`SITE CONCRETE PAVING
SECTION 32 13 00

PART 1 GENERAL

1.01 SUMMARY

A. Inclusions:
   1. Provisions set forth in Divisions 0 and 1;
   2. Concrete flatwork other than buildings and structures;
      a. Including concrete walks
   3. Concrete finishing of site concrete;
   4. Curing, protection, and patching of site concrete;
   5. Vegetation control;
   6. Expansion and tool joints in site concrete;
   7. Caulking of expansion joints in site concrete;
   8. Forming and shoring for site concrete;
   9. Placing of sleeves, inserts, and embedded items in site concrete;
   10. Clean sand fill under concrete flatwork or slabs as required for leveling and/or final grading of base;
   11. Submittal preparation;
   12. Clean up.

B. Related Sections:
   1. Section 31 00 00 Earthwork
   2. Section 31 31 19 Vegetation Control

1.02 SUBMITTALS

A. Product or Material Data:
   1. Submit copies of the concrete mix design to the Architect for review prior to installing materials.
   2. Submit copies of the product data to the Architect for review prior to installing the following:
      a. Expansion joints.
      b. Joint caulking material.

B. Samples or Mockups:
   1. Provide a minimum 48" square mock-up of concrete finishes to jobsite for approval of finishes prior to pouring exposed portions of work.
      a. Mock-up may be incorporated into the project.

C. Shop Drawings or Layout Drawings:
   1. Submit copies of shop drawings to the Architect for review prior to beginning fabrication.

1.03 QUALITY ASSURANCE

A. Regulatory Compliance:
   1. Walks and sidewalks shall have a continuous common surface, not interrupted by steps or by abrupt changes in level exceeding 1/2 inch and shall be a minimum of 48 inches in width. Surfaces shall be slip-resistant as follows:
      a. Slopes less than 5 percent:
         1) Surfaces with a slope of less than 5%- gradient shall be at least as slip-resistant as that described as a medium broom finish. Refer to CBC 11B-302.

B. Testing:

   1. Prior to preparation of finish sub-grade for work of this Section, the Contractor shall give appropriate notification to the Inspector and allow adequate time for compaction tests to be taken when required by the Inspector prior to work to sub-grade.

C. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR). Title 24, Part 1, Articles 2, 3, and 4 and Part 2, Section 205 definition of "Detectable Warning," Section 1127B.5 for "Curb Ramps," and Section 1133B.8.5 for "Detectable Warnings at Hazardous Vehicle Areas".

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement:
   1. Conform to ASTM C150, Type II or V, with the following exceptions:
      a. Cement shall not contain more than 0.60% total alkali when calculated as Sodium Oxide.
B. Fly Ash:
   1. Conform to ASTM C618, Class F
      a. Fly Ash may substitute cement for up to 30% of mix C+P content provided that the design mix meets 28-day strength requirements.

C. Aggregates:
   1. Conform to ASTM C33.
   2. Fine aggregate shall consist of washed natural sand.
      a. Fine aggregate shall not contain more than two percent (2%) by weight of deleterious substances.
      b. Fine aggregate shall meet the requirements of Table 1 below.

3. Coarse Aggregate shall consist of a clean, crushed rock or washed gravel.
   a. Shall not contain more than five percent (5%) by weight of flat, thin, elongated, or laminated material.
   b. Shall not contain more than two percent (2%) by weight shale or charty material.
   c. Coarse aggregate shall be 3/4" maximum size, see requirements of Table 1 below.

      Table 1 - GRADING OF COMBINED AGGREGATES

      1. Sieve (Woven Wire Cloth): Passing a 1-1/2"
         a. Percent by Weight 3/4" Maximum
      2. Sieve (Woven Wire Cloth): Passing a 1"
         a. Percent by Weight 3/4" Maximum
      3. Sieve (Woven Wire Cloth): Passing a 3/4"
         a. Percent by Weight 3/4" Maximum: 90-100
      4. Sieve (Woven Wire Cloth): Passing a 3/8"
         a. Percent by Weight 3/4" Maximum: 55-75
      5. Sieve (Woven Wire Cloth): Passing a #4
         a. Percent by Weight 3/4" Maximum: 40-60
      6. Sieve (Woven Wire Cloth): Passing a #8
         a. Percent by Weight 3/4" Maximum: 30-46
      7. Sieve (Woven Wire Cloth): Passing a #16
         a. Percent by Weight 3/4" Maximum: 23-40
      8. Sieve (Woven Wire Cloth): Passing a #30
         a. Percent by Weight 3/4" Maximum: 13-28
      9. Sieve (Woven Wire Cloth): Passing a #50
         a. Percent by Weight 3/4" Maximum: 5-15
      10. Sieve (Woven Wire Cloth): Passing a #100
         a. Percent by Weight 3/4" Maximum: 0-5

      Note: "Pea Gravel" mixes (mixes with 3/8" max. aggregate size), other than mixes used for exposed aggregate finish, will not be allowed.

D. Water shall be potable, clean and free from organic materials.

2.02 ACCESSORIES

A. Concrete Expansion Joints:
   1. Expansion joints shall be formed with 3/8" x 3-1/2" expansion joint and 3/8" x 1/2" expansion joint cap.
      a. Quality Standard:
         1) Sealtight by W. R. Meadows:
            a) Fibre Expansion Joint.
            b) Snap-Cap Expansion Joint Cap.

2. Expansion joint sealant shall be self-leveling polyurethane sealant for horizontal expansion joints.
    a. Conform to ASTM C 920, Type M, Grade P, Class 25, and Fed Spec. TT-S-00227E, Type I, Class A:
        1) W.R. Meadows, Sealtight Pourthane SL
        2) BASF Masterseal SL2;
        3) Or approved equal.

B. Clean sand fill under concrete flatwork or slabs shall conform to the fine aggregate specification above.

C. Curing Compound shall white-pigmented.
    1. Conform to ASTM C309.

D. Synthetic Fibers:
    1. Monofilament or fibrillated polypropylene fibers.
    2. Acceptable Products:
        a. Fiberstrand, Euclid Chemical Company, Cleveland, OH.
        b. Fibermesh, Fibermesh, Chattanooga, TN.
        c. Forta CR, Forta Corporation, Grove City, PA.

PART 3 EXECUTION

3.01 EXAMINATION

A. Start of work shall be considered as acceptance of existing conditions.

3.02 DELIVERY, STORAGE, AND HANDLING

A. A weighmasters certificate shall accompany each load of concrete.
    1. This certificate is to be delivered to the Project Inspector and Project Manager.

B. Cement shall be stored in such a manner to protect it from damage.

C. Only one (1) brand of cement shall be used for this work.

3.03 SEQUENCING AND SCHEDULING

A. Concrete shall be poured within 90 minutes of mixing.

3.04 VEGETATION CONTROL

A. Immediately prior to installing concrete, vegetation control chemicals shall be applied to the soil.

3.05 INSTALLATION OR APPLICATION

A. Install per the manufacturer's latest written recommendations.

B. Concrete shall conform to the recommendations of the Portland Cement Association and the American Concrete Institute, unless otherwise shown or noted in these specifications.

C. Preparation and Compaction:
   1. Concrete flatwork or vehicle traffic areas shall be placed over rolled sub-grade.
      a. Proof roll sub-grade and rework unsuitable areas prior to installing leveling sand fill.
      b. Compact subgrade to 95% relative compaction in traffic areas.
      c. Compact subgrade to 90% relative compaction in pedestrian walks and other slab areas.

D. Forms:
   1. Forms shall be built true-to-line and grade.
   2. Forms shall be rigid enough to prevent excessive deflection between supports.
      a. Supporting studs or joists shall not be spaced more than twelve inches on center.
   3. The site curbs and gutters shall conform to the CalTrans specifications. The surfaces are to be true and straight. The maximum tolerance for the top, edges or any face is 0.01' (1/8") from the edge of a ten foot straight-edge.
   4. The curved site curbs and gutters shall conform to the CalTrans specifications. The surfaces are to be true and uniform using flexable formboards. The maximum tolerance for the top, edges or any face is 0.01' (1/8") from the edge of a ten foot straight-edge.
   5. Arrangement and construction shall be subject to the approval of the Architect.
      a. Responsibility for adequacy of the forms rests with the Contractor.
   6. Coordinate to properly receive other construction, accessories, and anchorage.
      a. Install sleeves, inserts, bolts, conduit, or other devices prior to placing concrete.

E. Form ties or bolts shall be used to fasten the forms.
   1. Use sufficient strength and number to prevent spreading of forms.
      a. Wire ties will not be permitted.
   2. Ties shall be of such type that they can be entirely removed or cut back one inch (1") or more from the finished concrete surface.

F. Form Coating:
   1. Forms shall be coated with non-staining form oil.
      a. Apply shortly before the concrete is placed, prior to placing the reinforcement.

G. Form Removal:
   1. Form removal shall be performed in such a manner as to prevent damage to the concrete.Do not remove forms until the concrete has sufficiently hardened to permit their removal with safety.
      a. Form removal will not be allowed in less time than as follows:

Type of Work	Minimum Time
Walls, Vertical Forms	24 hours
Slabs	24 hours

Note: Time is measured from addition of cement to aggregate.

H. Embedded Items:
   1. Cooperate with all trades to ensure that all conduit, anchor bolts, sleeves, inserts, hangers, trench drains, grates, etc., are properly installed and secured in correct position.
      a. Embedded items shall be thoroughly clean and free from rust, scale, oil, or other foreign matter.
      b. All embedded items shall be securely held in their final positions by means of templates before concrete is poured.
      c. All pipes and conduits penetrating slabs shall be sleeved with PVC pipe, sized 1/2" larger I.D. vs pipe O.D. (1/4" gap around) and topped with self-leveling sealant.

I. Reinforcement:
   1. Concrete walks under roof areas shall be reinforced with #3 bars at 24" on center each way minimum, unless noted otherwise.
      a. Provide #4 bar dowels at 24" O.C. into adjacent footings.
   2. Locate reinforcement at mid height of flatwork or slab.

J. Mixing:
   1. Transit-Mixed Concrete:
      a. Mix and deliver in accordance with the requirements of ASTM C-94.
      b. Weighmasters Certificate shall accommodate each load of concrete.
      c. Water/(cement+fly ash) ratio shall be 0.50 or less.
   2. Slump:
      a. The amount of mixing water used shall not cause the slump to exceed the maximum allowed slump of 4 1/2".
      b. Slump test shall conform to ASTM C-143.

K. Placing:
    1. Concrete shall be used while fresh and before it has taken an initial set.
        a. Re-tempering partially hardened concrete will not be permitted.
    2. Place concrete in horizontal layers of such thickness that can be satisfactorily consolidated with vibrators.
    3. Place concrete as close as possible to its final position.
        a. Use of vibrators for extensive shifting shall not be permitted.
    4. Fresh concrete shall not be permitted to fall more than six feet (6'-0").Maximum spacing of deep-tooled joints for site work shall be as follows:
        a. 6 feet on center for sidewalks.
    5. Deep tool joints shall be a minimum of 1 1/8" deep with 3/8" radii edging.
    6. Tool edges of flatwork or slabs at construction joints and other exposed corners.
    7. Tool and expansion joints shall be located where shown on plans. Align joints of curbs or curbs and gutters with adjacent sidewalks.
        a. Tool joints shall be uniform, straight, made perpendicular to building face, and parallel to each other for a uniform and consistent look.
    8. Expansion joints shall be placed at a maximum of 24 feet on center for sidewalks.
        a. Place expansion joints to align with the corners of buildings or structures and to align with the center of structural columns.

L. Cold Weather Requirements:
    1. Do not place concrete on frozen ground.
    2. Do not mix or place when atmospheric temperature is below 35 degrees F.
    3. Protect concrete from freezing or frost for a period of five (5) days after placing.
    4. Calcium Chloride shall not be added to the mix.

M. Curing:
    1. Keep newly placed concrete moist for the first seven (7) days after the concrete has been placed.
    2. Horizontal Surfaces:
        a. Slabs poured in hot or dry weather shall have a fog spray applied to them during troweling.
        b. Slabs shall be cured with curing compound.
            1) Spray-applied curing compound having white pigment.
                i) Conform to ASTM C-309.
                ii) Fully coat surface to a solid white color.
                i) After curing, wash surface with a 10% solution of muriatic acid and flush with fresh water to expose slip-resistive aggregate.

3.06 QUALITY CONTROL

A. Tolerances:
   1. Concrete flatwork shall be true-to-plane to within 1/4" in 10'-0".

B. Field Testing: Any concrete in question to its quality may be tested at the discretion of the Architect, Inspector, or Owner. The Inspector may take concrete test cylinders from each batch of concrete.

3.07 PROTECTION OR ADJUSTMENTS

A. Defective Concrete:
   1. Concrete will be considered defective for the following reasons:
      a. Not meeting the minimum strength requirement.
      b. Not formed as indicated.
      c. Not true to intended alignment.
      d. Containing voids or rock pockets.
      e. Surface deviation of greater than specified tolerance.
      f. Concrete damaged due to erection operations.
      g. Concrete that does not fully conform to the specifications.
      h. Inconsistent surface finishes.
   2. Defective concrete shall be removed and replaced with concrete complying with the drawings and specifications.
      a. Unless otherwise approved by the Architect.

3.08 SCHEDULES

A. Typical Concrete Finish Schedule:
   1. Type of Finish: heavy broom finish
      a. Type of Surface: concrete slopes exceeding 6%
   2. Type of Finish: medium broom finish
      b. Type of Surface: all other areas

B. Concrete Test Strength Schedule
   1. Type: un-reinforced, reinforced concrete
      a. Required Strength: 2500 psi
      b. Minimum 7 Day Test: 1800 psi
      c. Minimum 28 Day Test: 2500 psi

2.09 CLEANING OR REPAIR

A. Formwork Cleaning:
   1. Remove dirt, chips, sawdust, nails, and other foreign matter from the forms before concrete is placed.
   2. Previously used forms shall be thoroughly cleaned of all dirt, mortar, and other foreign matter before reusing.

B. Upon completion of other work, clean exterior finished concrete surfaces.

C. Areas shall be swept and cleaned.

D. Remove from the premises surplus material, equipment and debris that result from this work.

END OF SECTION 32 13 00

SECTION 32 33 00
SITE FURNISHINGS

PART 1 GENERAL

1.01 SUMMARY

A. Inclusions:
   1. Provisions set forth in Divisions 0 and 1;
   2. Site benches;
   3. Accessories and associated hardware;
   4. Submittal preparation;
   5. Clean up.

B. Related Sections:
   1. Section 32 13 13: Site Concrete

1.02 SUBMITTALS

A. Product or Material Data:
   1. Submit copies of manufacturer's installation recommendations to Architect prior to beginning installation.

B. Samples or Mockups:
   1. Submit one (1) sample of the manufacturer's complete color range to the Architect for color selection purposes prior to ordering material.

C. Shop Drawings or Layout Drawings:
   1. Submit copies of shop drawings to the Architect for review prior to beginning fabrication.

1.03 QUALITY ASSURANCE

A. Qualifications:
   1. Installers shall have a minimum of two (2) years experience installing this type of equipment.

B. Sequencing and Scheduling:
   1. Coordinate installation of this equipment with other associated trades.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. DuMor Inc.; 138 Industrial Circle, Mifflintown, PA 17059; 800-598-4018; Email: sales@dumor.com; Website: www.dumor.com

B. Wausau Tile; P.O. Box 1520, Wausau, WI 54402; 800-388-8728; Email: wtile@wausautile.com; Website: www.wausautile.com

C. Landscape Forms; E. 7800 Michigan Ave., Kalamalzoo, MI 49048; Website: www.landscapeforms,com

2.02 BENCHES

A. Basis of Design:
   1. DuMor; Model 164 Series, Customized per drawings.

B. Materials:
   1. Supports:
      a. End Supports shall be ASTM A48 Class 30 cast iron.
   2. Seat Assembly:
      a. Seat straps shall be manufactured from 1/4” x 1 1/2” ASTM A36 carbon steel flat bar.
      b. Support pipes shall be manufactured from 1 1/2” (1 15/16” OD) ASTM A513 schedule 40 steel tubing.
      c. Seat contour straps shall be manufactured from 3/8” thick ASTM A36 steel plate.
   3. Anchoring:
      a. Stainless steel expansion anchors (1/2” x 3 3/4”) provided.

C. Dimensions
   1. 6-foot bench
      a. Overall: 75” long x 22 3/8” deep x 25 1/8” high

D. Finish:
   1. Powder Coating
      a. All parts are processed through an 8-stage iron phosphorous wash system.
      b. Parts are coated with a zinc-rich epoxy primer to an AVERAGE of 4-5 mils.
      c. Parts are then finished with a top-coat of TGIC-polyester powder to an AVERAGE of 4-5 mils.
      d. Powder is cured at the powder manufacturers specifications using combination of infrared and convection heat for approximately 20 minutes.
      e. Finished parts shall comply with the following American Standard Test Method (ASTM) for coating and coating method: ASTM-D-523, ASTM-D-3363, ASTM-D-1737, ASTM-D-3359, ASTM-D-2794, ASTM-B-117 and ASTM-D-3451.

2.03 ACCESSORIES OR HARDWARE

A. All hardware shall be stainless steel or hot dipped galvanized, suitable for exterior use.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify layout prior to beginning work.

B. Start of work shall be considered as acceptance of existing conditions.

3.02 SEQUENCING AND SCHEDULING

A. Coordinate installation of this equipment with other associated trades.

3.03 DELIVERY, STORAGE, AND HANDLING

A. Properly store and handle materials to avoid damage, rust, and other adverse conditions that may affect the quality of the finished product.

3.04 INSTALLATION OR APPLICATION

A. Handle and install benches per the manufacturer's latest written recommendations and installation instructions.

3.05 QUALITY CONTROL

A. Field Inspection:
   1. Project Inspector shall review installation and depth of footings.

3.06 CONDITION OF FINISHED WORK

A. Work shall be plumb, square, and true-to-line.

B. Work shall be clean, undamaged, and in new condition.
   1. Remove excess earth and debris created by the work of this Section.

END OF SECTION 32 33 00

SECTION 32 80 00
IRRIGATION SYSTEM

PART 1 GENERAL INFORMATION

1.01 SUMMARY

A. Inclusions:
   1. Provisions set forth in Divisions 0 and 1;
   2. Provide an underground irrigation system as shown and specified. The work includes:
      a. Automatic irrigation system including piping, fittings, sprinkler heads, and accessories.
      b. Valves and fittings.
      c. installation of new irrigation two wire controller and installation of new 2-wire cable.
      d. Two wire decoders and lightning arrestors and grounding rods.
      e. Testing.
      f. Excavating and backfilling irrigation system work.
      g. Associated exterior plumbing and accessories to tie into existing irrigation system.
      h. Pipe sleeves.
      i. Record drawings.

B. Related Work:
   1. Section 32 92 19: Seeding
   2. Section 32 93 00: Planting

1.02 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each of the system components. No substitutions will be allowed without prior written approval by the Landscape Architect.

B. Submit complete material list/catalog cut sheets prior to performing work for Landscape Architect review.

C. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Landscape Architect.

E. Provide irrigation system record drawings (As Built) in .pdf format. Also, provide District with two full size hard copy plans of the as-built information in photo mylar format. Plans shall be professionally drafted to scale with recorded placement dimensions.
   1. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
   2. Identify field changes of dimensions, details, and changes made by Architects Supplemental Instructions, Change Orders, or Request For Information responses.

F. Controller Charts: After final acceptance of the 'As-Built' record drawings, two (2) reduced copies of the controller charts (furnished by the contractor) shall be provided to the owner. Controller chart shall be reduced to fit inside controller box enclosure. Controller charts shall color key irrigation circuits and be laminated in plastic. One of the controller chart copies shall be installed inside controller enclosure.

G. Submit operating and maintenance data.
Provide instruction manual, which lists complete instructions for system equipment operation.

H. Contractor shall provide two sets of keys to each controller/enclosure.

I. Contractor shall provide tools for two (2) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on the project.

J. Contractor shall provide two (2) five foot (5') valve keys for operating isolation valves.

1.03 QUALITY ASSURANCE

A. Installer's Qualifications:
1. Minimum of 5 years experience installing irrigation systems of comparable size.

B. Materials, equipment, and methods of installation shall comply with the following codes and standards:
1. All local, municipal, and state laws, rules, and regulations governing or relating to any portion of this work, and hereby incorporated into and made part of these specifications and drawings shall take precedence;
2. American Society for Testing and Materials (ASTM);
3. The Irrigation Association (IA).

C. Excavating, backfilling, and compacting operations shall comply with requirements of Section 02200 – Earthwork, as modified when indicated by this Section.

D. Obtain Landscape Architect's acceptance of installed and tested irrigation system **prior to installing backfill materials**.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.

B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.

C. Store and handle materials to prevent damage and deterioration.

D. Provide secure, locked storage for valves, sprinkler heads, and similar

components that cannot be immediately replaced to prevent installation delays.

1.05 PROJECT CONDITIONS

A. Contact DigAlert (811) to open a ticket to have underground utilities marked prior to commencement of any excavation. **This is a state law**.

B. Promptly notify the Landscape Architect through the Architect of unexpected sub-surface conditions.

C. Irrigation system layout is diagrammatic. Exact location of piping, sprinkler heads, valves, and other components shall be established by Contractor in the field at time of installation.
   1. Space sprinkler components as indicated.
   2. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to the Landscape Architect.

D. Cutting and Patching:
   1. Cut through concrete and masonry with core drills. Jack hammers are not permitted.
   2. Materials and finishes for patching shall match existing cut surface materials and finish.
   3. Methods and materials used for cutting and patching shall be acceptable to the Architect.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Hunter Industries

B. Other acceptable manufacturers:
   1. Pacific-Western or equal
   2. Nibco or Matco
   3. 3M

C. See Irrigation Legend.

2.02 MATERIALS

A. General:
   1. Provide only new materials, without flaws or defects, and of the highest quality of their specified class and kind.
   2. Comply with pipe sizes indicated. No substitution of smaller pipes will be permitted. Larger sizes may be used subject to acceptance of the Landscape Architect. Remove damaged and defective pipe.
   3. Provide pipe continuously and permanently, marked with manufacturer's name or trademark size schedule and type of pipe, working pressure at 73 degrees F. and National Sanitation Foundation (NSF) approval.

B. Plastic Pipe, Fittings, and Connections:
   1. Polyvinyl Chloride Pipe:
      a. ASTM D2241, rigid, unplasticized PVC, extruded from virgin parent material. Provide pipe homogeneous through and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.
         1) Main Line 2-1/2” diameter or smaller:
            (a) Schedule 40 PVC.
         2) Main Line 3" diameter or larger:
            (a) "O" ring type Class 200.
         3) Lateral Lines:
            (a) Schedule 40 PVC.
   2. PVC Pipe Fittings:
      a. Fittings for "O" ring type Class 200 pipe shall be ductile iron fittings. Harco or Leemco. Install per manufacturer's specifications.
      b. Fittings for Schedule 40 PVC shall be ASTM D2241 Schedule 40 PVC molded fittings suitable for solvent weld, slip joint Ring Tite seal or screwed connections. Fittings made of other materials are not permitted.
         1) Size slip fitting socket taper to permit a dry unsoftened pipe end to be inserted no more than halfway into the socket. Saddle and cross fittings are not permitted.
         2) Use galvanized male adapters for plastic-to-metal connections. Hand tighten male adapters, plus one turn with a strap wrench.

C. BACK FLOW PREVENTION

   a. Existing backflow prevention device to remain

D. Sprinkler Heads, Valves, and Associated Equipment:
   1. Refer to drawings materials list.

E. Controls:
   1. Refer to drawings materials list.
   2. Two wire systems

F. Control Wire:
   1. Control and Ground Wire:
      a. Type UF 600 volt AWG control cable #14 or larger.
         1) Wire shall be rated for direct burial.
   2. Two Wire cable color:
      a. red and black with jacket colors per plans.

2.03 ACCESSORIES

A. Drainage Fill:
   1. 1/2" to 3/4" washed pea gravel.

B. Earth Fill:
   1. Clean soil free of stones larger than 2" diameter foreign matter, organic material, and debris.
      a. Provide imported fill materials when required.
      b. Suitable excavated materials removed to accommodate the irrigation system work may be used as fill material subject to the Landscape Architect's review and acceptance.

C. Low Voltage Wire Connectors:
   1. Socket seal-type wire connectors and waterproof sealer, (3M DBR/Y-6).

D. Valve Access Boxes:
   1. Tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes. Provide lid of same material, green in color. Apply valve numbers to each valve with Christy valve markers. Box shall be applied Engineering, Ametek, Rainbird or equal. Valve box lids shall be bolted shut prior to final acceptance.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Layout and stake the location of each pipe run and all sprinkler heads and sprinkler valves. Obtain Landscape Architect's acceptance of layout prior to excavating.

B. Place sleeves as indicated for installation of piping and control wire.

3.03 INSTALLATION

A. Excavating and Backfilling:
   1. All excavation shall be considered unclassified excavation and include all materials encountered.
   2. Excavate trenches to depth and width indicated on drawings to permit proper handling and installation of pipe and fittings.
   3. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in layers not greater than 6" depth.
   4. Provide compaction of 95% over main lines where they cross under areas with concrete or AC paving. Compact all other trench backfill to 90%.
   6. Replace paving of same materials, as necessary, using joints and patterns to match existing adjoining paving surfaces.

B. Plastic Pipe:
   1. Install plastic pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction.
   2. Saw cut plastic pipe. Use a square-in sawing vice to insure a square cut. Remove burrs and shavings at cut ends prior to installation.
   3. Make plastic-to-plastic joints with solvent weld joints for slip seal joints. Use only solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions. Contractor shall make arrangements with pipe manufacturer for all necessary field assistance.
   4. Make plastic-to-metal joints with plastic male adapters.
   5. Make solvent weld joints in accordance with manufacturer's recommendations.
   6. Allow joints to set at least 24 hours before pressure is applied to the system.
   7. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.

C. Sprinklers, Fittings, Valves, and Accessories:
   1. Install fittings, valves, sprinkler heads, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.
   2. Set sprinkler heads perpendicular to finished grade, except as otherwise indicated.
   3. Obtain Landscape Architect's review and acceptance of height for proposed sprinkler heads and valves prior to installation.
   4. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed sprinkler head spacing distance indicated.
   5. Install subsurface drip lines around tree plantings below grade as indicated on the plans.
   6. Install pop-up sprinklers with an adjustable triple-swing joint riser of at least 3 standard 90 degree elbows. Size to match size of pop-up inlet. Refer to irrigation drawings. All other nipples of the swing joint riser shall be of length as required for proper installation of the sprinkler head.
      a. All turf heads should be mounted on triple-swing joints.
   7. Install in-ground control valves in corresponding valve access boxes as indicated.
   8. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box.
   9. Seal threaded connection on pressure side of control valves with Teflon tape or approved plastic joint-type compound.

D. Control Wiring:
   1. Install control two wire cable in the piping trenches wherever possible.
      a. Place wire within 1” grey Sch 40 PVC conduit in trench adjacent to pipe.
      b. Install wire with slack to allow for thermal expansion and contraction.
      c. Expansion joints in wire to be provided at 200-foot intervals by making

5-6 turns of the wire around a piece of 1/2" pipe instead of slack.

d. Where necessary to run wire in a separate trench, provide a minimum cover of 18" as detailed.

2. Provide sufficient slack at site connections at remote control valve in control boxes and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.
3. Connect each remote control valve to one station of a controller except as otherwise indicated.
4. Connect each remote control valve to a common ground wire system independent of all other controllers.
5. Make wire connection to remote control electric valves and splices of wire in the field, using wire connectors and sealing cement in accordance with manufacturer's recommendations.
6. Provide tight joints to prevent leakage of water and corrosion build-up on the joint.
7. Wire splices shall only be made in accessible valve boxes. E. Two-Wire Cable Specifications

1. The two-wire shall have the following operating voltage: 600 V RMS max
2. The two-wire shall have the following temperature rating: 140°F (60°C)
3. The two-wire shall meet one criterion within each of the following categories:

Outer Jacket

High density polyethylene (HDPE) between 0.035” and 0.048” thick, conforming to ICEA S-61-402 and NEMA WC5

Conductors - two of the same gauge, conforming to ASTM B-33, B-3, or B-8

Bare copper
Tin coated solid copper

Conductor Arrangement

Conductors that are twisted
Conductors that are laid in parallel

Conductor Insulation

Low density, high molecular weight polyethylene (PE) with a thickness of .045” PVC conforming to UL-493 or UL-719 for thermoplastic-insulated style UF (Underground Feeder)

Conductor Color Coding

Black & red (recommended)
Black & white
Blue & red

Wire Path

1. The two-wire path may be looped, spliced, or branched permitting extensions of the path in multiple directions.

2. The distance from the controller to the end of any one wire run shall not exceed the maximum distance specified for the gauge of wire.
3. The distance from the controllers to the farthest device shall not exceed a distance of 10,000 feet (1524 m) using 14-gauge wire or 15,000 feet (2438.4 m) using 12-gauge wire.
4. All splices shall be made in a valve box.

Wire Installation Details

1. The two-wire shall be laid with the pressurized irrigation line between valve boxes and installed without damage including nicks, cuts, or abrasions to the outer jackets. There shall be a 24-inch (61 cm) slack loop at every valve box for making connections.
2. The two-wire cable shall be tested before decoders are installed.

F. Connectors

1. Direct Bury

a. All two-wire connectors shall be a DBR/Y-6 or equivalent direct bury splice, made for full submersion proof and shall effectively seal moisture from two or more conductors and installed per manufacturer's specifications, and as specified herein.
b. All twist connectors shall be a steel spring, metal shell, flame retardant PVC insulator.
c. The outer tube shall be made of polypropylene.
d. The internal gel shall be silicone electrical insulating gel.
e. The voltage rating shall be a minimum of 600 volts.
f. The operating temperature shall be -40°F to 221°F (-40°C to 105°C).

2. Connector Installation Details

a. All connectors shall be installed per manufacturer's specifications.
b. The installer shall make all connections per manufacturer's specifications.
c. The installer shall verify that no loose, unshielded wiring shall touch the ground, water, or other copper conductor causing a leakage of current to the ground or a short circuit across wires.
d. The installer shall make all connections fully submersion proof.
e. All splices shall be made inside a valve box.
f. The installer shall score the outer jacket of the wire 6 to 10 inches (15.24 cm to 25.4 cm) from each end without scoring conductor ins
g. The installer shall strip 1 inch (2.54 cm) of insulation from conductor without scoring the conductor.
h. Installer shall bundle like conductors, twist them together, and trim off ½ inch (1.27 cm) of conductors.
i. Installer shall twist a wire connector in a clockwise direction, and then place a fully submersion-proof DBR/Y tube over the top making sure connector is fully seated at the top of the tube. Snap the cover completely closed.

j. Installer shall ensure that all connections are mounted in a vertical orientation to eliminate standing water inside the connector.
k. Installer shall provide a strain relief to eliminate pressure on connector (for example, a loop knot in wire or a tie wrap).
l. All splices shall be made inside a valve box.

G. Field Decoders

1. Valve Decoders

a. Decoders shall be as specified on the irrigation legend of the plans.

b. 18 AWG/1mm dia. wire or larger shall be used for all decoder-to-solenoid connections. In high lightning areas this wire shall be twisted to maximize surge suppression.

c. Decoders shall be provided one per station. Each decoder shall have a single pair of red/blue leads for connection to the two-wire path, and a pair of black leads for connection to the solenoid.

d. Each decoder output shall have sufficient capacity to activate two typical 24VAC irrigation solenoids simultaneously. A “typical” solenoid is assumed to require approximately 400 ma inrush current with approximately 200 ma holding current. The decoders shall have a current draw of 3.5 ma standby and 40 ma per active station.

e. Decoders shall be filled with a waterproof polymer compound to protect all circuitry, but shall be installed in valve boxes to facilitate proper connections and service.

f. Each decoder shall include an integrated surge suppression circuit with an exposed, unjacketed ground wire. No additional surge suppression devices shall be required in the two-wire path.

g. Each decoder output shall also have thermal, resettable circuit breakers to prevent overload from solenoid malfunctions.

h. Each decoder shall be programmable via wireless electro-magnetic induction while installed, without disconnection of any waterproof connections. A wireless handheld meter (Hunter Industries Model ICD-HP) shall be furnished to allow programming, operation, and diagnostics through the decoder case.

2. Valve Decoder Wiring and Installation

a. The valve decoder shall be connected to the two-wire path and shall be installed within the valve box.

b. The valve decoders shall be attached to the valve wire using the connector specification in this document. All valve common wires shall be attached to white common wire of the valve decoder using the connector specification in this document.
c. The valve decoders shall not share valve wires or common wires between valve decoders.
d. The maximum wire run between a valve decoder and the controller shall be the same as stated in the manufacturer's two-wire specifications.
e. The maximum wire run between the valve decoder and the solenoid shall be 150 feet (45.7 m) using standard 14-gauge irrigation wire.
g. Each decoder shall be polarized.
h. The decoder shall be connected to the two-wire using the connector specification.
i. The valve decoder shall have enough current to run a typical solenoid up to 150 feet (45.7 m) away from valve decoder using standard 14-gauge irrigation wire.
j. The valve decoder shall have enough power to run 2 typical solenoids per decoder concurrently on separate outputs.
k. The valve decoder shall be installed in accordance with the manufacturer's published instructions.
l. The valve decoder shall carry a conditional 5-year warranty.

H. Grounding for Two-Wire

In all cases, where it does not conflict with appropriate grounding grid design for the site in question, ground rods or plates as referred to in this specification, shall conform to the following standards:

1. The installer shall follow manufacturer's grounding specifications.
2. The installer shall provide adequate earth ground (not to exceed 10 ohms from any electrical device or wire to earth ground, or in compliance with practices as defined in American Society of Irrigation Consultants Earth Grounding Guideline 100-2002, available at www.asic.org).
3. The installer shall install a ground rod or ground plate for every 12th decoder of 1,000 feet (182.88 m) on the two-wire, whichever is shorter, and on the end of every spur that exceeds 50 feet (15.24 m).
4. Grounding rods or plates shall be located the length of the grounding device away from the two-wire path. There shall be a 6-gauge bare copper wire connecting the grounding rod or plate to the surge arrestor.

I. Grounding Rods and Plates

1. All grounding rods shall be bare copper 5/8 inch (1.6 cm) diameter or greater and 8 feet (2.44 m) long or longer.

2. A 10-inch (25.4 cm) round valve box shall be installed over the top of the grounding rod to facilitate the use of a clamp-on ground resistance tester.
3. All grounding plates shall be a minimum of 5 square feet (1.5 m^2) as outlined in ASIC Earth Grounding Guideline 100-2002.
4. A 10-inch (25.4 cm) round valve box shall be installed over the top of the ground plate connection to facilitate the use of a clamp-on ground resistance tester.
5. Grounding rods and plates shall be located at a minimum distance from the two-wire to assure that the two-wire path is outside of the electrode sphere of influence. For an 8-foot (2.44 m) grounding rod, the grounding rod shall be connected at least 8 feet away from the two-wire path at a right angle to the two-wire path.
6. Consult the ASIC Earth Grounding Guideline 100-2002 for correct minimum recommended distances for different ground rod or ground plate sizes and grounding grid designs.

J. Connections to Grounding Rods and Plates

1. The minimum ground conductor running from the grounding device to the surge suppression device shall be a minimum of a 6-gauge/4.0mm diameter, bare copper wire.
2. The ground rod must be buried a minimum of 6 inches (15.24 cm) under the soil.
3. All connections to grounding rods or ground plates shall conform to ASIC Earth Grounding Guideline 100-2002, and shall consist of a Cadweld™ type connection.
4 Any wire extensions required to connect from a grounding rod or plate to a surge arrestor or enclosure ground lug shall be bare copper.
5. The 6-gauge solid conductor shall not exceed a minimum of an 8-inch (20.3 cm) radius bend at any point along the wire.
6. There shall only be one mechanical connection on the grounding system.
7. All ground lugs shall be made of either copper with stainless steel bolts and copper washers or brass with stainless steel bolts and brass washers.
8. All mechanical connections where wires connect shall be cleaned, scored, and covered with antioxidant.
9. Wire extensions connected to grounding devices shall use a Cadweld type connection where the bare copper ground wire meets the green grounding wire from the surge suppression device. This connection shall than be inserted in a DBR/Y-6 waterproof direct burial connector, or equivalent, or

with an approved wire clamp. Ground hardware shall extend at right angles from the two-wire path.

M. Utilize sleeves for installation of the irrigation system where indicated on drawings.
   1. Provide new sleeves for all locations where existing sleeves are not indicated. Install new sleeve prior to paving installation wherever possible.
   2. Remove and replace existing concrete and asphalt surfaces where cutting is necessary. Obtain Owner's and Architect's permission before cutting existing concrete and asphalt.

N. Flushing, Testing, and Adjustment:
   1. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.
   2. Perform system testing upon completion of each section. When main line installation has been completed, pressurize to 125 pounds for a period of 4 hours. Inspector and Landscape Architect shall observe test. Make necessary repair, and re-test repaired sections as required.
   3. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.
   4. Tighten nozzles on sprinklers after installation. Adjust sprinkler adjusting screw on lateral line or circuit as required for proper radius. Interchange nozzle patterns, as directed by the Landscape Architect, to give best arc of coverage.
   5. Adjust all electric remote control valve pressure regulators and flow control stems for system balance and optimum performance.
   6. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required of each season per Service Section below.

3.04 DISPOSAL OF WASTE MATERIAL

A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock, trash, and debris.

   1. Refer to Section 02050 Part 3.08 for additional Disposal requirements.

B. Maintain disposal route clear, clean, and free of debris.

3.05 ACCEPTANCE

A. Test and demonstrate to the Landscape Architect and Owner satisfactory operation of the system free of leaks.

B. Instruct the Owner's designated personnel in the operation of the system, including adjustment of sprinklers, controller(s), and valves.

C. Upon acceptance, the District will assume operation of the system.

D. All record documents and controller charts must be approved and submitted prior to final payment.

3.06 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.

B. Extreme care shall be taken by the landscape contractor when backfilling of trenches. They shall be left flush with the existing surrounding soil level. Tamp soil and rake level to make level bed for turf to establish.

END OF SECTION

SECTION 32 92 19
SEEDING

PART 1 GENERAL INFORMATION

1.01 SUMMARY

A. Inclusions:
   1. Provisions set forth in Divisions 0 and 1;
   2. Soil preparation;
   3. Hydroseeding turf;
   4. Fertilizing;
   5. Maintenance;
   6. Submittal preparation;
   7. Clean up.

B. Related Sections:
   1. Section 32 80 00: Irrigation System
   2. Section 32 93 00: Planting

1.02 SUBMITTALS

A. Submit seed vendor's certification for required grass seed mixture.
   1. Indicate percentage by weight, and percentages of purity, germination, and weed seed for each seeded lawn.

1.03 QUALITY ASSURANCE

A. Warranty:
   1. Provide a uniform stand of grass by watering, mowing, and maintaining seeded areas until final acceptance.
      a. Reseed areas with specified materials which fail to provide a uniform stand of grass until all affected areas are accepted by the Landscape Architect.

1.04 PROJECT CONDITIONS

A. Notify Landscape Architect at least 7 working days prior to start of seeding operations.

B. Protect existing utilities, paving, and other facilities from damage caused by seeding operations.

C. Perform seeding work only after planting and other work affecting ground surface has been completed.

D. Restrict traffic from lawn areas until grass is established.
   1. Erect signs and barriers as required.

E. Provide lawn watering equipment as required.

F. Install irrigation system prior to seeding.
   1. Locate, protect, and maintain the irrigation system during seeding operations.

2. Repair irrigation system components damaged during seeding operations at this Contractor's expense.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hydroseed mix for turf areas shall be as follows by volume:
   1. District approved Valley Mix

B. The above mix to be applied at 10 pounds per 1,000 sq. ft., equal in weight for each type grass seed.

C. Seeds shall be dated for the current growth season.

D. In addition, the following shall be included in the mix:
   1. Wood Cellulose Fiber Mulch: 45 pounds 1000 sq. ft.

E. Incorporate soil amendments throughout entire depth of planting zone.
   1. Areas to be planted and irrigated shall receive soil amendments.

F. Areas to be planted and irrigated shall receive soil amendments.
   1. Refer to plans for the soil amendments shall be incorporated throughout all areas to be seeded with turfgrass.
      a. Provide a copy of delivery slips on all materials used on the project to the District and Landscape Architect
      b. Delivery slips shall be provided at time of material delivery to site. Delivery will not be allowed without delivery slips on any items.

Note: If import soil is needed and in place, a soil suitability and fertility analysis of planted areas shall be made by a soils laboratory. If recommendations for soil amendment according to test results exceed the above quantities, the Contractor will be reimbursed for an extra based on unit costs submitted with original bid for soil amendments required in excess of the above quantities.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove foreign materials, plants, roots, stones, and debris from areas to be seeded.
   1. At time of planting, areas to be planted or seeded shall be free of stones, stumps, roots, or other deleterious matter 1" in diameter or larger and shall be free from all wire, plaster, or similar objects that would be a hindrance to planting or maintenance.

B. Protect existing underground improvements from damage.

C. Remove contaminated subsoil.

D. Cultivate large sport field area by ripping to depth of 12 inches with an

agricultural implement designed for that purpose. Rip area in two directions, perpendicular to each other.

1. Repeat cultivation areas where equipment has compacted subgrade

3.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver seed and fertilizer materials in original, unopened containers, showing weight, analysis, and name of manufacturer.

B. Store in a manner to prevent wetting and deterioration.

3.03 INSTALLATION

A. After preparation of soil has been completed, the areas to be seeded shall be brought to a finish grade with the finish surface being smooth and even, and well-firmed.
   1. Contractor shall make the entire area smooth and even.
   2. Contractor shall insure that finish grades are generally one inch below the surface of walks, curbs, paved areas, and yard boxes without abrupt changes in gradient (yard boxes shall be level and 1/2" above grade).

B. The ground surface shall be inspected by the Landscape Architect prior to seeding to determine suitability for planting.
   1. The Contractor shall obtain such approval before seeding.

C. Seed types shall be as specified and shall be applied at the rate indicated.

D. Equipment and Application:
   1. Hydraulic equipment used for the application of slurry shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix the above slurry.
   2. Distribution lines shall be large enough to prevent stoppage and to provide even distribution of the slurry over the ground.
   3. The pump shall be capable of exerting at least 150 psi at the nozzle or sufficient additional pressure for proper coverage.
   4. The slurry tank shall have a minimum capacity of 1,500 gallons and shall be mounted on a traveling unit which will place the slurry tank and spray nozzles within sufficient proximity of the areas to be seeded so as to provide uniform distribution without waste and shall be thoroughly clean and free of seed species that are not specified.
   5. With the engine at half throttle, water shall be added to the tank. When the water level has reached the height of the agitator shaft, good re-circulation shall be established and, at this time, the seed shall be added. Wood pulp mulch shall then be added to the mixture. The wood pulp mulch shall only be added to the mixture after the seed, and when the tank is at least one-third filled with water. The engine throttle shall be opened to full speed when the tank is half filled with water. The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp mulch

shall be added by the time the tank is two-thirds to three-fourths full. Spraying shall commence when the tank is full.
6. Spray with a uniform, visible coat.
7. The slurry shall be applied in a sweeping motion, in an arched stream so as to fall like rain allowing the wood fibers to build on each other until a good coat is achieved and the material is spread at the required rate per acre.
8. Slurry mixture which has not been applied to the slopes within four hours after mixing will be rejected and removed from the project at the Contractor's expense.

E. Watering Should be as Follows:
1. Prior to Hydroseed, the area shall be irrigated in order to provide a moist seed bed for the Hydroseed application.
2. Hydroseed areas shall receive several consecutive waterings the day of the Hydroseed to thoroughly saturate the soil.
3. After initial irrigation, water shall be applied as often and in sufficient amounts as conditions may require, to keep the soil wet above, around, and below the root systems of the plants (until germination is complete).

3.04 MAINTENANCE PERIOD

A. Maintain seeded lawns for a period of at least 90 days after completion and acceptance of seeding operations for the entire project.

B. Maintain seeded lawn areas, including watering, spot weeding, mowing, applications of herbicides, fungicides, insecticides, and re-seeding until a full, uniform stand of grass free of weeds, undesirable grass species, disease, and insects is achieved and accepted by the Landscape Architect.
1. Water daily to maintain adequate surface soil moisture for proper seed germination.
2. Maintenance Period work includes all mowing (at height approved by District), watering, weeding, reseeding, mulching, cultivating, spraying, and trimming necessary to bring the planted areas to healthy growing conditions, and any additional work needed to keep the areas neat, edged, and attractive.
3. Any day the Contractor fails to adequately water, replace unsuitable plants, weed, and other work determined to be necessary by the Landscape Architect, he will NOT be credited as part of the Maintenance Period.
4. Constant diligence shall be maintained for the advent of disease, insects, and/or rodent or vermint infestations, and proper preventative or control measures taken.

5. Maintenance Fertilization Applications
As indicated on the plans.

6. At completion of Maintenance Period, all areas included in the Contract shall be substantially clean and free of debris and seeds, and plant

materials shall be alive, healthy, and free of infestations.

7. Any erosion or slippage of soil caused by watering shall be repaired by the Contractor at his expense.
8. All walks, curbs, and gutters shall be kept clear of debris, mud, dust, and standing water by sweeping, mopping, or hosing down as required to maintain cleanliness throughout.
9. The Contractor, within fourteen (14) days of written notification by the District, shall remove and reseed all guaranteed turf that for any reason fail to meet the requirements of the guarantee.
10. All plant material replaced shall be guaranteed for the original period, starting from the date of replacement.

3.06 ACCEPTANCE

A. Inspection to determine acceptance of seeded lawns will be made by the Landscape Architect, upon Contractor's request.
   1. Provide notification at least 10 working days before requested inspection date.
   2. Seeded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, uniform, close stand of the specified grass is established free of weeds, undesirable grass species, disease, and insects.
   3. No individual lawn areas shall have bare spots or unacceptable cover totaling more than 2% of the individual areas, in areas requested to be inspected.

B. Upon acceptance, the Owner will assume lawn maintenance.

3.07 CLEAN UP

A. Perform clean up during installation of the work and upon completion of the work.
   1. Remove from site all excess materials, debris, and equipment.
   2. Repair damage resulting from seeding operations.

END OF SECTION

SECTION 32 90 00
PLANTING

PART 1 GENERAL INFORMATION

1.01 SUMMARY

A. Inclusions:
   1. Provisions set forth in Divisions 0 and 1;
   2. Soil preparation;
   3. Trees
   4. Planting mixes;
   5. Mulch and planting accessories;
   6. Maintenance;
   7. Submittal preparation;
   8. Clean up.

B. Related Sections:
   1. Section 32 92 19: Seeding
   2. Section 32 84 00: Irrigation System

1.02 QUALITY ASSURANCE

A. Plant names indicated shall comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature.

B. Names of varieties not listed conform generally with names accepted by the nursery trade.

C. Provide stock true to botanical name and legibly tagged.

D. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be measured as it stands in its natural position.

E. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.

F. Stock furnished shall be at least the minimum size indicated.
   1. Larger stock is acceptable, at no additional cost, providing that the larger plants will not be cut back to size indicated.
   2. Provide plants indicated by two measurements so that a maximum of 25% are of the minimum size indicated.

G. Provide "specimen" plants with a special height, shape, or character of growth.
   1. Tag specimen trees or shrubs at the source of supply.
   2. The Landscape Architect will inspect specimen selections at the source of supply for suitability and adaptability to selected location.
   3. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

H. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size, and variety.
   1. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.

I. Warranty:
   1. Warrant plant material to remain alive and be in healthy vigorous condition for a period of 1 year after completion and acceptance of entire project.
      a. Inspection of plants will be made by the Landscape Architect at completion of planting.
   2. Replace plants that are dead as determined by the Landscape Architect, or are in an unhealthy or unsightly condition, or have lost their natural shape due to dead branches, or other causes, at the Contractor's expense.
      a. Warrant all replacement plants for 1 year after installation.

1.03 PROJECT CONDITIONS

A. Notify Landscape Architect at least 7 working days prior to installation of plant material.

B. Protect existing utilities, paving, and other facilities from damage caused by landscape operations.

C. In the event that quantity discrepancies or material omissions occur in the plant materials list shown on the drawings, the planting plans shall govern.

D. The irrigation system will be installed prior to planting.
   1. Locate, protect, and maintain the irrigation system during planting operations.
   2. Repair irrigation components damaged during planting operation at the Contractor's expense.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide plants typical of their species or variety; with normal, densely developed branches and vigorous root systems.
   1. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation.
   2. Plants shall have a fully developed form without voids and open spaces.
      a. Plants held in storage will be rejected if they show signs of growth during storage.

B. Container-growth stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm, and whole.
   1. No plants shall be loose in the container.
      a. Container stock shall not be pot bound.

D. Provide tree species that mature at heights over 25'-0' with a single trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.

E. Plants planted in rows shall be matched in form.

F. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.

G. The height of the trees, measured from the crown of the roots to the top of the branch, shall not be less than the minimum size designated by industry standard.

H. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.

I. Replace plant materials found dead or not in a healthy growing condition.
   1. Plants that die or lose more than 30% of their original leaves shall be replaced under this Section.
   2. Replace plant materials of same size and species, with a new warranty commencing on date of replacement.

K. Trees shall be species and size-identified in plant schedule, grown in climatic conditions similar to close locality of the work.

L. Plants shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests or their eggs, excessive abrasions or other objectionable disfigurements, and shall have healthy, normal root systems, well filling their containers, but not to the point of being root bound. Tree trunks shall be sturdy and well hardened off. Main tree leader shall not be topped.

M. Substitutions for the indicated plant materials will be permitted.
   1. Provided the substitute materials are approved in advance by the Landscape Architect and the substitutions are made at no additional cost to the District.
   2. Except for the variations so authorized, all substitute plant materials shall conform to the requirements of these specifications.
   3. If accepted, substitute materials are of less value than those indicated or specified, the Contract price will be adjusted in accordance with the provisions of the Contract.

N. Plant Inspection and Rejection: Root condition of plants will be determined by the Architect through the removal of earth from the roots of at least two (2) plants but not more than 2% of the total number of species from each source.

2.02 SOIL AMENDMENTS

A. Areas to be planted and irrigated shall receive soil amendments as indicated on the plans.

B. A copy of delivery slips on all materials used on the project shall be delivered to the District representative and Landscape Architect.
    a) Delivery slips shall be provided at time of material delivery to site. Delivery will not be allowed without delivery slips on any items.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove foreign materials, plants, roots, stones, and debris from areas to be planted.
    1. At time of planting, areas to be planted shall be free of stones, stumps, roots, or other deleterious matter 1" in diameter or larger and shall be free from all wire, plaster, or similar objects that would be a hindrance to planting or maintenance.

B. Protect existing underground improvements from damage.

C. Remove contaminated subsoil.

D. Small turf areas, use a rear tine tiller. Till amendment into the cultivated soil to a depth of 6 inches. Rake smooth as needed to conform to finish grading requirements.

F. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds.
    1. Provide Tree pit width at least twice the diameter of the tree container size.
    2. Depth of pit shall accommodate the root system.
    3. Scarify the bottom of the pit to a depth of 4".
    4. Remove excavated materials from the site.

3.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer materials in original, unopened, and undamaged containers, showing weight, analysis, and the name of manufacturer.

B. Store in manner to prevent wetting and deterioration.

C. Take precautions in preparing plants for moving.
    1. Spray deciduous plants in foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration.
    2. Dig, pack, transport, and handle plants with care to ensure protection against injury.
    3. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrive, the certificate shall be filed with the Landscape Architect.
    4. Protect plants from drying out.
        a. If plants cannot be planted immediately upon delivery, properly protect them with oil, wet peat moss, or in manner acceptable to the Landscape

Architect.

b. Water heel-in plantings daily.

5. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

D. Cover plants transported on open vehicles with protective covering to prevent wind burn.

E. Reject plants when ball of earth surrounding roots has been cracked or broken preparatory to or during planting.

F. Provide dry, loose topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

3.03 INSTALLATION

A. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.

B. Locate plants as indicated or as approved in the field after staking by the Contractor.
   1. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.

C. Set plant material in the planting pit to proper grade alignment.

D. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure.

E. Set plant material root crown 1" above the finished grade.

F. No filling will be permitted around trunks or stems.

G. Backfill the pit with planting mixture.
   1. Do not use frozen or muddy mixtures for backfilling.
   2. Form a ring of soil around the edge of each planting pit to retain water.
   3. Tree planting pits backfill mix shall be as indicated on the plans. Blend with back fill.

H. Mulching:
   1. Where indicated mulch tree planting pits with required mulching material 3" deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

I. Tree Staking:
   1. Inspect trees for injury to trunks, evidence of insect infestation, and improper pruning before wrapping.
   2. Staking:
      a. Stake all trees immediately after lawn seeding operations, and prior to acceptance.

1) When high winds or other conditions that may affect tree survival or appearance occur, the Landscape Architect may require immediate staking.

3. All work shall be subject to acceptability of the Landscape Architect.

J. Pruning:
1. Pruning branches of deciduous stock after planting to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements.
a. In general, remove 1/4 to 1/3 of the leaf bearing buds. Proportion shall, in all cases be acceptable to the Landscape Architect. Remove or cut back broken, damaged, and non-symmetrical growth of new wood.
2. Multiple Leader Plants: Preserve the leader that will best promote the symmetry of the plant.
a. Cut branches flush with the trunk or main branch, at a point beyond a lateral shoot or bud a distance of not less than 1/2 the diameter of the supporting branch.
1) Make cut on an angle.
3. Prune evergreens only to remove broken or damaged branches.

3.04 INSPECTION

A. Examine proposed planting areas and conditions of installation.
1. Do not start planting work until unsatisfactory conditions are corrected.

3.05 MAINTENANCE

A. Planted areas will be inspected at completion of installation and accepted to compliance with specified materials and installation requirements.

B. After all work indicated on the drawings or herein specified has been completed, inspected, and approved by the Landscape Architect, the Contractor shall commence a ninety (90) day Maintenance Period.
1. This ninety (90) day Maintenance Period shall occur within the specified project completion timeframe.

C. Maintenance Fertilization Applications
1. To be as indicated on plans

3.06 WORK IN PROGRESS

A. Contractor shall continuously maintain areas included in the Contract during the progress of the work and until final acceptance of the work.

B. During Maintenance Period the contractor shall maintain the site and this includes watering, mulching, cultivating, spraying, and trimming necessary to bring the planted areas to a healthy growing condition, and any additional work needed to keep the areas neat, edged, and attractive.

C. During the maintenance period, the Contractor, at his own expense, shall

replace any plant indicating weakness or probability of dying.

D. All basins around trees shall be maintained at a four (4) inch depth throughout progress of the work, unless otherwise instructed by the District authorized representative.

E. Tree stakes that for any reason are damaged or rendered inadequate for support shall be repaired and restored to their original condition.

F. Constant diligence shall be maintained for the advent of disease, insects, and/or rodent infestation, and proper preventative or control measures taken.

G. All trees shall be maintained in their natural shapes.
   1. Tall or scraggly branches shall be thinned out where necessary.
   2. In no case shall trees be trimmed by heading or shearing.
   3. Any plants severely pruned in this manner shall be removed and replaced at Contractor's expense.

H. At completion of maintenance period, all areas included in the Contract shall be substantially clean and free of debris and seeds.
   1. All plant materials shall be alive, healthy, and free of infestations.

I. The Contractor, at his expense, shall repair any erosions or slippage of soil caused by watering.

3.07 CLEAN UP

A. All walks, curbs, and gutter shall be kept clear of debris, mud, dust, and standing water by sweeping, mopping, or hosing down, as required to maintain cleanliness throughout.

3.08 NOTICE

A. The Contractor, within fourteen (14) days of written notification by the District, shall remove and replace all guaranteed plant materials that for any reason fail to meet the requirements of the guarantee.
   1. All plant material replaced shall be guaranteed for the original period, starting from the date of replacement.

B. Written Notice:
   1. At the end of the specified Maintenance Period, the Contractor shall present written notice to the District that he has completed the required maintenance, and upon acceptance by Landscape Architect and District’s authorized representative, any further maintenance will be the responsibility of the District.

END OF SECTION