

NOTES:

- THERE WILL BE TWO MAIN MOWING HEIGHTS. 2" BLUEGRASS MAKES UP THE PRIMARY ROUGH, WHILE FAIRWAY AND GREEN AREAS ARE TO BE MOWED AT LESS THAN 0.5". ACCENT AREAS OF FINE FESCUE AND/OR ORNAMENTAL GRASSES WILL BE USED TO ADD VISUAL SEPARATION BETWEEN SOME AREAS.
- ADDITIONAL LANDSCAPE BEDS TO INCLUDE TREE PLANTINGS, PERENNIAL PLANTINGS, ETC.
- TEES, AS INDICATED, WOULD BE 8' SQUARE CONCRETE PADS, WITH ARTIFICIAL TURF MATS PLACED OR GLUED ON THE PAD.
- CONTOUR INTERVAL IS 1'
- MINIMUM SLOPE AT ANY GIVEN POINT IS 2%
- MAXIMUM SLOPE AT ANY GIVEN POINT IS 33.3% (3:1).
- GRADING ALLOWS FOR 10' WIDE PATH (BY OTHERS) ATTACHED TO DUNDEE, WITH A 2' SHOULDER ON THE GOLF SIDE AT A MAXIMUM OF 5% SLOPE.

NORTHING/EASTING POINT SCHEDULE

<u>POINT</u>	<u>DESCRIPTION</u>	<u>NORTHING</u>	<u>EASTING</u>
1	1 Tee	N 1400264.5889	E 3196115.3170
2	1 Green	N 1400260.2442	E 3196249.6654
3	2 Tee	N 1400266.0262	E 3196293.7996
4	2 Green	N 1400139.3028	E 3196304.9067
5	3 Tee	N 1400158.2774	E 3196336.4442
6	3 Green	N 1400026.1902	E 3196367.8165
7	4 Tee	N 1399988.8236	E 3196426.0257
8	4 Green	N 1399955.0269	E 3196230.2843
9	5 Tee	N 1399986.6942	E 3196187.0827
10	5 Green	N 1400018.3907	E 3196330.9165
11	6 Tee	N 1400048.1790	E 3196311.9300
12	6 Green	N 1400113.7172	E 3196262.5802
13	7 Tee	N 1400147.4082	E 3196268.2619
14	7 Green	N 1400229.5423	E 3196220.1408
15	8 Tee	N 1400214.7979	E 3196183.3341
16	8 Green	N 1400053.3655	E 3196238.1308
17	9 Tee	N 1400023.9831	E 3196170.2411
18	9 Green	N 1400205.8118	E 3196143.0635



NOTES:

- THERE WILL BE TWO MAIN MOWING HEIGHTS. 2" BLUEGRASS MAKES UP THE PRIMARY ROUGH, WHILE FAIRWAY AND GREEN AREAS ARE TO BE MOWED AT LESS THAN 0.5". ACCENT AREAS OF FINE FESCUE AND/OR ORNAMENTAL GRASSES WILL BE USED TO ADD VISUAL SEPARATION BETWEEN SOME AREAS.
- ADDITIONAL LANDSCAPE BEDS TO INCLUDE TREE PLANTINGS, PERENNIAL PLANTINGS, ETC.
- TEES, AS INDICATED, WOULD BE 8' SQUARE CONCRETE PADS, WITH ARTIFICIAL TURF MATS PLACED OR GLUED ON THE PAD.
- CONTOUR INTERVAL IS 1'
- MINIMUM SLOPE AT ANY GIVEN POINT IS 2%
- MAXIMUM SLOPE AT ANY GIVEN POINT IS 33.3% (3:1).
- GRADING ALLOWS FOR 10' WIDE PATH (BY OTHERS) ATTACHED TO DUNDEE, WITH A 2' SHOULDER ON THE GOLF SIDE AT A MAXIMUM OF 5% SLOPE.

PLANT SCHEDULE

SYMBOL QTY COMMON NAME

TREES

- 1 1 Austrian Pine
- 4 4 Baby Blue Eyes Colorado Blue Spruce
- 3 3 Burr Oak
- 5 5 Common Hackberry
- 7 7 Hot Wings® Tatarian Maple

SHRUBS

- 25 25 Black-eyed Susan
- 1 1 Dwarf Globe Blue Spruce
- 4 4 Flame Amur Maple
- 15 15 Hot Rod Switch Grass
- 7 7 Karl Foerster Feather Reed Grass
- 12 12 Stargazer Lily
- 15 15 Tiger Lily



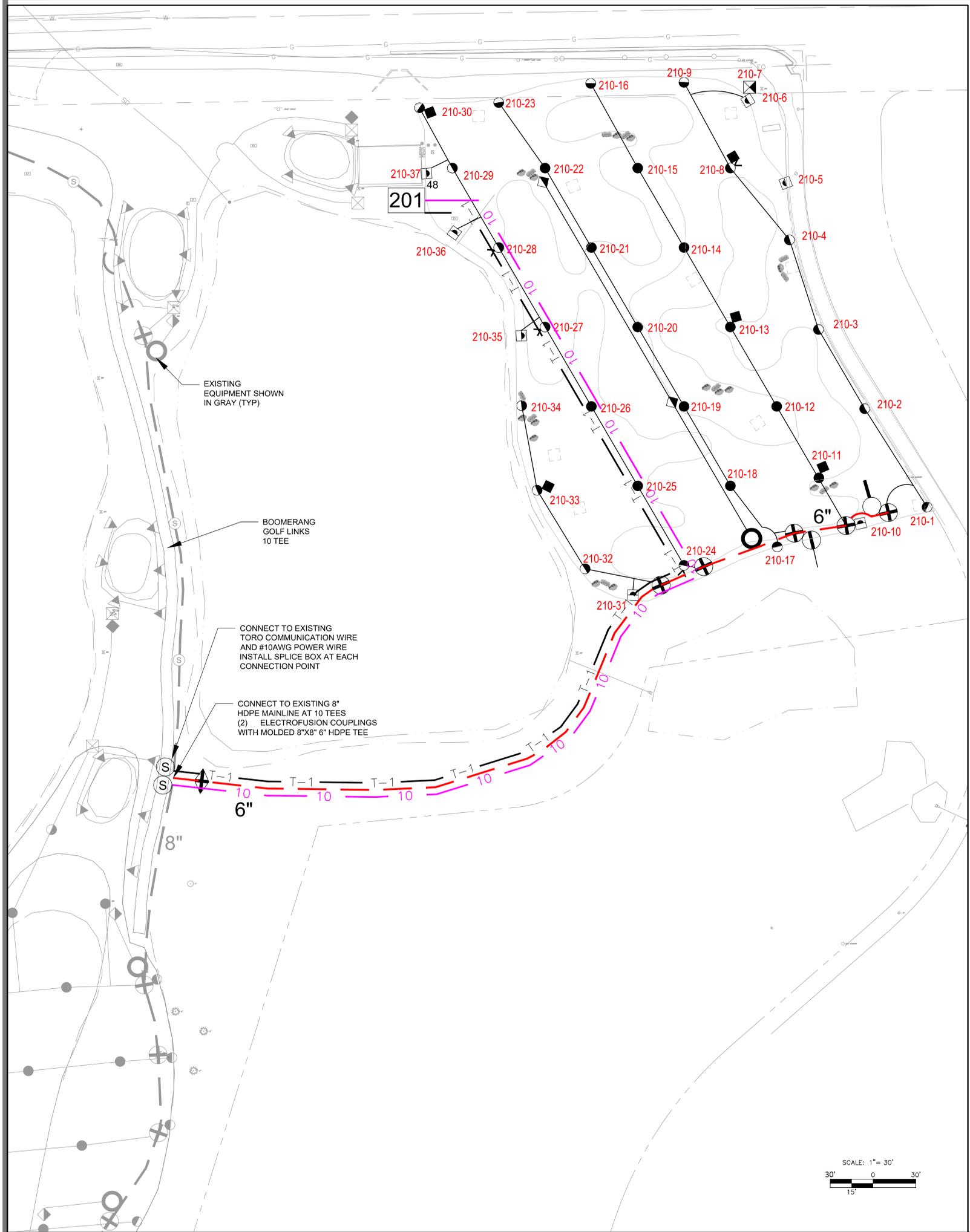


Irrigation technologies
 10395 W. Ottawa Ave.
 Littleton, CO 80127
 Phone 720.240.6208
 www.IrrigationTechnologies.biz

Boomerang SNAG Golf Course Greeley, CO

Boomerang SNAG Golf Course Irrigation Equipment Legend

- Estimated qty.
- 12 FULL CIRCLE VALVE IN HEAD SPRINKLER SPACED AT 65', SEE DETAILS #5,6,7
TORO FLEX800 FLX34-346-2 NOZZLE #34 65 PSI 26.2 GPM
 - 13 PART CIRCLE VALVE IN HEAD SPRINKLER SPACED AT 65', SEE DETAILS #5,6,7
TORO FLEX800 FLX35-346-2 NOZZLE #34 65 PSI 25.6 GPM
 - ⊗ 4 PART CIRCLE WITH REAR TAIL NOZZLE VALVE IN HEAD SPRINKLER SPACED AT 65', SEE DETAILS #5,6,7
TORO FLEX800 FLX35-346-2, NOZZLE #34 65 PSI, 25.6 GPM WITH REAR NOZZLE #102-6884 YELLOW 41" RADIUS ADDS 4.5 GPM
 - ⊞ 7 PART CIRCLE VALVE IN HEAD SPRINKLER SPACED AT 50', SEE DETAILS #5,6,7
TORO FLEX800 FLX35-316-2 NOZZLE #31, 65 PSI, 13.8 GPM
 - ◆ 5 QUICK COUPLER - SEE DETAIL #12
INCLUDE (2) EXTRA WIRES AND A COMMON LOOP AT EACH LOCATION
TORO #474-01
 - ◆ 2 WINTER WATERING HYDRANT / QC ASSEMBLY, SEE DETAIL #11
FURNISH AND INSTALL RAINBIRD 1" QC #5RC WITH WINTER WATERING HYDRANT
 - ⊞ 1 1.0" ELECTRIC VALVE ASSEMBLY FOR FUTURE DRIP IRRIGATION, SEE DETAIL #16
TORO P220GS-27-04
 - ⊕ 5 2" LATERAL ISOLATION VALVE - ANGLE VALVE CONFIGURATION - HARCO 2"X 6" #8431GGSQ - SEE DETAIL #13
 - ⊞ 1 MAINLINE GATE VALVE - CLOW C-509, SIZE TO MAIN - SEE DETAIL #8
 - ⊞ 1 AIR RELEASE VALVE - 2" BERHAD C31 - SEE DETAIL #9
 - ⊞ 1 2" MAINLINE DRAIN VALVE - 2" GATE VALVE, AQUA-FUSE CONTROL FLOW GATE VALVE WITH PE ENDS - SEE DETAILS #14,15
 - ⊞ 1 2" WINTER WATERING HYDRANT / QUICK COUPLER ISOLATION VALVE, AQUA-FUSE CONTROL FLOW GATE VALVE WITH PE ENDS - SEE DETAIL #10
 - ⊞ IRRIGATION CONTROLLER, SEE DETAILS #17,18
TORO LYNX SMART SATELLITE # 300-XXP6M4
 - ⊞ 48 STATION
 - ⊞ 2 SPLICE BOX - SEE INSTALLATION DETAIL #19
 - 2,500' 2" HDPE LATERAL PIPE DR11 RESIN 4710 - USE FOR VALVE IN HEAD AND WINTER WATERING QUICK COUPLER LATERAL PIPING - SEE DETAILS #1.2,3,4
 - 600' 6" MAINLINE PIPE - HDPE DR13.5 RESIN 4710
- POWER AND COMMUNICATION CABLE LEGEND**
- 10 800' #10 AWG DIRECT BURY POWER CABLE WITH #10 GROUND
 - T-1 800' TORO COMMUNICATION CABLE, REGENCY #R7162D
 - 3,000' #12-1 COMMON WIRE - INSTALL WITH LATERAL PIPE, PATH NOT SHOWN
 - 30,000' #14-1 STATION WIREINSTALL WITH LATERAL PIPE, PATH NOT SHOWN



Project	BR 11-20
Drafter	BDK
Check	BDK
Plot Date:	09-23-2024
Scale:	1"=30.0'
1"=30.0'	

REVISIONS	

SHEET TITLE:
SNAG Course
Irrigation
Design

SHEET
Ir-1
OF
2



Irrigation technologies

10395 W. Ottawa Ave.
Littleton, CO 80127
Phone 720.240.6208
www.IrrigationTechnologies.biz

Boomerang SNAG Golf Course Greeley, CO

Project BR 11-20

Drafter BDK

Check BDK

Plot Date: 09-23-2024

Scale:

N.T.S.

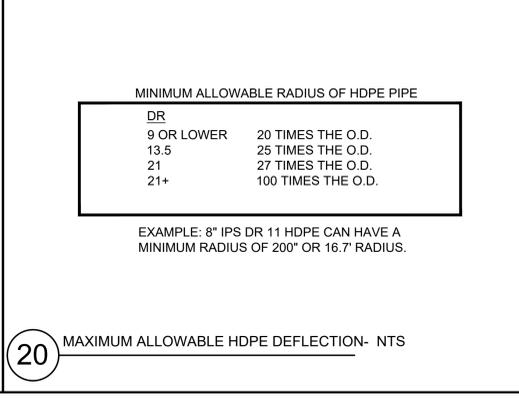
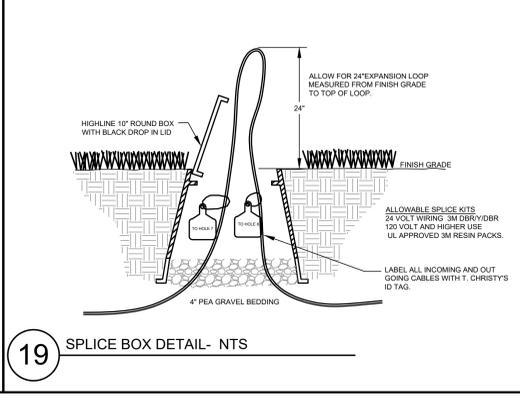
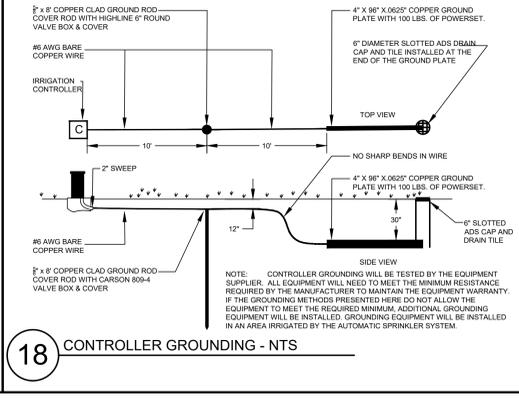
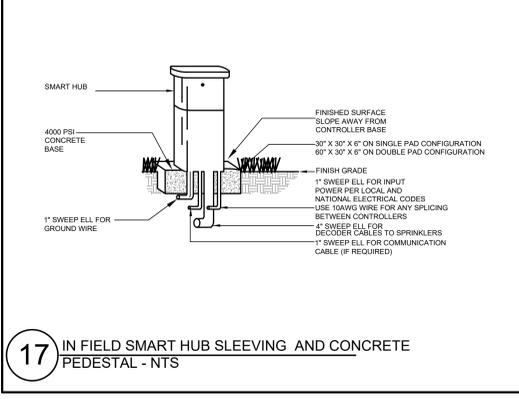
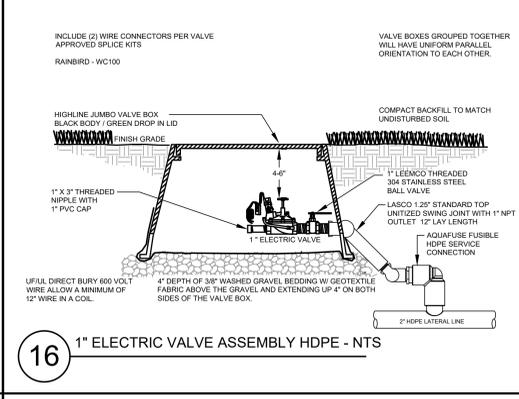
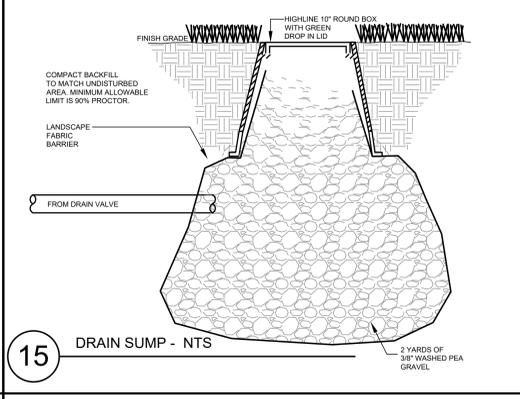
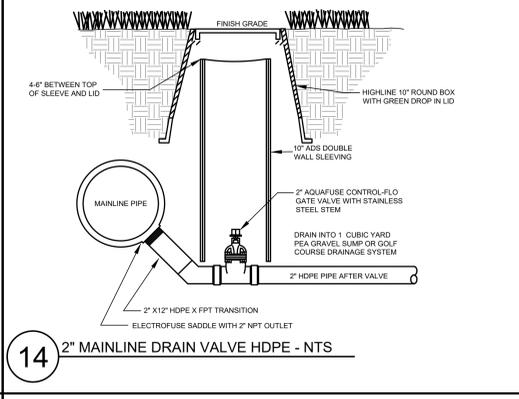
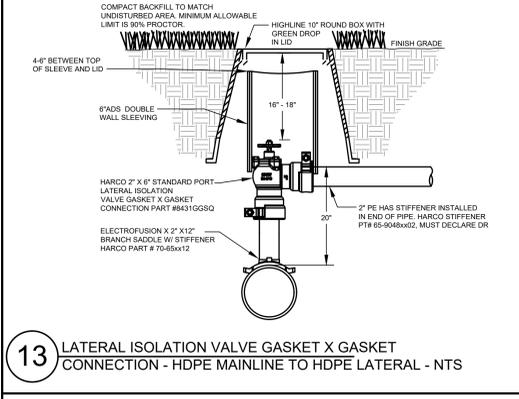
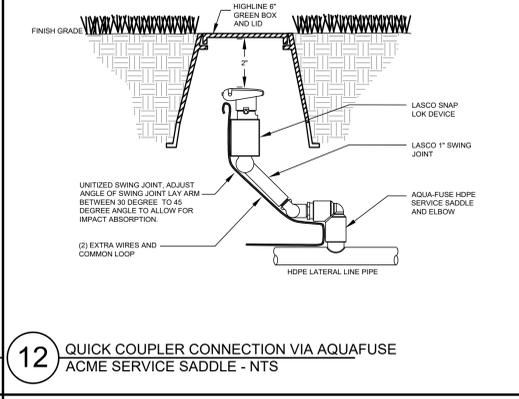
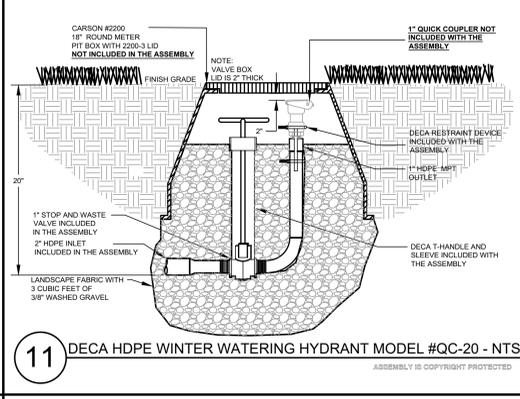
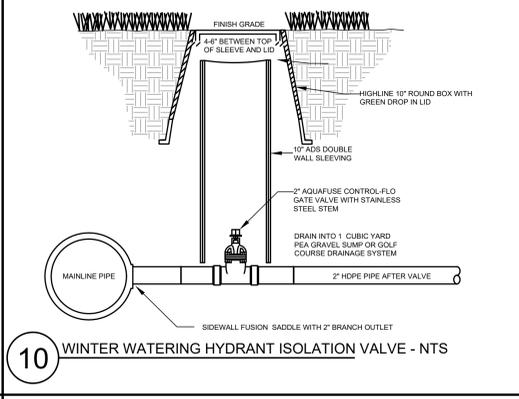
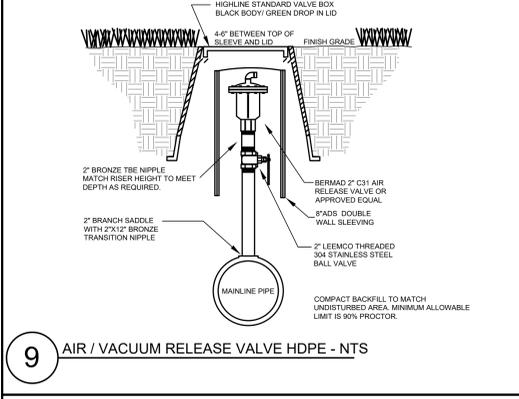
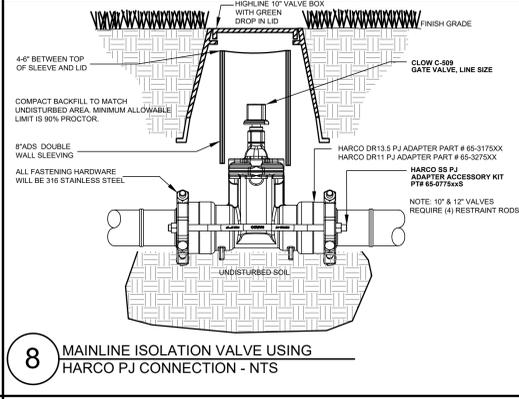
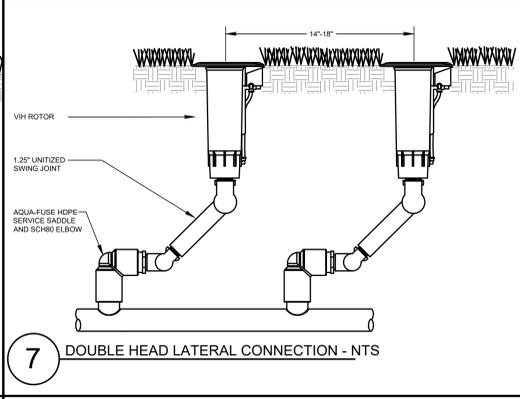
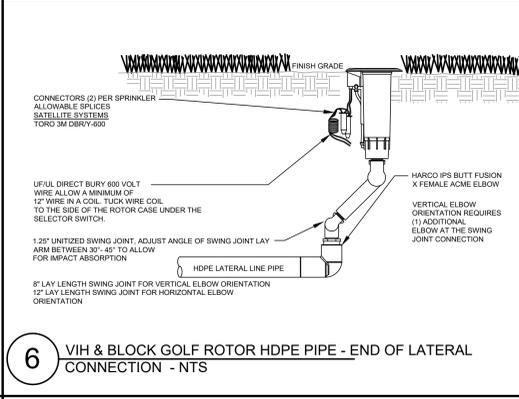
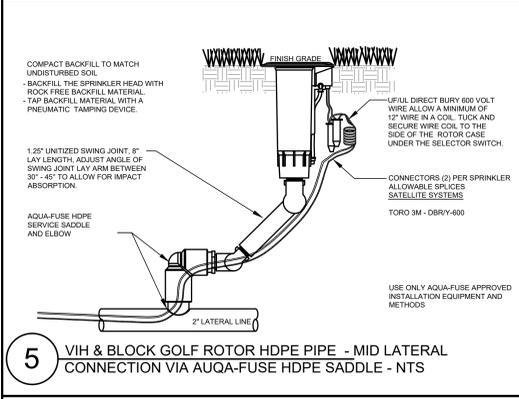
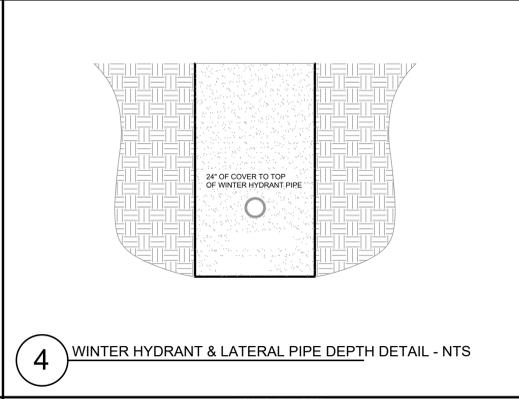
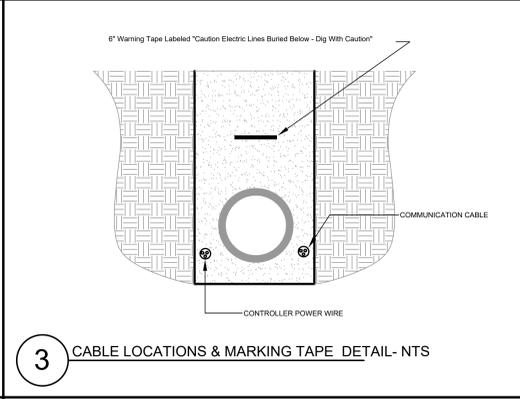
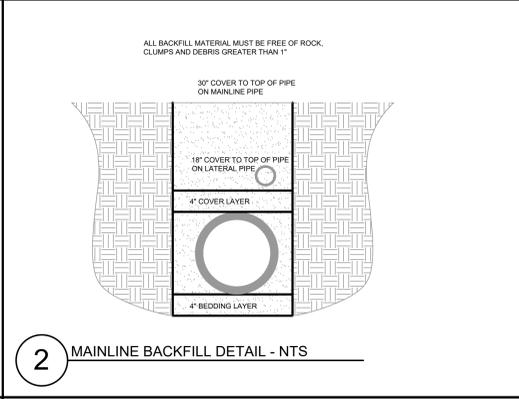
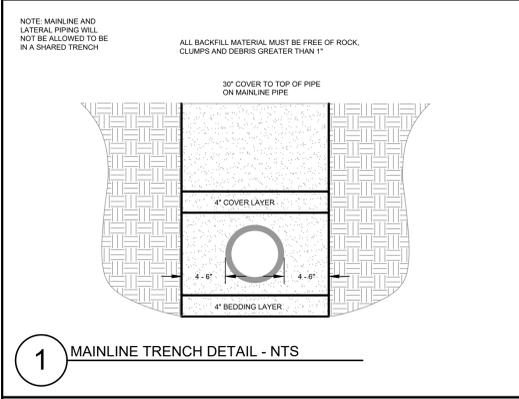
REVISIONS

SHEET TITLE:

Installation
Details

SHEET

Ir-2 OF 2



Boomerang Golf Links SNAG Course

Irrigation System

Technical Specifications

September 23, 2024

Table of Contents

SECTION 1- GENERAL PAGES 4-7

SECTION 2- PRODUCTS PAGES 8-14

SECTION 3 – EXECUTION PAGES 15-22

PROJECT INFORMATION/ QUALIFICATIONS

Project Scope:

The Contractor will be required to furnish and install all necessary components to irrigate the SNAG golf course. The plans that accompany these technical specifications identify the equipment needed, approximate quantities and locations for the equipment.

Project Needs:

The following is a summary of the work for the Project:

1. Main Irrigation Line Approximately 600' linear feet 6" diameter pipe, buried to a depth of 30" from top of pipe, or as noted, High density polyethylene pipe (HDPE), to be installed via track type or rubber tire 150hp (minimum horsepower) trencher.
2. Lateral Irrigation Lines Approximately 2,500' linear feet 2" diameter buried to a depth of 18" from top of pipe, High density polyethylene pipe (HDPE), to be installed via 80hp rubber tire/track vibratory plow.
3. Mainline Isolation Valves Push on style with restraints, fusion bond epoxy coated ductile iron body resilient wedge gate valves on the large diameter pipe (6") and fusion bond epoxy coated ductile iron body EPDM valve seal.
4. Control System Satellite based hardwire control system connected to the existing central control software package.
5. Approximate Sprinkler Quantity 36 golf body sprinklers, (5) quick couplers, and (2) winter quick couplers.
6. Pump Station The water supply for this golf course is supplied by the existing 8" mainline near 10 tees.

A. Constraints:

1. The Contractor will be required to have the keep the same crew for the duration of the project.
2. The Contractor will staff only crew that have extensive experience installing a new irrigation system on an existing 9-hole facilities of similar size and system scope.
3. The Contractor will staff only crew with extensive and verifiable experience with the handling and installation of high-density polyethylene pipe (HDPE) and associated materials found in golf irrigation renovation projects.

4. The Contractor will staff only crew that have extensive and verifiable experience with field satellite control systems. Identify product brand and solenoid count of each project. A minimum of (4) 2 wire projects completed in the last 2 years that are 9 holes or larger.
- B. **Project Schedule** – The following dates have tentatively been established. Refer to city documents for the project schedule.

1.1 SCOPE

- A. The Contractor shall provide all labor, products, materials, associated materials (whether specified or not), equipment, transportation, and supervision required to construct the irrigation system including, but not limited to:
- i. Valves, mechanical and electric.
 - ii. Field wiring.
 - iii. Piping, mainline and lateral
 - iv. Sprinkler heads, quick coupling valves, controller devices, and drip irrigation.
 - v. Pump stations and associated infrastructure.

1.2 SUBMITTALS AND SUBSTITUTIONS

- A. The Irrigation system shall be installed with specified components or approved equal equipment, including sprinkler heads, controllers, subsurface irrigation components and valves. Another manufacturer may be substituted provided they have received an "approved equal" status prior to bidding based on the substitution process established herein.
- B. Submittal for substitutions shall meet said addendum process and include any new hydraulic calculations and equipment locations.
- C. Substitution calculations and locations shall be proposed in writing and to scale for irrigation specifiers evaluation.
- D. Substitutions shall be submitted prior to bidding based on the substitution process herein.
- E. Materials, equipment, and methods of installation shall comply with, but are not limited to, the following codes and standards:
- i. All local and state laws and ordinances, and with all the established codes applicable thereto.
 - ii. National Electrical Code.
 - iii. American Society for Testing and Materials (ASTM).
 - iv. National Sanitation Foundation (NSF).
 - v. AWWA
- F. All materials submitted will be assembled in an electronic PDF format separated by each component. The Contractor will submit the electronic binder to the Consultant for review. Include a cut sheet of each component along with the warranty information for the product, the Supplier of the product, and a preventative maintenance practices manual for the piece of equipment. The Consultant will review the binder and may request additional information from the Contractor. The submittal package will be approved when the Consultant deems all necessary information has been provided. The Contractor will then assemble one printed and bound submittal book for the Owner. The document must be assembled and approved prior to the initial site visit of the irrigation designer.
- G. The Contractor will provide a proposed construction schedule for the project. The schedule will be developed to allow for continued operation of the existing system with transition to the operation of the new system. The Contractor will be required to have the central computer operational prior to the installation of any lateral pipe.

1.3 CONDUCT OF WORK

- A. The Contractor shall maintain a skilled superintendent on the site during the entire installation of his work. The Superintendent shall have the authority to act on all matters pertaining to the work.
- B. The assigned Superintendent and Crew Foreman will be required to complete the project through its entirety.

1.4 RIGHTS OF WAY

- A. The Contractor shall acquire the necessary right of way or lawful authority that may be necessary for approved crossings or occupation of any roads, street, or alleys upon which the Contractor work will be completed.

1.5 DELIVERIES, HANDLING AND STORAGE

- A. Materials shall be delivered to the site in accordance with the manufacturer's recommendations for shipment and protection of materials.
- B. Handling of materials as recommended by the manufacturer.
- C. Storage of all materials in locations designated and approved by the Owner.
- D. All materials are required to be contained within a locked storage container located within a fenced compound that will be secured during non-construction hours.
- E. The Contractor will provide adequate restroom and refuse facilities for their staff during the entire duration of the project.
- F. The Contractors staging area will be always kept clean and remove all refuse generated from packing materials and scrap generated during the installation of the project. The staging area will be returned to its original level of cleanliness or better at the completion of the project.

1.6 SITE CONDITIONS

- A. Take precautions to ensure that equipment and vehicles do not disturb or damage existing site grading, walks, curbs, pavements, utilities, plants, and other existing items and elements on public and private property.
- B. Verify locations and depths of all underground utilities prior to commencing excavation.
- C. Repair damage caused by Contractor's actions at no cost to the Owner.
- D. Existing Utilities:
 - i. Locate and mark all existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during this work.
 - ii. Public and/or private underground utilities that are unknown and not located that are damaged during the excavation processes shall be repaired at the Owners expense.
 - iii. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Owner immediately for directions. Cooperate with the Owner. Do not interrupt existing utilities serving facilities occupied and used by Owner or others during occupied hours, except when permitted in writing by Owner and then, only after acceptable temporary utility services have been provided.
 - iv. Provide minimum of 48-hour notice to Owner and receive written notice to proceed before interrupting any utility.

E. Underground Structures

- i. Underground structures, including boulders that are encountered during excavation in the alignment and depth shown on the plan shall be adjusted if possible, to avoid its excavation. If alignment and depth adjustment cannot be made and it becomes necessary to remove the same, the Contractor shall be paid for additional cost incurred for removal. See section 3.3 A-C for details.
- ii. The Contractor must show to Owner or Consultant the problem encountered and receive verbal and written approval before any add-on monies will be allowed.

F. Protection of Persons and Property:

- i. Barricade open excavations occurring as part of this work and post warning lights.
- ii. Operate warning lights as recommended by authorities having jurisdiction.
- iii. Protect structures, utilities, sidewalks cart paths, pavements, curbs, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by this work. Damaged areas will be repaired to original condition at Contractors cost.

1.7 GUARANTEE

- A. For a period of one (1) year from the date of final acceptance of work performed under this Section, the Contractor shall promptly furnish and install all parts and equipment, which prove defective in material, workmanship, or installation at no additional cost to Owner.
- B. Warranty items will be repaired within 48 hours of notice of defect to the Contractor. If the item is not repaired within 48 hours, the Owner reserves the right to repair the item(s) and charge the Contractor any material and labor cost for the repair.
- C. For phased or multiple season projects and during the warranty period, the Contractor shall drain and winterize the irrigation system each fall for the winter and shall place the irrigation system back into operation each spring at no additional cost to Owner. Winterization and spring startup will occur within 48 hours of notice from Owner. The Contractor will use a compressor rated at a minimum 500CFM to winterize the system.
- D. During the warranty period, the Contractor shall perform non-warranty work or service to the system at the Owner's request and shall be paid on a time and materials basis for such work as negotiated with the Owner.
- E. The Owner will be required to provide necessary maintenance to the system during the warranty period. Necessary maintenance is defined as items that wear with regular operation of the system.

1.8 SPECIAL PROJECT REQUIREMENTS

- A. The existing irrigation system will need to remain fully operational during the mainline installation process. All existing equipment must be operational by the end of each workday.

SECTION 2 – PRODUCTS

2.1 PE PIPE:

- A. 2 Inch Pipe Polyethylene pipe shall comply with ASTM D3035 or ASTM F714 and the following additional clarifications and requirements. It shall be IPS diameter, dimension ratio 11, and made from PE4710 compound. Polyethylene material shall meet ASTM D3350 code C with 2% to 3% carbon black.
- B. Any pipe, 3" and larger, that does not have wire as a component of the ditch must have a #14 AWG tracer wire installed along the entire length of the pipe run. A splice box is required for every 500' of pipe run or change of pipe direction. The tracer wire will loop into the splice box in the event the pipe routing needs to be located. The color of the tracer wire will be different than that on any other #14 wire used as a station control wire.
- C. All 2" PE will be supplied in a coiled bundle and must be uncoiled and straightened per the manufacturers recommended procedure. Pipe will be supplied in rolls no longer than 2,000'.
- D. PE pipe shall be warranted for a minimum of twenty-five (25) years to be free of defective material or workmanship by the manufacturer.

2.2 PE FITTINGS:

- A. Injection Molded Butt Fusion Fittings shall comply with ASTM D3261 and the following clarifications and requirements. They shall be IPS diameter, dimension ratio 11, and made from PE4710 compound. Polyethylene material shall meet ASTM D3350 code C with 2% to 3% carbon black. Ends of fittings shall be machined to match the diameter and thickness of the pipe to which it is to be fused. Fittings shall be injection molded so that knit lines/weld lines are not present in the vicinity of the crotches of elbows or tees.
- B. Fabricated Butt Fusion Fittings shall meet the five second pressure test of AWWA C906 for fittings to be used on DR 13.5 pipe. They shall be IPS diameter, made of DR 11 or thicker pipe complying with ASTM F714, and made from PE4710 compound. Polyethylene material shall meet ASTM D3350 code C with 2% to 3% carbon black. Ends of fittings shall be machined to match the diameter and thickness of the pipe to which it is to be fused. They are to be manufactured using Data Loggers. Temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the quality control records.
- C. Electro Fusion Fittings shall comply with ASTM F1055. They shall be IPS diameter, suitable for DR 11 service, and made from PE4710 compound. Polyethylene material shall meet ASTM D3350 code C with 2% to 3% carbon black. Branch outlets of branch saddles shall be DR 11 and machined to match the diameter and thickness of the pipe if it is to be butt fused.
- D. Socket Fusion Fittings shall comply with ASTM D2683. They shall be IPS diameter, suitable for DR 11 service, and made from PE4710 compound. Polyethylene material shall meet ASTM D3350 code C with 2% to 3% carbon black.
- E. Fittings 2" to 12" in diameter shall be injection molded in configurations for which injection molded fittings are commercially available. Fabricated fittings in these sizes may only be used with the express and prior permission of the Owner's Agent.

2.3 BRASS PIPE & FITTINGS

- A. Brass Pipe - 85% red brass, AMSI Schedule 40 screwed pipe.
- B. Fittings - Medium brass, screwed 250-pound class.

2.4 LOW VOLTAGE FIELD WIRING:

- A. Provide one low voltage control wire for each valve-in-head sprinkler or remote-control valve. Low voltage sprinkler and valve control wires shall be run from each sprinkler or remote-control valve location to the satellite controller location. Connections of common stations shall be made in the satellite controller on the terminal strip.
- B. Splices shall be made moisture proof with 3M DBR/Y-600 or approved equal splice kits.
- C. All low voltage wire shall be installed from 2,500' (760 m) reels.
- D. The minimum depth of cover for all low voltage wire shall be as indicated on the detail page of the plan and the minimum depth allowed by the NEC. Wiring may be installed by a suitable trenchless installation, but wire must not be pulled through the ground. A machine with a rack for wire reels and a blade with a wire chute should be used to lay wire into ground. This method should be used only where soil conditions permit installation without damaging wire. This method may not be used if trenching is specifically called for on the Plan.
- E. Low voltage wire shall be run with or be in a common trench with piping (lateral or main). The only exception is to get from the controller to the pipeline location. The deviation from the share trench will be noted on the Contractors field notes submitted to the Consultant.
- F. A 2-foot (60 cm) expansion loop shall be provided at each sprinkler. Expansion loop and splice shall be buried immediately below the pilot/solenoid side of the sprinkler.
- G. 24-volt wire will be supplied in 4 different colors and installed so that no two adjacent controllers have the same color wire. Suggested color scheme; red, blue, orange, brown. Do not use white or yellow. White is to be used as the Common, and yellow is to be used as an indicator of an extra wire.

2.5 120 VOLT POWER WIRE – IRRIGATION CONTROLLERS

- A. Type UF for use in accordance with the National Electrical Code or operation at a potential of 600 Volts or less and at a temperature of 75°C or less.
- B. Soft drawn bare copper conductor meeting the requirements of ASTM specification B-3 or B-8 and Polyvinyl chloride insulation, 75°C rated conforming to UL Standards 493 and 83. All cables shall be tested physically and electrically in accordance with UL Standard 493 and 83 (paragraphs 28.1, 29.1 and 29.2). All reels and cartons bear UL and/or c (UL) labels.
- C. Wire Colors - Hot Line - Black
Neutral - White
Equip. Ground – Green
- D. Wire will be installed as sized on the drawings.
- E. No splices will be allowed.
- F. All 120-volt direct burial splices shall be made with UL approved epoxy resin splice kits (3M 82 series or approved equal).
- G. The minimum depth of cover for all 120-volt wire shall be as indicated on the detail page of the plan and the minimum depth allowed by the NEC. Wiring may be installed by a suitable trenchless installation, but wire must not be pulled through the ground. A machine with a rack for wire reels and a blade with a wire chute should be

used to lay wire into ground. This method should be used only where soil conditions permit installation without damaging wire. This method may not be used if trenching is specifically called for on the Plan.

2.6 SPRINKLER HEADS

- A. Sprinklers heads will be installed as shown on the detail page of the plan.
- B. Sprinklers will be set level.
- C. The selector switch will be oriented towards the front edge of the green.
- D. Sprinkler heads will have a 5-year replacement warranty when partnered with the respective swing joint manufacturers.

2.7 LATERAL ISOLATION VALVES

- A. Lateral isolation valves shall be of the size and type called on the Plan. Connection of valves to main line and lateral pipe shall be as called for in the Construction Details. Valves shall conform to the following. Lateral Isolation Valves shall be 200 psi rated angle globe valves with integrally restrained ends. Ends shall be integrally restrained push on gasketed joint as required. Components shall be 316 Stainless Steel. joints shall be SBR Rubber and comply with ASTM F477. Internal seals shall be EPDM rubber.
 - i. Lateral isolation valves will have a 15-year parts and full labor replacement warranty.
 - ii. Lateral isolation valve will be manufactured by Harrington Corporation of Lynchburg, Virginia.

2.8 MAINLINE GATE VALVES

- A. Mainline gate valves shall be line size cast iron body with a minimum non-shock cold working pressure of 200 PSI (13.6bar). Valves shall be equipped with a 2" (50 mm) opening square operating nut unless otherwise specified on the Plan. Valves shall be fusion bonded epoxy coating that meets the AWWA C550 standard. The resilient wedge shall be ductile iron, fully encapsulated with a vulcanized EPDM rubber, and shall be drip-tight to flow in either direction. The stem shall be non-rising and made of stainless steel with minimum yield strength of 40,000psi. All bolting shall be stainless steel 304 sealed with hot melt and include anti-galling compound on all bolt threads.

Ductile Iron Gate valves shall conform to specification AWWA C509.

- B. Mainline gate valves will have a 10-year part and full labor replacement warranty.

2.9 AIR VENT/VACUUM RELIEF VALVE

- A. The air vent/vacuum relief valve shall be installed as shown on the detail page.

2.10 QUICK COUPLING VALVES:

- A. Install quick coupling valve with restraint as per detail.
- B. Two extra #14 wires will be installed at each quick coupler.

2.11 VALVE BOXES

- A. All valve boxes will be permanently branded/ hot stamped with a 2" tall one-character identifier in the lid of the box. Depth of branding will be no more than 1/8 inch into the box lid. Use the following one letter indicators to identify each specific valve box. Example Shown
- i. L– Lateral Isolation Valve
 - ii. M – Mainline Isolation Valve
 - iii. S – Wire Splice box
 - iv. D - Drain Valve
 - v. A - Air Release Valve
 - vi. Q - Winter Quick Coupler Valve Box
- B. All valve boxes will be manufactured by Highline unless specified otherwise in the installation details.

2.12 SLEEVES:

- A. Sleeving for all irrigation piping shall be SDR13.5 HDPE 4" diameter or 2 times the size of the irrigation pipe, whichever is larger.
- B. Sleeving for all communication and power service shall be SDR13.5 HDPE 4" diameter or 2 times the size of the irrigation pipe, whichever is larger.
- C. Sleeves will extend a minimum of 12" past any road/stream/bridge crossing unless noted otherwise on the plan.

2.13 SWING JOINTS:

- A. The swing joint shall be molded from rigid PVC, Type 1, cell classification 12454-B, conforming to ASTM D1784, with a pressure rating of 315 psi (21,7 Bars), @ 73°F (22,8°C) when tested in accordance with ASTM D3139, including 60 minutes @ 790 psi and short-term exposure of 1000 psi without leakage. All NPT threads, sockets and spigots shall be Schedule 80 per ASTM D2464 and D2467.
All components shall be factory pre-assembled, available in sizes 1", 1¼", 1½" inlet/outlet, and in lengths of 8", 12" and 18".
All rotating joints are modified stub ACME threads, with two elastomer O-rings for positive sealing and thread protection. Triple-top outlet fitting will be included on all Valve-In-Head sprinklers to facilitate precise adjustment of sprinkler height. Each size unit (1", 1¼", and 1½") shall be uniquely color-coded and boldly marked to enable easy identification.
All swing joint assemblies shall be available with any combination of NPT, BSP and ACME inlets/outlets. An enlarging outlet (no additional adapter required) for swing joints with 1" and 1¼" diameters shall be available to allow them to be used with many larger rotors. An optional reducing inlet (no additional adapters required) for 1¼" swing joints (ACME) shall be available for use with a 1½" outlet Service Tee.
All swing joints shall be designed utilizing computational fluid dynamics software, resulting in superior flow characteristics.
- C. Swing joints shall be manufactured by the respective sprinkler head manufacturer.
- D. Swing joints will have a 5-year warranty.

2.14 EQUIPMENT GROUNDING, FIELD SATELLITE

- A. The contractor will ground all equipment as required by the manufacturer to maintain the manufacturer's warranty.
- B. The Contractor will install the grounding as specified and will test the grounding of all equipment. A grounding report will be provided to the Owner and Consultant prior to substantial completion.
- C. In the event additional grounding is required, a cost will be determined prior to additional grounding equipment being installed.
- D. It is the responsibility of the installer to connect all electronic irrigation equipment for which he is responsible to earth ground in accordance with Article 250 of the National Electrical Code (NEC.) Grounding components will include the items described in the following paragraphs, at a minimum.
- E. Use grounding electrodes that are UL listed or manufactured to meet the minimum requirements of Article 250-52 of the 1999 NEC. At the very minimum, the grounding circuit will include a copper clad steel ground rod, a solid copper ground plate and 100 pounds of PowerSet® earth contact material.

SECTION 3 – EXECUTION

3.1 GENERAL

- A. All material shall be new, of good quality, and of the manufacturer specified. No substitutions of material shall be made without prior written approval by the Consultant.
- B. Requests for substitution shall be submitted in writing to the Consultant at least five (5) business days before the bid date. If substitution of material is approved, it will not relieve the Contractor of the obligation to replace any defective part whether during construction or in warranty period, at Contractor's expense.
- C. All materials shall be installed per these Plans and Specifications. If the installation of certain material is not covered in these specifications, then the Contractor shall follow the Manufacturer's' installation recommendations. If the manufacturer does not supply sufficient installation methods, make this known to the Owner and Consultant, and then the installation shall follow industry standards.
- D. The Contractor will build assemblies of each installation detail for the Consultant to review and accept prior to any installation taking place. Assembly review will take place during the first equipment staking site visit.
- E. The Contractor will post one complete set of construction documents including irrigation plans and written specifications inside each storage container and office space/trailer that is on the construction site. Each crew foreman is required to read and fully understand the construction document set.
- F. All skilled positions will be staffed by people that are experienced with each specific task as it relates to the installation of a golf course irrigation system. "Labor Ready" or similar daily labor persons cannot be used in skilled positions such as pipe fitting, wiring, project supervision or machine operation. Daily labor positions are allowed only to be used in final cleanup operations after all the technical processes are complete.
- G. The sprinkler head and central computer control system manufacturer will host an on-site pre-construction meeting with the installing Contractor of no less than four (4) hours in duration, on the manufacturers recommended process and procedure to install the manufacturers equipment specified in the plan set. The manufacturer will supply all necessary tools and people qualified to complete the training. The people providing the training will provide the Owner and Irrigation Designer with a written report of the training to include participants and topics covered during the training session.

3.2 LAYOUT

- A. It is recognized that because of the dynamic nature of golf course design and construction the golf course as-staked plan may differ substantially from the plans drawn for construction of the irrigation system. Be prepared to adjust installation of the irrigation system so that it will properly irrigate golf course features as actually constructed.
- B. The Consultant shall be responsible for locating all sprinklers on the site in advance of the Contractor's work. Sprinkler locations will be marked with a flag marker. The Contractor shall be responsible for maintaining these markers until the sprinklers are installed. Routing of the pipe shall be in accordance with the Irrigation Plan, except that the Consultant reserves the right to change the routing of pipe from that shown on the plan and to change the depth of trench and cover over the top of pipe in case of rock or other obstacles. In no event shall field changes of this nature affect the overall cost of the project except where these changes may alter the quality of materials to be provided according to the plan, or where excess depth of trench and backfill is required.

- C. The Contractor, subject to approval of the Consultant, may adjust the location of any pipeline to avoid ledge rock, stumps, or other obstacles, provided that such adjustment does not increase the quantity of pipe required and is not in conflict with the evident intent of the plan.
- D. Stakes shall be clearly marked and flagged to designate the type of equipment to be installed at each point. Stakes shall be placed accurately to allow equipment to be installed within one foot from the indicated position. Where a stake is offset from the indicated position, it shall be clearly marked to indicate the base position.
- E. The Contractor is responsible for maintaining the location of all staked equipment. Any stakes lost after the initial location will be re-staked by the Consultant during a future visit. If any additional visits are required, the Contractor will incur the cost of the visit(s) to include all related travel expenses.
- F. The Contractor will furnish all the necessary pin flags required to complete the equipment staking operation. A minimum of six (6) different color flags will need to be available during the staking. The irrigation staking flags will need to be a color other than what is being used to designate golf features.
- G. The Contractor will request field staking visits ten (10) business days in advance of the requested staking date.
- H. On renovation projects, survey type marking whiskers will be installed by the contractor marking all equipment staked by the Consultant. Whiskers must be installed within 24 hours of the Consultants staking visit. Locations will need to be protected and maintained by the Contractor.

3.3 EXCAVATION AND BACKFILLING/COMPACTION:

- A. Excavation shall include all materials encountered, except materials that cannot be excavated by normal mechanical means (ROCK EXCAVATION). Rock excavation shall cover the removal of rock that requires systematic drilling and blasting or use of a Hoe-Ram for its removal and boulders exceeding 1 cubic yard in volume. Material shall be considered rock when, at the discretion of the consultant or owner's representative, the Contractor is unable to progress with a Caterpillar 311 Track-Hoe (or equivalent weight class excavator) or 85 horsepower Ditch Witch 8850 trencher (or equivalent). Hardpan, hard clay, glacial till, sandstone, siltstone, shale, or other sedimentary rocks which are soft, weathered, or extensively fissured will not be classified as rock excavation. Rock is defined as one that has a modulus of elasticity of more than 200,000 psi or unconfined compressive strength at field moisture content of more than 2,000 psi.
- B. In the event unyielding material is encountered, excavation must stop, and the Owner's Representative made aware of the situation.
- C. Contractor to supply on bid form a unit price for removal of material which cannot be excavated by normal mechanical means (ROCK). Unit price shall be by volume (cubic yard) measured in its original position (prior to excavation). The quantity measured for payment will include only the material excavated from within the limits hereinafter defined. Any additional excavation outside of these limits will be considered as having been made for the contractor's benefit, and all costs in connection with such excavation shall be included in the contract prices for the various items of work.
 - a. Horizontal limits for measuring rock excavation will be the sides of the trench, except no payment will be made for the material removed outside of vertical planes extended beyond the maximum trench widths (30" width or 1.5 times the outside diameter of the pipe plus 12", whichever is greater).
 - b. Vertical distances shall be measured from the upper surface of the rock to an elevation 4 inches below the underside of the pipe barrel, or to the lower surface of the rock, whichever is less. Boulder exceeding 1 cubic yard in volume shall be paid for according to their measured volume.
- D. Excavated trenches of sufficient depth and width to permit proper handling and installation of pipe, wire, and fittings.
- E. 2" Lateral pipe installation shall be by vibratory plow. The "bullet" will be integrated onto the plow blade and oversized to minimize any potential damage to the pipe.
- F. Excavate to depths required to provide 4" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.

- G. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in layers not exceeding 6" per lift.
- H. Provide approved earth fill or sand to a point 4" above the top of pipe.
- I. Overfill with approved excavated or borrow fill materials free of lumps or rocks larger than 1" in any dimension. Level, compact, and water settle. Should settlement occur, refill and re-seed or sod as required.
- J. Except as indicated, install irrigation mains with a minimum cover of 30" and maximum depth of 34", based on finished grades. Install irrigation laterals with a minimum cover of 18" and maximum depth of 22" based on finished grades.
- K. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.
- L. Compaction will be achieved by a pneumatic tamping device, wheel driven vibratory compactor, or crew operated "jumping jack" compaction device. **No pile driving or "Hydra Hammer" type compactors are allowed.**
- M. All mainline, lateral lines, heads and valve boxes will be tamped to 90% compaction.
- N. Lateral "pull lines" will be flattened by a 2-ton smooth double drum hydrostatic vibratory roller and top dressed with an Owner approved dressing material. Rolling will continue until the Golf Course Superintendent and/or Consultant provide acceptance.
- O. Soil moisture will remain at optimal levels to achieve 90% compaction.
- P. Mainline trenches will require that (2) 18" widths of sod be cut before any trenching has begun.
- Q. Mainline trenches will have a 2" crown in the middle of the trench to allow for trench settling.

3.4 PIPE:

- A. Pipe and fittings shall be installed using procedures recommended by the manufacturer.
- B. Pipe and fittings shall be packaged in a manner suitable for shipment by a commercial carrier. Upon receipt at the job site, a receiving inspection shall be prepared. The quantity shall be verified, and any shipping damage shall be reported to the supplier within 7 days. Damaged fittings will be replaced with new at no cost to the Owner.
- C. Trenches shall be excavated in accordance with the plans and specifications. OSHA standards and City of Lakewood safety policies regarding safety shall be followed regarding trench safety. If groundwater is encountered, it shall be removed by the Contractor. Shoring of the trench, where required is the responsibility of the Contractor.
- D. Foundation & Bedding. Install pipe on grade and on a stable foundation. Unstable soil or muck shall be removed from the trench bottom. A 4" foundation or bedding of compacted native material shall be in the bottom of the trench. The bedding material shall be free of rock and organic debris and trash. Water shall be removed from the trench before bringing the bedding material and pipe to grade and backfilling. When a trench is cut through rocky material, it shall be excavated to 4" below the pipe bottom grade and bedded with rock free material. All slabs of rock, boulders and large rocks shall be removed, and disposed of off-site by the Contractor.
- E. Pipe and Large Fitting Handling: A nylon fabric choker sling capable of safely handling the weight of the pipe or fitting, shall be used to lift, place, and move pipe and fittings.
- F. Backfilling. Class I and II backfill shall be used for pipe embedment backfill. This material shall be compacted to at least 90% Standard Proctor Density in 6" lifts.

- G. Final Backfilling. Final backfill shall be placed in the trench and compacted to finished grade. Native soils without roots, limbs, large rocks, boulders, clumps, or frozen clods or any object that could damage the pipe can be used.
- H. Scrape off the oxidized layer on the pipe using either a hand scraper or another suitable scraper tool. Do not remove more than 1% of the pipe wall thickness.
- I. If needed before fusing operations occur, re-round oval pipe with a re-rounding clamp.
- J. Clean the pipe surface and the inside of the fitting liberally with isopropyl alcohol that has a solution of 99%. Make sure the surfaces are dry before assembly.
- K. All fusion saddles will be fused according to the saddle manufacturer's recommendations. All necessary tools to complete the saddle fusing will be used by the Contractor.
- L. Install fitting on pipe and firmly tighten all bolts, working in a diagonal pattern. The fitting must be flush with the pipe. Use care not to contaminate the clean fusion zone area.
- M. Assemble the pipe and fittings in a clean, supported, and physical stress-free condition as possible.
- N. Connect the fitting to the fusion processor and begin fusing. At the end of the fusing process, using a sharpie or similar silver metallic marker, record the time of day, total fusing time, cooling time and technicians' initials on the pipe next to the fitting.
- O. All personnel fusing HDPE pipe will have completed an HDPE fusion training course held by DECA, CMF Global, ISCO or other approved HDPE manufacturer. A Certificate of course completion will be required as part of the first pay request/draw.
- P. Any personnel fusing pipe is required to have a minimum of 500 hours of verifiable fusing experience.
- Q. All fusing equipment will always remain on site during the installation portion of the project.
- R. All fusing equipment will be checked for proper operation and be certified to be within OEM operational specifications prior to use on the project.
- S. The Contractor will remove any HDPE shavings from the installation process with a portable shop-vac type vacuum.
- T. All fusing equipment will have a Fluke model 62 MAX infrared thermometer that will be used before each butt fuse to verify that the head plate is in the correct heat range.
- U. Flanged fittings will only be used transition from the HDPE pipe to a mainline isolation valves or in situations as detailed on the construction documents. Flanged connections will not be allowed from fitting to fitting.
- V. All fused fittings will be allowed to cure for the minimum time defined by the fitting manufacturer before any valves or apparatus is attached to the fused component.
- W. The Contractor will be required to fuse pipe and saddles for the Consultant's observation during the initial staking visit. Pipe and saddles will be fused in actual operating conditions and in a quantity that is satisfactory to the Consultant. If the Contractor is not fusing pipe during the initial site visit, the Contractor will include in his price one (1) additional site visit to have the Consultant on site to observe the fusing process.
- X. The Contractor will include in his installation price a 2-day HDPE on-site fusion seminar that will be held by the HDPE fitting manufacturer. The manufacturer will cover all aspects of the fusion process to include equipment setup, equipment operation, fusion preparation, fusion methods, identification of current field conditions, and adjustments to adapt to the current field conditions. The seminar will include all methods of fusing that will be

occurring on the project site. All Contractor personnel that will be fusing are required to attend the seminar and receive a certificate of completion from the fitting manufacturers training representative.

3.5 SPRINKLERS, VALVES, FITTINGS, ACCESSORIES:

- A. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.
- B. Set sprinkler heads level, except as otherwise indicated or as per manufacturer's recommendations. Sprinklers will be checked by the Contractor for level using a bubble level in two directions with 90 degrees of separation.
- C. Install quick-coupling valves in the specified valve box and on elbow swing joint assembly as per manufacturer's recommendation.
- D. Install fittings and accessories as shown or required to complete the system.
- E. Install in-ground control valves in a valve access box as indicated.
- F. All valve boxes for the lateral, mainline, drain, air release, splices, and other associated equipment will be installed during the installation of the mainline pipe.
- G. 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.

3.6 FIELD WIRING:

- A. Install all station and common wire in the piping trenches wherever possible. When not possible, place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Expansion joints in wire will be provided at 500-foot intervals and pipeline change of directions. Where necessary to run wire in a separate trench, provide a minimum cover of 18".
- B. Provide sufficient slack (24") at site connections at remote control valves in control boxes, and wire splices to allow raising the valve bonnet or splice to the surface without disconnecting wires when repair is required.
- C. Connect each head/remote control valve to one station except as otherwise indicated.
- D. Make field wire connections to head/remote control electric valves and splices of wire in the field; using UL listed burial splice connectors in accordance with manufacturer's recommendations.
- E. All wiring will be installed with sufficient slack to allow the wire bundle to be moved out of the way in the event a repair is needed in that area. A minimum 60" coil will be bundled at mainline tees and angles.
- F. All low voltage wire bundles installed in the mainline trench will be taped with a black electrician's tape at 10-foot intervals.
- G. All wire splices will be performed by the same crew members during the entire project. No more than (2) crew members will be allowed to make wire splices. Crew members authorized to make wire splices will be identified at the beginning of the project.
- H. All Communication and/or control wire will be placed on the interior of the valve box during installation.

3.7 FLUSHING AND ADJUSTMENT:

- A. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.
- B. Adjust all electric remote-control valve flow control stems and pressure regulating device for system balance where applicable.
- C. Test and demonstrate operation of the sprinkler system to the Owner and/or Consultant.
- D. Fully flush all piping prior to installation of the sprinkler head/ electric valve onto the swing joint.

3.8 FIELD NOTES/RECORD DRAWING/PROGRESS REPORTS:

- A. During the installation of the system, the contractor will be required to keep daily field notes showing progress made during that day. An office copy of progress will be kept in a safe, clean environment. The office copy will be made available to the Owner and/or Consultant on request.
- B. The Contractor will provide field notes to the Consultant during each site visit, and prior to each pay request. The field notes will indicate equipment installed since the previous submission of field notes.
- C. Field notes presented to the Consultant will be on the same sheet size as the documents provided to the Contractor. 11x17 for each hole or 30x42 for multiple holes/sheets.
- D. The Consultant will transfer the field notes on to the As-built plan and will issue an updated electronic set of As-built record drawings after each site visit or at the request of the Owner or Contractor.
- E. Record drawings will be used to verify the percentage complete for pay requests. Progress reports will be provided at the request of the Owner and or Consultant. The report will detail the progress made within the requested time frame, any issues that have occurred during the requested time frame.

3.9 CLEANING PREMISES:

- A. The Contractor shall always keep the premises on which the work is being done, and adjoining premises, clean of rubbish caused by their work.
- B. Upon completion of the job, the Contractor shall clean up all debris caused by their work and leave the job site in a neat and clean condition.
- C. Asphalt and concrete cart paths will be swept clean of any accumulated dirt and or debris every Friday.
- D. Gravel cart paths will be kept mud free and will be overlaid with a matching gravel specification at any time that excess mud and/or rutting is created by the Contractors installation operation. The applied gravel layer will be compacted with a 5-7 hp vibratory plate compactor. The gravel layer will have a thickness of 6" and will provide a stable surface for the intended vehicle path traffic.

3.10 EQUIPMENT:

- A. The Contractor will keep all equipment used for the installation of the irrigation system in proper working condition. Any equipment leaks will be promptly repaired, and any damaged turf will be replaced due to damage caused by the leaking equipment.

- B. Equipment used on existing turf must have smooth tread tire. Bar cleat tires are not allowed on any equipment on the construction site and will be removed from the site at the Consultants request.
- C. Transport type equipment will only be driven in areas and routes as identified by the Golf Course Superintendent/Project Manager.
- D. The Contractor will furnish all necessary utility and transport vehicles for the project.
- E. Dump trucks with a load capacity of no more than 1 ton can be used to move spoils from the golf course to designated spoil locations. Any trucks used must remain on a route identified by the golf course superintendent.

3.11 ACCEPTANCE:

- A. Test and demonstrate to Owner and Designer the satisfactory operation of the system.
- B. A final inspection/walk through will consist of the follow key elements:
 - i. Central Computer Operation
 - ii. Valve Box Orientation/ Grade
 - iii. Controller Grounding/ Manual Station Operation
 - iv. Sprinkler Head Operation
 - v. As Built Review
 - vi. Trench Settlement
 - vii. Warranty documentation and contact information.
 - viii. Written notification, signed by an Owner’s representative and the contractor, indicating system completion in compliance with drawings, specifications, contracts, and industry standards.
- C. The Contractor shall instruct the Owner in the operation of the system, including but not limited to; sprinkler troubleshooting repair and adjustment, controller operation and programming, valve troubleshooting and repair.
- D. Upon written acceptance, the Owner will assume operation of the system. The Contractor will winterize the system during the fall of 2019 and 2020, provide startup for spring 2020 and spring 2021 during the 1-year warranty period. Winterization will be required for the entire system. The Owner will notify the Contractor 48 hours in advance of the procedure taking place. The Contractor will furnish all necessary equipment and labor to complete the operation. The Owner has the option of participating in the procedure, but this does not relieve the Contractor of any warranty liability.
- E. The sprinkler head manufacturer will provide an on-site technician to assist the Contractor with the winterization of the irrigation system during the warranty period of the system. The technician will identify the proper pressure and volume of air that is needed to properly winterize the system that prevents damage to any of the sprinkler heads. Any damaged sprinklers will be replaced under warranty.

3.12 PIPELINE TESTING AND PROCEDURE:

- A. Notify the Owner at least three (3) days in advance of testing.
- B. HDPE mainline pipe 3” and larger shall be subjected to a pressure test any time after partial backfill.
- C. HDPE pipe can be subjected to test any time after the minimum cool time, defined by the material manufacturer has been met.
- D. HDPE pipe can be subjected to test after fused components have met manufacturers recommended.
 - i. Quality Control Testing (On Site Bend Back Test)

Prior to HDPE pipe being installed in the trench, at the beginning of the job, the contractor shall cut out the first butt fusion of each pipe size. The contractor shall prepare the sample for the test in accordance with the "Job Aid/ Bend Back Testing" procedure document prepared by ISCO Industries, LLC dated Oct. 26, 06 or as revised, and in accordance with ASTM D 2657. The samples shall be tested in the presence of the Owner and / or the Consultant, all in accordance with testing procedures outlined in the ISCO document. All samples shall be labeled and saved. The purpose of the test is to determine if a good weld was made. A pass means no failures during the bend back test. This means a good weld. A break means a bad weld. Any failure shall require additional testing.

- ii. Additional testing may be required at any time at the discretion of the Owner and/or the Consultant.

E. Volumetric Leak Test

- i. Provide sufficient backfill around pipe to prevent pipe movement.
- ii. Expose couplings and fittings.
- iii. Purge all air from the pipe before testing.
- iv. Pipe will be tested at 125% of the working pressure.
- v. Leakage will be defined as the quantity of water that must be supplied to maintain pressure within 5 psi and determined by the formula $L = NDP/7400$
L = Allowable leakage in gallons per hour
N = Number of joints in tested section
D = Nominal diameter of pipe in inches
P = Square root of the average test pressure during test in psi

- F. The Contractor will introduce water into the mainline pipe network to allow for seal testing of all mainline and lateral isolation valves. Valves will be required to be under pressure for a minimum of 8 hours. Any valves that do not allow for a 100% watertight seal will be replaced with new at no cost to the Owner.

END OF SECTION

Bid Specifications

TABLE OF CONTENTS

INSTRUCTIONS TO BIDDERS -----	4
1 PROPOSAL	4
2 CHECK OR BID BOND.....	4
3 WITHDRAWAL OF BIDS.....	4
4 INTERPRETATIONS OF DRAWINGS AND DOCUMENTS.....	4
5 PERFORMANCE BOND.....	4
6 QUALIFICATIONS OF BIDDERS	5
7 ACCEPTANCE OR REJECTION OF BIDS.....	5
8 CONSTRUCTION SCHEDULE	5
9 CONTRACTOR RISK.....	5
10 ADDENDA - CHANGES IN THE WORK.....	5
11 DEFINITIONS.....	6
12 SALES AND USE TAX FORMS.....	6
13 INSURANCE.....	6
14 APPLICABLE LAWS	6
GENERAL CONDITIONS -----	7
1 DEFINITIONS.....	7
2 JURISDICTION.....	7
3 ESSENCE OF CONTRACT.....	7
4 NOTICE TO CONTRACTOR.....	7
5 INTERPRETATIONS AND INSTRUCTION.....	7
6 EXECUTION OF CONTRACT	8
7 SEPARATE CONTRACTS.....	8
8 GUARANTY BONDS.....	8
9 CONTRACTOR'S WORK SCHEDULE.....	8
10 CONTRACTOR'S OBLIGATIONS.....	9
11 ASSIGNMENTS.....	9
12 SUBCONTRACTS	9
13 RELATIONS OF CONTRACTOR AND SUB-CONTRACTOR.....	9
14 GOLF COURSE ARCHITECT'S (GCA'S) STATUS	11
15 GOLF COURSE ARCHITECT'S (GCA'S) DECISIONS.....	11
16 ARBITRATION.....	11
17 DAMAGES.....	12
18 CASH ALLOWANCES.....	12
19 MUTUAL RESPONSIBILITY OF CONTRACTORS.....	12
20 CONTRACTOR'S LIABILITY INSURANCE	12
21 CONTINGENT LIABILITY INSURANCE.....	12
22 CONTRACTOR'S INSURANCE.....	13
23 DETAIL DRAWINGS AND INSTRUCTIONS.....	13
24 CONTRACT DRAWINGS AND SPECIFICATIONS.....	13
25 SHOP DRAWINGS.....	13
26 DRAWINGS AND SPECIFICATIONS ON THE WORK	13
27 OWNERSHIP OF DRAWINGS.....	13
28 SAMPLES.....	13
29 MATERIALS, APPLIANCES, EMPLOYEES	14
30 ROYALTIES AND PATENTS	14
31 SURVEYS, PERMITS, LAWS, TAXES, AND REGULATIONS	14
32 PROTECTION OF WORK AND PROPERTY	15
33 ACCESS TO WORK	15
34 SUPERINTENDENCY / SUPERVISION.....	15
35 CHANGES IN THE WORK.....	16
36 CLAIMS FOR EXTRA COST	16
37 DELAYS AND EXTENSION OF TIME	16
38 CORRECTION OF WORK BEFORE FINAL PAYMENT	16
39 CORRECTION OF WORK AFTER FINAL PAYMENT.....	17
40 DEDUCTIONS FOR UNCORRECTED WORK	17
41 THE OWNER'S RIGHT TO DO WORK	17

42	OWNER'S RIGHT TO TERMINATE CONTRACT	17
43	THE CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT	17
44	APPLICATIONS FOR PAYMENT	18
45	RECOMMENDATIONS FOR PAYMENT	18
46	PAYMENTS WITHHELD	19
47	LIEN RELEASES	19
48	USE OF THE SITE	20
49	CUTTING, PATCHING	20
50	CLEANING UP	20
51	DETERMINATION AND EXTENSION OF CONTRACT TIME	20
52	DETERMINATION OF CONTRACT TIME	20
53	EXTENSION OF CONTRACT TIME	22
54	FAILURE TO COMPLETE THE WORK ON TIME / LIQUIDATED DAMAGES	23
55	TESTING	24
56	REVIEW OF WORK	24
57	NOTICE OF READINESS FOR FINAL REVIEW	24
58	CERTIFICATES / RECOMMENDATIONS	25
59	FINAL CLEAN UP AND GRADING	25
60	ENVIRONMENTAL CONTROLS	25
61	GUARANTEES	25
62	OPERATING INSTRUCTIONS	26
SPECIAL CONDITIONS		27
1	PRECEDENCE	27
2	DESCRIPTION OF WORK	27
3	SURVEYS	27
4	PROJECT COMPLETION AND LIQUIDATED DAMAGES	27
5	MAINTENANCE OF PROJECT	28
6	PROTECTION OF ADJOINING PROPERTY	28
7	FEDERAL, STATE AND LOCAL LAWS	28
8	APPROVAL BY THE GOLF COURSE ARCHITECT	28
9	LIENS OR CLAIMS	28
10	LAND FOR CONSTRUCTION PURPOSES	28
11	PUBLIC SAFETY	29
12	DUST ABATEMENT	29
13	OBSTRUCTING ROADWAY	29
14	RELOCATION AND PROTECTION OF UTILITIES	29
15	SUBSURFACE INVESTIGATIONS	30
16	CONTRACTOR'S RESPONSIBILITY	30
17	INSURANCE	30
18	STORAGE YARDS	32
19	PERMITS AND LICENSES	32
20	RIGHT-OF-WAY, LAND OWNERSHIP AND ADDITIONAL ACCESS TO WORK	32
TECHNICAL SECTION – MOBILIZATION		33
1	DESCRIPTION	33
2	BASIS OF PAYMENT	33
TECHNICAL SECTION – EARTHWORK		34
1	SCOPE OF WORK	34
2	SITE GRADING	34
3	SUBGRADES	35
4	PLAN GRADES	36
5	ROCK EXCAVATION	36
6	FINISH GRADING	36
7	COMPACTION OF FILL	36
8	SPECIFIED COMPACTION METHOD	37
9	ORDINARY COMPACTION METHOD	37
10	DRAINAGE	37
11	REMOVAL OF UNSTABLE SOILS	38
12	PROSECUTION AND CLEANUP	38

TECHNICAL SECTION – CAST-IN-PLACE CONCRETE-----	39
1 GENERAL	39
2 PRODUCTS.....	40
3 EXECUTION.....	40
TECHNICAL SECTION – SEEDING AND SODDING -----	43
1 SCOPE OF WORK	43
2 MATERIALS	43
3 FINISH SHAPING/ROCK PICKING/SEED BED PREP. OF TEES, FAIRWAYS AND SLOPES	44
4 WEED CONTROL	45
5 SEEDING - TEES, FAIRWAYS, NEAR ROUGH AND FAR ROUGH	45
6 MAINTENANCE OF THE SEEDED AREAS	46
7 MULCHING	47
8 SATISFACTORY GERMINATION / ESTABLISHMENT AND REPLACEMENT	47
9 CLEAN UP	47
TECHNICAL SECTION – PLANT MATERIALS & PLANTING -----	49
1 SCOPE OF WORK	49
2 JOB CONDITIONS, PROVISIONS AND STANDARDS	49
3 MATERIALS	49
4 PLANT MATERIAL STANDARDS	51
5 DELIVERY AND TEMPORARY STORAGE	52
6 PLANTING.....	52
7 SHRUB PLANTING	54
8 MAINTENANCE	55
9 INSPECTION AND ACCEPTANCE.....	55
10 PROTECTION OF TREES.....	56
11 GUARANTEE AND REPLACEMENT.....	56

INSTRUCTIONS TO BIDDERS

1 PROPOSAL

- 1.1 All bidders shall observe the following instructions and those contained in the "Advertisement - Notice To Bidders."
- 1.2 Only bids submitted upon the bid form furnished herein, or as modified via Addendum, will be accepted. All items shall be properly filled out, with no changes without written instructions via Addendum. Any Bid not duly signed will not be considered. Alternative bids will **not** be considered unless called for in the bid form, or via Addendum.
- 1.3 Prior to submitting a bid, bidders **MUST** satisfy themselves, by personal examination of the location of the proposed work and by examination of the plans and specifications and requirements of the work, accuracy of the estimate of the quantities of work to be done, and shall not at any time, after submission of a bid, dispute or complain of such estimates nor assert that there were any misunderstandings in regard to the nature of amount of work to be done. Bidders also shall carefully examine the form and time requirements of the contract, (existing conditions and limitations) and shall include in the bid, monies to cover the cost of all items included in the contract.
- 1.4 All bids must be delivered electronically, on or before the day and hour set for the opening of bids at the location called for in the "Advertisement Notice To Bidders". It is the responsibility of the bidder to verify that their bid has been received electronically. The Owner is not responsible for outages or other technical difficulties in the delivery of electronic communications.
- 1.5 The bid shall be submitted on the bid forms as provided. The entire book need not be submitted with the bidder's proposal.

2 CHECK OR BID BOND

- 2.1 Each bid shall be accompanied by a check as required in the Notice to Bidders or a bid bond, in an amount not less than five percent (5%) of the total bid.

3 WITHDRAWAL OF BIDS

- 3.1 The Bidder may withdraw any bid he has submitted at any time prior to the hour set for closing of bids provided a request for withdrawal is signed in a manner identical with the proposal being withdrawn. No withdrawal or modification will be permitted after the hour designated for closing of bids.

4 INTERPRETATIONS OF DRAWINGS AND DOCUMENTS

- 4.1 If a bidder finds discrepancies or omissions in the drawings or specifications, or if the bidder is in doubt of the meaning or needs clarifications, he shall notify the Golf Course Architect. If the point or points in question are not clearly and fully set forth, a written addendum will be mailed by the Golf Course Architect to each person obtaining a set of contract documents. The Owner will not be bound by, nor responsible for oral instructions, interpretations or representations by the Golf Course Architect.

5 PERFORMANCE BOND

- 5.1 The successful bidder will be required to execute the contract and a performance and payment bond within ten (10) calendar days from the date the written notice of award of the contract is mailed to the bidder at the address given by him. In case of a failure to do so, the Owner may, at its option, determine

that the bidder has withdrawn his bid and the certified check or bid bond accompanying the proposal shall become the property of the Owner, with proper notice.

6 QUALIFICATIONS OF BIDDERS

- 6.1 The Owner may make such investigations as it deems necessary to determine the ability of the bidders to perform the work, and the bidders shall furnish to the Owner all such information for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out his obligations of the contract and to complete the work contemplated thereby.
- 6.2 All Contractors intending to submit bids as General Contractor for this work shall be experienced in the field of golf course construction.
- 6.3 If the total amount of the work to be subcontracted amounts to forty percent (40%) or more of the total bid price, the CONTRACTOR shall be prepared to provide all of the above information for each of the SUB-CONTRACTORS employed by the CONTRACTOR.
- 6.4 All subcontractor contracts shall be subject to the approval of the Owner. All subcontractors shall also be required to show proficiency and experience in golf course construction, earthwork, irrigation system installation, and/or seeding; and shall provide reference names, addresses and telephone numbers of owners of golf course projects, in which he has participated.

7 ACCEPTANCE OR REJECTION OF BIDS

- 7.1 The OWNER reserves the right to accept or reject any or all bids, and to waive irregularities and informalities in order to serve the best interests of the project.
- 7.2 Bids which are incomplete, conditional, contain conditions or additions not called for, or irregularities of any kind, or which do not comply with the Advertisement Notice To Bidders and Instructions to Bidders, in the judgment of the Owner, may be rejected at the election of the Owner.

8 CONSTRUCTION SCHEDULE

- 8.1 Prior to signing the contract, the contractor shall submit an overall construction schedule for the project. This construction schedule shall start with the proposed date of signing and contract, and the completion date shall be the date specified in the contract.

9 CONTRACTOR RISK

- 9.1 The construction contract documents and the detailed specifications will contain the terms and provisions required for the construction of the project. No oral information obtained from any officer, agent or employee of the Owner shall in any way affect the risk or obligation assumed by the contractor, or relieve him from fulfilling any of the terms of the contract.

10 ADDENDA - CHANGES IN THE WORK

- 10.1 Changes in the work, corrections of errors, omissions or discrepancies in the Plans, Specifications, or other Contract Documents, or additional information necessary for the preparation of bids developed during the bidding period will be issued by the GOLF COURSE ARCHITECT as written addendum to all Bidders.

10.2 The CONTRACTOR will not be allowed to take advantage of errors or omissions in plans and specifications. The GOLF COURSE ARCHITECT will provide full instructions when errors or omissions are discovered.

10.3 No questions will be received less than three (3) working days before the bid opening due to the lack of time remaining to issue addenda to all other bidders.

11 DEFINITIONS

11.1 If used herein, the word "Owner" means the City of Greeley and their duly authorized agents. The Owner will be responsible for payment in accordance with the terms of the contract.

11.2 The word "Contractor" means the person, firm or corporation to whom the bid award is made and with whom the contract is entered into.

11.3 The term "Golf Course Architect (GCA)" refers to the firm of Phelps Golf Design LLC, Golf Course Architects, 10655 W. 73rd Pl., Arvada, CO 80005, and their duly authorized agents, designated by the Owner as its golf course architectural representative during the course of construction to perform agreed upon construction observation and computations of payment.

11.4 "Irrigation Consultant" shall mean Irrigation Technologies (Mr. Brian Keighin) and their duly authorized agents.

12 SALES AND USE TAX FORMS

12.1 Tax Exemption Certificates must be obtained from both the Owner and the State for all materials used in Owner projects. The Owner will furnish these forms to the successful bidder. The Owner will require a summary of all invoices for materials used in their project to be submitted upon completion of the Project for audit purposes.

12.2 Bid price is exempt from Federal, State or local taxes.

13 INSURANCE

13.1 Successful bidders shall furnish to the Owner a Certificate or Certificates of Insurance verifying general comprehensive liability, workmen's compensation and employee liability coverage prior to commencement of work.

14 APPLICABLE LAWS

14.1 The submission of a bid shall be a representation by the bidder that he has familiarized himself with all laws applicable to the Project and will comply therewith throughout the contract.

END OF SECTION

GENERAL CONDITIONS

1 DEFINITIONS

- 1.1 The Contract Documents consist of the Advertisement or Request for Bids, Instructions to Bidders, the Bid Form, the Proposal or Bid Schedule, the General Conditions of the Contract, the modifications to the General Conditions or Special Conditions, the Drawings and Specifications, including all modifications thereof incorporated in the documents before their execution. These form the Contract.
- 1.2 The "OWNER", the "CONTRACTOR", and the "GOLF COURSE ARCHITECT" (GCA), are those mentioned as such in the Instructions to Bidders. They are treated throughout the Contract Documents as if each were of the singular number and masculine gender.
- 1.3 The term "SUB-CONTRACTOR", as employed herein, includes only those having a direct contract with the CONTRACTOR and it includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.
- 1.4 The term "SUPERINTENDENT" shall mean the authorized representative of the OWNER on the job, for the purpose of inspection of materials and supervision/inspection of workmanship and equipment constructed or installed. "OWNER'S REPRESENTATIVE" shall be an interchangeable term with "SUPERINTENDENT" and shall be interpreted as the same.
- 1.5 The term "work" of the CONTRACTOR or SUB-CONTRACTOR includes labor, materials or both.
- 1.6 A "WORKING DAY" is defined as any day not including Saturdays, Sundays or any legal holidays, in which weather or other conditions, not under the control of the CONTRACTOR will permit construction operations to proceed for at least six (6) hours of the day with the normal working force engaged in performing the controlling item or items of work which would be in progress at that time.
- 1.7 "CALENDAR DAY" is any day of the week or month, no days being excepted.
- 1.8 Standard Specifications, such as A.S.T.M., A.A.S.H.O., W.W.P., used in these Specifications which are incorporated or referred to by number designation shall mean the latest revised edition.

2 JURISDICTION

- 2.1 The law of the place of building shall govern the construction of this Contract.

3 ESSENCE OF CONTRACT

- 3.1 All time limits stated in the Contract Documents are the essence of the Contract.

4 NOTICE TO CONTRACTOR

- 4.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

5 INTERPRETATIONS AND INSTRUCTION

- 5.1 If any person contemplating submitting a bid for any element of this work is in doubt as to the true meaning of any part of the plans, specifications or other proposed contract documents, he may submit

to the GCA a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery.

- 5.2 Any interpretation of the proposal documents will be made only by addendum duly issued or delivered to each person receiving a set of such documents. The OWNER or GCA will not be responsible for any other explanations or interpretations of the proposed documents.

6 EXECUTION OF CONTRACT

- 6.1 The successful bidder shall properly execute the form of contract within ten (10) days of receipt of notice of such award. Failure to execute the contract or to provide necessary bond will be considered cause for annulment of the award and forfeiture of bid guarantee as liquidated damages sustained by the OWNER as a result.
- 6.2 The Contract Documents are Complementary, and what is called for by any one shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment, and transportation necessary for proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

7 SEPARATE CONTRACTS

- 7.1 The OWNER reserves the right to let other contracts in connection with this work under similar General Conditions. The CONTRACTOR shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs. If any part of the CONTRACTOR'S work depends for proper execution or results upon the work of any other contractor, the CONTRACTOR shall inspect and promptly report to the GCA any defects in such work that render it unsuitable for such proper execution and results. His failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor's work after the execution of his work. To insure proper execution of his subsequent work, the CONTRACTOR shall measure work already in place and shall at once report to the GCA any discrepancy between the executed work and the drawings.

8 GUARANTY BONDS

- 8.1 The CONTRACTOR shall furnish guaranty bonds, as required in the Special Conditions, in such form as the OWNER may prescribe and with such sureties as he may approve. The premium shall be paid by the CONTRACTOR.

9 CONTRACTOR'S WORK SCHEDULE

- 9.1 The CONTRACTOR shall furnish the OWNER, the SUPERINTENDENT and the GCA with the proposed working schedule by major operation and working period. Once work has begun on an item in the schedule, the CONTRACTOR shall diligently prosecute the work whenever conditions permit. If a period of five (5) working days passes without substantial prosecution of the work, the OWNER may terminate the Contract and proceed to complete the remaining work in the most expeditious manner possible. The cost of the work, together with all additional costs for staking, observation and administration services by OWNER, the SUPERINTENDENT and the GCA shall be deducted from payments due the CONTRACTOR.

- 9.2 No work shall be performed on Sundays or legal holidays without written permission from the OWNER.
- 9.3 Where the site of the work is within seven hundred-fifty feet of any dwelling, no work shall be performed from 7 p.m. to 7 a.m. without the written consent of the OWNER.

10 CONTRACTOR'S OBLIGATIONS

- 10.1 The CONTRACTOR, by executing the Contract, represents that he has visited the site, studied the local conditions, and familiarized himself with all of the requirements of the Contract Documents, specifications and drawings.
- 10.2 If the CONTRACTOR, after carrying out all of the above studies and familiarizations, finds any error, omission or inconsistency, he shall at once report them to the GCA, in writing. The CONTRACTOR shall perform no work until such errors, omissions, etc., are corrected. The CONTRACTOR shall perform no work without drawings, specifications or interpretations.
- 10.3 The CONTRACTOR shall supervise and direct the work using his best skill and attention. All construction methods, techniques and procedures shall be the sole responsibility of the CONTRACTOR. He will be responsible for proper sequence and coordination of all phases of this work under the Contract.
- 10.4 The CONTRACTOR shall be responsible to the OWNER for the acts and omissions of all his employees, sub-contractors or any others who work under contract to the CONTRACTOR.

11 ASSIGNMENTS

- 11.1 Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the CONTRACTOR assign any moneys due or to become due to him hereunder, without the previous written consent of the OWNER.

12 SUBCONTRACTS

- 12.1 As soon as practicable and before awarding any sub-contracts, the CONTRACTOR shall notify the GCA in writing of the names of the sub-contractors proposed for the principal parts of the work, and for such other parts for which there may be reasonable objection. If before or after the execution of the Contract, the CONTRACTOR has submitted a list of sub-contractors which has been approved by the GCA and the change of any sub-contractors on such list is required by the OWNER after such approval, the contract price shall be increased or decreased by the difference in cost occasioned by such change. The CONTRACTOR shall not be required to employ any sub-contractor against whom he has a reasonable objection. The GCA shall, on request, furnish to any sub-contractor, wherever practicable, evidence of the amount certified on his account. The CONTRACTOR agrees that he is as fully responsible to the OWNER for the acts and omissions of his sub-contractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him. Nothing contained in the Contract Documents shall create any contractual relation between any sub-contractor and the OWNER.

13 RELATIONS OF CONTRACTOR AND SUB-CONTRACTOR

- 13.1 The CONTRACTOR agrees to bind every SUB-CONTRACTOR and every SUB-CONTRACTOR agrees to be bound by the terms of the Contract, the General Conditions, the Special Conditions, the Drawings and Specifications as far as applicable to his work, including the following provisions of this

article, unless specifically noted to the contrary in the sub-contract approved in writing as adequate by the OWNER or GCA.

13.2 The SUB-CONTRACTOR Agrees:

- 13.2.1 To be bound to the CONTRACTOR by the terms of the Contract; General Conditions; Special Conditions; the Drawings and the Specifications, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the OWNER.
- 13.2.2 To submit to the CONTRACTOR applications for payment in such reasonable time as to enable the CONTRACTOR to apply for payment under Section 44 of the General Conditions.
- 13.2.3 To make all claims for extras, for extensions of time and for damages for delays or otherwise, to the CONTRACTOR in the manner provided in the General Conditions for the like claims by the CONTRACTOR upon the OWNER, except that the time for making claims for extra cost is one week.

13.3 The CONTRACTOR Agrees:

- 13.3.1 To be bound to the SUB-CONTRACTOR by all the obligations that the OWNER assumes to the CONTRACTOR under the Contract, General Conditions, the Drawings and Specifications, and by all the provisions thereof affording remedies and redress to the CONTRACTOR from the OWNER.
- 13.3.2 To pay the SUB-CONTRACTOR, upon the payment of certificates, the amount allowed to the CONTRACTOR on account of the SUB-CONTRACTOR'S work to the extent of the SUBCONTRACTOR'S interest therein.
- 13.3.3 To pay the SUB-CONTRACTOR, upon the payment of certificates, if issued otherwise than as in 13.3.2 above, so that at all times his total payments shall be as large in proportion to the value of the work done by him as the total amount certified to the CONTRACTOR is to the value of the work done by him.
- 13.3.4 To pay the SUB-CONTRACTOR to such extent as may be provided by the Contract Documents or the sub-contract, if either of these provides for earlier or larger payments than the above.
- 13.3.5 To pay the SUB-CONTRACTOR on demand for his work or materials as far as executed and fixed in place, less the retained percentage, at the time the certificate should be issued, even though the GCA fails to issue it for any cause not the fault of the SUB-CONTRACTOR.
- 13.3.6 To make no demand for liquidated damages or penalty for delay in any sum in excess of such amount as may be specifically named in the sub-contract.
- 13.3.7 That no claim for services rendered or materials furnished by the CONTRACTOR to the SUB-CONTRACTOR shall be valid unless written notice thereof is given by the CONTRACTOR to the SUB-CONTRACTOR during the first ten days of the calendar month following that in which the claim originated.
- 13.3.8 To give the SUB-CONTRACTOR an opportunity to be present and to submit evidence in any arbitration involving his rights.

13.3.9 To name as arbitrator under arbitration proceedings as provided in the General Conditions the person nominated by the SUB-CONTRACTOR, if the sole cause of dispute is the work, materials, rights or responsibilities of the SUB-CONTRACTOR, or, if of the SUB-CONTRACTOR and any other SUB-CONTRACTOR jointly, to name as such arbitrator the person upon whom they agree.

13.4 The CONTRACTOR and the SUB-CONTRACTOR Agree:

13.4.1 That in the matter of arbitration, their rights and obligations and all procedure shall be analogous to those set forth in this Contract; provided, however, that a decision by the GCA shall not be a condition precedent to arbitration. Nothing in this article shall create any obligation on the part of the OWNER to pay or to see to the payment of any sums to any SUB-CONTRACTOR.

14 GOLF COURSE ARCHITECT'S (GCA'S) STATUS

14.1 The GCA shall be the OWNER'S representative during the construction period and he shall observe the work in process on behalf of the OWNER. He shall have authority to act on behalf of the OWNER only to the extent expressly provided in the Contract Documents or otherwise in writing, which shall be shown to the CONTRACTOR. He shall have authority to stop the work whenever such stoppage may be necessary in his reasonable opinion to insure the proper execution of the Contract. The GCA shall be, in the first instance, the interpreter of the conditions of the Contract and the judge of its performance. He shall side neither with the OWNER nor with the CONTRACTOR, but shall use his powers under the Contract to enforce its faithful performance by both. In the case of the termination of the employment of the GCA, the OWNER shall appoint a capable and reputable replacement against whom the CONTRACTOR makes no reasonable objection, whose status under the Contract shall be that of the former GCA, and dispute in connection with such appointment shall be subject to arbitration.

15 GOLF COURSE ARCHITECT'S (GCA'S) DECISIONS

15.1 The GCA shall, within a reasonable time, make decisions on all claims of the OWNER or CONTRACTOR and on all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents. The GCA'S decision, in matters relating to artistic effect, shall be final, if within the terms of the Contract Documents.

16 ARBITRATION

16.1 Subject to the agreement of both parties to this contract, any dispute, claim or question arising under this contract may be submitted to arbitration in accordance with the provisions then obtaining, of the Standard Form of Arbitration Procedure of the American Arbitration Association. In the event of arbitration, this agreement shall be specifically enforceable under the prevailing arbitration law, and judgment upon the award rendered may be entered in the court of the forum, state or federal, having jurisdiction. Absent agreement between the parties, arbitration shall not be a condition precedent to any right of legal action that either party may have against the other.

16.2 The CONTRACTOR shall not cause a delay of the work during any arbitration proceedings, except by agreement with the OWNER. Notice of the demand for arbitration of a dispute shall be filed in writing with the other party to the Contract, and a copy filed with the GCA. The demand for Arbitration shall be made within a reasonable time after the dispute has arisen; in no case, however, shall the demand be made later than the time of final payment, except as otherwise expressly stipulated in the Contract.

16.3 The arbitrators, if they deem that the case requires it, are authorized to award to the party whose contention is sustained, such sums as they or a majority of them shall deem proper to compensate him

for the time and expense incident to the proceeding and, if the arbitration was demanded without reasonable cause, they may also award damages for delay. The arbitrators shall fix their own compensation, unless otherwise provided by agreement, and shall assess the costs and changes of the proceedings upon either or both parties.

17 DAMAGES

17.1 Should either party to this Contract suffer damages because of any wrongful act or neglect of the other party or of anyone employed by him, claim shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the final payment, except as expressly stipulated otherwise in the case of faulty work or materials, and shall be adjusted by agreement.

18 CASH ALLOWANCES

18.1 The CONTRACTOR shall include in the Contract sum all allowances named in the Contract Documents and shall cause the work so covered to be done by such contractors and for such sums as the GCA may direct, the contract sum being adjusted in conformity therewith.

18.2 The CONTRACTOR declares that the contract sum included such sums for expenses and profit because of cash allowances as he deems proper. No demand for expenses or profit other than those included in the contract sum shall be allowed. The CONTRACTOR shall not be required to employ for such work persons against whom he has a reasonable objection.

19 MUTUAL RESPONSIBILITY OF CONTRACTORS

19.1 Should the CONTRACTOR cause damage to any separate contractor on the work the CONTRACTOR agrees, upon due notice, to settle with such contractor by agreement or arbitration, if he will settle. If such separate contractor sues the OWNER because of damage alleged to have been so sustained, the OWNER shall notify the CONTRACTOR, who shall defend such proceedings at the CONTRACTOR'S expense and, if any judgment against the OWNER arise therefrom, the CONTRACTOR shall pay or satisfy it and pay all costs incurred by the OWNER.

20 CONTRACTOR'S LIABILITY INSURANCE

20.1 The CONTRACTOR shall maintain such insurance as will protect him from claims under workmen's compensation acts and other employee benefits acts, from claims for damages because of bodily injury including death to his employees and all others and from claims for damage to property, and or all of which may arise out of or result from the CONTRACTOR'S operations under this Contract whether such operations be by himself or by any sub-contractor or anyone directly or indirectly employed by either of them. This insurance shall be written for not less than any limits of liability specified as part of this Contract. Certificates of such insurance shall be filed with the OWNER and the GCA.

21 CONTINGENT LIABILITY INSURANCE

21.1 The CONTRACTOR shall be responsible for and maintain such insurance as will protect the OWNER and GCA from contingent liability to others for damages because of bodily injury, including death, which may arise from operations under this contract, and any other liability for damages which the CONTRACTOR is required to insure under any provisions of this Contract.

22 CONTRACTOR'S INSURANCE

The CONTRACTOR shall provide satisfactory evidence of insurance in force during the term of the Contract as follows:

22.1 Specific insurance requirements are outlined, in detail, in the Special Conditions Section.

23 DETAIL DRAWINGS AND INSTRUCTIONS

23.1 The GCA shall furnish with reasonable promptness, additional instructions by means of drawings, or otherwise, necessary for the proper execution of the work. All such drawings and instruction shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable there from. The work shall be executed in conformity therewith and the CONTRACTOR shall do no work without proper drawings or instructions.

24 CONTRACT DRAWINGS AND SPECIFICATIONS

24.1 Unless otherwise provided in the Contract Documents the CONTRACTOR will be furnished, free of charge, all copies of the drawings and specifications reasonably necessary for the execution of the work.

24.2 All copies of drawings and specifications must be returned to the GCA upon demand.

25 SHOP DRAWINGS

25.1 The CONTRACTOR shall check and verify all field measurements and shall submit promptly three copies, checked and approved by him, of all shop or setting drawings and schedules required for the work of the various trades. The GCA shall check for reasonable conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The CONTRACTOR shall make any corrections required by the GCA and file with them two corrected copies each and furnish such other copies as may be needed. The GCA'S attention to such deviations at the time of submission, and secured with his written approval, shall not relieve the CONTRACTOR from responsibility for errors in shop drawings or schedules.

26 DRAWINGS AND SPECIFICATIONS ON THE WORK

26.1 The CONTRACTOR shall keep one copy of all drawings and specifications for the work, in good order, available to the GCA and SUPERINTENDENT at the job site.

27 OWNERSHIP OF DRAWINGS

27.1 All drawings, specifications and copies thereof furnished by the GCA are his property. They are not to be used on other work and with the exception of the signed Contract set, are to be returned to him on request, at the completion of the work.

28 SAMPLES

28.1 The CONTRACTOR shall furnish for approval, with reasonable promptness, all samples as directed by the SUPERINTENDENT or GCA. The GCA shall check such samples, with reasonable promptness, only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The work shall be in accordance with approved samples.

29 MATERIALS, APPLIANCES, EMPLOYEES

- 29.1 Unless otherwise stipulated, the CONTRACTOR shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the work.
- 29.2 All materials shall be new, unless otherwise specified in the Contract Documents. Both workmanship and materials shall be of good quality. The CONTRACTOR shall, if required, furnish satisfactory evidence as to the kind and quality of materials.
- 29.3 Where the CONTRACTOR has good reason to suggest a substitution, he shall indicate the amount of extra or credit involved, at the time of the contract signing, and in each case he shall obtain written approval from the OWNER, and the GCA before using substitute materials. For each proposed substitution, samples, descriptive and technical data, cost comparison data, and reports of tests shall be submitted to the GCA for approval. No substitute items shall be furnished or installed without written approval. The CONTRACTOR shall reimburse the OWNER for any additional architectural or engineering charges incurred in evaluating the proposed substitutions, whether accepted or rejected, for any changes in specifications and/or drawings, and in the work of other trades resulting from substitutions.
- 29.4 Strict Discipline and Good Order shall at all times be enforced by the CONTRACTOR, and he shall not employ on the work any unfit person and anyone not skilled in the work assigned to him.
- 29.5 The CONTRACTOR shall furnish the necessary sanitary conveniences, properly secluded, for laborers on this work and these shall be maintained in a manner inoffensive to the public.

30 ROYALTIES AND PATENTS

- 30.1 The CONTRACTOR shall pay all royalties and license fees. He shall defend all suits and claims for infringement of any patent rights and shall save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, but if the CONTRACTOR has information that the process of article specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the OWNER.

31 SURVEYS, PERMITS, LAWS, TAXES, AND REGULATIONS

- 31.1 The OWNER shall furnish all surveys unless otherwise specified, and shall acquire and pay for all easements for permanent structures or permanent changes in existing facilities, unless otherwise specified.
- 31.2 The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified, and shall secure and pay for all necessary permits and licenses. If the CONTRACTOR observes that the drawings and specifications are at variance therewith, he shall promptly notify the GCA in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. If the CONTRACTOR performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the GCA, he shall bear all costs arising therefrom.
- 31.3 Wherever the law of the place of building requires a sales, consumer, use, or other similar tax, the CONTRACTOR shall pay such tax.

32 PROTECTION OF WORK AND PROPERTY

32.1 The CONTRACTOR shall continuously maintain adequate protection of all his work from damage and shall protect the OWNER'S property from injury or loss arising in connection with this Contract. He shall make good any such damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the OWNER, or due to causes beyond the CONTRACTOR'S control and not to his fault or negligence. He shall adequately protect adjacent property as provided by law and the Contract Documents. The CONTRACTOR shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of Federal, State and Municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of workmen and the public and shall post danger signs warning against all hazards. In an emergency affecting the safety of life or of the work or of adjoining property, the CONTRACTOR without special instruction or authorization from the GCA or OWNER, is hereby permitted to act, at his discretion, to prevent such threatened loss or injury and he shall so act without appeal, if so authorized or instructed. Any compensation, claimed by the CONTRACTOR because of emergency work, shall be determined by agreement.

33 ACCESS TO WORK

33.1 The GCA and SUPERINTENDENT shall at all times have access to the work wherever it is in preparation or progress and the CONTRACTOR shall provide proper facilities for such access so that they may perform their functions under the Contract Documents. If the specifications, the GCA'S instructions, laws, ordinances or any public authority require any work to be specially tested or approved, the CONTRACTOR shall give timely notice of its readiness for observation or inspection. If the inspection is by an authority other than the GCA or SUPERINTENDENT, required certificates of inspection shall be secured by the CONTRACTOR. Observations by the GCA or SUPERINTENDENT shall be promptly made and, where practicable, at the source of supply. If any work should be covered up without approval or consent of the GCA or SUPERINTENDENT, it must be uncovered for examination at the CONTRACTOR'S expense, if ordered. Re-examination of questioned work may be ordered by the GCA or SUPERINTENDENT, and if so ordered, the work must be uncovered by the CONTRACTOR. If such work be found not in accordance with the Contract Documents, the CONTRACTOR shall pay such cost, unless it be found that the defect in the work was caused by a separate Contractor employed as provided in Section 7, and in that event, the OWNER shall pay such cost.

34 SUPERINTENDENCY / SUPERVISION

34.1 The CONTRACTOR shall give active supervision to the work, using his best skill and attention. He shall carefully study and compare all drawings, specifications and other instructions and shall at once report to the SUPERINTENDENT and GCA an error, inconsistency or omission which he may discover, but he shall not be liable to the OWNER for any damage resulting from any errors or deficiencies in the Contract Documents or other instructions by the SUPERINTENDENT or GCA. The GCA shall not be responsible for the acts or omissions of the SUPERINTENDENT.

34.2 The CONTRACTOR must submit with his bid, the name and qualifications of his job superintendent. The job superintendent will be present at the job site during the entire progress of the work. Any communication through the job superintendent shall be binding as if given to the CONTRACTOR.

35 CHANGES IN THE WORK

35.1 The OWNER, without invalidating the Contract, may order extra work or make changes by altering, adding to, or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change. In giving instructions, the GCA shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purpose of the construction, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order from the OWNER signed or countersigned by the GCA or a written order from the GCA, stating that the OWNER has authorized the extra work or change, and no claim for an addition to the contract sum shall be valid unless so ordered. The value of any such extra work or change shall be determined in one or more of the following ways:

- By Estimate and acceptance in a lump sum.
- By Unit Prices named in the Contract or subsequently agreed upon.
- By Cost and Percentage or by cost and fixed fee.

36 CLAIMS FOR EXTRA COST

36.1 If the CONTRACTOR claims that any instruction by drawings or otherwise involve extra cost under this Contract, he shall give the GCA written notice thereof within a reasonable time after the receipt of such instructions and, in any event, before proceeding to execute the work except in emergency endangering life or property, and the procedure shall then be as provided for in CHANGES IN THE WORK, section 35 above. No such claim shall be valid unless so made.

37 DELAYS AND EXTENSION OF TIME

37.1 If the CONTRACTOR be delayed at any time in the progress of the work by any act or neglect of the OWNER or the GCA, or of any employees of either, or by any separate contractor employed by the OWNER, or by changes ordered in the work, or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any causes beyond the CONTRACTOR'S control or by delay justified by the GCA, then the time of completion shall be extended for such reasonable time as the GCA may decide.

37.2 No such extension shall be made for delay occurring more than seven days before claim therefore is made in writing to the GCA. In the case of a continuing cause of delay, only one claim is necessary. If no schedule or agreement stating the dates upon which drawings shall be furnished is made, then no claim for delay shall be allowed on account of failure to furnish drawings until two weeks after demand for such drawings and not then unless such claim be reasonable. This article does not exclude the recovery of damages for delay by either party under other provision in the Contract Documents.

38 CORRECTION OF WORK BEFORE FINAL PAYMENT

38.1 The CONTRACTOR shall promptly remove from the premises all work condemned by the SUPERINTENDENT or the GCA as failing to conform to the Contract, whether incorporated or not, and the CONTRACTOR shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the OWNER and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. If the CONTRACTOR does not remove such condemned work within a reasonable time, fixed by written notice, the OWNER may

remove it and may store the material at the expense of the CONTRACTOR. If the CONTRACTOR does not pay the expense of such removal within ten days' time thereafter, the OWNER may, upon ten days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the CONTRACTOR.

39 CORRECTION OF WORK AFTER FINAL PAYMENT

39.1 The CONTRACTOR shall remedy any defects due to faulty materials or workmanship and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final payment, or from the date of the OWNER'S substantial usage or occupancy of the Project, whichever is earlier, and in accordance with the terms of any special guarantees provided in the Contract. The OWNER shall give notice of observed defects with reasonable promptness. All questions arising under this Section shall be decided by the GCA, notwithstanding final payment.

40 DEDUCTIONS FOR UNCORRECTED WORK

40.1 If the GCA and OWNER deem it expedient not to correct work injured or done not in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore.

41 THE OWNER'S RIGHT TO DO WORK

41.1 If the CONTRACTOR should neglect to prosecute the work properly or fail to perform any provision of this Contract, the OWNER, after ten days' written notice to the CONTRACTOR may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the CONTRACTOR provided, however, that the GOLF COURSE ARCHITECT shall approve both such action and the amount charged to the CONTRACTOR.

42 OWNER'S RIGHT TO TERMINATE CONTRACT

42.1 If the CONTRACTOR should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed because of his insolvency, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen, proper materials, or equipment or if he should fail to make prompt payment to sub-contractors or for material or labor, or persistently disregard laws, ordinances or the instruction of the GCA or otherwise be guilty of a substantial violation of any provision of the Contract, then the OWNER, upon receipt of the certificate from the GCA that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, and after giving the CONTRACTOR and his surety, if any, ten days' written notice, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price shall exceed the expense of finishing the work including compensation for additional architectural, managerial and administrative services, such excess shall be paid to the CONTRACTOR. If such expense shall exceed such unpaid balance, the CONTRACTOR shall pay the difference to the OWNER. The expense incurred by the OWNER as herein provided, and the damage incurred through the CONTRACTOR'S default, shall be certified by the GCA.

43 THE CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

43.1 If the work be stopped under an order of any court, or other public authority, for a period of ninety days, through no act or fault of the CONTRACTOR or of anyone employed by him, then the

CONTRACTOR may, upon ten days' written notice to the OWNER and the GCA terminate this Contract and recover from the OWNER payment for all work executed and any proven loss sustained upon any plant or materials and reasonable profit and damages. Should the GCA fail to issue any Certificate for Payment, through no fault of the CONTRACTOR, within ten days after the CONTRACTOR'S formal request for payment or if the OWNER should fail to pay to the CONTRACTOR within fifteen days of its maturity and presentation, any sum certified by the GCA or awarded by arbitrators, then the CONTRACTOR may, upon ten days' written notice to the OWNER and the GCA stop the work or terminate this Contract as set out in the preceding paragraph.

44 APPLICATIONS FOR PAYMENT

- 44.1 At least five days before each payment falls due, the CONTRACTOR shall submit to the GCA an itemized application for payment, supported to the extent required by the GCA by receipts or other vouchers, showing payments for materials and labor, payments to sub-contractors and such other evidence of the CONTRACTOR'S right to payment as the GCA may direct.
- 44.2 If payments are made on valuation of work done, the CONTRACTOR shall, before the first applications, submit to the GCA a schedule of values of the various parts of the work, including quantities, aggregating the total sum of the Contract, divided so as to facilitate payments to sub-contractors in accordance with Section 13.3 made out in such form as the GCA and the CONTRACTOR may agree upon, and, if required, supported by such evidence as to its correctness as the GCA may direct. This schedule, when approved by the GCA shall be used as a basis for Recommendations for Payments, the CONTRACTOR shall submit a statement based upon this schedule.
- 44.3 If payments are made for materials not incorporated in the work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the CONTRACTOR of bills of sale, lien waivers, or such other procedure as will establish the OWNER'S title to such material or otherwise adequately protect the OWNER'S interest including applicable insurance. The Contractor shall still be responsible for the storage, protection and insurance of all materials for which payments have been made as part of partial payments but not yet incorporated in the project to the full value of replacement regardless of any deductibles.
- 44.4 Payment for Mobilization, when applicable as a separate lump sum item in the Bid Schedule, shall be paid to the Contractor in conformance with the Basis of Payment as described in Technical Section - Mobilization.

45 RECOMMENDATIONS FOR PAYMENT

- 45.1 If the CONTRACTOR has made application for payment as above, the GCA shall, not later than the date when each payment falls due, issue a Recommendation for Payment to the CONTRACTOR for such amount as he decides to be properly due, or state in writing his reasons for withholding a recommendation for payment.
- 45.2 No recommendation issued nor payment made to the CONTRACTOR, nor partial or entire use or occupancy of the work by the OWNER, shall be an acceptance of any work or materials not in accordance with this Contract. The making and acceptance of the final payment shall constitute a waiver of all claims by the OWNER, other than those arising from unsettled liens, from faulty work appearing after final payment or from failure to comply with drawings and specifications and terms of any special guarantees specified in the Contract and of all claims by the CONTRACTOR, except those previously made and still unsettled.

45.3 Should the OWNER fail to pay the sum named in any Recommendation for Payment issued by the GCA or in any award by arbitration, upon demand when due, the CONTRACTOR shall receive, in addition to the sum named in the Recommendation, interest thereon at the legal rate in force at the place of construction.

46 PAYMENTS WITHHELD

46.1 The GCA may withhold or, because of subsequently discovered evidence, nullify the whole or a part of any recommendation to such extent as may be necessary in his reasonable opinion to protect the OWNER from loss because of:

46.1.1 Defective Work not remedied.

46.1.2 Claims filed or reasonable evidence indicating probable filing of claims .

46.1.3 Failure of the CONTRACTOR to make payments properly to the SUB-CONTRACTORS or for material or labor.

46.1.4 A Reasonable Doubt that the Contract can be completed for the balance then unpaid.

46.1.5 Damage to another contractor.

46.2 When the above grounds are removed, payment shall be made for amounts withheld because of them.

46.3 Retained Percentage - In addition to any payments withheld pursuant to this paragraph 46, the OWNER shall retain 10% of the calculated value of any work completed, until 50% of the work required by the contract has been performed. Thereafter, the OWNER shall pay any of the remaining installments without retaining additional funds if, in the opinion of the OWNER, satisfactory progress is being made in the work. The withheld percentage of the contract price shall be retained until the Contract is completed satisfactorily and finally accepted by the OWNER. If the OWNER finds that satisfactory progress is being made in all phases of the contract, it may, upon written request by the CONTRACTOR, authorize payment from the withheld percentage. Before such payment is made, the OWNER shall determine that satisfactory and substantial reasons exist for the payment and shall require written approval from any surety furnishing bonds for the contract work. The CONTRACTOR shall made partial payments of the amount due to each of his SUB-CONTRACTORS in the same manner as the OWNER is required to pay the CONTRACTOR under this contract if the SUB-CONTRACTOR is satisfactorily performing under this contract with the CONTRACTOR.

47 LIEN RELEASES

47.1 Neither the final payment nor any part of the retained percentage shall become due until the CONTRACTOR shall deliver to the OWNER (1) a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed; but the CONTRACTOR may, if any SUB-CONTRACTOR refuses to furnish a release or receipt in full, furnish a bond satisfactory to the OWNER, to indemnify him against any lien, (2) consent of surety, if any, to final payment, (3) publication by the Owner of the institution to make final settlement with the Contractor and (4) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any lien remains unsatisfied after all payments are made, the CONTRACTOR shall refund to the OWNER all money

that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

48 USE OF THE SITE

48.1 The CONTRACTOR shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits, plans or directions of the GCA and shall not unreasonably encumber the site with his materials.

49 CUTTING, PATCHING

49.1 The CONTRACTOR shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by the Drawings and Specifications for the completed project, and he shall make good after them as the GCA may direct. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore. The CONTRACTOR shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other contractor save with the consent of the GCA.

50 CLEANING UP

50.1 The CONTRACTOR shall at all times keep the premises free from accumulation of waste materials or rubbish caused by his employees or work, and at the completion of the work he shall remove all his rubbish from and about the site and all his tools, equipment, and surplus materials and shall leave his work acceptable, unless more exactly specified. In case of dispute, the OWNER may remove the rubbish and charge the cost to the CONTRACTOR as the GCA shall determine to be just.

50.2 Before acceptance of the job by the OWNER, the site and premises shall be thoroughly clean to the satisfaction of the GCA and the OWNER.

51 DETERMINATION AND EXTENSION OF CONTRACT TIME

51.1 The time allowed for completion of all work required by the Contract will be stated in the Bid Form, Agreement/Construction Contract, and/or the Special Conditions and that time allotment shall be known as the Contract Time. For reasons of public interest, it is essential that the Project be prosecuted continuously and effectively, with the least possible delay, to the end that all work will be completed within the time period allowed.

52 DETERMINATION OF CONTRACT TIME

52.1 CALENDAR COMPLETION DATE CONTRACT

52.1.1 When the Contract Time is established by a definite Calendar Completion Date, extraordinary delays caused by inclement weather in excess of that which is normal for the locality and season of the year in which the work is being performed may be allowed as justification for granting a time extension, but only when it can be shown, within reasonable expectations, that the time lost could not be made up through acceleration of the remaining work. Failure to prosecute the work continuously and diligently for the full period of time allowed, and with sufficient forces and equipment to maintain satisfactory progress, may result in forfeiture of the CONTRACTOR'S right to time extension for abnormal weather conditions even though there may not have been any defense or remedy for later weather delays.

52.1.2 Unless specifically indicated in the Special Conditions that the Contract is to be completed on a definite number of Working Days, the completion date for the Contract shall be the Calendar Completion Date as stated in the Bid Form, Agreement/Construction Contract, and/or the Special Conditions.

52.2 WORKING DAY CONTRACT

52.2.1 When the Contract Time for completion is on a Working Day basis, delays caused by conditions beyond the control of the CONTRACTOR will have been taken into consideration in assessing working day charges to the extent that the effects on controlling operations were apparent at the time of prosecuting the work. Hence, the granting of additional time for completion will be limited to circumstances not recognized and accounted for in the working day statements.

52.2.2 Assessment of Working Day charges will start on the date specified in the Notice of Contract Award, and all work must be completed in accordance with the requirements of the Contract on or before the date on which the specified number of Working Days expire. Assessment of working day charges will be in accordance with the following provisions:

52.2.2.1 The GCA will furnish the CONTRACTOR a weekly statement showing the working day charges assessed against the Contract during the preceding week, along with the time remaining for completion of the Project. No statements will be issued during periods of authorized winter suspension.

52.2.2.2 One whole day will be assessed for each Working Day on which the controlling items can be effectively prosecuted during six (6) or more hours of the CONTRACTOR'S daily working schedule. A fractional day will be assessed for each Working Day on which the controlling operations can be effectively prosecuted for at least two (2) hours but not more than six (6) hours of the day.

52.2.2.3 Fractional working day charges may be made on those days when conditions beyond the control of the CONTRACTOR and unknown to him at the time of bidding make it impossible to prosecute the controlling items of work with full normal efficiency or with the full normal working forces, or when any one or more but not all of the controlling items can be effectively prosecuted.

52.2.2.4 No working day charges will be assessed on Saturdays, Sundays, and legal holidays of the State, even though work may be performed. No fractional charge will be made for days on which the work cannot be prosecuted for at least two (2) hours of the normal working schedule.

52.2.2.5 No working day charges will be made during the periods between the effective dates of Suspension and Resumption of Work orders issued by the GCA for reasons entirely beyond the control and without the fault of the CONTRACTOR.

52.2.2.6 Upon receipt of each weekly working day statement, the CONTRACTOR will be allowed five (5) days in which to file a written protest if he considers an improper assessment was made. Unless a timely written protest is filed with the GCA, the statement shall be conclusively considered as having been accepted by the CONTRACTOR as correct.

52.2.2.7 Should the CONTRACTOR file a timely protest concerning working day charges on any statement, and if the GCA does not agree with the CONTRACTOR'S contentions by issuing an amended statement that is agreed to, the statement in question will be referred to the OWNER for disposition.

52.3 Should an extension of the Contract Time be granted as provided for in Section 53, the extended time for completion shall than be in full force and affect the same as though it were originally allowed.

53 EXTENSION OF CONTRACT TIME

53.1 If, for reasons beyond his control and without fault or negligence on his part, the CONTRACTOR finds it impossible to complete the Project within the Contract Time as awarded, an extension of time may be granted in accordance with the provisions hereof, provided the CONTRACTOR makes a written request for time extension before the Project has been completed and accepted. In his request, the CONTRACTOR shall set forth the reasons he believes will justify the granting of a time extension, based on the considerations described herein or on such other conditions as he considers to be relevant or accountable.

53.2 The Contract Time as awarded, may be extended as the GCA determines to be justified, for any of the following reasons, or for such other reasons as the OWNER may recognize as being entirely beyond the CONTRACTOR'S control:

53.2.1 Delays caused by failure of the OWNER to approve the Contract at least ten (10) Calendar Days in advance of the latest date specified for beginning construction operations;

53.2.2 Delays caused by an earthquake, flood, cloudburst, cyclone, tornado, or other cataclysmic phenomenon of a nature beyond the power of the CONTRACTOR to foresee and make preparations in defense against;

53.2.3 Delays caused by acts of the Government or a political subdivision or by acts of the public enemy including fires, epidemics, and strikes not caused by improper acts or omissions of the CONTRACTOR;

53.2.4 Delays caused by an action or nonaction of the OWNER, by noncompletion of work being done by other contractors, or by other unforeseeable interferences not the fault of the CONTRACTOR,

53.2.5 Extraordinary delays in delivery of materials, resulting from strikes, lockouts, freight embargoes, governmental acts, or sudden disaster, of a nature beyond the power of the CONTRACTOR or his material supplier to foresee and forestall;

53.2.6 Delays directly attributable to the performance of Extra Work or increased quantities of Work

53.3 The following circumstances or conditions **shall not** be considered valid reasons for the granting of time extensions:

53.3.1 Any plea by the CONTRACTOR that insufficient time was specified in the Contract;

53.3.2 Delays caused by conditions on the Project that could be foreseen or anticipated prior to bidding;

- 53.3.3 Delays caused by loss of efficiency in prosecuting work during cold weather, under the influence of traffic, or in the presence of other foreseeable interferences;
- 53.3.4 Delays caused by plant and equipment failure, when due to failure of the CONTRACTOR to provide and maintain the equipment in good mechanical condition or to provide for immediate emergency repairs;
- 53.3.5 Delays due to slow delivery of materials from the supplier or fabricator, when the material is available in warehouse stock or when delivery is delayed for reasons of priority, late ordering, financial considerations, or other causes within the power of the CONTRACTOR or his supplier to foresee and prevent;
- 53.3.6 Delays due to the CONTRACTOR'S failure to provide sufficient forces and equipment to maintain satisfactory progress and assure timely completion of the controlling items.

53.4 The foregoing provisions shall govern, not only in the granting of time extensions, but also as a means of defining the conditions which are considered beyond the control and without the fault of negligence of the CONTRACTOR in the assessment of working day charges by the GCA.

53.5 The granting of a time extension due to performance of Extra Work or increased quantities of work will be limited to a period of time which is proportional to the increased dollar volume of work, unless it can be shown that the added work was a controlling factor in the rate of progress or unless an extension of the Contract Time is otherwise allowed in the agreement authorizing the additional work, in which case the value of that work will be excluded from the considerations.

53.6 Any time extension which may otherwise have been granted in accordance with the foregoing provisions may not be granted if the CONTRACTOR fails to make written application therefore prior to completion and acceptance of the work.

54 FAILURE TO COMPLETE THE WORK ON TIME / LIQUIDATED DAMAGES

54.1 Time being an essential element of the Contract, it is hereby agreed that the OWNER will be entitled to damages for failure on the part of the CONTRACTOR to complete the work within the prescribed time. In view of the difficulty in making a precise determination of actual damages incurred, the CONTRACTOR will be assessed a daily charge in the amount stipulated, not as a penalty but as liquidated damages to compensate for the additional costs incurred as well as loss of revenues.

54.2 In any suit involving assessment or recovery of liquidated damages, the reasonableness of daily charges shall be presumed and the amount assessed will be in addition to every other remedy now or hereinafter enforceable at law, in equity, by statute, or under the Contract.

54.3 For each Calendar Day that any work remains uncompleted after expiration of the Contract Time as determined and extended in accordance with the provisions of Section 52, the CONTRACTOR will be assessed a daily charge in the amount shown in the Schedule of Deductions in the Special Conditions portion of the Specifications for the original amount of the Contract subject only to the waivers agreed to herein.

54.4 The OWNER may waive all or any portion of the liquidated damage assessments accruing during periods of authorized winter suspension, provided the CONTRACTOR has fulfilled his obligations under the provisions of the Contract Documents.

- 54.5 Permitting the CONTRACTOR to continue and finish the work or any part of it after the time fixed for its completion shall not in any way operate as a waiver on the part of the OWNER of any of his rights under the Contract. Neither by the act of taking over the work nor by annulment of the Contract shall the OWNER forfeit the right to recover liquidated damages from the CONTRACTOR or his Sureties.
- 54.6 The OWNER has the right to pay all costs for consultation, observation, inspection and staking, and all legal and administrative costs required beyond the completion date stated. The OWNER may deduct actual charges and reasonable administrative expenses from payments due to the CONTRACTOR before final payment is made to the CONTRACTOR.

55 TESTING

- 55.1 All tests (soils, compaction/density, concrete, topsoil, seed, etc.) required by these Specifications or Drawings or directed by the GCA shall be performed by a recognized, independent testing firm approved by the OWNER and GCA. Arrangements for testing shall be the responsibility of the Contractor.
- 55.2 Adequate notice shall be given by the CONTRACTOR to the testing company when sampling or testing is required and the CONTRACTOR shall cooperate fully in taking, storing and shipping all specimens.
- 55.3 Fees and charges by the testing firm shall be paid by the OWNER for passing tests, **unless stated otherwise in the Special Conditions.** All costs associated with any and all re-testing necessitated by the Contractor's operations or inability to obtain specified results on the first attempt shall be the responsibility of the Contractor for not only the first test but all subsequent tests.

The Contractor shall provide and pay for all testing required as part of the Construction Specifications for Root-zone mix (see technical specifications).

- 55.4 Reports shall be provided to the OWNER, the SUPERINTENDENT, the CONTRACTOR, and the GCA and all agencies required by law or these Specifications.

56 REVIEW OF WORK

- 56.1 Under the Contract Documents the CONTRACTOR has assumed the responsibility of furnishing all services, labor and materials for the entire work, in accordance with such documents. No provisions of any of the above paragraphs relating to supervision, inspection or observation of the work by the OWNER, SUPERINTENDENT, OWNER'S REPRESENTATIVE, GCA or Engineers employed by the GCA shall in any way affect said responsibility and undertaking of the CONTRACTOR; nor shall the failure of any of the foregoing to discover or to bring to the attention of the CONTRACTOR the existence of any work or materials not in accordance with said Contract Documents in any way affect such obligation of the CONTRACTOR or the rights and remedies of the OWNER as set forth in said Contract Documents.

57 NOTICE OF READINESS FOR FINAL REVIEW

- 57.1 When the CONTRACTOR is ready for a final review, he shall give notice to the GCA with a copy to the OWNER in the following words:

The work on the Contract for the (shown name of project as it appears on the Form of Contract), having been fully completed except as stipulated herein below, it is the request of the CONTRACTOR that final review be made promptly by the GCA. The following work is incomplete through no fault of the

CONTRACTOR: (list any work which the CONTRACTOR regards as exceptional under the Form of Contract).

57.2 No final review shall be made until such time as the GCA has received a letter in the exact form indicated above and a copy thereof has been received by the OWNER.

58 CERTIFICATES / RECOMMENDATIONS

58.1 The CONTRACTOR shall obtain certificates/recommendations of approval, acceptance and compliance from all authorities having jurisdiction over the Work and shall deliver these certificates/recommendations to the GCA. The Work shall not be deemed complete nor will final payment be made until such certificates/recommendations have been delivered.

59 FINAL CLEAN UP AND GRADING

59.1 It is the intent of these specifications that at the end of construction work all holes, ruts, settlements, washouts, rivulets, and depressions resulting from the work shall be filled and graded to match elevations of adjacent surfaces, and all areas disturbed by construction shall be restored to their original condition to the maximum extent practicable and as acceptable to the OWNER.

60 ENVIRONMENTAL CONTROLS

60.1 The CONTRACTOR shall be responsible for the implementation of the following Environmental Controls which shall be in compliance with all Federal, State and Local laws, rules and regulations.

60.2 DUST CONTROL - The CONTRACTOR shall be responsible for the abatement and control of dust produced as a result of this contract. All reasonable measures shall be taken by the CONTRACTOR, entirely at his own expense, to control dust. This shall include dust control efforts when deemed necessary by the OWNER on weekends, holidays, and other times during the contract period when fugitive dust may be a problem.

60.3 NOISE CONTROL - Construction machinery and vehicles shall be equipped with practical sound muffling devices and operated in a manner to cause the least noise consistent with efficient performance of the work.

60.4 POLLUTION CONTROL - Prevent the pollution by sanitary wastes, sediment, debris and other substances resulting from construction activities.

60.4.1 Prevent sediment, debris or other substances from entering water systems, sanitary sewers, storm drains and culverts.

60.4.2 Equipment maintenance and fueling.

60.4.2.1 Retain all spent oils, hydraulic fluids, and other petroleum fluids in containers for disposal off the site.

61 GUARANTEES

61.1 The guarantees required by the General Conditions are hereby supplemented by the following:

61.2 The CONTRACTOR shall deliver to the GCA, upon completion of all work under this Contract, and before final payment is made, his written guarantee made out to the OWNER, in a form satisfactory to the GCA, guaranteeing all the work, materials, appliances, equipment, etc., provided under the Contract

to be free from defective materials and/or faulty workmanship, and to be watertight and leakproof. In the guarantee, the CONTRACTOR shall agree to replace or re-execute, in a manner satisfactory to the GCA, without cost to the OWNER or the GCA, such work as may be found to be defective or faulty, and pay for all damages due to such replacement, or re-execution.

- 61.3 The CONTRACTOR'S overall guarantee shall cover a period of one (1) year from the date of final payment, or from the date of the Owner's substantial usage or occupancy of the Project, whichever is earlier, and in accordance with the terms of any special guarantees provided in the Contract.

62 OPERATING INSTRUCTIONS

- 62.1 Wiring diagrams, piping diagrams, installation instructions, parts lists and similar information shall be furnished for mechanical and electrical systems and all manufactured items and vendor's equipment. The CONTRACTOR shall be responsible for assembling this material and turning three (3) copies over to the OWNER at the completion of the Work.
- 62.2 The CONTRACTOR shall furnish the services of qualified supervisory personnel to start up the equipment which has been CONTRACTOR furnished and instruct the OWNER'S operating employees as to the procedures to be employed in starting up, operating, shutting down, lubricating, oiling, adjusting and maintaining all mechanical and electrical systems and items of equipment as covered more completely under "Irrigation" in these Specifications. OWNER-furnished equipment, if any, which is installed by the CONTRACTOR shall be started up by the OWNER. All necessary minor adjustments to this equipment shall be made by the OWNER. However, if the OWNER-furnished equipment has been improperly installed or has been damaged during installation, the CONTRACTOR shall be responsible for performing the necessary tasks in order to furnish the OWNER operable equipment.
- 62.3 The CONTRACTOR is cautioned that the operating instructions called for in the above two (2) paragraphs are a specific requirement and that Contract work will not be considered complete until the written and printed information is submitted in an acceptable form to the OWNER and until the OWNER'S operating employees have been properly instructed in the use and care of the systems and of the component parts of same.

END OF SECTION

SPECIAL CONDITIONS

1 PRECEDENCE

- 1.1 The order of precedence from high to low for the Contract Documents, in case of any discrepancy, is as follows: Bid Form, Special Conditions, Technical Sections, General Conditions.
- 1.2 Precedence from high to low for the Construction Drawings is as follows: Grading Plan, Landscape Plan.

2 DESCRIPTION OF WORK

- 2.1 The project consists of the items as shown and implied by the Contract Drawings and Specifications.
- 2.2 The Specifications for materials (unless revised on the drawings) and installation shall be in conformance with the Owners' Engineer, Public Works Department, or Standard Drawings and Specifications of a City, County or State.
- 2.3 The quantities identified in the "Bid Form" have been estimated from the Contract Drawings. The quantities given are for the general information of the bidder and represent the major items of the work to be done. The bidder is responsible for the verification of all quantities before he submits his lump sum bid.
- 2.4 The topographic and boundary data was provided Olssen Engineering.
- 2.5 The grading quantities were determined by plan area method in the office of Phelps Golf Design. These were based on one-foot contour intervals, and the earthwork quantities include a ten percent (10%) shrinkage factor. The Contractor may review these calculations if he desires **but it will be the responsibility of the Contractor to determine to his own satisfaction as to the quantities of work and submit a bid he feels is proper. No additional allowances will be made to the Contractor for extra earthwork he might claim unless approved changes are made during construction.**

3 SURVEYS

- 3.1 The Contractor shall be responsible for performance of all survey work necessary for completion of all work outlined herein. If there is any discrepancy between property control lines and levels as established on the drawings, the Contractor shall immediately notify the GCA and shall not proceed with any work affected until he has received direction from the GCA.
- 3.2 Any work done without being properly located may be ordered removed and replaced at the Contractor's expense.
- 3.3 It shall be the responsibility of the Contractor to preserve and protect all survey boundary and control stakes and replace, at the Contractor's expense, all damaged or destroyed stakes.

4 PROJECT COMPLETION AND LIQUIDATED DAMAGES

- 4.1 The project shall be commenced not later than ten (10) consecutive calendar days after the "Notice to Proceed" and shall be fully completed as set forth in the Instructions to Bidders.
- 4.2 The date for Substantial Completion shall be May 3, 2025.
- 4.3 The date for Final Completion shall be May 10, 2025.

4.4 For failure to complete the project on or before the date fixed for final completion, the Contractor shall pay to the Owner as liquidated damages and not as a penalty, an amount as specified in the Construction Contract, \$500 per day for each and every consecutive calendar day that the work is incomplete after the aforementioned dates for completion or any extended date thereof. Sundays and legal holidays shall be excluded in determining days in default.

5 MAINTENANCE OF PROJECT

5.1 The Contractor shall, for a period of one (1) year after the completion and acceptance of work, repair at his expense any leaks or other failures in the irrigation system and/or the equipment or any other deficiencies which occur to the golf course installation which are part of this contract only. During the first thirty (30) days of this period, the Contractor shall clean out any screens, valves, valve vaults, or valve boxes that have become plugged with dirt and debris. The retainer on the contract payments will be held by the Owner until the end of this thirty-day period. In the event that the Contractor shall fail to make such repairs and adjustments of other similar work, the Owner may do so and charge the Contractor the cost of the same.

6 PROTECTION OF ADJOINING PROPERTY

6.1 All roadways, driveways, fences, ditches, and adjoining properties shall be protected by the Contractor during the construction of the project. Such items as are disturbed by the Contractor shall be repaired or replaced at his expense in at least equal condition as to that found prior to the start of construction.

7 FEDERAL, STATE AND LOCAL LAWS

7.1 It shall be the responsibility of the Contractor to acquaint himself with all Federal, State and local laws governing the work to be completed and to conduct his obligation under this Contract in compliance with said laws.

8 APPROVAL BY THE GOLF COURSE ARCHITECT

8.1 Throughout these specifications, many handling and installation procedures, tools, equipment, and materials require approval by the GCA. Approval by the GCA shall in no way or manner cause the GCA to be held liable for any injuries suffered, equipment damaged, or improper installations. Approval by the GCA is used solely as a means of quality control.

9 LIENS OR CLAIMS

9.1 If, at any time, there shall be evidence of any lien or claim for which the Owner might become liable and which is chargeable to the Contractor, the Owner shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient for complete indemnification against such lien or claim. In the event the Owner has already paid to the Contractor all sums due under this Contract or the balance remaining unpaid is insufficient to protect the Owner, the contractor and his surety shall be liable to the Owner for any loss so sustained.

10 LAND FOR CONSTRUCTION PURPOSES

10.1 The work to be completed is located on land, the title to which belongs to the Owner or the local municipality. Any additional land desired by the Contractor for construction purposes shall be secured by him at his own expense. Nothing herein contained, and nothing marked on the drawings, shall be interpreted as giving the Contractor exclusive occupancy of the territory provided. The owner and its employees, for any purpose, may enter upon or occupy portions of it as directed by the GCA. Use of

the streets are subject to terms and conditions established or to be established by the appropriate governing authority.

11 PUBLIC SAFETY

- 11.1 Every precaution shall be taken by the Contractor to protect the public from personal injury or damage to property by furnishing and erecting all necessary barricades, warning or directional signs and signals in all areas where the work is being done, and on all detour routes. All barricades and obstructions shall be illuminated at night from sunset to sunrise. All such traffic control devices used shall conform to the Specifications prescribed in Part VI of the "Manual Uniform Traffic Control Devices for Streets and Highways" published by the U.S. Department of Transportation, Federal Highway Administration, 1971 or as amended. A copy of this manual may be available on a referral basis at the local City Traffic Engineer's Office. All openings into pipe, manholes, or vaults shall be bulkheaded securely to prevent unauthorized access when work is not in progress.

12 DUST ABATEMENT

- 12.1 During the performance of the work required by these specifications or of any operations appurtenant thereto, whether on right-of-way provided by the local municipality or elsewhere, the Contractor shall furnish all the labor, equipment, materials and means required, and shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance and to prevent dust which has originated from his operations from damaging dwellings or causing a nuisance to persons. The Contractor shall be liable for any damage resulting from dust originating from his operations under these Specifications.
- 12.2 The cost of sprinkling or of other methods of reducing the formation of dust shall be included in the price bid in the schedule for other items of work.
- 12.3 The Contractor will be able to use the golf course irrigation system for construction water, weather permitting.

13 OBSTRUCTING ROADWAY

- 13.1 No private drive, roadway or street shall be entirely closed to traffic by the Contractor without first obtaining the written consent of the Owner. When necessary, bridges shall be built across the trench or a detour made around it to facilitate travel. The Contractor shall remove and reset all street signs prior to any construction. Any damaged signs shall be replaced in kind or repaired by the Contractor.

14 RELOCATION AND PROTECTION OF UTILITIES

- 14.1 The Contractor, at his expense, shall protect and/or relocate all utility services, including adjacent water mains, gas mains, and telephone conduits that interfere with the work herein with the consent and to the satisfaction of the GCA and Owner thereof. The Contractor shall locate and expose all pipes or obstructions in advance of the excavation, and maintain in continuous service all sewers, drain ditches and irrigation pipe and ditches which he may encounter during the prosecution of the work, and shall in no case interfere with, divert or obstruct the flow in any such courses without first securing written permission from the Owner, and the Contractor shall furnish the GCA a copy of said permission.
- 14.2 The Contractor shall protect from injury and/or freezing, all pipes paralleling, crossing over or under the pipe, also all telephone conduits or any other underground service which may be exposed during the progress of the work. Should damage occur to any such underground service, the Contractor shall at once notify the GCA and the utilities organization owning such service, and shall render every

assistance possible to repair such damage and restore the service to a condition as good and permanent as before the excavation was made. Whenever such existing pipes or services become exposed in excavating, they shall be sustained securely in place until the work is completed and the earth shall then be filled in around them and tamped in the same manner specified for backfill with special precaution taken to prevent future settlement and damage to these pipes or services. Any and all costs of such repairs and maintenance, including all damage to persons or property arising therefrom, shall be entirely at the expenses of the Contractor.

- 14.3 The Contractor agrees to save harmless the Owner and the agents and employees thereof, against any and all liability, loss, damage, demands, actions or causes of action and expense of whatsoever nature, including court costs and attorney's fees, arising out of the damaging, changing or altering of any service irrespective of whether said claim, damage, action or cause of action arises upon the activities of the Contractor or is proximately caused thereby.

15 SUBSURFACE INVESTIGATIONS

- 15.1 Soils data for the project site, if available, is attached as part of the Construction Documents.
- 15.2 The Bidder may rely upon the accuracy of the technical data contained in the enclosed report but not upon the non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.
- 15.3 On request in advance, the Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a bid. The Bidder shall fill all holes, clean up and restore the site to its former conditions upon completion of such explorations.

16 CONTRACTOR'S RESPONSIBILITY

- 16.1 The Contractor shall be responsible for verifying all quantities and all dimensions on the drawings and schedules provided by the GCA and constituting this Contract. It shall be the responsibility of the Contractor to note such items prior to the formalization of this Contract through his signature, and to notify the GCA of any apparent discrepancy. Failure to provide such notice will not relieve the Contractor of his obligations hereunder to complete and protect the Contract price. The Contractor assumes full responsibility for the execution and completion of such work in the time provided, in a first class and workmanlike manner, and in accordance with the Contract Documents covered by the Contract and any and all supplemental plans and drawings and directions of the GCA.
- 16.2 The Contractor agrees to pay promptly for all materials, work, labor and services rendered in this project, including payments due subcontractor, that are incidental to the completion of this Contract. If the Owner receives indication or suspects that such payments are not being made, the Owner may withhold the amounts of such unpaid items until lien, waiver or other satisfactory evidence of payment is made.

17 INSURANCE

- 17.1 Contractor's Liability Insurance - The Contractor shall maintain such insurance as will protect him from claims under workmen's compensation laws, disability benefit laws or other employee benefit laws; from claims for damages because of injury, sickness, disease or death of any person other than his employees; and from claims for damage to property, including loss of use thereof - any or all of which may arise out of or result from the contractor's operations under the contract documents, whether such operations may be by himself or by any subcontractor or anyone directly or indirectly employed by any

of them or for whose acts any of them may be legally liable. Limits of coverage shall be as required by law, with the minimum being as follows:

17.1.1 Comprehensive general liability insurance shall be in the following amounts: \$1,000,000 for bodily injuries, including accidental death; each occurrence combined annual aggregate \$1,000,000; Property damage insurance shall be in amounts of \$1,000,000 each occurrence, combined annual aggregate \$1,000,000.

17.1.2 Excess or umbrella liability shall be maintained in the amount of \$2,000,000 for each aggregate occurrence.

17.1.3 The Comprehensive General Liability insurance will include as Additional Named Insureds: the Owner, the Golf Course Architect and his consultants, and each of their officers, agents and employees.

17.2 Automobile Insurance - The Contractor shall take out and maintain during the life of this contract, comprehensive automobile liability insurance \$500,000 each occurrence; bodily injury \$1,000,000 each occurrence; property damage \$500,000 each occurrence, combined single limit \$1,000,000. If any motor vehicles are engaged in operations within the terms of this contract on the site of the work to be performed thereunder, covering the use of all such motor vehicles, unless such coverage is included in the insurance specified above.

17.3 Additional Insurance - Included in such insurance will be contractual coverage sufficiently broad to insure that provisions of these Contract Documents titled "indemnity", as follows:

17.3.1 Indemnity: The Contractor and his surety shall indemnify and save harmless the Owner and the Golf Course Architect and all their officers, agents and employees from all suits, actions, claims, demands, payments, recoveries and judgments of every nature and description brought or recovered against said Contractor or Owner or GCA by reason of any injuries or damages received or sustained by any person(s) or property(ies) by or from the said Contractor or his employees, or in consequence of any neglect in protecting the work, or through the use of unacceptable materials used during the construction or in the work, or on account of any act or omission, neglect or misconduct of said Contractor, or by reason of any infringement of a patent, trademark or copyright, or because of a violation of any law, ordinance, order or decree.

17.3.2 The Owner may retain so much of the money due the Contractor under his Contract, as shall be considered necessary by said Owner or in case no money is due, his surety shall be held until suits, actions, claims, demands, payments, recoveries or judgments as aforesaid shall have been settled and satisfactory evidence to that effect furnished to the Owner.

17.4 Workmen's Compensation Insurance - The Contractor shall take out and maintain during the life of the contract, Workmen's Compensation coverage in the following amounts: State - as required by State statutes; applicable Federal (i.e., Longshoremen's, etc.) - statutory required amount; Employer's liability - \$1,000,000.

17.5 Owner's Liability Insurance - The Owner shall be responsible for maintaining his own liability insurance and, at his option, may maintain such insurance as will protect him against claims which may arise from operations under the contract documents.

18 STORAGE YARDS

- 18.1 The Contractor shall secure and maintain proper storage areas for equipment and materials in locations he may deem necessary for the proper execution of the job. The land owned by the Owner may be used as site headquarters, storage yard, or base of operations provided that the use of said land meets with the requirements and restrictions imposed by the Owner at the time of usage. All utilities such as temporary power, water, telephone, toilet facilities, etc. shall be provided by the Contractor at his own expense.
- 18.2 No storage yard or project headquarters site may be utilized in conflict with objections from the adjacent property owner unless the Contractor shall obtain from the Owner specific written permission for such objectionable use.
- 18.3 No objectionable material will be allowed to blow from, wash off or drain off of any storage yards on to adjacent property. The Contractor shall maintain all storage yards in as neat and orderly a manner as possible, allowing no accumulation of waste materials or disposal piles.
- 18.4 Upon completion of the project, completion of a particular phase of the project, or termination of the use of any particular area, site, storage yard, right-of-way or easement, the Contractor shall promptly and neatly clean up the area and re-establish the ground to the contours required by the project or conditions "as before".

19 PERMITS AND LICENSES

- 19.1 The Contractor shall be responsible for obtaining all permits required for the execution of this project. At this time, the anticipated permits include a grading and erosion control permit. The Contractor will be required to fulfill the requirements of such permits throughout the duration of the project.
- 19.2 The Contractor shall be responsible for obtaining all licenses required to complete work in the local jurisdiction.

20 RIGHT-OF-WAY, LAND OWNERSHIP AND ADDITIONAL ACCESS TO WORK

- 20.1 The Owner has provided the right-of-way, easement or project site for all permanent construction for the project. Any additional access, access right-of-way, construction areas, or additional needed land which may be involved in the construction of this project shall be the responsibility of the Contractor.

END OF SECTION

TECHNICAL SECTION – MOBILIZATION

1 DESCRIPTION

- 1.1 This work shall consist of the mobilization of personnel, equipment and supplies at the project site in preparation for work on the project. This item shall also include the establishment of the Contractor's offices, buildings and other necessary facilities, and all other costs incurred or labor and operations which must be performed prior to beginning the other items under the contract.

2 BASIS OF PAYMENT

- 2.1 Partial payments for mobilization will be made once each month as the work progresses. These partial payments will be made as follows:
 - 2.1.1 When 5% of the original contract amount is earned, 25% of the amount bid for this item will be paid.
 - 2.1.2 When 10% of the original contract amount is earned, 50% of the amount bid for this item, less all previous payments, will be paid.
 - 2.1.3 When 25% of the original contract amount is earned, 60% of the amount bid for this item, less all previous payments, will be paid.
 - 2.1.4 When 75% of the original contract amount is earned, the amount bid for this item, less all previous payments, will be paid.
- 2.2 For the purpose of this Specification the term "original contract amount" as used above shall mean the amount bid for the construction items on this contract not including the amount bid for mobilization. Payments for materials on hand, as described in General Conditions section 44.3, will not be included as a percent of original contract amount earned until said materials on hand have been incorporated into the work and accepted and paid for as contract items.
- 2.3 These payments shall be independent of partial payments as defined in General Conditions section 44.1 and 44.2.
- 2.4 Nothing herein shall be construed to limit or preclude partial payments for other items as provided for by the contract.

END OF SECTION

TECHNICAL SECTION – EARTHWORK

1 SCOPE OF WORK

- 1.1 The work under this Section of the Specifications consists of furnishing all labor, materials, and equipment to strip, excavate, place, compact, spread, mix, and finish grade according to the Drawings, Specifications and directions of the GOLF COURSE ARCHITECT (GCA) and SUPERINTENDENT.

2 SITE GRADING

- 2.1 The Contractor shall be required to do all grading necessary to complete all items of golf course construction as indicated on the Plans and included in the Specifications.
- 2.2 The Contractor will be required to strip all clean and useful soil in the upper 6 to 8" of the existing grade (so called "top-soil"), from all areas of fill and excavation on the golf course. The stripped "topsoil" shall be stockpiled adjacent to the stripped areas so that it does not interfere with the progress of the work. In no case shall "top-soil" be stockpiled on any native grass rough area that is intended to be preserved. There are certain areas that require better quality surface material, particularly tee surfaces and green slopes. The GCA may require the Contractor to place "topsoil" in these areas from satisfactory sources. The Contractor shall schedule the earthwork so as to place "topsoil" over the course in areas where "topsoil" may not be present or where it is not stripped in a one step method. Where "topsoil" is required, it shall be spread and graded over such areas to a minimum depth of six (6) inches. Should conditions require other procedures, the GCA will adjust the procedure accordingly. These provisions apply to all areas of the golf course, including tees, greens, bunkers and mounds, swales, etc., and where reference is made to "topsoil" stripping and/or replacing elsewhere in these specifications, the methods set forth in this Paragraph shall be deemed applicable and shall take precedence.
- 2.3 The Contractor shall utilize rock-free "topsoil" for spreading over all disturbed areas. Surface rock shall be removed by Contractor as directed by the GCA.
- 2.4 Sub-cuts will be required in areas where suitable materials are found to greater depths until sufficient "topsoil" has been stockpiled for use on the site.
- 2.5 Quality of the materials will be determined by the GCA and Superintendent on the site as the work progresses. Silty or peaty soils which of themselves are not acceptable will be excavated and used as fill materials.
- 2.6 Earthwork quantities indicated on the drawings or in the Proposal Form are estimates only. The Contractor will be required to stockpile sufficient material to cover all disturbed areas to required topsoil depth. If the Contractor fails to stockpile sufficient "topsoil", or if "topsoil" has been buried or wasted, then the Contractor shall, at his own expense, provide the balance of the "topsoil" required to properly complete the project from designated borrow areas on the property. If none are available, the Contractor will have to provide "topsoil" from offsite sources.
- 2.7 Whenever it appears that loose topsoil materials caused by discing will cause excessive settlement during or after seeding operations, the loose topsoil shall be re-compacted before seeding takes place. Areas of topsoil which have been over-compacted shall be loosened and broken up to the satisfaction of the GCA.

- 2.8 Rocks, roots, and debris in the "topsoil" layer must be removed as they are worked up by each succeeding operation. Unless otherwise stated on the Drawings or these Specifications, the topsoil cover shall be considered to be six inches (6") in depth. Removal of rocks smaller than 1" nominal diameter will not be required. The actual volume of rock between 3/8" and 1" shall not exceed 10% in the finished "topsoil" surface. Rocks shall be disposed of as indicated on the Drawings or as directed by the GCA.
- 2.9 Fill shall be obtained from ponds and other areas requiring excavation on the golf course as indicated on the plans and/or as otherwise designated by the GCA. Fill material to be used in construction of greens, tees, and fairway bunkers shall be suitable so that it can easily be shaped to golf course features and will settle uniformly. Material containing peat, muck or extensive organic matter will not be allowed as fill in these specialized areas.
- 2.10 Where fill material is obtained from borrow areas, such areas shall be graded to provide complete surface drainage and to blend with the surrounding contours to the satisfaction of the GCA.
- 2.11 In the event that surplus material is developed from the borrow areas, such material shall be placed in the surrounding areas as directed by the GCA.
- 2.12 Fill for greens, tees, and fairway bunkers shall be placed at the location shown on plans, graded and shaped. All fill material used in these features shall be clean and free of organic matter so that it can be easily shaped and will settle uniformly.
- 2.13 In all grading, including all cuts and fills, it is necessary to keep the soil as clear of debris as possible. This is particularly true of the soil used in tee and green construction. **The GCA reserves the right to adjust any proposed grades of bunker, tee and green locations, and mounds, to meet field conditions or to enhance the character of the golf course.**
- 2.14 All slopes around tees, greens, bunkers and mounds shall not be greater than 3:1 unless otherwise shown or directed by the GCA. Cut and Fill slopes in fairways, roughs, and non-use areas shall not exceed 3:1 unless otherwise directed by the GCA. It is necessary to keep all slopes to a gentle grade so that construction will harmonize with the surrounding terrain. The man-made grades should taper into the natural grades and should be gentle and should blend with the existing grade in as natural a way as possible. Particular attention shall be given the cut and/or fill slopes in this regard.
- 2.15 The Contractor shall take all necessary precautions to prevent any damage to existing trees, foliage, plant materials and property of the Owner outside the area of work under this section. When any injuries to trees occur, all rough edges or scarred areas shall be first made reasonably smooth in accordance with generally accepted horticultural practice, and the scars then thoroughly covered with a fungicide (Benlate or Benomil or Captan). This operation shall be carried out immediately after damage occurs.

3 SUBGRADES

- 3.1 Subgrades indicated on the Drawings or required elsewhere in these Specifications shall be uniform and true to finish grade, shape, and slope.

4 PLAN GRADES

- 4.1 All grades are shown as finish grade unless specifically noted. Grades at points between spot elevations or contours are to be determined by uniform slopes between given grades or elevations or between such given figures and existing grades.

5 ROCK EXCAVATION

- 5.1 Rock excavation includes rock, concrete, or other solid debris which can be removed only by blasting, with impact tools, or by drilling, or individual pieces having a volume of more than five (5) cubic yards each. Unless otherwise provided, the removal of rock will be considered as extra work and will be compensated as such. Rock which can be removed with a 3/4 cubic yard capacity power shovel with bucket curling force and stick crowd force of 35,000 pounds each is not considered rock excavation.
- 5.2 If any disagreement occurs between Contractor and Owner's Representative, the Contractor shall retain a Professional Geotechnical Consultant at his expense, which is approved by the Owner's Representative to determine if the material in question is not able to be worked with standard earth moving equipment.
- 5.3 "Rock" shall be disposed of in accordance with the GCA's directions.
- 5.4 Quantities of "rock" shall be measured in the field. The Contractor shall not proceed with "Rock Excavation" without prior written change order from the Owner.

6 FINISH GRADING

- 6.1 Site grading for greens and tees shall be finished in a workmanlike manner true to grade and cross section within 0.1' of finish grade shown on the Plans. Areas of the fairway and disturbed roughs shall be finished to seed bed condition within 0.1' of finished grade shown on the Plans. All areas that have been compacted by trucks, heavy equipment, or other vehicles or by storage of materials shall be plowed, disked, and dragged to match the texture of remaining finish graded areas.

7 COMPACTION OF FILL

- 7.1 All embankments of more than two feet (2'-0") shall require mechanical compaction in lifts not exceeding one foot (1'-0") each. Slopes receiving fill material shall be suitably scarified in order to permit the new fill to affect a bond. Clay, heavy loams, or very fine sandy loam soils shall be allowed to dry sufficiently before placing in a fill area.
- 7.2 Compaction under paving, sewers, or water mains shall be accomplished in lifts not exceeding six inches (6") in depth (loose) except where fill materials are granular and vibrating equipment is used, the entire embankment may be placed in one-foot (1'-0") lifts (see Section 8, paragraph 8.1 & 8.2 below)
- 7.3 In the golf course area, compaction by normal earthmoving equipment is usually sufficient as long as lifts do not exceed the depths indicated above. Should the GCA determine that compaction is not proper, either the Specified or Ordinary compaction method shall be required as described below.
- 7.4 Embankments shall not be constructed during periods when the soil freezes while being placed and compacted, nor shall any embankment material be placed on soil that is frozen to a depth greater than four (4") inches. Frozen soil shall not be placed in embankments.

8 SPECIFIED COMPACTION METHOD

- 8.1 Embankments under pavement, sewers and water mains shall be compacted to a 95% maximum density at not less than plus or minus 2 percent of optimum moisture content, unless otherwise specified.
- 8.2 Maximum density shall be determined in accordance with the AASHTO Modified Method of Test for the Compaction and Density of Soil, Designation T-180, and optimum moisture content shall be that corresponding to the maximum density in the above test.

9 ORDINARY COMPACTION METHOD

- 9.1 Compaction shall be obtained with a tamping roller, with an approved type of vibratory compactor, or with approved hand-tamping methods.
- 9.2 The tamping roller shall be capable of providing at least 200 psi on each tamping foot.
- 9.3 Each layer of soil shall be compacted until there is no evidence of further consolidation.

10 DRAINAGE

- 10.1 If necessary, during the progress of the work to interrupt the natural surface drainage or flow of artificial drains, or irrigation ditches, the Contractor shall provide adequate temporary drainage facilities that will prevent erosion damage or unnecessary delay in the work and shall restore original drainage or construct proposed drainage structures as soon as conditions will permit. The Contractor shall provide and maintain adequate drainage away from any building area during the construction period.

10.2 Silt Fence/Hay Bales

- 10.2.1 As part of, or in addition to any erosion control measures required by project permits (NPDES, SWMP, etc.), silt fence shall be installed where suggested by the Contractor and approved by the GCA or Superintendent and as needed to control sedimentation runoff and to prevent clogging and pollution of native waterways or drainage channels. Material shall be as manufactured by Mirafi, Inc. or acceptable equal. Fabric width shall be three (3) feet, with pockets or with belt. Posts may be as supplied by manufacturer or an acceptable equal supplied by the Contractor. Installation shall conform to the manufacturer's recommendations.
- 10.2.2 Payment shall be on a unit price basis or lump sum in accordance with the amount indicated in the Bid Schedule.
- 10.2.3 Hay Bales shall be installed where suggested by the Contractor and approved by the GCA or Superintendent and as needed to control erosion in waterways or drainage channels. Bales shall be anchored with steel rods, stakes or other materials as approved by the GCA.
- 10.2.4 It will be the responsibility of the Contractor to maintain the erosion control measures used in temporary swales and at inlets to culverts and storm sewer piping. Such responsibility shall continue throughout construction and until a letter of substantial completion has been issued by the Golf Course Architect and/or Engineer. Any build-up of debris and silt around the silt fencing and in the temporary swales will be promptly removed by the contractor.
- 10.2.5 After the issuance of the letter of substantial completion by the Golf Course Architect and/or Engineer, the Owner will assume responsibility for the maintenance.

10.2.6 Payment shall be on a unit price basis or lump sum in accordance with the contract basis indicated in the Bid Schedule.

11 REMOVAL OF UNSTABLE SOILS

- 11.1 Where excavation to proper subgrade exposes unstable soil, the Contractor shall remove the unstable materials and replace with satisfactory materials as directed by the GCA.
- 11.2 Soil, sod, weeds, or other material encountered above the subgrade elevation which cannot be properly compacted may be designated as unstable material by the GCA.

12 PROSECUTION AND CLEANUP

- 12.1 The Contractor shall be aware of and comply with work priorities outlined in these Specifications and other adjustment in work schedule as may be required to properly coordinate the construction work with other contractors or the Owner's requirements.
- 12.2 The grading Contractor shall leave the site in an orderly condition free of all debris so that seeding and sodding operations may proceed immediately. All areas outside the Contract limits which have been disturbed shall be restored to the original condition at the expense of the Contractor and to the satisfaction of the GCA.

END OF SECTION

TECHNICAL SECTION – CAST-IN-PLACE CONCRETE

1 GENERAL

1.1 Description of Work

- 1.1.1 Work in this section shall consist of furnishing all labor, materials, supplies, equipment, tools, and all incidental operations necessary to perform the concrete work as shown on the drawings and specified herein, including, but not limited to, curbs, ramps and sidewalks

1.2 Codes and Standards

- 1.2.1 Concrete construction shall be in accordance with the Uniform Building Code, 1988 Edition and all revisions and amendments thereto.

- 1.2.2 The following referenced standards are to be a part of this specification.

American Concrete Institute (ACI) Current Edition

ACI 301 - Specifications for Structural Concrete for Building

ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete

ACI 306 - Cold Weather Placement

ACI 347 - Recommended Practice for Concrete Formwork

1.3 Testing

- 1.3.1 Arrangements for testing of component materials and mix design operations shall be the responsibility of the Contractor. Testing of the end product plus batch plant and field inspection will be performed by a testing laboratory selected and paid for by the Owner. The Owner shall pay for all passing tests. All costs associated with any and all re-testing necessitated by the Contractor's operations or inability to obtain specified results on the first attempt shall be the responsibility of the Contractor for not only the first (failed) test but all subsequent tests.

- 1.3.2 Sampling and testing during concrete placement may include the following:

Sampling - ASTM C172

Slump - ASTM C143

Air Content - ASTM C31

Compressive Strength - ASTM C 39

- 1.3.3 Reinforcing Steel - The Contractor shall furnish a certificate of compliance with the standard specifications from the manufacturer of all reinforcement used in the concrete.

1.4 Mix Design Proportions

- 1.4.1 Provide a water-cement ratio of six (6) gallons of water per sack of cement maximum, including the aggregate surface water.

- 1.4.2 Provide a cement-aggregate ratio of six (6) sacks of cement per one (1) cubic yard of aggregate minimum.

- 1.4.3 Slumps shall comply with ASTM C143
- 1.4.4 Concrete strength shall be a minimum of 3750 psi at 28 days for all curbs, ramps, drainage structures, paths and sidewalks.
- 1.4.5 Air content shall be five (5) to seven (7) percent.

2 PRODUCTS

2.1 Aggregates

- 2.1.1 Fine: ASTM C33
- 2.1.2 Course: ASTM C33
- 2.1.3 Local aggregates of proven durability may be used when acceptable to the City.

2.2 Portland Cement

- 2.2.1 Portland cement shall conform to ASTM C150, Type II.
- 2.2.2 Provide a single brand and type of cement from the same mill for all work.

2.3 Water

- 2.3.1 Mixing water shall be fresh, clean and potable.

2.4 Reinforcing

- 2.4.1 Bars: ASTM A-615, Grade 40 deformed billet-steel bars.
- 2.4.2 Concrete engineering reinforcing fibers: Fibers shall be polypropylene, collated, fibrillated fibers from **Fibermesh Co.** or approved equal.

2.5 Air-Entraining Admixtures

- 2.5.1 Air-entraining admixtures shall comply with ASTM C-260.
- 2.5.2 Accelerating type or retarding type chemical admixtures shall not be used.
- 2.5.3 Chemical admixtures shall be the product of one of the following manufacturers: Sika Chemical Corporation, Master Builders Company, Protex Industries or W.R. Grace and Company used in strict conformity with the manufacturer's instructions.

2.6 Curing Compound

- 2.6.1 Membrane Forming Curing Compound: ASTM C309, Type 1.

3 EXECUTION

3.1 Formwork

- 3.1.1 Formwork may be steel or wood complying with ACI 347

- 3.1.2 Construct formwork so the concrete members and structures are of the correct size, shape, alignment, elevation and position as required.
- 3.1.3 Set all forms and adequately anchor, tie, brace and shore.
- 3.1.4 Position, support and secure reinforcement against displacement. Support reinforcement with metal chairs, runners, bolsters, spacers and hangers as required. Set wire ties so ends are directed into concrete and not toward exposed concrete surfaces.

3.2 Batching and Mixing

- 3.2.1 Batch, mix and transport concrete in accordance with ASTM C-94.
- 3.2.2 Batch plants used for production of ready mix concrete shall comply with the standards set forth by Plant Manufacturers Bureau of National Ready Mix Concrete Association.
- 3.2.3 Add Fibermesh to the concrete at the plant or in the truck mixer at the job site at a rate of 1.5 lbs. per cubic yard of concrete.

3.3 Concrete Placement

- 3.3.1 Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms as required.
- 3.3.2 Place concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until work of other trades affecting concrete is completed.
- 3.3.3 Consolidate placed concrete using mechanical vibrating equipment, with hand-rodging and tamping, so concrete is worked around all reinforcement, other embedded items and into all parts of the formwork. Vibration equipment shall not be permitted to come in contact with a joint assembly, the grade or a side form.
- 3.3.4 Protect concrete from physical damage or reduced strength due to weather conditions or extremes during mixing, placement and curing. In cold weather, comply with ACI 306. In hot weather, comply with ACI 305.

3.4 Concrete Finishing

- 3.4.1 The surface shall be floated with a wooden or magnesium float and given a transverse coarse-broom finish.
- 3.4.2 Check and level surface plane to a tolerance not exceeding 1/4 inch in one foot.

3.5 Joints

- 3.5.1 Expansion joints shall be placed every 100 feet. Preformed joint filler shall be furnished in lengths equal to the pavement width. Damaged or repaired joint filler shall not be used. The expansion joint filler shall be held in a vertical position. When expansion joint details are not shown on the drawings, the Contractor shall form the joint in conformance with good construction practice and shall furnish all expansion joint materials.

3.5.2 Contraction joints shall be formed by a jointing tool or other approved means and shall extend into the concrete for at least 1/4 of the depth and 1/8 inch wide. Contraction joints shall be spaced at intervals equal to the width of the sidewalk.

3.6 Curing

3.6.1 Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep moist for not less than 72 hours. Continue curing by use of a moisture-retaining cover or membrane-forming curing compound.

3.6.2 Provide protections as required to prevent damage to concrete.

3.6.3 During paving operations when the air temperature reaches 35 degrees F and is falling, placement of concrete shall cease.

3.7 Basis of Payment

3.7.1 Quantities of concrete sidewalk shall be paid for on the basis of the number of lineal feet in place.

3.7.2 Concrete sidewalk shall be paid for at the contract price per lineal foot. Payment shall be full compensation for furnishing and placing of all concrete, embankment, excavation, reinforcing, formwork and other requirements of the work. No additional payments will be authorized for pavement which exceeds the specified width or thickness.

END OF SECTION

TECHNICAL SECTION – SEEDING AND SODDING

1 SCOPE OF WORK

- 1.1 The work under this Section of the Specifications consists of furnishing all labor, materials, and equipment required for seeding or sodding the areas shown on the Drawings in accordance with these Specifications.

2 MATERIALS

- 2.1 All materials shall conform to the following requirements:
- 2.2 Seed:
 - 2.2.1 Seed shall be purchased from an established, reputable seed dealer, tagged to comply with the requirements of the seed mixture shown on the Drawings and/or in these Specifications and shall be approved by the GOLF COURSE ARCHITECT before use. Seed shall be certified as to purity of variety by the State Certifying Agency in the state of origin, and shall be "certified sod quality plus" based on both the contaminants prohibited and on the amount of seed tested.
 - 2.2.2 When seed is tested, it shall be on the basis of a 25–gram sample and shall not contain any noxious weeds for the specific region of the golf course nor any grassy weeds.
 - 2.2.3 The Contractor, if required by the Owner, shall furnish seed and soil samples to the Golf Course Architect at such time as will permit tests to be completed before any seeding is to be done. Testing costs will be paid for by the Owner.
 - 2.2.4 Seed and fertilizer SHALL NOT be applied in the same operation.
- 2.3 Sod:
 - 2.3.1 Sod shall include a maximum of the top 1" of well-established cultured sod consisting in the major part of live Kentucky Bluegrass varieties representing as many kinds of seed as shown in the SEED VARIETY CHART found at the end of this section (Irrigated Fairway Mix), grown on loam soil, unless otherwise approved by the GCA. Sod shall be free from noxious weeds, relatively free from all other weeds, and free from roots, stones and other objectionable materials. Sod shall resist normal handling without undue breaking or tearing.
 - 2.3.2 Before the sod is cut, it shall be raked free of debris and the top growth shall be trimmed to a height of approximately one and one half (1 1/2) inches.
 - 2.3.3 When the sod is cut, it shall be sufficiently moist to withstand exposure and handling during the transplant operations. If necessary, the sod shall be watered before cutting.
- 2.4 Mulch, if used on fairways and/or other undisturbed areas, may be fibrous wood mat or wheat straw approved by the Golf Course Architect. Mulch for greens, when required in the Special Conditions, shall only be fibrous wood mat. Only fertilizer and mulch may be applied in the same operation.
- 2.5 Hydro-seeding will be permitted in lieu of the mechanical seeding described in this section (Technical Section - Seeding, Sodding and Fertilization).

- 2.6 Water shall be suitable for irrigation and free from ingredients harmful to plant life. Water shall be provided by the Owner.
- 2.7 Stakes for holding the sod on slopes shall be lath or shingles, 6" long and pointed. Where this length of stake does not provide firm bearing, a stake of sufficient length to secure firm bearing shall be used.

3 FINISH SHAPING/ROCK PICKING/SEED BED PREP. OF TEES, FAIRWAYS AND SLOPES

- 3.1 The Contractor shall understand that the finish grading phase of golf course construction involves the most artistic and creative portion of the work, and the Contractor shall coordinate, cooperate and work closely with the GCA and Superintendent to obtain the desired results.
- 3.2 The Contractor will take all necessary precautions to prevent damage to drainage pipe, irrigation pipe, wiring, sprinkler heads, controllers, and under ground valve boxes previously installed. All culverts or other pipes in the area of haul roads should be ramped with sufficient earth fill if necessary to prevent damage. Should any damage occur, it would be the Contractor's responsibility to repair the damage at his expense.
- 3.3 All grades and contours previously established in the rough grading operation will be maintained and enhanced. Any damage or disruption to these grades or contours will be re-established by the Contractor.
- 3.4 The finish grading operation shall begin after the irrigation and major drainage work is completed in a given area. The GCA and Superintendent will be notified prior to any finish work so that they may inspect all work to that point and aid the Contractor in scheduling the finish grading.
- 3.5 Any area which may have been compacted by vehicle movement or by storage of materials or equipment shall be ripped, plowed, disked, and dragged to bring the affected area to a friable condition. Ripping shall be performed to a depth of 18" or all the way through the compacted soil if it is shallower than 18". Ripping shall be performed in at least two different directions to ensure proper breaking up of the material and to eliminate water holding pockets in the subgrade.
- 3.6 The fairways shall be smoothed and floated by means of a tractor drawn board or pipe drag, steel mat, soil surgeon, or equal. All clods shall be thoroughly pulverized and all areas blended to existing grades. This shall insure that there are no spots which shall hold water and that the surface is such that a gang mower set at 1/2 inch in height will not scalp any area.
- 3.7 The practice tee shall be treated in the same manner as regular tees.
- 3.8 The practice fairway and adjacent rough shall be treated in the same manner as regular fairways and rough areas.
- 3.9 Target greens shall be treated in the same manner as the fairways.
 - 3.9.1 They should be shaped and located as indicated on the grading plans or as directed by the GCA.
 - 3.9.2 They should consist of approved topsoil to a depth of at least 3 inches.
- 3.10 The Contractor shall provide a six-inch (6") topsoil cover for the areas shown on the plans to be seeded and bring the entire site to grade.

- 3.11 If the topsoil cover has been disturbed or is less than an acceptable depth prior to the application of seed, the Contractor shall supplement the topsoil in deficient areas to bring it up to a minimum acceptable depth.
- 3.12 Topsoil shall be free from turf, weeds, rock larger than one (1) inch in diameter in the top four (4) inches, concrete, roots, lime, cement, ashes or other deleterious matter which shall be hauled to a designated area on site. Topsoil shall be natural, friable, fertile loam possessing characteristics of representative topsoil in the vicinity. The actual volume of rock between 3/8" and 1" shall not exceed 10% in finished surface of the topsoil.
- 3.13 All holes, depressions, and rivulets shall be filled in and brought to a smooth grade. All sticks, branches, stones, or debris on the surface which will interfere with seeding shall be picked up and removed from the site.
- 3.14 The area to be seeded shall be worked until the soil is completely fined, in a mellow condition at least two (2) inches deep, disked, brought to finish grade, and dragged smooth by means of a tractor drawn board or pipe drag, steel mat, soil surgeon, or equal. All clods shall be thoroughly pulverized and all areas blended to existing grades. This shall insure that there are no spots which shall hold water and that the surface is such that a gang mower set at 1/2 inch in height will not scalp any area..
- 3.15 Areas around irrigation heads, controllers, drainage lines and caps, restricted areas around bunkers and greens that cannot be mechanically prepared shall be manually raked and smoothed.
- 3.16 At the completion of the seedbed preparation operation and prior to any grassing the GCA and Superintendent shall be notified for inspection and approval.

4 WEED CONTROL

- 4.1 The Contractor shall be responsible for weed control **prior and during** seeding operations, whether the seeding is to be done in the Fall and/or Spring. Weed control may be a combination of proper mowing, fertilization, irrigation, turf cultivation, vertical cutting, insect and disease control practices.
- 4.2 If seeding of an already prepared seedbed is to be suspended or delayed for a period of time, it may be necessary to utilize one or more methods of weed control such as:

Tillage of the soil at four (4) to six (6) week intervals OR
Application of a selective chemical pre-plant, pre-emergence or post emergence herbicide.
Herbicides may be non-systemic or systemic.

- 4.3 The person applying any weed killing chemical shall be a licensed or an otherwise approved applicator and shall adhere to any local, state or federal agencies requirements. All chemicals used by the Contractor shall be applied in accordance with the directions on the manufacturer's label as registered under the Federal Insecticide, Fungicide and Rodenticide Act.

5 SEEDING - TEES, FAIRWAYS, NEAR ROUGH AND FAR ROUGH

- 5.1 The areas sprinkled by the irrigation system shall be seeded with Fairway, Tee or Near Rough mix. The areas that do not receive sprinkling from the irrigation system, but have been disturbed during construction, shall be seeded with the Native Mix.

- 5.2 Seeding shall be done by means of a culti-packer seeder (Brillion or equal). All seed shall be evenly distributed on a still day at the application rate noted in these specifications, crossing the ground two different directions, applying 1/2 of the total application in each pass.
- 5.3 The general seasons for seeding (dates are approximate and specific completion dates will be identified in the Special Conditions to conform to various growing seasons in different regions of the country) are as follows:
- | | |
|--------|--------------------------|
| Spring | April 1 - June 1 |
| Fall | August 15 - September 15 |
- 5.4 Extreme care shall be taken when broadcasting the fairway seed so that it does not overlap into unwanted areas such as the putting green surfaces. A drop type seeder shall be used immediately around the perimeter of the areas planted with bentgrass on the greens.
- 5.5 The Golf Course Architect shall be the final judge as to the condition of all seeded areas which must have his approval.
- 5.6 Hydro-seeding will be permitted in lieu of the mechanical seeding described above. Only fertilizer and mulch may be applied in the same operation.
- 5.7 Unirrigated disturbed rough or unirrigated native areas shall be machine seeded (Brillion) in two operations applying 1/2 of the seed required in each operation.
- 5.8 The rough areas to be planted or areas where existing turf is saved shall be planted by means of a drill seeder (large seed) or a culti-packer seeder (small seed). Care shall be taken not to disturb the natural grasses.
- 5.9 Maximum allowable weed seed shall not exceed one percent (1%) of bulk seed in any species.
- 5.10 Seed - The minimum percentage by weight of pure live seed in each lot of seed and the planting rates shall be as indicated in the SEED VARIETY CHART found at the end of this section.

6 MAINTENANCE OF THE SEEDED AREAS

- 6.1 Immediately after each specific area of the golf course has been seeded, the Contractor will water the seedbed areas sufficiently to seal the soil around the seeds. This initial watering is of extreme importance.
- 6.2 It shall be the Owner's responsibility to maintain the seeded areas of the phased operation by keeping the soil constantly moist for the remainder of the warranty period. **This watering shall be under the supervision of the Contractor as he is responsible for satisfactory germination of the grass.**
- 6.3 It shall be the Owner's responsibility to do any mowing during the establishment period.
- 6.4 If washouts and/or rivulets are caused by improper installation of materials, or due to equipment failure resulting from improper installation, or due to any other damage caused by the Contractor, the Contractor will be responsible for repair. Washouts and/or rivulets due to normal rainfall will be the Contractor's responsibility. If washouts and/or rivulets occur from the operation of the irrigation system due to improper use by the Superintendent during the remainder of the warranty period, they will be repaired by the Owner.

7 MULCHING

7.1 When required in the Proposal Schedule, mulching will be done as follows:

7.1.1 Wheat straw mulch shall be evenly and uniformly distributed to provide actual coverage of 50% to 75% of the ground surface when specifically directed by the Golf Course Architect. The straw mulch shall be crimped into the soil perpendicular to the finished grades by use of a Coulter disc or acceptable vertical disc implement. Severe slopes shall be covered heavily with straw and tacked down by a spray tackifier application in accordance with Colorado Department of Transportation specifications. All areas on which mulching has been disturbed before acceptance by the GCA or Superintendent shall be re-mulched.

7.1.2 Straw mulch shall be applied at the rate of two (2) tons per acre.

7.1.3 Wood fiber hydromulch will be applied after seeding and spread over the seeded areas of disturbance at a rate of 2000 lbs/AC. The mulch shall be as manufactured by Profile Products and marketed as "Flexterra HP-FGM," or approved equal.

8 SATISFACTORY GERMINATION / ESTABLISHMENT AND REPLACEMENT

8.1 Thirty (30) to thirty-five (35) days after all areas have been seeded, a check shall be made to see that all watered areas demonstrate adequate germination. Areas outside of the sprinkling area of the irrigation system shall not be expected to be consistent if sufficient rainfall has not occurred.

8.2 The Contractor will provide an establishment and replacement guarantee for all seeding of areas covered by the irrigation system. **The Contractor will accept responsibility for repair of washouts and rivulets caused by normal weather conditions and irrigation run-off (if the irrigation system was installed by the Contractor) and all areas not showing an acceptable stand of grass.**

8.3 Seeded areas which fail to show an adequate stand of grass within four (4) weeks shall be raked, refertilized, reseeded, **and mulched** at the Contractor's expense. Areas seeded in the Fall which fail to show an adequate stand shall be refertilized, and reseeded **and mulched** the following spring before June 1.

8.4 An adequate stand of grass (irrigated) shall be ten to fifteen seedlings per inch with no bare area larger than one foot square present.

8.5 Any sod which fails to become established after one (1) month from installation shall be replaced immediately at the Contractor's expense.

9 CLEAN UP

9.1 All soil, manure, or similar material brought into the project by work operations shall be removed promptly, keeping the area clean at all times. Upon completion of seeding and sodding, excess soil, stones, and debris not previously cleaned up, shall be disposed of as directed by the Golf Course Architect.

9.2 All areas disturbed as a result of seeding or sodding shall be restored to their original condition or to the desired new appearance as directed by the Golf Course Architect.

Seed Variety Chart follows on the next page

SEED VARIETY CHART

Minimum percentage by weight of pure live seed in each lot of seed and the planting rates shall be as follows:

<u>AREA</u>	<u>GRASS VARIETIES (ratios by weight)</u>	<u>RATE -</u>
Irrigated Fairways and Rough	<u>Kentucky Bluegrass</u> Jump Start (30%), Full Moon (25%), Desert Moon (25%)	130 LBS/ACRE
	<u>Perennial Ryegrass</u> Gray Hawk (20%)	
Pond banks (semi-irrigated)	40% Big Horn GT Hard Fescue 40% Soil Guard Hard Fescue 10% Enchantment Chewing Fescue 10% Xeric or Shademaster III Creeping Red Fescue	225 LBS/ACRE
Outer Rough (Un-irrigated Native Mix)	100% Buffalo Brand Short-Grass Mix	15 LBS/ACRE

* Minimum % pure live seed = % purity x % germination

END OF SECTION

TECHNICAL SECTION – PLANT MATERIALS & PLANTING

1 SCOPE OF WORK

- 1.1 The work consists of furnishing all materials, equipment and labor required for the planting, maintenance, guarantee, and replacement of plant materials designated in the Drawings.
- 1.2 The Contractor shall be held responsible for familiarity with the scope of the work of any other Contractor and for coordinating his work with them.

2 JOB CONDITIONS, PROVISIONS AND STANDARDS

- 2.1 All planting work shall be performed under the direct supervision of a superintendent using, for performance of the work, laborers thoroughly experienced with the work of this Section and who shall be at the project site for the duration of the work of this Section.
- 2.2 No planting work shall take place during inclement weather or when ground conditions are, in the opinion of the GCA or the PROJECT REPRESENTATIVE, not in a condition to be properly worked. No planting work shall take place when the ground is frozen. No planting work shall take place when the ground is excessively wet or soggy and the movement or equipment of personnel may cause damage to turf or to native grass areas.
- 2.3 The Contractor shall at all times exercise judgment in the conduct of the work and in the use of any equipment on the site to protect the fragile turf grass over the entire project. The Contractor shall be responsible to replace or repair to as good as or better condition as the surrounding area any damage of any kind caused by his work effort.
- 2.4 The Contractor shall erect barricades or fencing, and/or shall provide at his expense security watchmen or whatever else may be deemed necessary to totally protect the plant materials and his work throughout the time of the Contract.
- 2.5 Within thirty (30) days after the award of the Contract, the Contractor shall furnish the GCA with copies of the supplying nurseries' confirmation of the Contractor's orders for all plant materials required by the plans and specifications.

3 MATERIALS

- 3.1 All materials for this Section shall conform to the following requirements:
- 3.2 Planting soil shall be a prepared mixture of topsoil, commercial fertilizer and peat. Prepare planting soil by thoroughly mixing one part peat, five parts topsoil to which has been added two pounds of 10-6-4 commercial fertilizer per cubic yard of topsoil.
- 3.3 Mulch shall be wood chips, shredded evergreen cones, or wood bark.
 - 3.3.1 Wood chips shall be clean, deciduous tree trimmings cut mechanically into chips not to exceed two (2) inches in size or diameter - no poly.
 - 3.3.2 Peat Moss shall be a natural product of Reed Sedge Peat, taken from a fresh-water site, or natural mountain peat. Peat shall be ground and free from lumps, roots, stones, or other foreign matter, and of such physical condition that the peat shall have been conditioned in storage piles after excavation for at least six months, including one freezing and thawing period. Peat shall

not contain more than 30% moisture by weight, and not less than 80% pure organic matter by weight. Analysis to be made in accordance with current methods of the Association of Official Agriculture Chemists, and furnished to the GCA for approval prior to delivery of the peat.

3.3.3 Shredded evergreen cones shall be produced from spruce, Douglas fir, or concolor fir cones and shredded in a hammer-mill without screens.

3.3.4 Wood bark shall be of commercial quality, derived from douglas fir or ponderosa pine and shall be clean with chips not to exceed two (2) inches in size of diameter.

3.4 Fertilizer shall be either:

3.4.1 Commercial fertilizer for additional plant application shall be a slow release formula of 5-10-5; Nitrogen 5%, phosphoric acid 10%, potash 5%, and shall contain minor trace elements. The formula shall be in conformity with applicable state fertilizer laws. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the project site in the original unopened container each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged will not be accepted. Bulk fertilizer shall be accompanied with supplier's certificate of analysis.

3.4.2 A plant tablet as manufactured by Agri-Form or equal. A 21 gram tablet shall contain total nitrogen derived from urea 20% (7% water soluble, 13% nonsoluble), 10% phosphoric acid, 5% soluble potash and trace elements. Agri-Form may be the only fertilizer available in a tablet form.

3.5 Tree wrapping material shall be first quality 4 inch wide rolls of bituminous impregnated corrugated or crepe paper tape specifically manufactured for tree wrapping and have qualities to resist insect infestation. Material for taping tree wrap shall be flexible, self-adhering, plastic tape or lightly tarred sisal yarn.

3.6 Steel stakes shall be standard Tee or Y Section farm fence posts not less than 8' - 0" long, minimum weight of 10.4 pounds, and with an anchor plate having a minimum area of 21 square inches.

3.6.1 Guy stakes shall be 2' - 0" length cut sections of steel fence posts or approved equal.

3.6.2 Guy wire shall be a good commercial quality of galvanized wire. Wire used to guy trees up to four inch caliper shall be No. 12 gauge and wire used to guy trees four inch caliper and over shall be No. 9 gauge.

3.6.3 Hose collars shall be new two-ply fabric bearing garden hose not less than 1/2" inside diameter.

3.7 Water: Water shall be furnished by the OWNER for the execution of all work including maintenance under this Contract.

3.7.1 Insecticide spray shall be methoxychlor or similar insecticide.

3.7.2 Antitranspirant shall be Wilt-Pruf by Nursery Specialty Products, Inc. or acceptable equal.

4 PLANT MATERIAL STANDARDS

- 4.1 Names and Grades: Plant material shall conform to nomenclature of "Standardized Plant Names" as adopted by the Joint Committee of Horticulture Nomenclature, latest edition. Size and grading standards shall conform to the American Association of Nurserymen Inc., as published in "American Standard for Nursery Stock," latest edition. No substitutions of size or grade shall be permitted without written permission of the GCA. Each plant shall be properly identified by name and size and legible waterproof tags securely fastened to each plant.
- 4.2 Form: Plant materials shall be well-formed representing highest quality for each species or variety. Trees shall have single trunks unless otherwise specified. Crotches shall be sound and unsplit. No "forced" plants exhibiting other than natural form will be accepted.
- 4.3 Health: All plants, including their roots, shall be free from disease, insects, or other injurious qualities. All local, state, and federal laws pertaining to the inspection, sales, and shipment of plant materials shall be complied with. The trunk bark of all trees shall be sound. Trees shall have no large wounds and any small wounds shall have a satisfactory callus roll formed or forming over them. Plants shall show good annual growth. Buds shall be plump and well filled for the species. Evergreen foliage shall be of good intense color.
- 4.4 Quality: All plants shall be true to type. They shall have normal well-developed branch systems and a vigorous, fibrous root system. They shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sunscale injuries, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All Plants shall be nursery grown unless otherwise indicated on the Drawings or elsewhere in these Specifications. They shall have been growing in similar climatic conditions as the location of the project for at least two years prior to the date of this Contract unless otherwise approved.
- 4.5 Methods of Furnishing: Plants shall be furnished balled and burlapped (B&B) or in containers as required and shown on the drawings. The minimum size of balls for B&B plants shall conform with the dimensions set forth in the "American Standard for Nursery Stock" for the sizes of plants specified. All balls shall be of natural earth in which the plant has been growing. No manufactured or artificially produced or mudded-in balls shall be accepted. Balls shall be firm and unbroken. Balled and burlapped plants may be rejected due to their failure to meet good digging practices. Freshly dug or plants placed in cold storage will not be accepted.
- 4.6 Deliver to the Planting Site: The Contractor shall notify the GCA in advance, when the plant material is to be delivered. He shall furnish therewith an itemized list in quadruplicate of the actual quantity of plant material in each delivery, to insure coordination of delivery and required inspection at the point of delivery. Plant material shall be packaged, handled, shipped, and delivered in a manner and by such methods that plants will arrive at the site undamaged and in excellent health. Plants delivered shall be additionally cared for and protected from damage and deterioration until such time as they are accepted by the OWNER.
- 4.7 Inspection: The Contractor shall be responsible for all inspection and approval of plant material that may be required by state, federal, and other authorities, and he shall secure any permits and certificates that may be required. Any inspection certificates required by law shall be filed with the PROJECT REPRESENTATIVE.
 - 4.7.1 All Plants shall be subject to inspection and approval at place of growth before digging, upon delivery, and at the project site during progress of work: for quality, for size, condition of balls, roots, latent defects, or injuries.

4.7.2 The OWNER, the GCA, and the PROJECT REPRESENTATIVE reserve the right to reject at any time or place prior to acceptance any and all materials which in their opinion fail to meet specifications. Inspection of materials is primarily for quality, size, and variety, but other requirements are not waived-even though visual inspection results in approval. Plants may be inspected where available, but inspection at the places of supply shall not preclude the right of rejection at the site. Rejected materials shall be promptly removed from the site.

4.8 Substitutions: Plants, or cultivars, other than those named in the list of plants to be furnished will not be accepted unless specifically approved in writing.

4.9 Digging and Handling: All precautions customary in good trade practices shall be taken in preparing plants for transplanting, in accordance with the "American Standard for Nursery Stock." Workmanship that fails to meet the highest standards will be rejected.

5 DELIVERY AND TEMPORARY STORAGE

5.1 Plant material shall be planted no later than five (5) days from delivery. The Contractor shall protect the stock in a temporary nursery at the site when temporary storage or heeling-in is necessary. The Contractor shall provide and prepare a suitable heeling ground or heeling-in nursery prior to the shipment of the plant material from the growing nursery of other source.

5.2 Plant material unloaded and accepted by the PROJECT REPRESENTATIVE shall be immediately heeled-in or transported to the planting site and planted. Material left out of ground overnight or left with its rootball bare to the sun, or otherwise unprotected during transit, unloading, or storage shall be rejected by the PROJECT REPRESENTATIVE, if in his judgment, such lack of protection has caused damage to the roots of the plant or in any other way injured the plant material.

5.3 Plants shall not be bound with wire or rope to damage the bark or branches. Plants shall be lifted and handled from the bottom of the ball or container. Plants with balls cracked or broken before or during planting operations will be immediately rejected.

6 PLANTING

6.1 Layout: The ground layout for plantings shall be accomplished by the Contractor before any excavation is made. The locations for individual plants shall be staked with each stake having the specie name and plant size clearly printed with waterproof marker. All layout locations and configurations shall be approved by the PROJECT REPRESENTATIVE prior to planting operations. Where below ground or overhead obstructions are encountered, the trees shall be relocated by the PROJECT REPRESENTATIVE.

6.2 Planting pits for trees and shrubs shall be circular with vertical sides and flat bottoms and sized in accordance with outlines and dimensions shown in the drawings. The minimal acceptable width of a plant pit will be two times the diameter of the plant ball (2 x ball diameter).

6.3 The plant pit, centered on the location stake, shall be excavated in a cylindrical shape with vertical sides and flat or saucer-shaped bottom.

6.4 Mechanical diggers may be employed in the excavation of tree and shrub pits. When rotating auger-type diggers are used, the vertical sides of the pits (usually burnished to a hard smooth surface by the rotating blade or spade) shall be scarified, fractured or otherwise broken down to eliminate the

impervious wall. Mechanically dug pits shall comply with dimension requirements previously stated and as shown on the Drawings.

- 6.5 Plant pits for container grown stock shall be excavated below finish grade as required to handle the ball. The ball shall be placed on undisturbed soil.
- 6.6 Plant pits for all other plants shall be excavated below finish grade as required to accommodate the ball and bed (no less than 6" depth) of prepared backfill mix. Dispose of all excavated soil on-site at the direction of the PROJECT REPRESENTATIVE prior to bringing backfill or plant to excavated plant pit.
- 6.7 Setting of Trees: Before setting the trees, pits shall be backfilled with "planting soil" to a minimum depth of six inches (6") and thoroughly tamped. All plants shall be placed at such a level so that after settlement, the natural relationship between the original grade at which the plant grew and the present grade shall be 2" - 4". Trees shall be planted plumb. Planting soil shall be tamped under the around the base of each ball to fill all voids and shall be placed in 6 to 8 inch layers, each thoroughly tamped and puddled. Burlap shall be removed from the sides and top of balls to prevent exposure to the elements and adjusted to prevent air pockets. No burlap shall be pulled from under the balls. Ball wrapping material such as chicken wire, rope, etc., must be removed prior to placing and/or backfill.
 - 6.7.1 Deciduous plants and shrubs shall be set so that if settlement occurs, the ball will be 2" - 4" above the surrounding grade.
 - 6.7.2 All evergreen material shall be set 2" to 4" higher than ground level, with backfill sloped up to the trunk.
 - 6.7.3 With extra soil, form a small temporary dike just beyond the rim of the hole. Fill the dike with water and allow it to settle. **Do not tamp the backfill.** Check the moisture level weekly by digging down near the edge of the dike. Check moisture level weekly by digging down near the edge of the dike. Water as needed. In irrigated lawns, remove the dike after 6-8 weeks. In non-irrigated plantings, allow the dike to remain until the second growing season.
- 6.8 Stake or guy trees immediately after planting according to design detail:
 - 6.8.1 Deciduous trees --

For trees up to fifteen (15) feet tall - place two (2) steel fence posts (8'-0" in length) or two (2) 2'-0" metal stakes at 180° driven vertically into firm soil outside of the pit with the blade of the post on the tree side. Run a double strand of wire through hose around trunk and back to post or stake and twist taut.

For trees over fifteen (15) tall - place three (3) steel fence posts (8'-0" in length) or three (3) 2'-0" metal stakes at 120° around the tree driven into firm soil outside of the pit with the blade of the post on the tree side. Run a double strand of wire through hose around the trunk and back to the post or stake and twist taut.
 - 6.8.2 Evergreen trees -- place three (3) steel fence posts (8' - 0" in length) at 120° around tree driven vertically into firm soil outside of the pit with the blade of the post on the tree side and guy. Also stake and guy with 2' - 0" stakes at the same locations as the posts.

- 6.9 Spraying and Wrapping: All deciduous tree trunks shall be thoroughly sprayed with methoxychlor or similar insecticide and wrapped immediately after planting with wrapping material overlapping one and one-half inches (1 1/2") wound from ground line to the second branch and securely taped at five places including the top, middle and bottom. Antitranspirant shall be sprayed to thoroughly cover all plants.
- 6.10 Mulch: Plants shall be mulched immediately after planting. Mulch shall be spread evenly to a minimum depth of three (3) inches and shall cover the entire saucer area of individual plants and the entire surface of planting beds within the edged outline. Peat moss and other light-weight mulch materials shall be thoroughly moistened to prevent blowing.
- 6.11 Pruning: All trees shall be neatly pruned after planting in accordance with the best standard practices. The tree shall be pruned to preserve its natural form and character and in a manner appropriate to its particular requirements. In general, at least one-third of the deciduous trees shall be removed by thinning or shortening of branches but no leaders shall be cut. All pruning shall be done with clean, sharp tools. Scars must then be thoroughly covered with a fungicide (Benlate or Benomil or Captan). This operation shall be carried out immediately after damage occurs.
- 6.12 Fertilizer: Fertilizer shall be applied to each plant in the following total amounts:
- 6.12.1 Commercial Formula: Deciduous shade and flowering trees to six feet in height - two pounds; deciduous shade trees six feet to three inches caliper - four pounds; upright evergreens - over five feet in height - four pounds; spreading evergreens - two pounds; deciduous shrubs twelve inches to twenty-four inches in height - one pound; deciduous shrubs over twenty-four inches in height - one and one-half pounds; groundcover plants - one-half pound.
- 6.12.2 After the planting pits for trees and shrubs have been dug to the proper dimensions and depth, fertilizer tablets (number of tablets according to manufacturer's requirements) shall be deposited in the bottom of each pit. The location of the fertilizer tablet in the planting pit shall be such that the bottoms of B&B plants and container plants are established immediately above the location of the tablet.
- 6.13 Underground pipes - The Contractor shall be responsible for damage to any underground utility, irrigation line or other improvement. In the event a pipe or line obstructs a plant location, the Contractor will notify the PROJECT REPRESENTATIVE to receive a new plant location.
- 6.14 Clean-up: Materials brought onto the site shall be neatly stockpiled upon completion of each planting day. Debris will be removed daily and the project site kept in a clean and tidy condition at all times.

7 SHRUB PLANTING

- 7.1 Layout: Beds and pit locations shall be approved by the PROJECT REPRESENTATIVE in accordance with the plant list and tentative location shown on the Drawings. The general form of the planting bed shall be staked out and excavating performed within the stakes.
- 7.2 Planting pits: Planting pits shall have vertical sides. The diameter of the pits shall be one foot greater than the diameter of the ball of the shrub. The depth of the pit shall be enough to accommodate the ball or roots of the shrub when the shrub is set to finish grade, allowing for six inches of compacted planting soil below the roots of the plant.

- 7.3 Setting of shrubs: All materials shall be planted in the same relation to the finish grade as they had before transplanting. Balled and burlapped plants shall have planting soil tamped under the balls. All burlap, ropes, staves, etc., shall be taken off the sides and tops of balls and removed from the hole before backfilling, but no burlap shall be pulled out from under the balls. When the hole has been 2/3 backfilled with "planting soil," water shall be poured in filling the hole, and allowed to soak away so that all voids or air pockets under or around the roots are eliminated. After the water has soaked away, the hole shall be completely backfilled with "planting soil." After the backfill settles, additional soil shall be filled in, to the level of the finish grade. A shallow saucer of soil shall be formed around the edge of each hole to hold additional water.
- 7.4 Pruning: All shrubs shall be neatly pruned or thinned immediately after planting in accordance with best standard practices. Broken or badly bruised branches shall be removed with a clean cut. Each shrub shall be pruned to preserve its natural form or character and in a manner appropriate to its particular requirements. All pruning and thinning shall be done with sharp clean tools. All cuts over one-half inch (1/2") shall be painted with approved tree paint or left bare.
- 7.5 Mulch: Shall be applied to all shrub beds and pits to a depth of three (3) inches unless otherwise specified.

8 MAINTENANCE

- 8.1 General: Maintenance shall begin when a plant is planted and shall continue until the work is accepted by the OWNER. Maintenance shall include any and all operations necessary to keep and promote the health and vigorous growth of all plants including watering, weeding, cultivating, mulching, tightening and repairing of guys, removal of dead branches, resetting plants to proper grade or upright position, and any other necessary operation.
- 8.2 At completion of the work, the Contractor shall furnish three (3) copies of written maintenance instructions to the OWNER and one (1) copy to the GCA for proper maintenance and care of all planting throughout the year.
- 8.3 Minor vandalism or other damage to the plantings or related work shall be the responsibility of the Contractor until all work receives Final Acceptance by the OWNER. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractors shall be immediately brought to the attention of the PROJECT REPRESENTATIVE who will be the sole judge as to the extent of such damage. Major damage is typically any damage over \$500.00 worth of materials and/or labor required to repair the damage. For the Contractor to be awarded additional monies under the provisions of the "extra work" clause stated in these Documents, he shall have fully protected his work as specified herein. Any failure, however slight, of the Contractor to have provided this protection or security shall be grounds to nullify any request for additional remuneration.

9 INSPECTION AND ACCEPTANCE

- 9.1 Final inspection of all plant materials and planting work will be made by the OWNER, the GCA, and the PROJECT REPRESENTATIVE at the conclusion of the work effort upon written notice by the Contractor at least five days prior to the anticipated date. Plants must be in excellent and vigorous condition. Any plant in a questionable condition or excessively pruned plant which in the opinion of the GCA is no longer an excellent representative of the species shall be replaced prior to Final Acceptance.

- 9.2 After inspection, the Contractor will be notified in writing by the GCA if there are any deficiencies in the requirements for acceptance of the work.

10 PROTECTION OF TREES

- 10.1 Trees or plants to remain shall not be injured or defaced. Do not damage roots of trees to remain.
- 10.2 Repair of Damaged Trees - Contractor Responsibility
- 10.3 When any injuries to trees occur, all rough edges or scarred areas shall be first made reasonably smooth in accordance with generally accepted horticultural practice, and the scars then thoroughly covered with a fungicide (Benlate or Benomil or Captan). This operation shall be carried out immediately after damage occurs. Any such plants that are damaged by any construction operations to such an extent as to destroy their value for shade or landscape purposes, shall be cut out and disposed of by the Contractor, without compensation, when so directed by the GCA, regardless of whether or not such cutting and disposal shall be done as part of ordinary clearing operations. The Contractor shall be penalized \$1,000 for each tree so removed. The responsibility for the removal of trees by the Contractor shall end upon final acceptance of the golf course by the Owner, unless otherwise directed by the GCA.
- 10.4 Protection from Harmful Substances
- 10.5 No paint, oil, volatile materials, or any substance that might cause damage to trees shall be spilled or buried in the vicinity of trees. The Contractor shall not park and/or store equipment, or perform equipment maintenance, in an area next to trees. If the Contractor does so and trees are damaged or killed, the penalty indicated above will be imposed. If professional tree experts are desired, it will be at the Contractor's expense.

11 GUARANTEE AND REPLACEMENT

- 11.1 For a period of one (1) year from the date of Notice of Final Acceptance of all work and at no additional cost to the OWNER, the Contractor is to replace any trees or shrubs that are dead, or that are in the opinion of the GCA or PROJECT REPRESENTATIVE, in an unhealthy or unsightly condition, or that have lost their natural shape due to dead branches or excessive pruning of dead branches. Inadequate or improper maintenance by the OWNER shall not be cause for replacement of plant material by the Contractor.
- 11.2 At the end of the guarantee period, inspection will be made by the GCA upon written notice by the Contractor at least five (5) days before the anticipated date. Any tree required under this Contract that is dead or not in satisfactory condition as determined by the GCA shall be removed from the site and shall be replaced as soon as conditions permit during the normal planting season.
- 11.3 All replacements shall be trees of the same kind and size as originally specified in the plant list. Replacement costs shall be borne by the Contractor.
- 11.4 Replacement plantings required at the end of the guarantee period are not to be guaranteed. These trees are subject to inspection and rejection by the GCA before and after planting.
- 11.5 Any and all areas of turf or native rough damaged by tree or shrub planting or replacement operations are to be fully restored to original or better condition as directed by the GCA.

END OF SECTION