes of 2 $\frac{1}{2}$:1 or steeper and in ditch bottoms shall be staked with six stakes per square meter or roll of sod.

Sod placed on slopes flatter than 2½:1 shall be staked with from two to four stakes per square meter or roll, as determined by the Engineer. Stakes shall be of lath or similar materials and shall be driven 150 millimeters into the ground, leaving approximately 12 millimeters of the top above the sod line.

Sod may also be staked using wire staples of three millimeter diameter ungalvanized wire. Staples shall be driven flush with the ground. In addition the Contractor shall have the option of using a polyethylene material to stake the newly laid sod in place. The approximate mesh size shall be 20 millimeters by 15 millimeters. The polyethylene material should dissolve within one growing season. 150 millimeter wire staples shall be placed over the netting and sod and driven until flush with top of sod surface. The pins shall be placed at a distance of 600 millimeters apart and staggered in adjacent rows. The staples (pins) shall be three millimeter diameter wire.

(c) Firming Sod.

After placing, all sod shall be firmed by use of an approved roller, a tamper or other approved methods. On steep slopes the sod may be firmed by compacting with hand shovels. The firming process shall remove all air pockets and shall pack the sod roots firmly into the prepared soil.

(d) Watering Sod.

The Contractor shall water all sod immediately after placing. All sodded areas shall be kept thoroughly watered by the Contractor for 20 days after laying and as often as required thereafter until completion of other items of work in the Contract. If sodding is the last item of work that can be accomplished during the current season, but other items of work in the same Contract are to be completed during the following planting season, the Contractor will be relieved of maintaining the sod after completing all work in connection with sodding as shown on the Plans or required in these Specifications. All sods shall be moist and growing when accepted.

(e) Sodding Season.

Sod may be planted during the periods of March 1 to April 15 and September 1 to November 15.

Sod may be planted during the period, November 15 to March 1, when the soil and sod is workable and with the approval of the Engineer. If sod is planted between November 15 and

March 1, the Contractor will maintain the sod until 20 days after the beginning of the spring sodding season.

The Engineer reserves the right to delay the sodding of all types of sod or to vary the permissible sodding seasons, due to weather, soil conditions or for other causes.

(f) Construction Sequence.

The construction sequence for sodding shall conform to the same requirements specified in Section 903.

905.04 METHOD OF MEASUREMENT.

All sod shall be measured by the number of square meters (slope measurement) of surface area planted.

905.05 BASIS OF PAYMENT.

The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit prices per square meter for the various kinds of sod, which prices shall be full compensation for all excavation, for all soil preparation, for furnishing, transporting, placing, firming, watering, cultivating, and maintaining the sod and for all labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 906**FURNISHING AND PLACING TOPSOIL****906.01 DESCRIPTION.**

This work shall consist of furnishing, preparing and placing loamy topsoil in reasonable close conformity with the locations shown on the Plans and in accordance with these Specifications or as directed by the Engineer.

BID ITEM

Topsoil.

906.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Topsoil..... Section 2100

906.03 CONSTRUCTION REQUIREMENTS.

Prior to the starting of hauling operations all grass, weeds, brush, stumps and other objectionable materials shall be removed from the area from which the topsoil is to be obtained.

During hauling operations the Contractor shall take all reasonable care to avoid injury to the existing plants and structures and prevent spilling the soil onto the roadway surface.

The topsoil shall be spread over the areas and to the depths indicated on the Plans or as ordered by the Engineer.

After the soil has been spread, all stones, brush, roots, large clods and other objectionable material shall be removed from the topsoil area and disposed of as directed by the Engineer.

906.04 METHOD OF MEASUREMENT.

This work shall be measured by the cubic meter of top soil, loose measurement, in the vehicle at the point of unloading. If, due to the nature of the work or method of construction, measurement in the vehicle is impracticable, other methods of measurement approved by the Engineer may be used.

The Engineer may elect to use the quantity shown on the Plans, provided the project is constructed essentially to the line and grade shown on the Plans. When the Plans have been altered or disagreement exists between the Contractor and the Engineer in any balance or the entire project, either party shall

have the right to request and have the quantity for the area involved to be measured.

906.05 BASIS OF PAYMENT.

The amount of topsoil, delivered and placed, measured as provided above, shall be paid for at the Contract unit price per cubic meter for "Topsoil", which price shall be full compensation for furnishing, delivering and placing of all topsoil, and for all labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 907

FERTILIZER, AGRICULTURAL LIMESTONE AND PEAT MOSS

907.01 DESCRIPTION.

This work shall consist of the furnishing, preparing and placing of commercial fertilizers, agricultural limestone and peat moss in reasonable close conformity with the quantities and the locations shown on the Plans and in accordance with these Specifications or as directed by the Engineer.

BID ITEMS

- Fertilizer (*-***-****).
- Agricultural Limestone.
- Peat Moss.
- * Percent Nitrogen.
- ** Percent P_2O_5 .
- *** Percent K_2O .

907.02 MATERIALS.

All materials shall conform to the requirements specified in the Materials Division.

Agricultural Limestone	Section 2100
Commercial Fertilizer	Section 2100
Peat Moss	Section 2100
Bags for Packaging	Section 2100

907.03 CONSTRUCTION REQUIREMENTS.

(a) Commercial Fertilizers.

Commercial fertilizers of the kind and quantity indicated on the Plans shall be applied to the areas to be fertilized by drilling into the previously prepared soil with a fertilizer attachment to seed drills. Fertilizers may be spread by hand methods over areas on which it is impracticable to operate seed drills.

(b) Agricultural Limestone.

Agricultural limestone shall be spread uniformly over the areas and in the amounts designated on the Plans or ordered by the Engineer. The limestone may be spread with standard lime spreaders as a pelletized material blended with the fertilizer

or other approved equipment. The application shall be made prior to drilling the seeds.

(c) Peat Moss.

The use and disposition of peat moss shall be in accordance with the notes and provisions shown on the Plans and these Specifications.

907.04 METHOD OF MEASUREMENT.

Commercial fertilizers shall be measured by the number of kilograms of the various kinds, furnished and applied.

Agricultural limestone shall be measured by the metric ton in the vehicle at the time and place of unloading or from tickets when blended with the fertilizer by the supplier, or at other points as may be designated by the Engineer. Commercial scale tickets will be accepted.

Peat moss shall be measured by the bag of 25 kilograms each per bag.

907.05 BASIS OF PAYMENT.

The quantity of fertilizers, agricultural limestone and peat moss furnished and distributed and measured as provided above, shall be paid for at the Contract unit prices per kilogram for kinds of "Fertilizer"; per metric ton for "Agricultural Limestone", or per 25 kilogram bag for "Peat Moss", which prices shall be full compensation for furnishing, delivering, and distributing all material, for all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 908

MULCHING, SLOPE PROTECTION AND EROSION CONTROL

908.01 DESCRIPTION.

This work shall consist of furnishing, placing and securing mulching materials, mulch held in place with plastic netting or emulsified asphalt; and erosion control such as ditch lining or on slopes as designated on the Plans.

The areas to be covered shall be in reasonable close conformity with those designated on the Plans or directed by the Engineer and the work shall be performed in accordance with these Specifications.

BID ITEMS

* Mulching (**).

** Erosion Control.

** Permanent Erosion Control.

Emulsified Asphalt (***) For Mulch Cover.

* Specified type of mulching. No entry denotes any material provided for in Section 2100 may be used.

** Specified type of erosion control. No entry denotes any material provided for on the Plans.

*** Denotes Grade.

908.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Bituminous Materials	Section 1200
Mulching Material	Section 2100

908.03 CONSTRUCTION REQUIREMENTS.

(a) Mulching.

The mulching material as specified or permitted shall be placed over the designated areas after seeding and fertilizing has been completed. The mulching material shall be spread uniformly to the approximate depths shown below or as indicated on the Plans.

Type of Material	Approx. Depth (Loose Meas.)	Approx. Metric Tons per Hectare Required for Depth Shown.
Prairie Hay	37 mm	0.4 to 0.5
Bromegrass	37 mm	0.4 to 0.5

Other vegetative mulches may be acceptable when approved by the Engineer. The above rates are to be considered as a guide. It will be at the Engineer's discretion to determine what rate is sufficient for adequate protection of the seeded areas.

The mulching material shall be punched into the soil so that it is partially covered. The punching operation shall be performed longitudinally with a mulching puncher. Care shall be exercised to obtain a reasonably even distribution of mulch partly incorporated into the soil. It may be necessary to use weights or hydraulic pressure to insure that the mulch is punched into the soil.

On slopes too steep for disking, the mulching shall be "patted" with forks as it is placed on the slopes. Soil from the top of slope areas shall be placed by hand methods on the mulching material to reduce loss due to wind. Cloddy soil should be placed over the upper $\frac{1}{3}$ of slopes and should average approximately one cubic meter of soil to each 80 square meters of area.

Mulch and erosion control, when required on lawns and small areas in urban situations, shall be applied with hand methods unless permitted otherwise by the Engineer. The mulch shall be patted down with forks or other suitable tools as it is placed. Light applications of soil may be required to be spread over the mulch to help prevent loss due to wind.

The length of hay or other mulching material is important in order for the mulch to interlap and bind together. Short-stemmed mulching material is more vulnerable to wind action than long-stemmed mulching material. When mulch is applied with a straw blower, it may be necessary to remove cutting knives to prevent cutting mulch too short.

The Contractor shall arrange his work so that the mulch can be placed and punched immediately after each slope area is seeded. Mulching operations shall not lag behind seeding operations more than 24 hours during clear weather. When rain is threatening, the Contractor shall make every effort to mulch areas the same day as seeded. Mulch shall be replaced before seeds germinate when remulching wind or rain damaged areas.

The excelsior mulching material shall be placed over the designated areas after seeding and fertilizing has been com-

pleted in accordance with the notes and details shown on the Plans or as directed by the Engineer. The excelsior mulch shall be spread uniformly over the areas to a thickness of approximately 37 millimeters, loose measurement, unless otherwise indicated on the Plans. The application shall provide for even coverage without clumps, or bare spots. The excelsior mulch shall not be punched into the soil.

Emulsified asphalt for mulch cover shall be placed over the designated areas after seeding, fertilizing and mulching has been completed. The emulsified asphalt shall be spread uniformly over the areas at the rate of application as designated on the Plans or as directed by the Engineer. The equipment shall be operated in such a manner that a reasonable uniform distribution of asphalt is obtained with no bare spots.

The emulsified asphalt shall be diluted with water until the mixture consists of approximately 50% emulsified asphalt and 50% water. This water shall not be paid for directly, but shall be subsidiary to the emulsified asphalt.

The Contractor shall arrange his work so that the emulsified asphalt can be placed immediately after each area has been mulched.

(b) Shaping of Ditches and Slopes.

Areas that are to receive Erosion Control shall be shaped to a smooth uniform surface with a firm well-prepared seedbed.

On projects where the seeding and fertilizing is not included in the Contract, the seeds and fertilizer will be furnished by the Department for use on those areas. The Contractor shall plant the seed and fertilize these areas as a part of the work of placing the specified type of Erosion Control.

908.04 METHOD OF MEASUREMENT.

(a) Plan Quantity Payment.

The quantities of mulching for which payment will be made shall be the quantities shown on the Plans provided the project is constructed essentially to the lines and grades shown on the Plans. No allowance will be made for any quantities included as contingencies on the Plans.

When the Plans have been altered or when disagreement exists between the Contractor and the Engineer, as to the accuracy of the Plan quantities for a given area or the entire project, either party shall have the right to request and cause the

areas involved to be measured with payment in accordance with measured quantities.

If all parties agree, payment for mulch may also be made on the basis of drill measure less five percent.

(b) Measured Quantities.

Erosion Control and Permanent Erosion Control shall be measured by the square yard of material in place.

Emulsified asphalt shall be measured by the metric ton as provided in Section 109. Deduction shall be made for the number of tons which are not placed on the designated areas.

All area measurements in this Section will be based upon slope measurements.

908.05 BASIS OF PAYMENT.

The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract price per hectare for "Mulching," or per square meter for the various types of "Erosion Control", or "Permanent Erosion Control", per metric ton of "Emulsified Asphalt for Mulch Cover" of the various grades, which prices shall be full compensation for furnishing and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

When the quantity of "Emulsified Asphalt for Mulch Cover" furnished overruns or underruns the Contract quantity by any amount, the Contract unit price shall govern.

SECTION 909**PRUNING EXISTING TREES AND HEDGES****909.01 DESCRIPTION.**

This work shall consist of the pruning, shaping and treating of existing trees and hedges in reasonable close conformity to the best horticultural practices, the notes on the Plans, and in accordance with these Specifications or as directed by the Engineer.

BID ITEMS

- Pruning Existing Trees.
- Pruning Existing Trees-Special.
- Pruning Existing Hedge.

909.02 CONSTRUCTION REQUIREMENTS.

Limbs larger than 25 millimeter in diameter shall be removed with a minimum of two cuts. The cut preceding the final cuts shall be made approximately 300 to 600 millimeters from the trunk of the tree. The limb shall first be undercut and then cut from the top in such a manner that there is no tearing when the limb snaps off.

The limb stub shall be removed by making a shallow undercut flush with the tree trunk prior to making the final downward cut. Avoid leaving a shoulder when making the final cut. Heavy limb stubs should be supported while cutting. When required, limb scars shall be pointed at top and bottom and roughened or torn wood and bark shall be neatly cut off with sharp tools.

All dead limbs and such live limbs as the Engineer directs shall be removed. Small branches growing close to each other shall be thinned out as directed by the Engineer.

Large limbs shall not be allowed to crash through lower branches but shall be lowered with ropes. Ropes shall be carefully attached or placed over other branches to facilitate in carefully lowering the cut limbs.

All limb scars over 25 millimeters in diameter shall be painted with an approved antiseptic paint. This paint may consist of approved "Tree Paint", or "Asphalt Paint". The limb scars shall be washed with copper sulfate solution consisting of one kilogram copper sulfate to 25 or 30 liters of water before applying paint.

Should special cavity work or other special tree surgical work be required in addition to the items of work listed above, the word "Special" shall follow the unit bidding item, Pruning Existing Trees (Example-Pruning Existing Trees-"Special"). In addition, a description of the work required shall be noted on the Plans.

Pruning existing hedge shall be performed as outlined above for other trees. Thinning out of branches and clearing the lower tree trunks of branches shall be performed as directed by the Engineer. Should the hedge trees require shearing or trimming to fence height, in addition to the items of work listed above, a description of the work required shall be noted on the Plans.

All brush and debris resulting from the pruning of trees and hedge shall be disposed of in such a manner that the right of way and adjoining property will be left with a neat, presentable appearance.

909.03 METHOD OF MEASUREMENT.

This work shall be measured according to the number of existing trees pruned and according to the meters (slope measurement) of existing hedge pruned.

909.04 BASIS OF PAYMENT.

The completed and accepted work, measured as provided above, shall be paid at the Contract unit price per each for "Pruning Existing Trees", or "Pruning Existing Trees-Special" and per meter for "Pruning Existing Hedge", which prices shall be full compensation for all labor, tools, equipment and incidentals necessary to complete the work.

Penalty. Should severe damage be done to a tree or trees by making improper cuts which allow the limb or limbs to tear into the tree trunk or trunks or if severe damage is done by allowing large limbs to crash through lower branches, there shall be no pay for the work done on the tree or trees which are thus damaged. Completion of the work done on such trees, by removing broken limbs, trimming limbs and painting limb scars, will be required.

SECTION 910**TREE WELLS****910.01 DESCRIPTION.**

This work shall consist of the construction of mortar uncoursed rubble masonry tree wells in accordance with these Specifications and in reasonably close conformity with the dimensions and locations as shown on the Plans or established by the Engineer.

BID ITEMS

Stone Masonry for Tree Wells.

Porous Materials for Tree Root Protection.

910.02 MATERIALS.

Materials shall conform to the requirements provided in the Materials Division.

Stone for Tree Wells	Section 1100
Portland Cement.....	Section 2000
Water	Section 2400
Fine Aggregate	Section 1100
Burlap.....	Section 1400

Porous material for covering tree-root areas shall consist of any granular material such as sand, sand-gravel, gravel, crushed stone or chat. The material shall be uniformly graded from coarse to fine, shall all pass a 75 mm sieve, shall have a gradation factor of not less than 3.00 and shall not have a plasticity index greater than 3.

910.03 CONSTRUCTION REQUIREMENTS.

All trees around which tree wells are to be placed shall be carefully protected during the placing of the embankment and the construction of the masonry wells.

That portion of the root spread of the tree that will be covered by the embankment, shall be covered with a layer of porous material. The root spread of the tree shall be considered as the same area as that over which the branches spread. Unless otherwise indicated on the Plans the depth of the layer of porous material shall be 150 millimeters. The porous material shall meet the requirements provided above. Prior to placing the porous materials, the area to be covered shall be cleaned of all vegetation. The porous material shall be placed before any em-

bankment is placed over the area and the material shall be carefully protected and maintained in a uniform layer of the required thickness during the placing of the embankment.

Tree wells shall be constructed not later than 30 days after any embankment is placed around the tree.

The base of the tree well shall be placed in a trench excavated to a depth of 150 millimeters below the natural ground level.

All stones shall be laid in mortar with all spaces between stones completely filled and with the stones carefully settled in the mortar beds before the mortar has set.

The mortar shall conform to the requirements of Division 400.

In general the larger stones shall be used in the bottom of the masonry wall and the thickness of the stones shall decrease from the bottom of the wall to the top.

The masonry shall be constructed in a workmanlike manner and the top of the wall shall fit the embankment slope.

The mortar shall be protected from the direct rays of the sun and shall be cured for three days with wet burlap or wet cotton mats.

The backfill around the wall shall be carefully placed and the finished construction shall present a neat appearance.

910.04 METHOD OF MEASUREMENT.

Stone masonry for tree wells shall be measured by the cubic meter of masonry, complete in place. The measurement shall be the actual quantity in place, but not to exceed the neat lines of the masonry as shown on the Plans or as ordered by the Engineer.

Porous material for tree-root protection shall be measured by the cubic meter, in the vehicle, at the place of unloading.

No measurement shall be made of excavation for tree wells or of cleaning vegetation from the area to be covered by porous material. This work shall be considered as subsidiary work pertaining to the quantities of stone masonry and porous material for which payment is made.

910.05 BASIS OF PAYMENT.

The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit price per cubic meter for "Stone Masonry for Tree Wells", and per cubic meter for "Porous Materials for Tree-Root Protection", which prices shall be full compensation for furnishing and placing

all materials, for all excavation, for all labor, tools, equipment, and incidentals necessary to complete the work.

SECTION 911

PARK STRUCTURES

911.01 DESCRIPTION.

This work shall consist of the construction of structures for road side parks. The structures shall be in reasonable close conformity with the details shown on Plans and shall be constructed as shown on the Plans and in accordance with these Specifications or as directed by the Engineer.

BID ITEMS

Fireplace.

Grill.

Masonry Windbreak.

Charcoal Grill.

Table (*).

Comfort Station (**).

Comfort Station Modification.

Concrete Shelter (***)

Table Shade (****).

Reshingle Existing Shelter House.

Waste Receptacle.

“(Wood Without Base)” denotes table constructed of wood and without base.

“(Wood With Base)” denotes table constructed of wood and with concrete base.

“(Concrete With Base)” denotes table constructed of concrete and with concrete base.

** Denotes building as Type I, Type II, etc., as shown on Plans.

*** Denotes shelter with windbreak.

No entry denotes shelter without windbreak.

**** “(Masonry)” denotes masonry table shade.

“(Stone)” denotes stone table shade.

No entry denotes wood table shade.

911.02 MATERIALS.

All materials shall conform to the requirements provided in the Materials Division.

Cement	Section 2000
Coarse Aggregate	Section 1100
Fine Aggregate	Section 1100
Mixed Aggregate	Section 1100

Concrete Masonry Units.....	Section 1300
Welded Steel Wire Fabric.....	Section 1600
Lumber.....	Section 2300
Reinforcing Steel.....	Section 1600
Water.....	Section 2400
Concrete Curing Materials.....	Section 1400

Materials not covered by these Specifications shall be in accordance with the details shown on the Plans and shall meet the approval of the Engineer.

911.03 CONSTRUCTION REQUIREMENTS.

(a) Concrete.

Concrete shall be Class A or as noted on the Plans and shall be reinforced as shown on the Plans. Concrete shall be proportioned and mixed in accordance with the requirements specified in Division 400. Ready-mix concrete will be permitted. Ready-mix concrete shall be proportioned, mixed and transported in accordance with the requirements specified in Section 402.

The form work for, and the placing, finishing, curing, and protection of the concrete shall conform to the requirements of Section 701.

The method of reinforced concrete structures shall conform to the requirements of Section 703.

The mortar for light weight masonry units shall be as required for brick or block in Section 402.

(b) Earthwork.

The entire park area shall be shaped and finished to conform to the typical sections shown on the Plans, to the completed structures and to such a condition that surface drainage is complete, leaving no pockets in which surface water will stand.

The ground line or surface, on which concrete bases are constructed, shall be shaped to conform to the typical section shown on the Plans. The finishing of the surface and the furnishing of any necessary additional earth material shall be considered as part of the work and will not be measured for payment.

(c) Park Structures.

All structures shall be constructed in accordance with dimensions and details as shown on the Plans. All work shall be done in a neat and workmanlike manner.

Unless otherwise noted on the Plans, structures shall receive one prime coat and two finish coats of paint. The color and type of paint will be designated on the Plans or in the Contract or as designated by the Engineer. Color samples of the paint shall be submitted to the Engineer for approval of the color and quality before using on the structure. All paint will be approved by visual inspection.

911.04 METHOD OF MEASUREMENT.

Fireplace, grill, charcoal grill, table, comfort station, concrete shelter, table shade, masonry windbreak, comfort station modification, reshingle existing shelter house and waste receptacle shall be measured per each complete in place. No measurement will be made of the separate items involved.

911.05 BASIS OF PAYMENT.

The amount of completed and accepted work measured as provided above, shall be paid for at the Contract prices per each for "Fireplace", "Grill", "Charcoal Grill", "Table", "Comfort Station", "Concrete Shelter", "Table Shade", "Masonry Windbreak", "Comfort Station Modification", "Reshingle Existing Shelter House", and "Waste Receptacle", which prices shall be full compensation for furnishing and placing all materials, for all excavation, for all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 912

WATER SYSTEM

912.01 DESCRIPTION.

This work shall consist of the construction of a water system including pipe, hydrants, storage tank when specified, and necessary accessories in accordance with this Specification and as shown on the Plans.

BID ITEM

Water System.

912.02 MATERIALS.

All materials shall be as shown on the Plans and shall conform to the requirements provided in the Materials Division.

Cement	Section 2000
Coarse Aggregate	Section 1100
Fine Aggregate	Section 1100
Mixed Aggregate	Section 1100
Welded Steel Wire Fabric	Section 1600
Water	Section 2400
Concrete Curing Materials	Section 1400
Aggregates for Underdrains	Section 1100
Drain Tile	Section 1900

912.03 CONSTRUCTION REQUIREMENTS.

Trenches shall be of necessary width to properly lay the pipe and shall be constructed according to the lines and grades established by the Engineer. The minimum depth of cover for pipe shall be one meter. Pipe placed under existing roadway shall be installed as noted on the Plans. The backfill for trenches shall be properly compacted. Pipe threads shall be treated with pipe joint compound prior to connection when iron pipe is installed. All concrete shall be Class A unless shown otherwise on the Plans. The Contractor shall make the service connection to the water supply unless otherwise noted on the Plans.

912.04 METHOD OF MEASUREMENT.

This work shall be measured as a unit complete in place. No measurement will be made of the various items of work.

912.05 BASIS OF PAYMENT.

The amount of completed and accepted work, measured as provided above, shall be paid at the Contract unit price per each for "Water System" which price shall be full compensation for all excavation and backfilling, furnishing and placing all materials, labor, tools, equipment and incidentals necessary to complete the work.